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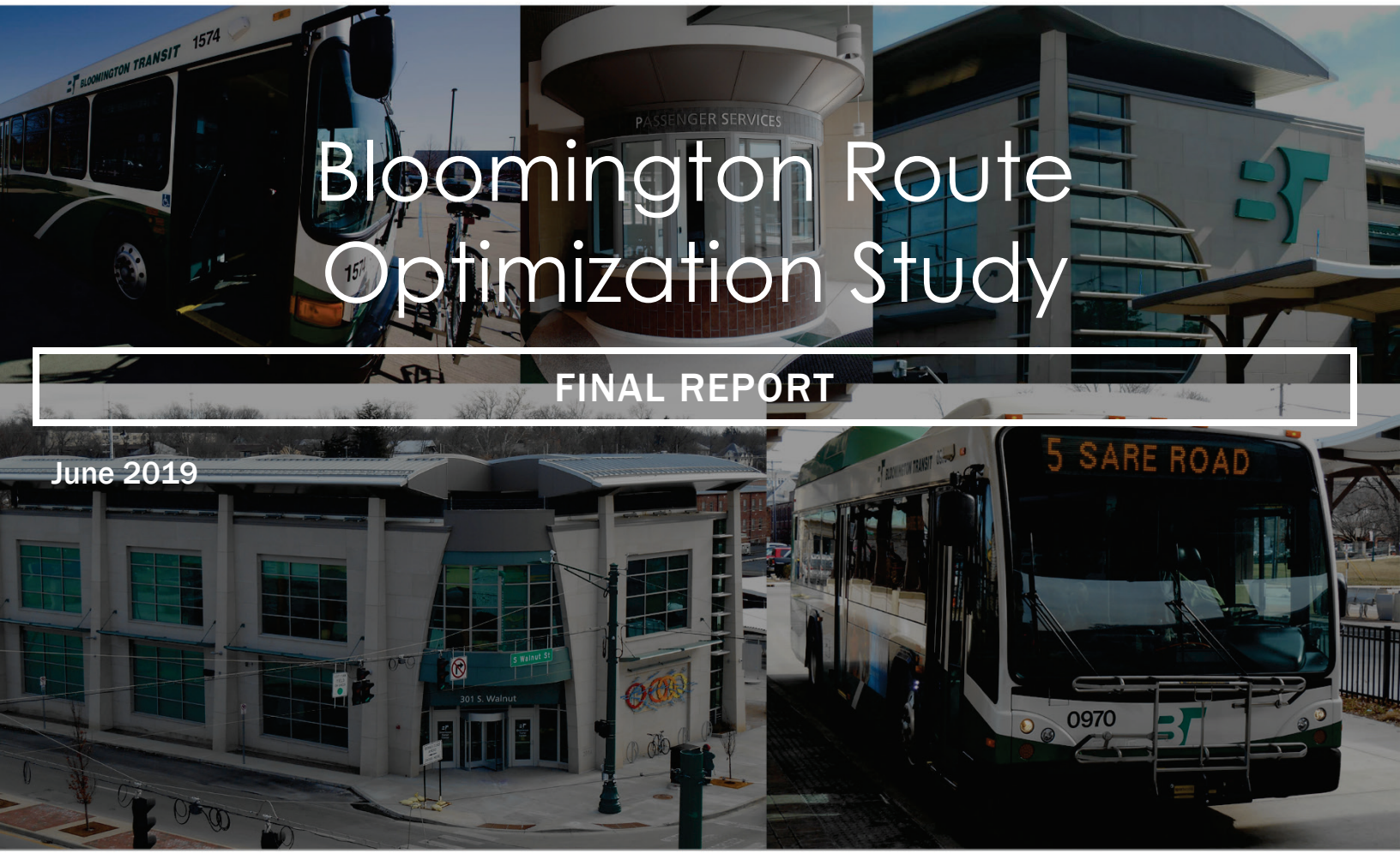

Bloomington Route Optimization Study

FINAL REPORT

June 2019

Prepared for:

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EXECUTIVE SUMMARY

Like many college towns, Bloomington, Indiana is served by two complementary transit systems. The Bloomington Public Transportation Corporation (BPTC) provides fixed-route service throughout the Bloomington Urbanized Area and ADA paratransit service within the City of Bloomington. Indiana University operates its own fixed-route transit service, focused on the mobility needs of IU students, faculty, and staff.

BPTC's fixed-route service, known as Bloomington Transit (BT), carries over three million passengers annually. The BTaccess paratransit service provides approximately 35,000 passenger trips a year. Both of these services experienced dramatic ridership growth from their inception until 2014. Between 1984 and 2014, total BPTC ridership increased from less than 500,000 riders per year to more than 3.5 million. However, since 2014, BPTC has seen its ridership decline. Similarly, Indiana University's Campus Bus service now carries three million annual passengers, down from a peak of 3.7 million in 2011.

The decline in transit ridership in Bloomington is consistent with national trends and coincides with a rapidly changing mobility landscape. Factors contributing to this decline include the prevalence of new and emerging technologies such as app-based ride hailing services, shared-use scooters, and even changing retail habits such as online shopping. In addition, development trends in Bloomington have resulted in more people living downtown and within walking or biking distance of the IU Campus. These residents are likely less reliant on transit to get to key regional destinations, both because of proximity and availability of other mobility options.

