



Route 1 Transit Study SJ292



Background – Legislative Action

- **Senate Joint Resolution (SJ 292) – 2011
General Assembly Session**
Requesting the Department of Rail and Public Transportation to evaluate the level of study necessary to identify and advance potential public transportation services to Fort Belvoir in Fairfax County and the Marine Corps Base at Quantico in Prince William and Stafford Counties

Background – Existing Conditions

- ❑ 27 miles long from the Capital Beltway (I-495/I-95) to Prince William County/Stafford Line.
- ❑ Off-Peak Travel Time (via auto)
 - From Huntington to Fort Belvoir: 20-25 minutes
 - From Huntington to Quantico: 50-55 minutes
- ❑ Travel Time (via transit)
 - Huntington to Fort Belvoir: 20 min. (REX) / 40 min. (Rt. 171)
 - Huntington to Lorton: 50 minutes (Rt. 171)
 - Woodbridge VRE to Quantico: 50 minutes
- ❑ Corridor serves an important north-south link for residents, commuters, transit vehicles, visitors, retail businesses and military installations.
 - “Main Street” for local residents (Mount Vernon District / Town of Dumfries)
 - Access to Activity Centers
 - Alternative to Interstate 95 (traffic congestion, accidents, summer travel)
 - Fairfax Connector 171
 - WMATA REX
 - PRTC Local and Commuter Services
- ❑ Upcoming BRAC action combined with persistent levels of extreme congestion on the corridor prompted Virginia Senator Toddy Puller’s and Delegate Scott Surovell’s Legislative action to conduct a Route 1 Transit Study.



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Existing Corridor-wide Transit Service

- **WMATA – “Rex” Service**
 - King Street Metro to Fort Belvoir Main Post
 - 12 stops / 12 minute peak and 30 minute off peak period headways
 - 35-40 mins. from Huntington Metro to Fort Belvoir
 - Traffic Signal Priority emitter on some buses
 - Limited intersections outfitted to receive signal
 - **Ridership (May 2011)**

• Weekday total	71,386
• Average weekday	3,386
• Saturday total	7,942
• Saturday Average	1,986
• Sunday Total	5,237
• Sunday Average	873
• Monthly total	84,284
- **Fairfax Connector**
 - Route 171 (local route)
 - Huntington Metro to Franconia/Springfield Metro via Fort Belvoir and Lorton
 - Multiple stops / 30 minute headways
 - Fall Service Change will terminate route at Lorton VRE
 - Currently looking to split the 171 route and terminate at Lorton
 - Create new route 371 from Lorton to Franconia/Springfield Metro
- **PRTC OmniLink**
 - Route 1 (Woodbridge VRE to Quantico)
 - 55 stops total (28NB, 29SB) / 50-55 minute headways
 - Route Deviation
 - **Ridership**

• FY11 Total Ridership	91,225
• Average Daily	355
• FY11 Total Saturday Ridership	7648
• Saturday Average Daily	153



Note:

- WMATA, Fairfax Connector, and PRTC have other bus routes that operate on portions of Route 1
- FRED does not provide service to Quantico and there are no plans to provide additional service

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Existing Conditions



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Summary of Background Research

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Studies and Efforts

- Route 1 has been the subject of numerous roadway and transit-related studies and efforts.
 - Fairfax County Comprehensive Plan
 - Mount Vernon District Long-Range Visioning Report
 - BRAC EIS / BRAC Existing Conditions Report
 - VDOT Location Study / Corridor Study
 - Fairfax Connector & PRTC TDP
 - WMATA Regional Bus Study
 - Richmond Highway Public Transportation Initiatives
 - BRT Feasibility Study (Prince William County)
 - Potomac Communities, Urban Land Use Institute Report
 - North Woodbridge Study Area Long Range Plan
 - WMATA US 1 Fort Belvoir to Huntington Metro Rail Station ~ Transit Improvement Study
 - Prince William County BRAC Report
 - NVTC ~ Route 1 Corridor Bus Study 2001

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Transit Related Recommendations

