KIPDA
Kentuckiana Regional Planning and Development Agency

LOUISVILLE DOWNTOWN PARTNERSHIP

Downtown Mobility Study

Louisville, Kentucky

Prepared by

HDR

In association with

wsp new!west

November **2017**

Contents

1 Purpose and Context

1.1 Study Purpose

The purpose of this study is to *develop a multimodal plan for improving mobility and enhancing safety for all transportation system users in the core area of downtown Louisville to support economic development and enhanced livability*. The study considers all transportation modes and is a data driven assessment of a wide range of projects proposed and recommended by agencies, stakeholders, and the public over the last several years. Seven major project objectives include:

1. Address improved mobility for all transportation system users;
2. Consider all major modes (pedestrian, bicycle, transit, street/auto/truck);
3. Coordinate the plan with other ongoing plans in the area and region;
4. Take into account ongoing and planned economic development opportunities;
5. Consider both traditional and innovative approaches to improving mobility and infrastructure;
6. Prepare data driven assessments supporting the study findings; and
7. Provide prioritized near-term and long-term project recommendations.

1.2 Study Area

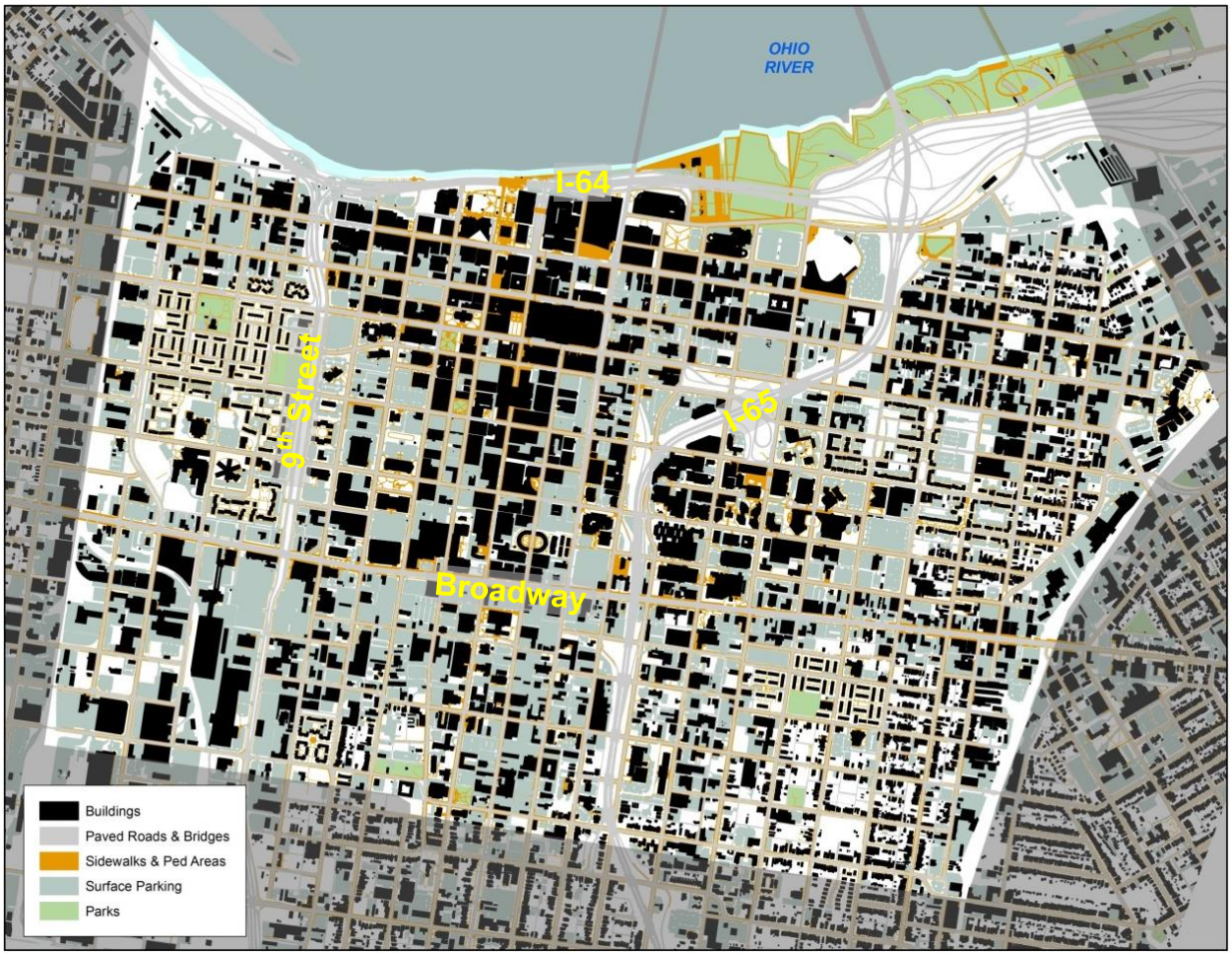
The study area for the project is bounded by the Ohio River to the north, the CSX Railroad to the east, Kentucky Street to the south, and 13th Street to the west, as illustrated in **Figure 1-1**.

Figure 1-1. Study Area

Within the study area, the urban form is that of a typical downtown, with a cluster of high-density multi-story office, commercial, retail and restaurant buildings, other lower-density employment areas, surface parking lots, residential areas, and parkland, all connected via a grid-street network. This urban form is illustrated in **Figure 1-2** and described in more detail below.

The core Central Business District (CBD) is located in the center of the study area and extends from the Ohio River south to Broadway and from 9th Street east to the vicinity of I-65. The district contains the tallest buildings in Kentucky and is home to several major employers. It is an important government center with local, state and Federal agency offices. In addition, the district contains major tourist and entertainment destinations, including 4th Street Live, the Louisville Convention Center, West Main Historical District, the KFC Yum! Center, Louisville Slugger Field, and others. There are also numerous museums, hotels, restaurants, and other businesses.

Figure 1-2. Study Area Urban Form



The downtown hospitals and major medical institutions are located east of I-65 and south of Muhammad Ali Boulevard. This medical district includes Norton Hospital, University of Louisville Hospital, KentuckyOne Health Jewish Hospital, and many medical office buildings and health service providers. Residential and smaller employment buildings surround the CBD to the west,

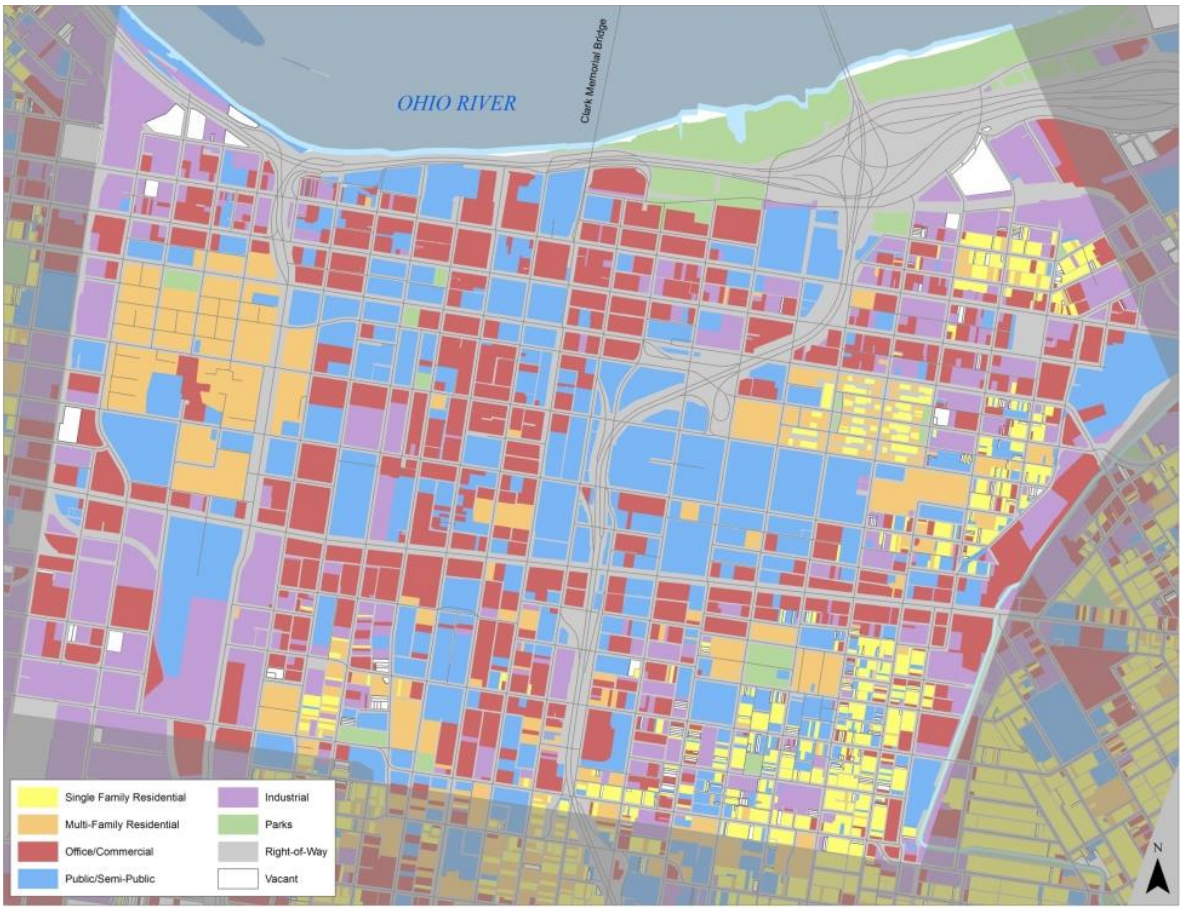
south, and east. Parking garages are located mainly within the CBD, but surface parking is located throughout the study area, both inside and outside the CBD.

Adjacent to the riverfront to the northeast is Waterfront Park, which contains the majority of the public park land within the study area. Waterfront Park is an 85-acre multi-purpose park with gardens, walking/biking trails, picnic areas, a playground, space for concerts and festivals, a Promenade along the river, and extensive open space. Renovation of the Big 4 Bridge, an historic pedestrian/bicycle facility, which spans the Ohio River connecting Louisville and Southern Indiana, was completed in May 2014 and sees much use and activity.

There are two major interstate highways that traverse the study area. I-64 runs parallel to the Ohio River in the north. I-65 bisects the study area on a north-south alignment and crosses over the Ohio River into Indiana. A second I-65 Ohio River bridge opened to traffic in January 2016.

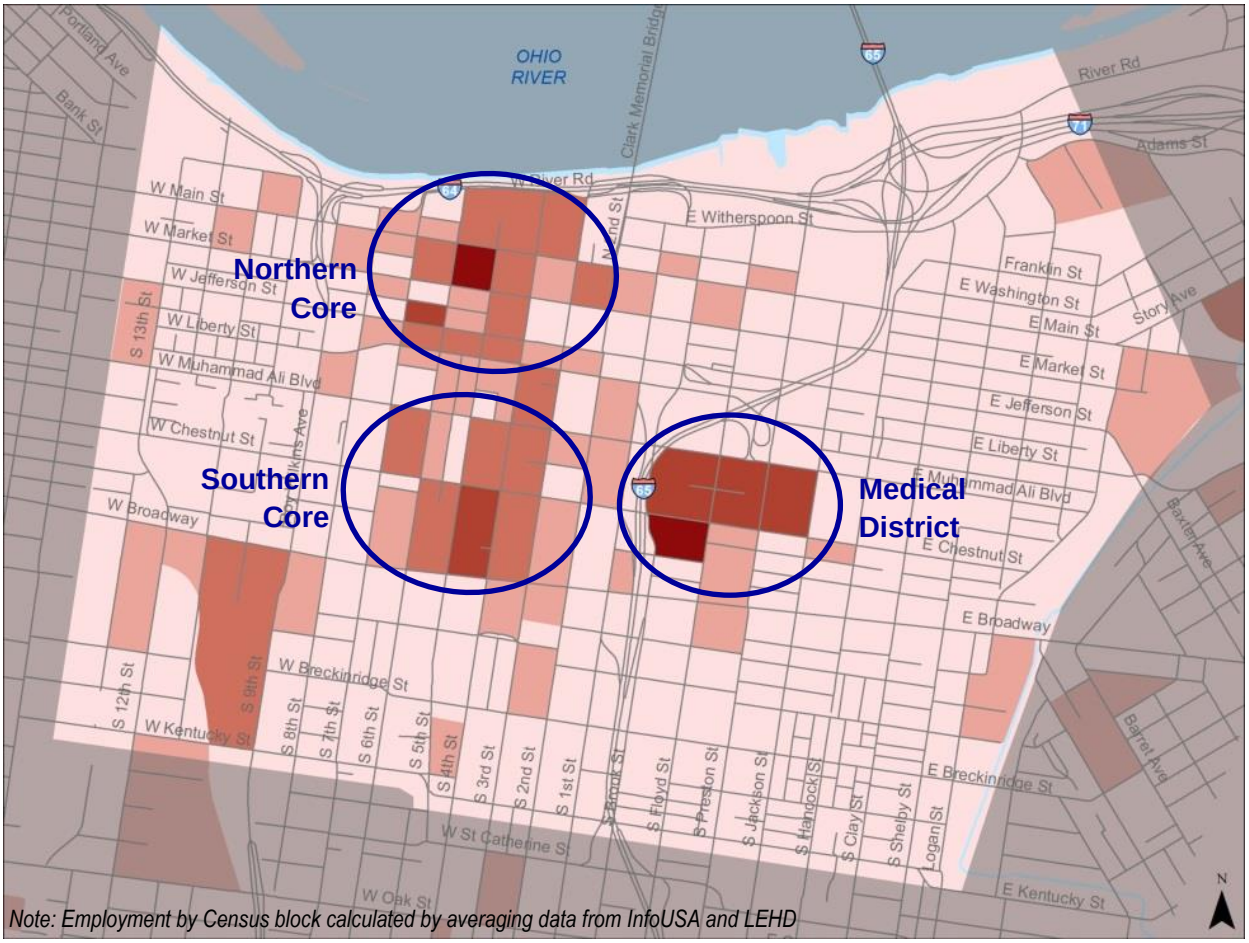
Specific land use types by parcel are mapped in **Figure 1-3**. As the figure indicates, the CBD is primarily occupied by office/commercial and public/semi-public uses, with very little residential or industrial property. Pockets of industrial uses are scattered around the periphery, with the largest industrial properties located in the west. There is a large multi-family residential area west of the CBD, while most of the single-family residential is located east of the CBD.

Figure 1-3. Existing Land Use



There are essentially three main centers of employment within the study area, as indicated by the darker areas on **Figure 1-4**: Northern Core, Southern Core, and Medical District. Approximately 85,000 employees work within the study area, with well over half of them in one of the three major employment centers. Given the small amount of residential property in the downtown area, specifically in proximity to these major employment centers, transportation and mobility to and within the downtown area are important issues.

Figure 1-4. Employment Density



Note: Employment by Census block calculated by averaging data from InfoUSA and LEHD

1.3 Relevant Plans and Projects

This study was prepared in the context of recent and ongoing planning, design, and construction projects throughout the City. The ideas and concepts from numerous recent planning efforts have been considered and several of the most relevant documents are summarized below. In addition, many of these studies and reports are noted throughout the document.

In addition to these recent studies, this work takes into account ongoing planning/design projects such as the Market Street reconstruction and streetscape in NuLu, I-65 Ramp to Brook Street/Jefferson Street, River Road Extension Project, Vision Russell Initiative and Choice Neighborhood Project, Dixie Highway Bus Rapid Transit Project, and 9th Street Planning Study. Some of these projects are transportation related, while others are focused on development or

land-use. It also takes into account ongoing and recently completed construction projects such as the Ohio River Bridges, OMNI Hotel, improvements made around the Jefferson County Community and Technical College campus, and the reconstruction of the of the Convention Center. These are just a few examples, as there is considerable planning, design, and construction activity going on throughout downtown Louisville.

A brief summary of some of the recent plans referenced in this document includes:

MOVE Louisville, 2016

This document is a long-range multi-modal transportation plan for all of Metro Louisville. The focus of the plan is to encourage transportation decisions that will increase multimodal mobility between living, working, shopping and entertainment areas. The plan considers all transportation modes including walking, bicycle, transit, paratransit, and automobile. The plan recommends several transportation projects in the downtown area.

Downtown Louisville Master Plan, February 2014

This master plan presents a vision for downtown Louisville as well as specific projects that can be implemented over the next 10 years to achieve that vision. It addresses commercial and residential development, urban form, connectivity, and an implementation plan. It includes several important transportation project recommendations.

Louisville Metro Government Transportation Study, June 2014

This report summarizes the transportation habits of workers in downtown Louisville, in terms of how they get to work, factors that influence their transportation choices, and potential improvements to the existing infrastructure recommended by study respondents. Data was gathered via an online survey conducted in May 2014. The survey highlights challenges and opportunities for improving the transportation system in downtown.

Louisville Metro Bike Master Plan – Projects Update 2016-2020, May 2016

This document outlines the current bicycle system and the proposed near-term improvements to that system. Several of the projects are already completed, but many are still in the planning or design phases of project development.

Road Diet Feasibility Review, January 2015

This report documents the screening of 26 candidate corridors throughout Metro Louisville for road diets or lane reductions. The corridors were evaluated based on existing geometry and cross section, available capacity, transition location/design, and transit operations. A number of the candidate corridors fall within the downtown study area, including Broadway (entire study area length), Market Street (from 1st Street to Chestnut St Connector), Main Street (from 9th Street to the western study area limit and from 1st Street to Chestnut St Connector), Jefferson Street (from 1st Street to the western study area limit), River Road (from Witherspoon Street to the eastern study area limit), and Kentucky Street (from 9th Street to the eastern study area limit).

Louisville Downtown Development Plan – Connectivity Study Update, March 2008

This report is an update to the 2002 Downtown Development Plan which examined the downtown context and connections between and among the major development centers in downtown Louisville. The update focused on the northern section of downtown Louisville, and specifically recommended improved pedestrian facilities along West Main Street and connections between Main Street and the public open spaces along the River.

Downtown Louisville Two-Way Street Study, October 2009

This report summarizes a study that evaluated the feasibility of converting streets in downtown Louisville from one-way to two-way operations. The operational characteristics and potential traffic impacts of the conversions were evaluated. The study area extended from 9th Street to Baxter Avenue, and from the Ohio River south to Oak Street.

Louisville Metro Bike Master Plan, May 2010

This document built on the previous 2006 Bicycle Plan and includes updated goals and objectives defined with the assistance of Bike Louisville and the Bicycle Task Force. The two primary goals of the plan are to increase bicycling activity, and to increase safety for cyclists by reducing crashes with motor vehicles. The plan recommends expansion of the bicycle system to 550 miles.

Louisville Metro Pedestrian Master Plan, March 2010

This effort built on the previous 2008 Walkability Plan with updated goals and objectives formed by the Step Up, Louisville and Active Living committees. The two primary goals of the plan are to improve and expand upon the current pedestrian network, and to improve safety by reducing the rate of pedestrian crashes by half over 20 years. The plan calls for expanding the system to over 600 miles. Given the fairly good coverage of sidewalks in the downtown area, there are not many additional projects recommended in this study that apply to this study's project area.

Horizon 2035 Metropolitan Transportation Plan, August 2014

This document is the long-range transportation plan for the Louisville region's Metropolitan Planning Organization (MPO), the Kentuckiana Regional Planning and Development Agency (KIPDA). In accordance with federal regulations, it provides long and short-range strategies to help develop a multimodal system that provides for the safe and efficient movement of both goods and people in the region.

Louisville Waterfront Park Phase IV – Conceptual Master Plan Report, July 2014

This report was approved by Metro Council in 2015 and focuses on the westward expansion of the Waterfront Park improvements along the Ohio River in downtown Louisville. The Phase IV area includes approximately 22 acres between 9th and 13th Streets. The main transportation related goals for this area include improved connectivity for all modes and redevelopment of infrastructure. This project was advanced in April 2017 with the acquisition of 4.8 acres by the Metropolitan Sewer District (MSD) for construction related to a tunnel basin project. Once they

have completed their work on the property they will turn most of it over to Metro for the future park. **Figure 1-5** illustrates the latest plan.

Figure 1-5. Waterfront Park Phase IV

Source: https://louisvilleky.gov/sites/default/files/louisville_forward/waterfront_park_phase_iv_rendering_4.10.2017.pdfsources.

1.4 Transportation Context

While it is impossible to predict exactly how Louisville's transportation system will look and function in the future, reasoned projections can be made for the 5 to 15 year time horizon based on historic trends, socioeconomic trends, policy goals, technologic developments, engineering and planning innovations, and the expected outcomes of current decisions. Several of these topics are addressed below at a high level to present a context for this study.

TRENDS

There are several national and local historic trends at work with regard to mobility in Louisville.

- Pedestrian Planning – Nationally and locally there is a significant push for improved pedestrian mobility, accessibility, and safety. Higher expectations from the public related to walkability have significantly impacted street and community planning and design.

- Pedestrian Activity and Safety – Based on count data, pedestrian activity in the downtown has not changed very much in the last 10 years; however, with the new Omni Hotel, expanded Convention Center, and other new or renovated hotels and residential developments, future growth is expected. There have been a number of pedestrian fatalities and injuries in the downtown area over the last five years and therefore, pedestrian safety continues to be a major concern for Metro planners and engineers.

- Bicycle Activity and Safety – Bicycle use has increased in the downtown area over the last 10 years; however, it remains a very small share of the total modal activity. Bicycle

activity is expected to increase further with the addition of the newly completed bike share system and new bicycle facilities. With the growth of cycling both locally and nationally, bicycle safety considerations have become a more important part of downtown transportation projects.

- Transit Activity – Transit Authority of River City (TARC) ridership has not changed substantially over the last 15 years except for a small increase in 2007-2008. The agency has continued to refine and improve service, but the macro-economic changes such as population and employment shifts to the suburbs, telecommuting, and new transportation services such as Uber/Lyft have limited passenger growth. The downtown is still the central hub for the system, though the cross-town and suburb-to-suburb transit travel demand has increased somewhat over those 15 years. It is important to note that TARC will soon prepare a comprehensive operational analysis of all routes, stops, and operations along with a strategic plan addressing all aspects of their operations. This upcoming effort could change how TARC looks and operates in the coming years.

- Traffic Growth - Regionally and nationally, traffic growth stalled during the recession, but it has since begun to increase again. However, in the downtown core, traffic has not increased very much in the past 10 years. Again, with new development underway, a moderate increase is expected over the next 10 years. Ongoing planning and travel modeling efforts in the downtown area reflect this trend.

- Public Expectations – The public has increasingly high expectations from the transportation system. They expect, among other things, a high level of reliability and safety; wide range of modal choices; accessibility to dispersed destinations; on-demand service characteristics; and moderate costs.

INFRASTRUCTURE

There have been numerous recent improvements in the transportation infrastructure throughout the study area that benefit safety and mobility. The completion of the Ohio River Bridges project, including the I-64/I-65/I-71 interchange improvements, has had a large impact on transportation in and around downtown. Smaller scale examples include the implementation of new signal operations and equipment such as leading pedestrian indicators and flashing yellow arrows as well as updates to signage and striping to improve safety. Ongoing efforts to coordinate traffic signal timing have improved mobility. Americans with Disabilities Act (ADA) compliant upgrades have also increased mobility options for persons with disabilities in the downtown area.

VEHICLE TECHNOLOGY

Over the last several decades advancements in vehicle technology have been significant, including numerous safety improvements that have reduced fatalities and injuries for automobile occupants. Additional features are rapidly being introduced in the automobile industry, including advance warning and automated vehicle control technologies. The introduction of all-electric and high efficiency gasoline powered vehicles is also beginning to change the mobility landscape. With these new technologies, vehicle operating costs may come down along with emissions rates. TARC implemented all-electric buses on the downtown circulator routes in

2015 and then added six more Proterra electric buses in 2016 running on Route 4 (Downtown to Iroquois Park). With 16 Proterra buses, TARC has one of the largest electric bus fleets in the US.

INFORMATION

Increased access to mobility related data such as mobile applications (apps) providing maps and directions as well as real time travel data has also changed the transportation landscape. It is now possible to obtain real-time traffic data for travel to/from and through downtown Louisville in ways that were not possible 15 years ago. Furthermore, phone apps can provide routing options and estimated travel times for walking, biking, taking transit, or driving. Real-time bus arrival information is also available. This information availability impacts the travel decisions made by individuals in the downtown core. It also affects where they travel to, with some destinations gaining prominence over others based on marketing presence and the ease of obtaining information about a specific destination.

POLICIES, GUIDELINES, AND INDUSTRY CHANGES

The transportation industry is changing rapidly in many ways. Many new policies have come to the forefront of the transportation system planning field in the last 10 to 15 years. These include new ways of viewing the transportation system as well as new perspectives on how to plan, design, and deliver transportation projects. Some of these policies and related best practices include: complete streets; sustainability; street typologies; improved accessible design standards; quantitative and predictive safety analysis; bicycle facility planning standards; and new project funding and delivery mechanisms.

1.5 Agencies and Responsibilities in Downtown

There are many agencies with responsibilities for the planning, construction, operation, and maintenance of the downtown transportation system. Each of these agencies is discussed briefly below to provide the agency context for planning for improvements to the system.

Louisville Metro – Metro owns and maintains the majority of the street system in downtown. They are responsible for planning, design, constructing, and maintaining al local streets. They also have a Memorandum of Agreement (MOA) with the Kentucky Transportation Cabinet to maintain many of the state owned streets and highways in downtown. Metro also operates and maintains the traffic signal system downtown. The funds for maintaining and improving the Metro street system come from a variety of sources including local, state, and federal funds. Within Louisville Metro there are several entities that have specific responsibilities and authority for transportation decision making. Three of these include the Department of Public Works – Division of Streets and Road Operations (maintenance, operations, signals, operations funding), Louisville Forward/Develop Louisville (planning and capital funding), and the Public Works - Division of Transportation (planning, design, construction, capital funding).

Transit Authority of River City (TARC) – TARC plans and operates all of the public transit service in downtown. That includes the circulators, local buses, and express buses. They purchase, operate, and maintain the buses. They also market their service. TARC works with Metro to maintain bus stops throughout the downtown. Funds for the transit service, equipment,

and infrastructure comes from a local employment tax, federal funds, fare box collections, grants, local service sponsors, advertising, and other sources. TARC is a key decision maker and a major user of the street system. Changes to the street system often impact TARC stops and/or routes. Given that TARC is a transportation focused agency, most of the TARC departments take part in planning, operating, funding, and/or maintaining the transit system.

Kentucky Transportation Cabinet (KYTC) – KYTC has primary responsibility for all state and federal highways in the downtown. That includes US Highways and Interstates. KYTC has an agreement with Metro to maintain many non-Interstate highway facilities. KYTC retains authority for decision making regarding these highways. KYTC also oversees all federal and state transportation funds that are spent on streets and highways downtown. KYTC involvement includes both local District 5 staff and Central Office staff.

Kentuckiana Regional Planning and Development Agency (KIPDA) – KIPDA is the regional planning agency that is responsible for the continuing, comprehensive, and cooperative transportation planning in the region (the "3 C's"). KIPDA is the agency through with all federal transportation funds must flow. Projects must be on KIPDA's Transportation Improvement Program (TIP) and Long Rang Transportation Plan (LRTP) to be eligible for federal funding. KIPDA provided the federal funding for this project as part of its efforts to conduct regional "3 C" planning. The KIPDA Transportation Division is involved in all regional transportation planning.

Louisville Downtown Partnership (LDP) – LDP was founded in 2013 as a combination of the Louisville Downtown Management District (LDMD), Kentucky's only Business Improvement District and the Louisville Downtown Development Corporation (LDDC), which is a private, non-profit 501(c)(3) organization. LDP's mission is "to take the long view on downtown success, through strengthening commerce, providing high-quality place making, improving visitor, resident and workforce experiences, and to stimulate high-quality development and vitality in Louisville's Downtown." (LDP, 2017) LDP provided the local match funding for this project. LDP staff play an important role in the planning and implementation of projects across downtown, including both transportation and development projects.

Parking Authority of River City (PARC) – PARC is the public parking authority in Louisville. PARC owns, operates, and maintains most of the parking garages in the core of downtown. They also own some small surface parking lots. PARC also owns, operates, and maintains the on-street metered parking. PARC has bonds that are paid using the parking authority revenue. PARC is involved in parking related planning and decision making and some transportation decision making when it involves parking.

Federal Highway Administration (FHWA) – FHWA does not own or operate any of the streets or highways in downtown; however, they do have review and approval authority over some highways, including the Interstate highways and ramps. FHWA is a review, approval, and funding agency in the context of downtown transportation system. FHWA coordinates with KYTC and Louisville Metro on major projects that affect the federal transportation system.

1.6 Report Structure

The structure of this report is to first present the existing conditions and an assessment of study area issues and opportunities. This is followed by a comprehensive listing and screening evaluation of potential projects across all of the four modal plan components plus a policy section. The final chapter presents the evaluation scoring, prioritization, and phasing of the projects that were advanced through the screening process. The modal components plus the policy section include:

1. Pedestrian
2. Bicycle
3. Transit
4. Street / Auto
5. Policies and Agency Coordination

The order of the components is intentional as it allows the study to build up from the pedestrian network to the bicycle network, followed by the motorized modal networks. The street / auto category ultimately includes many of the integrated multimodal projects that involve multiple system components. For example, a complete street project could involve pedestrian, bicycle, transit, and auto elements. In that case, the overall project would be discussed in the Street / Auto section, but portions of the project would be discussed in the other sections with each referring back to the larger overall project. As the downtown transportation system is very complex, the interrelationships between the elements are highlighted throughout the document.

2 Existing Conditions

2.1 Safety

As shown in **Table 2-1**, there were approximately 11,990 crashes[1], including 2,100 injury crashes and nine fatal crashes, recorded within the study area between 2011 and 2015. This represents over five crashes per day and over one injury crash per day. Of those crashes, 347 (3%) were pedestrian crashes and 144 (1%) were bicycle crashes. While pedestrian and bicycle crashes represent only 4% of the total crashes, they represent 18% of the injury crashes and 56% of the fatal crashes, highlighting the need to address these crash types.

Table 2-1. Area Crash Data (2011 to 2015)

	Fatal	Injury	Property Damage Only	Total
Motor Vehicle Only Crashes	4	1,733	9,764	**11,501**
Pedestrian Crashes	4	283	60	**347**
Bicycle Crashes	1	94	49	**144**
All Crashes	**9**	**2,110**	**9,873**	**11,992**

Source: HDR analysis of crash data from KIPDA and Kentucky State Police (crashinformationky.org/KCAP)

Most of the crashes within the study area occurred at major intersections, as illustrated in **Figure 2-1**, which shows the density of crashes.[2] Corridors with larger numbers of crashes include Broadway, Jefferson Street, 2nd Street, 1st Street, and Brook Street. These are also the corridors with the highest traffic volumes.

The seven highest crash locations by number of crashes are listed in **Table 2-2** (crashes within 200 feet of the center of an intersection). They include two intersections on Brook Street and four on Broadway. Brook Street at Jefferson Street exceeds the next highest location by over 40 crashes. Using planning-level approach volumes, crash rates were estimated for the seven locations. In general, the intersections with the most crashes also had the highest crash rates. Due to lower approach volumes at **Brook St & Muhammad Ali Blvd**, that intersection had the second highest crash rate despite a lower number of overall crashes.

[1] Based on geocoded crash data from the Kentucky State Police website, excluding crashes on the interstates.
[2] Based on crashes within a 200 foot radius of a specific location.

Figure 2-1. Total Crash Density

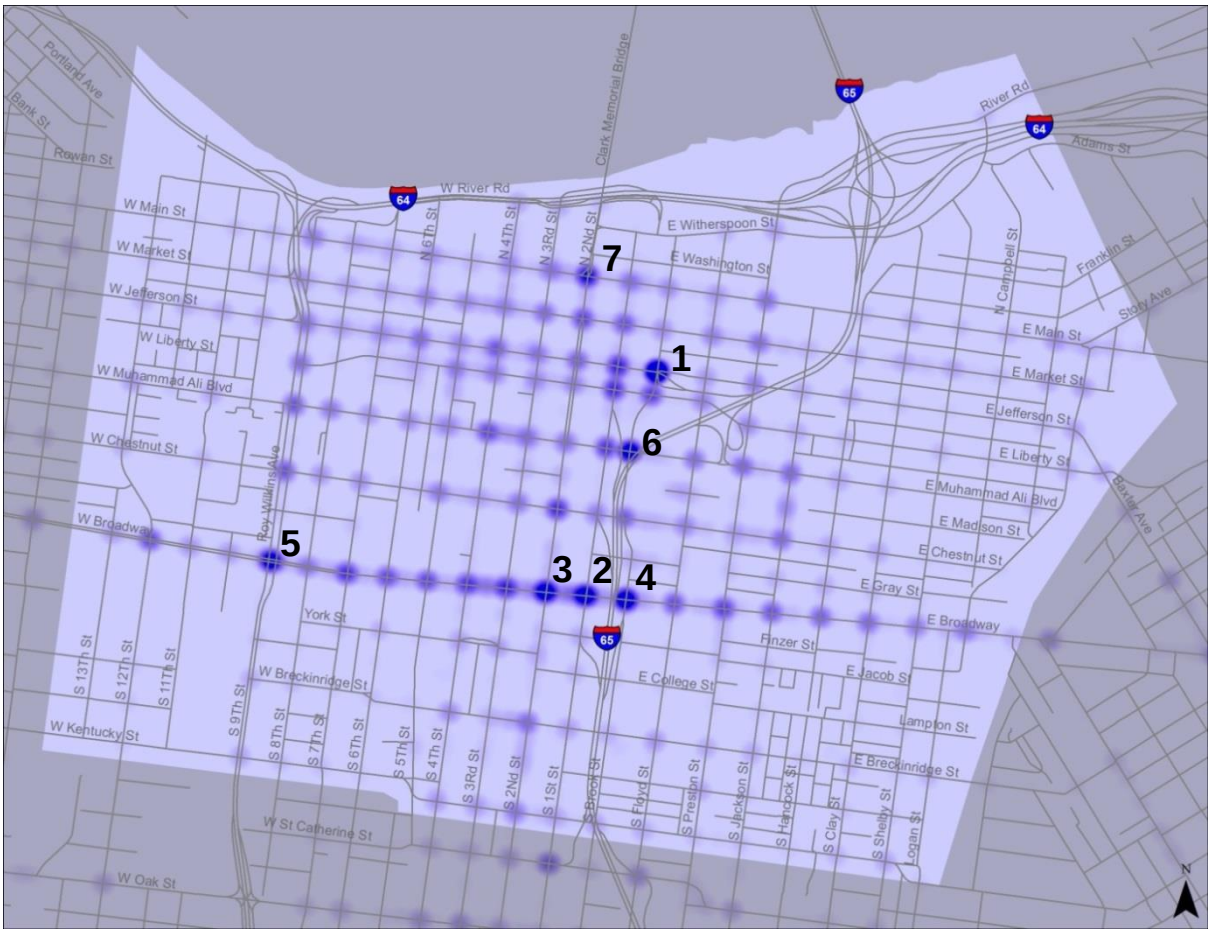


Table 2-2. Seven Highest Total Crash Locations (2011 to 2015)

		Fatal	Injury	Property Damage Only	Total Crashes	Crash Rate (Crashes/10MEV)
1	Brook St & Jefferson St	0	34	231	265	**50.1**
2	1st St & Broadway	0	53	171	224	34.7
3	2nd St & Broadway	0	40	173	213	26.5
4	Brook St & Broadway	0	29	179	208	28.4
5	9th St/Roy Wilkins Ave & Broadway	0	45	142	187	25.1
6	Brook St & Muhammad Ali Blvd	0	14	160	174	**43.3**
7	2nd St & Main St	1	10	135	146	26.4

Source: HDR analysis of crash data from KIPDA and KSP Note: 10MEV = 10 Million Entering Vehicles

The fatal and injury crash density for 2011 to 2015 is illustrated in **Figure 2-2**. As shown, Broadway, Muhammad Ali Boulevard, Jefferson Street, and 9th Street are high injury crash corridors. The seven highest injury/fatal crash locations are listed in **Table 2-3** (based on injury

or fatal crashes within 200 feet of the center of an intersection). Five Broadway intersections are in the top seven; Broadway has as many as three lanes per direction, lacks dedicated turn lanes, and is a relatively higher speed facility. Injury crash rates were developed for these intersections and are listed in **Table 2-3**. Several other intersections were analyzed and despite not being in the top 7 for total injury crashes, they are worth mentioning due to their high crash rates (resulting from lower approach volumes). They include 1st Street & Muhammad Ali Blvd (7.1 injury crashes per 10MEV) and 9th St/Roy Wilkins Ave & Muhammad Ali Blvd (5.2 injury crashes per 10MEV).

Figure 2-2. Injury and Fatal Crash Density

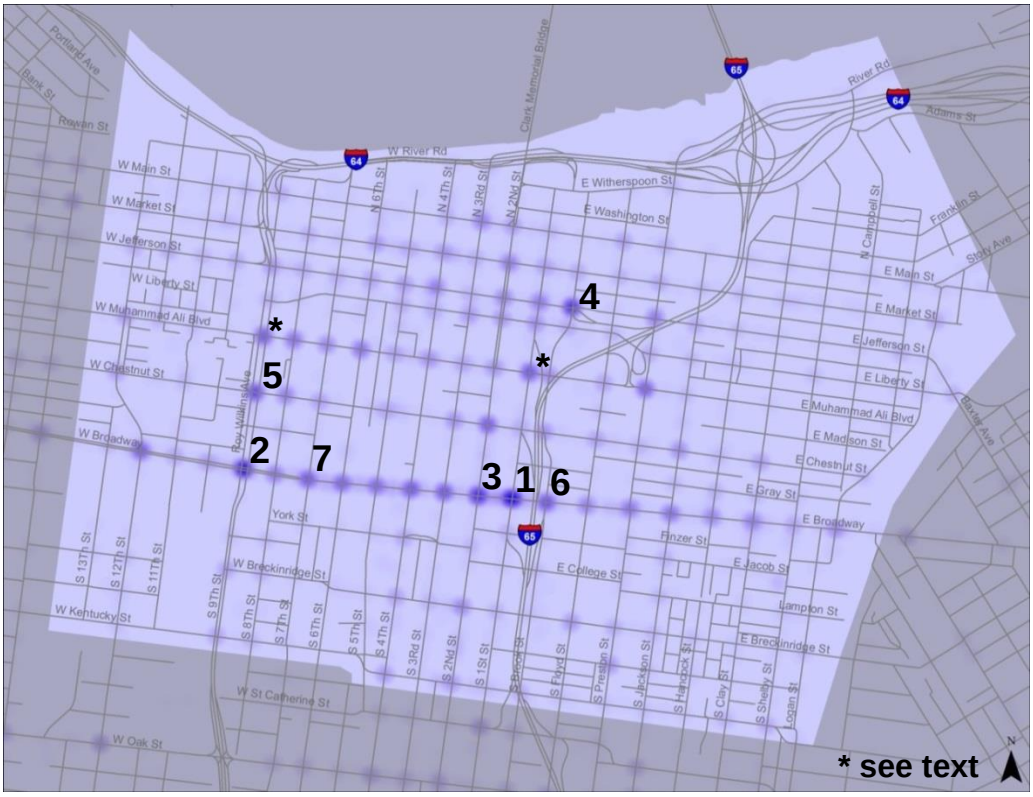


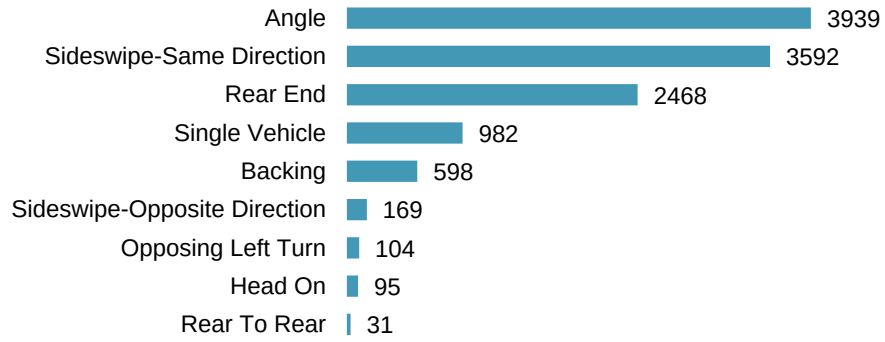
Table 2-3. Seven Highest Injury/Fatal Crash Locations (2011 to 2015)

		Fatal Crashes	Injury Crashes	Crash Rate (Crashes/10MEV)
1	1st St & Broadway	0	53	8.2
2	9th St/Roy Wilkins Ave & Broadway	0	45	6.0
3	2nd St & Broadway	0	41	5.1
4	Brook St & Jefferson St	0	34	6.4
5	9th St/Roy Wilkins Ave & Chestnut St	1	28	5.2
6	Brook St & Broadway	0	29	4.0
7	7th & Broadway	0	28	5.7

Source: HDR analysis of crash data from KIPDA and KSP Note: 10MEV = 10 Million Entering Vehicles

The crash types that are predominant in the study area include angle crashes, followed by sideswipe same direction crashes and then rear-end crashes as shown in **Figure 2-3**. A more detailed review of the data showed that many of the angle crashes were between two vehicles headed straight. As can be expected in a downtown urban environment, there were also many crashes involving a parked auto or autos in the process of parking.

Figure 2-3. Crashes by Type



Pedestrian and bicycle crash density plots are provided in **Figure 2-4 and Figure** 2-5 respectively. The most common areas for pedestrian crashes are Broadway, 4th Street, and at Chestnut and 2nd Street. Bicycle crashes are most common on Broadway, Market and 3rd Street.

Figure 2-4. Pedestrian Crash Density

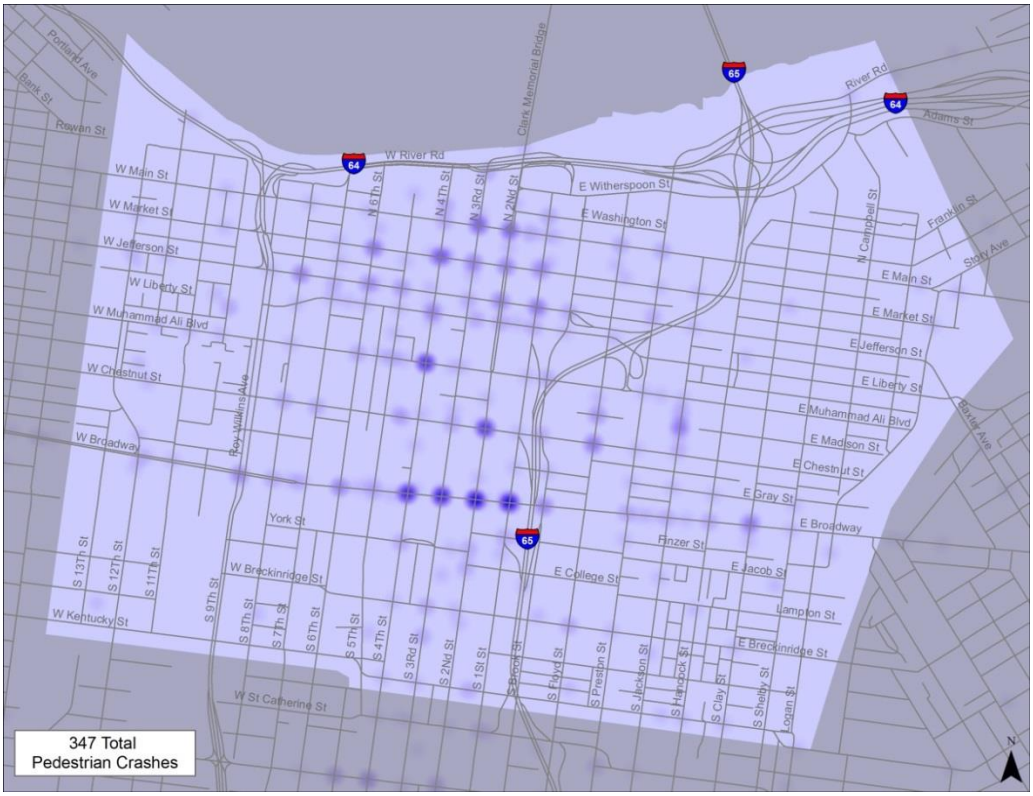
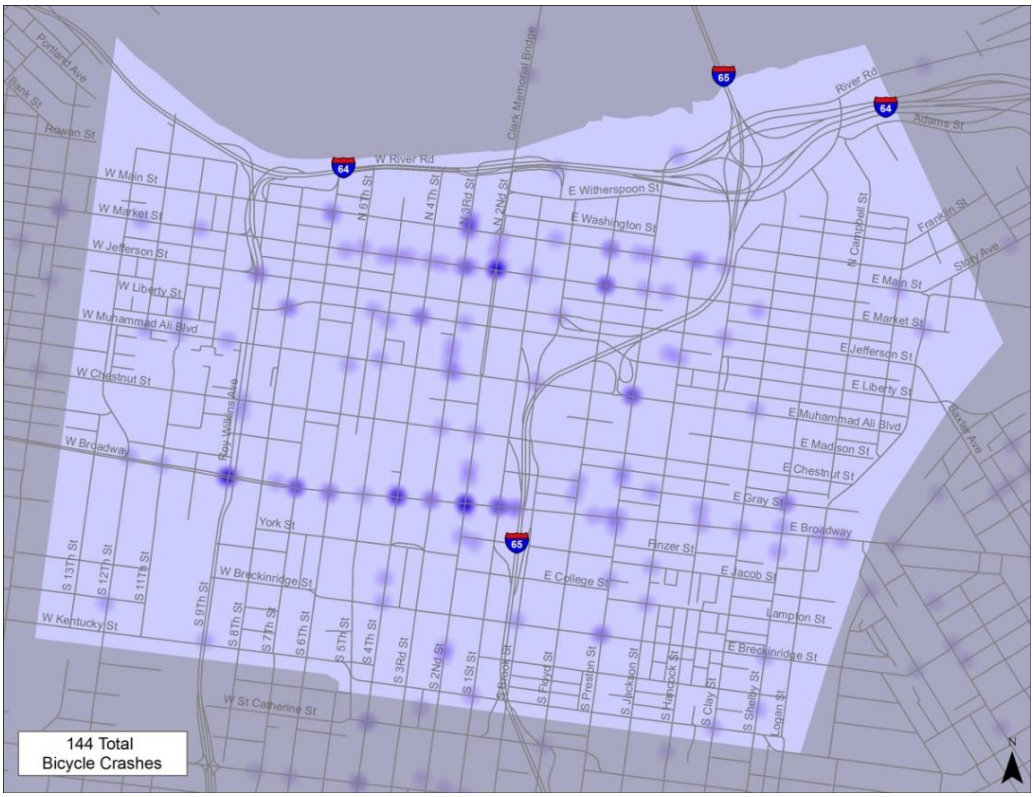


Figure 2-5. Bicycle Crash Density



Vehicle speed is a major factor in determining the severity of pedestrian and cyclist crashes. Research has demonstrated that modest increases in vehicle speed can lead to significant increases in the rates of serious injury or death for pedestrians and cyclists (see **Figure 2-6)**. Given that pedestrian and bicycle crashes represent a disproportionally high share of the fatal and injury crashes downtown, it is important to consider vehicle speed in the effort to reduce the number of fatal and injury crashes.

Figure 2-6. Total Crash Density

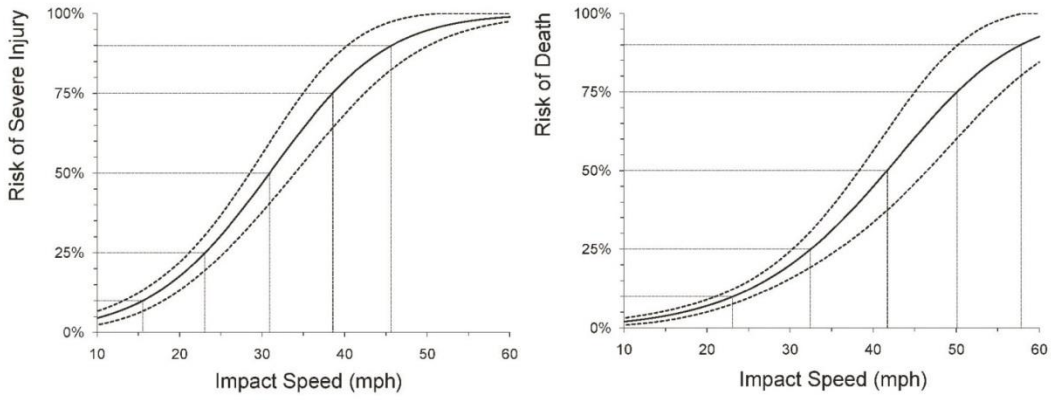


Figure 1. Risk of severe injury (left) and death (right) in relation to impact speed in a sample of 422 pedestrians aged 15+ years struck by a single forward-moving car or light truck model year 1989–1999, United States, 1994–1998. Risks are adjusted for pedestrian age, height, weight, body mass index, and type of striking vehicle, and standardized to the distribution of pedestrian age and type of striking vehicle for pedestrians struck in the United States in years 2007–2009. Dotted lines represent point-wise 95% confidence intervals. Serious injury is defined as AIS score of 4 or greater and includes death irrespective of AIS score.

Source: Impact Speed and a Pedestrian's Risk of Severe Injury of Death (AAA Foundation for Traffic Safety, 2011)

Safety Summary

The crash analysis highlighted Broadway as an important corridor for safety improvements across all modes. For vehicular traffic, it emphasized the Jefferson Street/Brook Street intersection and intersections along 1st Street, 2nd Street and 9th Street. For pedestrian and bicycle safety, in addition to the Broadway corridor, the analysis highlighted intersections along 2nd Street, 3rd Street, and 4th Street.

Pedestrian safety continues to be a key priority in Louisville. Louisville is in the final year of a three-year federal grant to fund pedestrian safety related work, including education and outreach. Louisville was awared this grant in part because of the high number of pedestrian fatalities and injuries compared to peer cities.

