AUGUST 2013

Reimagining a Legacy Transit System

Lessons from Wilmington, Delaware

About the State Smart Transportation Initiative (SSTI)

Transportation is a basic social and economic need. Providing affordable choices to meet transportation needs is an acknowledged responsibility of government. However, mobility solutions conceived a generation ago might not be economically or environmentally sustainable today.

The mission of SSTI is to promote "smart transportation" practices that foster equitable economic development and environmental sustainability, while maintaining high standards of governmental efficiency and transparency.

SSTI operates in three ways:

1. As a community of practice, where participating agencies can learn together and share experiences as they implement innovative smart transportation policies.
2. As a source of direct technical assistance to these agencies on transformative and replicable smart transportation reform efforts.
3. As a resource to the wider transportation community, including local, state, and federal agencies, in its effort to reorient practice to changing social and financial demands.

SSTI is funded by the Rockefeller Foundation. For more information, visit www.ssti.us.

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SSTI's Review of Transit Service in Wilmington, Delaware

At the request of the Delaware Department of Transportation (DelDOT), SSTI provided an independent review of transit services in Wilmington, Delaware. SSTI reached out to a wide variety of agencies and stakeholders while gathering information on the transit system. Many people from across agencies and the community at large have generously shared information and knowledge essential for this study.

Contributing agencies include DelDOT, the Delaware Transit Corporation (DTC), City of Wilmington staff, and the Wilmington Area Planning Council (WILMAPCO). SSTI extends special thanks to Shailen Bhatt, Delaware Department of Transportation Secretary; Lauren Skiver, DTC Chief Executive Officer; Ken Potts, DTC Chief Administrative Officer; Catherine Smith, DTC Planning Manager; David Dooley, DTC Planning, and DelDOT land use planner Mike DuRoss. Tigist Zegeye and Dave Gula, both from WILMAPCO, and Dave Blankenship, Wilmington's Director of Transportation, also added valuable insight.

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Executive Summary

Reimagining a Legacy Transit System: Lessons from Wilmington, Delaware

Delaware Transit Corporation (DTC) is a wholly owned subsidiary of the Delaware Department of Transportation. DTC operates fixed-route bus, paratransit, commuter rail, and off-street parking facilities in downtown Wilmington. DTC's fixed-route bus system is called DART First State (DART).

Wilmington functions as the hub of the DART system in New Castle County, providing over 10 million passenger trips a year—including bus and demand response paratransit. Thirty-eight of DART's 60 routes serve Wilmington. Within the City of Wilmington, DART ridership continues to grow, resulting in bus congestion in the city's central business district (CBD), particularly around and adjacent to Rodney Square. This success illustrates DTC's role as an increasingly important part of the economic engine of the city. DTC contributes positively to the overall economic vibrancy of Wilmington through the movement of people, increased accessibility to the transportation system, improvements in air quality, and provision of access to jobs, medical care, and commercial centers.

Historically the majority of employers and employment clustered in and adjacent to this public square, and the system developed as a hub-and-spoke service, with the vast majority of transfers occurring in the downtown area. In 1993 DTC implemented a service change that centralized the majority of transfers on Rodney Square, which became the city's de facto transit hub. Centralizing bus service and transfers at Rodney Square proved convenient for bus riders. From an operations perspective the system drew increasing ridership.

The success of Wilmington's transit service has brought challenges. As DART added more service to respond to the increasing demand, the additional buses started stacking around the square—sometimes two or three buses deep along the King Street side of the square. The situation began to negatively impact traffic movement and presented a clear safety concern as bus riders scrambled to find their buses. Parallel developments around Rodney Square included the growth of the high-end condominium market as well as an increasing number of financial firms locating offices along or adjacent to the square. For these neighbors, the transit activity created challenges of congestion, cleanliness, and safety.

Much of the bus congestion results from the legacy of a hub-and-spoke transit system that assumes the majority of destinations are in the CBD and/or that riders with other destinations will transfer to other DART bus routes in the CBD. While the transfer system's focus on the CBD provides quality service for those needing to access downtown destinations, additional data is needed to determine how best to serve destinations outside of the CBD.

In this context, this study seeks to make recommendations for improving current system operations and to point out directions that can help position DART to function as an integral part of the city's and region's transportation system.

This study focuses on three broad goals essential for the short- and long-term success of transit in Wilmington:

- Maintain overall system health for the short-term.
- Grow ridership and improve overall rider experience for the short- and longer-term.
- Establish best practices (data collection, etc.) that become standard policy.

These goals can be achieved by implementing two types of changes. First is a consideration of programs and policies to improve the rider experience. Improvements may be as basic as installing digital screens to display real-time bus arrival information at major bus stops or developing a smartphone application so that riders can see when their bus is coming. These policies and programs typically can be implemented in the near-term over approximately one to two years. Second, the report discusses potential transit hub locations, and service and route modifications to strengthen service in both the CBD and suburban areas. These modifications go beyond the two-year time frame and will require an evaluation of infrastructure and operational alternatives that can be accomplished in the mid- to long-term. Within these parameters, this report identifies the following needs.

Figure 1: The City of Wilmington, Delaware

Short-Term Improvements

Implement programs and policies to improve DTC operations and service

In the short-term, some simple initiatives will empower DTC to make positive improvements to operations and public perceptions of the system. Essential short-term initiatives include:

Improve the quality of available data

Improved data will set the stage for DTC to engage in informed decision making. Improving data quality and data reliability is absolutely essential for DTC as it begins planning for significant improvements to the system. DTC currently lacks the detailed data required to make a final siting decision for any new transit facility. Existing data does not drill down to the bus stop level to facilitate a sophisticated analysis of passenger transfers and connections. Additional data that is necessary to make defensible decisions on facility locations include:

- Origin-destination studies.
- Boarding and alighting surveys.
- Data on commuter flows tied to transit ridership.
- Completion of modeling, using the Delaware Department of Transportation's (DelDOT) Land Use Transportation Scenario Analysis Modeling tool (LUTSAM) to more accurately model potential transit trips under different alternative scenarios. LUTSAM can provide essential data to identify potential transit hub locations and transit-oriented development locations.
- Random-sample interviews of non-transit riders to determine what might get them to try transit.

Create outreach and encouragement programs to increase ridership

DTC should work to establish a suite of programs that will encourage new ridership while retaining existing customers. A consideration of best practice policies and programs employed by successful bus systems will help DTC select initiatives most likely to succeed. While not all the strategies listed below will apply to the situation in Wilmington, these strategies offer examples of ways to encourage a robust rider base. Many of these programs and policies are practical to implement in the short-term.

- Attract new riders.
  - Partner with employers to develop an expanded Rideshare commute program that goes beyond existing ride match efforts to include employer-sponsored bus passes.[1]
  - Partner with employers to implement parking cash out programs. These programs, together with employer-sponsored bus pass programs, have a proven track record of reducing the number of employees driving alone.[2]
  - Implement bus pass programs for municipal employees.
  - Implement bus pass programs for students at local colleges and universities.
- Support existing ridership and attract new riders through enhanced use of technology.
  - Use existing GPS and Automatic Vehicle Locator (AVL) technology to make real-time bus arrival and departure information available to the public. Support development of smartphone technology integrated with GPS so riders have ready access to this information.
  - Install digital displays at major bus stops with bus arrival times so riders know how long it will be until their bus arrives.
  - Include data on bus route arrivals, detours, and delays with the DelDOT smartphone application and ensure that the data is on par with the roadway information included in that application.
- Maintain service in the CBD while reconfiguring the route structure on the periphery to capture suburban ridership.
- Create meaningful connections between rail and bus service, recognizing that many transit riders may begin their transit trip by train but complete that journey by bus.
- Improve headways and travel times to make bus service fast and convenient. Achieving this goal may require raising transit fares to generate needed revenue for increased service hours.
- Establish "express" bus routes to primary employment destinations. Use data on employment centers, and trip origins and destinations to confirm routes appropriate to serve suburban areas and employment centers. Employ land use modeling tools available through DelDOT for this analysis.

[1] Metro (Los Angeles County Metropolitan Transportation Authority), "Commute Services," March 20, 2010, www.metro.net/about/commute-services/

[2] U.S. Environmental Protection Agency, Office of Air and Radiation, "Parking Cash Out: Implementing Commuter Benefits as One of the Nation's Best Workplaces for Commuters," March 2005, www.bestworkplaces.org/pdf/ParkingCashout_07.pdf.

- Provide more bus stops and transfer points and make them appealing and convenient, including benches and bike racks to support multiple modes of arrival at the stop. Partner with local institutions to design new, attractive, eye-catching bus shelters, bicycle racks, benches, and other transit amenities.
- Construct transit priority lanes (diamond lanes) or other facilities to move buses through congested areas more efficiently.
- Implement Transit Signal Priority as a policy to give buses a little more time to get through a light, thus improving travel times.
- Construct bus turnouts with road reconstructions to facilitate bus service and reduce impact on other transportation modes.

DTC must make thoughtful changes in order to serve the population in the most effective manner based on data-driven policy decisions. In order to achieve this, DTC will need to strengthen partnerships with the city, the MPO (Wilmington Area Planning Council, WILMAPCO), and other agencies in the region that shape land use and gather relevant data. Through well-informed choices on route and service structures that take people to jobs and other destinations, Wilmington's transit system will become an integral part of the transportation choices for a large portion of the metro area's population.

Figure 2: Bus Rapid Transit Line in Los Angeles. Photo credit: Oran Viriyincy.

Longer-Term Improvements

Address the increasing demand for transit by improving the accessibility of the transit system

Address potential ridership: DTC should adopt an integrated approach that partners service in the CBD with a regional approach to transit services. This broad approach acknowledges changing land use patterns and is essential for the future success of the system. Significant bus service outside Wilmington's urban core already exists, but it does not offer convenient service that is competitive with auto travel times. Improvements needed to increase the viability of the regional transit system include:

- Reinstate bus-on-shoulder service on the interstate to improve travel times of express bus service into Wilmington.
- Create "Bus Only" lanes to improve travel times into and out of Wilmington. Dedicated transit lanes throughout New Castle County's congested road sections would help promote the viability of transit.
- Tighten transfer service in suburban areas to improve locations and wait times for regional transit alternatives and operations in Wilmington's urbanized and suburbanizing areas outside the CBD. This is essential for creating a robust and resilient service.
- Consider establishing suburban satellite hubs at locations with strong current ridership or high potential for future ridership.

Recommended changes require altering the current hub-and-spoke system to serve trip origins and destinations that both do and do not require a stop in the CBD. These changes, done well, will allow for more transit-oriented development centered on new employment and residential areas outside of the historic downtown.

In order to achieve desired outcomes, DTC will need to engage in planning activities to gather important information that will allow the agency to make sustainable long-term decisions for the transit service. This report recommends DTC do the following:

Engage in meaningful land use planning with DelDOT, Wilmington, New Castle County, and WILMAPCO. DTC must use its voice in these discussions to move transit-supportive land use policies forward. New developments in the city and county need to respond to increasing demand for transit, and agreement must be reached on policies that will support integration of robust transit service.

Identify and pursue preferred alternatives. Based on an analysis of previous studies, site visits, potential project phasing, funding potential, preliminary risk assessment, input from agency staff, and citizen input, this report explores three major alternatives for centralizing bus transfers. Within each of these alternatives, specific sites are considered. The alternatives include:

Potential north side hub locations (near Rodney Square)

- French and 9th Streets
- Shipley and 9th Streets

Potential south side hub locations (near Amtrak/Greyhound)

- Front and 2nd Streets
  (Christina Gateway–Walnut Street Sweep)
- Front at Walnut Street

Additional transit alternatives

Implement a blended alternative that pairs a transit hub adjacent to Amtrak and Greyhound with dedicated transit lanes that incorporate bicycle and pedestrian facilities. A transit corridor—possibly a linear transit "hub/corridor" (Orange/Walnut Streets)—will connect Rodney Square and the CBD to Amtrak in addition to offering opportunities to reach destinations beyond the CBD. A transit corridor offers multimodal benefits as well. The corridor should provide bicycle facilities in addition to improved transit. An initial analysis suggests there is existing excess roadway capacity that could support reallocating space for a transit corridor.

