



SAN DIEGO AIRPORT TRANSIT PLAN

Draft Transit Alternatives Report

April 2015



Cover Photo Source: mcmahonsteel.com.

Table of Contents

		Page
1	Introduction.....	1
2	Travel Market Analysis.....	2
3	Assessment of Travel Behavior, Modes and Corridors	10
4	Alternatives	14
5	Next Steps.....	34

Table of Figures

			Page
Figure 1	Origins and Destinations of Trips To and From SAN.....		3
Figure 2	Origins and Destinations of Trips To and From SAN (Residents).....		5
Figure 3	Origins and Destinations of Trips To and From SAN (Visitors)		6
Figure 4	Origins and Destinations of Trips To and From SAN (Visitors, Airport Area).....		7
Figure 5	Hotel Destinations		8
Figure 6	Resident Access Modes		9
Figure 7	Visitor Access Modes.....		9
Figure 8	Route 992 Ridership (Westbound).....		16
Figure 9	Route 992 Ridership (Eastbound)		16
Figure 10	Path from Middletown Trolley Station to Future Airport Shuttle Stop		18
Figure 11	Middletown Station Southbound Platform		20
Figure 12	Terminal 1 Signage.....		21
Figure 13	Route 992 Stop at Terminal 2		22
Figure 14	Hotel Destinations		24
Figure 15	Big Bay Shuttle		25
Figure 16	I-5 North Park-and-Rides.....		27
Figure 17	Estimated Costs and Ridership		29

1 INTRODUCTION

This Draft Transit Alternatives Report, part of the San Diego Airport Transit Plan, describes conceptual alternatives for new public transit service to San Diego International Airport (SAN). The purpose of the report is to identify alternatives with potential to increase transit's share of the market for airport access. Evaluation of the alternatives, including development of detailed ridership and cost estimates, will occur following this report. The alternatives were developed by Nelson\Nygaard based on analysis of data in the project's Existing Conditions report, peer examples in the Case Studies report, recommendations from previous plans, and additional field research. While the goal is to present well thought out alternatives, it should be noted that these are not recommendations. Recommended alternatives can only be developed after additional analysis, and the input of staff and partner agencies.

As described in the Existing Conditions report, current public transit service to the airport consists of Metropolitan Transit System (MTS) bus Routes 992 and 923. Route 992 provides service every 15 minutes weekdays and every 30 minutes evenings and weekends to Santa Fe Depot, Horton Plaza and City College Trolley Station along Broadway in Downtown San Diego. Route 923, meanwhile, provides less frequent service to downtown and Ocean Beach. The San Diego Trolley's Middletown Station is located just northeast of the airport, roughly one-and-a-half miles from the passenger terminals along Harbor Drive on the airport's south side. COASTER commuter rail and Amtrak intercity rail lines bypass the airport in the Trolley right-of-way (ROW). Interstate 5 (I-5) is just east of the ROW. The airport is also served by private for-hire and courtesy shuttles.

An airport expansion project now underway presents opportunities for improved transit access. A consolidated Rental Car Center, or RCC, is under construction along Pacific Highway on the northeast side of the airport, and as part of that project a busway is being built between the RCC/northside parking and the passenger terminals. There will be a shuttle stop about a block away from the Middletown trolley stop, and improvements are planned to the pedestrian path between them.

Previous plans have identified a number of ideas for improving transit access to the airport, including regional express buses and a new Intermodal Transit Center in the rail right-of-way on the airport's northeast side. The Intermodal Terminal would be served by Trolley, COASTER, Amtrak, and future California High-Speed Rail service.

2 TRAVEL MARKET ANALYSIS

Findings from the 2012 airport passenger survey, detailed in the Existing Conditions report, are summarized in this chapter.

Analysis of origins and destinations of trips by all modes with one end at the airport is summarized in Figure 1 on the following page. As the figure indicates, one-third (34 percent) of all trips begin or end in the immediate area of the airport, including Downtown. More than one-sixth (18 percent) begin or end in the Interstate 5 North/COASTER corridor, where a Trolley extension (the Mid-Coast Corridor) is scheduled to begin construction later this year. About one-eighth of trips (12 percent) begin or end in the Interstate 8/Trolley Green Line corridor, and another one-eighth (12 percent) are in the State Route 163 corridor.

Figure 1 Origins and Destinations of Trips To and From SAN

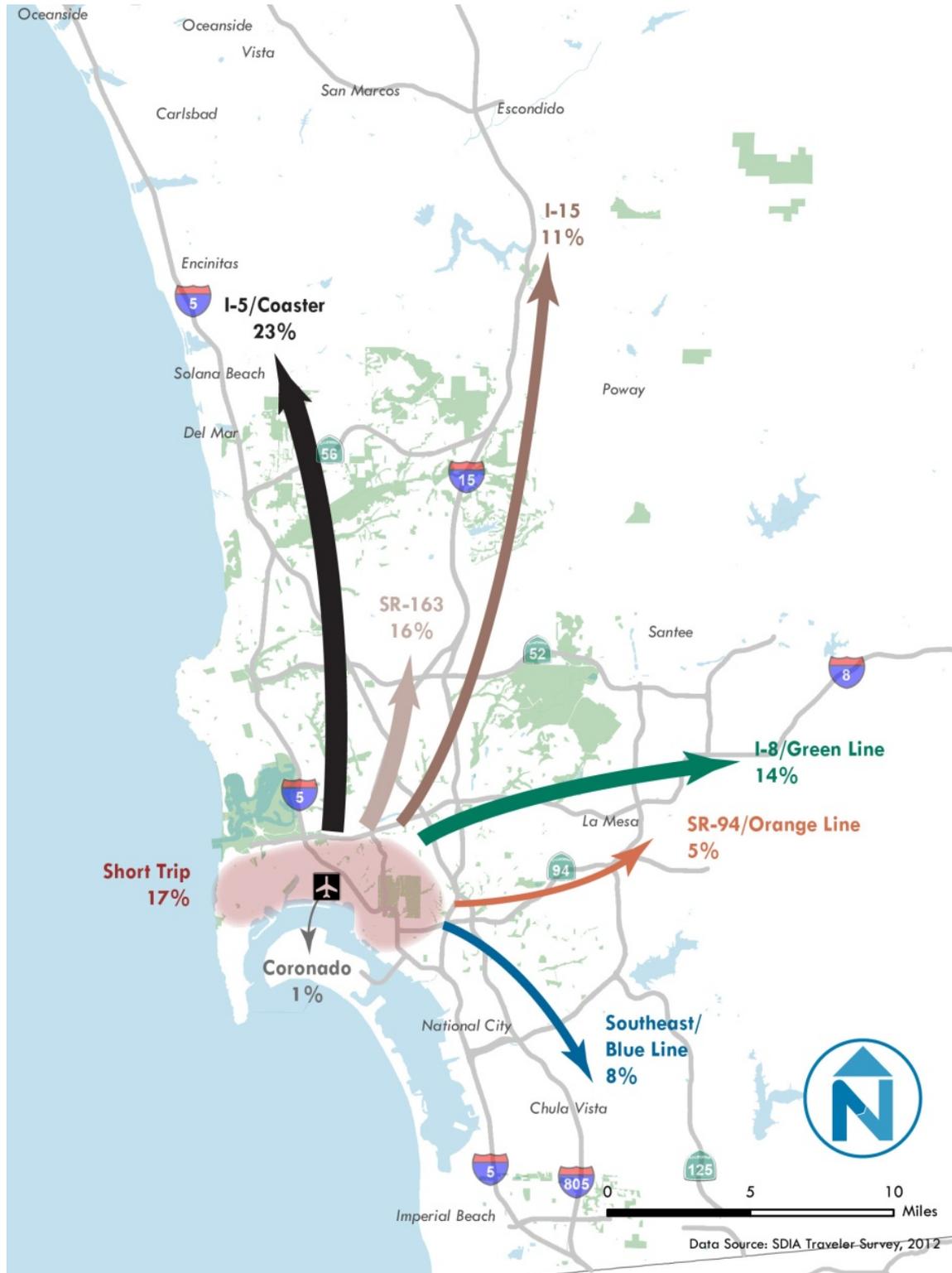


Note: Some travel in the SR-163 corridor may also travel on the I-15 corridor.

Travel patterns to and from the airport vary by category of traveler. Travel patterns of area residents are shown in Figure 2 on the following page. As might be expected, fewer trips (17 percent) begin or end in the immediate area of the airport, which is used by residents throughout the region. The largest origin/destination for residents is the I-5/COASTER corridor, which accounts for nearly one-quarter (23 percent) of trip ends. This is followed by the SR-163 corridor (16 percent) and the I-8/Green Line corridor (14 percent). It should be noted that previous analysis has found that most airport employees live to the south, many of them in the Trolley Blue Line corridor.

