Service Concepts Summary Report

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Palm Tran

Route Performance Maximization Initiative

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1 Introduction and Executive Summary

This is the second report in the Route Performance Maximization Initiative (RPM) for Palm Tran, the primary public transit operator of Palm Beach County, Florida. The RPM is a multi-phase planning effort focused on improving Palm Tran's network to better meet the mobility needs of the growing population of the Palm Beach County.

Planning and the Public Conversation

This first phase of the RPM Initiative comprises two major elements. The first report, the Existing System Evaluation, provided a thorough overview of the current state of the transit network, evaluating its performance and design along multiple criteria to identify existing strengths, as well as opportunities for improvement.

This second report presents several Service Concepts illustrating conceptual transit networks for Palm Beach County focused on meeting different goals. These Concepts will be designed and presented to Palm Tran's Service Board and the Palm Beach County Board of County Commissioners. These service concepts were designed in a collaborative workshop involving staff from JWA's consulting team, Palm Tran, Palm Beach County, and many of the cities within Palm Tran's service area.

In the next phase of the RPM, the Service Concepts will be used to illustrate the tradeoff between particular network design objectives for a conversation among the public, stakeholders and elected officials that will ultimately shape a new plan for transit in Palm Beach County.

What We Know So Far

In the first report, several key observations were made about Palm Tran's current service offering and capacity to meet the transit needs of Palm Beach County.

First, the overall service level available in the County is very limited compared to that of many agencies in comparable places in Florida and elsewhere. This means that Palm Tran's ability to pursue any of the various goals of transit (generating high ridership, maximizing coverage, etc) is also limited, compared to those peers. Figure 1 reproduces a chart from the Existing System Evaluation comparing the level of transit service per person in the service area to a number of peer agencies.

A fundamental driver of transit usefulness is frequency: how often a bus comes along a route. Frequency offers several independent benefits. It means that travel is possible nearer to the user's desired departure time, and also that it is possible to transfer between routes without much delay, which is the essence of an effective network.

Frequency's relationship to ridership is dramatic throughout the industry. At most transit agencies, the most productive routes (in terms of ridership per unit of service provided) will be the most frequent ones.

The industry standard definition of Frequent Service -- which is every 15 minutes through the majority of the service day -- would include no Palm Tran routes, so we have lowered this standard to 20 minutes to introduce frequency contrasts into the discussion. Even this frequency is provided on only two lines: Highway 1 and Lake Worth Blvd.

The coverage of the county's population and jobs is also notable by industry standards. Just over half of the county's jobs, and fewer than half of its residents, are within 1/4 mile of a transit stop, as shown in Figure 2. This, however, is not so much a fact about Palm Tran as a fact about the county. The low level of transit resources must be spread over an exceptionally vast service area. The low density of much of the developed area makes it very expensive to provide service that benefits relatively few people. Transit performs best in areas that are both dense and walkable, which in Palm Beach County is mostly the coastal strip east of I-95. For that reason, this strip is where Palm Tran's service, coverage, and ridership are generally highest.

Figure 3 on page 7 shows a map of the existing transit network, color-coded by the prevailing midday frequency of service.

The Service Concepts

This report presents two contrasting network design concepts. Both are constrained by existing resources, so they present a difficult choice. The Ridership Concept is designed to expand the reach of the Frequent Network, while necessarily shrinking the total coverage area. The Coverage Concept keeps the coverage of the existing system with some minor refinements, but as a result its ability to increase ridership is limited.

The concepts presented here, and our analysis of them, are intended to form the basis of a public conversation. Is ridership really the goal on which Palm Tran should be measured? If so, the way to pursue that goal is to cut service in places where some people need it but it is not heavily used. If retaining everyone's service is the top priority, then Palm Tran should have low expectations for ridership growth.

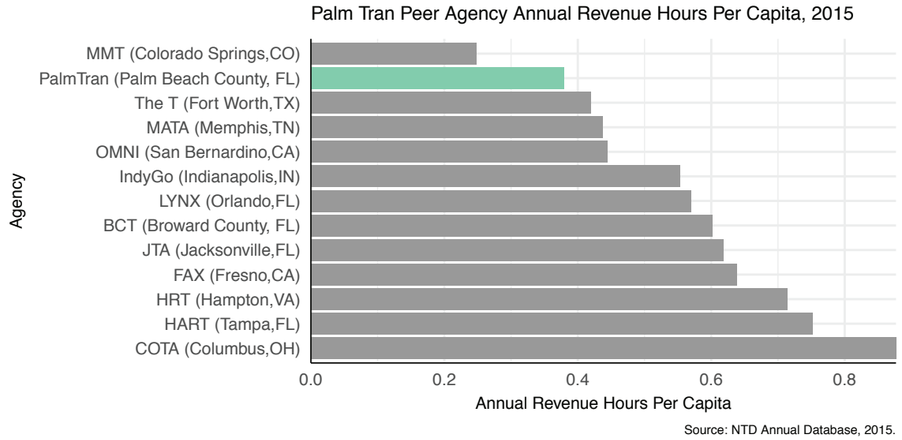

Figure 1: Palm Tran Peer Agency Annual Revenue Hours per Capita

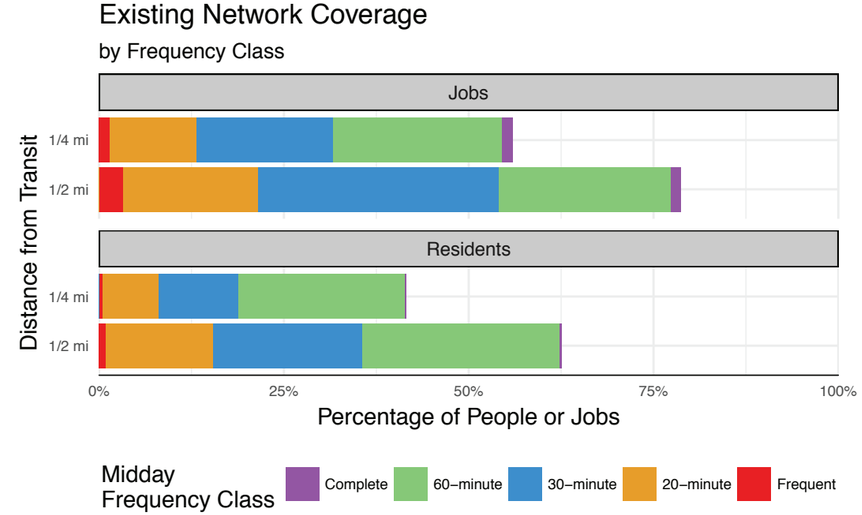

Figure 2: Palm Tran Existing Frequent Network Access and Total Coverage

There is no right answer to this value judgment. It is for the county's citizens to comment on, and for its elected officials to decide. This report presents a choice, but the choice is yours.

Figure 3: Palm Tran Existing Transit Network Frequency Map

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The Service Concepts

Explaining the Tradeoffs

The Service Concepts are not intended to present a specific transit network redesign proposal. Instead, their purpose is to visualize the potential outcome of a decision to pursue one of two transit goals. The ultimate network proposal that emerges from the next phase of the RPM Initiative will be based on public, stakeholder and elected official feedback on the Service Concepts.

The Service Concepts are designed to make clear the contrast between network designs aimed at two different goals: maximizing ridership by improving the frequency and usefulness of service in places with the densest, strongest markets, or expanding and maintaining coverage by extending the network to get close to as many people as possible, even if the service available to them operates infrequently. Each Concept is designed to the same approximate budget limit (486,000 annual revenue hours of service, comparable with Palm Tran's current service level), and each represent a visualization of what Palm Tran could do with its resources if either goal were the primary organizing principle of the network

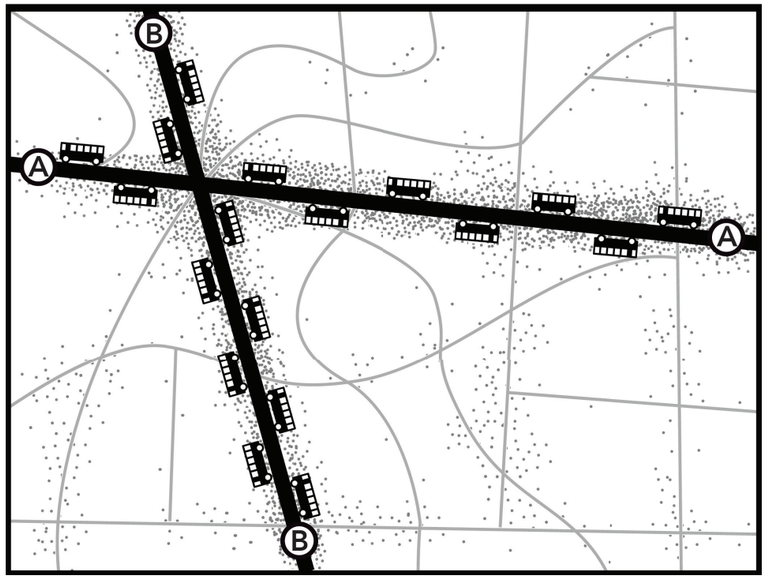

Figure 4: Ridership Network for a simple fictional city (dots = residents or jobs)

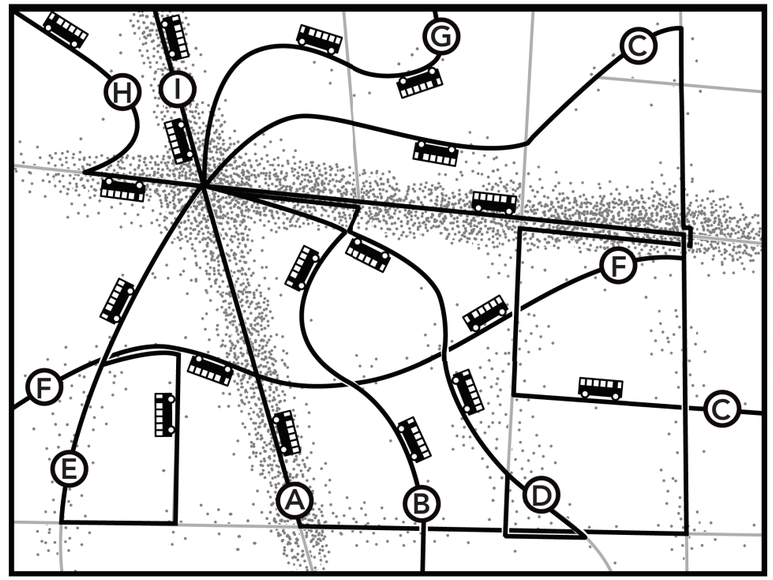

Figure 5: Coverage Network for the same fictional city. More routes, less frequency.

Ridership or Coverage?

If the Palm Tran system were designed only for maximum ridership, it would focus only on areas where there are many potential riders, and transit is useful for many of their trips. In other words, Palm Tran would be thinking like a private enterprise and targeting a market where its product is competitive.

Yet maximizing ridership is not the only goal of public transit systems. While private transit companies may focus on profits, and therefore on exclusively high-ridership routes, public transit is almost always expected to serve some or all places regardless of the ridership that results.

Ridership and coverage goals come into direct conflict with one another. If a transit agency wants to do more of one within a fixed budget, it must do less of the other.

In the fictional town shown in the diagrams in Figure 4 and Figure 5, the little dots indicate dwellings, commercial buildings and other land uses. The lines indicate roads. Most of the activity in the town is concentrated around two main roads, as in most cities and towns where commercial activity and dense development tend to locate on arterial transportation corridors.

A transit agency pursuing only a ***ridership*** goal would run all of its buses on the streets where there are many people, where walking to transit stops is easy, and where they can run straight routes that feel direct and fast to customers. This would result in a network like the one in Figure 4.

Total ridership would be high because a large number of people would have very high frequency, and frequency tends to have high ridership payoffs. However, people who live or need to travel away from these corridors, to places in the bottom right corner of Figure 4, for example, would not be able to access transit without a long walk to a frequent route.

If the town were pursuing only a ***coverage*** goal, on the other hand, the transit agency would spread out services so that every street had some bus service. As a result, all routes would be infrequent, even those on the main roads. Because service would rarely be coming when somebody wanted to travel, fewer people would be likely to find the service useful due to the long waiting times required to access it. As a result, ridership would typically be low. This is the scenario depicted in Figure 8.

In these two scenarios, the town is using the same number of buses. These two networks cost the same amount to operate, but they deliver very different outcomes.

While an agency can divide its budget between ridership and coverage goals, it cannot do both with the same dollar. Within any fixed budget, the more it does of one, the less it does of the other.

These illustrations also show a relationship between coverage and complexity. Networks offering high levels of coverage – a bus running down every street – are naturally more complex.

All transit agencies, including Palm Tran, spend some portion of their budget pursuing each goal. A particularly clear way for transit agencies to set a policy balancing ridership and coverage goals is to decide what percentage of their service budget should be spent in pursuit of each.

We estimate that, in the existing network, Palm Tran is spending about 60% of its service in ways and in places that generate high ridership, and about 40% in ways and places where low ridership is the predictable result.

The right balance of ridership and coverage goal-oriented service varies between communities. It can also change over time as the values and ambitions of a community change. Most importantly, there is no technically "correct" point along the spectrum between the two goals; this is policy question that can only be answered by decisionmaking among an agency's staff, leadership, elected officials, stakeholders and the public.

The next sections explain the two service concepts, Ridership and Coverage. After a high-level comparison, subsequent sections describe the differences in how they effect coverage and mobility in each part of the County.

Service Types

Each of the Service Concept maps use a common visual code to communicate the service level assigned to each route. Each color of line represents the designed midday frequency of the conceptual route:

- Red - every 15 minutes
- Orange - every 20 minutes
- Blue - every 30 minutes
- Green - every 60 minutes
- Green Dashed Line - greater than every 60 minutes (typically 90-minute frequency)

Ridership Service Concept

Figure 6 on page 11 shows the map of the Ridership Service Concept. This concept focuses on improving the usefulness of transit in the parts of Palm Beach County where current services are generating strong ridership, or where the development pattern is relatively dense and walkable. In the Ridership Concept, approximately 75% of resources are dedicated to service focused solely on generating high ridership, while 25% of resources are focused on maintaining existing coverage, compared the 60%/40% ridership/coverage split today.

The key features of this Concept are:

- The introduction of 15-minute frequency to the US-1 corridor (Route 1), inner Lake Worth Road corridor (Route 62), inner Okeechobee corridor (Route 43), along segments connecting Palm Beach Outlet mall to Downtown West Palm Beach (Routes 36,37 and 38), and along segments between downtown West Palm Beach and 45th (Routes 31 and 33)
- Frequency improvements (to every 30 minutes, from every 60 minutes today) on most other corridors, such as Boynton Beach Blvd., Atlantic or Forest Hill.
- Reduction in the extent of low-frequency coverage services in lower-density, hard to serve places, such as the segments of Boynton Beach Blvd. west of Military Trail, or those currently served by Route 92 in Boca Raton.

Frequent Network (Every 15 Minutes)

In the Ridership Concept, many more people have access to more useful service than do today, reducing wait times and thus travel times on the corridors where it is available. This improves the competitiveness of transit with other modes of transportation, and reduces the potential wait penalty for a customer who has missed their bus. The key to these benefits is the high frequency.

High frequency is provides three independent benefits to the customer:

- Reduced waiting. The customer can travel closer to their desired time.
- Better connections. Frequency makes it easier to connect between routes to reach many destinations. In effect, frequency is what turns a pile of routes into a network.
- Better reliability. The customer experience of reliability is improved on frequent service, because any disruption to a single trip causes less of a delay.

These factors routinely correlate with high productivity (riders / quantity of service) in most transit agencies, and at very high frequencies, every 15 minutes or better, the ridership payoffs tend to intensify.

For this reason, the Ridership Concept uses the industry standard definition of frequent service, which is every 15 minutes all day, while the existing system's offering is never better than 20 all day.

The Frequent Network in the Ridership Concept consists of Highway 1, Lake Worth Road, and Okeechobee (east of Military Trail). The first two already have 20 minute frequency and the third is a relatively high-ridership service at its current 30-minute frequency level. Okeechobee was a high-priority frequency improvement project emerging from Palm Tran's 2016 Transit Development Plan (TDP).

In most places that are not served at 15-minute frequency in the Ridership Concept, a 30-minute level of service is provided. Corridors such as Boynton Beach or Atlantic, which today are served only every hour for most of the day, would have their level of service double in their highest ridership segments, but the routing of those services are simplified to ensure maximum usefulness to the greatest number of people. All 30-minute frequency routes in the Ridership Concept have the potential to grow into high-frequency (15-minute) routes as funding becomes available.

Coverage Service Concept

Figure 7 on page 12 shows the map of the Coverage Service Concept.

This network is a modest streamlining of the existing system, with virtually no loss of coverage to existing riders. Frequency, as a result, is not much improved, so waits and travel times are much longer than in the Ridership Concept. The split of resources between goals is about 60% for ridership and 40% for coverage, not much different from what it is today.

On Palm Tran's current high-ridership corridors, the Coverage Service Concept preserves the existing level of service. US-1 and Lake Worth Road both operate every 20 minutes, and Okeechobee, Congress and Military Trail all run every half-hour. No new 20-minute segments or routes have been added to the network in this Concept.

The only 15-minute service in the Coverage Alternative is Route 90, which is a modification of the existing Route 94 designed to provide consistent 15-minute service between US-1 and FAU through the entire day when combined with Route 91.

Night and Weekend Service

Currently, Palm Tran operates a much lower level of service on weekends than on weekdays. While overall travel volume is lower on weekends, many people still work, shop, and make trips for other purposes. As a result, high ridership transit networks often have robust weekend service offerings, with key elements of the network (such as the most frequent services) providing frequencies and spans matching or close to their weekday level.

Unfortunately, to fund a higher level of weekend service with Palm Tran's current resources would require a substantial service cut to the weekday service level. As a result, these Service Concepts have been designed to maintain weekend service levels that are comparable with the existing network.

This means that in the Coverage Service Concept, which is very comparable to the existing network, many routes have Saturday and Sunday frequency and span patterns close to or matching the current service level on those days.

In the Ridership Service Concept, routes' weekend frequency and span patterns are based on elements of the existing network operating at similar headways. So blue 30-minute routes have weekend service levels comparable to existing routes 2,3 or 43, for example. This does have

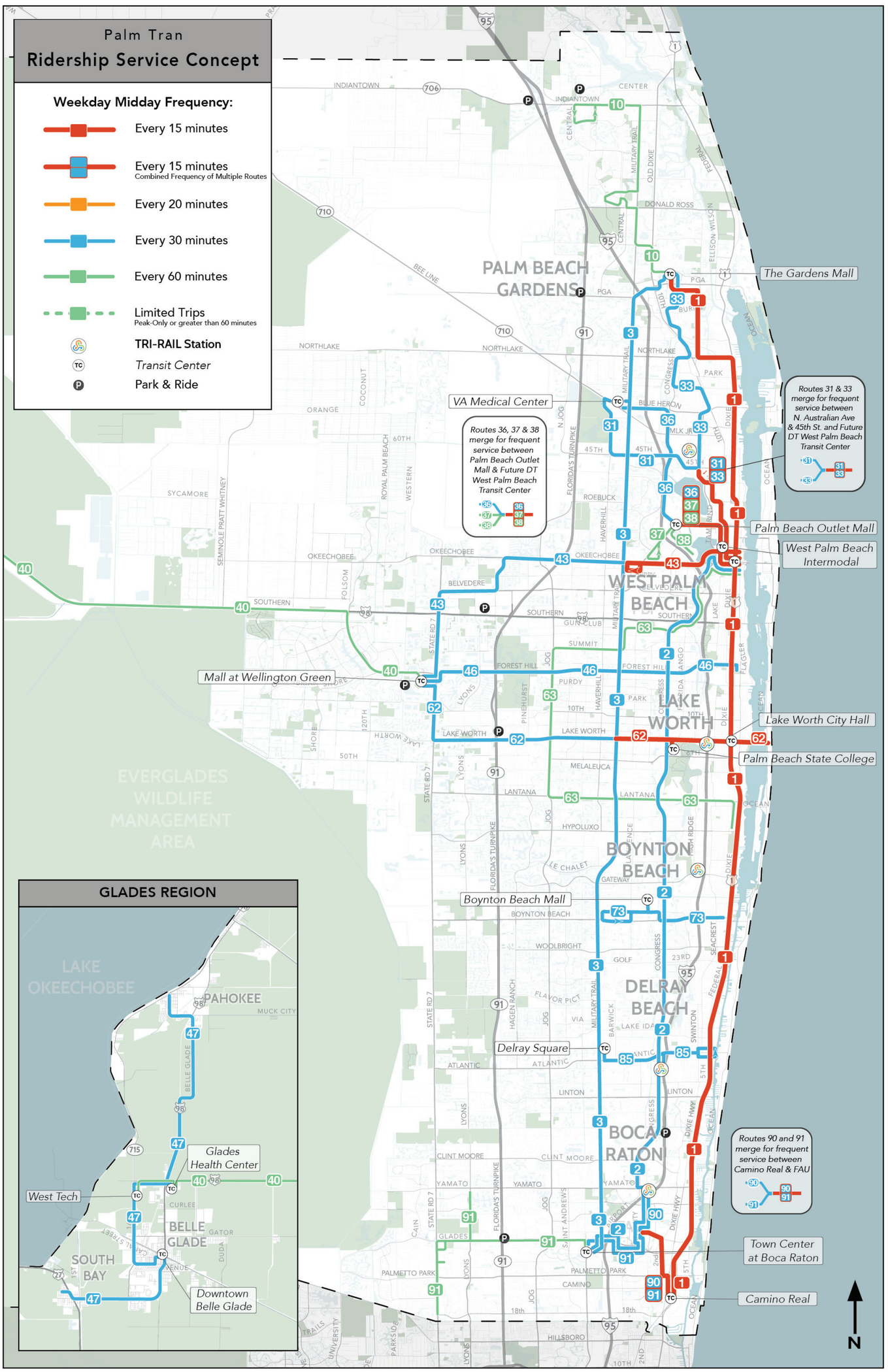

Figure 6: Ridership Service Concept (Detail)

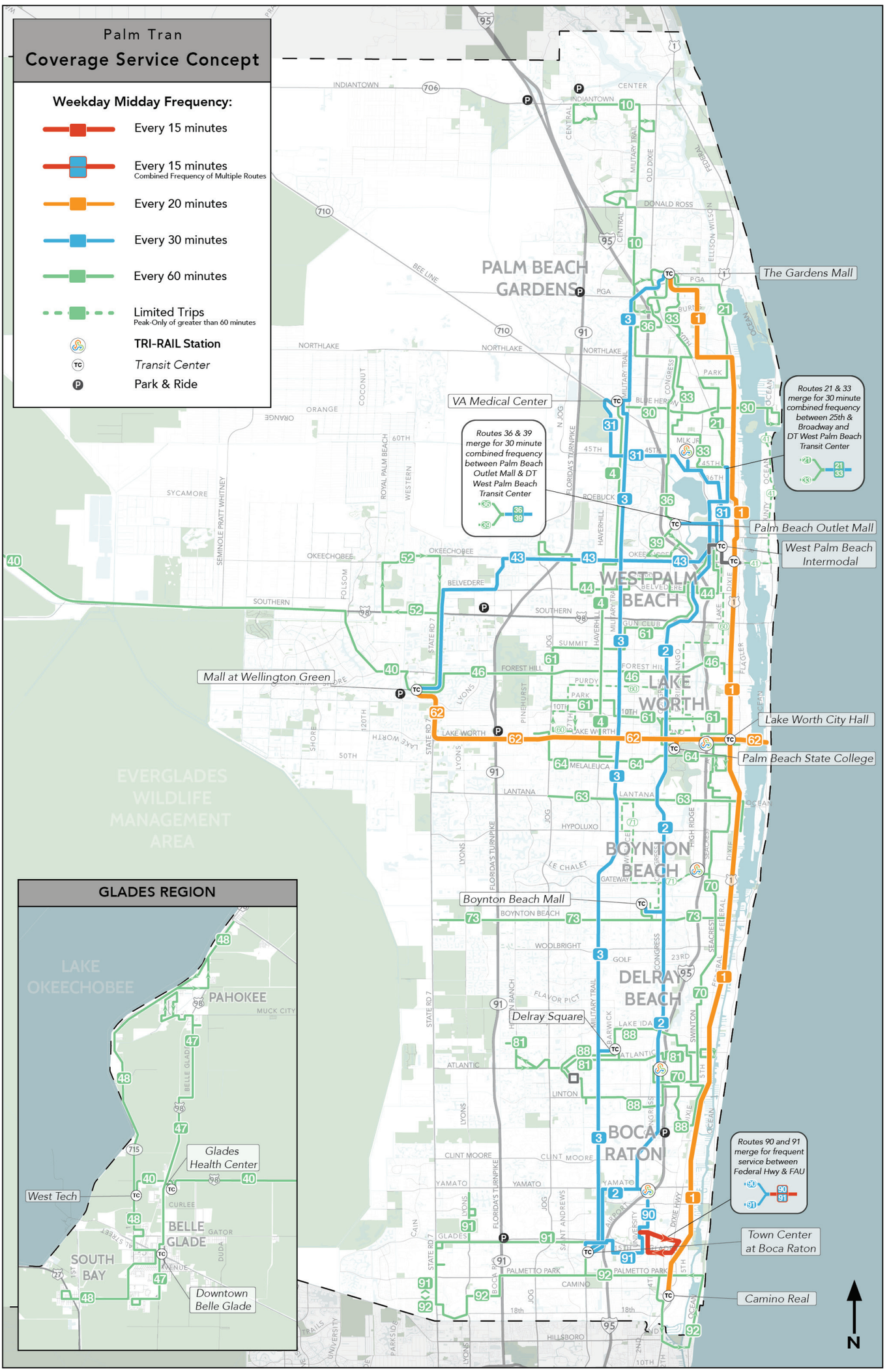

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Figure 7: Coverage Service Concept (Detail)

the effect of shifting some new resources into weekends: for example, Route 73 in the Ridership Service Concept adds 60-minute service along Boynton Beach Boulevard on Sundays, a segment that is currently not served on Sundays.

Downtown West Palm Beach Routing

While the primary differences between the Service Concepts and existing network arise from the different goals each pursue, they also differ from the current network in one other key way: the design of services in Downtown West Palm Beach.

Today, Palm Tran services that reach Downtown converge at the Intermodal Transit Center, (ITC) just west of the Tri-Rail station and Tamarind St. The current routing of services in this area is shown in Figure 8.

