Las Vegas to Los Angeles
Rail Corridor Improvement Feasibility Study

ASSESSMENT OF LAS VEGAS TERMINAL NEEDS AND ADDITIONAL RIDERSHIP/REVENUE SENSITIVITY ANALYSIS
Introduction

There has not been passenger rail service between Las Vegas, Nevada, and Los Angeles, California, since the discontinuation of Amtrak’s Desert Wind service in 1997. The Regional Transportation Commission of Southern Nevada (RTC), in conjunction with the Federal Railroad Administration (FRA) and a wide group of agencies and stakeholders, oversaw a feasibility study to assess the viability of a new passenger rail service between the two metropolitan areas. The study, completed in September, 2006, included a wide range of tasks:

- A market assessment, to determine the potential travel demand;
- Development of service parameters, to create a conceptual schedule;
- An examination of existing and forecast rail operations and infrastructure;
- Identification of five conceptual route alternatives, later refined to three alternatives for more-detailed analysis;
- Rail improvement projects necessary to provide sufficient rail capacity and to reduce travel time;
- Forecasts of ridership and revenue for each of the route alternatives;
- Estimated costs for rail improvement projects, needed rolling stock, and for Operations and Maintenance associated with the new service; and
- Determination of next steps required for the advancement of the project.

Previous Service

From 1981 to 1997, Amtrak’s Desert Wind service provided a passenger rail connection between Los Angeles and Las Vegas, with continuing service to Salt Lake City, Utah, and ultimately to Chicago, Illinois. The Desert Wind service faced a number of issues that caused its performance to suffer, resulting in a decline in service frequency, from daily service to three times per week. These issues included the following.

- A “long distance” train, rather than a corridor train, the Desert Wind was not optimally configured to serve the travel needs on the Las Vegas-Los Angeles corridor. The train provided sleeper compartments, which added weight and reduced passenger capacity. Examples of the trains and amenities that would be more applicable to this market are those used on Amtrak’s Pacific Surfliner and Cascades routes. These trains provide comfortable cars with coach and business seating, as well as a café to provide snacks and beverages. The Cascades service also features a Bistro car which provides additional meal options in a casual sit-down environment for passengers to enjoy their meals.
- The train provided only one daily trip. Just as with other transportation mode choices, a range of travel times to accommodate differing schedules is needed to attract and maintain ridership and patronage.
- The train was not scheduled to arrive and depart from the end point markets (Las Vegas and/or Los Angeles) at optimal times of the day. As
with the previous observation, a successful service would provide arrival times at both locations that would meet the needs of a broad range of business and recreational travelers.

- The average travel time for the *Desert Wind* was about seven hours, as the schedule needed to accommodate potential delays that impacted its reliability over the longer distance it traveled, making it less competitive with other travel options, particularly travel by automobile. A successful passenger rail service would need to provide a reduced travel time in order to draw passengers from other modes.

The *Desert Wind*’s Las Vegas station stop was located downtown, near the Plaza Hotel, as shown in the photo at right.

In 1999, discussions were held between Amtrak, Union Pacific Railroad (UPRR), and others to restore service between Las Vegas and Los Angeles. Rather than the downtown station, as previously used, a new stop was considered adjacent to the Rio Hotel and Casino, located on the west side of the I-15 freeway, near Flamingo Road. A number of Las Vegas casinos agreed to support the rail service by purchasing tickets for resale. A number of improvement projects, chiefly providing additional capacity by double tracking the Cima grade, were discussed. Unfortunately, the service was not reestablished as part of that effort.

**Results of Feasibility Study**

The feasibility study completed this past year for RTC determined that there is a strong current and future demand for travel, based on growth in employment and population for both the Las Vegas/Greater Southern Nevada region as well as for Southern California. This demand includes travel for both business and recreational purposes.

Of the three alternatives, Alternative A1, running between Union Station in Los Angeles and Las Vegas, would provide the highest potential ridership and revenue, and best meet commonly-accepted standards for farebox recovery (the difference between revenue and costs).

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1 Photo Credit: USA Rail Guide. [www.trainweb.com/usarail/lasvegasnv.html](http://www.trainweb.com/usarail/lasvegasnv.html) (Used with permission)
Alternative A1 would provide service from Las Vegas to Los Angeles, with intermediate station stops at Primm, Nevada, and Barstow, Victorville, San Bernardino, and Montclair, California. It would travel over tracks owned by Union Pacific Railroad, Burlington Northern Santa Fe (BNSF) Railway, and member agencies of the Southern California Regional Rail Authority, which operates Metrolink commuter rail service throughout six counties in Southern California. Figure 1 shows Alternative A1’s proposed alignment.
Annual ridership (based on a forecast for 2010 service) is forecast to be 362,000 passengers, based on a service that would operate 365 days a year, with from four to nine trains per day operating between Las Vegas and Los Angeles. The number of roundtrips each day would vary, reflecting existing travel patterns, with higher ridership on weekends, holidays and during peak travel periods (from a few hundred to several thousand passengers per day). Travel time between the two areas would depend on the rail equipment used. Five hours 30 minutes was the midrange travel time.