Travel patterns of visitors to San Diego are shown in Figure 3 on page 6. Over three-quarters of visitor trips (78 percent) begin or end in the area of the airport, including Downtown.

Figure 2 Origins and Destinations of Trips To and From SAN (Residents)



Note: Some travel in the SR-163 corridor may also travel on the I-15 corridor.

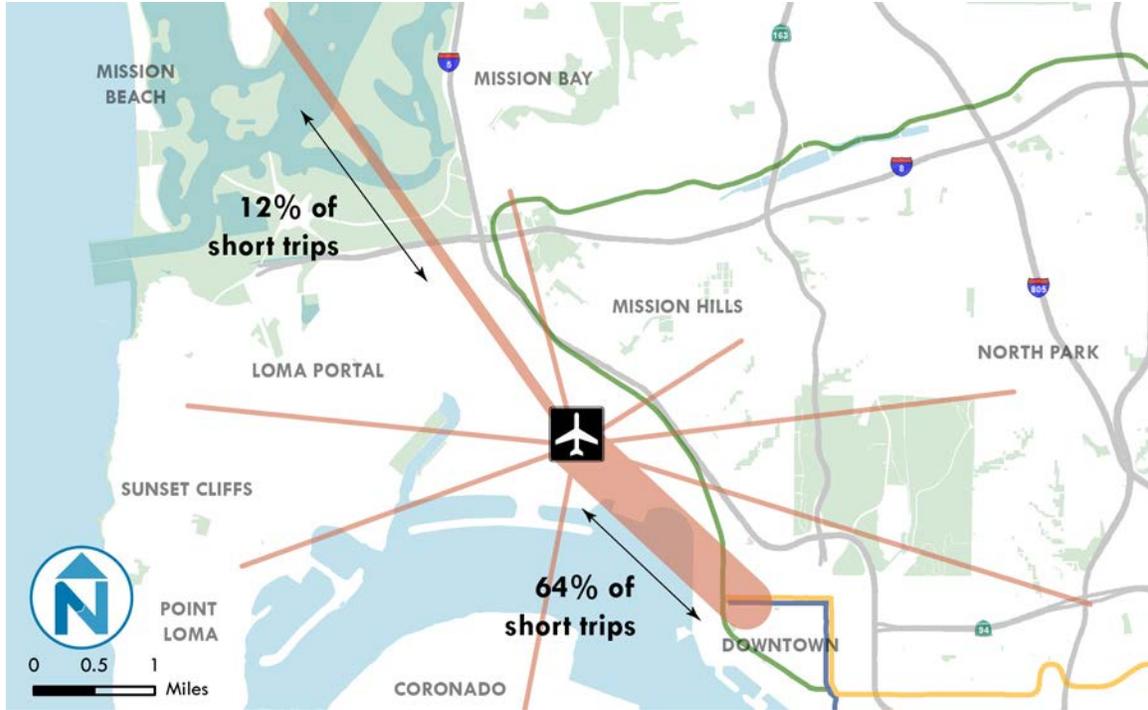
Figure 3 Origins and Destinations of Trips To and From SAN (Visitors)



Note: Some travel in the SR-163 corridor may also travel on the I-15 corridor.

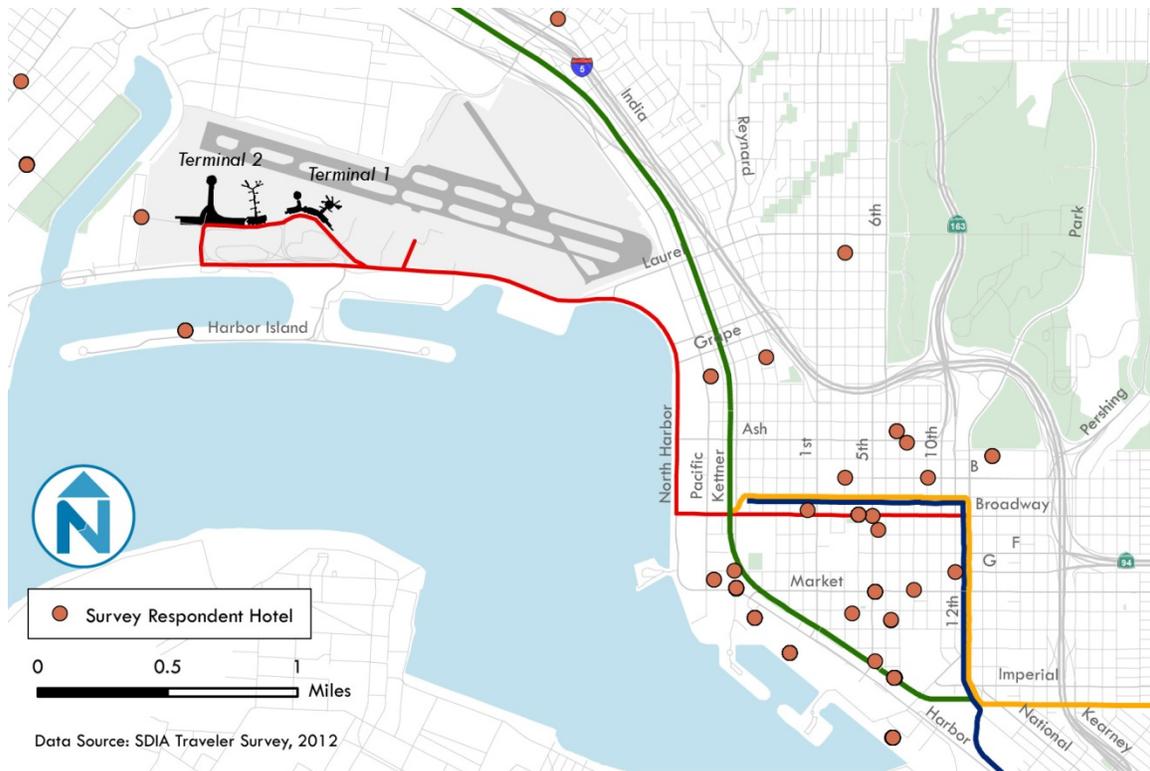
Figure 4 below shows origins and destinations of visitor trips within the airport area in greater detail. As the figure indicates, nearly two-third of these trips (64 percent) or nearly half of all visitor trips (50 percent) begin or end downtown. About one-eighth of airport-area visitor trips (12 percent) begin or end in the Mission Beach area.

Figure 4 Origins and Destinations of Trips To and From SAN (Visitors, Airport Area)



Overall, the survey found that close to half of visitors are traveling between the airport and hotels, and many of these hotels are located in Downtown San Diego, including the Gaslamp Quarter. Hotel-related demand accounts for roughly 18 percent of all airport-related travel, and demand related to the San Diego Convention Center, cruise ships, and other downtown destinations accounts for approximately 22 percent of all travel to and from the airport. Figure 5 below shows locations of hotel-based origins and destinations reported by survey respondents.

Figure 5 Hotel Destinations



In identifying transit alternatives, it is important to understand the distinct needs and behavior of different groups. Figures 6 and 7 below show airport access modes for residents and visitors, by corridor. As the figures indicate, visitors are much likelier to travel to and from the airport using transit and taxis, while residents are likelier to drive or be picked up or dropped off. This pattern is logical since residents have immediate access to their personal vehicles, while visitors must choose their access mode against the need and cost of renting a car. This has implications for the types of transit improvements that might be most attractive to each market.

