Mode Operating Cost Comparison (one-way trip) - (Loop - 800 miles)_

Mode	Las Vegas to LA 269 miles	Las Vegas to Reno 446 miles	Las Vegas to Ely 242 miles	Las Vegas to Logandale 57 miles	Las Vegas to Pahrump 62 miles	Las Vegas to Carson 436 miles	Elko to Ely 188 miles	Carson to Fernley 49 miles	Reno to Fernley 34 miles	Reno to Elko 288 miles
Car	$20.00	$33.00	$18.00	$4.00	$6.00	$32.00	$14.00	$3.50	$2.50	$21.00
Rail Passenger	$39.00	$45.00	$39.00	$16.00	$16.00	$45.00	$26.00	$12.00	$7.50	$39.00
Light Rail	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	$1.50	n/a
Commuter Rail	$70.00	$81.00	$64.00	$13.00	$13.00	$81.00	$48.00	$11.00	$8.00	$70.00
Heavy Rail (BART)	n/a	n/a	n/a	$6.00	$6.00	n/a	n/a	$5.00	$4.00	n/a
Intercity Bus	$38.00	$72.00	n/a	n/a	$10.00	$70.00	n/a	$14.00	$11.00	$51.00
Commercial Air	$90.00	$96.00	pending	n/a	n/a	n/a	pending	n/a	n/a	$165.50
Monorail	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Maglev	$42.00	$70.00	$38.00	n/a	n/a	$69.00	$30.00	n/a	n/a	$45.00

Definition of Modes

Passenger Car

A **passenger car** is any motor vehicle that is an automobile, auto-based pickup, large limousine or three-wheel automobile or automobile derivative. Motor vehicles are used primarily for carrying passengers, including convertibles, sedans and station wagons. Passenger cars typically carry less than 10 passengers.

Bus and Trolleybus

The vast majority of scheduled fixed-route transit service operates in bus and trolleybus modes on streets and highways using rubber-tired vehicles. In all but about 50 or 60 metropolitan areas and small cities, bus service is the only fixed-route transit service available.

Bus mode uses vehicles powered by diesel, gasoline, battery or alternative fuel engines contained within the vehicle.

Types of Vehicles

A **transit bus** has front and center doors, normally with a rear-mounted engine, low-back seating, and without luggage compartments or restroom facilities for use in frequent-stop service. (By far the most common bus used for local service, these buses are mostly 40 feet long, but 35-foot and 30-foot versions are also common in smaller cities and on lightly-patronized routes.)

An **intercity bus** has a front door only, separate luggage compartments, and usually restroom facilities and high-backed seats for use in high-speed long-distance service. (Such buses are 40 or 45 feet in length and are used by the largest transit agencies and private companies on express and limited-stop routes.)

A **van** is a vehicle having a typical seating capacity of 5 to 15 passengers and classified as a van by vehicle manufacturers. A **modified van** (body-on- chassis van) is a standard van that has undergone some structural changes, usually made to increase its size and particularly its height. The seating capacity of modified vans is approximately 9 to 18 passengers.

Automobiles such as station wagons and sports utility vehicles may also be used on extremely lightly-patronized routes in remote rural areas.

Types of Service

Local service, where vehicles may stop every block or two along a route several miles long, is by far the most common type of bus service. Trolleybuses, unless bypass overhead wiring is available, cannot pass the trolleybus in front of them, and thus generally operate in local service only.

When limited to a small geographic area or to short-distance trips, local service is often called **circulator, feeder, neighborhood, trolley, or shuttle service**. Such routes, which often have a lower fare than regular local service, may operate in a loop and connect, often at a transfer center

or rail station, to major routes for travel to more far-flung destinations. Examples are office park circulators, historic district routes, transit mall shuttles, rail feeder routes, and university campus loops.

Express service speeds up longer trips, especially in major metropolitan areas during heavily-patronized peak commuting hours, by operating long distances without stopping. Examples include park-and-ride routes between suburban parking lots and the central business district that operate on freeways, and express buses on major streets that operate local service on the outlying portions of a route until a certain point and then operate non-stop to the central business district.