ITC is a large facility that is able to facilitate a major transfer between many different routes and regional rail, but it imposes major inefficiencies upon Palm Tran, and upon the travel times of its customers:

- ITC is a substantial walk from many key Downtown destinations: more than 1/2 mile from CityPlace, the new Brightline rail station at Quadrille and Evernia, and the Convention Center, nearly 1 mile to Flagler Park, and comparable distances to other destinations and places of employment in the area.
- The facility itself is designed in a way that extends pedestrian walk distances, since its location across the Tri-Rail line means that people must deviate off shortest paths to the safe places to cross the rails.
- Its location away from Dixie Highway requires a long deviation of Route 1, Palm Tran's busiest route, extending through travel times and increasing the cost of operating the service.
- Its local bus circulation pattern also maximizes travel distances and times for buses and their customers. Currently, most buses using the facility access it via Australian Avenue, far from the central area of downtown. A bus deviating off of Highway 1 to serve the facility must make 8 or 9 turns to get to the facility and back.

Future Downtown Transit Facility

One of the most promising possibilities for the future of transit in Palm Beach County that emerged during the Core Design Workshop was the prospect of a new, more centrally-located transit facility in Downtown West Palm Beach. The City of West Palm Beach is currently studying options for a development project on the block north between

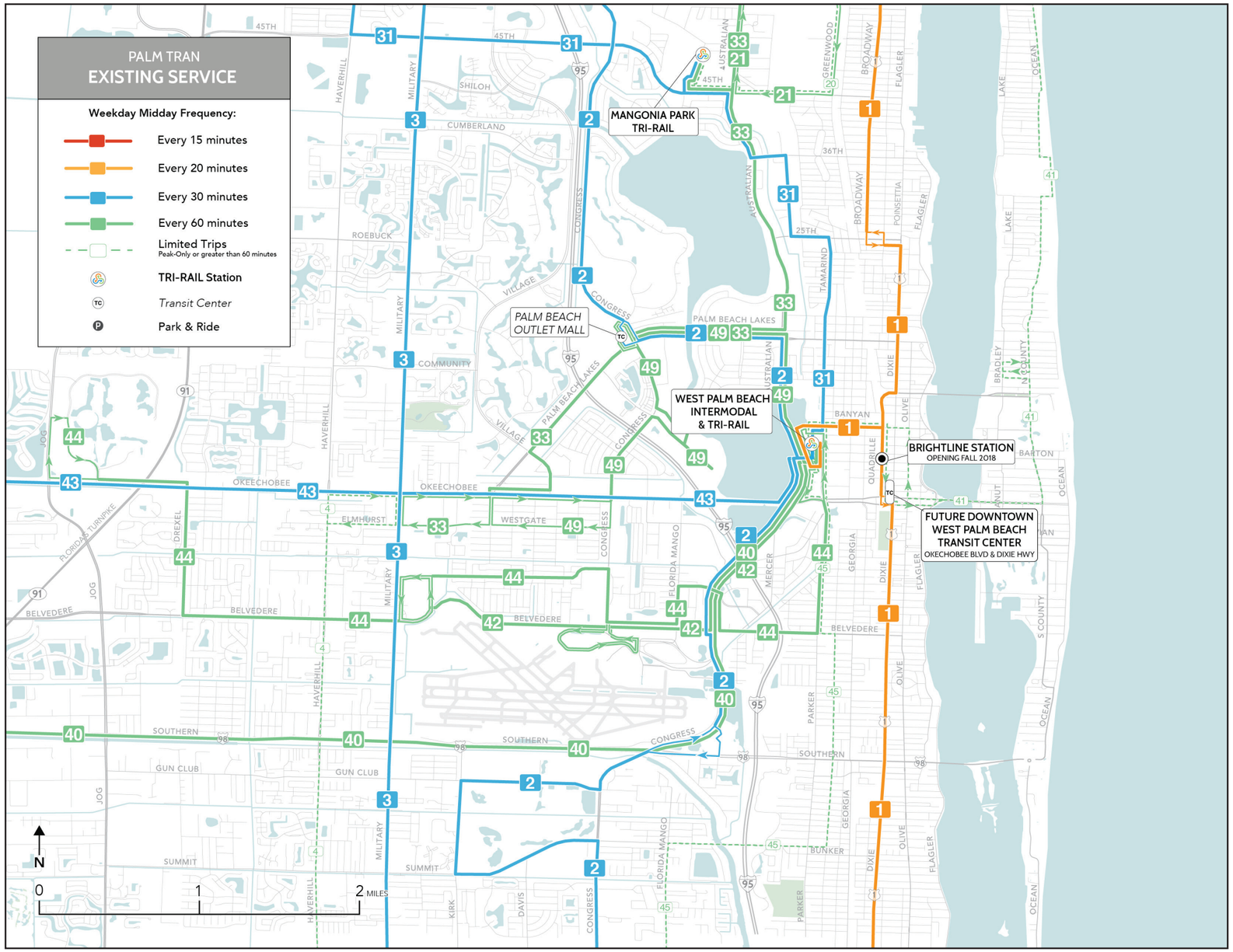


Figure 8: Current Downtown West Palm Beach Transit Network

Okeechobee Blvd. and Lakeview Avenue, and between Dixie Highway and Quadrille Blvd. This project could involve a transit station on the ground floor that could function as a hub for buses serving all of West Palm Beach and adjacent cities.

While no specific development proposal yet exists for the site, a temporary transfer facility could be quickly established that would provide many of the same benefits, bringing more routes closer to the major downtown destinations, improving the usefulness of services for people traveling to or from those places. This facility would also permit the discontinuation of the current Banyan Blvd. deviation of Route 1 to reach the ITC, saving some operational resources that can be reinvested to improve service elsewhere.

Downtown Routing Serving New Facility

In order to serve this potential new facility, downtown routing in each Service Concept operates on a new principle: most routes coming into downtown from the west go first to the Tri-Rail station, by stopping on-street along Tamarind Ave., and then continue to the future facility via Tamarind and Okeechobee. Route 1 no longer goes to Tri-Rail directly, but other bus services would combine to form a high-frequency link to facilitate this connection, possibly supplemented by the local shuttle system of the City of West Palm Beach.

Coverage Service Concept

The revised Downtown West Palm Beach network from the Service Concept is shown in Figure 9. In this Concept, Route 1 serves the new transit facility but not the Tri-Rail station directly. Routes 21 and 33 terminate at the ITC, but connections are available to all other downtown routes, either on Tamarind adjacent to the Tri-Rail station, or to Route 1 along Broadway north of downtown. The sole route terminating downtown that does not make a direct connection to Route 1 is Route 44, which terminates at ITC (where connections are available to all other routes along Tamarind).

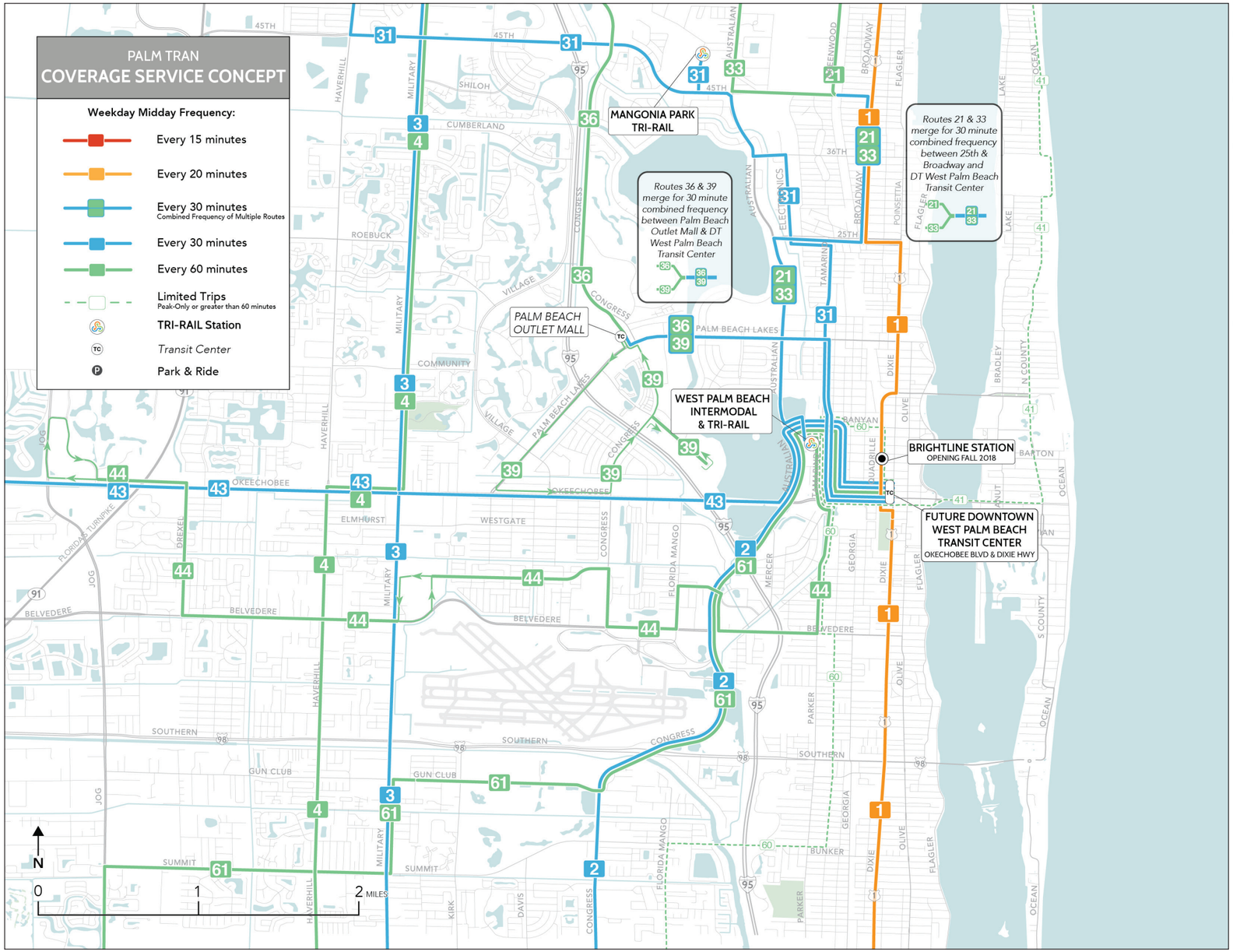


Figure 9: Coverage Service Concept: Downtown West Palm Beach Routing

Ridership Service Concept

Because there are far fewer routes, the downtown network in the Ridership Concept shown in Figure 10 is much simpler than that of the Coverage Concept or the existing network. The Ridership Concept is organized around four main paths into downtown:

- Routes 2 and 63, from the south, enter Downtown via Australian, turn right on Banyan and right on Tamarind to serve Tri-Rail, and then continue via Tamarind and Okeechobee towards the future downtown transit facility.
- Route 43, from the west, enters Downtown via Okeechobee, makes a left via the interchange ramp onto Australian, and then continues to serve Tri-Rail and the transit center via Tamarind and Okeechobee.
- Routes 31,33, 36, 37 and 38 all converge onto Tamarind at Palm Beach Lakes Blvd., and then continue to serve Tri-Rail and the new downtown transit facility via Tamarind and Okeechobee.
- Route 1 does not reach the Tri-Rail station,staying on Dixie Highway through Downtown. However, a local shuttle would be available to ensure a quick connection between the two points, and 15 buses per hour would travel between the two on other Palm Tran routes.

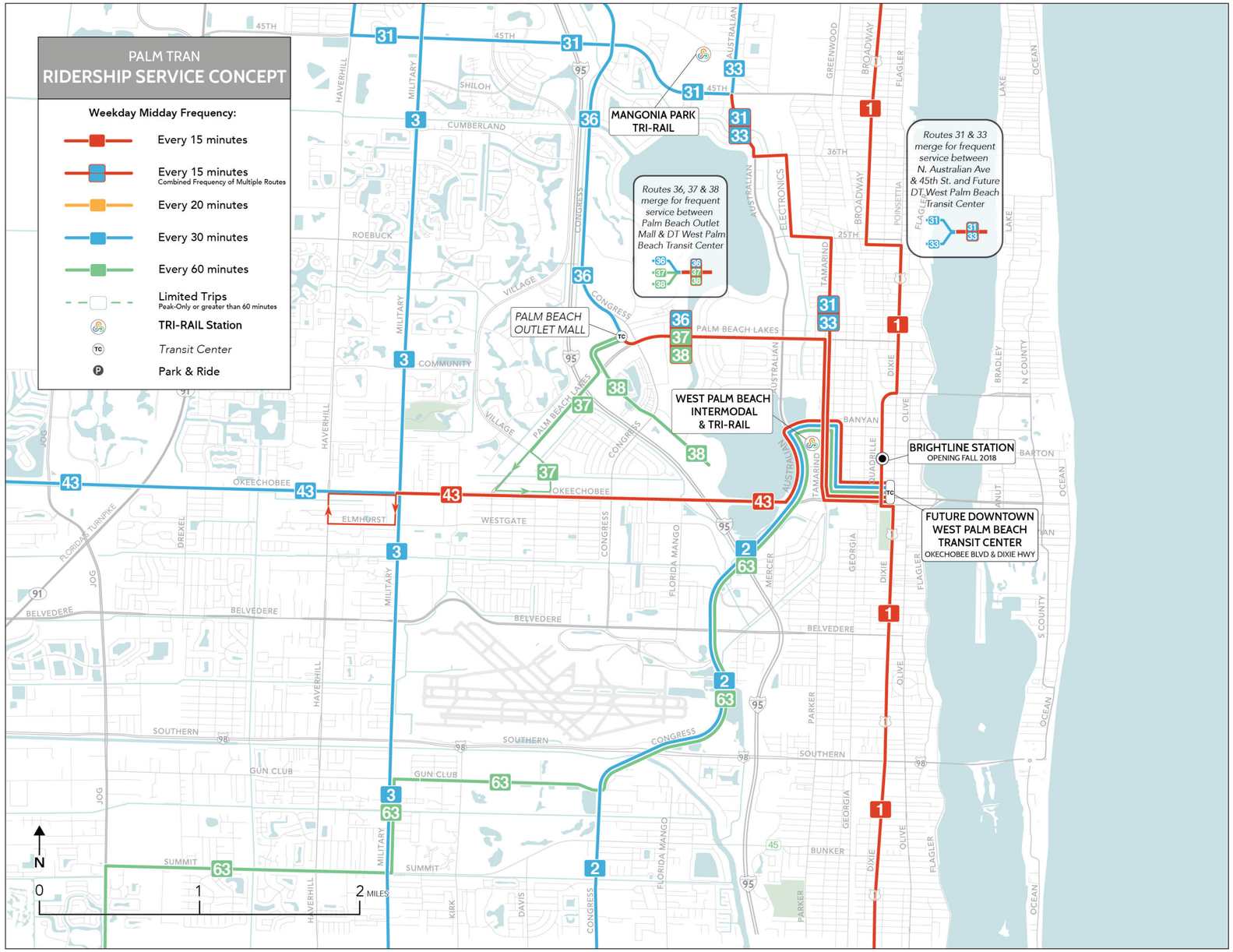


Figure 10: Ridership Service Concept: Downtown West Palm Beach Routing

North County

The North County area of the network is one the most extensively restructured portions of the Concepts, because the existing network structure is so problematic. Here, the Coverage Concept articulates network design ideas already in progress for upcoming Palm Tran service changes intended to simplify the network and reduce travel times in the North County area, without reducing coverage in the area.

A key feature of these changes is for all routes covering this area, south of The Gardens mall, to provide direct service into downtown West Palm Beach and all of the connections there. Eliminating the transfer that is currently necessary to reach downtown from many places in Riviera Beach, Lake Park and North Palm Beach would have the effect of greatly improving travel times into downtown from many parts of the North County area, and increase the ease of accessing the downtown pulse for people traveling connecting to or from other parts of the county.

The Ridership Concept also establishes direct service into downtown from the North County area, but consolidates currently infrequent local service between Military Trail and US-1 into two very simple paths at higher frequency. As a result, it unable to reach every currently served segment, but travel times using the higher-frequency routes that remain would be substantially reduced.

Ridership Concept

In the Ridership Concept, there are just 5 main routes in the North County area. Route 1 on US-1 operates between downtown West Palm Beach and The Gardens mall in the same was as it does today, but at higher 15-minute frequency. Route 3 on Military Trail is unchanged from its current pattern, and would continue to serve Military Trail and the VA Medical Center before terminating at The Gardens mall, at 30-minute headways all day.

Between these major regional north-south corridors, the design of local services is substantially different. Most importantly, Route 2 would now terminate at the new downtown West Palm Beach transit facility, with its northern segment between downtown and the VA Medical Center becoming a new route, the 36.

All of the other routes between The Gardens and downtown West Palm Beach are designed to converge into two 15-minute segments north of the West Palm Beach Tri-Rail Station:

- Routes 31 and 33 would together offer 15-minute service from downtown West Palm Beach to the downtown Tri-Rail station, along Tamarind to 45th, and then branch after serving the Mangonia Park Tri-Rail station, with the 31 continuing every 30 minutes to the VA, and the 33 continuing every 30 minutes through Riviera Beach to The Gardens.
- Routes 36, 37 and 38 would together offer 15-minute service between the Palm Beach Outlet Mall and downtown West Palm Beach. Every other trip would continue as Route 36 to the VA Medical Center via Blue Heron, while the other two trips each hour would continue as Route 37 and Route 38, each serving Palm Beach Lakes Boulevard and Executive Center Drive, respectively. Routes 37 and 38 would operate hourly.

Consistent with the ridership goal of this scenario, these changes concentrate service in the North County area into the straightest transit paths serving the densest areas and major destinations.

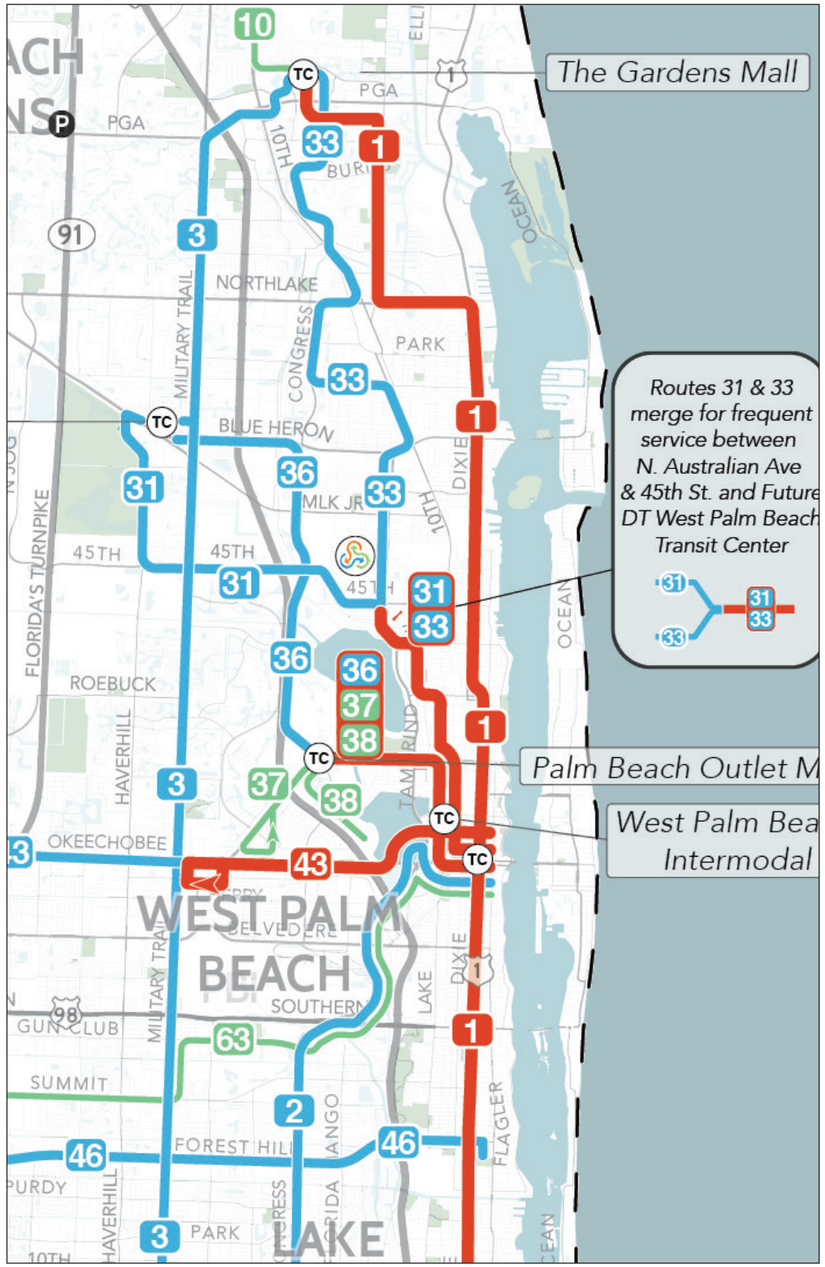


Figure 11: Ridership Service Concept: North County Detail

Coverage Concept

The Coverage Concept retains much of the coverage of the existing network, but reorganizes it in a simpler and more efficient manner. One of the issues in the existing network in this area is that it has no focal point, so it is difficult to connect between routes to reach a range of destinations. Two routes extend north from Mangonia Tri-Rail, and a third, the 33, extends south to West Palm Beach but does not go to Tri-Rail or downtown where it could connect with other services. Many routes weave across each other in inefficient ways in order to cover the entire area.

Additionally, the only route between US-1 and Military Trail that reaches The Gardens Mall, Route 20, is the least frequent service in the area.

Figure 12 and Figure 13 compare the Coverage Concept to the existing network in this area.

In the Coverage Concept, as in Ridership, Route 33 connects The Gardens Mall and downtown West Palm Beach using portions of the existing routing of routes 20 and 21, and converges with Route 21 to provide a combined 30-minute headway south of 45th Ave into downtown.

Route 36 incorporates elements of the existing 2, 33 and 20 to provide local access to the western side of the North County area, particularly neighborhoods immediately east of I-95. It merges with Route 39 at Palm Beach Outlet Mall to provide a combined 30-minute headway along Palm Beach Lakes Blvd. into downtown.

Route 21 is also straightened and simplified, using a portion of the existing routing of Route 20 to reach 45th, where it converges with Route 33 to provide a combined 30-minute headway to the West Palm Beach Tri-Rail station and the new downtown transit facility.

These changes provide straighter, simpler and easier to remember routes through this portion of the network, without sacrificing access to existing areas. Routes 33 and 36 now provide new direct connections from neighborhoods in Riviera Beach and North Palm Beach to The Gardens Mall and downtown West Palm Beach that require a long walk or transfer today.

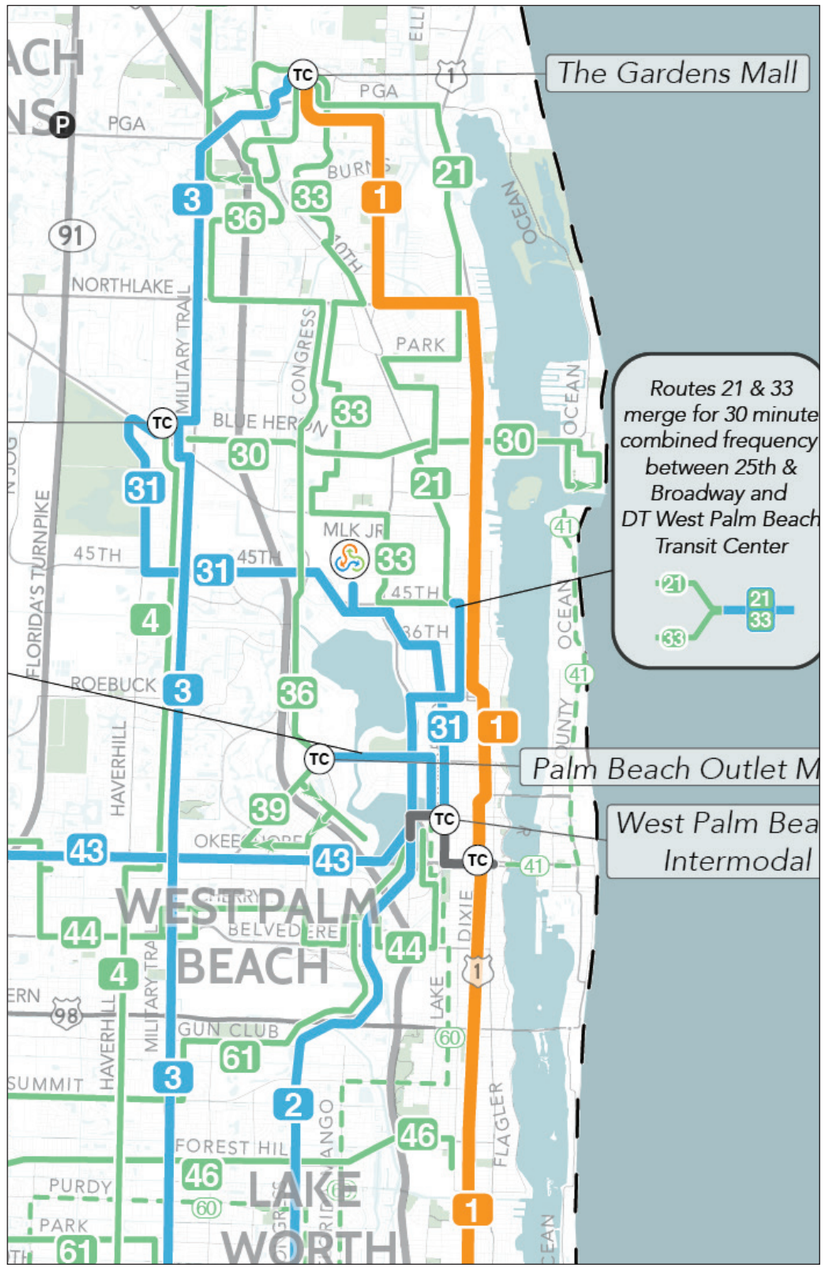


Figure 12: Coverage Service Concept: North County Detail

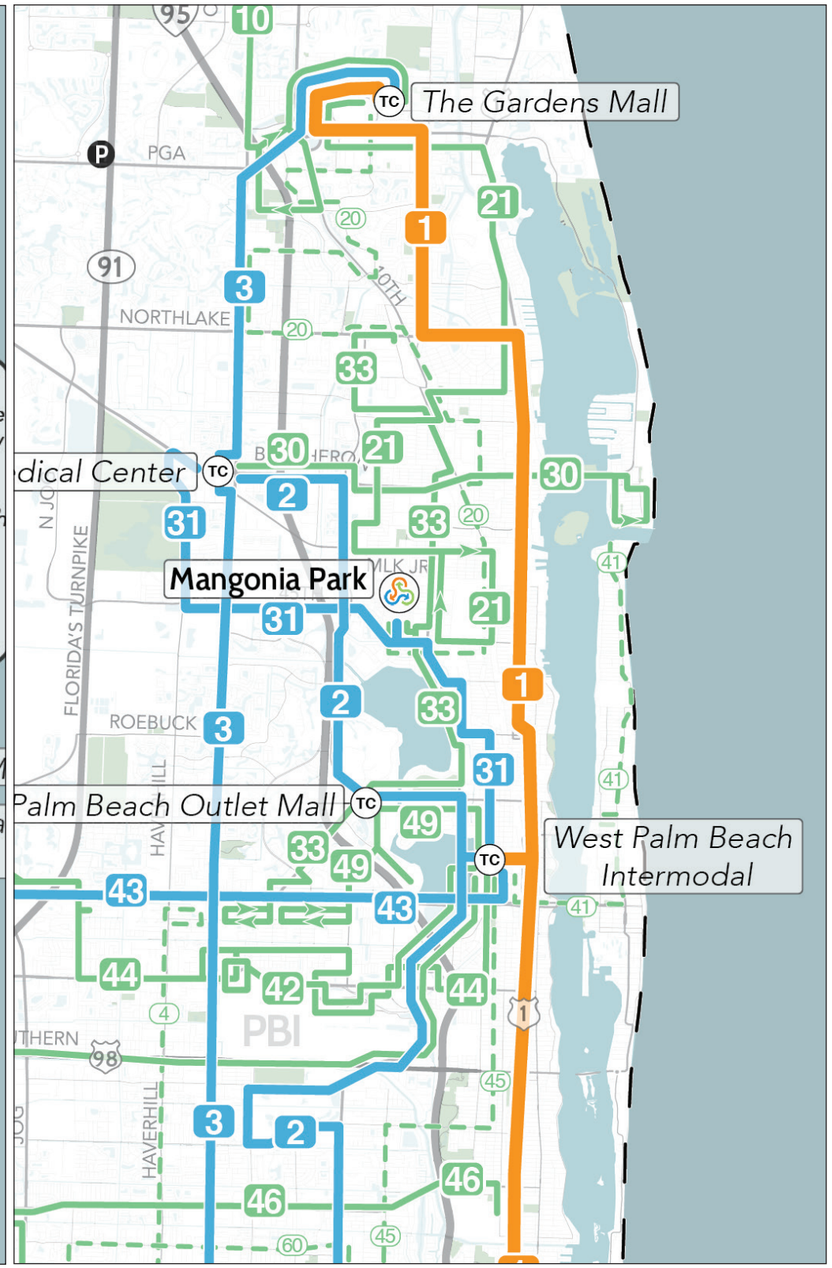


Figure 13: Existing Network: North County Detail

West Palm Beach / Lake Worth

West Palm Beach and Lake Worth comprise the area of Palm Beach County with the most extensive dense, relatively walkable and connected neighborhoods. Lake Worth is also an area of relatively high economic disadvantage.