Figure 6 Resident Access Modes

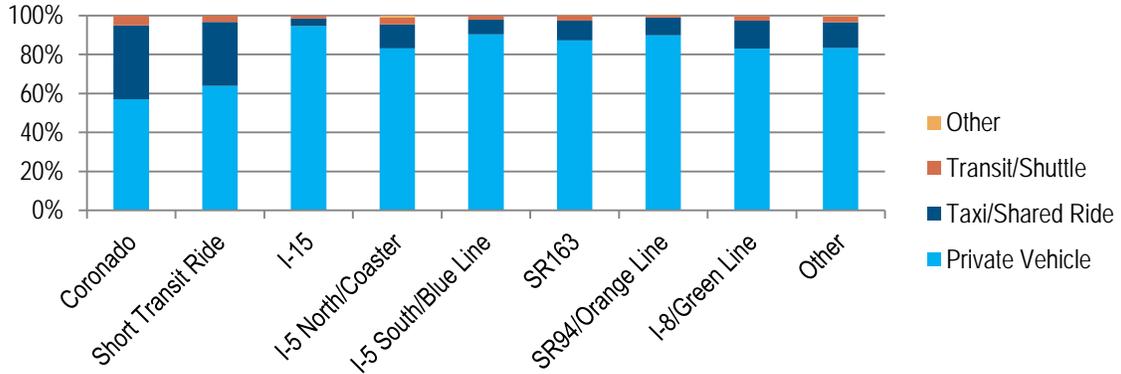
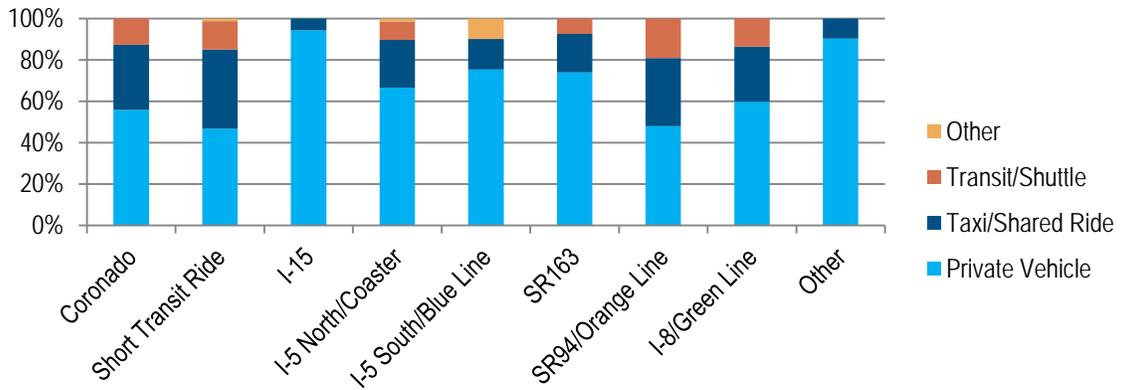


Figure 7 Visitor Access Modes



3 ASSESSMENT OF TRAVEL BEHAVIOR, MODES AND CORRIDORS

In addition to the travel market analysis, assessment has been conducted of other important inputs into the development of alternatives: factors in travel behavior; modes, or available tools; and characteristics of the corridors identified through the travel market analysis.

Travel Behavior

While individual travel choice decisions may be based on many factors, the two most common (after basic access, i.e. whether a destination can be arrived at using a mode of transportation) are travel time and the cost of travel. However, travelers may not make decisions based on actual costs or travel times, as perceptions of travel time and cost can vary significantly. While auto ownership is expensive (a national average of 59.2 cents per mile driven, according to the American Automobile Association's 2014 survey), the financial incentives to use a car on any given trip are typically limited to the price of gas, tolls and parking. At the same time, research has found that time spent waiting for transit may be perceived as much longer than it actually is, a factor that may be compounded if one must transfer, or if a bus or train is running late.

Other factors that should be taken into account include the “legibility” or ease of understanding of a transit route (including factors such as route directness, and “clockface” headways every 10, 15, 20, 40 or 60 minutes) as well as other passenger information/awareness issues such as marketing and wayfinding/signage; actual and perceived safety; comfort; and qualitative elements of the experience such as the “pleasantness” of pedestrian paths to and from transit stops. This may be particularly important for travelers who are not familiar with their destination – their need for information both before their trip and upon arrival is critical, as visitors often make their access mode decision before they arrive on site.

Comfort and experience for travel to and from an airport may be different than for other types of trips, as passengers are often carrying luggage and are much more time sensitive – missing a trip or being late may have a much greater impact on an air passenger than a regular commuter.

In addition, air travelers include passengers who are travelling on business being paid for by others. The ability to save money on a transit trip may have little impact on someone travelling on an expense account.

That said, there is still a substantial opportunity to improve transit ridership to San Diego International Airport. Previous work suggests that the number of transit riders could essentially double with improved service. It is important to note that even the best transit services can never hope to capture a majority of trips to an airport. The unique characteristics of airports, which include early and late shift workers, the absolute need to be on time to catch a plane, the phenomenon of groups travelling together, and the fact that a trip's cost may be paid by someone

other than the traveler him/herself are just some of the factors which suggest that airports are unique in their transit choice behavior.

Resident Travelers

For residents who own cars, the decision whether to drive to the airport may be driven primarily by a) the cost to park, and b) the difference in travel time between driving and taking transit or other modes.

The daily cost to park at SAN currently starts at \$11 (with an online coupon). Lower rates are available at nearby private lots. In any case, transit should be cheaper for individuals, although for families, couples or friends carpooling, parking may cost less than transit for trips of just a day or two.

While transit should be cost-competitive with driving to the airport for most trips, however, depending on origin and destination, transit travel times may be substantially longer – particularly in a relatively sprawling region such as San Diego County.

In developing alternatives that might make transit more attractive to residents, then, travel time and reliability will be major factors.

Visitors

For visitors, the time-and-money calculus is somewhat different: while some visitors may be picked up and dropped off by residents, many may be deciding whether to rent a car, a potentially laborious and expensive proposition, which is heavily influenced by the visitor's ultimate destination, as well as the cost of parking at the destination location. A visitor may make the decision on access mode based largely on their need for a car for the duration of their visit, rather than on the quality of the transit option.

For visitors, awareness and understanding of their options may be of particular importance – as a relative stranger to a new area, a visitor needs information in advance of travel as well as information upon arrival that gives a high degree of confidence that the transit service will meet all of their needs. Visitor trips are complicated by a factor specific to airport access: the need to negotiate luggage. Note, as well, different types of visitors – business travelers vs. vacationing families, for example – may behave differently.

Airport Employees

Finally, airport employees are most cost-conscious, as they must travel to the airport frequently. Because many employers work early or late shifts, service span may also be an issue, as would other factors in transit service such as frequency and numbers of transfers required.

Modes

Existing public transit service to the airport is provided by bus routes making local stops. While relatively frequent stops increase access, they degrade travel time, especially over longer distances. This is why so-called “rapid” bus services such as those recently introduced in San Diego have become increasingly popular: by stopping only at the busiest locations, they improve travel times for most potential users. Express buses and shuttles providing direct, non-stop, point-to-point access are similar in this regard.

In addition to the bus routes serving the airport directly, there is a light rail station near the airport that will soon be connected to the passenger terminals by a shuttle. While most residents and employees within the airport's travel shed are not located near a Trolley station, the system does serve major corridors, and it will soon be extended north alongside I-5. Some stations provide free parking extending the reach of the system, but capacity is limited, and importantly for airport access, stays are limited to 24 hours.

COASTER commuter and Amtrak intercity trains, meanwhile, already serve the I-5 North corridor but bypass the airport without stopping. The nearest COASTER station is the Santa Fe Depot, where trains terminate; the nearest station to the north is at Old Town, and; the next station, Sorrento Valley, is north of La Jolla and University City. Additionally, COASTER service is currently infrequent outside of peak commute hours, although a major expansion of service was included in SANDAG's most recent Regional Transportation Plan. The Mid-Coast Corridor Trolley extension will serve University City and interim destinations.

Finally, while not a transit mode, one of the most cost-effective tools available for improving transit access is improved awareness of existing service, and opportunities may exist for enhanced wayfinding signage and other localized improvements at the airport and other locations as well as a renewed marketing effort via digital and other platforms.

Key Travel Corridors

The travel market analysis found the greatest overall demand for travel to and from the airport in, first, the immediate area of the airport, including downtown; second, the I-5 North/COASTER/Mid-Coast Trolley extension corridor; and third, the I-8/Trolley Green Line corridor. Each of these corridors has distinct transportation-related characteristics that suggest different strategies for improving transit access and market share.

Airport Area

In the immediate area of the airport, including downtown, most of those traveling to and from the airport are visitors, and existing transit service to the airport is relatively convenient: Route 992 provides relatively frequent connections between the airport and downtown core at most times. The first and most obvious way to improve airport access within the area of the airport, then, would be to make improvements to the speed, frequency and span of Route 992 service.

However, much of downtown, including the Gaslamp Quarter, is not served by Route 992. Visitors carrying luggage are especially sensitive and averse to transfers and/or long walks to and from stops. Another strategy for improving airport access, then, might be to provide transit service to parts of downtown not directly served by Route 992, particularly hotels. The Port of San Diego currently operates seasonal Big Bay waterfront shuttle service that might be expanded to serve the airport, and operate year-round.

I-5 North/COASTER

The I-5 North corridor features an existing rail alignment that might be leveraged in a number of ways. First, additional improvements could be made to pedestrian and shuttle connections between the Middletown Trolley Station and airport terminals. Second, shuttle service could be provided to and from the Old Town Transit Center, which serves as both a Trolley and COASTER stop, although parking issues at this station would have to be addressed. And third, rail service in

the corridor could be expanded as planned, including the Mid-Coast Corridor project as well as expanded COASTER service.

In addition to Old Town shuttle service, additional opportunities may exist to introduce express bus service between the airport and remote parking lots, in this corridor and others. There are a few existing moderately sized park-and-ride lots in the I-5 corridor, with a larger lot planned at Manchester Avenue in Encinitas, and there are managed lanes north of I-805; there are many lots in the I-15 corridor, where there are also managed lanes.

