HIGH CAPACITY TRANSIT BRIEFING BOOK

Light Rail, Streetcar, Bus Rapid Transit, and Rapid Bus

onboard
YOUR FUTURE TRANSIT PLAN

RTC

onboard
YOUR FUTURE TRANSIT PLAN

RTC

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GLOSSARY

High Capacity Transit (HCT)

High capacity transit (HCT) refers to faster, higher-volume transit services in busier, denser travel corridors. HCT services typically move more people faster and more efficiently than regular bus services, and operate seven days a week from early morning until late night.

Light Rail Transit

Light rail provides regional or local rail service that operates with one to three car trains in high volume corridors. Service typically operates in dedicated lanes in roadway medians, although underground and elevated service can also be provided. Vehicles are powered electrically, with power drawn from overhead wires.

Queue Jump Lanes

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, allowing only the bus to skip to the front of the line at a stop light.

Boarding and Alighting

Boarding is the act of getting on or into a transit vehicle (bus, train, streetcar, etc.). Alighting is the act of getting off a transit vehicle. The "number of boardings or alightings" are the number of people who get on or off of a transit vehicle.

Bus Rapid Transit

A high-quality bus service that operates much like light rail, providing frequent, rapid service in dedicated transit lanes.

Rapid Bus

A high quality bus service that is similar to Bus Rapid Transit, but without dedicated transit lanes, or dedicated lanes in only limited areas.

Frequency

How often a bus or train arrives at any given stop or station. HCT aims for a frequency of service at least every 15 minutes during peak periods and every 20 minutes during off-peak periods.

Transit Signal Priority (TSP)

Traffic signal technology that gives green light priority to buses and streetcars, allowing public transit to bypass traffic congestion.

First Mile/Last Mile Connections

Refers to connections to and from transit stations or transit hubs. These include a variety of options such as walking, biking, taking a private shuttle, using a ride-hailing service such as Uber or Lyft, a taxi, and more.

Transit-Oriented Development (TOD)

Transit-oriented development, or TOD, is development that includes a mixture of housing, office, retail and/or other amenities integrated into a walkable neighborhood that is well connected with quality public transportation.

Regional Transportation Commission (RTC)

The Regional Transportation Commission of Southern Nevada (RTC) is a regional entity that oversees public transportation, traffic management, roadway design and construction funding, and transportation planning for Southern Nevada. In addition to being a public transit agency, the RTC serves as the region's Metropolitan Planning Organization (MPO) and distributes federal funding to transportation projects across Southern Nevada.

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INTRODUCTION

- What is On Board?
- What the High Capacity Transit Plan?
- Why?
- What is High Capacity Transit?
- High Capacity Transit Modes
- What are the Benefits of High Capacity Transit?

What is On Board?

On Board is our community's comprehensive transit plan for Southern Nevada.

This visionary plan will identify how high capacity transit services, enhancements to the current bus system and emerging transportation technologies can improve future mobility and accessibility for our residents and visitors.

The plan is expected to take approximately 18 to 24 months to develop and be completed by fall 2018.

What is the High Capacity Transit Plan?

The High Capacity Transit component of the plan will identify the corridors where enhanced transit services such as bus rapid transit, streetcar, or light rail would provide the most benefit to riders and the surrounding community. The plan will identify and prioritize services and related improvements for future implementation based on a thorough analysis of existing conditions, planned and predicted conditions, and stakeholder and community input. It will also identify how commercial and residential development along the designated corridors can support or result from HCT services.

Why?

Congestion is only going to increase, and we can't build our way out of it.

Today, just over 2 million of us call Southern Nevada home and more than 42 million people visit each year. By 2025, Clark County's population is expected to grow to 2.7 million while visitor volume is expected to grow to 53.1 million visitors per year.

We need to find multiple ways to move people reliably and efficiently, and On Board will help identify solutions to this challenge.

STREETCAR ATLANTA, GA

LIGHT RAIL DENVER, CO

BUS RAPID TRANSIT SALT LAKE CITY, UT

What is High Capacity Transit?

High capacity transit (HCT) refers to faster, higher-volume transit services in busier, denser travel corridors. HCT services typically move more people faster and more efficiently than regular bus services, and operate seven days a week from early morning until late night.

On Board will identify the corridors where HCT services such as bus rapid transit, streetcar, or light rail would provide the most benefit to riders and the regional economy.

High Capacity Transit Modes

- **Light Rail Transit (LRT).** Light rail provides regional or local rail service that operates with one to three car trains in high volume corridors. Service typically operates in dedicated lanes in roadway medians, although underground and elevated service can also be provided. Vehicles are powered electrically, with power drawn from overhead wires. Light rail stations 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.
- **Urban Light Rail.** Urban Light Rail is similar to light rail in nearly all respects except two. First, it operates in more densely developed areas, and second, it operates in curbside lanes that are also used by cars to turn right at intersections and in and out of businesses.
- **Streetcar.** Streetcars, also known as trams or trolleys, are typically single-train railcars (often articulated) that operate in mixed traffic on city streets, making either curbside or center lane stops on embedded tracks. Although they operate at slower maximum speeds, streetcars often run through business districts, making frequent stops and providing a smoother ride as compared to buses. They are also often very effective in stimulating economic development.