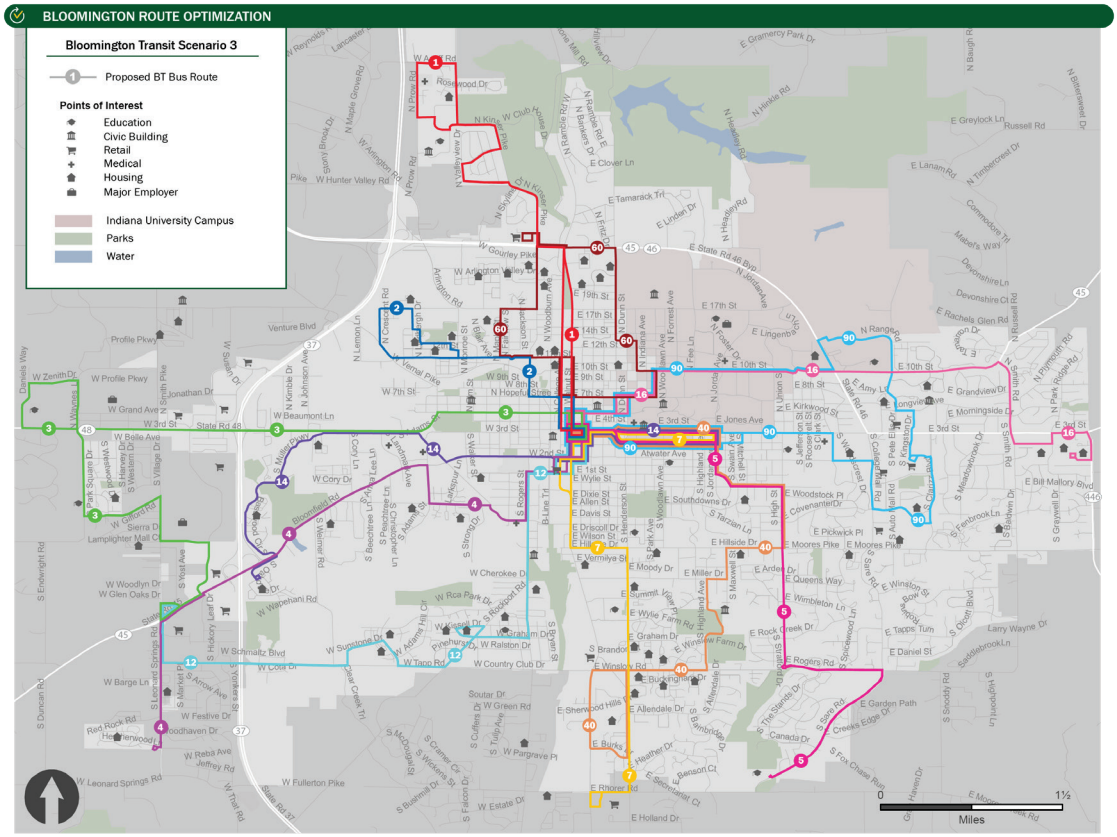
The Bloomington Route Optimization Study provided an opportunity to take a fresh look at Bloomington's existing transit services and assess how well they align with the mobility needs of the changing region. The recommendations developed over the course of this study are intended to improve service for existing riders; help Bloomington Transit and IU Campus Bus attract new riders; and ensure that both systems are operating as efficiently and effectively as possible.

This document consists of six chapters that follow this executive summary. Each corresponds to the major phases of the study:

- **Market Analysis.** An assessment of the existing and potential demand for transit service based on population and employment density, as well as socio-economic and demographic characteristics (Chapter 1).
- **Assessment of Existing Conditions.** An overview of existing transit services in the study area, including current operating characteristics (Chapter 2).
- **Stakeholder Outreach.** A summary of the rider and non-rider input, collected in meetings and surveys over the course of the study, and used to inform the development of preliminary service improvement recommendations (Chapter 3).
- **Identification of Service Issues and Opportunities.** A diagnostic assessment of the existing systems' strengths, weaknesses, and opportunities, as identified through the combination of technical analyses, stakeholder outreach, and industry best practices (Chapter 4).
- **Development of Service Scenarios.** A review of the two preliminary service redesign scenarios for Bloomington Transit and IU Campus Bus (four scenarios total), and the feedback received from stakeholders in response to each scenario (Chapter 5).
- **Final Recommendations.** A detailed set of recommendations designed to better align transit service with ridership potential, and to improve the ridership, productivity, and on-time performance of both systems (Chapter 6).

The final recommendations in this document include short-range recommendations that can be implemented within the constraints of existing resources, and long-range recommendations that will require additional funding and analysis before possible implementation. **Figure 1** presents a system map of the final recommended short-range service scenario for Bloomington Transit. This scenario combines the most popular elements of the two preliminary service scenarios redesign scenarios with the most effective features of the current BT network and new ideas that emerged from the stakeholder outreach process.

Figure 1: Recommended Short-Range Service Redesign Scenario for Bloomington Transit