2.2 Pedestrian Facilities

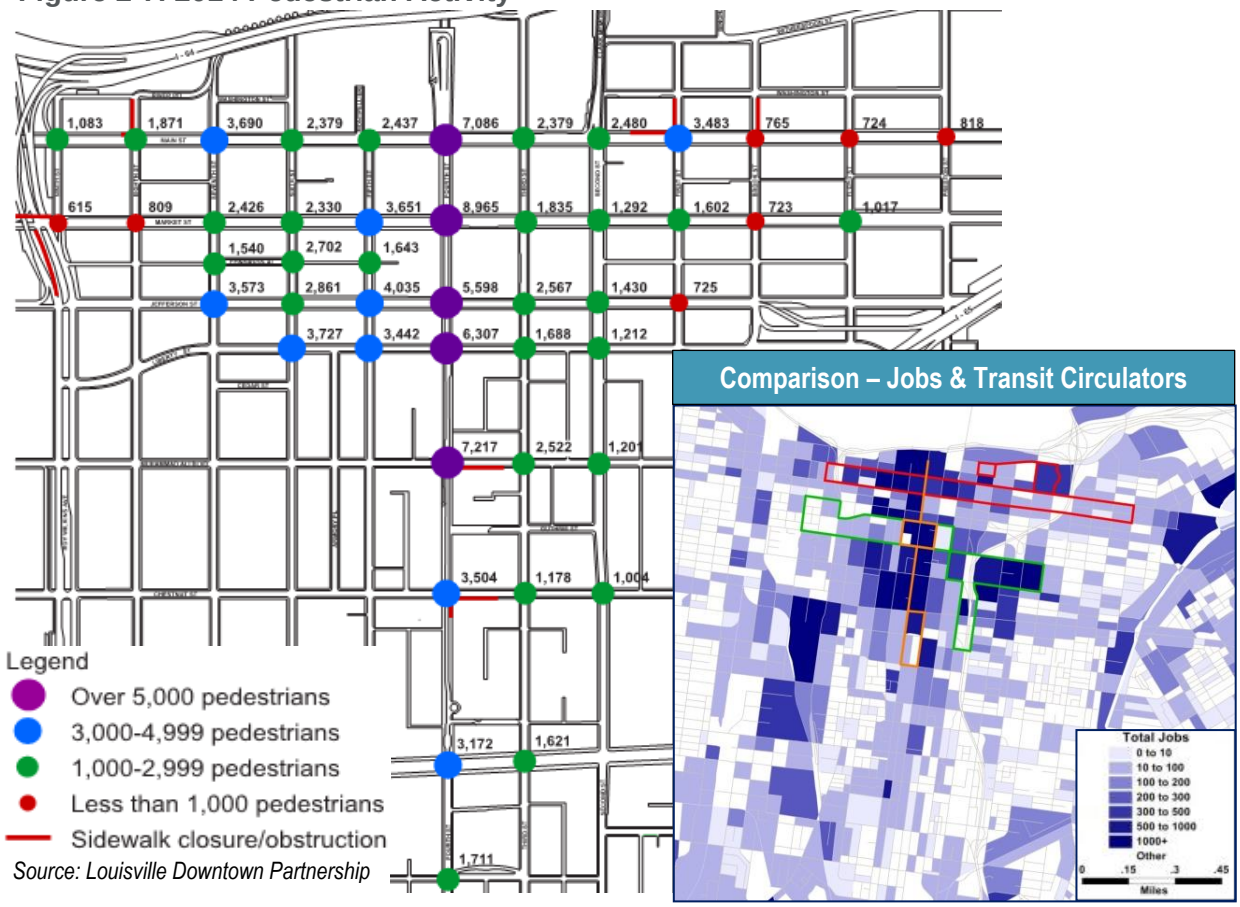
The current environment in downtown Louisville facilitates basic pedestrian mobility. There are sidewalks, crosswalks, and pedestrian signals, including pedestrian countdown signals throughout the downtown area. Nearly all locations are ADA compliant. Many streetscapes and building frontages have been improved, facilitating safe pedestrian flows on the sidewalks, providing sufficient space for both walking and standing, and enhancing the attractiveness of the area at a pedestrian scale. 4th Street between Liberty Street and Muhammad Ali Boulevard (4th Street Live!) has been redeveloped as a shared use space that is often restricted to pedestrians only. However, even with the pedestrian-oriented improvements, there are still further improvements that can be made to enhance the walkability, functionality, safety, and attractiveness of the downtown area.

PEDESTRIAN FLOWS AND ACTIVITY

Pedestrian activity is focused on key corridors and open space areas. **Figure 2-7** shows 12-hour pedestrian activity based on counts taken in 2014. As expected, 4th Street is the corridor with the highest pedestrian flows. The area generally bounded by 7th Street, Liberty Street, 4th Street, and Main Street is the area with the highest level of pedestrian activity.

The high pedestrian corridors and nodes on **Figure 2-7** correlate well with the high employment density areas and activity corridors/nodes. For example, the highest recent pedestrian count was at Market Street/4th Street. The Kentucky International Convention Center is on one corner of this intersection and the 35-story 400 West Market Building is on another corner.

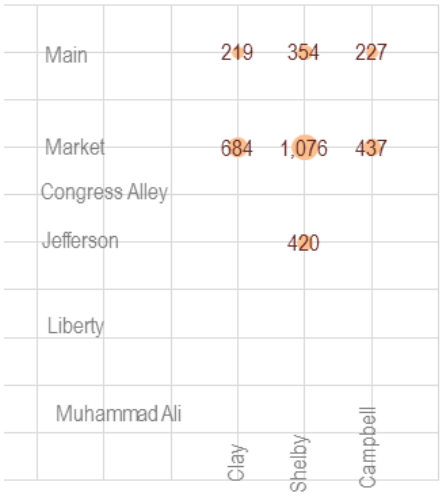
Figure 2-7. 2014 Pedestrian Activity



Source: Louisville Downtown Partnership

There are lower pedestrian volumes on the streets outside of the major development and activity areas, including the NuLu area east of downtown along Market Street between Clay Street and Campbell Street. **Figure 2-8** shows pedestrian volumes where counts were available in NuLu. The intersection of Market Street and Shelby Street is the highest volume location in NuLu, with 1,000 pedestrians over 12 hours.

Figure 2-8. NuLu Approach Counts



The downtown pedestrian activity extends across the entire day, but as expected there is a significant peak from 12:00 to 1:00 PM as shown in **Figure 2-9**. This figure shows the cumulative arriving pedestrians at all downtown count locations during each hour. There is a small peak from 8:00 to 9:00 AM and another small peak from 5:00 to 6:00 PM. The peaking seems to indicate a large number of people walk to/from lunch or for exercise during their lunch break. **Figure 2-10** illustrates the one hour pedestrian counts in the study area by intersection.

Figure 2-9. Hourly Pedestrian Volumes – Cumulative for All Locations

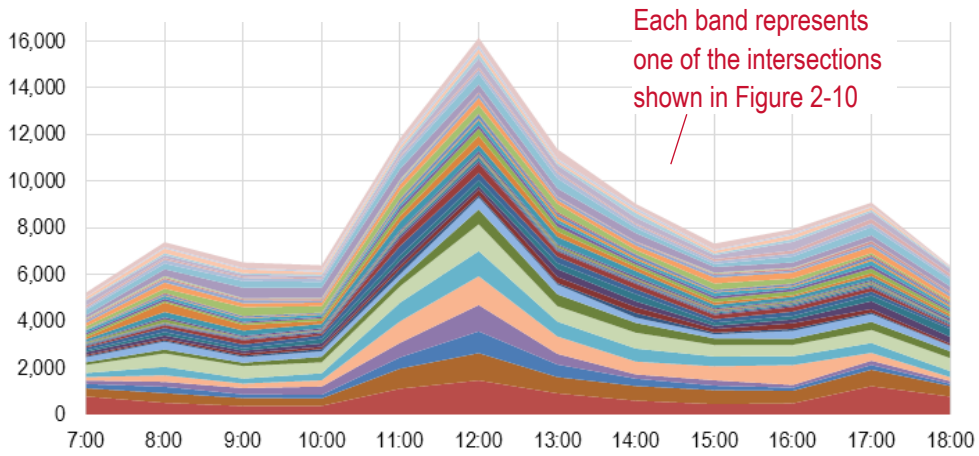
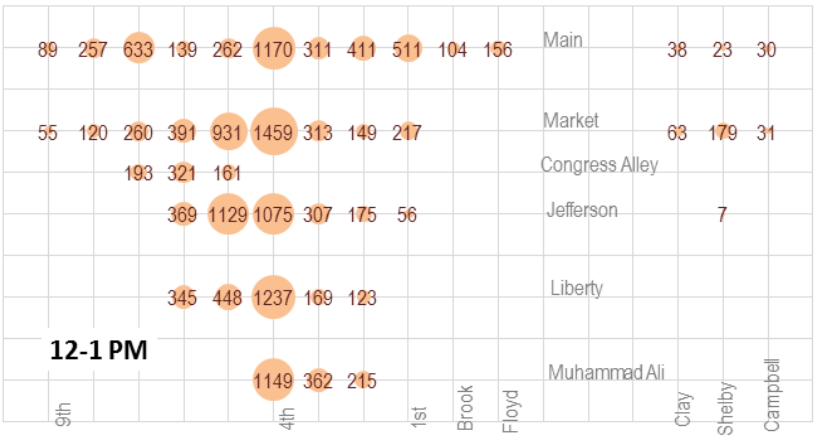


Figure 2-10. Pedestrian Volumes from Noon to 1 PM, selected intersections



A review of historical pedestrian activity data demonstrates that the center of activity is in nearly the same place as it was 10 years ago. It also shows that pedestrian activity has not increased and may actually have decreased somewhat over the last 10 years.

In downtown Louisville, few commute trips are walk-only trips (<2% in good weather based on 2014 survey data)[3]. Instead, many commute-related walk trips are part of multimodal trips, with the most frequent being between a parking space and a work location. Other walk trips include non-commute work trips (e.g. between offices), personal business trips (e.g. to a government office), lunch/retail trips (e.g. to/from restaurants), and visitor/tourist trips (i.e. to/from museums, hotels, or other key destinations). Overall, there are a wide range of walk trip purposes.

As the downtown and other areas continue to redevelop it is expected that pedestrian activity will continue to increase. In areas where sidewalks and crosswalks are wide and well marked that will not present new problems. However, in locations where the sidewalks and crosswalks are narrow, missing, not ADA compliant, or where there is insufficient signage and markings, new or upgraded infrastructure may be needed.

A walking and windshield survey was conducted of the study area to further evaluate the existing pedestrian conditions in the study area. Based on those observations several needs or possible improvements were identified as summarized in **Table 2-4**. Several of these observations overlap with recent study findings as outlined below.

[3] *Louisville Metro Government Transportation Study* (June 2014)

Table 2-4. Pedestrian Facility Observations

Street	Cross-Street or Location	Potential Issue
Main Street	3rd St, 5th St, and 9th St	Crosswalk and pavement marking maintenance/visibility
Market Street	9th St to Baxter Ave	Need countdown pedestrian signals, improved ADA ramps and improved crosswalks
Broadway	Clay, Jackson, Preston, and Floyd	Crosswalk and pavement marking maintenance/visibility
	1st and 2nd Streets	Countdown pedestrian signals
	3rd St, 4th St, and 5th St	Crosswalk markings and several countdown pedestrian signals
	7th St to 13th St	Crosswalk and pavement marking maintenance/visibility
2nd Street	Kentucky, Breckenridge, York, and Market	Crosswalk and pavement marking maintenance/visibility
3rd Street	Market, Jefferson, Guthrie, Chestnut, Broadway, and Breckenridge	Crosswalk and pavement marking maintenance/visibility
5th Street	Breckenridge, York, Broadway, Market, and Main	Crosswalk and pavement marking maintenance/visibility
Riverfront Connections	Belvedere and north of end 4th Street, including walkways from the Galt House to the riverfront	Improvements in the following areas would be beneficial: wayfinding, lighting, and design changes to make them more inviting to visitors

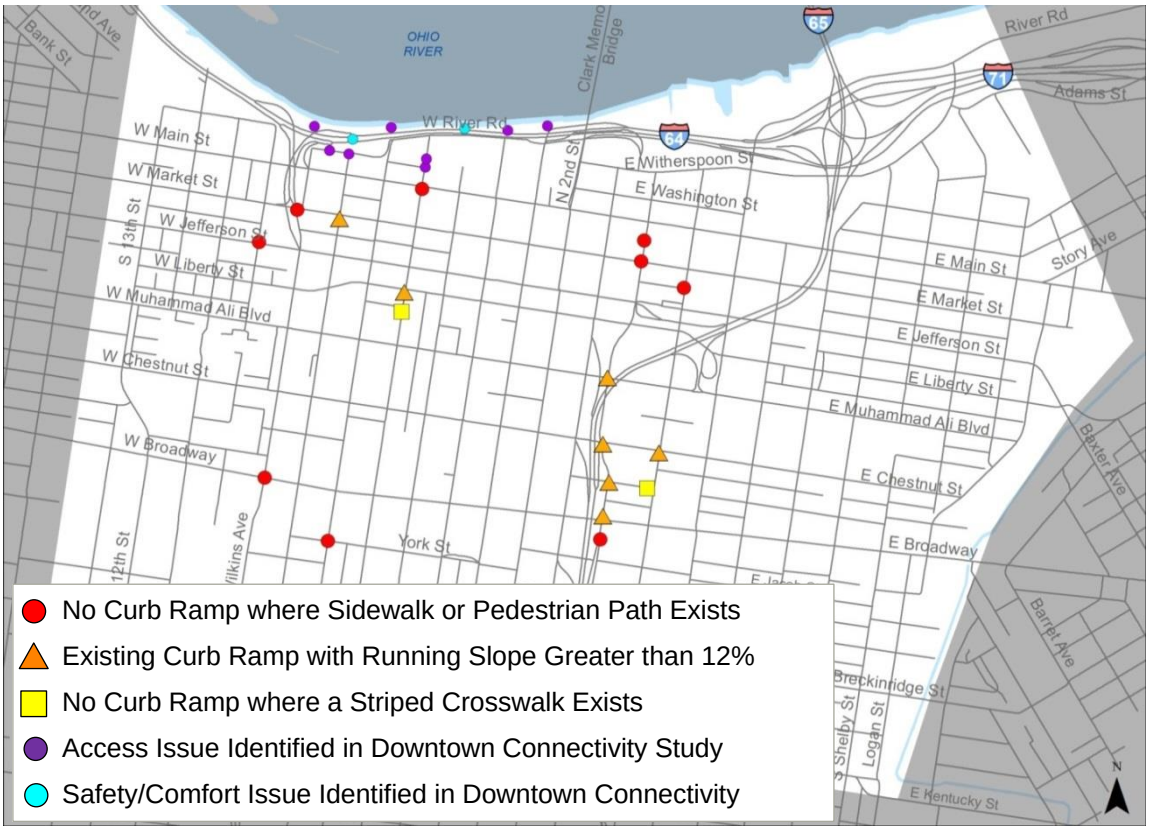
Most sidewalks and curb ramps in the downtown are ADA compliant and Louisville Metro has an ADA Transition Plan to address the remaining locations that need to be upgraded. **Figure 2-11** includes high priority areas identified by the City for upgrades.

Maintaining pedestrian crosswalk markings is another ongoing effort. Other pedestrian mobility issues and needs relate to riverfront access and a few locations where pedestrian connections are limited or missing. They include:

- Poor or missing connections to the riverfront at 9th Street, 8th Street, 7th Street, 6th Street, 5th Street, and 4th Street. The need for these improvements was documented in the Downtown Connectivity Study (2009). **Figure 2-11** shows the issues identified in that study.
- Jefferson Street at Brook Street – No connection on the south leg across the ramp.
- 3rd Street – Narrow sidewalk sections such as west side north of Market Street

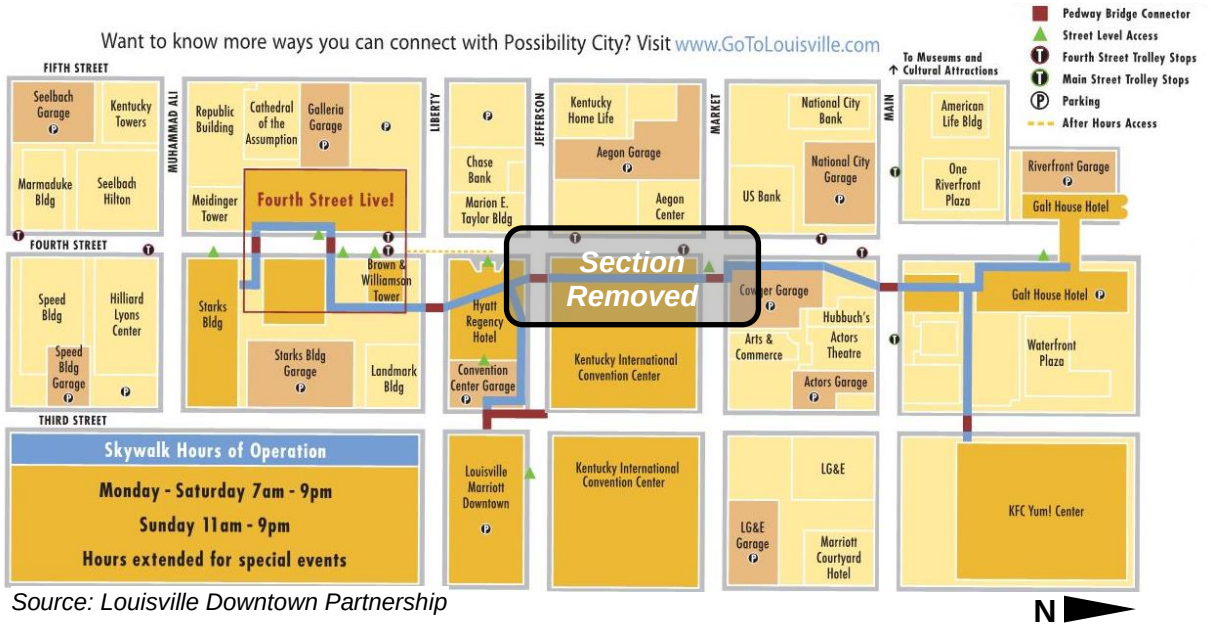
Pedestrian safety, which was discussed previously, is an important issue. This includes needs related to vehicular traffic control and speed as well as improved pedestrian accommodations, which could include modifications to signage, markings, or signal operations as discussed later in the report.

Figure 2-11. Pedestrian Issues Identified in Recent Studies



Prior to the Convention Center reconstruction there was a downtown skywalk system (Louie Link) that ran along 4th Street from the Galt House hotel in the north to the Starks building in the south. It had cross connections to the KFC Yum! Center and Marriott hotel. It was designed to provide pedestrians with a way of walking in a climate controlled environment, above street level between several hotels, the Kentucky International Convention Center, the KFC Yum! Center, parking garages, and 4th Street Live!. The skywalk system before the reconstruction is shown in **Figure 2-12**. The walkway was open for 14 hours on a typical day. The middle portion of the system was removed with the Convention Center expansion project.

Figure 2-12. Historic Louisville Skywalk System (Louie Link)



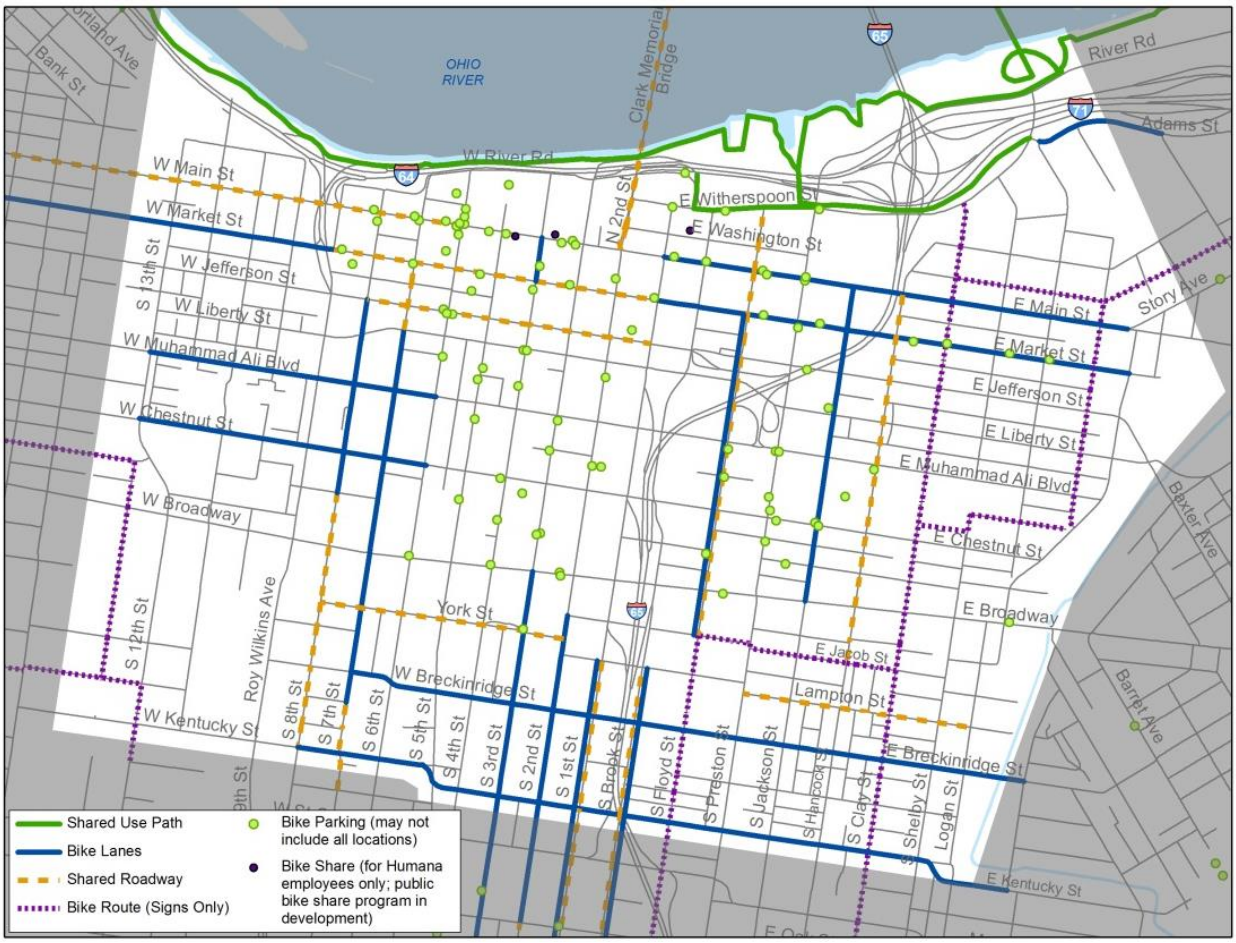
Source: Louisville Downtown Partnership

2.3 Bicycle Facilities

Bicycle facilities have been significantly expanded in the downtown area over the last few years. This includes investments in new bike lanes, shared use roadway lanes, new bike parking (covered and uncovered), and signage and pavement markings. It also includes the LouVelo bike share system that opened in May 2017 with 305 bikes at 27 stations located mainly in downtown, Old Louisville, and NuLu. There is also the existing riverfront portion of the Louisville Loop that passes through downtown. **Figure 2-13** shows the current bike facilities in downtown.

Even with the most recent improvements, there are still no separated bicycle facilities through the downtown core. For example, a rider using the bike lanes on 2nd Street (northbound) and 3rd Street (southbound) to travel to/from downtown would ride in the general traffic lanes north of Broadway. Similarly, east-west riders must use the general traffic lanes or a shared roadway in the core. Apart from the Louisville Loop along the river, there are no complete east-west or north-south separated bike facilities through downtown. Shared lanes and signed bike routes provide the missing connections in several locations.

Figure 2-13. Existing Bicycle Facilities



Although it still represents a minor percentage of the total trips, bicycle use appears to be on the rise in downtown both for commute/transport and for recreation purposes. A recent news article noted that 753 cyclists had been observed over two days at five downtown locations.[4] This is a substantial increase over initial counts from a year earlier. The average ridership of the Humana B-Cycle City bike share system is approximately 4,000 per year,[5] and has been fairly steady compared to the previous year. Future data from the new bike share program will likely provide excellent information about biking trends downtown.

To give a general sense of downtown bicycle ridership, a heat map from Strava Labs has been provided in **Figure 2-14**.[6] Strava Labs offers an app to bicyclists that allows users to track the distance of every bike ride, as well as the route they took, using GPS on their phones. That data is then compiled for all the Strava users showing the most popular bike routes. Typical Strava users are recreational bikers although data from commuters is potentially included as well. The Louisville Loop and the Big Four Bridge are the dominant routes and facilities used. In the east-west direction, Main Street, Market Street, and Jefferson Street (west of 7th Street) all carry

[4] http://www.wdrb.com/story/29621610/observation-of-louisvilles-bike-lanes-reveals-confusion-contention-among-drivers-and-cyclists
[5] Count data from 1/1/13 to 7/1/14
[6] http://labs.strava.com/heatmap/#15/-85.75578/38.24903/gray/bike

riders. Broadway carries riders mainly west of 2nd Street and both Kentucky Street and Breckinridge Street carry riders primarily west of 4th Street. In the north-south direction, 2nd Street, 3rd Street, and 4th Street are the primary routes for Strava registered riders. 7th Street and Preston Street provide connections to River Road and the Louisville Loop.

The eco-counter on the Big 4 Bridge counts cyclists and showed an average of 145 riders per day with an average of 113 riders per day on weekdays, confirming the high use on the Strava map in that area.[7] The activity on River Road and Witherspoon Street is also very high.

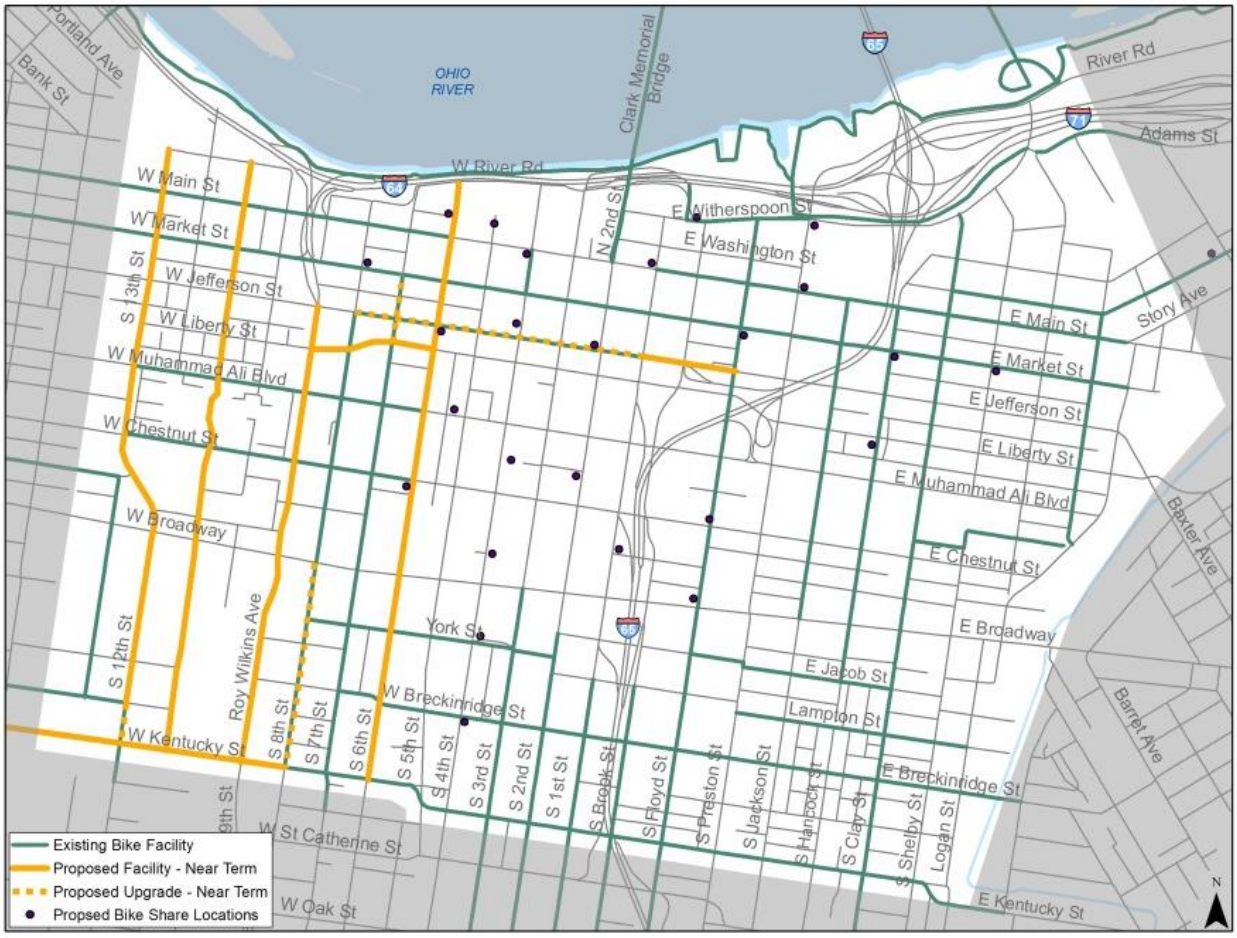
Figure 2-14. Strava Bicycle Activity Map

[7] Count data from 6/1/13 to 7/7/14

The city continues to add to the bicycle facility network each year. Several important near-term projects that were planned for the downtown area are illustrated in **Figure 2-15**. Several of these have already been implemented, including the new bike lanes/buffered bike lanes on 6th Street and 12th Street.

Another substantial bicycle improvement is the implementation of the public bike share program in 2017. This was one of the goals of *Sustain Louisville* (2013), Louisville Metro's sustainability plan. The program has been in development over the last several years with station location planning and program funding (including station sponsorships). The now operational 27 public bike share stations with approximately 300 bicycles, represents a major investment in biking in Louisville. Many of the bike share stations are in downtown as shown on **Figure 2-15**. There are additional stations in Old Louisville and near the University of Louisville main campus.

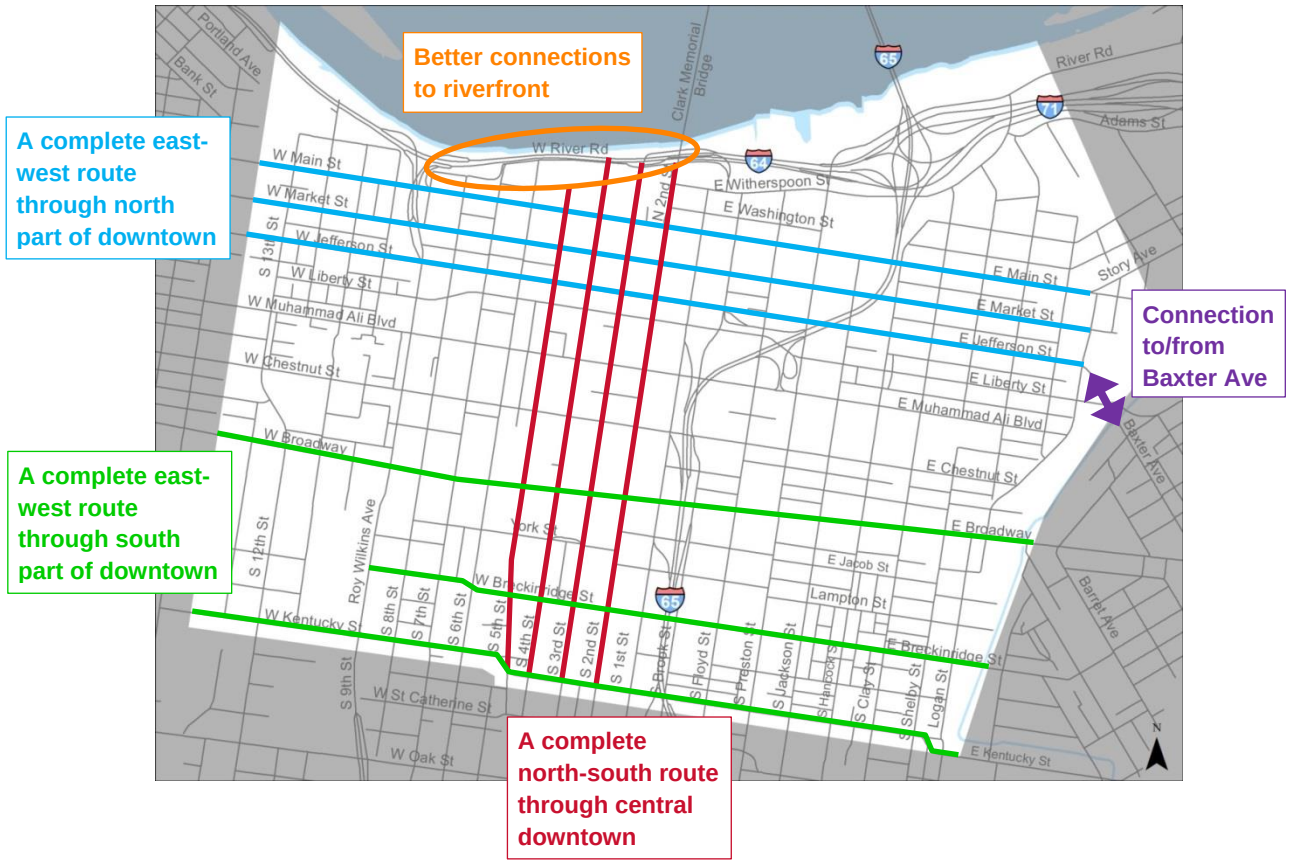
Figure 2-15. Current Near-Term Bicycle Facility Improvements



Bicycle Needs

An overall review of the current bicycle facilities and use patterns in downtown Louisville points to several potential bicycle facility issues and needs, as shown in **Figure 2-16**.

Figure 2-16. Bicycle Facility Needs



In addition to these facility needs there are bicycle safety issues to be addressed on Broadway, Market Street, and 3rd Street as presented in the safety section.

2.4 Transit

Downtown Louisville is the focal point for much of the region's transit service - with 32 of the 41 routes in the region directly serving downtown. These routes account for over 85% of the total ridership on the Transit Authority of River City (TARC) system. **Figure 2-17** shows the roadways with TARC routes as well as stops (including those with shelters) within the study area. There is broad coverage downtown, though many routes are one-way with the reverse direction one block away. Most of the downtown study area has a stop spacing of a quarter mile (see inset), though the nearest stop may be for a low frequency route. There are shelters along many high frequency routes, at several important transfer points, and at high demand stops, consistent with TARC's *Transit Design Standards Manual* (2013).

Figure 2-17. Bus Routes and Stops in Downtown

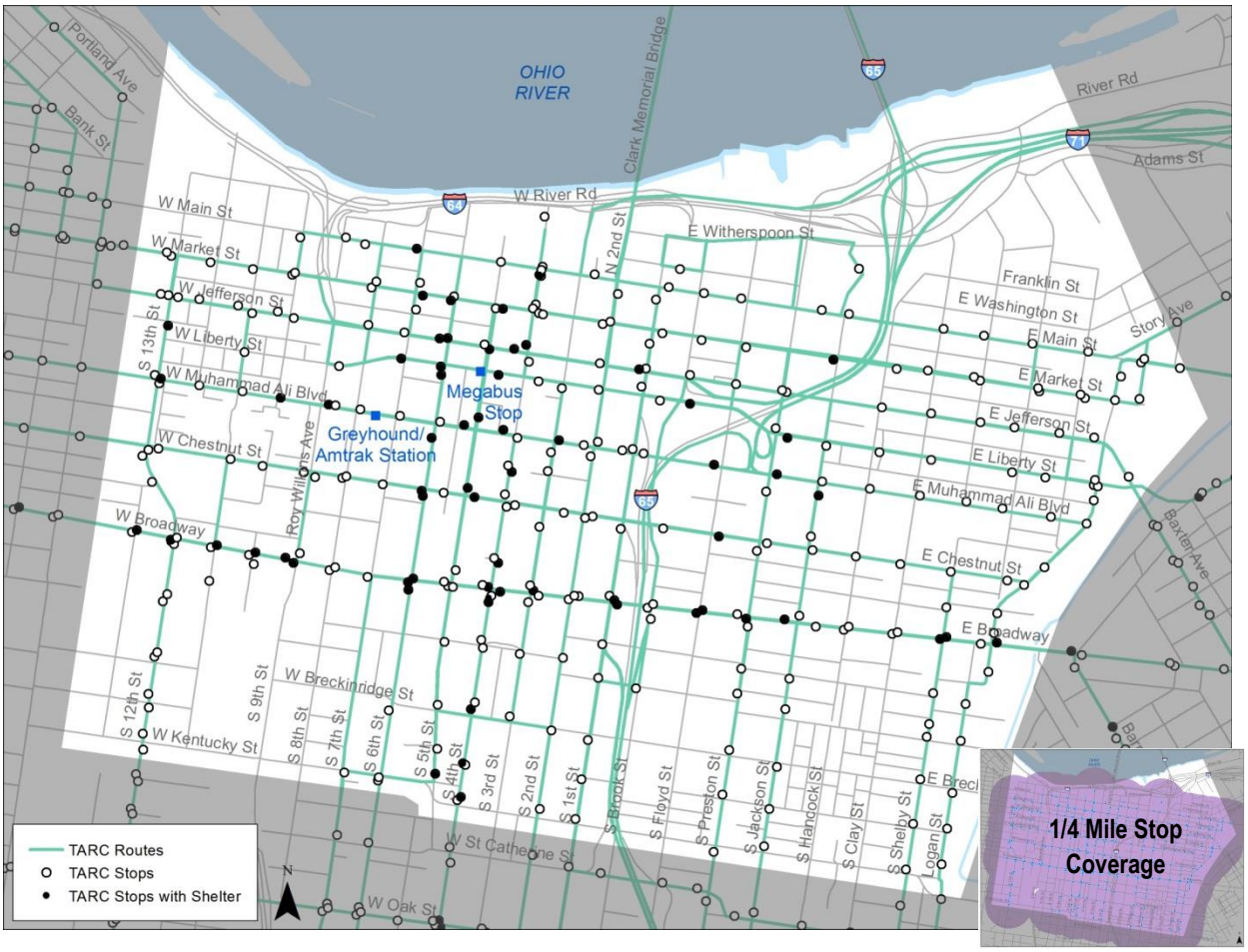


Figure 2-18 shows the 19 local and circulator routes serving downtown with different colors for each route. This shows the areas of overlap and the concentration of service in the downtown core on certain streets. Many of the routes intersect downtown, although there are a few exceptions. **Figure 2-19** shows the local and circulator routes with the higher frequency routes weighted more heavily. The Main/Market Circulator and the 4th Street Circulator both run only in downtown and use a the Zero Bus all electric vehicle fleet.

Figure 2-18. Color Coded Local and Circulator Routes

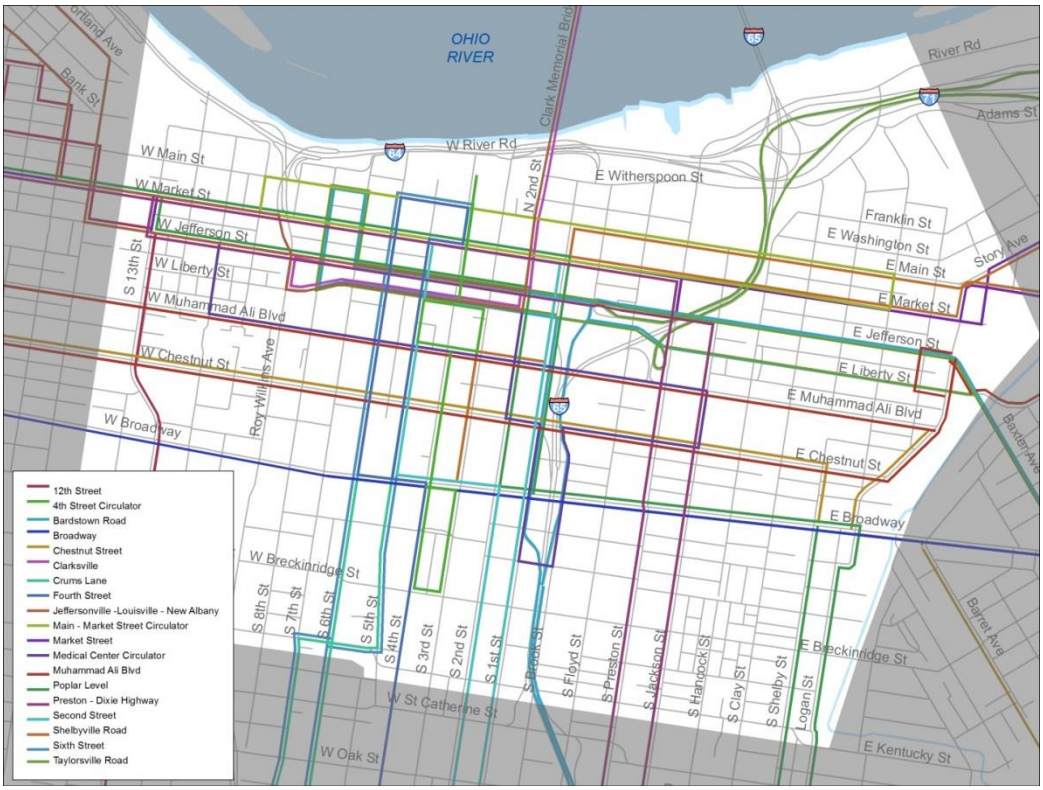


Figure 2-19. Routes Weighted by Frequency

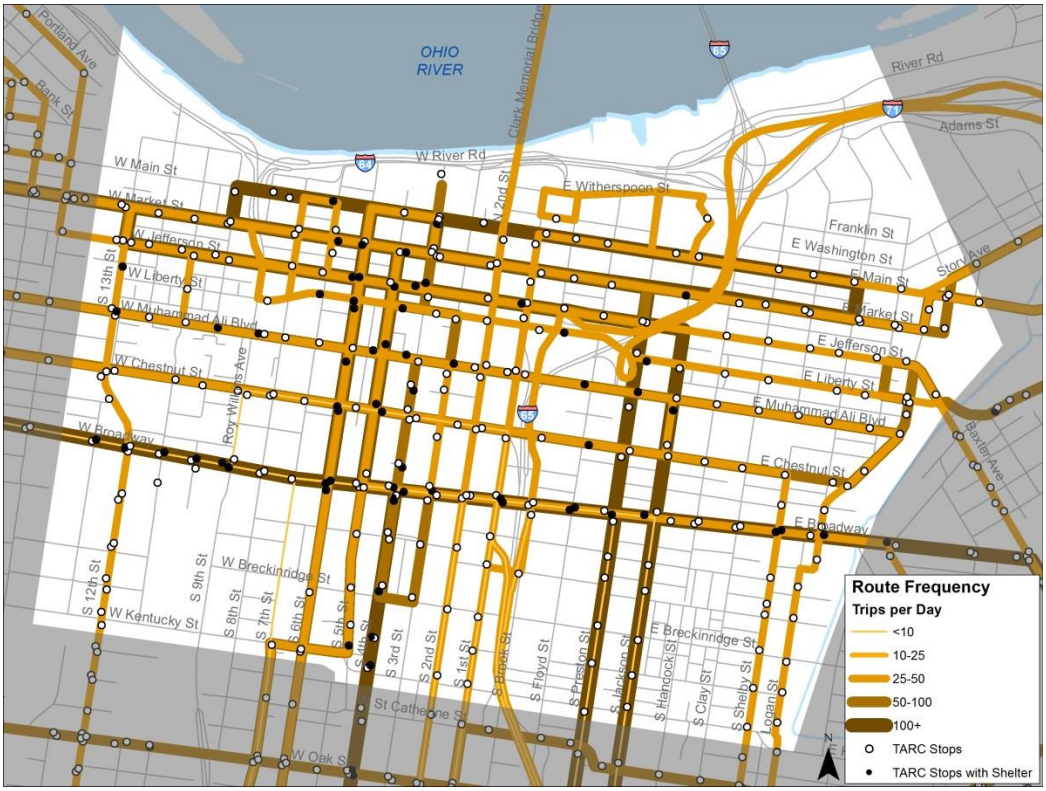


Figure 2-20 shows the downtown routes overlaid on each other and weighted based on frequency, resulting in a service frequency heat map. The figure demonstrates that 5th Street, Jefferson Street, and Market Street have the most transit service followed by 6th Street and Broadway.

As noted previously, the majority of downtown routes intersect, several at multiple locations. This connectivity provides riders with good transfer service if they know where to transfer. It is more difficult for riders who are less familiar with the important transfer points or riders that are making unplanned travel decisions. **Table 2-5** depicts several trip origins and destinations that can be accommodated using various transfer combinations. The resulting example transfer points are shown on **Figure 2-20**. These are just some of the possible transfer points in downtown (some but not all of these have shelters). TARC's trip planner and Google Transit are both very helpful in navigating the TARC system and making the best connections in a timely manner.

While the interconnectivity is good, the complexity can make it difficult for riders to know the best route and transfer locations (especially when there are multiple transfer locations). In addition, when there is more than one possible route from downtown to a destination, but the routes leave from different locations in downtown, it is difficult to know quickly how to catch the next bus without real-time on-line information.

For example, the 19, 31, and 23 (north leg) routes all go to the general vicinity of Hubbards Lane in St. Mathews, but they leave from different parts of downtown. Traveling from 7th Street and Liberty Street to Hubbards Lane yields several options, such as Route 31 from 5th Street and Jefferson Street, Route 19 from 7th Street and Chestnut Street, and Route 17/40 to Route 25/19 from 7th Street and Liberty Street. Route 23 could also be accessed on Broadway. There is not one clear location where riders could catch several of the possible routes.

TARC's on-board survey in 2013 indicated that information at bus stops and shelters was very important to many current riders – at the top of the list of communication-related improvements. In the City transportation survey, timed transfers (timing bus arrivals and departures at key locations so riders can easy transfer between buses) were rated very highly. Overall, there seems to be considerable transit rider interest in improved communication and connections. The current route system offers great flexibility and many different connection options. It also creates a network of routes with wide coverage. However, it also creates a matrix of routes/trip combinations that can be complex for new or infrequent riders. There is no central location downtown where riders can board a bus to various parts of the city. This leads to the need for considerable traveler information to make informed travel decisions.

Figure 2-20. Service Frequency Heat Map

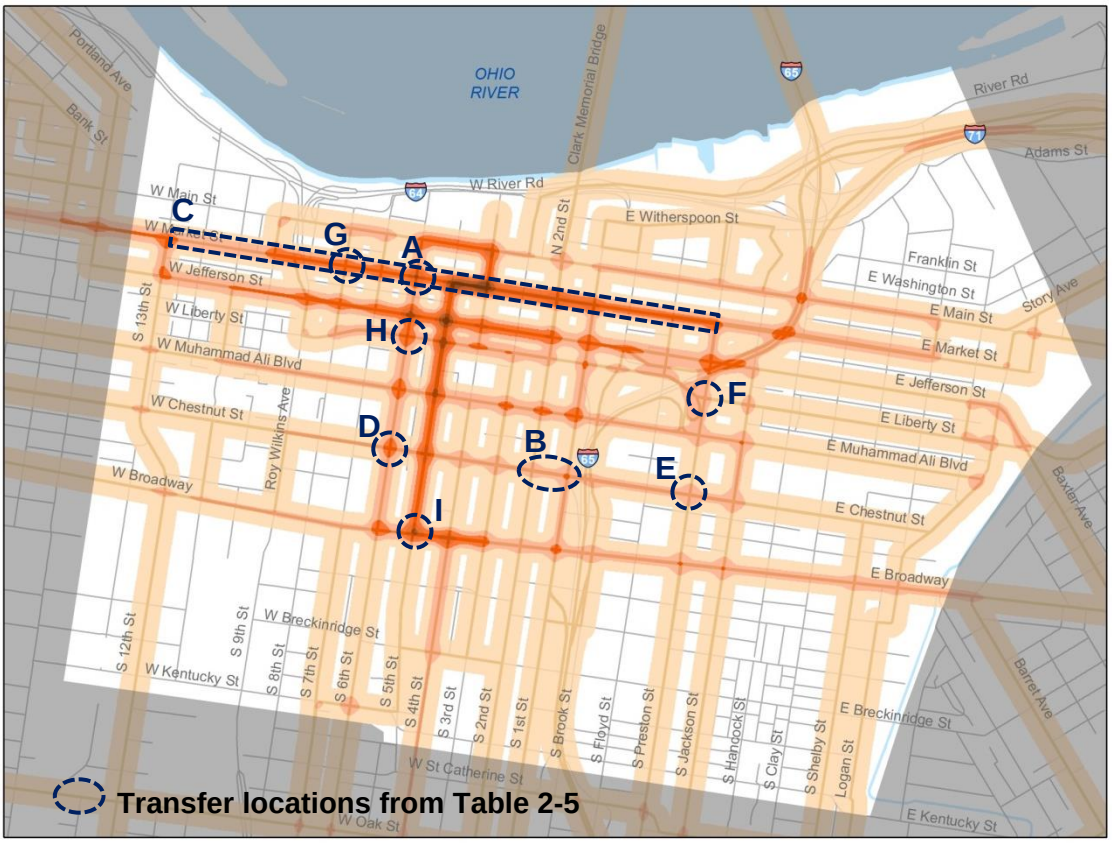


Table 2-5. Example Transit Transfer Opportunities

Start	End	Route 1	Route 2	Transfer Location
Chickasaw/ Shawnee Area	South Louisville/ Univ. of Louisville/ Expo Center	15	4/6	**A.** 6th/Market
			2	**B.** Walk from 2nd/Chestnut to 1st/Chestnut
			18	**C.** Market (13th to Preston)
Chickasaw/ Shawnee Area	South Louisville/ Univ. of Louisville/ Expo Center	19/21	4/6	**D.** 6th/Chestnut
			2	**B.** Walk from 2nd/Chestnut to 1st/Chestnut
			18	**E.** Chestnut/Preston
Dixie Highway South	Bardstown Road Area	18	17/40	**F.** Liberty/Preston or **G.** 8th/Market*
			21	** Chestnut/18th
			23	** Dixie/Broadway
Dixie Highway South	Bardstown Road Area	63	17/40	**H.** 6th/Liberty
			21	** Chestnut/18th
			23	**I.** Broadway/5th

*TARC trip planner recommends 8th/Market and Google recommends Liberty/Preston
** Outside of downtown area, not on map

There are 19 local and circulator routes serving the downtown area and 13 express or shuttle routes. Nearly one-third of the boarding and alighting activity throughout the TARC system occurs in the downtown area (this includes transferring passengers). There are approximately 75 miles of local/circulator bus routes downtown as shown in **Table 2-6**.

