2016 motion

HIGH CAPACITY TRANSIT BRIEFING BOOK

Light Rail, BRT, & Rapid Bus

RTA Nashville MTA NELSON NYGAARD

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What is HCT?

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What is HCT?

As part of the nMotion 2016 process, stakeholders have expressed a very strong desire for fast and convenient services. The primary way in which this type of service can be provided is through the development of "High Capacity Transit" or "HCT" services. This is a term that encompasses a variety of services, including commuter rail, light rail, streetcar, Bus Rapid Transit (BRT), Rapid Bus, and others. This document focuses on the development of light rail, BRT, and Rapid Bus, which would be the primary HCT options for Nashville's major pikes and other high volume arterial corridors.*

- **Light Rail.** Light rail provides urban rail service that typically operates in an exclusive right-of-way in areas of higher population and employment densities. It is typically operated with one to three car trains and is designed to serve high volume corridors. Stops are usually spaced farther apart than those of local bus services. Cities implementing new light rail lines coordinate land use and development strategies to stimulate economic development, increase density, and improve walkability around new stations. This must be the case for light rail to be successful in Nashville.

- **Bus Rapid Transit (BRT).** Bus Rapid Transit (BRT) is a high-quality bus service that operates much like light rail, including in dedicated transit lanes. When fully implemented, BRT can decrease travel times, improve corridor safety, and spur economic development. Operational and design elements that set BRT apart from traditional local bus service include enhanced stations with prepayment and level boarding, dedicated transit lanes, wider stop spacing, traffic signal priority, higher capacity vehicles, specialized branding, and more frequent service.

- **Rapid Bus.** Rapid Bus is very similar to BRT, but does not operate in dedicated transit lanes. Instead, most service operates in mixed traffic with targeted measures to provide transit priority, such as queue jump lanes (short bus lanes to bypass backups at traffic signals) and signal priority. Nashville MTA's current BRT-lite service is a low-cost version of Rapid Bus.

Nashville MTA intends to develop a variety of High Capacity Transit services that will provide the underpinnings of a much more robust transit system. Together, they will form a Frequent Transit Network that will provide fast and frequent service for long hours to Middle Tennessee's most important destinations.

**While these three modes would be the primary options for the Metro area and are the focus of this briefing book, there is also potential for additional HCT options such as commuter rail to North Nashville and streetcar to Germantown and the West End.*

Minneapolis, MN Light Rail

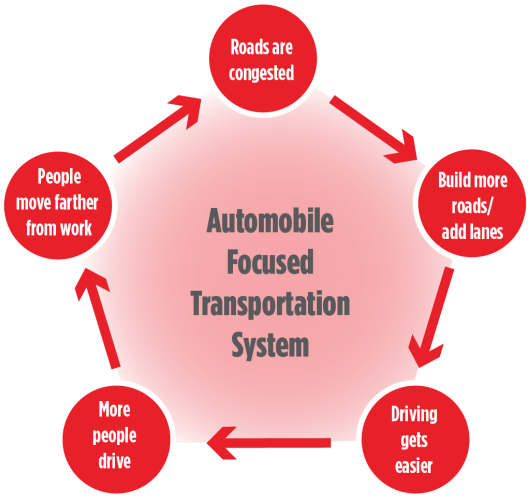
Cleveland, OH Bus Rapid Transit

Los Angeles, CA Rapid Bus

Why Develop HCT in Nashville?

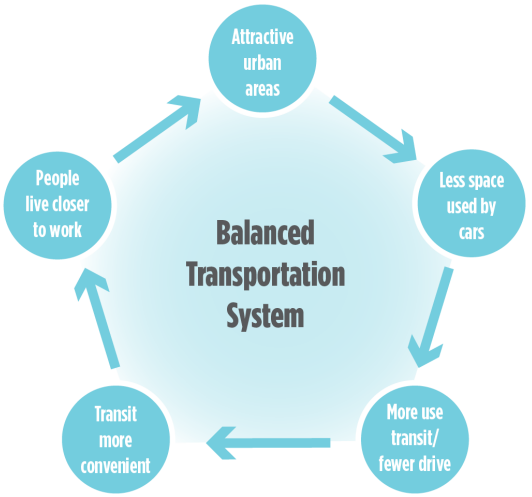
A More Balanced Transportation System

Nashville and Middle Tennessee are among the most sprawling places in the United States. As the region has grown, the transportation emphasis has been on automobile travel. Today, Middle Tennessee and Nashville have many wide roads, severe traffic congestion, and few alternatives to driving. Transit is sparse, and the ability to walk or bike is limited. Many residents and workers must drive even if they would prefer other options. The development of HCT is an important step toward creating a more balanced transportation system for Middle Tennessee.



Accommodate Growth

Middle Tennessee is growing rapidly, and the region's past transportation model is no longer sustainable. While the development of HCT will not eliminate traffic congestion, it will provide a means to accommodate the region's growth. It will not be possible to widen many roads, but it will be possible to use transit to transport more people in less time using the same space, and accommodate the growth that is coming. This is not an effort to make people use transit when they would rather drive; instead, it is an effort to provide choices that people want and that many would elect to use.



Note: Adapted from diagram by David Alpert, The Atlantic Citylab

Salt Lake City, UT

How Does Investment in HCT Serve the Community?

The development of HCT will support Nashville's vision from NashvilleNext, to create more livable, walkable centers and corridors that can accommodate new jobs and a range of housing types. These transit corridors will connect to Nashville's unique neighborhoods and make the pikes an attractive place for people to live, work, and play.

The Benefits

- **More Attractive Service:** HCT is faster, more convenient, more comfortable, and more attractive than regular bus service.
- **More Riders:** Because it is more attractive, HCT services attract more riders than regular bus service.
- **More Business:** The additional riders that HCT attracts increase sales for local businesses.
- **Higher Property Values:** Well-designed HCT services increase residential and commercial property values.
- **New Development:** HCT has a demonstrated effect on generating transit-oriented retail and housing development.

2 The Network

Top Demand Corridors
Multi-Corridor/Frequent Transit Network
HCT Corridors

Top Demand Corridors

The NashvilleNext Growth and Preservation Concept Map and nMotion 2016 provides the basis for the development of Nashville's HCT network. This includes investments in corridors where ridership is already high, where planned development will create significant new demand for transit, and where HCT can spur new development.

Multi-Corridor/ Frequent Transit Network

The HCT network will deliver faster, reliable transit service between centers. The routes will intersect to provide a network of frequent and attractive services to very high numbers of residents, workers, and visitors. HCT projects will be an important element of revitalizing Nashville's pikes.

The network will:

- Provide **enhanced service**.
- Be **frequent**. With service operating every 10 minutes throughout most of the day, riders will be able to use HCT services without a schedule.
- Provide **faster service**. Depending on the corridor, travel times will decrease by 10% to 30%.
- Provide **reliable service**, with trains and buses operating as scheduled.
- **Connect neighborhoods** to downtown, to each other, and to jobs throughout the region.
- Be **comfortable, pleasant, and easy to use**. All aspects of the service will be easy for the rider to understand.
- Be **safe and secure** at stops and on the vehicle.
- Provide **connections** to other MTA and regional routes, and provide easy connectivity between buses and other modes of transportation.
- Support **healthy lifestyles** by providing options for car-less travel, encouraging walking and biking, reducing pollution, and increasing riders' connections to their communities.

