Park Hill Industrial Corridor

SHORT-TERM TRANSPORTATION PLANNING STUDY

PHASE II SUMMARY REPORT

DECEMBER 2007

FINAL

Submitted to:

Louisville/Jefferson County Metro Government

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ENGINEERING INFRASTRUCTURE SOLUTIONS

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1.0 Introduction

Louisville/Jefferson County Metro Government will soon be conducting a Master Plan for the Park Hill Industrial Corridor. As a precursor to the Master Plan, Metro elected to initiate work to begin looking at the transportation needs, both existing and future, within the Corridor. The Park Hill Industrial Corridor Short-term Transportation Planning Study seeks to define alternative multi-modal transportation projects for addressing the corridor's transportation needs.

The study has three objectives. The first objective is to conduct Phase I of the short-term transportation study, which was completed in June 2007. The Phase I study deals primarily with describing existing conditions and the industrial freight traffic patterns in the corridor. The Phase II study addresses private and public transportation issues: accessibility of places of employment to workers, parking, area's public transportation level of service, pedestrian and bicycle mobility needs, and similar topics. The second objective is to prepare a draft of the Park Hill Industrial Corridor Master Plan's Transportation/Mobility Element, which this Phase II Summary Report accomplishes. The draft integrates the findings of Phase I and Phase II of the study and presents them in the format suitable for inclusion with the master planning process. The third objective of this study is to conduct a public participation process. Under this task, the stakeholders (area residents, businesses, property owners, public and non-profit sector representatives, etc.) have been engaged in the planning process and their feedback integrated into the Phase II Report (draft Transportation/Mobility Element). The public participation process has conformed to the requirements of the Louisville Metro Code of Ordinances. This third objective has been accomplished throughout the development of the Phase I and II reports.

This Phase II Summary Report serves as both the Final Report for the Phase II Study and as the Draft Transportation Element of the Park Hill Industrial Corridor Master Plan. More specifically, this Phase II Summary Report provides the following: defines the purpose and need for transportation improvements in the Park Hill Industrial Corridor; describes both the current and future land use within the study area; documents the mobility needs based on the current conditions in the study area; identifies the transportation goals and objectives and discusses the draft mobility elements of the Master Plan; presents proposed alternative transportation improvements for the study area; and, formulates draft recommendations and next steps for the transportation/mobility element development. Chapters 3 through 5 serve as the preliminary transportation element for the Master Plan.

1.1 Purpose of Study

The purpose of the Phase II study is to inform an expected future master-planning/implementation strategy process for the Park Hill Industrial Corridor and serve as a basis for a transportation component of the comprehensive plan for the area. Louisville /Jefferson County Metro Government views the Park Hill Industrial Corridor as an area with unique opportunities for economic development. The most important of these opportunities are based on Park Hill's size and its strategic location. The study should address the transportation needs of modern industries in the area and at the same time ensure sustainability of neighborhoods and mixed uses. The study examines industrial freight traffic

patterns, accessibility of places of employment for residents of the surrounding neighborhoods, and the compatibility of current transportation patterns with viable commercial uses along the major thoroughfares and on the main intersections.

The study area is the only large infill industrial area in Louisville. Due to the recent expansion of the UPS Worldport international air freight hub, Louisville's entrepreneurs are capitalizing on new export-oriented business opportunities. Proximity of the Park Hill Corridor to the UPS Worldport and the study area's rail and highway connections to the Louisville International Airport area and surrounding industrial parks makes the Corridor a unique place to grow a permanent employment base working to serve Louisville's new global trade opportunities.

The study area is immediately adjacent to the University of Louisville campus. Redevelopment of the Park Hill Industrial Corridor will provide university-linked startups and research-and-development centers with attractively priced, convenient and promising locations for business creation and expansion. This proximity is a critical factor in the area's redevelopment strategy, and the study should address transportation needs arising from it.

Above all, this Short-term Transportation Study must be designed to advance the Louisville Metro's economic development agenda in the Park Hill Industrial Corridor and Louisville's West End. One of the goals of the future Master Plan is to ensure that the area's infrastructure meets the demands of today's businesses as well as provides for contemporary quality-of-life standards for residents of the surrounding neighborhoods. To achieve this balance, understanding of the existing and alternative transportation patterns is critical. Also, the area's need for better access to a wider regional and national transportation network needs study. By examining and addressing these needs, the Short-term Transportation Study will serve as one of the first building blocks of the Master Plan/Implementation Strategy for the Park Hill Industrial Corridor.

Since this Short-term Transportation Planning Study is being developed in advance of the Master Plan, the proposed alternative transportation improvements are based on existing and currently known land use and developments in the study area. Therefore, it may be necessary to make modifications and/or additions to the proposed transportation alternatives once the master-planning process defines the future land use and proposed real estate development project sites. The Mobility Element of the finalized Master Plan will reflect these updates.

1.2 Study Area

The Park Hill Industrial Corridor Short-term Transportation Planning study area is a 2,100-acre urban area south of I-64, between I-264 and I-65 in northwestern Louisville, Jefferson County. More specifically the study area, shown in **Figure 1-1**, is defined by Broadway (US 150) to the north, 22nd Street (US 31W) on the west, Algonquin Parkway (KY 2054) to Winkler Avenue on the south and 8th, 6th, and 3rd Streets on the east. The study area for the forthcoming Master Plan is a 1,400-acre subarea of the Transportation Planning study area and also is presented in Figure 1-1.

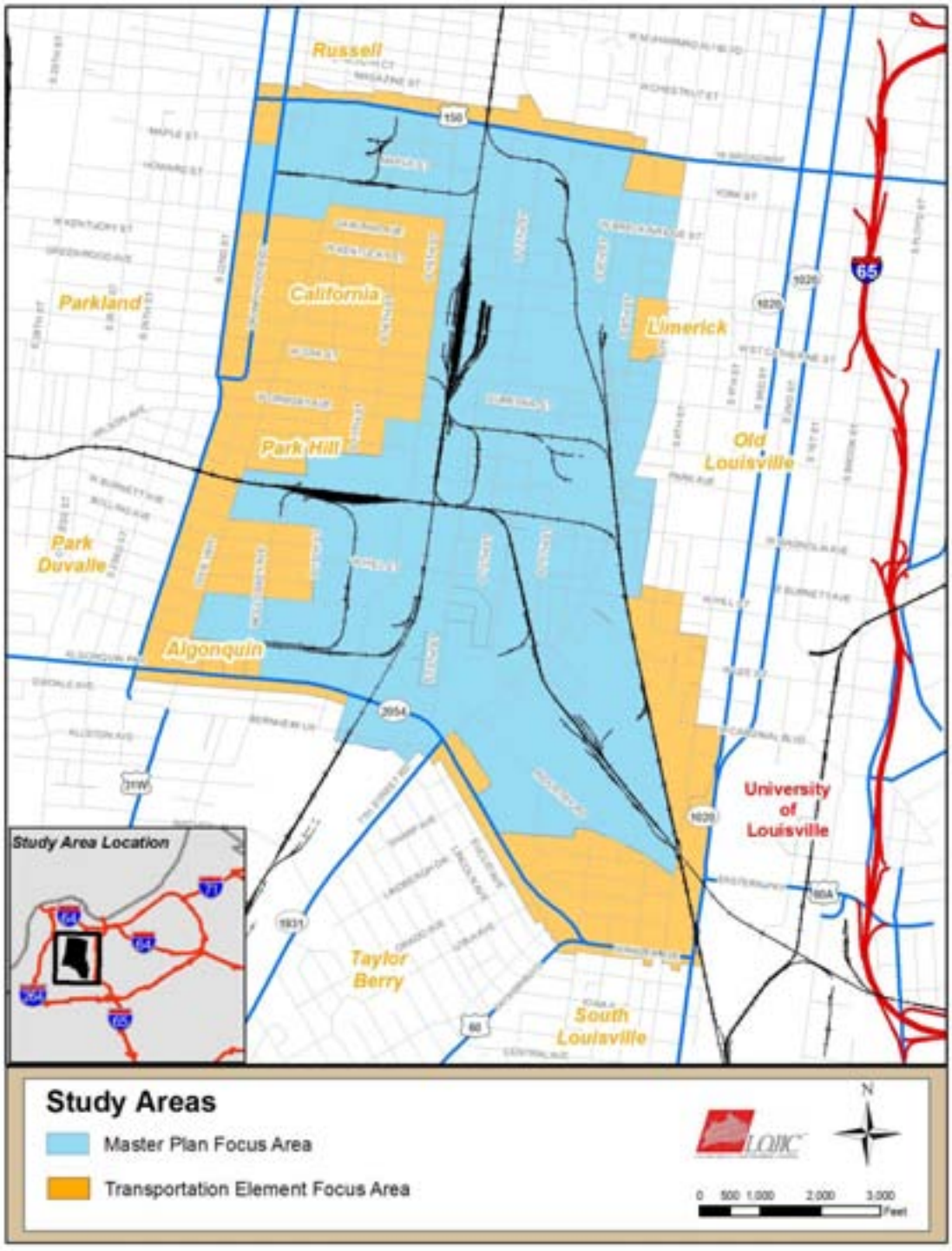


Figure 1-1: Park Hill Industrial Corridor Study Areas

The study area is in an urban setting consisting of predominantly industrial and residential development. About one-half of the area is in residential use, encompassing several neighborhoods. Figure 1-1 shows the major neighborhoods that make up the study area. Much of the existing industrial area is in non-active use, storage or limited use.

The Park Hill Industrial Corridor was once an important manufacturing center in west Louisville, but over the years plant closures or relocations have resulted in losses of jobs and a general decline in population and employment. This area was once home to factories such as Philip Morris, Fawcett Printing Company and Corhart Refractories. Over the past three decades, this area's distressed conditions - characterized by vacant or underutilized industrial sites and high unemployment and poverty rates - have limited its ability to attract new investment[1].

Transportation within the corridor is defined by an urban street grid, with bus transit routes, and three rail lines. The Park Hill Industrial Corridor Short-term Transportation Planning Study is being undertaken to identify solutions to make transportation within the area more conducive to redevelopment and revitalization.

1.3 Purpose and Need

According to the EPA Grant application by the Louisville Jefferson County Metro Government[2], this area has experienced a decline in population as a result of economic restructuring and plant closures. The unemployment rate in the corridor is 16%. More than 80% of the area's residents are African-American, and 47.6% live below the poverty level. The industrial corridor contains abandoned, vacant, or underused brownfield sites. The threat of contamination, whether perceived or real, stifles redevelopment of the area. Assessment of brownfields will promote eventual cleanup and redevelopment, and stimulate private investment in the Park Hill Industrial Corridor. Redevelopment of these sites will help reverse the negative perceptions of the corridor, stimulate employment opportunities, and increase property values and local revenues in the area.

The Park Hill Industrial Corridor presents a unique challenge. This once thriving residential, commercial and industrial area has been in a state of decline, but recent efforts have sought to bring about much needed change. Transportation within the corridor is one area that is in particular need of improvement. The Park Hill Industrial Corridor Short-term Transportation Planning Study is being undertaken to identify solutions to make transportation within the area more conducive to redevelopment and revitalization.

The needs for this study are numerous. Each of the following areas will be considered during the course of study:

Freeway Access: Direct freeway access to the study area is limited. Magnolia Avenue, St. Catherine, and Broadway provide ingress into the study area, and Oak Street provides egress from the study area to I-65 to the east. 9th Street (Roy Wilkins Avenue), 22nd Street and 21st Street provide study area ingress and egress to I-64 to the north. Virginia Avenue and Oak Street provide ingress and egress to I-264 (Shawnee Expressway) to the west. Each of these routes requires travel through residential areas, a less than desirable condition for truck traffic accessing the study area.

[1] The Kentucky Brownfield Program, Kentucky Brownfield Update, Volume 1, Issue 3, Winter 2007.
[2] EPA Brownfields Grant Fact Sheet 2007 (http://earth1.epa.gov/swerosps/bf/07arc/r04_ky_louisvillejefferson.htm).

Street System: The east-west streets through the study area are disconnected due to the reconstructed 9th Street and the rail network. The same can be said for the north-south streets through the study area. North-south travel through the area is limited to the 7th Street / 9th Street corridor, 12th, and 15th Streets. In the east-west direction, Kentucky, Oak, and Hill Street traverse the study area. Kentucky Street has two at-grade rail crossings.

Rail and Freight Movement: The existing rail network in the study area serves as both a benefit and an obstacle. The benefit is obvious- rail access can help attract industry to the area. However, as it currently exists, the system serves as an obstacle to traffic flow.

Land Use: Incompatible land uses exist in the study area. As redevelopment opportunities are explored, the relationship between transportation and land use must be considered. In particular, locating compatible land uses in proximity to not only the necessary transportation facilities, but also compatible uses.

Pedestrians & Bicycles: Some area streets have bicycle lanes, but the bikeway system is not continuous. East-west connectivity is limited (Kentucky Street and Garland Avenue), but there are no north-south facilities that pass completely through the study area.

Transit: The Transit Authority of River City (TARC) currently operates a number of bus routes that serve portions of the study area. However, as the area redevelops, there will be a need to re-evaluate the service provided. In particular, accessibility to current and future jobs and homes should be considered.

Wayfinding: For those unfamiliar with the area, travel can be confusing due to the discontinuities that exist within the street system. Directional signage is limited, and existing land use and the rail network sever the majority of the streets in the area.

2.0 Study Area Land Use

A thorough understanding of both the existing and future land use within the study area is vital to knowing where transportation improvements are currently needed and will be needed as the area redevelops. This section discusses the existing Park Hill Industrial Corridor study area and the currently known developments that are planned for the area.

2.1 Existing Land Use

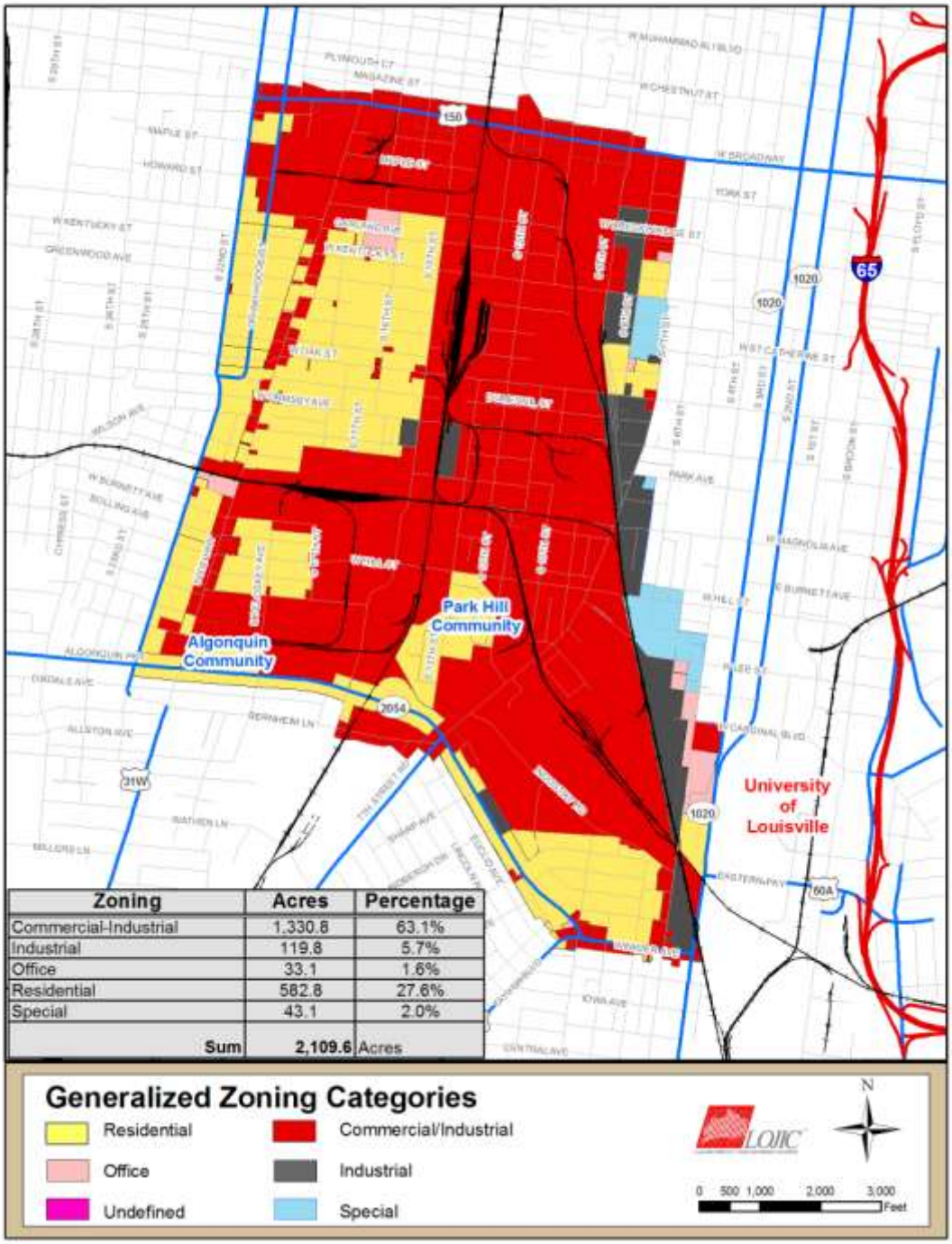
The 2,100 acre Park Hill Industrial Corridor, formerly a manufacturing center, historically consisted of heavy industrial property. A number of these industries were tied to the railroads in the area. As a result of the industrial properties, much of the area consists of potentially contaminated parcels or potential brownfields. Brownfields are sites where expansion, redevelopment, or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.[1]

Today, the corridor's land use consists of a variety of residential, commercial, and industrial land uses. This mix of land uses is not always desirable as non-compatible land uses are found adjacent to one another. For example, pockets of residential development are located near current or former industrial sites, as demonstrated in **Figure 2-1**. Each of these varying lands uses the transportation system in different ways and has different needs.

Figure 2-1: Apartment Building Located Near Industrial Sites

[1] Source: http://www.epa.gov/brownfields/

As shown in **Figure 2-2,** the core of the study area is primarily zoned industrial with residential and other uses on the periphery. This presents some challenges to the transportation system since heavy industrial trucks and vehicles must travel through the residential areas to access the interstate.



Zoning	Acres	Percentage
Commercial-Industrial	1,330.8	63.1%
Industrial	119.8	5.7%
Office	33.1	1.6%
Residential	582.8	27.6%
Special	43.1	2.0%
Sum	2,109.6	Acres

Figure 2-2: Generalized Zoning Map by Major Categories

A description of the zoning categories within the study area is as follows:

- Commercial/Industrial – limited local neighborhood service oriented businesses and light industrial uses located throughout.
- Industrial – consists of many vacant parcels along the CSX rail line on the eastern side of the study area and smaller pockets of current industrial uses.
- Office – associated with the University of Louisville's Belknap Campus and parcels along Kentucky Street and west of 18th Street.
- Residential - west half of study area and southeast corner primarily; small single family homes without driveways and with limited off street parking. Also includes the Park Hill and Algonquin communities.
- Special – Residential neighborhoods within the Old Louisville Historic District.

Nearly two-thirds (63 percent) of the study area is zoned commercial-industrial. Residential zoning makes up approximately 28 percent of the Corridor. The remaining 10 percent consists of parcels zoned as industrial, office, or special.

Table 2-1 presents a summary of the land use within the study corridor, disaggregated by facility type covering the ground.

Table 2-1: Land Use by Category

Land Use	Acres	Percentage
Building	501.7	23.8%
Paved/Unpaved Parking	524.6	24.9%
Paved/Unpaved Driveway	32.5	1.5%
Sidewalk	69.0	3.3%
Street Right-of-Way	420.6	19.9%

Approximately 23.8 percent of the study area is covered with buildings, and 24.9 percent is considered paved or unpaved parking facility. One interesting item to note is that street rights-of-way make up approximately 19.9 percent of the study area.

2.2 Services

A number of important services are located within the study area, as shown in **Figure 2-3**. Five of Louisville Metro's parks are located in the Park Hill Industrial Corridor, including Victory, California, St. Louis, Parkhill, and Stansbury. Central Park, Ben Washer Park, and Memorial Park are within a short distance from the study area.