Limited-stop service is a hybrid between local and express service, where the stops may be several blocks to a mile or more apart to speed up the trip.

Bus rapid transit (BRT) is a type of limited-stop service developed in the 1990s that relies on technology to help speed up the service. It combines the quality of rail transit and the flexibility of buses. It can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets. A BRT line combines intelligent transportation systems technology, priority for transit, rapid and convenient fare collection, and integration with land use policy in order to substantially upgrade bus system performance.

Accessibility

A **station** is a public transportation passenger facility.

An **accessible station** is a station which provides ready access, and does not have physical barriers that prohibit and/or restrict access by individuals with disabilities, including individuals who use wheelchairs.

Fixed Guideways

A **Fixed Guideway** is a mass transit facility using and occupying a separate right-of-way or rail for the exclusive use of mass transportation and other high-occupancy vehicles; or using a fixed catenary system useable by other forms of transportation.

Fixed guideways are generally located only in large metropolitan areas where traffic congestion is the worst. These rights of way may be restricted solely to buses and trolleybuses, or may be shared with vanpools, carpools, motorcycles, alternate-fuel vehicles, toll-paying vehicles, and emergency vehicles based on state law and local ordinance. They may also be reversible, operating toward the central business district in the morning and away from it in the afternoon.

Although almost exclusively located on the surface, short stretches of some of these roadways are in tunnels or elevated. In addition, as bus rapid transit lines are implemented, more surface streets are being converted to fixed guideways through restricted access and technology that allows buses to preempt or expedite traffic light cycles.

There are three types:

A **Busway (Bus Lane)** is a roadway reserved for buses only. It may be a grade separated or controlled access roadway.

A **Contraflow Lane** is a reserved lane for buses on which the direction of bus traffic is opposite to the flow of traffic on the other lanes.

A **High-Occupancy Vehicle (HOV) Facility (Commuter Lane or Transitway)** Exclusive or controlled access right-of-way that is restricted to high occupancy vehicles (buses, passenger vans and cars carrying one or more passengers) for a portion or all of a day.

Fixed guideways are also classified by the time they are in effect.

Controlled Access Right-of-Way--Lanes restricted for at least a portion of the day for use by transit vehicles and/or other high occupancy vehicles. Use of controlled access lanes may also be permitted for vehicles preparing to turn. The restriction must be sufficiently enforced so that 95 percent of vehicles using the lanes during the restricted period are authorized to use them.

Exclusive Right-of-Way--Roadway or other right-of-way reserved at all times for transit use and/or other high occupancy vehicles. The restriction must be sufficiently enforced so that 95 percent of vehicles using the right-of-way are authorized to use it.

Transit Centers

Many transit agencies utilize transit centers, where riders can easily transfer from one vehicle to another.

A **transit center** is a fixed location where passengers interchange from one route or vehicle to another that has significant infrastructure such as a waiting room, benches, restrooms, sales outlet, ticket or pass vending machines, and/or other services.

A **bus station** is a type of transit center. A location that has very little infrastructure--such as shelters and/or benches at a street corner where two routes intersect--would be a transfer point.

A **park and ride facility** is a parking garage and/or lot used for parking passengers' automobiles, either free or for a fee, while they use transit agency facilities. Park-and-ride facilities are generally established as collector sites for rail or bus service. Park-and-ride facilities may also serve as collector sites for vanpools and carpools, and as transit centers.

A **kiss and ride facility** is a part of a park and ride facility where commuters who are passengers in non-transit vehicles are dropped off to board a mass transportation vehicle.

Such centers may be located at rail stations, intercity bus terminals, or ferry terminals, and may be shared with other transit agencies. Small and medium-sized agencies might have one center in the central business district; larger agencies might have several additional centers scattered throughout the suburbs at major shopping malls or park-and-ride lots. In some instances, a timed-transfer system is used, in which all buses converge on the transit center at a specific time to exchange passengers.