Other Corridors

In other corridors, including the I-8/Green Line corridor, the Orange and Blue Line corridors, and the I-15 corridor, existing transit infrastructure might also be leveraged. Both the Green and Orange Lines stop at Old Town; the Blue Line will be extended to Middletown, Old Town and the University of California San Diego (UCSD) as part of the Mid-Coast Corridor project; and the managed lanes in the I-15 corridor used by new Rapid bus service might also be used for airport express service (or, alternately, Rapid bus service might be extended to the airport).

4 ALTERNATIVES

Alternatives have been developed for two time horizons: near-term, or within one to five years; and longer-term.

The alternatives may be briefly described as follows:

Near-Term Alternatives

- *Route 992 Rapid Service:* To reduce travel time, remove lightly used stops on Harbor Drive, combine closely spaced stops on Broadway, and relocate/combine airport stops.
 - *Rapid 992:* Convert Route 992 to a Rapid service, with stops only at City College Station, Horton Plaza, Courthouses, Santa Fe Depot, Harbor Drive adjacent to the Commuter Terminal, Terminal 1 and Terminal 2.
 - *Combine with Route 235:* Extend direct airport access to the I-15 corridor.
 - *Combine with Route 215:* Extend direct airport access to the El Cajon corridor, and improve frequency.
- *Trolley Access Improvements:* Improve the connection between the Middletown Trolley Station and future airport shuttle stop by improving the pedestrian path, providing frequent shuttle service, and enhancing wayfinding and passenger information.
- *Airport Transit Wayfinding and Marketing:* Increase awareness and convenience of existing transit service.
- *Old Town Shuttle:* Introduce shuttle or regular transit service to the Old Town Transit Center.
- *Harbor Drive Shuttle:* Extend and expand the Big Bay Shuttle to serve the airport, operate year-round, and provide access to the Gaslamp Quarter.
- *Regional Express Buses:* Work with partner agencies to identify sites in the I-5 North corridor for a new or expanded park-and-ride.

Longer-Term Alternatives

- *Intermodal Transit Center:* Implement using high-speed rail funding.
- *Harbor Drive Trolley Extension:* Add a line from the Santa Fe Depot to the airport terminals.

Near-Term Alternatives

Alternatives developed for the near term could be implemented with relative ease, meaning that they should be neither especially expensive nor require significant planning, design, engineering or permit acquisition.

Route 992 Rapid Service

The simplest way to improve transit access to the airport would be to improve existing transit to the airport – MTS Route 992. Route 992 already provides connections to downtown and other major transit routes.

However, Route 992 could be improved. It could operate every 15 minutes on weekends, when it now operates every 30 minutes. It could begin and end operations an hour or so earlier and later, better serving airport employees with early-morning or late-night shifts. And, potentially most beneficially, it could be made faster. Ideally, the first trip would arrive at the airport by 5 AM and the last trip would leave the airport after midnight to accommodate most shift workers.

Currently, scheduled travel times on weekdays between Terminal 1 and Horton Plaza are 18 to 19 minutes. While this may not be an especially long trip, it is not time-competitive with point-to-point shuttles, TNCs or taxis -- according to Google Maps, mid-day drive time is 11 minutes. Additionally, many passengers must wait to transfer to or from the Trolley or other transit routes. Finally, passengers may have to wait up to 15 minutes (currently 30 minutes on weekends) for Route 992 to arrive, and this time is likely to be perceived as much longer than it actually is.

Route 992 could be made faster at low cost and with little impact by removing or combining some stops. Figures 8 and 9 on the following page, from the Existing Conditions Report, show average weekday activity levels at each stop on the route as of 2014.

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 San Diego County Regional Airport Authority

Figure 8 Route 992 Ridership (Westbound)

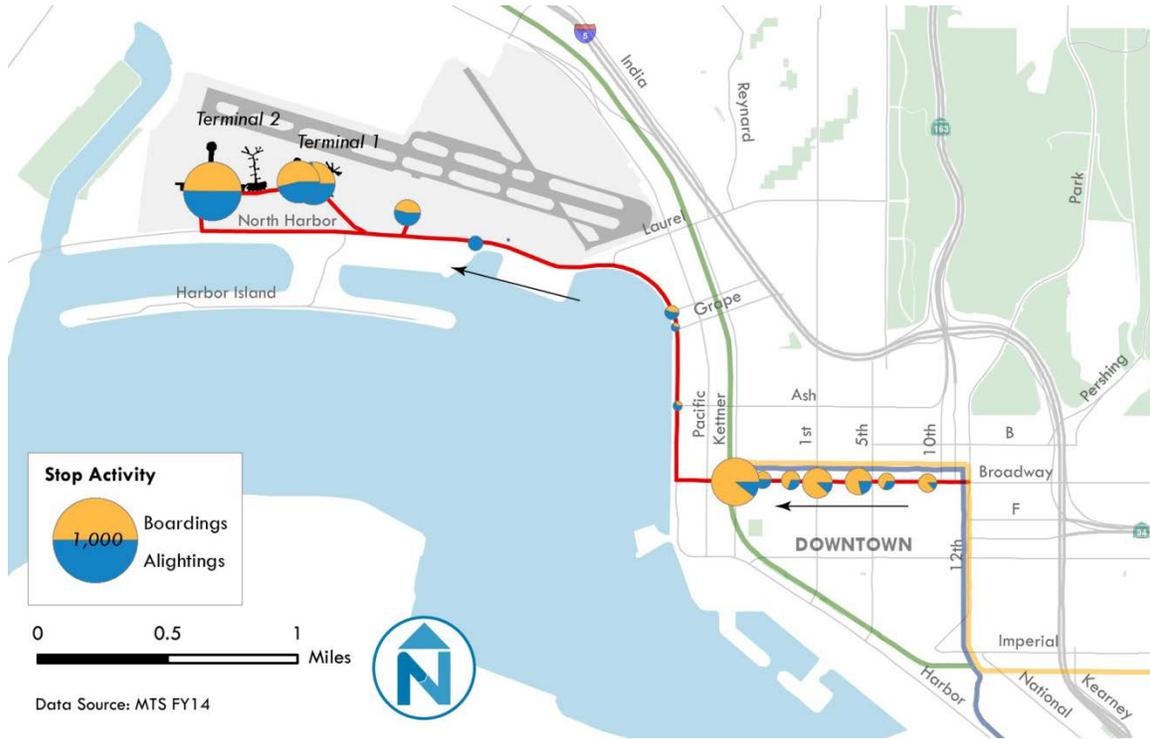
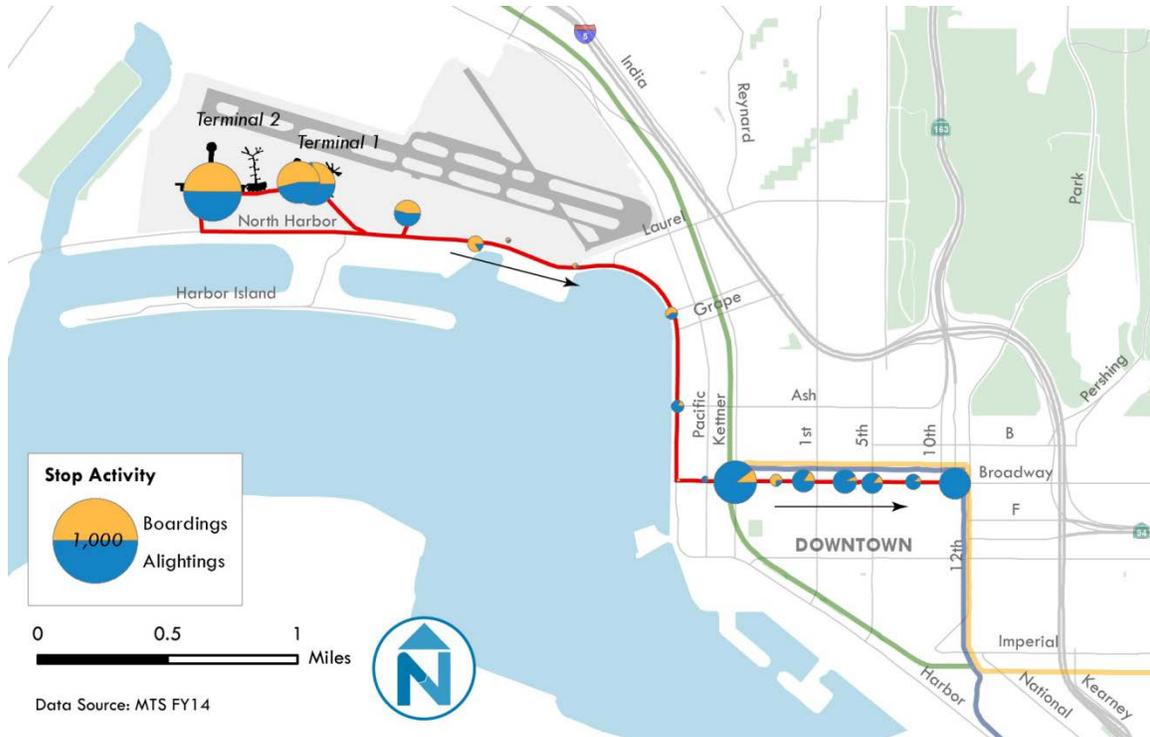


Figure 9 Route 992 Ridership (Eastbound)



As the figures indicate, there is relatively little activity between the airport and downtown, at the 10 stops along Harbor Drive. These stops are also served on weekdays by Route 923, which overlaps with Route 992 between the airport and the City College Trolley Station/Transit Center (with the exception of one short segment near the B Street Cruise Terminal). These stops could be removed without eliminating access on weekdays, and the number of riders who would benefit from faster travel times would be much greater than the number of riders impacted by longer wait times.

