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Prepared by the Indianapolis Metropolitan Planning Organization

Contributing Consultants:

ABCBRINKERHOFF

Greenstreet

CRLG

ALOFT STRATEGIES
Chapter 1: Introduction
Project Context

Indy Connect

The Purple Line, as a rapid transit corridor project, is included within the Indy Connect Transit Vision Plan (map: Figure 1.01). Indy Connect, Central Indiana’s Transportation Initiative, is about connecting people to people and people to places through a network of bus routes, rapid transit lines, walking and biking paths and roadways. It’s about how these modes of transportation work together to get people to healthcare, jobs, the grocery store, school and entertainment. It offers much-needed transportation for those who can’t drive or afford a car, alternatives for those who don’t want to drive a car, and opportunities for jobs, cleaner air and neighborhood revitalization.

The Indy Connect Transit Vision Plan\(^1\) included recommendations for bus, rail, and roadway enhancements. It was the culmination of decades of research by transportation experts, and the most comprehensive plan for regional transportation ever developed for Central Indiana. The award-winning public outreach

\(^1\) Indianapolis Metropolitan Planning Area Indy Connect Transit Vision Plan – Volume 3, February 16, 2011, p.12.
and employment opportunities created by construction and operation of a system have a positive impact on the entire community, thus we encourage that related minority owned business, women owned business, and other disadvantaged business contracting goals not only be met, but exceeded.

At the same time, this comprehensive multimodal regional transportation system addresses each of the key issues identified in Chapter 1. The improved bus service and better transit linkages will enhance regional mobility, resulting in 61 thousand additional transit-based trips a day by 2035. By infusing development along key corridors, attracting transit-oriented development and making our central areas more appealing to new residents, the implementation of rail-based transit helps preserve the vitality of our region’s core. Property values near rail service in Marion County alone are expected to rise on average by 4%. Congestion will be reduced: Average daily delay per commuter will fall by 33%. Reducing car-based trips and roadway congestion will abate environmental pollution. Altogether these improvements will result in improved regional competitiveness.

The Indy Connect Transit Vision Plan was also supported by the Central Indiana Transit Task Force (CITTF), a group of Central Indiana business leaders who, in 2010, created a transportation strategy that was based on affordable funding options, addressed regional governance for transportation, and included recommendations on how to engage policy makers and the public in active dialogue.

History of the Purple Line
Various studies have been completed with regard to the need for expanding mass transit in Central Indiana, both for reasons of economic vitality as well as the need to provide a variety of transportation options to travelers within the region. The reports below led up to the identified need for a rapid transit Purple Line in Central Indiana.

Central Indiana Transit Task Force
In late 2008, the Central Indiana Corporate Partnership (CICP), the Greater Indianapolis Chamber of Commerce (GICC), and the Central Indiana Community Foundation (CICF) brought together a group of business leaders to form the Central Indiana Transit Task Force (CITTF). In 2010 the CITTF released the Summary Report on Transportation Alternatives in Central Indiana. This report laid out recommendations.
for the expansion and enhancement of transportation (highways, expressways, bus, and rail) in the Central Indiana region (Figure 1.02), as well as recommendations for financing the system, and its governance, but did not specifically recommend east-west cross-town transit service within the Purple Line study area.

2010 Comprehensive Operational Analysis

The 2010 Indianapolis Public Transportation Corporation (IndyGo) Comprehensive Operational Analysis (COA, aka. Bus Plan) recommends 38th Street as a future “Transit Emphasis Corridor” (Figure 1.03) or “Key Urban Arterial Corridor” (p.50 of that document).

- Route 39 was identified as a “Key Arterial Corridor” based on its high performance, including short term recommendations for increasing frequency (which, courtesy of a $6M funding increase from the Indianapolis Marion County City-County Council, took place in Summer 2013) and long term recommendations for upgrading Route 39 to rapid bus, while maintaining the current route from downtown to the far east side.
Route 38 was identified as a “Supporting Local Service”, with no change short-term and eventual upgrade to a cross-town route with rapid bus service.