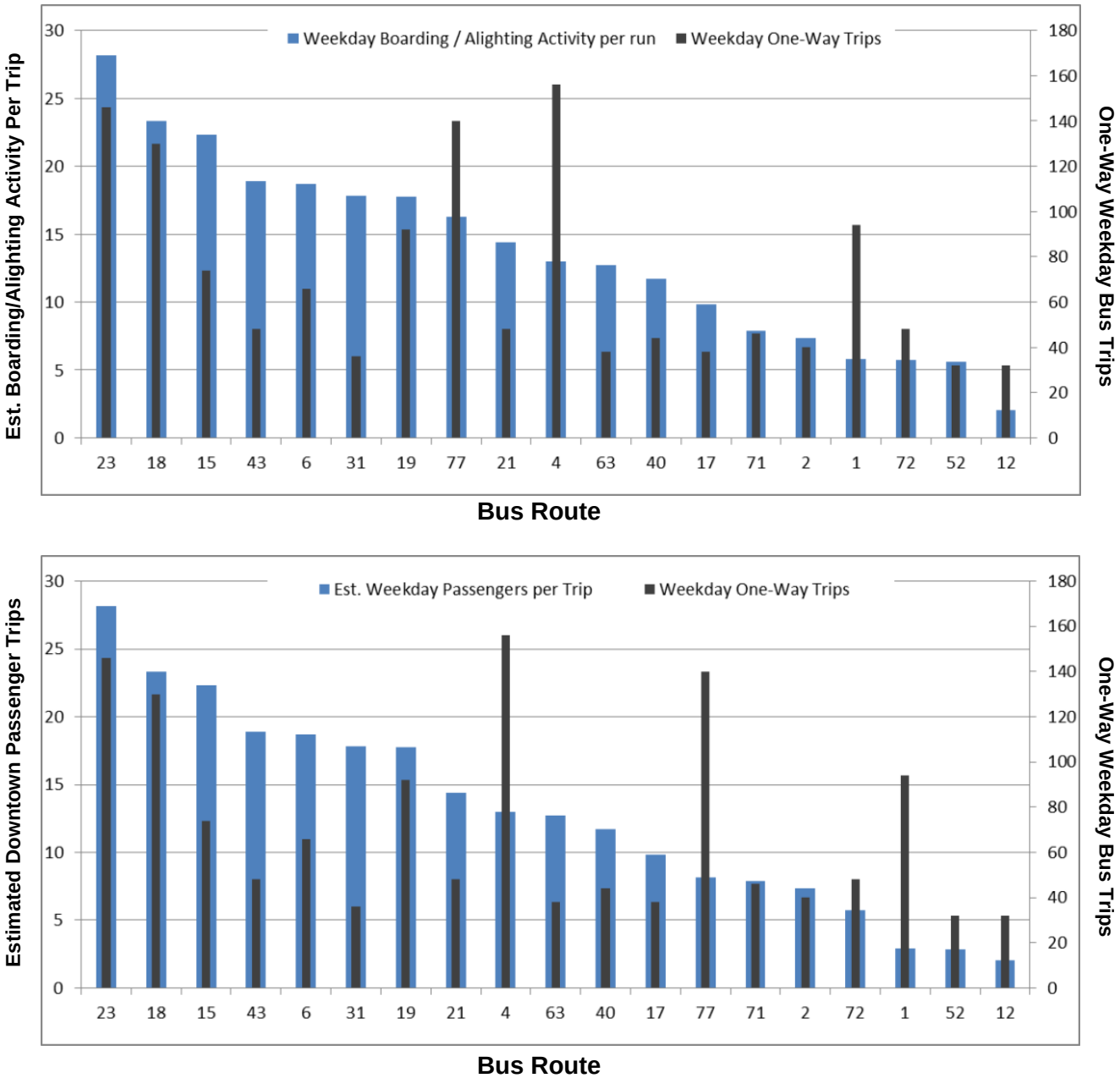
The average stop spacing is every 680 feet with a range of 560 feet to 790 feet This is consistent with TARC's CBD stop spacing guidelines of 400 to 1000 feet with a typical spacing of 600 feet (*Transit Design Standards Manual*, TARC 2013). In the areas outside the CBD (SoBro, Phoenix Hill, Etc.) the spacing is near the low end of the range for urban settings (500 to 1,200 feet with 750 feet typical). The recent TARC service guidelines developed as part of MOVE Louisville recommend an increased spacing of 900 feet in dense urban areas. To match these guidelines, up to three stops per mile would need to be removed from several of the routes. **Table 2-6** shows the number of one-way bus trips for each route as well as the average boarding and alighting activity within the downtown based on recent ridecheck on/off data.

Table 2-6. Downtown Bus Route Data

Route	Miles in Study Area	Stops in Study Area	Stops/Mile	Avg. Stop Spacing (ft)	One-Way Bus Trips per Weekday	Avg. Weekday Boarding and Alighting Activity Per One-Way Trip
1	2.8	20	7	730	94	6
2	3.0	24	8	660	40	7
4	3.1	25	8	650	156	13
6	2.9	21	7	740	66	19
12	2.4	18	7	700	32	2
15	5.2	43	8	640	74	22
17	4.1	34	8	640	38	10
18	5.4	47	9	610	130	23
19	5.5	47	9	610	92	18
21	5.0	46	9	580	48	14
23	4.4	41	9	560	146	28
31	4.6	38	8	640	36	18
40	4.1	34	8	640	44	12
43	6.4	56	9	610	48	19
52	4.3	35	8	650	32	6
63	2.9	21	7	740	38	13
71	3.3	22	7	790	46	8
72	2.3	14	6	870	48	6
77	3.6	23	6	820	140	16
Total/Avg	**75.2**	**609**	**8**	**680**	**71**	**14**

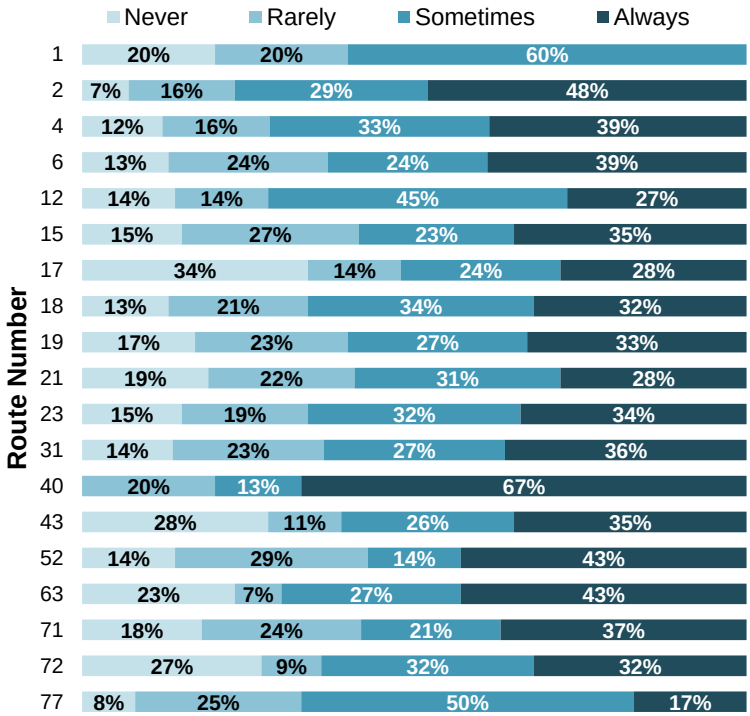
The top graph in **Figure 2-21** shows the bus trip frequency and typical estimated boarding/ alighting activity per bus trip. The bottom graph shows the same bus frequency information, but it estimates passenger trips by assuming that all passenger trips begin or end outside of downtown, except for the circulator routes which have both beginning and ending points in downtown. From this data it appears that a few high frequency routes have moderate downtown boarding and alighting activity given their service frequency. For example, Route 1 has over 90 one way bus runs per day with less than 5 passenger trips per run.

Figure 2-21. Downtown Transit Activity by Route



Many transfers also occur in the downtown area. While there is no detailed data on where transfers occur or between which routes, the recent on-board survey did address the topic of transfers. For the 19 downtown local/circulator routes 34% of the respondents indicated that they transfer "always" and another 30% indicated that they transfer "sometimes". This would indicate that as many as half of all riders may make a transfer during a typical trip with many of those occurring downtown. The survey results for the transfer question are shown in **Figure 2-22**. Some of the routes with very high transfer responses include Routes 2, 40, 52, and 63. Route 52 is the medical circulator. (Further quantifying the transfers occurring downtown or preferably system-wide could be very valuable for future system planning.)

Figure 2-22. Transfer Frequency by Route (2013 Survey Data)



The Louisville Metro Transportation Study survey completed in 2014 found that nearly half of the respondents including recent and non-recent riders thought faster, more direct service was important to improve public transportation in Louisville. While this is a broad statement, it is viewed as an important public input to the planning process. **Figure 2-23** shows other improvements highlighted by survey respondents, in decreasing importance to recent users. 40% of recent riders and nearly a quarter of the other respondents supported new bus shelters and benches. 25% of recent riders also wanted coordinated timed transfers between buses, later service times, and improved on-time performance.

Figure 2-23. TARC Improvements Recommended by Survey Respondents

Source: Louisville Metro Transportation Study (2014)

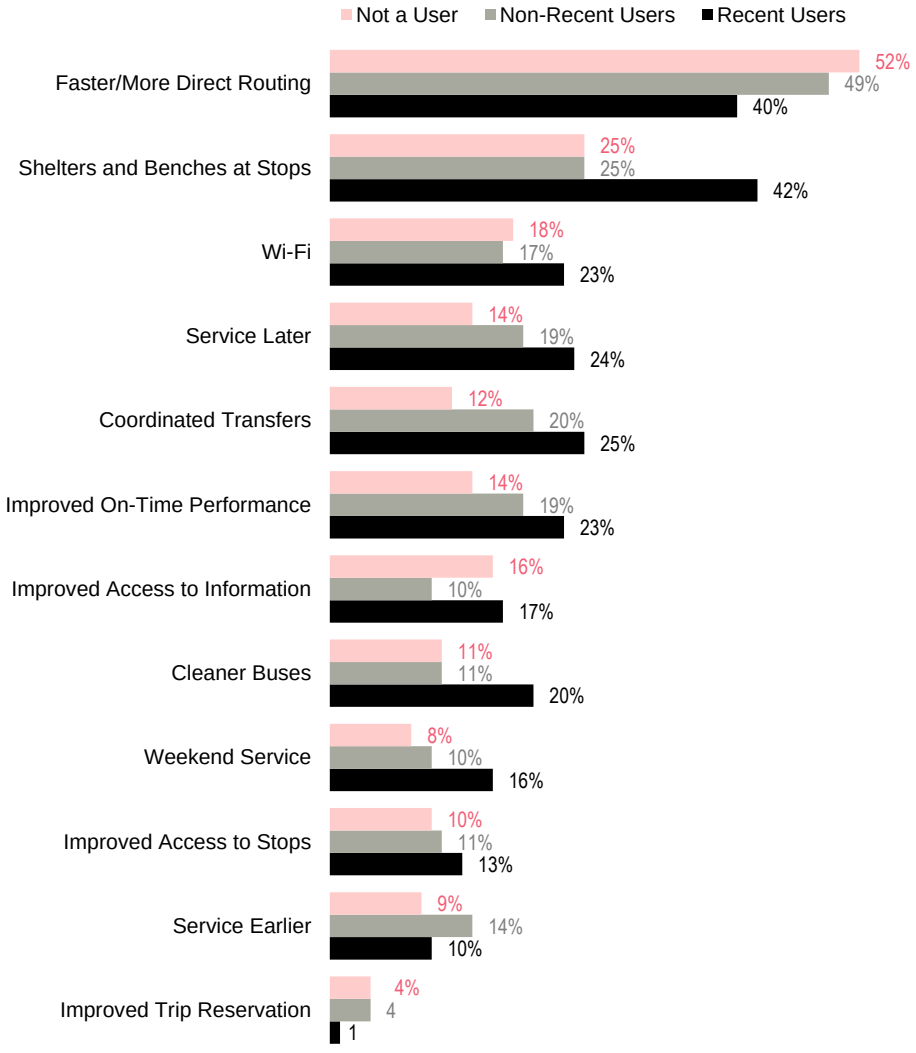


Figure 2-24 shows a stop coverage map highlighting the areas within a tenth of a mile of a bus stop. There is very good coverage by this measure, though some stops are on one-way streets so passengers must walk to/from another street on the reverse trip. Research shows that most transit riders are willing to walk ¼ to ½ mile to get to a stop. There may be some opportunities for reducing the number of stops; however, the stop spacing generally meets to the design guidelines and seems to indicate that a reduction could be detrimental in some cases.

Figure 2-24. Tenth of a Mile Coverage Map

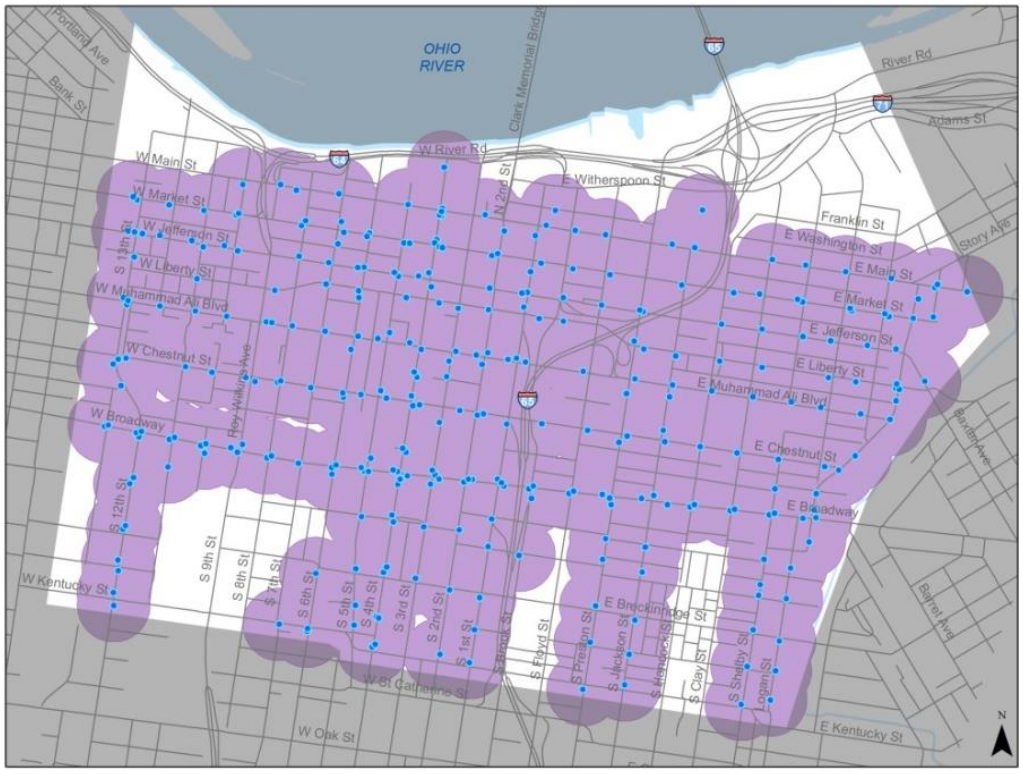
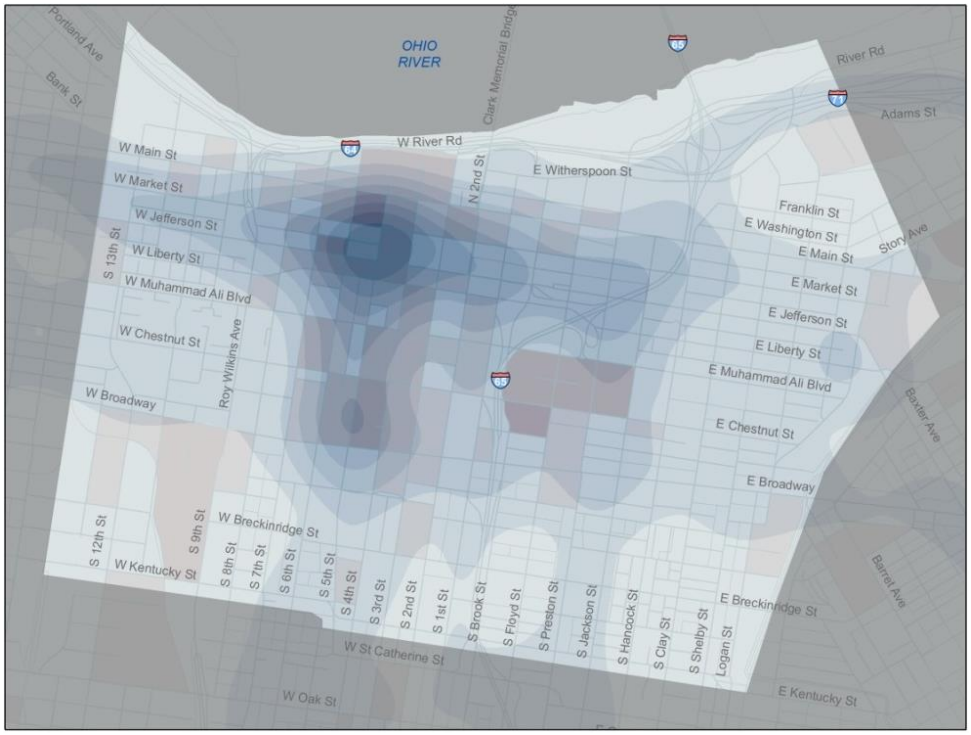


Figure 2-25 shows the estimated weekday boarding and alighting activity at each of the stops as a hot spot (density) map. This activity is by definition at existing bus stops, so it does not show the actual trip start or end, but it gives a general idea regarding activity levels and stop choice. The densest areas of activity are near Jefferson Street and 5th and 6th Streets, Market Street and 4th Street, and along Broadway. This figure correlates well with **Figure 2-20** which showed that the most dense service areas are near these same locations.

Figure 2-25. Boarding and Alighting Activity

When the boarding and alighting activity is plotted with the employment data (see **Figure 2-26**), it shows that the northern and southern employment centers attract considerable ridership.

Figure 2-26. Boarding and Alighting Data on Employment Map

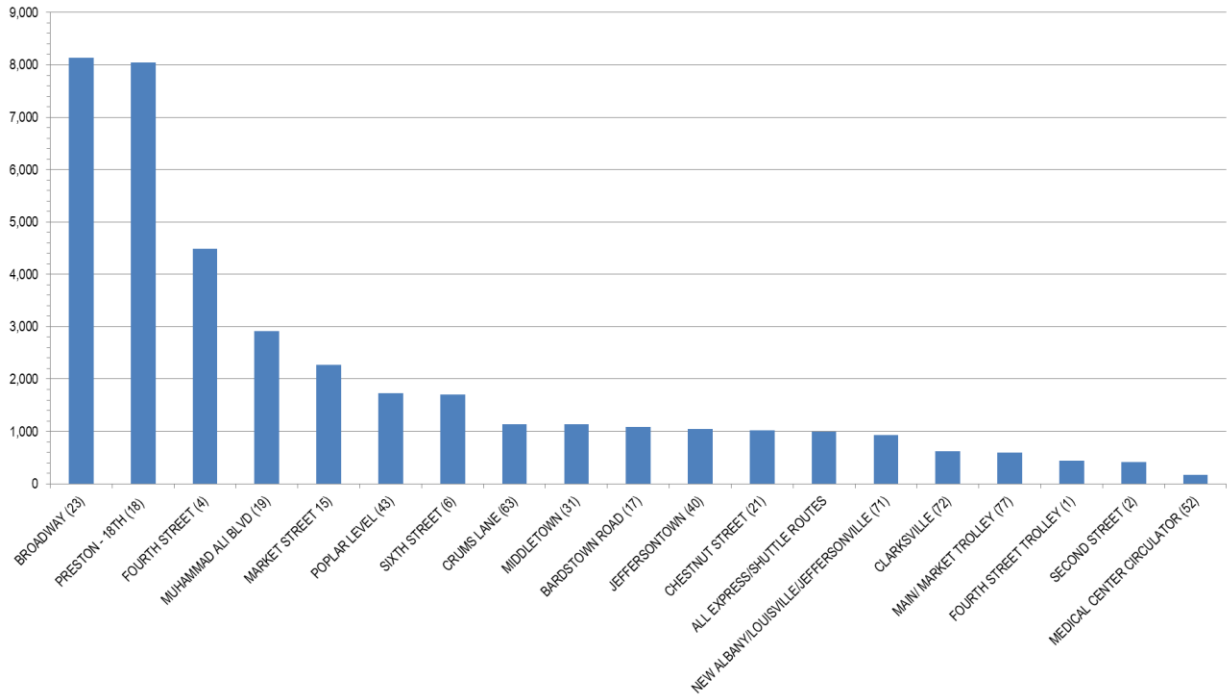


Overall vehicle travel speeds and congestion levels on streets with bus routes affect the transit service quality for those routes. Similarly, operational constraints such as tight turning radii, blocked left turns, and double parked vehicles can all negatively affect service.

Some of the major constraint points for transit service in downtown Louisville include the 4th Street intersections with Jefferson Street, Liberty Street, and Muhammad Ali Boulevard. The 4th Street circulator must make left turns in both directions just north and south of 4th Street Live. Frequently the delays to make these turns are so long that walking becomes a viable alternative to riding the bus. South of Muhammad Ali Boulevard, there are often vehicles blocking travel lanes on 4th Street, further constraining the bus movements.

Figure 2-27 shows the daily ridership by route for those routes serving downtown. Routes 18 and 23 carry the most passengers on an annual basis at approximately 2.4 million each. Routes 4 and 19 carry another 2 million combined. Most of the remaining regular routes carry between 100,000 and 500,000 passengers per year. The 13 express bus/UPS shuttle routes serving downtown carry 250,000 passengers combined. The Trolley / Zero Bus Routes carried 110,000 to 160,000 passengers in FY 2014 and the medical circulator carried fewer than 50,000 passengers.

Figure 2-27. Daily Ridership by Route (FY 2014)



During the last few years, TARC has completely switched the vehicle fleet for the 4th Street and Main Street/Market Street circulators to an all electric fleet. Both of these routes run only in downtown and there is a charging station on 3rd Street near the library and on Market Street just eats of 9th Street. These circulators are often impacted by ongoing downtown construction and lane/road closures. During the Ohio river Bridges project, the Main Street/Market Street circulator was affected by the lane closures, increased congestion, and reduced speeds on

Market Street. The 4th Street circulator is currently impacted by the closure of 3rd Street and 4th Street for the Convention Center renovations. The buses are temporarily required to use portions of 2nd Street and 5th Street to get around the construction work zone.

An important change that is coming to downtown in the next two years is the addition of the Dixie Highway Bus Rapid Transit (BRT) service, which will have several stops in downtown. The stops will be on 9th Street, Market Street, and Jefferson Street. This BRT service will include new branded stops with traveler information. This will be the first BRT service in Louisville.

In addition to TARC service downtown, there is also a private hospital shuttle in the Medical District that provides service between many of the major destinations and garages. This service runs daily between 6 AM and 10 PM with stops on Market Street at Nucleus, two on Muhammad Ali Boulevard, and one each on Preston Street, Chestnut Street, and Madison Street (HSC Garage).

Transit Summary

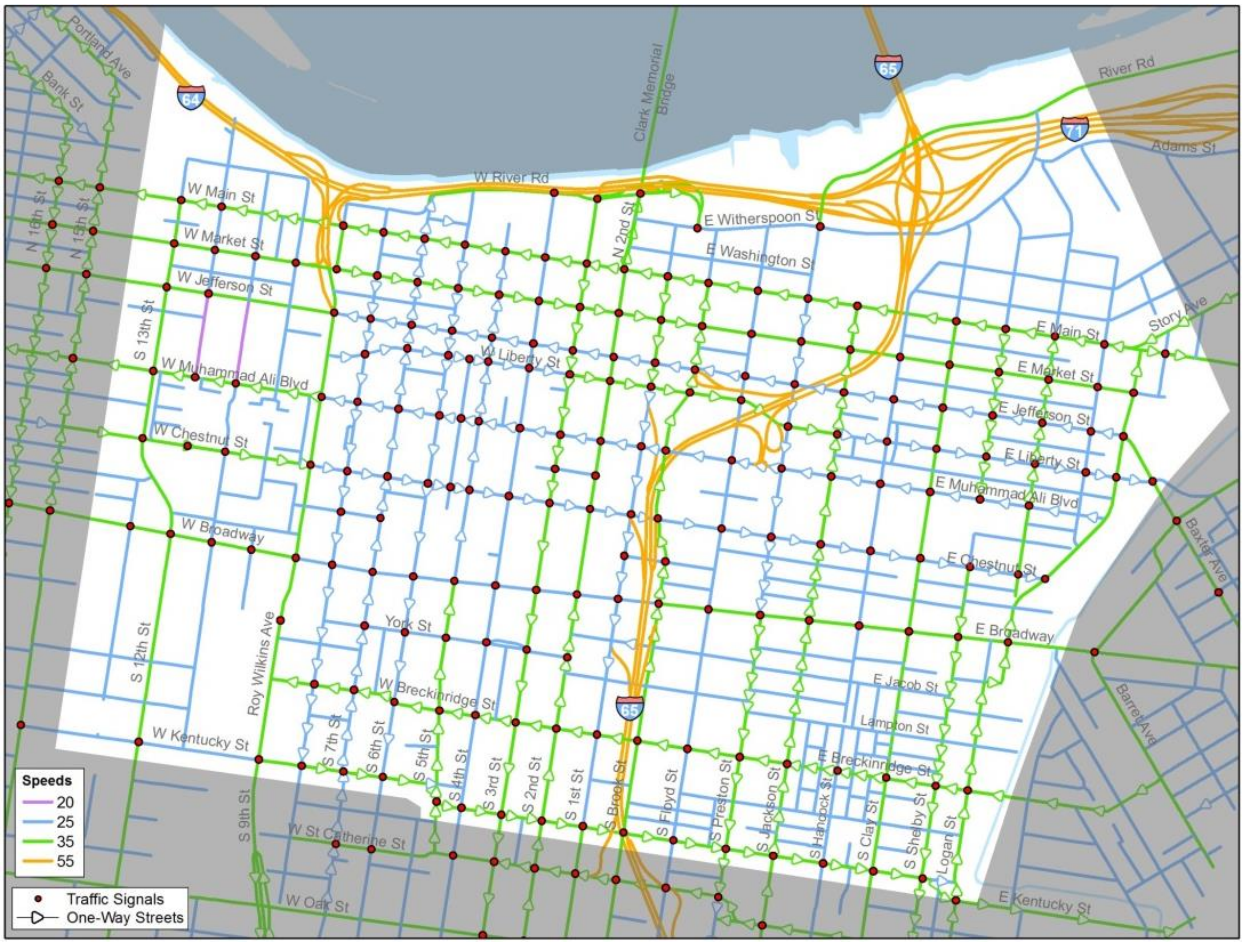
The transit analysis indicates several potential opportunities for enhancing the system. Some are larger and more systematic, while others would be more modest. Some of the concepts that could be considered are listed below. These are not recommendations, but ideas stemming from the review of the current system downtown.

- Continue to upgrade and improve bus shelters and benches
- New signage to attract attention to TARC stops and facilities (marketing and branding)
- Improved real-time information at stops (TARC real-time arrival information is available via smartphone apps such as Transit. Real-time arrival information will also be available at the future BRT stations, including the downtown stations.)
- One or two connection points or a connection zone within downtown that would serve as a focal point for riders traveling to/from downtown or transferring between routes
- Restructured route system with transit emphasis corridors downtown
- Route modifications to improve travel times or improve service coverage
- Improved bus stop spacing, which examines stop frequency and coverage/walk times to achieve the optimal balance of service coverage, speed, and reliability
- New bus facilities (such as bus only lanes) to improve bus travel times.

2.5 Streets and Traffic

The downtown street system is the principal framework for mobility across all modes – carrying autos, bicycles, buses, and trucks. Streets in the study area include many one-way street segments as shown in **Figure 2-28**, with most operating in pairs. These streets operate generally in pairs. For example, 7th Street runs one-way northbound, while 8th Street runs one-way southbound.

Figure 2-28. Streets, Traffic Signals, Posted Speeds



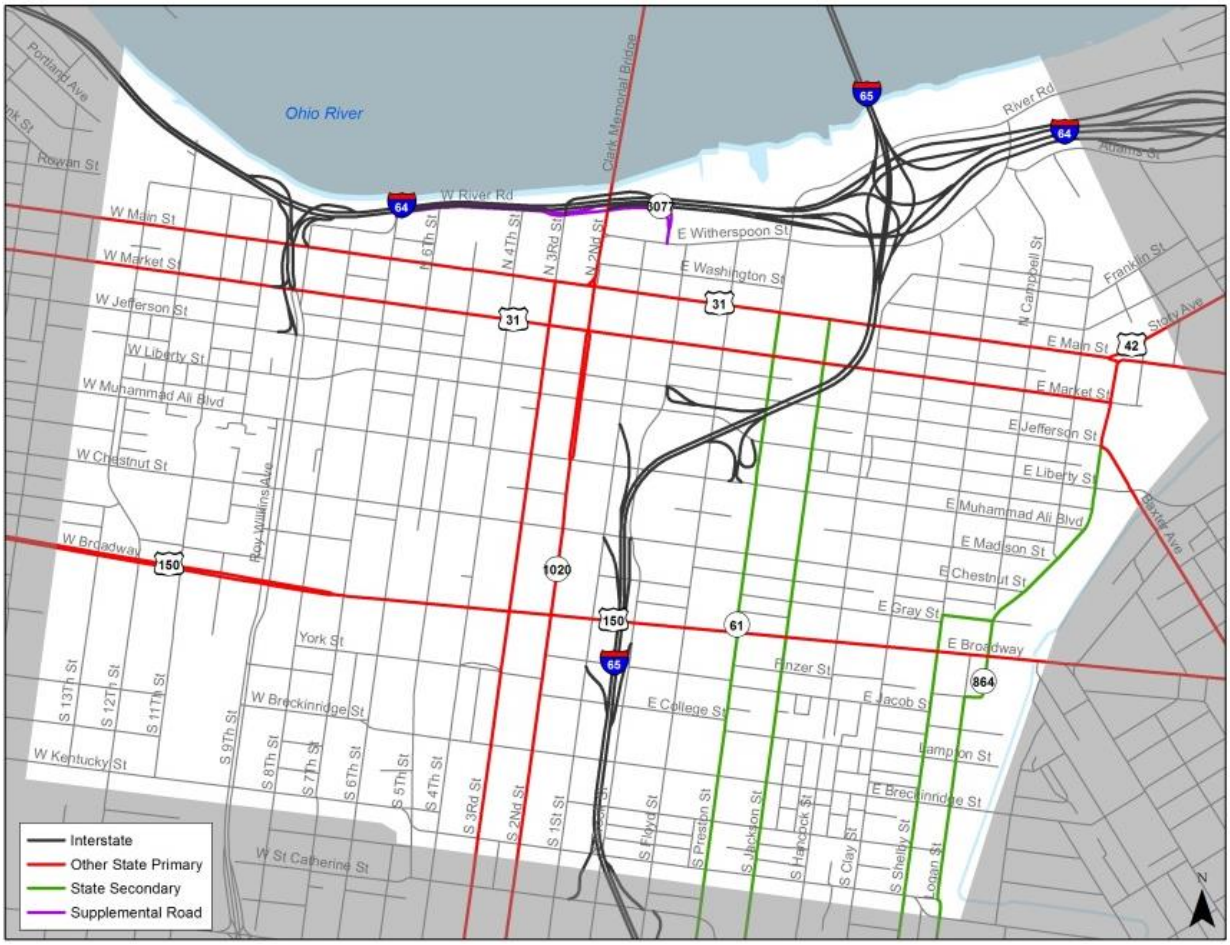
The speed limit for most downtown streets is set at either 25 mph or 35 mph. By City ordinance, the speed limit on downtown Louisville Metro streets is 25 mph unless specifically posted otherwise.[8] The speed limit on Kentucky Transportation Cabinet (KYTC) non-interstate highways in downtown Louisville defaults to 35 mph. However, the City may in rare cases, modify that speed limit with the approval of the Secretary of Transportation (KRS 189.390). A review of the posted speed limit signs shows that many streets do not have signs posted and in some cases the speed limit is not clear. For example, a city street may be posted at 35 mph south of Broadway and, without any speed limit signs north of Broadway, drivers might expect

[8] Chapter 71 Section 86 (http://www.amlegal.com/nxt/gateway.dll/Kentucky/loukymetro)

that the speed limit is 35 mph all the way to Main Street. No comprehensive speed data was available for the study area; however, field observations and periodic checks of mobile-phone-based speed data from Google indicate many corridors operate at or below the posted speed during peak periods but during off-peak times and on lower volume sections of road, speeds often exceed the posted speed limit.

Typical lane widths range from 10 to 11 feet, with some as narrow as 9 feet. Right-of-way widths are approximately 60 feet on most downtown streets (55 ft to 62 ft) with some of the wider streets such as Jefferson, Market, and Main having 90-foot right-of-way widths. Curb to curb pavement widths typically range from 35 to 60 feet. There are traffic signals at most intersections and the signal timing tends to be coordinated, pre-timed with typical cycle lengths of 75 to 100 seconds. Several of the streets in downtown are owned by KYTC as illustrated in **Figure 2-29**. This includes key streets such as Broadway, Main Street, Market Street, Preston Street, and Jackson Street. KYTC has a memorandum of agreement with Louisville Metro for maintaining many of these streets. The freeway ramps are also major KYTC owned facilities that directly affect the downtown street system. Decisions regarding modifications to these state owned streets and ramps are ultimately the responsibility of KYTC and FHWA.

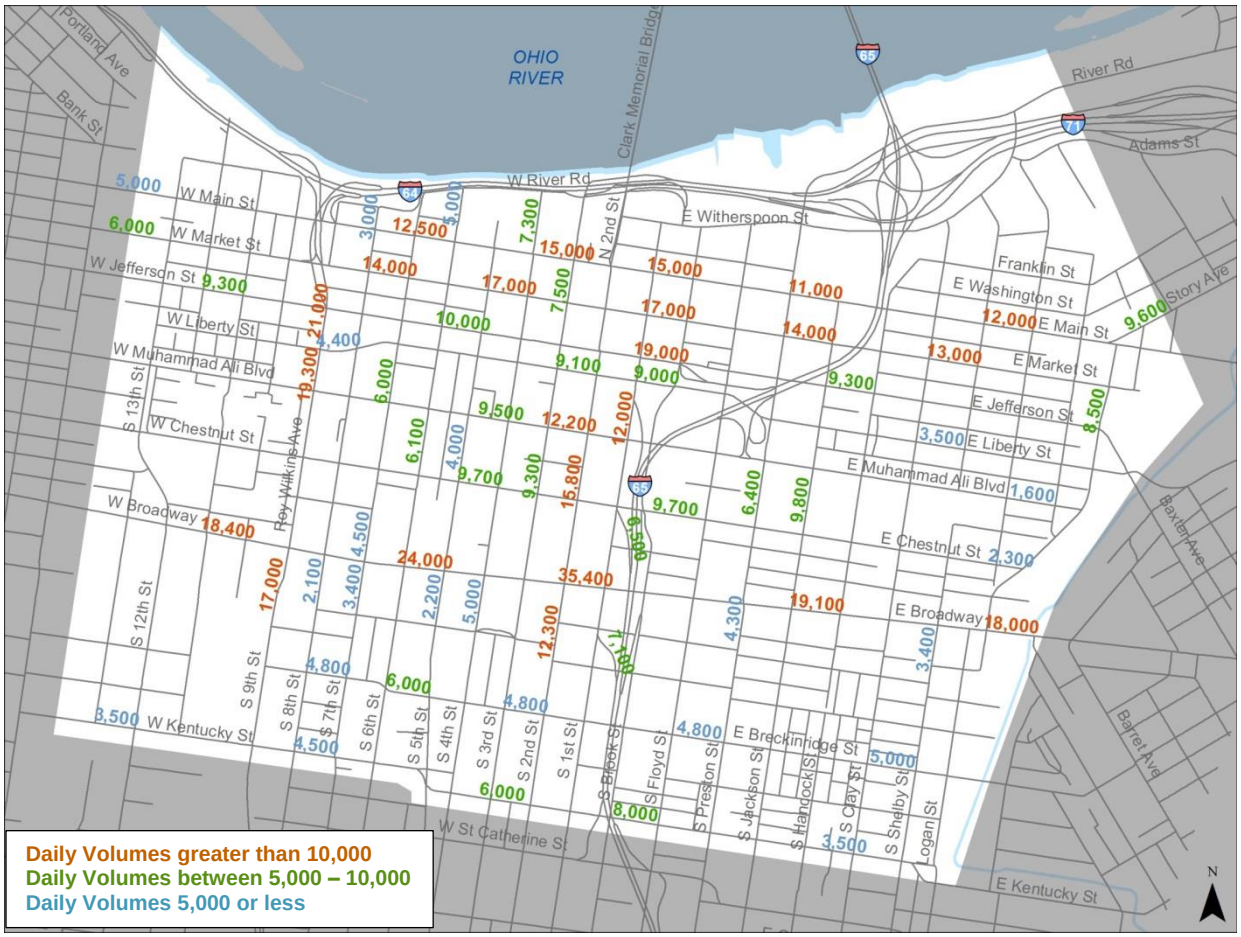
Figure 2-29. US and State Highways



Approximate 2016 average daily traffic (ADT) volumes in the study area are provided in **Figure 2-30**. It is difficult to definitively establish ADT's because of the impact of the Ohio River Bridge project, the 3rd Street and 4th Street closures, and downtown construction projects which have significantly impacted traffic counts over the last nearly four years. This has resulted in considerable variation in the traffic counts on certain streets. However, the reported daily volumes, combined with the available peak hour traffic data, still provide a reasonable basis for traffic planning. The highest volumes streets are Broadway, Main Street, Market Street, Jefferson Street, 2nd Street, and 9th Street. Several others carry just slightly lower volumes including Chestnut Street, Muhammad Ali Boulevard, Liberty Street, and Jackson Street.

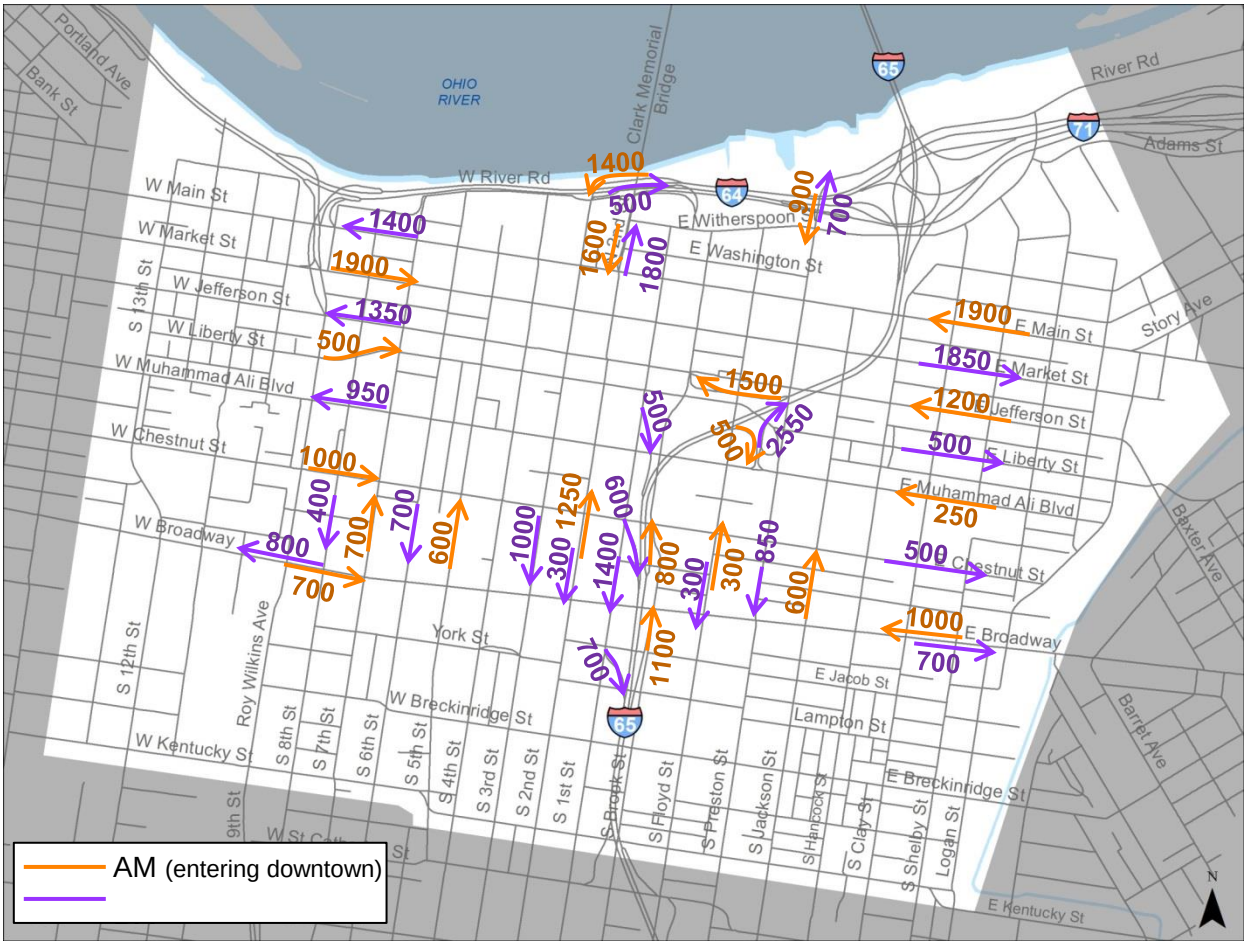
There are several streets with fewer than 3,000 vehicles per day per lane. These streets present opportunities for re-purposing pavement width to allow for two-way flows and/or a reduction in the total number of lanes to better accommodate other modes.

Figure 2-30. Existing Daily Traffic Volumes



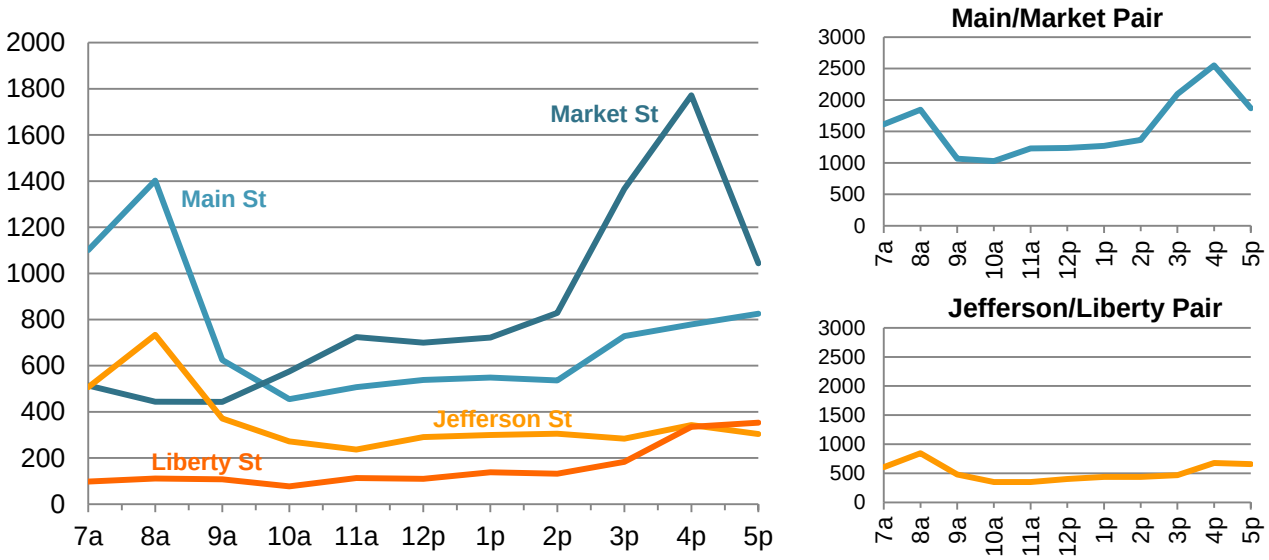
Peak-hour traffic flows provide another informative perspective on the current traffic patterns. **Figure 2-31** provides estimates of the AM and PM peak hour volumes at key locations around the edge of downtown. These volumes are approximate values derived from Metro's AM, Midday, and PM peak period Synchro traffic models and other available traffic counts. This figure shows the higher volume roadways as well as several lower volume locations. Counts for some of the lower volume roadways are omitted. Based on these estimates, approximately 23,000 vehicles enter the downtown during the AM peak hour, with a similar number exiting during the PM peak hour (2,000 peak direction trips were added to account for the omitted minor streets).

Figure 2-31. Peak Hour Flows



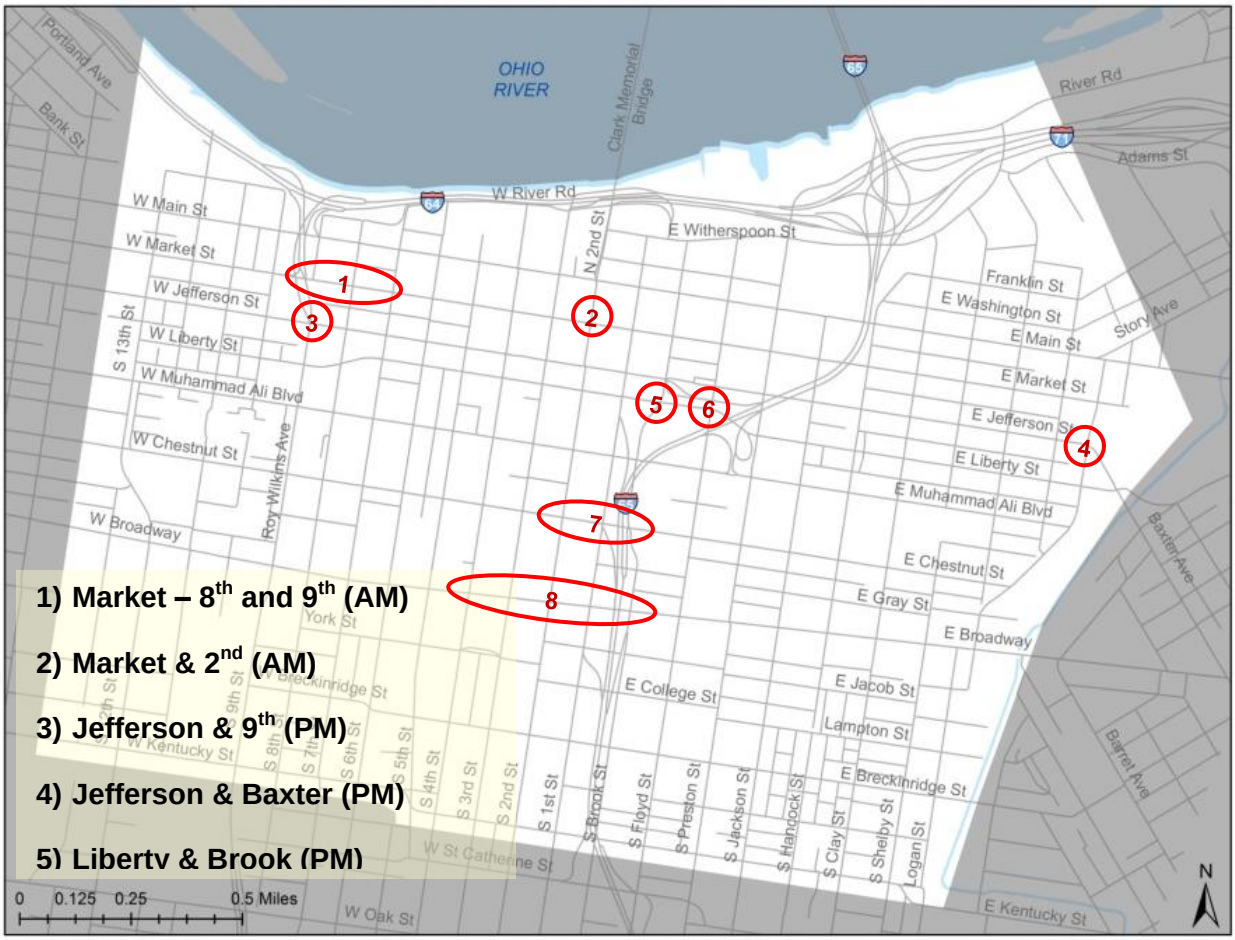
Several of the high-volume roadways at the edge of downtown have significant peaking characteristics. **Figure 2-32** shows the hourly volumes on Main Street, Market Street, Jefferson Street, and Liberty Street from 7:00 AM to 6:00 PM both individually and as one-way pairs. Main Street has a significant peak in the morning and Market Street has a comparable peak in the afternoon. These strong peaks create challenges from a traffic capacity standpoint, but the uneven distribution of traffic between streets can present an opportunity given that some streets may be under capacity.

Figure 2-32. Peak Hour Flows – East of I-65



To help identify critical intersections and capacity constraints, the City's peak-hour Synchro traffic models were reviewed along with intersection turning movement counts. The intersections shown in **Figure 2-33** were identified as some of the capacity constraint points. Market Street in the west is a constraint in the AM peak, Market Street and 2nd Street is also a high volume location in the AM. Jefferson Street at either end of the downtown is a constraint in the PM, with heavy turning volumes. Liberty Street at both Brook and Floyd are constraint points in the PM. The Chestnut Street area between 2nd and Brook has heavy conflicting volumes. Broadway has very heavy volumes from Brook Street west to 4th Street, especially in the PM peak.

Figure 2-33. Capacity Constrained Intersections



Many factors other than traffic volumes affect traffic flow and congestion in downtown. These include pedestrian crossing volumes, truck loading and unloading activity (especially double parking), parallel parking activity, bus stops for passenger boarding and alighting, hotel van and taxi activity, lane widths, turn restrictions, traffic signal operations (phasing, timing, progression, etc.), and construction. All of these are factors at work throughout the downtown.

