Saint Louis

RAPID TRANSIT CONNECTOR STUDY

Moving Transit Forward

EXECUTIVE SUMMARY

2015

Metro®

A Bi-State Development Enterprise

BACKGROUND

The Rapid Transit Connector Study (RTCS) is one of the St. Louis region's first major efforts to implement Moving Transit Forward, the long-range plan that established a framework for expanding and improving the Metro Transit System over the next 30 years. The RTCS is an alternatives analysis intended to identify two corridors capable of supporting high-performance, long-distance, city-to-suburb transit services and bringing those benefits to the region in a quick and cost-effective manner. The Rapid Transit Connector Study investigated transit options defined by high-performance characteristics:

- Frequent service (10-20 minutes)
- Dedicated stations
- Limited stops, faster speeds
- Low wait times
- Quick fare payment and boarding
- Transit prioritization strategies

OPTIONS INVESTIGATED:

Light Rail

Bus Rapid Transit

Commuter Rail

Among a wide range of potential transit projects, Moving Transit Forward suggested four interstates in Missouri - I-70, I-64, I-44, and I-55 - that may support high-performance BRT lines and improve longer-distance commutes between the urban core and fast-growing suburban areas.

One of the primary needs highlighted by Moving Transit Forward is the expansion of premium transit services into new communities and travel markets, particularly projects that will improve both city-suburb connections and travel within suburban areas. The "Central Corridor" stretching from Downtown St. Louis to the Central West End and the City of Clayton still holds the region's largest concentration of jobs, and is well-served by MetroLink. However, the greatest share of growth in jobs and households is occurring in places like Chesterfield, Earth City, and St. Charles; areas easily accessible by highway but not by transit. This regional dynamic and the increasing jobs-housing spatial mismatch led to the RTCS problem statement:

PROBLEM STATEMENT:

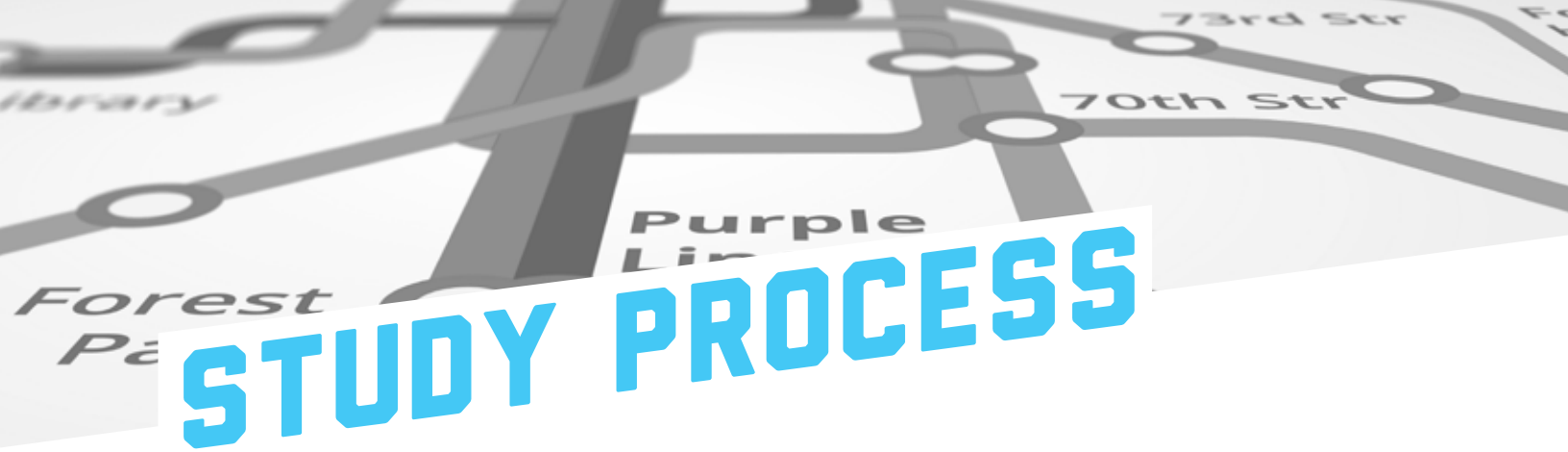
- Transit-dependent populations are increasingly isolated from job opportunities.
- Transit connections between low-income and transit-dependent populations and major, growing job centers require multiple transfers and burdensome travel time.
- Significant reverse commutes and trips outside the Central Corridor are underserved by transit.
- Traffic congestion creates significant delays along interstates and major arterials.