TRAX LIGHT RAIL SALT LAKE CITY, UT

SUN LINK STREETCAR TUCSON, AZ

High Capacity Transit Modes

- **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 and fixed guideways as part of the right of way. When fully implemented, BRT can decrease travel times, and spur economic development. Operational and design elements that set BRT apart from traditional local bus service include dedicated transit lanes, enhanced stations with prepayment and level boarding, wider stop spacing, transit 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, or does so only in limited areas. 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. RTC'S SDX line is a version of rapid bus service operating largely without dedicated transit lanes, except in limited segments.

ORANGE LINE - BRT LOS ANGELES, CA

STRIP & DOWNTOWN EXPRESS (SDX) - RAPID BUS LAS VEGAS, NV

How does High Capacity Transit Benefit Southern Nevada?

1 Makes Southern Nevada a better place to live and work.
Transit services increase access to jobs, schools, shopping, entertainment and recreational opportunities. Fast, convenient and enjoyable service will increase access to many resources.

2 Attracts talent and makes Southern Nevada more competitive.
Quality transit service helps to attract and retain a talented work force.

3 Supports accessibility and reduced costs.
Transit reduces household transportation costs and provides fast access to residents who are not able to or cannot drive, allowing them to get to work, shopping, medical appointments, and social activities.

4 Supports responsible growth.
Transit supports growth by moving more people within the same right-of-way footprint—accommodating new residents and employees efficiently. Well-designed transit services increase property values.

5 Contributes to health and safety.
Transit riders walk an average of 19 minutes per day, nearly reaching the Center for Disease Control's recommendation of 22 minutes a day of moderate aerobic activity. Transit services have lower accident rates than travel by personal automobile.

6 Makes Southern Nevada a better place to visit.
Visitors expect quality public transportation to get around a world-class city. In Las Vegas, 12-20% of visitors use transit during their visit.

7 Boosts the region's economy.
Well-designed transit services encourage economic and real estate development.

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THE NETWORK

- High Capacity Transit Network
- Frequent Transit Network
- Characteristics of Frequent Transit Networks

High Capacity Transit Network

The HCT network will deliver faster and more 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. The network will:

- Provide **higher capacity, enhanced service**.
- Be **frequent**. With service operating at least every 15 minutes during peak periods and every 20 minutes during off-peak periods, riders will be able to use HCT services without a schedule.
- Provide **faster service** with exclusive transit right-of-way. Depending on the corridor, travel times will decrease by 10% to 30%.
- Provide **reliable service via exclusive right-of-way**, with trains and buses operating as scheduled.
- **Connect neighborhoods** to key destinations, to each other, and to jobs throughout the region through higher capacity service.
- 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 stations and on the vehicle.
- Provide higher capacity **connections** to other 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.

Source: http://infomaps.translink.ca/System_Maps/skytrain_bline_seabus_map.pdf

Frequent Transit Network

Over the past decade, there has been an increased emphasis on the development of Frequent Transit Networks This is because transit is most attractive when it is frequent enough that people don't need to consult a timetable and can instead just go to a stop and know that the train or bus will arrive shortly. Nearly all major transit systems operate networks of frequent services, most of which are based on HCT services. In very large cities, these are often comprised of rapid transit and light rail lines that are supplemented with bus-based HCT services. However, in most cities, Frequent Transit Networks or Frequent Service Networks are comprised largely of bus-based services, with more limited rail services if at all.

RTC plans to develop High Capacity Transit in Southern Nevada's most important urban travel corridors. These corridors, and the services that operate in these corridors, will be those that will serve high volumes of passengers and connect the region's most important destinations. The HCT network will also become Southern Nevada's Frequent Transit Network.

Characteristics of Frequent Transit Networks

Frequent Transit Networks consist of a number of inter-related elements:

- Frequent service, typically every 10 to 15 minutes or less from the beginning of the morning peak to early evening or later.
- A sufficient number of routes to create a network that serves all high-demand locations.
- Direct routes that operate along major arterials, consisting of a combination of rapid transit, light rail, BRT, Rapid Bus, and local bus routes, and sometimes consisting entirely of local bus routes.
- Special branding and information to make service visible and memorable.

These elements are designed to make service more convenient, connected, and memorable.

Convenient

Frequent Transit Networks are designed to provide frequent and direct service that operates for long hours:

- **Frequent:** Most transit systems consider services that operate at least every 15 minutes throughout the day and into (at least) the early evening as "frequent." However, there are exceptions and, as described further below, Boston includes only a subset of its frequent routes (those that have been designated as "Key Corridor" routes), and Columbus, OH includes routes that operate less frequently during the midday.
- **Long Hours of Service:** With few exceptions, Frequent Transit Network services have long spans of service and operate seven days a week. However, many Frequent Transit Network services operate less frequently at night.
- **Direct:** With only limited exceptions due to unique circumstances such as geographic and street layout constraints, Frequent Service Networks are comprised of routes that are direct and operate in exclusive rights-of-way and/or along major arterials.