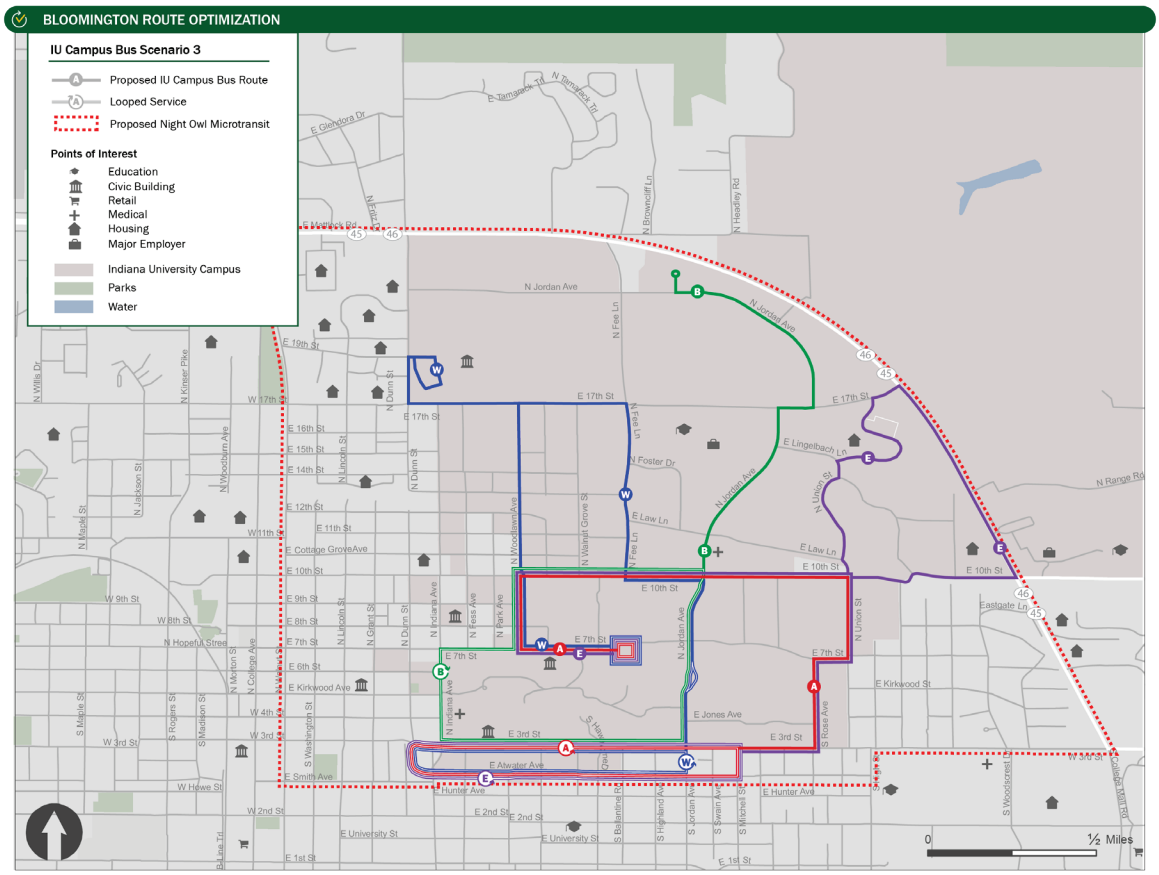


Key features of recommended service redesign scenario include the following:

- New service to Ivy Tech and the future site of Bloomington Hospital
- New bi-directional service along Muller Parkway, Basswood Drive, and Oakdale Drive
- New service along Tapp Road
- Additional access to Walmart and the Social Security Administration office
- Simplified and consolidated service in east Bloomington and along the Henderson Street corridor
- Streamlined access to downtown Bloomington from the 11th Street and Kinser Pike corridors
- Bi-directional circulation in high-density neighborhoods north of downtown, and high-density retail corridors east of IU
- One-seat ride from Henderson Street and Muller Parkway/Basswood Drive corridors to IU campus.
- Elimination of unproductive service along portions of Sare Road
- Clockface frequency on all routes
- Reduced schedules, but no reduced coverage, during IU break periods

Figure 2 presents the final recommended short-range system map for the IU Campus Bus network. This scenario recommends a streamlining of IU Campus Bus service via four core routes: the A Route, B Route, E Route, and W Route. To complement fixed-route service, the recommended scenario proposes to replace the current Night Owl route with an app-based on-demand service, also known as microtransit, on Friday and Saturday nights.

Figure 2: Recommended Short-Range Service Redesign Scenario for IU Campus Bus Service



The final recommended short-range service scenarios are projected to increase annual ridership by 6.2 percent for Bloomington Transit and by 4.5 percent IU Campus Bus within two years. A redesigned transit network often takes up to two years to reach its full ridership potential as changes tend to be disruptive, no matter how well-designed. In fact, ridership often falls in the initial months after a major service change while riders familiarize themselves with the new route network. Over time, however, this trend will likely reverse itself and ridership growth will accelerate.

1. MARKET ANALYSIS

More than any other factor, the effectiveness and efficiency of public transportation is determined by density. Where there are higher concentrations of people and/or jobs, transit ridership tends to be higher. At the same time, most transit agencies have a mandate to provide comprehensive service in the communities they serve, and to provide mobility for residents with no other means of transportation. The purpose of this Market Analysis is to both identify the strongest transit corridors in the Bloomington region and to highlight areas with relatively high transit need.

While Transit Potential is an analysis of population and employment density, Transit Need focuses on socio-economic characteristics such as income, automobile availability, age, and disability status that are indicative of a higher propensity to use transit. Transit use is also influenced by the built environment. In particular, there are certain land uses – such retail centers, civic buildings, multifamily housing, educational institutions, medical facilities, and major employment centers – that tend to generate transit trips at a relatively higher rate. As such, these ridership generators are included in the maps describing Transit Potential and Transit Need.