While most areas of the county along the Intracoastal Waterway and east of I-95 have comparable or higher density and walkability, this area in particular has substantially more density in the area west of the freeway. This means that it is a key market for Palm Tran to serve, since the dense areas where many people are nearby who could choose to use transit area greater in number, and closer together. Today, several of Palm Tran's most productive routes, include routes 62, 43 and 46, operate in this region.

The structure of this area of the network is organized around a grid principle, with the long north-south routes 1, 2 and 3 intersecting routes traveling east-west along the main corridors of Okeechobee, Forest Hill and Lake Worth Road. When transit is organized into a grid, any location within walking distance to a route in the grid can be reached with only one transfer. However, when the grid operates at low frequencies, wait times are long, increasing overall transit time and the utility and competitiveness of the service for trips requiring a transfer.

In the existing system and the Coverage Concept, many of the neighborhoods east of Jog also have lower-frequency local coverage services on the lower-density corridors like 10th, Purdy or Melaleuca.

Ridership Concept

The Ridership Concept focuses more resources on the major corridors, improving the frequency of key routes on Okeechobee, Forest Hill and Lake Worth. Frequencies are increased on grid routes, reducing wait time penalties required to transfer. In addition to the 15-minute frequency of Route 1, both Route 43 and Route 62 now have 15-minute shortline[1] segments from the coastal corridor to Military Trail. While this represents a drop in service on the segment of Route 62 between Military Trail and Wellington Green compared to the existing network, this outer portion currently generates less ridership than the inner segment as density declines west of Military Trail.

Route 46 serving Forest Hill would also be upgraded to a higher service level in the Ridership Concept, from 60-minute service in the existing network to 30-minute service. Forest Hill is less dense than Lake Worth and Okeechobee, but is still a relatively strong transit corridor compared to other parts of the county, and a strong ridership prospect at higher frequency, as indicated by the current productivity of the service.

Most of the lower-frequency coverage within this area is not included in the Ridership Concept, with the exception of the redesigned Route 63, which is extended from Lantana and Jog to downtown West Palm Beach via Jog, Summit, Military Trail , Gun Club and Australian. Existing routes 4, 45, 60 and 61 are not present in this scenario, though in some cases (as with Route 63), service is still available near some of their existing stops.

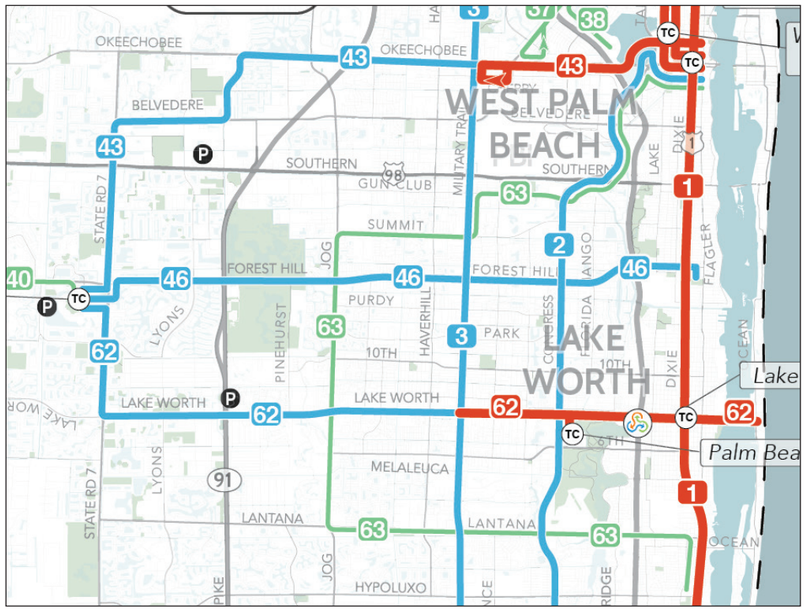


Figure 14: Ridership Service Concept: West Palm Beach / Lake Worth Detail

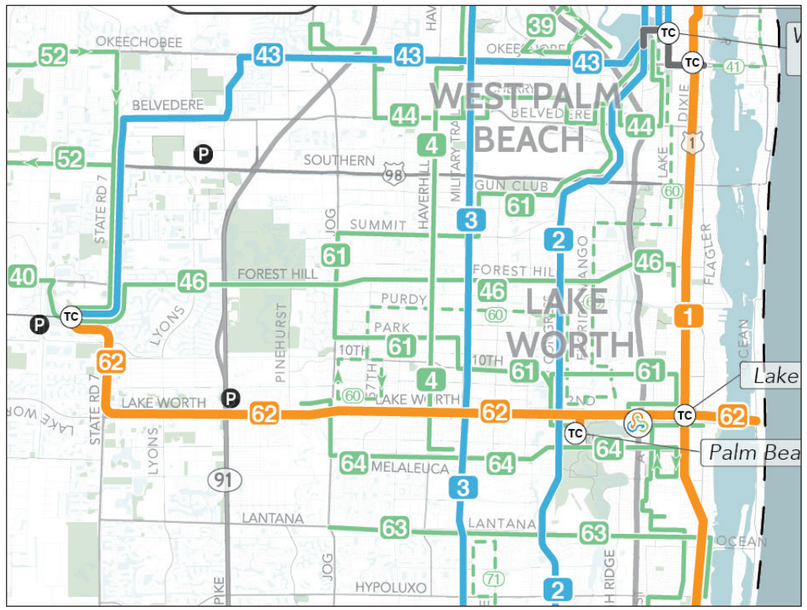


Figure 15: Coverage Service Concept: West Palm Beach / Lake Worth Detail

Coverage Concept

The Coverage Concept maintains much of the existing structure of the network in this area, but with a number of small tweaks designed to improve efficiency or travel times. The changes are as follows:

- The current one-way loop of Route 43 along Belvedere and Weisman Way east of SR-7 and Belvedere is simplified, with Route 43 staying on Belvedere in both directions between SR-7 and Sansburys Way. This would reduce travel times along Route 43, no longer requiring passengers riding through to travel around the loop. Route 52 would continue to serve a portion of loop in the same manner as today.
- Route 42 serving the airport is discontinued. This route largely duplicates Route 44 (which serves more riders and dense neighborhoods and destinations) and generates very little ridership.
- Route 40 to and from the Glades is truncated at Wellington Green mall.
- Route 61 is extended via Jog, Summit, Gun Club and Australian to downtown West Palm Beach, serving Palm Beach County offices and facilities south of Gun Club. This allows the elimination of the deviation of Route 2 on Gun Club in the existing network, and adds new coverage on Summit.
- Existing routes 45 and 60 are combined into a single Route 60. This conceptual route would operate along the same routing as the existing 45 and 60, but with a new segment along 10th Ave and Congress from Florida Mango Rd. to Greenbrier Dr. bridging the current gap between the two routes.
- Route 70 coming from Delray Beach and Boynton Beach is extended to the transit center at Lake Worth City Hall from its current terminus just north of Lantana.

1 A shortline is a segment of a transit route that operates at a higher frequency than the complete route. In the cases of routes 43 and 62 in the Ridership Concept, each stop between US-1 and Military Trail is served by a bus every 15 minutes, while every other bus continues west to Wellington Green, providing 30-minute service.

Boynton Beach

South of Lantana, the development pattern west of I-95 grows less dense, more spread out and more disconnected. Current transit services in this area include Route 71, which provides local coverage at very low frequencies around Boynton Beach, Route 73, which is a corridor service on Boynton Beach Boulevard, and Route 70, which runs from Lantana to Delray Beach on streets between US-1 and the I-95 freeway. All of these routes operate hourly.

Ridership Concept

In the Ridership Concept, the local network is streamlined in Boynton Beach and Delray Beach, focusing more frequent service in the denser areas. Connections to other areas of the county are mostly unchanged, with the exception of the improvement of Route 1 to 15-minute frequency.

As a result, the overall area and number of people reached by transit is smaller, but in the places that are served, higher frequencies enable shorter travel times and less waiting, particularly for trips taking advantage of a transfer to or from 15-minute Route 1.

The existing Route 70 is discontinued in the Ridership Concept. While the area served by Route 70 is a strong ridership prospect because of its density, grid street pattern and general walkability, in many places, routes 70 and 1 duplicate much of their market, since the unique coverage area of the 70 is confined to the area between the freeway (which presents an obstacle to walking in most places) and the streets on which the route itself operates.

The improvement of Route 1 to 15-minute service offers a higher degree of utility that is likely to be very useful to many people who today might choose Route 70, even if this requires a slightly longer walk. Removing this duplication unlocks resources that can be reinvested to improve frequencies on routes in other strong markets where high-frequency service is not already in place.

In Boynton Beach, Route 73 is shortened to end at the commercial node at Military Trail, and increased from 60-minute service to 30-minute service. This establishes more useful service between the main dense and walkable residential area of Boynton Beach east of I-95 to the retail and employment cluster around Boynton Beach Mall.

There are a number of dense residential developments along Boynton Beach Boulevard between Military Trail and Congress, though the lack of safe crossings makes pedestrian access to transit a challenge in many places.

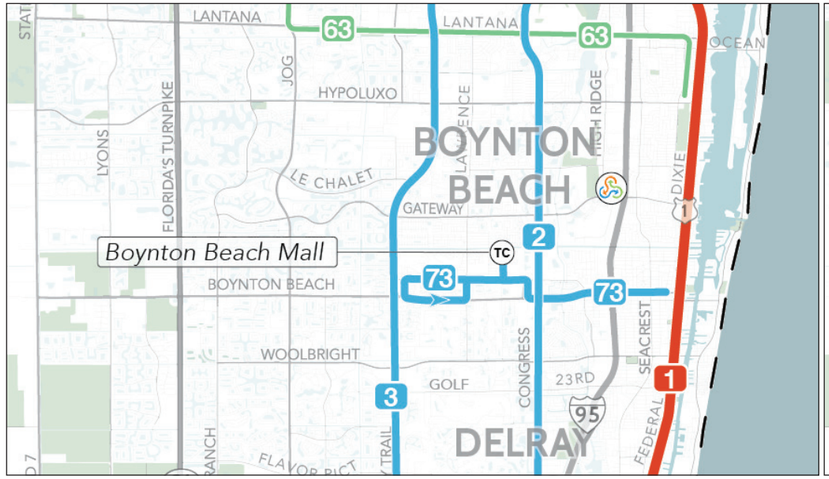


Figure 16: Ridership Service Concept: Boynton Beach

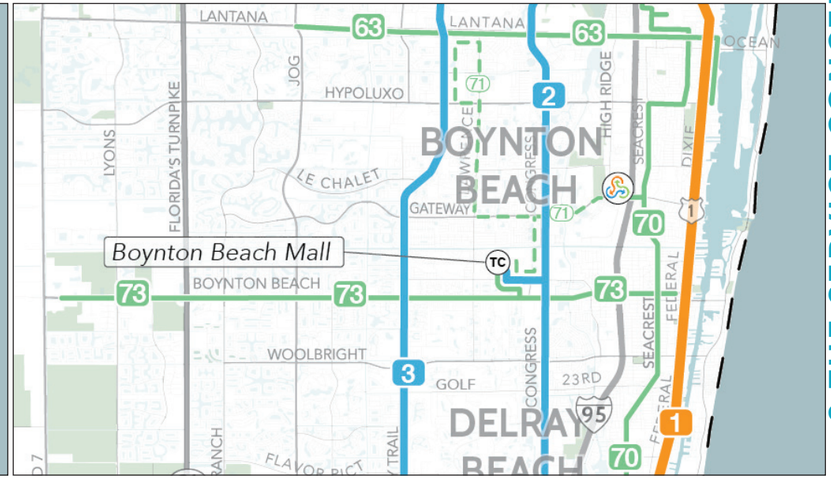


Figure 17: Coverage Service Concept: Boynton Beach

West of Military Trail, density drops quickly. Reaching the Bethesda Hospital at the end of Boynton Beach Boulevard requires traversing a long extent of undeveloped land where current ridership is minimal, which is why Route 73 ends at Military Trail in the Ridership Concept

Coverage Concept

In the Coverage Concept, service in Boynton Beach is very similar to its current pattern, with Route 73 operating every 60 minutes along the entire extent of Boynton Beach Boulevard. Route 70 is extended from its current terminus north of Lantana to Lake Worth, establishing a new connection to routes in that area for people traveling to or from places along Swinton and Seacrest. Route 71 would be retained with its current routing and service level.

Delray Beach

The current transit service in Delray Beach uses three routes (70,80 and 81) to provide service the many pockets of density in the area. Unfortunately, many of these places are located in gated communities or neighborhoods off main roads that require substantial deviation to reach, extending travel times and increasing the amount of resources required to reach the area's population.

Ridership Concept

In the Ridership Concept, the local coverage network in Delray Beach is simplified, with the sole remaining segment a 30-minute connection between downtown Delray Beach, the Delray Beach Tri-Rail station, and Delray Square mall, Route 85.

Delray Square and the Tri-Rail station are the two highest-ridership locations in this part of the existing network; other high-ridership sites include shopping centers near the intersections of Linton and Military Trail or Congress. These locations would now be accessible via an improved transfer between routes 85, 2 and 3. The local coverage currently provided by routes 70, 80, and 81 is not present in the Ridership Service Concept.

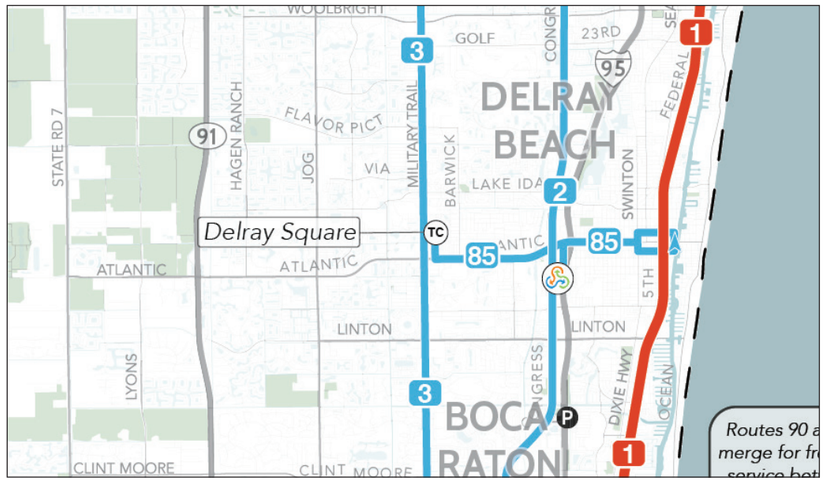


Figure 18: Ridership Service Concept: Delray Beach

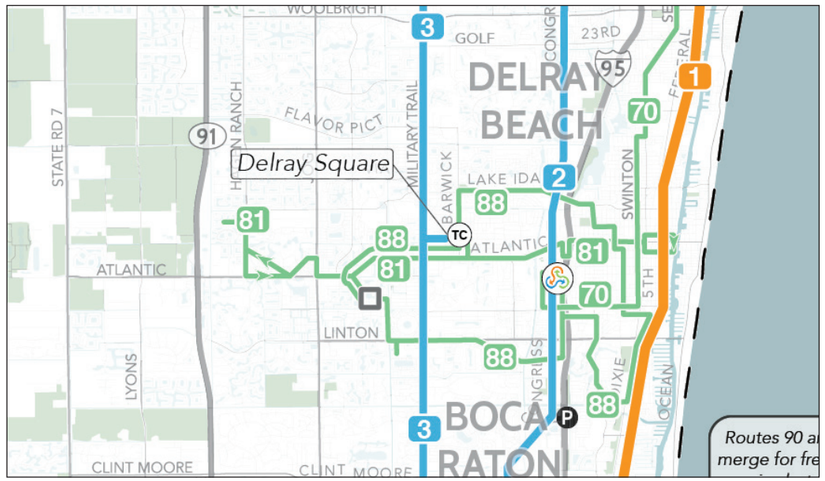


Figure 19: Coverage Service Concept: Delray Beach

Coverage Concept

The Coverage Concept includes most of the existing coverage in Delray Beach, but makes some routing adjustments in order to simplify the network design or improve travel times.

- Route 81 is straightened, removing the long deviation off Atlantic the existing route makes from the Tri-Rail station to 10th St. Instead, Route 81 would simply loop through the Tri-Rail station parking lot, and return north to Atlantic via Congress.
- Route 88 replaces existing routes 80 and 81. This route operates as a loop around Delray Beach, primarily serving Linton, Atlantic, Lake Ida and US-1. It includes the current path of Route 80 from Delray Square to I-95 and the current path of Route 81 east of Delray Square.
- Route 70 is truncated at the Delray Beach Tri-Rail station. The segments currently served by this route west of the station would now be operated by Route 88, with the exception of the short piece of Lowson Blvd. and Homewood Blvd. now used by Route 70 to travel between the Tri-Rail station and Linton.

Boca Raton and South County

As with many parts of Palm Beach County, the southern area near the Broward County Line is split between the very dense, walkable area around Boca Raton and the US-1 corridor, and the more dispersed, less walkable development pattern west of I-95. However, Boca Raton is also home to Florida Atlantic University, one of the largest single travel destinations in the county, as well as more continuous development along State Road 7 in the west.

Ridership Concept

The Ridership Concept preserves and improves the connection between the Boca Raton Tri-Rail Station, FAU, downtown Boca Raton, and the Town Center mall. It also retains the 60-minute coverage service provided by Route 91 on Glades Road to SR-7 and connections to Broward County Transit service. However, it eliminates Route 92, which mainly serves lower-density segments where the existing ridership level is very low.

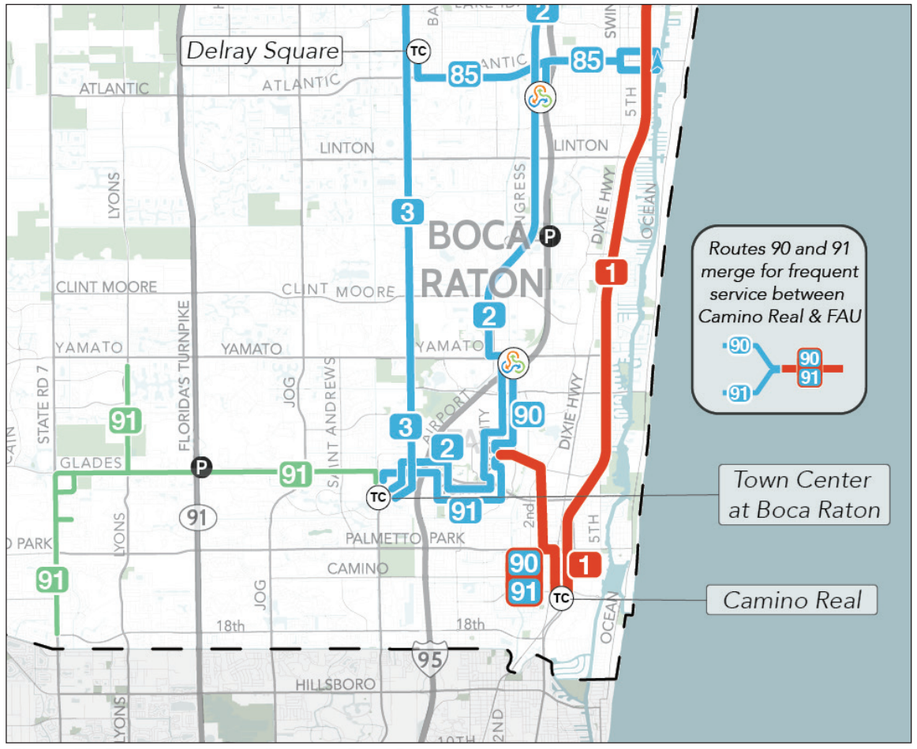


Figure 20: Ridership Service Concept: Boca Raton and South County

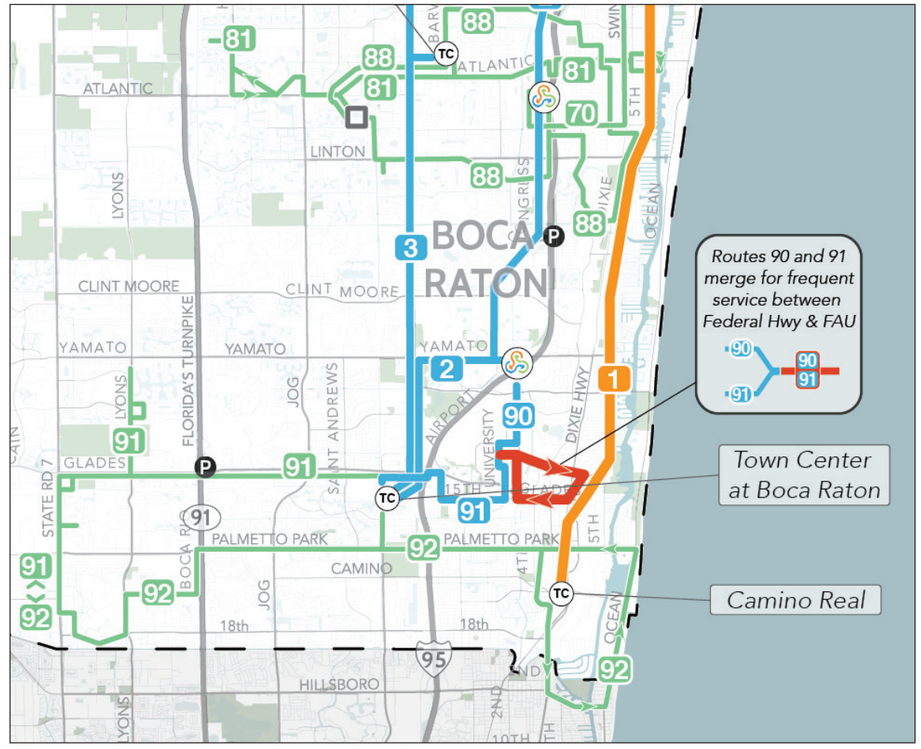


Figure 21: Coverage Service Concept: Boca Raton and South County

In downtown Boca Raton, Route 1's turnaround has been modified to allow it to use Federal rather than Dixie in both directions. This puts the 15-minute service closer to more people and jobs in the dense residential and commercial core of Boca Raton.

In the existing system, Route 94 offers 15 and 20 minute service for most of the day from the Tri-Rail station to US-1 via FAU, but does not reach downtown Boca Raton. This connection is reinforced in the Ridership Concept's Route 91. Route 91 is a 30-minute service, with 15-minute service during the AM and PM peak periods. Additionally, during the midday period, it would operate offset from the 30-minute segment of Route 91 (a shortline between Town Center Mall and Camino Real Transit Center) to provide a consistent 15-minute headway between the center of the FAU campus and downtown Boca Raton.

Route 91 itself provides an improved connection between downtown Boca Raton, FAU and Town Center Mall. Transit travel to the mall from FAU and downtown Boca Raton is currently possible using Route 91, an hourly service. The Ridership Concept adds a 30-minute shortline segment to Route 91 between downtown Boca Raton and Town Center mall (with hourly service similar to existing continuing along Glades Route and SR-7 to the west).