One-way fares would vary between $55 and $95, based on a number of factors², with a premium service priced $10 - $15 higher.

In order to provide sufficient rail capacity, as well as improvements to increase passenger train speed and reduce travel time, a program of rail improvement projects was developed. In order to “bookend” the potential impacts of these projects, “Low-Build” and a “High-Build” range of project options were created. The Low-Build range would provide spot improvements needed for the service’s establishment and operation. Improvement projects would include adding new sidings and lengthening existing sidings to provide for efficient train meets, track improvements, and additional sections of main track in congested areas. The High-Build range would provide for additional capacity, recognizing future increased rail volumes for both passenger and freight services. Under the High-Build option, extensive sections of double track would be provided, as well as fourth main track up the busy Cajon Pass that is the primary rail corridor between Las Vegas and Southern California. Estimated costs for the rail improvement projects identified as part of Alternative A1 range from $1.1B for the Low-Build option to $3.5B for the High-Build option.

Expanded Scope of Work

At the completion of the initial feasibility study, RTC directed IBI Group, who conducted the project, to provide an additional assessment, including:

- Additional ridership and revenue forecasting;
- Identification of the elements needed for a Las Vegas passenger rail terminal, as well as for a maintenance and layover facility; and
- A review of three conceptual locations for the facilities, using a variety of criteria.

This information will assist RTC, FRA and other stakeholders as the service is advanced through the planning stage toward implementation.

The results of the expanded scope are incorporated in this technical report.

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² Factors would include the day and time of travel, as well as could reflect discounts for advance purchase. Travel during peak periods such as weekends and holidays could be higher.
Ridership and Revenue Sensitivity Analysis

The initial ridership assessment forecast an annual ridership for Alternative A1 of 362,000 passengers. The underlying assumption for this forecast was a travel time between Las Vegas and Los Angeles of approximately 5 hours and 30 minutes, at an average one-way fare of $57.25.

In order to gauge the impact of different variables on ridership and revenue, an additional analysis was conducted. Variables analyzed included:

- Longer travel times of 6 hours and 6 hours 30 minutes;
- Additional frequencies (34 roundtrips per week, rather than the 24 roundtrips originally analyzed);
- Lower frequencies (15 and 10 roundtrips per week);
- Higher and lower average fares; and
- Higher fares combined with additional frequencies

A complete description of the additional sensitivity analysis can be found as an Appendix to this technical report.

Table 1 provides a comparative summary showing information on Alternative A1 from the original feasibility study, as well as the three most productive scenarios from the sensitivity analysis. The results provided by AECOM were refined to include estimated operations and maintenance (O&M) costs and the potential farebox recovery ratio for each scenario.

<table>
<thead>
<tr>
<th>Year 2010 Forecasts</th>
<th>Alternative A1</th>
<th>Sensitivity 3</th>
<th>Sensitivity 6</th>
<th>Sensitivity 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>362,200</td>
<td>276,800</td>
<td>279,100</td>
<td>361,300</td>
</tr>
<tr>
<td>Revenue (2006$)</td>
<td>$18,730,000</td>
<td>$14,420,000</td>
<td>$21,160,000</td>
<td>$27,180,000</td>
</tr>
<tr>
<td>Estimated O&amp;M Costs</td>
<td>$34,000,000</td>
<td>$23,100,000</td>
<td>$32,700,000</td>
<td>$43,100,000</td>
</tr>
<tr>
<td>Net Operating Loss</td>
<td>$15,270,000</td>
<td>$8,680,000</td>
<td>$11,540,000</td>
<td>$15,920,000</td>
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<tr>
<td>Fare Recovery Percentage</td>
<td>55.09%</td>
<td>62.42%</td>
<td>64.71%</td>
<td>63.06%</td>
</tr>
<tr>
<td>Average Riders per Train</td>
<td>145</td>
<td>157</td>
<td>112</td>
<td>102</td>
</tr>
<tr>
<td>Average Rail Travel Time between Las Vegas and Los Angeles</td>
<td>5:30</td>
<td>5:30</td>
<td>5:30</td>
<td>5:30</td>
</tr>
<tr>
<td>Average Rail Fare</td>
<td>57.25</td>
<td>57.25</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Average Weekly Rail Roundtrips</td>
<td>24</td>
<td>15</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Coaches per trainset</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

The apportionment of costs associated with any potential net operating loss has not yet been determined, and would be the subject of future discussions between those agencies and stakeholders involved with the service.
Additionally, the costs in Table 1 include only a general provision for station O&M costs and terminal and maintenance facility O&M costs, and may be found to be higher upon further development of the alternatives. They do not include costs associated with debt retirement and other such costs.3

Of the additional sensitivity runs exhibiting good potential, Sensitivities 3, 6, and 9 show that very favorable farebox recovery ratios are possible with several scenarios. While it would not reduce the need for significant capital investment for rail improvement projects to provide needed capacity, as well as the costs of facilities, rolling stock and other needs, this scenario could offer an attractive option for initial service establishment.