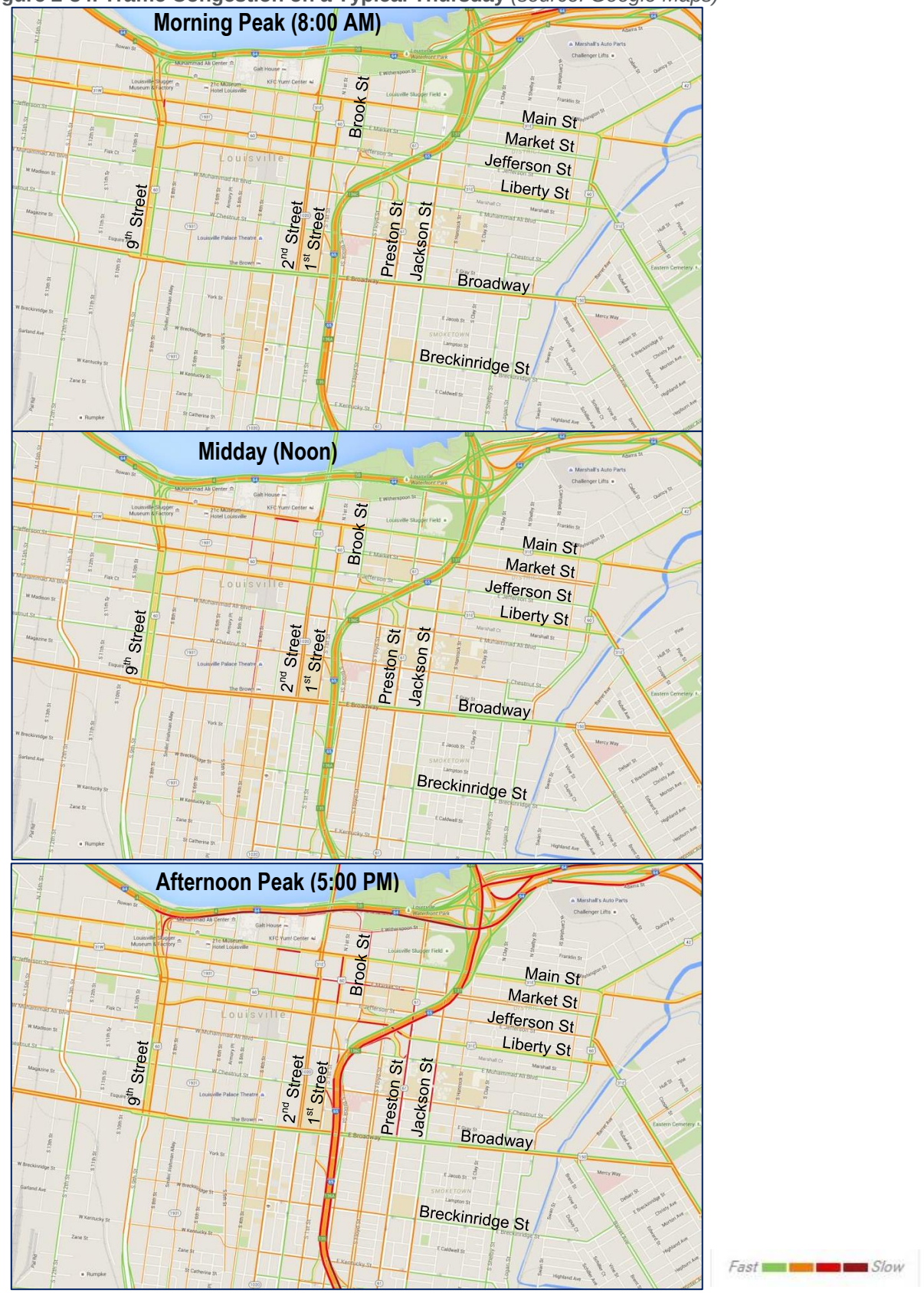
Signal timing is a major tool for maintaining acceptable traffic flow in downtown. Metro Louisville maintains a coordinated traffic signal system in downtown that is timed to promote progression on key corridors and to limit traveler delay. This system is soon to be upgraded with new signal timings throughout the downtown.

WAZE Traffic data has been requested from Louisville Metro to do a more thorough analysis of traffic congestion in the downtown area. Until that data becomes available several “typical” maps were captured using Google maps as shown in **Figure 2-34**, in order to gain an overall perspective on traffic speeds and congestion These maps highlight the more congested locations in downtown during each of the three peak periods. Some of the results are related to ongoing construction downtown, but others are simply recurring slow points in the network.

While there are general slowdowns on many downtown links during all three time periods, the PM peak hour is typically more congested than the other two peaks. This matches the results of the Synchro analysis and traffic volume review. Specific areas of PM peak congestion based on the Google speed maps include: Market Street, Brook Street, Liberty Street, Preston Street, and Jackson Street. There are several other locations that show up as slow areas that match the Synchro analysis such as the Liberty/Jefferson/Baxter/Chestnut intersections in the east. There are specific locations for which the AM peak is the critical time period, including the freeway off-ramps and the key routes into downtown.

Overall, the downtown grid system has considerable congestion in some areas, but available capacity in others. It also is a flexible system where some lower volume streets can pick up the overflow from congested corridors during construction or due to network changes. This reserve capacity is a benefit and an opportunity. The system needs reserve capacity to function well, but too much reserve capacity could be an inefficient use of available resources.

Figure 2-34. Traffic Congestion on a Typical Thursday *(source: Google Maps)*



3 Plan Elements and Project Screening

The following sections describe and evaluate the nearly 150 projects considered in each of the four primary modal components of the Downtown Mobility Study as well as a number of potential policies. The projects and policies come from a variety of sources and are intended to address the range of issues identified in the Existing Conditions.

This work combines and builds on a series of previous plans, including the Downtown Master Plan (2014), the MOVE Louisville 10-Year Transportation Plan (2015), the Downtown Louisville Two-Way Street Study (2009), the Louisville Downtown Development Plan (2003); Phoenix Hill Neighborhood Plan (2008); SoBro Neighborhood Plan (2007); and Butchertown Neighborhood Plan (2008), and many others.

Within each modal component there are several stand-alone projects, but there are also many integrated multimodal projects. For these projects, the key elements have been listed within each plan section, with references to the overarching project. Cross-references have been included in the project lists so that it is clear which projects are grouped together. For example, a complete streets project may have projects listed in the pedestrian, bicycle, and transit sections all of which refer the reader to the streets section for the all encompassing complete streets project.

For each plan element, a list of projects is provided, as well as a map. Each project is discussed and a recommendation is made for either advancing the project to the next stage, dismissing it from the plan, or combining it with another project in the plan. Several major pedestrian and bicycle projects have been combined into larger complete streets projects, for example. Projects that are advanced or dismissed are discussed with a rationale provided for the recommendation.

3.1 Pedestrian System & New Connections

Walkability is foundational to a successful downtown transportation system and a vibrant downtown climate. As the evaluation of Existing Conditions indicated, the downtown boasts a fairly robust pedestrian transportation infrastructure. However, there are still improvements – both "spot" and "systemic" – that could fill key gaps and further enhance the downtown network.

It is important to note that nearly all of the projects discussed in this report relate in one way or another to pedestrians. The City's complete streets policy emphasizes the need for pedestrian travel to be taken into account on all transportation projects. Therefore, the projects presented in this section are primarily pedestrian only projects, while several multimodal projects (such as complete streets projects) are discussed later in the report. **Figure 3.1-1** and **Table 3.1-1** provide the locations and descriptions of the projects that fall in this category. The projects are divided into four major groups:

1. Sidewalk Improvements
2. Intersections/Safety
3. Connectivity
4. Corridor/Area Improvements

Figure 3.1-1: Evaluated Pedestrian Projects

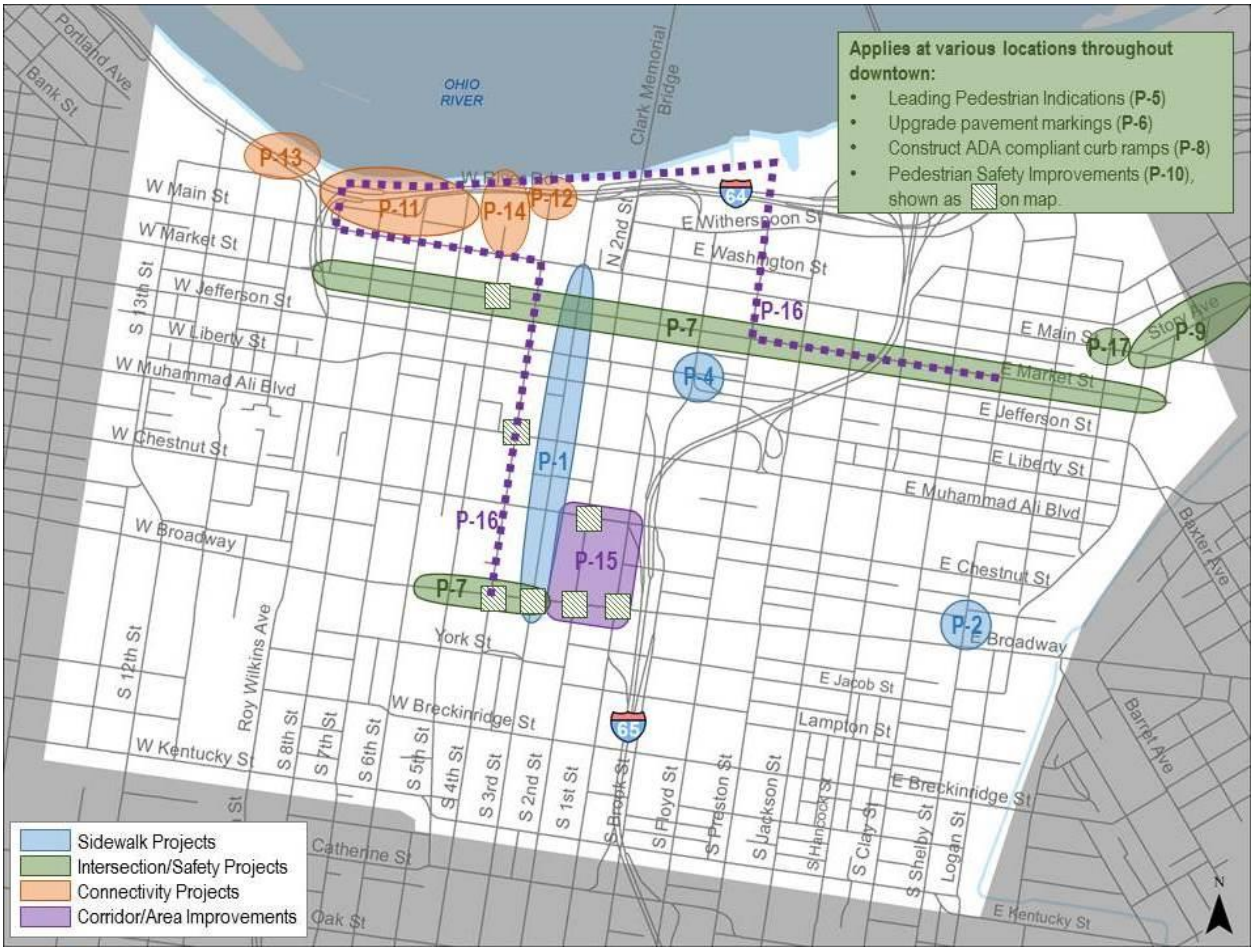


Table 3.1-1: Evaluated Pedestrian Projects

#	Project	Location	Description	Dispensation
Sidewalks				
P-1	3rd St	Main St to Broadway	Widen and repair	See S-3
P-2	Shelby St	Broadway to Gray St	Repair	Complete
P-4	Jefferson St/Brook St	On Brook and Jefferson	Provide missing sidewalks and crosswalks	See S-40
Intersections/Safety				
P-5	LPIs	Throughout Downtown	Install leading pedestrian indications (LPIs)	Complete
P-6	Markings	Various	Repaint crosswalks and other markings	Advance
P-7	Ped Signals	Market St and Broadway	Install pedestrian countdown signals	Advance
P-8	Curb Ramps	Various	Construct ADA compliant curb ramps	Advance
P-9	Story Ave	Main St to Frankfort	Improve ped safety in various locations	Advance
P-17	School Crossing	Main St at Wenzel St	Upgrade school crossing treatment	See S-38
P-10	Spot Safety	Top 7 intersections	Make ped safety improvements	Advance
Connectivity				
P-11	Riverfront Access	6th St to 9th St	Access at intersections, connections through parking, landscaping/streetscape	See S-36
P-12	Riverfront Access	4th St	New connection from Main St. to Riverfront and/or improved wayfinding	See S-28
P-13	W. Waterfront Park	Northwest of I-64/9th St	Ped/bike connections in park and to river	Implement with park
P-14	Belvedere	Main St to Riverfront at 5th St	Reconstruct Belvedere and connections to riverfront. Improve wayfinding, lighting and pedestrian amenities.	Advance
Corridor/Area Improvements				
P-15	JCTC Campus	Area around campus	Sidewalks, crosswalks, signage, lighting, bicycle parking, landscaping, etc.	Complete
P-16	Louisville Urban Trail	Downtown / Riverfront	Walk/bike trail connecting museums, venues, hotels, riverfront, and NuLu	Advance

Note: Projects have been grouped into similar project categories. Some project numbers have been omitted.

3.1.1 Sidewalk Improvements

The sidewalk category includes repair, widening, and short new sections for construction. Major new sidewalk connections fall under the Connectivity category.

P-1: Third Street, Main Street to Broadway - Along this section of 3rd Street, the sidewalk on the west side of the street has many narrow segments as well as some that are obstructed by poles or street furniture (See **Figure 3.1-2**). This is especially an issue immediately before or after an event at the Yum Center. There are also portions of this segment that are in need of repair and/or ADA improvements.

As the proposed 3rd Street one-way/two-way conversion presents an opportunity to improve the same sections of street, this project has been absorbed into the conversion project for the purposes of this study. **Element of S-3**

Figure 3.1-2: Third Street Sidewalk

Narrow sidewalk on west side of 3rd Street, just south of Liberty Street

Constricted sidewalk on west side of 3rd Street, just north of Market Street

---

P-2: Shelby Street, Broadway to Gray Street - This project improved the sidewalk on Shelby Street. This work has been completed (See **Figure 3.1-3**). **Complete**

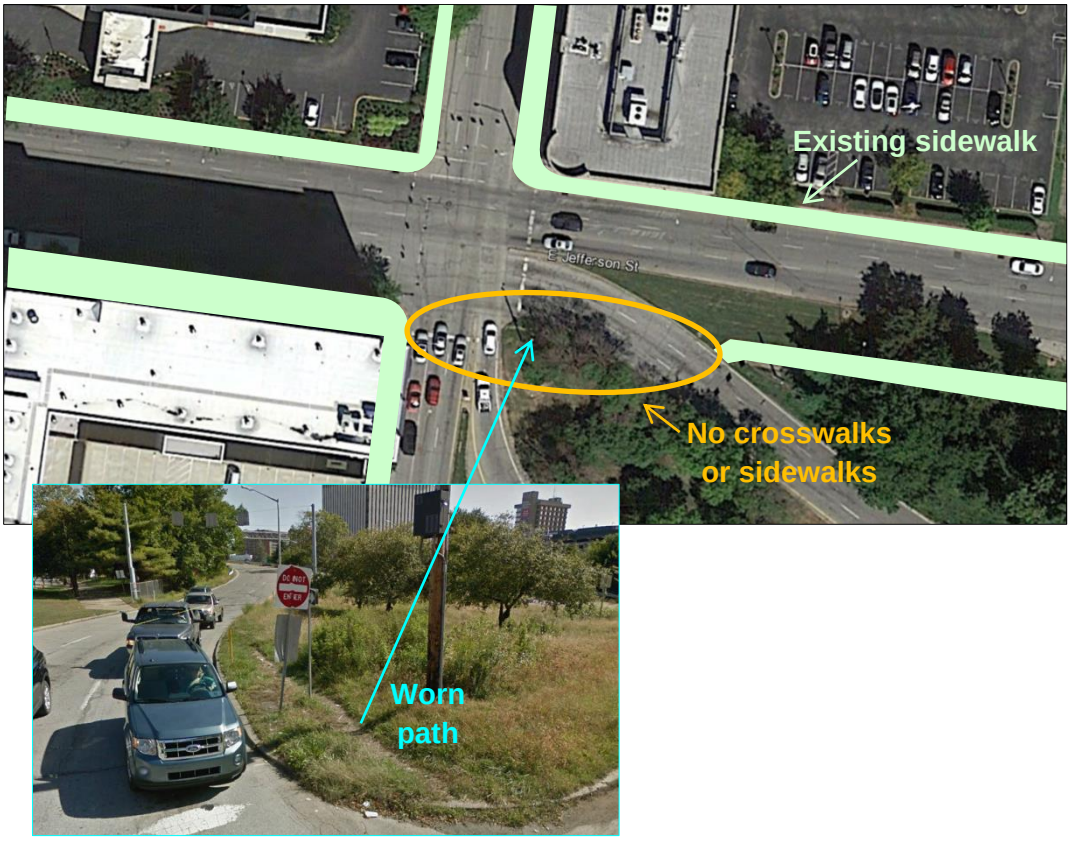
Figure 3.1-3: Shelby Street Sidewalk

before

after

P-4: Jefferson / Brook Street Sidewalks and Crosswalks - There is no pedestrian access on the southeast corner of this intersection across the I-65 ramp approach (See **Figure 3.1-4**). Pedestrians have worn a walking path in this area. Based on this observed use, it is recommended that pedestrian access be addressed by the larger I-65/Brook Street/Jefferson Street Ramp reconstruction project. **Element of S-40**

Figure 3.1-4: I-65 / Brook Street / Jefferson Street Ramp Missing Sidewalk



3.1.2 Intersections/Safety

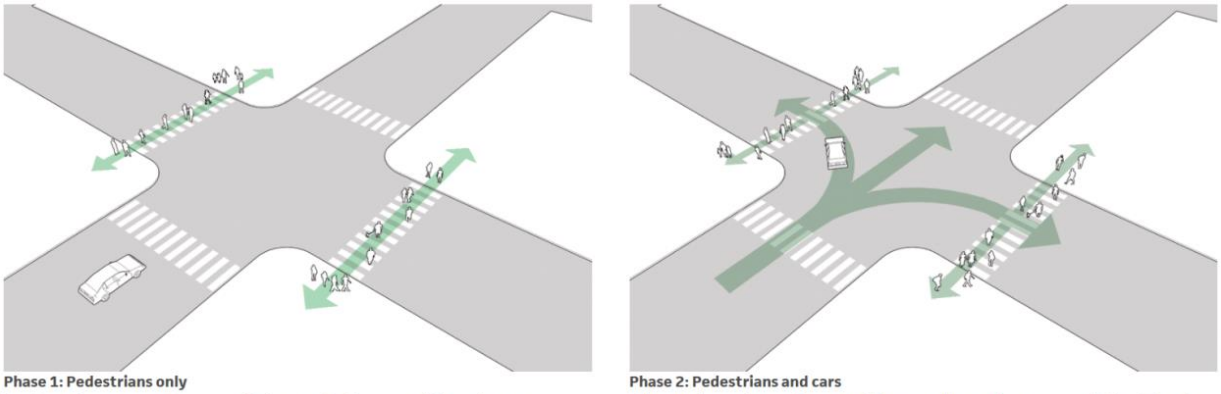
Intersections are locations of concentrated conflict between pedestrians and other transportation modes. These projects include both downtown-wide and location-specific improvements.

P-5: Downtown LPI - This project was implemented in 2015/2016 in response to documented pedestrian safety issues. It installed leading pedestrian intervals (LPIs) at signalized intersections throughout downtown. LPIs provide pedestrians with a head start before vehicles receive the green indication in the same direction of travel (See **Figure 3.1-5**). LPI installations have been shown to have a substantial benefit for pedestrian safety, reducing pedestrian-vehicle crashes by as much as 60% in some cases. [1] The cost of implementing LPI at existing signals with pedestrian indications is modest as it only requires controller programming and possibly additional cabinet wiring to accommodate the existing controller assembly. At an annualized cost of less than $100 per year per intersection over 20 years, the treatment can be

[1] A.C. Fayish and Frank Gross, "Safety effectiveness of leading pedestrian intervals evaluated by a before–after study with comparison groups," Transportation Research Record No. 2198 (2010). pg 15–22.

very cost-effective. The major potential issue is maintaining traffic flow at key locations with the small amount of lost green time. **Complete**

Figure 3.1-5: Leading Pedestrian Intervals



Phase 1: Pedestrians only
Pedestrians are given a minimum 3–7 second head start entering the intersection.

Phase 2: Pedestrians and cars
Through and turning traffic are given the green light. Turning traffic yields to pedestrians already in the crosswalk.

Source: Urban Street Design Guide (NACTO, 2013)

P-6: Crosswalks and Other Pavements Markings - Field observations showed that several crosswalks and pavement markings need to be repainted. This project is part of Metro's ongoing maintenance efforts, but it is extremely important for safety and mobility. **Advance**

P-7: Pedestrian Signal Upgrades - Field observations showed that countdown pedestrian signals have not been implemented at several locations including some on Broadway and on Market Street. Implementing these upgrades could be completed as a small stand-alone project or with other improvements. **Advance**

P-8: ADA Upgrades - Field observations and a review of the Louisville Metro ADA Transition Plan showed the need for new or upgraded curb ramps at certain locations. **Advance**

P-9: Story Avenue Traffic Calming (Butchertown) - This project would implement traffic calming on Story Avenue to improve pedestrian safety from Main Street to Brownsboro Road. **Advance**

P-17: Main Street at Wenzel Street School Crossing - This project to upgrade the school crossing treatment for Lincoln Elementary is proposed to be absorbed into the Main Street / Story Avenue / Baxter Avenue intersection reconfiguration one block away, which could help calm traffic at this location as well. **Element of S-38**

P-10: Top 7 Pedestrian Crash Locations - The pedestrian safety review identified seven locations that should be highlighted for pedestrian safety upgrades. The improvements could be as simple as signage and marking upgrades, though more extensive improvements could be considered either as stand-alone projects or as part of larger projects (i.e. on Broadway). While this project is recommended to advance, pavement marking upgrades have already been made at six of the seven intersections (see **Figure 3.1-6**). A post implementation crash review should be completed to see what further improvements (if any) should be made or if other intersections should be added to the list. **Advance**

Figure 3.1-6: Recent Striping Improvements at Broadway and 1st

3.1.3 Connectivity

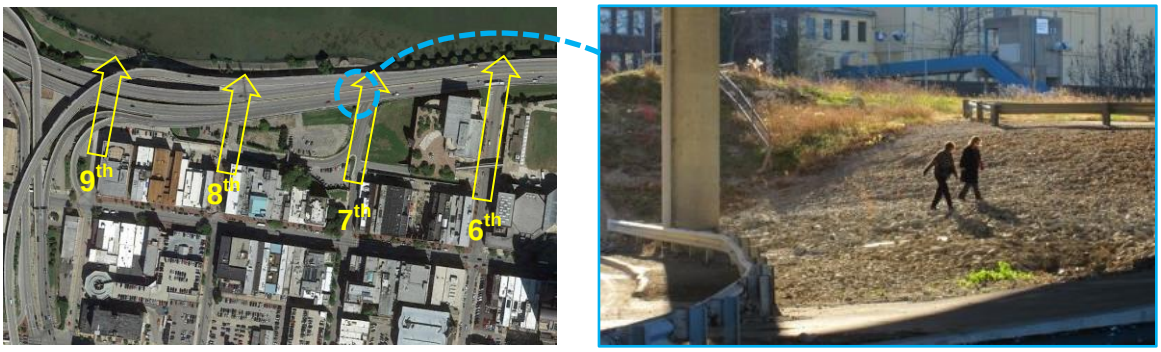
Connectivity projects fill gaps in the existing network and/or open up new access to previously unconnected (or poorly connected) areas.

P-11: Improved Riverfront Access - This project would improve pedestrian access from downtown to the Riverfront at one or more of: 6th Street, 7th Street, 8th Street, and 9th Street. (See **Figure 3.1-7**) Improvements at these locations have been proposed for many years. The need for these improvements was documented in the Downtown Connectivity Study (2009).

There are several improvement options. At 6th Street and River Road one option would be to install a crosswalk, signage and rapid flashing beacon. To provide a strong connection at 7th Street, the 7th Street / Washington Street intersection should be converted to a standard intersection design (special attention will be needed to accommodate the drive to the

Muhammad Ali garage). Sidewalks would be extended north to a new 7th Street / River Road intersection (part of the new River Road project). Crosswalks would be provided at this new intersection. For 8th Street, one solution would be re-institute 8th Street to the extended River Road, with sidewalks on both sides. This would divide the existing parking into two separate lots. The 9th Street connection is not recommended due to the expense and permitting requirements of constructing a new access point through the flood wall. These improvements should be considered as part of the River Road extension project. **Element of S-36**

Figure 3.1-7: Riverfront Access



9th Street: Major project; requires new connection through the flood wall.

8th Street: Modest project; requires new right-of-way and access construction.

7th Street: Modest project; requires construction of new access connection, possible unsignalized street crossing.

6th Street: Small project; requires upgrade of existing unsignalized crossing.

P-12: Riverfront Access at 4th Street - This project would provide improved pedestrian Riverfront access at 4th Street as recommended by several prior planning studies. (see **Figure 3.1-8**) This could be accomplished in many ways from low-cost signage upgrades directing people to the current bridge over River Road to a complete redesign of the connection. The option proposed in the Downtown Master Plan would bring pedestrians down on the south side of River Road, in conjunction with major modifications to the Belvedere, and provide at-grade pedestrian crossings.

To improve 4th Street access to the riverfront, 4th Street could be converted to one-way southbound under the Galt House turnaround. This could provide 8 to 12-ft sidewalks on both sides down to the down to the intersection of 4th and River Road. It would also reduce the complexity of this area by eliminating U-turns to go northbound on 4th Street. It would limit driver's options for accessing River Road. They would be diverted to 6th and 3rd Streets. Lower level garage access could still be provided to River Road. The circulation limitations associated with this option are unlikely to be popular and could frustrate visitors and local drivers alike. This is also not consistent with the desire to convert streets to two-way operations. Instead, it may be possible to narrow the lanes and to redesign the retaining wall to provide a sidewalk. Metro recently removed the narrow median and striped bike lanes on 4th Street from Main Street to River Road. The southbound bike lane is continuous. A sharrow is used northbound at the

narrow point where the street divides. Both bicyclists and pedestrians have been observed using the bike lane. **Element of S-46**

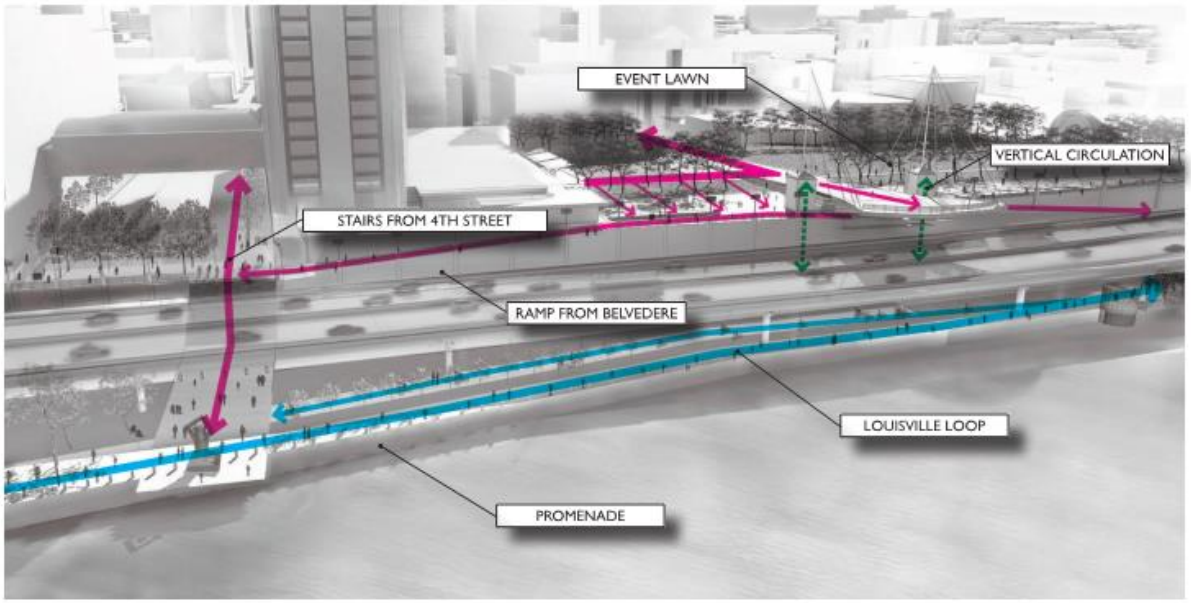
Figure 3.1-8: 4th Street Riverfront Access

P-13: West Waterfront Park Trails/Paths - This project is part of the proposed West Waterfront Park project. It is a necessary part of that project and will be implemented at the same time. (see **Figure 3.1-9**) **To be implemented as part of West Waterfront Park Project.**

Figure 3.1-9: West Waterfront Park Master Plan

P-14: Belvedere Upgrades - Previous studies have recommended improvements to the Belvedere, including accessibility to the Riverfront. The Downtown Master Plan proposed a complete "reimagining" of the Belvedere that would dramatically change access to the Riverfront from both 5th Street and 4th Street, emphasizing at-grade crossings. (See **Figure 3.1-10**) **Advance**

Figure 3.1-10: Potential Belvedere Improvements (Downtown Master Plan)



3.1.4 Corridor/Area Improvements

P-15: JCTC Campus Bicycle/Pedestrian Improvement Phase II - This project was implemented in 2016 and included new sidewalks, crosswalks, signage, lighting, bicycle parking, and landscaping. **Complete**

P-16: Louisville Urban Trail - Indianapolis has had tremendous success with their Cultural Trail project. A Louisville version of this concept was proposed; one that would connect the cultural attractions, hotels, and restaurants in downtown with the riverfront and with destinations in NuLu/Phoenix Hill, and Old Louisville. The off-street trail would include signage, walkway markings, etc. to attract/educate both residents and visitors. One possible route for such a trail is shown in **Figure 3.1-11**; however, there are many routes that could be considered. **Advance**

Figure 3.1-11: Possible Louisville Urban Trail Route

3.2 Bicycle System

The downtown core has a fairly extensive network of bicycle facilities, as was shown and discussed in the Existing Conditions section; however, there is a need for new bike facilities that cross the downtown both east-west and north-south as well as for better bike lane connectivity, improved riverfront access, and continued enhancement of the system (safety, bike parking, intersection treatments, etc.). Many bike projects have been proposed through prior plans and many have been implemented. For example, *Louisville Metro's Bicycle Master Plan: Projects Update 2016-2020* outlines several priority projects for downtown. The potential downtown bicycle projects are grouped into several categories for discussion and screening and are presented in **Figure 3.2-1** and **Table 3.2-1**.

Figure 3.2-1: Evaluated Bicycle Projects

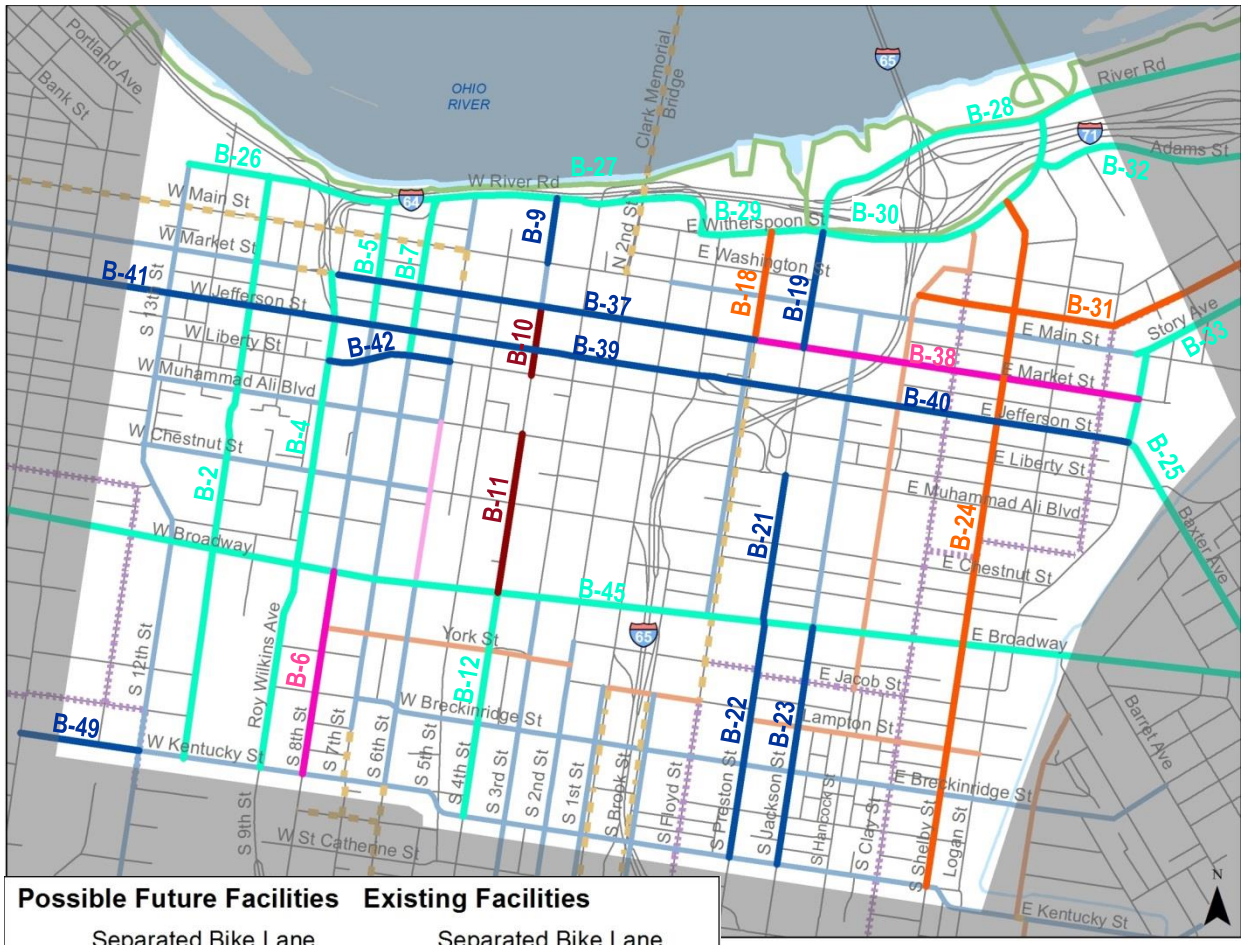


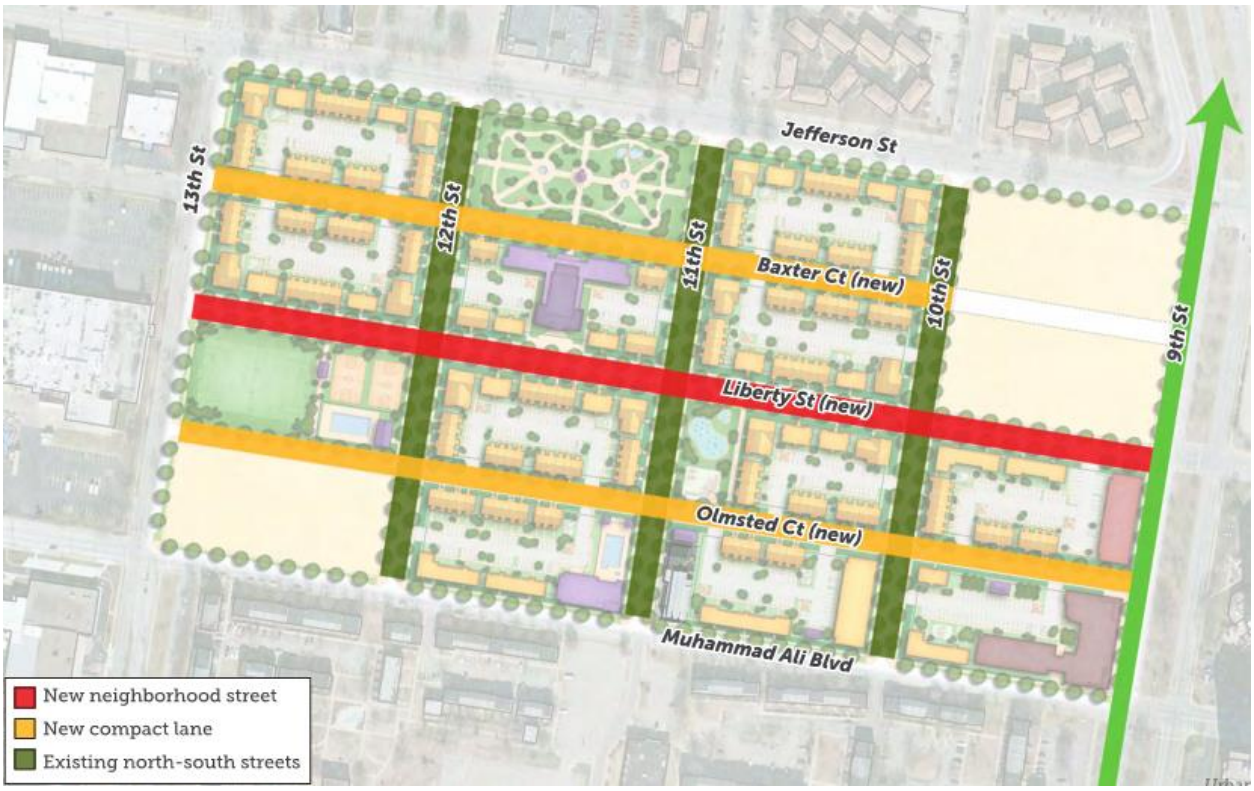
Table 3.2-1: Evaluated Bicycle Projects

#	Project	Location	Description	Dispensation
B-1	12th/13th St	Market St to Kentucky St	Buffered, both directions	Complete
B-2	11th St	Rowan St to Kentucky St	TBD, both directions	Advance
B-3	10th St	Rowan St to Muhammad Ali Blvd	Shared Roadway, both directions	Dismiss
B-4	9th St	Market St to Kentucky St	TBD, both directions	See S-35
B-5	8th St	River Rd to Jefferson St	TBD, southbound (proposed as sharrow)	See S-1 & S-36
B-6	8th St	Broadway to Kentucky St	Cycle track, southbound	Advance
B-7	7th St	Liberty St to River Rd	TBD, northbound (currently sharrow)	See S-1 & S-36
B-8	6th St	River Rd to Kentucky St	Various types, southbound	Complete
B-9	4th St	Main St to River Rd	Buffered, both directions	See S-46
B-10	4th St	Market St to Liberty St	Shared space roadway, both directions	See S-48
B-11	4th St	Muhammad Ali Blvd to Broadway	Shared space roadway, both directions	See S-49
B-12	4th St	Broadway to Kentucky St	TBD, both directions	Advance
B-13	3rd St	Main St to Broadway	TBD, southbound	Dismiss
B-14	2nd St	Jacob St to Main St	Buffered, northbound	Dismiss
B-15	1st St	Main St to College St	Buffered, southbound	Dismiss
B-16	Brook St	College St to Main St	Buffered, northbound	Dismiss
B-17	Floyd St	Market St to Broadway	Repaint SB bike lane, NB sharrow	Advance
B-18	Floyd St	Witherspoon St to Market St	Urban Bike Blvd, both directions	Advance
B-19	Preston St	Witherspoon St to Market St	Buffered, both directions	Dismiss
B-20	Preston St	Market St to Muhammad Ali Blvd	Conventional, southbound	Dismiss
B-21	Preston St	Muhammad Ali Blvd to Broadway	Conventional, southbound	Advance
B-22	Preston St	Broadway to Kentucky St	Conventional, southbound	Advance
B-23	Jackson St	Kentucky St to Broadway	Conventional, northbound	Advance
B-24	Shelby St	Broadway to Witherspoon St	Bike Boulevard, both directions	Advance
B-25	Baxter Ave	Main St to Broadway	TBD, both directions	Advance
B-26	River Rd	6th St to 13th St	Buffered or cycle track, both directions	See S-36
B-27	River Rd	Witherspoon St to 6th St	TBD, both directions	See S-28
B-28	River Rd	Witherspoon St to Frankfort Ave	TBD, both directions	See S-29
B-29	Witherspoon St	Preston St to River Rd	TBD, both directions	Advance

B-30	Witherspoon St	River Rd to River Rd	TBD, both directions	Complete
B-31	Washington St	Adams St to Hancock St	Neighborway, both directions	Advance
B-32	Adams St	Witherspoon St to Spring St	TBD, upgrade, both directions	Advance
B-33	Story Ave	Frankfort Ave to Main St	TBD, westbound	Advance
B-34	Main St	Story Ave to 1st St	Conventional, westbound	Complete
B-35	Main St	1st St to 6th St	Conventional, westbound	Dismiss
B-36	Main St	9th St to 22nd St	Buffered, westbound	Dismiss
B-37	Market St	9th St to Floyd St	Buffered, eastbound	See S-34
B-38	Market St	Floyd St to Baxter Ave	Cycle Track	Ongoing
B-39	Jefferson St	Floyd St to 9th St	Buffered, westbound	See S-33
B-40	Jefferson St	Baxter Ave to Floyd St	Buffered, westbound	See S-18
B-41	Jefferson St	9th St to 26th St	Buffered, both directions	See S-47
B-42	Liberty St	9th St to 6th St	Buffered, eastbound	Advance
B-43	Muhammad Ali Blvd	6th St to 13th St	Buffered, westbound	Complete
B-44	Chestnut St	13th St to 6th St	Buffered, eastbound	Complete
B-45	Broadway	15th St to Baxter Ave	TBD, both directions	See S-32
B-46	Jacob St	2nd St to Floyd St	Signage, both directions	Dismiss
B-47	Breckenridge St	7th St to 9th St	Buffered, westbound	Dismiss
B-48	Kentucky St	8th St to 12th St	Buffered, two-way	Complete
B-49	Kentucky St	12th St to 15th St	Buffered, two-way	Advance
B-50	Bike Parking	Downtown	Update Development Codes	Advance

B-1: 12th / 13th Streets from Market Street to Kentucky Street - This project made use of available width on 12th and 13th Streets from Market Street to Kentucky Street to provide a buffered bike lane in both directions in this 1.1 mile corridor. **Complete**

B-2: 11th Street from Rowan Street to Kentucky Street - This would provide a second north-south connection west of downtown. It could include a combination of sharrows and bike lanes as width and parking allow. This project crosses through the center of the Beecher Terrace development, which will be redeveloped as a mixed-use mixed-income area as part of the Choice Neighborhood Initiative. The 11th Street bike facilities in the redevelopment area should be implemented with that project. These bike facilities have a lower priority given the presence of the 12th and 13th Street buffered bike lanes, but they could be valuable as part of the redevelopment effort. **Advance**



B-3: 10th Street from Rowan Street to Muhammad Ali Boulevard - This proposed bike facility is considered to be duplicative given the current recommendations along 9th Street, 11th Street, and 12th/13th Street. **Dismiss**

B-4: 9th Street from Market Street to Kentucky Street - This project should be defined by the 9th Street Visioning Study that is currently underway. That study should determine the appropriate level of bicycle facilities for this corridor. A grade separated facility is possible given the wide right-of-way, but there are other competing priorities. **See Project S-35**

B-5: 8th Street from River Road to Jefferson Street - This project will be part of two other projects proposed for this corridor: 1) the two-way conversion of 7th Street and 8th Street and 2) the extension of River Road. Those projects will define the type of bike facilities on this segment. It is recommended that the 7th and 8th Street conversion project preserve the north-south bike lanes and possibly even upgrade them. The bike lanes could be shifted to one street (simpler for users) if on-street parking could be removed from one street and concentrated on the other. The extension of the bike lanes to River Road is important for riverfront access. **See Projects S-1 & S-36**

B-6: 8th Street from Broadway to Kentucky Street - The opportunity exists for a cycle track on 8th Street south of Broadway due to long distances with few intersections or driveways

(especially on the west side) and moderate on-street parking demand. This would provide a good connection to the bike lanes on Breckinridge Street and Kentucky Street. **Advance**

B-7: 7th Street from Liberty Street to River Road - This project will be part of two other projects proposed for this corridor: 1) the two-way conversion of 7th Street and 8th Street and 2) the extension of River Road. Those projects will define the type of bike facilities on this stretch. It is recommended that the 7th and 8th Street conversion project preserve the north-south bike lanes and possibly even upgrade them. The bike lanes could be shifted to one street (simpler for users) if on-street parking could be removed from one street and concentrated on the other. The extension of the bike lanes to River Road is important for riverfront access. **See Projects S-1 & S-36**

B-8: 6th Street from River Road to Kentucky Street - Louisville Metro implemented as a buffered bike lane for most of its length. There are some shared lane and conventional bike lane sections where space did not permit the buffer. One complexity is the large number of buses on this corridor north of Broadway. **Complete**

B-9: 4th Street from Main Street to River Road - The currently proposed plan for this important connection is for buffered bike lanes. The complex/undefined vehicle circulation patterns (including turning and u-turning vehicles) and the narrow curb to curb width for the opening of the ramp down to River Road (~28 feet) create design challenges. Using the space for bicycles also precludes adding a sidewalk down the ramp. One option that could be considered is a compact urban roundabout. The current curb to curb width is ~90 to 100 feet, which is in the range for these roundabouts. A teardrop shape could be considered since the Galt House turnaround provides the northbound U-turn/left-turn movement. This design could potentially better accommodate bicycles and pedestrians in this area. Bicycles would need to share the lane with vehicles in the roundabout area. **See Project S-46**

B-10: 4th Street from Market Street to Liberty Street - This two-block (730-foot) section of 4th Street passes by the Convention Center, a major hotel, park, and office/retail buildings. It is a major walking corridor for visitors and residents. It also has moderate traffic volumes and one block is currently closed to vehicles due to construction. To provide an improved north-south bicycle facility it may be possible to convert this two-block stretch to a shared space. The same treatment is proposed for the two-block section south of Muhammad Ali. **See Project S-48**

B-11: 4th Street from Muhammad Ali to Broadway - This long two-block (1,780-foot) section of 4th Street serves several hotels, restaurants, offices, and will soon feature a new apartment building. Travel speeds on this street are slow due to the narrow lanes, on-street parking, and other activity. One option for improving this street for bicycle use would be to consider a shared space street. **See Project S-49**

B-12: 4th Street from Broadway to Kentucky - South of Broadway, bike lanes could be considered to provide a direct connection from the residential areas to the south into downtown. Currently, there are bike lanes on 2nd Street / 3rd Street and 6th Street / 7th Street that provide this connection. Given the two way traffic, on-street parking, and ~37.5 feet of curb-to-curb width on 4th Street, adding bike lanes will be difficult. If parking was removed from one side, a one direction bike lane could be added with shared lane markings in the reverse direction. **Advance**

B-13: 3rd Street from Main Street to Broadway – Considering the proposal to convert 3rd Street to two-way traffic, there is not expected to be any width available for bicycle lanes. **Dismiss**

B-14: 2nd Street from Jacob Street to Main Street - 2nd Street is a major north-south vehicular traffic route. It is a capacity constraint at certain intersections and is expected to carry more traffic due to other street conversions and lane reductions as well as the new tolls. There is insufficient width to add bike lanes without removing a travel lane. **Dismiss**

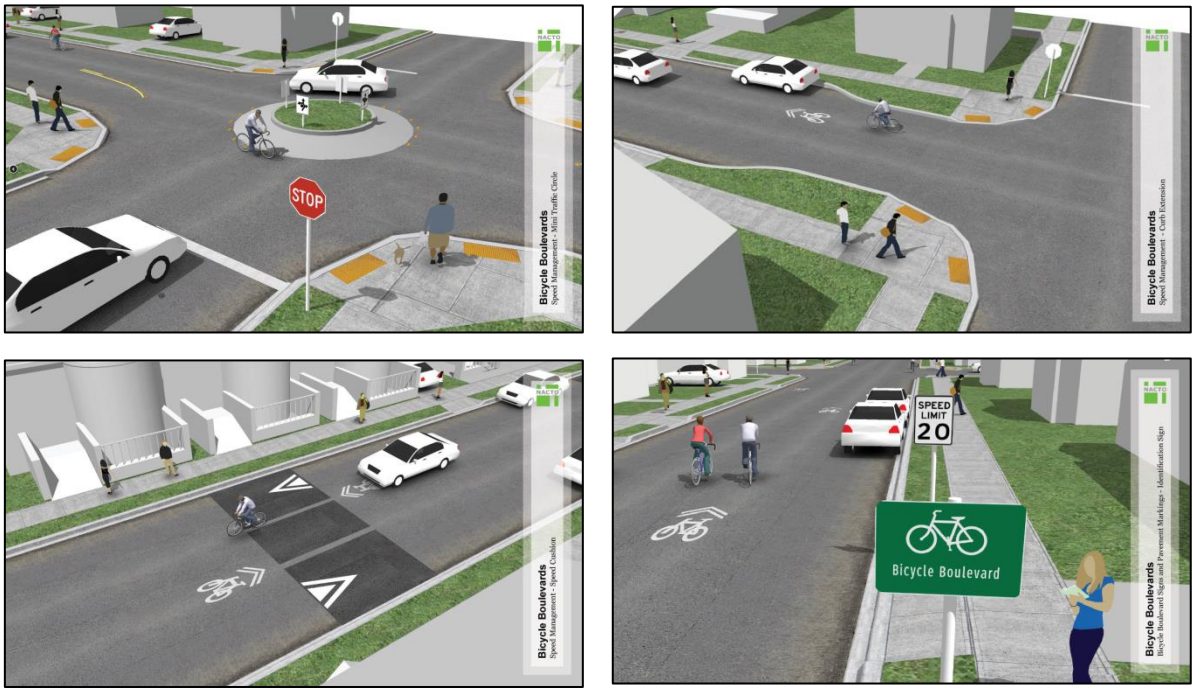
B-15: 1st Street from Main Street to College Street - 1st Street in this area is not conducive to bicycle travel due to the high traffic volumes, higher travel speeds, and two freeway on-ramps. While it is possible to consider adding a bike lane in this area, there appear to be better streets to serve this purpose. **Dismiss**

B-16: Brook Street from College Street to Main Street - Brook Street in this area is not conducive to bicycle travel due to the high traffic volumes, higher travel speeds, and freeway off-ramps. While it is possible to consider adding a bike lane in this area, there appear to be better streets to serve this purpose. **Dismiss**

B-17: Floyd Street from Market Street to Broadway - This section of street falls into the category of maintenance and striping updates. **Advance**

B-18: Floyd Street from Witherspoon Street to Market Street - Upgrading this two block stretch of Floyd Street would better connect the Medical District with the riverfront. It currently has shared lane markings. For bicycle travel, Floyd Street benefits from having the lowest traffic volumes of any north-south street in the area. Therefore, it is proposed that this two block section be converted to an urban bicycle boulevard. This could include reinforcing traffic calming measures (volumes and speeds are already low). Concepts could include a mini-roundabout at Washington Street to replace the all-way stop; neckdowns, a speed hump (with bicycle grooves) on each block; and a roundabout at Witherspoon Street (which could require narrowing Witherspoon Street). (See **Figure 3.2-2**) **Advance**

Figure 3.2-2: Bike Boulevard Concepts



B-19: Preston Street from Witherspoon Street to Market Street - The northern two-way block has four lanes and an ADT of 8,000. It could be reduced to 3 lanes with bike lanes in both directions, connecting with the westbound Main Street bike lane. This could affect event traffic management. The southern block could carry one southbound bike lane to connect with Market Street eastbound if parking (or a travel lane) was removed. This street is a state highway however, and these changes could affect event traffic management. It is also difficult to extend the lanes further south due to the I-65 interchange ramps. **Dismiss**