Transit Potential

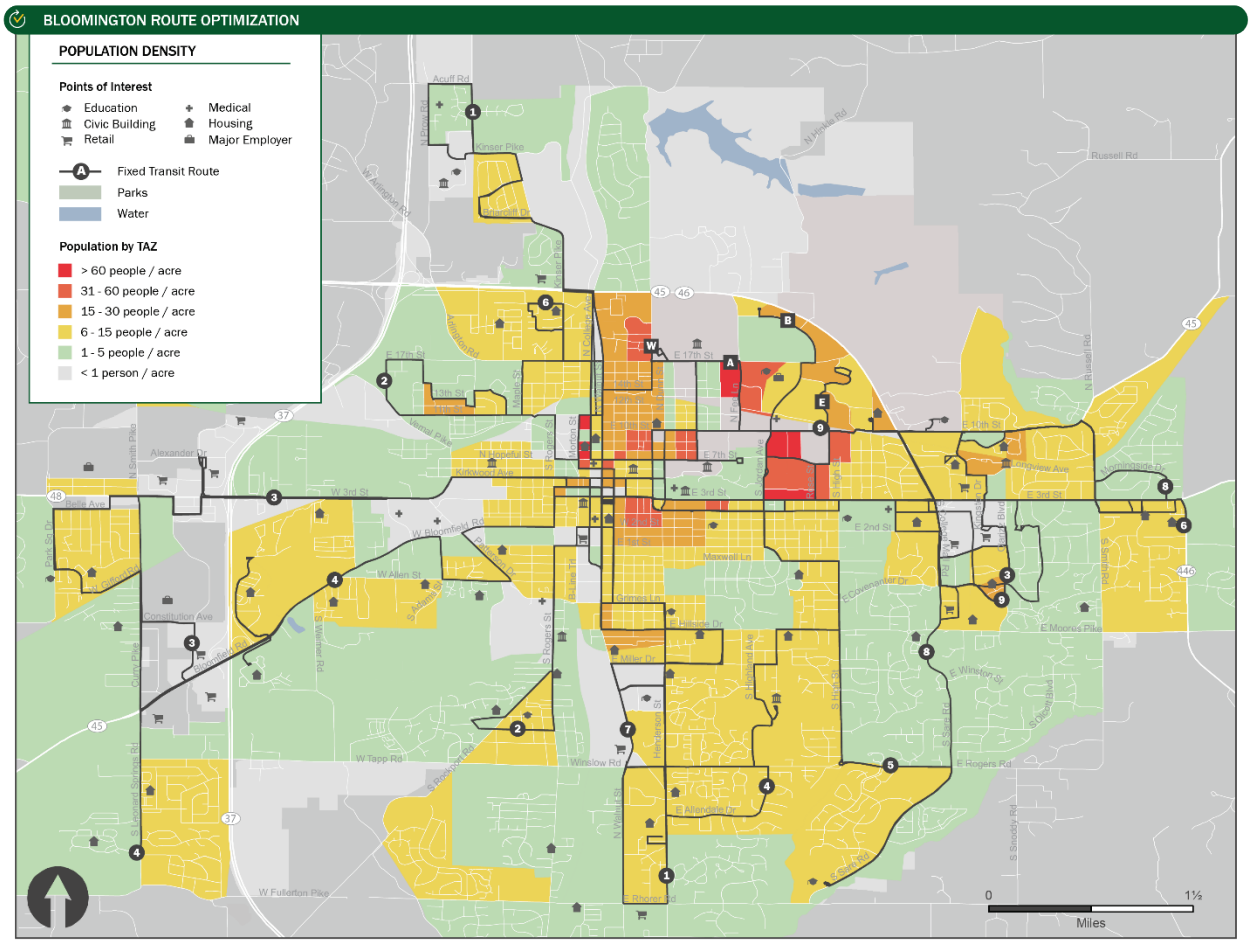
Transit service is generally most effective in areas with high concentrations of residents and/or jobs. The following Transit Potential analysis uses 2013 population and employment projections from The Bloomington/Monroe County Metropolitan Planning Organization's long-range transportation plan (Transform 2040). The geographic divisions used for this analysis are Transportation Analysis Zones (TAZ).

Population Density

Public transportation is most efficient when it connects population and employment centers where people can easily walk to and from bus stops. The reach of transit is generally limited to within one-quarter mile to one-half mile of the transit line, or a 10-minute walk. For this reason, the size of a transit travel market is directly related to an area's population density. Typically, a density greater than five people per acre is needed to support base-level (hourly) fixed-route transit service. **Figure 3** shows the population density of Bloomington. Yellow areas indicate places where fixed-route service could be feasible; areas with darker colors have the potential to support more frequent service.

While much of Bloomington has low to moderate population density, pockets of higher density can be found in downtown, north of downtown off North Walnut Street, and around Indiana University. Virtually all areas and corridors that have the density to support fixed-route transit service currently have some level of service.