Nashville, TN

HCT Corridors

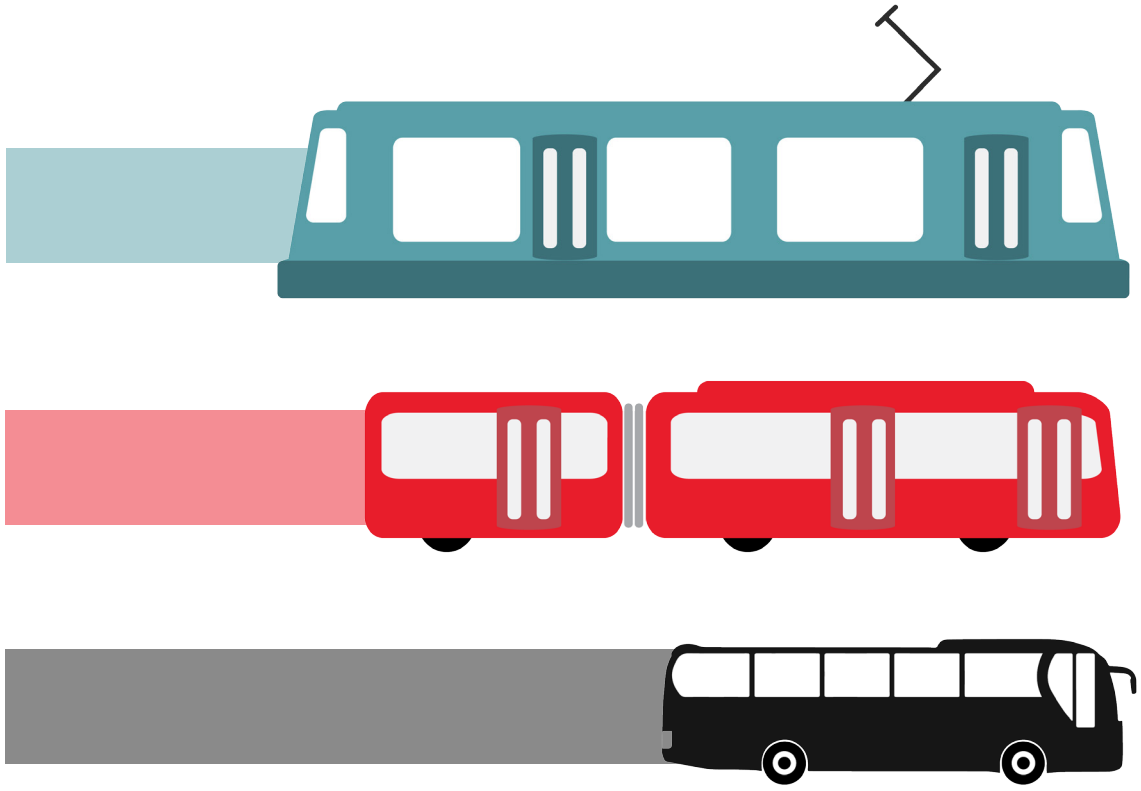
In addition to improved transit service, HCT corridor improvements would build complete streets improvements, including "along the corridor" and "across the corridor" pedestrian improvements. While final decisions have not yet been made, candidate corridors and potential transit modes include the following:

Light Rail, BRT, or Rapid Bus

- Gallatin Pike
- Murfreesboro Pike
- Nolensville Pike
- Charlotte Avenue

BRT or Rapid Bus

- 21st Avenue South/Hillsboro Pike
- West End
- Dickerson Pike

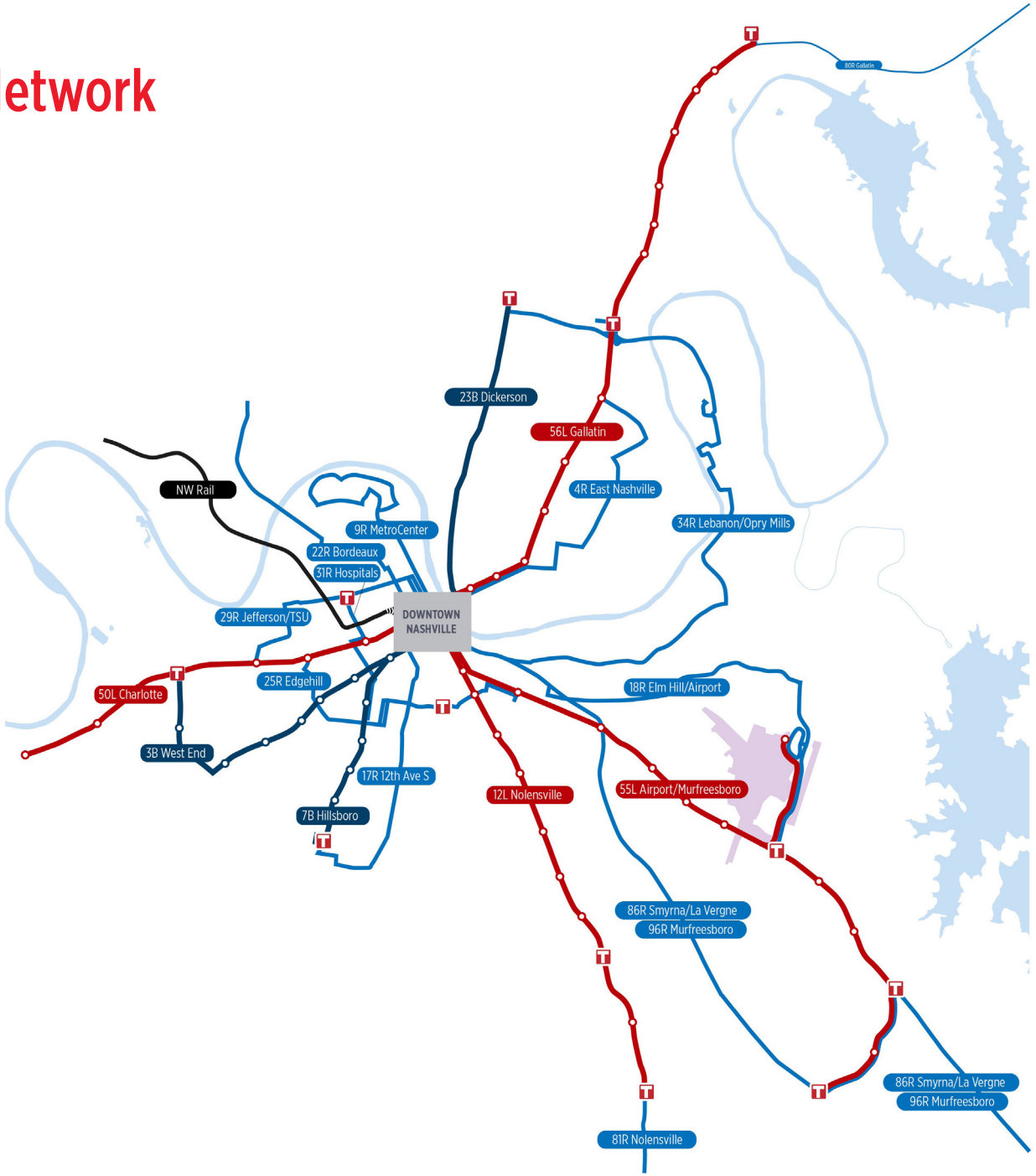


Rapid Bus

- East Nashville between Gallatin Road at Ardee Avenue and downtown via areas east of Gallatin Pike
- MetroCenter to downtown via 3rd Avenue North
- The Mall at Green Hills to downtown via 12th Avenue South
- Murfreesboro Pike to downtown via Nashville International Airport and Elm Hill Pike
- Elm Hill/Airport Rapid between Murfreesboro and downtown Nashville via Nashville International Airport
- Bordeaux to downtown via Clarksville Pike
- Charlotte Avenue to Trevecca Nazarene University via Edgehill Avenue
- Charlotte Avenue to downtown via TSU and Jefferson Street
- Metro General Hospital to Vanderbilt Medical Center via Saint Thomas Midtown Hospital
- Gallatin Pike to downtown Nashville via Opry Mills

Potential HCT Network

- Light Rail
- BRT
- Rapid Bus
- Commuter Rail



3 The Service

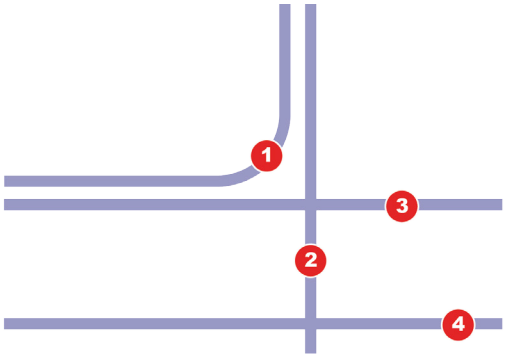
Multiple Routes
Service Reliability
Travel Times
Service Frequencies and Hours of Service
Station/Stop Spacing

Multiple Routes

A primary HCT route would operate in each HCT corridor and, depending upon the corridor, would be either light rail, BRT, or Rapid Bus. In most cases, other routes would also operate in the HCT corridors.

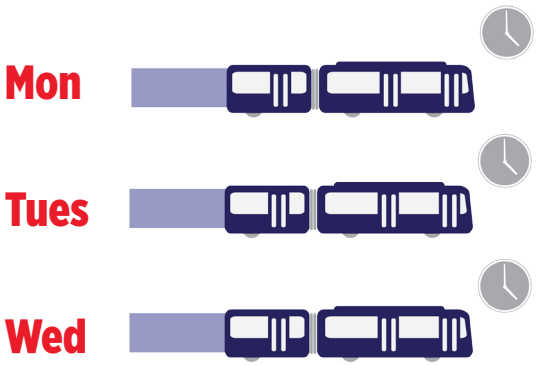
These additional services include:

- Local neighborhood routes that would provide local service in outer areas and then funnel into an HCT corridor into downtown
- Crosstown routes and local circulators that would use one or more HCT corridors as part of their path between starting and ending points
- Express routes that would use the HCT corridors within the urban core to speed service in and out of downtown, through downtown, and from downtown to the West End