Connected

Frequent Transit Networks are designed to serve the locations that most people want to go to most often—to downtowns, urban neighborhoods, mixed-use corridors, employment centers, and major institutions such as universities.

Frequent Service Networks can also create a de-facto "system backbone" that provides a structure for other services. In the same manner that large urban systems are built around the backbone that their rapid transit systems provide, Frequent Service Networks can provide a similar structure for smaller systems, with lower frequency routes and specialized services providing connections to the Frequent Service Network.

Memorable

Frequent Transit Networks use four primary approaches to making service memorable: special branding, Frequent Transit Network maps, simple service structures, and simple schedules.

Use of branding for Frequent Services
(Portland, OR; San Francisco, CA; Providence, RD)

- **Branding:** Many transit systems brand their Frequent Transit Networks to heighten awareness of the available services. Examples include Minneapolis/Saint Paul's "Hi-Frequency Network," Vancouver's "Frequent Transit Network," Providence's "Key Corridor Network," and San Francisco's "Rapid Network." Many transit systems that brand their Frequent Transit Networks publish Frequent Transit Network Maps and indicate frequent services uniquely on system maps. For example, LA Metro publishes an "Every 15 Minutes (or Less)" map. Branding is also used in a variety of other ways, including in marketing materials, at bus stops, and on schedules.
- **Frequent Service Maps:** Many systems produce special Frequent Transit Network maps that are designed to highlight frequent services and make them stand out from other service. Transit systems that do this include Boston's MBTA, Minneapolis/Saint Paul's Metro Transit, Portland's Tri-Met, Washington, DC's WMATA, and Vancouver's TransLink.
- **Simple Service Structure:** Frequent Transit Networks have simple service structures that are designed to make service easier to remember. Typically, they operate as directly as possible within exclusive rights-of-way and/or along major arterials.
- **Simple Schedules:** Frequent Transit Networks also typically have simple schedules, with transit services scheduled to operate at even intervals (clockface headways) that passengers can easily remember.

THE SERVICE

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

Multiple Routes

A primary route would operate in each HCT corridor. In some cases, other routes would also operate in the HCT corridors. These additional services could include:

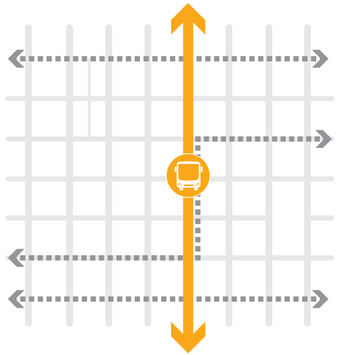
- Local neighborhood routes that would provide local service in outer areas and then funnel into an HCT corridor
- Crosstown routes and local circulators that would use one or more HCT corridors as part of their path between starting and ending points
- Express routes that would use the HCT corridors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

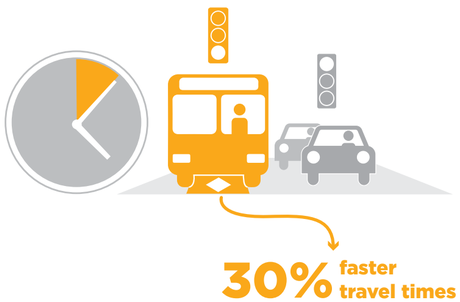
Service Reliability

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 can reduce travel times by up to 30%.





Service Frequency and Hours of Service

HCT services will be designed to take Southern Nevada riders where they want to go when they want to, on weekdays and weekends.

Service will operate at least every 15 minutes during peak periods and every 20 minutes during off peak periods, seven days a week. It will operate from at least early morning until late night, and in many cases for 24 hours per day.

SERVICE UP TO 24 HRS PER DAY

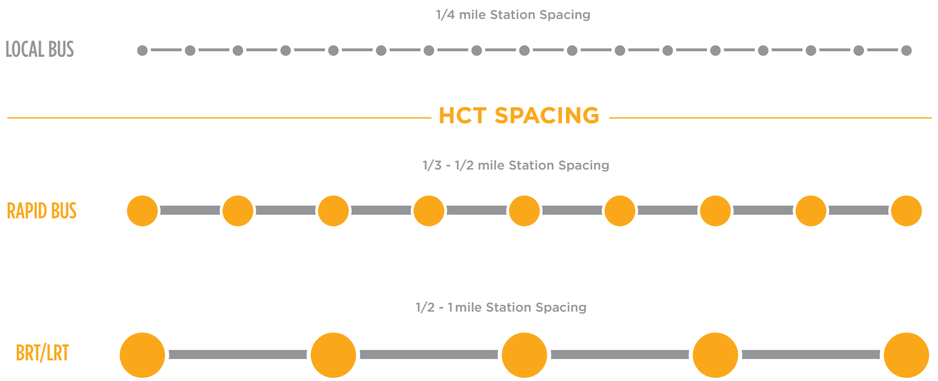
SERVICE AT LEAST EVERY 15 TO 20 MINUTES

Station Spacing

RTC's local bus stops are spaced approximately 1/4 mile apart. For HCT, to create a better balance between speed and walking distances, stations will be spaced further apart. Depending upon the type of HCT service, stations will be spaced 1/3 of a mile to one mile apart.