Figure 3: Bloomington Population Density

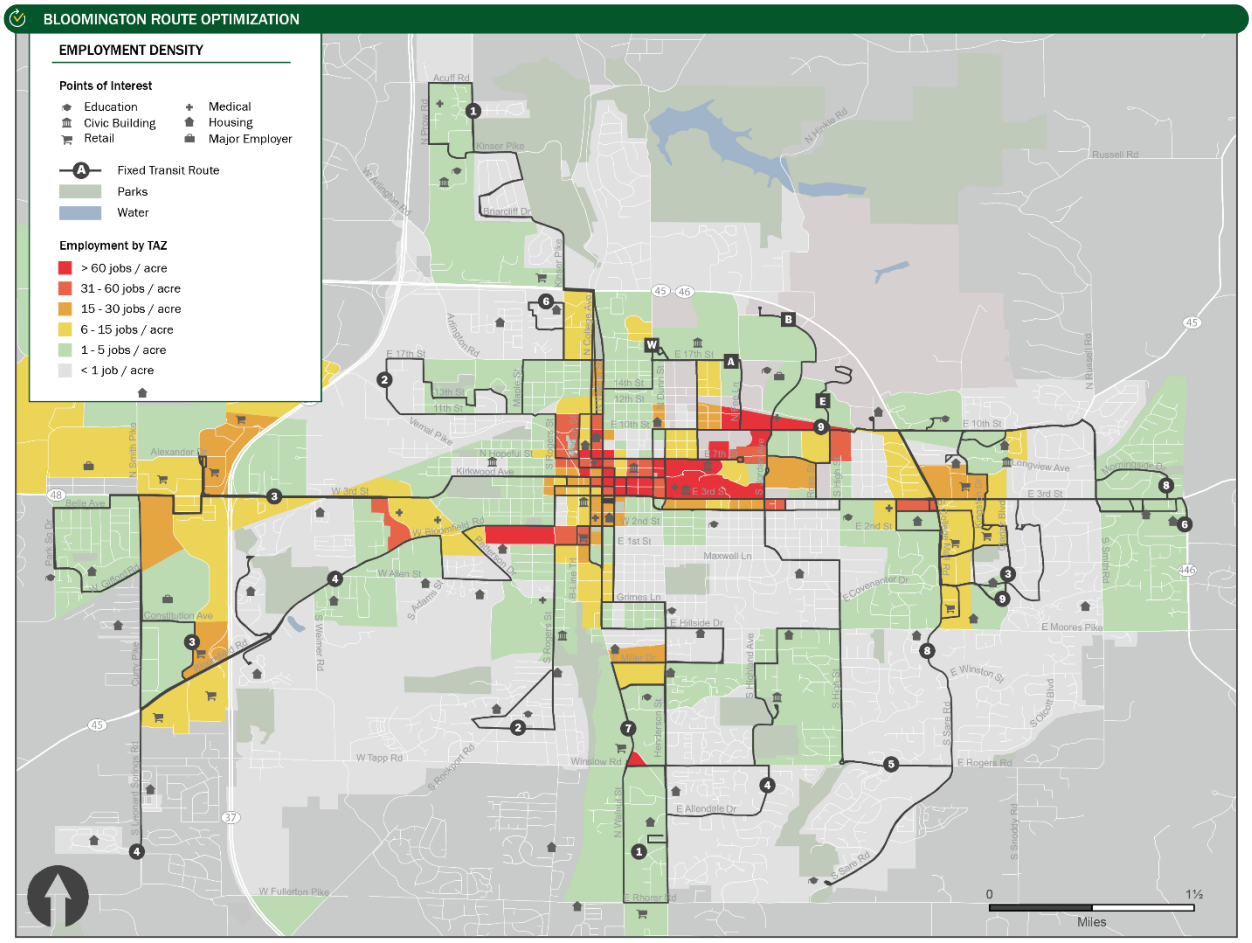


Employment Density

Given that traveling to and from work accounts for the largest single segment of transit trips in most markets, the location and number of jobs in a region are also strong indicators of transit demand. Transit that serves areas of high employment density also provides key connections to job opportunities. Like population density, an employment density greater than five jobs per acre can typically support base-level fixed-route service. This density corresponds with yellow areas in **Figure 4**.

Bloomington's jobs are concentrated around downtown; at Indiana University and its surroundings; and at several outlying areas, including south of West Bloomfield Road, southwest of downtown. Like population density, employment density in Bloomington dissipates further outside the downtown and University regions.

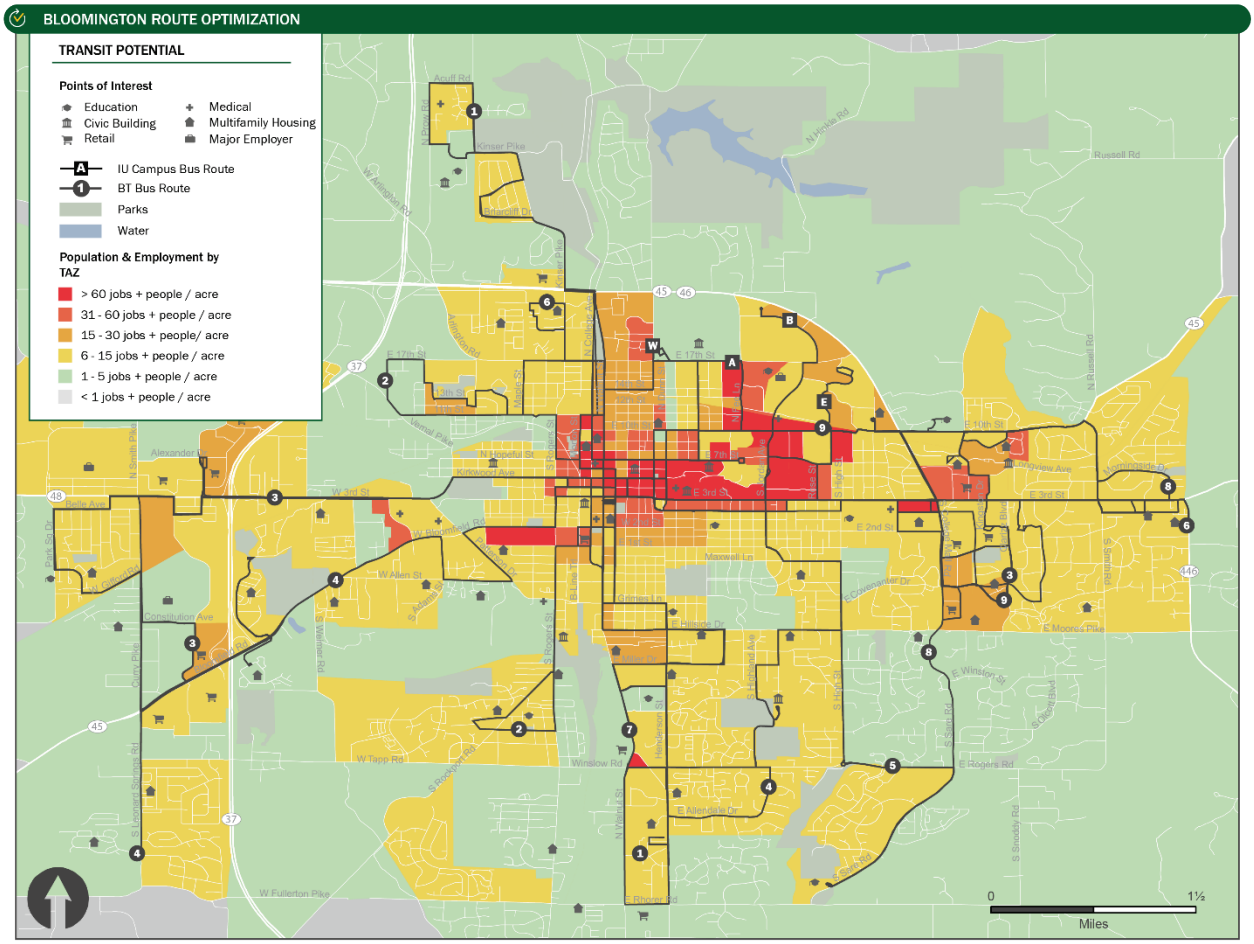
Figure 4: Bloomington Employment Density