Travel Time

The additional sensitivity analysis shows that travel time continues to be the most important factor in determining potential ridership.

Table 2 shows how longer travel times beyond the 5 hours and 30 minutes trip used in the feasibility study would impact ridership.

<table>
<thead>
<tr>
<th>Travel Time</th>
<th>5 Hours 30 Minutes (Alternative A1)</th>
<th>6 Hours 30 Minutes</th>
<th>6 Hours 30 Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>362,000</td>
<td>288,100</td>
<td>229,200</td>
</tr>
<tr>
<td>Change from Alternative A1</td>
<td>- 21%</td>
<td>- 36%</td>
<td></td>
</tr>
</tbody>
</table>

Frequency of Rail Service

The feasibility study established 24 weekly roundtrips for the new service. Sensitivity analysis reveals that ridership and farebox recovery ratios would continue to meet a commonly-accepted standard with either fewer (15) or more (34) weekly roundtrips. This offers the possibility that the service could initially offer the 15 roundtrips, and add additional frequencies as dictated by ridership, demand, and available resources. Table 3 compares the ridership and revenue associated with the 15, 24, and 34 roundtrip scenarios.

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3 These costs will be further refined in a future phase concurrent with the development of a financing plan for the project.
### Table 3
Frequency of Rail Service

<table>
<thead>
<tr>
<th>Number of Weekly Roundtrips</th>
<th>24 (Alternative A1)</th>
<th>15</th>
<th>34</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>362,000</td>
<td>276,800</td>
<td>361,300</td>
</tr>
<tr>
<td>Change from Alternative A1</td>
<td>-24%</td>
<td>-0.2%</td>
<td></td>
</tr>
</tbody>
</table>

#### Fares

Lastly, the feasibility study used an average forecast fare of $57.25. Impacts to ridership as a result of a higher fare, a lower fare, and a higher fare combined with increased frequencies were modeled as part of the sensitivity analysis. The results of this work are shown in **Table 4**.

### Table 4
Average Fares Paid

<table>
<thead>
<tr>
<th>Average Forecast Fare (One-way)</th>
<th>$57.25 (Alternative A1)</th>
<th>$50.00</th>
<th>$70.00</th>
<th>$85.00 (24 weekly roundtrips)</th>
<th>$85.00 (34 weekly roundtrips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>362,000</td>
<td>391,000</td>
<td>320,800</td>
<td>279,100</td>
<td>361,300</td>
</tr>
<tr>
<td>Change from Alternative A1</td>
<td>+8%</td>
<td>-11%</td>
<td>-23%</td>
<td>-0.2%</td>
<td></td>
</tr>
</tbody>
</table>

It is interesting to note that a combination of higher fares, offset by more frequent trains between Las Vegas and Los Angeles would attract a ridership very similar to that in the original Alternative A1.
Terminal Needs
A Las Vegas passenger rail terminal would need to provide, at a minimum, the following features.

- Ticketing/Customer Service counter and electronic ticket vending machines
- Station Agent and Employee Area (including security)
- Baggage handling/Storage area
- Passenger waiting area
- Restrooms
- Café/Retail space to provide meals, snacks, and sundries
- On-site parking (short- and long-term)
- Passenger pick-up/drop-off area
- Transit, taxi, resort shuttle pick-up and drop-off area

A 10-12,000 square-foot facility is seen as providing sufficient space for all these needs. Conceptually, parking facilities (both a parking structure and a surface lot) would accommodate approximately 500 cars.

Number, size of platforms

A single, center platform would provide access to two station tracks. The platform would be 600’ feet long, sufficient to accommodate a Pacific-Surfliner-type trainset of five coaches and two locomotives, with elevators and escalators connecting the platform and the terminal via a tunnel.

Amenities to be provided within Terminal

Initial terminal amenities would consist of a small café and retail space. As needed, this retail and dining area could be expanded by using standalone kiosks and carts to provide more retail and service options. A spacious waiting area would provide seating for passengers and guests, with restrooms located nearby. A staffed ticket counter would provide ticket sales and passenger services. Baggage handling would be provided.