Three public schools are located in the study area. Wheatley Elementary is located on St. Catherine at 17th Street. Mc Ferran Elementary is located on 7th Street at Industry Road. Cochran Elementary is located on West Gaulbert Avenue at 6th Street.

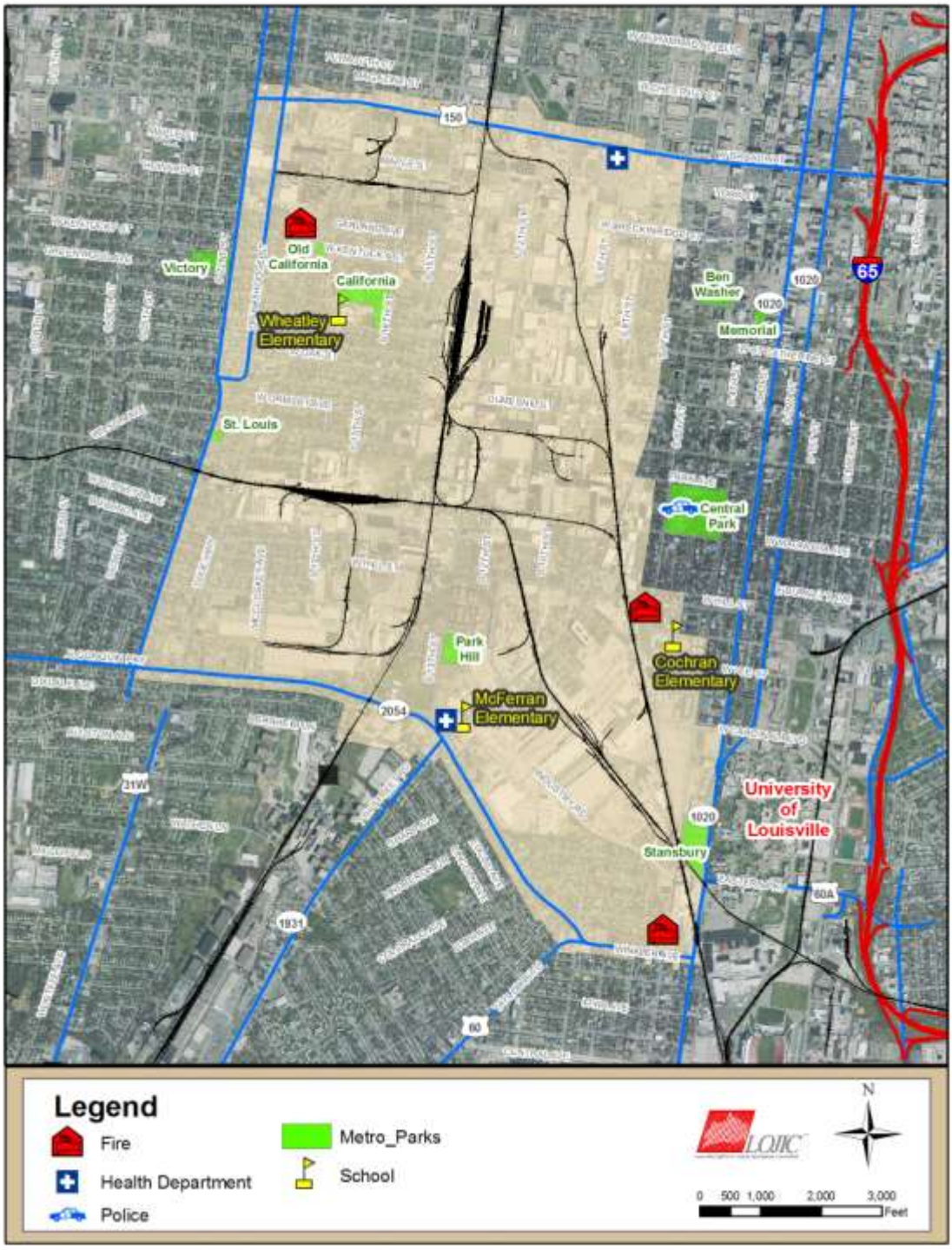


Figure 2-3: Services Located within the Park Hill Study Area

Louisville Metro operates two health clinics in the Park Hill study area. The Bridges of Hope Clinic is located on Algonquin Parkway, just west of 7th Street. The L&N Neighborhood Place is located on West Broadway, west of 9th Street.

2.3 Current and Known Developments

Figure 2-4 depicts four sites that are either currently being marketed for redevelopment, or are currently under development. Descriptions of these sites are as follows:

- New Bridge Crossing, located on the 22-acre former Phillip Morris site near 18th Street and Broadway, is a mixed use development currently underway. Once completed, the development is anticipated to offer residential, commercial, and office space.

- The Vogt Site, located on Ormsby Avenue between 9th and 11th Street, is the former home to a machine company. The former 35-acre manufacturing complex is currently for sale and is considered a high priority for redevelopment by many in the community.

- The Rhodia Site, once home to the chemical company Rhodia, Inc., is currently owned by Louisville Metro. Metro has cleared the site on 7th Street and is currently marketing it for redevelopment.

- The American Standard Site, located on Shipp Street near 7th Street, was home to the bathroom fixture maker American Standard until the early 1990's. There is great potential for redevelopment of the site as it is located in proximity to the University of Louisville and would make an excellent candidate for mixed use residential and commercial catering to the local student population.

Recent news indicates some renewed interest in development in this corridor. In February, The Louisville Business First quoted city officials citing five businesses recently locating, or planning to locate, in the corridor:

> *"City officials point to Consumers Choice Coffee Inc., Pro-Liquitech International Inc. and Great Northern Manufacturing LLC as shining examples of how taking a chance on west Louisville can pay dividends for a growing company."*
>
> *"Also, Hosting.com plans to locate a data center in the corridor, near 12th and West Oak Streets, and Heaven Hill Distilleries Inc., is considering an expansion of its facilities at 17th and West Breckinridge streets in the area."*
>
> *"Each of the businesses has relocated from other parts of town to the Park Hill Corridor during the past couple of years, and each has brought vibrancy to the corridor's blighted neighborhoods."*[2]

As redevelopment opportunities are explored, the relationship between transportation and land use must be considered. In particular, locating compatible land uses in proximity to not only the necessary transportation facilities, but also other compatible uses, will be critical.

[2] Park Hill: Businesses find a land of plenty in the Park Hill Corridor, Business First of Louisville, February 23, 2007.

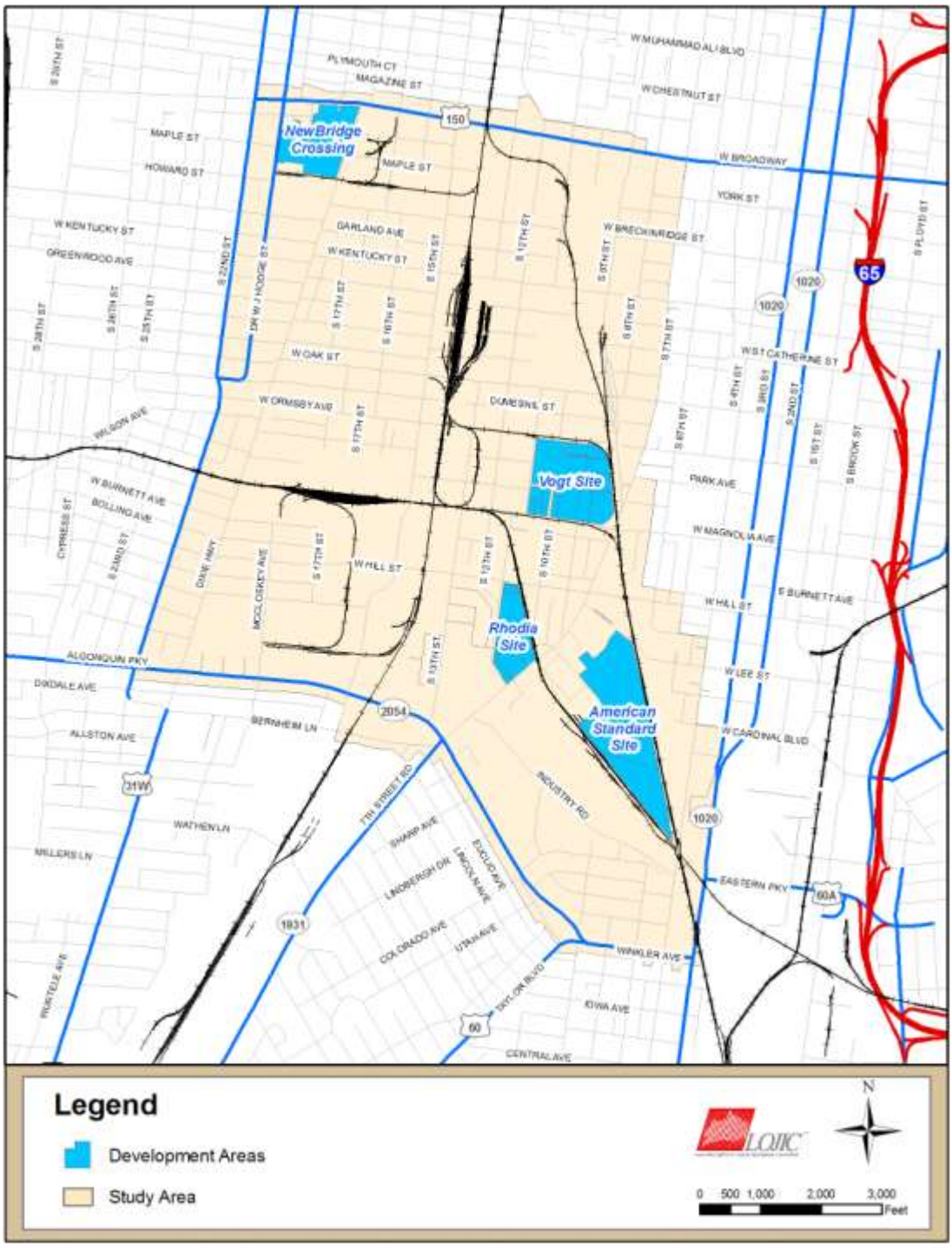


Figure 2-4: Known Redevelopment Sites

3.0 Mobility Needs

To meet the ultimate mobility objectives of the Master Plan, the magnitude of the Park Hill Industrial Corridor's transportation deficiencies must first be established. There is an extensive network of multi-modal systems that serve the Corridor's demand for movement of people and goods. The existing condition of the following transportation systems within and surrounding the study area will be described:

- Roadway Network
- Freeway Access
- Public Transportation
- Pedestrian Facilities
- Bikeways
- Parking Facilities
- Freight Operations

3.1 Roadway Network

The current roadway system consists of an urban grid network extended south from the downtown area. While just to the east of the study area is Louisville's major north-south interstate route (I-65), the majority of the streets are owned and maintained by Louisville Metro. As shown in **Table 3-1**, approximately 88% are city streets while the remaining roadways are either owned by the Kentucky Transportation Cabinet or privately-owned.

Table 3-1: Ownership of Corridor Street Network

Owned by:	Length (miles)	Percent
City (Louisville Metro)	46.1	87.8%
State (Kentucky Transportation Cabinet)	4.9	9.3%
Privately-owned	1.5	2.9%
Total	**52.5**	**100%**

Source: 2007 LOJIC data

Despite the overall grid network, a multitude of streets are disconnected. Further, only two east-west streets and three north-south streets are continuous through the Corridor, including:

- East-West Direction
  - Oak Street
  - Hill Street
- North-South Direction
  - 9th Street / 7th Street
  - 12th Street (using segments of 11th Street)
  - 15th Street (using segments of 16th Street)

These through routes are shown in **Figure 3-1**. Note that particular routes, such as Broadway, are excluded as they are on the boundaries of the Corridor. Connectivity issues can be directly related to the presence of numerous rail lines. Existing rail operations are discussed in **Section 3.7**.

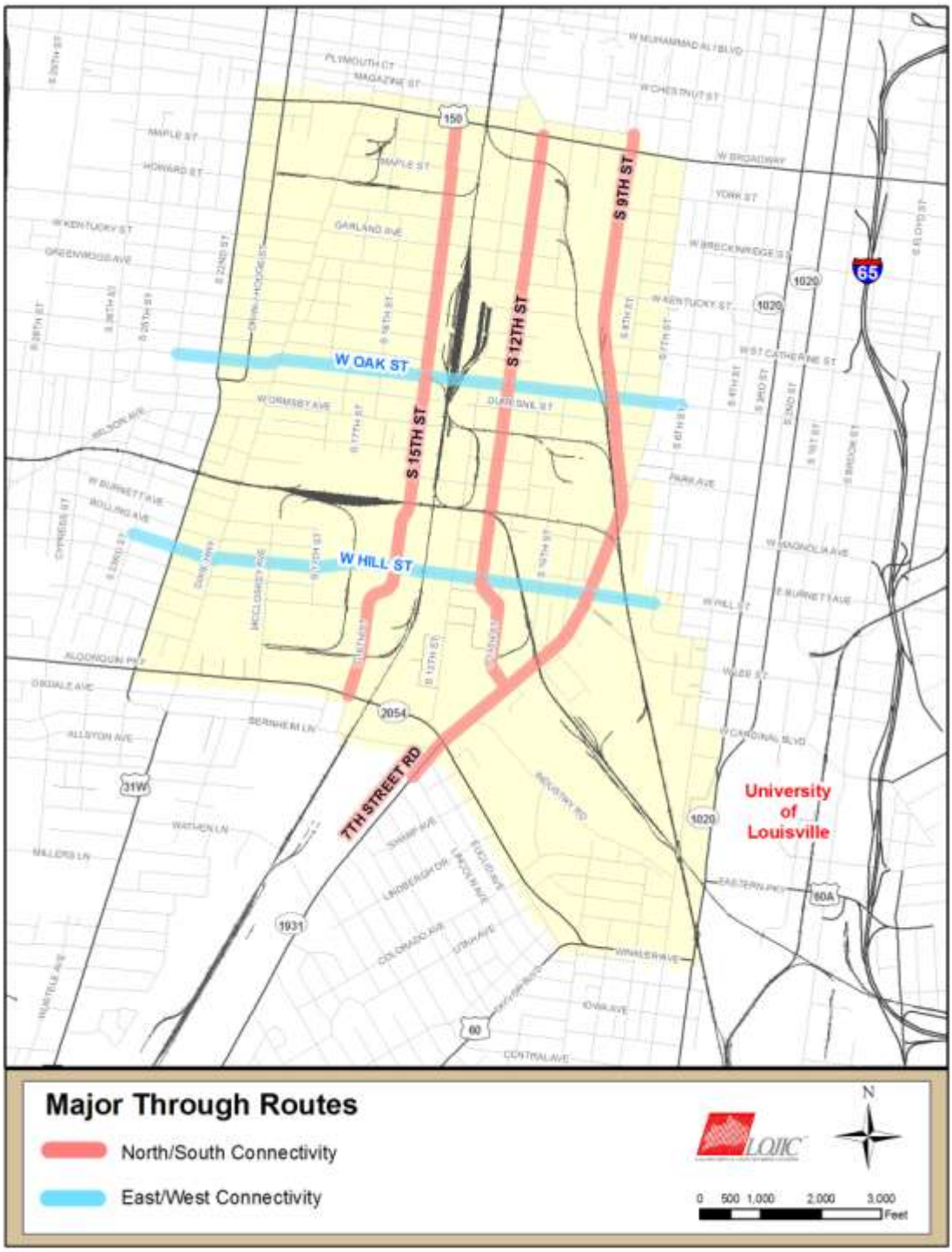


Figure 3-1: Continuous Routes within the Park Hill Industrial Corridor

In the east-west direction, Oak, and Hill Street traverse the study area. Kentucky Street passes through much of the study area, but is currently blocked by a curb west of 15th Street. North-south travel through the area is limited to 7th, 12th, and 15th Streets. 7th Street provides a continuous route in the northbound direction only as the recent reconstruction of 9th Street included reconfiguration of the 7th Street intersection with 9th Street. In order to continue south, traffic on 7th Street is required to connect to 9th Street at Kentucky Street or via the single point urban interchange (SPUI) at Oak Street. Additionally, 12th and 15th Street rely on 11th and 16th Streets respectively to connect to Algonquin on the south.

Roadways within the Park Hill Industrial Corridor experience relatively low average daily traffic (ADT) volumes when compared to surrounding, more continuous routes. **Figure 3-2** illustrates the traffic volumes on major roadways within and surrounding the study area. Traffic seems to disperse within the internal roadway network. The heaviest-traveled routes and their corresponding ADTs are listed in **Table 3-2**.

Table 3-2: Major Roadways and Average Daily Traffic (ADT) Volumes

Roadway	Location	ADT
East-West		
Broadway (US 150)	West of 22nd Street	15,900
	East of 9th Street	22,500
Kentucky Street	West of 9th Street	5,030
Oak Street	West of 9th Street	3,530
	East of 9th Street	8,840
Hill Street	East & West of 7th Street	12,400
Algonquin Parkway (KY 2054)	East of 7th Street	10,500
	West of 7th Street	12,900
North-South		
22nd Street (US 31W)	North of Virginia Avenue	5,980
	South of Virginia Avenue	6,810
Dixie Highway	North of Virginia Avenue	9,520
	South of Virginia Avenue	14,500
4th Street	South of Oak Street	8,860
7th Street (KY 1931)	North of 9th Street	2,970
	South of 9th Street	16,900
9th Street	North of 7th Street	16,300

Source: Kentucky Transportation Cabinet, 2006

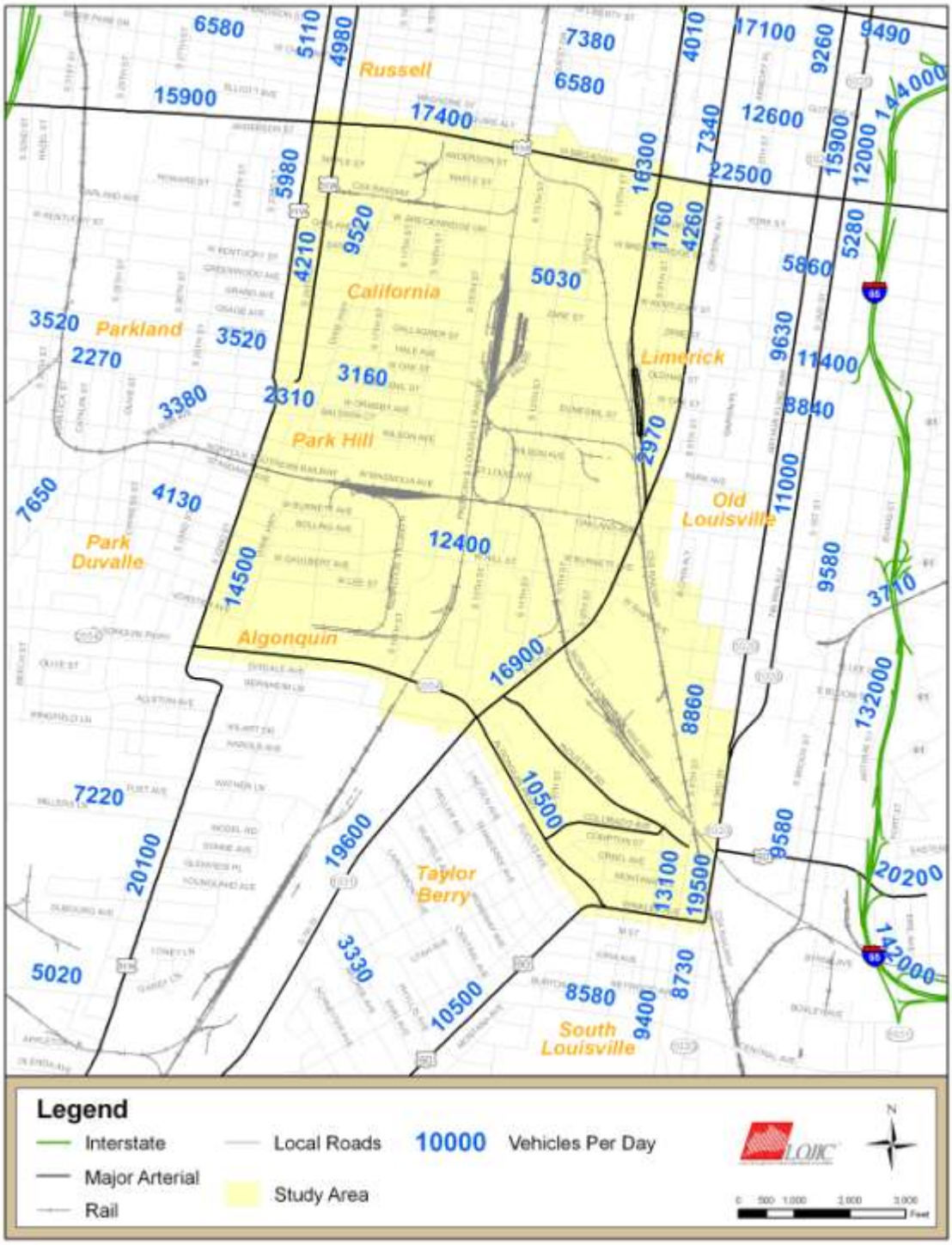


Figure 3-2: Average Daily Traffic (ADT) Volumes
Source: Kentucky Transportation Cabinet, 2006

For those unfamiliar with the area, travel is confusing due to the discontinuities that exist within the street system. As mentioned previously, existing land use and the rail network sever the majority of the streets in the area. Directional or wayfinding signage is limited, particularly guide signs directing motorists to one of the nearby freeways. Signs directing motorists to the Interstate system are typically found only in the vicinity of interchanges.