Route 30 was recommended for redirection downtown in the short term, and reversion back to a cross-town once BRT along Meridian Street is established for easier transfers.

The IndyGo COA update (branded as “IndyGo Forward”) will occur during Summer/Fall 2014, with the revised COA scheduled for completion in Spring 2015. These results may impact the assumptions of this report.

**Indy Connect Transit Vision Plan**

In the 2011 plan, a comprehensive list of 13 candidate transit projects was developed in response to previous studies and recent public input (Figure 1.04). This list included a recommendation for using 38th Street as an arterial BRT service:

> “38th Street Cross-town service would extend along 38th Street from Eagle Creek on the west to Lawrence on the east, by way of key stops at Lafayette Square, Meridian Street and the Fairgrounds.”

The 13 candidate projects were ranked using a methodology consisting of service characteristics (vehicle technology, frequency, span, etc.), geography, operating statistics (vehicles required, revenue hours, etc.), potential trips served, and costs (capital, operation, and maintenance). The results of that ranking placed the 38th Street corridor as the 5th highest priority of the 13 projects. However, the plan also stated that stakeholder communities can affect the implementation order of projects by enhancing each corridor’s “readiness” for transit improvements through regional cooperation, developing transportation, land use, and zoning plans that would be supportive of transit improvements, willingness to engage in “value capture” strategies that would provide additional funding for implementation, and establishing appropriate regulatory and administrative policies to support both transit and land use investments. Over time, the previously identified “38th Street Corridor”, now referred to as the Purple Line, has risen in priority due to these readiness factors.
Purple Line Study Area

For the Purple Line Alternatives Analysis, the study area includes both the 30th Street and 38th Street corridors (Figure 1.05). Both streets are relatively straight and run parallel through the same mid-north area of Marion County, approximately one mile apart. 38th Street covers approximately 92.1% of the County’s width along its direct east-west roadway, while 30th Street covers approximately 81.0%.

The majority of each corridor that lies within Marion County was included in the study area, as well as the cross streets of Lafayette Road,
Michigan Road, Meridian Street, Fall Creek, Shadeland Ave, and Post Road. Also included were Pendleton Pike and Post Road north of 38th Street, and all roadway segments (42nd, 46th, and 56th Streets) used by the portion of IndyGo’s Route 4 that runs between Keystone Avenue and Post Road.

Finally, recognizing that IndyGo Routes 38 and 39 currently connect directly to the center of downtown using Meridian Street between 38th and Ohio Streets (Figure 1.06), and in order to maintain that routing option, the streets recommended for use by the Red Line south of 38th Street (Meridian Street -- which was determined to be a feasible option in an addendum to the 2013 Red Line Alternatives Analysis -- the Capitol Avenue / Illinois Street couplet, and the Washington Street / Maryland Street couplet) have also been included within the Purple Line study area.

Purpose & Need
The Purple Line rapid transit corridor is needed to provide a rapid transit option within one of the most heavily trafficked and populated corridors in Indianapolis. The 38th, 30th, and 34th Street corridors contain some of the highest concentrations of population density, poverty, low-income households, zero-car households, and therefore transit dependent people, in the Central Indiana region.

The Purple Line will provide a transfer opportunity with other rapid transit lines, including the Red, Green, and Orange Lines, from and to the far west and east sides of Indianapolis. It will also provide enhanced connectivity to local transit routes, and with other transportation options, such as bikeways and trails.

In 2013 IndyGo increased service frequencies on the Route 39 (east 38th Street). The recorded increase in ridership on Route 39 indicates a strong opportunity for further enhancement and establishment of the corridor as a rapid transit line.

The transit system currently in place (2014) requires nearly all riders to travel downtown before transferring between routes, should they live and work near different transit routes. It is at least a four-mile trip between 38th Street and transfer opportunities downtown for residents of the 38th Street corridor. Downtown Indianapolis is the largest employment center in Indiana, but many other employment centers within the Central Indiana region are located on the fringes of the community, built on greenfield land that was more affordable for developers than land in urban areas. Due to the location of these employment centers, riders are often required to take long trips with multiple transfers to reach them.