Operating Practices

Schedules are determined by a combination of factors. Normally they are a function of demand, which is why 2-3 times as many buses are operated during peak commuting hours than at other times. Many routes in larger cities, in fact only operate during the peak hours.

The type of vehicle used on a route is determined by the maximum number of riders expected at any point on the route, with the result that at other points along the route--especially the beginning and ending points--the bus may be largely empty. Also, because of the peak-directional flow nature of commuting, where 90% of traffic may go towards the central business district in the morning and away from it in the afternoon, buses operating in the opposite direction necessarily carry few people, but must be operated to get back out to the end of the line for the next peak-direction trip.

Passenger Rail

Rail transit services exist in over 50 metropolitan areas and small cities, and the number grows almost yearly.

Commuter rail (also called **metropolitan rail**, **regional rail**, or **suburban rail**) is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within urbanized areas, or between urbanized areas and outlying areas. Such rail service, using either locomotive hauled or self propelled railroad passenger cars, is generally characterized by multi-trip tickets, specific station to station fares, railroad employment practices and usually only one or two stations in the central business district. Intercity rail service is excluded, except for that portion of such service that is operated by or under contract with a public transit agency for predominantly commuter services, which means that for any given trip segment (i.e., distance between any two stations), more than 50% of the average daily ridership travels on the train at least three times a week.

Heavy rail (**metro, subway, rapid transit,** or **rapid rail**) is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails; separate rights-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling, and high platform loading. If the service were converted to full automation with no onboard personnel, the service would be considered an automated guideway.

Light rail (**streetcar, tramway,** or **trolley**) is lightweight passenger rail cars operating singly (or in short, usually two-car, trains) on fixed rails in right-of-way that is not separated from other traffic for much of the way. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line via a trolley or a pantograph.

High Speed Rail, sometimes called High Speed Ground Transportation, refers to a series of technologies involving trains traveling at top speeds of 90 to 300mph. A 1997 report to Congress concluded that each of these technologies has potential to solve passenger transportation problems in some of our Nation's most well traveled intercity corridors. FRA administers programs to help develop high speed rail systems in such corridors.

A number of States are planning high speed rail systems and making improvements necessary for high speed rail. The technologies these States are planning to use typically involve upgrades of existing rail lines, rather than entirely new rail lines exclusively devoted to 150 to 200 mph trains, such as operate in Europe or Japan, or 250-300 mph magnetic levitation technology (maglev), such as planned in Germany and Japan. Amtrak has 150 mph train service, known as "Acela" which operates in the Boston-New York-Washington Northeast Corridor. Amtrak has also offered to operate "Acela Regional" service in other State-sponsored corridors if funds are made available for the necessary capital upgrades. In addition to upgrading a number of rail lines, the State of California has prepared a business plan to construct a 200 or 300 mph system.

Commercial Air

Regularly scheduled passenger service. In Nevada, there are three commercial service airports McCarran International, Reno/Tahoe International and Elko Municipal.

Monorail

A single rail serving as a track for passenger or freight vehicles. In most cases rail is elevated, but monorails can also run at grade, below grade or in subway tunnels. Vehicles are either suspended from or straddle a narrow guideway. Monorail vehicles are wider than the guideway that supports them.

