

Triangle Transit Authority Durham-Chapel Hill-Carrboro MPO Capital Area MPO North Carolina DOT Triangle J Council of Governments	<h1 style="margin: 0;">Transit Infrastructure Blueprint</h1> <p style="margin: 0;"><i>Analyzing land use, travel markets and costs</i></p>	August 22, 2006
Project Overview & Tasks		

Purpose. Provide the technical basis for a Regional Transit Blueprint for the Triangle that describes future transit corridors and planned or potential transit infrastructure investments in the corridors.

Desired Result. Citizens and decision-makers understand the character of current and projected development and travel in future transit corridors, how the corridors relate to one another, and important considerations for different types of transit investments in the corridors. The project is *not* designed to have substantial public engagement on investment priorities or to establish these priorities, although it will be closely coordinated with the public involvement efforts of the MPO Long Range Transportation Plan (LRTP) updates. The main focus of the project is to provide clear, consistent information for decision-makers to engage the public and set priorities through the LRTPs.

Why this is Important.

- There has been no comprehensive, consistent regionwide blueprint for major transit investments since the development of TTA’s 1995 Transit Plan. Major transit investment planning since then has focused on individual projects and grouping selected projects into a transit component when MPO Long Range Transportation Plans (LRTPs) are updated.
- This project-specific approach has resulted in cost and revenue assumptions and estimates for major transit investments in the fiscally constrained LRTPs that may no longer be realistic, since they rely on new federal funding to pay 50% and NCDOT to pay 25%, a new regional revenue source and out-dated costs for some projects.
- To secure federal funds, state funds and a new regional revenue source to support major transit investments will require a high level of cooperation among both MPOs, the NCDOT, the TTA and federal agencies. Absent such cooperation, individual MPOs and communities may need to fund major transit investments from their existing individual revenue streams.


Goals. The goals are designed to provide decision-makers and the public with information to understand transit corridors and investments and set realistic priorities among them:

1. show the location of transit corridors and type of major planned and proposed transit investments, including assumed alignment, technology, stations and service characteristics for analysis purposes;
2. clearly articulate the mobility and community development purposes that transit investments in each corridor could serve (purpose and need of transit investments in each corridor);
3. track the status of transit investments in the planning and funding process;
4. show how current and projected land use relates to transit infrastructure investments in corridors;
5. provide clear, transparent, consistent information related to the cost of investments, the components of these costs, and the assumptions used in developing the costs;
6. analyze travel markets in the transit corridors (trip types, origins and destinations, characteristics, etc.; facilities can be modeled if specific investment scenarios are developed);
7. document how travel results and infrastructure costs relate to eligibility for specific funding sources, particularly federal “new starts” or “small starts” funding, and what can be paid for with current revenue streams vs. what would require new or increased revenues.

Foundations. The Regional Transit Blueprint is built on two foundations:

- The area covered consists of the Metropolitan Area Boundaries of the two MPOs and the authorized service area of TTA (including the authorized 10-mile service area beyond its 3 member counties): all of Durham, Orange and Wake Counties and portions of Chatham, Franklin, Granville, Harnett and Johnston counties.
- The corridors and investments are drawn from previous and ongoing plans, studies and reports (e.g., the two MPO LRTPs, TTA's 1995 Regional Transit Plan, the transit component of CAMPO's CTP, the EastTrans study, the 15-501 transit corridor MIS, the I-40/NC54 corridor study, the TTA-RDU Airport link study, the CORE report, the US1 Corridor study, and local community comprehensive and transportation plans).

Framework. The transit blueprint is composed of two main elements:

1. *Transit Corridors:* consistently defined, comparable  corridors of defined width within which major transit infrastructure investments may be made.
2. *Transit Investments:* specific descriptions of alignments, technology, stations and service characteristics which permit analysis using modeling techniques; these may be either detailed and adopted, as in TTA's Phase I Regional Rail project, or conceptual, depending on the stage of investment planning. Project sponsors may choose to create an investment scenario in a corridor for the purposes of analysis.