Transit Potential Index

Transit Potential, shown in **Figure 5**, combines the population and employment densities for each TAZ to indicate the viability of fixed-route service in an area. In Bloomington, the highest potential for transit service exists in the downtown area and in the vicinity of Indiana University. Additionally, most areas in Bloomington with density sufficient to support fixed-route service are currently served by at least one BT or IU Campus Bus route. Relatively dense areas lacking transit service include north of West 3rd Street and west of State Route 37; south of State Route 45/46 and east of College Avenue; pockets east of South Leonard Springs Road; and southwest of the southern end of Route 2.

Figure 5: Bloomington Transit Potential



Transit Need

Above all, public transportation is a mobility tool. Certain population subgroups have a relatively higher propensity to use transit as their primary means of local and regional transportation. These groups include:

- **People without access to an automobile**, whether it be by choice or due to financial or legal reasons, often have no other transportation options besides using transit;
- **Persons with disabilities**, many of whom can't drive and/or have difficulty driving;
- **Low-income individuals**, typically because transit is less expensive than owning and operating a car;
- **Youth / young adults** who are either too young to drive, or have in recent years shown a greater interest in transit, walking, and biking than in driving; and
- **Older adults**, who as they age, often become less comfortable or less able to operate a vehicle.

The maps that follow (**Figure 6**–**Figure 10**) show the densities of each of these five high-transit-propensity population subgroups by Census block group to help determine where the need for transit service in the study area is greatest.

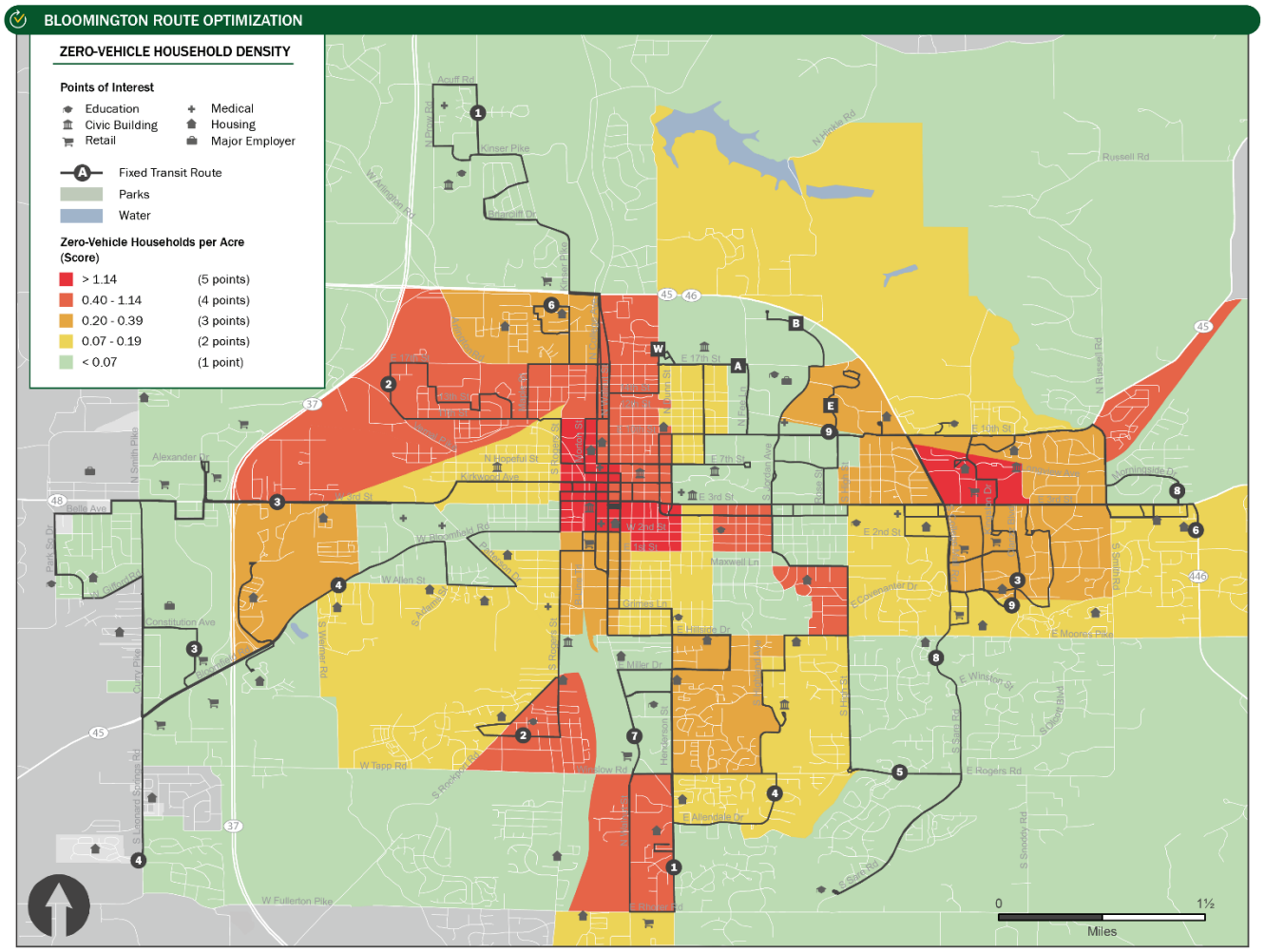
With density ranges differing for each demographic analysis, the maps utilize a Jenks Natural Breaks Classification Method to assign each block group to one of five density categories. For each analysis, depending on the natural break category into which it falls, a score from 1 (lowest density) to 5 (highest density) is assigned to each block group. Following the analysis of each individual factor, the Transit Need Index map (**Figure 11**) shows the composite Transit Need score for each block group based on the sum of its scores in each preceding analysis. For example, if a block group falls in the highest density category for each of the five demographic analyses, it will end up with a Transit Need Index value of 25 (5+5+5+5+5). The lowest possible Transit Need Index score is 5 (1+1+1+1+1).