Fairfax County Comprehensive Plan

- Implement enhanced transit service along Richmond Highway, such as Metro, Light Rail, Bus Rapid Transit
- Establish transit stations at North Kings Hwy; at Beacon Hill Road; near Fordson Lane; near Mohawk Lane; near Sacramento; near Railroad line on Fort Belvoir Base; and at Telegraph Road

Fairfax County Transit Development Plan

- Modify schedule for Metrobus 11Y Mt. Vernon Express Line trips
- Restructure and Improve Metrobus REX service
- Increase service and revise routing on Connector 151/152 and 161/162

Prince William County Comprehensive Plan

- Identify and develop alternative transit concepts such as bus rapid transit, light rail transit, Potomac ferry service, Metro Rail extension (Blue Line) to Potomac Mills
- Establish a transit center on Belvoir Road at Pence Gate
- Extend PRTC's Route 1 OmniLink Route from Prince William County to South Post entrance and improving connections to existing transit centers by extending the Metrobus REX line to Lorton VRE and improve local bus connections to the Franconia-Springfield Station

Prince William County / PRTC BRT Feasibility Study (2011)

- Implement two local BRT routes to service the PRTC Transit Center and the Route 1 123 Commuter Lot as land use and ridership demand increase to support the investment
- To offset travel time due to traffic congestion implement queue jump lanes and transit signal priority

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Transit Related Recommendations Continued

Mount Vernon District Visioning Task Force (2010)

- Implement a peak period HOV/bus lane on Richmond Highway
- Encourage VDOT to install traffic responsive technology on all of the traffic signals in the Mount Vernon District

Potomac and Rappahannock Transportation Commission TDP

OmniLink – Route 1 Extension to Ft. Belvoir (timeframe 2011 – 2020)

- Improve weekday peak period service frequency from 30 minutes to 20 minutes,
- Improve weekday midday service frequency from 45 minutes to 30 minutes,
- Improve weekday night service frequency from 45 minutes to 30 minutes,
- Improve Saturday service frequency from 110 minutes to 60 minutes, and
- Add Sunday service at a frequency of 110 minutes

VDOT Centerline Study (2009)

- Widen Route 1 from Capital Beltway to the Stafford County line with accommodations for trails and transit bus pullouts in key locations

Transit Related Recommendations Continued

WMATA US 1 Ft. Belvoir to Huntington Metro Station Transit Improvement Study

Three phases of recommendations:

Phase one (2003 – 2010)

- Streamline bus service and routes
- Add GPS and SmartCard payment technology to buses
- Implement signal priority in the corridor for buses
- Improve/enhance pedestrian and passenger facilities

Phase two (2010 – 2025)

- Implement Bus Rapid Transit

Phase three (2025+)

- Implement light rail transit in the corridor as ridership demand and land-use density and development will support the major capital investment

Infrastructure Recommendations

- Widen Route 1 from the Capital Beltway to the Stafford County line with accommodations for trails, right shoulder bus lane pull-offs and shelters at high-demand stops
- Encourage VDOT to install traffic responsive technology on all of traffic signals in the Mount Vernon District
- Procure and Deploy Traffic Signal Priority on Richmond Highway
- Improve pedestrian network along the corridor and passenger experience at bus stops (e.g., shelters)



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Current Efforts

Transit

- Richmond Highway Public Transportation Initiative
 - \$55 Million Program (\$28 M allocated for initiative so far)
 - Some sidewalk and bus stop improvements completed
 - Route 1 Transit Center (near Fordson Road) – conceptual study
- Fairfax Connector
 - Streamline Route 171 to improve overall route performance
- Fort Belvoir Area / Route 1 Transit Study (Fairfax County)
 - Scoping Underway

Road Improvements

- Route 1 Widening from Joplin and Brady's Hill in Prince William County (near Quantico)
- Route 1/ VA 123 Intersection (Woodbridge)
 - Phased Construction due to funding availability

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Potential “Next Steps” for Transit in the Route 1 Corridor

Near-term

- Improve conditions for transit operations and riders
 - Conduct necessary study and analysis to implement BRT
 - Conduct pedestrian facility and shelter assessment and develop a funding strategy to improve the existing conditions
 - Focus redevelopment to the corridor