Analyses. Project work is focused on three inter-related analyses:

1. A *land use analysis* that examines current and projected development in corridors.
2. A *travel market analysis* that examines travel based on the land use and transportation infrastructure.
3. A *cost analysis* that examines infrastructure costs and implications for funding sources based on the Federal Transit Administration's *New Starts* and *Small Starts* programs.

Tasks associated with each of these analyses are outlined on pages 4 through 8.

How the Products from the Analyses Can Be Used. The reports, supporting information and data, analysis tools, mapping and materials developed for this project can be used to create:

1. A 50-year transit vision
2. Scenarios for analysis in a Long Range Transportation Plan
3. Projects for inclusion in Long Range Transportation Plans and Comprehensive Transportation Plans
4. Transit alternatives for consideration in transportation corridor studies
5. Land use alternatives for planning efforts

Relation of the Transit Infrastructure Blueprint to Other Plans. The Transit Infrastructure Blueprint has been designed to provide valuable information for (and constitute initial steps of) preparation of two on-going transportation planning efforts: federally required Long Range Transportation Plans (LRTPs) and state-required Comprehensive Transportation Plans (CTPs). The Transit Blueprint can lower the eventual cost and/or improve the quality of the work undertaken in preparing LRTPs and CTPs:

- the corridor and infrastructure descriptions will provide a universe of potential transit projects for consideration in the LRTPs and CTPs;
- the corridor land use analysis will provide valuable information on land use and socioeconomic conditions and trends in transit corridors;
- the travel analysis will provide an early overview of travel patterns for consideration in developing LRTP and CTP alternatives;
- the cost analysis will provide consistent and transparent information for LRTP fiscal constraint considerations.

Products. The following products will be prepared during the project:

1. Project Overview
2. Regional Transit Investment Principles
3. Project Status Reports (quarterly: October, January, April, July)
4. Meeting Summaries (each meeting)
5. Partnership document describing roles and responsibilities among:
 - a. TTA Regional Planning and Engineering Department
 - b. Capital Area MPO staff
 - c. Durham-Chapel Hill-Carrboro MPO staff
 - d. Triangle J COG Planning Department
 - e. NCDOT Public Transportation Division
6. Corridor Description Summary Report
 - a. List and description of each corridor/transit infrastructure project
 - b. Parcel-level mapping of each corridor
7. Corridor Land Use and Development Report
8. Corridor Travel Market Analysis Report
9. Transit Infrastructure Cost Analysis Report
10. Regional Decision-making Report (optional)
11. Triangle Regional Transit Infrastructure Blueprint (Final Report)

Project Organization. The Blueprint is structured as a partnership among TTA, the two MPOs, NCDOT's Public Transportation Division and TJCOG. TTA transportation planning and modeling staff and TJCOG Planning and GIS staff will undertake the work; some funding may be available for outside assistance should it be needed for specific tasks. TTA staff will be responsible for conducting the *travel analysis* and *cost analysis* tasks; TJCOG staff will be responsible for conducting the *corridor description* and *land use analysis* tasks. TJCOG staff will be responsible for keeping track of overall project schedules and documentation, much as it does with other joint MPO/TTA work such as air quality conformity work.

A Partners Team of stakeholders provides input, reviews deliverables, and makes recommendations to existing decision-making organizations (MPO TACs, local governments, NCDOT Board, TTA Board). A Sponsors Team of local and regional agency staffs performs work and/or provides data.

<i>Timeline:</i> Summer 2006	Establish and convene sponsors and partners teams, agree on detailed task list, responsibilities, products, begin infrastructure and corridor descriptions; begin investment principles
Fall 2006	Finish corridor and infrastructure descriptions; finalize principles
Winter 2006	Begin land use, travel and cost analysis
Spring 2007	Finish land use, travel, cost analysis
Summer 2007	Conclude work, issue Blueprint, implement tracking mechanism

Cost. \$161,000 in direct funding plus \$75,000 allocation of TTA staff time.