B-20: Preston Street from Market Street to Muhammad Ali Boulevard - This three block portion of Preston Street serves the I-65 interchange ramps which makes right side bike lanes challenging. Floyd Street is a better north-south route. **Dismiss**

B-21: Preston Street from Muhammad Ali Boulevard to Broadway - This proposed bike lane would be the direct complement to the lane on Jackson Street. The curb-to-curb width is similar at approximately 42 feet, thus the design could be similar (two through lanes, parking on both sides where possible, and a conventional bike lane). The traffic volumes, parking activity, bus activity, and driveway activity north of Broadway is such that two through lanes are warranted as on Jackson Street. In general, this project will be challenging due to the potential for parking impacts though the center of the Medical District. **Advance**

B-22: Preston Street from Broadway to Kentucky Street - This proposed bike lane would be the direct complement to the lane on Jackson Street. The curb to curb width is similar at approximately 42 feet, thus the design could be similar (two through lanes, parking on both sides where possible, and a conventional bike lane). South of Broadway the traffic volume and other activity is reduced compared to in the Medical District, though still substantial in the PM peak. Due to the higher PM peak volumes a two-lane option may be preferred; however, a part-time parking lane could be implemented, but that would require enforcement. **Advance**

B-23: Jackson Street from Kentucky Street to Broadway - This bike lane completes the northbound link to the Medical District from the east-west Kentucky Street/Breckinridge Street lanes. Jackson Street is one-way with an ADT in the 5,000 to 6,000 range. The AM northbound approach volume at Broadway is approximately 550 vehicles per hour. The curb-to-curb width is approximately 36 feet. This width is sufficient to accommodate two 10.5-foot travel lanes, an 8-foot parking lane on one side and a 7-foot buffered bike lane on the other side. Alternatively, it could accommodate one 12-foot travel lane, 8-foot parking lanes on both sides, and an 8-foot buffered bike lane. With this second option, turn lanes would be beneficial at intersections. Additionally, two approach lanes are recommended at Broadway to tie into the two northbound lanes north of Broadway and to limit the side-street green time required for Jackson Street at that intersection. **Advance**

B-24: Shelby Street from Broadway to Witherspoon Street - This lower volume north-south roadway bisects the NuLu area and would provide a good candidate for an urban bicycle boulevard (Neighborway). It would be beneficial if the section of Shelby Street that has been closed to traffic were opened to bicycle traffic to provide a continuous route. (If this is not possible then it may be necessary to shift the bicycle boulevard east to Campbell Street.) **Advance**

B-25: Baxter Street from Main Street to Broadway - This is a complex and high traffic volume section of street; however, it also provides a critical connection to the Irish Hill area and beyond. It is important to make a better connection in the east. **Advance**

B-26: River Road from 6th Street to 13th Street - A buffered bike lane or cycle track could be designed and implemented as part of the River Road Extension project. **See Project S-36**

B-27: River Road from Witherspoon Street to 6th Street - This portion of River Road serves an important vehicular traffic function; it is also desirable on-street bicycle facilities. Further analysis is needed to determine if on-street facilities are feasible. There are nearby east-west off-street facilities, but they are designed primarily for recreational travel. **See Project S-28**

B-28: River Road from Witherspoon Street to Frankfort Avenue - This portion of River Road has a 50 foot curb-to-curb width (wider where turn lanes are present) and could be restriped to provide a three-lane cross section with buffered bicycle lanes on both sides. The *Road Diet Feasibility Study* stated that this was feasible from a traffic perspective. **See Project S-29**

B-29: Witherspoon Street from Preston Street to River Road - This portion of Witherspoon runs along the Waterfront Park. It offers a possible connection between the two portions of River Road discussed above. The facility type would need to be determined. **Advance**

B-30: Witherspoon Street from River Road to River Road - This street was re-opened with an off-street shared-use path that was removed during the bridges construction. **Complete**

B-31: Washington Street from Adams Street to Hancock Street - This is a planned Neighborway corridor, which will serve Butchertown. **Advance**

B-32: Adams Street from Witherspoon Street to Spring Street - This street has shared lanes. An upgrade could be possible, improving the connection to Waterfront Park. **Advance**

B-33: Story Avenue from Frankfort Avenue to Main Street - This westbound street connects the end of Frankfort Avenue to NuLu and downtown. Adding a bike lane would likely require removing a parking lane as the traffic volumes are heavy in the AM peak period. **Advance**

B-34: Main Street from Story Avenue to 1st Street - This project provides the corresponding westbound complement to the soon to be constructed Market Street cycle track. **Complete**

B-35: Main Street from 1st Street to 6th Street - This project would provide a connection into the heart of the downtown; however, it would require the removal of a travel lane or parking lane. The traffic impacts of removing a lane at the 2nd Street and 3rd Street intersections could be substantial and parking in this area is heavily used on both sides of the street. Other better options exist for making this connection. **Dismiss**

B-36: Main Street from 9th Street to 22nd Street - A conventional, westbound bike lane could be added to this street with minimal traffic impacts; however this street is also proposed for two-way conversion and there are other east-west bike lanes. **Dismiss**

B-37: Market Street from 9th Street to Floyd - This would re-allocate width on Market Street to provide a westbound bike lane through downtown. Market Street has experienced several bicycle crashes in the last five years. This project is contingent on the street remaining one-way

from 9th Street to Brook Street. It is part of the larger Market Street Complete Streets project. **See Project S-34**

B-38: Market Street from Floyd to Baxter - This project will provide a cycle track on Market Street as part of the complete street project to be started later this year. **Ongoing**

B-39: Jefferson Street from Floyd Street to 9th Street - This would re-allocate width on Jefferson Street to provide a westbound bike lane through downtown. This project is contingent on the street remaining one-way from Brook Street to 9th Street. It is part of the larger Jefferson Complete Streets project. **See Project S-33**

B-40: Jefferson Street from Baxter to Floyd - This project would provide a westbound bike lane that would complement the cycle track planned for Market Street and connect all the way into the heart of downtown. This should be done along with the one-way / two-way conversion on that segment of Jefferson Street. **See Project S-18**

B-41: Jefferson Street from 9th Street to 26th Street - Buffered bike lanes could be considered in both directions as part of a three-lane conversion. The KTC road diet report indicated this conversion was feasible. **See Project S-47**

B-42: Liberty Street from 9th Street to 6th Street - An eastbound bike lane could be installed on this three block segment. It is part of Metro's near-term plans. **Advance**

B-43: Muhammad Ali from 6th Street to 13th Street - This project made use of available width on Muhammad Ali to provide a buffered bike lane. **Complete**

B-44: Chestnut Street from 13th Street to 6th Street - This project made use of available width on Chestnut to provide a buffered bike lane. **Complete**

B-45: Broadway from 13th Street to Baxter Street - Broadway is a popular bicycle route as shown by the Strava bicycle activity map and pictures of the corridor (see **Figure X**). However, the street is not designed for non-expert cyclists. Broadway has a higher number of bicycle crashes than most other streets in the downtown as shown by the bicycle crash density map in Existing Conditions. Improvements could potentially provide safety benefits. This project is part of the larger complete street project for the Broadway corridor. **See Project S-32**

B-46: Jacob Street from 2nd Street to Floyd Street - This project would install bicycle route signage in both directions. It is not clear that this is a corridor that is appropriate for encouraging non-expert cyclists to use given the nearby freeway ramps. **Dismiss**

B-47: Breckinridge Street from 7th Street to 9th Street - Breckinridge currently connects to the bicycle lanes on 6th Street and 7th Street. Bike lanes were also installed on Kentucky Street in both directions parallel to this segment to provide a connection to the west. **Dismiss**

B-48: Kentucky Street from 8th Street to 12th Street - This project was recently completed to 12th Street. **Complete.**

B-49: Kentucky Street from 12th Street to 15th Street - The Kentucky Street bike lanes could be continued west to connect with the California neighborhood. **Advance**

B-50: Bike Parking Downtown - Bicycle use for non-recreational travel is expected to increase in the future, which will result in an increased demand for bicycle parking. Local codes should adequately address this future need in a reasonable manner. **Advance**

3.3 Transit System

A major emphasis of the study was on improving transit service and facilities for TARC's current and future customers. As presented previously, this included a review of current transit service (stops, speeds, and frequency) and ridership patterns in downtown as well as consideration of survey data and other information. The transit improvement projects presented here are divided into four categories:

1. Bus-Only Lanes
2. New/Enhanced Service
3. Routing Revisions and Service Extensions
4. Transit Centers / Transfer Zones

The projects are highlighted on **Figure 3.3-1** and listed in **Table 3.3-1**.

Figure 3.3-1: Evaluated Transit Projects

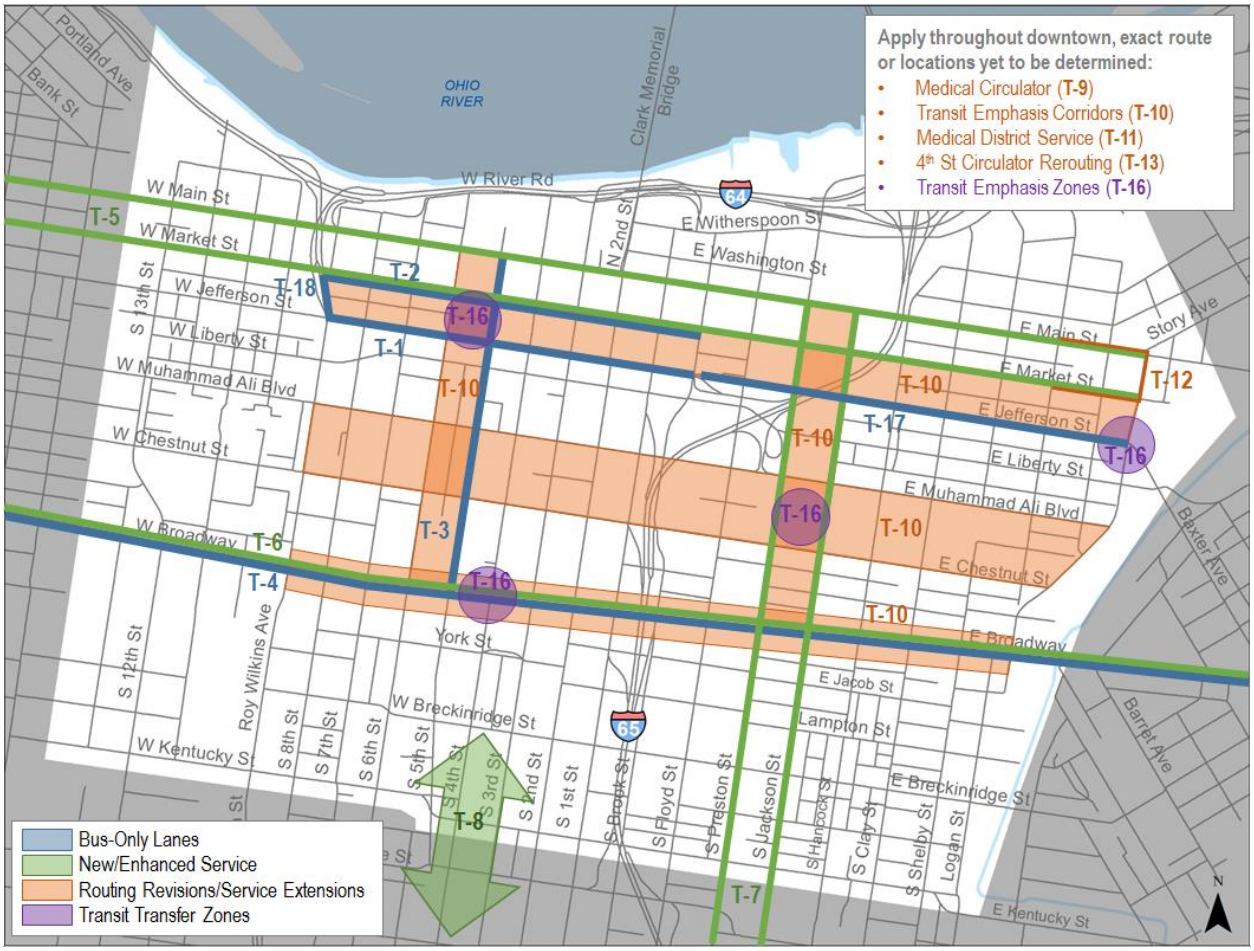


Table 3.3-1: Evaluated Transit Projects

#	Project	Location	Description	Dispensation
Bus-Only Lanes				
T-1	Jefferson St	Brook St to 9th St	Westbound bus-only lane	See S-33
T-2	Market St	9th St to Brook St	Eastbound bus-only lane	See S-34
T-3	5th St	Broadway to Main St	Northbound bus-only in right lane	Advance
T-4	Broadway	West of 15th St to Baxter Ave	Transit priority lane, both directions	See S-32
T-17	Jefferson St	Baxter Ave to Brook St	Westbound bus-only lane	See S-18
T-18	9th Street	Jefferson St to Market St	Northbound bus-only	See S-35
New/Enhanced Service				
T-5	Main St / Market St Streetcar	15th St to Baxter Ave	Modern streetcar, high frequency, high amenity stops	Advance
T-6	Broadway BRT	Shawnee Park to Baxter Ave	High frequency, high amenity stops	Advance
T-7	Preston St	Through Downtown	Upgrade to premium transit service	Advance
T-8	U of L, Airport, Expo. Center	North/South corridor connections	Add new bus service to these destinations along a north-south corridor	Advance
Routing Revisions and Service Extensions				
T-9	Medical Circulator	11th St to Preston St	Rationalize service; simplify to E-W route	Advance
T-10	Transit Emphasis Corridors	Jefferson St, Market St, Muhammad Ali Blvd, Chestnut St, Broadway, 5th/6th Streets	Revise bus routes to increase service on key corridors, reduce service on other streets, reduce stops	Advance
T-11	Medical District Service	2nd St to Hancock St, Market St to Jacob St	Reconfigure existing routes to provide improved service, encourage ridership	Advance
T-12	Main/Market Circulator Extension	Campbell St to Baxter St	Extend to east, relocate/add stops as needed	Advance
T-13	4th St Circulator Rerouting	2nd St, 3rd St, or Downtown Loop	Re-route current circulator to improve efficiency and promote ridership	Advance
Transit Centers / Transfer Zones				
T-14	Transit Center – Central	Near 5th St & Jefferson St	Major transit center with private development	Dismiss
T-15	Transit Center – Eastern Edge	Near Jefferson St & Baxter Ave	Major transit center with private development	Dismiss
T-16	Transit Emphasis Zones	TBD	Modified routes designed to overlap within zone, upgraded stops	Advance

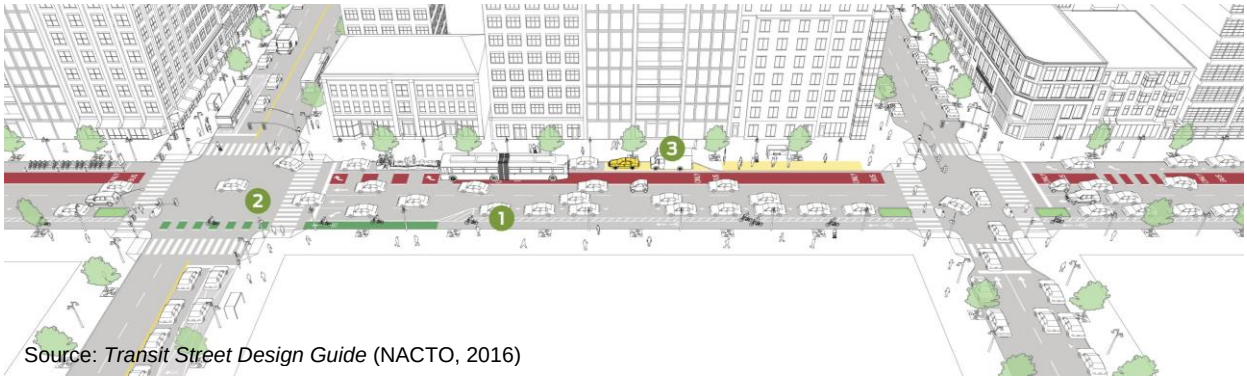
TARC's proposed Strategic Plan and Comprehensive Operational Analysis (COA) that will be undertaken in 2018 will certainly influence some of the projects listed above. That work will look at TARC's service across the region and will map out a plan for continuing to improve the service plan and delivery.

3.3.1 Bus-Only Lanes

Bus-only lanes can provide an effective means of prioritizing transit service in a busy downtown. However, they must be long enough to improve bus travel times and operations and they must carry enough buses and passengers that they are clearly warranted.

According to the NACTO *Transit Street Design Guide*, "One-way corridor streets, which often have multiple travel lanes and significant daily throughput, and which connect multiple urban or activity centers, may be prime corridors to implement dedicated transit lanes. These may be trunkline transit routes where multiple bus lines converge and connect." A best practices figure from that guide is shown in **Figure 3.3-2** for reference.

Figure 3.3-2: Example Bus-Only Lane on One-Way Street



Source: *Transit Street Design Guide* (NACTO, 2016)

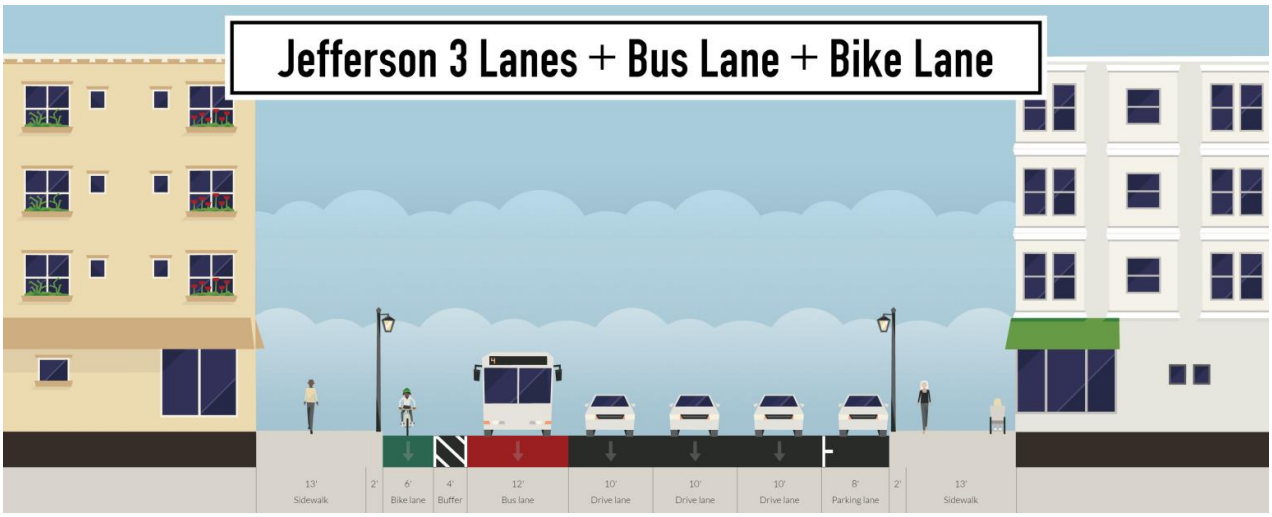
TRB's *Transit Capacity and Quality of Service Manual*, 3rd Ed. provides planning guidance for bus-only lanes. It states that curb bus lanes in normal flow conditions should serve at least 30 buses and 1,200 passengers in the peak hour and on a main street in a central business district this is increased to 50 buses and 2,000 passengers. However, it also refers to the *Bus Rapid Transit Practitioner's Guide*, which states that in the context of BRT service, "*The bus lanes should carry as many people as in the adjacent general traffic lane. Generally, at least 25 buses should use the lanes during the peak hour. (Ideally, there should be at least one bus per signal cycle to give buses a steady presence in the bus lane.)*" For streets with BRT service in downtown Louisville, the italicized warrants have been emphasized in this study.

During the development of the MOVE Louisville plan, the benefits of transit emphasis corridors were discussed and several downtown streets were considered including Market Street, Jefferson Street, and Broadway. These streets were therefore assessed for bus-only lanes both with and without bus route changes. In addition, 5th and 6th Streets were considered due to high bus use and 9th Street was considered based on available right-of-way and the proposed BRT service in that corridor. The transit emphasis corridor concept and possible route changes are discussed further in project T-10, while the bus lane projects are discussed here.

T-1: Jefferson Street, Brook Street to 9th Street - This project would re-allocate one lane on nine blocks of Jefferson Street to provide a westbound bus-only lane through downtown. This project is contingent on the street remaining one-way from Brook Street to 9th Street. It is part of

the larger Jefferson Street Complete Streets project. A potential typical section for this project is shown in **Figure 3.3-3**. **See Project S-33**

Figure 3.3-3: Jefferson Street, Brook Street to 9th Street (T-1 and S-33)



Project Definition: This project would convert one general purpose travel lane to a 24-hour westbound bus-only lane. The lane would be painted red with signage (preferably overhead) to designate it as a bus-only lane. Buses would stop in this lane to pick-up and drop-off passengers. Right-turns by other vehicles would be allowed from this lane, making it a shared bus-lane / right-turn lane at many intersections. To make the project most effective and increase public acceptance, routes should be adjusted to make use of this lane the fullest extent. To maximize speeds, the number of stops should be kept to a minimum.

To implement the project, it is essential that this portion of Jefferson Street remain one-way as discussed in the Streets section. By leaving it one-way, there is flexibility to implement several complete street design concepts, including the addition of bus-only lanes and bike lanes.

Purpose and Need: As stated in the *Bus Rapid Transit Practitioner's Guide*, "Bus lanes require (1) a sufficient frequency of buses, (2) traffic congestion along the roadway, (3) suitable street geometry, and (4) community willingness to enforce the regulations. From a BRT perspective, bus lanes are useful in establishing a clear identity for the BRT service's running way."

1 - Warrants: As shown in **Table 3.3-2**, There are currently 20 buses an hour on Jefferson Street near 3rd Street during peak times and about half that in the middle of the day. By adjusting several routes this could be increased to 30 in the peak hour and 14 during midday. This includes the new Dixie Highway BRT service. This would exceed the BRT bus lane threshold of 25 buses per hour, but it is not enough for one bus per signal cycle (at 90 second cycles there are 40 per hour). There would be three lanes remaining for general purpose travel. The number of bus passengers in the lane would reach 600 during peak times, assuming 20 passengers per bus. That would be comparable to an average of 600 people per hour in the other three lanes during the AM and PM peak hours. [The average of the AM and PM peak hour volumes at 3rd Street is 1,650 vph (Metro Synchro model). At 1.1 persons/vehicle that

yields 1,815 people or 600 people per lane.] Therefore, by making some route adjustments it is possible to justify a bus-only lane on Jefferson Street in the core area of downtown.

Table 3.3-2: Buses Per Hour on Market Street and Jefferson Street near 3rd Street

		Market Street (Eastbound)						Jefferson Street (Westbound)					
		AM Peak		Midday		PM Peak		AM Peak		Midday		PM Peak	
	Route Number	Current Buses	Proposed Buses	Current Buses	Proposed Buses	Current Buses	Proposed Buses	Current Buses	Proposed Buses	Current Buses	Proposed Buses	Current Buses	Proposed Buses
Local Bus Routes	2	2	0	1	0	1	0	0	0	0	0	0	0
	15	3	3	2	2	3	3	3	3	2	2	3	3
	17	0	1	0	1	0	2	2	2	1	1	2	2
	18/BRT	4	6	4	6	4	6	4	6	4	6	4	6
	31	1	1	1	1	2	2	0	2	0	1	0	1
	40	0	2	0	1	0	2	0	0	1	1	2	2
	43	2	2	1	1	2	2	2	2	1	1	2	2
	71	0	2	0	1	0	2	2	2	1	1	2	2
	72	0	2	0	1	0	2	2	2	1	1	2	2
	77/Zero	6	6	6	6	6	6	0	0	0	0	0	0
Subtotal		18	25	15	20	18	27	15	19	11	14	17	20
Express Bus Routes	17x	0	0	0	0	0	2	2	2	0	0	0	0
	40x	0	0	0	0	0	2	2	2	0	0	0	0
	45x	0	2	0	0	0	1	0	0	0	0	0	0
	53x	1	1	0	0	1	1	0	1	0	0	0	1
	61x	1	1	0	0	0	0	0	0	0	0	0	1
	65x	0	0	0	0	0	0	2	2	0	0	2	2
	66x	1	1	0	0	1	1	0	0	0	0	0	0
	67x	2	2	0	0	2	2	0	2	0	0	0	2
	68x/49x	2	2	0	0	2	2	0	2	0	0	0	2
	78x	2	2	0	0	1	1	0	2	0	0	0	2
Subtotal		9	11	0	0	7	12	6	13	0	0	2	10
Total		27	36	15	20	25	39	21	32	11	14	19	30
People @ 20/bus		540	720	300	400	500	780	420	640	220	280	380	600

2 - Congestion: There is increasing congestion in the downtown core due to new development as well as a major push to improve pedestrian and bicycle safety and mobility. Congestion in downtown is expected to increase and if plans are not made for transit now, it may become difficult to maintain adequate peak period bus movements in the future (as has happened on 4th Street and now 3rd Street). This project will speed travel and maintain capacity for the future.

3 - Street Geometry: There is adequate width as described in the Streets section of the report.

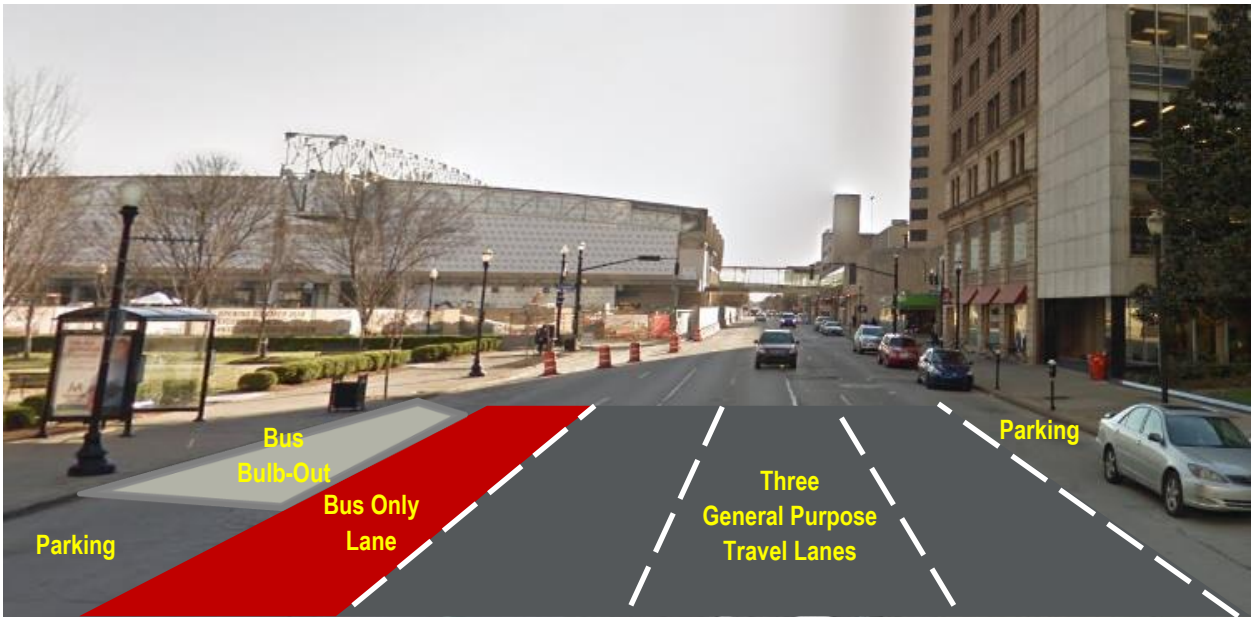
4 - Enforcement: The City must make enforcement a priority for the project to be successful.

5 - Marketing: Bus lanes serving both the BRT and other buses will significantly increase the market presence of transit in downtown, showing that it is an important and valuable mode of travel in Louisville.

Trial Implementation: The current lane closure on Jefferson Street due to the convention center construction provides an ideal opportunity for a trail bus-lane implementation from 4th Street west to 9th Street. The street is already three lanes from 2nd Street to 4th Street. There

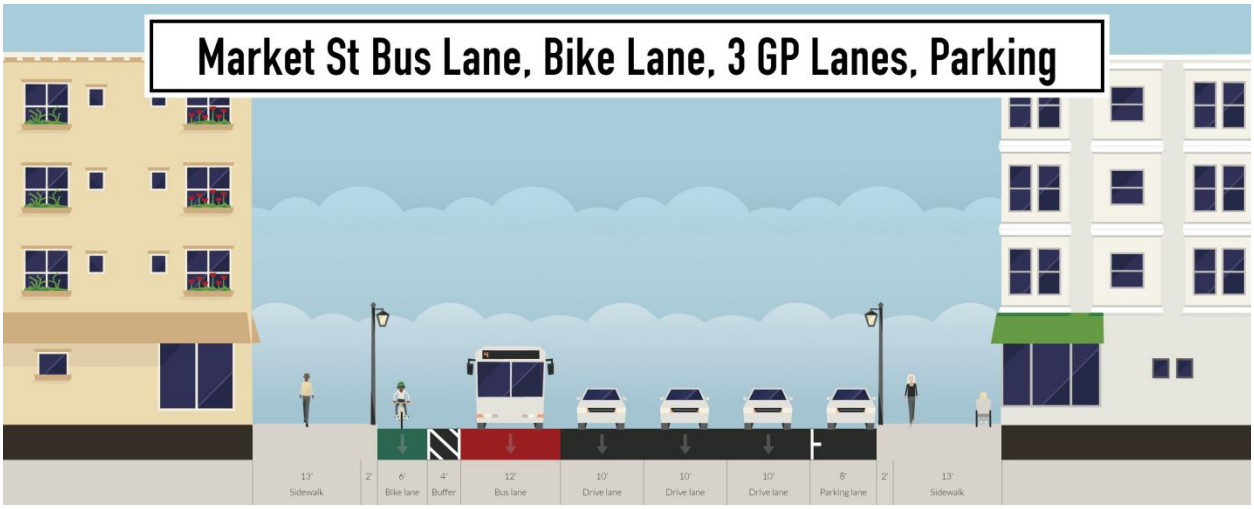
are several approaches that could be taken for this trial project. One approach would be leave the on-street parking, stripe the bus lane and right turn lanes, and construct bulb-outs at all bus stops. (See **Figure 3.3-4**) The cost of this approach would be moderate and it would provide a good indication of how the bus-lane would operate.

Figure 3.3-4: Bus Lane Trial Implementation Concept on Jefferson



T-2: Market Street, 9th Street to Brook Street - This project would re-allocate width on nine blocks of Market Street to provide an eastbound bus only lane through downtown. (See **Figure 3.3-5**)This project is contingent on the street remaining one-way from 9th Street to Brook Street. It is part of the larger Market Street Complete Streets project. **See Project S-34**

Figure 3.3-5: Market Street, 9th Street to Brook Street (T-2 and S-34)



Project Discussion: Much of the discussion for the Jefferson Street bus lane also applies to Market Street; however, the bus activity is higher on Market Street as shown in **Table 3.3-2**. Also, as a State Highway, KYTC would need to agree to any modifications to this street.

1 - Warrants: As shown in **Table 3.3-2**, There are approximately 25 buses per hour on Market Street near 3rd Street during peak times, which already meets the 25 bus threshold for BRT bus-only lanes. By adjusting several routes this could be increased to nearly 40 in the peak and 20 during midday. This would be approximately one bus per signal cycle during peak times. The number of bus passengers in the lane would reach nearly 800 during peak times, assuming 20 passengers per bus. That would be comparable to the number of people per lane in the remaining three lanes. Therefore, it is possible to justify a bus only lane on Market Street in the core area of downtown.

2 - Congestion: The traffic flow characteristics on Market Street are such that a bus-only lane could provide a benefit to bus passengers. Similar to Jefferson Street, the preservation of transit capacity on Market Street is desirable. A complete traffic analysis would be necessary to document traffic impacts on Market Street, but with turn lanes at intersections and optimized signal timing, it is expected that three lanes can carry the 11,000 to 17,500 vehicles per day that travel this street. (KIPDA, 2016) These volumes are similar to those on Jefferson Street.

3 - Street Geometry: There is adequate width as described in the Streets section of the report.

4 - Enforcement: The City must make enforcement a priority for the project to be successful.

5 - Marketing: Bus lanes serving both the BRT and other buses will significantly increase the market presence of transit in downtown, showing that it is an important and valuable mode of travel in Louisville.

Trial Implementation: Similar to the situation on Jefferson Street, the convention center construction lane closure on Market Street provides an opportunity for a trail bus-lane implementation from 9th Street to 4th Street. The street is already three lanes from 3rd Street to 4th Street. At a minimum, it provides the conditions for a trial of how best to operate Market Street with only three though travel lanes leading up to the critical 2nd Street / Market Street intersection. The current condition is more capacity constrained than with the bus lane because the bus lane would remove some traffic from the three general purpose lanes.

T-3: 5th Street, Broadway to Main Street - This project would re-allocate width on 5th Street to prioritize bus operations in this important corridor. There are currently 17 bus routes (including express routes) that use 5th Avenue. During the PM peak, the large number of buses creates a "de facto" bus only lane near Jefferson Street and Market Street. The project would include bus stop bump-outs and station area improvements south of Liberty Street. North of Liberty Street it would include a designated bus lane, bus stop area improvements, and the addition of parking to compensate for lost parking on Jefferson Street and Market Street. These improvements

would increase the visibility of transit downtown and would give buses clear priority in the corridor. The bus lane could be a full-time bus lane or a peak period only bus lane. Advance

Project Discussion: A review of Metro's AM and PM Synchro models showed that a single northbound through approach lane could potentially serve the existing demand at Liberty Street, Jefferson Street, and possibly Market Street. This is an area with significant bus and auto conflicts during peak periods. It is proposed that one through lane be converted to a bus only lane that also allows right turns from south of Liberty Street to north of Market Street. South of this section, the dual through approach lanes may be necessary. The proposed improvements are described below with the numbers corresponding to those in **Figure 3.3-6**.

1. The bus stop north of Broadway would be bumped out to provide an in-line bus stop, reducing bus delay and creating space for a shelter if desired. The bump out should be long enough to serve two buses simultaneously.

2. The bus stop north of Chestnut Street would be bumped out to provide an in-line stop, reducing bus delay and increasing the sidewalk throughway to better serve non-bus riders using the sidewalk. The bump out should be long enough to serve two buses simultaneously.

3. The bus stop north of Muhammad Ali Boulevard would be bumped out to provide an in-line bus stop, reducing bus delay and creating space for a shelter if desired. The bump out should be long enough to serve two buses simultaneously. It may be possible to add several metered parking spaces on this block north of the bus stop.

4. The bus only lane would start just south of Liberty Street in the right of the two through lanes. The northbound right-turn only lane would remain in place. The bus only lane would carry north through the intersection.

5. The bus stop on the near-side of Jefferson Street could be shifted to the far-side location as discussed with **Project T-16**. The stop would

Figure 3.3-6: 5th Street Project T-3

include a bump-out to provide for in-line stopping and to create an area for a high-quality shelter while maintaining a wide sidewalk area. The primary reason for moving this stop to the far-side is to shorten the transfer distance to the westbound Jefferson Street stop at the same intersection. If the stop is moved, then on-street metered parking could be added to the block from Liberty Street to Jefferson Street.

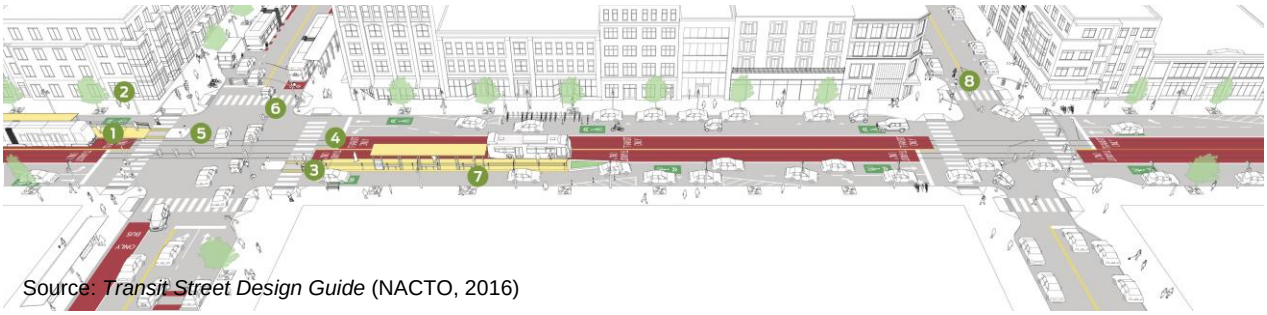
6. The sidewalk bump-out could apply to the entire block from Jefferson Street to Market Street. However, the intersection capacity at Market Street should be examined in more detail to determine the appropriate number of approach lanes. The heavy right-turn volume may require a third approach lane as is present today. That could limit the sidewalk widening north of the mid-block crosswalk. One option would be to shift the bus stop further south to allow for the current lane configuration north of the stop area.

7. The bus only lane could end just south of Market Street or it could extend to Main Street depending on the intersection analysis results and any bus re-routing in the area. See the re-routing discussion for **Project T-10**.

T-4: Broadway, West of 15th Street to Baxter Avenue - This project would create a transit priority lane in both directions on Broadway. It is part of the larger Broadway complete street project. The desire for transit priority lanes must be balanced with the need for sufficient traffic capacity as well as the desire for bicycle facilities in the same corridor. This street is also a state highway and KYTC must agree to all changes on the street. **See Project S-32**

Project Discussion: Broadway is a primary transit corridor with high ridership and high frequency service (Route 23 among others). The MOVE Louisville project identified this as one of the highest priority corridors for future Bus Rapid Transit service. (MOVE Louisville, 2016) Ridership numbers are moderate to high from 12th Street all the way to Jackson Street. The street has major transit destinations such as the Jefferson Community and Technical College, various government service buildings, and the Medical District. The right-of-way is also quite wide at over 100 feet throughout the corridor. Both side running and center running transit lanes have been proposed for the corridor. (See **Figure 3.3-7**) However, there are several competing needs in the corridor including a major need to improve pedestrian, bicycle, and traffic safety. **Project S-32** includes a discussion of options and trade-offs.

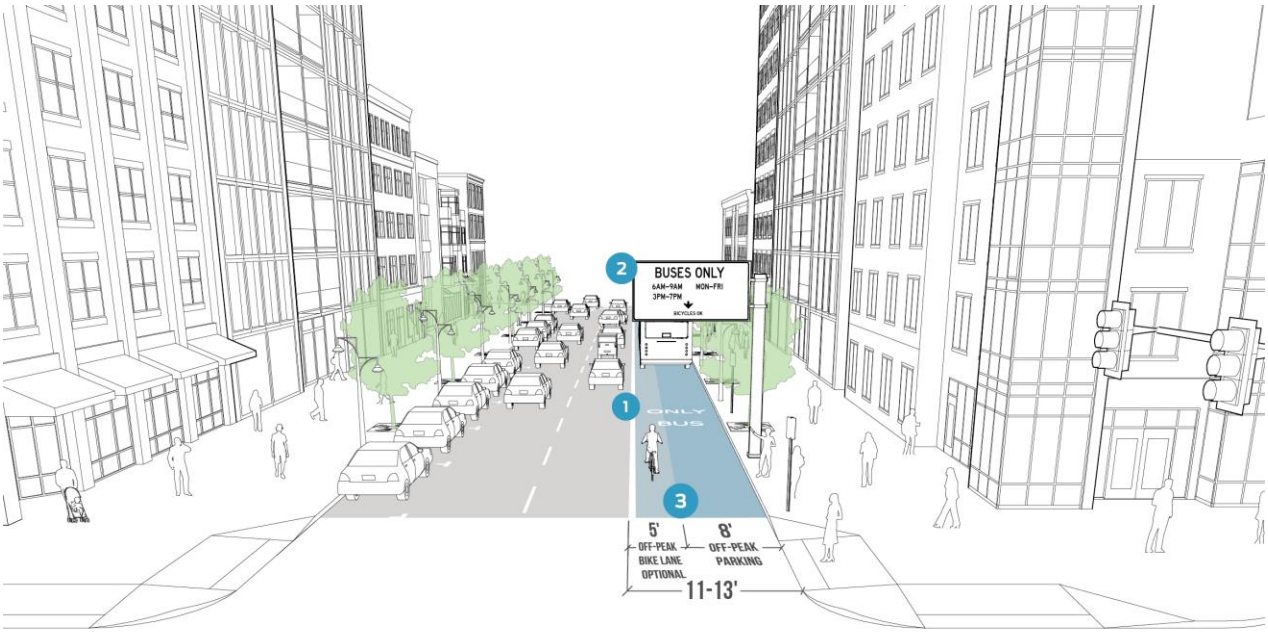
Figure 3.3-7: Center Running Transit Concept



Source: *Transit Street Design Guide* (NACTO, 2016)

T-17: Jefferson Street, Baxter Avenue to Brook Street - This project would re-allocate width on Jefferson Street to provide a westbound bus-only lane through NuLu. The project needs to be examined in light of the desire for two-way traffic on this section of Jefferson Street. It may require eliminating parking to provide this bus lane. There is also a plan for a bike lane on this street segment. It is not possible to provide a bus lane, bike lane, maintain parking on both sides of the street, and convert the street to an effective two-way flow street. Trade-offs will need to be made during design. A peak-period only bus lane using restricted off-peak only parking may be an option (see image below). **See Project S-18**

Figure 3.3-7: Peak Hour Transit Lane Concept



Source: Transit Street Design Guide (NACTO, 2016)

T-18: 9th Street, Jefferson Street to Market Street - This short bus-only lane project would connect the bus-only lanes on Jefferson Street and Market Street. It is important if the other two projects are completed to facilitate a reliable connection between the two streets and help buses avoid traffic congestion. It is feasible to provide this connection within the existing right-of-way; however, a small design study would be needed to determine the extent of physical improvements necessary. The need for the connection must also be considered within the larger context of the ongoing 9th Street study and the desire to re-imagine the entire 9th Street corridor along the edge of downtown. **See Project S-35**

3.3.2 New/Enhanced Service

Several new or premium transit service options were discussed over the course of the project. They range from new local bus service, to Bus Rapid Transit (BRT) or Enhanced Bus, and Streetcar service.

T-5: Main/Market Streetcar Studies and Implementation - One new service proposal is for a streetcar line that would run east-west on Main Street and Market Street. It could connect NuLu and Butchertown in the east with Russell and Portland in the west, passing through the downtown core. The total length of the corridor could be between 2.4 and 3.4 miles, depending on how far west it went. At a cost of $28 million per track mile (based on recent construction costs) the project cost could be $134 million to $190 million. **Advance**

Project Discussion: Streetcar projects have been constructed in a number of cities across the US over the last ten years. Many are credited with helping to promote downtown economic development. The recent Kansas City project is an excellent example, with over $1.8 billion in economic development underway in the streetcar taxing district since 2012. The line itself has been a major transportation success as well, with ridership more than double the initial projections. However, there have also been projects that have not gone as well, with low ridership and lackluster development. Each project must stand on its own merits.

At a high level, the potential for streetcar in Louisville can be evaluated based on the existing land-use intensity of the area it would serve, the ridership in that corridor today, the existing trip generators/destinations, and the market based development potential (not available land). Based on these indicators, there are several factors that would support an east-west streetcar route such as development activity in NuLu, destinations throughout the downtown core, and the major developments planned for the Russell neighborhood. However, there are also factors that do not support this corridor, such as moderate current ridership on what would be the likely proposed route, mainly low-rise development outside of the core area, and limited high-intensity development activity at the west end of the corridor. Designing the route as a loop on Market Street and Main Street is also less desirable than a simple linear, one street system. It may be that another route would be more advantageous.

Finally, the cost is a major consideration, but not a fatal flaw. Many cities have succeeded in raising the funds necessary for a starter streetcar line. It typically requires funds from several sources. For example, Kansas City set up a transportation development district to collect property taxes to fund both construction and operations (streetcar rides are free in Kansas City). Those funds were part of an overall package that included City funds, donations, and a TIGER grant. Louisville would need to develop a plan to raise the necessary capital and operating funds.

MOVE Louisville Report: There are two important quotes from this report. The first states, "*The Market and Main Street corridors in downtown have a concentration of cultural destinations and employment clusters and a growing residential population. Move Louisville recommends that additional study be undertaken to determine the feasibility and the cost and benefit of a downtown Market/Main street car line*." (MOVE Louisville, 2016)

However, the second states, "*Today, Louisville must both increase density within its centers and address sustainable funding to support fixed-guideway transit. Move Louisville's policies and priority projects aim to address these challenges over the next 20 years so that fixed guideway service becomes feasible. Given today's constraints, Move Louisville recommends Bus Rapid Transit be the mode to achieve premium transit service."* (MOVE Louisville, 2016)

While a feasibility study could be useful for assessing the potential for streetcar, it may be more important to continue to work toward densifying the corridor, whle spending the limited study and design funds on the Broadway BRT corridor which is feasible for implementation now.

T-6: Broadway Premium Transit Service from Shawnee Park to Baxter Avenue - Broadway is a major transit corridor with Route 23 having the second highest ridership of any route. This corridor has been identified for premium bus service such as a Bus Rapid Transit (BRT) service. Given the high ridership and route connectivity, roadway makes an excellent trunk line. The extent of in-street facilities such as bus lanes and queue jump lanes will depend on the decisions made for the street as a whole. While this project must coordinate with the Complete Street project (**Project S-32**), it could be implemented separately and possibly on a faster schedule. Therefore, it has been maintained as a separate high priority project. **Advance**

Project Discussion: The Broadway premium bus service is assumed to run approximately 5.6 miles from Shawnee Park to Baxter Avenue. The cost for the service was estimated separately from Project S-32; however, if both projects were implemented together then more substantial improvements could be possible. The T-6 project cost (3.5 million per mile) does not include reconstructing the entire street, but instead working where possible within the current curb lines. Some reconstruction would however be possible.

The additional operating cost for this service would depend on the frequency of local service that would remain in the corridor. If the current 15 minute headways are increased to 10 minute headways then 2 to 3 more buses would need to be put in service throughout the day to cover the approximately 60 to 80 minute round-trip for Shawnee Park to a turn-around somewhere on Baxter Avenue. It would also be important to consider how the current eastern portion of the route would connect with the BRT service. Timed transfers might be beneficial if feasible. An origin-destination study for Route 23 could shed light on the best way to set up the new service and connect it with the existing route structure and schedules.

Medical District Service: This new BRT service will serve the Medical District on Broadway. It may be possible to work with employers in that area to promote the service. If the service is effective enough, it may be possible to work with employers on transit pass subsidy programs such as exist at hospitals in St. Louis, Boston, and elsewhere. Possibly a combination of Broadway premium service, Preston premium service, improved hospital circulator service, and the creation of a transit transfer zone in the Medical District (raising transit's market presence) could convince additional employers to subsidize employee transit passes. This could make a major difference in the transit market share in that part of downtown.

MOVE Louisville Plan: The MOVE Louisville plan called for a $140 million upgrade of the corridor. That is substantially more than has been included in this study for both the BRT and complete street elements. The total for T-6 (5.6 miles) and S-32 (4.5 miles) is $47 million, which is still over $9 million per mile. The major difference is that the MOVE Louisville plan called for fixed guideway BRT (see **Figure 3.3-8**) and a two-way cycle track, while the project in this plan assumes a less expensive reconstruction of the street without a fixed guideway component. The final scope of the project will clearly dictate the capital budget.

Figure 3.3-8: Fixed Guideway System in Eugene, OR

T-7: Preston Highway Premium Transit Service from south of study area into downtown - The Preston Highway / Preston Street corridor has been identified as another high ridership corridor that would benefit from a higher level of transit service. The details for this concept still need to be worked out, but there is agreement that it holds promise for the future. One benefit of this line is that it would directly serve the Medical District and downtown, better linking the two in the process. See the discussion above relative to the Medical District. **Advance**

Project Discussion: The capital cost for this service was listed as $9.6 million in MOVE Louisville, and the annual operating cost was listed as $5.1 million. The capital cost seems low for a service running from the Gene Snyder freeway into downtown, a distance that is likely to exceed 11 miles. Assuming a capital cost of $2 million per mile would result in a $23 million cost. Depending on the level of improvements, this could possibly include funds for some rolling stock.

T-8: North-South Premium Bus Service to U of L, Airport, and Exposition Center - This potential new bus service would serve several major origin/destination locations; however, past and current analysis continues to cast uncertainty on the number of riders that would use this service. The existing lines serving these destinations are generally under-performing. Furthermore, out of town visitors tend not to use public bus transit to and from these types of locations. They are often willing to pay for faster and more direct service as they are often on business or pleasure travel and making unfamiliar trips. The rise of Uber and other rideshare companies adds to the competition for these trips. Of all of these destinations, the University of Louisville connection is the most promising, but the Route 4 which provides this service today, is an under-performing route. The density of development and the draw between downtown and the University is not yet strong enough to support a unique new service. As the population density increases downtown this situation may change and the demand for transit in the corridor may increase. One step that is recommended is that StreetLight Inc. origin-destination data be

purchased for this corridor. That will provide real data to underpin the decision for the corridor.

Advance - U of L to Downtown Only

Project Discussion: There has long been a desire to provide improved transit service between downtown and several of the major destinations south of downtown. This was a focus of the T2 light rail initiative in the 1990s. However, it is not clear that a high level of ridership could be achieved for several of these destinations. This is due in part to the trip purposes, willingness to pay for convenience, hours of operation, need to carry luggage, group travel, competition from Uber, taxis, and shuttles, and other factors.

A high level investigation was conducted into the travel time (without stops included) needed to serve the following destinations: Exposition Center, Louisville Airport. Churchill Downs, and the University of Louisville. The current order of magnitude ridership was also examined.

As shown in **Figure 3.3-9**, it could take 31 minutes to serve all of these locations using the arterial network. It could take 20 minutes to serve all but Churchill Downs using the freeway system (few intermediate stops). A 17 minute trip could serve downtown to the University on the arterial system through Old Louisville.

A planning level review of ridership data showed that the University has ridership numbers that are an order of magnitude higher than the other three destinations as shown in **Table 3.3-3**. It is important to note that the University also has considerably better transit service and all students, staff, and faculty are eligible to ride TARC “free” by using their identification badges.