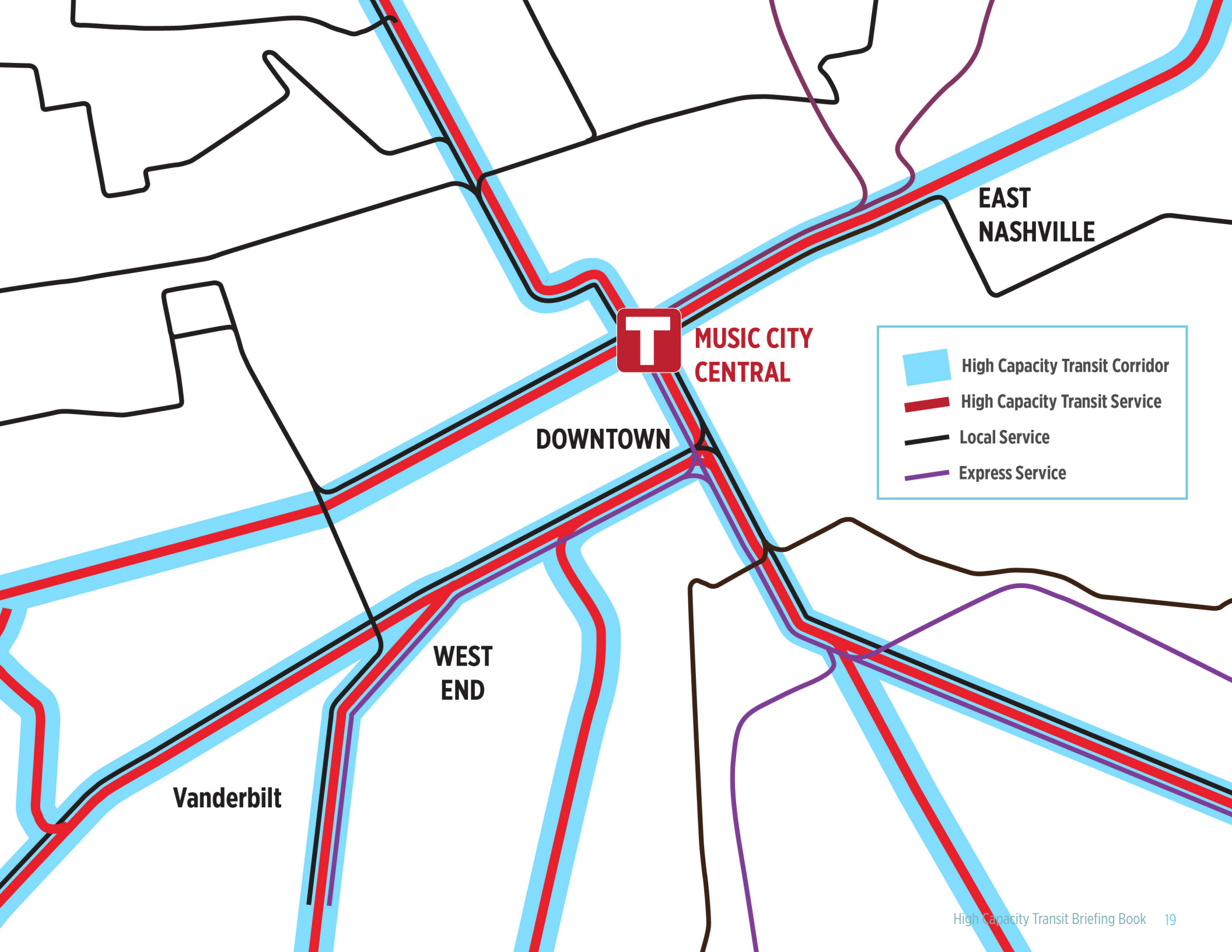
Service Reliability

HCT services will be designed to provide very reliable service, in part through the use of priority measures such as dedicated lanes, queue jump lanes, transit signal priority, and roadway design changes.



Travel Times

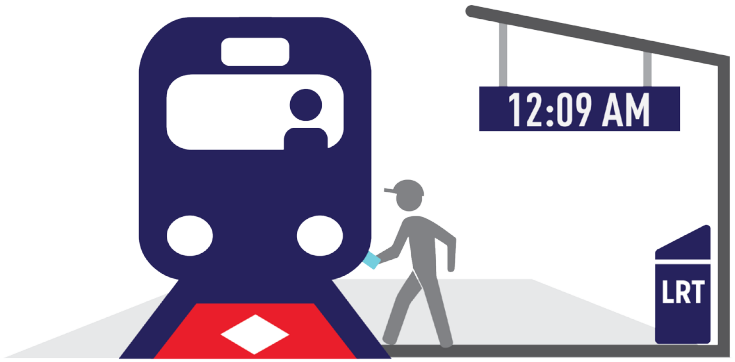
Through the use of dedicated lanes, signal priority, longer stop spacing, and other measures, HCT service will reduce travel times by up to 30%.


EAST
NASHVILLE
MUSIC CITY
CENTRAL
DOWNTOWN
WEST
END
Vanderbilt
High Capacity Transit Corridor
High Capacity Transit Service
Local Service
Express Service

Service Frequency and Hours of Service

HCT services will be designed to take Nashvillians where they want to go when they want to go, on both weekdays and weekends. When fully built out, service will operate at least every 10 minutes throughout most of the day, seven days a week. Service will operate for up to 21 hours per day (from 5 AM to 2 AM).

- HCT arrives every 10 minutes or less from 6 AM to 9 PM
- Service operates 20+ hours on weekdays and extends beyond midnight
- Late night service operates every 30 minutes or better
- Service is frequent in the evening
- Traffic control systems and monitoring ensure service reliability and push information to riders
- Incident response is prioritized to keep transit moving



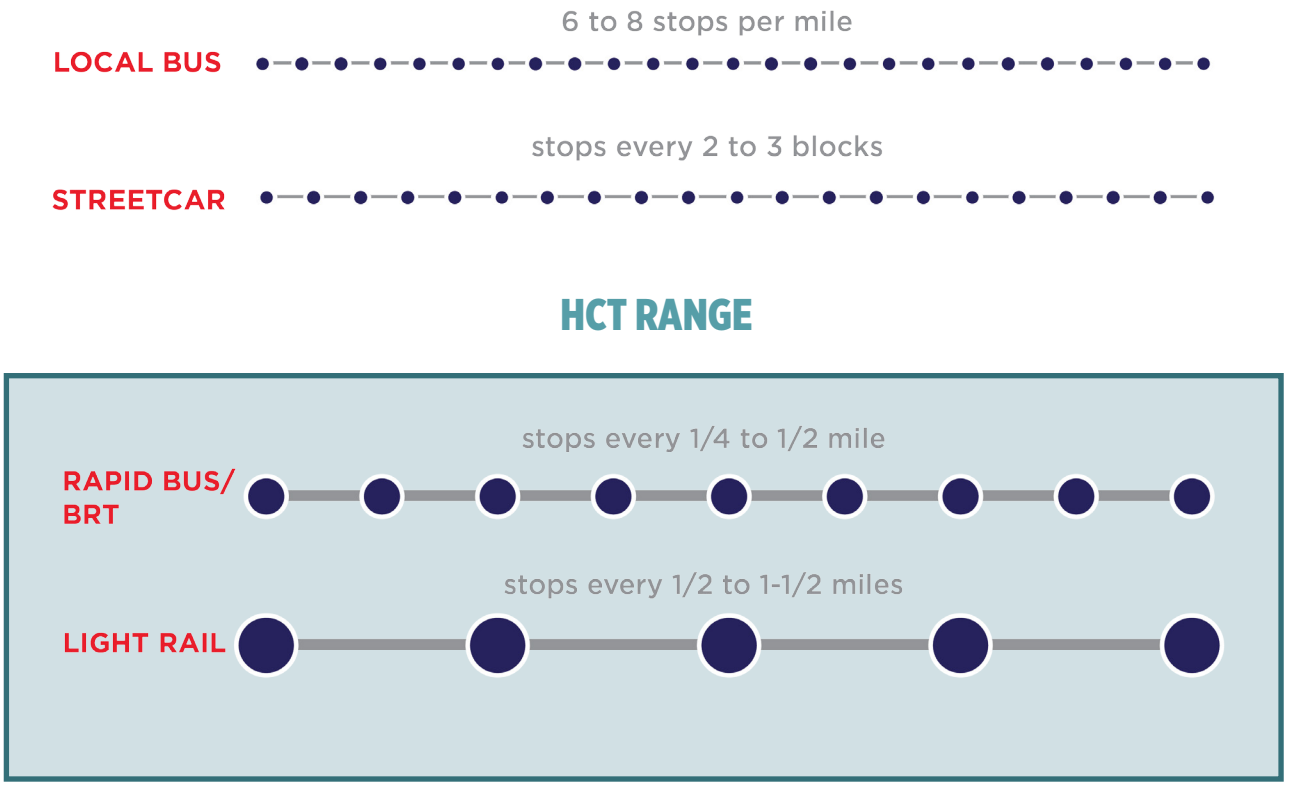
SERVICE 20+ HRS PER DAY

ARRIVALS EVERY 10 MIN OR LESS (6 AM to 6 PM)