As Figures 8 and 9 also illustrate, activity levels at the 19 stops along Broadway vary. Some of these stops are as little as two short blocks or about 550 feet apart, and removing or combining some of the lesser-used stops would have little impact on access.

The greatest opportunity for stop consolidation and relocation, however, might be at the airport itself. Route 992 makes a total of five stops at the passenger terminals: one at the Commuter Terminal, and two each at Terminals 1 and 2. The stop at the Commuter Terminal requires a route deviation nearly one-quarter of a mile long, while the stops at Terminals 1 and 2 are just a few hundred feet apart. The Commuter Terminal could be served from a stop on the roadway rather than deviating into the terminal curb, while Terminals 1 and 2 could each be served by a single stop. Eliminating the front door stop at the Commuter Terminal would impact very few riders, since less than 5 people board or alight at that stop on a typical day, and commuter terminal passenger traffic is on the decline. Employees who might use the bus and who work in the commuter terminal would have a short walk from the roadway stop or from Terminal 1.

Without additional data, analysis cannot be conducted of the running time impacts of these changes. However, each time a bus must stop, even to pick up a single passenger, it must slow to a stop, “dwell” during loading and unloading, merge back into traffic, and accelerate, a process that can take anywhere from a few seconds to several minutes. Removal of 10 stops on Harbor Drive, several on Broadway, and two at the airport, plus shortening the route by a quarter-mile, should save several minutes per trip. These changes can be made without negatively impacting a significant number of riders; local riders will all have alternatives available, and ridership at the impacted stops is very low, as seen on Figures 8 and 9 on the previous page.

Removing all of these stops would effectively make Route 992 a limited-stop or “rapid” service; it might make sense, then, to go ahead and brand it as MTS Rapid service, and have it make only the Broadway stops used by Rapid Routes 215 and 235 – City College, Horton Plaza, Courthouses and Santa Fe Depot – as well as the three airport stops identified above. Rapid service charges a higher fare than other services; however, airport travelers tend to be less price-sensitive than other groups.

Alternately, Route 992 could be consolidated with either Route 215 or 235, providing one-seat rides to the airport from either the El Cajon Boulevard or I-15 corridors. Because Route 215 operates every 10 minutes during peak periods, rather than every 15, this would improve the frequency of airport service. Route 235, meanwhile, operates less frequently than Route 992 in the mid-day; in order to maintain existing service levels on Route 992 without increasing costs, a “short line” could be operated between the airport and Broadway.

Trolley Access Improvements

The Middletown Trolley Station is just outside airport property, one block east of Pacific Highway on the north side of Palm Street. There is currently no transit connection between the station and passenger terminals. However, the busway opening in January 2016 between the terminals and

the northside parking lot and RCC will include a shuttle stop at Palm. This stop will be served by the parking shuttle, which is expected to operate with increased frequency and a schedule when the roadway is opened.

In conjunction with the busway project, SANDAG is funding improvements to the pedestrian path between the station and shuttle stop. The existing path is shown in Figure 10 on the following page.

Figure 10 Path from Middletown Trolley Station to Future Airport Shuttle Stop



As Figure 10 indicates, the existing path is relatively direct, but the sidewalk is very narrow, and the path is further constrained by landscaping. Additionally, Pacific Highway is very wide, and the wait to cross the street can be long.

One solution to these problems would be to provide a pedestrian bridge between the station and shuttle stop. While pedestrian bridges can be problematic due to the grade change required at each end – the need to climb stairs or a ramp, or wait for an elevator – the elevation of the station is about 16 feet higher than the stop, meaning that vertical circulation should be required only at the shuttle end. At the station end, the bridge could be at grade, level with the sidewalk. However, the bridge would have to be located on the existing commercial property at right, and it would be relatively expensive to construct.

Alternately, the existing path could be improved in a variety of ways:

- Widen the sidewalk to provide at least eight feet of unobstructed clear space, enough for two pedestrians carrying luggage to comfortably pass.

- Extend or “bulb out” the corner on the west side of Pacific Highway, where there is a parking lane along the curb, in order to reduce the pedestrian crossing distance.
- At the corners, provide wheelchair ramps aligned with the crosswalk.
- Improve the visibility of the crosswalk using “ladder,” “zebra,” or “continental” striping or textured materials.
- Widen the center median to at least six feet, in order to provide a pedestrian refuge between the northbound and southbound lanes of Pacific Highway. This could be accomplished without widening the street by narrowing traffic lanes slightly.
- Change signal phasing in order to reduce pedestrian wait times.
- Provide a “countdown” pedestrian signal.

Improvement plans provided by SANDAG include three of these elements: a widened sidewalk between the station and Pacific Highway with new wheelchair ramps on all four corners of the intersection (directly aligned on one corner, although not on others), as well as ladder crossings. The crosswalk on the north side of the intersection of Palm and Pacific Highway would also be straightened and made shorter as part of the reconstruction of the northwestern corner. However, pedestrian conditions on that corner would actually be degraded by a wider radius designed to accommodate right turns at relatively high speeds. Moreover, a pedestrian refuge is not included despite the removal of one of the two existing southbound left-turn lanes; instead, a buffer is added between the turn and through lanes, and the lanes themselves remain 12 feet wide, wider than is necessary for safe operation.

In addition to improving the pedestrian path, other changes could be made to make the Trolley-shuttle connection more attractive to travelers with other options for airport access.

First, shuttle service should be relatively frequent – ideally, waits at most times should be no longer than 10 minutes, the maximum “walk up” frequency, or frequency at which most passengers will simply head toward a stop without first consulting a schedule.

Second, real-time information should be provided on shuttle wait times, both at the shuttle stop and on the platform at the Trolley station.

And third, wayfinding improvements should be made both at the station and along the path to the stop. These could range from something as simple as new signs on the Trolley platforms directing arriving passengers to the shuttle stop to major changes such as re-naming the station. The station’s southbound platform is shown in Figure 11.

Figure 11 Middletown Station Southbound Platform



As Figure 11 shows, for most passengers arriving at the station, there is no indication that this is the stop closest to the airport – the view of the airfield is blocked from most vantage points by the building at right. Additionally, the name of the station offers no guidance. Until recently, Middletown Station was named “Palm Street Station”; changing its name to “Airport/Middletown” would be a relatively simple matter, as there would be some cost for new signs, but maps, timetables and other printed materials including the station name could be replaced over time, as part of regular cycles. Adding flight information screens or boarding pass kiosks at the station would further suggest “arrival” at the airport when reaching the station.

Airport Transit Wayfinding and Marketing

One simple and cost-effective way to improve transit service is to improve awareness of existing service. Existing service can also be made more useful, convenient and attractive without making changes to the service itself.

Figure 12 shows existing signs in Terminal 1 directing passengers toward bus and shuttle stops.

Figure 12 Terminal 1 Signage



In the photo, a Route 992 stop is immediately outside the door at left, but there is little indication of this: only a “City Bus” sign over the door. The sign directing passengers to the “Shuttle to Terminals” is more prominent, and those seeking “Ground Transportation” – which could be interpreted to include local buses – are directed to the sky bridge.

Figure 13 on the following page shows a bus shelter outside Terminal 2.

Figure 13 Route 992 Stop at Terminal 2



This shelter is shared by the airport's internal circulator shuttle service and Route 992. However, while signs for the airport circulator are prominent, only a small MTS logo to the side of the shelter indicates that the stop is also used by local buses. Additionally, the stop's location is at the far end of the curb outside the terminal, further reducing the visibility of MTS service.

Visitors to San Diego may be prepared to use transit, and the Internet has made it relatively easy to learn about service in advance. However, if upon arrival at the airport, passengers find it difficult to complete a task as seemingly simple as locating a bus stop, then they may choose to take a taxi or rent a car instead. Moreover, when visitors can see transit service at the airport, and are aware that it exists, they may be more likely to use it in the future.