The other major change to the eastern part of the Boca Raton section of the network is the rerouting of Route 2, serving the Congress corridor. Currently, Route 2 reaches Town Center via Yamato and Military Trail, duplicating Route 3 for the last 1.75 miles of its path. With the completion of the new overpass over I-95 near the Boca Raton Tri-Rail station, it is now possible for Route 2 to serve FAU directly, and add another option for students to connect between the station, the campus and the mall. Route 2 would now offer a single-seat ride to FAU for anyone near Congress.

Coverage Concept

The Coverage Concept preserves all the existing coverage in Boca Raton, but it does share some design elements with the Ridership Concept that are different from the existing service, chiefly the shortline of Route 91.

However, in the Coverage Concept, Routes 90 and 91 would touch US-1 in a way more similar to the existing service, with their combined segment looping via 20th, Federal Hwy., Glades Rd., and 2nd Ave. This improves service between Town Center Mall, FAU and the dense housing and commercial area along 20th, although it does not touch downtown Boca Raton directly as in the Ridership Concept.

The Glades

The Glades area poses a challenge for transit, because its communities, the largest of which is Belle Glade, are located far apart from one another, and from the main developed area of Palm Beach County along the coastline. This means that transit routes serving the area must traverse extensive areas of undeveloped land in order to reach places with people, jobs and destinations that generate travel demand.

Both the Ridership and Coverage Concepts anticipate the end of a grant currently funding a portion of existing transit service in the Glades. As a result, the overall level of service in each concept is somewhat lower than that in place currently. The manner in which the remaining resources are allocated differs between the two Concepts due to the varying goals each is designed to pursue.

Ridership Concept

In the Ridership Concept, Routes 47 and 48 are combined into a single route on segments currently served by both, and operating every 30 minutes. This Concept's redesigned Route 47 is similar to the existing 47 between Pahokee and Glades Health Center, but continues via Highway 98 and 16th St. to through the west side of Belle Glade, and then into the downtown area of the city via MLK Blvd. In downtown itself, the route would use 5th St., Ave A and Main in order to directly serve the commercial area.

From downtown, Route 47 continues south and west similar to the existing 47, but includes the segment of Route 48 between 16th St. and South Bay.

While several segments that are currently served are not in this Concept, no major destinations lose service, and importantly, West Tech gains 30-minute service connecting to Belle Glade and the other communities in the area.

Coverage Concept

In the Glades, the Coverage Concept is very similar to the existing network, except that due to the expiration of the current grant funding towards enhanced service in the area, Route 47's frequency is reduced from every 30 minutes to every 60 minutes. Routes 47 and 48 would continue to connect to Route 40 at West Tech and the Glades Health Center, and serve Belle Glade, South Bay and Pahokee in a way similar to the current service.

Figure 22: Ridership Service Concept: Glades Area

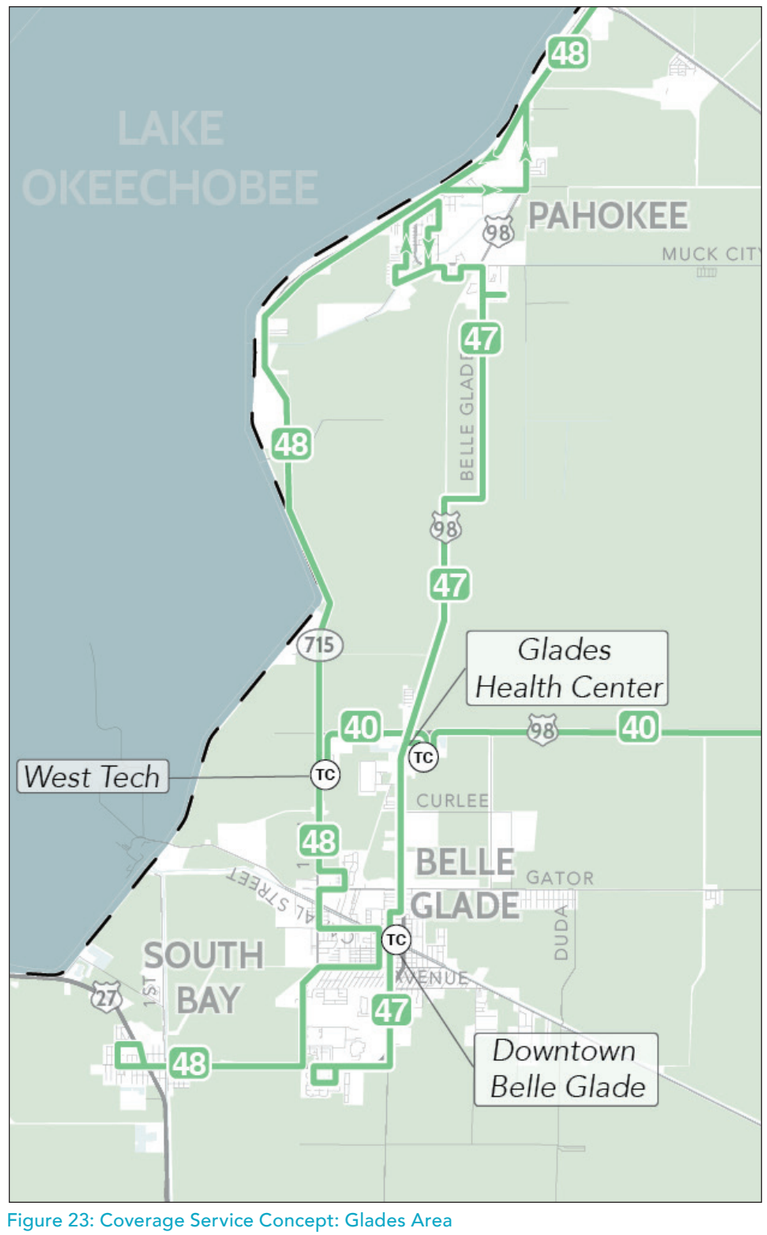


Figure 23: Coverage Service Concept: Glades Area

3

Evaluating the Service Concepts

Measuring the Impacts of Service Concepts

While the network design differences between the Service Concepts are very obvious when looking at the route maps, its less clear how each impacts the lives of actual people. This section presents two analyses gauging the impact of each Service Concept on people and travel time.

The first compares how many people and jobs are near transit, and near the Frequent Network, in each Service Concept.

The second of these uses travel time isochrones to map and analyze the area (and the number of people and jobs) that can be reached in 30, 45 and 60 minutes from a number of key locations throughout Palm Beach County in each Service Concept.

Coverage Analysis

Figure 24 presents the results of the coverage analysis comparing the two Service Concepts and the Existing Network. In each chart, colored bars show the proportion of the total population or jobs within the County that are within 1/4 mile of a transit stop, split by each frequency tier of transit service. People or jobs near 15-minute or better service is shown in red; near 20-minute or better service, in orange, and so on.

In reviewing this, it is important to remember that most people traveling to work on transit are not "nine to five" commuters. Transit serves work trips across the day and evening, especially in sectors such as retail, manufacturing, and entertainment. For that reason, the all-day frequency is a critical indicator of whether transit will be useful to them whenever their commute happens to be.

These charts explain the illustrate the tradeoff between the two Service Concepts. The Ridership Service Concept vastly expands the reach of the Frequent Network, bringing 15-minute service to US-1, inner Okeechobee and Lake Worth, and the combined segments of routes 36, 37 and 38, and 31 and 33. The number of people who are near to 30-minute service also increases, so that almost everyone who has transit access has it at 30-minute frequency or better.

Expanding the reach of the most frequent tier of routes comes at the cost of the total number of people and jobs near service of any kind. In the Ridership Service Concept, fewer than 30% of Palm Beach County residents are within 1/4 mile of transit service, and fewer than 75% of jobs.

The Ridership Concept reaches more people with more useful service,

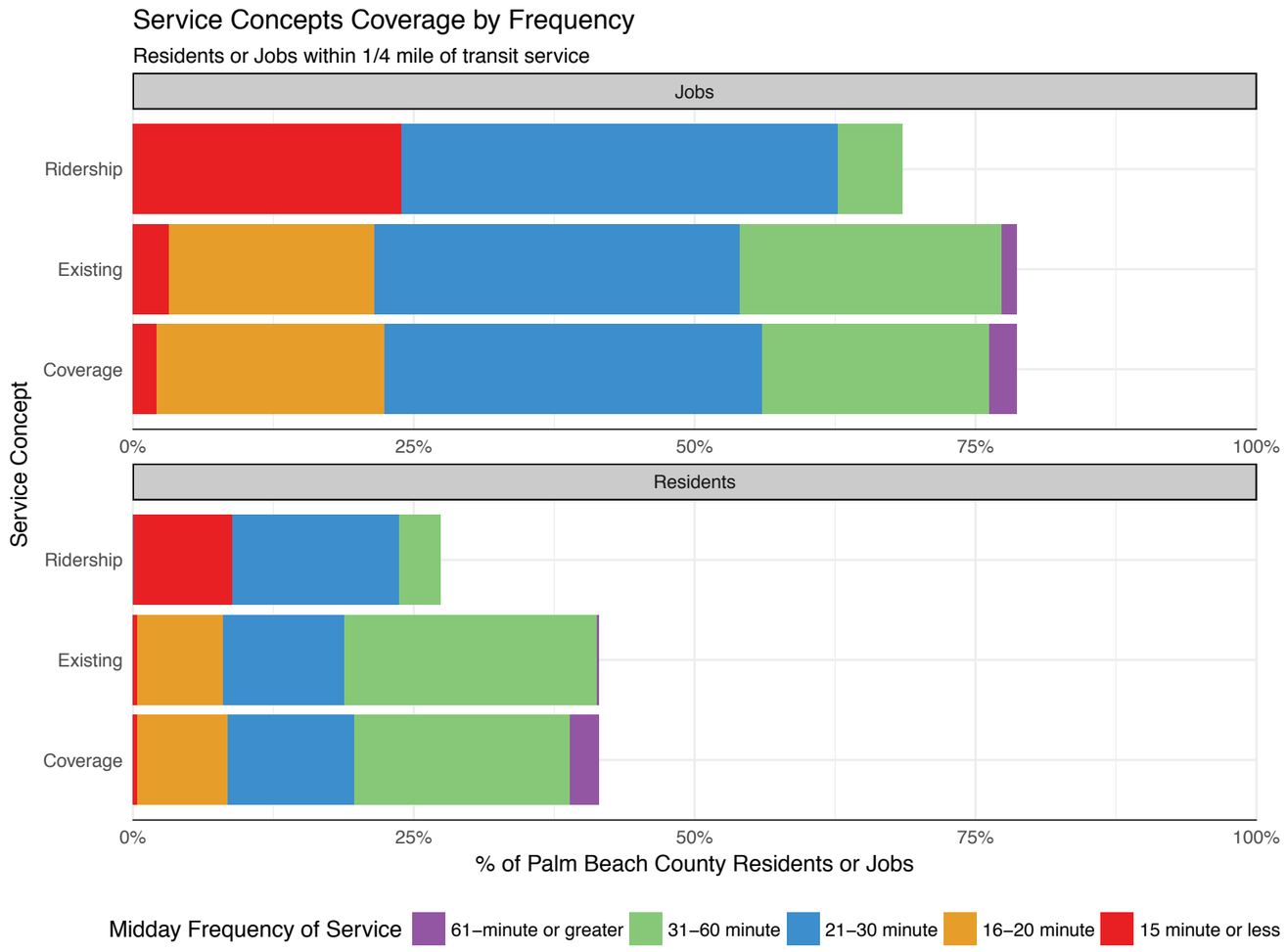


Figure 24: Coverage Analysis: Service Concepts and Existing Network

offering a more competitive mobility product where it is available compared to the reach of 20 or 30-minute services in place today. However, it contracts the overall coverage area of the network, reducing the range of places where people could rely on transit to provide a lifeline mobility option (even if that option is inconvenient because it operates less frequently).

The Coverage Concept brings some level of transit service to many more people, and is very similar to the Existing Network. While 15-minute service is available only near Route 94 in Boca Raton, the total number of people within 1/4 mile of service at any frequency is substantially higher, at over 40% of the total population and 75% of total jobs.

The Coverage Service Concept, and the Existing System, maximize the overall reach of the network, but lack the resources to do so while offering the most useful tier of service to a large number of people or jobs.

This is the substance of the tradeoff illustrated by the two Concepts: with the current level of funding, preserving all existing converage and improving service on high-ridership corridors like Route 1 or Route 62 cannot both be accomplished concurrently.

Access Analysis

Another way to compare the two Service Concepts is to look at how useful they are for travel to important places likely to be of interest to many people in Palm Beach County.

To do this, we use a visualization technique called an isochrone, which is a shape containing every possible point that could be reached from an origin location using transit and walking within a given time threshold. For each location, we've compared the area that could be accessed by transit within 30 minutes, 45 minutes and 60 minutes of travel time, and plotted them on a map.

We've also performed an analysis similar to the coverage analysis on the previous page, assessing the number of people and jobs within each isochrone. As a result, we are able to make observations about the number of people or jobs who can reach an important place, like downtown West Palm Beach, within 30, 45, or 60 minutes of travel time.

Expanding the number of people or jobs within a reasonable travel time of a location means that the potential number of people who might choose to use transit to reach the opportunities at that location is expanded as well.

For this analysis, a set of isochrone points throughout Palm Beach County was developed, including locations such as major educational institutions, hospitals, the downtown core of West Palm Beach, shopping centers, and the commercial cores of several of the smaller cities within the County. For each of these locations, maps are presented comparing the area that could be reached from each point with each Service Concept to that currently possible with the existing system.

Figure 25 shows a simple explanation of how these maps work. In each map, the isochrone is color-coded to show three things:

- Blue shows areas that gain access within the time threshold using the Service Concept that are not today accessible today with the existing network.
- Purple shows places that retain access within 45 minutes with either the Concept or the existing network
- Red shows places lose access within 45 minutes, compared to the existing network.

The change in population or job access can be thought about in these terms as well. If more people or jobs are within reach in 45 minutes, that means that the total number within the blue "gained" area is greater than the total number within the red "lost" area. If the number within the red area is greater than that in the blue area, then the net number of jobs or residents accessible in 45 minutes is lower.

The remainder of this section presents a set of 45-minute isochrones for a number of locations around the county. A more detailed isochrone map set, including the 30-minute and 60-minute isochrones in addition to the 45-minute, is available in Appendix A.

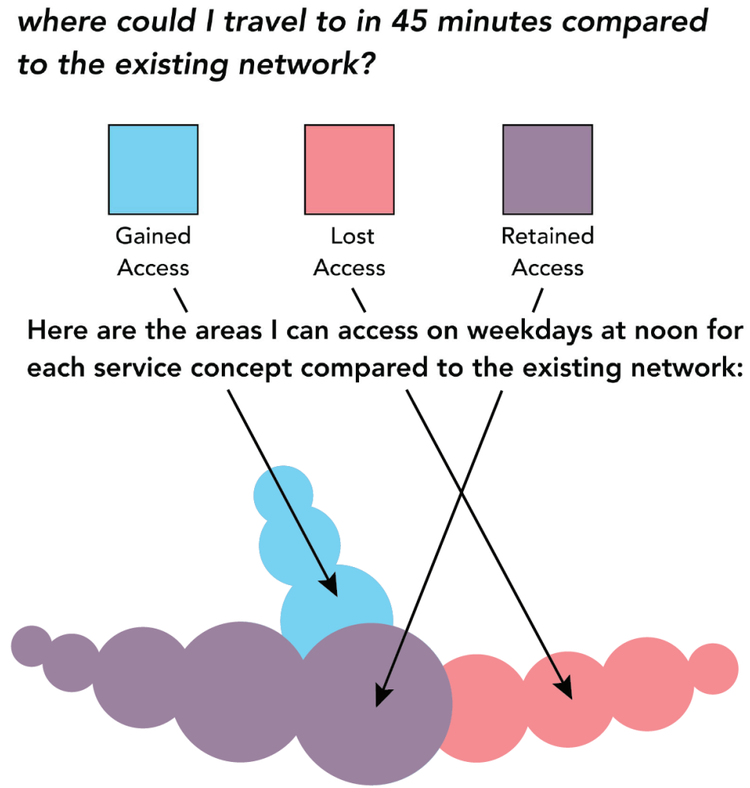


Figure 25: Isochrone Components

Downtown West Palm Beach

With the design of the Service Concepts centered around the future transit facility at Okeechobee and US-1, the location of the central transfer point of the network moves much closer to the core of downtown West Palm Beach. This means that people starting their trips closer to the centroid of the area do not have to walk across the core to reach transit connections currently located at ITC, reducing travel times.

As a result, both the Coverage and Ridership Service Concepts show big gains in the accessible area and number of residents and jobs compared to the existing system. The focus of the existing system is at ITC, rather than the new facility, so this is partly a natural consequence of the relocation of the main transfer point. For example, even though it operates at the same frequency, a person traveling from Okeechobee and US-1 can travel much farther west along Okeechobee in the Coverage Concept simply because accessing this route today requires a long walk to ITC.

From New Downtown Transit Center,

where could I travel to in 45 minutes compared to the existing network?

Gained Access

Lost Access

Retained Access

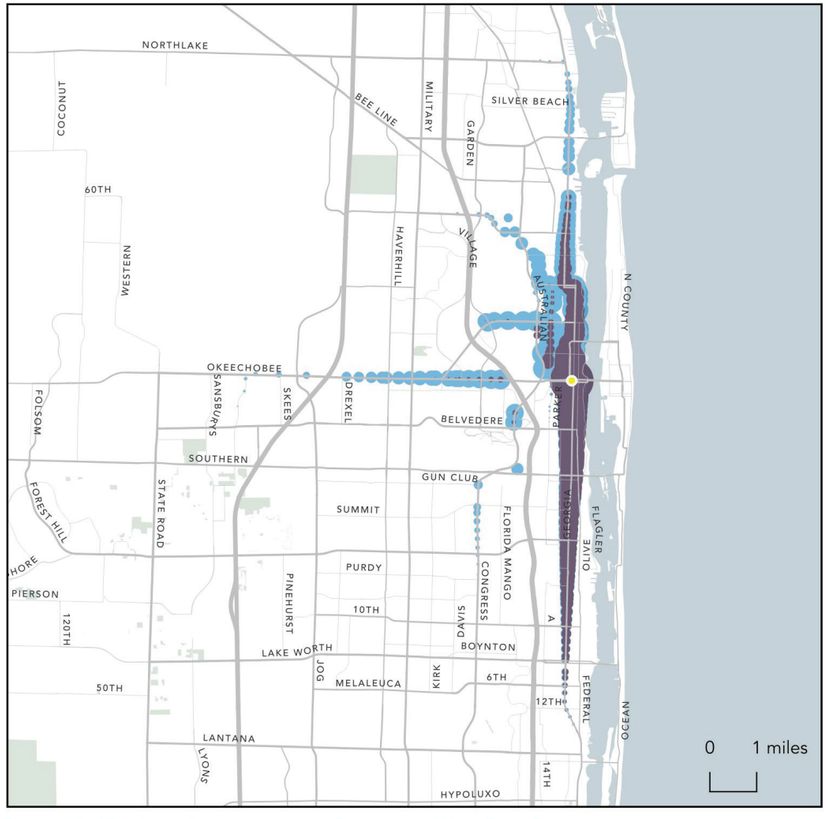
Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	6,500	0 %	15,500	0 %
30	Coverage	10,400	59.8 %	19,400	24.9 %
30	Ridership	17,800	172.3 %	25,000	60.9 %
45	Existing	24,700	0 %	28,700	0 %
45	Coverage	42,900	73.5 %	40,800	42.4 %
45	Ridership	55,400	124.3 %	50,200	75.3 %
60	Existing	64,500	0 %	50,200	0 %
60	Coverage	99,400	54.2 %	77,200	53.8 %
60	Ridership	129,700	101.2 %	98,200	95.6 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

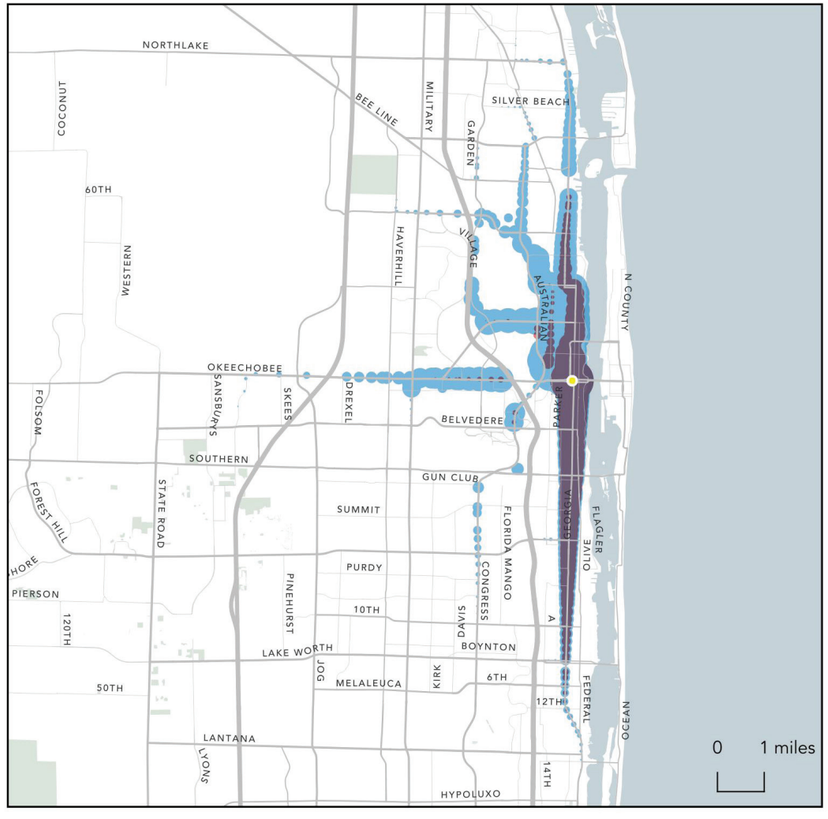


Figure 26: 45-minute isochrone map - Downtown West Palm Beach

Downtown Boca Raton

The two service concepts both represent substantial changes from the existing network in the manner in which transit is provided in Downtown Boca Raton. Figure 27 shows a map comparing the 45-minute isochrones available with each Service Concept to that of the existing network.

In the Coverage Concept, changes from the existing network are quite minimal. The major gain in this area is due to the improved 15-minute service to FAU from US-1, which shows up in blue as the major access area gained, even though the 90/91 combined service providing it doesn't get all the way to downtown Boca Raton.

In the Ridership Concept, the extension of frequent service between FAU and downtown dramatically expands the ease of traveling between these two destinations, as shown in the blue area covering most of FAU. Additionally, the 30-minute service between downtown and Town Center mall has added benefits in bringing new areas into reach within 45 minutes of travel time. The frequency improvement to Route 1 also slightly improves the isochrone up US-1 due to the reduced wait time to access the service. As a result, the number of people and jobs accessible in a given time frame from downtown Boca Raton increases dramatically, with much of FAU and the commercial and residential areas around it now accessible within 30 minutes of transit travel time.

From Downtown Boca Raton,

where could I travel to in 45 minutes compared to the existing network?

Gained Access

Lost Access

Retained Access

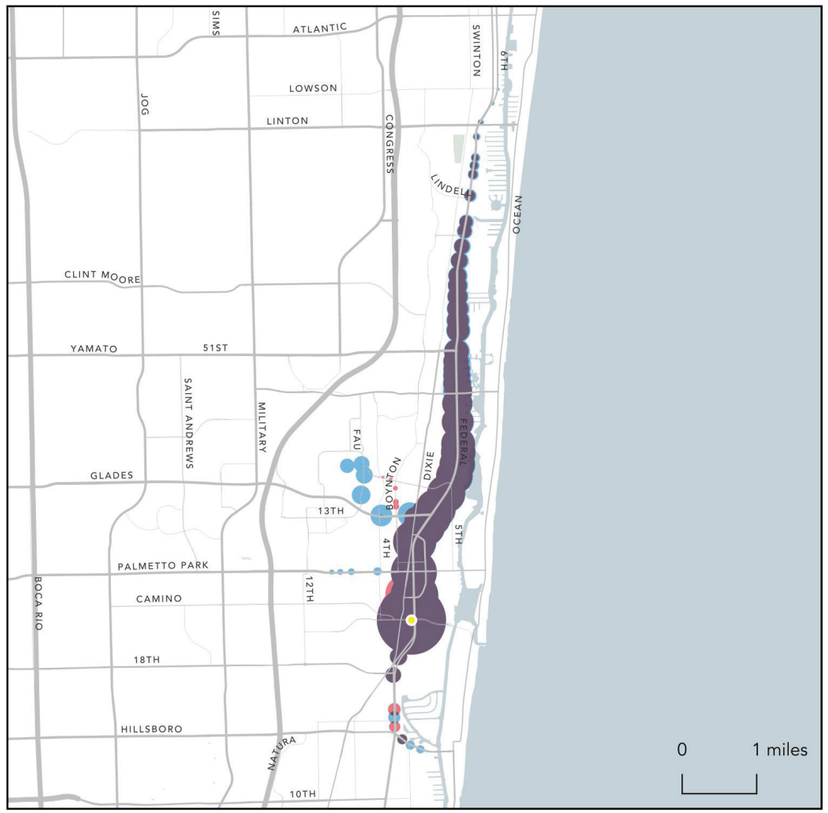
Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	3,500	0 %	5,200	0 %
30	Coverage	3,500	0.3 %	5,300	1.1 %
30	Ridership	6,200	79.2 %	9,300	77.5 %
45	Existing	11,200	0 %	13,600	0 %
45	Coverage	12,200	9.2 %	14,900	9.2 %
45	Ridership	17,100	52.6 %	21,100	54.6 %
60	Existing	27,200	0 %	27,400	0 %
60	Coverage	31,200	14.7 %	30,200	10.1 %
60	Ridership	36,700	35.1 %	40,300	47.1 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

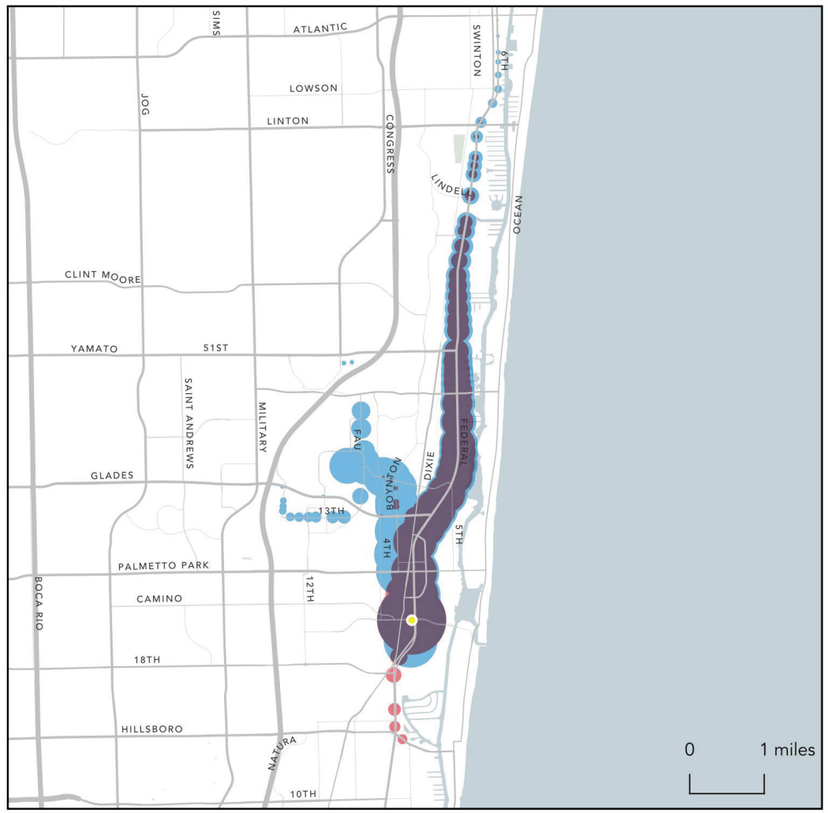


Figure 27: 45-minute isochrone map - Downtown Boca Raton

Florida Atlantic University (Boca Raton)

Service to FAU follows the same principle in each Service Concept, with the major points of difference being the routing of Route 3, and the endpoint of the 90/91 frequent combined segment. Figure 28 shows a map comparing the 45-minute isochrones available from FAU with each Service Concept to that of the existing network.

