Transforming Dixie Highway - Dixie Bus Rapid Transit
Preliminary Operational Analysis Summary

June, 2015

Overview

The Dixie Bus Rapid Transit (BRT) service has been proposed as an upgrade to the Transit Authority of River City's (TARC's) highly successful Route 18 corridor on the west side of Louisville Metro. TARC is the authority responsible for providing transit service in the Greater Louisville area. Its 2008-2009 Long Range Plan states that "TARC and the community in the greater Louisville region have tremendous opportunity to continue to build a more robust and comprehensive transportation system that is able to provide a broader range of transportation options that responds to changing demographics, changing climate and changing consumer preferences." The new service is expected to overlay the existing Route 18 corridor from downtown to Dixie Garden/Bethany Lane with high-quality, high-speed branded bus service. The physical facilities would include approximately 36 enhanced station stops, new BRT-style vehicles, Intelligent Transportation System (ITS) technology and signal upgrades (including transit signal priority), select bus queue jump lanes, and minor roadway improvements. All of these elements would be integrated into a distinct branded BRT system. This would be Louisville's first BRT service.

The Dixie BRT service is proposed to maintain 15 minute headways between 6:00 a.m. and 7:00 p.m. and offer a 15 percent travel time reduction over the current local bus service. The proposed station spacing averages ¾ of a mile, with closer spacing approaching downtown and longer spacing in outlying areas. The average end-to-end travel time is approximately 54 minutes, resulting in an average travel speed of 15.4 miles per hour. The new BRT system is projected to carry 4,600 daily riders. When combined with the predicted local Route 18 ridership of 1,900, this brings the total projected ridership to 6,500, an increase of over 40 percent for the corridor. The service is expected to eliminate over 800,000 vehicle miles of travel from local roadways annually. The total capital cost for the project is estimated at $11.9 million for buses and transit infrastructure, with an additional $5.2 million for ITS and signal system upgrades. The annual incremental operating cost for the system in the opening year of 2018 is $2.8 million.

Route and Stops

The Dixie BRT route would follow the current Route 18 corridor from Bethany Lane north into downtown as shown on the figure on the next page. On opening day, there would be approximately 18 stops in each direction (36 total) with an average spacing of ¾ of a mile. The distance between stops is shorter in the north where ridership is higher. These stops may be in the travel lane or they may be in pull-out bays/areas depending on the right-of-way, speeds, volumes, pedestrian accommodations, and roadway geometry. (The Option B project would end in the vicinity of Greenwood, resulting in fewer stations in each direction and five fewer bus-only infrastructure locations.)

Frequency and Hours of Operation

BRT service is expected to begin around 4:30 a.m. and end around midnight, consistent with the current local service. The expected frequency for the proposed BRT between 6:00 a.m. to 7:00 p.m. is 15 minute headways. Frequencies will be reduced before and after these times. The BRT service will be in addition to 30 minute headways for the underlying local bus service. Thus the effective service frequency will be approximately every 10 minutes throughout the majority of the day.

Travel Time, Speeds, and Station Dwell Times

The expected travel time from Dixie Garden/Bethany Lane to downtown is 54 minutes, resulting in an average speed of 15.4 miles per hour. The maximum expected travel speed is approximately 45 mph between some of the southern stations. The station dwell time will range from 15 to 30 seconds. The average running speed (excluding station stop time) is 17.4 mph, which is reasonable given the expected average vehicular speeds along this route.

ITS / Signal Technology

The Dixie BRT project includes significant ITS and signal/signal system upgrades throughout the corridor. These improvements will include overall traffic signal system optimization to reduce delay and therefore travel time in the corridor. The system upgrades will also provide the capability for handling transit signal priority (TSP) at selected intersections or sets of intersections. **Figure 1** illustrates the currently proposed intersections where TSP (or bus queue jump lanes) could be considered. The signal system will also be connected to the Louisville Metro traffic operations center (TOC) so that timing plans can be changed from the TOC if needed. The signal upgrades are critical to achieving the travel time goals for the project.

Vehicles and Fare Collection

The Dixie BRT would require approximately eight vehicles to be in operation at all times to achieve the proposed service frequency. The current proposal is to employ eight new vehicles in this service and to use two existing buses as spares until additional buses can be added to the fleet. The new buses would be branded as Dixie BRT buses in a manner that matches the proposed new station stops. These buses would be BRT-look, ADA compliant 40-foot buses with two doors. The eight new buses are estimated to cost approximately $4.0 million.

The expected fare collection system would be consistent with the soon-to-be implemented MyTARC system, which includes the use of "tap and go" fare cards. Exact cash fare is still an option however. In the future, it would be desirable to convert the Dixie BRT system to a pay-before boarding system; however that is not part of the current proposal. The fare for the new service has also not been set. One option is to set it at the same level as the current local service ($1.75 for cash fare, less for passes). Another option would be to set it similar to the express bus fare, which is $2.75 (cash fare) or $1.00 more than the local service.