Changing demographics, work sites moving out of downtown, and new commute patterns suggest partnering a central transit hub and transit corridor with multiple, smaller transfer points to serve destinations outside of the CBD. Such an arrangement could better capture suburban commuters and suburban employment centers.

Consider improving suburban satellite hubs at locations with strong current ridership, for example, the Christiana Mall or the Prices Corners Park & Ride and other suburban locations where riders transfer between routes. New locations for suburban hubs where there is unmet rider demand, such as US 13 North and South and the US 202 corridor, should be investigated fully. Transfers outside the CBD could be centralized at existing transit Park & Ride lots on the periphery. These suburban transfer locations must be improved to provide an efficient and comfortable rider experience. These transfer locations should also incorporate goals of transit-oriented development and be designed to work with express bus service. Locations might include stops serving grocery stores or shopping centers.

This report recommends establishing a blend of a linear transit corridor with the construction of a transit hub adjacent to the Joseph Biden Amtrak and Greyhound Station. Locating a transit hub adjacent to intercity bus, SEPTA regional rail, and Amtrak Northeast Corridor rail services, partnered with a transit corridor that incorporates bicycle facilities, will truly capture available multimodal opportunities.

State-owned land is available at this location and, once cleared, could serve in the short-term as a street-level transfer center so that the construction of a multistory transit hub could be easily phased. DTC stands to gain the greatest benefit by continuing service to Rodney Square while providing streamlined service between the CBD and the multimodal services at the Amtrak and Greyhound stations. This is true regardless of whether DTC selects a brick-and-mortar downtown transit hub or a transit corridor for service in the CBD.

Figure 3: Example of street with mixed modes. Credit www.pbicimages.org_Laura Sandt

Ongoing Efforts

Regardless of the path chosen, the following efforts will help DTC develop the best possible projects and programs to support transit:

Draw on multiple funding options that bring in dollars from federal, state, and local agencies as well as private sources. Take full advantage of FTA funding available for planning, design, and construction of a new transit hub. Several of the sites under consideration are currently fully or partially publicly owned. The assessed value of the land could be applied toward the 20 percent match required to obtain a federal grant. Explore opportunities for joint development,[3] public-private partnerships, transit value capture strategies, or bonding programs. Raising transit fares or introducing a transit tax to generate funds for construction should also be considered for the project's financing package.

[3] U.S. Department of Transportation, "Federal Transit Administration Guidance on Joint Development," draft circular, accessed March 22, 2013, http://www.fta.dot.gov/documents/W(FINAL)_(2).pdf.

Craft a financing plan that is sensitive to the likely phasing of project construction. Any significant changes to the current route and transfer system will take time, as well as additional resources. Part of the evaluation of preferred alternatives for a transit hub should include a consideration of the potential of the site to support the phasing of the project. The current reality of limited funds for transit improvements will likely require some type of phasing plan. The plan will need to include phased construction that minimizes impacts on existing transit operations.

Engage in a collaborative process to aid in site analysis and final site selection. Final site selection should be done using a public process to draw on the knowledge and expertise of a variety of public interests.

Stakeholders to bring to the table include:

- WILMAPCO
- City of Wilmington
- Business development organizations
- Human services organizations
- Transit riders
- Property owners affected by possible transit operations
- DelDOT
- Mayor's Office and/or City Council transportation/streets/public works committees
- Economic Development Office for the City of Wilmington and/or DEDO State Economic Development Office

Limitations of this Study

The study focuses on capital improvements, policies, and practices to improve the transit system in Wilmington and support a strong ridership base into the future. A significant part of the study weighs the potential benefits of establishing a brick-and-mortar transit hub as well as other significant operational changes. Although the report makes recommendations on the feasibility of specific transit hub locations, policy recommendations that will strengthen ridership and the long-term health of the Wilmington bus service also receive significant attention in the report.

The report benefits from previous studies conducted for DTC that focused on the issue of transit congestion around Rodney Square. These studies evaluated a broad array of possible alternatives for addressing the challenge of bus congestion in Wilmington's CBD, but no consensus on a preferred alternative was reached.

This review of the DART system took place over eight months. Using professional expertise, earlier reports, stakeholder interviews, and expert knowledge from peer transportation systems, analysts at SSTI developed a focused list of policy actions as well as a group of preferred alternatives for locating a transit hub. Recommendations of this study provide abbreviated feasibility assessments but make no final recommendations for facility siting. Political considerations are not taken into account in the evaluation of potential sites. Sites are evaluated primarily on the consideration of future needs of the transit system and the ability to increase the appeal of bus transit to a wide range of current and potential riders. As part of the selection process it is critical that DTC enter into a public involvement process to gather ideas and feedback from the public and identified stakeholders.

The time available and the lack of detailed data constrained this analysis and the resulting recommendations. As DTC and DelDOT work through feasibility studies to select the alternative(s) to pursue, it is imperative that the agencies collect the necessary data and run the required scenario analyses that will allow for the most consistent and defensible decision making.

Figure 4: Link Connector Airport shuttle buses, Sound Transit.
Photo credit: Oran Viriyincy

Introduction and Background

The City of Wilmington, Delaware, is located in the middle of one of the busiest metropolitan areas of the United States—the Northeast Corridor (NEC). The NEC includes the major metropolitan areas of Washington DC, Baltimore, Philadelphia, and New York. As part of the NEC, Wilmington's Amtrak station is the 11th busiest train station in the United States. World-class transit service in Wilmington is essential to the success of the region as well as the City of Wilmington.

The Delaware Transit Corporation (DTC), a division of the Delaware Department of Transportation (DelDOT) owns and operates transit services (bus and commuter rail) statewide. DART First State (DART) is the branding name for DTC's transit services and includes fixed-route bus and commuter rail lines and parking lots. DelDOT, in May 2012, requested SSTI provide an independent review of and recommend changes to bus circulation and transfer locations under consideration in the City of Wilmington.

This report builds on a downtown circulation study and transportation analysis that began in 1997, when the city, DelDOT, Wilmington Initiatives, and the Wilmington Area Metropolitan Planning Council (WILMAPCO) commissioned the study. Initially the study in 2008 also identified significant transit needs. Picking up where the previous study left off, this report makes recommendations for improvements to the transit system that will provide benefits to the system, the riders, and the larger community.

It is important to note that, while this study considers alternatives for siting a brick-and-mortar transit hub in addition to other infrastructure alternatives, the discussion also focuses on needed changes from a policy level. The details of any alternative that DART adopts will need to be worked out as DART moves forward to implement the recommended changes.

The report is organized into eight main sections in addition to the introductory materials:

- Short-term policies and programs
- Long-term policies and programs
- Operations and capital alternatives
- Evaluation criteria and recommendations
- Alternatives rejected after evaluation
- Evaluated alternatives for potential hub locations
- Alternatives analysis
- Summary of available funding opportunities to assist in funding changes to Wilmington's transit operations/system

Purpose of Study

The study considers strategies and policies to improve the transit system in Wilmington and support a strong ridership base into the future. Political considerations are not taken into account in the evaluation of potential sites. Sites are evaluated primarily on the consideration of future needs of the transit system and the ability to increase the appeal of bus transit to a wide range of current and potential riders.

Approach/Methodology

SSTI reviewed the information, analysis, and conclusions from previous studies to evaluate potential changes to the route system as well as to analyze options for and make recommendations on constructing a transit hub to serve the bus system in Wilmington. Recommendations to DelDOT and DTC are based on best practices, professional opinion, coordination with major stakeholders at in-person meetings, and experience with Wilmington's transit system. As part of this effort, the following research was completed:

- Literature review, including the following documents:
  - "Wilmington Downtown Circulation Study—Transit Center Evaluation," March 2010 (TCE), prepared by Whitman, Requardt & Associates, BBP & Associates, and Mundle & Associates for the city, MPO (WILMAPCO), and DelDOT
  - "Downtown Wilmington Circulation Study Review" (draft), September 2011, prepared by Parsons Brinkerhoff
  - PowerPoint presentation on the conclusions of the TCE, October 2010, and "Safety and Traffic Review of Proposed Rodney Square to Shipley Street Bus Service Change," November 2011, prepared by Parsons Brinckerhoff and DelDOT
  - "Delaware Transit Corporation Business Plan" (draft), revised May 1, 2011
  - Route schedules and transfer information provided by DTC Scheduling and Planning staff
  - Analysis of commuter flows to and from the WILMAPCO Region, 1990–2000

- Online research on the following websites:
  - Dartfirststate
  - Delaware Transit Corporation
  - WILMAPCO
  - DelDOT
- On-site meetings with transit, state, MPO, and city staff
- Phone interviews with:
  - John Rago, former Deputy Chief of Staff, City of Wilmington
  - Kash Srinivasan, retired Director Department of Public Works, City of Wilmington
  - David Blankenship, Director of Transportation, City of Wilmington
  - Jerry Bilton, Community Services Building Facilities Manager, City of Wilmington
  - Leonard Sophrin, Director of Policy Initiatives, Mayor's Office, City of Wilmington
- Review of themes from public information meetings/hearings
- Review of routes and ridership information
- Review of transit best practices
- Consult with transit professionals from outside Delaware
  - Charlotte Area Transit System (NC)
  - Madison Metro (WI)
- Establish consistent evaluation criteria and application to evaluate identified alternatives

Identified Stakeholders and Stakeholder Interests

The following are known groups of stakeholders:

Agencies

- DelDOT; DTC
- WILMAPCO
- City of Wilmington
- New Castle County Government and Land Use Department
- Other transit providers—SEPTA, Amtrak, Greyhound

Community members

- Transit riders
  - Transit dependent—primarily originating in the downtown area
  - Commuters
  - Other potential riders
- Residents
- Business owners and business organizations
- Property owners

Service organizations

- Job-training centers
- Gateway House
- Sunday Breakfast Mission

Transit Service in Wilmington—Connecting People and Places

"Great transit lines succeed to the extent that many different kinds of people with different situations and purposes find them useful."[4] In order to continue to serve the needs of a broad range of current and potential riders, DART must develop the ability to respond flexibly in the face of changing circumstances. In the past, development and commute patterns required transit—bus or rail—to bring commuters into densely developed central cities. However, over the past fifty or so years many metropolitan areas in the United States experienced a trend of decentralizing urban settlement and growth. This trend resulted in the dispersal of residential development and distribution of employment centers outside of a city's traditional central business district (CBD). That said, many older cities, Wilmington included, continue to offer essential services and significant levels of employment, creating a need for transit to serve both urban core and exurban destinations. Additionally, significant populations in the urban core require transit to access jobs outside of the downtown district. Without an adequate response to this phenomenon, transit can't bring riders where they need to go efficiently and conveniently. As more discretionary riders abandon the bus system because it no longer provides time-efficient and cost-effective service, bus transit becomes increasingly identified as a social service rather than as a service that contributes to economic growth and community vibrancy.