Stations will be located based on a number of considerations, including access to activities located along the route and transfers with intersecting transit routes.

Typical Transit Station Spacing



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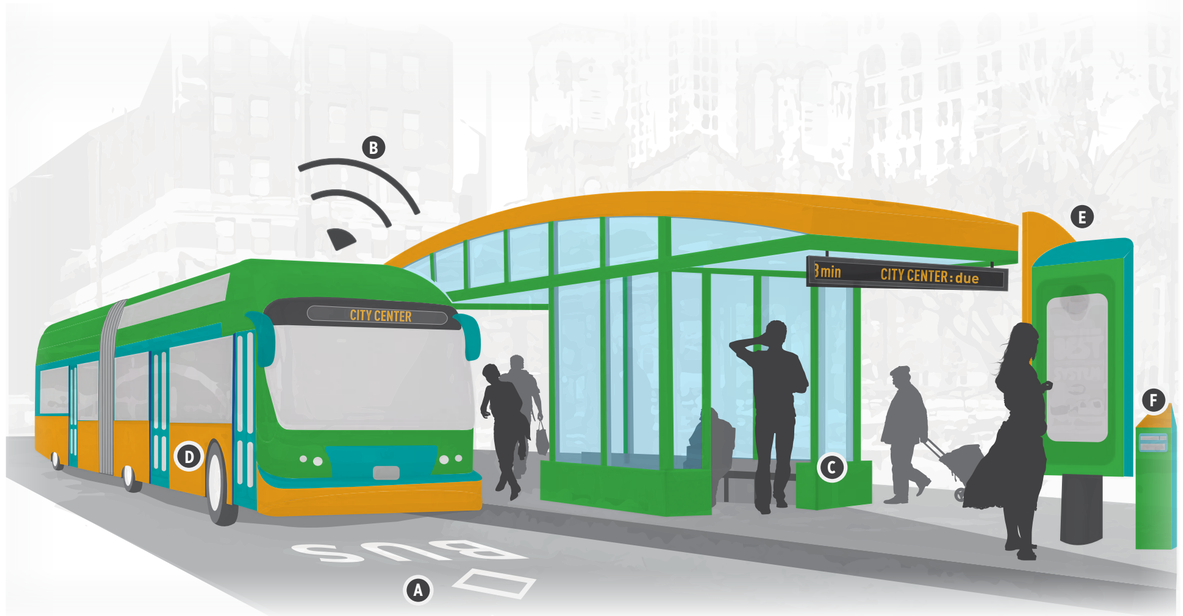
TYPICAL HCT ELEMENTS

- Typical High Capacity Transit Elements
- High Capacity Transit Running Ways
- Center-Running Transit Lanes
- Side-Running Transit Lanes
- Exclusive Transit Lanes
- Converting General Purpose Lanes
- Queue Jump Lanes
- High Capacity Transit Signal Priority

Typical High Capacity Transit Elements

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.



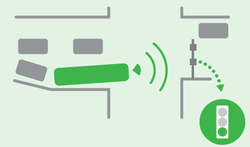
A. Dedicated Transit Lanes **B.** Transit Signal Priority **C.** Enhanced Stations **D.** Specialized Vehicles **E.** HCT Branding **F.** Off-Board Fare Collection Systems

A DEDICATED TRANSIT LANES

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

B TRANSIT SIGNAL PRIORITY

Intersection improvements, including transit signal priority (TSP) and queue jump lanes, 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 VEHICLES

Custom vehicles provide more capacity, more doors, and lower floors for easier boarding and alighting.

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 mobile ticketing and ticket vending machines, card readers, and other tools at stations allow passengers to load without waiting in line to pay their fares.

High Capacity Transit Running Ways

HCT can operate in many ways, but most include some sort of dedicated running way, either center or side-running transit lanes, exclusive transit rights-of-way, or with more limited queue jump lanes. All of these make transit faster by providing the ability to bypass traffic congestion.

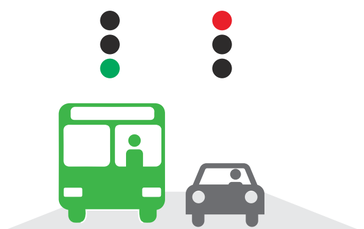
RTC currently operates multiple services in designated transit-only lanes. These have contributed to RTC's success in attracting riders through faster travel times. Expansion of this dedicated transit lane network to other key corridors will help maximize this benefit throughout the transit system.