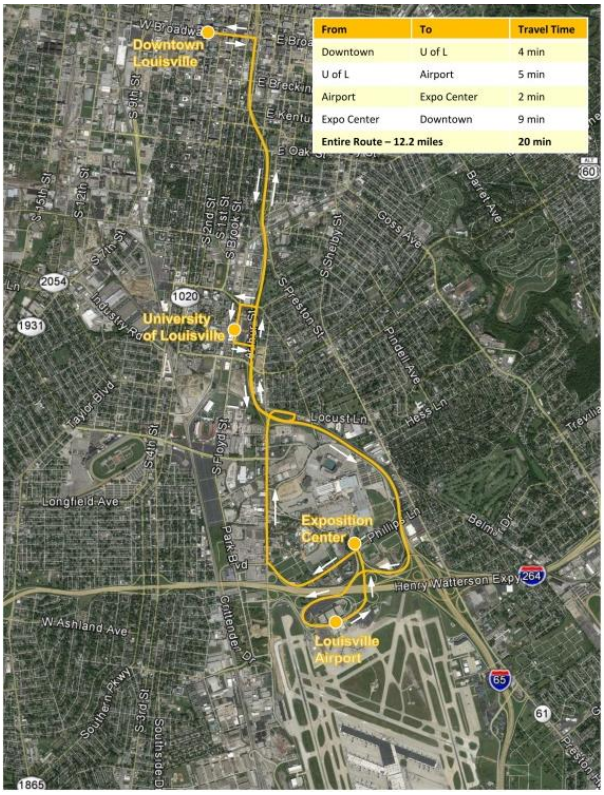
Table 3.3-3: Ridership Estimates

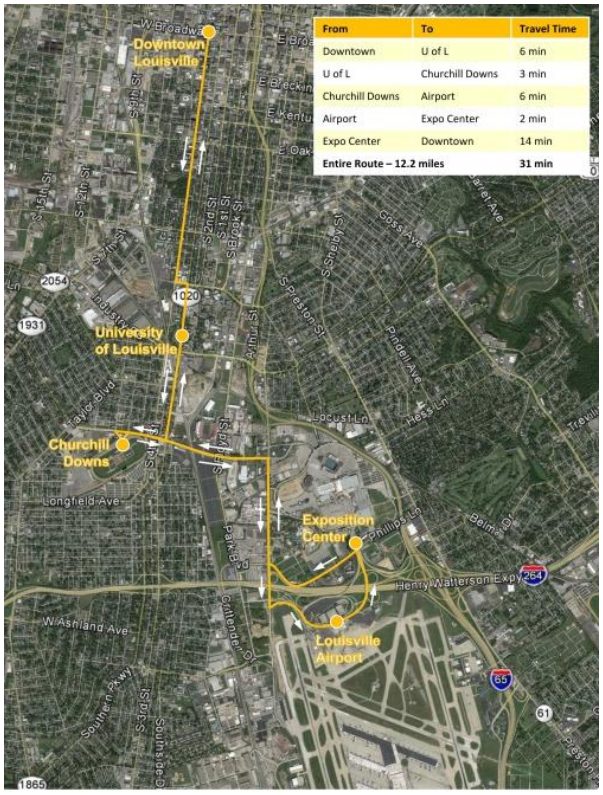
Location	Routes	Estimated Ridership Per Month
Louisville Airport	2	1,000
Churchill Downs	4, 6, 29	2,000
Exposition Center	2	400
University of Louisville	2, 4, 18, 93, 94, 95	22,500

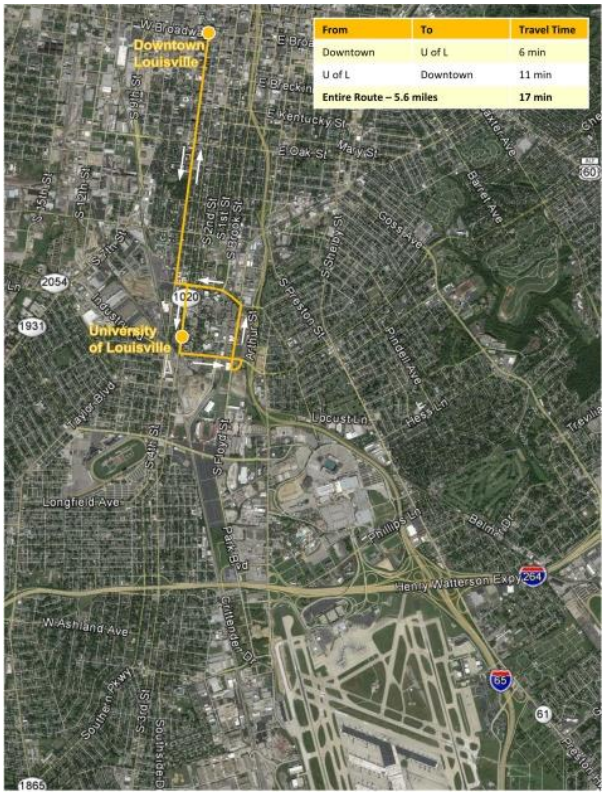
A review of these destinations and their activity types and levels would indicate that high frequency transit service would likely not attract high ridership numbers throughout the day all year from Churchill Downs, the Exposition Center, and the airport. It is expected that ridership to/from these locations would vary and would not necessarily be sufficient to plan an entire new service around. This is especially true given the hours of operation and therefore cost necessary to service them.

However, the University of Louisville could potentially be a southern anchor to a new service and there are at least two primary options for routing that service. One would be a simple north-south route between the University and Downtown through the neighborhoods between them. However, that is similar to the current services and it does not appear to be as successful as originally hoped. A potentially beneficial variation would be to extend the service to the Medical District and possibly NuLu.

Figure 3.3-9: Southern Connector Route Travel Times (Without Stops)







Another option would be to run service between the University, Medical District and downtown using Preston Street and Jackson Street.

In order to test these options it is recommended that TARC and/or Louisville Metro purchase origin-destination data from StreetLight Inc. to assess the actual flows between these different areas. This data can be purchased for under $15,000 and would provide very useful information for determining the feasibility of this new service. It is also possible to purchase StreetLight Inc. data for the Churchill Downs, Exposition Center, and Airport areas to verify the high level view of these areas.

3.3.3 Routing Revisions and Service Extensions

This category of transit enhancements adjusts, extends, or otherwise improves current routes, shifts routes to take advantage of two-way streets, and implements the larger idea of transit emphasis corridors by gathering routes and using the proposed bus lanes to enhance and simplify the customer experience.

T-9: Medical Circulator Service Rationalization - The current medical circulator runs during the middle of the day, carries few riders per run, and is somewhat circuitous. It is proposed that service hours and frequency be increased, and that the route be adjusted to run from 12th Street to Story Avenue along an adjusted route. This routing has been carefully constructed to continue to serve the existing rider base while better serving one of the most dense employment centers in the Louisville region, it would be beneficial to improve service to this area. **Advance**

T-10: Transit Emphasis Corridors – Jefferson Street / Market Street, Muhammad Ali Boulevard / Chestnut Street, Broadway, 5th Street / 6th Street - Due in part to the one-way nature of the majority of downtown roads, the current route system has bus lines on every major east-west street from Broadway to Main Street and on most of the north-south streets from Jackson Street to 6th Street. A review of the coverage map shows that nearly the entire downtown area is within ¼ mile of a bus stop; however, the one-way nature of the routes makes it more difficult to know where to catch the bus and it means that passengers must go to a different street for the return trip. One concept that could change that for at least some downtown riders would be a two-way transit emphasis corridor, on which east-west or north-south service would be consolidated. The routes could be redesigned to overlap and/or intersect deliberately along specific corridors and/or at specific named station locations (upgraded stops with more amenities and passenger information). Several east-west transit emphasis corridors have been considered. Four corridors were considered for serving the northern portion of downtown and then Broadway was considered in the south. One key change needed to create a simplified transit emphasis corridor is two-way travel. Thus, this transit concept it directly linked with the proposed one-way to two-way conversions described in the “Complete Streets” section of this Chapter. A series of proposed new routes are shown in **Figure 3.3-10**. **Advance**

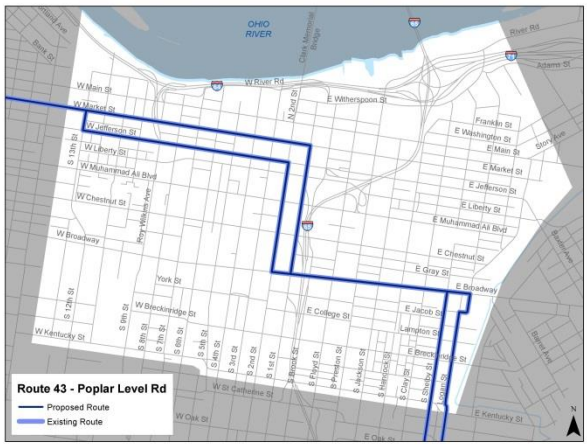
Additional Information: This concept includes the re-routing of many bus lines in downtown to simplify routing, while maintaining good geographic coverage of the downtown. The modified

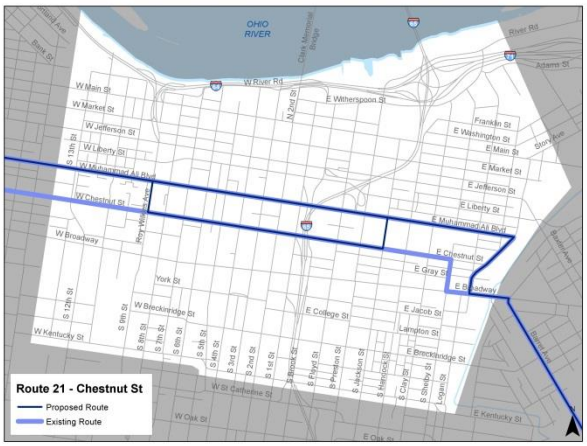
routes would use the emphasis corridors which are located in key demand corridors and spaced to limit walking distances.

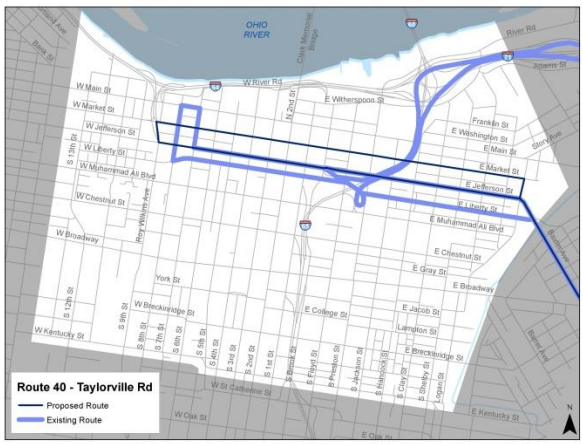
There are several locations on these routes that may need to be examined in further detail to address operational concerns. For example, a few routes are proposed to use 5th Street to Main Street to 6th Street to "turn-around". This would likely require a special transit phase at Main Street / 5th Street to allow the buses to jump ahead of the 5th Street traffic.

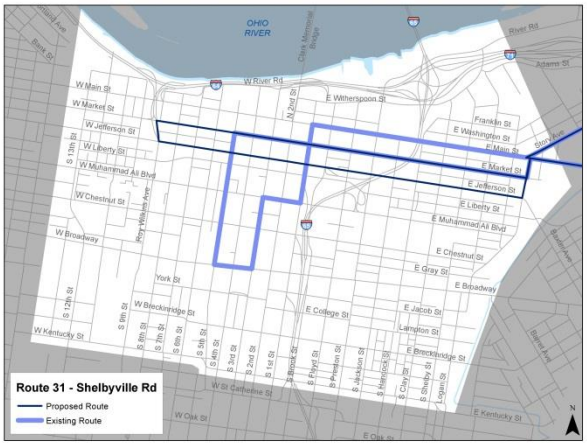
By making these adjustments, the transit transfer zones and transit emphasis corridors will become major transit areas with a high density of service and easy transfers. Several routes would still serve the area south of Jefferson Street on Muhammad Ali Boulevard, Chestnut Street, and Broadway so that there would still be good overall coverage. The net walking time for riders should remain similar to what it is today; but the routes and transfers could be simpler.

Figure 3.3-10: Proposed Downtown Route Adjustments
(Using the Proposed Jefferson and Market Bus Lanes)





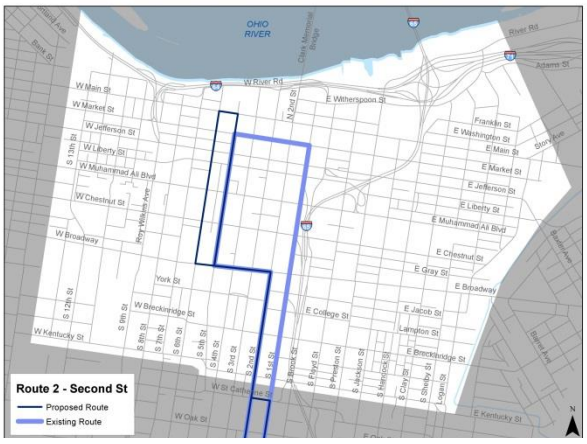


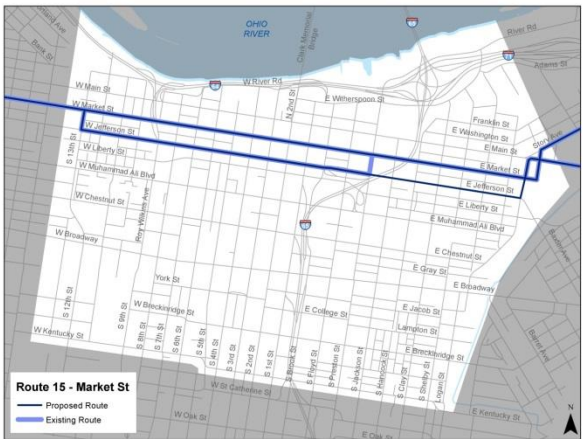


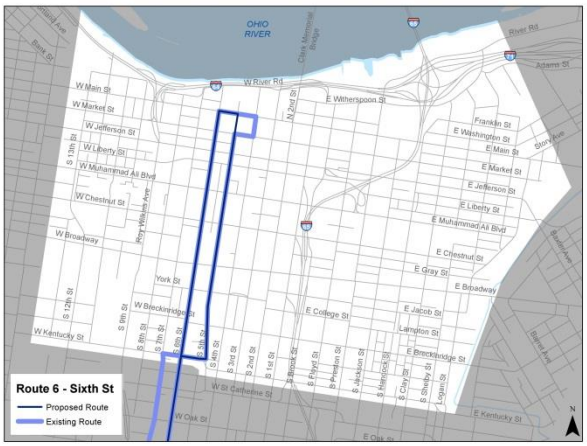

OHIO RIVER
Route 72 - Clarksville
Proposed Route
Existing Route

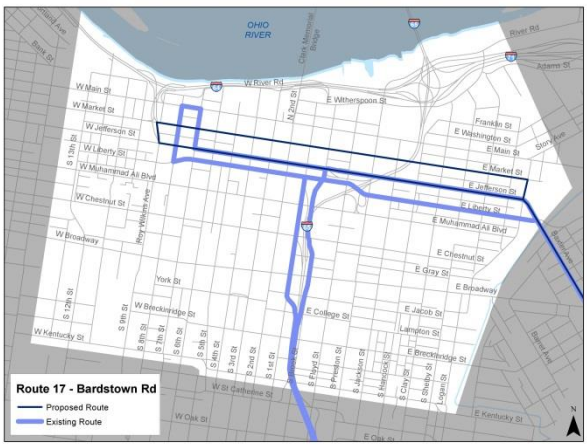

OHIO RIVER
Route 63 - Crums Ln
Proposed Route
Existing Route


OHIO RIVER
Route 71 - Jeffersonville-Louisville-New Albany
Proposed Route
Existing Route


OHIO RIVER
Route 2 - Second St
Proposed Route
Existing Route


OHIO RIVER
Route 15 - Market St
Proposed Route
Existing Route

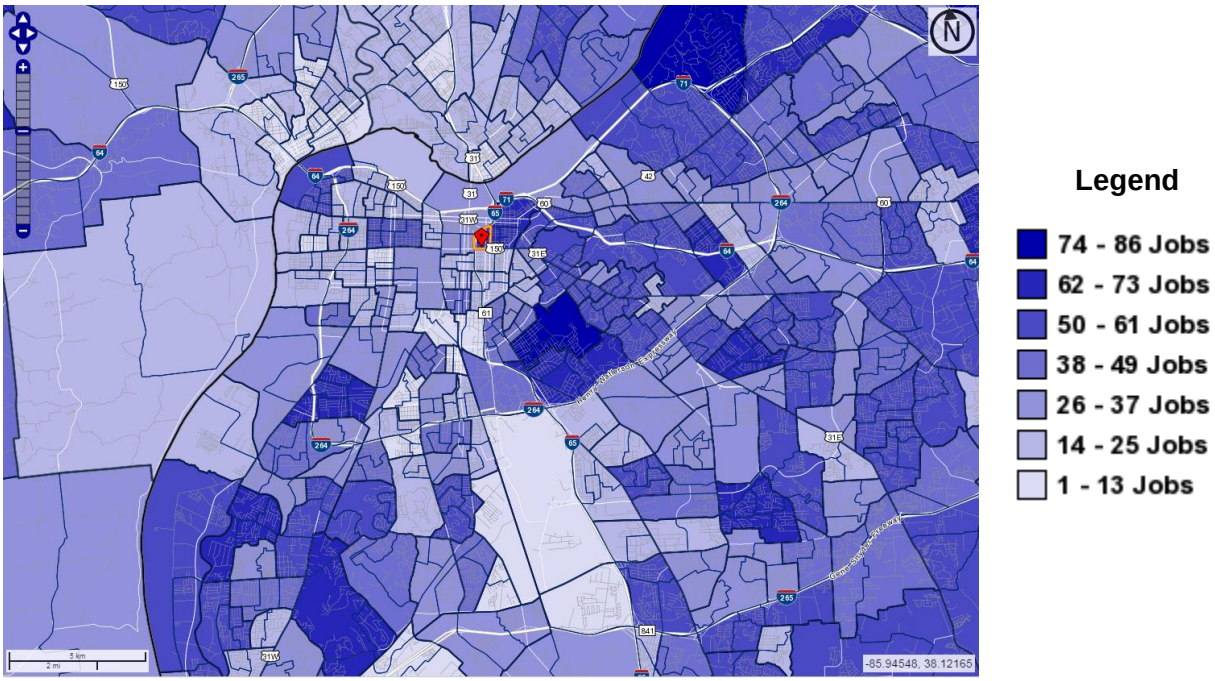

OHIO RIVER
Route 6 - Sixth St
Proposed Route
Existing Route


OHIO RIVER
Route 17 - Bardstown Rd
Proposed Route
Existing Route

T-11: Medical District Service: One of the observations of the existing conditions assessment was the moderate density of ridership in the Medical District. Often these downtown districts have very high transit ridership. It is not yet clear how service to this area could be improved, but this appears to be a potential need and opportunity. One option is to have routes such as those to/from Indiana extend into this area. This would add cost and time to each run. Another option would be to reconfigure the 4th Street circulator to serve the Medical District. That would connect all of the downtown only routes that do not go near the Medical District with a frequent connection, but with an additional transfer. The Route 18 and several other local routes currently provide this connection. **Advance**

Project Discussion: Currently there are six local and circulator routes that serve the Medical District in downtown Louisville (Routes 18, 19, 21, 23, 43, and 52). This area is estimated to have 15,000 or more jobs (LEHD and InfoUSA data) and has thousands of patients and visitors daily. The jobs total is about one-sixth of the total for the downtown study area and the jobs are clustered in a relatively dense area. It is recommended that service to this area be increased by adjusting additional routes to pass through the Medical District. Additionally, the medical circulator route could be renamed the Medical District Circulator and could be designed to provide better service between the hospitals, Russell, Downtown, and Phoenix Hill. For reference, **Figure 3.3-11** shows the home end of work trips traveling to/from the Medical District area. Note that there are many trips going to Phoenix Hill and Butchertown.

Figure 3.3-11: Home End of Commute Trips to Medical District Area (LEHD Synthesized Data)



There are numerous patients in Russell and Phoenix Hill that need access to the Hospital District. Phoenix Hill also rated highly as a home end for Hospital District workers. A transfer point could also be instituted at or near the corner of Jefferson Street and Story Avenue.

T-12: Main/Market Circulator Eastern Extension The Main/Market circulator currently stops at Campbell. With the new development that has occurred over the last 10 years at the west end of the route, it is time to consider extending it the last two blocks to Baxter Avenue. This could be done with little travel time change, and it may be possible to simply move several stops and only add one new stop. Locating the stops so that the buses can make the required left turns will be very important. **Advance**

T-13: 4th Street Circulator Re-Routing - The 4th Street Circulator does not function as originally intended due to several factors including the closure of 4th Street Live to vehicular traffic. Due to construction, the route currently uses 2nd Street and 5th Street for part of its run. Even before the construction the 4th Street route had low average travel times and low ridership for the number of trips. During the study many different options were considered. One of the most promising was to use 3rd Street in both directions once that street is converted to two-way operation. That would result in a consistent route that is easy to understand. One other idea would be to try an entirely new route during the current construction. One option would be a downtown loop serving downtown and the Medical District on Market, Preston, Broadway, and 5th Street (with a diversion onto 3rd Street to recharge). While loops are not ideal, the current construction limits options. Another option would be a north-south route on 2nd and 3rd Streets between downtown and U of L to test that service. A third option would be to adjust the route to use 2nd Street both directions and connect it to the Medical District. This would be a new type of service. **Advance**

3.3.4 Transit Centers / Transfer Zones

Several concepts were considered for improved transit connectivity/transfers and stations.

T-14 and T-15: Transit Centers – Central (T-14), Eastern Edge (T-15) - The Downtown Master Plan recommended a transit center in the downtown core, providing a single high-quality transit access and transfer location for all major downtown routes. The center would serve as an origin/destination for many routes and would provide a place to wait for the next bus. Traveler information (including real-time bus arrivals), bus passes, and other services would also be available. Keys to the success of such a center are the location (proximity to demand center of CBD, convenience for bus routing), size, and integration of the center. Based on the team's analysis, the intersection of 5th Street and Jefferson Street is near the center of the current transit demand downtown. Two sites near this intersection appear to be potential candidates. Developing a transit center, potentially in conjunction with additional private development, at one of these two sites could provide a new transit emphasis in downtown. However, transit centers can be very expensive and can limit future flexibility. It would also be difficult (but not impossible) to route all local, circulator, and express buses in the downtown through either of these two sites. A system of hubs, emphasis corridors, and transfer zones may be more applicable of Louisville, and is consistent with the planning recommended in MOVE Louisville. The decision not to focus on specific transit centers was discussed with TARC and Louisville

Metro and there was general agreement on not moving forward with this approach at present. **Dismiss**

Project Discussion: The primary downtown location considered for a transit center is the City owned parking lot on the southwest corner of Market Street and 6th Street as shown in **Figure 3.3-12**. This location was previously considered for a similar purpose in the T2 study. It is centrally located and offers public/private development opportunities. However, there are considerable operational drawbacks and future flexibility limitations associated with a central fixed transit center site. It was decided that a more flexible transit transfer zone concept would be more beneficial.

Another location that was considered but determined to be inferior for a transit center was the southeast corner of 5th Street and Liberty Street. This privately owned parking lot is centrally located, but with buildings on two sides and limited street frontage on narrow streets it would present considerable operational challenges for a transit center.

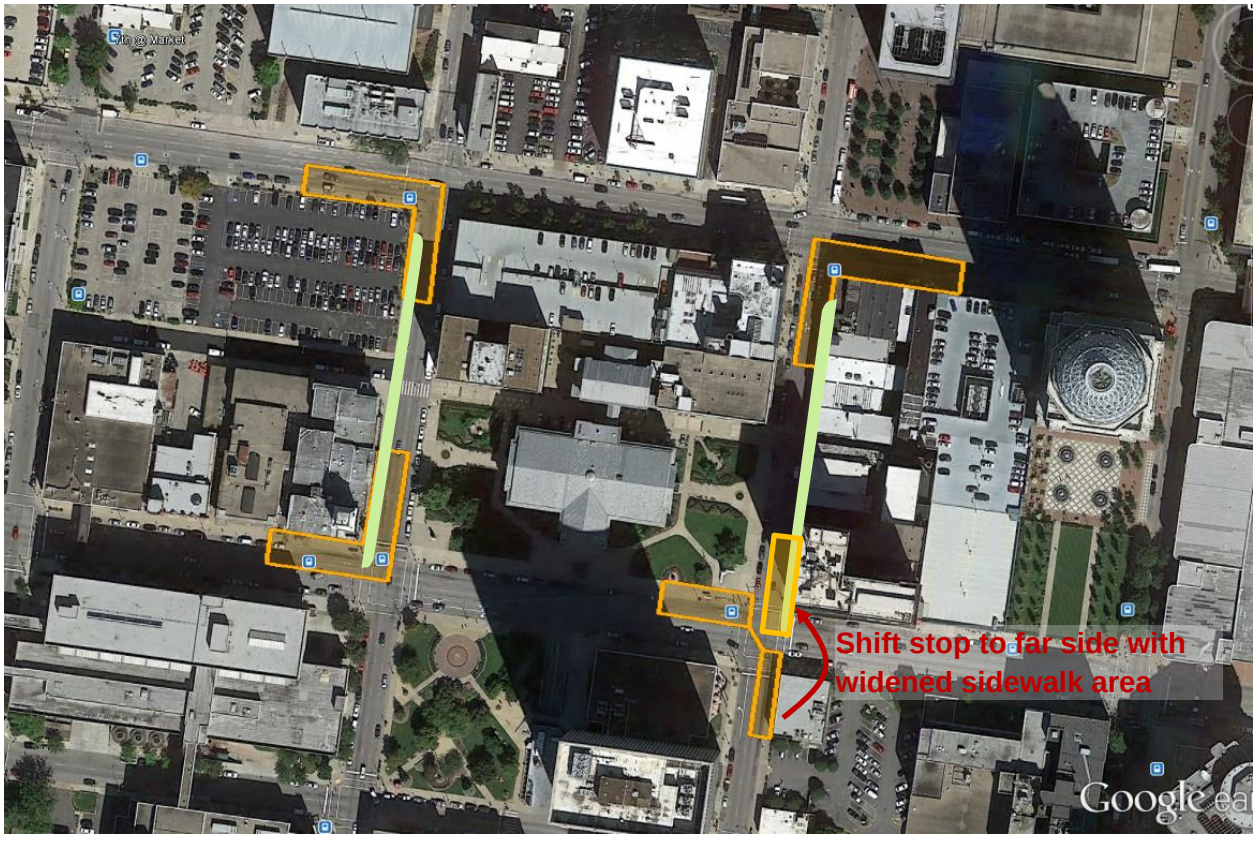
A location on the eastern edge of the downtown area (east side of NuLu) was also considered for an edge transit center. The site is in the vicinity of the Chestnut Street / Baxter Avenue intersection. This location would provide a fixed point for transfers between routes serving that part of downtown (Routes 17, 19 and 40). This project was not viewed as a high priority, furthermore with the proposed two-way conversions and possible route adjustments in the area, constructing a transit center could create operational constraints. A transit transfer zone in this area (similar to the one proposed for downtown) may be more beneficial.

Figure 3.3-12: Market Street and 6th Street Site

T-16: Transfer Emphasis Zones - This concept would select several blocks of the downtown area as a transit emphasis zone (TEZ). Routes would be designed to overlap and/or intersect in this well defined zone. The stops in this area would be upgraded to named TEZ stations with large attractive shelters, prominent signage, appropriate lighting, benches, and real-time information displays. The TEZ could also include limited street vending. One objective of this concept would be to create a transit architectural and signage presence throughout the central part of the downtown and make using transit easier and more attractive. Essentially, this would be a well signed distributed on-street transit center with the goal of minimizing walking and waiting. Timed transfers would be difficult, however, as buses would still be on-street. **Advance**

Project Discussion: Many different concepts for transit transfer zones were explored. The concept that appeared to have the most promise was a primary zone centered on the block defined by Jefferson Street, 6th Street, Market Street, and 5th Street as shown in **Figure 3.3-13**. Two other areas were also highlighted for potential transit emphasis zones, one on Broadway and another in the Medical District.

Figure 3.3-13: Downtown Transit Emphasis Zone (T-16)



The downtown core zone is bordered by four of the highest transit service streets in the entire region, furthermore, with the route adjustments described previously nearly every downtown route will pass at least some part of the zone. This will allow for effective on-street transfers.

However, it is recommended that the stops in this zone be enhanced substantially, with larger shelters where physically feasible, real-time information, maps, and information designed for both regular users and new users. The signage should clearly direct riders on how to transfer from one route to another, indicating which buses serve each stop.

The Broadway transfer zone was proposed to be located in the vicinity of 5th Street and 6th Street. The stops at the corners of these streets could be upgraded to include improved signage, including real-time arrival information and wayfinding signage to assist with making transfers. In conjunction with the upgrades, it would be possible to make some stop consolidations as well to benefit travel times and reliability.

At 5th Street the near-side northbound stop could be removed, with all northbound buses stopping on the far side. That stop was mentioned for upgrading with a bulb-out with the 5th Street project. It would be designed to serve at least two buses at the same time. If capacity is an issue then the near-side stop could be maintained for the northbound routes, leaving the far-side stop only for buses turning from Broadway. The eastbound bus stop at this intersection should be moved from the near-side to the far-side so that it is easier for transfers to/from the 5th Street routes. It should also be upgraded with a shelter and wayfinding signage. The far-side westbound stop should be moved to the near-side and possibly consolidated with the current stop near 4th Street to prevent there from being two stops on one block. Having a westbound near-side stop at 5th Street will facilitate transfers to/from the northbound 5th Street routes.

At 6th Street the stops on the southwest corner are in good locations and only wayfinding signage and real-time information would need to be added. The near-side westbound stop could be moved to the far-side to facilitate transfers with the southbound 6th Street routes if that was allowed by the Federal agency that is responsible for security on that site. The bollards would need to be set back far enough for a stop with a shelter to be installed.

3.4 Enhanced Complete Street System

One major component of the study is to incorporate a number of Complete Streets initiatives. These initiatives aim to make efficient use of the constrained right-of-way in the downtown area to facilitate safe and efficient mobility for all modes. This includes a review of the traffic flow and safety issues, as well as the opportunities for improving transit service, pedestrian travel, and bicycle travel.

Figure 3.4-1 and **Table 3.4-1** provide the locations and descriptions of the projects that fall this category. The projects are divided into six major groups:

1. Two-Way Conversions
2. Lane Reductions
3. Enhanced Complete Streets
4. Connectivity
5. Intersection Improvements
6. Area Improvements and Policies

Figure 3.4-1: Evaluated Street Projects

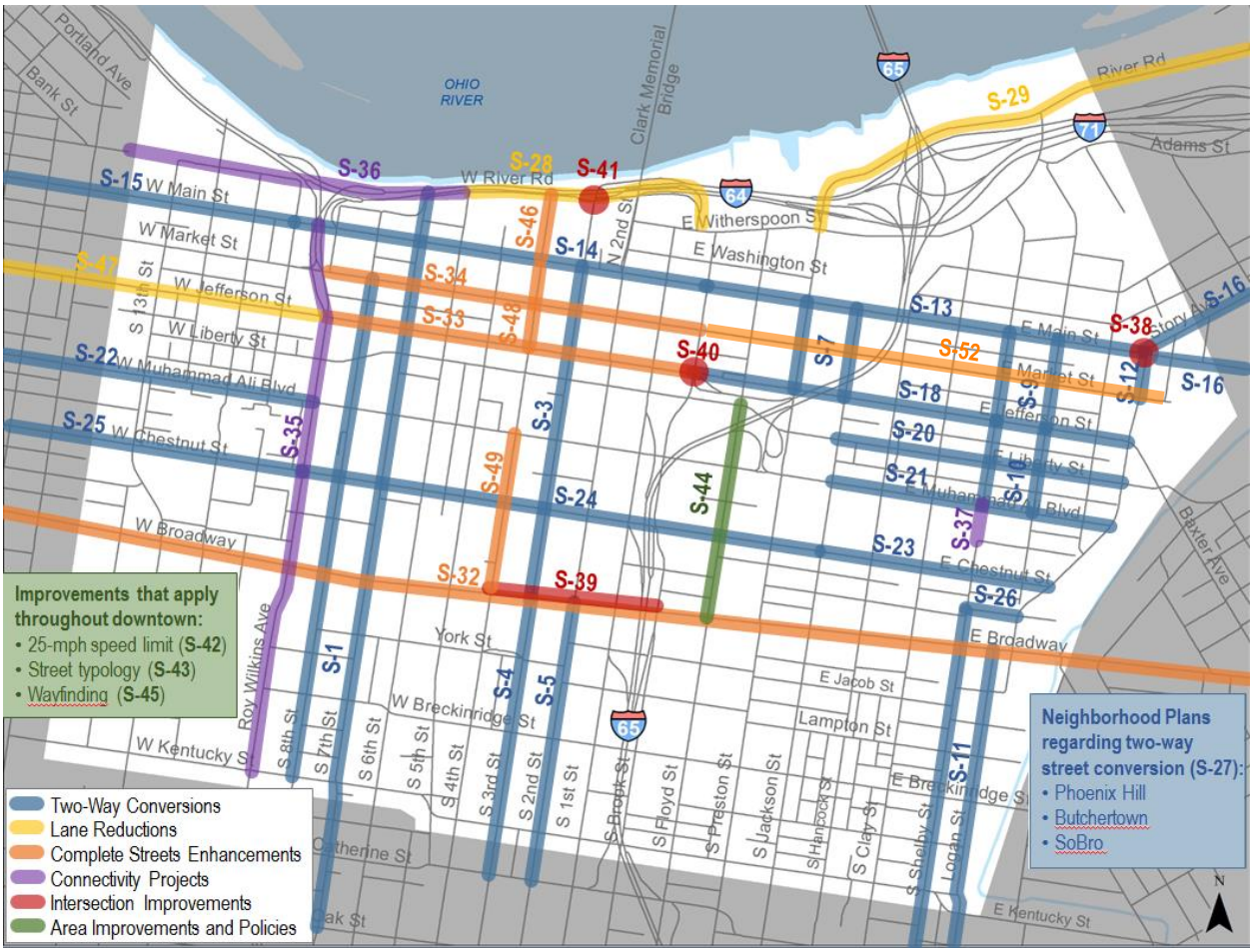


Table 3.4-1: Evaluated Street Projects

#	Project	Location	Description	Dispensation
Two-Way Conversions				
S-1	8th St 7th St	River Rd to Kentucky St River Rd to Oak St		Advance
S-2	6th St 5th St	Main St to Kentucky St Main St to St Catherine St		Dismiss
S-3	3rd St (north)	Main St to Broadway		Advance
S-4	3rd St (south)	Broadway to St Catherine St		Advance
S-5	2nd S	Broadway to St Catherine St		Advance
S-7	Preston St/Jackson St	Main St to Jefferson St		Advance
S-8	Preston St/Jackson St	Jefferson St to Broadway		Dismiss
S-9	Shelby St/Campbell St	Main St to Jefferson St		Advance
S-10	Shelby St/Campbell St	Jefferson St to Muhammad Ali Blvd		Advance
S-11	Shelby St/Logan St	Gray St to Goss Ave		Advance
S-12	Baxter Ave	Main St to Market St		See S-38
S-13	Main St	Brook St to Story Ave		Advance
S-14	Main St	10th St to Brook St		Advance
S-15	Main St	10th St to west of study area		Advance
S-16	Story Ave/Main St	Baxter Ave to Brownsboro Rd		Advance
S-17	Market St	9th St to Brook St		Dismiss
S-18	Jefferson St	Brook St to Baxter Ave		Advance
S-19	Jefferson St	9th St to Brook St		Dismiss
S-20	Liberty St	Jackson St to Chestnut Connector		Advance
S-21	Muhammad Ali Blvd	Jackson St to Chestnut Connector		Advance
S-22	Muhammad Ali Blvd	from 9th St west beyond study area		Advance
S-23	Chestnut St	Jackson St to Chestnut Connector		Advance
S-24	Chestnut St	9th St to Jackson St		Advance
S-25	Chestnut St	from 9th St west beyond study area		Advance
S-26	Gray St	Shelby St to Campbell St		Advance
S-27	Neighborhood projects	Phoenix Hill, Butchertown, & SoBro		Advance
Lane Reductions				
S-28	River Rd	Witherspoon St or 3rd St to 6th St	3-lane section	Advance
S-29	River Rd	Witherspoon St to near Frankfort Ave	3-lane section	Advance
S-30	12th St/13th St	Rowan St to Kentucky St		Complete
S-31	E. Main St	1st St to Story Ave		Dismiss
S-47	Jefferson St	9th St to 26th St	3-lane section	Advance

Table 3.4-1: Evaluated Street Projects (Cont'd)

#	Project	Location	Description	Dispensation
Complete Streets Enhancements				
S-32	Broadway	15th St to Baxter Ave	transit and/or bikes	Advance
S-33	Jefferson St	Brook St to 9th St	transit, bikes, parking	Advance
S-34	Market St	9th St to Brook St	transit, bikes	Advance
S-46	4th St	Main St to River Rd	transit, bikes	Advance
S-48	4th St	Liberty St to Main St	Shared Street	Advance
S-49	4th St	Broadway to Muhammad Ali Blvd	Shared Street	Advance
S-52	Market St	Brook St to Baxter St	transit, bikes, parking	Advance
Connectivity				
S-35	9th St	Main St to Kentucky St	Reduce barrier	Advance
S-36	River Rd	6th St to Northwestern Pkwy	Extension/Streetscape	Advance
S-37	Shelby St	Muhammad Ali Blvd to Madison St	Reopen	See B-24
Intersection Improvements				
S-38	Main St/Story Ave	Convert to standard intersection or roundabout		Advance
S-39	Broadway	4th St to Brook St	Safety improvements	See S-32
S-40	I-65/Brook St/Jeff. St	Reconstruct intersection and/or ramp configuration		Advance
S-41	I-65/3rd St/River Rd	Reconstruct ramp intersection, potential roundabout		See S-28
S-51	1st St Ramps	I-65 Ramps from 1st Street	Safety Improvements	Dismiss
Area Improvements and Policies				
S-42	25-mph speed limit	Downtown	incl signage upgrades	Advance
S-43	Street typology	Downtown	develop & assign	Advance
S-44	Floyd St upgrade	Medical District	aesthetic, ops/safety	Advance
S-45	Wayfinding	Downtown	ped/bike & vehicles	Advance

3.4.1 One-Way/Two-Way Conversions

The *Downtown Mobility Plan* study team considered recommendations from previous plans, modified them, and added to them to come up with the current recommendations for one-way street conversions as discussed in detail below.

The *Downtown Master Plan* (2014) proposed that many one-way streets in downtown be converted to two-way streets. The *MOVE Louisville 10-Year Transportation Plan* (2016) listed one-way to two-way conversions as a top priority for the City. This same concept had also been proposed in prior downtown and neighborhood plans such as the *Louisville Downtown Development Plan* (2003); *Phoenix Hill Neighborhood Plan* (2008); *SoBro Neighborhood Plan* (2007); and *Butchertown Neighborhood Plan* (2008).

The *Downtown Louisville Two-Way Street Study* (2009) was the most recent comprehensive study. That study concluded that there were a limited number of streets that could be easily converted to two-way operations. These streets tend to be lower volume streets and they are located east, south, and west of the most heavily traveled core area. They included:

- Main Street east of 2nd Street;
- Jefferson east of the I-65 off-ramp,
- Liberty, Muhammad Ali, and Chestnut east of Jackson Street
- Shelby and Campbell Streets
- 7th and 8th Streets
- Breckenridge and Kentucky Streets

The currently proposed plan includes these streets, but adds several streets outside the core in the west and south, and three possible street segments in the core area.

The proposed one-way / two-way street conversion projects have far-reaching implications for all travel modes and adjoining developments. They benefit neighborhoods and shopping districts. They can improve access and circulation and facilitate new bus and bike routes. They simplify circulation for those unfamiliar with the downtown one-way street system. The conversions will also make intersection traffic patterns more complex and will reduce the capacity of the street system. They could impact on-street parking, bike lanes, and garage access driveways. Thus there are many important trade-offs to consider in making these changes.

8th Street / 7th Street Couplet (S-1): This street pair has been proposed for conversion for many years. The streets are on the edge of the downtown core and carry moderate volumes. 7th Street carries the higher volume (over 6,000 ADT near Jefferson Street) because it partially pairs with 6th Street. Prior and current analysis has shown that the conversion is feasible. While there will be increased traffic congestion, reasonable flow is still possible, especially with left-turn lanes in key locations. The potential for parking or bike lane impacts is an important tradeoff consideration. Project cost is also an issue. The project should be extended north to connect with River Road. This project has been recommended because of the potential circulation,

access, development, and complete street benefits. This project incorporates elements of Project **P-11** and connects with Project **S-36**. **Advance**

Project Definition: Convert 7th Street and 8th Street from one-way to two-way operations from River Road to Kentucky Street. They will be two-lane streets with left-turn lanes at key intersections. The project will include signal equipment, signage, and pavement markings. Parking, loading zones, sidewalks, and curb lines may need to be modified. The project includes pedestrian and bicycle connections to the riverfront in coordination with the River Road Extension project.

Purpose and Need: The need for the project is related to circulation, access, complete streets design, economic development, and urban design. The purpose is to provide two streets with direct auto access to make them more attractive for development. Some key project challenges include on-street parking, truck loading, signal progression, speeds, parking access, bike lanes, and safety.

Traffic, Design, and Safety: Current traffic volumes range from 2,500 to 7,000 vpd, with higher volumes in the north on 7th St. The right-of-way width is 60 feet and the curb-to-curb width is 42 feet. Prior studies have indicted that this conversion is feasible from a traffic flow standpoint (Entran, 2006 and 2009). Based on peak hour volumes and the City's Synchro model the critical intersections include: 8th at Market, 8th at Chestnut, 7th at Muhammad Ali, and 7th at Jefferson. For safety and operations purposes, it is recommended that left-turn lanes be considered at key intersections. This will reduce rear-end crashes and allow vehicles to pass left-turning vehicles. It will help maintain good signal operations and keep delay similar to the current conditions. To provide left-turn lanes, one of the through lanes will have to be shifted on the intersection approach. This will require eliminating some parking. The bike lane may also have to be shifted with the through lane to provide the necessary width. One possible new typical section at an intersection is shown for reference (see **Figure 3.4-2**). It may be possible to operate the new two-way streets without left-turn lanes, but they provide safety and operational benefits.

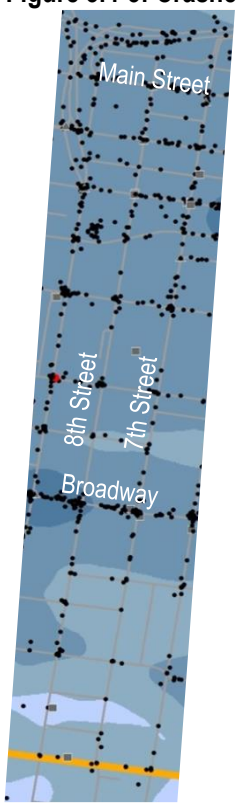
Figure 3.4-2: 7th Street Section Concept

Pedestrians: The project includes elements of project **P-11** to facilitate the riverfront connection. This could include new sidewalks, intersection treatments, and crosswalks at the north end.

Bike Lanes: The implementation of this project could require modifying the bikes lanes near intersections to accommodate left-turn lanes.

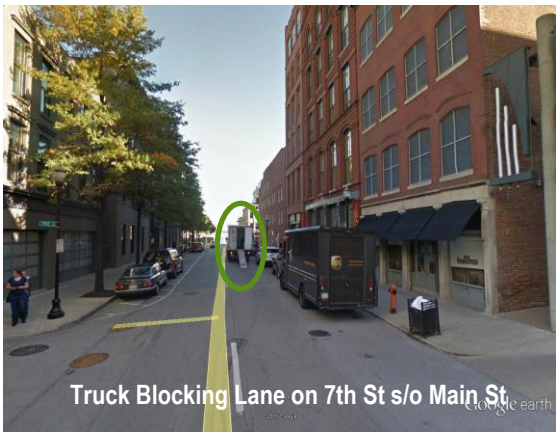
Safety: The streets do not have noticeable crash clusters except where they intersect major streets such as Broadway, Muhammad Ali, and Main. Converting the street to two way operations will increase the conflict points, but may also slow traffic. (see **Figure 3.4-3**)

Figure 3.4-3: Crashes



Parking: To accommodate the left-turn lanes it may be necessary to remove parking on one side of the roadway for approximately 200 feet on either side of each intersection. This could result in the loss of well over 100 parking spaces on these two streets, including all of the parking on one (and maybe both sides) from Liberty north to Main.

Figure 3.4-4: Truck Parked on 7th Street



Truck Loading: Truck loading is an important function on these streets. Sufficient curb frontage must be maintained to accommodate this need, while minimizing blockages. (see **Figure 3.4-4**)

6th Street / 5th Street Couplet (S-2): These two streets are primary transit routes. During the PM peak hour, the right through lane on 5th Street essentially acts as a bus lane. They also have important traffic movement functions with 6th Street playing an important role in providing access into the downtown from River Road. 6th Street has also been restriped to have a bike lane for most of its length in downtown. With 7th Street being converted to two-way, 5th Street may carry more PM outbound traffic as well. Given these constraints, it is recommended that these two streets remain one-way. **Dismiss**

S-3: Third Street, Main Street to Broadway - This street conversion has been considered for many years, but it became more important due to the OMNI hotel development. It is proposed to improve access to OMNI and other developments in the corridor. To maximize capacity, left-turn lanes should be provided at critical intersections. South of Jefferson Street, two southbound through lanes would be required based on existing traffic volumes. Given these constraints, it will be necessary to remove parking from one side of Third Street for most of the corridor and possibly from both sides near Liberty Street, Muhammad Ali Boulevard, Chestnut Street, and Broadway. **Project P-1** is also integrated into this project. **Advance**

Project Definition: Convert 3rd Street from one-way southbound to two-way operations from Main Street to Broadway. The modified roadway would be a two-lane road with left-turn lanes

at intersections. The project would include signal equipment, signage, and striping modifications. Parking, loading zones, sidewalks, and curb lines may need to be modified.

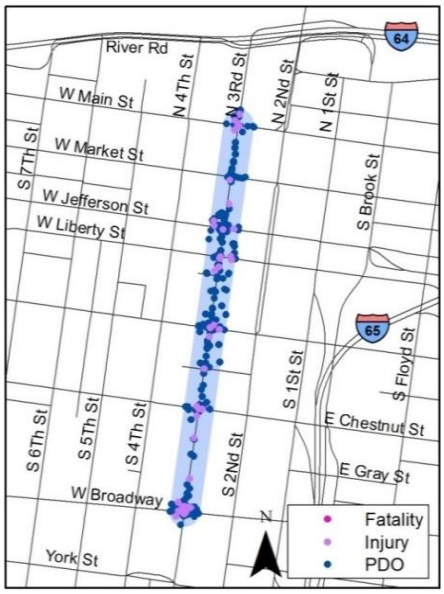
Purpose and Need: Project need is related to circulation, access, complete streets design, economic development, and urban design. The purpose is to provide direct access and to make 3rd Street more attractive for development. It could also serve a 3rd Street circulator route.

Pedestrians: Sidewalks on 3rd Street are narrow in several places. A key location is on the west side just north of Market Street, where an additional 3 feet could improve the pedestrian walking environment and safety. To the extent possible, sidewalks should be widened and/or maintained and where they are narrow poles, signs, and street furniture should be limited. (See Project **P-1**)

Transit: Converting 3rd Street to two-way accommodates the proposal to shift the 4th Street Circulator to 3rd Street. However, for the circulator to operate effectively, traffic flow on 3rd Street must be maintained; therefore, the incorporation of left-turn lanes into the design is preferred to facilitate transit vehicle flows. Truck loading zones should be limited as well. Signal timing should take transit into account and transit signal priority could be considered.

Safety: There is conflicting research on the safety of one-way and two-way streets. Several studies have demonstrated that one-way streets increase speeds, which can increase crash severity. The Safety Analyst software has safety performance functions that would indicate that one-way streets could have higher crash rates (all else being equal). Conversely, one-way streets have a much lower number of conflict points and they simplify the driving environment. The current crash patterns on 3rd Street are shown in **Figure 3.4-5**. When 3rd Street is converted, the traffic congestion is expected to increase and the speeds to decrease. Overall, an increase in crashes would seem likely, though the change in the crash rate is uncertain. To help maintain a high level of safety, turn lanes and LPIs could be used in the design. As part of the change, the speed limit on 3rd Street could be reduced to 25 mph.

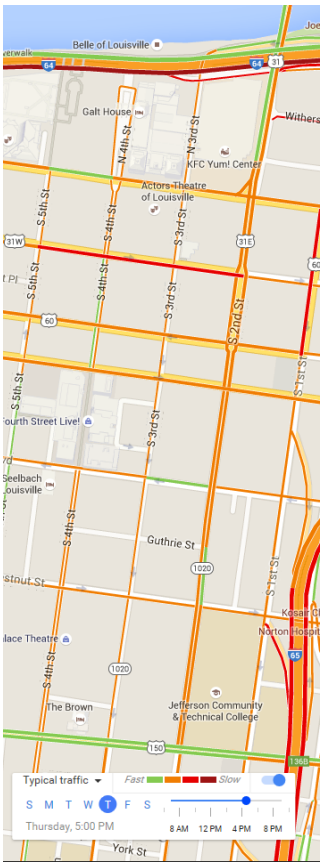
Figure 3.4-5: 3rd Street Crashes



Traffic and Parking: It is feasible to convert 3rd Street from Main to Broadway to two-way operations; however, traffic congestion will increase noticeably with LOS drops throughout the corridor. Furthermore, parking will need to be removed on one or both sides of many blocks to maintain acceptable (LOS D or better) traffic conditions. This section of 3rd Street is not paired with another one-way street so it can be converted independently. North of Main Street it was already converted to two-way operations when the Yum Center was constructed.

The maximum traffic volume on 3rd Street in this section is 10,000 ADT with approximately 1,000 in the peak hour. There are peak hour left-turns of 100 or more at several intersections including: Market Street, Guthrie Street, Chestnut Street, and Broadway. Volumes are particularly heavy during the PM peak at the southern end of the corridor. Given the current one-way operations with turn lanes and multiple through lanes, the current LOS is generally acceptable. However, congestion is an issue during high volume hours and on key segments. **Figure 3.4-6** shows the travel speed patterns on 3rd Street on a typical Thursday afternoon with 3rd Street showing some slow speeds (orange). The pavement width on 3rd Street is approximately 40 feet (34 feet just south of Main and just south of Market), with two through lanes and parking on both sides for most of the corridor.