3.2 Freeway Access

The Corridor is surrounded by three major interstates, I-65 (Dr. Martin Luther King Jr. Expressway) to the east, I-264 (Shawnee Expressway) to the west, and I-64 to the north. Direct access to these facilities is limited. The following streets, shown in **Figure 3-3**, provide existing connections between Louisville's interstate system and the Corridor:

- I-65
  - Magnolia Avenue (ingress only)
  - St. Catherine Street (ingress only)
  - Broadway (ingress only)
  - Oak Street (egress only)
- I-64
  - 9th Street (Roy Wilkins Avenue)
  - 22nd Street
  - 21st Street
- I-264
  - Virginia Avenue/Oak Street

Figure 3-3: Streets with Direct Freeway Access

Most of these interstate interchanges are either partial or split over several locations to provide for all traffic movements due to the urban setting and one-way street network. The non-traditional layout of these interchanges pose safety issues for those unfamiliar with the area. Thus, signage for facilitating freeway access to the interstate system is critical. Unfortunately, the current interstate signage within the Park Hill Industrial Corridor is very limited. **Figure 3-4** shows one example of a nearly hidden location for an interstate on-ramp. Note this location is outside the Park Hill Corridor.

Figure 3-4: Magnolia Avenue approaching the I-65 southbound on-ramp

Recently, the Kentucky Transportation Cabinet (KYTC) and Louisville Metro Government conducted a scoping study seeking improvements to better facilitate traffic flow, safety, and access associated with ramps along I-65 south of downtown Louisville. A recommended conceptual alternative was developed that included significant improvements to the I-65 ramps, but these recommendations are not currently included in the KYTC Six Year Highway Plan. It was noted in the report, however, that the recommended concepts should be further explored during preliminary design phases.

3.3 Public Transportation

Since 1974 the Transit Authority of River City (TARC) has provided bus service in the Louisville metropolitan area. The current TARC bus system serves the entire Greater Louisville urbanized area with express services extending beyond the existing urban limits. TARC's service area includes a five-county area consisting of Clark and Floyd counties in Indiana and Jefferson, Oldham, and Bullitt counties in Kentucky. TARC currently operates over 50 routes in its five-county service area, with the majority of routes operating exclusively within Jefferson County. Services in adjacent counties feed into Jefferson County. Average weekday ridership on the TARC bus system is approximately 52,000.

TARC's bus system operates seven days a week, including holidays. The hours of revenue service operation for the majority of bus routes is from 5:30 A.M. to 9:00 P.M. on weekdays, with minimal

service on a few routes from as early as 4:00 A.M. to as late as 12:30 A.M. Weekend and holidays service for the majority of routes is from 6:00 A.M. to 9:00 P.M. However, a few routes start as early as 5:00 A.M. and run as late as 12:00 A.M. Headways for bus operations range from 5 to 30 minutes during the A.M. and P.M. peak periods, and from 20 to 60 minutes during off-peak periods.

TARC currently operates a number of bus routes that serve portions of the study area. However, as the area redevelops, there will be a need to re-evaluate the service provided. In particular, accessibility to current and future jobs and homes should be considered.

Statistics demonstrate the profound demand for public transportation within the Corridor. The strong transit ridership is attributable to the high transit dependent population, as shown in **Table 3-3**.

Table 3-3: Transit Dependent Populations

	Transit Dependent Populations								
	Total Households	Zero Vehicle Households		Population 5-17 Years of Age		Population 65 Years of Age or Older		Disabled Population	
Jefferson County	287,012	32,402	11.3%	121,633	17.5%	93,539	13.5%	92,592	13.3%
Park Hill Study Area	5,409	2,282	42.2%	2,554	20.5%	1,453	11.7%	2,375	19.0%

Source: U.S. Census Bureau, 2000 Census Data

It is clear that much of the workforce within the study area is dependent on public transportation. Of the total workforce within the Park Hill Industrial Corridor, approximately 24% use public transportation to commute to work. This compares to 3% of Jefferson County commuters that use public transportation.

The Transit Authority of River City (TARC) currently provides twelve bus routes serving portions of the Corridor. These routes are shown in **Figure 3-5**. Collectively, these routes serve approximately 25,000 weekday riders, which represent 48% of TARC's total daily ridership. The top three utilized routes in the TARC system serve portions of the Corridor.

Despite the high demand, TARC has minimal accommodations for its riders within the Park Hill Industrial Corridor. Bus stops are simply marked along sidewalks with bus stop signs. Shelters and benches do not exist at most of the locations within the Corridor.

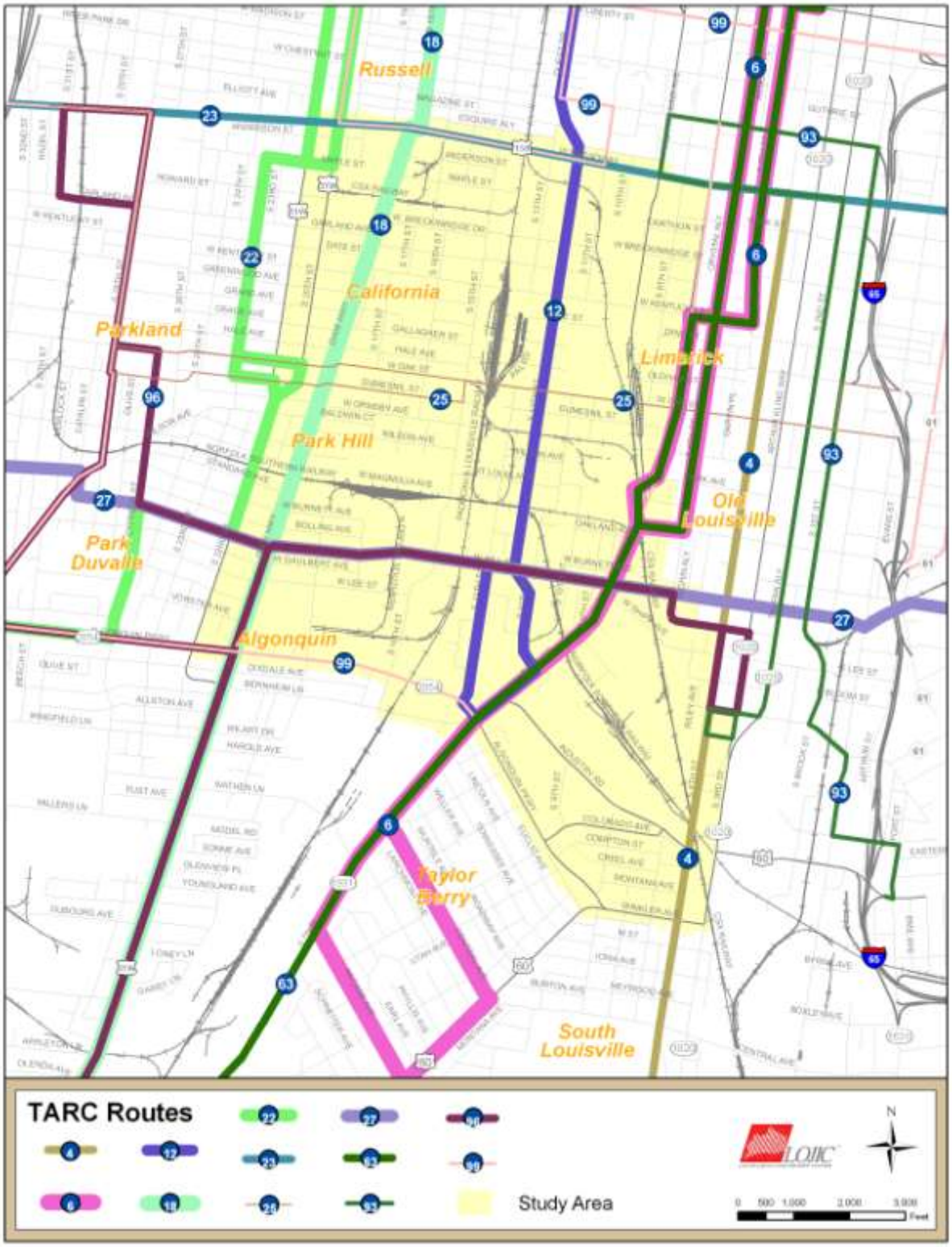


Figure 3-5: Existing TARC routes within the Park Hill Industrial Corridor

3.4 Pedestrian Facilities

In addition to the high usage of public transportation, over four times as many commuters within the Park Hill Industrial Corridor walk to their place of work as within Jefferson County as a whole. Conventional facilities for pedestrians are well established throughout the study area. Sidewalks provide access to homes, transit stops, parks, schools, and many other important destinations for residential areas. Over 110 miles of sidewalk are defined in the LOJIC database (based on an assumed average sidewalk width of 5 feet.) There are ample locations to cross streets with some degree of safety, being in an urban area with the numerous signalized and stop-controlled intersections. Most signalized intersections include handicap-accessible ramps and pedestrian signals.

3.5 Bikeways

A comprehensive bikeway system does not exist within the Park Hill Industrial Corridor. Instead, current bicycle facilities include some signed bike routes and designated bike lanes. There are no designated off-street bike paths or trails. It appears that efforts to connect bike facilities within and surrounding the Corridor have been made. **Figure 3-6** displays the current bicycle facilities located within and surrounding the study area.

Signed bike routes are sparse within the Corridor. One continuous east-west route exists that primarily utilizes Kentucky Street. The signed route detours off Kentucky Street for a few blocks to avoid the wide rail crossing between 13th Street and 15th Street. There are no continuous north-south routes within the Corridor. A section of 13th Street between Garland Avenue and Magazine Street is signed as a bike route. In the southeast corner of the Corridor, a few streets are signed for bicycles to provide safer accommodations for bicyclists around the University of Louisville campus.

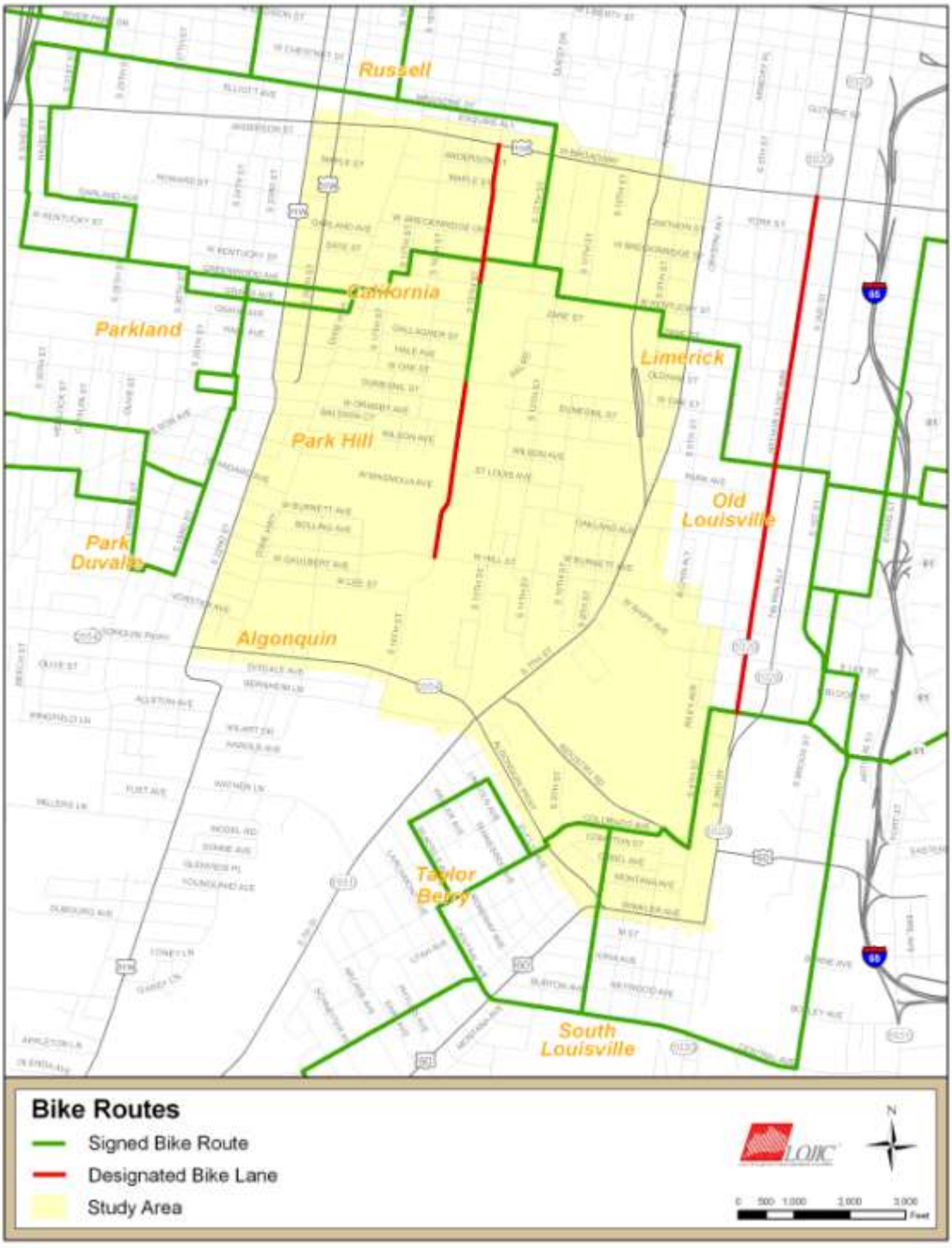


Figure 3-6: Existing Bicycle Facilities within the Park Hill Industrial Corridor

The only designated bike lanes that currently exist are along two sections of 15th Street. Signage and striping define the lanes for both directions of the street. The bike lanes along 15th Street are shown in **Figure 3-7**.

Figure 3-7: Dedicated Bike Lanes along 15th Street

Additional bike facilities are currently being planned for the Corridor. As part of the Olmsted Parkways Study, the first series of improvements involves new bike lanes along Algonquin Parkway and connecting Eastern Parkway to Algonquin Parkway with a series of bicycle lanes and paths running through residential streets and neighborhoods. This would also include restriping Fourth Street between Cardinal Boulevard and Industry Road as a three lane facility (Fourth Street is currently four lanes) so that striped bicycle lanes could be added. A second planned improvement includes exploring opportunities for an on or off-street bicycle path along Eastern Parkway through the University of Louisville.

3.6 Parking Facilities

No public or private parking garage facilities exist within the study area. However, of the roughly 2,100 acres that make up the Park Hill Industrial Corridor, approximately 20% of the land use is designated as off-street paved parking area and 5% as off-street unpaved parking.

Most areas in the western portion of the Corridor include on-street parking to accommodate dense residential housing. While most residents have access to their property by using rear alleys, on-street parking is permitted and heavily utilized on both sides of the streets. The parking lanes in this area are not striped.

Another location with on-street parking is Dixie Highway. A mix of residences and businesses occupy the adjacent land along the street. Vehicles are frequently parked on both sides of the street, despite

the existing parking that is located behind the buildings. **Figure 3-8** displays a parked vehicle (circled in red) along Dixie Highway partially on the sidewalk between utility poles.

Figure 3-8: Undefined Parking along Dixie Highway

3.7 Freight Operations

Freight operations within the Corridor consist of sporadic truck operations and rail freight. Numerous businesses rely on trucking operations, while the majority of rail activity is pass-through traffic.

Truck Operations - Trucks use a variety of streets to access the Park Hill Industrial Corridor. As designated truck routes are limited, trucks are often forced to find their own route. For a truck that is unfamiliar with the Corridor, this can be extremely difficult because of tight turning radii at intersections and low bridge clearances. In particular, local residents are all too familiar with trucks getting stuck under the 3rd Street railroad underpass south of Eastern Parkway. This has also been an issue east of the River Park interchange from I-264 (Shawnee Expressway) northwest of the study area.

Commercial traffic is dispersed over numerous streets within and adjacent to the Corridor. Most streets that accommodate some truck traffic experience between four and seven percent trucks over the course of a day. This can be considered an advantage with respect to Park Hill as truck traffic is not focused on a specific corridor. Most routes that are currently used require some travel through residential neighborhoods.

One of the few designated truck routes providing access to the Corridor from I-65 travels along Cardinal Boulevard through the University of Louisville campus and then along 4th Street through part of the Old

Louisville historic neighborhood. This route is not ideal for trucks because of the heavy pedestrian movements and narrow streets with on-street parking.

The 9th Street extension, completed in 2003, provides improved access to I-64 to the north. This extension connected 9th Street to the existing 7th Street corridor north of Hill Street, created a new interchange at Oak Street, and signalized the intersection with Kentucky Street. However, the reconstructed portion of the facility is currently underutilized as a trucking route. I-65 to the east tends to be closer to the majority of the Park Hill Industrial Corridor than I-64.

Rail Operations - Four rail companies provide service through Park Hill, and the currently active rail lines are shown in **Figure 3-9**. There is a total of 31.1 miles of track within the Corridor. Two large rail yards are also located within the Corridor; the Norfolk Southern yard is located north of Hill Street and west of 15th Street and the Paducah and Louisville yard is between Oak and Kentucky Street east of 15th Street.

As mentioned previously, a number of streets within the Corridor are severed by the numerous rail lines. However, numerous streets have rail crossings (at-grade or grade-separated) to maintain access. There are a total of 44 rail crossings, 27 of which are at-grade crossings. The locations of these rail crossings are shown in **Figure 3-9**. Approximately half of the at-grade crossings have flashing lights and less than one-on-five have active crossing gates.

Through discussions with some of the rail line operators, it has been found that trains may block roadways within the Corridor for up to five minutes, and on rare occurrences, as long as 20 minutes. This has been a particular issue with the Kentucky Street rail crossing between 12th and 15th Street. This location has 10 rail lines as it is at the northern end of the Paducah and Louisville yard.

Figure 3-9: Active Rail Lines within the Park Hill Industrial Corridor

4.0 Mobility Elements

The following sections discuss the transportation goals and objectives for the Park Hill Industrial Corridor Short-term Transportation Planning Study. These goals and objectives serve two purposes. First, they have been used to develop general recommendations for transportation enhancements, which are found in Sections 4.2 through 4.8. Second, the goals and objectives provided guidance for the development of specific potential capital improvement projects, discussed in detail in Chapter 5.

4.1 Transportation Goals and Objectives

Louisville Metro will coordinate a more comprehensive Master Plan for the Park Hill Industrial Corridor beginning some time in 2008. The focus area for the Master Plan will be somewhat smaller than that for the Short-term Transportation Planning Study, but the recommendations from the Master Plan will likely have a tremendous impact on the area's transportation system.

With that in mind, consideration must be given to the scope of and timeline for suggested changes in land use within the Park Hill corridor. The relationship between land use and transportation is often convoluted in that needed transportation improvements come after the land use changes are implemented. With the environmental concerns related to the brownfields within the study area, phasing of improvements is critical to ensure that the transportation system will be capable of accommodating the multimodal traffic (including vehicular, truck, transit, pedestrian, and bicycle) that will be generated.