Expected Annual Passenger Loads

Based on the forecast for Alternative A1, approximately 1,000 passengers per day (362,000 annually), would use the facility, with higher volumes during peak weekend and holiday travel periods.
Maintenance and Layover Facility Needs
A maintenance and layover facility would provide for the cleaning, fueling, inspection, minor maintenance and storage of trains in Las Vegas. The facility needs would include:

- Storage tracks,
- Inspection track,
- Train car wash, and
- Maintenance stores and administrative offices for railroad operator personnel, including facilities for train crews

Major maintenance of trains and locomotives would be performed at existing facilities in Los Angeles or elsewhere.

Conceptual Terminal Locations

Three locations were considered for the Las Vegas passenger rail terminal. They are:

- Downtown Las Vegas,
- Mid-Strip, and
- South Strip

The examination of these three conceptual sites provides a representative sampling of the potential locations available for the Las Vegas – Los Angeles service, and lays out the issues to be resolved and options available as the project is advanced.

For comparative purposes, and to ease maintenance activities and “deadhead” (non-revenue) train moves, the maintenance and layover facility would be ideally located close to the passenger terminal site. Figure 2 shows the location of the three conceptual sites relative to each other, Downtown Las Vegas, the Strip, and to McCarran International Airport. A description of each of the conceptual candidate sites is provided in the following paragraphs. Beyond discussions of issues with members of the Las Vegas-Los Angeles Rail Corridor Improvement Feasibility Study’s Technical Advisory Committee, which includes representation from Union Pacific Railroad, no contacts have been made with any of the landowners of the sites conceptually considered in this technical report. The inclusion of any site does not represent the agreement of, or participation by any party in the findings of this technical assessment.
**Downtown** – This traditional location would be sited close by the long-time station stops of previous Las Vegas-bound passenger rail services, on an RTC-owned property located at the intersection of Main Street and Bonneville Avenue, across the rail line from the Clark County Government Center and RTC’s offices. The passenger platforms would be located on the south side (compass direction – from the perspective of the I-15 freeway corridor, it would be considered east) of the Union Pacific’s mainline. A maintenance and layover facility would be located directly west (south) of the terminal and its platforms. **Figure 3** shows a more detailed view of the Downtown terminal’s potential location. **Figure 4** provides a conceptual layout of the terminal station itself. **Figure 5** shows the footprint that would be required for locating the maintenance facility adjacent to the Downtown site.
Figure 3 Downtown Terminal station area
Figure 4 Downtown
Terminal conceptual layout
Figure 5 - Downtown Terminal and Maintenance Facility footprint
**Mid-Strip** – A mid-strip location near Rio All-Suites Hotel and Casino, considered in 1999’s effort to restore passenger rail service remains an interesting conceptual site. In the Mid-Strip option, the terminal and its accompanying maintenance and layover facility would be located on the north (west) side of UP’s main line, just west of I-15, near Flamingo Road. Figure 6 shows the general area of the Mid-Strip terminal area. The station layout at this location would be similar to that proposed for the Downtown station, so no layout drawing was produced for the Mid-Strip location. Figure 7 shows the footprint required for locating the maintenance facility adjacent to the Mid-Strip terminal location.
Figure 6 - Mid-Strip Terminal station area
South Strip – Unlike the Downtown or Mid-Strip terminal locations, the conceptual location for a South Strip terminal is a site located on the Henderson Branch Line, off the UP Main Line, on Las Vegas Boulevard, east of Sunset. The South Strip terminal location could offer a passenger rail station directly fronting Las Vegas Boulevard, with easy access to McCarran International Airport, to Citizen Area Transit’s South Strip Transfer Terminal, and to the Regional Fixed Guideway. A maintenance and layover facility would also be located on the less-utilized Henderson Branch, just north of the I-15. Figure 8 shows a view of the existing South Strip station area. Figure 9 provides a layout of the terminal, parking and passenger pick-up and drop-off areas. Figure 9a provides a conceptual layout of the terminal building itself. Figure 10 shows the footprint required for the nearby maintenance facility.
Figure 10 - South Strip Terminal and Maintenance Facility footprint
Criteria for Comparison of Conceptual Alternative Locations
To provide for an initial discussion and comparison of the conceptual sites for a Las Vegas terminal, a list of eight criteria has been developed. The intent is not to identify a preferred terminal location at this time, but more to lay out for RTC and other stakeholders the relative strengths and weaknesses of each conceptual site. It is anticipated that a more-detailed analysis of the three station areas will be conducted as part of environmental clearance, and a preferred location determined as part of that effort.

The criteria include:
- Location near major activity centers,
- Sufficient land for the terminal,
- Sufficient land for an adjacent maintenance and layover facility,
- Connectivity with transit,
- Access,
- Availability of land,
- Compatibility with surrounding land uses, and
- Operational considerations

Each site will be assigned a value from one to five as to how well (or poorly) they meet the factors in the criteria, ranging from excellent (1) to poor (5), with a lower score being better.