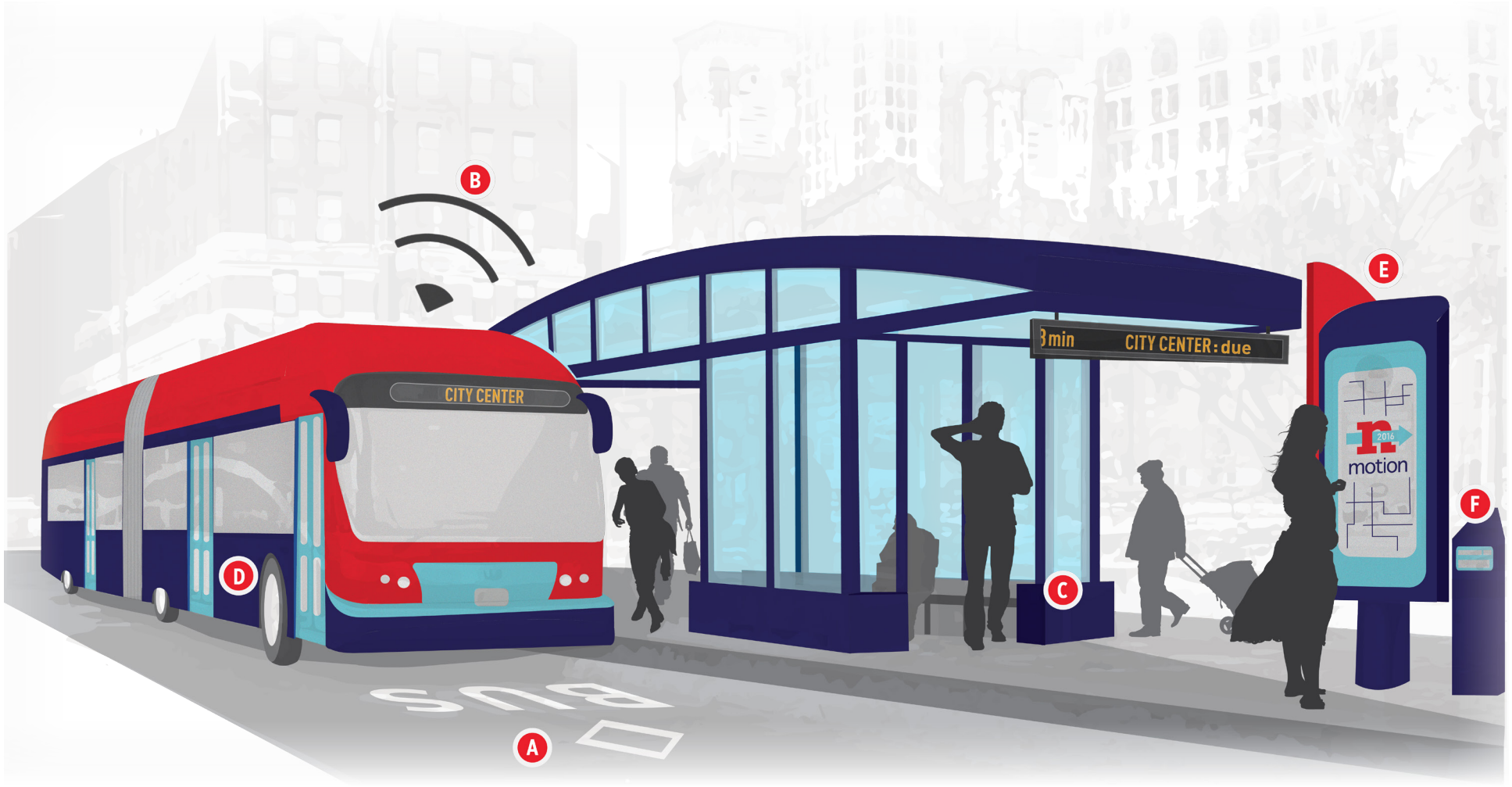
Station/Stop Spacing

In most cases, the HCT service will provide the primary service in each corridor; unlike current BRT-lite service, regular local service with closely-spaced stops will not be provided in the same corridor. (Other services will also operate in many HCT corridors, but these services will be designed primarily to serve other markets.) To create a better balance between speed and walking distances than existing local services, stations will be spaced 1/4 to 1/2 mile apart.

- HCT station spacing differs by mode
- Stations spaced 1/2 mile apart or less do not require underlay service
- Stations are located at major transfer points with high capacity service or intersecting bus routes
- Spacing also may vary depending on topography (hilly areas may warrant tighter spacing, for example)



4 Typical HCT Elements



A. Dedicated Transit Lanes **B.** Transit Signal Priority **C.** Enhanced Stations **D.** Specialized Vehicles **E.** HCT Branding **F.** Off-Board Fare Collection Systems

TYPICAL HCT ELEMENTS | HIGH CAPACITY TRANSIT BRIEFING BOOK

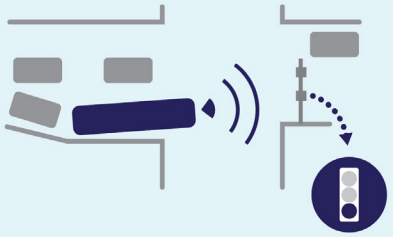
Based on the type of HCT service provided in a corridor, the following elements may or may not be included. For example, light rail would operate in dedicated lanes but Rapid Bus may not.

A DEDICATED TRANSIT LANES

Transit-only lanes separate transit from traffic and are clearly marked to increase visibility.

B TRANSIT SIGNAL PRIORITY

Intersection improvements, including transit signal priority (TSP), allow transit to bypass congestion. TSP gives buses and trains earlier and/or longer green lights.



C ENHANCED STATIONS

Stations include raised platforms, off-board fare payment, real-time arrival information, larger shelters, and other passenger amenities.

D SPECIALIZED VEVICLES

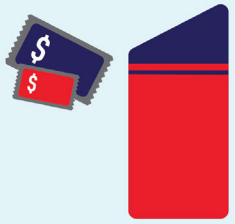
Custom vehicles provide more capacity, more doors, and lower floors for easier loading and unloading.

E HCT BRANDING

Unique designs make transit vehicles and stations more visible, raising awareness of HCT and increasing customer expectations for higher levels of service.

F OFF-BOARD FARE COLLECTION SYSTEMS

Off-board fare collection using ticket vending machines, card readers, and other tools at stations allow passengers to load without waiting in line to pay their fares.



5 Dedicated Transit Lanes and Signal Priority

Center-Running Transit Lanes
Side-Running Transit Lanes
Grade-Separated Transitways
Converting a General Purpose Lane
Queue Jump Lanes
HCT Signal Priority

HCT Running Ways

Clearly delineated transit lanes reduce conflicts between autos and transit. Red lane treatments give HCT services a greater level of visibility, can act as wayfinding for high-quality service, and communicate speed and reliability. This treatment also helps to prevent general purpose traffic from entering the lane illegally and minimizes illegal parking and loading.

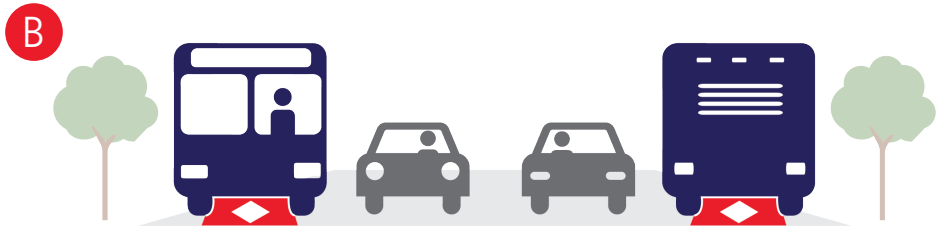
CENTER-RUNNING TRANSIT LANES

A. Center-Running Transit Lanes

B. Side-Running Transit Lanes

C. Exclusive Transit Rights-of-Way

D. Queue Jump Lanes

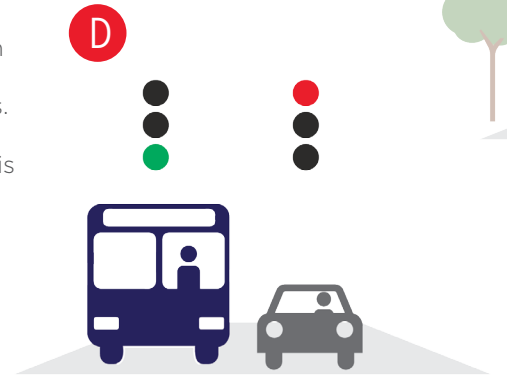


SIDE-RUNNING TRANSIT LANES

ADDITIONAL CONSIDERATIONS

Dedicated transit lanes reduce transit travel times, signal delay, and dwell times. While not preferred, transit-only lanes can be applied intermittently in corridors where a dedicated lane is not feasible from end to end or to allow transit vehicles to bypass congestion at specific intersections or bottlenecks. Enforcement is also important. If the use of dedicated lanes is not enforced, people will abuse them. However, experience in other cities indicates that it is not difficult to keep abuse to a minimum.