The primary goal of the transportation component of the master planning process is to accommodate the transportation needs associated with the proposed land use changes. The timing of the Master Plan update is such that the anticipated land use changes are currently unknown; however, the need for area transportation improvements also includes overcoming existing deficiencies that serve as obstacles to mobility and area redevelopment. Thus, transportation improvements can also be used as a catalyst to attract development to the area.

Draft Transportation Objectives - An underlying objective of previous work on the Park Hill Industrial Corridor Short-term Transportation Planning Study was to determine where deficiencies exist within the area transportation system so that improvement options could be developed. The development of potential improvements could then focus on issues that will foster redevelopment of the area by improving access and mobility. To that end, a list of objectives was developed to bring guidance and direction to the process. These objectives include the following:

- **Promote connectivity:**

  To the surrounding neighborhoods: The Park Hill Industrial Corridor is surrounded on all sides by residential neighborhoods, but portions of the street system within the study area serve as a barrier to travel between those neighborhoods. Providing improved connections through Park Hill will serve a number of purposes for the surrounding neighborhoods, such as improving accessibility to jobs and services, decreasing travel costs, and contributing to heightened community cohesion.

  To the freeway system: The Park Hill Industrial Corridor is surrounded by the Interstate system, but accessibility to the freeway network is limited both in terms of the number of access points and the quality of the access provided. Opportunities to provide increased

accessibility to the freeway system should be explored to increase the attractiveness of the area from a regional perspective.

To the University of Louisville: The University of Louisville's Belknap Campus is a growing, vibrant part of the City. As the University continues to expand, its reach will extend farther into the surrounding communities and provide additional opportunities for redevelopment and positive growth. The Park Hill Industrial Corridor presents an ideal location for expansion from the University of Louisville, either in the form of off-campus residential or commercial development to accommodate student needs, or conversion of the relatively inexpensive land into much-needed campus office or classroom space. Improving the connections between Park Hill and the University will make such growth more attractive.

To Louisville International Airport: As a UPS hub, Louisville International Airport is recognized as the third busiest cargo airport in North America. In addition, the airport serves more than 4.5 million passengers each year. Improved connectivity to the airport would make the Park Hill corridor more attractive to business.

To the Jefferson Riverport: The Jefferson Riverport is located southwest of the Park Hill corridor, and is approximately 10 to 12 days transit time (by barge) from the Gulf of Mexico. A number of businesses have located within the vicinity of the Riverport.

- **Provide enhanced circulation opportunities within the Park Hill Industrial Corridor**

  Much attention has been given to the disconnected street system and limited transit facilities located within the Park Hill corridor. Reconnecting streets or establishing new bicycle, pedestrian, or transit corridors would serve the needs of residents and commuters alike.

- **Enhance the multimodal transportation system, including:**

  Transit system: Provide additional public transportation opportunities for the heavily transit-dependent population within the study area and provide improved accessibility to employment opportunities for those living outside the corridor. Enhanced transit shelters or transit hubs should be given consideration to improve connections between routes and neighborhoods.

  Bicycle and pedestrian facilities: Seek opportunities to enhance the existing bikeway network by expanding or providing improved connections between existing routes.

  Embrace the "Complete Street" concept: Where appropriate, public streets should be designed to accommodate all potential users. That includes accommodations for transit users, pedestrians, and bicyclists in addition to automobiles. Sidewalks are currently found throughout the Park Hill corridor, but bicycle facilities are limited. It is important to consider the context into which each street fits inside the study area as accommodations for all users is not necessarily intended for certain facilities.

- **Provide signed truck routes, where appropriate**

  Currently, companies that rely on trucking operations are able to designate their own truck routes based on their location. Trucks destined for I-64 to the north have the options of using 9th Street or 21st/22nd Street; if heading to I-264 to the west or south, a number of options exist, such as Virginia/Oak Street, Algonquin Parkway, and Dumesnil Street for travel to/from the west and 3rd Street and 7th Street provide access to the south. The majority of these routes travel through residential areas. Having this number of opportunities ensures that no one route carries a significantly higher percentage of trucks than another. Access to I-65 is an issue, however, as most all routes pass through either the University of Louisville or the Old Louisville Historic District. Options to provide improved truck access to I-65 while avoiding these resources should be explored.

- **Manage land access so as to preserve capacity and safety for the future**

  Access management guidelines should be developed as the land use picture is developed to ensure that best practices are followed. This will ensure that land access is provided in a manner that is responsible and safe.

- **Increase quality of life within the surrounding neighborhoods**

  Improved mobility can certainly improve quality of life as citizens have better access to jobs, services, and their community. Enhanced transportation opportunities that serve all citizens, including motorists and non-motorists alike, can lead to healthier, more vibrant neighborhoods.

- **Limit opportunities for vehicle-rail interaction**

  The existing rail infrastructure is a tremendous boon for the Park Hill corridor. However, a number of rail crossings are at-grade and provide the potential for incidents to occur. Where possible, existing at-grade rail crossings should be grade separated to eliminate the potential for such incidents to occur. Where grade separations are not practical, active warning systems (i.e. flashing warning lights and rail gates) should be considered for any grade crossings open to public traffic.

- **Promote the development of intermodal facilities**

  In the strictest sense, “intermodal” typically refers to freight shipments as they relate to transit by both rail and truck. The establishment of dedicated facilities to load/off-load cargo to rail from truck could lead to reduced shipping costs for local businesses and may decrease the need for future rail lines to serve redeveloped areas. Rather than relying on a new rail spur, shipments could be moved by truck to nearby rail yards where they are loaded onto rail in the form of trailer on flat car (TOFC) or container on flat car (COFC.) In addition to freight, intermodal could be applied to future public transportation facilities within the area. This could apply to a transit center where passengers transfer between bus and advanced rapid transit.

- **Partner with developers and businesses to promote development opportunities in the Park Hill Industrial Corridor**

  Working with would-be developers and potential business owners within the Park Hill corridor is perhaps the simplest way to ensure the transportation needs of future development are met.

Once the Master Plan process is underway and a vision for future land use becomes clearer, these objectives can provide guidance and direction in scoping improvements that should be considered for implementation within and surrounding the Park Hill Industrial Corridor. In general terms, they have been used to develop general, area-wide recommendations which are detailed in the following sections.

4.2 Roadway Network

Roads are an important public resource and are costly to build, improve and maintain. It is vital to protect and manage the roadway system to ensure both proper traffic flow and economic development in the area. Several general roadway recommendations to improve traffic circulation include:

Improve connectivity – The existing roadway network in the Park Hill Corridor is an extension of the urban grid network of downtown Louisville and as discussed earlier is hampered by connectivity issues. Efforts should be made through either public investment or private developments to reestablish this grid pattern and resolve the connectivity issues in the study area. However, as new streets are constructed, they do not necessarily need to conform to a straight east west or north south pattern. Where appropriate, streets can be curving, linking existing or proposed land use features, as shown in **Figure 4-1**.

The illustration presents a concept for dense, mixed-use development with a mix of urban and suburban development, with the preservation of ample green space. Curving minor streets are introduced where necessary to avoid direct impacts to existing structures or to better utilize existing parcel space. Buildings with street frontage are combined with facilities off the street, thereby better using the existing space. Parcel access from major streets is limited, with most access points being located on minor streets so as to not interfere with traffic flow on the major streets. Bicycle lanes and sidewalks are provided to accommodate non-motorized travel, where appropriate. Sidewalks are present on all streets, but bicycle lanes are found only on routes that can safely accommodate the additional width necessary.

While not all these concepts apply to the Park Hill that exists today, the possibility of future land use transitioning to new and better uses may result in a new way of thinking of the street system in the area. Concepts such as these could be introduced into the transportation system to not only make it more efficient, but to also make it more visually appealing.

Convert one way streets to two way streets – There are several streets within the study area that are one way. However, only portions of these streets are one way, while the majority of the street through the study area is two way. For example, Kentucky Street is only one way between 18th Street and 26th Street. These short segments of one way streets and a true lack of a one way paired couplet system, lead to connectivity issues as well as being confusing to motorists. Normally a one way street system is implemented to improve traffic capacity. However, traffic volumes in the study area do not

warrant one way streets. Converting one way streets to two way streets can both improve circulation and promote economic development by increasing exposure.

Promote Hierarchy of Streets – Streets and roads serve two primary functions – mobility (movement of traffic) and access to adjoining land. Different functional classes provide varying levels of mobility and access. An efficient street system adheres to a functional hierarchy. Therefore, guidelines for each functional classification of street should be developed. Functional classification is the process by which streets are grouped according to their function. The three general types of streets are:

- Arterials – provides the highest level of mobility and lowest level of land access
- Collectors – provides less traffic mobility and may still contain some level of access control
- Local – provides access to land use with little or no focus on through movement

Figure 4-1: Concept for Street Connectivity and Access

In general, arterial streets are wider, carry higher traffic volumes, and experience higher travel speeds. Access to arterials in the area, such as Oak, 9th, and Hill Street should be controlled. Access to properties should be encouraged to be located on collector or local streets as opposed to along the arterials.

Access Management – An access management plan should be implemented in the study area. Access management is the systematic control of the location, design, and operation of driveways, median openings, and street connections to a roadway. The purpose of access management is to

provide access to land development in a manner that preserves the safety and efficiency of the transportation system. By allowing closely spaced curb cuts, median openings, driveways near major intersections, and poorly coordinated traffic signals, many areas are placing a heavy burden on the roadway which leads to unsafe and congested conditions. By managing access, government agencies can extend the life of these roads, improve traffic safety, decrease congestion, improve traffic flow, and improve air quality, which helps preserve long-term property values and provides an improved quality of life.

Specific elements of access management that should be addressed in the study area include:

Corner clearance: Kentucky's Highway Design Manual does provide guidance on the preservation of corner clearance. It defines corner clearance to be the distance between an intersection and the nearest driveway. The Design Manual identifies four types of intersection corner clearance, as shown in **Figure 4-2**. The four types of corner clearance are:

A. Upstream on the major roadway
B. Downstream on the major roadway
C. Approach side on the minor roadway
D. Departure side on the minor roadway

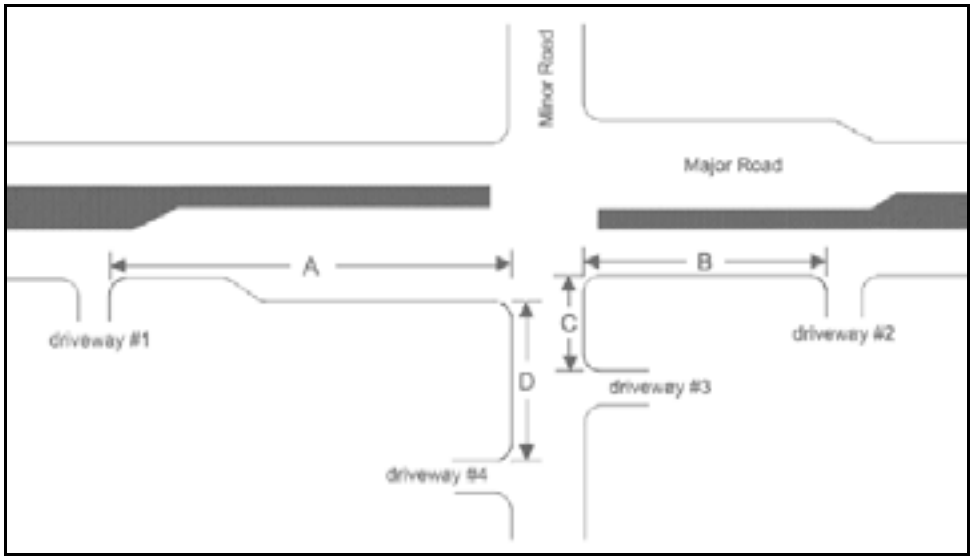


Figure 4-2: Four Types of Corner Clearance

Minimum corner clearance on minor streets should not be less than 150 feet. In extreme cases, a right-in/right-out entrance may be considered on the minor roadway within (less than) 150 feet of the major street, provided that a non-traversable median is constructed to prevent left turns.

Driveway spacing, location, and design: The Design Manual states that driveway location should consider the relation to intersection sight distance and appropriate spacing from other intersections. Access points on both sides of the roadway should be aligned directly opposite one another where possible. Driveways should not be located within the functional area of an intersection and should be designed to accommodate safe and efficient ingress and egress to

adjacent properties. As part of highway design projects, designers are encouraged to eliminate driveways that are not necessary for reasonable property access, combine driveways, provide cross access between properties, and maximize spacing between driveways.

For divided roadways, each side of the roadway can be considered independently with regard to driveway spacing. If access points are offset, right-in/right-out entrances shall be utilized. Median openings allowing full access must consider driveway spacing on both sides of the road. Crossroads are allowed only when spacing requirements can be met for both sides of the road.

Local Agency Involvement: Sometimes there exist significant differences in access management practices at the State and local levels. While access permits to State highways are granted by the Transportation Cabinet, sometimes land use decisions made by local governmental agencies are in conflict with the Cabinet's access management regulations. For example, a local agency may grant a request for rezoning to an applicant desiring to build a shopping center and the request would include an increase to the number of driveways, but this would violate the State's minimum spacing requirements. Another example would be where a local agency grants access from a parcel to a side street, but the driveway intersection with the side street violates the State's corner clearance minimum requirement. In spite of a growing public awareness about access management, these hypothetical scenarios can and do happen today.

Turning lanes: The Design Manual recognizes the usefulness of turning lanes in segregating turning traffic from through traffic. While not necessarily appropriate within most of the Park Hill Industrial Corridor, the Manual directs designers to consider providing for indirect turns through "jug handles" and indirect U-turns in addition to left-turn lanes and right-turn lanes.

Signage and Aesthetics - Signing and landscaping can do more than just enhance an area's aesthetic appeal. There are several techniques that communities can use to not only help beautify a roadway corridor, but to improve traffic flow, safety and access to adjoining properties. A few techniques that may be considered in the Park Hill Corridor are listed below.

Gateways: A gateway is a landmark that indicates an arrival or departure to or from a specified area. Gateways are usually very aesthetically pleasing and provide a marker for a special area or place. Gateways also tell motorists that they are entering somewhere new and that speed must be reduced. They identify a different driving environment. Gateways can be a combination of street narrowing, medians, signing, archways, or other identifiable features.

Landscaping: Landscaping can provide motorists with visual cues to access points. More clearly defined intersections and curb cuts along the roadway improve ingress and egress movement, thereby lessening access movement impact on the through traffic flow. Landscaping can also help make the perceived visual width of the highway seem lees than it actually is, which in turn can help reduce vehicle speeds. Landscaping makes for a more natural and pleasing environment for the users. It also provides a separation between the street and the pedestrian circulation areas. Landscaping within medians provides a green and natural break from a continuous sea of pavement.

Street Lighting: Street lighting can have a very positive effect on the character of a corridor. The careful placement and choice of light type can provide a beautiful mix of light and shadow. Up-

lighting of street trees can make a very stimulating evening experience. A correctly designed lighting layout also provides increased security and a safer environment for both the motorist and the pedestrian.

Signing: A wayfinding signage plan should be developed for the Park Hill Industrial Corridor. These signs would direct vehicles not only to important transportation features such as the Interstate system, but also important community features such as parks, schools, and community centers. Signage can be a low cost interim solution to the street connectivity issues in the corridor by directing users to utilize the proper streets. Wayfinding can also be utilized to promote economic development by providing direct signage to larger developments in the area.

4.3 Freeway Access

The Park Hill Study Area is surrounded by interstate facilities, including I-264 (Shawnee Expressway) to the west, I-64 to the north and I-65 to the east, access to the interstate system is potentially an asset to this corridor. However, direct freeway access to the study area is limited and where available, hindered by substandard or split configurations of some interchanges. Freeway access should be directed to the arterial streets in the area.

There are three east/west routes that traverse that corridor that have the potential to be the primary route for direct truck access to the freeways. In the northern and central portion of the study area, both Oak and W. Kentucky streets are relatively close to existing rail operations. Hill Street provides access in the southern portion.

Oak Street is a continuous route and contains interchanges on both I-264 and I-65. However, west of 16th Street, Oak is a one way street in the westbound direction. Converting Oak Street to two-way traffic flow to create freeway access throughout the study area should be explored. There is also a substandard railroad underpass east of 15th Street that needs to be raised to improve vertical clearance.

Kentucky Street has offset intersections at both 18th Street and 26th Street and does not contain a direct interchange with I-65 or I-264. Access to I-65 is easily obtained through St. Catherine Street. Portions of Kentucky Street are also one way, limiting access.

Hill Street, in the southern portion of the study area, is an arterial that is continuous from Wilson Avenue east. Hill Street does not contain direct access to I-65 but does allow access through the interstate ramps at Arthur Street and Preston Street near the northern portion of the University of Louisville's Belknap campus. Opportunities to improve the I-65 ramps or create new access points should be considered. Hill Street contains fewer residential properties than Oak Street and Kentucky Street and serves as a southern boundary of the Old Louisville Historic District, making it a more suitable location to direct heavy truck traffic.

There are fewer opportunities for direct freeway access to I-64 with the north/south routes. 9th Street and 22nd Street provide direct access to I-64 to the north. Both these streets are major arterials and are located on the periphery of the study area. Within the center of the study area, 15th Street and 18th Street (Dixie Highway) are arterials that provide access to Broadway, which links to I-65, as well as I-64 via 9th Street or 22nd Street. Opportunities for improving access between Broadway and I-264 should be also studied.

4.4 Public Transportation

Transit technologies can be categorized into several classifications, each of which has particular characteristics that serve to meet certain specific requirements. Different transit modes bring different opportunities and benefits. Scale and impacts (environmental and community) of the transit mode are important factors to consider. This section briefly examines some general transit technologies that may be applicable to the Park Hill Industrial Corridor.

Transit options are generally sorted by system classification, which includes type of service, capacity and speed. System capacity is further broken down by low, medium, high, and regional. Examples of the capacity categories are:

- Low: Buses and Personal Rapid Transit
- Medium: Bus Rapid Transit, Light Rail and Monorail
- High: Rapid Transit Rail/Subway
- Regional: Commuter Rail/Diesel Multiple Unit

With regards to the Park Hill Industrial Corridor, the focus should be placed predominately on low to medium capacity transit systems including bus routes and fixed guideway transit systems.

Bus Routes - Currently, Park Hill is served by 12 TARC bus routes. However, surveys conducted within the corridor have revealed some deficiencies in the bus system. Three specific recommendations that should be considered are expanded coverage, frequency/schedule of service, and on-street infrastructure improvements.

Expanded Coverage: Given the high level of ridership and route coverage, there is little need for any rerouting of existing services. However, expanding certain routes to link the corridor to the University of Louisville is desirable. This would serve the unmet need of direct service between the campus, Portland and Park Hill neighborhoods.

Frequency of Service*:* In accordance with demand and the number of destinations on a given route, peak and mid-day service within the corridor should be in the range of 10 minutes and 12-15 minutes, respectively.

On-Street Infrastructure Improvements: On-street infrastructure improvements can take many forms and are intended to enhance the aesthetics of a bus stop, as well as increase safety and comfort. Examples of amenities that aid in aesthetics are shelters, trash receptacles, benches, signs, maps and schedules and newspaper vendors. Additionally, curbs, ramps, and sidewalk improvements are all infrastructure enhancements that can greatly increase the safety of riders with easier and safer boarding.

Advanced Rapid Transit Systems - An advanced rapid system is a public transportation facility using and occupying a separate right of way or rail for the exclusive use of public transportation and other high occupancy vehicles (HOV), or a fixed catenary system useable by other forms of transportation. Previous transit planning efforts by TARC have considered advanced rapid transit for the region, including connections to the Park Hill area. There currently is some discussion of examining the feasibility of fixed guideway transit in the TARC service area, specifically the southwest corridor. There

are several different types of options municipalities can decide upon when choosing the best rapid transit system including:

Bus Rapid Transit Systems: This mode combines the quality of rail transit and the flexibility of buses and can operate on exclusive transitways, HOV lanes, expressways, or ordinary streets.

At-grade Light Rail Transit Systems: A rail mode comprised of vehicles with steel wheels operating on steel tracks drawing electrical power from an overhead catenary.

Commuter Rail Systems: Resembles intercity rail services, but in urban transit applications.

Diesel Multiple Unit (DMU): Trains are equipped with diesel propulsion for use on non-electrified lines.