The rapid transit corridors can alleviate some of the inconvenience currently experienced by providing the backbone of an improved system that will facilitate more cross-town routes and therefore transfers outside of downtown.

The following vision statement is based on locally adopted goals and objectives. It will guide the development and evaluation of alternatives and lay the foundation for future environmental review phases.

Indy Connect aspires to create a more livable, accessible, sustainable, and vibrant Central Indiana region. In addition to providing transportation choice to Central Indiana residents, transit improvements are intended to create development and growth opportunities. The selected system should encourage more focused development within established activity centers and identified areas with potential for transit-oriented development, thereby further encouraging transit use, improving air quality, and enhancing regional sustainability.

The Purple Line as a rapid transit corridor can assist in the fulfillment of this vision.

Project Goals
The following goals are derived from the Transit System Principles of the Indy Connect Transit Vision Plan.

• Provide an alternative to private automobile use and therefore opportunities to reduce automobile dependence
• Provide more direct, more frequent, and faster travel options
• Select transit technologies that most efficiently serve our transportation needs in a cost-effective manner
• Leverage public investment in transit by
providing improved service to established activity centers and areas with economic development potential

- Maintain and improve essential services in existing transit-dependent areas
- Provide convenient connections between transit services and other travel modes
- Build on the existing arterial street network
- Reduce the demand for parking spaces in downtown Indianapolis and other urban centers, thereby enabling site redevelopment opportunities
- Better serve cross-town travel patterns
- Mitigate increasing traffic congestion
- Improve air quality and reduce greenhouse gas emissions

In addition to the goals above, the following questions were posed during the Purple Line Alternatives Analysis study:

- Is the Purple Line a necessary rapid transit corridor for the Central Indiana region?
- Does the selected study area include alignment options that could establish the Purple Line as recommended in past transit planning documents?
- Can alignment options be eliminated that have physical limitations to providing a service that will meet the FTA’s definition of rapid transit?
- Will the selected vehicle technology be cost-effective?
- Does the service provide the potential to increase access and allow riders to be more spontaneous with their trips?
- Does the selected alignment effectively balance service for populations that are transit-dependent with efficient operations and access to destinations for employment, health, or social opportunities?
- How will the Purple Line connect to other rapid transit lines, local transit, cycling facilities, and other modes of transportation?
- Will this service meet the demands of the most prominent trip patterns?
- Will special traffic control features be necessary to streamline operations, and if so where?
- Does the selected alignment have the potential to encourage increased ridership in the corridor?

**Public Participation**

The Purple Line Alternatives Analysis was conducted from March 2014 through January 2015. During the course of the project, there were three opportunities for public input (Figure 1.07), four Corridor Advisory Committee (CAC) meetings, several stakeholder conversations, and a final public presentation in February 2015 to the Indianapolis Regional Transportation Council for final approval of the document.

- CAC Meetings occurred in March, May, August, and September 2014. Each meeting took place in a different location within the Study Area to ensure as much participation as possible. CAC

Figure 1.07: Images from the 2014 public input meetings.
participants included representatives of agencies and institutions in the Purple Line study area including Eskenazi Health, Marian University, the City of Lawrence, CAFE neighborhood, Marion County Health & Hospital, Midtown Indy, various community development corporations, and others. Over 60 stakeholders were invited to be part of the committee.

- Public input opportunities included (1) evening meetings on three separate nights and in different locations in May 2014, (2) a lunch time webinar and evening meetings on two separate nights and in different locations in August 2014, and (3) an evening meeting and lunchtime webinar in September 2014. Each meeting took place in a different location within the Study Area to ensure as much participation as possible.

- Stakeholder conversations were held with representatives of the Indiana Department of Transportation (INDOT), the City of Indianapolis, the City of Lawrence, neighborhood organizations, and other interested parties as initiated by MPO staff or requested by the public.

In addition to the advertised public meetings, conversations took place with several representatives of, businesses that serve, and members of the Latino population on the west side of Indianapolis with regard to their opinions of and preferences for transit.