In the Ridership Concept, the introduction of consistent, all-day 15-minute service to downtown Boca Raton puts many more jobs and people in that area in reach of the FAU campus. Sending Route 3 through the campus also adds many jobs and people along Congress to the north to the access area. Finally, the new 30-minute connection to Town Center mall provides a substantial reduction in travel times between the two. Overall, the blue area shown in Figure 28 for the Ridership Concept contains nearly twice as many people, and 1.6 times as many jobs, as are accessible in 45 minutes in the existing network. With the inclusion of much of downtown Boca Raton in the 30 minute isochrone, more than 5 times as many people and jobs can be reached in a half hour from FAU.

The Coverage Service Concept includes similar benefits for access to and from FAU. It has the same 30-minute connection between FAU and Town Center, and the same 15-minute connection to US-1. In the Coverage Concept, instead of reaching all the way to downtown Boca Raton, the frequent combination of routes 90 and 91 loops around 20th, Federal Highway, and Glades Road, enabling a transfer to Route 1 and bringing transit service closer to more of the dense residential area between FAU and Federal.

From FAU Campus,

where could I travel to in 45 minutes compared to the existing network?

Gained Access

Lost Access

Retained Access

Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	700	0 %	1,300	0 %
30	Coverage	3,200	360 %	4,300	235.5 %
30	Ridership	4,700	562 %	7,900	508.9 %
45	Existing	5,700	0 %	10,000	0 %
45	Coverage	11,800	108.3 %	18,100	81.8 %
45	Ridership	16,700	194.6 %	26,900	169.6 %
60	Existing	20,900	0 %	33,200	0 %
60	Coverage	24,400	16.7 %	40,000	20.3 %
60	Ridership	34,900	67 %	50,400	51.6 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept

Ridership Service Concept

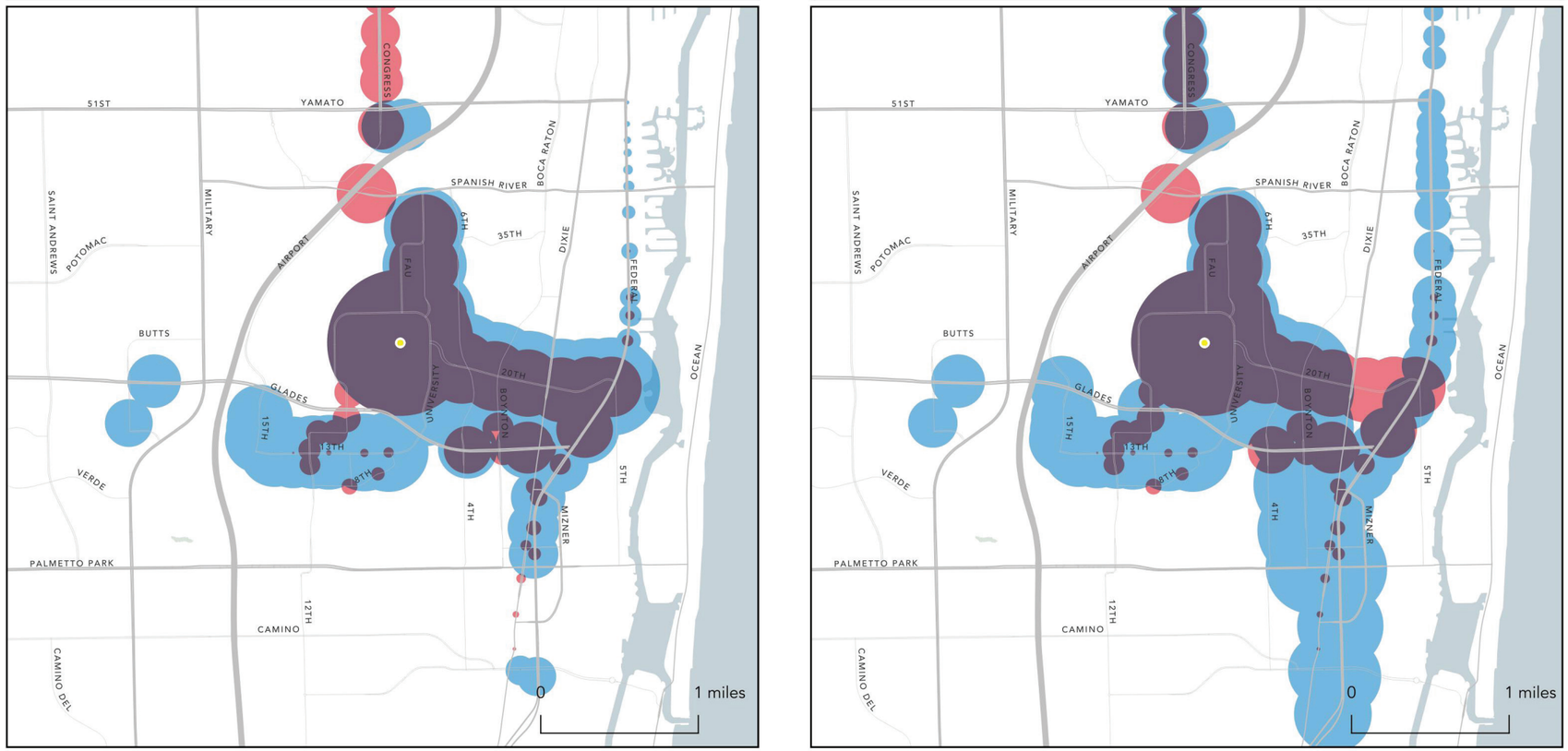


Figure 28: 45-minute isochrone map - Florida Atlantic University (Boca Raton)

Delray Beach

In Delray Beach, the Ridership Service Concept simplifies the network into a single 30-minute route, while in the Coverage Service Concept, nearly all of the existing coverage is retained, with some routes adjusted to reduce long deviations and improve travel times. Figure 29 shows a map comparing the 45-minute isochrones available from downtown Delray Beach with each Service Concept to that of the existing network.

As a result, the impact of the Ridership Concept is immediately clear: the added frequency on Atlantic allows for much more of that corridor to be reached from downtown Delray Beach in a shorter time, and consequently, to access much more of the connecting Congress and Military corridors by transferring.

The Coverage Concept does not add any new coverage, and the places where existing services are no longer available are evident from this map, highlighted in red. As a result of the reduction in deviations, it is now possible to travel a bit farther along Atlantic in a shorter period of time. So the number of people and jobs accessible from downtown Delray Beach is either very close to the existing network or slightly improved in at each time threshold.

From Downtown Delray Beach,

where could I travel to in 45 minutes compared to the existing network?

Gained Access | Lost Access | Retained Access

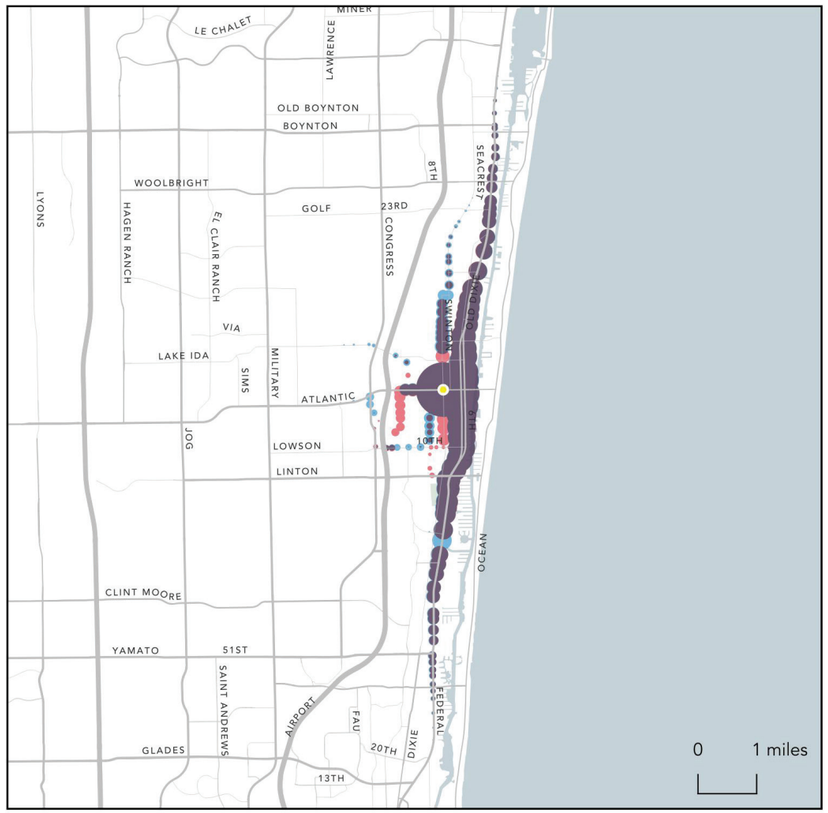
• Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	3,200	0 %	4,200	0 %
30	Coverage	3,200	1.5 %	4,200	0.7 %
30	Ridership	4,800	50.3 %	5,300	25.7 %
45	Existing	17,000	0 %	12,400	0 %
45	Coverage	16,900	-0.2 %	12,600	1.8 %
45	Ridership	20,400	20.2 %	14,900	20 %
60	Existing	50,500	0 %	27,300	0 %
60	Coverage	52,700	4.2 %	28,500	4.6 %
60	Ridership	50,700	0.3 %	30,800	13.1 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

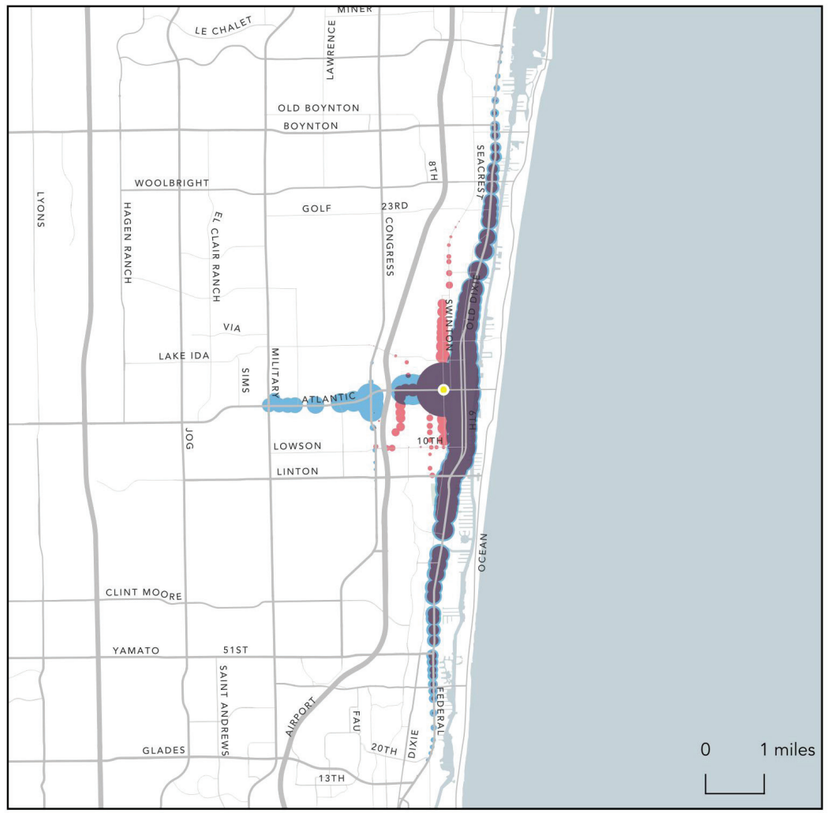


Figure 29: 45-minute isochrone map - Downtown Delray Beach

Boynton Beach

The network design principles at work in Boynton Beach are rquite similar to those seen in Delray Beach. In Ridership, the network is simplified, with Route 73 operating every 30 minutes serving the Boynton Beach Boulevard corridor from downtown to Military. In Coverage, the existing Route 73 is retained at 60-minute service, as is the existing Route 70. Figure 30 shows a map comparing the 45-minute isochrones available from downtown Delray Beach with each Service Concept to that of the existing network.

As a result of the changes in the Ridership Service Concept, a person travelling from downtown Boynton Beach can reach more of the area west along Boynton Beach Boulevard in 30, 45 or 60 minutes then they can today. Trips involving transfers to routes 2 or 3 thus happen faster as well, since a person making such a transfer arrives at the transfer point sooner. In this scenario, transit is no longer available along the portion of Boynton Beach Boulevard west of Military, or any of the segments served by Route 70.

In the Coverage Service Concept, all of the places that can be reached today on transit in 30, 45 or 60 minutes from Boynton Beach are still accessible, generally in the same travel time. This is because no substantial changes are made in this Concept to any of the routes serving the city.

From Downtown Boynton Beach,

where could I travel to in 45 minutes compared to the existing network?

Gained Access

Lost Access

Retained Access

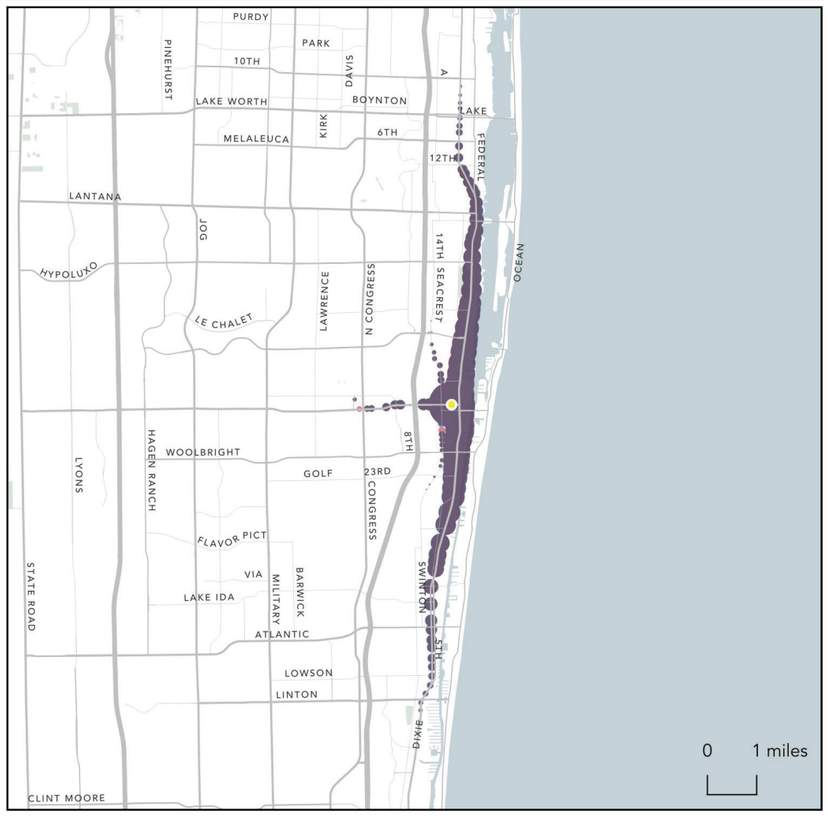
Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	5,800	0 %	2,300	0 %
30	Coverage	5,900	1.1 %	2,300	1.7 %
30	Ridership	8,700	50.2 %	3,100	36.2 %
45	Existing	22,900	0 %	8,900	0 %
45	Coverage	23,200	1.5 %	9,200	3.4 %
45	Ridership	29,800	30.3 %	12,900	45.3 %
60	Existing	59,900	0 %	24,300	0 %
60	Coverage	60,300	0.7 %	25,200	3.8 %
60	Ridership	72,000	20.2 %	31,400	29.3 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

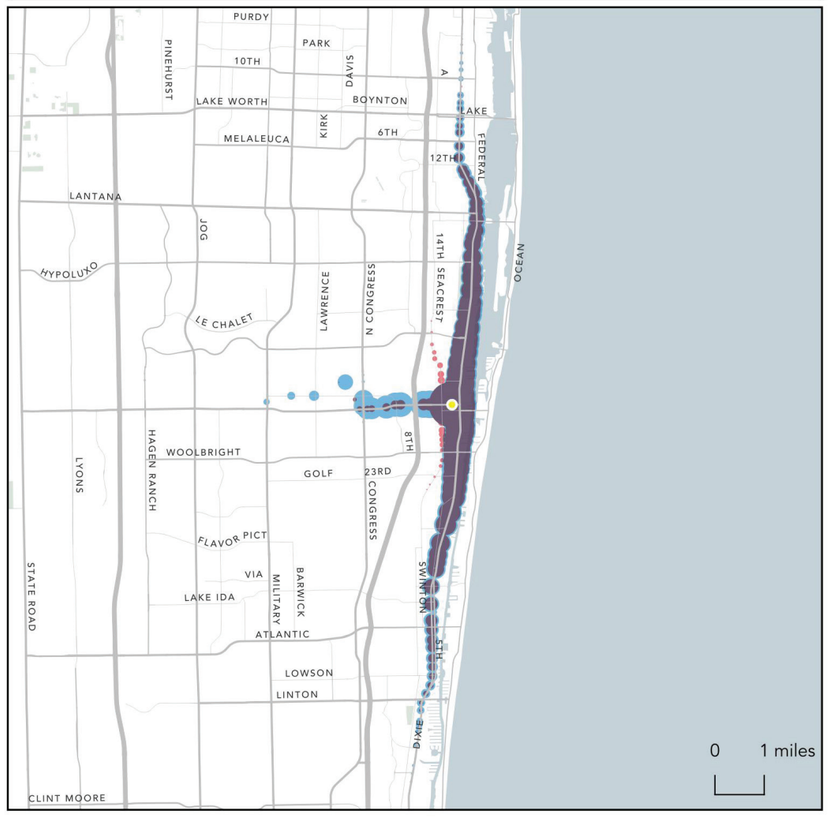


Figure 30: 45-minute isochrone map - Downtown Boynton Beach

Lake Worth and Military Trail

This area of the network is the crossing point of several of Palm Tran's longest, busiest and most productive existing services: Route 62 on Lake Worth Road, Route 2 on Congress, and Route 3 on Military Trail. The existing network and Coverage Service Concept also include a number of infrequent coverage routes in this area, while the Ridership Concept reallocates some of the resources of this portion of the network to improve frequency on Forest Hill and inner Lake Worth Road.

Figure 31 shows a map comparing the 45-minute isochrones available from Lake Worth and Military Trail with each Service Concept to that of the existing network.

In Ridership, the biggest in access for this location are:

- Slight reduction in travel times along inner Lake Worth Road and connection to Route 1 on US-1 as a result of the reduction of frequencies on these segments from 20-minute to 15-minute. This change means that initial waits on these segments would be reduced by an average of 2.5 minutes, so a trip on Route 62 east of Military Trail would be 2.5 minutes faster. A trip involving a tranfer to Route 1 would be 5 minutes faster, as a result of the combined reduction in wait times.
- The reduced frequency of Route 62 west of Military Trail from 20-minute to 30-minute causes the isochrone to contract slightly (by 5 minutes of travel time) along that portion of the corridor.
- The increased frequency on Forest Hill means that portions of that corridor are now accessible from Lake Worth and Military Trail within 60 minutes.
- Currently-served segments along Haverhill, 10th and Melaleuca are no longer accessible within 60 minutes.

From Lake Worth and Military Trail,

where could I travel to in 45 minutes compared to the existing network?

Gained Access | Lost Access | Retained Access

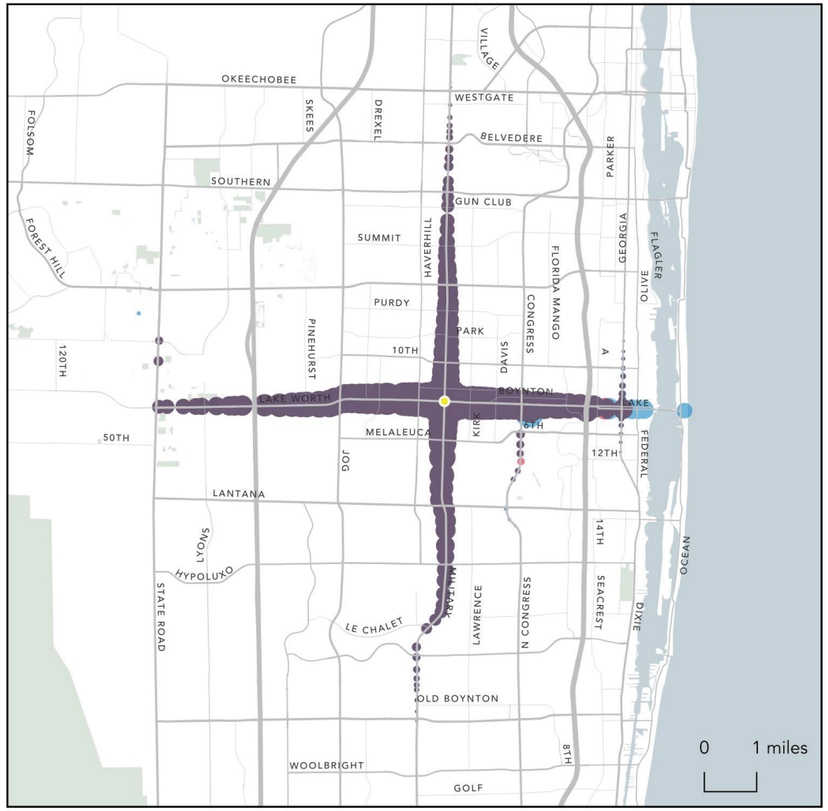
• Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	11,700	0 %	3,000	0 %
30	Coverage	11,800	0.6 %	3,100	2.1 %
30	Ridership	10,400	-11.4 %	2,900	-5.7 %
45	Existing	41,900	0 %	10,800	0 %
45	Coverage	42,900	2.3 %	11,300	4 %
45	Ridership	43,000	2.6 %	11,400	5.1 %
60	Existing	99,000	0 %	25,300	0 %
60	Coverage	103,800	4.8 %	26,300	3.8 %
60	Ridership	109,900	11 %	38,200	51.2 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

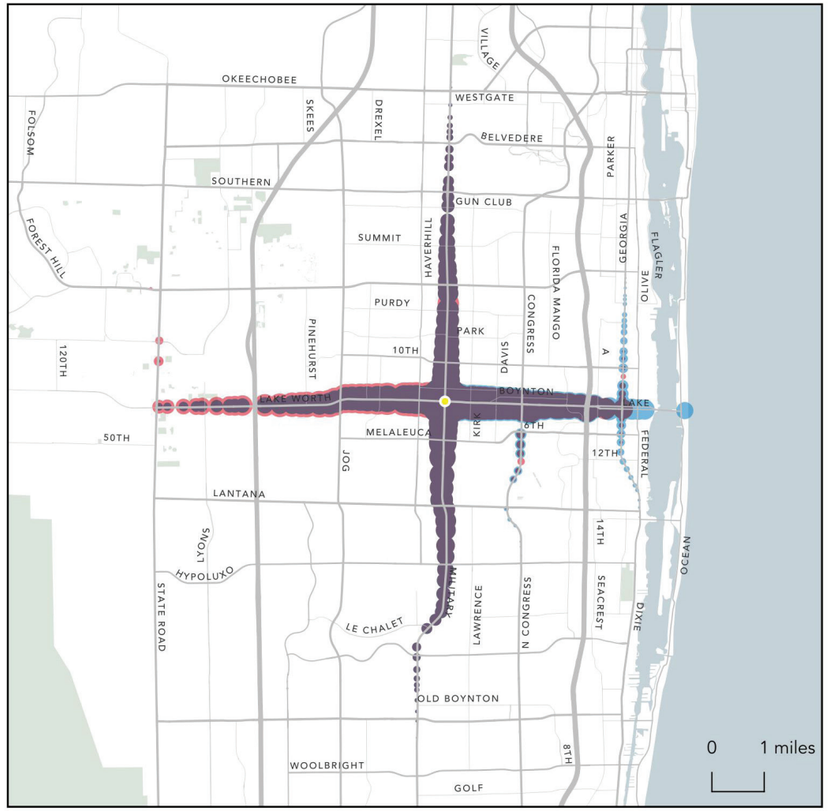


Figure 31: 45-minute isochrone map - Lake Worth and Military Trail

Okeechobee & Military Trail

In the Service Concepts, the most substantial change to travel from Okeechobee and Military Trail is provided by the introduction of the 15-minute shortline frequency on Route 43 in the Ridership Concept between Military and downtown West Palm Beach. Figure 32 shows a map comparing the 45-minute isochrones available from Okeechobee and Military Trail with each Service Concept to that of the existing network.