EXCLUSIVE TRANSIT RIGHTS-OF-WAY



QUEUE JUMP LANES

Center-Running Transit Lanes

With center-running lanes, transit vehicles operate in the center of a roadway. Whereas transit vehicles traveling in curb lanes can face conflicts from other vehicle traffic, including passenger drop-offs, commercial deliveries, and illegal parking, center-running lanes eliminate most of these conflicts and thus enhance vehicle safety as well as improve transit service speed and reliability.

However, there are two challenges in developing center-running transit lanes. First, a wider roadway is required, since dedicated space is needed for center stations. Second, to ensure fast and reliable transit service, left-hand turns are usually minimized (in a similar manner as when a median island is installed), which can present challenges for access to residences and businesses. Primarily for this reason, in areas where a high priority is placed on transit, center-running lanes are common, while in areas where a higher priority is place on automobile travel, they are less common. In the United States, nearly all street-running light rail systems operate in center medians, while most BRT systems operate in curb lanes. The decision to install a center-running transit lane must take into account existing access points, planned land use changes, and feedback from residents and business owners on transit mode and design.

Side-Running Transit Lanes

Side-running transit lanes are the most common approach to exclusive bus lanes in the United States. In many cases, side-running lanes are easier to implement than center-running lanes as they do not require changes to left turns and can use existing curbside stops. Side-running bus lanes can also provide flexibility for shared use. In some areas, side-running or curbside lanes are used as transit lanes during peak periods and for parking at other times. They are sometimes shared with taxis and/or bicycles. In Seattle, some transit lanes are shared with high occupancy vehicles, which is a model that could be appropriate for Nashville.

However, there are also disadvantages to side-running transit lanes. To maintain access to businesses and turns onto intersecting streets, right turns are usually allowed from curbside bus lanes. In cases where they are adjacent to a parking lane, cars pulling in and out of the parking lane do so from the bus lane. Curbside lanes are also more prone to illegal parking and passenger pickups and drop-offs. All of these actions create friction with transit service and make it slower and less reliable than service in center-running lanes.

Finally, curbside transit-only lanes can sometimes be in contraflow lanes, in which buses travel in the opposite direction of regular traffic. In effect, a one-way street is converted to two-way, with regular traffic traveling in one direction, and buses traveling in the other.

Exclusive Transit Rights-of-Way

In many areas, HCT services operate in exclusive grade-separated transitways. The most common examples are light rail lines that operate in tunnels or on elevated tracks. A common model for many light rail systems, including Boston, San Francisco, and Pittsburgh, is for service to operate on the surface outside of downtown and in tunnels through downtown. Some cities, including Pittsburgh, Hartford, and Los Angeles, also have long-distance exclusive grade-separated busways. Seattle and Boston have downtown tunnels used by buses (and light rail in Seattle).

In Nashville, it is likely that most HCT service would operate on the surface within the rights-of-way of major arterials. However, there could be limited applications for grade-separated transitways, including light rail or BRT in tunnels through downtown.

Eugene, OR

Seattle, WA

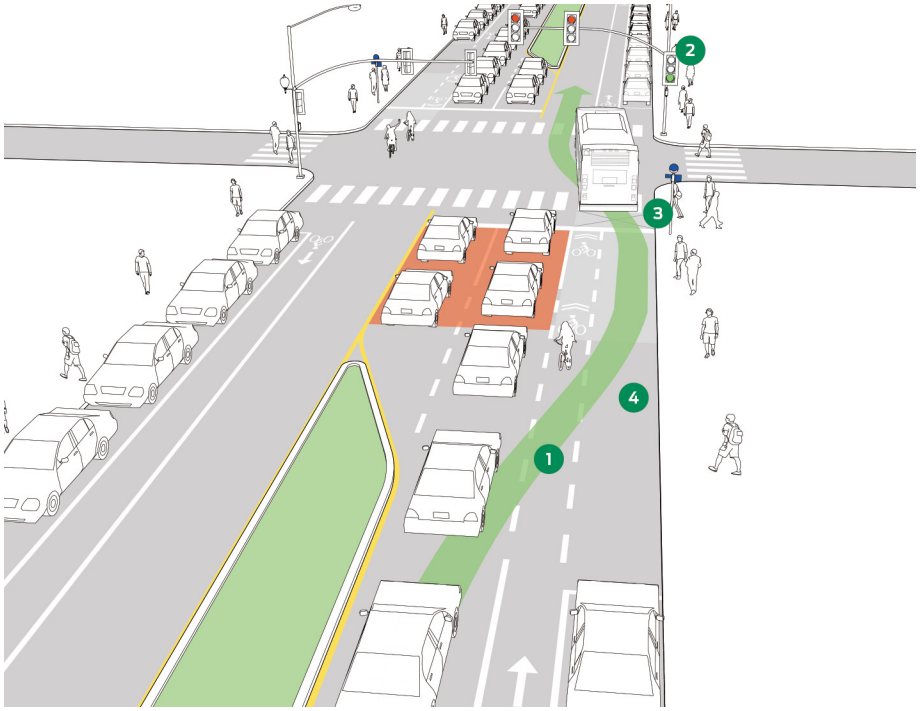
Image: Tunneltalk.com

Converting a General Purpose Lane

CONVERTING A GENERAL PURPOSE TRAVEL LANE TO A TRANSIT-ONLY LANE IS JUSTIFIED WHERE IT **INCREASES THE NUMBER OF PEOPLE THAT A ROADWAY CAN CARRY** AND IMPROVES THE AVERAGE PERSON TRAVEL TIME IN THE CORRIDOR

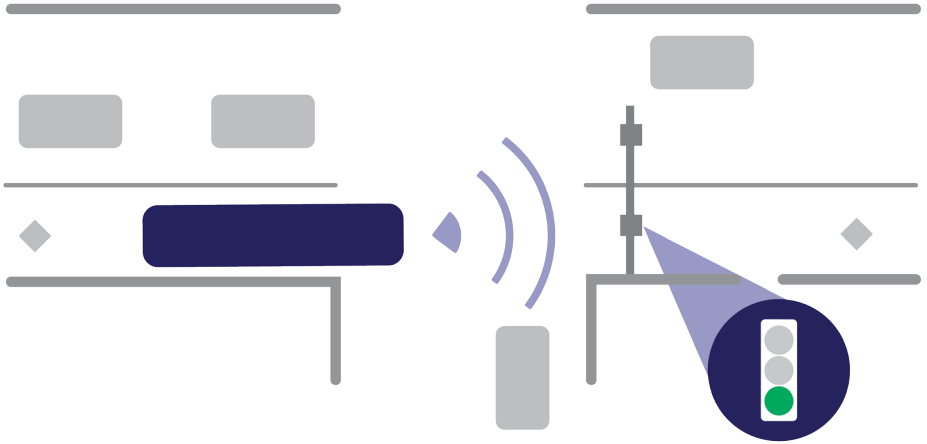
Queue Jump Lanes

In areas where HCT service operates largely in mixed traffic, queue jump lanes provide transit vehicles priority by creating a special lane at intersections that allows buses to move to the front of stopped traffic. The lanes are restricted to transit vehicles only (and sometimes permit right-turning vehicles); this allows a bus to skip to the front of the line at a stop light. Queue jump lanes are often combined with signal priority, where the queue jump lane is provided a green signal before the general traffic lanes.



HCT Signal Priority

Intersections are a primary source of transit delay. Traffic-signal priority activated by an approaching transit vehicle can help to reduce this delay. As the transit vehicle approaches the intersection, the traffic signal stays green longer allowing the transit vehicle to get through the intersection, or the red signal is shortened to reduce the amount of time the transit vehicle is stopped.



HCT SIGNAL PRIORITY

Las Vegas, NV

6 Enhanced Stations

Safe and Comfortable Stations
Station Types
Landscaping, Street Trees, and Art
Station Location in Right-of-Way

Safe and Comfortable Stations

HCT stations are distinguished by their narrow platforms and stations that provide the full suite of amenities—from comfortable seating to weather protection to real-time information so that passengers know exactly when the next bus will arrive.

STATION SIZE

A. Platform width: 12-18 feet; minimum 10 feet (preferable for single direction platform)

B. Platform length: length should exceed the length of the longest vehicle multiplied by the maximum number of vehicles expected to serve the station and stop at the same time

C. Platform area: provide 7 to 10 square feet of pedestrian space per peak hour queuing passenger

PASSENGER COMFORT AND AMENITIES

D. Vertical panels provide weather protection and separation from vehicle traffic (for center-running stations)

E. Ample and comfortable seating and lean bars are available for passengers while they wait

F. Real-time information and other wayfinding information is provided

G. Ticket vending machines can make fare payment easier and reduce vehicle dwell times

LIGHTING AND SECURITY

H. Vertical lighting and security features improve station visibility and safety; video surveillance and emergency call boxes can also be used to improve security

Station Types

All HCT stations would feature a baseline level of amenities expected of an enhanced transit system. Additionally, high volume stations and those that tie into major placemaking or public space opportunities would provide additional features that reflect the aesthetic and community value of HCT stations.