A summary of that public outreach effort is included in Appendix B: Public Outreach Materials, p.87.

- Information regarding the Purple Line and public meetings was distributed to thousands of Latinos in the West 38th Street/Lafayette Square area and at events that catered to Latinos.

- Latino Community leaders from the area were contacted in person, via email and by phone and invited to participate in the study for the Purple Line.

- Of the dozens of comments received, the majority illustrated the need for improved service. Over 80% of those approached knew nothing about Indy Connect or the Purple Line study. Almost 20% said they knew nothing about how to even catch a bus.

Regional Demographics

Regional demographic analysis indicates that the Census block groups that line the 30th and 38th Street corridors are located in areas with high percentages of workers with disabilities, senior residents (age 65+), households with no vehicle present, and minority, low income*, and poverty populations. The presence of these community characteristics indicates that the 30th and 38th Street corridors would likely benefit greatly from enhanced public transit options and frequency, and potentially from the implementation of a rapid transit corridor, confirming the selection of this area for analysis.

The maps on pages 13-14 show the percentages of each characteristic by census block, as compared within the Central Indiana region.
Chapter 1: Introduction

- Percent HH No Vehicle
- Percent Walk / Bike / Bus
- Percent Commute Other Than Drive Alone
- Percent Work at Home
- Percent Pop. Not White
- Percent HH Low Income
- Percent Pop. in Poverty
- Percent Households No Vehicle
- % Population in Poverty
- % Household Low Income
- % Households No Vehicle
- % Non-White

* % HH Low Income = HH at or below 150% of federal poverty standard for the average household size within the central Indiana region.
Chapter 2: 

Vehicle Selection
Chapter 2: Vehicle Selection

Vehicle Technologies Evaluated

Three transit vehicle technologies were considered for the Purple Line: Bus Rapid Transit (BRT), Streetcar, and Light Rail Transit (LRT). Each technology is described below, followed by Table A: Vehicle Amenities and Service Characteristics, p.19 which compares the major characteristics of each technology. It is assumed that the Purple Line will operate on or along existing streets, due to the fact that the study area does not include any rail or other non-street transportation right-of-way that would be suitable to serve the potential riders and destinations therein.

Streetcar

Streetcars are the modern technological descendant of the historic streetcar or trolley. Streetcars can operate on tracks in their own dedicated space, in the roadway mixed with other traffic, or in pedestrian areas. Modern streetcars are powered by electricity, drawn by an overhead wire, or catenary, system. Some streetcar vehicles being introduced to the U.S. market have batteries that allow them to operate “off wire” for some portion of the route.

Figure 2.01: Streetcar in Tacoma, Washington

Fixed facilities that would be necessary for a streetcar system, including the overhead catenary system, power substations (typically located about one mile apart), signal and communication systems, and a vehicle maintenance and storage facility to accommodate a new streetcar fleet.

Figure 2.02: LRT in Phoenix, Arizona

Light Rail Transit (LRT)

The features of light rail transit (LRT) are similar to modern streetcars. The main difference is that LRT tends to be characterized by somewhat larger vehicles and multi-car trains, typically 200 to 400 feet in total length. Train length depends on passenger demand, service frequency, and block length when operated on streets. “Light” denotes more flexibility in operation than heavy rail systems, such as subways and commuter rail, and typically “light rail” is not Federal Railroad Administration (FRA) compliant and therefore cannot operate in the same corridors as freight rail.

All Technologies

There are some vehicle and operating characteristics (LRT, BRT, and Streetcar) that would exist for all three technologies. These include having stations with amenities like platforms for level boarding to make it easy for people with wheelchairs, strollers, crutches or other devices to quickly board the bus, off-board fare collection at a kiosk to eliminate the need for the vehicle to wait while riders pay their fare directly to a driver, canopies or sheltered structures, seating, lighting, art, landscaping, bicycle racks, real time information about the next bus arriving and estimated arrival time, and other amenities. Implementation of any of these technologies

---

1 Technology descriptions have been paraphrased from those provided within the Red Line Alternatives Analysis: http://www.indyconnect.org/pages/Red-Line-Recommendations/

2 Tracks are formed of continuously welded rails embedded at-grade in a concrete slab.

3 The facility would have to be located on a site adjacent to or close to the line and would be connected by a lead track.