The RTCS focused on projects that would expand access and improve reverse-commute travel time to those suburban job centers, while also providing a competitive transit alternative for "choice" commuters currently driving into and through the core.

The results of the RTCS reflect extensive analysis performed by an interagency study team (the Transportation Corridor Improvement Group, TCIG), a stakeholder Advisory Committee, and extensive public involvement. Metro and its partners progressively narrowed the study area from the four highway corridors referenced above to a more focused study area, then to a set of four potential corridors, and finally to two selected corridors. Each iterative selection was based on corridor performance relative to the study's defined goals (from Moving Transit Forward) and their relative cost effectiveness.

STUDY GOALS:

- Improve mobility choices and the efficiency of the transportation network by lowering transit travel times, improving connections, and expanding high-performance transit into emerging markets.
- Support transit-oriented, sustainable economic development; help reinforce the urban core and create jobs.
- Improve access to jobs and other goods and services, particularly for the region's low-income and minority populations.
- Improve and support livability by expanding travel choices for a larger segment of the population and making transit a more viable alternative to the car.
- Create cost-effective transportation solutions that maximize the performance of existing services and facilities, and can be implemented in a reasonable amount of time.
- Protect natural and community resources.



STUDY PROCESS

The RTCS was jointly managed by the interagency Transportation Corridor Improvement Group (TCIG), with oversight from a regional Advisory Committee consisting of policy leadership from Metro, East-West Gateway Council of Governments, the City of St. Louis, St. Louis County, MoDOT, and other stakeholders.

The study also included an energetic public involvement program designed to help the community understand and provide input on the study's goals and objectives, corridor and mode selection, station design, system branding, and comparative costs and benefits. Public feedback helped direct the inquiry and shape every component of the recommended alternatives. This effort included a project website, e-newsletters, two series of public meetings (March and September 2013), an online public survey, and stakeholder interviews. The graphics below summarize the study process.

1

TIER ONE: CORRIDOR SCREENING AND STUDY AREA

POPULATION | JOBS | ACTIVITY CENTERS | LAND USE | TRAVEL DEMANDS | PUBLIC INPUT

2

SELECTION OF ALTERNATIVES (FOUR BRT CORRIDORS)