Connections

At Broadway the Dixie BRT would connect with the high frequency east-west Route 23, which is proposed as the next phase of BRT expansion in the region after Dixie Highway. In downtown, it would connect with other TARC routes and the downtown circulators, providing linkages to the rest of the region thus extending riders ability to travel farther for employment and other activities.

Demographics

The proposed BRT route serves one of the most important transit corridors in the region. It has high ridership and links key residential and employment areas including: Valley Station, Pleasure Ridge Park, Shively, West Louisville, and Downtown. There are 27,000 people and 40,000 jobs within the ¼ mile walk-shed of the proposed line. According to the American Community Survey data (2009-2013, 5-Year Estimates), 34 percent of the people in the walk-shed live below the poverty line. Approximately 50 percent of the jobs have annual income below $40,000 per year. The population within the ¼ mile area is 60% minority (56% African-American). In addition, approximately 24 percent of the households in the walk-shed do not have a car and another 41 percent have only one car. Low auto ownership is a major factor in the success of transit in this corridor. These demographic characteristics are highlighted in **Figure 2**.

Figure 1: Dixie BRT

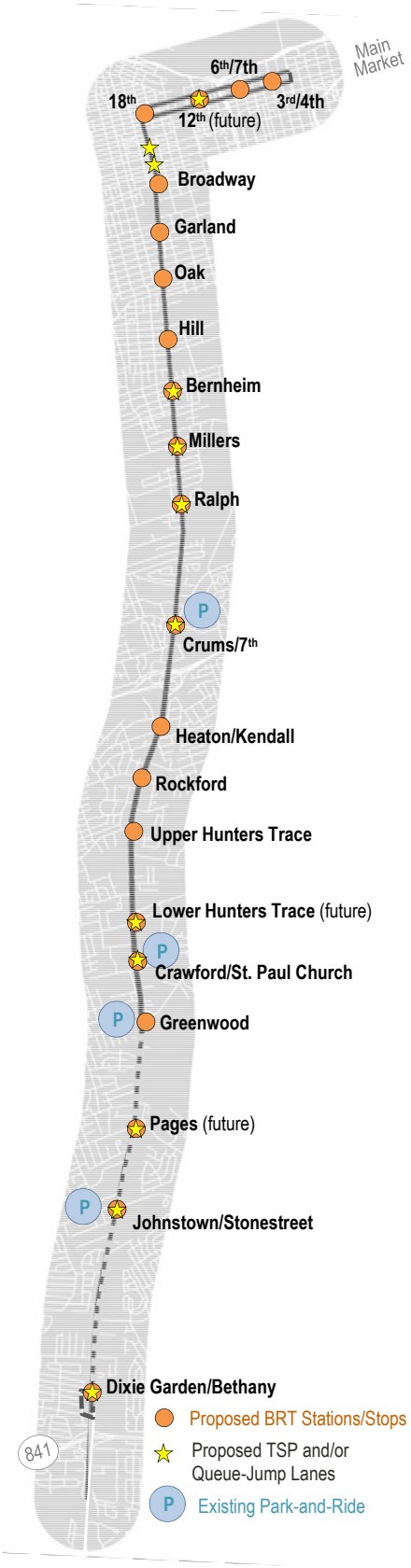
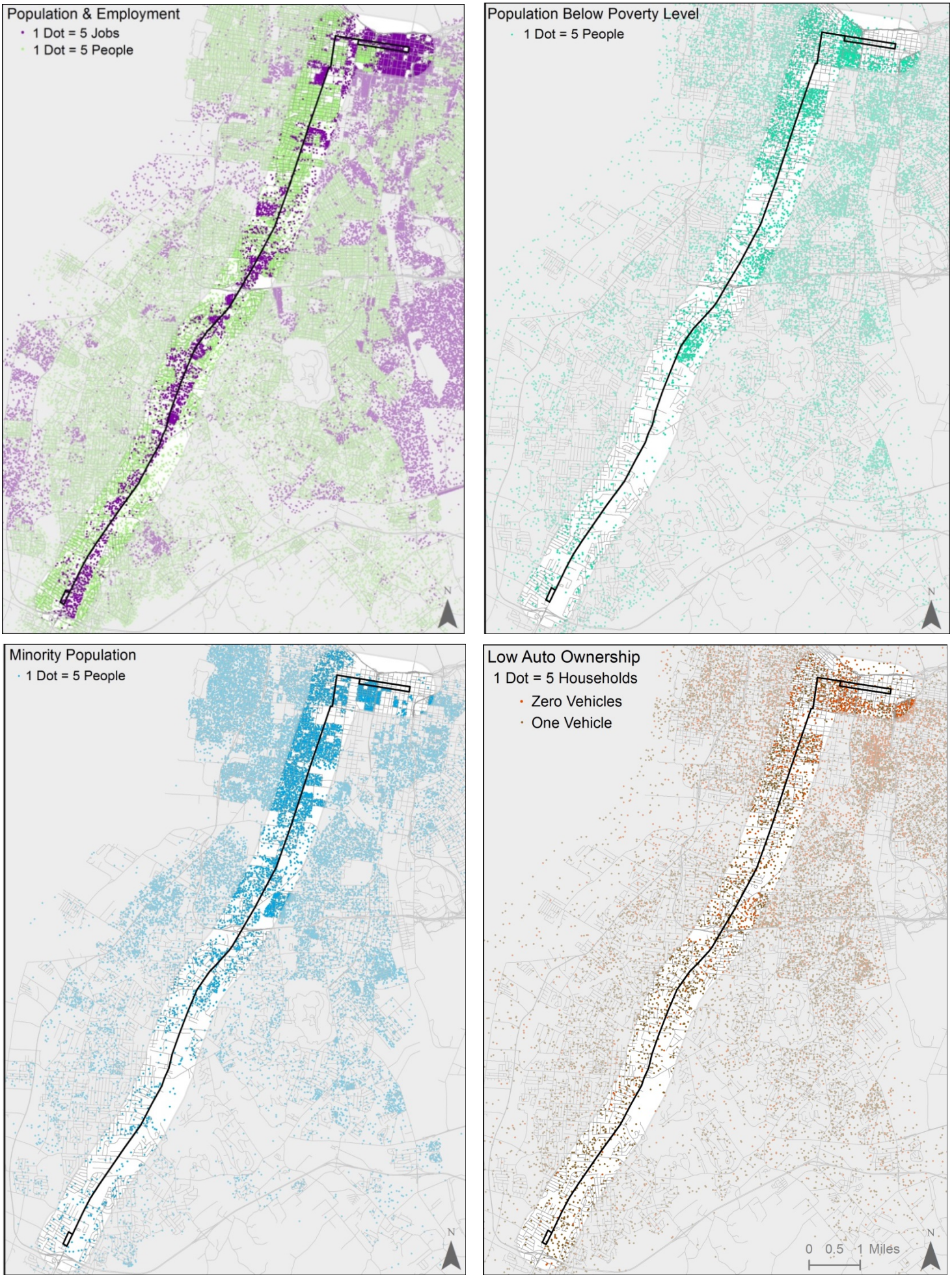