Electric trolley buses: Large rubber-tire vehicles operating on streets with electric propulsion from overhead traction.

In concert with other modes of transportation, there are ample opportunities to include advanced rapid transit service in the Park Hill Corridor. Due to the high percentage of transit dependent riders in Park Hill, transit ridership in the corridor is high. Approximately 50% (25,000 daily riders) of TARC's weekday ridership is served by bus routes that travel through portions of the study area. Transit dependents are defined as people whose auto ownership, geographical or socio-economic characteristics cause them to rely largely or fully on public transportation for their mobility. The high ridership in the corridor lends itself to advanced rapid transit.

As with any transportation network, one of the most important facets is to create good connections between local collector systems such as the local bus, rapid transit, auto and pedestrian systems. This is often done at outlying stations which combine park and ride facilities and a bus terminal or at a central city terminal. In some cases the facility also can include retail activity and services.

In Park Hill, transit oriented development (TOD) in conjunction with the potential to implement fixed guideway transit could be used (in a limited manner) to revitalize this aging community. This type of development emphasizes dense, walkable design making pedestrians the highest priority. By centralizing development around a central node such as a transit station, a mixture of uses within a close proximity can be achieved. This allows for high density land uses to be easily accessible. Additionally, this central development location is further supported by a system of buses, trolley, taxis, as well as bicycle and pedestrians paths. A potential application within an area such as Park Hill is to pursue limited mixed-use development around a future transit center, providing commercial opportunities (i.e. restaurants, services, etc.) within walking distance of the location where transit users change modes of travel before heading to their ultimate destinations.

There are several benefits that can be achieved through TOD. First, with a greater ease in mobility and ease of travel, a high quality of life can be achieved. With an emphasis on public transit, there is a marked reduction in automobile traffic. This correlates to a decrease in traffic congestion, accidents and injury. Second, residents can benefit economically by living in TOD areas. Reduced spending on transportation through automobile maintenance and fuel cost savings can result in more affordable housing. Third, residents can enjoy health benefits associated with living in a walkable community. Not only are the neighborhoods designed to promote walking, but children can safely play in the streets due

to the limited number of cars and businesses profit from increased foot traffic. Finally, high density design minimizes the incentive to build sprawling developments, thus greatly reducing pollution and negative environmental impacts.

4.5 Pedestrian Facilities

Pedestrian facilities are integral to maintaining a balanced transportation system. Apart from promoting physical activity and a healthy lifestyle through sidewalks and paths, special detail to road crossings and conflict points can greatly increase safety, as well as provide quality aesthetics. The following examples are design strategies that can be used to encourage safety:

Raised Crosswalks - A raised pedestrian crossing is a powerful mode of traffic calming and provides a very safe way for pedestrians to cross a crowded street corridor. This slight change in the vertical plane creates a very noticeable pedestrian area. The motorist is forced to slow and allow pedestrians to cross.

Crossing Islands - These are raised landscaped islands placed in the center of the street that help protect crossing pedestrians from vehicles. These islands allow pedestrians to cross only one direction of traffic at a time and can be very useful where there are more than one lane in each direction or where traffic volumes or speed are high. The pedestrian can wait on the island, check the other traffic direction, and continue to the other side of the street.

Special Paving Materials - Special paving materials can also provide additional safety as well as aesthetic appeal to crossing locations. These pavements delineate an area of pedestrian use that warns drivers to be cautious and aware of potential conflicts. The materials can themselves act as traffic calming devices by providing a change in texture that reminds motorists to slow down and take notice.

4.6 Bikeways

Bicycle friendly communities encourage their residents to safely participate in bicycle riding for transportation and enjoyment. Louisville Metro has, in fact, adopted a policy of promoting “complete streets” to encourage the design of streets that are not purely for vehicle traffic, but also include facilities for biking as well. To ensure that Louisville attains its goals, the city is concentrating its efforts in five areas:

- Encouragement - Creating an environment that is conducive to more riding of bicycles for fun, fitness and transportation.
- Education - An informed citizenry, knowledgeable police, legislators and public officials and better training for engineers and planners in facility design.
- Engineering - Creating a bicycle and pedestrian transportation system that allows users with varying abilities to safely and efficiently travel between destinations.
- Enforcement - Equitable and consistent enforcement of traffic laws affecting motorists and bicyclists.

- Evaluation - Regular monitoring and performance evaluation of our progress toward becoming a bicycle-friendly community[1].

Essentially, bikeways can be classified into three groups; sidepath, which is a path adjacent to a roadway but separated from it by a physical barrier; bike path, which is not adjacent to a roadway but is in its own right of way; and bike lane, which is a traffic lane on a roadway marked for bicycle use only and separated from the rest of the roadway only by markings[2]. Each facility type comes with its own advantages and disadvantages and they need to be carefully considered when planning the overall transportation network.

Sidepaths - The main advantage to the sidepath is that bicyclists are off the road and therefore are protected from traffic. Not only is there a physical separation, but often times, curbs and parked cars add an extra layer of protection. However, these same cars present a problem with the passengers exiting and entering the parked cars blocking the bike lanes. Another disadvantage of the sidepath is that intersections remain an issue. Bicyclists are required to yield to the motor traffic and often times have to wait longer for a clearance. Additionally, if only one path is provided on a given side of the roadway, half the bike traffic is flowing against the grain of traffic. Subsequently, motorists are sometimes surprised by a biker that isn't traveling with normal traffic patterns. Many studies have demonstrated that cyclists using sidepaths or sidewalks are several times more at risk than cyclists using roadways[3].

Bike Paths - Since a bike path runs along its own designated right of way, they typically run along rivers, canyons, lakes, beaches or through parks. Also, it is not uncommon for an unused railway to be converted into a bike path. These paths can also be used as shortcuts where automobile traffic is not feasible. Ironically, bike paths are considered less safe than bike lanes. First of all, bike paths are not used purely by bikers. In fact, they are havens for skaters, pedestrians, and pet owners. Often times, these diverse groups do not mesh well and paths can become hazardous. Secondly, intersections can be hazardous. Sightlines can be insufficient, and motorist might not be aware of bicyclists crossing at spaces other than typical intersections. Finally, bike paths might not be designed or maintained to the same standard as normal roadways. Therefore, the paths can become deteriorated more easily and thus become dangerous.

Bike Lanes - Bike lanes are special lanes on a roadway that are marked for bicycle use only. Typically, bike lanes should have a minimum requirement of five feet of clear surface, devoid of any irregularities, however, AASHTO guidelines stipulates that in certain situations a four foot lane may be acceptable. When on-street parking is present, it is acceptable practice either to leave a 12-13 foot combined parking and bike lane or to differentiate with a painted line between the parking and bike lanes. One advantage to the painted line between the two is that this

[1]Louisville Metro: http://www.louisvilleky.gov/BikeLouisville/
[2]Bicycle Transportation Institute: http://www.bicycledriving.com/bikeways.htm
[3] *Ibid.*

tends to encourage motorists to park closer to the curb. At the intersections, it is imperative that parking setbacks are maintained to ensure proper safety. Additionally, clear markings and signage must be provided to direct both the motorists and bicyclists. Signage should also indicate that motorists should yield the shared lane to the bicyclists.

While the Park Hill Corridor does have the skeletal makings of a bikeway system, it is not comprehensive, and connectivity is limited and signed routes are not continuous. With the corridor's proximity to the Ohio River and downtown, Old Louisville and the University of Louisville, the opportunity exists for Park Hill to be a vital link by upgrading the road network, embracing the "complete streets" concept and providing improved bicycle and pedestrian facilities. However, appropriate routes must be carefully thought out so as to provide safe and efficient routes for bicycle travel.

4.7 Parking Facilities

Parking plays a key role in land use accessibility, development opportunities, and the economy of an area. Availability of parking usually depends on the intensity of development and land cost and may be governed by codes and ordinances. Parking options can and do affect the decision making process of travelers. In order to maintain an environment of proper balance with regards to parking, proper planning must be utilized. Too much parking in a given area can waste valuable land resources and lead to disjointed development, while not enough parking can cause travelers to choose alternate destinations, inhibit development and overflow into adjacent areas. Historically, parking was designed to provide a minimum number of parking spaces per residence or development. The goal was to minimize walking distances and prevent overflow. However, with better planning and alternative land uses, this idea is becoming obsolete. Planners are now encouraging public transit use and a diminished personal vehicle role.

The following are strategies that can be employed by local officials to manage parking needs:

- ***Minimum or Maximum Parking Requirements*** - Local building codes or zoning ordinances generally control the amount of parking that must or may be provided at a site by the site developer or owner. Typically, parking requirements are specified as a ratio of the number of parking spaces required/allowed per square foot, per dwelling unit, or per some other measure of intensity of use, taking into account the type of use proposed for the site. Parking codes traditionally stipulate a minimum number of spaces required, or may be framed in terms of maximums.

- ***Employer/Institutional Parking Management -*** Owners or occupants of work sites or activity centers may elect to manage their own parking supply, adjusting parking space totals and utilizing targeted allocation of on- and off-site parking, preferential parking for high occupancy vehicles (HOVs), or price incentives or disincentives to allocate supply.

- ***On-Street Residential Neighborhood Parking Management*** - Local jurisdictions may adopt measures to restrict parking by non-residents. These restrictions may involve permitting, various parking duration limits, and active enforcement and penalties.

- ***On-Street Commercial Area Parking Management*** - Communities may impose parking restrictions to prohibit on-street parking or limit its duration. Typically this strategy involves either time of day/day of week restrictions (communicated through signs) or metering.

- ***Peripheral Parking*** - Parking may be provided at the fringe, or "periphery," of a CBD or activity center, as an alternative to having more parking within the center. Such facilities are either located within a reasonable walk of the core area, or provided with shuttle service. They represent an option for private vehicle users willing to trade off a reduced cost for parking against foregone convenience of parking on-site. Peripheral parking facilities may be provided by local governments or by private interests, but usually are initiated by or consistent with a policy or planning requirement.

- ***Park-and-Ride*** - Urban regions may develop "remote" park-and-ride or park-and-pool parking at outlying locations, generally along express transit lines. Such parking, normally provided by transit agencies, transfers parking supply and shifts demand away from city centers, while supporting transit riding from low-density areas[4].

4.8 Freight

Rail Operations - In combination with Transit Oriented Development (TOD), commercial and industrial rail operations in the Park Hill Study area can be consolidated. With proper policies and governmental support, rail operations can be an integral part of a high-density, mixed-use neighborhood.

Presently, the corridor has four rail operators providing service within its borders with little or no coordination amongst them. This can lead to several issues including disjointed land uses, environmental pollution, and unnecessary traffic delays. By creating a centralized rail terminal, these issues can be mitigated. The coordination of expansion plans can cut cost through the elimination of duplicate lines, while a consolidated industrial development plan can improve access needs. Additionally, industrial and commercial customers can be better served.

Environmental factors play an important role in the location of rail operations. A consolidated rail yard limits the effects throughout the corridor from ground and air pollution, as well as noise pollution caused by both rail cars and heavy truck traffic.

Truck Traffic - The consolidation of rail operations also directly affects truck traffic in the corridor. Numerous businesses within the Park Hill study area rely on trucking operations. The current disjointed and uncoordinated industrial operations allow for numerous routes within the study area which trucks may use for both internal circulation and access to the freeway system. Most routes are not designated as truck routes and consequently drivers are left to their own devises to plan their own route. A uniform truck route designation must be implemented to provide proper access to destinations. This will not only improve safety and traffic concerns but also help alleviate pollution.

[4] Parking Management and Supply. *Transportation Research Board.* Washington D.C: 2003.

In the Park Hill Industrial Corridor, it is especially important that truck traffic be designated to certain routes in the eastern and southeastern portions of the study area. Truck traffic should not be completely forbidden to traverse Old Louisville and the University of Louisville's Belknap Campus. Each area has special characteristics that may not be compatible with heavy trucks, however. Additionally, after a truck route has been designated, some general principles should be followed to maintain proper flow of traffic and safety. In relation to Park Hill, these should include grade separations with railways whenever possible, limited on-street parking, and reduced conflicts with pedestrians and cyclists.

5.0 Proposed Improvements

Based largely on the Mobility Needs discussed in Chapter 3 and the Transportation Goals and Objectives discussed in Chapter 4, a series of potential improvement alternatives have been developed that seek to satisfy both the existing and long-term transportation needs for the Park Hill Industrial Corridor. Whereas the Mobility Elements discussed in Chapter 4 focus on more general concepts and opportunities, this chapter includes specific projects or plans that could be considered for future implementation. These projects represent specific examples of how the general concepts in Chapter 4 can be implemented to increase mobility, connectivity, and access within the Park Hill Corridor.

5.1 Roadway Improvements

The potential roadway improvements consist of a variety of different types of specific capital projects. Most have been developed to address an existing deficiency or to accommodate potential land use changes. Discussions with local real estate brokers and developers provided some insight as to where some improvements would be desirable.

Preliminary cost estimates are provided for reference. At this level, it is difficult to ascertain the potential costs associated with implementing large scale transportation improvement projects. Therefore, a range of potential costs is provided based on engineering experience and historical perspective for local projects of similar magnitude. As such, these costs are subject to change depending on a large number of factors, such as unknown subsurface conditions, utility relocations, future material costs, and magnitude of the improvements once design plans are completed.

There are numerous studies or projects that are currently planned or under evaluation that affect the study area that are not included in this chapter. Many of these options would be included in the proposed improvements for Park Hill as they work to meet the Transportation Goals and Objectives discussed previously.

The addition of bicycle lanes and service drives on Algonquin Parkway is under consideration in the Olmsted Parkways Study. The service drives would serve as frontage roads providing access to individual houses as opposed to one driveway per house. This access management technique should improve traffic flow along the facility. One ultimate goal of the study is to remove truck traffic from Algonquin Parkway. However, there are no specific recommendations as to other routes to be used. As mentioned in Chapter 3, trucks are distributed throughout the Park Hill Corridor and eliminating the Algonquin Parkway corridor as one option for trucks will increase the burden on other facilities.

A planning study is underway to investigate improvements to the 3rd and 4th Street corridors. One proposal from this study includes performing a “road diet” on 4th Street south of Cardinal Boulevard to provide two travel lanes (one in each direction) and bicycle lanes beneath the railroad underpass. The street under the rail underpass is not wide enough to accommodate full-width travel lanes (the existing lanes are less than 10 feet wide) which means that trucks traveling to or from Industry Road encroach into the adjacent lane as they travel under the structure. Providing two full-width lanes at least 11-feet wide will prevent this from occurring in the future.

In the coming year, the University of Louisville will be working to update its Master Plan for the Belknap Campus. The update will guide future expansion and development of the university and may result in recommendations affecting the Park Hill Corridor.

The realignment of the existing offset intersection between 18th Street (Dixie Highway) and Broadway is being evaluated by Louisville Metro Public Works. Louisville Metro is also currently considering converting most one-ways streets in the downtown area (including the one-way portions of 7th and 8th Street) to two-way traffic flow.

The Kentucky Transportation Cabinet (KYTC) and Louisville Metro Government conducted a scoping study seeking improvements to facilitate better traffic flow, safety and access associated with ramps along I-65 from Crittenden Drive to St. Catherine Street. A recommended conceptual alternative was developed that included significant improvements to the I-65 ramps, but these recommendations are not currently included in the KYTC Six Year Highway Plan. One specific recommendation that arose from the study was to consider a new access point along I-65 near the Kentucky Fair and Exposition Center (KFEC), southeast of the Park Hill Corridor. This new interchange would connect directly to Central Avenue through an extension of the roadway to the east (Central Avenue currently ends at Crittenden Drive west of the KFEC).

The potential roadway improvements for the Park Hill Industrial Corridor are shown on **Figure 5-1**. The following pages discuss these improvements in detail.

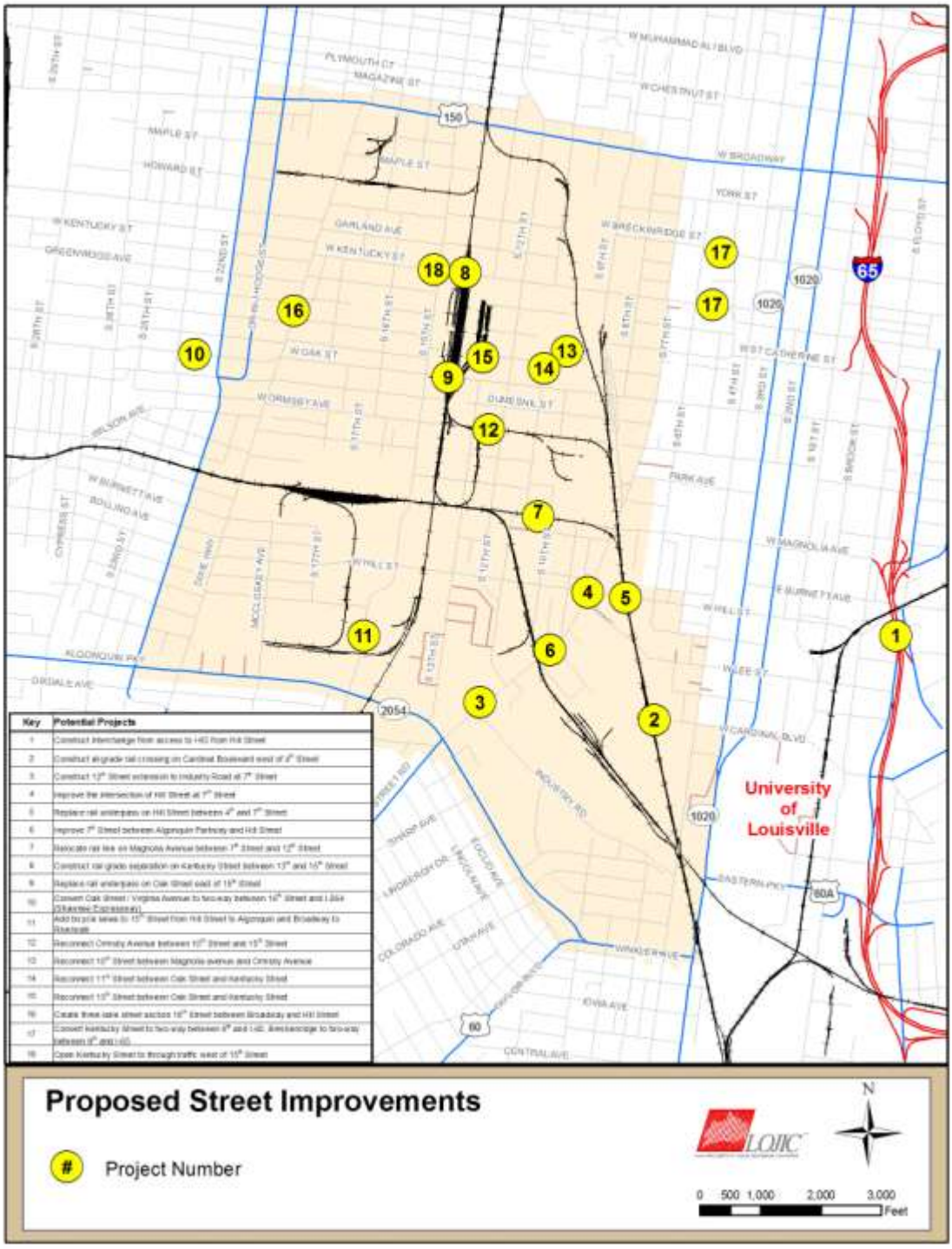


Figure 5-1: Proposed Street Improvements

1	**PROJECT DESCRIPTION:** Construct interchange for access to I-65 from Hill Street	

ISSUE:
Hill Street is designated a truck route into Park Hill, but trucks are forced to use Cardinal Boulevard (through the University of Louisville) and 4th Street (through Old Louisville) as there is no interchange on Hill Street providing access to I-65.

PROPOSED IMPROVEMENT:

A new interchange could be constructed connecting Hill Street directly to I-65. Similar to the existing Arthur Street exit on southbound I-65, a new collector-distributor (C-D) system could be developed on both sides of I-65 providing full access to the Interstate.

On southbound I-65, the C-D would begin north of Magnolia Avenue and would tie into the existing Arthur Street (this would replace the existing Arthur Street ramp from I-65.) This would provide access to and from southbound I-65. Existing access from Magnolia Avenue (at Floyd Street) would be removed.