1. Proximity to major activity centers?
All three sites generally meet this criterion, though the Downtown and South Strip sites are more convenient than is the Mid-Strip site, due to their direct proximity to existing and planned activity centers.

**Downtown** – In addition to the existing hotels, casinos, government buildings and offices in the downtown area, there are a number of significant projects under consideration for the area adjacent to the conceptual terminal. Of these, Union Park, a major mixed-use development, would see new office, residential and retail uses built in the currently undeveloped parcel bounded by the UP ROW, West Bonneville Avenue, and Grand Central Parkway. A new City Hall site has also been identified on the south side of the rail line.

**Mid-Strip** – This area, other than the Rio All-Suites Hotel and Casino, is generally less densely developed than is the downtown location, with some high-density residential and low-density commercial uses nearby. There are significant other casino properties located off Las Vegas Boulevard, east across the I-15 freeway.

**South Strip** – The proximity of McCarran International Airport limits the uses in this area. This location essentially constitutes the south end of the Las Vegas Boulevard Strip. Major hotels and casinos, beginning with Mandalay Bay are located just north of the site. A major commercial development is planned off
Sunset, just south of the site. Future plans of the Clark County Department of Aviation include the establishment of a new airport near Primm, in addition to McCarran International Airport.

Assessment:
   Downtown: 1  
   Mid-Strip: 3  
   South Strip: 2

2. **Sufficient land to accommodate the terminal at this location**
   There is sufficient land at each of the three conceptual locations to accommodate the terminal. At this stage, no discussions with the landowners (other than RTC, which owns the property on which the Downtown terminal could be located) have been held. In all three cases, the land is undeveloped, or could be made available relatively easily (there is an existing service station adjacent to the South Strip location).

Assessment:
   Downtown: 1  
   Mid-Strip: 1  
   South Strip: 2

3. **Sufficient land available to accommodate the maintenance and layover facility at this location**
   There are issues associated with each of the conceptual sites with this criterion. In order to accommodate the maintenance facility at the Downtown site, the switching and layout for the various elements, particularly the train wash, would be very tight. The Mid-Strip location is also constrained, but rather as a result of available ROW, as well as from the presence of a number of lead tracks that serve businesses just off the main line. Finally, the South Strip location would require that the maintenance facility be located slightly further away from the terminal, relatively speaking. The maintenance facility would be located on the north side of the I-15 corridor, while the terminal would be located on the south side, separated by a single-track bridge over which the rail line runs.

Assessment:
   Downtown: 3  
   Mid-Strip: 3  
   South Strip: 2

4. **Connectivity and integration with existing or planned transit services**
   Providing good connectivity between the passenger rail terminal and Citizen’s Area Transit bus services would provide an intermodal linkage and encourage increased use of transit.
**Downtown** – The Downtown terminal location would use Alternative Site 1, identified as one of two options for the proposed Central City Intermodal Transfer Terminal (CCITT), to which ACE Bus Rapid Transit and other bus routes will relocate from the existing Downtown Transportation Center (DTC). The CCITT is also going to be the terminus of the Regional Fixed Guideway. The combination of these two locations would provide excellent connectivity between the rail service and transit services that could provide a transfer and carry passengers almost anywhere within the region. This combination could also provide potential connectivity with the California-Nevada Super Speed Train (Maglev)\(^4\), which could use the space over the rail platform tracks linking the Maglev terminal with that of the conventional rail service.

**Mid-Strip** – The Mid-Strip location offers poor connectivity options by comparison with the other two conceptual sites. RTC route 202 is the only current transit service that passes the site. In order to provide good transit access, routes would have to be adjusted. Transfers to other routes would be necessary, which would reduce the attractiveness of transit as a travel mode to and from the passenger rail terminal. This location would not offer a direct connection to the Regional Fixed Guideway. It could potentially offer a shared connection with the Maglev service.

**South Strip** – The South Strip location, while not offering the direct advantages that the Downtown location could offer, would be very near the South Strip Transfer Terminal at Sunset. Existing services which could serve a terminal here include Routes 109 and “The Deuce”. Additionally, the alignment of the Regional Fixed Guideway along South Las Vegas Boulevard would provide an opportunity for easy access to and from a South Strip terminal. This site could potentially provide a connection to the Maglev service.

Assessment:
- Downtown: 1
- Mid-Strip: 4
- South Strip: 2

5. **Terminal access**
Vehicle, bicycle and pedestrian access to the terminal facility would vary greatly. It is likely that there would be a need for new signals at intersections around the terminal, to provide for safe and efficient ingress and egress to the facility.