As a result, in the Ridership Concept, travel times in the inner portion of the corridor are reduced by an average of 7.5 minutes, bringing more of the dense downtown activity and residential development into the 45 minute and 60 minute isochrones from this location in Ridership.

In Coverage, the only major change for this location is the elimination of the loop of Route 43 south of Belvedere just east of SR-7. The stops along the loop served by the existing network are no longer reachable in the isochrone from Okeechobee and Military Trail in either Service Concept.

From Okeechobee and Military Trail,

where could I travel to in 45 minutes compared to the existing network?

Gained Access

Lost Access

Retained Access

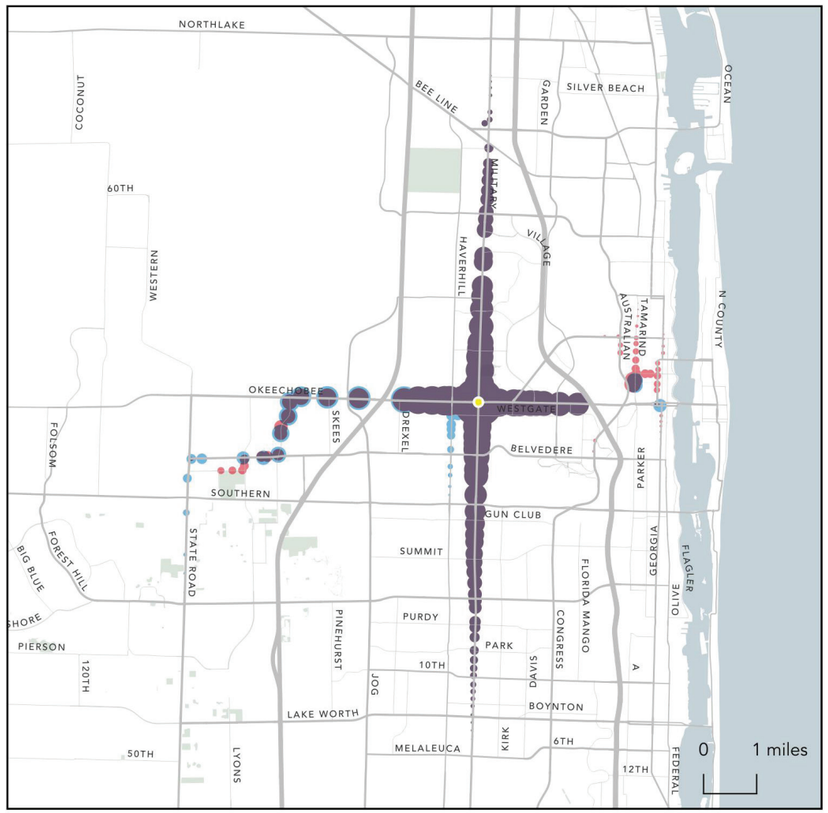
Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	5,500	0 %	2,500	0 %
30	Coverage	5,700	2.5 %	2,600	2.7 %
30	Ridership	7,600	37.3 %	4,600	86.2 %
45	Existing	29,800	0 %	15,700	0 %
45	Coverage	30,300	1.9 %	14,500	-7.9 %
45	Ridership	35,700	19.9 %	23,000	46.7 %
60	Existing	84,600	0 %	51,900	0 %
60	Coverage	83,400	-1.5 %	46,700	-10.1 %
60	Ridership	93,800	10.8 %	60,200	16.1 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

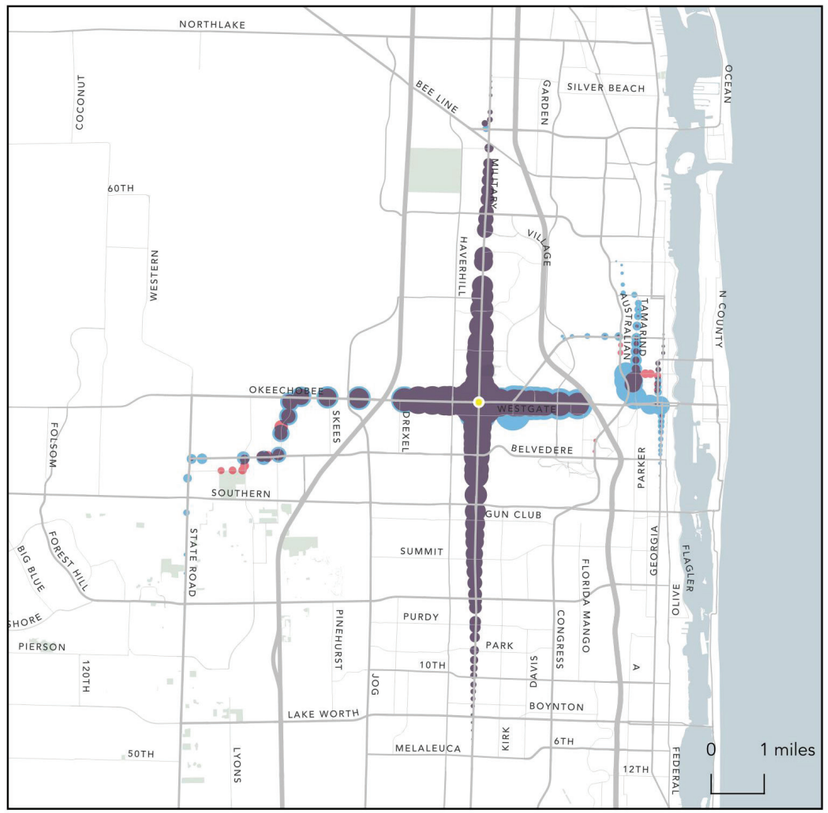


Figure 32: 45-minute isochrone map - Okeechobee and Military Trail

Wellington Green Mall

Wellington Green mall is a very important point in the mid-county network where the major east-west corridors of Lake Worth Road, Forest Hill and Okeechobee converge. Figure 33 shows a map comparing the 45-minute isochrones available from Wellington Green Mall with each Service Concept to that of the existing network.

Both Service Concepts preserve most of the network in this area, but with a few important changes in Ridership. First, the increase in frequency on Route 46 serving Forest Hill means that much more of that corridor is reachable from Wellington Green in a given travel time. The elimination of the loop of Route 43 east of SR-7 near Belvedere drops one segment out of reach entirely, as does the elimination of Route 52 from the Ridership Concept. Finally, the reduction in frequency of the longline segment of Route 62 west of Military Trail from 20 to 30 minutes also slightly diminishes the isochrone heading east along that corridor.

In Coverage, all of these services are the same as in existing, except that the looping deviation of Route 43 south of Belvedere is also removed. This allows Route 43 to reach Okeechobee a bit faster that in the existing system.

From Wellington Green Mall,

where could I travel to in 45 minutes compared to the existing network?

Gained Access | Lost Access | Retained Access

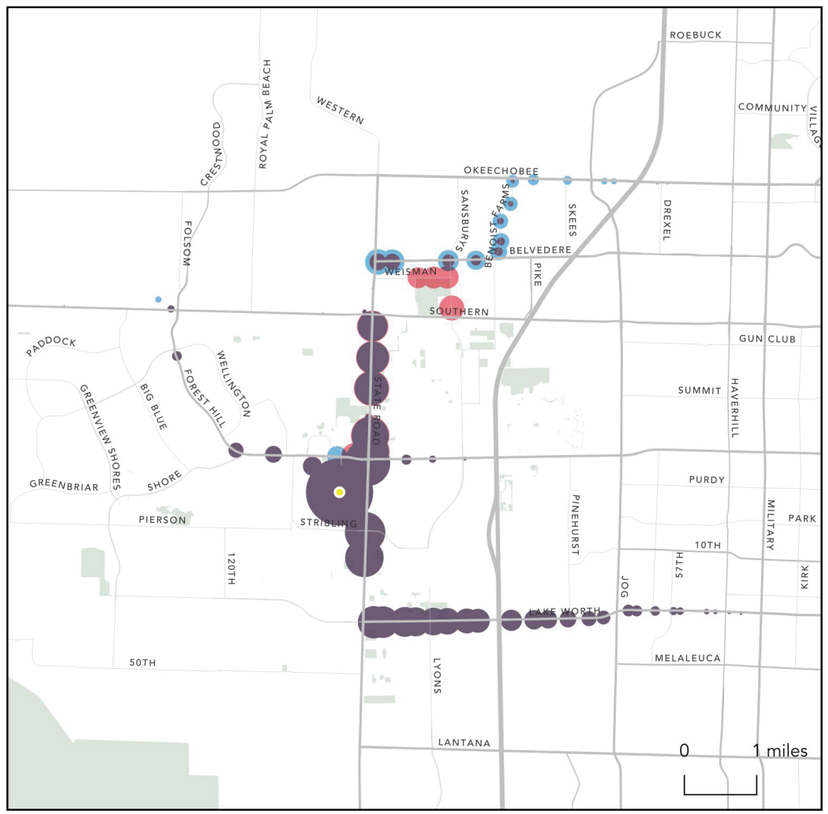
Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	1,500	0 %	1,100	0 %
30	Coverage	1,400	-4.6 %	1,000	-2.6 %
30	Ridership	1,300	-16 %	900	-15 %
45	Existing	9,000	0 %	4,400	0 %
45	Coverage	9,600	6.6 %	4,400	-1 %
45	Ridership	8,900	-1.8 %	3,700	-16.3 %
60	Existing	33,200	0 %	12,700	0 %
60	Coverage	37,200	11.8 %	14,200	11.9 %
60	Ridership	38,800	16.8 %	15,200	19.6 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

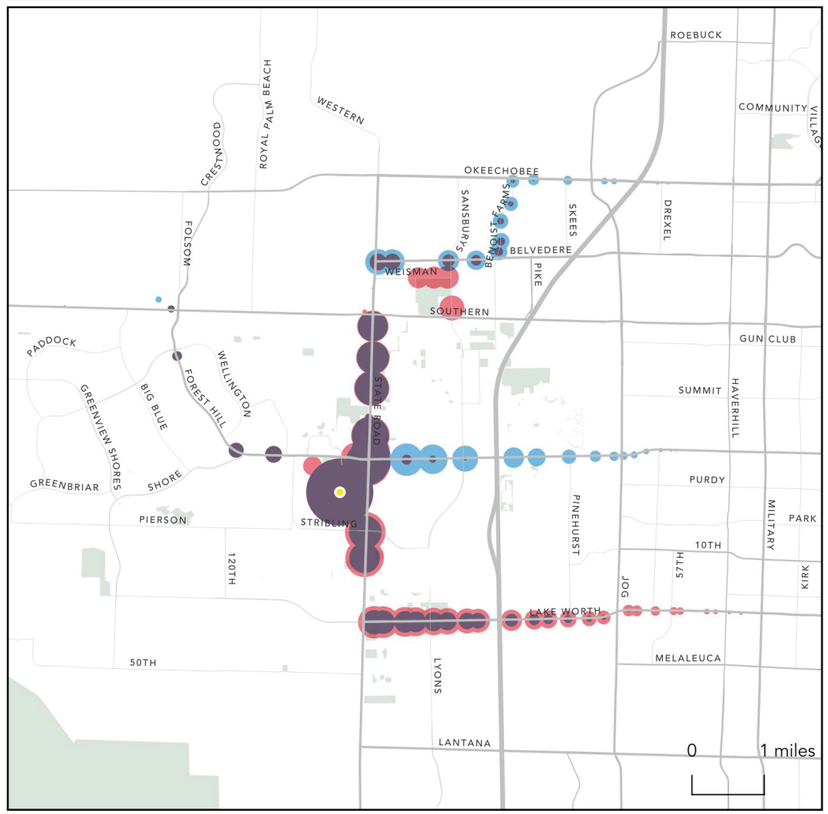


Figure 33: 45-minute isochrone map - Wellington Green Mall

The Gardens Mall

In the northern area of the network, the Gardens mall is the point of convergences for two primary north-south transit corridors, as well as local routes serving the Riviera Beach and North Palm Beach areas. Service north of the Gardens is also available via Route 10, ending in Jupiter. Figure 34 shows a map comparing the 45-minute isochrones available from The Gardens with each Service Concept to that of the existing network.

In both Service Concepts, the structure of the network in the portion of this area between US-1 and Military Trail is substantially different than in the existing network. In both, Route 33 now links the Gardens Mall to downtown West Palm Beach, rather than turning back north of the core of the city as it does today.

In the Ridership Concept, the 30-minute service on Route 33 results in much faster travel times, and a much larger isochrone, along Australian, Congress and the other segments served between the mall and Northlake.

The Ridership Concept does withdraw service from existing routes 20 and 21, so their unique segments are no longer accessible from this location within 60 minutes.

In the Coverage Concept, the straighter paths through the North County area permit faster travel times, increasing the number of people and jobs accessible at each time threshold. While Route 33 operates only every 60 minutes in this Concept, the streamlined routing and connection to the Gardens means that people traveling south from the mall can get much further south. Meanwhile, Route 21 is left relatively unchanged, save for some straightening south of Northlake.

From The Gardens Mall,

where could I travel to in 45 minutes compared to the existing network?

Gained Access | Lost Access | Retained Access

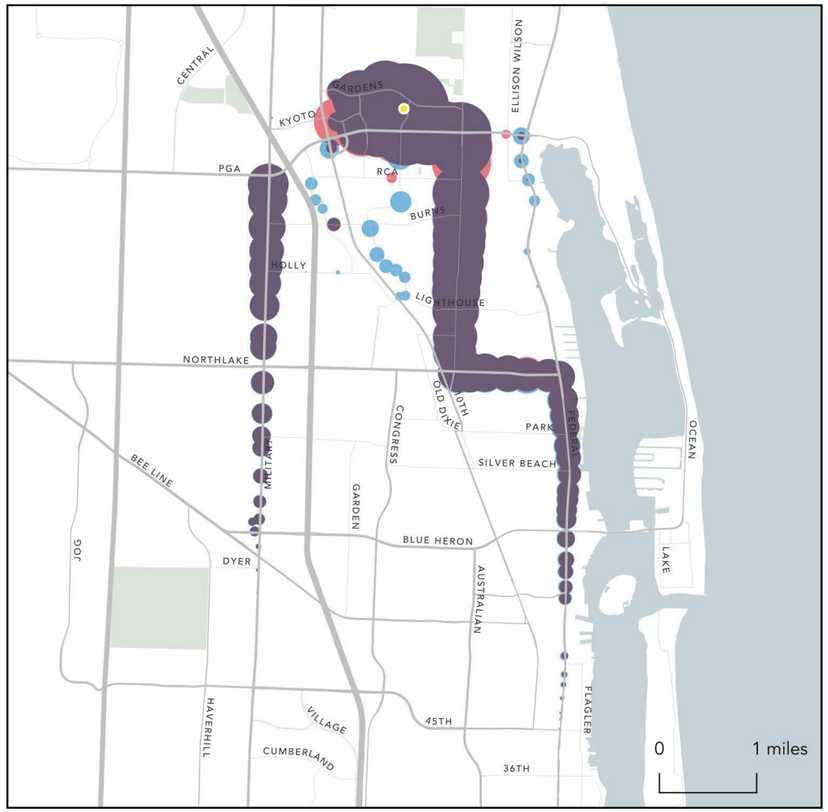
• Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	3,600	0 %	4,600	0 %
30	Coverage	3,500	-2.1 %	4,300	-7.1 %
30	Ridership	5,300	48.8 %	5,500	18.6 %
45	Existing	15,300	0 %	11,800	0 %
45	Coverage	16,600	8.3 %	12,400	4.8 %
45	Ridership	22,200	44.6 %	15,200	28.6 %
60	Existing	39,700	0 %	25,800	0 %
60	Coverage	46,800	18 %	30,400	17.6 %
60	Ridership	51,200	29.2 %	35,400	37 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

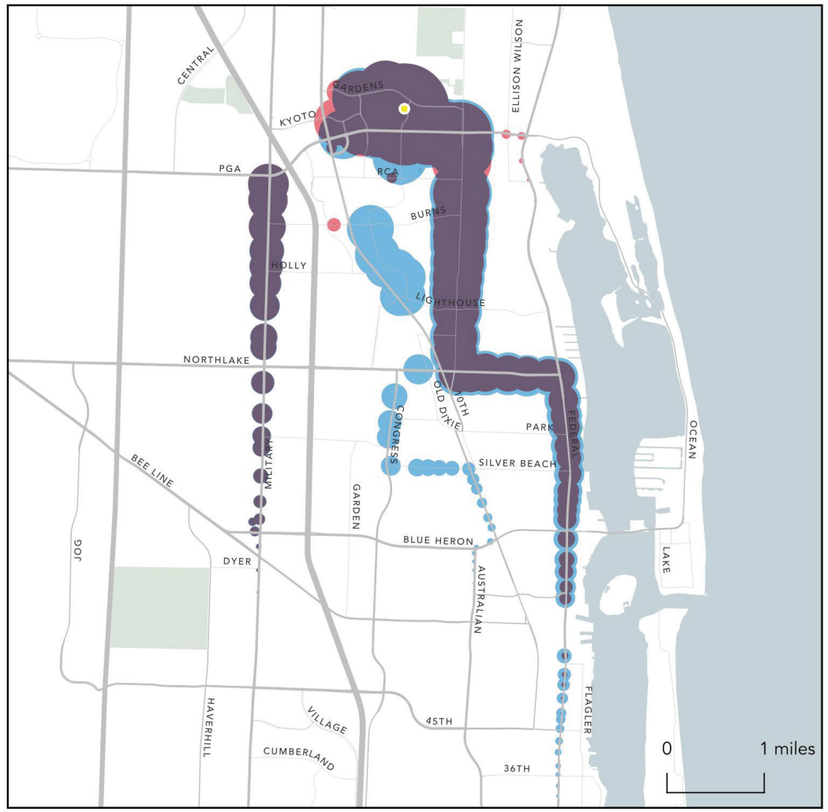


Figure 34: 45-minute isochrone map - The Gardens Mall

The Glades Service Center

As described earlier in this report, the overall service level in the Glades is smaller in both Service Concepts than in the existing network, because of the expiration of the grant funding a portion of the current service level. Figure 35 shows a map comparing the 45-minute isochrones available from The Gardens with each Service Concept to that of the existing network.

In the Ridership Concept, service in this area is restructured so that there is just one local route connecting to Route 40, Route 48, which operates every 30 minutes. In order to serve both downtown Belle Glade, West Tech, Glades Service Center, and Pahokee, it includes portions of the current routes of both the 47 and 48. The 30-minute connection from the Service Center means that travel to West Tech and south along 16th is much faster, although this is a mostly undeveloped area until the routes reaches the western edge of Belle Glade. The extended routing requires slightly more travel time to reach the western side Belle Glade from the medical center. Additionally, the single Route 48 now reaches South Bay, enabling a new connection from the medical center over a 60-minute travel time.

In the Coverage Alternative, both existing routes are retained, but Route 48 is reduced to every 60 minutes. As a result, its isochrone shrinks by the equivalent of 15 minutes of travel time, the difference in the average wait for a 30-minute service versus a 60-minute service. Some areas that are today accessible by transit within 60-minutes from Glades Service Center (such as Pahokee) would now require slightly more than an hour to get to.

From The Glades,

where could I travel to in 45 minutes compared to the existing network?

Gained Access

Lost Access

Retained Access

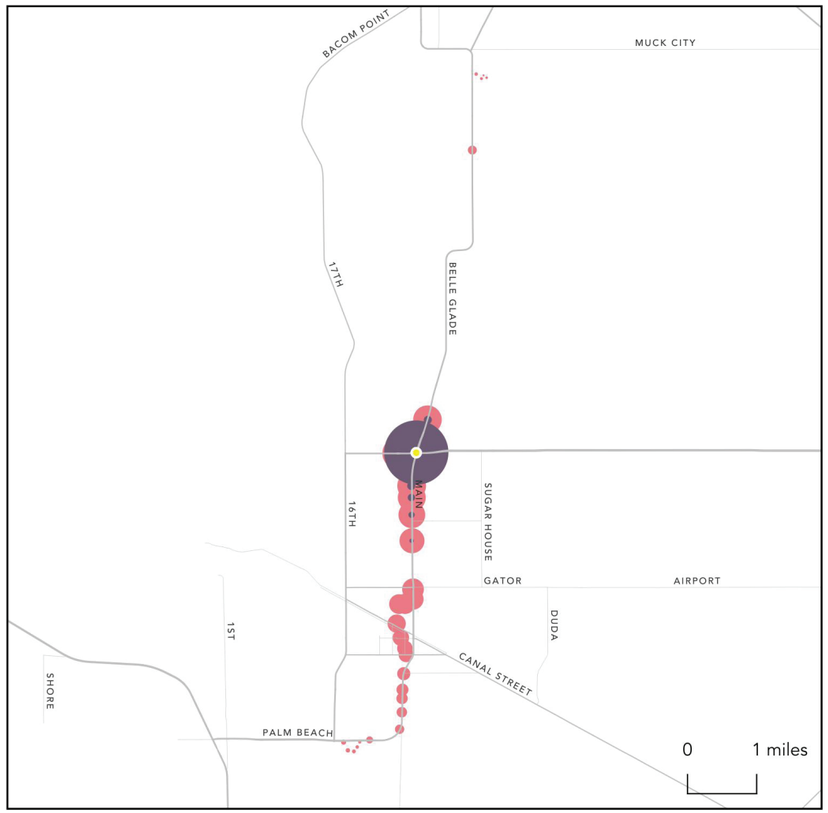
Starting Point

Here are the areas I can access on weekdays at noon for each service concept compared to the existing network:

Travel Time	Network	Residents	% Change	Jobs	% Change
30	Existing	100	0 %	100	0 %
30	Coverage	0	-28.8 %	0	-14.8 %
30	Ridership	100	-23.1 %	100	-6.9 %
45	Existing	1,600	0 %	600	0 %
45	Coverage	200	-89.9 %	100	-74.5 %
45	Ridership	1,600	-0.2 %	400	-38.7 %
60	Existing	5,100	0 %	1,300	0 %
60	Coverage	2,300	-54.6 %	900	-32.7 %
60	Ridership	7,000	36.9 %	1,300	1.5 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

Coverage Service Concept



Ridership Service Concept

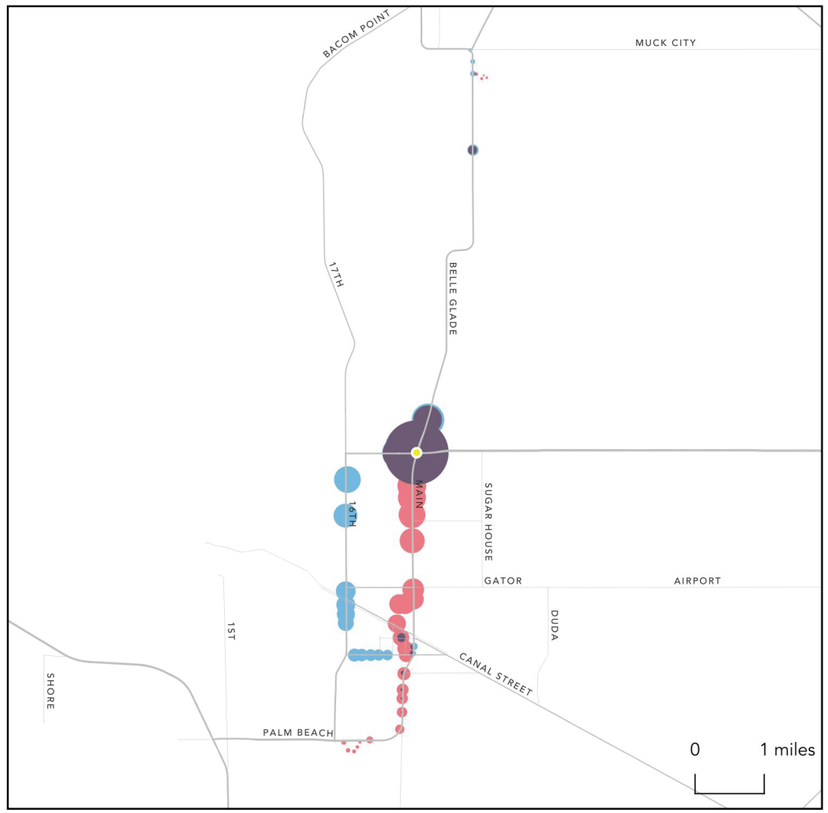


Figure 35: 45-minute isochrone map - The Glades (Glades Medical Center)

4

What Could Be Done With More Resources?

In the Existing System Evaluation report, and in the summary of this report, we've observed that compared to many of its peers, Palm Tran's level of service is very low. This limits the agency's ability to fully meet the transit needs to the County, both in terms of its ability to provide Frequent Service to all of the dense transit markets that would likely generate high ridership, and in terms of its abillity to extend lower-frequency service to as many people in the County as possible, regardless of their development pattern.

With this constraint in mind, we've developed a list of potential improvements to each Service Concept that could be considered in the future if Palm Tran's resource level were expanded. For each Concept, we present a list of potential future projects Palm Tran could consider as further improvements towards the ridership or coverage goals. We also present a map of each Service Concept incorporating a number of those projects (amounting to approximately 15% more transit operating resources).

Palm Beach County's transit needs are substantial, and this section is not intended as an exhaustive list of every possible transit project that could be undertaken to meet those needs. Instead, these "Enhanced Service Concepts" are included in order to inform and illustrate a conversation around what could be possible for transit in the region with more resources.

In a context of a slowly growing level of resources, these projects would form the basis of an incremental implementation plan, and could be brought into service independently as funding became available. Which projects happened when would depend on the flow of new resources, but the tables included here presents a two indicators around the number of people's lives touched by each improvement that could be used as a starting point for comparing the value and cost-efficiency of different options.

Ridership Concept Additional Projects

In the Ridership Concept, the improvements are focused on expanding and enriching the Frequent Network wherever residential and employment density suggests that it would be likely to generate a strong return in ridership.