Figure 2: Corridor Demographics



Development Opportunities – Current and Future

There are several major development efforts underway in the Dixie Highway corridor, including a new Walmart and YMCA that are soon to be constructed at Broadway near the north end of the corridor. There is also ongoing residential and commercial development and redevelopment in the central and southern portions of the corridor. This includes a new 125,000 square foot Kroger megastore south of the Watterson Expressway. At the far northern end of the BRT corridor, there are plans for major new development and a waterfront park in the Shippingport area along the Ohio River. It is expected that additional transportation investments in the corridor will further support these and other proposed developments.

Ridership

The projected 2018 ridership for the Dixie BRT is approximately 4,600 riders per day. The local Route 18 is predicted to continue to carry 1,900 riders per day, resulting in a total of 6,500 riders per day in the corridor, which is an increase of 41% over the projected 2018 baseline of 4,600 daily riders. This ridership forecast was developed using equations from TCRP Report 118: *Rapid Transit Practitioner's Guide*. It is based on elasticities related to increased frequency and shorter travel times as well as the benefit of enhanced transit features and amenities. It averages the high and low forecasts for two different methods to yield an expected value.

Costs and Revenues

The proposed new service frequency would require approximately 78 additional service hours per day or over 24,000 hours per year. Using a fully allocated cost of $115 per revenue hour results in an incremental annual operating and maintenance cost of $2.8 million in 2018. (The hourly cost is based on an assumed 2014 cost of $106 per hour increased by 2% annually.) The additional revenue from the new riders is conservatively estimated at approximately half a million, which is a fare-box recovery of approximately 20 percent for the fully allocated incremental costs. This revenue estimate would change depending on the final decision regarding the fares.

Project Benefits

The Dixie Bus Rapid Transit Project will offer a variety of benefits to the community. Current transit riders will experience shorter transit travel times, enhanced waiting areas, and improved service reliability. These service improvements will attract new passengers, which will reduce auto VMT and related auto-oriented impacts such as fuel consumption and air pollutant emissions. This premium service will enhance the image of transit in the region and encourage economic investment in the corridor. The Dixie Corridor project can also be a catalyst for BRT investments in other corridors.