SERVICE STRATEGY | ROADWAY TYPES | STATION COMPONENTS | VEHICLES | TRANSIT PRIORITIZATION

3

TIER TWO: SCREENING OF ALTERNATIVES

PERFORMANCE | RIDERSHIP ESTIMATES/MARKETS | POPULATION/JOB DENSITY | ENVIRONMENTAL/ECONOMIC IMPACTS | PUBLIC INPUT

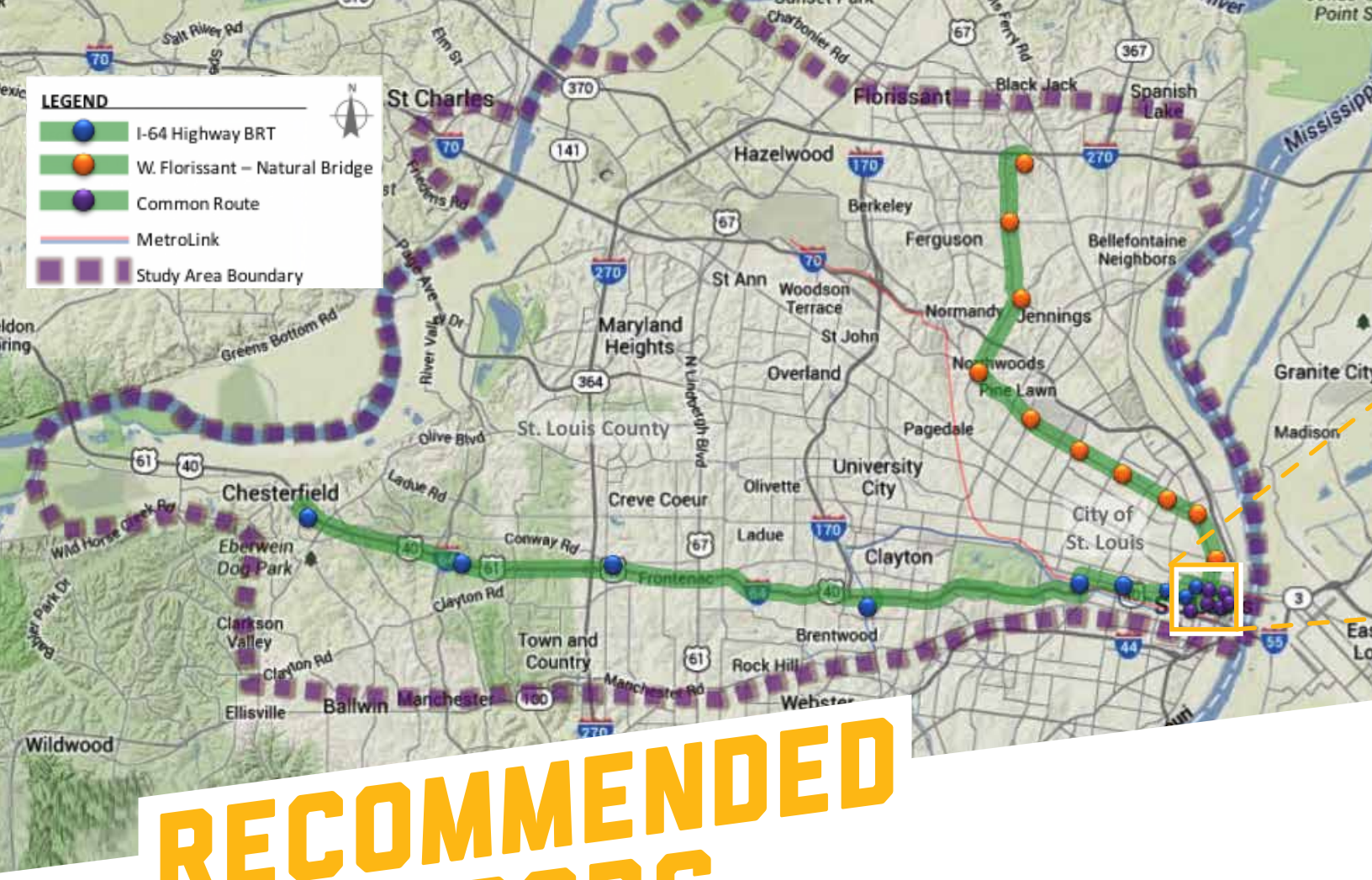
4

RECOMMENDATION OF LOCALLY PREFERRED ALTERNATIVE (LPA)

PUBLIC ENGAGEMENT PROCESS

- Advisory Committee & Leadership Interviews, Feb.-Mar. 2013
- Public Meetings, Mar. 2013
- Advisory Committee & Leadership Interviews, Summer 2013
- Public Meetings, Sept. 2013
- Advisory Committee, Oct. 2013
- Locally Preferred Alternative, Nov. 2013
- Metro Board of Commissioners, Mar. 2014
- East-West Gateway Board of Directors, Apr. 2014

BUS RAPID TRANSIT IN LOS ANGELES



RECOMMENDED CORRIDORS

The study team combined the results of the technical analyses with feedback from the public engagement process and identified a Locally-Preferred Alternative (LPA) consisting of two project corridors. The TCIG and Advisory Committee endorsed this LPA and recommended it be advanced to the next stage of project development and consideration for federal funding:

- **EAST-WEST ALTERNATIVE: I-64 BRT**
- **NORTH-SOUTH ALTERNATIVE: WEST FLORISSANT-NATURAL BRIDGE BRT**

A full description of the LPA, including an evaluation of funding scenarios, an initial assessment of competitiveness for federal funding, and an implementation timeline, is included in the St. Louis Rapid Transit Connector Study Final Report.