Sponsors: MPOs: CAMPO (\$74,000) and DCHC MPO (\$37,000) pass-through federal funds
 NCDOT: \$25,000 (PTD) state funds.
 TTA: \$25,000 direct funding plus \$75,000 of dedicated staff time

Partners: MPOs, TTA, NCDOT, local governments, transit agencies, universities, TriMAP/RTA (and affiliated private sector groups), ITRE Triangle Model team, adjacent RPOs.

Task Categories and Products. This section summarizes the major tasks in eight project task categories, and the specific products to be developed. More detailed descriptions may be developed.

1. Project Coordination and Documentation (TJCOG coordinate)

- Continue to develop this guidance document to clearly spell out tasks and the roles and responsibilities of participating organizations.
- Establish a sponsors team and partners team – sponsors team consists of lead staff from the 5 sponsoring organizations (DCHC MPO, CAMPO, TTA, TJCOG, NCDOT PTD) who will be responsible for specific tasks or inputs; partners team includes additional staff from participating agencies, their member communities, and other key stakeholders.
- Arrange meetings of participants and develop meeting summaries
- Establish geographic extent of the project (area currently covered by 2 MPOs plus authorized TTA service area – 10 mile limit beyond Orange, Durham and Wake Counties)
- Document all activities and decisions
- Prepare project overview report and quarterly status reports.
- Coordinate with GIS/web staff/printers
- Meet with/give updates to partner and community boards and committees



2. Regional Transit Decision-Making & Investment Principles (TTA coordinate)

- Document how the work of this project relates to the development of the LRTPs and other concurrent transit-planning efforts; stress the primacy of the LRTPs as the established, federally-required mechanism to establish transit investment priorities. Demonstrate how the Joint MPO TAC group can work with other regional transportation leadership groups to move towards consensus on major transit infrastructure investments.
- Solicit input on transit corridor investment principles through the public involvement programs of the MPO LRTPs, including in the initial Goals and Objectives portions in 2006.

- Develop a set of draft transit corridor investment principles based on the knowledge and experience of technical staff and feedback from the LRTP update process.
 - Develop options/recommendations for a cooperative decision-making framework on regional transit investments among the MPOs, RPOs, TTA, NCDOT, and other regional partners based on technical staff knowledge and experience and prior work (e.g. CUTR organizational study). Stress LRTP primacy and use Joint MPO committee as lead group.
 - (Optional) technical staff recommendation for transit corridor investment priorities based on principles and analysis results.
3. Corridor and Infrastructure Descriptions (TJCOG coordinate)
- Work with sponsors and partners teams to define major transit corridors and infrastructure projects based on technological and service characteristics and phase based on different status of timing, funding, or planning stage.
 - Identify projects meeting the characteristics and define project phases.
 - Create and continually update master spreadsheet of major transit infrastructure, including (where known):
 - a. Location/alignment
 - b. Technology/type of service (e.g. commuter rail, regional rail, LRT, BRT, Enhanced Bus)
 - c. Planning Status (e.g. CTP, LRTP, TIP, Corridor Study, Sketch Plan, Concept)
 - d. Cost (see #6 below).
 - Map all corridors and major transit infrastructure at large format size and 11x17 size over most recent aerial photography, showing:
 - a. Corridor width
 - b. ROW (where known or assumed)
 - c. Station locations (where known or assumed)
 - d. Structures (where known or assumed).
 - Establish criteria for a “bus-oriented comparison” scenario to apply to corridors, if appropriate.
 - Summarize all transit services that don’t meet the criteria for major transit infrastructure, including local bus, express bus, feeder services, ADA services, community rural and human service agency transportation.
 - Prepare Regional Transit Corridor Description Report.
4. Corridor Land Use Analysis (TJCOG coordinate)

Products

- A. Short overview of transit corridor land use. Prepare in Microsoft Publisher with images and color, create pdf version and post to web site. Include:
- The overall growth and development picture for the region in the future
 - List of the land uses included in the 3 categories (30+ types) from the SE data project