Figure 3.4-6: PM Speeds



Given the traffic volumes, development intensity, and current/future transit service it is important that two-way 3rd Street be constructed with adequate traffic capacity while maintaining as much parking as possible. To maximize capacity, separate left-turn lanes should be provided at critical intersections. These locations could be operated using actuated protected-permitted left turns with a flashing yellow arrow to limit the green time assigned to left turns. Without the turn lanes, traffic would likely be congested in a manner that would limit bus/truck flows and frustrate drivers with long delays. To evaluate the conversion at a planning level the City's AM and PM Synchro models were adjusted to include a northbound travel lane. Northbound traffic (300 vehicles in the peak hour, with turning traffic) was added to the models without any reduction in southbound traffic. The results of that analysis indicted that two-way operations could function at acceptable levels of service (LOS D or better); however, the level of congestion will increase noticeably.

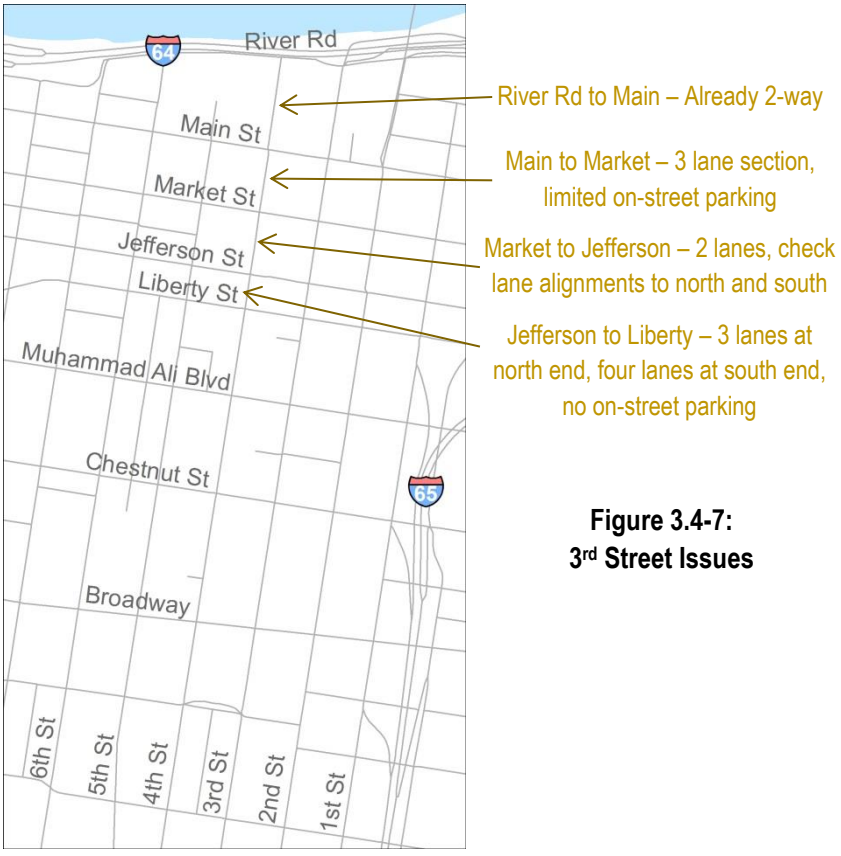


Figure 3.4-7: 3rd Street Issues

Adding a northbound through lane will require the

removal of a southbound through lane and/or parking depending on the segment and intersection. If separate left-turn lanes are included throughout the corridor, more parking will need to be eliminated, but the traffic flow would be better than with shared left turns. A review of the geometry and volumes revealed that many of these decisions should be made at a detailed level as one approach does not necessarily work well for the whole corridor. South of Jefferson Street two southbound through lanes would be required based on existing traffic volumes. Southbound volumes approaching Broadway reach as high as 1,300 during the PM peak hour. While some of this traffic may divert to 2nd Street, it is expected that two through lanes would still be needed. Given these constraints, it will be necessary to remove parking from one side of 3rd Street for most of the corridor and from both sides near Liberty, Muhammad Ali, Chestnut, and Broadway. Figure 3-6 shows one possible general concept for the two-way conversion.

S-4: 3rd Street, Broadway to St. Catherine Street - This southern portion of 3rd Street is not as high of a priority and should not be converted until other changes to the system have been completed. It should not be done at the same time as the section to the north to limit the northbound traffic on the converted 3rd Street. It is however a viable future project that could improve local circulation for the SoBro neighborhood (See Project **S-27**) **Advance**

Traffic: South of Broadway southbound 3rd Street is paired with northbound 2nd Street. It is recommended that 3rd Street South of Broadway be maintained as one-way southbound in the near-term. Converting that portion of 3rd Street will feed additional traffic northbound into downtown on 3rd Street. When 3rd Street south of Broadway is converted to two-way operations, 2nd Street south of Broadway should also be converted.

Bicycles and Parking: The bicycle lane and on-street parking on 3rd Street will need to be taken into consideration in the design phase of the project. Given the 42-foot curb-to-curb width, it may be necessary to eliminate parking or use a shared lane approach to accommodate new left-turn lanes if they are required at any of the major intersections.

S-5: 2nd Street, Broadway to St. Catherine Street - This project would complete the conversion of 2nd Street to two-way operations. It is currently proposed that this conversion occur at the same time as the southern 3rd Street conversion. This has the benefit of not making the near-term 3rd Street conversion project more complex. However, if it would be beneficial to shift more southbound traffic from 3rd Street to 2nd Street, this project could be advanced sooner. Volumes on both streets decrease south of Broadway, but together they carry nearly 20,000 ADT south of Broadway. This project is also part of the SoBro neighborhood plan (Project **S-27**). **Advance**

S-7: Preston Street / Jackson Street, Main Street to Jefferson Street - This project would facilitate circulation and access between the major east-west streets (Jefferson, Market, and Main) and key areas around downtown. It will likely increase traffic on Preston Street as this will

provide a new route to River Road. This conversion may make bike lanes on these streets more difficult to implement, but Floyd and Hancock can serve as primary routes for cyclists. **Advance**

S-8: Preston Street / Jackson Street, Jefferson Street to Broadway - This couplet serves the heart of the Medical District. Traffic volumes, parking and driveway use, bus activity and pedestrian volumes are all high in this area. While many hospital visitors would prefer two-way streets in this area, the demands on the system make that challenging without causing traffic impacts. Initial traffic assessments for the area did not show these changes to be feasible without eliminating high-use on-street parking. **Dismiss**

S-9: Shelby Street / Campbell Street, Main Street to Jefferson Street - Shelby and Campbell are one-way streets through the heart of NuLu. There are circulation, access, speed, driver expectancy, and development benefits to converting these streets to two-way flow. Traffic volumes are low (maximum of 1,300 ADT based on 2014 counts). The northern sections of both streets are particularly important to better connect Jefferson, Market, and Main. **Advance**

S-10: Shelby Street / Campbell Street, Jefferson Street to Muhammad Ali - Similar to the northern section (S-9) there are circulation, access, speed, driver expectancy, and development benefits to converting these streets to two-way flow. They cross into residential areas as they move south. Traffic volumes are low. **Advance**

S-11: Shelby Street / Logan Street (Campbell Street) from Gray Street to Goss Ave - Converting these streets could benefit the Smoketown and Shelby Park neighborhoods by reducing speeds, facilitating access/circulation, and promoting development. Traffic volumes are low. **Advance**

S-12: Baxter Avenue from Main Street to Market Street - This project is part of the reconfiguration of the Main / Story / Baxter intersection. Allowing southbound traffic to use this street will better disperse inbound traffic from Story Avenue, allowing traffic to more easily use other westbound streets into downtown such as Jefferson, Muhammad Ali, and Broadway. This change is essential if Main Street is ultimately to be converted to two-way operations in the east. The project makes the Baxter Avenue / Market Street intersection more complex. **See S-38**

S-13: Main Street (US 31), Brook Street to Story Avenue - Traffic volumes on Main Street in this section are heavy in the AM peak, but much lower throughout the remainder of the day. With the Baxter Avenue conversion some of this traffic will distribute to other streets. Traffic analysis shows that conversion of this portion of Main Street is likely feasible; however, there could be impacts to parking and/or the bike lane. It may only be possible to provide one

eastbound lane and left turn lanes may be needed at key intersections. As a state highway, KYTC will need to support any proposed changes on this street. **Advance**

S-14: Main Street (US 31), 10th Street to Brook Street - The central portion of Main Street in the downtown core has high traffic volumes. There are several intersections that operate poorly during peak times, including those at 2nd Street and 3rd Street. Converting this section of Main Street, while desirable from an urban form standpoint, has the potential for considerable traffic issues based on traffic analysis to date. This project should lag behind the others due to the challenges of implementation. As a state highway, KYTC will need to support any proposed changes on this street. **Advance**

S-15: Main Street (US 31), 10th Street west beyond study boundary - This portion of Main Street does not carry high traffic volumes and could be converted to two-way operation. This would simplify circulation and potentially reduce speeds. As a state highway, KYTC will need to support any proposed changes on this street. **Advance**

S-16: Story Avenue / Main Street / Mellwood Avenue (US 42), Baxter Avenue to Brownsboro Road - This conversion project would be one of the more complex changes as it involves the ramp terminals for a split diamond interchange (outside the project area). While this is a desirable change from a neighborhood perspective, considerable additional study is needed to determine the feasibility and potential impacts of the change. As a state highway, KYTC will need to support any proposed changes on this street. **Advance**

S-17: Market Street from 9th Street to Brook Street - After extensive review and consideration of the options, it is recommended that this section on Market Street remain one-way. This will potentially allow for eastbound transit and bicycle facilities to be added with limited impacts to parking. Converting this street to two-way operations would result in all lanes being needed for general vehicular travel and there would still be the potential for traffic impacts. Leaving the one-way configuration allows for a better use of the curb to curb width considering all modes. **Dismiss**

S-18: Jefferson Street from Brook Street to Baxter Avenue - This project will help balance the east-west traffic flow. The upcoming Market Street project will remove one eastbound lane. By converting Jefferson Street to two-way operation, and additional eastbound lane could be added to the system. Jefferson also connects very well with Baxter Avenue at the edge of NuLu. This project appears feasible based on traffic volumes and could benefit downtown circulation and promote system efficiency and redundancy. **Advance**

S-19: Jefferson Street from 9th Street to Brook Street - After extensive review and consideration of the options, it is recommended that this section on Jefferson Street remain one-way for reasons similar to those noted above for Market Street. This would be the westbound complete street companion to Market Street in the core. **Dismiss**

S-20: Liberty Street, Jackson Street to Chestnut Connector - This portion of Liberty Street goes through a residential area and would benefit from being converted to two-way operation to slow speeds and improve access. Volumes are moderate. **Advance**

S-21: Muhammad Ali Boulevard, Jackson Street to Chestnut Connector - This portion of Muhammad Ali Boulevard Street goes through a residential area and would benefit from being converted to two-way operation to slow speeds and improve access. Volumes are moderate. **Advance**

S-22: Muhammad Ali Boulevard, from 9th Street west beyond study boundary - This portion of Muhammad Ali Boulevard Street goes into the Russell neighborhood and would benefit from being converted to two-way operation to slow speeds and improve access. Volumes are moderate. **Advance**

S-23: Chestnut Street, Jackson Street to Chestnut Connector - This portion of Chestnut Street goes through a residential area and would benefit from being converted to two-way operation to slow speeds and improve access. Volumes are moderate. **Advance**

S-24: Chestnut Street, 9th Street to Jackson Street - This portion of Chestnut Street runs through the southern part of the downtown core and through the Medical District. It has heavy peak period traffic volumes and a limited curb to curb width. Analysis indicates that converting this street segment could result in traffic issues at various intersections along the corridor. **Advance**

S-25: Chestnut Street, from 9th Street west beyond study boundary - This portion of Chestnut Street serves the Russell neighborhood and would benefit from being converted to two-way operation to slow speeds and improve access. Volumes are moderate. **Advance**

S-26: Gray Street, Shelby Street to Campbell Street - This change is part of the change to Shelby Street and Campbell Street in this area and will allow full circulation. **Advance**

S-27: Phoenix Hill, Butchertown, and SoBro - These communities have their own recommendations for additional one-way/two-way street conversions. These neighborhood

recommendations could benefit each neighborhood. Several of the recommendations are addressed by the projects already discussed; however, there are other projects that do not relate as directly to downtown that should also be considered. **Advance**

3.4.2 Lane Reductions

For a number of streets, reducing the number of general purpose traffic lanes can facilitate complete streets goals by freeing up right-of-way to assign to other modes or uses. Projects proposed by prior studies or by members of the project team have been considered. One of the primary resources for this analysis was the Kentucky Transportation Center's 2015 *Road Diet Feasibility Review*.

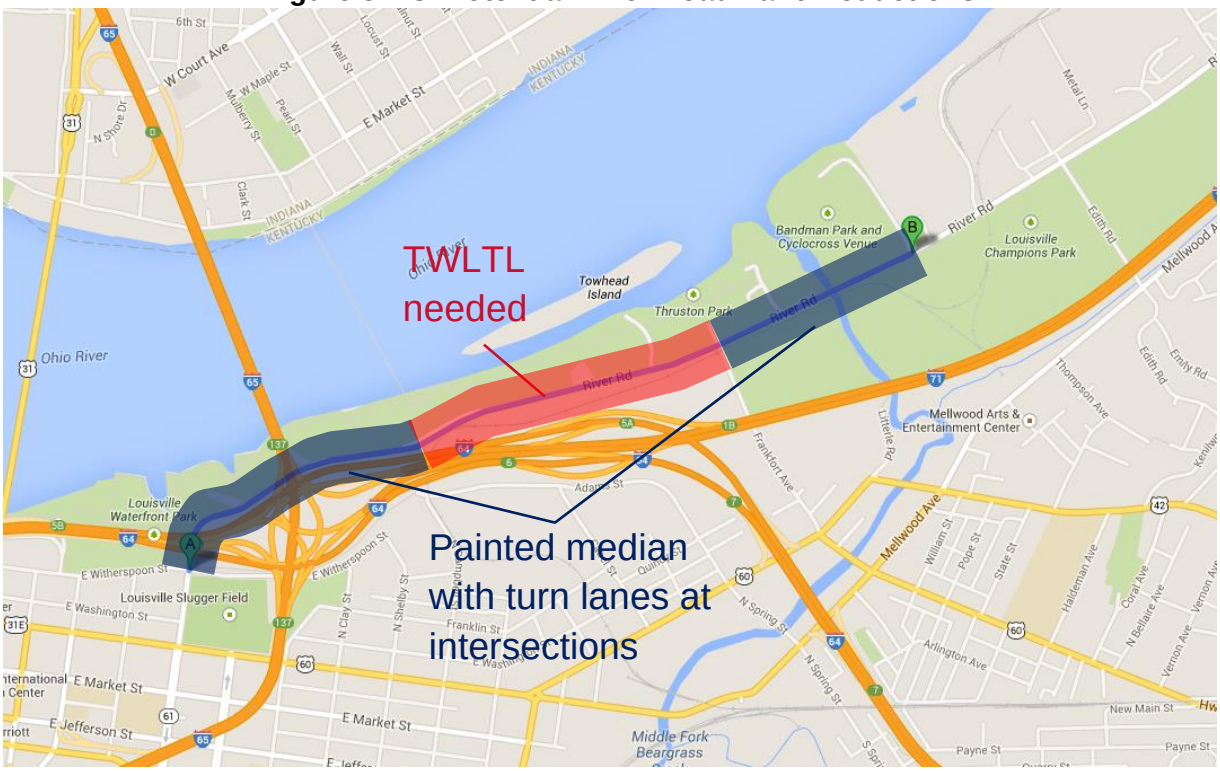
S-28: River Road, Witherspoon Street or 3rd Street to 6th Street - This is a four lane divided street that serves as an important connection between the interstate ramps and key downtown streets. It also presents a barrier to pedestrians wishing to access the riverfront. One design concept is to reduce the through lanes to one in each direction with bicycle lanes and narrower pedestrian crossings. Another option would leave the wider section and use other techniques to facilitate crossings and slow traffic to make it more bicycle friendly. The project could be incorporated into the River Road extension project to facilitate implementation. The bridge columns present a design challenge for some design options; however, there are already left turn lanes at all of the intersections. Maintaining peak hour traffic flow is important. Event traffic flow is a secondary issue. The project should be completed taking into account Project S-41, which is a proposal to reconfigure the I-64 / 3rd Street / River Road Interchange Off-Ramp intersection. One concept was to install a roundabout at this intersection. It is desirable to make this intersection more accommodating for pedestrians and cyclists. Changes at this location should be examined in detailed before a decision is made given the critical function of this intersection. **Advance**

Traffic: The most recent count data shows 7,600 vehicles per day west of 4th Street and 13,700 vehicles per day east of 4th Street. It may be necessary to leave four lanes east of 4th Street to maintain acceptable traffic flow in the vicinity of the I-65 ramps, but then narrow the typical section west of 4th Street. It may also be easier to accommodate pedestrians at 4th Street rather than at 3rd Street.

S-29: River Road, Witherspoon Street to near Frankfort Avenue - River Road leading into downtown is a four lane undivided street. An assessment completed by the Kentucky Transportation Center (KTC) indicated that a three-lane section would be sufficient. Approximately 0.4 miles east of Frankfort Avenue it drops to a two lane road. Using a three lane section provides left turn lanes where needed, but it also allows for two lanes in one direction for event traffic management or detour routing. A painted flush median could be used as well. A design study should determine the striping scheme. **Advance**

Design and Traffic: The 1.7 mile section of River Road west of downtown has been proposed for conversion from a four lane undivided section to a three lane section. KTC's *Road Diet Feasibility Review* supports this proposal. The current estimated ADT is 7,500 west of the Witherspoon Road/Big 4 Bridge Driveway and 13,000 east of this intersection. These volumes are within the acceptable range for a three lane section. Further east the road transitions to two lanes. There are no traffic signals. The key capacity control points are at the two River Road/Witherspoon Street intersections. Based on the KTC study these intersections will function acceptably with a three lane cross section. From the Witherspoon Road/Big 4 Bridge Driveway east to Frankfort Avenue there are driveways on both sides of the street and a Two-Way Left-Turn Lane (TWLTL) would be needed. East and west of that section a painted median could be used with turn lanes at intersections. (see **Figure 3.4-8**)

Figure 3.4-8: Potential River Road Lane Reductions



S-30: 12th Street / 13th Street, Rowan Street to Kentucky Street - This lane reduction project has already been implemented and bike lanes have been installed. **Complete**

S-31: E. Main Street, 1st Street to Story Avenue - Removing a travel lane from Main Street (US 31W) in the east could be feasible if it is to remain one-way; however, with the recommendation for two-way travel, all travel lanes will be needed to accommodate through and turning traffic unless parking was removed. **Dismiss**

S-47: Jefferson Street, from 9th Street to 26th Street - This section of Jefferson Street is a two-way, four lane street with parking on both sides. The curb-to-curb width is approximately 60 feet. It could be converted to a three lane section with buffered bike lanes in both directions. The bike lanes could be on the curb side of the parking lanes as well. The KTC road diet report indicated that this lane reduction was feasible. This street could potentially provide a very good bike route through Russell. **Advance**

3.4.3 Enhanced Complete Streets

The complete street projects typically include several modal elements, with trade-offs between each. The goal of these projects is to serve all users as safely and effectively as possible. These are some of the larger and more complex projects in the plan.

S-32: Broadway, 15th Street to Baxter Avenue - This major complete street project would reconstruct Broadway through downtown. The project would need further definition, but concepts that have been proposed include implementing a five lane section and using the additional width for transit and/or bicycle facilities. There are several locations near I-65 where capacity issues will need to be resolved, but further to the west a five lane section appears feasible at a planning level. West of 8th Street the typical section is already 5 lanes. Furthermore, the corridor is proposed for a high capacity transit route. Safety is a primary issue on Broadway and should be a major design consideration. One challenge for this project is that Broadway is the Pegasus Parade route and therefore medians have not been permitted in the past. If there was a design that could accommodate the parade route and still provide raised medians that would be ideal for traffic and pedestrian crossing safety. Instead of a raised median, pavement treatments (colored paver medians) could be used. **Advance**

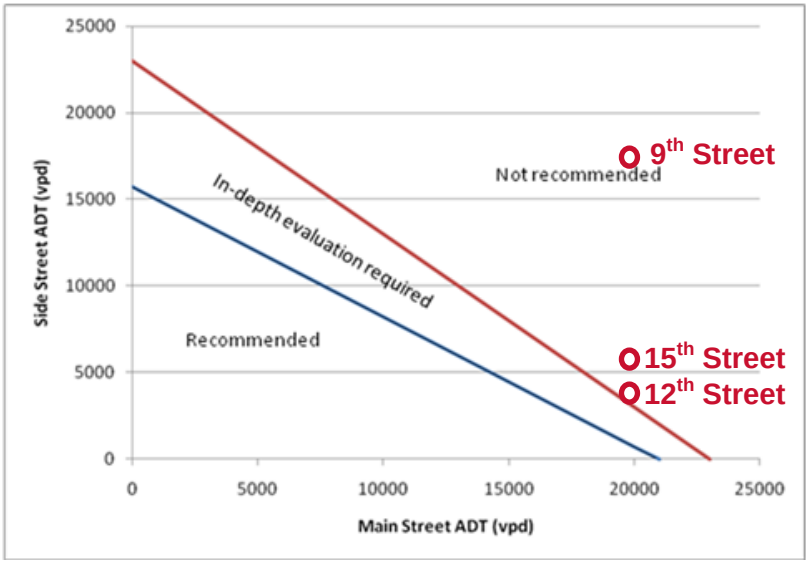
Project Definition: Major corridor improvements including lane reductions, turn lanes, transit improvements, bicycle and pedestrian improvements. Exact scope will vary by section and will need to be determined by a detailed planning and design effort. The project could be joined with **Project T-6** (Broadway BRT).

Additional Discussion: The Broadway corridor is the major transportation corridor through the southern half of the study area. It carries high volumes across all modes. It serves many types of users, including local residents and through traffic. It also has the highest number of crashes of any corridor in downtown, with crash hot spots at six intersections between 9th Street and Brook Street and a very high number of crashes overall. (see **Figure 3.4-9**)

Figure 3.4-9: Crashes on Broadway

Broadway is currently 70 feet wide curb-to-curb through the study area and operates with five to seven lanes depending on the location. For this discussion, Broadway is divided into three segments: 13th Street to 9th Street; 9th Street to Brook Street; and Brook Street to Barret Avenue.

Figure 3.4-10: Road Diet Feasibility on Broadway



13th Street to 9th Street – This section operates with four through lanes and turn lanes (five lane section) and a speed limit of 35 mph. The *Road Diet Feasibility Review* recommended that this segment be considered for a three lane section with a TWLTL. Traffic counts on Broadway (2013 to 2015) show volumes of approximately 20,000 on this segment. The daily side street counts on 9th Street, 12th Street, and 15th Street are 17,000 vpd, 4,000 vpd, and 5,400 vpd respectively. Plotting these points on the Road Diet feasibility graph (see **Figure 3.4-10**) raises questions regarding whether this section should be three or five lanes.

Figure 3.4-11: Traffic at 15th St

The available peak hour volumes for 9th Street and 15th Street were examined to determine how Broadway might operate. (See **Figure 3.4-11**) The results of that analysis showed that using the KTC reported volumes plus 10% (to account for volume growth / fluctuations) the intersections will operate at

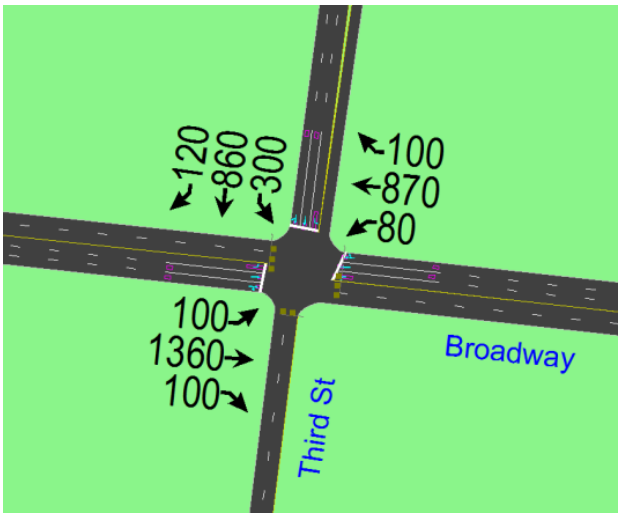
LOS D with several movements at LOD E/F. Thus the corridor would be near the threshold of its capacity with three lanes. This would have the benefit of calming and slowing traffic, but it could also make using Broadway as a high capacity transit corridor (or BRT corridor) more difficult as the buses would be in congested traffic during peak hours. The outside lanes could be converted to bus only lanes. With only Route 23 operating on this segment there would be six buses per hour per lane in each direction (assuming 10 minute peak headways).

A follow-up planning analysis was conducted with a recent Synchro file for the entire Broadway corridor. This modeling effort assumed slightly lower volumes and showed that, with these volume assumptions, it may be possible to achieve reasonable levels of service as far east as 10th Street with a three-lane section; however, the predicted queues were long and could block prior intersections. Using actuated coordinated traffic signals instead of pre-timed signals could increase the capacity. Both analyses showed considerable issues with a three-lane section and a thorough analysis is needed to demonstrate feasibility.

There are other design options that could be considered such as short bus-only lanes at key locations. There is also a desire to add bicycle facilities to the corridor (discussed later). That could be accomplished by moving ahead with the three lane section or removing parking. In this area there are many off-street and side-street parking options. This section should be examined in more detail to determine the best solution. One typical section option would have five travel lanes, parking on one side and bike lanes on both sides. Buses would stop in the outside travel lanes and bike lanes would wrap around behind stops.

9th Street to Brook Street – This section operates as five lanes during off-peak hours with an extra lane in each direction during peak periods. All lane widths are 10 feet. The daily traffic counts over the last five years range from 23,000 to 35,500 on this segment. Per the often referenced Florida level of service planning guidelines, the low end of this range is clearly in the volume range for a four lane typical section, while the upper end is consistent with a six-lane typical section for 35 mph speeds or lower. The most recent count was conducted in 2013 and was 23,900 vpd just west of 4th Street. The KTC *Road Diet Feasibility Review* recommended that this segment be considered for a five lane section with a TWLTL and permanent parking on both sides. The volumes appear to support this proposal with the exception of the segment from 4th Street to First Street. A substantial amount of traffic turns onto Broadway from 4th Street, 3rd Street (see **Figure 3.4-12**), and 2nd Street combined (a net gain of 760 vehicles on Broadway based on the available counts). When added to the 1,120 eastbound through vehicles at 4th Street, this results in a flow of nearly 1,900. To accommodate this high peak volume a third eastbound auxiliary lane may be necessary. (The

Figure 3.4-12: Traffic at 3rd Street



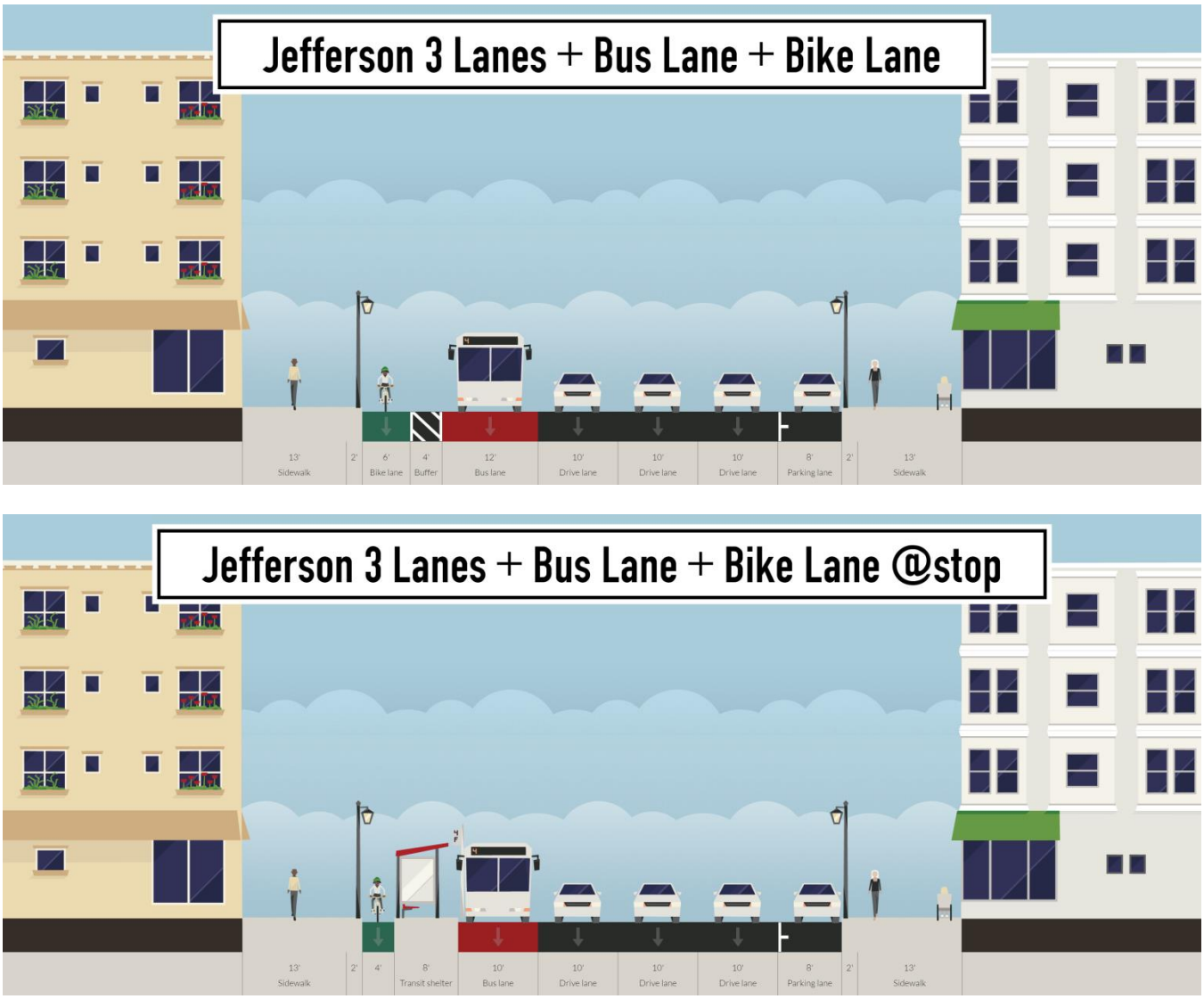
southbound left volume at 3rd Street may decrease in the future due to that street being converted to two-way operations north of Broadway. Some of that traffic may shift to 2nd Street.)

Full buffered bike lanes could only be added if parking was restricted to one side or if the sidewalks were narrowed on one or both sides. With parking only on one side, bike lanes could be added to both sides. A two-way cycle track could also be considered for a portion of the corridor given the relatively small number of curb cuts. For example, there are nine curb cuts on the north side of Broadway between 1st Street and 9th Street.

Brook Street to Barret Avenue – This section operates as five lanes during off-peak times with an extra lane in each direction during peak times. All lane widths are 10 feet. The daily traffic counts over the last five years range from 18,000 to 19,100 on this segment. The KTC *Road Diet Feasibility Review* recommended that this segment in be considered for a five lane section with a TWLTL and permanent parking on both sides.

S-33: Jefferson Street, Brook Street to 9th Street - Considerable attention has been given to the potential uses of the 60-foot curb-to-curb width on Jefferson Street (90-foot right-of-way). Currently, there are four travel lanes and parking on both sides of this one-way street. This is more than adequate for the traffic demands. If the street was converted to two-way operation, all four lanes would be needed to provide adequate traffic capacity. However, if it remains one-way, it is possible to use one lane as a bus-only lane and by removing and/or adjusting parking to accommodate a buffered bike lane as well. The remaining three lanes could handle the majority of the traffic demand; though increased congestion would be expected. The bus-only lane and bike lane would both be on the right side and would be striped to allow for right turn lanes at intersections. Several bus routes in the downtown area could be rerouted to use this bus lane, making Jefferson a major westbound bus corridor. (See **Figure 3.4-13**) **Advance**

Figure 3.4-13: Jefferson Street, Brook Street to 9th Street (S-33)

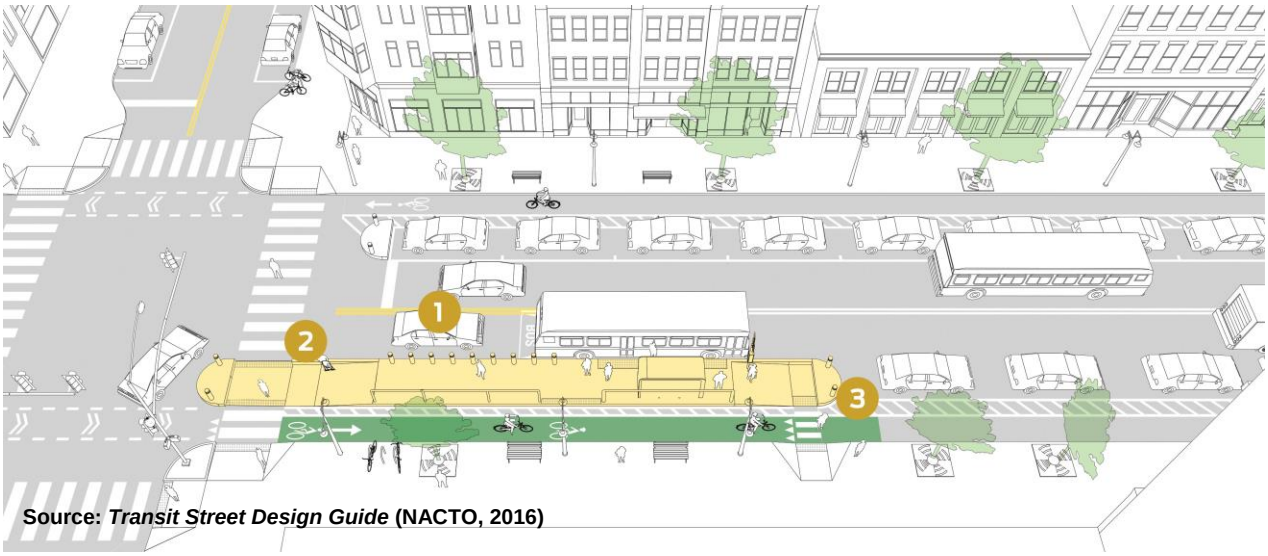


Traffic: Jefferson Street carries between 10,800 and 21,100 vehicles per day between Brook Street and 9th Street, with the volume generally decreasing from east to west (KIPDA 2016). The Downtown Master Plan proposed that Jefferson Street be converted to two-way. This could require all lanes to be used for carrying traffic to maintain acceptable levels of service. Two-way traffic in this area also has nominal benefits for businesses as this is not a major retail street in the downtown core. By keeping the street one-way, traffic can be accommodated in three lanes, leaving width for other uses.

Several of the concepts currently being proposed for the I-65 Off-Ramp/Brook Street/Jefferson Street intersection could preclude converting this portion of Jefferson Street. Some of the concepts tie into Jefferson Street in such a way that traffic from Brook Street west must remain one-way either because of lane needs or signal timing needs, or both.

Transit and Bicycle: One concept for the use of the available width is to install a bus lane and a buffered bike lane on the right side of the street; leaving three travel lanes and a parking lane on the left side of the street. Parking would likely be removed from the right side of the street. The bike lane would pass behind the bus stops using some version of the example design shown in **Figure 3.4-14** and Jefferson Street plan view in **Figure 3.4-15**.

Figure 3.4-14: Bike Lane Passing Transit Stop



Source: ***Transit Street Design Guide*** **(NACTO, 2016)**

Figure 3.4-15: Potential Plan View on Jefferson

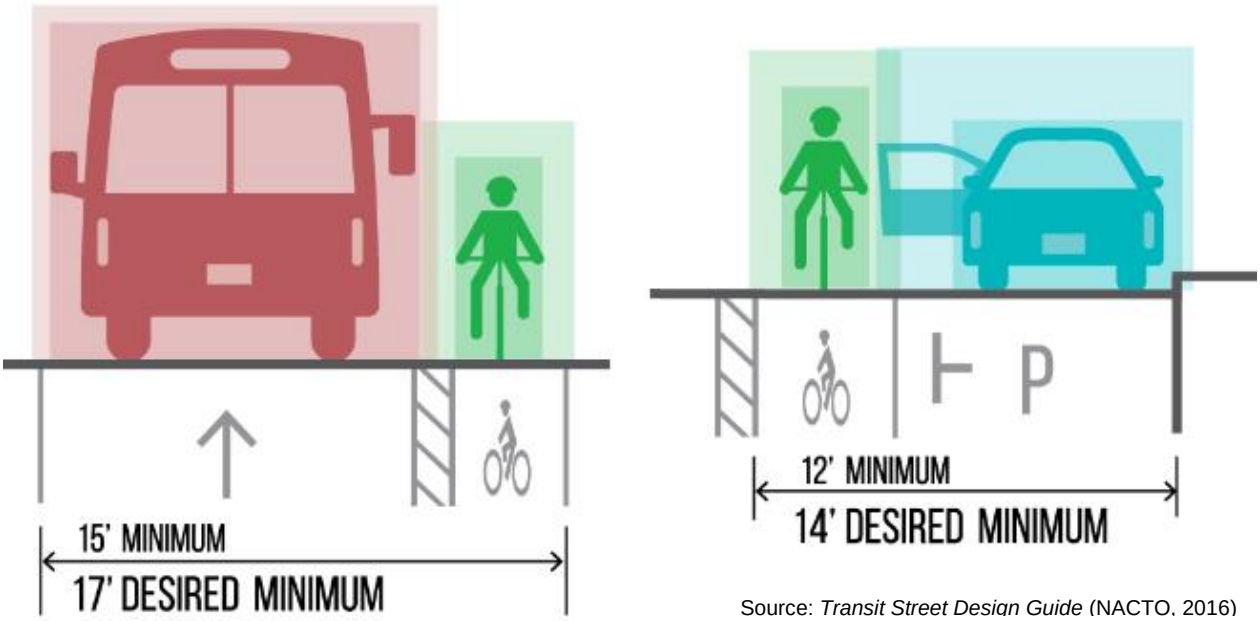
Another option would be to add the bike lane, but not the bus-only lane. This could allow for parking to remain on both sides of the street. Louisville Metro has developed a preliminary design plan for this concept.

A third option would use minimums for nearly all dimensions: 7.5-ft parking lane, 5-ft bike lane, 10-ft bus lane, three 10-ft travel lanes, and another 7.5-ft parking lane (60 feet total). See **Figure 3.4-16** for NACTO recommended minimums for bus-bike, and bike-parking widths. It is

not clear that this option is feasible, but it would accommodate all of the modal needs identified in this study. Adding two feet to the typical section (62 feet total) would provide 8-ft parking lanes and an 11-ft bus lane. This would require taking two feet from the sidewalk on one side of the street, thereby reducing the sidewalk with to 13 feet.

A variation on this would be to construct a nine block urban multi-use trail using 18 feet on one side of the street, leaving a 15 foot sidewalk on the other side and 57 feet for a bus lane, 3 travel lanes, and parking on both sides of the street. However, the 18 feet may not be sufficiently wide to accommodate all of the needs in that area.

Figure 3.4-16: Minimum Widths for Bike Lanes Adjacent to Bus Lanes and



Source: *Transit Street Design Guide* (NACTO, 2016)

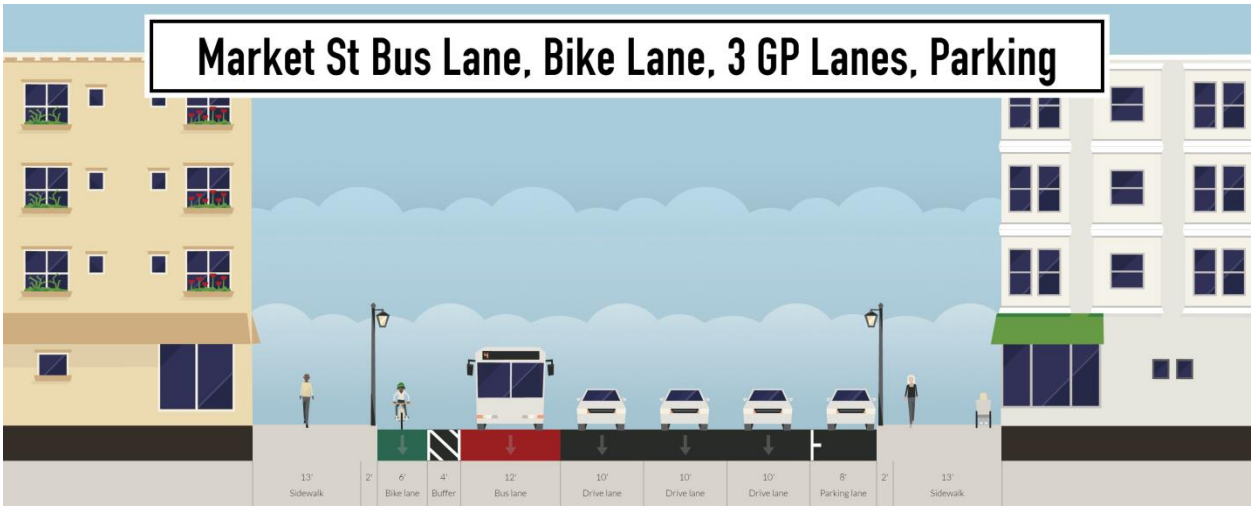
Finally, all of the bus lane options assume that TARC will re-route additional buses on Jefferson to make it a downtown transit emphasis corridor. By routing additional buses onto Jefferson Street, the number of buses will exceed the threshold required to substantiate the bus-only lane. The bus passenger facilities on the street could also be upgraded, including additional or upgraded shelters and signage.

Parking: Some of the Jefferson Street options will require the removal of parking from one side of the street, while others would only eliminate select spaces. The Jefferson Street parking meters on the five central blocks have strong utilization ($14,000 per month in revenue). The public may oppose the removal of these spaces. The parking loss and financial impact to the Parking Authority would also need to be addressed. Replacement parking spaces would need to be identified.

S-34: Market Street, 9th Street to Brook Street - Market Street could be handled in much the same way as Jefferson Street. Once the Jefferson Street project is implemented the design

could be generally replicated on Market Street to provide a parallel bus and buffered bike lane on Market Street as shown in **Figure 3.4-17**. Market Street also has 60 feet of curb to curb width through most of the core, so a similar typical section could be employed. Parking on the south curb face would need to be eliminated or shifted in many places to accommodate this new design. **Advance**

Figure 3.4-17: Market Street, 9th Street to Brook Street (T-2 and S-34)



Project Discussion: A review of the AM and PM peak hour Synchro models for downtown Louisville shows that much of the nine block corridor operates at LOS C or better during both peak hours. It also shows that the volumes drop in the middle of the corridor. However, there are two critical intersections that may need additional improvements or special treatments to allow a three through lane typical section to operate without substantially impacting traffic flow.

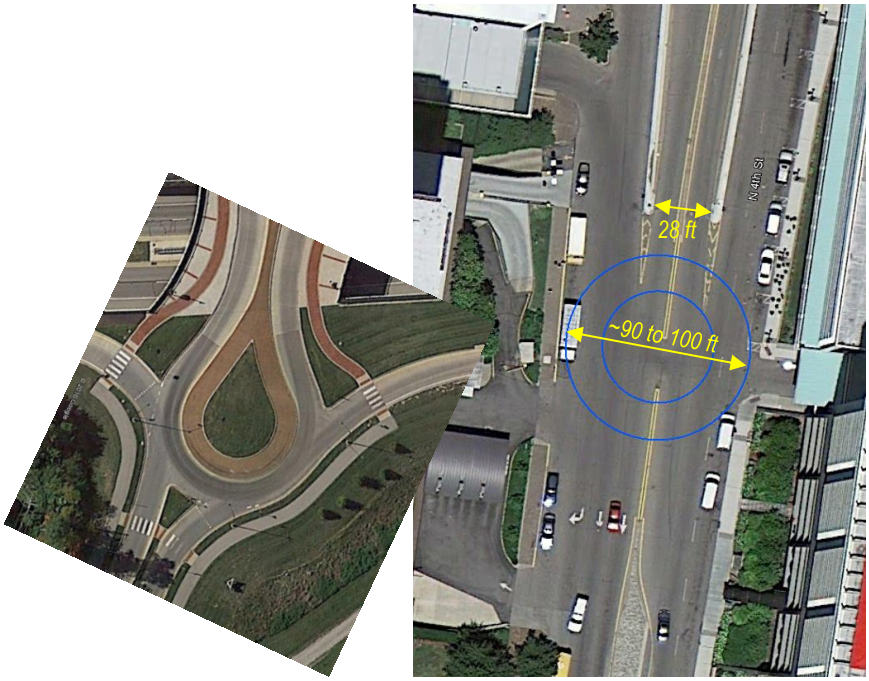
The first is at 8th Street in the AM peak hour. A southbound left-turn lane may be needed at this location to allow for adequate eastbound green time. This is especially true when 8th Street is converted to two-way operations. With that change, the intersection should operate acceptably with three eastbound lanes.

The second location is at 2nd Street. This is a critical intersection for the entire downtown system and it is even more important with the introduction of tolls on I-65, as it is a key gateway to the 2nd Street Bridge. Removing an eastbound through lane at this location could impact traffic flow, especially during the PM peak period. With signal timing adjustments it appears that the LOS can be maintained at a high LOS D; however, if further study indicates that there are issues, then additional improvements may be warranted at this location.

The overall goal of projects S-33 and S-34 is to provide a street pair through the center of downtown that serves all modes in both directions at a high level. Each street would have three general purpose traffic lanes, a bus lane, a bike lane, parking, and wide sidewalks. Together they would serve all users in both directions. It appears that this can be accomplished with moderate effects to the traffic operations and parking supply. Steps could be taken to mitigate both of these, but they cannot be entirely eliminated.

S-46: 4th Street, Main Street to River Road - This short section of street is a challenge due to the function, geometry, topography, ownership, and other issues. The upper area on 4th Street near Main Street presents one set of issues, the opening and grade area another, and the River Road intersection still another set of issues. Overall, there is a desire to improve this link for bicycles and pedestrians, while maintaining traffic/transit flows and promoting a safe environment for all. This project could take the form of a simple signing and marking project with wayfinding for pedestrians to better direct them to the current grade separated crossing; signs and marking for bicycles; and care taken to maintain safe vehicle circulation. However, it could also take the form of a roundabout at the top of the grade and a new at-grade crossing of River Road with a new sidewalk between the two. There are other options that could be considered as well, with unique paving, channelization, or other approaches. Metro recently removed the narrow median on 4th Street in this section and striped new bike lanes. The bike lanes are used by both pedestrians and bicyclists. The striping confirms that autos and trucks do not need the full width of the roadway in that location and that other options are possible. This project incorporates **Projects P-12 and B-9**. (See **Figure 3.4-18**) **Advance**

Figure 3.4-18: Possible Compact Urban Roundabout



S-48: 4th Street Shared Street, Main Street to Liberty Street – This two block (730 foot) section of 4th Street passes by the Convention Center, a major hotel, park, and office/retail buildings. It is a major walking corridor for visitors and residents alike. It also has moderate traffic volumes and one block is currently closed to vehicles due to construction. To provide an improved north-south bicycle facility it may be possible to convert this two block stretch to a shared space. This could be part of a Louisville Cultural Trail. It would still allow vehicles, but it would make walking and bike riding equal in that space. The same treatment is proposed for the two block section south of Muhammad Ali. **Advance**

S-49: 4th Street Shared Street, Muhammad Ali Blvd to Broadway - This long two block (1,780 foot) section of 4th Street serves several hotels, restaurants, offices, and will soon have a new apartment building. Travel speeds on this street are slow due to the narrow lanes, on-street parking, and other activity. One option for improving this street for bicycle use would be to consider a shared space street. See Figure 3.4-19 for a shared street in Indianapolis. **Advance**

Figure 3.4-19: Shared Street Example (Georgia St in Indianapolis)

3.4.4 Connectivity Improvements

Connectivity improvements are geared toward removing barriers, “healing the grid”, and providing additional traffic dispersion throughout downtown.

S-35: 9th Street Reconstruction, Main Street to Kentucky Street - 9th Street with its wide right-of-way and many lanes was designed to carry a significant volume of north-south traffic, but it creates a barrier between the Russell neighborhood and downtown. Louisville Metro has initiated a study to define a vision for this corridor and to do some early implementation. The

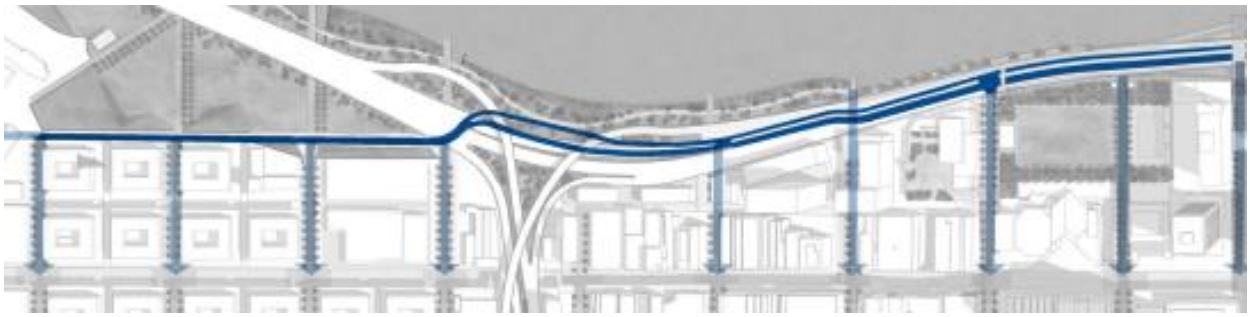
corridor offers many possibilities for both travel and placemaking. The redevelopment of the Beecher Terrace area is adjacent to the corridor and improved transit service with the Dixie Highway BRT is planned as well. This project includes **Project B-4**. **Advance**

Additional information: The 9th Street corridor is a six lane street with turn lanes that carries approximately 20,000 to 30,000 vehicles per day. This volume is generally consistent with a four lane street with turn lanes. Additional width could therefore potentially be used for other purposes. The outside curb to outside curb width today is 130 feet. The ongoing study will examine the current activity in the corridor, including how people use space for recreation, relaxation, and transportation. The MOVE Louisville plan listed this project as a priority. There may also be opportunities for modifying the interstate ramps and intersections to reduce the impact on the community and to open more lane for other uses.