The best practice in wayfinding is, first, to guide users to their destinations using architectural design cues, rather than signs; but second, if signs must be used, to provide exactly the right amount of information, at the right locations, as clearly as possible. At airports such as SAN, there are many destinations competing for space on signs; nonetheless, signs reading "bus to downtown" and "shuttle to Trolley" would do little to contribute to clutter. Signs directing passengers to the airport might also be installed at major Route 992 stops downtown, such as Santa Fe Depot.

Additional steps could also be taken at stops themselves to make the experience of using transit more convenient. First, ticket vending machines or TVMs like those found at rail stations would allow passengers to purchase tickets before boarding, speeding the loading process and reducing travel times for all passengers. Second, signs providing real-time information on wait times, like

those at rail stations, could serve to reassure passengers and reduce perceived waiting time, which research has found can seem much longer than it actually is. The signs might also provide information on destinations: for example, “The next bus for downtown leaves in 10 minutes” or “The next shuttle to the Trolley station leaves in 5 minutes.”

Finally, additional marketing of existing airport transit service could be conducted via various platforms, including the airport website as well as smartphone applications.

Old Town Shuttle

The Old Town Transit Center (OTTC) is the region’s largest multimodal transit hub outside of Downtown San Diego, with Trolley Green Line, COASTER, and Amtrak service in addition to 11 MTS bus routes and UCSD and University of San Diego (USD) shuttles. Additionally, it is one of the largest park-and-ride lots in the region, with 412 parking spaces on-site and an additional 350 spaces available to the public at Caltrans District 11 headquarters across the street.

OTTC is also just five miles via Pacific Highway and Harbor Drive from the airport terminals. Future shuttle or regular transit service could operate between the airport and Old Town, where connections could be made to COASTER and Amtrak as well as shuttle and bus routes serving UCSD, USD, Ocean Beach, Mission Bay, Pacific Beach, La Jolla and other neighborhoods.

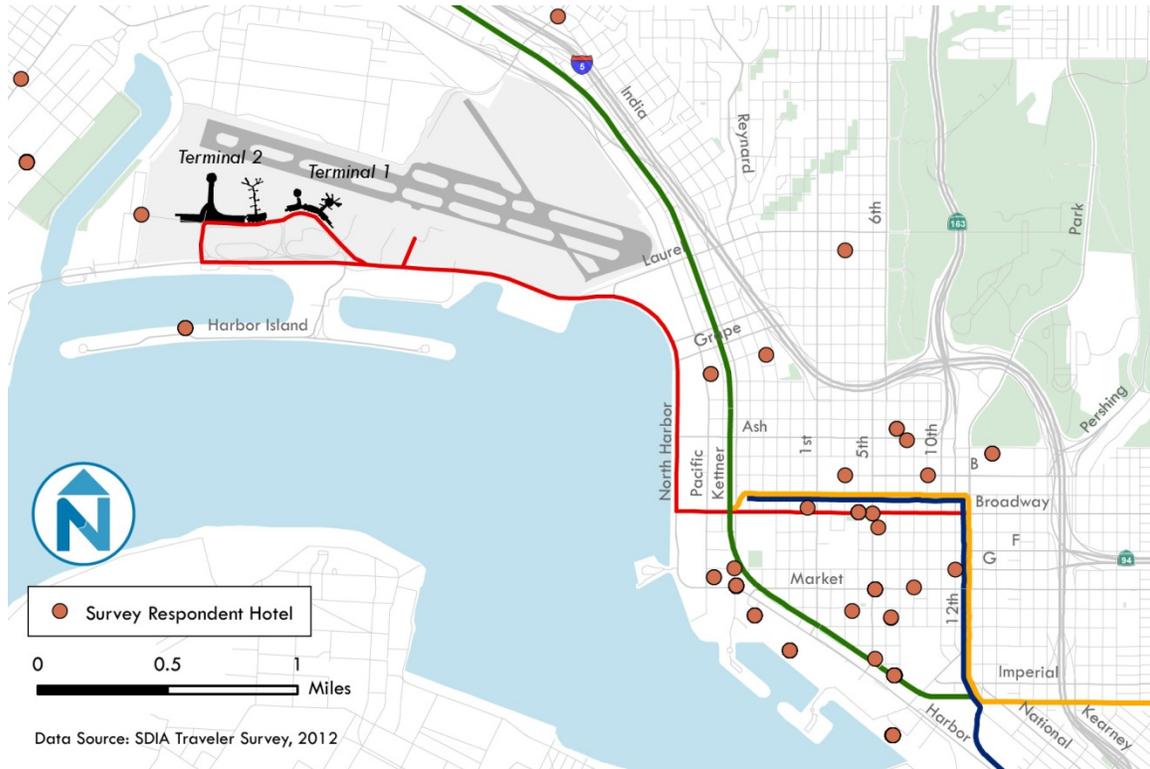
There are limitations. The utility of connections to COASTER and Amtrak is limited, for the near-term at least, by infrequent service. Additionally, all parking at OTTC is limited to 24 hours. The parking is operated by the State Parks Department and there would be significant concern that parking could be used by airport passengers rather than by Old Town patrons. A comprehensive parking management plan would need to be included in final alternatives development.

Such a shuttle service could be operated by the airport or by MTS with potential funding contributions from SAN.

Harbor Drive Shuttle

MTS Route 992 provides relatively frequent transit service between the airport and the downtown core along Broadway, and this service could be made faster and more attractive if the previous recommendation were implemented. However, many downtown destinations are not within a short walk of Route 992 stops, particularly for passengers carrying luggage. Figure 14 on the following page, repeated from Chapter 2, shows locations of hotel-based origins and destinations reported by airport survey respondents.

Figure 14 Hotel Destinations



As Figure 14 illustrates, many downtown hotels are located well south of Broadway, near the Convention Center along Harbor Drive or in the Gaslamp Quarter. Many of these locations are near Trolley Green Line stations, but there is no direct public transit connection to the airport.

There is, however, a seasonal shuttle operated by the Port of San Diego – the Big Bay Shuttle – which currently terminates near the airport, at the Sheraton Hotel on Harbor Island. The Big Bay Shuttle route is shown in Figure 15 on the following page.

Figure 15 Big Bay Shuttle



As Figure 15 indicates, the Big Bay Shuttle directly serves five hotels, three of which – the Hyatt, Marriott Marquis & Marina, and Hilton San Diego Bayfront – are located well south of Broadway. It operates every 10 to 15 minutes seven days a week (10 a.m. to 8 p.m. Sunday through Thursday, and 10 a.m. to 10 p.m. Friday and Saturday).

However, the shuttle currently operates only during the summer, and does not directly serve the airport. Furthermore, using the shuttle to access the airport (which is across Harbor Drive from the Sheraton) and carrying luggage are expressly discouraged. Finally, it does not stop near Fifth Avenue, the access point from Harbor Drive for the Gaslamp Quarter.

An extension of the shuttle is planned to the Kona Kai Resort & Marina on Shelter Island, west of the airport. As part of this extension, Terminals 1 and 2 could be served with only a relatively minor deviation. The shuttle could also be expanded to operate year-round, thereby providing a regular direct transit option between the airport and hotels near the Convention Center. Finally, an additional stop could be provided at the Convention Center, by Fifth Avenue, providing access to the Gaslamp Quarter. (Note that if events at the Convention Center prevented its use as a stop, a new stop would be required on the north side of Harbor Drive. Such a stop might be desirable in any case so that westbound passengers would not have to first travel east.)

Regional Express Buses

Options for regional express bus service have been explored in some detail as part of previous Airport Transit Plans. This service would be similar to the LAX FlyAway service operated by Los Angeles World Airports, or LAWA.

The most successful of the LAX FlyAway routes, the Van Nuys Flyaway, will celebrate its 40th year of operation in 2015, and operates out of a purpose-built terminal with 2,500 parking spaces and room for future remote check-in facilities. The Van Nuys, Union Station and Westwood FlyAway routes have in recent years required only a modest subsidy, or even operated at a profit.

On the other hand, two FlyAway routes, serving Irvine and the La Brea/Expo Metro Rail station, have been abandoned due to low ridership and heavy losses, and the Westwood route was nearly abandoned in 2011, before fares were increased. The only two remaining FlyAway routes, Santa Monica and Hollywood, were introduced just last year.

The core question that SAN must answer in deciding whether and how much express bus service to offer is how much it is willing to pay. LAWA is required under the 2004 LAX Master Plan Mitigation Monitoring and Reporting Program to expand FlyAway service to nine routes by the end of 2015. SAN operates under no such constraints, and any express bus service provided by the airport should probably require minimal subsidy (for operations; some capital investment, for example in a remote parking garage, may be worthwhile).