SHARED DOWNTOWN ST. LOUIS LOOP

Both of these corridors would terminate at the Civic Center Station in Downtown St. Louis. The pathways through downtown would overlap in a similar loop along Washington Avenue, the Broadway/4th Street one-way pair, Market Street, and 14th Street into Civic Center Station, providing a connection to MetroLink and twenty bus routes.

I-64 BRT

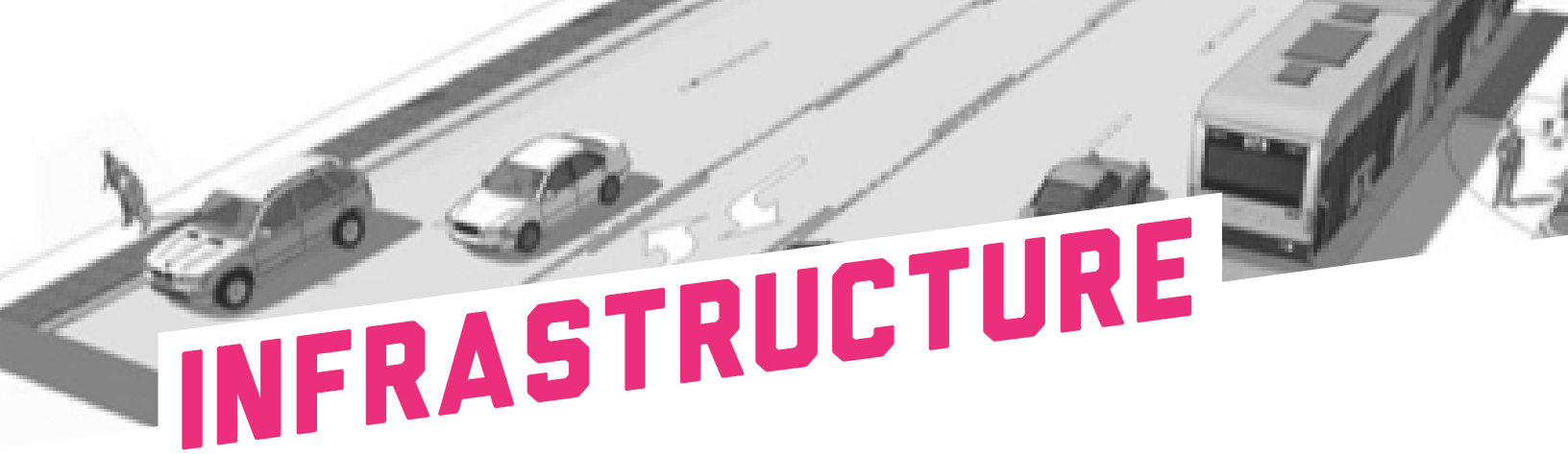
The 23-mile I-64 BRT would operate between the City of Chesterfield and Downtown St. Louis. It would run within the I-64 right-of-way between Chesterfield Mall and the Boyle Street interchange; at Boyle it would exit I-64 to Forest Park Avenue, then travel east into Downtown. The more dispersed land use patterns in the western section of the corridor would require shuttles to carry riders to their end destinations. The corridor hosts major employment centers, large universities and hospitals, and many of the region's most-visited cultural attractions, along with 163,000 jobs and nearly 55,000 people within one half-mile. The I-64 BRT would provide the region's first single-seat transit ride between West County and Downtown, and is projected to improve transit travel time by 30%, from 76 minutes to 53 minutes.