Typical HCT Stations

All light rail and BRT stations would offer a base level of passenger amenity including benches, glass canopy shelters, HCT standalone marker/pylon, technology pylon (with real time information and system maps), off-board fare collection, rub rail for precise docking, safety railing (depending on site conditions), pedestrian LED lighting, trash and recycling bins, schedule kiosk, and bike parking.

Very High Volume HCT Stations

Very high volume stations would include additional features such as magnetic or optical docking guidance, multiple recycling/ trash bins, vending machine, bike locker/bike cages, public art, and additional bike parking.

Urban Place Stations

Urban Place Stations would provide direct links to major developments and public spaces. These stations would include features such as major public art investment, increased tree and landscaping coverage, decorative LED lighting/accent illumination, and additional bike parking. Staffed retail space should be considered in these locations.

Landscaping, Street Trees, and Art

HCT stations serve as community spaces that provide a comfortable and attractive place for people to gather. As stations are built or upgraded, improvements such as street trees, landscaping, and green stormwater treatments can be implemented to soften the landscape.

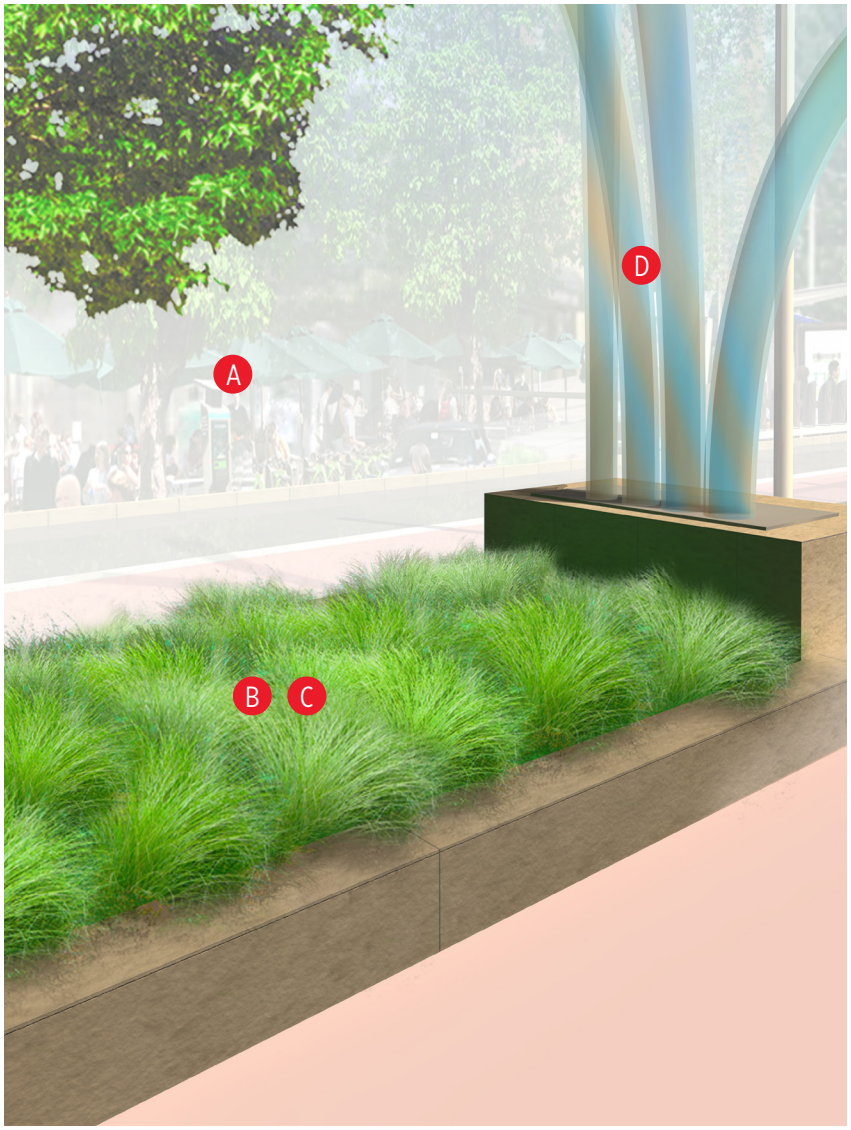
Art and placemaking elements can be incorporated into the station design or added as a stand-alone element.

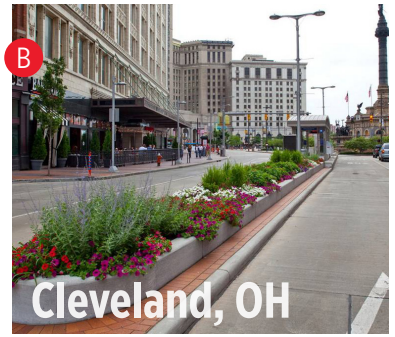
A. Improvements near stations include street trees and landscaping

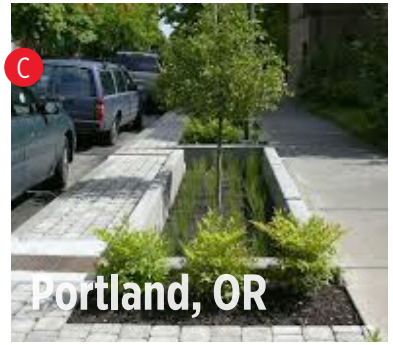
B. Stations incorporate street trees, landscaping, and other green infrastructure where width allows

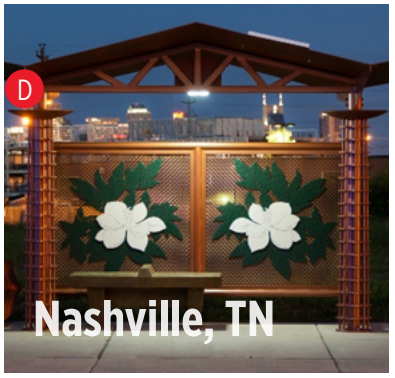
C. Landscaped stormwater treatments bring both function and beauty to the station area

D. Art can be included in a variety of ways









Station Location in Right-of-Way

There are a number of options for station placement. When HCT service is implemented with dedicated lanes, stations can be located in the center median or along the side of the road. Specific station configurations at each station depend on a variety of factors, including available space, pedestrian access and movement, and safety.

Median Stations with Center-Running Transit Lanes

- In areas with high pedestrian activity, center median stations reduce conflicts between sidewalk activities and waiting passengers. However, because a separate area is provided for waiting passengers, center platforms require more street width and are more challenging to locate.
- Center median stations can be aligned to serve both directions of travel or be split to serve a single direction:
  - Single center platforms require left-door boarding, which necessitates the use of special buses.
  - Split center platforms accommodate the traditional right-door buses, which allows non-HCT routes to use the HCT stops as well.
- Pedestrian access can be provided on either end of the station platform to correspond with existing pedestrian crossings at intersections; these crossings should be supported with median noses to reduce exposure to turning traffic.

Curbside Stations with Side-Running Transit Lanes

- Side stations, which are typically located on sidewalks, require less right-of-way width and are easier to locate in narrow corridors.
- Costs to develop side stations are less than for center stations.
- In areas with high ridership volumes, waiting passengers can often crowd out or conflict with other sidewalk activities.


CENTER-RUNNING


SIDE-RUNNING

7 High Amenity Vehicles

High Amenity Vehicles

HCT vehicles stand out from the rest—they are branded with a unique look and feel and have features that facilitate quick and easy boarding. The inside of the vehicles is clean, seats are comfortable, and bike racks on board facilitate seamless bike-to-transit integration.