Long-term

- Plan for the future:
 - Conduct land use analysis and develop a vision for economic development/redevelopment in the corridor
 - Feasibility analysis to determine potential for extending metro or implementing light rail

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Comparable Capital and O&M Costs

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- Broad Street BRT, 7 miles:
 - \$68M Capital
 - \$5.4M Annual O&M
- The Tide LRT, 7 miles
 - \$300+M Capital
 - \$15M Annual O&M
- Metro Silver Line, 11.6 miles:
 - \$2.5B Capital
 - ~\$50M Annual O&M

Federal Funding Programs

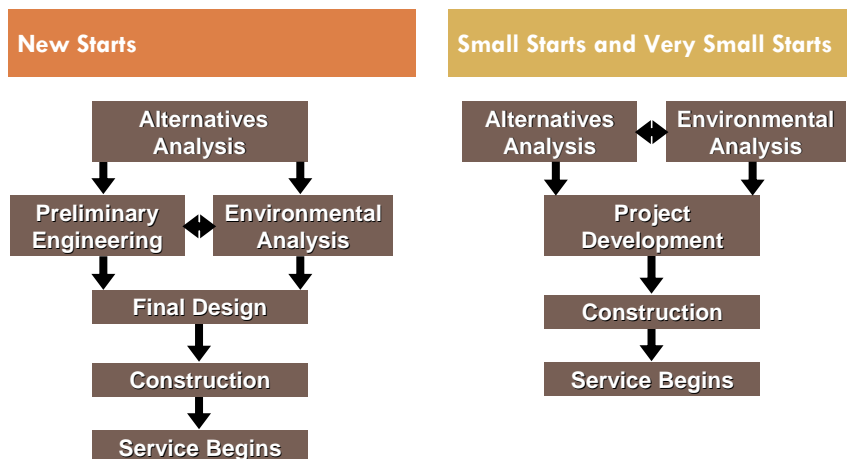
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- Section 5309 provides federal funding for three major project types
 - **New Starts:** Large major capital investment that require significant project planning, environmental analysis and ridership forecasting
 - **Small Starts:** Smaller projects that may pursue federal funds with streamlined planning and ridership forecasting
 - **Very Small Starts:** Very small capital investment requiring a simplified planning process and project criteria



New Starts vs. Small Starts

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Small Starts vs. Very Small Starts

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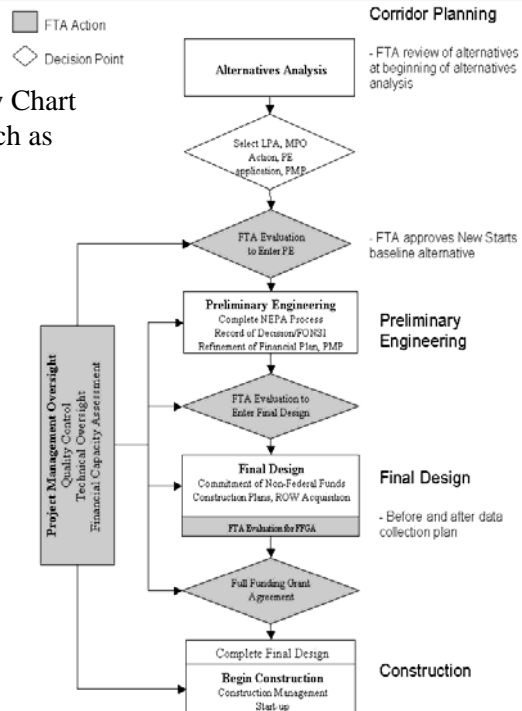
Small Starts

- Fixed guideway for 50% of route during peak hours
- Substantial transit stations
- Signal Priority/Pre-emption (for Bus/LRT)
- Low Floor / Level Boarding Vehicles
- Special Branding of Service
- Frequent Service - 10 min peak/15 min off peak
- Service offered at least 14 hours per day
- Less than \$250M total cost
- Maximum \$75M Federal share