**Downtown**
This site is located near the interchange of I-15 and I-515. Freeway connectivity would be good, with access at Charleston Boulevard and Grand Central

\(^4\) The California-Nevada Super Speed Train would provide service with rail vehicles using magnetic levitation. Ultimately, the project envisions operating Maglev service between Anaheim, California, and Las Vegas, with intermediate stops at Ontario, Victorville, and Barstow, California, and Primm, Nevada.
Parkway. Street access would be good, with potential access from Main Street, and Bonneville Avenue. Signal controls in the area would need to be reviewed to provide for efficient vehicle movements in and out of the passenger terminal, as well as the CCITT, potentially across Main Street from the terminal. Pedestrian and bicycle access appears to be excellent.

**Mid-Strip**
There would be significant access and circulation issues at this site. Freeway connectivity would be fair, with access from I-15 at Flamingo. Primary access in and out of the facility would be via Hotel Rio Drive. Pedestrian and bicycle access would be poor.

**South Strip**
Access to this site is generally good. Freeway access would be by way of I-215, with an exit located at Las Vegas Boulevard. Street access would be good, from both Las Vegas Boulevard and from Post Road. Pedestrian access from Las Vegas Boulevard would be average, given the existing land uses and distance between the terminal and nearby hotels. Bicycle access would be excellent, because a bike trail is planned for the Branch Line ROW.

**Assessment:**
- Downtown: 1
- Mid-Strip: 5
- South Strip: 2

6. **Availability of Land**
Currently, the property for all of the conceptual sites appears available. As to ownership, the Downtown site is largely owned by RTC, the Mid-Strip site is owned by Harrah’s (owner of the Rio), and the South Strip site is owned by Clark County. Should the Bonneville and Main site be selected for the CCITT, the terminal could be reconfigured to be accommodated as part of the CCITT. At the Mid-Strip site, it is possible that future plans for the Rio’s expansion might preclude its availability as a terminal. Given limitations on potential uses surrounding the airport, particularly at this location, it is possible that the South Strip land could be acquired by RTC for use as a terminal.

**Assessment:**
- Downtown: 2
- Mid-Strip: 2
- South Strip: 2

7. **Compatibility with adjoining land uses**
With all three sites, the terminal facility would constitute an acceptable, and, in fact, a desirable land use. The Las Vegas to Los Angeles service would provide an new and exciting transportation option, which could stimulate increased economic development and growth, now and in the future.
However, the adjoining maintenance facility would not be compatible. While it has been shown to provide a sense of its scale and needed footprint in both the Downtown and Mid-Strip locations, by its nature, the maintenance and layover facility is an industrial use, with noise and visual impacts that would make it an unattractive neighbor to nearby residential or commercial uses. Only the South Strip location would provide an existing industrial area that would be a highly compatible use.

**Downtown**
As noted above, the area directly adjacent to the conceptual terminal location is beginning an extensive development process which will continue the transformation of the downtown Las Vegas area. A passenger rail terminal could be very supportive of this development and other proposed land uses, as it would provide residents, employees, and visitors with convenient access to the Las Vegas – Los Angeles service. However, it is likely that locating the maintenance and layover facility near the terminal would not be supportive of the existing and planned land uses, as a result of the industrial character of the layover facility, and potential noise and visual impacts.

**Mid-Strip**
The major land uses on both sides of the I-15 freeway mid-strip at Flamingo Road are primarily hotel and gaming properties. As was the case when last considered in 1999, a Mid-Strip passenger rail terminal would be supportive of the adjacent hotels and casinos, on both sides of I-15, though its relative distance from many of these uses reduces its benefit. The maintenance and layover facility would not be supportive of the existing and planned land uses. As currently shown, it would be located next to a residential complex.

**South Strip**
The land uses currently surrounding the South Strip location are aviation (the airport), a golf course, a light commercial/industrial complex, and I-15. The maintenance and layover facility would be sited next to an industrial area consisting of warehouses and a recycling facility.

Assessment:
- Downtown: 6 (1 for terminal, 5 for maintenance facility)
- Mid-Strip: 7 (3 for terminal, 5 for maintenance facility)
- South Strip: 3 (2 for terminal, 1 for maintenance facility)

8. Operational Considerations

**Rail Operations at Stations**

Under the planned service arrangement in the near term, there would be between four and nine daily passenger train movements between Las Vegas and
Los Angeles, depending on the day of the week. At the Las Vegas end, each such ‘revenue’ (passenger-carrying) movement would need to move as directly as possible between one of the two station platform tracks and the mainline of the UP Cima Subdivision.

On a daily basis, four or five non-revenue train movements would be required between the storage facility and car wash and the passenger station. Ideally, such non-revenue movements should not require use of mainline track. However, conditions at some locations may require this (e.g. when there is insufficient length available for storage tracks). Where this is required, the non-revenue passenger train movements may be subject to delays from freight operations on the mainline.

This section presents a preliminary comparison of the initially proposed station configurations in terms of passenger train operations. Characteristics of the stations, storage tracks, and connections to mainline tracks may be modified to improve their performance if sites are highly advantageous, or upon more detailed consideration of operating requirements.