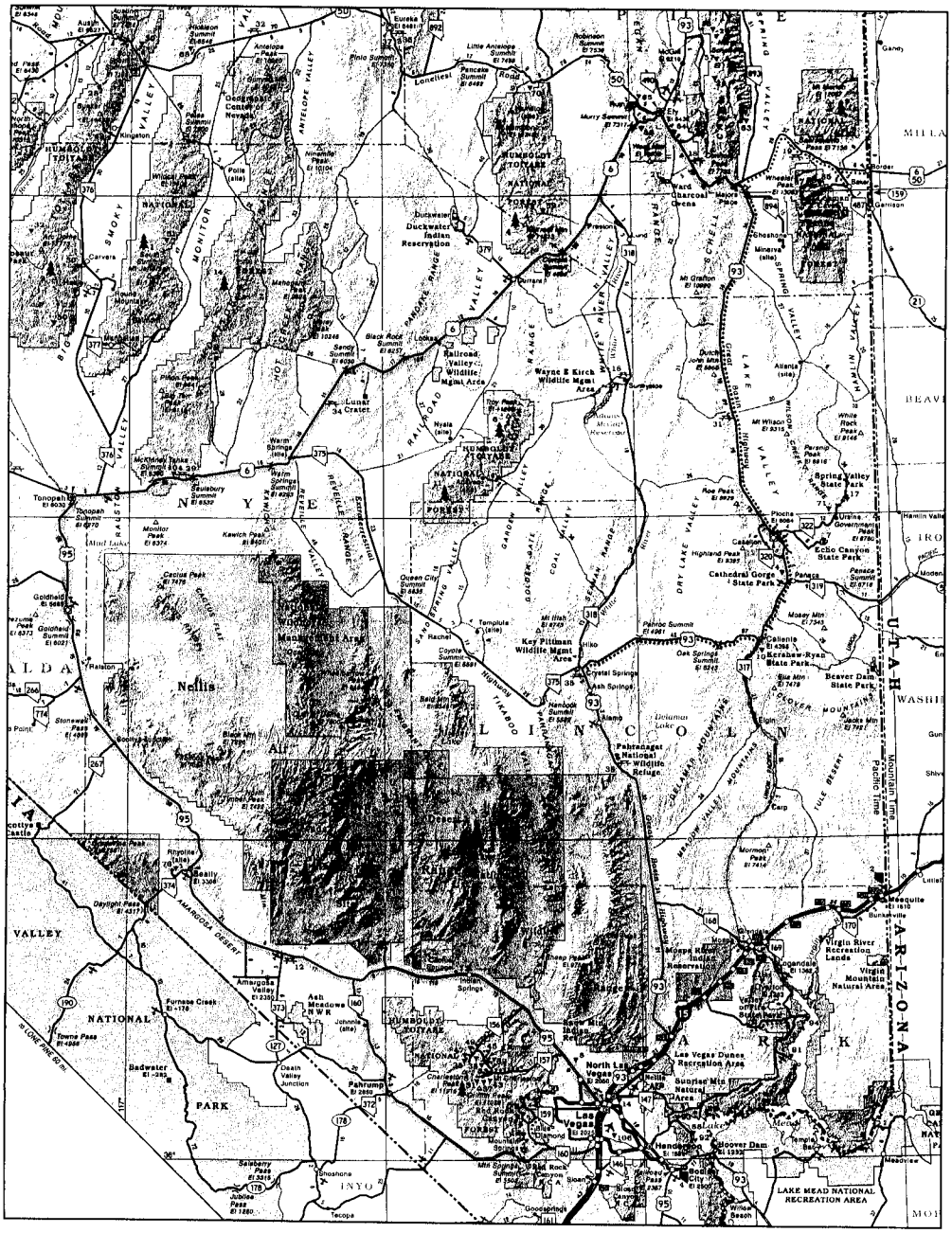
Maglev

This type of vehicle hovers above the guideway, supported, positioned and propelled by magnetic force, with no physical contact. The absence of mechanical friction enables a maximum service cruising speed in excess of 300 miles per hour, and assures efficient, quiet operation and low maintenance costs.

Sources:

American Public Transportation Association www.apta.com/
Federal Railroad Administration www.fra.dot.gov/
The Monorail Society www.monorails.org/
Bureau of Transportation Statistics www.bts.gov
California Nevada Super Speed Train Commission www.ci.las-vegas.nv.us/946.htm

LONG RANGE RURAL TRANSPORTATION ALTERNATIVE ALIGNMENTS



NEVADA DOT

0 10 20 30 40 50 miles
0 10 20 30 40 50 60 70 80 kilometers

NEVADA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION CARTOGRAPHY
(775) 888-7627

Map Source: Nevada Official Highway Map (2004)

Prepared for
SCR 31 Committee
March 2004
For discussion purposes only