Very Small Starts

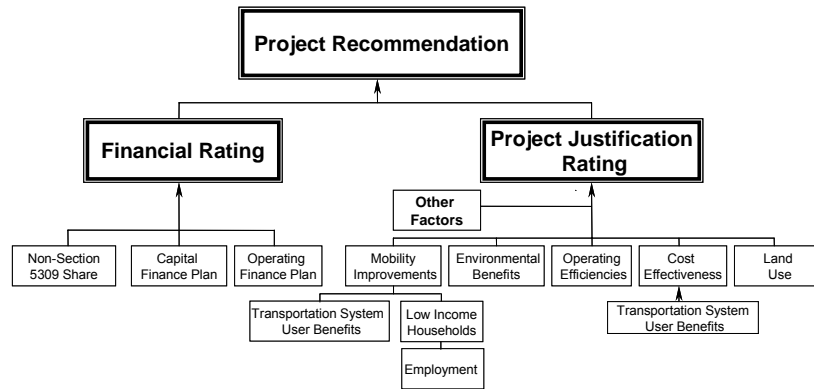
- Transit Stations
- Signal Priority/Pre-emption (for Bus/LRT)
- Low Floor / Level Boarding Vehicles
- Special Branding of Service
- Frequent Service - 10 min peak/15 min off peak
- Service offered at least 14 hours per day
- Existing corridor ridership exceeding 3,000/day
- Less than \$50M total cost
- Less than \$3M per mile (excluding vehicles)
- Maximum \$25M Federal share

FTA “New Starts” Process Flow Chart
for major capital investment, such as
LRT or Metro



FTA 5309 Federal Funding Program Rating Criteria

Rating System:
High, Medium-High, Medium, Medium Low, Low



Minimum Project Development Requirements which must be met:

Metropolitan Planning and Programming Requirements	Project Management Technical Capability	NEPA Process Approvals	Other
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FTA New Starts Rating Criteria

Project Justification Rating (50%)

Cost Effectiveness (50%)

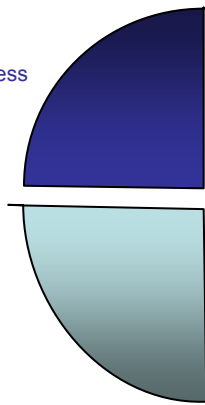
Land Use (50%)

Project Finance Rating (50%)

Non-New Starts Share (20%)

Capital Funding Plan (50%)

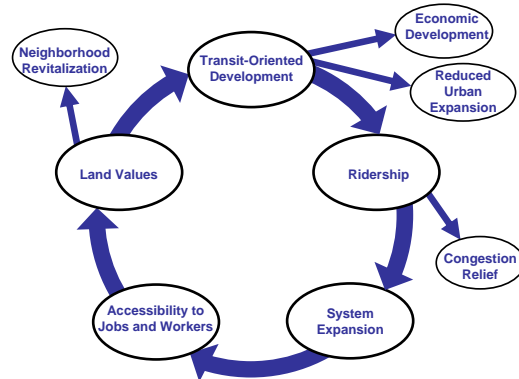
Operating Funding Plan (30%)



Reasons for Land Use Study

Encourage economic development in transit corridors

- Mobility benefits
- Economic benefits
- Health benefits



Definition of Bus Rapid Transit

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- A form of transit using a combination of services, facilities, and branding to provide premium level of service
- Two main objectives
 - Provide travel times comparable to rail
 - Provide a travel experience comparable to rail

Bus Rapid Transit Components

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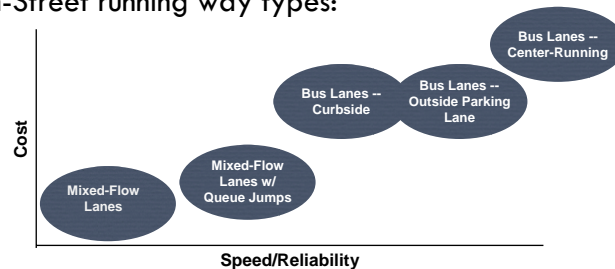
- ❑ Running Ways
- ❑ Stations
- ❑ Vehicles
- ❑ Fare Collection
- ❑ Intelligent Transportation System
- ❑ Service & Operating Plans
- ❑ Branding Elements