**Downtown**

The downtown station site is near the former Las Vegas passenger train station, on a short three-track section of the UP Cima Subdivision mainline. At this point the line carries about 20-25 daily freight trains; however, one or more of the main tracks are frequently occupied because Las Vegas is both a freight train crew change point and a location where ‘meets’ can be made between trains in opposing directions. To mitigate the likely delays from stopped or slowly moving freights in this vicinity, an additional mainline track would be provided in conjunction with the station, allowing room for an additional train to stop between the Wyoming Avenue and Sands Avenue interlockings as shown below. An additional crossover at the new control point for the station would allow passenger trains to use either mainline track 1 or 2 to approach or leave the station. These improvements notwithstanding, passenger trains arriving in or leaving Las Vegas would still be subject to occasional delays in the station vicinity. **Figure 11** shows the track improvements necessary for a Downtown terminal.
Mid-Strip

The Mid-Strip station site is located on a two-track section of the UP Cima subdivision mainline south of downtown, and would also be subject to delays from freights stopping at Las Vegas. Its location on the west side of the tracks is not favorable for a third main track extension, because of industrial lead tracks in the section between the Sands Avenue and Tropicana Avenue control point (as shown below) and because this location is farther removed from the crew change point. In lieu of major reconstruction, the station would be directly connected to both mainline tracks 1 and 2 at a new interlocking, and a former crossover at Tropicana Avenue would be restored to provide full routing flexibility between that control point and the station. Figure 12 shows the track improvements necessary for a Mid-Strip station.

Internally, the site does allow direct transit between the station and storage yard without using the UPSF mainline. Because a highway overpass restricts the available height at the preferred location for a train wash, this would be located so that trains would be washed inbound to the station, blocking the routes to and from the station during part of the process. An alternative to this would be to take the wash off the direct route, requiring additional non-revenue movement.
The overall site appears to be constrained by an industrial lead track to the south. The proposed storage yard is also adjacent to land uses which may require some additional measures to mitigate possible noise impacts (e.g. sound barriers, ‘ground air’ and power systems to minimize train idling.)

**Figure 12**
Mid-Strip Terminal – Needed Track Improvements

There could be a fair risk that non-revenue moves between the terminal and the maintenance and layover facility could be blocked or delayed by freight trains at this location, even if the maintenance and layover facility were off the main lines. Installing a third main track between CP Sands and CP Tropicana might alleviate this, but at significant cost for relocation of the many active lead tracks in the area.

Locating the maintenance and layover facility off the main on the Henderson Branch Line would create additional problems at this location by increasing the potential for both revenue and non-revenue train movements to experience delays as a result of UP freight activity.
**South Strip**

Site considerations led to a separation of the station platform tracks from the storage and wash facilities. This will require the 4-5 daily non-revenue movements to traverse the Henderson branch main track over the single-track bridge over I-15. At present, the branch is not signaled, and the relatively infrequent local freights can be authorized to serve the entire branch before obtaining authorization to return to the Cima Subdivision main track. With the South Strip station in service, the branch would most likely be signaled, from a new control point (interlocking) at the Cima Subdivision mainline (MP 327.1) to a point just east of where the station tracks join the branch mainline. All revenue and non-revenue passenger train movements to and from the station would be made on signal authorization, most likely by UP dispatchers for the Cima Subdivision.

Because the present freight frequency is not likely to increase significantly, the freight operation would be fairly similar to today’s, with permission for use of the branch east of the station being handled as at present. Local freight movements between the station and the Cima Subdivision mainline would be subject to signals. Very occasionally, passenger train movements will be subject to delay from local freight operations. Pre-departure time allowances from the storage facility to the station may need to account for this. Given the relatively low level of both freight and passenger train traffic, it should be possible to schedule revenue passenger train movements to minimize interference with local freight service on the branch. At present, there do not appear to be more than two active customers in this section. **Figure 13** shows the track improvements necessary for a South Strip terminal.
Summary of Operational Considerations

From a passenger train operations perspective, the key factors in evaluating station sites are:

- The extent to which revenue train movements are subject to delays from freight operations;
- The extent to which non-revenue movements (e.g. between storage tracks and station) are subject to delays from freight operations;
- Whether the train wash can be accessed on a direct route between the storage tracks and the station;
- Whether the routine train wash activity would conflict with access between the main line and the station; and
- Potential ‘good neighbor’ issues with land use adjacent to storage tracks.