WEST FLORISSANT-NATURAL BRIDGE BRT

The 16-mile West Florissant-Natural Bridge (WFNB) corridor is composed of several urban and suburban roads between the new North County Transit Center and Downtown St. Louis. It would operate exclusively in arterial roadways. Similar to the Halls Ferry-Riverview BRT, land uses are largely residential, coupled with pockets of commercial development and community amenities such as parks, libraries, schools, and healthcare. This corridor is relatively high-density and lower-income. Total population approaches 70,000 within a half-mile; the combined corridor hosts nearly 6,500 zero-car households and has a median household income of $30,000. The WFNB BRT would reduce transit travel time between North County and Downtown by 40%, from 70 minutes to 42 minutes.

PROJECTED RIDERSHIP/COSTS

	I-64 BRT		WFNB BRT	
YEAR	2010	2040	2010	2040
Weekday Ridership	5,100	6,800	3,200	3,200
New Transit Trips	2,100	2,900	600	500
Capital Costs, $2013	$37,938,000		$39,107,000	
Net O&M Costs, $2013	$3,436,952		$2,573,554	



INFRASTRUCTURE

These projects must incorporate "rail-like" characteristic to successfully compete for federal funding and meet the study goals. There are several technological and right-of-way treatments that can fulfill these needs, and those proposed here were selected for their relative cost effectiveness, ease of implementation, and appropriateness for each corridor. The recommended treatments include sidewalk bump-outs, traffic signal priority (TSP), and queue jumps or bypass lanes at intersections in order to speed transit travel. Dedicated transit lanes were considered, but political support for such a strategy is uncertain, and federal studies and peer system feedback indicate that dedicated lanes are only cost-effective in high-density areas or highly congested roadways. It is recommended that these projects operate in mixed traffic, though segments of the WFNB BRT would include Business Access and Transit (BAT) lanes that limit the use of curb lanes to transit vehicles and vehicles making right turns. The I-64 BRT may be able to take advantage of TSP at metered ramps, but that will be dependent on future study by MoDOT. The photographs and figures below show examples of these transit prioritization strategies.

RUNNING WAY FEATURES

BAT LANE CONCEPT

QUEUE JUMP SIGNAL

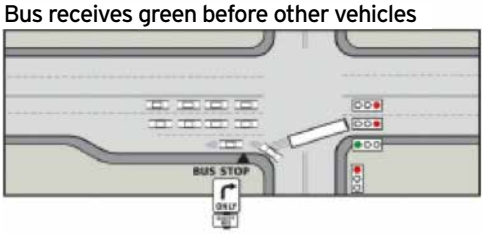
SIDEWALK BUMP-OUT

KEY RUNNING WAY CONCEPTS

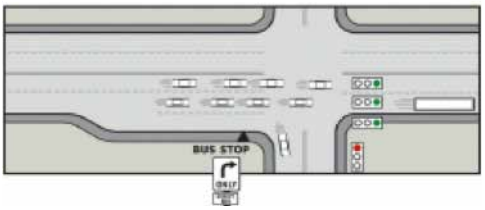
BUS QUEUE JUMP CONCEPT

Passengers board during red

Bus receives green before other vehicles

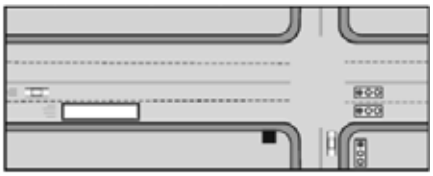


Other vehicles proceed a few seconds later

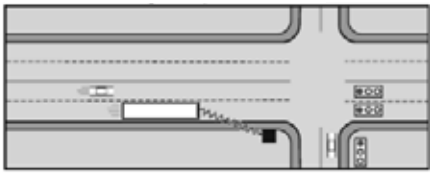


TRAFFIC SIGNAL PRIORITY (TSP) CONCEPT

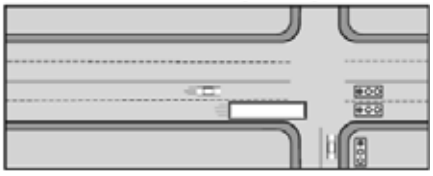
Bus approaches green signal



Signal controller detects bus extends current green phase



Bus proceeds on extended green



VEHICLES

The WFNB BRT may be best served by 60-foot articulated buses, consisting of two vehicle sections linked by a pivoting, accordion-like connector that allows passengers access to both sections of the bus. Multiple doors allow fast passenger boarding, similar to MetroLink. Similar vehicles in operation today can carry 80-100 passengers, with seating for 40-50.