Running Ways

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- Critical to determining speed/reliability
- Often most costly feature of BRT system
- On-Street running way types:



- Balance of BRT and general purpose traffic priority



Running Way Types

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Side-running
Boston Silver Line



Center Running
Rouen, France



Dedicated Busway
Ottawa, Canada

Running Way Features

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- Running way markings distinguish running way

(FTA
Requirement)

Signs &
Pavement
Markings

Raised Lane
Delineators

Pavement
Color
& Material

- Running way guidance: higher speeds, precision docking



Curb Guidance



Optical Guidance

Running Way Features

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Lane Delineators



Pavement Markings and Material

Station Examples

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Orlando Lymmo



Los Angeles

Station Examples

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Boston Silver Line



Brisbane, Australia



York, Ontario



Vehicles

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- Symbol of the system
- Impacts to speed, capacity, environment, and comfort



Conventional Standard



Conventional Articulated



Stylized Articulated
(partial low-floor)



Stylized Standard



Stylized Articulated
(full low-floor)



Vehicles

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York, Ontario



Las Vegas



DRPT
Virginia Department of Rail and Public Transportation

GRTC
TRANSIT SYSTEM

Fare Collection

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- Objective is to expedite boarding
- Implications for planning, operations, revenue and ridership

System	Advantages	Constraints	Boarding Speed
On-Board Driver-Validated	Lower cost; no infrastructure outside vehicle	Increased dwell times	★
On-Board Conductor-Validated	Quicker boarding; all passengers checked	Higher labor requirements	★★★★
Off-Board Proof-of-Payment	Multi-door boarding; common to light rail systems	Risk of fare evasion; fare inspector required	★★★★★
Off-Board Barrier System	Multi-door boarding; no fare inspectors required	Intensive infrastructure costs at stations	★★★★★

DRPT
Virginia Department of Rail and Public Transportation

GRTC
TRANSIT SYSTEM

Intelligent Transportation System

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- Transit Signal Priority (TSP)

- ▶ Critical ITS technology

- ↑ Reliability

- ↑ Efficiency

- ↑ Safety



- Two common types: early green & green extension
- TSP ≠ Signal Preemption
- FTA requires signal timing optimization for BRT



Branding

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- Communicates BRT system attributes and performance
- Reinforce impression of premium service




Orlando Lymmo



VIVA Ontario





Land Use Policy Tools

4 D's of Transit Supportive Development:

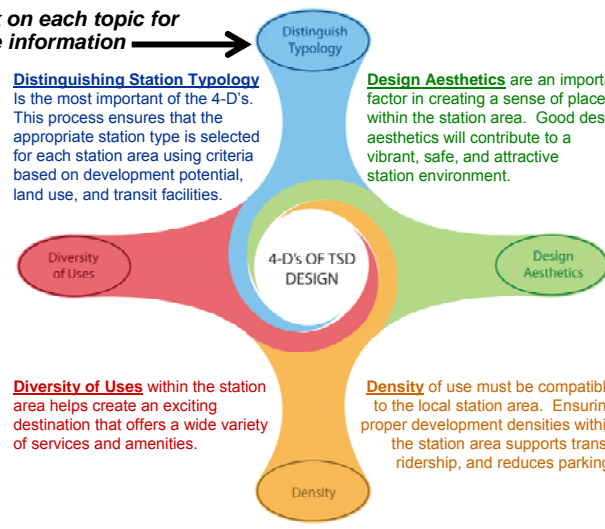
Home Page

Project Introduction
Distinguish Typology
Density
Design Aesthetics
Diversity of Uses

These 4D's represent the major community planning principles of transit supportive development.

Click on each topic for more information →

Distinguishing Station Typology
Is the most important of the 4-D's. This process ensures that the appropriate station type is selected for each station area using criteria based on development potential, land use, and transit facilities.