Streetcars are typically 65 to 70 feet long and 8’-1” to 8’-6” wide. Smaller than a LRT vehicle, the streetcar vehicle size enables them to operate in a number of urbanized settings and make sharper turns than LRT. Operator cabs at both ends of the vehicle allow bi-directional operation, and streetcars can operate either as a single or two-car train.
or separate corridor next to the roadway. In downtown areas, LRT tends to operate on-street but in dedicated lanes (such as those in Phoenix, Arizona, Figure 2.02) and does not mix with general traffic like streetcars typically do. Because of this, local turning access to driveways and parking garages, both public and private, may be restricted to only right turns, to avoid conflicts between general traffic and LRT vehicles. Medians may be constructed to ensure that left turns are restricted within the LRT corridor.

LRT vehicles are typically powered by electricity, drawn by an overhead wire, or catenary, system, which would require power substations, but could also be powered by diesel or other fuels.

**Bus Rapid Transit (BRT)**

The main differences between bus rapid transit (BRT) service and local bus service are the enhanced stations and platforms, fewer stations than local service, low-floor vehicles, unique branding to distinguish the BRT service from local bus service, and bus signal priority improvements. BRT lines may also include exclusive lanes, where possible, with associated pavement striping and overhead signage to enhance operations.

BRT station platforms can utilize bus bulbs (aka. bump-outs) that extend from the curb, and are typically level with the vehicle doorways. Some BRT systems use guidance and docking systems to minimize the space between the platform and the vehicle, reducing the need for ramps or bridge-plates and enabling fast boarding and alighting for all riders, including persons with disabilities.

BRT vehicles may be similar in size to a standard 40-foot bus with multiple entry/exit doors to facilitate passenger loading and unloading or a longer 60-foot articulated bus where there is greater passenger demand. BRT vehicles are generally about 12’-0” high and approximately 8’-6” wide.

**Past Recommendations**

The Indianapolis Metropolitan Planning Area Indy Connect Transit Vision Plan – Volume 3 (“Transit Vision Plan”) recommends utilizing bus rapid transit (BRT) technology for the Purple Line (38th Street) corridor:

*BRT Projects on Arterial Streets: Two potential alignments for permanent BRT service have been identified... 38th Street Cross-town service would extend along 38th Street from Eagle Creek on the west to Lawrence on the east, by way of key stops at Lafayette Square, Meridian Street and the Fairgrounds.*

In addition, the Transit System Principles/System Design Principles (p.12 of the Transit Vision Plan) include the following principle:

*Select transit technologies that most efficiently serve our transportation needs in a cost-effective manner.*

A major advantage of BRT vehicles is their flexibility. The service is not limited to a single corridor with embedded tracks, restricting any other movement, like LRT and Streetcars. BRT can feature a variety of service strategies, such as single corridor, branching service, or detour onto non-BRT routes into mixed traffic in the case of an emergency or large regional event. BRT is also far less limited in turning movements than rail technologies, providing more flexibility for route selection, and would only require additional maintenance facilities if the existing facilities are at capacity. Otherwise existing facilities could be shared by local service buses and BRT vehicles.

---

BRT is the preferred mode of transit for the Purple Line for the following reasons.

**Corridor Capacity Analysis**

Based on the study alternatives, the Purple Line corridor will likely use an existing roadway with potential limitations to pavement widening. Therefore the more flexible BRT system would be preferred over the necessary infrastructure installation (fixed track) of a streetcar or LRT system.

Further, limitations for fixed infrastructure based on a capacity analysis of the alternatives (more information in the Roadway Operations Analyses in Chapter 3, p.34) indicate that a mode of transit that can transition from fixed guideway to mixed traffic (like BRT) as necessary within the selected corridor would be preferred.

