

7 BEST PRACTICES

Mixed Modes: High Capacity Transit and European Street Trams

MONTPELLIER, FRANCE; DUBLIN, IRELAND; PORTLAND; SAN FRANCISCO

WHAT IS IT?

High capacity transit (HCT) is defined by its function: to carry high volumes of passengers quickly and efficiently from one place to another. Other defining characteristics of HCT service include the ability to bypass traffic and avoid delay by operating in exclusive or semi-exclusive rights-of-way, faster overall travel speeds due to wide station spacing, frequent service, transit priority street and signal treatments, and premium station and passenger amenities.

The transit modes most commonly associated with high capacity transit include:

- **Light rail transit (LRT)** – light rail trains operating in exclusive or semi-exclusive right-of-way
- **Bus rapid transit (BRT)** – high-end vehicles with sculpted exteriors and interior amenities, regular or advanced, bus vehicles operating primarily in exclusive or semi-exclusive right-of-way
- **Rapid streetcar** – streetcar trains operating primarily in exclusive or semi-exclusive right-of-way
- **Commuter rail** – heavy rail passenger trains operating on exclusive, semi-exclusive or non-exclusive (with freight) railroad tracks
- **Monorail** – train cars operating on a single track system in fully exclusive right-of-way

Some cities and regions, including Seattle, use the term *intermediate capacity transit* to talk about urban transit modes that have some features of HCT service but do not operate in fully exclusive right of way and/or do not operate with high capacity vehicles such as multicar trains. As in many areas, there is a blurring

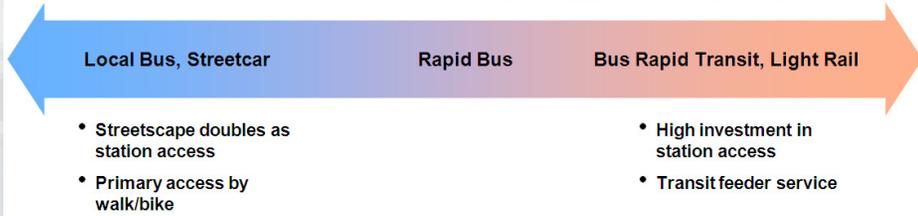


of terminology and transit product. This section emphasizes the need to pay attention to what the transit service and design deliver (the product), not just the name we give that product.

The distinction between urban streetcars – smaller trains operating in mixed-traffic with limited priority—and light rail transit, which is typically developed using exclusive rights-of-way, has been blurred in many European cities that have taken an integrated approach, combining the best attributes of each. These European street tram systems, which have been constructed in places like Lyon and Nantes, France; Dublin, Ireland; and Hanover, Germany over the past few decades, use larger vehicles with the sleek styling of a modern streetcar, but capacities comparable to a light rail train. They operate in street-running

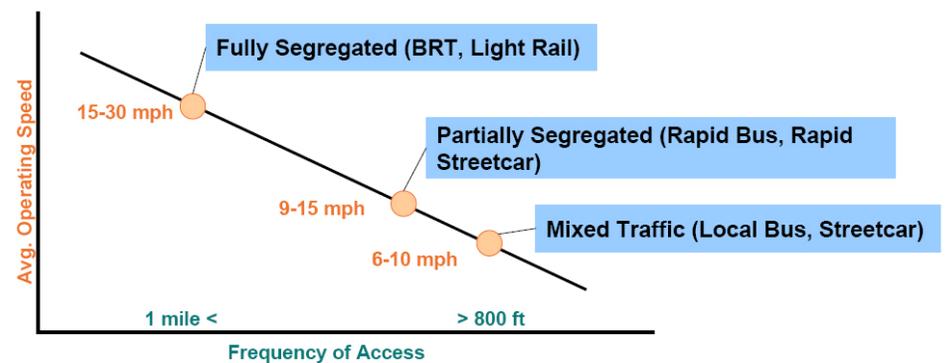
dedicated rights-of-way with traffic priority on urban streets and also stress urban integration and the placemaking value of rail transit investments.

Light rail can operate in a fashion similar to a streetcar in mixed traffic or, on the other end of the spectrum, like a completely grade-separated rapid metro service; the lines between the two are often blurred. Light rail operating with at-grade intersection crossings, as it does on Martin Luther King Boulevard in Southeast Seattle, is more similar to a mixed flow streetcar, while light rail operating in fully exclusive, grade-separated right-of-way is very similar to a heavy rail system like BART in the San Francisco Bay Area.