In the table below, each site (in the configuration described above) is rated on each of these factors, from advantageous (1) to unsuitable (5). A weighted ranking is also shown, assigning weights ranging from 1 to 4 for the factors.
### Table 2
Operational Considerations for Las Vegas Terminal Sites

<table>
<thead>
<tr>
<th>Operational Consideration</th>
<th>Downtown</th>
<th>Mid-Strip</th>
<th>South Strip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue train movements subject to freight delays (weight = 4)</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Non-revenue train movements subject to freight delays (weight = 2)</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Wash on direct route from station to storage (weight = 1)</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wash activity conflicts with station access (weight = 1)</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Land use adjacent to storage tracks (weight = 1)</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Weighted Ranking (lower scores are preferable)</strong></td>
<td><strong>24</strong></td>
<td><strong>25</strong></td>
<td><strong>11</strong></td>
</tr>
</tbody>
</table>

Under this preliminary rating system, the South Strip site is indicated as being the most favorable. The sites on the mainline are less favorable. It is possible that the mainline sites could be made more attractive by making further mainline improvements, though this might require considerable expense.

**Assessment:**
- Downtown: 4
- Mid-Strip: 4
- South Strip: 2

**Assessment Summary**
Table 3 provides a summary of the values assessed for each of the conceptual terminal sites. Again, this summary is meant to facilitate discussion and review of the criteria used and the values associated with each. More-detailed analysis of conceptual terminal locations and the identification of a preferred location would be conducted in a future phase of the project.
Table 3
Assessment Summary for Las Vegas Terminal Sites

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Downtown</th>
<th>Mid-Strip</th>
<th>South Strip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity to major activity centers</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Sufficient land for terminal</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sufficient land for maintenance facility</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Connectivity with transit</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Access</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Availability of land</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Land use compatibility</td>
<td>6</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Operational considerations</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total of all values (a lower value is better)</strong></td>
<td><strong>19</strong></td>
<td><strong>29</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

Other Issues

**Future Bicycle Path** – RTC’s long-range bicycle master plans identify the Henderson Branch Line as the alignment for a future bicycle path. Moving from Henderson north, the bicycle path’s proposed alignment would bring it directly past the conceptual location for a South Strip terminal. Planning documents show the bicycle path continuing along the Union Pacific’s main line, at which point it would continue in both directions along the UP corridor.

Conceptually, the bicycle path has been incorporated into planning for a possible South Strip terminal facility, providing additional connectivity. The timeline for the bicycle path appears to be some years off, as it is not shown on a map which covers a period out to 2016.

Nevertheless, the placement of the bicycle path’s route bears consideration. While there are clear advantages to having the path include the passenger rail terminal, as the path travels north toward I-15, a new overcrossing to accommodate the bicycle path would need to be constructed. This could be a standalone structure for the bicycle path, or could be designed to provide a second rail crossing over I-15, which would provide additional capacity as the LV-LA rail service expands to meet future demand. Alternatively, the bicycle path’s route could divert from the terminal to nearby surface streets, crossing I-15 via Sunset. The advantage of this option would be to eliminate the cost associated with the new structure.

Between the South Strip terminal location and the UP main line, train speeds will be low, as trains slow to enter or leave the terminal or maintenance and layover facility. This segment will have a number of train movements throughout the day,
and having the bicycle path pass adjacent to the proposed maintenance and layover facility area could raise a number of issues, including, but not limited to:

- Liability and insurance issues,
- Security concerns,
- Impacts on Maintenance-of-Way activities, and
- Potential loss of ROW for future use.

Should the bicycle path seek to use UP’s main line as a north-south corridor, this could impact either the Downtown or Mid-Strip terminal locations. As well, UP would have to agree to the use of its ROW for the bicycle path.

Likely UP concerns regarding a Bicycle Path adjacent to its ROW (which could extend through the Henderson Branch Line segment as well as the main line) would be similar to those raised about the path’s proximity to a South Strip maintenance and layover facility.

**McCarran International Airport Issues** – There are potential issues with a South Strip terminal that are different from either of the other two conceptual locations under consideration. The South Strip terminal is proposed to be located on land owned by the Clark County Department of Aviation which operates McCarran International Airport. The terminal would be located opposite Las Vegas Boulevard from the airport’s runways. It would be necessary to work closely with Clark County Department of Aviation on noise and safety issues related to the disposition of the runways and the rail terminal facility.

**Future Integration with Maglev**

The initial phase of the proposed California-Nevada Super Speed Train project, which would operate trains using magnetic levitation technology (Maglev), would run between downtown Las Vegas and Primm, Nevada, with the potential for a stop at the new Ivanpah Airport.

The Maglev project is beginning a more-detailed environmental assessment of the initial segment, which will include a refinement of potential alignment alternatives. Ultimately, the project envisions operating Maglev service between Anaheim, California, and Las Vegas, with intermediate stops at Ontario, Victorville, and Barstow, California, in addition to Primm, Nevada. Ideally, potential alignments would consider the advantages of integration with other transportation modes, such as the conventional passenger rail service between Las Vegas and Los Angeles. Construction of the Maglev project is not yet funded.