While the Transit Potential analysis highlights areas of Bloomington with actual densities to support fixed-route service, Transit Need is a relative measure that estimates the need for transit compared to other block groups. There is not, however, a specific Transit Need Index score or value that represents a threshold for supporting fixed-route service. Instead, Transit Need should be considered alongside Transit Potential. If two areas have similar and sufficient Transit Potential, the area with higher Transit Need should be prioritized for service. Conversely, in some locations, while the density of transit-dependent population groups may be relatively high, if the total population and/or employment density are still quite low, the potential to generate substantial fixed-route transit ridership will also remain low.

Zero-Vehicle Household Density

Figure 6 shows the density of zero-vehicle households in Bloomington. Higher densities of zero-vehicle households can be found in and around downtown and on East 3rd Street near College Mall. Other areas with high concentrations of zero-vehicle households are located in northwest Bloomington, pockets along South Walnut Street, Broadview, and south of the IU campus.

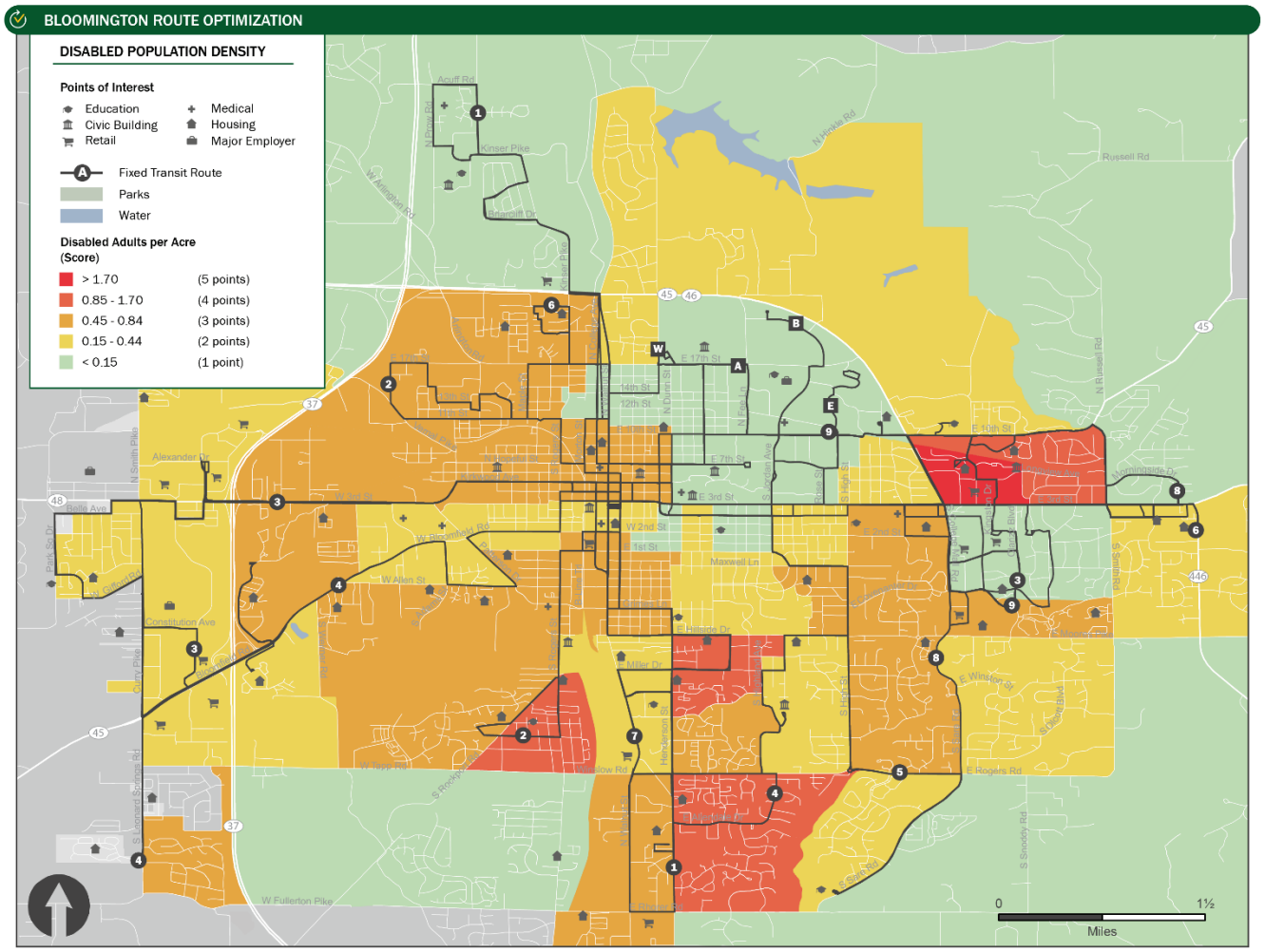
Figure 6: Bloomington Zero-Vehicle Household Density