Additional Considerations

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.

CENTER-RUNNING TRANSIT LANES

SIDE-RUNNING TRANSIT LANES



QUEUE JUMP LANES

EXCLUSIVE TRANSIT RIGHTS-OF-WAY

Center-Running Transit Lanes

With center-running lanes, transit vehicles operate in the center of a roadway. This type of operation eliminates conflicts with other vehicle traffic, including passenger drop-offs, commercial deliveries, and illegal parking, which makes transit service faster and more reliable.

There are two considerations 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 placed 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 curbside 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.

PHOENIX, AZ

LAS VEGAS, NV

Side-Running Transit Lanes

Side-running transit lanes place dedicated lanes next to the curb or parking lane and are the most commonly used approach to provide dedicated lanes for bus service. This is usually because they 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 lanes are used as transit lanes during peak periods and for parking at other times. They are also 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 Southern Nevada.

There are also considerations to keep in mind with to side-running transit lanes. To maintain access to businesses and turns onto intersecting streets, right turns are usually allowed from side-running 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. Side-running 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, side-running transit-only lanes can sometimes be in opposing 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.

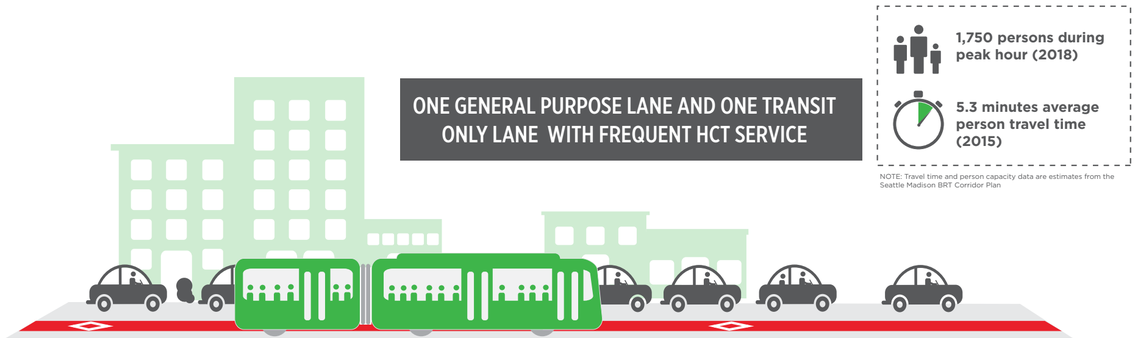
Exclusive Transit Lanes

In many areas, HCT services operate in exclusive transitways. The most common examples are subways and elevated rail lines, but also include transit malls, dedicated transitways through college campuses and under or over crossings at congested intersections and to avoid natural barriers.

In Southern Nevada, it is likely that most HCT service would operate within the rights-of-way of major arterials. However, there could be limited applications for dedicated grade-separated transitways, for example to avoid congestion at I-15 intersections, or to access McCarran International Airport and other activity centers.

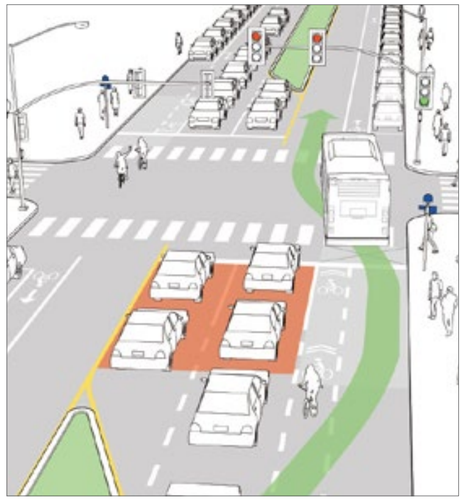
Converting General Purpose Lanes

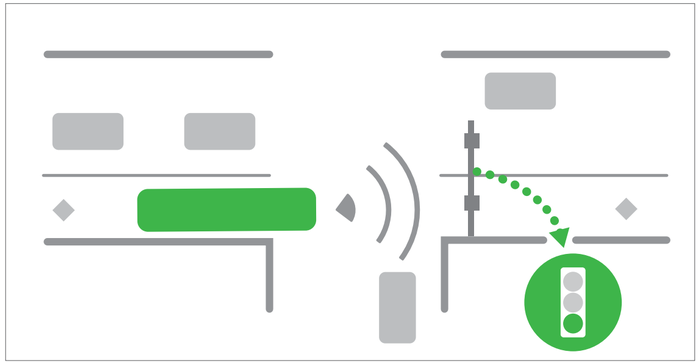
Converting a general purpose travel lane to a transit-only lane is justified where it increases the number of people that a roadway can carry and improves the average person travel time in the corridor.



Queue Jump Lanes

In areas where HCT service operates largely in mixed traffic, queue jump lanes can 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.