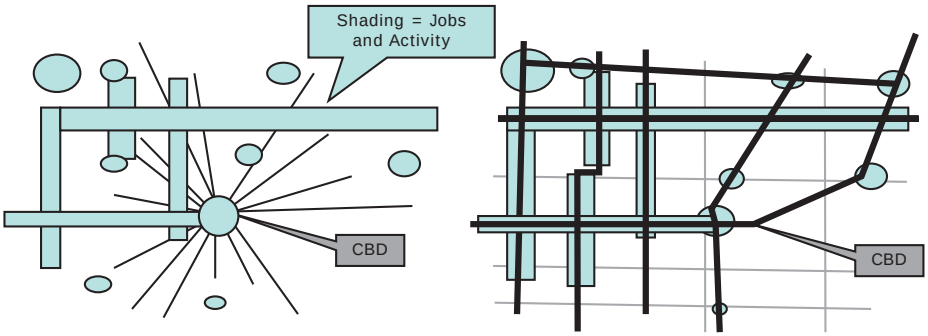
While this study considers alternatives for siting a brick-and-mortar transit hub in addition to other infrastructure alternatives, the discussion is more holistic in nature, considering beneficial policy and program changes while giving equal weight to capital/infrastructure changes. The details of any alternative that DART adopts will need to be worked out as DART moves forward to implement the recommended changes.

Metro bus systems responding to new commuter needs continue to thrive and even attract "discretionary" ridership. This change does not come without pain, as service adjustments often require a major retooling of the route system in order to continue to serve the urban core while simultaneously providing "multidestination" service beyond the central district.[5]

[4] Jarrett Walker, "The Atlantic Wonders If Transit Is Failing White People," Human Transit (blog), July 10, 2012, www.humantransit.org/2012/07/the-atlantic-wonders-if-transit-is-failing-white-people.html.
[5] Charlotte (NC) Area Transit System, "CATS Maps," n.d., charmeck.org/city/charlotte/cats/Bus/maps/Pages/default.aspx.

Successful change stems in large part from the ability to use ridership, employment, and other demographic data to reconfigure systems to serve a spectrum of transit riders—current and potential.

Successful change stems in large part from the ability to use ridership, employment, and other demographic data to reconfigure systems to serve a spectrum of transit riders—current and potential. Often, as is the case with Tallahassee, Florida's STAR Metro system; Madison Metro in Madison, Wisconsin; and Charlotte, North Carolina's CATS system, this entails maintaining service to the CBD while simultaneously providing a new or restructured network of service to residential and employment centers outside of the historic downtown.[6] The focus becomes connecting destinations rather than funneling riders to a CBD.



Traditional approach:

Connecting neighborhoods to CBD, but jobs outside of CBD difficult to reach

Multi-destination approach:

Connecting destimations to each other

Figure 5: Examining the influence of multidestination service[7]

The gridded system above shows reduced redundancy in routes while maintaining service to the CBD. Removing this redundancy might require a transfer, but the trip might take less time, and money saved from eliminating duplicative service can be put into increasing frequency of service or other initiatives.[8]

[6] City of Tallahassee (FL), "Route Maps & Schedules," n.d., www.talgov.com/StarMetro/starmetro-routes.aspx; Metro, "Commute Services"; Charlotte Area Transit System, "CATS Maps."

[7] Gregory Thomson et al., Understanding Transit Ridership Demand for a Multidestination, Multimodal Transit Network in an American Metropolitan Area (San Jose, CA: Mineta Transportation Institute, January 2012), http://transweb.sjsu.edu/PDFs/research/1003-multi-destination-multimodal-metropolitan-area-transit-riders.pdf. Jeffrey R. Brown and Gregory L. Thompson, "Examining the Influence of Multidestination Service Orientation on Transit Service Productivity: A Multivariate Analysis," Transportation 35, no. 2 (March 1, 2008): 237–52.

[8] Jarrett Walker, "'Transferring' Can Be Good for You, and Good for Your City," Human Transit (blog), April 25, 2009, www.humantransit.org/2009/04/why-transferring-is-good-for-you-and-good-for-your-city.html.

Short-Term Policies and Programs

In addition to modifying route structures to better serve rider needs and increase efficiency, successful bus systems employ a suite of policies and programs to increase ridership and attract new riders. Many of these changes, discussed below, can be implemented on a short time frame.

Improve the quality of available data. High-quality data will set the stage for DTC to engage in informed decision making. Improving data quality and data reliability is absolutely essential for DTC as it begins planning for significant improvements to the system. DTC currently lacks the detailed data required to make a final siting decision for any new transit facility. Existing data does not drill down to the bus stop level to facilitate a sophisticated analysis of passenger transfers and connections. Additional data that is necessary to make a defensible decision on facility locations include:

- Origin-destination studies.
- Boarding and alighting surveys.
- Data on commuter flows tied to transit ridership.
- Model runs using tax-parcel-level analysis zones to more accurately model potential transit trips under different alternative scenarios.
- Random-sample interviews of non-transit riders to determine what might get them to try transit.

Attract new riders

- Partner with employers to develop metro commute programs that include subsidized bus passes in addition to existing Rideshare programs.[9]
- Implement bus pass programs for municipal employees.
- Implement bus pass programs for students.

Improve service quality

- Install GPS and Automatic Vehicle Locator (AVL) technology that will make bus arrival times available to the public via cellphone applications and Internet technology.
- Include data on bus route arrivals, detours, and delays with the DelDOT smartphone application and ensure that it is on par with the roadway information included in that application.

[9] Metro, "Commute Services."

- Maintain service in the CBD while reconfiguring the route structure on the periphery to capture suburban ridership.
- Work with Southeastern Pennsylvania Transit Authority (SEPTA) to better coordinate transit connections between the Biden Amtrak station and DART service. Currently, SEPTA changes its schedules at least three times per year; DTC changes schedules two times per year.
- Create meaningful multimodal connections between rail and bus service, recognizing that many transit riders may begin their transit journey by train but complete that journey by bus.
- Improve headways and travel times to make bus service fast and convenient.
- Establish "express" bus routes to primary employment destinations.
- Design stops and transfer points to be appealing and convenient, including benches and bike racks to support multiple modes of arrival at the stop.
- Develop digital displays with bus arrival times so riders know how long it will be until their bus arrives.
- Construct transit priority lanes (diamond lanes) or other facilities to move buses through congested areas more efficiently.
- Construct bus turnouts with road reconstructions to facilitate bus service and reduce impacts on other transportation modes.
- Coordinate with DelDOT to implement bus-on-shoulder or transit priority lanes for freeway express service.
- Install equipment on buses and traffic lights that will give buses a little more time to get through lights, thus improving travel times.
- Implement audible stop announcements on buses. Audible stop announcements provide valuable assurance to veteran and new riders and also are required and allow DTC to meet Title VI regulations.

DTC will not need to incorporate every one of the listed strategies into a restructuring effort. However, DTC must make context-based changes based on data-driven policy decisions about how to serve the population in the manner that is most effective for their service area.[10] Through well-informed choices on route and service structures that take people to jobs and other destinations, Wilmington's transit system will become an integral part of the transportations choices for a large portion of the metro area's population.

[10] "Get Onboard: It's Time To Stop Hating the Bus," NPR.org, March 29, 2012, www.npr.org/2012/03/29/149625725/op-ed-hate-the-bus-its-time-to-reconsider.

Targeted short-term strategies

A number of the strategies noted above hold high potential for immediate positive results. Four strategies or sets of strategies are discussed here in greater detail.

Implement new technology to support existing ridership and encourage new customers. Develop a smartphone transit application to communicate real-time bus arrival. DTC's website has incorporated Google's "plan your trip" tool since January 2012. This tool is primarily useful using a traditional web interface. DTC has yet to develop or sponsor development of a smartphone application for navigating "on the fly." Currently, the existing smartphone application available for the Wilmington transit system—DART First State—provides information on only the 200 numbered routes. The application developer, AnyStop, has indicated that it will include information on additional routes as that data become available to them. Providing route and stop schedule data to AnyStop will result in full development of a no-cost application that will be a great asset to transit riders. DART First State should also consider providing a link on their website so riders can download the application.

Work with major employers and universities to establish commuter benefits programs. Commuter benefits programs work as part of a transportation demand management program (TDM). TDM encompasses a suite of measures that can be used to reduce commuting by workers driving alone.[11] TDM not only reduces traffic and congestion, it limits stress on existing transportation infrastructure, benefits the environment, and improves health outcomes by increasing physical activity. Subsidized transit passes, guaranteed ride home programs, and limits on the availability of subsidized car parking illustrate a few examples of TDM policies. DART should strengthen existing partnerships with municipalities, educational institutions, and local businesses to develop policies and programs that position transit to play a significant role in community livability efforts.

Many transit systems already actively engage in TDM programs. Madison Metro, in Madison, Wisconsin, Metro Transit in Minneapolis, and the Regional Transit District in Denver all manage successful TDM programs that include commuter benefit bus passes as part of the effort.[12]

Complete an onboard Origin-Destination (OD) survey for all the Wilmington routes. DTC does collect data and makes decisions using a data-driven methodology but lacks an OD study. Currently, data collected include:

[11] University of South Florida, Center for Urban Transportation Research, "National TDM and Telework Clearinghouse," 2012, www.nctr.usf.edu/clearinghouse/.

[12] City of Madison, Wisconsin, "Metro Transit," n.d., http://www.cityofmadison.com/metro/; Metro Transit (Minneapolis/St. Paul), "Go-To Cards and Passes," 2012, http://metrotransit.org/passes-go-to-cards.aspx; Regional Transportation District (Denver), "Adopted Budget 2012," accessed December 11, 2012, http://www.rtd-denver.com/PDF_Files/Financial_Reports/Adopted_2012.pdf.

Improving suburban bus connections to both downtown and the Amtrak/ SEPTA station can help attain regional goals for congestion management and air quality, in addition to managing demand on the highway system.

- Route boarding data from General Farebox, Inc.
- Rider surveys
- Agency surveys, e.g., Dover-Kent MPO
- Operator semiannual interviews
- Comments from public hearing workshops and customer correspondence
- Employer interviews

However, an OD survey is an absolute necessity to gather data for making the much-needed changes to the route structure. Currently DART does not have this critical information on where people want or need to go. The survey will help DART understand whether the current hub-and-spoke system is efficiently serving its riders. The OD survey is particularly important as many destinations—employment, shopping, education, etc.—are no longer concentrated downtown.

Identify areas of employment outside the CBD and target these employment centers for improved transit service.[13] DTC already manages an extensive regional network of bus routes. DTC should take advantage of census data available through WILMAPCO to identify areas of job concentration. This data should be incorporated into GIS and the LUTSAM/DelDOT modeling tool to overlay employment centers with the transit system map and determine adequacy of coverage. Assuming that there are major employment centers outside the CBD, are transit riders required to travel downtown and then transfer to other buses to reach these destinations? DTC should use available land use modeling and route planning tools to more efficiently connect transit riders to their destinations.

DTC should take full advantage of existing infrastructure and bus routes outside of Wilmington's CBD to encourage commuters whose trips originate in outlying areas to take the bus. A review of existing bus routes serving suburban Wilmington strongly suggests that such an effort can be accomplished. Improving suburban bus connections to both downtown and the Amtrak/SEPTA station can assist in attaining regional goals for congestion management and improving air quality, in addition to management of demand on the highway system.

Regional goals will be accomplished only if DTC works to make suburban bus routes more convenient. Metro-area bus routes with transfers should be tightened, both spatially and temporally. Currently, bus riders may need to walk a quarter mile, and sometimes more, to get to their transfer. Once there, they may wait a half hour for their bus. The system as currently

[13] Center for Transit-Oriented Development, "Transit-Oriented Development (TOD) and Employment," May 2011, reconnectingamerica.org/assets/Uploads/TODandEmploymentFINALMay2011.pdf.

configured is inconvenient and not time-competitive with driving a single-occupancy vehicle from many locations. Changes to the route structure and schedules to ensure that transfers occur at central locations with minimal wait time between buses will create strong incentives for potential riders to switch modes from personal vehicle to public transit.