Conceptual I-65 Interchange Improvements

On northbound I-65, the C-D would begin north of St. Stephens Cemetery. New ramps would connect the existing Hill Street alignment to I-65, and the existing Preston Street ramp would be closed. Additional access would be provided to Preston north of the railroad tracks. This concept was compared to the KYTC study recommendations and does not appear to be in conflict with the findings.

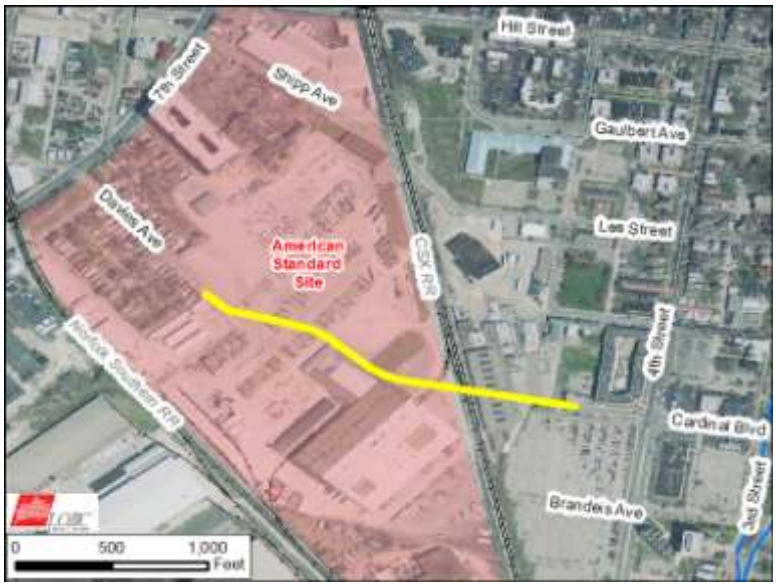
BENEFIT:	**COST ESTIMATE:**
Provides a direct truck route into the Corridor from I-65, avoiding Old Louisville.	$75 - $80 Million

2	**PROJECT DESCRIPTION:** Construct at-grade rail crossing on Cardinal Boulevard west of 4th Street	

ISSUE:
The former American Standard site is a location with the potential to see early redevelopment, but access to the site is limited to 7th Street and Lee Street/Shipp Avenue.

PROPOSED IMPROVEMENT:

The American Standard site has the potential to provide space for university-related development, such as residential and commercial opportunities. The scope of proposed changes to the American Standard site is not fully known, but a recent announcement suggested 426 apartments would be constructed and a developer has an option to purchase the main structure near Shipp Avenue and 7th Street.



New At-Grade Rail Crossing Location and Potential Street Alignment

Access is currently limited due to rail lines to the east and south, but access to the site could be increased by creating a new at-grade rail crossing on Cardinal Boulevard west of existing 4th Street. While the final site layout is unknown, one option would be to tie this new roadway into the existing Davies Avenue alignment for access to 7th Street. An existing warehouse building is located just east of CSX's dual track rail line. The building would have to be razed in order to accommodate the new roadway alignment. This contributes substantially to the cost of the improvement.

One disadvantage to this alternative is that it introduces a new grade crossing in the vicinity of the University, where both pedestrian and auto traffic are high.

BENEFIT:	**COST ESTIMATE:**
Provides direct access to the American Standard site from I-65 and UofL.	$1 - $2 Million (plus building demolition)

3	**PROJECT DESCRIPTION:** Construct 12th Street extension to Industry Road at 7th Street	

ISSUE:
The Rhodia Site is a location with the potential to see early redevelopment, but access to the site is limited to 7th Street and 11th Street.

PROPOSED IMPROVEMENT:

The Rhodia Site is currently being marketed by Louisville Metro. Access to the site can be improved by realigning 12th Street through the existing Parkway Place housing development and realigning Industry Road as it approaches 7th Street. The result is a 12th Street corridor that not only connects directly to the Rhodia Site, but also travels completely through the Park Hill Industrial Corridor and connects directly to Industry Road, which currently connects to 4th Street and eventually I-65 via Cardinal Boulevard. In addition, improved access is provided to Hill Street to the north.

Potential Connection for Industry Road and 12th Street

An existing office building is located east of the 7th Street/Industry Road intersection and would be difficult to avoid with the realignment of Industry. The long-term plans for the Parkway Place housing development are unknown, and this improvement is somewhat contingent upon what happens to that area and the eventual use of the Rhodia Site. It would not be desirable to realign 12th Street through Parkway Place if it remains a housing complex and the Rhodia Site is converted to an industrial land use.

BENEFIT:	**COST ESTIMATE:**
Provides improved access to the Rhodia Site from I-65 and UL.	$2 - $3 Million (plus building demolition, if necessary)

4	**PROJECT DESCRIPTION:** Improve the intersection of Hill Street at 7th Street	

ISSUE:
No left turns are allowed from Hill Street onto 7th Street, and left turns are restricted from 7th Street onto Hill Street.

PROPOSED IMPROVEMENT:

At the Hill Street intersection with 7th Street, neither facility has turn lanes. No left turns are allowed from Hill Street onto 7th Street. Left turns are not allowed from 7th Street onto Hill Street during the weekday peak hours of 7:00 – 9:00 AM and 3:00 – 6:00 PM. This severely restricts access to parcels located along 7th Street (such as the American Standard Site and the Rhodia Site) and hinders mobility in the area. This section of Hill Street carries over 12,000 vehicles per day and 7th Street carries nearly 17,000 per day.

Widening on Hill and 7th Street for Turn Lanes

The improvement is to widen the Hill Street and 7th Street approaches to provide left turn lanes, thereby improving mobility and increasing travel opportunities along both facilities. This will likely require the acquisition of right-of-way along both facilities. However, the improvement will better facilitate traffic movement through the area by providing access for directions of travel not currently provided.

BENEFIT:	**COST ESTIMATE:**	
Improves accessibility to neighborhoods, commercial development, and future redevelopment sites.	$1.5 - $2 Million	

5	**PROJECT DESCRIPTION:** Replace rail underpass on Hill Street between 4th and 7th Street	

ISSUE:
The existing Hill Street rail underpass is narrow and does not satisfactorily accommodate pedestrians or bicyclists.

PROPOSED IMPROVEMENT:

The underpass separating Hill Street from the dual track CSX rail line does not provide full lane widths as it is less than 20-feet wide. Sidewalks are obstructed by utility poles or are otherwise inaccessible. The vertical clearance for the structure is approximately 14-feet, 5-inches.

Existing Hill Street Rail Underpass

The improvement is to replace the aging rail structure with a wider span to accommodate two full travel lanes plus bicycle lanes and sidewalks. This improvement will increase mobility and safety along Hill Street, which is currently designated as a truck route. Current KYTC guidelines call for a minimum vertical clearance of 15-feet; therefore, it would be desirable to increase the clearance by a minimum of seven inches.

BENEFIT:	**COST ESTIMATE:**
Improves mobility for all modes of travel along Hill Street.	$4 - $5 Million

6	**PROJECT DESCRIPTION:** Improve 7th Street between Algonquin Parkway and Hill Street	

ISSUE:
7th Street, between Algonquin Parkway and Hill Street, is a four-lane facility with dense development and no turn lanes.

PROPOSED IMPROVEMENT:

7th Street is a major artery through the Park Hill Industrial Corridor, connecting south Louisville to downtown and providing access to the study area from both directions. Two redevelopment sites are located on the segment between Algonquin Parkway and Hill Street, and this section of 7th Street currently carries nearly 17,000 vehicles per day.

7th Street North of Industry Road

The improvement is to widen 7th Street to a five-lane section, providing a continuous center left turn lane. The center turn lane will increase accessibility to adjacent parcels such as the Rhodia Site and the American Standard Site.

This will require the acquisition of substantial right-of-way, and the impacts to existing utilities will result in high costs to construct. However, the improvement will better facilitate traffic movement through the area while providing increased, safer access to adjacent parcels.

Example of Proposed Typical Section

BENEFIT:	**COST ESTIMATE:**	
Improves mobility and safety along 7th Street while increasing parcel accessibility.	$8 - $10 Million	

7	**PROJECT DESCRIPTION:** Relocate rail line on Magnolia Avenue between 7th Street and 12th Street	

ISSUE:
Magnolia Avenue, west of 7th Street, has an active rail line running down the center.

PROPOSED IMPROVEMENT:

Magnolia Avenue is a two-way street connecting businesses to 7th Street and points beyond. An active rail line runs down the middle of the street, and two-way traffic travels on each side of the rail line. However, the street width is approximately 18-feet on each side of the rail line, which is not wide enough to accommodate two travel lanes. Signage is poor, leading to confusion as to which side of the tracks is safe for driving.

The improvement is to relocate the rail line to the south, leaving an approximately 36-foot wide street on the north side. The three existing at-grade rail crossings at 9th and 10th Street can remain in place, and the crossing at 11th Street can be closed as the street terminates at Magnolia.

Magnolia Avenue looking West

BENEFIT:	**COST ESTIMATE:**
Improves safety by eliminating confusing travel patterns.	$600,000 - $700,000 (plus active protection for remaining rail crossings)

8	**PROJECT DESCRIPTION:** Construct rail grade separation on Kentucky Street between 13th and 15th Street	

ISSUE:
The existing at-grade rail crossing on Kentucky Street between 13th and 15th crosses 10 rail lines.

PROPOSED IMPROVEMENT:

Kentucky Street is the only east-west street that traverses the entire Park Hill Industrial Corridor Master Plan focus area (connecting 15th Street to 9th Street and areas east) between Oak Street and Broadway. However, it currently has two at-grade rail crossings, the larger of which is located between 13th and 15th Street and crosses 10 rail lines at the north end of the Paducah and Louisville rail yard. This section of Kentucky Street currently carries approximately 5,000 vehicles per day. Kentucky Street is closed to through traffic on the west side of 15th Street.

Kentucky Street Grade Crossing

The Paducah and Louisville Railroad has expressed a desire to close the Kentucky Street grade crossing as it affects the operations of their yard. Trains often block the crossing for extended periods of time, leading to driver frustration.

Creating a grade separated rail crossing by lowering Kentucky Street under the rail lines (similar to the existing Oak Street underpass to the south) will maintain the current level of access and east-west mobility through the study area and will allow Kentucky Street to become a more continuous bike route. However, the cost to accomplish such a project will be significant and may not prove feasible, unless future development were to increase the demand for travel on Kentucky Street. Kentucky Street would also be closed during the construction. If this alternative is to be pursued, re-opening Kentucky Street to through traffic west of 15th Street should be given some consideration (see Project #18).

BENEFIT:	**COST ESTIMATE:**	
Eliminates undesirable at-grade rail crossing.	$10 - $12 Million	

9	**PROJECT DESCRIPTION:** Replace rail underpass on Oak Street east of 15th Street	

ISSUE:
The existing Oak Street rail underpass is narrow and does not have the vertical clearance necessary to accommodate truck traffic.

PROPOSED IMPROVEMENT:

The underpass separating Oak Street from the south end of the Paducah and Louisville rail yard provides only 11-feet, 5-inches of vertical clearance. This clearance means the underpass is not capable of accomodating commerical trucks. There is no shoulder under the structure, nor are bike lanes provided. Sidewalks are provided, and are separated from the street by structure piers.

Existing Oak Street Rail Underpass

The improvement is to replace the aging rail structure with a wider span to accommodate four full travel lanes plus bicycle lanes and sidewalks. This improvement will make Oak Street an attractive option for truck traffic and will likely result in better utilization of the 9th Street interchange with Oak Street.

Current KYTC guidelines call for a minimum vertical clearance of 15-feet; therefore, it would be desirable to increase the clearance by a minimum of 3-feet, 7-inches.

BENEFIT:	**COST ESTIMATE:**	
Provides truck access to western portion of Oak Street.	$10 - $12 Million	

10	**PROJECT DESCRIPTION:** Convert Oak Street / Virginia Avenue to two-way between 16th Street and I-264 (Shawnee Expressway)	

ISSUE:
Oak Street (Virginia Avenue) is one-way westbound west of 16th Street.

PROPOSED IMPROVEMENT:

Oak Street, which turns into Virginia Avenue at 26th Street, is one-way (westbound) west of 16th Street. This corridor provides access for Park Hill to I-264 (Shawnee Expressway); Dumesnil Street, which is one-way eastbound, provides access from the Shawnee Expressway to the study area. Dumesnil Street is severed by the Paducah and Louisville rail line east of 15th Street.

Oak Street / Virginia Avenue

The improvement is to convert Oak Street / Virginia Avenue to two-way traffic flow. This will allow for more efficient access between the Park Hill Industrial Corridor and the Shawnee Expressway.

The disadvantage with this improvement is the impact to on-street parking. Oak Street and Virginia Avenue, which travel through residential areas, are two-lane facilities with parking on both sides of the street. Conversion to two-way traffic flow will likely require turn lanes at major intersections. Most residences have alleys behind, but most utilize the on-street parking as it is more convenient.

Numerous signalized intersections are located along both streets. Upgrading the signals to accommodate two-way traffic flow will result in significant costs.

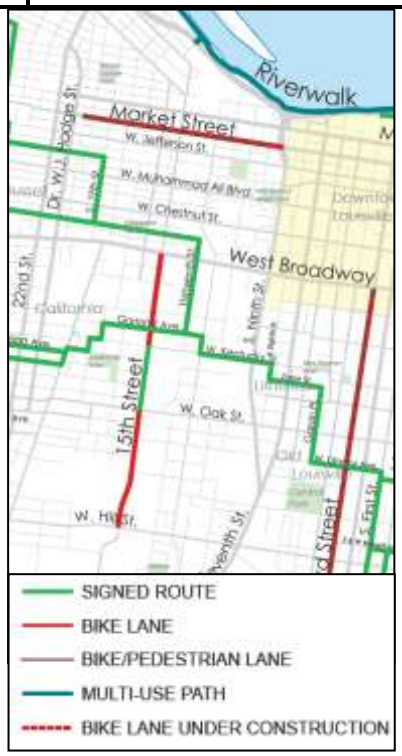
BENEFIT:	**COST ESTIMATE:**	
Improves freeway access and mobility.	$2 - $3 Million	

11	**PROJECT DESCRIPTION:** Add bicycle lanes to 15th Street from Hill Street to Algonquin and Broadway to Riverwalk

ISSUE:
15th Street currently has bike lanes or is designated a bike route from Hill Street to Broadway, but there is limited connectivity to the north and south.

PROPOSED IMPROVEMENT:

The existing bikeway system within Park Hill Industrial Corridor is fragmented and discontinuous. The sole north-south bicycle facility is 15th Street, which has bike lanes between Hill and Oak Street and between Kentucky Street and Broadway. Between Oak and Kentucky Street, 15th is a signed bike route with no lanes or bicycle striping. 15th Street, one of the few continuous north-south routes, serves as a "buffer" street as the areas to the west are predominately residential in nature while areas to the east tend to be more industrial. This makes it an ideal candidate for expanded bicycle facilities as it connects residential areas to potential jobs.



Existing Bikeway System
Source: Louisville Metro

There is a plan underway to provide bicycle lanes on Algonquin Parkway. Connecting the facilities on 15th Street to the new bike lanes on Algonquin would be highly desirable. South of Hill Street, the 15th Street corridor moves west into the 16th Street corridor. This section of 16th Street is approximately 40-feet wide and carries four lanes of traffic to Lee Street. South of Lee Street, 16th Street is approximately 38-feet wide and is two-lane. These portions of 16th Street could be restriped as a two-lane (or perhaps a three-lane section between Hill and Lee Street) to provide the width necessary to stripe bicycle lanes.

Connecting Park Hill to the Riverwalk to the north would also be desirable. North of Broadway, 15th Street is approximately 40-feet wide, but turns into a one-way (northbound) street with on-street parking. A northbound bicycle lane on 15th Street and a southbound lane on 16th Street could accomplish this goal.

BENEFIT:	**COST ESTIMATE:**
Provides improved bikeway connectivity.	$50,000 - $60,000

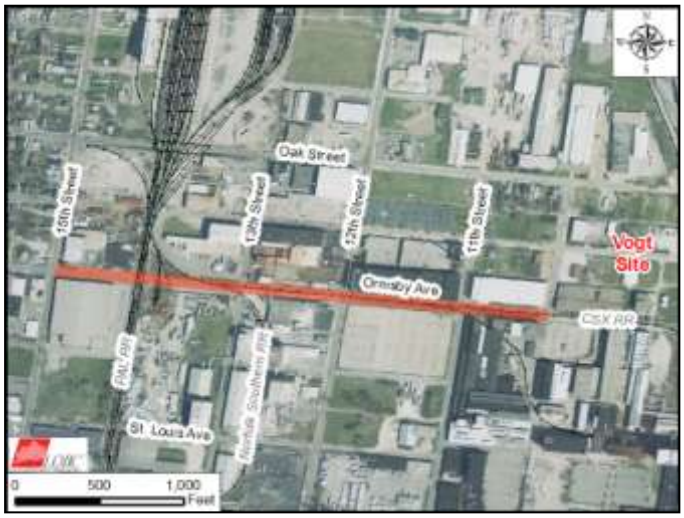
12

PROJECT DESCRIPTION:
Reconnect Ormsby Avenue between 10th Street and 15th Street

ISSUE:
Ormsby Avenue is open to traffic between 10th and 15th Street, but this segment is poorly maintained and sees little (if any) use.

PROPOSED IMPROVEMENT:

Ormsby Avenue appears on most maps, but it does not appear to be a paved street. However, there are railroad crossing signs (crossbucks) located on the Paducah and Louisville grade crossing east of 15th Street and the street is open to traffic. Ormsby crosses not only the Paducah and Louisville rail line, but it also crosses a Norfolk Southern interchange track and a CSX interchange track runs down the middle of the street east of 13th Street.



Ormsby Avenue

The improvement is to upgrade Ormsby Avenue to reconnect to areas to the east, including the Vogt Site which is a potential early redevelopment site. The improvements should include, at minimum, repaving Ormsby and upgrading existing signage and striping to increase the street's visibility. Opportunities to relocate (or even eliminate) existing rail lines would make this improvement more attractive, particularly the CSX and Norfolk Southern lines.

Ormsby Avenue looking East

BENEFIT:	**COST ESTIMATE:**
Improves east-west connectivity and accessibility to Vogt Site.	$1.5 - $2 Million (plus active protection for remaining rail crossings)

13	**PROJECT DESCRIPTION:** Reconnect 10th Street between Magnolia Avenue and Ormsby Avenue	

ISSUE:
10th Street currently is disconnected between Magnolia Avenue and Ormsby Avenue. 12th Street is currently the only facility providing unimpeded north-south travel east of 15th Street and west of the CSX rail line.

PROPOSED IMPROVEMENT:

10th Street is severed by industrial development between Magnolia Avenue and Ormsby Avenue. Re-establishing a connection between these facilities would increase mobility in the area by facilitating better north-south movement adjacent to the Vogt Site and provide a north-south alternative to 12th Street.

The improvement is to reconnect the severed 10th Street. This reconnection does not necessarily require the street to conform to the existing grid system, but could utilize connections to adjacent facilities (such as 11th Street) to provide a continuous north-south corridor.

This option should be considered if the land use through the area is to change and existing businesses relocate or alter their operations. If existing buildings are not removed, opportunities to provide a connection through or around the existing facilities should be given consideration. This option is an alternative to Project 14 and 15.

Potential 10th Street Reconnection

Existing 10th Street looking North

BENEFIT:	**COST ESTIMATE:**
Improves north-south connectivity and accessibility to Vogt Site.	$2 - $3 Million (plus active protection for rail crossings and building demolition)

14	**PROJECT DESCRIPTION:** Reconnect 11th Street between Oak Street and Kentucky Street

ISSUE:
11th Street currently is disconnected between Oak Street and Kentucky Street. 12th Street is currently the only facility providing unimpeded north-south travel east of 15th Street and west of the CSX rail line.

PROPOSED IMPROVEMENT:

11th Street is severed by industrial development between Oak Street and Kentucky Street. Re-establishing a connection between these facilities would increase mobility in the area by facilitating better north-south movement adjacent to the Vogt Site and provide a north-south alternative to 12th Street.

Potential 11th Street Reconnection

The improvement is to reconnect the severed 11th Street. This reconnection does not necessarily require the street to conform to the existing grid system, but could utilize connections to adjacent facilities (such as 10th Street) to provide a continuous north-south corridor.