**Operations and Maintenance**

A BRT system would allow certain efficiencies in vehicle maintenance and storage by using the existing facilities, which could significantly reduce the system cost as compared to streetcar or LRT systems. The shorter vehicle length and greater flexibility of turning movements of a BRT system would also be advantageous. While LRT systems tend to have greater passenger capacity for a single vehicle, BRT vehicles could arrive at stations more frequently.

---

**Table A: Vehicle Amenities and Service Characteristics**

<table>
<thead>
<tr>
<th>Enhanced Stations</th>
<th>Bus Rapid Transit (BRT)</th>
<th>Streetcar</th>
<th>Light Rail Transit (LRT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>user information (maps, real-time “next bus” information using intelligent transportation systems (its) technology)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>off-board fare collection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>low-floor boarding</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>unique branding</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>station spacing (miles)</td>
<td>1/4 to 1 mi</td>
<td>1/4 to 1 mi</td>
<td>1/2 to 2 mi</td>
</tr>
</tbody>
</table>

**Transitway Improvements**

| priority signalization improvements | ✓ | ✓ | ✓ |
| can mix with traffic | ✓ | ✓ |
| can have dedicated, exclusive lanes, with associated pavement striping and overhead signage | ✓ | ✓ | ✓ |
| can have both exclusive lanes and mix with traffic, with associated pavement striping and overhead signage | ✓ | ✓ |
| has flexibility to deviate from the fixed route for special circumstances (e.g. road closures for traffic accidents or parades, etc.) | ✓ |
| bulb-outs at stations (platforms that extend from the curb and are typically level with the vehicle doorways) | ✓ | ✓ |
| typically requires power substation(s) | ✓ | ✓ | depends on propulsion |
| would utilize existing maintenance / storage facility | ✓ |
| typical length of corridor fixed-guideway (miles) | 0.1 – 17.0+ mi | < 5.0 mi | 2.0 – 20.0+ mi |

**Vehicles**

| multiple entry/exit doors | ✓ | ✓ | ✓ |
| length of single car/unit | 40’-65’ | 65’-70’ | ~ 100’ |
| number of cars/units | 1 | 1-2 | 2-4 |
| bi-directional (operates either direction without turning around) | ✓ | ✓ |
| can typically make 90-degree turns without increasing right-of-way | ✓ | ✓ |
| electric, diesel, or compressed natural gas vehicles | ✓ | ✓ | ✓ |
| maximum peak period directional passenger capacity | 2,000-7,000 | 2,000 | 14,000-25,000 |
Vehicle Ridership Capacity

According to a record of IndyGo’s average daily boardings and alightings (June 2013), the potential Purple Line alignment corridors within the study area experience the level of activity listed in Table B: Boardings/Alightings (2013). The counts within the table are not based on specific route activity, but rather all activity that occurred within each potential alternative corridor listed in the table. The boarding and alighting counts indicate a higher number of existing riders accessing transit along the 38th Street corridor from Eagle Creek Parkway to Mitthoefer Rd than either the 30th Street corridor or 38th Street corridor that connects to the City of Lawrence via streets utilized by IndyGo’s Route 4 (42nd/46th/56th St) (Figure 2.04).

A preliminary review of total ridership on routes 4, 30, 38, and 39 (routes within the study area - Figure 2.05) indicates that these routes carry a respective average daily ridership of 927, 489, 1,530, and 4,539 passengers per day.

Additionally, output was generated from the Indianapolis MPO’s regional travel demand model (TDM), estimating ridership potential in 2015 if the Red, Green, Blue, and Purple Lines were open and operating as BRT services. That output indicates that the number of daily boardings (based on the alternative route options compared within this document) could range from 3,100 to 6,200 boardings per day\(^5\).

---

5 The TDM ridership potential can be found in Table K: Purple Line Ridership Projections, p.52.
appropriate in the near-term, but over time, as potential increases in ridership occur, may have too little capacity.