S-36: River Road Extension/Streetscape, 6th Street to Northwestern Parkway - This approximately three-quarter mile extension would restore an important element of local east-west connectivity for which I-64 is currently a barrier. In doing so, it would also improve local access to the riverfront. As envisioned, the extension would also include pedestrian and bike facilities, as well as a streetscape component. The project also includes elements of other projects including the pedestrian connections to the riverfront at 6th Street through 9th Street and the bicycle connections at those same places. **Advance**

Additional Project Information: This project would construct an extension of River Road from 7th Street west to Rowan Street at 11th Street. (See **Figure 3.4-20**) The new road would be two lanes with sidewalks. Streetscape features would be tied in with the proposed Waterfront Park Phase IV project. See Section 1.3 for additional discussion of the Waterfront Park project.

Figure 3.4-20: River Road Project – Concept Alignment



S-37: Reopen Shelby Street, Muhammad Ali Boulevard to Madison Street - This one-block section, currently on private property owned by Phoenix Place, would be an all-new section of road – requiring right-of-way, utilities, signalization, sidewalks, etc. The cost of reconstructing this roadway may not be justified in the near-term. However, reconnecting Shelby Street for bicycle and pedestrian traffic would be very beneficial. **See Project B-24**

S-52: Market Street, Brook Street to Baxter Street – East of Brook Street, Market Street is has been redesigned with two eastbound lanes, one westbound lane, parking on both sides, an

eastbound cycle track (at sidewalk level), and significant streetscape enhancements (**Figure 3.4-21**). The goal of the project is to reconstruct Market Street into a complete street corridor that has a pedestrian scale, promotes bicycle use, supports small businesses and residential development, and creates a sense of place. The project has strong local support and has been a high priority project for Louisville Metro and the NuLu community.

The East Market Street Traffic Analysis (2014) indicated that the proposed design would accommodate the existing eastbound traffic volumes at reasonable speeds and levels of service. A review of the City's Synchro model supported this conclusion. The low side-street and westbound volumes allow for acceptable eastbound flows. The westbound direction is more congested, with a predicted PM peak hour average speed of 12 mph. The Baxter Avenue intersection should be given additional attention, as the proposed two lane eastbound approach may not be sufficient. An eastbound right turn lane may be warranted at that location (unless improvements to other parallel streets such as Jefferson Street make it unnecessary).

While the proposed design can accommodate the existing volumes, it is sensitive to the volume of left turning traffic, which could increase as the NuLu area redevelops. Therefore, it is recommended that a system evaluation be completed that examines the total eastbound and westbound through capacity in the area. Based on the analysis conducted for this study, it may be beneficial to convert one or even two westbound lanes on Jefferson Street to eastbound to restore the capacity removed on Market Street. **Advance**

Figure 3.4-21: Market Street 3-Lane Design

3.4.5 Intersection Improvements

This category includes a variety of intersection improvement projects. Some of them are focused on safety, others on circulation or capacity, and others on multimodal objectives.

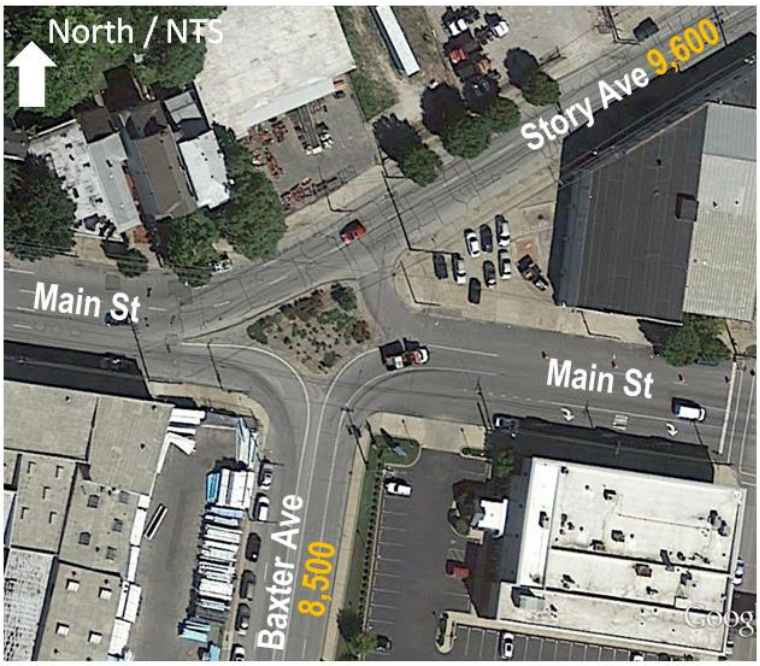
S-38: Main Street / Story Avenue - This project would involve reconfiguring this unconventional intersection into either a more standardized intersection configuration or a roundabout. The goal is to improve vehicle circulation and to create opportunities for safe pedestrian crossings. As part of the project the block of Baxter Avenue to the south would be converted to two-way operations, allowing traffic from Story Avenue to continue south to Jefferson Street and Broadway. One challenge for this project is the very high southbound to westbound traffic movement, which exceeds the capacity for a typical right turn at a signalized intersection. In addition to limited delay, the intersection also has a very low crash rate and maintaining that high level of safety is important. **Advance**

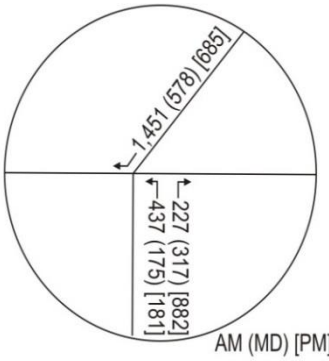
Project Discussion: This project is necessary to convert Main Street and Baxter Avenue to two-way operations. It will also improve circulation to/from and through NuLu. However, the project has substantial capacity and safety challenges. As shown in **Figure 3.4-22**, the approach streets have high peak period approach volumes. The southbound right volume in the AM peak hour exceeds the capacity of a typical double right turn lane at a signalized intersection. The northbound right turn is then heavy in the PM peak hour. For these reasons it may be difficult to design a standard signalized intersection that will accommodate these volumes without free-flow movements. A roundabout with a southbound to westbound slip ramp and a northbound to eastbound slip ramp may function acceptably.

There were 14 crashes in 5 years at this intersection, with 2 injury crashes and no pedestrian or bicycle crashes. This is a low crash rate of approximately 0.4 crashes per million entering vehicles (MEV), which is below the typical threshold for considering safety improvements. It is expected that the addition of a signal at this intersection would increase the number of crashes; however, it will also allow pedestrians and bicyclists to cross the intersection more safely. As discussed, the project will also significantly improve local circulation and access.

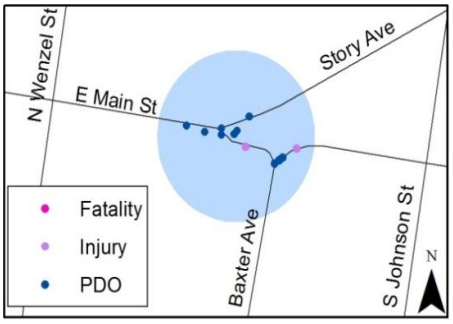
S-39: Broadway Intersection Safety Improvements, 4th Street to Brook Street - In 2016, signing and striping improvements were made at these intersections. These locations were high crash locations for pedestrians and motor vehicles. A review of the post crash data should be conducted to determine what improvements (if any) should be implemented next. That work could be conducted as part of the complete street assessment of Broadway. **See Project S-32**

Figure 3.4-22: Main Street / Story Avenue Intersection





2015 Peak Hour Volumes (Estimated)



Crash Map (2010-2014)

One possible future concept
(though the SB right may need additional capacity)

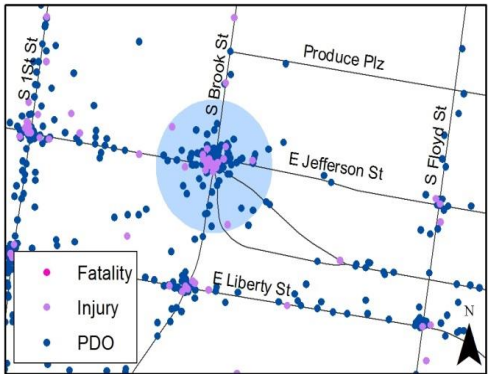
S-40: I-65 / Brook Street / Jefferson Street Interchange Ramp - This project, already in the design phase, would involve intersection reconstruction and/or ramp reconfiguration to improve traffic safety and operations. There are several options being considered. Better serving the traffic to the Medical District is a key objective. Improving bicycle and pedestrian facilities is another top priority. **Advance**

Project Discussion: This intersection has one of the highest crash rates in the state. The simultaneous movement of ramp and surface street traffic leads to considerable weaving, especially westbound. The crash rate at the intersection exceeds 4 per MEV. Most of the crashes are angle and sideswipe crashes, and 90% are property damage only crashes. **Figure 3.4-23** shows a crash map by severity.

Since the new bridge over the Ohio River has been open and 3rd Street and 4th Street closed, the ramp traffic volumes have increased. This has increased the queues on the ramp. They now regularly back up onto the new collector-distributor roadway running parallel to I-65 southbound. It is critical that any new improvements at this location resolve this operational issue and provide capacity for future growth.

Traffic growth in the area has been modest; however, with the new Omni Hotel, continued development at Nucleus, and other ongoing and planned development in the area, this ramp will be very important in the future. There are many concepts that have been tested for improving the ramp. The best concepts resolve the safety and operational issues, without creating new issues elsewhere in the street network.

Figure 3.4-23: I-65 / Brook Street / Jefferson Street Interchange Ramp



Crash Map (2010-2014)

S-41: I-64 / 3rd Street / River Road Interchange Ramp - This project would reconstruct the 3rd Street ramp intersection. A roundabout has been proposed as one concept. This intersection is a high traffic volume location. It is important to maintain traffic flow to minimize queuing into the I-64 westbound mainline. The intersection is also a riverfront access location. This project should be considered as part of the River Road corridor. **See Project S-28**

S-51: 1st St Ramps, I-65 Ramps from 1st Street – This project would address the potential safety issues at the I-65 on-ramp connections from 1st Street. The 1st Street I-65 on-ramps just south of Liberty Street and just south of Chestnut Street both serve between approximately 6,500 vpd. They both diverge from 1st Street at an oblique angle, which allows vehicles to begin accelerating before they reach the ramp. Safety concerns have been raised with regard to these ramps, including pedestrian safety (see picture). Modifications to these ramps could be considered such as reconstructing them at closer to right angles. That would slow the vehicles turning on to the ramps and shorten the distance that pedestrians would cross. However, a modification of that type could be expensive given the grades and proximity of the interstate. It is also important to consider the required acceleration distance. The ramp south of Jefferson Street is roughly 1,200 feet to the start of the taper. The ramp south of Chestnut Street is approximately 600 feet to the start of the taper. For a 60 mph design speed, a starting speed of 18 mph (the assumed turning speed), and an assumed upgrade of 3% for half the ramp, an acceleration distance of 1,650 feet is recommended. Thus shortening the ramps is not desirable. Due to the cost and complexity, it is not recommended that these projects move forward at this time as a separate unique project. **Dismiss**

Figure 3.4-21: 1st Street Ramp

3.4.6 Area Improvements and Policies

This section addresses key area-wide improvements and policies that could benefit transportation for everyone downtown. The downtown transportation system and infrastructure is maintained and operated by many different agencies including Louisville Metro, KYTC, TARC, PARC, and the Downtown Partnership as discussed in Chapter 1. At certain locations, the FHWA also has review and approval authority. Each agency has its own goals and objectives, but it is important for them to come to agreement on important overall goals, directions, and policies. It is also important to agree on important system wide projects. The projects/policies listed below are area wide projects/policies that could be considered along with all of the location specific projects discussed previously in this report.

S-42: 25 MPH Downtown Speed Limit with Signage Upgrades - This project would legally set all of the downtown streets to a maximum 25 mph speed limit, including state highways. Some streets (neighborways) could be set at 20 mph and shared space streets such as 4th Street Live would be set at 5 to 10 mph. This change would require KYTC approval for the state highways, but it is legally allowable. Once set, new signs would be erected on primary entry streets into the downtown informing drivers of the maximum speed in the downtown area and possibly making them aware of potential fines. **Advance**

S-43: Downtown Street Typology - One method for improving the planning and design of downtown streets is to assign them a typology that matches both their function and context. Many cities have started using this approach; changing the old functional classifications to types such as Commercial Corridors, Activity Streets, and System Links – each with their own typical sections and design parameters. An approach such as this may provide decision makers and technical staff with a clearer way to communicate about street design goals and design criteria. Louisville Metro and KYTC would need to develop the appropriate street types and determine the applicable design parameters. **Advance**

S-44: Floyd St Upgrade in Medical District - This project would upgrade Floyd Street with various aesthetic and operational/safety improvements. Floyd Street is a key arterial in the Medical District, but it also provides good connections to the north and south, especially for bicycles. It has on-street parking that is heavily used. The project is not currently well defined, but it could include elements such as a smart parking directing visitors to available parking, curb extensions, streetscape/hardscape aesthetic improvements (landscaping or ADA compliant pavers), a mini-roundabout at the all way stop controlled intersection, pedestrian scale lighting, etc. **Advance**

S-45: Downtown Wayfinding - This project would result in the installation of additional and/or enhanced wayfinding for downtown and/or NuLu. It would include pedestrian and vehicle scale signs and pedestrian oriented pavement markings. These installations would have clear objectives, a consistent theme, and a color palate that matches the current wayfinding color palate. There would also be phone apps and other technology aspects to the program. From a transportation perspective, the goal would be to provide additional traveler information to downtown visitors, employees and residents. The current signage is shown below long with a comparison sign from a comparison City. The Louisville signage installation is of a considerably higher quality; however, the sign legibility as not as good for drivers. There is also substantially less signage in Louisville than the City used for comparison. **Advance**

Figure 3.4-22: Wayfinding Signage (left – Louisville, right – Columbus)

General Policies and Goals

Some of the goals and policies that are important to most if not all of the agencies involved in this study include:

- **Achieve a Stronger Implementation of Complete Streets** – Louisville Metro has an adopted complete streets policy and the agencies involved in the study all agree on the importance of planning and designing for all users. However, there is a need to continue to advance this policy and design philosophy through to the design and construction phases of all downtown and edge neighborhood projects. An example where this is being implemented is the I-65/Brook Street Ramp project where pedestrian accessibility has been a major design consideration even though it is a freeway ramp project.
- **Provide Mobility Options for All Residents, Workers, and Visitors** – There is a need to continue to provide a wide range of mobility options for different transportation system users downtown. The options should accommodate person with disabilities. They should also serve those that do not have a car or do not want to drive their car downtown.
- **Protect the Most Vulnerable Users** – This means making design and operational decisions that will improve pedestrian and bicycle safety, sometimes at the expense of traffic speed and/or capacity.
- **Rebalance the Goals and Uses on Downtown Streets** – Each street serves multiple functions and modes. There is a strong desire on certain downtown streets to increase the emphasis on the sense of place and on the pedestrian scale design elements, while potentially limiting traffic speeds and traffic flows. An example of this is the Market Street project in NuLu.
- **Explore Innovative Ways of Moving People and Goods Downtown** – Transportation technology is advancing rapidly and Louisville wants to be at the forefront of new developments. The opportunities may apply to any mode. The downtown circulator vehicles for example are part of TARC's early adoption of electric vehicle technology. There may be other new technologies that could be applied to pedestrian safety (e.g. crosswalk technologies). Louisville Metro and KYTC may also find that they have a role to play in the deployment of automated and/or connected vehicle technologies.
- **Emphasize Quantitative Safety in Decision Making** – Transportation planners and designers can now address safety using both historical data and predictive crash methods, similar to traffic capacity analyses. These new advances should be applied to transportation decision making in downtown Louisville.

To effectively improve the downtown transportation system, all of the major agencies with responsibilities and authority downtown must cooperate in project decision making and implementation from planning and designing to funding and construction. This involves agreeing on policies such as those listed above and then working together on advancing specific projects or groups of projects. This also means working together to identify the highest priority projects. To accomplish this, it would be beneficial for all of the agencies to regularly review transportation plans, priorities, and specific projects for downtown to make sure that efforts are coordinated and on schedule.

4 Recommendations and Priorities

4.1 Methodology

All of the projects that were carried forward through the screening process were evaluated and ranked to develop a prioritized list for implementation. Cost estimates were also generated for use in the prioritization process; although, it should be noted that in many cases the costs were developed in the referenced prior studies and have been carried forward to this report.

Twelve evaluation criteria were utilized in this prioritization. For each of these criteria, a subset of elements was considered, as listed below. Based on how well the project addressed the elements of each of the criteria, a score of 0-4 was assigned. Then a multiplier (shown in parentheses next to each criterion below) was applied to that score to achieve the overall summary rating based on a 100 point scale.

1. Safety (14)
    - Crash Reduction
    - Safety Assessment
2. Congestion Management (12)
    - Traffic Volume
    - Improvement in Traffic Operations
3. Travel Demand Management (4)
    - Traffic Demand Reduction
    - Traffic Route Improvement
4. Transit Mobility (10)
    - Ridership
    - Service, Accessibility, and Transit Network
5. Bicycle/ Pedestrian Mobility (10)
    - Increase Bicycle/Pedestrian Travel
    - Improve Bicycle/Pedestrian Network
6. Economic Development (12)
    - Promotes New Development
    - Consistency with Latest Planning
7. Urban Form (8)
    - Design, Context, and Aesthetics
    - Connectivity
8. System Maintenance and Operations (6)
    - Address Current O&M Issues
    - Reduce Long-Term O&M Costs
9. Cost/Benefit and Funding (8)
    - Cost Feasibility

10. Environment and Society (6)
    - Environmental Impacts
    - Community Benefit/Impacts
11. Freight Mobility (4)
    - Facilitates Truck Movements/Activities
12. Community Support (6)
    - Community Support

The resulting study priorities are shown in the maps and tables below. The maps further categorize the ranked projects into near-term (1-5 years), mid-term (5-10 years), and long-term (10+ years) time horizons. In general, the highest-ranked projects were placed into the near-term horizon, while the lowest-ranked projects fell into the long-term horizon. In some cases, lower ranking projects were moved to the near-term horizon based on a variety of other factors (political, development-driven, phasing issues, etc.)

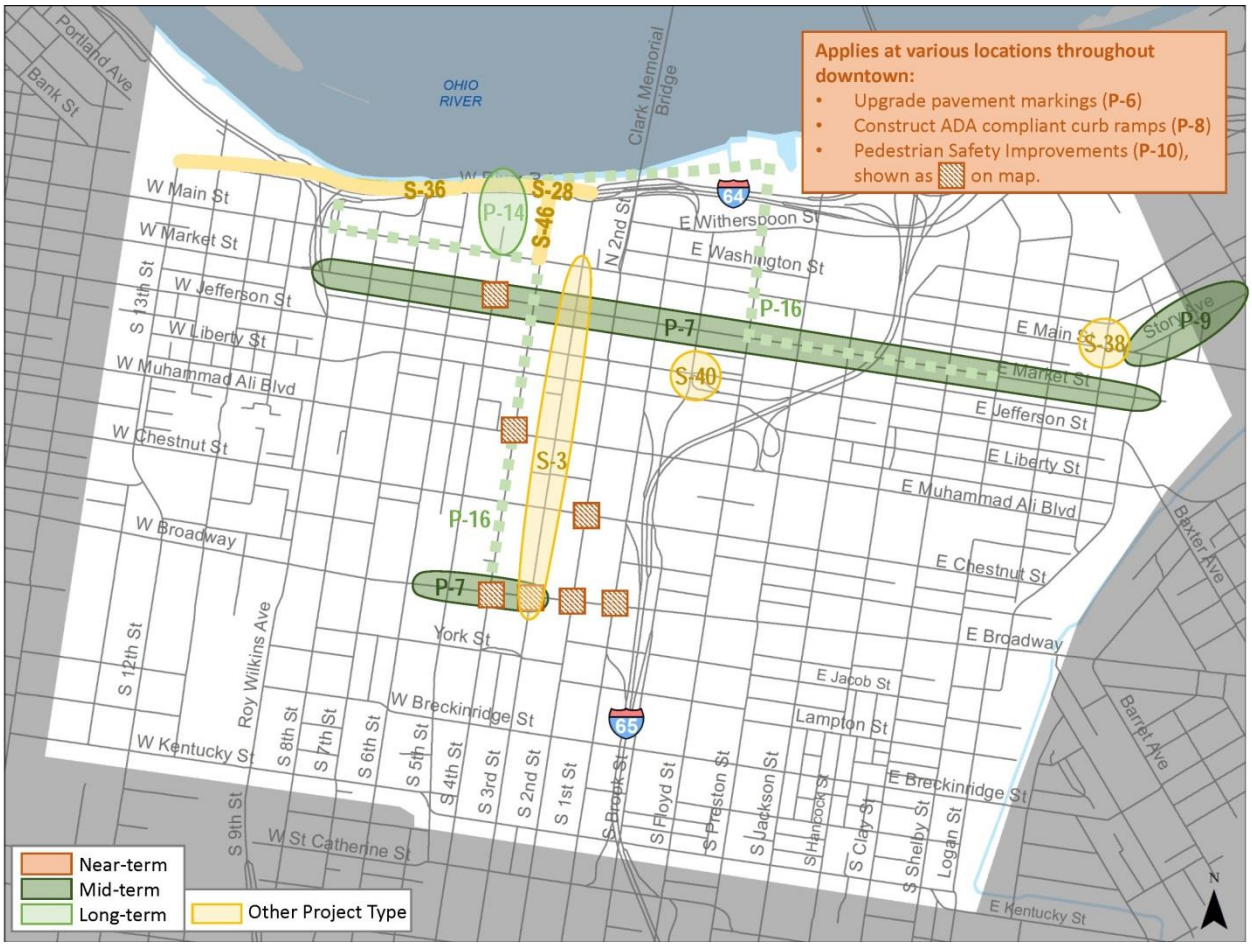
4.2 Pedestrian Network

Seven pedestrian projects were evaluated as stand-alone projects. These seven projects were ranked and prioritized as shown in **Figure 4-1** and **Table 4-1**. The remaining pedestrian projects were either already completed (e.g. JCTC Campus Improvements) or were grouped together with larger street projects. By grouping them, they can be implemented quicker and in a coordinated manner with other ongoing efforts. The cost of the improvements can also be included in the larger project. A prime example is the inclusion of the riverfront access projects (P-11) which were combined with the larger River Road Extension project (S-36).

Several of the near-term intersection improvement locations (P-10) have been recently re-striped. Post implementation crash reviews are in order at these locations as outlined in the evaluation discussion for that project.

Two large scale projects were proposed for long-term implementation. They are the Louisville Urban Trail concept and the Belvedere reconstruction project. Both of these projects are expected to exceed $15 million and would benefit from focused planning/design studies to further define them before advancing them to the next stage of project development.

Figure 4-1: Prioritized Pedestrian Projects



**See Streets map and ranking table for additional projects with pedestrian components.*

Table 4-1: Pedestrian Projects Ranking

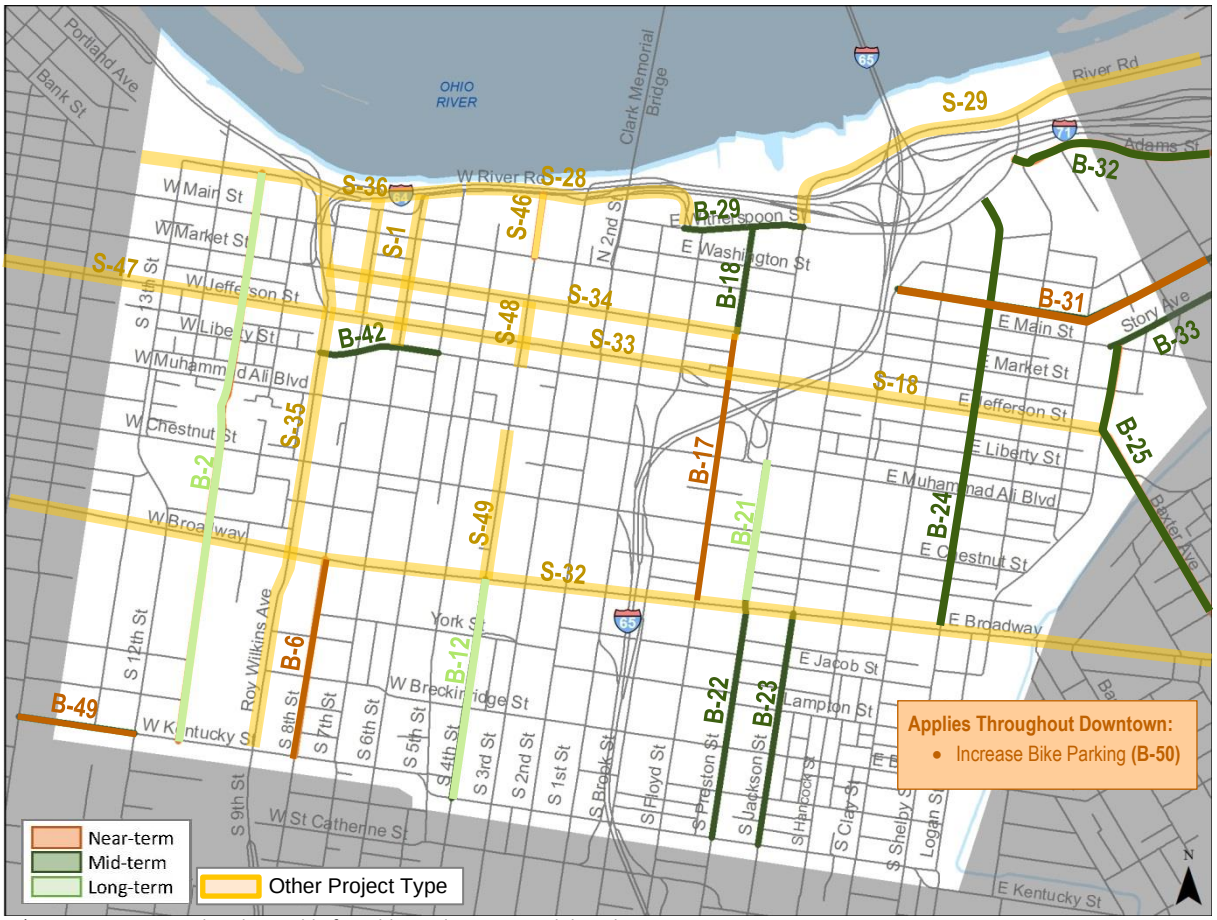
Rank	ID	Segment	Safety	Congestion Management	Travel Demand Management	Transit	Bicycle/ Pedestrian	Economic Development	Urban Form	System Maint. and Operations	Cost/Benefit and Funding	Environment and Society	Freight	Community Support	Summary Rating	Total Project Cost ($000)	Plan Phase
1	P-6	Repaint Crosswalk Markings, Throughout Downtown	●	◔	◑	◑	●	●	●	●	●	◑	◔	●	82.0	400	1
2	P-10	Spot Safety, Top 7 Locations	●	◑	◑	◑	●	◑	◑	●	◑	●	◔	◑	76.5	1,750	1
3	P-8	Curb Ramps, Various locations	◑	○	◑	◑	●	●	●	●	◑	◑	○	●	69.0	200	1
4	P-9	Story Ave, Main St to Frankfort	◑	○	◑	◑	●	◑	●	●	◑	◑	○	◑	63.0	700	2
5	P-7	Ped Signals, Market & Broadway corridors	◕	○	◑	◔	●	◑	◑	◑	◑	◑	○	◑	59.5	240	2
6	P-16	Urban Trail, Downtown/Riverfront	◔	○	◔	◑	●	◑	●	◑	◔	◑	○	◑	52.5	15,000	3
7	P-14	Belvedere upgrades, Main to Riverfront at 5th	◔	○	◔	◔	●	◑	●	◑	◔	◑	○	◑	46.5	25,000	3

4.3 Bicycle Network

There were approximately 17 stand-alone bicycle projects that were evaluated and ranked. There were another 14 that were combined with street projects to be evaluated as part of those larger projects - typically complete streets projects.

The combination of the existing and proposed bike facilities (including those that are part of street projects) creates a complete network effectively serving the downtown core.
The prioritized map and project ranking are shown in **Figure 4-2** and **Table 4-2**.

Figure 4-2: Prioritized Bicycle Projects



**See Streets map and ranking table for additional projects with bicycle components*

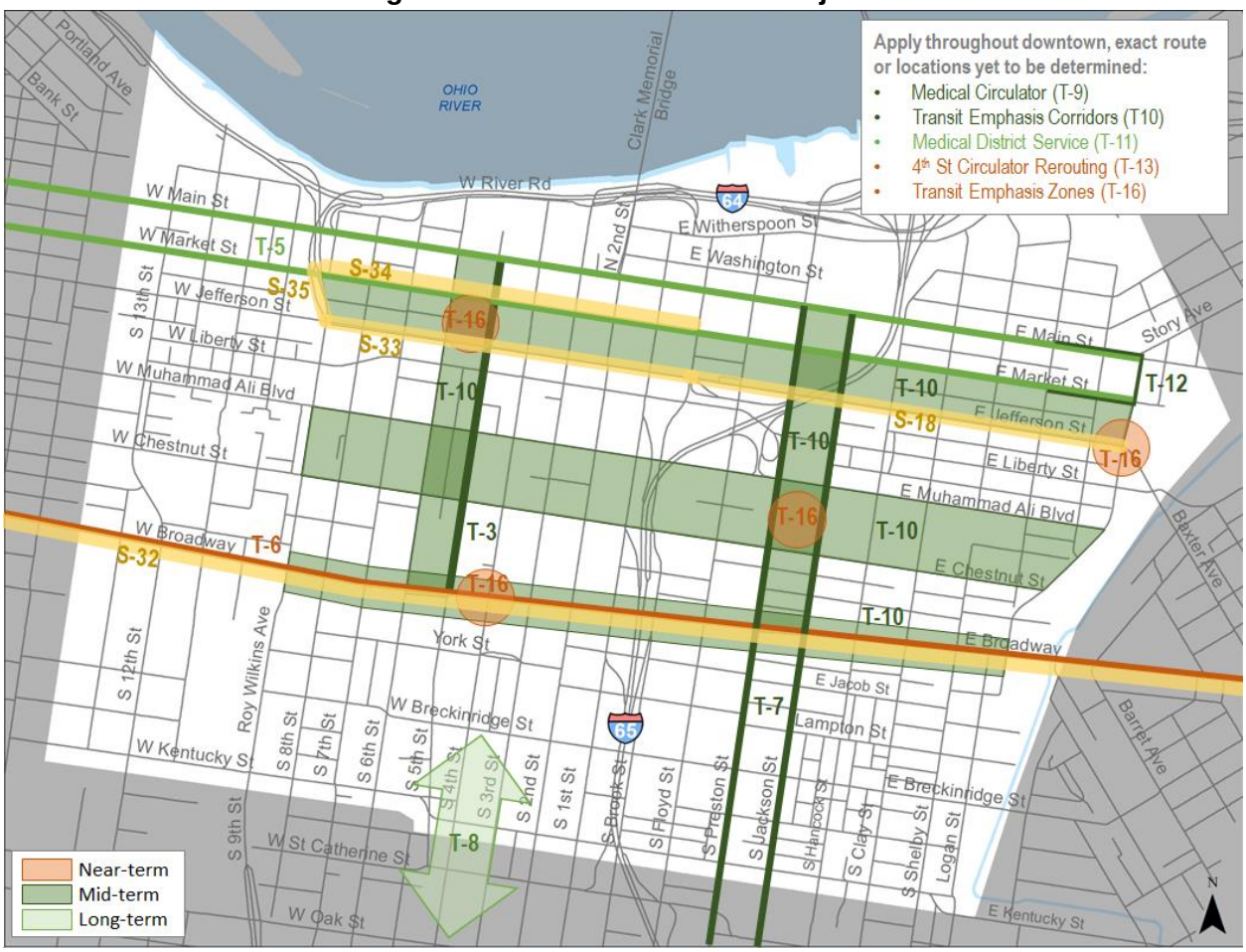
Table 4-2: Bicycle Projects Ranking

Rank	ID	Segment	Safety	Congestion Management	Travel Demand Management	Transit	Bicycle/ Pedestrian	Economic Development	Urban Form	System Maint. and Operations	Cost/Benefit and Funding	Environment and Society	Freight	Community Support	Summary Rating	Total Project Cost ($000)	Plan Phase
1	B-25	Baxter Ave, Main St to Broadway	◑	○	◕	◑	●	●	●	◔	◕	◕	○	◑	60.0	30	2
2	B-2	11th St, Rowen St to Kentucky St	◑	○	◑	◔	◕	●	●	◔	◕	●	○	◕	57.0	50	3
3	B-17	Floyd St, Market St to Broadway	◔	◔	◑	◕	●	◑	◑	◕	●	◑	◔	○	52.5	20	1
4	B-24	Shelby St, Broadway to Witherspoon	◑	◔	◕	◑	●	◑	◕	◑	◑	◑	◔	◔	52.5	200	2
5	B-50	Bike Parking Requirements, Throughout Downtown	◔	○	◕	◑	◕	◕	●	◑	◕	◑	○	◔	49.5	10	1
6	B-18	Floyd St, Witherspoon St to Market St	◑	○	◕	◔	●	◑	●	◔	◑	◑	○	◑	48.0	250	2
7	B-31	Washington, Adams to Hancock St	◔	○	◕	○	◑	●	●	◔	◕	◑	○	◕	46.5	90	1
8	B-32	Adams St, Witherspoon St to Spring St	◔	○	◕	○	◑	◕	●	◔	◕	◑	○	◕	43.5	30	2
9	B-6	8th St SB Cycle Track, Broadway to Kentucky St	◔	○	◕	○	◑	◑	◕	◔	◕	◑	○	◑	37.0	40	1
10	B-12	4th St, Broadway to Kentucky St	◔	○	◕	◔	◑	◑	◑	◔	◕	◑	○	◔	36.0	20	3
11	B-33	Story Ave, Frankfort Ave to Main St	◔	○	◕	○	◑	◑	◕	◔	◕	◑	○	◔	35.5	60	2
12	B-49	Kentucky St, 12th St to 15th St	◔	○	◕	○	◑	◔	◑	◔	◕	◑	○	◕	33.5	10	1
13	B-42	Liberty St, 6th St to 9th St	◔	○	◕	○	◑	◑	◑	◔	◕	◑	○	◔	33.5	10	2
14	B-23	Jackson St, Broadway to Kentucky St	◔	○	◕	○	◑	◔	◕	◔	◕	◑	○	◔	32.5	10	2
15	B-29	Witherspoon, Preston to River Rd	◔	○	◕	○	◑	◔	◑	◔	◕	◑	○	◔	30.5	10	2
16	B-22	Preston St, Broadway to Kentucky St	◔	○	◕	○	◔	◔	◕	◔	◕	◑	○	◔	30.0	10	2
17	B-21	Preston St, Muhammad Ali Blvd to Broadway	◔	○	◕	○	◕	○	◕	◔	◔	◑	○	◔	28.0	10	3

4.4 Transit Network

Each of the transit network projects were evaluated, ranked and prioritized. The results are shown in **Figure 4.3** and **Table 4.3**.

Figure 4.3: Prioritized Transit Projects



**See Streets map and ranking table for additional projects with transit components.*

Table 4.3: Transit Projects Ranking

Rank	ID	Segment	Safety	Congestion Management	Travel Demand Management	Transit	Bicycle/ Pedestrian	Economic Development	Urban Form	System Maint. and Operations	Cost/Benefit and Funding	Environment and Society	Freight	Community Support	Summary Rating	Total Project Cost ($000)	Plan Phase
1	T-6	Broadway Bus Rapid Transit, Shawnee Park to Baxter Ave	◔	◕	●	●	◕	◕	●	◔	◑	◕	◔	◕	66.5	19,600	1
2	T-16	Transit Emphasis Zones, TBD	◔	◔	◕	●	◕	◕	●	◕	◕	◕	◔	●	66.0	1,250	1
3	T-13	4th Street Circulator Re-Routing, 2nd St, 3rd St, or Downtown Loop	◔	◔	◕	◕	◕	◕	●	●	●	◕	◔	◕	65.5	250	1
4	T-3	5th St Bus-Only Lane (NB), Broadway to Main St	◑	◑	◕	◕	◕	◑	●	◑	◕	◕	◔	◑	62.5	750	2
5	T-7	Preston St, Through Downtown (Preston and Jackson)	◔	◕	●	●	◕	◕	●	◔	◔	◑	◔	◑	61.5	23,000	2
6	T-12	Main/Market Circulator Extension, Campbell to Baxter	◔	◔	◕	◕	◕	◕	◕	◔	●	◕	◔	●	60.5	9	1
7	T-10	Transit Emphasis Corridors, 10th to Baxter and Broadway to River Road	◔	◔	◑	◕	◕	●	●	◑	◑	◑	◔	◕	59.0	200	2
8	T-9	Medical Circulator, 11th to Preston	◔	◔	◑	◕	◕	◕	◕	◕	◕	◕	◔	◕	59.0	50	2
9	T-11	Medical District Service, 2nd St to Hancock St, Market St to Jacob St	◔	◔	◕	◕	◕	◕	◕	◕	◕	◕	◔	◑	58.5	500	3
10	T-8	U of L, Airport and Fair/Expo Ctr, North/South corridor connections	◔	◑	●	◕	◕	◕	◕	◔	◔	◑	◔	◕	55.5	2,750	3
11	T-5	Main St. / Market St. Streetcar, 15th Street to Baxter/Jefferson	○	◔	●	◕	◕	●	●	○	○	◕	◔	◕	52.0	134,400	3

4.5 Enhanced Complete Streets Network

The enhanced complete street projects were evaluated, ranked and prioritized. The results are shown in **Figure 4.4** and **Table 4.4**.

Figure 4.4: Prioritized Street Projects

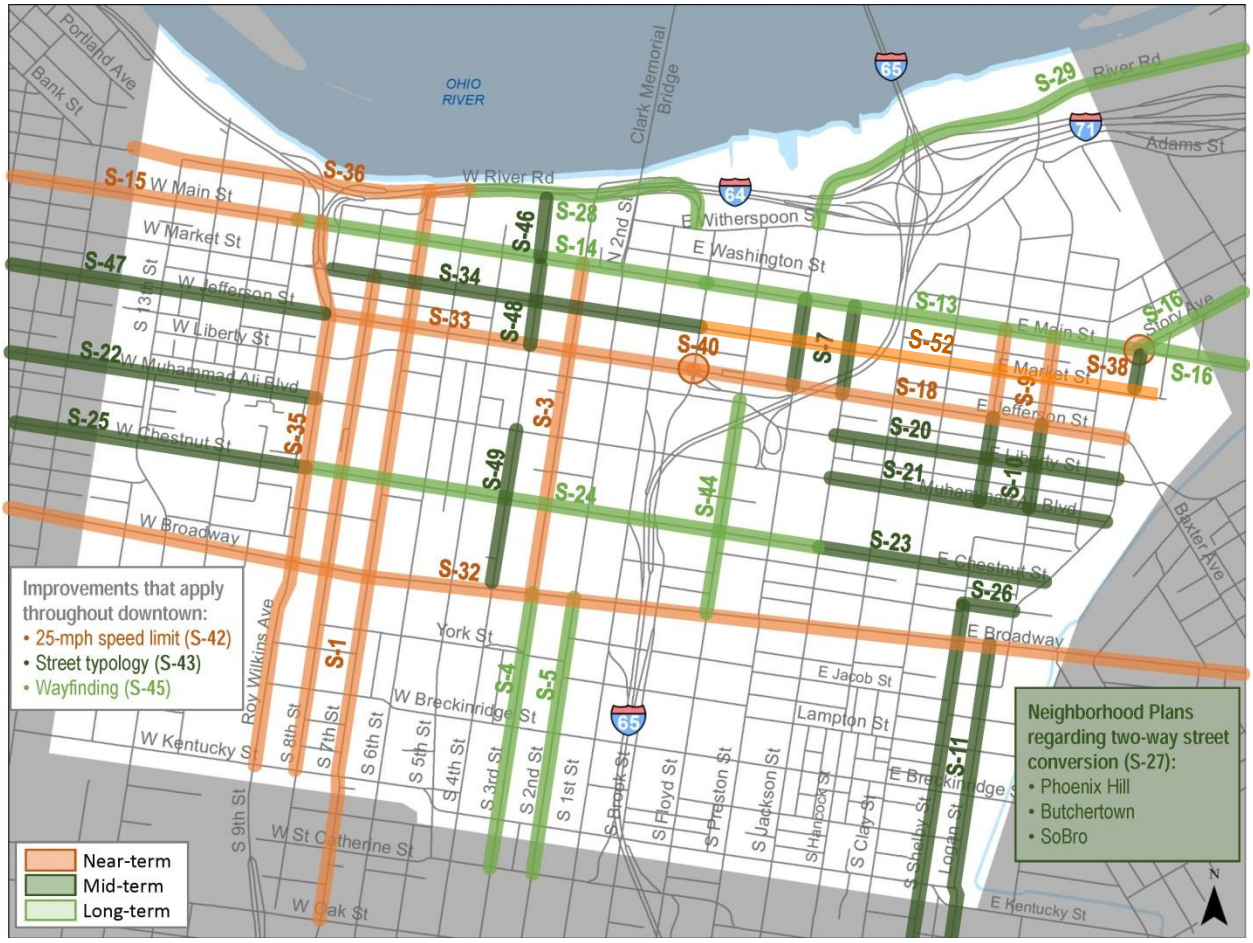
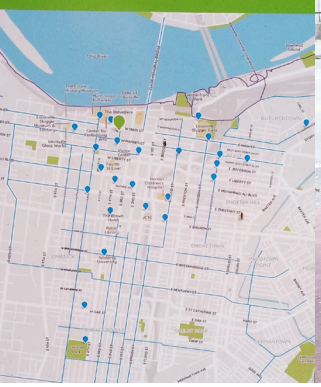


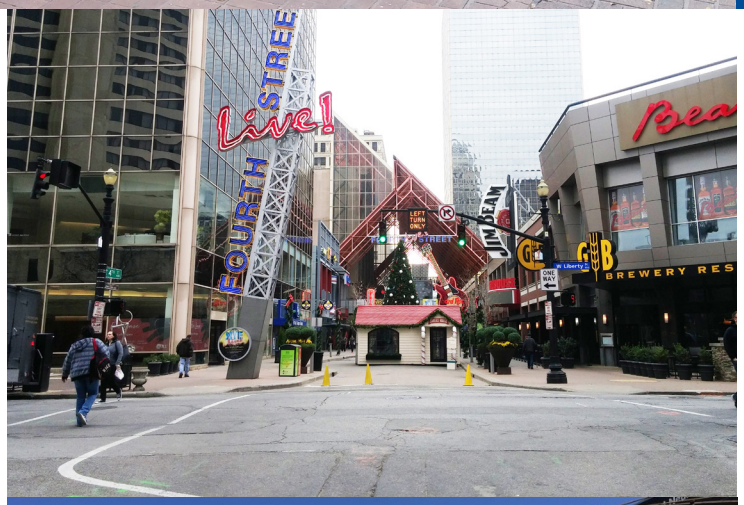
Table 4.4: Street Projects Ranking

Rank	ID	Segment	Safety	Congestion Management	Travel Demand Management	Transit	Bicycle/ Pedestrian	Economic Development	Urban Form	System Maint. and Operations	Cost/Benefit and Funding	Environment and Society	Freight	Community Support	Summary Rating	Total Project Cost ($000)	Plan Phase	Cross Reference
1	S-32	Broadway Complete Streets, 36th St to Baxter Ave	●	◑	◑	●	●	●	●	◑	◔	◕	◔	●	78.5	27,000	1	T-4, B-45, S-39
2	S-33	Jefferson Street Complete Street, Brook St to 9th St	●	◑	◑	●	●	●	●	◑	◔	◕	◔	●	78.5	7,200	1	T-1, B-39
3	S-34	Market St Complete Street, 9th St to Brook St	●	◑	◑	●	●	●	●	◑	◔	◕	◔	●	78.5	7,200	2	T-2, B-37
4	S-36	River Road Extension/Streetscape, 6th St to Northwestern Pa	◑	●	●	◑	●	●	●	◑	◑	◑	◑	●	76.0	9,000	1	B-5, B-7, B-26
5	S-42	25-mph Speed Limit Review, Throughout Downtown	●	◑	◑	◑	●	◕	●	◑	◑	●	◑	◑	72.0	250	1	-
6	S-52	East Market Street Enhancements, Brook Street to Johnson St	◑	◑	◑	◕	●	●	●	◑	◔	●	◔	●	70.5	10,000	1	-
7	S-18	Jefferson Street Two-Way Conversion, Brook St to Baxter Av	◔	●	●	◑	◑	●	●	◑	◕	◕	◕	◕	70.5	1,500	1	T-17, B-40
8	S-40	I-65/Brook Street Interchange, I-65/Brook Street Interchange	●	◑	◑	◑	◑	◕	◕	◑	●	◑	◑	◕	67.5	9,500	1	-
9	S-9	Shelby/Campbell Two-Way Conversion, Main to Jefferson	◔	◕	◕	◑	◑	●	●	◑	◕	◕	◑	●	67.0	1,650	1	-
10	S-1	7th and 8th St Two-Way Conversion, Main to St. Catherine, M	◑	◑	◕	◑	◑	●	●	◑	◕	◕	◑	◕	66.0	3,600	1	B-5, B-7, P-11
11	S-35	9th Street Reconstruction, Main St to Kentucky St	◑	◑	◑	◕	●	●	●	◑	◔	◕	◔	◑	66.0	7,200	1	T-18, B-4
12	S-11	Shelby/Logan Two-Way Conversion, Gray St to Goss Ave	◔	◕	◕	◑	◑	●	●	◑	◕	◕	◑	◕	65.5	2,100	2	-
13	S-15	Main St Two-Way Conversion, 10th St to 22nd St	◔	◕	◕	◑	◑	●	●	◑	◕	◕	◑	◕	65.5	1,650	2	-
14	S-20	Liberty Street Two-Way Conversion, Jackson St. to Chestnut	◔	◑	◕	◕	◕	●	●	◑	◑	◕	◑	◕	65.5	975	2	-
15	S-21	Muhammad Ali Blvd Two-Way Conversion, Jackson St. to C	◔	◑	◕	◕	◕	●	●	◑	◑	◕	◑	◕	65.5	915	2	-
16	S-22	Muhammad Ali Blvd Two-Way Conversion, 9th St to west of	◔	◕	◕	◑	◑	●	●	◑	◑	◕	◑	◕	65.5	610	2	-
17	S-23	Chestnut St Two-Way Conversion, Jackson St. to Chestnut C	◔	◑	◕	◕	◕	●	●	◑	◑	◕	◑	◕	65.5	750	2	-
18	S-25	Chestnut St Two-Way Conversion, 9th St to west of study are	◔	◕	◕	◑	◑	●	●	◑	◕	◕	◑	◕	65.5	500	2	-
19	S-26	Gray St Two-Way Conversion, Shelby St to Campbell St	◔	◕	◕	◑	◑	●	●	◑	◕	◕	◑	◕	65.5	150	2	-
20	S-46	4th Street - Riverfront Connection, Main Street to River Road	◑	◑	◕	◑	●	◕	●	◑	◑	◕	◔	◕	65.0	1,000	2	B-9, P-12
21	S-10	Shelby/Campbell St. Two-Way Conversion, Jefferson to Muh	◔	◕	◑	◑	◑	●	●	◑	◑	◕	◑	◕	64.5	600	2	-
22	S-43	Develop Typology for Downtown Streets,	◑	◑	◑	◕	◕	◕	◕	◑	◕	◕	◕	◑	64.5	100	2	-
23	S-38	Main St. & Story Ave. Intersection, Main / Story / Baxter	◔	◕	●	◕	◑	◕	●	◑	◑	◕	◑	◕	64.0	3,500	1	S-12, B-33, S-16
24	S-27	Neighborhood Two-Way Conversions, Phoenix Hill, Butchertc	◔	◑	◕	◕	◕	◕	●	◑	◑	◕	◑	◕	62.5	3,000	2	-
25	S-7	Preston/Jackson One-Way to Two-Way Conversion, Main to	◔	◑	◕	◑	◑	●	●	◑	◕	◕	◑	◕	62.5	600	2	-
26	S-48	4th Street - North Shared Street, Main Street to Liberty Street	◑	◑	◑	◑	●	◕	●	◔	◔	●	◔	◕	62.0	1,500	2	B-10
27	S-49	4th Street - South Shared Street, Muhammad Ali to Broadway	◑	◑	◑	◑	●	◕	●	◔	◔	●	◔	◕	62.0	2,100	2	B-11
28	S-47	Jefferson St. Two-Way Conversion, 9th St to 26th St	◔	◑	●	◑	●	◕	●	◔	◕	◕	◔	◑	61.5	240	2	B-41
29	S-28	River Road Lane Reductions, Witherspoon St or 3rd St to 6th S	◑	◑	◑	◑	●	◕	●	◑	◑	◑	◔	◑	61.0	400	3	B-27
30	S-3	3rd Street Two-Way Conversion, Main to Broadway	◔	◔	◑	◑	◑	●	●	◑	◕	◕	◕	●	61.0	1,880	1	P-1
31	S-29	River Road Near Waterfront Park, Witherspoon St to Frankfort	◑	◑	◑	◑	●	◑	◕	◑	◕	◑	◑	◑	59.0	625	3	B-28
32	S-4	3rd St Two-Way Conversion, Broadway to St Catherine	◔	◑	◑	◑	◕	●	●	◑	◑	◑	◑	◑	59.0	3,130	3	S-27
33	S-5	2nd St Two-Way Conversion, Broadway to St Catherine	◔	◑	◑	◑	◕	●	●	◑	◑	◑	◑	◑	59.0	900	3	S-27
34	S-13	Main St. Two-Way Conversion, Brook St to Story Ave	◑	◑	◑	◑	◑	●	●	◔	◑	◑	◑	◑	58.5	1,500	3	-
35	S-44	Floyd St upgrade, Medical District	◑	◑	◑	◑	◕	◕	●	◔	◑	◑	◑	◑	58.0	400	3	-
36	S-45	Wayfinding, Throughout Downtown	◔	◑	◕	◑	◕	◕	◕	◔	◕	◑	◑		52.5	2,000	3	-
37	S-14	Main St Two-Way Conversion, 10th St to Brook St	◔	◔	◕	◔	◑	●	●	◑	◑	◕	◑		50.5	1,350	3	-
38	S-16	Story Ave/Main St Two-Way Conversion, Baxter Ave to Brov	◔	◔	◕	◔	◑	●	●	◑	◑	◕	◑		50.5	1,200	3	P-9, B-33
39	S-24	Chestnut St Two-Way Conversion, 9th St to Jackson St	◔	◔	◕	◔	◑	●	●	◑	◑	◕	◑		50.5	500	3	-

LouVelo

4TH & MAIN ST





401 West Main St. Suite #500
Louisville, KY 40241
502.909.3234

hdrinc.com

We practice increased use of sustainable materials and reduction of material use.