4-D's OF TSD DESIGN

Design Aesthetics are an important factor in creating a sense of place within the station area. Good design aesthetics will contribute to a vibrant, safe, and attractive station environment.

Diversity of Uses within the station area helps create an exciting destination that offers a wide variety of services and amenities.

Density of use must be compatible to the local station area. Ensuring proper development densities within the station area supports transit ridership, and reduces parking.



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4 D's of Transit Supportive Development:

Density

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Following are important DENSITY considerations for transit supportive development:

- The FTA uses population density as a measure of TSD feasibility and considers low density to be below 3,333 people per square mile (2 dwellings per acre).
- Most locations fall below the density threshold.
- Increased density directly correlates with increased transit ridership.
- Good TSD should offer easily accessible critical services in order to help reduce automobile dependence.



High density development is very transit supportive.

Photo source: Lincoln Institute



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4 D's of Transit Supportive Development:

Density


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- Using structured parking increases density by increasing the availability of developable land.
- Compact building design and infill development strategies are both ways to help increase density.
- Highest density development should be placed nearest transit stations.




2 dwellings per acre or less is considered "low" density

Source: FTA and Lincoln Institute



At least 4 dwellings per acre is considered "medium" density

Source: FTA and Lincoln Institute



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4 D's of Transit Supportive Development:

Design Aesthetics

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Some AESTHETIC treatment considerations for TSD are:

- Use well crafted design guidelines and building standards to create a unique sense of place.
- Scale the size and variety of the development to fit the needs of the local community
- Define community character with coordinated visual treatments like:
 - Streetscape elements unique to the development
 - Unique street signage
 - Way finding elements designed specifically for the TSD
 - Landscape treatments unique to the TSD
 - Varied architectural style and building height
 - Unique entry monuments



Design aesthetics are an important factor in creating a sense of place




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4 D's of Transit Supportive Development:

Design Aesthetics

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Station aesthetics are an integral part of the TSD design process
Graphic source: HNTB



Multi-use pathways help enhance pedestrian access and aesthetic quality
Photo source: Nashville.gov

- Create prototypical design examples to exhibit the desired community look.
- Provide for easy pedestrian access by considering the following:
 - A network of interconnected trails and pathways
 - Place storefront development close to the street
 - Reduce required walking distances by providing direct pedestrian shortcuts throughout the development
 - Match the building scale to suit the pedestrian environment



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4 D's of Transit Supportive Development:


Design Aesthetics

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- Reduce the impacts of automobile traffic by considering the following:
 - Limit or eliminate off-street parking
 - Place off-street parking facilities behind buildings and at the edges of the community
 - Provide structured parking facilities instead of surface parking
 - Limit automobile access to the outer edges of the development
 - Include traffic calming devices along street corridors



Good TSD design provides a vibrant, well lit atmosphere
Photo source: transitgallery.com



Building color, texture, and spacing are all important aesthetic considerations
Photo source: wikipedia.org



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4 D's of Transit Supportive Development: Diversity of Uses

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Some key points to consider when thinking about DIVERSITY OF USES in TSD:

- Mixed-use development is a major factor in creating a vibrant, active community that will have transit supportive population density.
- Successful TSD often has an established employment base located within close proximity to the transit station.
- For a wider variety of options, uses should be mixed within the same building and between adjacent sites.



Uses can be mixed "horizontally" by having a variety of uses in a defined area, including retail, office, residential and parking.
Source: HWYB Corporation



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4 D's of Transit Supportive Development: Diversity of Uses

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- Successful TSD includes a variety of uses like:
 - Public
 - Commercial
 - Residential
 - Office/employment
 - Entertainment
 - Retail
 - Open space




Multiple uses can be mixed "vertically" within a building or block.
Source: HWYB Corporation



Diverse uses promote activity and support transit ridership.
Source: Transit

- TSD should include a wide range of housing choices including:
 - Small lot single-family
 - Multi-family
 - Town homes
 - Lofts above commercial and retail uses
 - Multi-story apartments
 - Affordable housing options




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4 D's of Transit Supportive Development: Diversity of Uses