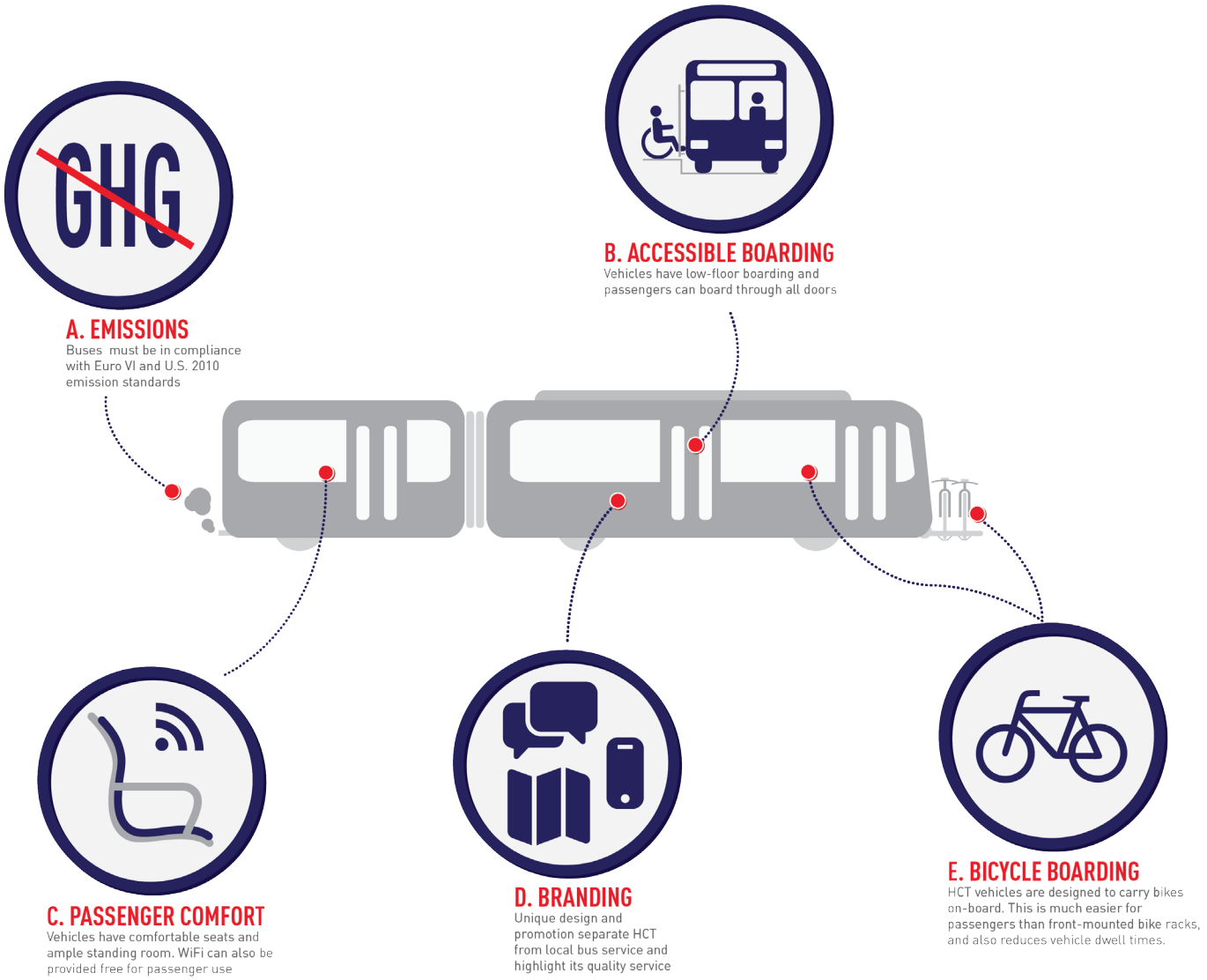
A. Alternative fuel vehicles support reduced emissions

B. Vehicles have low-floor boarding and passengers can board through all doors to speed boarding and alighting

C. Vehicles have comfortable seats and ample standing room

D. Unique design separates HCT vehicles from local buses

E. Vehicles are equipped with 2-4 bicycle racks on board



Bogota, Colombia

8 Unique Branding and Information

Branding
Passenger Information
Wayfinding

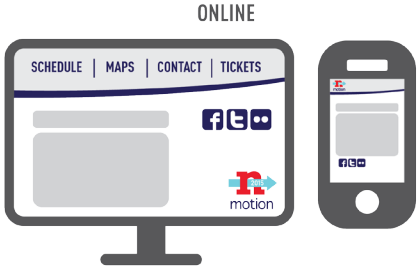
Branding

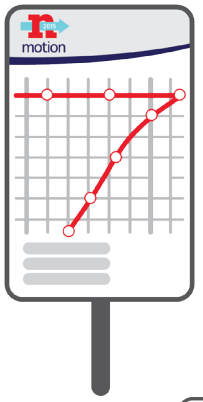
Branding communicates the unique quality of an HCT network. The brand stands for reliability, efficiency, and seamless integration with other modes of travel. All elements of the HCT system are branded, from the vehicles to the real-time information and wayfinding.

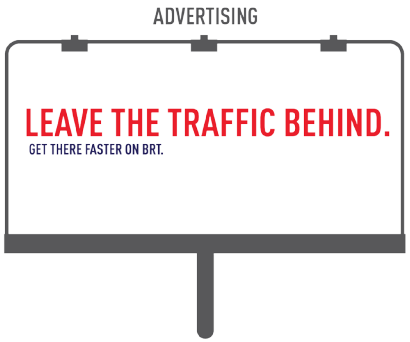
A. Unique brand and identity reinforces promise of high-quality service

B. Brand is distinct from, but also fits in with, the larger system

C. Brand is graphic and intelligible and accessible to English and non-English speakers







Hartford, CT

Los Angeles, CA


King County METRO
RAPIDRIDE
E Line
Shoreline
Aurora Ave N
Greenwood Ave N
Meridian Ave N
Sounder Commuter Rail
N 200th St
N 192nd St
N 185th St
N 180th St
N 175th St
N 170th St
N 165th St
N 160th St
N 155th St
N 152nd St
N 145th St
N 135th St
N 130th St
N 125th St
N 115th St
N 105th St
N 100th St
N 95th St
N 90th St
N 85th St
N 80th St
N 76th St
N 72nd St
N 70th St
N 65th St
N 46th St
N 45th St
MAPLE LEAF
UNIVERSITY DISTRICT
QUEEN ANNE
CAPITOL HILL
Downtown Seattle
ELLIOTT BAY
Lynn St
Galer St
Denny Way
Bell St
Virginia St
Pike St
Seneca St
Cherry St
Yesler Way
KEY
Station
Stop
Northbound Only Stop
Temporary Stop
Commuter Rail
PRESS BUTTON FOR AUDIO MESSAGE.
orca
RapidRide Only
6 AM - 7 PM
Tap your ORCA
WELCOME
PLEASE
TAG CARD
orca

Seattle, WA

Passenger Information

HCT schedules and station names are clearly marked at all stations. Arrival information is available online, on apps, and at the stations in real-time so that passengers know exactly when the next bus or train is scheduled to arrive. All passenger information tools use the established HCT brand to communicate quality and consistency of service.

A. Real-time information signs show exactly when the next bus is scheduled to arrive

B. Station names are clearly marked

C. Station design aesthetics are consistent with the HCT brand

Wayfinding

Maps and other wayfinding devices help riders orient themselves when they get off HCT at the station. Major destinations, bicycle routes, and other multimodal connections should be easily accessible for passengers when they get off the bus or train.

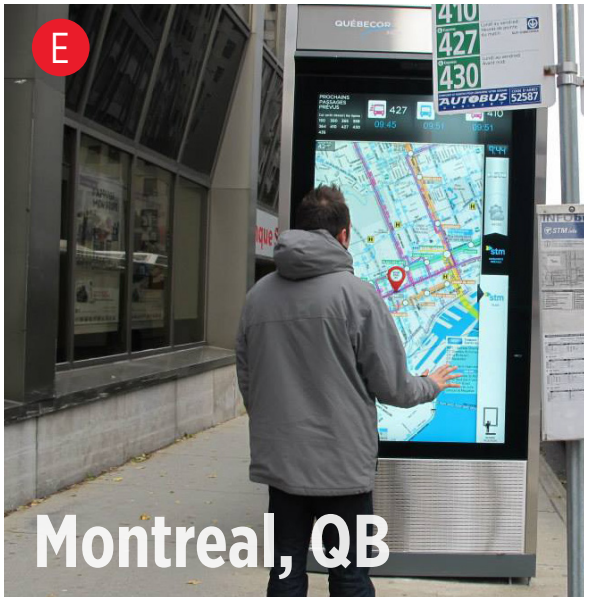
D. Clear wayfinding and maps help passengers orient themselves

E. Interactive maps help passengers make multimodal connections and navigate to destinations throughout the city

F. Tall, unique signage helps passengers identify HCT stations from a distance


C
NexTrip
C
Ride free, ride green along Nicollet Mall
FREE RIDE
Pay no fare on buses marked "Free Ride"
Metro Transit
Minneapolis, MN


D
B44 Avenue U 0
B44 Avenue U 0
B44 Knapp Street 1
B44 Avenue U 2
FRI MAR 21 08:01 AM
NYCDOT
New York, NY


E
QUÉBECOR
410
427
430
AUTOBUS 52587
Montreal, QB


B
SOUTHBOUND
MAX is running every 10
PROSPECT
TICKETS
max
SOUTHBOUND
Fort Collins, CO