The most promising of the express bus options assessed for the Airport Transit Plan – Phase II in 2010 was an alternative operating non-stop from the I-5/State Route 56 interchange¹. Assuming 30-minute headways, annual operating costs for this service were estimated at \$3.796 to \$4.462 million, depending on span of service. Potential ridership, meanwhile, was estimated at between 363,558 and 586,150 annual passengers, in year four of operation. This amounts to a cost per trip of between \$6.48 and \$12.27.

LAX FlyAway fares are currently \$8, except for Westwood service, which is \$10. This suggests that service in the I-5 corridor could potentially operate at a relatively modest subsidy, or even at a slight profit. However, additional analysis would need to be conducted of the sensitivity or ridership to fares, as well as frequency and access.

Notably, the FlyAway routes that have proven most successful are those with the most convenient and affordable access. Van Nuys, as previously mentioned, offers 2,500 parking spaces available for \$4 per day, well below the rates charged by the airport or airport-area operators. Parking at Union Station is \$6 per day, but the station is the regional transit hub for Metro heavy and light rail lines as well as Metrolink commuter rail lines, bus rapid transit, and other transit services. Westwood riders have access to reserved spaces in a UCLA garage that charges \$8-\$12 per day; however, the route primarily serves a student market, and the site is located near campus as well as multiple bus lines. By contrast, the Expo/La Brea location was adjacent to a Metro Rail Expo Line station, but offered no parking, while Irvine fares were \$25.

For a SAN FlyAway to succeed, then, one or more remote locations would probably need to be found with moderate to high parking capacity at low rates (or, potentially, high demand from students). Analysis from the Phase II plan as well as the travel market analysis conducted for this study also suggests that the I-5 corridor has significantly more potential than other corridors, and that service should be introduced and the market tested here before I-15 or other corridors.

Existing park-and-ride sites in the I-5 corridor, starting 10 miles north of the airport and continuing to the north, are as shown in Figure 16 on the following page.

¹ This location was identified as El Camino Real and Valley Centre Drive, northeast of the interchange. The existing park-and-ride in the area, Sorrento Valley Road, is just southwest of the interchange.

Figure 16 I-5 North Park-and-Rides

Location	Spaces
Gilman Dr (La Jolla)	26
Sorrento Valley COASTER Stn ²	121 ³
Sorrento Valley Rd (I-5/SR 56)	50
Birmingham Dr (Encinitas)	56
Calle Magdalena (Encinitas)	27
La Costa (Carlsbad)	115

Parking is free at each of these locations; there is a two-week limit on parking at COASTER stations, including Sorrento Valley. In addition to the above, a 150-space lot is planned next to a direct access ramp to I-5 express lanes for HOV users at Manchester Avenue in Encinitas. Part of the North Coast Corridor project, it is scheduled to open in 2018.

The Phase II ridership analysis also projected parking demand. For the most promising alternative, operating non-stop from the vicinity of I-5 and SR 56, demand was projected at between 550 and 863 parking spaces. This is several times greater than the existing supply at any of the I-5 park-and-rides.

All of this suggests that if SAN is to pursue an express bus option, it should work with Caltrans, SANDAG and other agency partners to identify a site in the I-5 corridor where several hundred additional parking spaces could be provided relatively inexpensively, preferably in a surface lot. This could be an expansion of an existing site, or a new site.

If SAN were to proceed, operations should probably be contracted out to a private entity, as LAWA has done (alternately, MTS could provide the service under contract). This would be less costly, difficult and risky than attempting to manage operations in-house.

However, FlyAway service suffers from a number of operational deficiencies that SAN should seek to avoid in any relationship with a private contractor. First, the ticketing and loading process is highly inefficient: cash is not accepted, so tickets must be purchased online, from an agent at a staffed booth, from a ticket vending machine, or from the operator using a credit-card reader. Because there is no discount for advance purchases, most tickets are purchased by passengers just before or while boarding, greatly slowing the process and in some cases delaying departure. Second, while real-time information is available on arrival and departure times, it is not available online. Rather, passengers must call agents, who must then call dispatch.

² Additional COASTER stations at Solana Beach, Encinitas, Carlsbad Poinsettia and Carlsbad Village are not included, as these sites are some distance from the nearest freeway interchange and within existing urbanized areas, meaning that additional parking for airport travelers would likely have to be in relatively expensive garages.

³ Survey based on aerial photography.

Longer-Term Alternatives

Intermodal Transit Center

A facility shared among multiple rail and bus operators in the rail right-of-way between Pacific Highway and I-5, on the northeast side of the airport, has previously been identified as a long-term alternative for improving transit access to the airport. The ITC, to be located between the Middletown and Washington Street Trolley stations, could serve as the southern terminal for California High-Speed Rail as well as an Amtrak, COASTER and Trolley Station. It would be connected by a pedestrian bridge over Pacific Highway to the Rental Car Center (RCC) now under construction and to a future North Side Passenger Processing Center.

The interim improvements to Trolley access now under construction will provide connectivity to the airport for Trolley passengers, access that could be relatively high-quality if accompanied by the Middletown Station-area improvements previously identified. The ITC project would further provide access for Amtrak and COASTER riders. However, COASTER service levels are currently relatively low, and are not planned to be increased for some time. Moreover, the high-speed rail project represents a potentially important source of not just riders, but capital funds. For this reason, the project should probably be developed in partnership with the High-Speed Rail Authority, as part of the extension of high-speed rail service to San Diego.

Harbor Drive Trolley Extension

Finally, an extension of the Trolley to a station near the airport terminals would provide direct rail access to SAN like that found in many international and an increasing number of North American airports. A Trolley extension would be higher-capacity, faster, more reliable, and probably more frequent than Route 992, even a “Rapid” 992 as described above. However, it would come at a very high cost. A spur along Harbor Drive from the existing alignment would likely need to be nearly entirely elevated, greatly increasing costs over an at-grade alignment. The Mid-Coast Trolley extension, which will largely be at-grade in existing rail and freeway right-of-way, is projected to cost approximately \$2 billion, or \$180 million per mile. Additionally, construction could disrupt traffic on Harbor Drive for years.

Costs & Ridership

Development of detailed cost and ridership estimates will occur following this report. However, preliminary, order-of-magnitude estimates can be provided based on local and national experience.

Figure 17 on the following page estimates capital cost, annual operating cost (minus fare revenue), and ridership potential (in terms of new transit users, not total passengers) for each near- and long-term alternative.

For costs, one dollar sign (“\$”) represents a lower cost alternative, generally less than \$1 M; two dollar signs (“\$\$”), represent a medium cost alternative (generally between \$1 and \$2 M), and three dollar signs (“\$\$\$”) represents high cost alternative of more than \$3M. A “plus sign” at the end suggests costs over \$4 million. All cost figures are in current-year (2015) dollars.

For ridership, potential relative to other alternatives is estimated using a three-point scale, with one plus sign (“+”) representing lowest potential and three plus signs (“+++”) representing highest potential.

Figure 17 Estimated Costs and Ridership

Project		Cost		Ridership
		Capital	Annual Operating	
Near-Term Alternatives				
Route 992 Rapid Service	Rapid 992	\$\$ - \$\$\$	\$	++
	Combine with Route 215	\$\$	\$	+++
	Combine with Route 235	\$\$	-\$ (minor savings possible)	++
Trolley Access Improvements		\$\$-\$\$\$	\$	+++
Airport Transit Wayfinding and Marketing		\$	\$	+
Old Town Shuttle		\$\$	\$\$	++
Harbor Drive Shuttle		\$	\$\$	+
Regional Express Buses (FlyAway)		\$\$-\$\$\$+	\$\$-\$\$\$+	++ - +++
Longer-Term Alternatives				
Intermodal Transit Center		\$250-375M	TBD	+++

Cost and ridership estimates were developed as follows.

Capital Costs

Near-Term Alternatives

- **Route 992 Rapid Service:** Estimated capital costs for most alternatives are based on vehicle costs, which in turn are based on peak vehicle requirements. Assuming the operating plans for the three Route 992 Rapid Service subalternatives described in the following section, under Operating Costs, the Rapid 992 and Combine with Route 235 options would each require four new Rapid vehicles in operation (in place of existing non-Rapid vehicles); plus a spare vehicle, they would have a vehicle requirement of five. Combining with Route 215, meanwhile, would require one fewer vehicle. The approximate cost of a 60-foot MTS Rapid bus is \$905,000⁴; therefore, the capital cost for the first two options is estimated at approximately \$4.525 million, and for the last option, at \$3.62 million. Additional costs would be associated with bus stop improvements on airport property, as well as improved information at all stops.
- **Trolley Access Improvements:** Improving headways for shuttle service planned to serve the Middletown Trolley Station from 15 to 10 minutes would likely require one additional vehicle. For purposes of estimation, a cost per vehicle of \$500,000 was assumed. Improvements to the at-grade path between the trolley station and shuttle stop,

⁴ Based on information provided by MTS. A 40-foot vehicle would cost approximately \$523,000. Costs are based on a fleet order of approximately 30 vehicles.

meanwhile, could vary greatly in cost depending on a range of factors, but the with the highest cost improvement being a potential pedestrian bridge and lesser cost improvements estimated between \$500,000 and \$1 million, for a total capital cost of \$1-\$1.5 million.