High Capacity Transit Signal Priority

Intersections are a primary source of transit delay. Transit Signal Priority, activated by an approaching transit vehicle, can help to reduce this delay along with queue jumps. As a 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.

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ENHANCED STATIONS

- Distinctive Stations
- Station Types
- Location in Right-of-Way

Distinctive Stations

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

STATION SIZE

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

B. Platform 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 separation from vehicle traffic at center-running stations and canopy shelter for shade and sun protection.

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. Off-board fare payment, including the rideRTC mobile ticketing application, reduces delay at stations and allows for all-door boarding.

LIGHTING AND SECURITY

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

Station Types

All HCT stations 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 provide additional opportunities to tie in features that reflect the aesthetic and community value of HCT stations.

Typical HCT Stations

All light rail and BRT stations would offer a minimum level of passenger amenities, including benches, canopy shelters, HCT standalone marker/pylon, technology pylon (with real time information and system maps), offboard fare collection, trash and recycling bins, and bike parking.

Very High Volume HCT Stations

Very high volume stations would include additional features such as wayfinding signage, bike lockers/bike cages, public art, and landscaping.

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.

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 stations 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.

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 insides of the vehicles are clean; seats are comfortable; and bike racks on board facilitate seamless bike-to-transit integration. Most of RTC's vehicles already include these amenities.

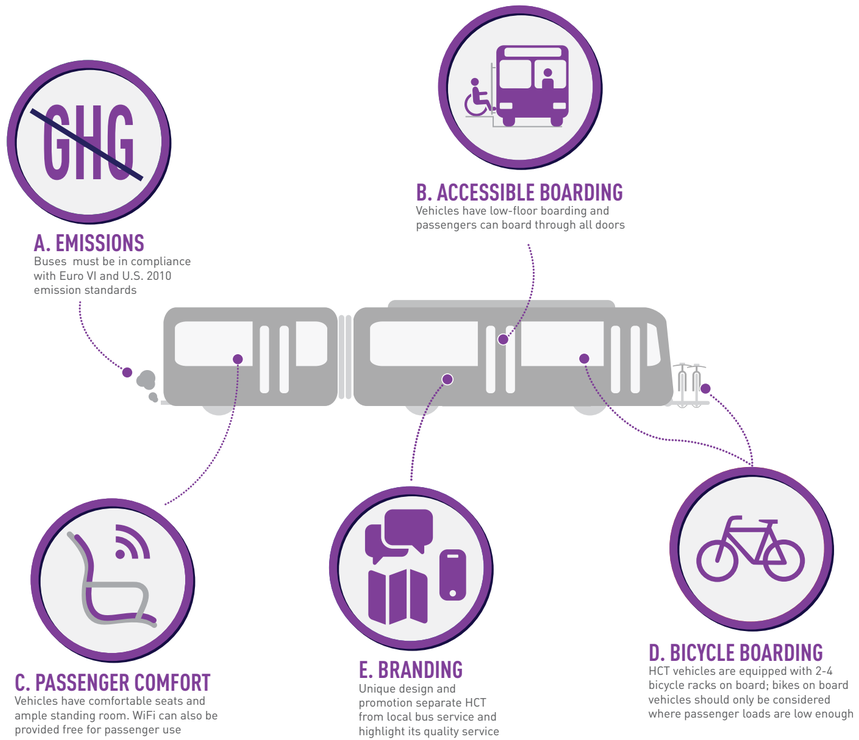
A. Alternative fuel vehicles support reduced emissions.

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.



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.

- Unique brand and identity reinforces promise of high-quality service.
- Brand is distinct from, but also fits in with the larger system.
- Brand is graphically intelligible and accessible to English and non-English speakers.

Passenger Information

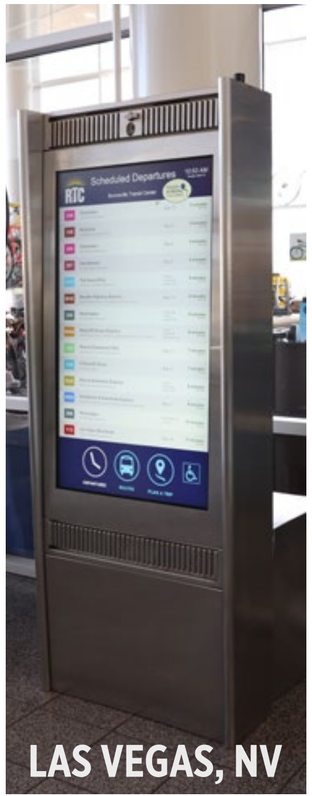
HCT schedules and station names are clearly marked at all stations. Arrival information is available online, on apps, and at the stations in real-time so that passengers know exactly when the next bus or train is scheduled to arrive. All passenger information tools use the established HCT brand to communicate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

- Real-time information signs show exactly when the next bus is scheduled to arrive.
- Station names are clearly marked.
- 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.