CASE STUDY—Tallahassee's Star Metro getting riders where they need to go[14]

As of 2005, just 14 percent of jobs in the Star Metro service area were located in Tallahassee's downtown district and all of the routes on the radial transit system required a trip downtown. Star Metro's own survey data concluded that less than 10 percent of their riders needed to get downtown. In response to this data, in the summer of 2011 Star Metro underwent a radical reorganization and transformation in a successful effort to address this immediate service issue. System changes resulted in a radical reconfiguring the 50-year-old public transit routes in Florida's state capital. Prior to the change, Star Metro struggled to provide service and keep riders, much less attract new ones. Much like Wilmington, Tallahassee's growth followed national trends in residential and employment locations, with people and jobs moving out of the city. Star Metro's transit routes, until 2011, did not respond to the changes.

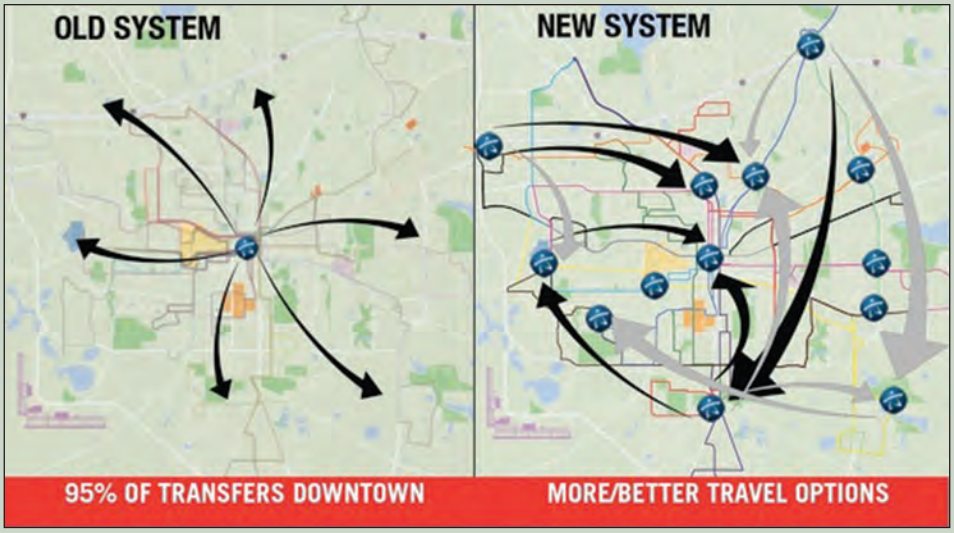


Image courtesy of Star Metro

Figure 6: Tallahassee's old bus route map (L) and new bus route map (R)

[14] Emily Badger, "Decentralizing Bus Routes in Tallahassee," Atlantic Cities, September 16, 2011, http://www.theatlanticcities.com/commute/2011/09/tallahassee-bus-system/118/; Jeffrey R. Brown and Gregory L. Thompson, "The Relationship between Transit Ridership and Urban Decentralization: Insights from Atlanta," Urban Studies 45, no. 5 & 6 (May 2008): 1119–39, www.reconnectingamerica.org/assets/Uploads/urbanstudiesatlantapaper.pdf.

Star Metro's story points to what could be done if DTC had critical origin and destination and employment location data. Star Metro reduced the number of lines from 26 to 12 but lengthened route distances.[15] The number of routes serving the CBD dropped to six, but all these routes connected with numerous other crosstown lines, creating service and operating cost efficiencies.

Long-Term Policies and Programs

Additional efforts that DTC must undertake span planning, policy, operating, and capital program adjustments.

Explore the potential for transit-oriented development (TOD) at transit hub or transfer locations. TOD may be viable in association with regional and urban bus service. Several recent studies conclude that high-density employment areas have strong potential to attract residential and commercial development, making TOD appealing to area commuters.[16] Scenario analysis tools such as LUTSAM, which is available to DelDOT, should be used to determine the viability of locations to site bus transfer facilities and/or TOD development. DTC should take advantage of the modeling expertise available through DelDOT's GIS department. Using LUTSAM or similar modeling programs, DTC can gauge potential for transit ridership under numerous different scenarios, targeting analysis for TOD adjacent to employment and commercial centers to determine location of transfer points and main routes. DTC should work with policy makers, elected officials, and local business to develop transit routes, influence land use patterns, and create TOD policies that will sustain transit and increase the efficiency of the overall transportation system to support economic vitality.[17]

TOD reduces the perceived need for wider roads and overbuilt parking.[18] The cities of Minneapolis and Denver have succeeded in bringing transit to the table to influence TOD with great success.[19] Denver's example illustrates how TOD fosters the type of compact development that is more livable and equitable by providing access to community, jobs, goods, and services for non-drivers and drivers alike.

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[15] City of Tallahassee, "Route Maps & Schedules."

[16] Center for Transit-Oriented Development, "Transit-Oriented Development (TOD) and Employment."

[17] Adie Tomer et al., "Missed Opportunity: Transit and Jobs in Metropolitan America," Metropolitan Infrastructure Initiative Series and Metropolitan Opportunity Series (Brookings Institution), May 2011, www.brookings.edu/~/media/research/files/reports/2011/5/12%20jobs%20and%20transit/0512_jobs_transit.

[18] Center for Transit-Oriented Development, "Transit Corridors and TOD: Connecting the Dots", n.d., reconnectingamerica.org/assets/Uploads/RA203corridorsFINAL3.pdf.

[19] Metropolitan Council (Twin Cities MN region), "Guide for Transit-Oriented Development," August 2006, www.metrocouncil.org/Communities/Publications-And-ResourcesTOD_index_page.aspx; Regional Transportation District, "Adopted Budget 2012."

CASE STUDY—Denver's Regional Transportation District

Denver, Colorado, works through a state-established Regional Transportation District (RTD) to provide long-range planning, system build out, operations, and financial management.[20] By combining federal and state funding with local sales and use tax revenues and developing creative public-private partnerships, the RTD has pursued critical system expansions that provide enhanced economic activity, regional connectivity, and improved quality of life for the entire community.

Requiring new developments to build connected street networks, include transit service, and incorporate a mixture of residential, employment, and commercial uses makes transit a feasible and more appealing alternative to single-occupancy-vehicle trips. Transit-oriented development is, by design, more compact, reducing overall travel costs by shortening trips. Shorter and fewer trips result in construction of fewer lane miles and an overall reduction in roadway width demands. The more streamlined transportation network results in lower infrastructure construction and lower maintenance costs.

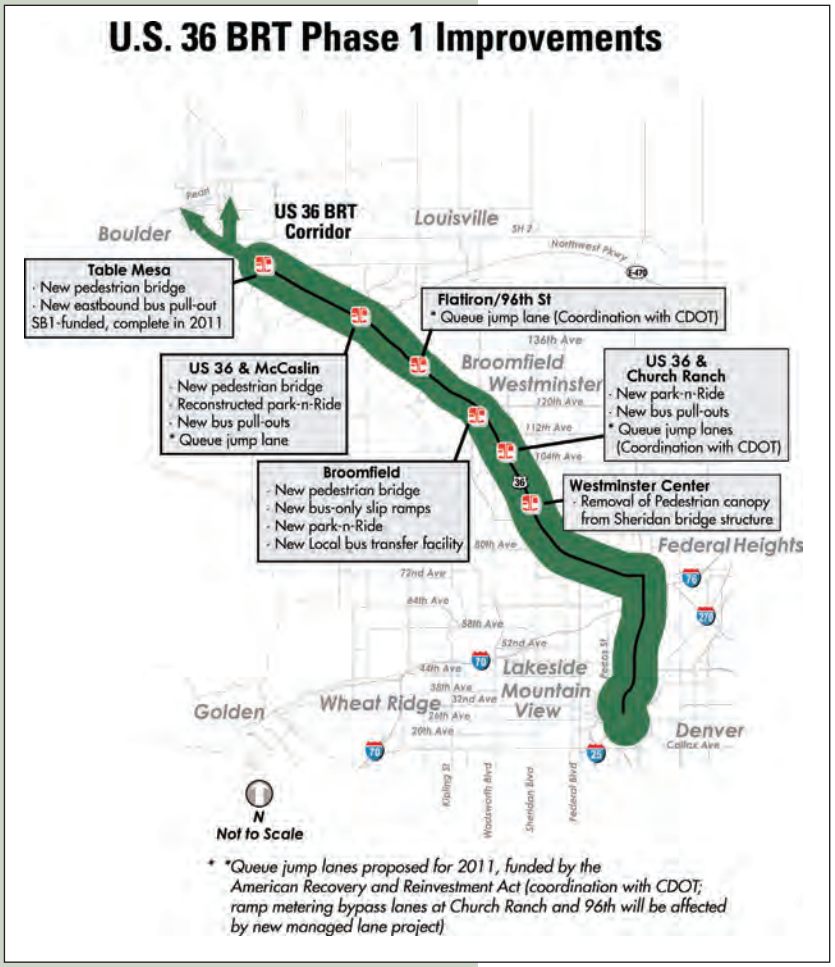

Figure 7: TOD districts in Metro Denver[21]

[20] Regional Transportation District, "Adopted Budget 2012."
[21] Image courtesy of Denver Regional Council of Governments.

Engage in long-range planning—DTC, DelDOT, City of Wilmington, and WILMAPCO

- *Implement express bus service* in conjunction with coordinated regional transit and transfers discussed above. As part of this service, DTC must work with DelDOT to reestablish express bus lanes and/or bus-on-shoulder programs that will improve travel time between major cities and employment centers.

- *Take an active role in long-range planning and land use decisions*—As noted in DTC's draft business plan, DTC has relied on DelDOT to produce long-range plans for the transit system in the past.[22] A more active role in long-range planning for the system will allow DTC to proactively pursue such major capital and planning projects as are currently under consideration for Wilmington's transit system.

- *Strengthen DART's transportation demand management efforts*—Currently, DART participates with DelDOT Planning through the Transportation Impact Study process to recommend TDM programs for employers to implement.

- *Consider secondary development impacts*—Any changes that involve the redevelopment of a site within the city will create a ripple of secondary impacts that are not directly related to the operation of the transit system.

- *Complete a long-range city transportation plan*—The City of Wilmington does not currently have a long-range transportation plan or street design guidelines. Like DTC, Wilmington has relied on WILMAPCO, the area MPO, to create area transportation plans that include the city. While these plans are of high quality, they are not able to offer the type of prioritization or detailed analysis of transportation needs that a city the size of Wilmington would benefit from. A multimodal transportation plan will assist the city and DTC in weaving transportation projects into broader city development plans in a coordinated fashion.

- *Work jointly among the city, DTC and DelDOT to address transit system needs.* Incorporate the transit system's long-range operations, capital, and infrastructure needs into planning documents across agencies.

[22] Delaware Transit Corporation, "Draft Business Plan," revised draft, May 31, 2011.

- *Conduct meaningful public outreach*—Engage the public early in the planning process when considering changes to routes, schedules, construction of a transit hub, etc. Solicit ideas from the public and stakeholders as the planning process begins, not after making decisions on major changes to the system. Involve stakeholders in selection of alternatives to pursue. Work with transit riders, the city, the MPO, business groups, advocacy organizations, and residents for the highest level of involvement.

- *Consider a fare increase*—The last transit fare increase in Wilmington occurred in the 1990s. Holding fares to $1.15 for a one-way trip is admirable and removes significant financial burden from transit-dependent and low-income riders. However, not adjusting transit fares upward to account for inflation, increases in operations and maintenance costs, and declining outside revenue sources reduces revenue available to DTC for pursuit of capital projects. A review of peer systems reveals that other transit providers have raised revenue in response to external economic forces.[23] Over the long term this constraint, if not adequately addressed, will negatively impact the transit system as a whole.

- *Explore new revenue options*—Provide the transit system with a dedicated revenue stream for long-term sustainability. Currently, there is no dedicated funding for transit. The transit system competes with other state programs for scarce dollars available through state general purpose revenues, the state transportation trust fund, and allocations from tolls and fees.