Source: Nelson\Nygaard

AVERAGE SPEEDS RELATIVE TO STOP SPACING



WHY DO IT?

Urban transit users have a variety of travel options, including driving, bicycling, walking, or taking transit. Each mode offers advantages, depending on passengers' circumstances. Most transit users do not expect transit to get them to their destination faster than driving, but they find benefits that make transit a desirable option.

In order for transit service to be effective, transit speed and access (meaning spacing of stops as well as vertical movements for grade separated transit services) must be balanced. In the case of high capacity transit, access is typically concentrated in a few stations that are spaced far apart; in exchange, the service is able to achieve higher travel speeds, shorter travel times, and better on-time performance. In these cases there is greater need for good access to stations by bike, foot, local bus, or automobile. There is a direct tradeoff between station spacing and

operating speed; lines with fewer stops experience less delay but require people to travel farther to reach them.

Several cities in the U.S. and Europe have implemented streetcar or light rail systems that run both on separated rights-of-way and in mixed flow traffic, depending on the location on the line.

San Francisco's Muni Metro system is largely based on historic streetcar lines and operates in various rights-of-way ranging from subway to surface streets in mixed flow traffic.

Dublin, Ireland has integrated light rail into its historical context. Launched in 2004, the LUAS (Irish for "speed") system had provided over 50 million trips by the beginning of 2007 and was running a financial surplus. In 2009, LUAS provide 25.4 million trips in a single year, down slightly from its peak of 27.3 million trips in 2008. This decline is attributed to economic recession. The management agency, RPA, continues to maintain a financial surplus from operation of the light rail system.



LUAS in Dublin operates in street-running, dedicated lanes in very tight quarters.

Source: SDG

Montpellier, France, has a street tram network consisting of two lines and several parking facilities. Touted as one of the most stylish public transport systems in the world, with highly decorated cars, it is the busiest street tram system in France, carrying over 100,000 passengers a day. It uses a street-running dedicated right-of-way through the dense urban core to the outer suburbs.

The Metropolitan Area Express (MAX) in Portland, Oregon, claims the fifth highest ridership among light rail systems in the United States and is the country's most ridden stand-alone light rail system. (The busiest light rail systems—those in Boston, San Francisco, Los Angeles and Philadelphia—are integrated with heavy rail subway networks.) MAX carried 107,400 daily passenger trips (weekdays) in 2008 and has seen ridership as high as 118,200 per day during peak periods. In central Portland and Hillsboro, MAX trains run in street-running dedicated lanes on surface streets. Otherwise, MAX runs within its own right-of-way, generally either in street medians, along freeways, or on former freight railroad lines.

Where the tracks run along a street, intersections are generally controlled by traffic signals that give trains priority. Where the tracks occupy a completely separate right-of-way, level crossings are protected by automatic crossing gates.

Sound Transit's Central Link light rail, new in operation, provides a mix of operating environments. In downtown Seattle, it operates underground in exclusive right-of-way; in southeast Seattle it operates at grade along an arterial street. Central Link is a part of the city's Urban Village Transit Network, providing fast connections between neighborhoods targeted for growth while aiding circulation through downtown. Additional light rail lines could provide both urban circulation and neighborhood connections within the city.



MAX Light Rail in Portland operates in a separate right-of-way outside downtown but in street-running dedicated lanes in downtown Portland and Hillsboro.

Source: Nelson\Nygaard



The Montpellier, France street tram provides 130,000 daily trips on a two line system. Two additional lines are planned or under construction.

Source: SDG

HOW WELL DOES IT WORK?

Successful transit services deliver safe, comfortable, reliable service to passengers in a manner that pleases existing customers and attracts new customers. To the degree that a transit system or line can implement key elements of HCT (or intermediate capacity transit), it will be more successful at attracting and retaining ridership. These factors include:

- High frequency so that the rider does not need a schedule
- A long daily span (18 hours is optimal)
- Widely-spaced stops (1000 feet or more)
- A high-quality customer experience (large windows, tall ceilings, clean environment on vehicles, real-time information, clean station areas, covered waiting areas at stations)
- Mixed land uses concentrated within walking distance of stations
- A dedicated right-of-way for as much of the route as possible

Both bus and rail systems designed to include these features typically enjoy high ridership and lead to better land use decisions, with more investment in areas served by these systems.