**Capital Cost Comparison**

Figure 2.06 compares the actual or estimated capital cost per mile for representative existing and planned BRT, streetcar, and LRT projects. The existing capital cost data is in year-of-expenditure dollars within approximately the last ten years. The BRT costs reflect a range of running-ways and vehicles, from a cost of $3.5 million per mile in Kansas City, where some peak period exclusive bus lanes and 40-foot vehicles were applied, to $5.5 million per mile in Eugene, Oregon

where more exclusive median and guided busway and 60-foot stylized vehicles were used. In Cleveland, where the entire street was rebuilt as part of the BRT project (from building face to building face including road repaving, sidewalks, utility burying, lighting, some facade renovation, and other elements), capital costs of $29.0 million per mile were incurred.

In general, BRT has the lowest capital cost per mile of the vehicle technologies considered, with streetcar and LRT having a substantially higher cost per mile. This is due, in large part, to BRT’s use of converted travel or parking lanes or operation in mixed traffic, while streetcar and LRT systems require street reconstruction, development of separate power systems, and a vehicle storage/maintenance facility. The capital cost of BRT can increase substantially if a separate busway or complete street reconstruction is undertaken to develop an exclusive BRT guideway, as demonstrated by the higher cost per mile for the Cleveland Health Line, Los Angeles Orange Line, and Eugene EmX BRT corridors. However, per mile costs, even for those BRT lines, are still less than for streetcar or LRT.

For an arterial-type BRT line that does not involve the acquisition and construction of exclusive right-of-way, vehicles are the primary capital cost driver. After vehicles, a maintenance/operating facility (if necessary) and stations/stops are large cost drivers. The need for a new maintenance/operating facility will depend on the number of vehicles required to operate a Purple Line BRT. If the existing IndyGo facility cannot accommodate the required number of buses, a new facility would be needed.
be required at considerable cost. Although it may be likely that the existing facility has the capacity to accommodate the vehicles that would be required for Purple Line operation, this may not be the case if the Red, Blue and Purple lines are implemented at roughly the same time. However, it should be noted that new, separate maintenance/operating facilities are not anticipated to be needed for the Red and Blue Line BRT projects.

At this initial stage of the Purple Line analysis, three projects (a partly on-street light rail line, a streetcar line under construction, and an arterial BRT line) were chosen for cost comparison purposes based on their similarities to the needs and environment of the Purple Line BRT project. These are, with year of expenditure dollars:

- **Light rail – Charlotte Blue Line, $42 million per mile.** The Charlotte light rail system is one of the most recently developed in the U.S. Its alignment consists of a mix on exclusive right-of-way and on-street operation. Given the lack of an exclusive off-street right-of-way in the Purple Line study area, on-street operation would be likely but would generally require the conversion of a portion of travel lanes to exclusive light rail operation.

- **Streetcar – Cincinnati Streetcar, $41 million per mile.** This line is currently under construction and is scheduled to open in 2016. The topography of the corridor is generally flat, similar to the Purple Line study area, although it is located within a central business district environment.

- **Arterial BRT – Eugene (EmX) Franklin Line, $5.5 million per mile.** This extension to the first BRT line in Eugene features a mix of exclusive and semi-exclusive alignments within existing right-of-way. Eugene, rather than Kansas City, is suggested as a more appropriate comparison with the Purple Line. Eugene’s line features stylized 60-foot buses and more elaborate stations than Kansas City’s line, which uses standard 40-foot buses and more modest stations.

The costs cited above include purchasing vehicles. Based on various potential Purple Line corridor lengths, a rough comparison of costs by mode is shown in Table C: Purple Line Initial Cost Comparisons by Mode.

LRT and streetcar costs are similar, although various LRT systems, as shown in Figure 1, cost far more (exceeding $100 million per mile in some cases) due to unique local conditions such as bridges, tunneling and other exclusive right-of-way treatments. Streetcar costs are comparable to lower-end LRT costs as both modes employ the same technology and on-street operation, although streetcars tend to operate primarily in mixed traffic while LRT tends to operate primarily in exclusive lanes. In addition, as noted above, the costs of most new streetcar and LRT lines includes a new maintenance/operating facility whereas most BRT systems are able to operate from existing bus facilities.