- *Reduce free and low-cost automobile parking*—A reduction in available automobile parking, both surface and covered, will help incentivize transit use. Converting surface parking to commercial, residential, or office use assists in the development of a more vibrant city and improves the utilization of bus transit.

[23] Consider that SEPTA, DTC's neighbor in Philadelphia, plans for fare increases every three years indexed to cost-of-living increases. See Southeastern Pennsylvania Transportation Authority, "SEPTA Announces Proposed Fare Changes for Fiscal Year 2014," press release, March 14, 2013, http://www.septa.org/media/releases/2013/03-14.html.

Emerging models like the Mississippi River Regional Planning Commission's new three-county rural fixed-route service makes transit available to rural areas outside of the fixed-route service boundaries. This model shows potential for addressing equity issues in service provision while saving scarce dollars for capital and service improvements to the fixed-route system.

- *Enhance economic development*—Use transit-oriented development adjacent to transit centers and transfer points to enhance economic vitality.
- *Reduce expenses associated with elderly/disabled on-demand services*—Currently a significant percentage of the DTC operating expense in the Wilmington area is the result of elderly and disabled service provided outside the current fixed-route service area, often to residential developments too disparate to support fixed-route services.[24] Look to emerging models like the Mississippi River Regional Planning Commission's new three-county rural fixed-route service that makes transit available to rural areas outside of the fixed-route service area. This model shows potential for addressing equity issues in service provision while saving scarce dollars for capital and service improvements to the fixed-route system.[25]
- *Address class/status issues*—It may be necessary to hire a PR firm to address the misconception of conflating transit riders with homeless persons and panhandlers and to make it clear that transit is not part of the panhandling challenge the city faces. Buses are not the cause of the loitering/panhandling/homeless problem at Rodney Square or in the downtown area. Bus riders are customers of the transit system who go to the square to get on or off a bus. These riders are a separate population from the homeless or those panhandling around the square.
- *Conduct a public relations campaign to support changes to the transit system*—Consider contracting with a marketing firm to assist DTC with messaging for the different alternative scenarios under consideration. Once an alternative is selected (hub, transfer point, etc.) provide consistent, clear messages and information to support the project.

[24] WILMAPCO , "2040 Regional Transportation Plan Update," 2011, http://www.wilmapco.org/Rtp/2040/2040RTP.pdf.
[25] Mississippi River Regional Planning Commission (Wisconsin), "SMRT Commuter Bus Information," December 2012, www.mrrpc.com/SMRT_BUS.html.

Operations and Capital—Alternatives Analysis

Background information

Downtown Wilmington is home to 38 of DART's 60 bus routes. Thirty-four of these routes use two principal loops through Wilmington: the Amtrak loop and the Orange Street loop (Figure 8). The Orange Street loop serves 22 routes and the Amtrak loop includes 12 routes. Orange Street buses lay over at Rodney Square and Amtrak buses lay over at the Amtrak station.

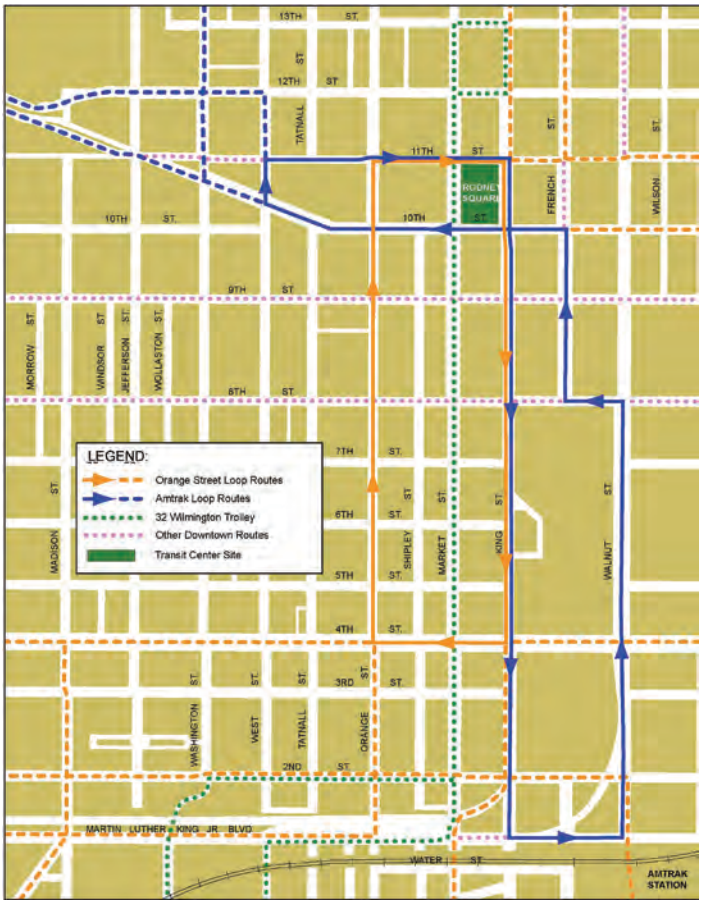

Figure 8: Existing DART routes in the CBD
Image courtesy of WILMAPCO

Despite the success of Wilmington's transit system, the city lacks a transit hub. Starting in 1993, DART centralized routes to Rodney Square. Buses in Wilmington began using the King Street and 10th Street sides of Rodney Square, the city's central square and public green space, as a principal location for transfers between bus routes. Until June 2012, when King Street stops were relocated to accommodate construction on Rodney Square, transit operated using a pulse system, where the majority of bus routes arrived at Rodney Square at approximately the same time. Transfers then occurred at this location with little or no wait time for riders. Buses staged on three sides of Rodney Square to execute these transfers.

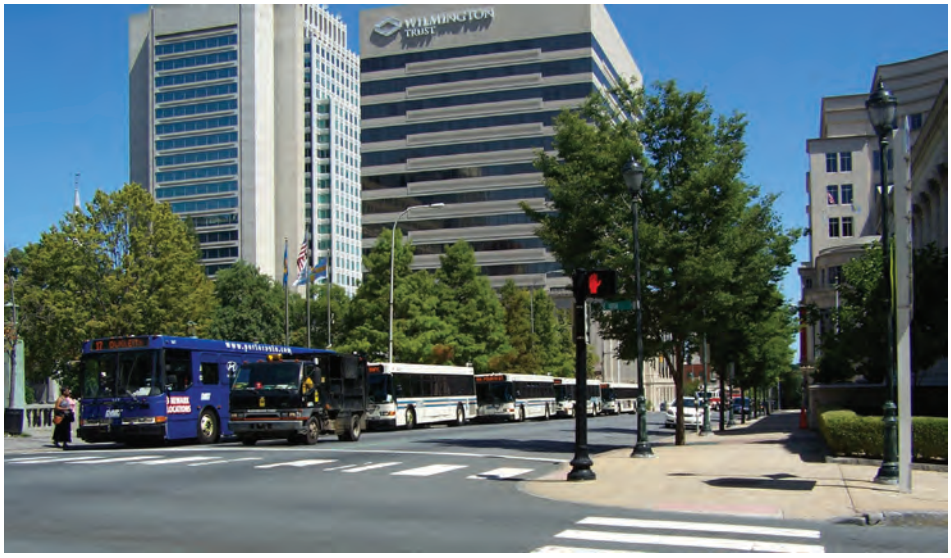

Figure 9: DART buses lined up at Rodney Square

This system proved successful, particularly for riders whose destinations were downtown. For these riders, Wilmington's transit system became a victim of its own success. Buses were often double- or triple-stacked along three sides of the square, essentially closing off the city's major public green space. In the confusion, bus riders experienced difficulty finding their buses to make transfers. Concern for pedestrian and vehicle safety grew.

Making changes to the transfer or routing system in Wilmington raises several key challenges, including effectiveness of circulation routes, economic development potential, safety, provision of convenient service, connectivity with Amtrak and SEPTA rail services, and system preservation.

In 2008 Whitman, Requardt & Associates, LLP, began a Wilmington Downtown Circulation Study (WDCS) to assist Wilmington Initiatives, WILMAPCO, the City of Wilmington, DTC, and DelDOT with making long-range transportation planning decisions. The original purpose of the study focused on evaluating downtown transportation generally and making recommendations about how the transportation system in Wilmington could better serve users across modes. While the study did make recommendations for street- and traffic-flow improvements, the questions of how to improve downtown bus circulation and selection of a site for a transit center quickly became an integral part of the study. The WDCS evaluates two sites in detail—one at 8th and Orange Streets and another at 9th and Shipley Streets—for suitability for use as a transit hub. The WDCS also provides detailed discussion of transit system operations and implications for moving main transit operations off Rodney Square. Please refer to the WDCS for details on operations/schedule/routing adjustments that may be necessary if the main bus transfer locations move.

In addition to the 9th and Shipley Street location, the preferred alternative presented in the WDCS, this analysis considers the following alternatives for reconfiguring the main transfer and route operations for the transit system in Wilmington, Delaware.

Short-term options

Short-term operational change recommendations are taken from the WDCS. Under this temporary scenario, the Orange Street loop buses would stop on the 11th Street side of Rodney Square but would lay over on the west side of the 1000 block of French Street or on Shipley between 9th and 10th Streets. These new locations for layovers require the removal of ten automobile parking spots on the French Street block and nine spots on the Shipley block.

Long-term options

In the long-term, this report recommends continuing bus stops on Rodney Square as well as both the construction of a downtown facility to continue core service in the CBD and the implementation of a more regionally focused transfer system. While continuing service on the square, DTC should establish a transit hub in downtown Wilmington, or on a transit corridor, to take pressure off of congested bus service on Rodney Square. A transit hub will provide an anchor for the Wilmington Transit system. A new transit hub/corridor will also address the issue of buses dwelling on the street. Longer-term solutions also must recognize the fact that development and commute patterns in the Wilmington metropolitan region are changing and there is an increasing need to develop regional connections to address these needs. What follows is a consideration of the merits of different alternatives for future capital improvements for DART.

Long-term solutions must recognize the fact that development and commute patterns in the Wilmington metropolitan region are changing, increasing the need to develop regional connections to address these changes.

Evaluation criteria and recommendations

Recommendations consider the feasibility of potential sites for a transit hub for Wilmington and the potential benefit of reconfiguring the area's route system to better respond to existing and future transportation needs. The first portion of the following analysis reviews alternatives for potential transit hub locations while the second part considers how a new transit hub, or hubs, might be incorporated into reconfigured transit operations.

Evaluation criteria include a number of considerations:

- Impact on overall system
- Impact on existing ridership
- Impact on potential future ridership
- Consistency with city development and objectives
- Consistency with DTC short- and long-term goals
- Impact on downtown business district
- Impact on commuters—all modes
- Feasibility/constructability
- Financing potential
- Risk analysis

Alternatives rejected after evaluation

1) Do nothing

Discussion: With this alternative, bus transfers remain focused on Rodney Square and triple-stacking, congestion, and safety concerns remain. At the same time, the increase in high-end real estate developments around the square has created tension between these new residents and the adjacent bus operations. These congestion, cleanliness, and safety concerns have resulted in a growing desire to make changes in transit operations on Rodney Square.

Analysis: The documented transit congestion and pedestrian and vehicular safety concerns require adjustments to the transfer system. While transit must maintain a presence on the square, as service at this location provides essential connections to major downtown destinations, this alternative should be rejected for the stated safety and quality-of-life reasons.

Figure 10: Bus congestion at Rodney Square

2) King Street distributed transfers

Discussion: This alternative would continue use of Rodney Square as a de facto transit hub while distributing a significant portion of the bus stop and transfer activity along four blocks of King Street, between 8th and 12th Streets.