- How the land uses were derived (refer to detailed document from SE data project)
 - The relationship between land use and transit (include reference to major published works)
 - Measures of land use/development activity that will be used (e.g. amount, density/intensity, diversity/mix, design characteristics)
 - How land use is considered in project analyses (e.g. New Starts, TRM)
- B. Visual guide to transit corridor land use describing the land use categories, with photos and short descriptions of each, and examples in the region, with at least one example of each in Wake, Durham and Orange Counties. Prepare in Microsoft Publisher with images and color, create pdf version and post to web site.
- C. Regional Transit Land Use and Development Analysis Report (principle document for this task) with comparative quantitative information about each corridor, including acreage by land use type, building square footage (non-residential) and dwelling units/group quarters beds (residential) and resultant population, households and jobs by type based on SE data forecasting project. Analysis for each corridor as a whole and specific defined areas (e.g. ¼ and ½ mile radius from stations (if denoted). Include benchmarks developed by project team (e.g. measures of intensity such as TTA station area guidelines, comparison to national standards or comparison to transit corridors in other regions [if readily available from New Starts database]) and qualitative assessment based on any qualitative transit investment principles developed in Task Category #2. Prepare information for up to 3 scenarios: SE forecast scenario plus 2 others defined by project team. Place corridor land use measures in regional terms (e.g. x% of regional jobs or population).
- Include detailed information on local or regional designations from adopted plans (transit corridor, Transit Oriented Development, etc.) and any specific development standards, infrastructure investments or fiscal policies that have been adopted to support these designations, including any quantitative data on project approvals/proposals that have occurred under these designations.
- Final version in Microsoft Publisher with images and color, create pdf version and post to web site.
- D. Powerpoint presentations of overview, visual guide, and analysis, also in native and pdf formats and posted to website.
- E. GIS data sets of parcel-based land use in ESRI shapefile format with attributes.
- F. DVDs or CDs with the documents, powerpoint presentations and GIS data sets.

Summary of tasks:

- Develop overview document summarizing growth and development and related travel characteristics in the region today and into the future, and how they relate to corridors
- Work with sponsors and partners teams to define parcels within the corridors of interest based on distance from infrastructure or other criteria.
- Map parcel level land use based on the land use prototypes to be used in the SE data forecasts and create visual depictions showing current examples of each land use type.

- Develop a lay-person's visual guide to the land use types.
- Based on local plans and TTA's station development guidelines and corridor market study, highlight areas already planned for transit-supportive development and additional areas that could be transit supportive based on clear criteria from documented sources or approved by the project team.
- Create up to 3 land use "scenarios" by apply documented decision-rules to selected parcels and/or development "templates" based on familiar developments within the region and potential future types of development from similar regions.
- Provide corridor-level summaries of development quantity, intensity, mix, etc.
- Prepare Regional Transit Land Use and Development Analysis Report.

5. Travel Market Analysis (TTA coordinate)

- Review TAZ consolidations to district areas for the purposes of transit analysis, and adjust where necessary.
- Develop brief overview document on the view of the region today:
 - a. Population and employment by TAZ or district using 2005 data
 - b. Show households by strata from model showing location of zero (0) car and low income households
 - c. Run model trip generation and distribution to map travel patterns by trip purpose and prepare desire line analysis by district
 - d. Map existing transit service in the region today, perhaps with thematic map of service intensity and map of walk access area (area with transit access)
 - e. After receiving on board survey data, prepare map of travel patterns on transit
- Develop brief overview document on the view of region in the future
 - a. Repeat analysis of population and employment from above (today) using 2035 projections
 - b. Map of zero (0) car and low income households and their destinations
 - c. Identify changes in existing markets and emerging markets
 - d. Develop a bus-oriented comparison alternative using adopted Long Range Transportation Plans and existing short range transit plans
 - e. Identify any future markets not well served by the comparison alternative
- Analysis of future transportation problems in each corridor (take existing MPO LRTPs/CTPs as start for this task)
 - a. Corridors with deficiencies in highway capacity (congestion)
 - b. Low income access to jobs and activities
 - c. Long future travel times on bus-oriented comparison alternative transit services
 - d. Identify magnitude of future transportation problems
- Develop evaluation measures for problems identified in previous step.
- Develop analysis tools for proposed transit improvements to address future transportation problems in the region. This will involve identifying the scope of improvements on a corridor by corridor basis that will address the problems identified previously. The improvements will be coded in the model and a forecast will be generated to compare to the bus-oriented comparison alternative forecast. The improvements will

be evaluated by their performance using the evaluation measures developed in the previous step. Describe/document how the analysis tools handle specific travel characteristics (e.g. stations and neighborhood amenities) and the assumptions about the characteristics used in the tools.