The I-64 BRT alternative would likely use 40-foot commuter coaches, which are well suited for highway service. Any advances in vehicle technology that may address the operational concerns about using articulated vehicles in highway corridors will be considered during the project development phase.

STATION DESIGN

Both projects would include unique stations that create a pleasant and informative passenger waiting environment; provide visible, substantial investment in the surrounding streetscape; and help reduce dwell time. These station elements may be added or subtracted as the projects are developed, but the final station design must include enough features to support "rail-like" service in order to qualify for federal funding. This conceptual design is for a typical station on arterial streets; it does not include the highway-based park-and-ride stations for the I-64 corridor:

ELEMENTS TO REDUCE DWELL TIME

These components will help speed travel and target a MetroLink stop-time of 20 seconds by allowing buses to remain in the travel lane and facilitating quick passenger boarding:

- Off-board fare payment (TBD)
- Platform height (near-level boarding)
- Platform length (multi-door boarding)
- "Rub rail" for enhanced docking
- Sidewalk bump-outs

BASIC FEATURES

Basic features provide passengers with shelter, seating, safety, and route information. The list of components prioritized by TCIG and community stakeholders includes:

- Route and schedule information kiosk
- Architectural canopy
- Benches
- Trash receptacle
- Wind screen
- Safety railing
- General and accent lighting

STATION DESIGN (CONT.)

The conceptual project assumes off-board fare payment using ticket-vending machines. Off-board fare payment would play a critical role in reducing customer boarding time to twenty seconds and speeding overall travel time, similar to MetroLink, but those benefits must be measured against both the increased costs for fare enforcement and public perception of proof-of-payment systems. Off-board fare payment will require additional staff analysis and a policy decision from Metro's Board of Commissioners.

STATION ENHANCEMENTS

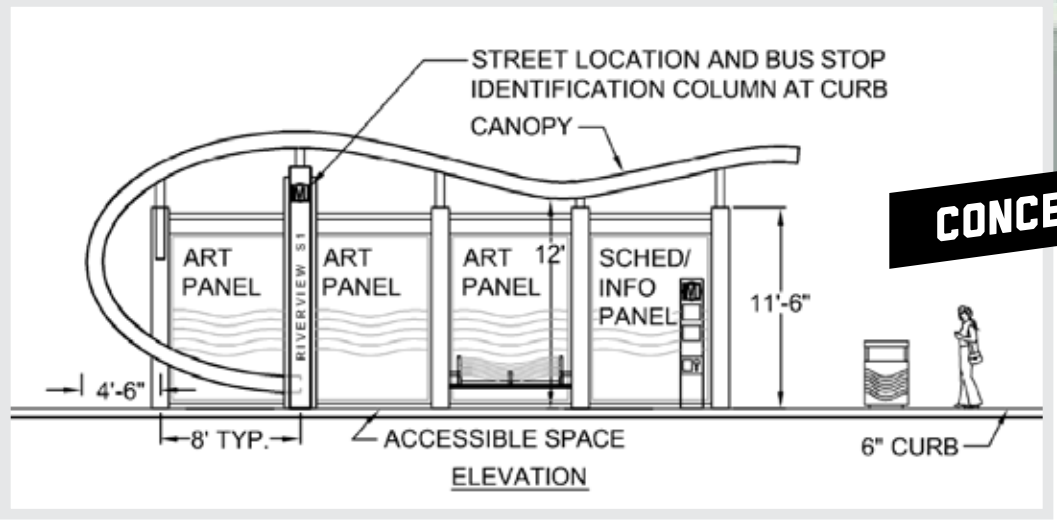
These items are not necessary to the basic function of a BRT system, but they can help communicate brand identity, improve the customer experience, and generate a feeling of return on community investment.