Beginning in June 2012, DART removed bus stops on the King Street side of Rodney Square, distributing stops for those routes off the square but still along King Street and within two blocks of the former Rodney Square stops. Construction activities associated with a Transportation Enhancements grant to improve Rodney Square, library renovations, and Delaware Center for Arts and Design construction at 6th Street necessitated the new stop configuration. DART considered the reconfigured stops something of a test case for whether the distributed stops alternative would meet the needs of transit ridership while providing congestion relief for Rodney Square. The reconfigured stops have worked fairly well overall and should remain in place while DTC evaluates longer-term alternatives for changes to center-city bus routes.

Figure 11: Distributed stops on King Street

Analysis: With the current construction occurring in Rodney Square, DTC decided to test the idea of distributed transfers. The test has been successful in some ways—bus riders appear to be adjusting, traffic flows have experienced little to no impact, and service has not experienced significant interruptions. The layover of buses along King Street has been problematic in certain locations, however. Distributed stops appear to assist in short-term rerouting scenarios and may be a useful alternative during construction of a preferred transit hub. This alternative is not recommended as a long-term solution, however, due to the inconvenience to some riders and because of some traffic safety issues associated with turning vehicle movements and bus sightlines.

Evaluated alternatives for potential hub locations

DTC, the City of Wilmington, and WILMAPCO considered the following potential transit hub locations and requested that SSTI provide an independent evaluation of the alternatives. The alternatives evaluated discuss specific sites, but they are also thematic. During project planning, the specific location of sites for a hub or a transit corridor may need to be adjusted.

Selecting any of these alternatives may result in changes to traffic patterns and bus routing, making site selection a greater challenge than anticipated. Importantly, moving forward with construction of a transit hub will require a full public involvement effort as well as high-level coordination between DelDOT, the City of Wilmington, DTC, and DART to make operational changes.

The 2011 Wilmington Downtown Circulation Study (WDCS) includes a matrix evaluating each of these locations. This report does not repeat site evaluations at the level of detail of the WDCS. A brief accounting of pros and cons for the evaluated alternatives is presented. If further detail is desired, please refer to the WDCS matrix.

The relative merits and shortcomings of each location are summarized below. The alternatives analysis that follows takes a broader view to look at how a new transit hub might function under three different alternatives for the DART system.

Figure 12: Rush hour transit commute

Table 1: Summary evaluation of alternative hub locations (Hub numbers correspond to the numbers shown on figure 5)

Location	Pros	Cons
1. Rodney Square	The early planning process eliminated this location as a main hub. Site included here for reference. The site will still be served by DART but will not be the main transfer location.	
2. French and 9th Streets	• State-owned property • Easy conversion of current transit routing to serve site (esp. for Walnut Street loop) • Close to Eastside residential area	• Small site may not support future system needs • Sale of adjacent building may include parking lot • Political resistance and proximity to Eastside residential areas
3. Shipley and 9th Streets (Midtown Garage)	• Central location • Transfers could occur on lot rather than on street • Underutilized Shipley Street • Potential public-private partnership • Potential to acquire full block • Current Midtown Garage needs to be demolished	• Privately owned • Properties facing 8th Street would need to be acquired to get the entire block • Adjacent building manager resistance
4. Front and 2nd Streets (Christina Gateway–Walnut Street Sweep)	• Size • Near train station and intercity bus terminal • Partly public owned	• Needs new street access • Needs street reconfiguration • Loss of public green space • Not central to offices near Rodney Square • Increased transfers* • Probable need for circulator bus to serve Rodney Square
5. Front and Walnut Streets	• Proximity to train station • Easy access for Walnut Street loop buses • Access from S. Walnut Street	• Gateway house property acquisition my be required • Increased transfers* • Not central to offices near Rodney Square • Probably need for new circulator bus to serve Rodney Square
Linear transit corridor	• Proximity to Rodney Square and train station/ intercity bus terminal • Increased route efficiencies • Multimodal opportunities connecting transit and bike modes • Decreased travel times • Increased commercial development activity • Eliminates need for brick-and-mortar facility • Potential to link with regional express bus • Increases connectivity south of river	• May require street reconfiguration from one-way to two-way. Potentially impacts greater downtown circulation network. • Potential for transfers*

***Considering transfers (or connections):** Some of the alternatives above show potential for increased transfers. Conventional wisdom holds that transfers should be avoided. However, a trip that requires a passenger to make a connection, or transfer, may actually provide a faster trip, if measured in actual trip duration. Connections can be accomplished while minimizing impacts on ridership. Siting transfer locations in vibrant urban locations and where connections can be made to a variety of desirable destinations provides a space where there are interesting diversions available during the wait for the next bus. These are the sorts of connections that DART should provide.[26]

[26] Jarrett Walker, "Unhelpful Word Watch: To Transfer," Human Transit (blog), April 11, 2009, http://urbanist.typepad.com/human_transit/2009/04/unhelpful-word-watch-to-transfer.html; Walker, "Transferring."

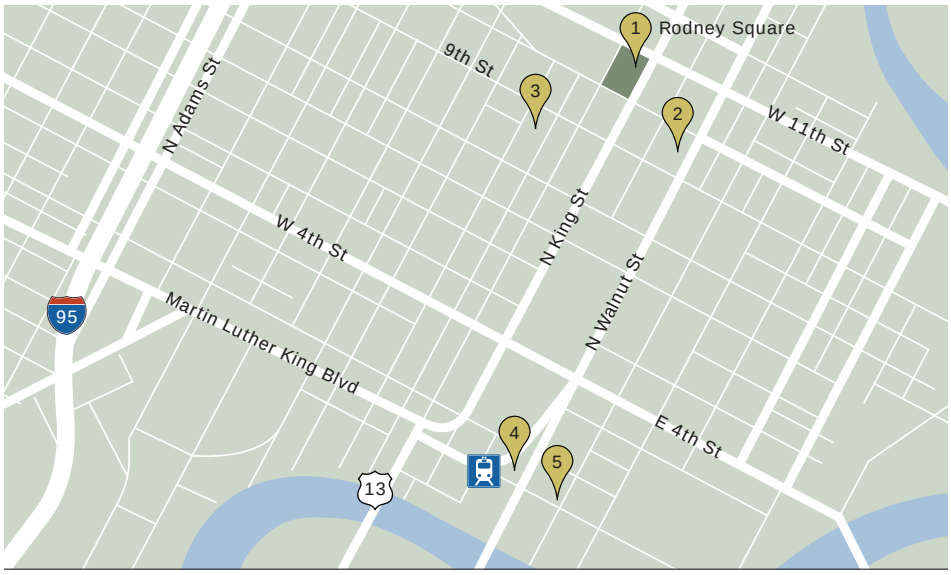

Figure 13: Potential transit hub locations

Alternatives analysis

The following analysis looks at how a new transit hub might function under three different alternatives for the DART system: 1) construction of a single transit hub; 2) construction of two smaller hubs; and 3) a shift to a modified hub-and-spoke transit model that provides service in the CBD with transfer points to promote regional connectivity outside the center city.

1) Construct a single transit hub to efficiently and conveniently serve patrons and to decrease bus transfers and layovers at Rodney Square

Under this alternative, bus service would still occur on Rodney Square, but buses using the King Street stop on Rodney Square and bus layovers would move to the new hub. Double- and triple-stacking of buses around the square would be eliminated. Four potential hub locations are considered for this discussion—two near Rodney Square and two near the Amtrak station. Figure 13 depicts potential hub locations and Table 1 presents the pros and cons of each site.

Hub alternatives near Rodney Square

Site 2—French and 9th Streets

This site encompasses 0.89 acres and is located two blocks southeast of Rodney Square. The property is adjacent to major downtown employment centers and is currently in use as a surface parking lot. DelDOT and DTC consider this site a good candidate for a transit hub and have invested in preliminary feasibility studies submitted to the state.

Analysis: This site links up well with existing Wilmington bus routes and offers good accessibility to the government center and other employment centers in the CBD. Buses could still stop at Rodney Square but would lay over at the French Street location. Bus layover capacity is somewhat less than at other, larger sites but the proximity to existing routes, Rodney Square, and trip destinations may outweigh the size constraints.

DTC's preliminary assessment shows that the site could support between 16 and 20 buses on site at a time. The site is accessible from both Walnut and French Streets, allowing buses coming from Amtrak to stay on Walnut and turn left into the site. The right turn onto French Street would require some modifications to improve the turning radius for buses and across the site there are some minor grade issues. The number of on-street parking spaces that would be removed from French Street would be determined by the site design.

The state requested DTC and DelDOT drop consideration of this site, as the state wanted the surface parking available for the sale and possible redevelopment of the adjacent Education Center. Since that time, the Education Center has been sold. It is unclear whether the parking lot is still required for this use. A review of recent aerial photographs shows an empty parking lot, suggesting the parking lot might easily be converted to a transfer center or transfer point.

Impact on route structure and transfers: Moderate. This location is adjacent to Rodney Square and King Street, where most transfers now occur. It should be noted that this site, if selected, would require the realignment of routes serving the Amtrak station, resulting in approximately 750 bus trips per day on Orange Street.

Risk assessment: In the past, the state has shown an unwillingness to convert this parking lot into a bus hub. However, this site is in an excellent location for shifting bus transfers off Rodney Square and may warrant revisiting the possibility of constructing a transit facility here. The site's proximity to Rodney Square, downtown employment, and other destinations makes it an appealing location for a transit facility. Locating a bus facility on this parcel creates the opportunity to increase transit ridership, which would reduce the perceived need for automobile parking at this location. Converting this site from surface parking to transit service that is convenient and appealing also offers the opportunity to manage demand for automobile travel while enhancing the viability of bus transit in the city.

Site 3—Shipley and 9th Streets (Midtown Garage)

Locating a transit hub at Shipley and 9th Streets emerged as the preferred alternative in the WDCS and in a follow-up traffic study conducted by Parsons Brinkerhoff. The specific location, the Midtown Garage, is a 52-year-old parking garage, now condemned. The site is approximately one city block from Rodney Square and encompasses approximately 1.46 acres.

DTC would construct a ground-level transit hub, with interior bus bays. Other buses would stop along Shipley and Orange Streets. The transit floor of the facility would offer restrooms, benches, and other amenities to enhance service and increase the appeal of transit. The upper stories on this site could include a variety of uses, including public parking.

Between 50 and 80 on-street parking spaces would be removed to accommodate the new bus hub. While some buses would continue to stop at Rodney Square on 10th and 11th Streets, bus stop activity would no longer occur on the King Street side of the square. Bus stops on the King Street side of the square would migrate to the new transit hub.

Analysis: Constructing a transit hub at 9th and Shipley would provide transit congestion relief on Rodney Square by removing the bus stop on the King Street side of the square. Eliminating some of the bus traffic from Rodney Square would assist the City of Wilmington in achieving the goal of increasing the livability of the CBD by improving the urban park at Rodney Square. Improvements to Shipley Street may have economic development potential in the creation of a new retail corridor.

Impact on route structure and transfers: Moderate. This location is adjacent to Rodney Square and King Street, where most transfers now occur. A traffic safety analysis conducted by Parsons Brinkerhoff concluded that projected bus traffic could be accommodated in this corridor with minor adjustments to intersections, pavement markings, and signage.

This site, if selected, would require the realignment of routes serving the Amtrak station, resulting in approximately 750 bus trips per day on Orange Street.

Risk assessment: The WDCS and the Parsons study showed that a transit hub could be constructed at the site of the Midtown Garage. The site's appeal includes its central location and the opportunity to execute many bus transfers off-street. It would be possible to change traffic patterns to improve pedestrian safety and traffic flow and new parking could be constructed above the street-level transit transfer center. Additionally, this site has potential for a public-private partnership funding arrangement.

The site is not without challenges. This alternative would require realigning routes that currently serve the Amtrak station along 8th Street to Orange and from Orange to 10th or 12th Streets. Possible additional complications include the need to reconfigure the street patterns for pedestrian safety and resistance of Shipley Street business owners concerned about losing their loading zone if Shipley Street is blocked by bus traffic. Orange-line buses currently run on the front face of these businesses, and there is additional concern over the possibility that these companies would get "boxed in" with bus traffic on both sides of their operations. However, if the facility design locates bus transfers and layovers interior to the parcel rather than on the street, business owner concerns may be minimized.