- *Airport Transit Wayfinding and Marketing:* Costs in this category include replacement signage, ticket vending machines, real-time arrival information signs, and marketing costs. On their own, none of these items should be especially expensive: MTS has indicated that real-time signs should cost approximately \$13,000 each (a request for information on TVM costs is still pending). Total capital costs for this alternative have been estimated at less than \$500,000.
- *Old Town Shuttle:* Based on the operating plan described in the following section, the estimated vehicle requirement for this service is three. In 2012, MTS placed a large order for 40-foot buses at a cost per vehicle of approximately \$450,000 (350 for \$159.5 million). Assuming a cost of \$500,000 per vehicle, and purchase of one spare, for a total of four vehicles, the capital cost for this alternative would be approximately \$2 million. It has been conservatively estimated at \$2-\$2.5 million.
- *Harbor Drive Shuttle:* Assuming no change in service levels, one additional vehicle should be required to extend Big Bay Shuttle service to the airport. The cost for this alternative has been estimated, conservatively, at \$500,000-\$1 million. (Note that capital costs for this alternative would increase if the Convention Center could not be used as a stop, and a new stop had to be constructed on the north side of Harbor Drive at Fifth Avenue.)
- *Regional Express Buses:* Costs for this alternative could vary greatly depending on the cost for a new or expanded park-and-ride lot or garage. For purposes of estimation, construction of a surface lot with approximately 750 spaces has been assumed; at a cost per space of approximately \$2,500, this would cost approximately \$1.875 million (note, however, that structured parking would cost significantly more). A parking garage would cost significantly more, up to \$20M for construction. Luxury “over-the-road” coaches of the type typically used for this type of service, meanwhile, cost more than standard 40-foot buses. For purposes of estimation, a cost per vehicle of \$750,000 has been assumed, and a vehicle requirement of four vehicles (based on 30-minute service, round-trip travel times of between 60 and 90 minutes and a spare vehicle). This amounts to a vehicle cost of approximately \$3 million, and a total cost for the alternative of \$4.5-\$5 million.

The actual cost for both capital and operation would depend on the way the service is contracted. Typically, the contractor would provide the buses and other basic capital needs; the airport would ensure adequate parking is available, as well as adding signage and information. Operating costs would also be offset by fares to some extent – the actual farebox recovery for this alternative cannot be known at this time.

Longer-Term Alternatives

- *Intermodal Transit Center:* The estimated capital cost for this alternative is based on peer examples including the new Anaheim Regional Transportation Intermodal Center, or ARTIC, which cost \$188 million to construct and was built to accommodate commuter, intercity and high-speed rail. The San Diego ITC would need to be higher-capacity and would include additional elements such as a Trolley station, parking garage and pedestrian bridge over Pacific Highway. For this reason, its capital cost has been estimated at between \$250 and \$375 million.

- *Harbor Drive Trolley Extension:* The estimated capital cost for this alternative assumes construction of an elevated fixed-guideway from the existing Trolley right-of-way along California Street, along Harbor Drive and into the airport property, with stations at both Terminal 1 and Terminal 2. The primarily at-grade Mid-Coast Trolley extension is projected to cost approximately \$180 million per mile; a two-mile viaduct between the airport and the existing Trolley right-of-way, with a connecting to the existing California Street viaduct, would likely cost \$500 and \$750 million.

Operating Costs

Near-Term Alternatives

- *Route 992 Rapid Service:* Estimated annual operating and maintenance costs for most alternatives are based on proposed operating plans, estimated average speeds and MTS's current cost per hour of revenue service of \$97.92. Note that for purposes of "apples-to-apples" comparison, this cost has been applied to services that might be operated at lower cost by a private contractor, such as airport shuttle service to the Middletown Trolley Station. In any case, assumed operating plans for the Rapid 992 subalternatives were as follows:
 - For the Rapid 992 option, service would be extended by two hours per day, and weekend headways would be improved from 30 to 15 minutes.
 - The Combine with Route 215 option would require no additional service beyond that in the Rapid 992 option. When Route 215 operates every 30 minutes, mid-day and weekends, a "short line" would operate along the current Route 992 alignment in order to maintain 15-minute service in this segment.
 - The Combine with Route 235 option would result in service every 10 minutes rather than every 15 minutes during peak periods.

Cost savings could be realized from the reduced travel times that would result from the improvements proposed as part of these alternatives. In order to remain conservative, no such savings have been assumed. However, cost savings have been assumed from elimination of overlapping segments of Route 992 and Routes 215 and 235 on Broadway. By increasing early-morning, late-night and weekend service, the Rapid 992 option would increase annual O&M costs by a moderate amount, less than \$500,000 per year. The Combine with Route 215 option would increase peak service levels, but this would be offset by elimination of the overlapping segment, and there would be cost savings from elimination of this redundancy off peak, more or less eliminating the increased costs of longer spans and 15-minute weekend service on Route 992. Finally, the Combine with Route 235 option might actually cost less to operate, due to the elimination of the overlapping segment.

- *Trolley Access Improvements:* The additional shuttle required to provide 10-minute rather than 15-minute service would, if it operated from 4 a.m. to 1 a.m. in order to reflect Trolley schedules and serve airport workers, cost between \$500,000 and \$1 million per year to operate.
- *Airport Transit Wayfinding and Marketing:* There would be some ongoing operating costs associated with ticket vending machines and real-time arrival information. However, these costs would total less than \$500,000 per year.

- *Old Town Shuttle:* At headways of 20 minutes, it is estimated that three vehicles would be required to operate this service. If the span for this service was 4 a.m. to 1 a.m., then annual operating costs should be in the \$2-\$2.5 million range. (Note, however, that actual costs might be slightly lower, as service would likely be operated less often late at night).
- *Harbor Drive Shuttle:* During the summer, when this service currently operates, only one additional vehicle would be required to serve the airport. Expanding service to operate year-round, however, would come at a cost. Assuming a headway of 15 minutes, it is estimated that six vehicles would be required to operate this service, resulting in a total annual operating cost of between \$1.5 and \$2 million. (Note: this figure may be adjusted based on information on current operations to be provided by the Port.)
- *Regional Express Buses:* The previous estimated operating cost for express bus service to the I-5/SR 56 interchange has been inflated slightly, to an estimated cost of between \$4 and \$4.5 million. Note, however, that fare revenues might cover most if not all of the cost of this service.

Longer-Term Alternatives

- *Intermodal Transit Center:* Due to the many unknown variables associated with operation of this facility, operating costs have not been estimated.
- *Harbor Drive Trolley Extension:* MTS's operating costs for Trolley service are somewhat higher than for bus service: \$140.67 per hour. However, Trolley service is much faster than bus service: travel time between Santa Fe Depot and the airport has been estimated at approximately eight minutes. Assuming 15-minute headways, this service might be operated with a single two-car trainset, resulting in annual operating costs of between \$2 and \$2.5 million.

Ridership

Development of detailed ridership estimates will occur following this report. For now, ridership potential for each alternative has been estimated relative to other alternatives.

- The major capital projects in the longer-term category – the Intermodal Transit Center, with its variety of connecting rail services, and the Harbor Drive Trolley extension – would likely have far higher ridership than the much less expensive projects in the near-term category.
- Among near-term alternatives, the Route 992 Rapid Service alternative's Combine with Route 215 option would likely have the highest ridership, as it would provide service as frequent as every 10 minutes, and direct service between the airport and the El Cajon Boulevard corridor.
- Remaining Rapid 992 options, frequent shuttle service from the Middletown Trolley Station, expanded Harbor Drive shuttle service and regional express buses would likely have moderate ridership potential.
- Shuttle service to the Old Town Transit Center would likely have slightly lower potential than other transit service options, as the market for service connecting to other bus routes outside of downtown is somewhat limited.
- Wayfinding and marketing improvements including ticket machines and real-time arrival information would not increase actual service levels and thus would have the least impact on ridership, although they would also cost relatively little to implement.

5 NEXT STEPS

These draft transit alternatives have been developed in order to provide the Airport Transit/Roadway Committee with a range of options for improving transit service to the airport. Those deemed to be most promising and approved for advancement by the Committee will be further explored and developed in the next phase of this project, which will include detailed analysis of estimated costs and ridership.