Figure 36 presents a list of possible improvements consistent with the goals and network structure of the Ridership Concept. For each project, a description of the service is provided, along with:

Line	Existing Route or Corridor	Description	Est. Additional Revenue hours	Total Jobs w/n 1/4 mile of Improvement	Total Add. Jobs w/n 1/4 mile of 15-minute service	Total People w/n 1/4 mile of Improvement	Total Add. People w/n 1/4 mile of 15-minute service	Included in Enhanced Ridership Service Concept (y/n)
2	**Route 2 - Congress**	**15-minute Shortline WPB to Lake Worth**	**11475**	**30096**	**12649**	**15485**	**9535**	**yes**
2	Route 2 - Congress	Increase frequency of entire route to every 15 or 20 minutes	36434	57488	39125	45357	38837	no
3	Route 3 - Military Trail	Increase frequency of entire route to every 15 or 20 minutes	41252	38897	33553	69621	64666	no
3	**Route 3 - Military Trail**	**15-minute Shortline VA to Lake Worth**	**19125**	**18144**	**12803**	**40022**	**35108**	**yes**
31	Route 31	Increase frequency of entire route to every 15 or 20 minutes	13367	19432	8739	15776	6329	no
33	Route 33	Increase frequency of entire route to every 15 or 20 minutes	13498	20894	9323	22518	12180	no
43	**Route 43**	**Increase frequency of entire route to every 15-minutes (extend shortline)**	**8143**	**27144**	**4700**	**22001**	**10800**	**yes**
46	Route 46	15-minute Shortline US-1 to Military Trail	7650	25858	25263	10409	8727	no
46	**Route 46**	**Increase frequency of entire route to every 15 or 20 minutes**	**15615**	**23902**	**23307**	**23855**	**22173**	**yes**
62	**Route 62**	**Increase frequency of entire route (extend shortline)**	**8398**	**8245**	**3993**	**24025**	**12475**	**yes**
63	Route 63	Increase frequency of entire route to every 30 minutes	37575	4323	3505	15327	12556	no
73	Route 73	Increase frequency of entire route to every 15 or 20 minutes	9975	3799	3144	8136	7171	no
85	Route 85	Increase frequency of entire route to every 15 or 20 minutes	8700	6184	3158	7878	6252	no

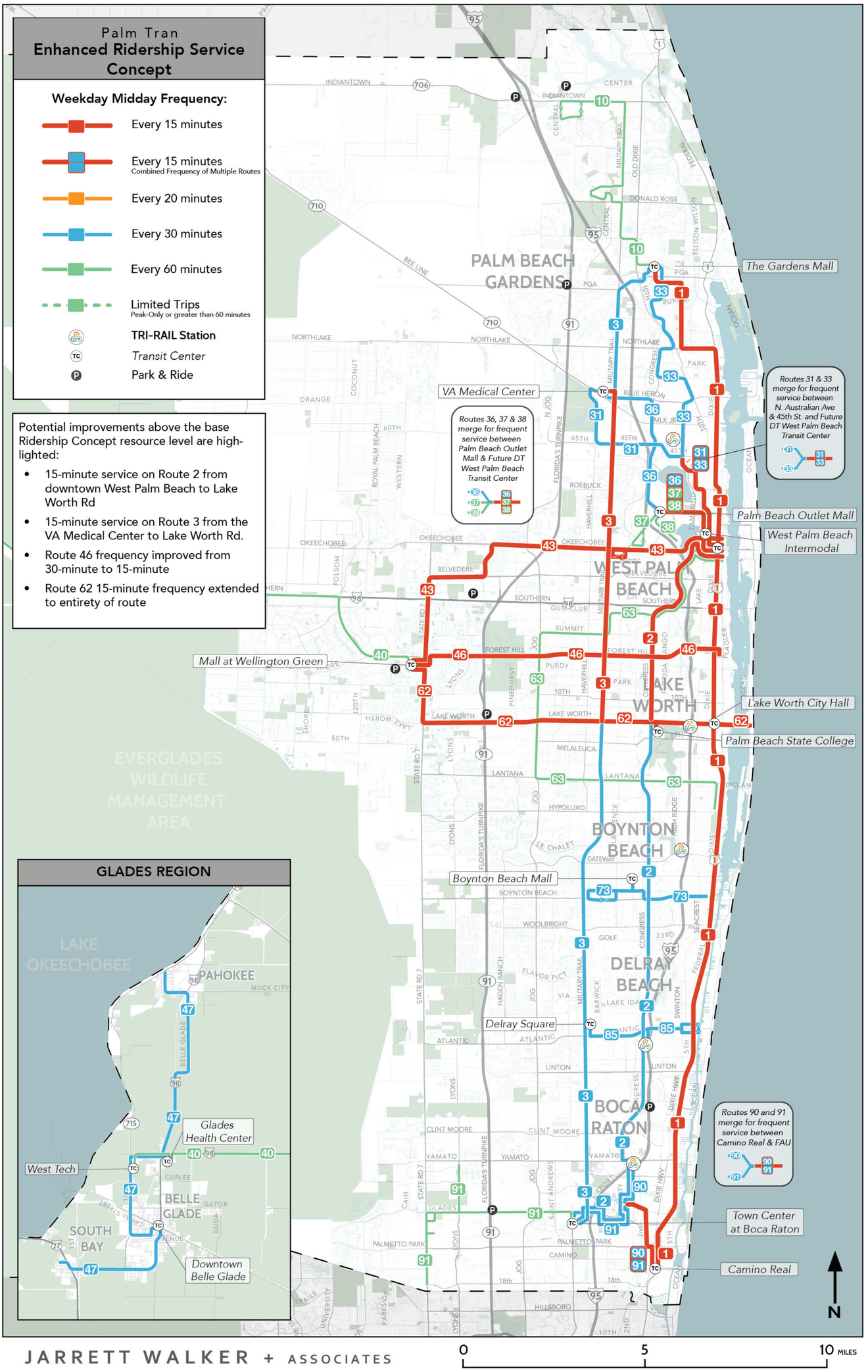
Figure 36: Ridership Concept: Potential Additional Improvements (bold rows shown in Figure 37 on page 38)

- Estimated additional cost in annual revenue hours,
- Estimated total number of people within 1/4 mile of the conceptual service (the total population potentially benefitting from the improvement).
- Estimated additional number of people that the improvement would put within walking distance to the frequent network of 15-minute services compared to the baseline Ridership Concept.

Figure 37 on page 38 presents one potential combination of these projects, focused on enhancing the frequency of routes in the West Palm Beach and Lake Worth area, introducing a frequent grid. This potential "Enhanced Ridership Service Concept" adds approximately 15% more resources to the basic Ridership Concept, and makes the following changes:

- 15-minute frequency on routes 43 and 62 is is extended for the entire length of both routes
- A 15-minute frequent shortline segment is added to Route 2 between downtown West Palm Beach and Lake Worth Road.
- A 15-minute shortline segment is added to Route 3 between the VA Medical Center and Lake Worth Road.

With a frequent network grid, travel is possible to all points near routes within the grid without requiring very arduous transfers, since all routes operate frequently enough that the next bus is always coming soon.



JARRETT WALKER + ASSOCIATES

Figure 37: Enhanced Ridership Concept: Potential Additional Improvements Map

Coverage Concept Additional Projects

In the Coverage Concept, the list of improvements are focused on simply reaching more people, on currently-unserved corridors like Yamatao or Hypoluxo. Today, Palm Tran's limited resources mean that it can't afford to extend service to lower-density corridors with more challenging walk environments. With more resources to pursue the coverage goal, new routes could be established reaching places that today are difficult or impossible to travel to using transit.

Figure 38 presents a list of possible coverage improvements focused on achieving the goal described in the previous paragraph. For each project, a description of the serving is provided, along with:

- Estimated additional cost in annual revenue hours.
- Estimated total number of people near the conceptual service.
- Estimated additional number of people that service would put within reach of transit of any kind compared to the baseline Coverage Concept. Each new service is assigned a dummy "Line" number for ease of mapping.

For the purposes of this illustration, these projects have been designed with the same parameters: 60-minute service over a 15-hour span during weekdays (approximately 6 a.m. to 9 p.m.), 8-12 hours on Saturdays and Sundays.

Figure 39 on page 40 is a map showing a potential combination of these improvements into an "Enhanced Coverage Service Concept". This enhanced version of the Coverage Service Concept includes projects amounting to approximately 15% more resources than are budgeting in the basic scenario. The specific projects included are as follows:

- New hourly service on Woolbright, Hypoluxo, Golf, and Clint Moore Rd. In each case, service on the corridor would extend from near US-1 to Jog Road, facilitating potential connections to routes 1, 2 and 3.
- New hourly service on SW 18th St., extending from downtown Boca Raton and the Camino Real Transit Center to the Sandalfoot Square shopping center near the intersection of SR-7 and SW 18th.
- New hourly crosstown service to Jog Rd., from Okeechobee to the Town Center at Boca Raton shopping mall. One important note, while Jog is a long regional corridor with substantial residential and commercial development along it, it has no obvious north-end connection point and terminus that could be used to coordinate a timed transfer (short of extending the route to the VA or into West Palm Beach). This will negatively impact the usefulness of such a route, due to the difficulty of making untimed connections to a 60-minute service.
- New hourly service to Jupiter via US-1 along the coast north of The Gardens mall.

Line	New Service to Corridor or Area	Description	Est. Additional Revenue hours	Total Jobs w/n 1/4 mile of Improvement	Total Add. Jobs w/n 1/4 mile of transit	Total People w/n 1/4 mile of Improvement	Total Add. People w/n 1/4 mile of Transit	Included in Enhanced Coverage Service Concept (y/n)
4		Connect routes 4 and 71	6239	17135	481	59758	693	no
5	**Jog Rd**	**New Jog crosstown (Okeechobee to Town Center @ Boca)**	**19252**	**12932**	**5649**	**44797**	**30102**	**yes**
11	**Jupiter**	**New low-frequency coverage service to Jupiter via US-1**	**9626**	**9022**	**5486**	**10285**	**7449**	**yes**
12	Old Dixie (N of The Gardens)	New low-frequency coverage service	6343	7826	3430	7497	5282	no
35	Northlake W of 710	New low-frequency coverage service	14439	4505	1047	7969	5463	no
50	**Wellington area**	**New coverage route west of Wellington Green mall**	**4813**	**2828**	**1648**	**14288**	**11914**	**yes**
55	Coverage in Loxahatchee area	New low-frequency coverage service	4813	4802	1935	18204	11033	no
60		Connect routes 60 and 71	9225	40149	1457	73691	4325	no
65	**Hypoluxo (US-1 to Jog Rd)**	**New low-frequency coverage service**	**9626**	**2743**	**1119**	**12794**	**6399**	**yes**
73	Route 73	Extend 73 to Wellington Green via SR 7	0	2870	1339	7341	4816	no
75	**Woolbright to Jog Rd (US-1 to Jog Rd)**	**New low-frequency coverage service**	**8638**	**4376**	**1769**	**10145**	**6138**	**yes**
76	Golf (US-1 to Jog Rd)	New low-frequency coverage service	4813	5009	1537	6963	2732	yes
77	Gateway (US-1 to Jog Rd)	New low-frequency coverage service	9626	5844	614	13484	4026	no
87	Yamato (US-1 to Jog Rd)	New low-frequency coverage service	4813	8049	1544	5290	3380	no
89	**Clint Moore (US-1 to Jog Rd)**	**New low-frequency coverage service**	**4813**	**9214**	**5153**	**6232**	**4429**	**yes**
95	**18th (US-1 to Jog Rd)**	**New low-frequency coverage service**	**9626**	**4472**	**1886**	**10982**	**8127**	**yes**

Figure 38: Coverage Concept: Potential Additional Improvements (Bold rows shown in Figure 39 on page 40)

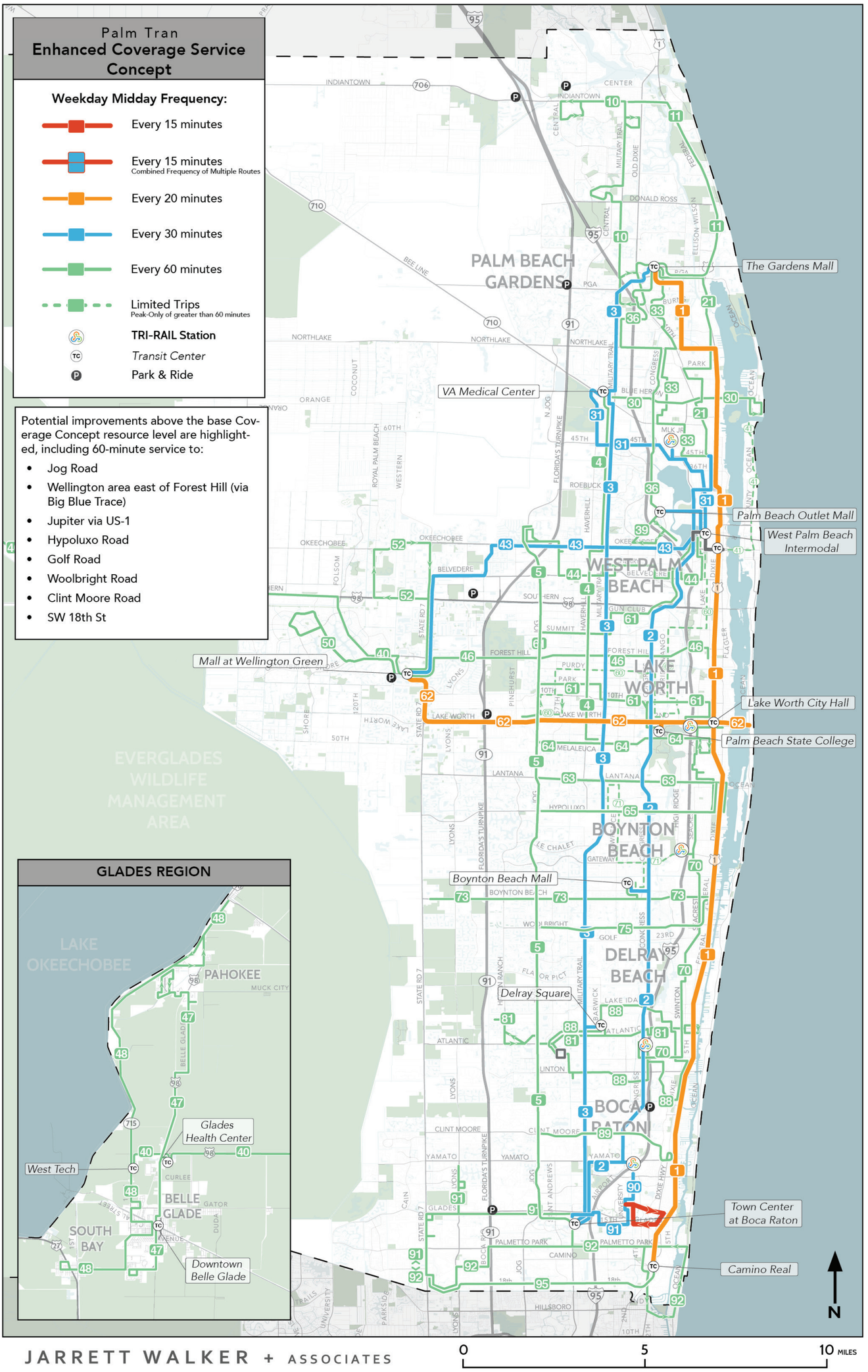


Figure 39: Enhanced Coverage Concept: Potential Additional Improvements Map

Appendix A: Detailed Isochrone Atlas

This section presents a more detailed way of viewing the isochrones discussed earlier in this report. Instead of showing only the 45-minute travel time isochrone, each page of this appendix compares the isochrone for the existing system, Ridership and Coverage Concepts for 30, 45 and 60 minutes of travel time.

Rather than comparing the Concepts to the existing network separately, this method overlays all three. This allows for the direct comparison of all three at once, though reading the image can be a bit more challenging.

In each detailed isochrone map, the Coverage Concept and Ridership Concept are overlaid, allowing direct comparison. The existing system isochrone is shown overlaid and crosshatched. Figure 40 shows an example legend.

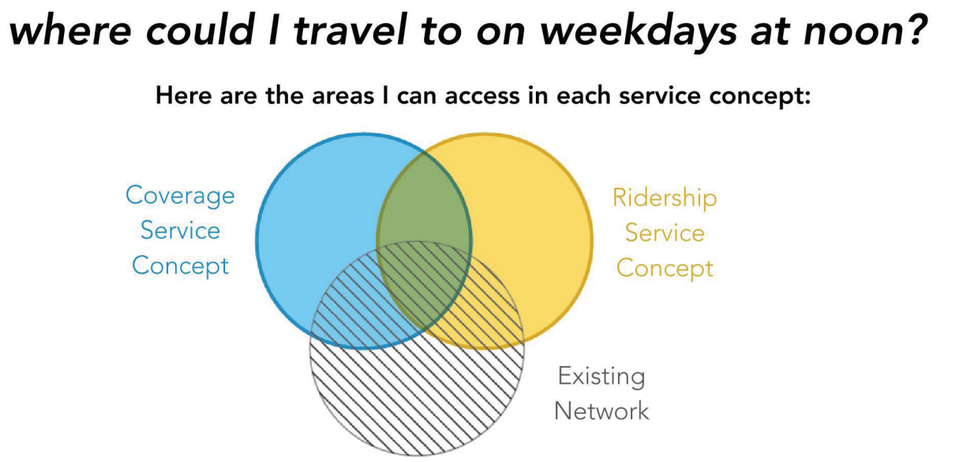
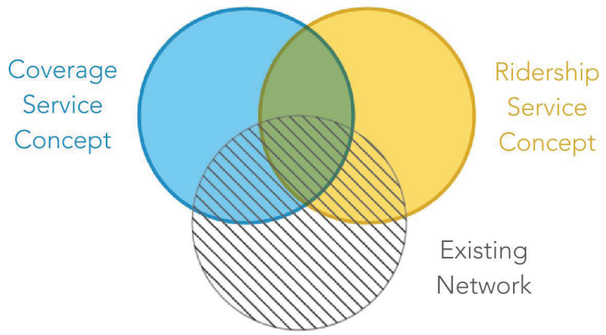


Figure 40: Detailed Isochrone Atlas Legend

From New Downtown Transit Center,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	6,500	0 %	15,500	0 %
30	Coverage	10,400	59.8 %	19,400	24.9 %
30	Ridership	17,800	172.3 %	25,000	60.9 %
45	Existing	24,700	0 %	28,700	0 %
45	Coverage	42,900	73.5 %	40,800	42.4 %
45	Ridership	55,400	124.3 %	50,200	75.3 %
60	Existing	64,500	0 %	50,200	0 %
60	Coverage	99,400	54.2 %	77,200	53.8 %
60	Ridership	129,700	101.2 %	98,200	95.6 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

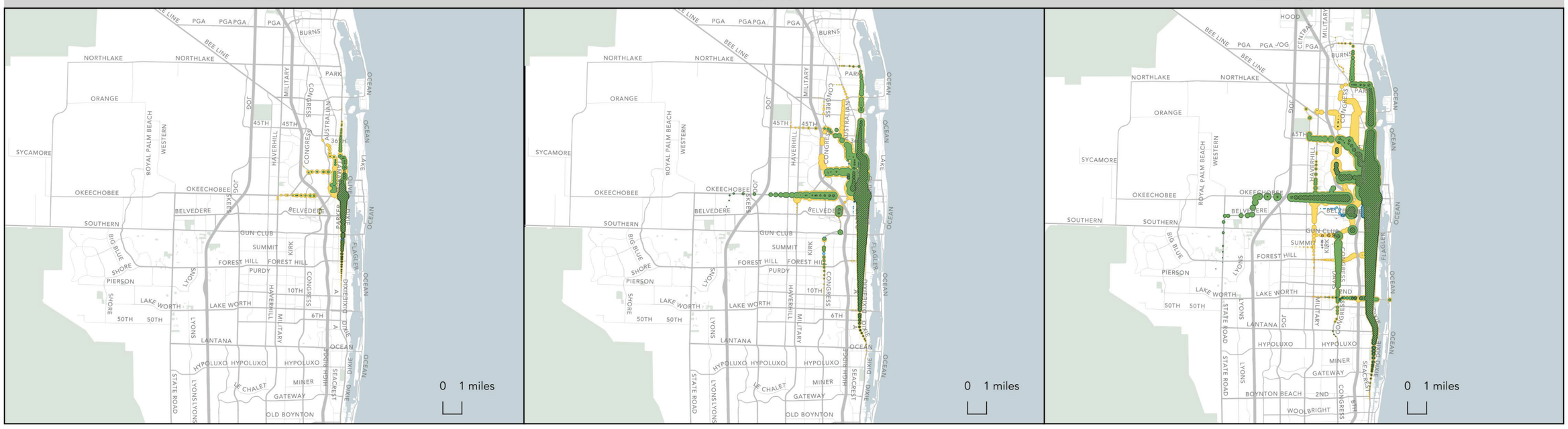
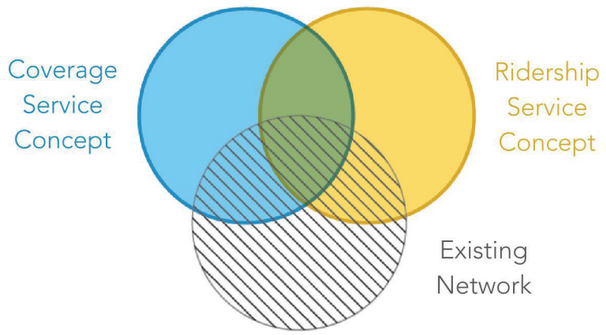


Figure 41: Isochrone Analysis from New Downtown Transit Center

From Downtown Boca Raton,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	3,500	0 %	5,200	0 %
30	Coverage	3,500	0.3 %	5,300	1.1 %
30	Ridership	6,200	79.2 %	9,300	77.5 %
45	Existing	11,200	0 %	13,600	0 %
45	Coverage	12,200	9.2 %	14,900	9.2 %
45	Ridership	17,100	52.6 %	21,100	54.6 %
60	Existing	27,200	0 %	27,400	0 %
60	Coverage	31,200	14.7 %	30,200	10.1 %
60	Ridership	36,700	35.1 %	40,300	47.1 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

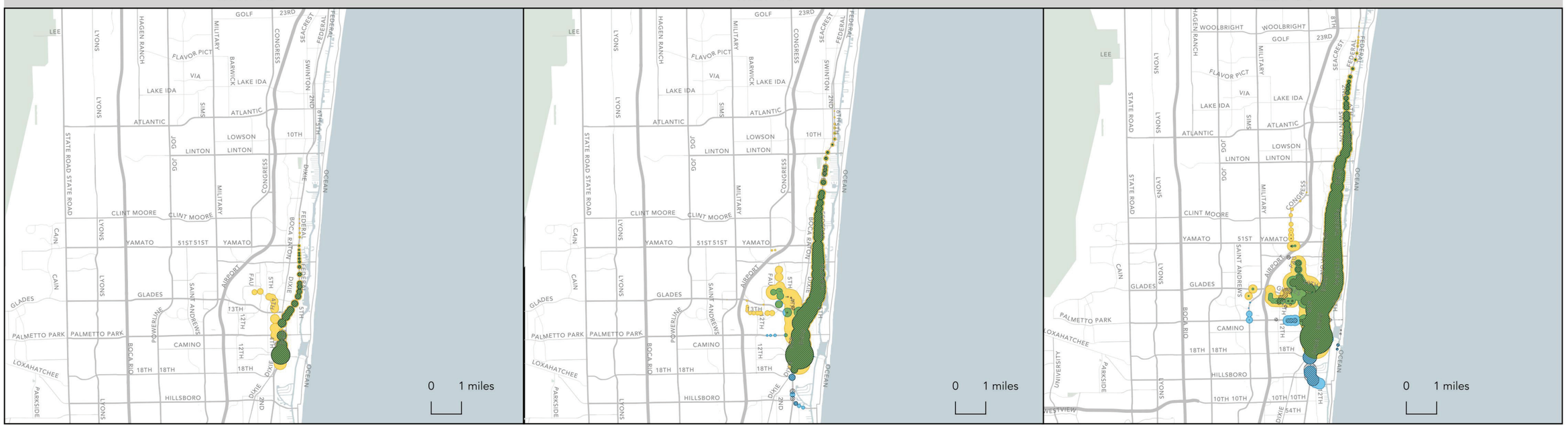
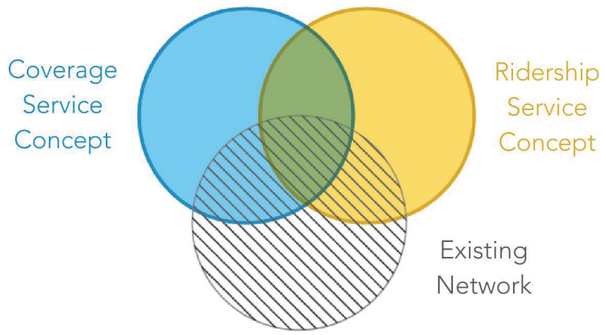


Figure 42: Isochrone Analysis from Downtown Boca Raton

From FAU Campus,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	700	0 %	1,300	0 %
30	Coverage	3,200	360 %	4,300	235.5 %
30	Ridership	4,700	562 %	7,900	508.9 %
45	Existing	5,700	0 %	10,000	0 %
45	Coverage	11,800	108.3 %	18,100	81.8 %
45	Ridership	16,700	194.6 %	26,900	169.6 %
60	Existing	20,900	0 %	33,200	0 %
60	Coverage	24,400	16.7 %	40,000	20.3 %
60	Ridership	34,900	67 %	50,400	51.6 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