This option should be considered if the land use through the area is to change and existing businesses relocate or alter their operations. If existing buildings are not removed, opportunities to provide a connection through or around the existing facilities should be given consideration. This option is an alternative to Project 13 and 15.

11th Street looking North

BENEFIT:	**COST ESTIMATE:**
Improves north-south connectivity and accessibility to Vogt Site.	$2 - $3 Million (plus building demolition)

15	**PROJECT DESCRIPTION:** Reconnect 13th Street between Oak Street and Kentucky Street	

ISSUE:
13th Street currently is disconnected between Oak Street and Kentucky Street. 12th Street is currently the only facility providing unimpeded north-south travel east of 15th Street and west of the CSX rail line.

PROPOSED IMPROVEMENT:

13th Street is severed by industrial development and the Paducah and Louisville Railroad yard between Oak Street and Kentucky Street. Re-establishing a connection between Oak and Kentucky would increase mobility in the area by facilitating better north-south movement and providing a north-south alternative to 12th Street.

Potential 13th Street Reconnection

The improvement is to reconnect the severed 13th Street. A direct, linear connection between Oak Street and Kentucky Street may not be feasible as that alignment would fall within the limits of the Paducah and Louisville Railroad yard. There may be a possibility to fit the alignment slightly to the east so that it roughly follows the existing alignment for Pal Road.

This option should be considered if the land use through the area is to change and existing infrastructure is altered or removed. If these modifications are not made, opportunities to provide a connection through the existing facilities should be given consideration. This option is an alternative to Project 13 and 14 but could be considered in combination with one or the other.

13th Street looking North

BENEFIT:	**COST ESTIMATE:**	
Improves north-south connectivity.	$2 - $3 Million	

16	**PROJECT DESCRIPTION:** Create three-lane street section 18th Street between Broadway and Hill Street	

ISSUE:
18th Street currently is a wide two-lane, two-way street with on-street parking between Broadway and Hill Street.

PROPOSED IMPROVEMENT:

18th Street (Dixie Highway)

18th Street (Dixie Highway) is currently a two-lane, two-way street with on-street parking between Hill Street and Broadway. South of Hill Street, Dixie Highway becomes a four-lane facility. Most all facilities with on-street parking also have off-street parking available. There is a significant amount of pedestrian activity in this portion of the corridor, but pedestrian crossings are limited to midblock striped crosswalks north of Breckenridge Street and the signalized intersections. Traffic signals are located at the intersections with Hill Street, Dumesnil, Oak, Garland and Broadway. Street widths vary from 36 to 40 feet, and this section carries approximately 9,500 vehicles per day.

The improvement is to convert this portion of Dixie Highway to a three-lane section, with one travel lane in each direction and a continuous center left turn lane. This will decrease the opportunities for rear end crashes and remove the unnecessary on-street parking which hinders the visibility of pedestrians crossing the street. Access to the redevelopment at NewBridge Crossing, the location of the former Phillip Morris factory, and redevelopment planned for the area surrounding the 18th Street intersection with Oak Street will also be increased.

Louisville Metro is currently evaluating options for realigning the offset intersections with 18th Street and Broadway. Therefore, no additional modifications are proposed.

BENEFIT:	**COST ESTIMATE:**	
Improves safety, north-south connectivity, and accessibility.	$400,000 - $500,000	

17	**PROJECT DESCRIPTION:** Convert Kentucky Street to two-way between 8th and I-65, Breckenridge to two-way between 9th and I-65

ISSUE:
Kentucky Street is one-way (eastbound) east of 8th Street and Breckenridge Street is one-way (westbound) east of 9th Street.

PROPOSED IMPROVEMENT:

Kentucky Street is currently two-way west of 8th Street and provides one of the few opportunities for east-west travel through the northern portion of the Park Hill Industrial Corridor. East of 8th Street, the facility is one-way with two lanes providing for eastbound travel. Breckenridge Street does not extend west of 9th Street and is currently one-way with two lanes providing for westbound travel. Both facilities have limited on-street parking through this area.

Kentucky Street and Breckenridge Street

The improvement is to convert both Kentucky Street and Breckenridge Street to two-way traffic flow. This will allow for more efficient access between the Park Hill Industrial Corridor and points east – including Ben Washer and Memorial Park and I-65. A decision on where to terminate two-way traffic flow will require discussions with Louisville Metro Public Works staff, local stakeholders, and local officials.

Numerous signalized intersections are located along both streets. Upgrading the signals to accommodate two-way traffic flow will result in significant costs.

BENEFIT:	**COST ESTIMATE:**	
Improves freeway access and east-west mobility.	$2.5 - $3 Million	

18	**PROJECT DESCRIPTION:** Open Kentucky Street to through traffic west of 15th Street	

ISSUE:
Kentucky Street is currently blocked to through traffic on the west side of 15th Street.

PROPOSED IMPROVEMENT:

Kentucky Street is the only east-west street that traverses the entire Park Hill Industrial Corridor Master Plan focus area (connecting 15th Street to 9th Street and areas east) between Oak Street and Broadway. However, it currently is closed to through traffic on the west side of 15th Street. A landscaped berm has been constructed to prevent travel west of the intersection, but Kentucky Street is connected between the west side of 15th Street and 18th Street.

Kentucky Street at 15th Street

The improvement is to remove the landscaped berm west of 15th Street to allow for a direct connection along Kentucky Street to 18th Street.

If this alternative is to be pursued, grade separating the rail crossing on Kentucky Street between 13th Street and 15th Street should be given some consideration (see Project #9).

BENEFIT:	**COST ESTIMATE:**	
Increases east-west mobility.	$5,000	

5.2 Public Transportation Improvements

The potential public transportation improvements consist of a variety of different types of operational strategies and capital projects. Most have been developed to address existing transit needs or to accommodate future goals for improved service and potential land use changes in the study area. Discussions with TARC provided some insight as to where some improvements would be desirable. A summary of the existing transit service in the study area and the proposed public transportation improvements are discussed in this section.

5.2.1 Summary of Service in the Study Area

Twelve TARC bus routes serve the study area. These routes are shown in **Figure 5-2.** Currently, bus stops are areas on sidewalks marked by bus stop signs. Shelters or benches do not exist at these locations in the study area. The route service types include: radial, cross-town, circulator, and shuttle bus service. These service types are defined as follows:

- **Radial Service:** Local or express service designed primarily to connect the Central Business District with outlying areas.
- **Cross-town Service:** Non-radial bus or rail service which does not enter the central business district.
- **Circulator Service:** A bus serving an area confined to a specific locale, such as a downtown area or suburban neighborhood, with connections to major traffic corridors.
- **Shuttle Service:** A public or private vehicle that travels back and forth over a particular route, especially a short route or one that provides connections between transportation systems, employment centers, etc. Bus service that typically does not operate on a fixed schedule.

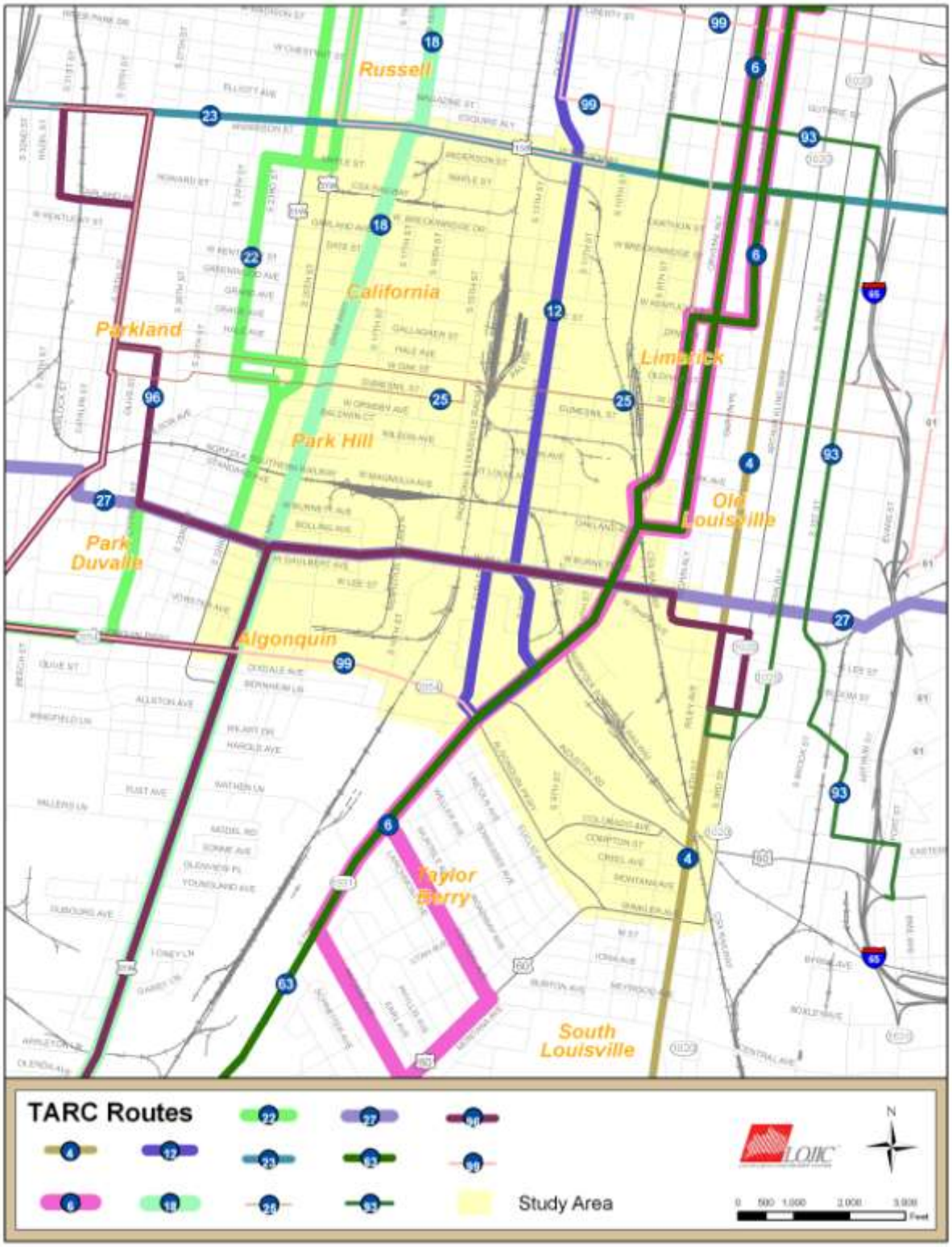


Figure 5-2: Existing TARC routes within the Park Hill Study Area

Current ridership figures for the routes serving the Park Hill study area are shown in **Table 5-1**. The strong transit ridership is attributable to the corridor's relatively high transit dependent population when compared to Jefferson County's total population.

Table 5-1: TARC Ridership Figures

Route #	Route Name	May 2007 Avg. Weekday Ridership
Radial Routes		
18	PRESTON - 18TH STREET	7,022
23	BROADWAY	6,408
4	FOURTH STREET	4,370
6	TAYLOR-SIXTH STREET	2,333
63	CRUMS LANE	1,111
Cross-town Routes		
25	OAK STREET	1,514
27	HILL STREET	1,242
63	CRUMS LANE	1,111
22	TWENTY-SECOND STREET	400
12	TWELFTH STREET	331
Circulator Routes		
96	WEST LOUISVILLE SHUTTLE	72
Shuttle Routes		
93	UPS-UL-JCTC	46
99	UPS-WEST LOUISVILLE	45

Source: Transit Authority of River City (TARC), June 2007

Routes operating in the study area serve approximately 25,000 weekday riders, which represent 48% of TARC's total daily ridership. The top four utilized routes (Routes 4, 6, 18, and 23) in the TARC system serve portions of the study area. Headways between buses on these routes are 15 minutes or less during rush hour, and 20 minutes or less during the rest of the day. TARC's three primary cross-town routes, 25, 27, and 29, provide access to many of Louisville's major commercial corridors, and allow for transfers to all of other major routes within the system.

Route 12 operates as a cross-town route for TARC but does serve as a circulator within the Park Hill and Portland neighborhoods; service is hourly throughout the day. Route 22 runs along the western boundary of the study area, continuing west along Algonquin Parkway to Park DuValle and north to I-64 and New Albany. Route 63 runs from downtown Louisville, through the study area along 7th Street, and south to Pleasure Ridge Park by way of Crums Lane, Cane Run Road, and Terry Road.

5.2.2 Proposed Improvements

Public transit remains the only mode of transportation available for many Park Hill residents. Many of these residents who rely on transit are seniors, children, low-income or disabled. TARC provides good geographic coverage and service frequency in the study area to make public transportation an attractive option for residents; however, improvements to serve the current and future needs will be necessary as the Park Hill Master Plan is implemented in the future. Future goals and proposed options for improved service in the corridor included: TARC service (increased frequency and expanded coverage); on-street infrastructure improvements; and, implementation of advanced rapid transit service. These proposed public transit improvement areas are described below.

Bus Transit Service Frequency – TARC has maintained a high level of weekday service along routes 4, 6, 18, and 23, in accordance to the demand and number of destinations along the corridors these routes serve. Existing TARC service (radial and cross-town routes) frequencies in the Park Hill neighborhood are presented in **Table 5-2.**

Table 5-2: Existing Service Frequencies (Minutes)

Route	Rush Hour	Mid-day	Evening	Saturday	Sunday
4	12	12	35	20	30
6	15	20	45	40	50
12	60	60	no service	60	60
18	15	20	30	30	40
22	35	70	60	70	no service
23	13	15	30	30	40
25	30	40	45	50	50
27	30	40	60	60	60
29	35	35	60	60	60
63	30	60	60	60	60

Source: Transit Authority of River City (TARC), November 2007

Opportunities for improved service in the study area lie mainly with the cross-town routes. A reduction of rush hour and mid-day headways on these routes from the 30-40 minute range to 12-20 minutes would increase the overall usability of TARC, within the study area and beyond, by expanding the amount of area where high-frequency service is available and reducing the amount of time waiting when making a transfer to or from one of the cross-town routes.

Other frequency improvements should be considered for the radial routes that serve the study area. TARC should maintain or improve (10 minutes peak and 12-15 minutes mid-day) the high level of weekday service along Routes 4, 6, 18, and 23, in accordance to the demand and number of destinations along the corridors these routes serve as the Master Plan development projects are implemented in the future.

The proposed improvements in service frequency would essentially double the service frequency currently provided on these routes, and in turn would approximately double costs. Estimates of the additional operating costs for improving service frequency on the routes would be based on the

additional miles and hours of service and have not been estimated for this study. More detailed operating data is required to develop the operating cost estimates and would be developed by TARC in the future prior to implementing any service improvements. In addition to operating and maintenance cost increases, additional buses would be required to provide this improved service. The number of additional buses would be calculated once the operating plans are finalized. The average cost for a standard bus ranges from $300,000 to $360,000.

Expanded Coverage – Given the high level of ridership and route coverage in the study area, little need is seen for any rerouting of existing service. Potential for improved routings would involve the extension of route 12:

- From 11th Street to Industry Road to the University of Louisville campus -- lengthening the route serves an unmet need for direct service between the campus and the Park Hill and Portland neighborhoods.
- From Algonquin Pkwy to Dixie Hwy south to Crums Lane – provides more shopping opportunities and connections.

As with increased frequency of service, the operating and capital cost associated with expanded coverage is based on required increases in the bus fleet, and miles and hours of service. This information would be determined once the operating plans are finalized.

On-Street Infrastructure Improvements – The Park Hill study area contains a number of major transfer points between routes. The intersections of Broadway and Dixie Highway (routes 18 & 23), and 4th and Winkler (routes 4 & 29) both have large numbers of transferring riders throughout the day. Stops at these locations, as well as other major boarding and transfer points within the study area, are in need of improved pedestrian access and stop amenities including shelters, trash receptacles, and signage. Depending on frequency of use and riders' needs for accessibility, convenience and safety, the major stops and transfer points in the study area should be reviewed for improved on-street infrastructure improvements and bus stop amenities.

Improved shelters at the study area's major transfer points should be the top priority. These locations would require larger shelters with seating for 10-12 people rather than the current smaller shelters (seats 2-3 people) at various locations along TARC routes. Examples of shelters are shown in **Figure 5-3.** Costs for shelters vary greatly depending on size, design, materials, etc. A basic 10-12 seat shelter would range from $15,000 to $20,000.

Improved bus stop amenities are also needed. Some of these amenities include:

- Shelters
- Trash receptacles
- Signage
- Maps / Schedules
- Phones & newspaper vendors

Other on-street infrastructure improvements include:

- Easier and Safer Boarding / Alighting
  - Improved pedestrian access
  - Sidewalks
  - Ramps
  - Curbs

- Safety and Maintenance
  - Lighting
  - Vandal – Resistant Designs

Figure 5-3: Bus Shelter Examples

Advanced Rapid Transit – TARC's Transportation Tomorrow (T^2) program primarily focused on the study of Light Rail Transit (LRT) for the South Central Corridor prior to the termination of the study in 2004. However, as part of the T^2 program, a Long Range Corridor Analysis was conducted and from that analysis, TARC developed a *Long Ranged Advanced Transit Plan* (December 2001). The long range transit plan identified six long range-study corridors for potential advanced transit. One of these corridors was the Southwest Corridor, which includes the Park Hill study area. The Southwest Corridor alignments ranged from 16 to 22 miles from downtown to southwestern Jefferson County generally following Dixie Highway and the Paducah and Louisville Railroad, serving Shively and other neighborhoods.

In addition to the *Long Ranged Advanced Transit Plan,* TARC also performed a generalized feasibility analysis (August 1999) of Diesel Multiple Unit (DMU) Rail Transit Services in Louisville's South West Corridor (Paducah & Louisville Railroad). The work described in this report deals with the generalized feasibility assessment activities for possible DMU deployment from Louisville to the Southwest in the Dixie Highway Corridor. There are currently discussions to look again at the feasibility of advanced transit in this corridor.

The benefits of implementing advanced transit are numerous. These benefits include: increased quality jobs; roadway congestion mitigation; broad improvements in quality of life; providing a framework for sustainable or smart growth; stimulate economic development; revitalize the existing Park Hill corridor; and connections to downtown.

Alternative advanced technologies could be considered for the commuter transit service in this corridor. Both Diesel Multiple Unit (DMU) and Automated Guideway Transit (AGT) technologies have been conceptually looked at for this study. A brief description of each technology is provided below.

- **DMU Rail Systems -** Diesel Multiple Unit (DMU) trains, equipped in diesel propulsion, are the most popular types of railway vehicles on non-electrified lines. DMU is a compromise between buses and heavy coaches used on luxury trains. Typically, DMU's are not as comfortable and don't ride as well as locomotive-hauled coaches, however, they are cheaper to maintain and offer more operational flexibility. DMU trains can be joined together with greater ease and in less time than locomotive-hauled trains; they can also be reversed easier. The majority of DMU's have a top speed of 75 mph, with newer models offering 90 mph. Because of the DMU's typically lower power-to-weight ratio, its acceleration and speed decreases especially on hilly terrain.
- **Automated Guideway Transit (AGT) -** AGT has many of the characteristics of Light Rail Transit, but runs without operators, being controlled by a central command and control center, on a pre-set schedule. To accommodate this automation, the AGT must run in an exclusive guideway or right-of-way, with power normally provided by a third rail alongside the track or from underneath the car with a Linear Induction Motor system. It is essential that the power supply is protected from public access, both in route and in stations. Automation often allows very short headways, or distances between trains, because the control capability allows the build-in of numerous safety indications and responses that can be activated quicker than by an operator. The largest public transit AGT in North America is the Skytrain in Vancouver, British Columbia, with similar systems in Toronto and Detroit. Smaller capacity AGT systems have been used at major activity centers and to connect parking areas with airline terminals or to connect the terminals themselves.

An advantage of the DMU technology is that it can operate on the existing freight rail lines in the corridor. Discussions with the railroads reflected opposition to joint passenger and freight utilization of the trackage. However, typically windows of time for passenger only usage is workable; those windows could be the a.m. peak, at noon, and during the p.m. peak. Except for these peak hour windows, the tracks would be exclusively used for freight operations.