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- Mixed-use design should consider the inclusion of public uses, examples include:
 - Post office
 - Courthouse
 - Community center(s)
 - Police station(s)
 - Fire house(s)
 - Government center



Mixed use development provides a wide variety of choices for residents and commuters alike
Photo source: <http://www.walshandassociates.com>



Mixed uses, including open spaces, help establish a vibrant and active T.S.D. community
Photo source: Light Rail Central



Five Station Types

Development Potential

Land Use Characteristics

Transit Facilities/Services

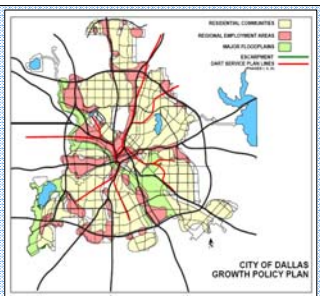
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4 D's of Transit Supportive Development: Distinguish Typology


Project Introduction
4-D's of TSD Home
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How does **STATION TYPOLOGY** facilitate the TSD design process?

- "One size doesn't fit all"
- Typology provides a framework for conceptual, regional level planning.
- Typology provides a framework for determining appropriate design and development standards.
- Typology provides a framework from which to embark on more detailed station area planning.
- Typology facilitates the evaluation of transit impacts on existing development patterns and future land use.




Residential Communities and Regional Employment Areas are the two major station type categories used in determining station typology



Distinguish Typology: 5 Station Area Types

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More Employment Oriented Station Types

Downtown Stations	Downtown Stations are generally located in major employment and cultural centers. Downtown Stations are typically supported by high-density mixed-use development including retail and entertainment uses, major office and commercial development, and moderate- to high-density housing development.	Click to View Local Example
Destination Stations	Destination Stations are generally located in regional employment areas, potentially near special-use venues like sports stadiums and convention centers. Destination stations are typically supported by moderate-density mixed-use development including retail and entertainment uses, office and commercial development, and moderate- to high-density housing development. These station areas also may take the form of a campus that is characterized by a concentration of similar or related non-retail, non-residential uses such as a cluster of education, corporate, governmental and institutional uses with adjacent housing.	Click to View Example
Sub-Regional Center Stations	Sub-Regional Center Stations are smaller than Downtown Stations and are typically supported by medium- to high-density mixed-use development including retail and entertainment uses, major office and commercial development, and surrounded by moderate density residential development. This station type may have a cultural orientation, offering a concentration of arts, cultural and hospitality	Click to View Local Example

More Residential Oriented Station Types

Community Stations	Community Stations are typically supported by moderate- to high-density mixed-use development including retail and entertainment uses, major office and commercial development and moderate-density housing development.	Click to View Local Example 1
		Click to View Local Example 2
Neighborhood Stations	Neighborhood Stations are generally located in residential communities. These walk-up stations typically include single- and multi-family housing supported by low- to moderate-density mixed-use development including live-work units.	Click to View Local Example 1
		Click to View Local Example 2

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For Discussion

“Next Steps” for Route 1 Corridor

- **Prepare for the Future: Develop a vision for Rt. 1 Corridor**
 - Land use analysis
 - Pedestrian oriented destination
 - Transit vs. auto oriented
 - Redevelopment potential
 - Conduct feasibility analysis to determine the potential for implementing light rail or extending metro south in the Rt. 1 Corridor in the 2025 - 2030+ timeframe
- **Immediately implement Bus Rapid Transit by dedicating travel lane between Huntington Metro Station and Ft. Belvoir and improve pedestrian environment**
 - ❖ pursue “Small Starts” or “Very Small Starts” federal funding
 - ❖ advance without pursuing federal funding
 - Conceptual engineering and design
 - Conduct bike and pedestrian connectivity analysis
 - Traffic impact analysis
 - Develop capital and O&M cost
 - Land-use analysis
 - Ridership projections
 - User benefit
- **Immediately improve PRTC service between Quantico and Ft. Belvoir**
 - Expand Route 1 OmniLink Service to Ft. Belvoir
 - Expand OmniRide from 1 to 4 buses as residential development increases

❖ Local Decision Required

Discussion