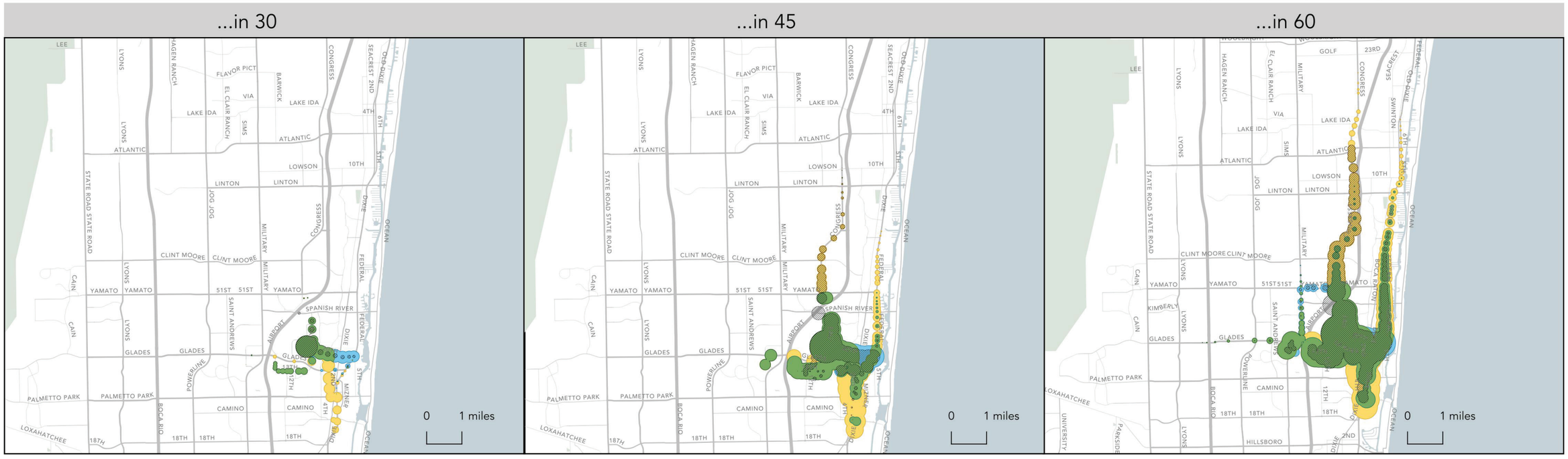
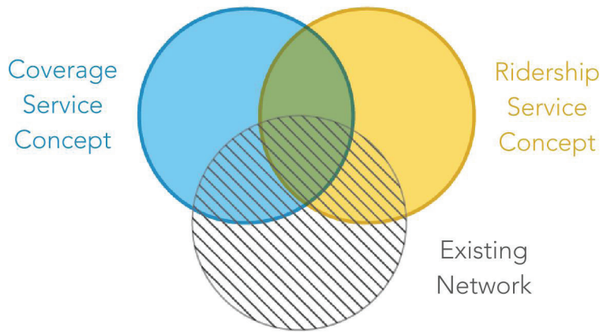


Figure 43: Isochrone Analysis from FAU (Boca Raton)

From Downtown Delray Beach,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



- This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	3,200	0 %	4,200	0 %
30	Coverage	3,200	1.5 %	4,200	0.7 %
30	Ridership	4,800	50.3 %	5,300	25.7 %
45	Existing	17,000	0 %	12,400	0 %
45	Coverage	16,900	-0.2 %	12,600	1.8 %
45	Ridership	20,400	20.2 %	14,900	20 %
60	Existing	50,500	0 %	27,300	0 %
60	Coverage	52,700	4.2 %	28,500	4.6 %
60	Ridership	50,700	0.3 %	30,800	13.1 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

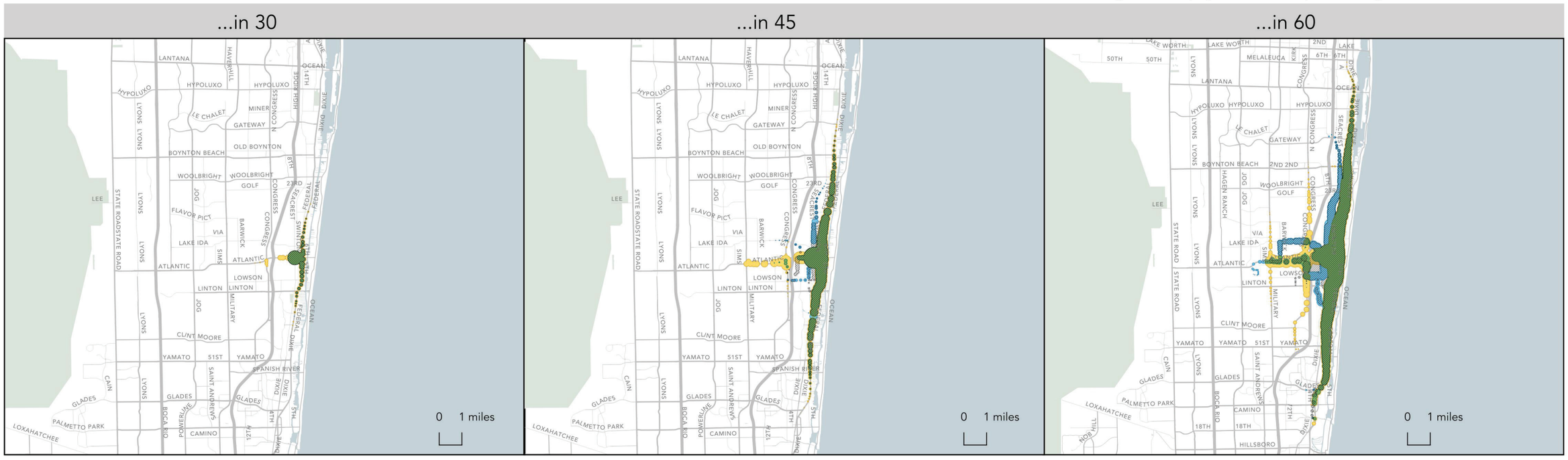
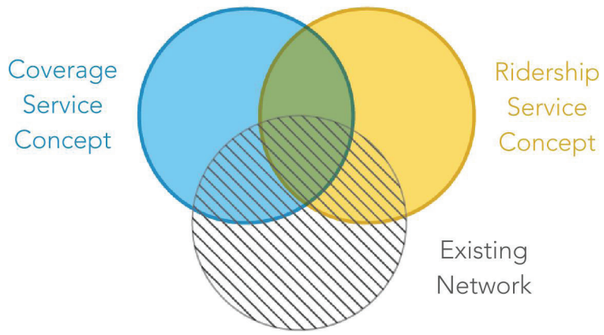


Figure 44: Isochrone Analysis from Downtown Delray Beach

From Downtown Boynton Beach,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	5,800	0 %	2,300	0 %
30	Coverage	5,900	1.1 %	2,300	1.7 %
30	Ridership	8,700	50.2 %	3,100	36.2 %
45	Existing	22,900	0 %	8,900	0 %
45	Coverage	23,200	1.5 %	9,200	3.4 %
45	Ridership	29,800	30.3 %	12,900	45.3 %
60	Existing	59,900	0 %	24,300	0 %
60	Coverage	60,300	0.7 %	25,200	3.8 %
60	Ridership	72,000	20.2 %	31,400	29.3 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

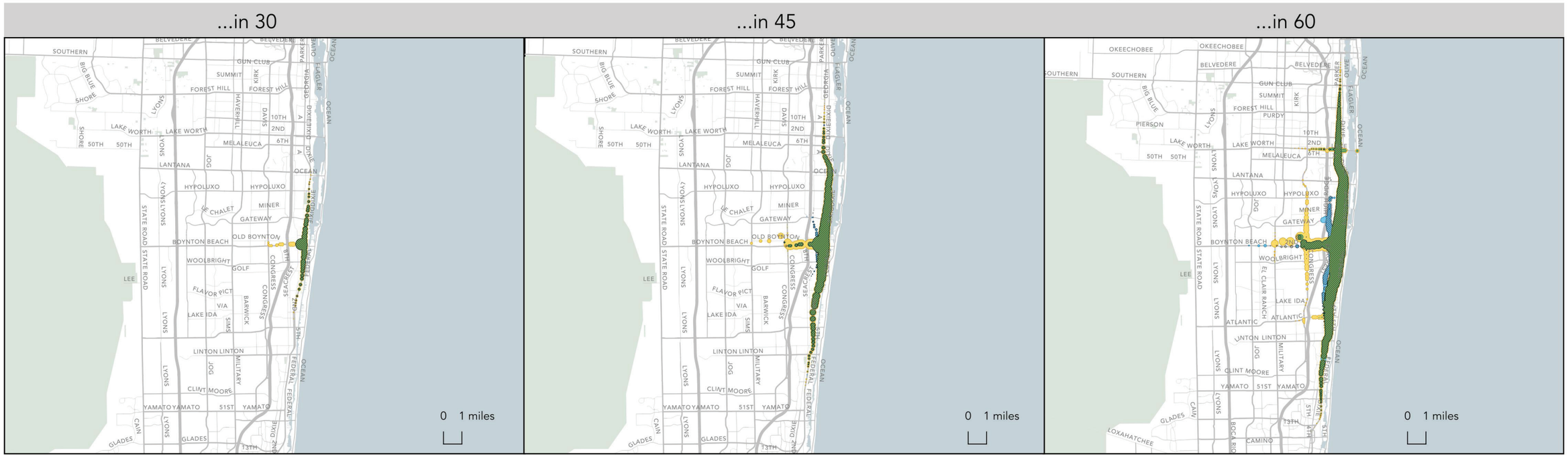
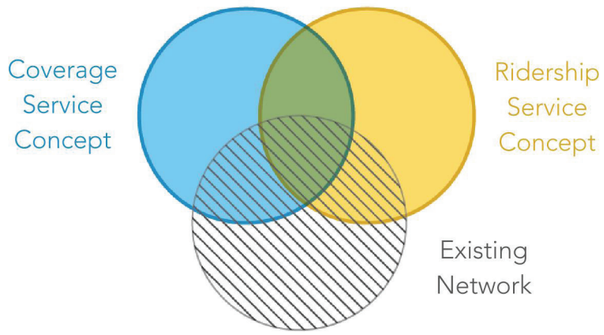


Figure 45: Isochrone Analysis from Downtown Boynton Beach

From Lake Worth and Military Trail,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	11,700	0 %	3,000	0 %
30	Coverage	11,800	0.6 %	3,100	2.1 %
30	Ridership	10,400	-11.4 %	2,900	-5.7 %
45	Existing	41,900	0 %	10,800	0 %
45	Coverage	42,900	2.3 %	11,300	4 %
45	Ridership	43,000	2.6 %	11,400	5.1 %
60	Existing	99,000	0 %	25,300	0 %
60	Coverage	103,800	4.8 %	26,300	3.8 %
60	Ridership	109,900	11 %	38,200	51.2 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

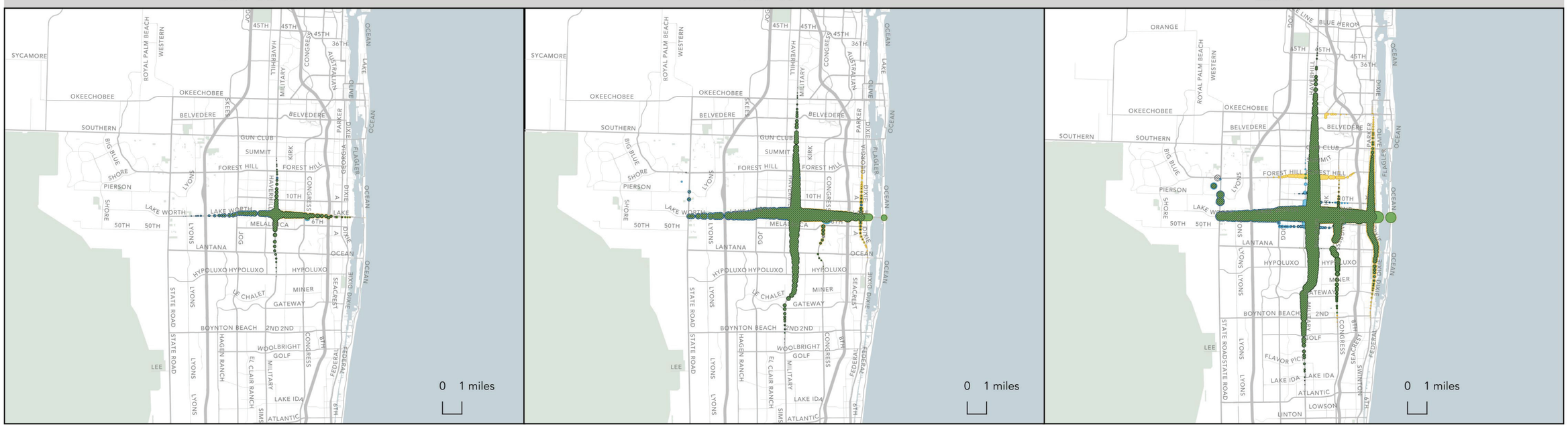
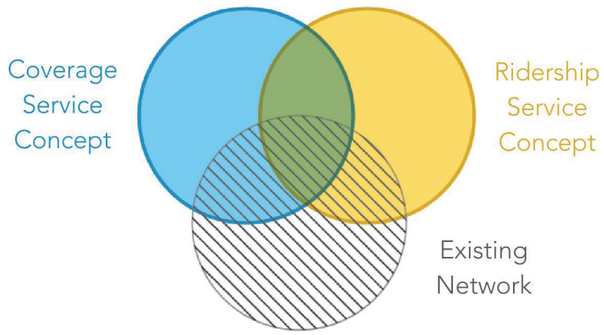


Figure 46: Isochrone Analysis from Lake Worth Rd. & Military Trail

From Okeechobee and Military Trail,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	5,500	0 %	2,500	0 %
30	Coverage	5,700	2.5 %	2,600	2.7 %
30	Ridership	7,600	37.3 %	4,600	86.2 %
45	Existing	29,800	0 %	15,700	0 %
45	Coverage	30,300	1.9 %	14,500	-7.9 %
45	Ridership	35,700	19.9 %	23,000	46.7 %
60	Existing	84,600	0 %	51,900	0 %
60	Coverage	83,400	-1.5 %	46,700	-10.1 %
60	Ridership	93,800	10.8 %	60,200	16.1 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

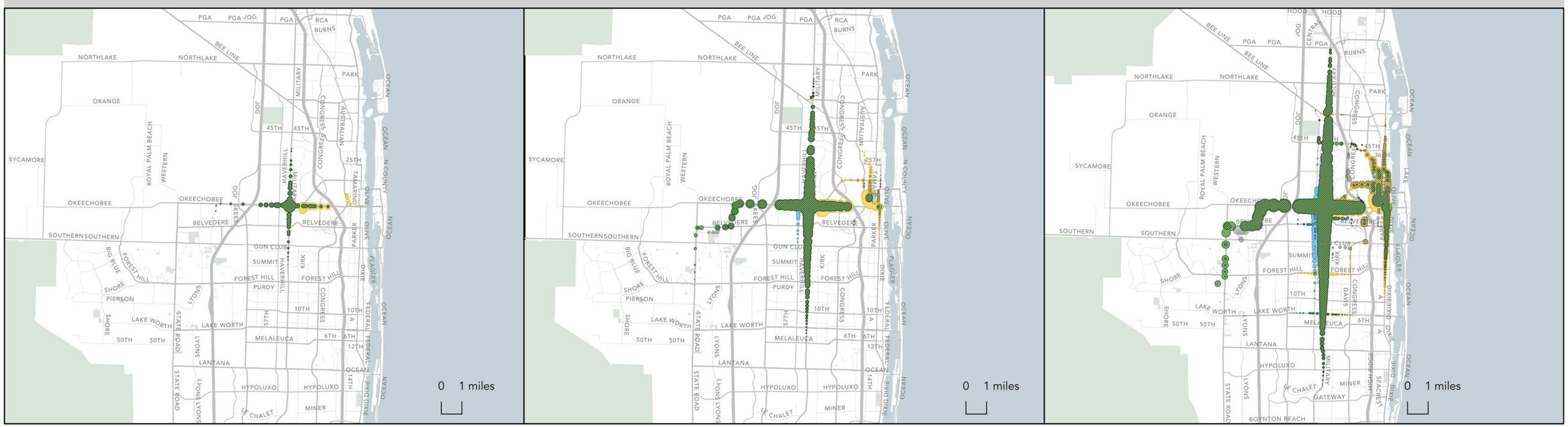
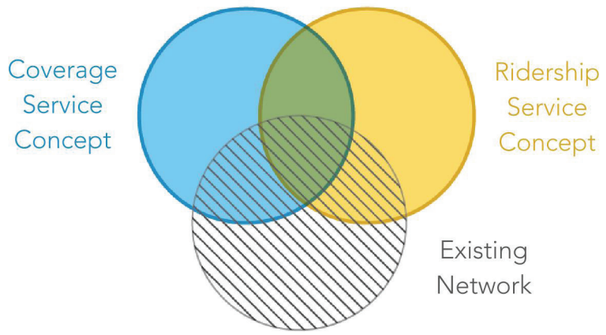


Figure 47: Isochrone Analysis from Okeechobee Blvd. & Military Trail

From Wellington Green Mall,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



- This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	1,500	0 %	1,100	0 %
30	Coverage	1,400	-4.6 %	1,000	-2.6 %
30	Ridership	1,300	-16 %	900	-15 %
45	Existing	9,000	0 %	4,400	0 %
45	Coverage	9,600	6.6 %	4,400	-1 %
45	Ridership	8,900	-1.8 %	3,700	-16.3 %
60	Existing	33,200	0 %	12,700	0 %
60	Coverage	37,200	11.8 %	14,200	11.9 %
60	Ridership	38,800	16.8 %	15,200	19.6 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

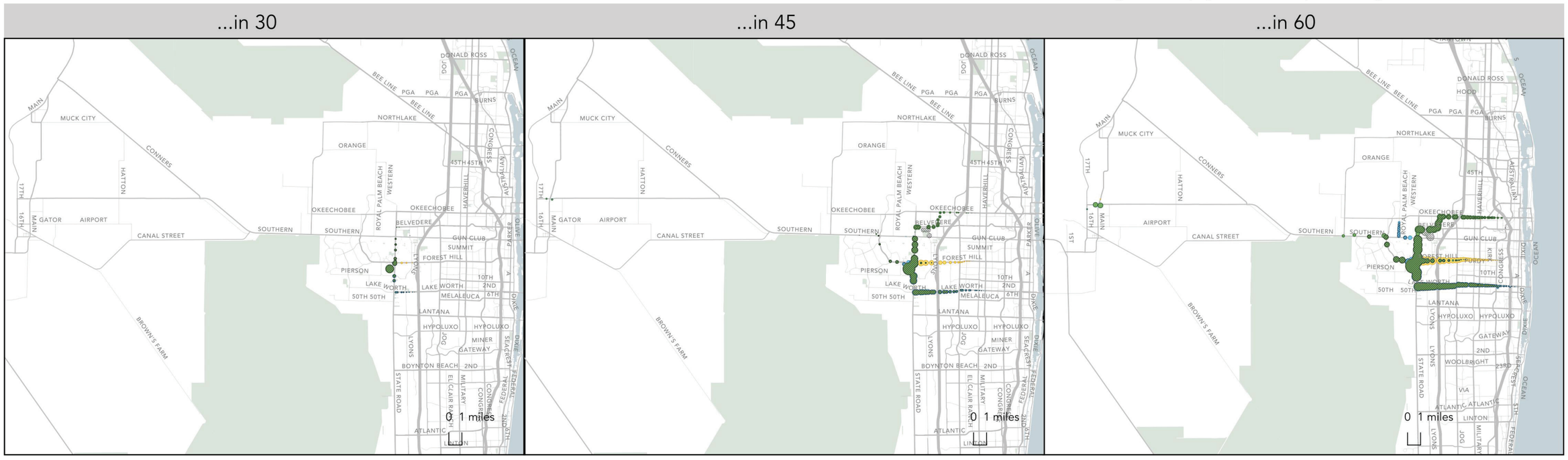
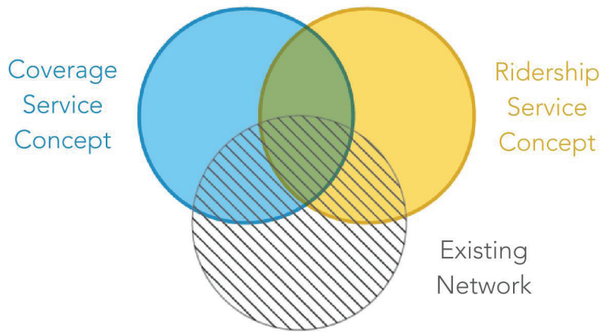


Figure 48: Isochrone Analysis from Wellington Green Mall

From The Gardens Mall,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	3,600	0 %	4,600	0 %
30	Coverage	3,500	-2.1 %	4,300	-7.1 %
30	Ridership	5,300	48.8 %	5,500	18.6 %
45	Existing	15,300	0 %	11,800	0 %
45	Coverage	16,600	8.3 %	12,400	4.8 %
45	Ridership	22,200	44.6 %	15,200	28.6 %
60	Existing	39,700	0 %	25,800	0 %
60	Coverage	46,800	18 %	30,400	17.6 %
60	Ridership	51,200	29.2 %	35,400	37 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

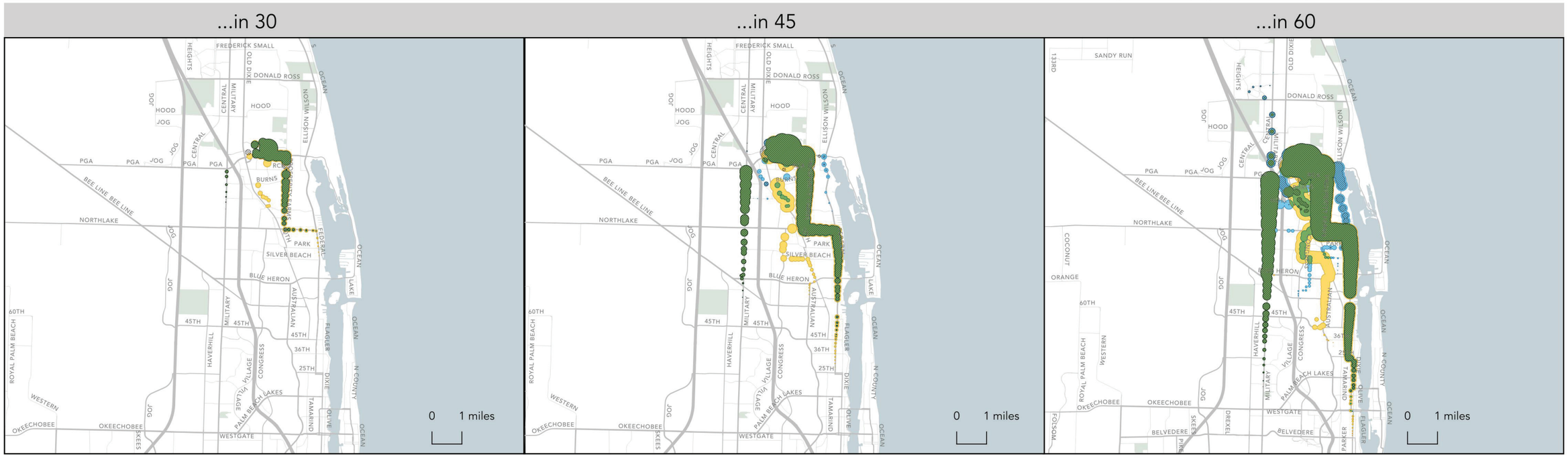
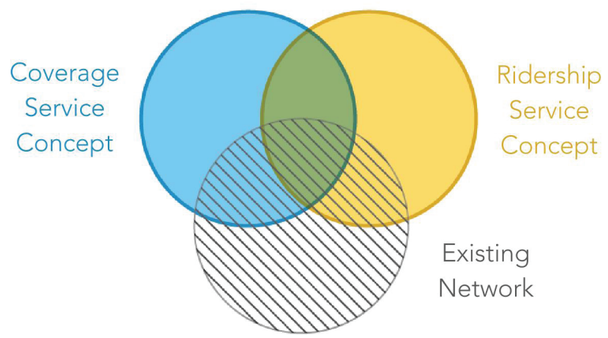


Figure 49: Isochrone Analysis from The Gardens Mall

From The Glades,

where could I travel to on weekdays at noon?

Here are the areas I can access in each service concept:



► This table shows the number of residents and jobs located within each travel time for each concept, rounded to the nearest hundred.

Residential and Job Access

Travel Time	Concept	Residents	% Change	Jobs	% Change
30	Existing	100	0 %	100	0 %
30	Coverage	0	-28.8 %	0	-14.8 %
30	Ridership	100	-23.1 %	100	-6.9 %
45	Existing	1,600	0 %	600	0 %
45	Coverage	200	-89.9 %	100	-74.5 %
45	Ridership	1,600	-0.2 %	400	-38.7 %
60	Existing	5,100	0 %	1,300	0 %
60	Coverage	2,300	-54.6 %	900	-32.7 %
60	Ridership	7,000	36.9 %	1,300	1.5 %

Data: U.S. Census American Community Survey 5-year Estimates Summary File, 2010-2014.
U.S. Census Longitudinal-Employer Household Dynamics Program, 2014

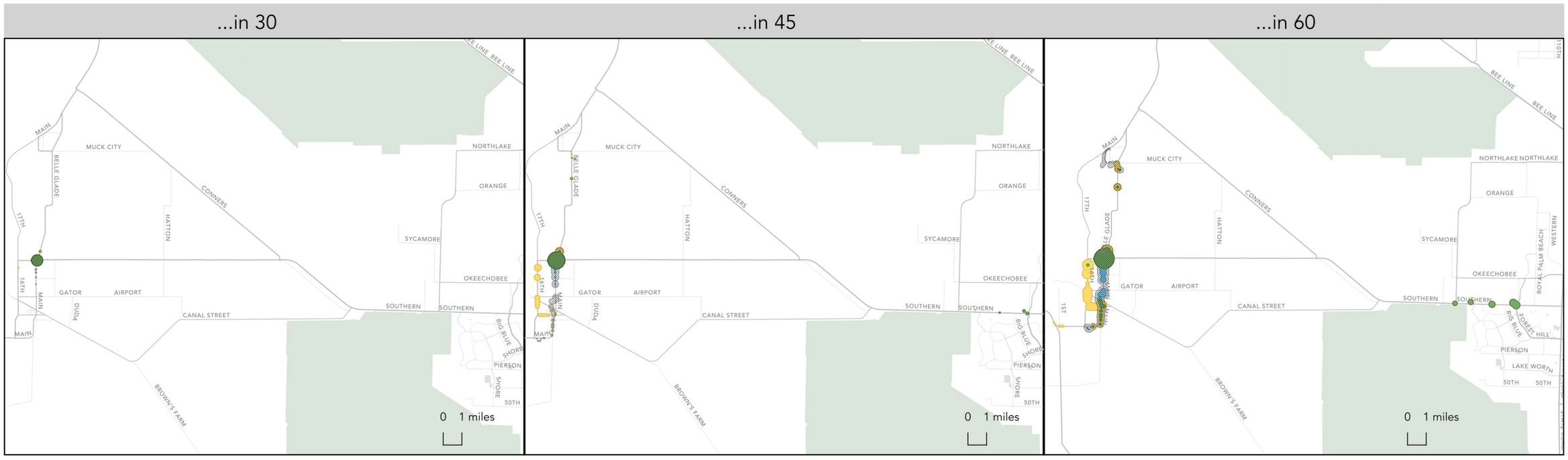


Figure 50: Isochrone Analysis from Glades Medical Center