The prospects for successful deployment of advanced transit service are positive inasmuch as it is consistent with numerous critical federal transportation initiatives, including rail bus integration, intelligent transportation system development, intermodal transit system management, work place access, infrastructure preservation, environmental enhancement, congestion and accident reduction, and preservation of existing transportation infrastructure. Diesel Multiple Unit deployment in Louisville's Southwest Corridor from downtown Louisville could significantly contribute to: the effective linking of transit and land use; growing smart; providing an alternative to the automobile in Louisville's historically most congested and accident prone corridor, and providing access to employment.

Automated Guideway Transit (AGT) would be well suited for providing circulation and distribution services within the Park Hill study area as well as for providing connectivity to downtown businesses and investments, to proposed commuter transit services in the Southwest Corridor, and to potential remote parking sites. By connections to an intermodal transportation facility, AGT could provide final distribution of goods movement from the freight rail operations within the study area.

The costs for advanced transit service would be based on several categories including infrastructure construction, guideway elements, vehicle type, maintenance facilities, and operating plans, among other elements. This information would be defined in later phases of study for potential advanced service in the study area.

5.3 Intermodal Transportation Facilities

The development of an intermodal transportation facility in the study area could take great advantage of the extensive railroad infrastructure for the benefit of goods and passenger movement. An intermodal hub would seek to maximize the goods movement function of the facility. Intermodal typically refers to freight shipments as they relate to transit by both rail and truck. The establishment of dedicated facilities to load/off-load cargo to rail from truck could lead to reduced shipping costs for local businesses and may decrease the need for future rail lines to serve redeveloped areas. Rather than relying on a new rail spur, shipments could be moved by truck to nearby rail yards where they are loaded onto rail in the form of trailer on flat car (TOFC) or container on flat car (COFC.) In addition to freight, intermodal could be applied to future public transportation facilities within the area. This could apply to a transit center where passengers transfer between bus and fixed guideway transit.

Two potential intermodal hub sites have been identified and are shown in **Figure 5-4**. Site 1 is defined by Wilson Avenue to the north, 17th Street on the west, Norfolk Southern railroad on the south, and 15th Street on the east. This proposed site location would require the provision of shared trackage rights by Norfolk Southern to the other freight rail operations (specifically CSX and Paducah & Louisville Railway) in the study area to gain access to the facility. Proposed projects numbers 10 (Oak Street rail underpass) and 11 (Oak Street / Virginia Ave. two-way conversion) described in Section 5.1 above would provided better accessibility to the Site 1 location. Site 2 is defined by Ormsby Avenue / CSX railroad to the North, Paducah and Louisville Railway on the west, Norfolk Southern railroad on the south, and South 12th Street on the east. All of the major railroads in the study area would have direct

access to the intermodal facility at the Site 2 location. Proposed projects numbers 8 (relocation of rail line on Magnolia), 10, and 11 would provide benefits to the Site 2 location.

Major factors affecting the selection of a site for an intermodal transportation facility include cost, land acquisition, and ease of connectivity among transportation modes. Cost considerations for both capital and operating expenses are a major factor to consider in site selection. The scope of the facility will impact cost due to increased land acquisition, additional infrastructure requirements, higher operational and maintenance costs, and enhancements required to the surrounding environment to mitigate the negative impacts of the facility. Both the potential sites and the identification of additional sites will need to be evaluated during the Master Plan.

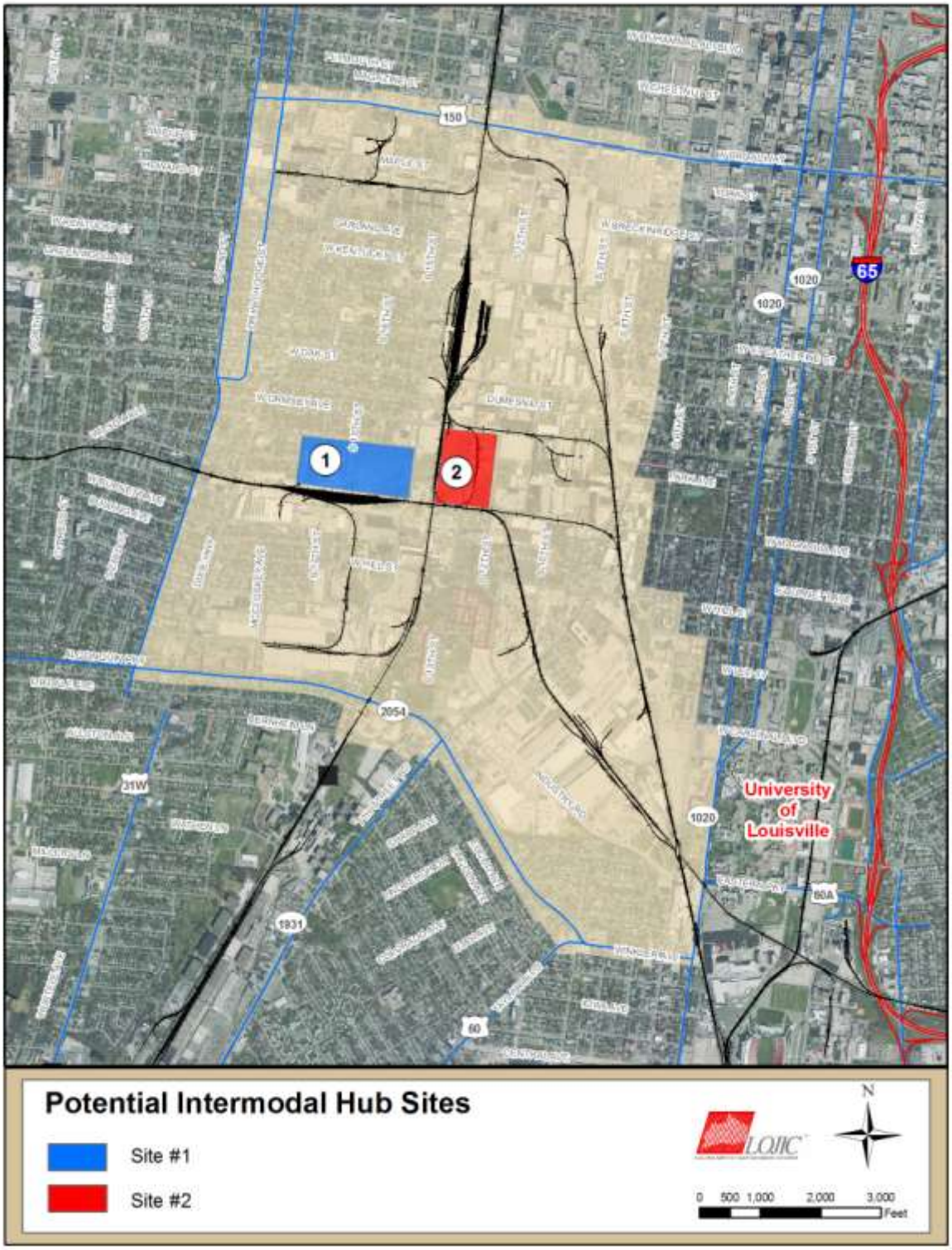


Figure 5-4: Potential Intermodal Hub Sites

6.0 Recommendations and Next Steps

This section discusses the recommendations for the potential improvements discussed in Chapter 5.

6.1 Roadway Improvements

Table 6-1 presents a summary of the recommendations for the roadway improvement projects presented in Chapter 5. The recommendations for each project are classified into two categories. A description of the categories is as follows:

> **Recommended for further study** - These projects are recommended for future consideration regardless of the findings from the Master Plan. Most of these projects address one or more existing deficiencies within the study area and are worthy of further pursuit. However, details related to the implementation will require additional analysis and based on those analyses; the final outcome may appear significantly different than the current concept.
>
> **Defer to the Master Plan** – On their own, these projects may or may not be required to produce significant benefits within the Park Hill Industrial Corridor. However, land use recommendations that develop in the Master Plan may result in the need to consider these improvement options. These types of projects typically focus on re-establishing street connections or relocating rail infrastructure. As such, each of these projects requires input from the Master Plan to not only determine their ultimate feasibility, but also better define project termini, corridors, and costs.

A brief description of each project, categorized by recommendation, follows.

- **Recommended for further study:**

  Project #1 - Construct interchange for access to I-65 from Hill Street: Improved freeway access, particularly to I-65, is critical to the redevelopment of the Park Hill Corridor. This concept creates a new access point from Hill Street, thereby reducing traffic through the Old Louisville neighborhood and the University of Louisville campus.

  Project #4 – Improve the intersection of Hill Street at 7th Street: During discussions with local stakeholders, the Hill Street corridor was mentioned numerous times as needing improvement. The existing Hill Street intersection with 7th Street does not have left turn lanes. Left turns are not allowed from Hill Street, and peak hour restrictions are in place for left turns from 7th Street. Minor widening is needed to accommodate left turn lanes on all four approaches.

  Project #5 – Replace rail underpass on Hill Street between 4th and 7th Street: This rail underpass is narrow and does not sufficiently accommodate pedestrians or bicyclists. Upgrading the structure is recommended to widen the street beneath and to increase the vertical clearance to current standards.

Table 6-1: Summary of Roadway Improvement Recommendations

Key	Potential Projects	Recommendation	Location
1	Construct interchange for access to I-65 from Hill Street	Recommended for further study	East of Floyd Street
2	Construct at-grade rail crossing on Cardinal Boulevard west of 4th Street	Defer to Master Plan	West of 4th Street
3	Construct 12th Street extension to Industry Road at 7th Street	Defer to Master Plan	Between 7th Street and Hill Street
4	Improve the intersection of Hill Street at 7th Street	Recommended for further study	7th Street intersection with Hill Street
5	Replace rail underpass on Hill Street between 4th and 7th Street	Recommended for further study	Between 7th Street and 4th Street
6	Improve 7th Street between Algonquin Parkway and Hill Street	Recommended for further study	Algonquin Parkway to Hill Street
7	Relocate rail line on Magnolia Avenue between 7th Street and 12th Street	Defer to Master Plan	Between 7th Street and 12th Street
8	Construct rail grade separation on Kentucky Street between 13th and 15th Street	Defer to Master Plan	Between 13th and 15th Street
9	Replace rail underpass on Oak Street east of 15th Street	Recommended for further study	Between 13th Street and 15th Street
10	Convert Oak Street / Virginia Avenue to two-way between 16th Street and I-264 (Shawnee Expressway)	Defer to Master Plan	Between 16th Street and I-264
11	Add bicycle lanes to 15th Street from Hill Street to Algonquin and Broadway to Riverwalk	Recommended for further study	Algonquin to Hill Street, Broadway to the Ohio River
12	Reconnect Ormsby Avenue between 10th Street and 15th Street	Defer to Master Plan	10th Street to 15th Street
13	Reconnect 10th Street between Magnolia avenue and Ormsby Avenue	Defer to Master Plan	South of West Ormsby Avenue
14	Reconnect 11th Street between Oak Street and Kentucky Street	Defer to Master Plan	Between Oak Street and Kentucky Street
15	Reconnect 13th Street between Oak Street and Kentucky Street	Defer to Master Plan	Between Oak Street and Kentucky Street
16	Create three-lane street section 18th Street between Broadway and Hill Street	Recommended for further study	Hill Street to Broadway
17	Convert Kentucky Street to two-way between 8th and I-65, Breckenridge to two-way between 9th and I-65	Recommended for further study	East of 8th Street / 9th Street
18	Open Kentucky Street to through traffic west of 15th Street	Defer to Master Plan	West of 15th Street

Project #6 - Improve 7th Street between Algonquin Parkway and Hill Street: This section of 7th Street is one of the more congested routes through the Park Hill Corridor. With the anticipated redevelopment on both sides of the street, widening to accommodate a center turn lane is recommended.

Project #9 - Replace rail underpass on Oak Street east of 15th Street: The existing Oak Street underpass has a vertical clearance of 11-feet, 5-inches, making the corridor unusable for trucks. With the interchange connecting Oak Street to 9th Street (and eventually I-64 to the north), replacing this aging underpass will provide an additional corridor for commercial traffic and open up opportunities for redevelopment.

Project #11: Add bicycle lanes to 15th Street from Hill Street to Algonquin and Broadway to Riverwalk: The existing bicycle facilities on 15th Street can be extended to the south to tie into the proposed facilities on Algonquin Parkway with relative ease. This increases overall bikeway connectivity. Connecting 15th Street bicyclists to the Riverwalk requires some reconfiguration of the existing street usage. North of Broadway, 15th converts to one-way traffic with two lanes traveling in the northbound direction. If converted to two-way, the on-street parking could be removed and bicycle lanes could be accommodated. Another option to consider is removing parking from one side of 15th Street for a northbound bicycle lane, and doing the same on 16th Street (which consists of two southbound lanes with on-street parking) to provide a southbound lane.

Project #16: Create three-lane street section 18th Street between Broadway and Hill Street: This section of Dixie Highway is two-lane, two-way with on-street parking in some areas. Numerous offset intersections are present and there is heavy pedestrian activity from nearby residences, parks, and schools. The recommendation is to remove the on-street parking and restripe the facility as a three-lane section with a continuous center left turn lane.

Project #17: Convert Kentucky Street to two-way between 8th and I-65, Breckenridge to two-way between 9th and I-65: Kentucky Street is one-way (eastbound) east of 8th Street and Breckenridge Street is one-way (westbound) east of 9th Street. These facilities provide local access between the northern portions of the study area to points east. Breckenridge is severed at 9th Street as a tee intersection, and picks up again as a two-way street west of 11th Street. Kentucky Street is currently two-way west of 8th Street. The recommendation is to convert both facilities to two-way traffic, at least to a point east of I-65. The final recommendation as to the extent of the conversion to the east will require further study.

- **Defer to Master Plan:**

Project #2 – Construct at-grade rail crossing on Cardinal Boulevard west of 4th Street: To increase accessibility to the American Standard site, this project should be considered for further study. Relocating and improving the skew angle at the existing at-grade rail crossing on Shipp Avenue/Lee Street west of 4th Street was considered as an alternative, but was not recommended for further consideration as it appears to conflict with the approved site plan for the American Standard Site. The Cardinal Boulevard option calls for a new grade crossing on the University of Louisville campus, which presents some issues with respect to pedestrian movement across the dual track CSX line.

Project #3 – Construct 12th Street extension to Industry Road at 7th Street: This project would likely be recommended as it increases accessibility to the Rhodia Site and increases access between the study area and I-65. However, the long-term plans for the Park Place housing development must be taken into consideration before a final recommendation can be made.

Project #7 - Relocate rail line on Magnolia Avenue between 7th Street and 12th Street: Depending on the land use recommendations for areas north or south of Magnolia Avenue, it may be advantageous to relocate the rail line currently in the middle of the street to the north or south side.

Project #8 - Construct rail grade separation on Kentucky Street between 13th and 15th Street: East-west connectivity in the northern portion of the Park Hill Industrial Corridor is limited, and Kentucky Street provides the only continuous option between Oak Street and Broadway. Discussions with the Paducah and Louisville revealed their desire to close Kentucky in the vicinity of their rail yard, located east of 15th Street. This improvement was developed as an alternative to closing Kentucky Street, which is the only east-west street that traverses the entire Park Hill Industrial Corridor Master Plan focus area (connecting 15th Street to 9th Street and areas east) between Oak Street and Broadway. Given the high cost of constructing a new grade separation, especially one passing beneath numerous rail lines, knowing what the future may hold in store for the Kentucky Street corridor would help justify the cost. This project should be considered in combination with Project #18.

Project #10 - Convert Oak Street / Virginia Avenue to two-way between 16th Street and I-264 (Shawnee Expressway): Oak Street is one-way west of 16th Street, with two lanes providing for travel in the westbound direction. This corridor provides access for Park Hill to I-264 (Shawnee Expressway). Dumesnil Street, which is one-way eastbound, provides access from the Shawnee Expressway to the study area. (Dumesnil Street is severed by the Paducah and Louisville rail line east of 15th Street.) The improvement for future consideration is to convert Oak Street, which turns into Virginia Avenue at 26th Street, to two-way traffic flow. This would allow for more efficient access between the Park Hill Industrial Corridor and the Shawnee Expressway. However, the potential benefits would have to outweight the potential impacts to residential areas west of the study area.

Project #12 - Reconnect Ormsby Avenue between 10th Street and 15th Street: This project is deferred for future consideration, contingent upon the land use recommendations that result from the Master Plan. If land use in the vicinity of the severed portion of Ormsby remains unchanged, the project would likely not be recommended. The corridor could provide improved access to the Vogt Site and adjacent parcels.

Project #13 - Reconnect 10th Street between Magnolia Avenue and Ormsby Avenue: This project is deferred for future consideration, contingent upon the land use recommendations that result from the Master Plan. If land use in the vicinity of the severed portion of 10th Street remains unchanged, the project would likely not be recommended. The corridor could provide improved access to the Vogt Site and adjacent parcels.

Project #14 - Reconnect 11th Street between Oak Street and Kentucky Street: This project is deferred for future consideration, contingent upon the land use recommendations that

result from the Master Plan. If land use in the vicinity of the severed portion of 11th Street remains unchanged, the project would likely not be recommended.

Project #15 - Reconnect 13th Street between Oak Street and Kentucky Street: This project is deferred for future consideration, contingent upon the land use recommendations that result from the Master Plan. If land use in the vicinity of the severed portion of 13th Street remains unchanged, the project would likely not be recommended. This corridor will likely affect the operations of the Paducah and Louisville rail yard.

Project #18 – Open Kentucky Street to through traffic west of 15th Street: As there is a lack of continuous east-west routes in the northern portion of the Park Hill Industrial Corridor (other than Broadway), it would be desirable to make Kentucky Street continuous by removing the curb that currently blocks travel on the west side of 15th Street. This project should be considered in combination with Project #8.

6.2 Public Transportation Improvements

The potential public transportation improvements proposed for the study area as discussed in Chapter 5 were grouped into the following categories:

- Bus Transit Service Frequency
- Expanded Service Coverage
- On-Street Infrastructure Improvements
- Advanced Rapid Transit

Bus service frequency improvements, expanded bus service geographic coverage, and on-street infrastructure improvements are all recommended for future consideration regardless of the findings from the Master Plan. The high transit dependency and ridership in the study area indicate the need for these improvements and they are worthy of further study. The specific details of the operational strategies and capital requirements related to implementation of these recommendations will require additional analysis.

The further consideration of the recommendation for advanced rapid transit in the study area should defer to the Master Plan. The implementation of advanced rapid transit may not be required to produce significant benefits within the Park Hill study area. However, land use recommendations that develop in the Master Plan and the potential future demand for increased, higher capacity, public transportation service in the Southwest Corridor of the Louisville Metro area may result in the need to consider the implementation of advanced or fixed guideway transit.

6.3 Intermodal Transportation Facility

The establishment of dedicated facilities to load/off-load cargo to rail from truck could lead to reduced shipping costs for local businesses and may decrease the need for future rail lines to serve redeveloped areas. Major factors affecting the selection of a site for an intermodal transportation facility include cost, land acquisition, and ease of connectivity among transportation modes. Two potential intermodal hub sites have been identified and are described in Chapter 5. It is recommended that both

the potential sites, and the identification of any additional sites based on the master-planning process, be considered and evaluated during the Master Plan.

6.4 Next Steps

Louisville Metro will coordinate a comprehensive Master Plan for the Park Hill Industrial Corridor beginning some time in early 2008. The focus area for the Master Plan will be somewhat smaller than that for the Short-term Transportation Planning Study, but the recommendations from the Master Plan may have a tremendous impact on the area's transportation system.

With that in mind, consideration must be given to the scope of and timeline for suggested changes in land use within the Park Hill corridor. The relationship between land use and transportation is often convoluted in that needed transportation improvements come after the land use changes are implemented. Phasing of improvements is critical to ensure that the transportation system will be capable of accommodating the multimodal traffic (including vehicular, truck, transit, pedestrian, and bicycle) that will be generated.

The Phase I and II Reports for the Short-term Transportation Planning Study will allow for coordination with the master planning process to ensure land use considerations are fully planned for in terms of their transportation needs. Once the Master Plan process is underway and a vision for future land use becomes clearer, the recommendations for roadway and transit improvement projects can provide guidance and direction in scoping improvements that should be considered for implementation within and surrounding the Park Hill Industrial Corridor.

SHORT-TERM TRANSPORTATION PLANNING STUDY

PHASE II SUMMARY REPORT

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