Hub alternatives near Amtrak/Greyhound

Site 4—2nd and Front Streets (Christina Gateway–Walnut Street Sweep)

This site encompasses a full city block and is directly across the street from the Amtrak station to the south and the Greyhound intercity bus terminal to the west. East Front Street essentially bisects this block, forming what is referred to as the "sweep." The land is publicly owned, with the majority of the parcel currently used as green space.

Analysis: Adjacency to both the Amtrak station and the Greyhound intercity bus terminal provides a wealth of multimodal transportation opportunities. Although most of the discussion related to improving the Wilmington transit system has revolved around Rodney Square, significant congestion from buses laying over at the train station also exists. While buses do not double- or triple-stack along the curb at this location, they do stretch across two and sometimes three city blocks for layovers.

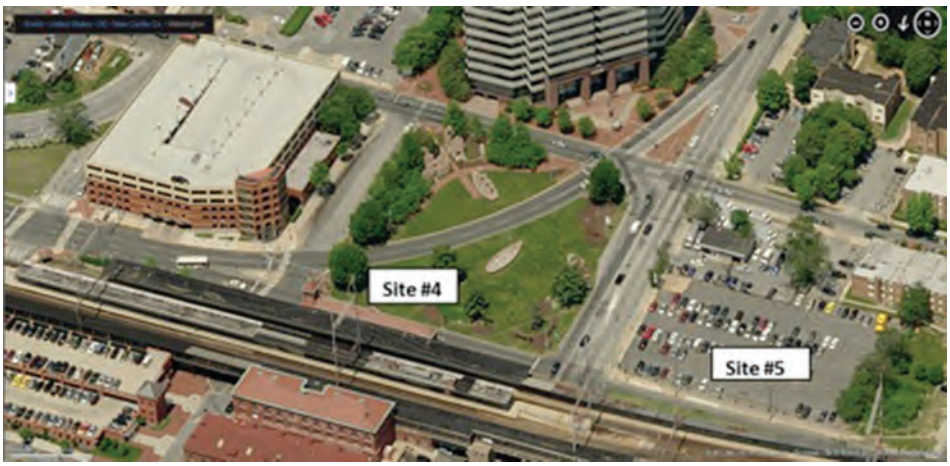

Figure 14: Site alternatives near Amtrak

The majority of this parcel is state owned and currently provides public green space in a part of the city otherwise lacking this amenity.

Impacts on route structure and transfers: A single bus hub at this location, while coordinating well with the Amtrak loop buses, will create challenges for providing bus service to Rodney Square, the main downtown employment district. With the current system, service is provided between Rodney Square and the train station without requiring a transfer. It is likely that a circulator route would need to be added to provide acceptable service levels to downtown and the Rodney Square area. A two-seat trip may still be required with this option. Trips requiring transfers are never preferred by transit riders, so siting the main transfer center at this location could result in a dip in ridership.

Risk assessment: Removal of the exiting roadway that bisects this parcel would require a significant reconfiguration of the roadway system in front of the train station. The loss of this limited green space would likely spark controversy.

Site 5—Front and Walnut Streets

This site encompasses a full city block and is adjacent to both the Amtrak station and the Greyhound intercity bus terminal. The majority of land is state owned, with the majority of the property currently used as surface parking. There is a small car rental business on the parcel. Gateway House, a 58-bed single-room-occupancy housing facility, is also located adjacent to this parcel.

Twelve bus routes serve the Amtrak terminal. Buses stopping at the Amtrak station lay over along Martin Luther King Drive in front of the Amtrak station.

Analysis: Adjacency to both the Amtrak station and the Greyhound intercity bus terminal provides a wealth of multimodal transportation opportunities. Although most of the discussion related to improving the Wilmington transit system has revolved around Rodney Square, bus congestion caused by buses laying over at the train station exists. While buses do not double- or triple-stack along the curb at this location, they do stretch across two and sometimes three city blocks for layovers.

The majority of this parcel is state owned and currently is used by Gateway House and a car rental company as well as for a parking lot. The use of part of the site as a housing facility for homeless men creates equity concerns, particularly if the housing is relocated to make room for a transit hub.

Impacts on route structure and transfers: A single bus hub at this location, while coordinating well with the Amtrak loop buses, would create challenges for providing bus service to Rodney Square. With the current system, service is provided between Rodney Square and the train station without requiring a transfer. It is likely a circulator route would need to be added to provide acceptable service levels to downtown and the Rodney Square area.

Risk assessment: A two-seat trip may still be required with this option. Trips requiring transfers are never preferred by transit riders, so siting the main transfer center at this location could result in a less vibrant bus system.

2) Construct two smaller hubs, one at or near Rodney Square (site 2 or 3) and one at or near the Amtrak station (site 4 or 5)

Analysis: Construct two smaller transit hubs—possibly one at or near the Amtrak station (Walnut and 2nd Streets) and the other adjacent to Rodney Square at French and 9th Streets. The routes that follow the two major loops—the Orange Street loop and the Amtrak loop—would pass through these hubs to help minimize transfers. Routes originating from the south, the Amtrak loop, would lay over at the hub in the CBD and routes originating from the north would dwell at the hub near the Amtrak station.

Impacts on route structure and transfers: Impacts to current routes and transfers would be minimal with this alternative.
The location of a hub adjacent to Rodney Square coordinates well with existing routes and would help ease transit congestion on Rodney Square. The location of a second hub convenient to the Amtrak station would mean the Amtrak routes would also be minimally impacted. Scheduling routes originating, or anchored, at one hub to lay over at the second hub would help reduce costs and facilitate transfers. This alternative also offers the advantage of the Amtrak and Orange Street buses providing double coverage, since those buses would provide service to both of the hubs.

Figure 15: Multi-modal service at the Wilmington Amtrak Station

3) Construct a single hub adjacent to the Amtrak and Greyhound stations (sites 4 or 5) and develop a linear transit corridor to connect with Rodney Square, the CBD, and other destinations within the city. Incorporate on-street bicycle facilities and enhanced pedestrian accommodations. Pair with improved regional connectivity.

With this alternative, downtown service would focus on a blend of the linear transit corridor with a new transit hub next to the Amtrak station/ Greyhound terminal. Locating a transit hub adjacent to Greyhound and the Northeast Corridor rail service would truly capture available multimodal opportunities.

Transfers outside the CBD should be centralized at existing Transit Park & Ride lots on the periphery of the city. These suburban transfer locations must be improved to provide an efficient and comfortable rider experience. These transfer locations should also incorporate goals of transit-oriented development and be designed to work with express bus service. Locations might include stops serving grocery stores or shopping centers.

Improving suburban satellite hubs at locations with strong current ridership could help achieve TOD goals. The Christiana Mall or the Prices Corners Park & Ride have strong ridership and are well suited for TOD. In addition to these locations DTC should identify locations for suburban hubs where there is unmet rider demand, such as US 13 North and South and the US 202 corridor.

Figure 16: Transit riders boarding bus to Christiana Mall

Changing demographics, the movement of work sites out of downtown, and new commute patterns suggest that partnering a central transit hub and transit corridor with multiple, smaller transfer points to serve destinations outside of the CBD could better capture suburban commuters and suburban employment centers.

As with the other alternatives, DART would maintain a presence on Rodney Square. The significant concentration of destinations adjacent to the square, including major employers and government centers, means service must continue to this location. As noted, congestion and safety concerns associated with the concentration of transfers around the square can be addressed through the implementation of transfer points at strategic locations.

Figure 17: Linear transit corridor with bus/bicycle improvements[27]

Developing a linear transit corridor, either as a two-way corridor or using two adjacent streets, offers the additional opportunity of improving bicycle infrastructure at the same time transit service is upgraded. Recent research suggests that providing space for bicyclists when a new, dedicated transit facility is built is safe and can help a city achieve multimodal livability goals in addition to meeting other goals of congestion mitigation, air quality improvements, etc.[28]

[27] Edward Vielmetti, "Back to School Bus Schedules for University of Michigan and Ann Arbor Transportation Authority Buses," AnnArbor.com, accessed January 16, 2013, http://www.annarbor.com/vielmetti/back-to-school-bus-schedules-for-university-of-michigan-and-ann-arbor-transit-authority-buses/.
[28] "Bike-Bus Lanes," StreetsWiki, n.d., streetswiki.wikispaces.com/Bike-Bus+lanes; New York City DOT, "Measuring the Street: New Metrics for 21st Century Streets, " December 2012, www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf.

Figure 18: Left-side bike lane with right-side dedicated bus lane, University Avenue, Madison, Wisconsin[29]

Figure 18 illustrates a successful strategy incorporating bicycle and bus facilities. The left-side bike lane removes the conflict between bicycles and right-turning buses. The bus routes do not require a left turn across the bike lane.

In addition to reconfiguring specified streets within downtown Wilmington, DTC should identify locations for new regional hubs/transfer centers that may already be available. Transit Park & Ride lots, some with bicycle lockers, already exist. To implement this alternative, DART should determine the sites with the highest ridership and employment densities for both current and future development. These strategically selected locations could then be enhanced as regional transit transfer points, which could offer amenities for riders and drivers. These locations would offer service for riders whose trip origins and destinations do not require them to ride into downtown Wilmington.

[29] John Allen, "Buses and Bicycles Sharing Urban Streets," John S. Allen's Bicycle Facilities, Laws and Programs Pages, August 9, 2010, http://www.bikexprt.com/bikepol/facil/lanes/bikebus.htm.

Analysis: Transit hubs and transfer points should be located adjacent to major trip generators and should provide connectivity for residential, commercial, educational, and business trip generators throughout the city. The principal downtown transfer point should be at a transit hub near the Amtrak and Greyhound stations, with additional transfers available through the transit corridor. The location of additional transfer points should be determined through an analysis of major destinations on the periphery of the city. Identifying transfer-point locations through an alternatives analysis that includes an overlay of major employment, residential, and commercial destinations with the existing route system is essential for this planning.

The alternatives analysis for siting the transfer points must take into account the importance of locating the transfer points in visible and accessible areas that provide functional access to a variety of destinations. The temptation to "tuck away" the transfer points should be resisted. Making transit accessible is important for obvious reasons; making transit visible to the community increases public awareness of the importance of transit for the community. Improved remote transfer-point hubs can provide additional value, serving as stops for express bus routes and potentially for transit-oriented development projects.

This hybrid approach would allow for greater system flexibility over the long-term and would support phased implementation with minimal service disruption. For example, the transfer points might be constructed first and put into service while the transit hubs are being designed/constructed. Any of the options included as part of this alternative would likely require a reconfiguring of the current route system. Under this alternative, buses would continue to provide service to Rodney Square, but bus layovers would no longer occur on the square.

Impacts on route structure and transfers: Impacts on current routes and transfers within downtown Wilmington would be modest. Changes to routes on the city's periphery, however, likely would be significant because routes would be altered to provide more efficient service to peripheral destinations as connectivity between the various regional routes would no longer require a trip downtown. For a transfer-point system to be successful, a change in how transfers occur is essential. Transfers must be centralized and wait times minimized. The routes outside the CBD, as currently drawn, often require long walks between bus stops and unacceptably long wait times—often thirty minutes. This situation leaves transit outside the city as a mode of last resort. The goal of changing to a transfer-point system that connects destinations outside the urban core is to reward riders with competitive travel times. Downtown service, whether hub or transfer point, should coordinate with stops on Rodney Square and Amtrak.