- Prepare Regional Transit Corridor Travel Market Analysis Report.

6. Cost Analysis (TTA coordinate)

- Develop prototype transit facilities (end-of-line commuter, medium transfer facility, large transfer facility, etc.) that would, for example, include the following capital cost infrastructure features:
 - a. Size of park and ride lot (amount of spaces for automobiles)
 - b. Transit facilities required: on-street only; on-street with transit pullover spaces; off-street transit facilities with transit lanes, separate egress/access facilities; passenger walkways; ADA requirements, etc.
 - c. Passenger amenities: signage and information, waiting areas and furniture, communication systems, platforms, curbing, etc.
 - d. Operator and maintenance facilities: restrooms, vending machines, etc.
 - e. Vehicles – varieties, type, technologies, etc.
 - f. ROW requirements: determine amount of land required, if any
- Develop unit costs for all the components for all types of infrastructure investments based on local and national experience, including line segments, structures, vehicles, station/stop facilities, etc. Use FTA-endorsed methods (e.g. Booz-Allen-Hamilton cost model)
- Utilize FTA Standard Cost Categories as a tool to develop costs of prototype transit facilities, as identified above. The SCC tool provides a means for current value, annualized value based upon useful life cycle SCC items.
- Develop and apply a methodology for ROW acquisition cost estimates based on available information in each infrastructure investment corridor
 - a. Using on-line assessor's records, identify parcels in areas of planned transit activities (for park and ride lot for example) and utilize the assessed valuation.
 - b. Add a value to assessed valuation to derive an estimate of current value. Inflate accordingly to year-of-expenditure/acquisition of property.
- Develop soft cost estimates and apply to SCC.
- Clearly document the reference sources, assumptions, and methodologies used in developing cost estimates, including the step-by-step application of methodologies for each infrastructure project and phase.
- Develop operating costs of transit services based upon estimates of annualized hours and miles, and development of hourly costs for type of service, using current dollars. Document method for converting to Year Of Expenditure (YOE) costs to enter into generic cash flow analysis for use during LRTP fiscal constraint process.
- Develop and document a methodology for stating capital costs in both constant dollar and inflated (year-of-expenditure) dollar terms.

- Develop and document a methodology for comparing pay-as-you go financing with bond/borrowing financing, for capital costs.
 - a. Develop abbreviated, generic present value calculations (discounted values) of capital costs to determine net difference between pay as you go and/or bond/borrowing financing methods.
 - Develop and document an abbreviated, generic cash flow analysis of sources and uses of capital funds and operating funds, and year of expenditures (inflated)
 - Prepare Regional Transit Corridor Cost Analysis Report. Report will include graphics, profiles, cross-sections, plans, photos, etc., as needed to describe prototype infrastructure and vehicles.
7. Corridor GIS mapping/Website (TJCOG coordinate)
- Undertake GIS mapping for tasks described previously.
 - create project web site and post all information.
 - explore options for creating a scenario builder on web site.
 - Develop and implement mechanism for tracking changes over time.
8. Final Report and Maps Printing (TJCOG coordinate)
- Prepare section discussing issues related to decision-making mechanisms/framework/process that would enable all of the organizations with authority (MPOs, TTA and NCDOT) to move forward together. (optional)
 - Prepare a section listing important implementation issues, such as:
 - Relation to railroad operations, if in rail corridor
 - Maintenance
 - Interim service/service phasing
 - Implications of using federal funding vs. state and local funding.
 - Prepare draft Blueprint and circulate for review and comment.
 - Prepare and format final report and maps, get quotes from printers, supply printed copies to partners, create pdfs of all documents and maps and post to website.