- Real-time bus arrival information
- Marker/pylon
- Wi-Fi
- Bike rack
- Public art
- Stainless steel and/or glass materials
- Colored concrete
- Landscaping
- Emergency call box
- Security cameras
- Water service

STATION BRANDING

BRT systems often use a "brand footprint" to effectively communicate the service's functional attributes, such as high frequencies and lower travel times, as well as emotional attributes the agency wants customers to associate with the service, such as convenience, safety, and being a smart commute choice. This study produced an initial framework for a brand footprint, which would require refinement in later stages of project development. The final "brand strategy" should include a BRT system name, color scheme, graphics, logos, maps, and staff training.

CONCEPTUAL BRT STATION



Some of the most popular potential system names identified during the study included:

- Arc (or ARC if an acronym)
- The Current
- The Flow
- MetroRunner
- St. Louis Slide
- St. Louis Spirit

RETURN ON INVESTMENT

FOR THE METRO SYSTEM AND THE REGION

REDUCED TRANSFERS AND TRAVEL TIME

Average operating speeds would compare to MetroLink, at around 25 mph. The I-64 BRT would provide the Metro System's first single-seat ride between Chesterfield and Downtown St. Louis, and would lower end-to-end transit travel time by 30%, from 76 minutes to 53 minutes. The WFNB BRT would provide a single-seat ride from North County to Downtown St. Louis and reduce travel time in a strong transit market by 40%, from approximately 70 minutes to 42 minutes.

JOB ACCESS AND NORTH-WEST CONNECTIONS

Implementing and linking both LPA projects would make it far easier for residents of North County and North City to access job opportunities in fast-growing West County, and vice versa. The transit trip between those two areas currently requires transfers between three routes and around two hours of travel in one direction. Implementing both LPAs would cut transfers by half and overall travel time by a half-hour. This type of improvement is sorely needed by Metro customers in those economically-disadvantaged communities, particularly if West County continues to attract new retail and job centers.

ATTRACTING NEW CUSTOMERS

One of Metro's primary goals for the Moving Transit Forward long-range plan is to expand its customer base by reaching into new markets and engaging people who may be willing to use transit under the right circumstances. The I-64 BRT will provide the region's first single-seat, high-performance transit ride between Chesterfield, the Central West End, and Downtown St. Louis, and is estimated to attract 2,100 new "choice" riders per weekday, 41% of its opening-year weekday ridership. The West Florissant-Natural Bridge BRT line would serve an already transit-dependent market, but would still attract 600 new weekday riders, or 19% of that line's projected weekday trips. Overall ridership in the I-64 corridor is projected to increase by 357% from 1,115 to 5,100 weekday boardings in the opening year. A direct comparison for the West Florissant-Natural Bridge BRT is more difficult, but a conservative estimate is an overall increase of 23%, from 2,610 weekday riders to 3,200.

METROBUS SYSTEM EFFICIENCIES

Both projects would play a critical role in supporting and evolving the Metro Transit System by providing additional high-performance spokes and multimodal connection hubs, just like the MetroLink System. The presence of BRT stations in North and West County will allow Metro to reconfigure MetroBus routes and service strategy in those areas, moving from long and circuitous routes to shorter collectors that will move people to the BRT line in a more timely, efficient, and cost-effective manner. These two routes would also establish an armature for future expansions of a regional BRT system.

COST EFFECTIVE EXTENSION OF HIGH-PERFORMANCE TRANSIT

During Metro's long-range planning process, the community clearly voiced a desire for additional high-performance transit services like MetroLink. The St. Louis region will not have the resources to build additional MetroLink lines to all of the neighborhoods that may benefit from them. At a national average cost of around $80 million per mile, we must limit light rail investments to corridors that have the population densities, job centers, and development opportunities to justify them. Less costly BRT lines can be used either to provide high-performance service in areas that do not have the densities to support rail or to build the ridership and development markets in a corridor prior to being converted to rail. At an average capital cost of $2 million per mile, the region could deploy a considerable number of high-performance BRT spokes over the next 30 years.