Risk assessment: There is a risk of losing riders early on when adopting a transfer-point system. Conversations with route planning staff at Madison Metro in Madison, Wisconsin, brought up the drop in bus ridership that occurred when this system made the change from hub-and-spoke routing to a transfer-point scheme. Metro experienced an approximately 5 percent drop in riders. Metro staff indicated that this drop appeared to be a longer-term shift.[30] Staff added that, ten years after the switch, the bus system is experiencing record boardings.

CASE STUDY: Making service convenient with multiple transfer points—Madison Metro Transit

Starting in the early 1990s, Madison Metro Transit shifted operations from a hub-and-spoke system focused on Capitol Square in downtown Madison, Wisconsin, to a modified transfer hub on the square and five major transfer points in the outer edges of the city. Additional regional service to rural areas in the Madison commute shed is available at transfer points and Park & Ride lots. Metro adjusted schedules so the system runs time-point transfers, with a target wait time for transfers of no more than five minutes.

Metro does not have a brick-and-mortar transit hub. Instead, Metro offers multiple, smaller transfer points that distribute bus routes throughout the urbanized area. Hub/transfer-point locations include: Capitol Square, which actually is several bus stops/transfer points around the square; West Transfer Point; East Transfer Point; North Transfer Point; South Transfer Point; and Middleton Transfer Point. The transfer points are specifically designed to make "peripheral to peripheral" trips viable for riders. Routes are "anchored" to one of these locations, meaning the routes begin and end at a transfer point. Madison Metro Transit's system map may be found here: http://www.cityofmadison.com/metro/schedules/SystemMaps/WeekdayMap.pdf

[30] Madison Metro staff, telephone interview, June 13, 2012.

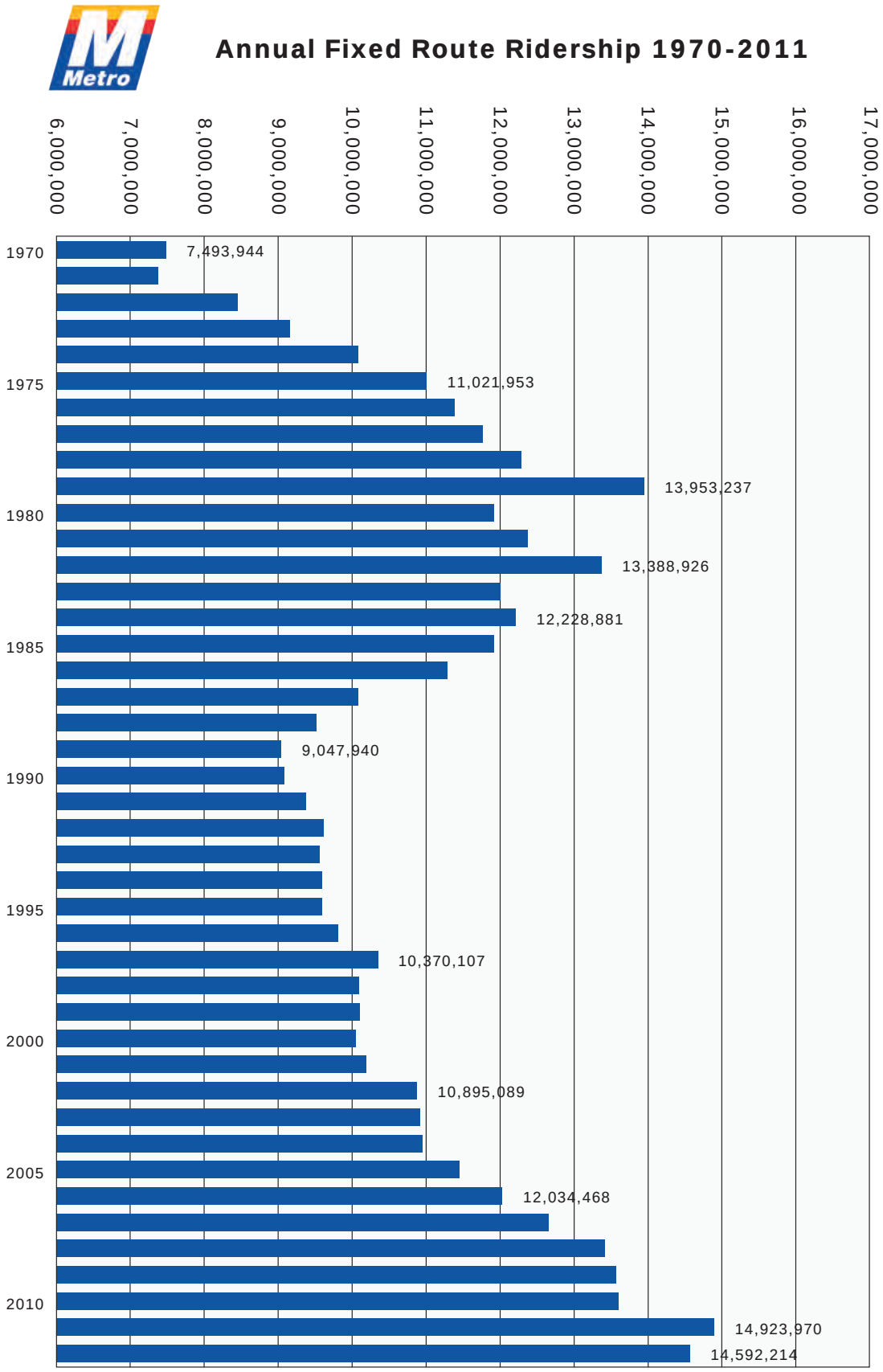

Figure 19: Madison Metro ridership trends

Metro staff cautions that Metro saw a significant drop in ridership for the first few years after the transfer-point system came on line. Metro has more than recovered, however, recording almost 15 million passenger trips in 2011, a record for the system.

Some of the lessons learned through Metro's redesign include:

- Do not underestimate the importance of education and marketing.
- Build transfer facilities to have a minimum useful life of 10 to 15 years.
- Get driver buy-in during the early stages.
- Provide amenities at transfer points, at least for drivers.
- Address potential safety and security issues at transfer points.
- Do not underestimate the importance of providing sufficient service during noncommute times to reach those who may not have typical nine-to-five employment.

Funding Alternatives

FTA offers funding that can assist DTC with planning, design, and capital construction needs associated with making the necessary changes to the transit system in Wilmington. MAP-21 includes many familiar planning/design/construction funding lines. The new transportation bill also offers funding for:

- The Livability Grants program.
- Additional flexibility for bonding programs like TIFIA.
- Joint development (JD) projects; FTA has issued a proposed circular to assist with JD.[31]
- Transit fixed-guideway projects.
- Freeway bus-on-shoulder/express bus projects.
- Bus Rapid Transit projects.[32]

[31] U.S. Department of Transportation, "Federal Transit Administration Guidance."

[32] U.S. Department of Transportation, Federal Transit Administration, "MAP-21: Moving Ahead for Progress in the 21st Century," 2012, www.fta.dot.gov/map21/index.html.

In addition to funds available through FTA, DTC should consider a variety of revenue options, including:

- Increasing fares, both temporarily to raise capital for projects and permanently to sustain the system.
- Partnering with the city and the county to develop dedicated revenue sources that can help fund larger capital projects and service changes benefiting both city and county. One option may be establishing a city-sponsored mobility tax to support transit projects with the revenue being used to fund specific capital or service improvements desired by the region.
- Planning for use of state-owned real estate as part of the required 20 percent match for capital construction projects. DTC is fortunate to own significant property in the City of Wilmington, the value of which could be used for a local match. Additional revenue opportunities include creating a TIF district or pursuing a JD or public-private partnership (P3) for the selected site, which could also lower the taxpayer cost associated with a project.
- Consider entering into a JD or P3 agreement if building a brick-and-mortar facility. Do not limit partnership options to include only a structured parking option. Consider a transit hub on the lower level along with mixed-use commercial/residential. The City of LaCrosse provides an excellent example of a newly constructed bus transit facility developed as a P3. Instead of entering into a contract for providing additional structured car parking, the transit agency opted for mixed-use residential and commercial development.[33]

Figure 20: The LaCrosse Grand River Station.
Source: Gorman and Company

[33] Samantha Marcus, "Take a Look Inside Grand River Station," LaCrosse Tribune, April 20, 2010, www.lacrossetribune.com/news/local/article_e8aee216-4c33-11df-8386-001cc4c002e0.html.

Conclusions and Recommendations

It is important to note that, while this study considers alternatives for siting a brick-and-mortar transit hub in addition to other infrastructure alternatives, the discussion focuses on needed changes from a policy level. The details of any alternative that DART adopts will need to be worked out as DART moves forward to implement the recommended changes.

System Modifications and Capital Improvements

Based on the considerations discussed above, alternative 3, a linear transit corridor with a new transit hub next to the Amtrak station/ Greyhound, offers the greatest possibility for establishing a dynamic transit system that serves Wilmington's entire urbanized area. This alternative addresses the need to improve transit operations in the central city as well as provide improved multimodal opportunities and enhanced regional connectivity in the greater Wilmington metro area. While the transit system within the city remains vibrant, there is unmet need for transit connectivity in the growing employment and residential areas outside of the immediate downtown. The viability of these regional connections will be enhanced if DTCpursues transit-oriented development land use policies adjacent to regional transit hubs.

The recommended alternative provides short-term relief of transit congestion on Rodney Square and offers long-term strategies to make transit responsive to changing employment patterns and demographics in Wilmington and New Castle County. These improved transfer-point/remote hubs can serve express bus routes and transit-oriented development projects.

For the short-term, DART should implement operational changes recommended in the WDCS. While these changes will not solve the problems currently faced by the DART system, they will provide temporary relief by addressing transit congestion downtown. This system should be used as a temporary measure while the planning, financing, and construction of the selected long-term alternative are underway.

The implementation of a long-term solution to the challenges faced by DART will clearly take time. This report recommends DART and DelDOT embark on a feasibility study and data collection effort to determine the details of the system changes that will best position the system for future success.

To support any capital improvements and to maintain the transit system in a state of good repair, DART must address the issue of stagnating fare-box revenue. Fares on the DART system have not kept pace with inflation, effectively reducing the ability of the system to make improvements or even maintain service levels.

Program and Policies

In order to achieve its goals, DTC will need to engage in longer-term planning activities to gather important information that will allow the agency to make sustainable long-term decisions for the transit service. This report recommends improving the quality of available data to allow DTC to engage in informed decision making. DTC does not currently have the necessary data to make a final siting decision for a transit hub. Data needed to make a defensible conclusion on site location include:

- Origin-destination studies.
- Boarding and alighting surveys.
- Data on long-term commuter flows tied to transit ridership.
- Model runs that drill down to tax parcel level. Use scenario analysis tool (available through DelDOT).
- Random-sample interviews of non-transit riders to determine what might get them to try transit.

The following amenities will greatly enhance transit service for riders, drivers, and the community:

- Provide services at the transit hub and/or transfer points. Services should include restrooms for at least the drivers, although public restrooms would also be a benefit.
- Provide an adequate amount of secure bicycle parking. Covered bicycle parking or bicycle lockers will provide a level of security for transit riders. Guidelines for industry-standard bicycle parking are available through the Association of Pedestrian and Bicycle Professionals.[34]
- Locate remote transit hubs or transfer points near commercial outlets to make it possible for transit riders, or drivers on break, to quickly get a snack or run an errand.

[34] Association of Pedestrian and Bicycle Professionals, "Bicycle Parking Guidelines," 2002, www.sfbike.org/download/Bike_Parking/APBPbikeparking.pdf.

It is essential to reach out to the public and stakeholders as early as possible. Public involvement is a key part of this analysis. By discussing alternatives before final facilities are selected, DTC will obtain critical input from system users, drivers, business interests, and the general public. Surveys and public meetings will help determine where people already go on the bus, where they would like to go, and what would get them to start riding.

Figure 21: Intercity Transit, Olympia, WA. www.pedbikeimages.org/danburden