- Clear wayfinding and maps help passengers orient themselves.
- Interactive maps help passengers make multimodal connections and navigate to destinations throughout the city.
- Tall, unique signage helps passengers identify HCT stations from a distance, and may provide shade as well.

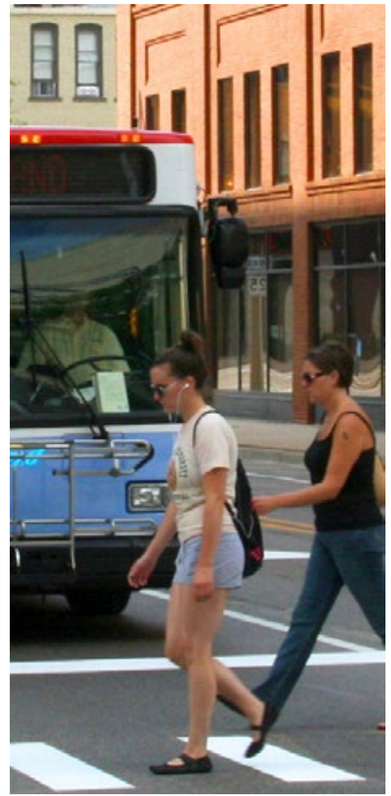


Pedestrian Access

A good pedestrian environment is an essential foundation for good access to HCT 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:** Within a half-mile of every transit station, sidewalks should be at least 8 feet wide and seamlessly connect to the surrounding sidewalk network.
- **Curb Extensions:** Streets that have on-street parking typically require a set-back from an intersection to increase visibility. This “dead space” at the intersection can become part of 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.
- **Signals:** All signals should have a pedestrian countdown and 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 RTC stops are far from signalized intersections. In these cases, crosswalks with pedestrian refuges can make crossings much safer and more comfortable.



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 provide first and last mile connections 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 two 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 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.

6

TRANSIT ORIENTED DEVELOPMENT

- What is Transit-Oriented Development (TOD)?
- Why TOD?
- TOD Station Types

What is TOD?

Transit-oriented development (TOD) is mixed-use, walkable development in which housing, retail and/or office is clustered around high capacity transit stations such as a subway, LRT, or BRT station. These developments are designed to be walkable places that provide convenient access a wide variety of activities and with transit. To be considered TOD, a development must be located within a half-mile walking distance of transit.

It is important to note that TOD may look different depending on the neighborhood, city, or region within which it is located. In addition, TOD station types may vary according to the type of transit it serves. Proximity to higher volume transit, such as subway systems, may command higher density TOD, while lower density and more human-scaled TOD may be more appropriate for lower volume transit, such as a BRT line.

How will the On Board plan shape TOD in Southern Nevada?

The On Board plan will emphasize developing HCT in areas where development is currently transit-oriented, and in areas where the potential for new transit-oriented development is strongest. HCT can help to stimulate these types of developments, and in turn, transit-oriented development will produce higher transit ridership.

Why TOD?

Transit-oriented development produces more efficient urban growth and encourages residents, employees and visitors to live active lifestyles. By locating in amenity-rich and location efficient areas, TODs help create walkable neighborhoods with options for people to live, work, shop, eat and play without depending on a car for their daily needs. By building next to transit, TODs also create new markets for transit agencies to capture additional ridership. According to the Center for Transit Oriented Development, TODs can create the following benefits:

Economic Development:

TOD brings potential for new business growth and value capture by increasing property values where transit investments have occurred.

Community Development:

Proximity to transit dramatically expands a household's mobility options and can significantly reduce transportation costs, freeing up household income for other purposes. In addition, TOD can also free up space and funding that would be otherwise devoted to providing parking, which makes housing more affordable.

Fiscal Sustainability:

New residents who see access to transit as an amenity support strong transit ridership and fare revenue for the transit agency.

Livability:

Locating close to transit encourages the development of walkable communities, which better accommodate active lifestyles and social well-being. In addition, TOD can reduce transportation costs and provide easy access to destinations like parks, entertainment, resources and services without a personal vehicle.

Workforce Development:

Increased density helps bring housing closer to employment centers and business districts. Thus, improved access to jobs can mean economic opportunity for low-income people and working families.

Environmental:

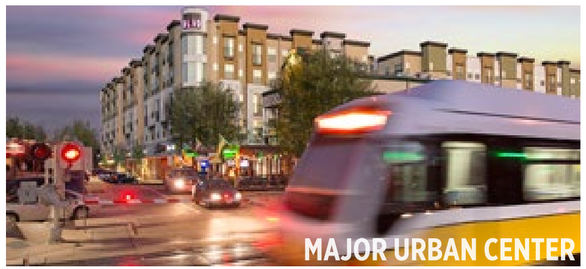
TOD can reduce household driving, which would result in better air quality, lower greenhouse gas emissions and lower traffic congestion.