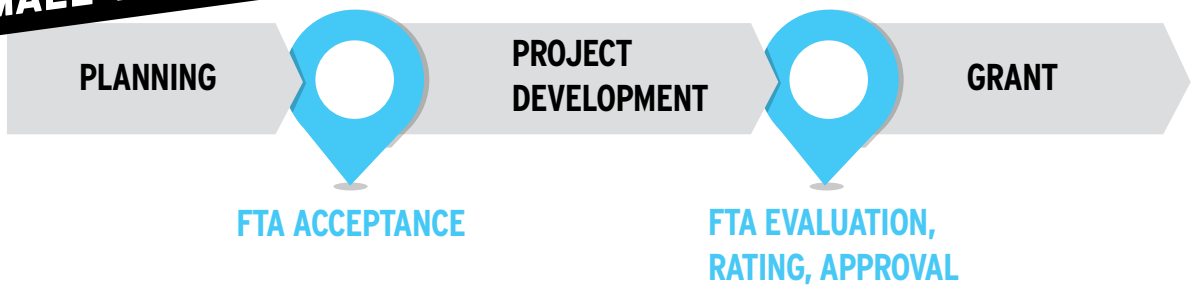
These projects are aimed at providing a MetroLink level of service at a fraction of the cost. However, the opportunity cost of choosing BRT over light rail is its unproven track record of catalyzing and supporting development. The St. Louis region has struggled to attract new buildings and uses to most MetroLink stations for myriad reasons, but developers largely concur that under the right circumstances, rail can drive development; no such agreement exists for BRT. The RTCS accordingly assumes that BRT lines may help stabilize and revitalize economically-disadvantaged neighborhoods, but may not spur new construction.


HIGH PERFORMANCE,
LOW COST

MOVING FORWARD

Moving Transit Forward promised the community that federal funding would be sought for any major capital projects, so Metro designed the Rapid Transit Connector Study planning process according to federal requirements for the New Starts and Small Starts grant programs:

SMALL STARTS PROCESS



The RTCS alternatives analysis fulfills the required first step of corridor planning. Now that an LPA has been approved and adopted into EWGCOG's long-range transportation plan, Metro will ask FTA for a preliminary assessment of the projects' competitiveness for federal funding. Metro and the TCIG will carry that feedback into the project development phase, spending 12-18 months working with stakeholder communities to finalize decisions such as station locations and design, running ways, TSP treatments, operating strategy, vehicle types and design, and a branding strategy. During project development, the system components described in this report can be scaled up or down, but each project will need to maintain "rail-like" characteristics in order to qualify for federal funding.

At the same time, Metro and TCIG will have to work with funding partners to craft a financial strategy, including steps to secure a local match for federal funding. The table below provides the minimum local match required for a Small Starts grant. The most likely source of that local match is Proposition A funds that have been collected but not yet allocated to Metro.

MINIMUM LOCAL MATCH REQUIREMENTS

	CAPITAL COSTS	SMALL STARTS (80%)	LOCAL (20%)
I-64 BRT	$37.9 M	$30.3 M	$7.6 M
W. Florissant-Nat. Bridge BRT	$39.1 M	$31.3 M	$7.8 M
TOTAL	$77 M	$61.6 M	$15.4 M

Implementation of both projects is anticipated to add approximately 2.8% to Metro's annual O&M costs; approximately 1.2% from the WFNB BRT and 1.6% from the I-64 BRT project. After FY 2020, Metro could look to additional Proposition A revenues to fund operations, or pursue additional sources of funding.

In order to realize the full potential of the entire Moving Transit Forward long-range plan, Metro and other stakeholders must continue to promote a dedicated funding source for public transportation from the State of Missouri. Missouri ranks 40th among all the states and the District of Columbia in transit funding per person. Moving Transit Forward makes a compelling case for the benefits the Metro Transit System brings to the St. Louis region, as well as the need to expand and improve the system if St. Louis is to thrive over the coming decades. That plan, and these BRT options that stem from it, should be at the core of ongoing dialogue with regional, state, and federal leaders.

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