F
Swift
AURORA VILLAGE
01
Swift
Everett, WA

9 Convenient Access

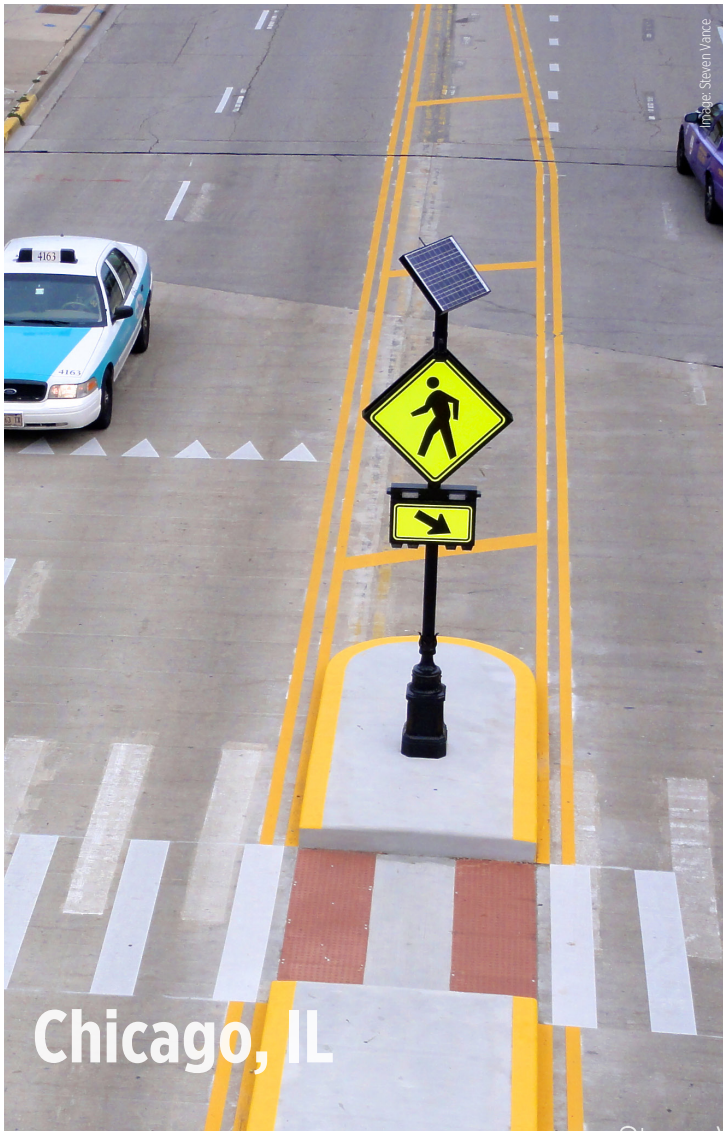
Pedestrian Access
Universal Access
Bicycle Integration

Pedestrian Access

Virtually all transit riders are also pedestrians, and poor pedestrian conditions throughout much of Nashville create a major barrier to transit use. This is especially the case along the city's major pikes where HCT services are planned. Common problems include a complete lack of sidewalks in many areas that make it difficult to get to and from stops, crossings that are spaced very far apart, and a lack of accessibility for those with mobility impairments. Smart Growth America's 2014 "Dangerous by Design" report ranked Nashville as one of the most dangerous places to walk in the United States.

A good pedestrian environment is an essential foundation for good access to HCT stops and stations. Pedestrian access refers to the extent to which the pedestrian environment, amenities, and infrastructure support people in reaching HCT services. Well-designed, pedestrian-oriented infrastructure increases the safety, comfort, and enjoyment of the entire transit trip. Gaps in the sidewalk network, stops along high speed roads, and insufficient waiting areas all contribute to less attractive facilities and can deter transit riders.

Pedestrian infrastructure includes an array of amenities and improvements, such as wide and textured sidewalks, curb ramps, marked crossings, and pedestrian signals. A sidewalk or walking path and a safe crossing are critical for all types of stops and stations.



- **Wide Sidewalks:** Continuous sidewalks should be at least 8 feet wide and seamlessly connected to the sidewalk network in the area. A wide and accessible sidewalk network should be complete within a half-mile of every transit stop and station.

- **Curb Extensions:** Streets that have on-street parking typically have a required set-back from an intersection to increase visibility. This "dead space" at the intersection can be rededicated to expand the pedestrian realm and reduce crossing distance.

- **Well-Marked Crossings:** Transitions and street crossings should be well-marked and preferably include raised crossings that prioritize pedestrians. Raised crossings are better for people walking and rolling and also serve as a traffic calming measure.

- **Signals:** All signals should have a pedestrian countdown and, if necessary, a push-button to allow a pedestrian to request a crossing. Pedestrian-only crossing phases at very busy locations—such as downtown—allow pedestrians to cross an intersection in any direction. Leading pedestrian intervals give pedestrians a few seconds of "head start" to claim the crosswalk ahead of turning traffic.

- **Pedestrian Refuges:** Many MTA stops are far from signalized intersections. In these cases, crosswalks with pedestrian refuges can make crossings much safer and more comfortable.

San Francisco, CA

Madison, WI

Washington, DC

Universal Access

HCT stations are universally accessible to reduce barriers and vertical obstructions and ensure people of all ages and abilities can access transit safely and seamlessly. The transition areas between the station and the neighborhood are clearly marked to improve safety. Curb ramps are available for people with disabilities, families with strollers, and travelers with luggage.

A. Crosswalk markings indicate a safe place for pedestrians to cross the road and access the station

B. Curb ramps, facility ramps, and tactile surfaces make station access safe and easy for people of all ages and abilities

C. A pedestrian refuge provides a place for pedestrians to rest and wait and physical separation between pedestrians crossing the street and vehicles passing by

Bicycle Integration

Seamless integration between bicycling and HCT can help to solve the last mile problem for people that choose to bicycle for a leg of their journey. Safe and comfortable bicycle facilities and secure places to park a bike are essential to expand the "reach" of the HCT network—allowing people to travel from further away to access a station.

Short-Term and Secure Parking at Stations

Short-term bike parking allows people arriving by bike a place to park for 2 hours or less. Secure bike parking at stations provides bicyclists a "worry free" place to store their bike and continue their trip on transit.

Bikeways

Bicycle access to HCT stations should consider the needs of bicyclists of all ages and abilities by providing safe and convenient access to stations. This means providing dedicated bikeway facilities such as protected bike lanes, multi-use paths, or designated low-traffic, low-volume neighborhood greenways that access HCT stops and stations. Where on-street bikeways cross major intersections, enhanced crossing treatments should be used.

Bicycle-Sharing Integration

Having bike share stations located near HCT stations maximizes the effectiveness of both public transportation systems. People can quickly and easily use bike share to arrive at or depart from a transit station.


Portland, OR

Redwood City, CA


Seattle, WA

Washington, DC

Oakland, CA

10 Economic Development and Revitalization

Economic Development

Major transit projects have been proven to stimulate complementary economic development. In summary, the proposed improvements would be expected to provide benefits in terms of:

- **New Development:** Major new transit investments typically stimulate new development around stations and, in some cases, along the entire line. Other transit investments, such as transit centers, can also stimulate development, or be constructed as part of joint development projects. In addition, BRT lines that include significant infrastructure—Cleveland's Health Line is a primary example—can also stimulate new development.
- **Consumer Spending:** Transit investments tend to increase consumer spending around transit centers and along major transit corridors. This is due, in part, to the larger retail and business market access that transit provides for these areas, but also because transit riders make day-to-day use of service businesses (such as grocery stores, pharmacies, and general merchandise retail) that are convenient to transit.
- **Property Values:** There are numerous examples that property values increase due to transit proximity. In addition, national socio-economic shifts, especially with regard to younger generations and their demonstrated preferences to drive less and locate in walkable, mixed-use areas, are more welcoming to both transit use and land uses surrounding transit.
- **Land Development Values:** Economic and land development returns attributed to transit investment have also been shown to be significant, and far exceed the cost to plan, design, and construct the transit infrastructure.
- **Business Benefits:** Transit benefits for business are reflected in two principal ways: the improved business climate for retail businesses, which is closely linked to the increased amounts of consumer spending associated with transit projects, and the potential for increased operational efficiency of any business type.
- **Individuals' Transportation Costs and Productivity:** Transit can offer individual and household savings on transportation costs, especially when compared to the costs of owning and operating a vehicle.

Revitalizing the Pikes

NashvilleNext, the city's long-range plan for growth and preservation, is designed to focus more jobs and housing along the pikes and other major arterials. Nashville MTA's HCT planning efforts support NashvilleNext and will help stimulate the envisioned development. While HCT projects will provide excellent service to the corridors as they exist today, the projects will be designed to serve the new, more vibrant corridors that will emerge over the next 25 years.

11 Summary

Summary

A combination of the development vision and tools created through NashvilleNext and the implementation of HCT in targeted corridors provides the opportunity to transform Nashville—by creating more livable neighborhoods and vibrant commercial districts, and a more balanced transportation system that includes convenient and attractive transit. These changes will make Nashville more competitive, more prosperous, and a more compelling place to live, work, and visit.

Existing view of Nolensville Pike south of Craighead St.

Rendering of a potential scenario for Nolensville Pike south of Craighead St.

Source: Healing the Pikes, Nashville Civic Design Center