TOD Station Types

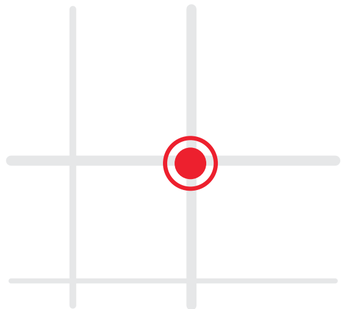
The success of High Capacity Transit is closely related to the station area characteristics along HCT corridors. The land uses and development capacity around the station areas, as well as the surrounding street network, block patterns and treatment of parking can significantly affect the long-term viability of the station areas. When layered together, these aspects of the station area create unique places that can become vibrant neighborhood centers attractive to new residents, bustling regional destinations, or institution-based areas serving a specific need within the region. A successful transit line is one that has a hierarchy of places along the line, places that serve both the local and regional population.

Varying HCT station types will result in different types of TOD. A station type framework can provide guidance and set expectations for the type of development most appropriate per HCT station. The following are examples of station types based on contextual characteristics including land use mix, street and block pattern, building heights and placements and mobility.

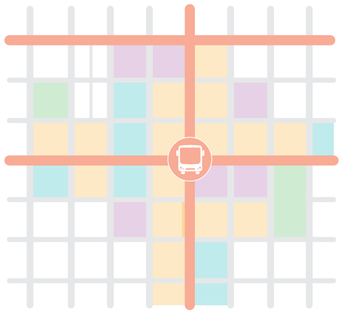
- **Downtown** stations are located in the most intensely used land in the region, with civic, institutional and entertainment uses sharing the same spaces as high density residential, office and commercial uses. As the primary centers for regional economic and cultural activity, these stations cater to a regional market often being the center of or major transfer points in a regional transit system. Downtown stations have a rich mix of transit modes and are often the locations where multiple HCT modes converge.
- **Major Urban Center** stations typically serve as destinations for surrounding neighborhoods and have a mix of uses with mid- to high-rise multi-family residential integrated with mixed-use commercial buildings. The concentration of uses positions these stations as regional employment hubs. Major Urban Center stations can serve as commuter hubs connecting to the rest of a region and are served by multiple transit options, often including rail and Bus Rapid Transit as well as local bus services.
- **Suburban Neighborhood Center** stations are characterized by their higher level of transit service and pedestrian orientation than the surrounding auto-oriented context. These stations may take on the qualities of town centers having a mix of uses oriented toward the transit station.



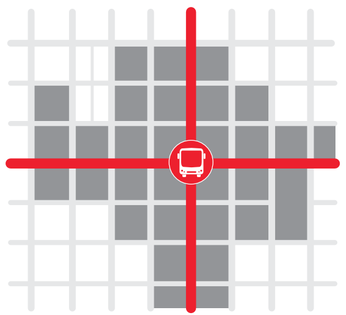
THE STAGES OF TRANSIT ORIENTED DEVELOPMENT



1 Identify Transit Oriented Development (TOD) site

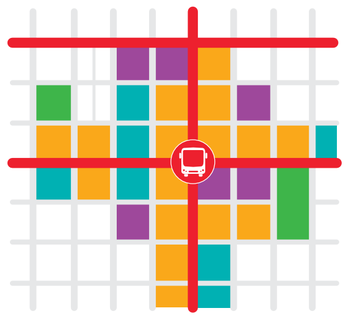


2 Develop TOD plan



3 Develop transit and walkable street corridors

4 Make zoning changes to encourage TOD



5 Complete TOD district

7

SUMMARY

Summary

The development of an HCT network will significantly improve transit service throughout much of Southern Nevada. HCT will better serve the region's residents and make it more competitive as a visitor destination.

As described in this briefing book, HCT can be developed in a number of ways. The primary modes for Southern Nevada will likely consist of a combination of light rail, Bus Rapid Transit, and Rapid Bus, although other modes may also be considered. Preferred modes will be determined based on a number of factors, including potential ridership, the physical characteristics of each corridor, and the potential for Transit-Oriented Development (TOD).

Different types of HCT services will be developed in different corridors; however, all will share a number of important features:

- Special branding to make it easy for residents and visitors to identify what will be RTC's most convenient transit services.
- Seven-day-a week service from early morning until late evening, and in many cases 24 hour service to serve a wide range to travel needs.
- Frequent service (at least every 15 minutes during peak periods and every 20 minutes during off-peak periods) to make service convenient.
- Distinctive, high quality stations with amenities to make service easily identifiable and comfortable.
- Enhanced transit vehicles.
- Transit priority ranging from transit signal priority and queue jump lanes to dedicated transit lanes to make service fast.
- Easy fare payment.

In total, HCT improvements will provide much better transit options for residents who rely on it every day, residents who use transit only occasionally, and for visitors. It may also provide indirect benefits to those who won't use it, such as reduced traffic congestion. HCT improvements will also stimulate responsible development in key corridors that will improve the region's economic vitality and make Southern Nevada a better place to live.

Development Evolution of an HCT Corridor

onboard

YOUR FUTURE TRANSIT PLAN