Disabled Population Density

Figure 7 shows the density of disabled populations in Bloomington. Disabled populations are most concentrated off East 3rd Street north of College Mall, as well as in pockets off South Henderson Street and South Rockport Road. All areas receiving four or five points in this analysis are served by at least one BT fixed-route service.

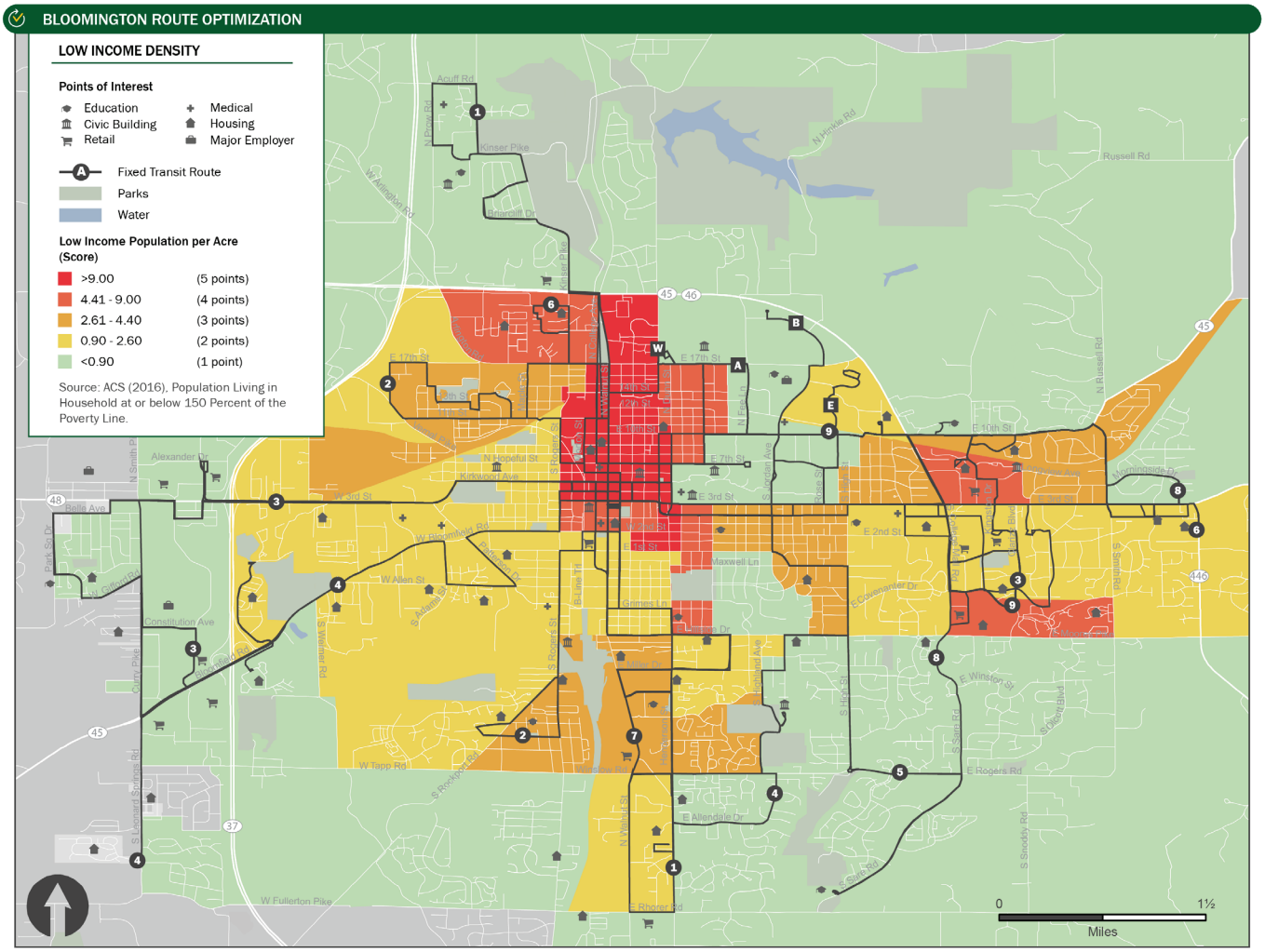
Figure 7: Bloomington Disabled Population Density



Low-Income Population Density

Figure 8 shows the density of low-income households in Bloomington. Low-income households are concentrated around downtown and north Bloomington, as well in pockets south and east. A majority of areas displaying as low-income have access to transit service, with some exceptions (such as southwest of Route 2 West, and just south of the College Mall area).

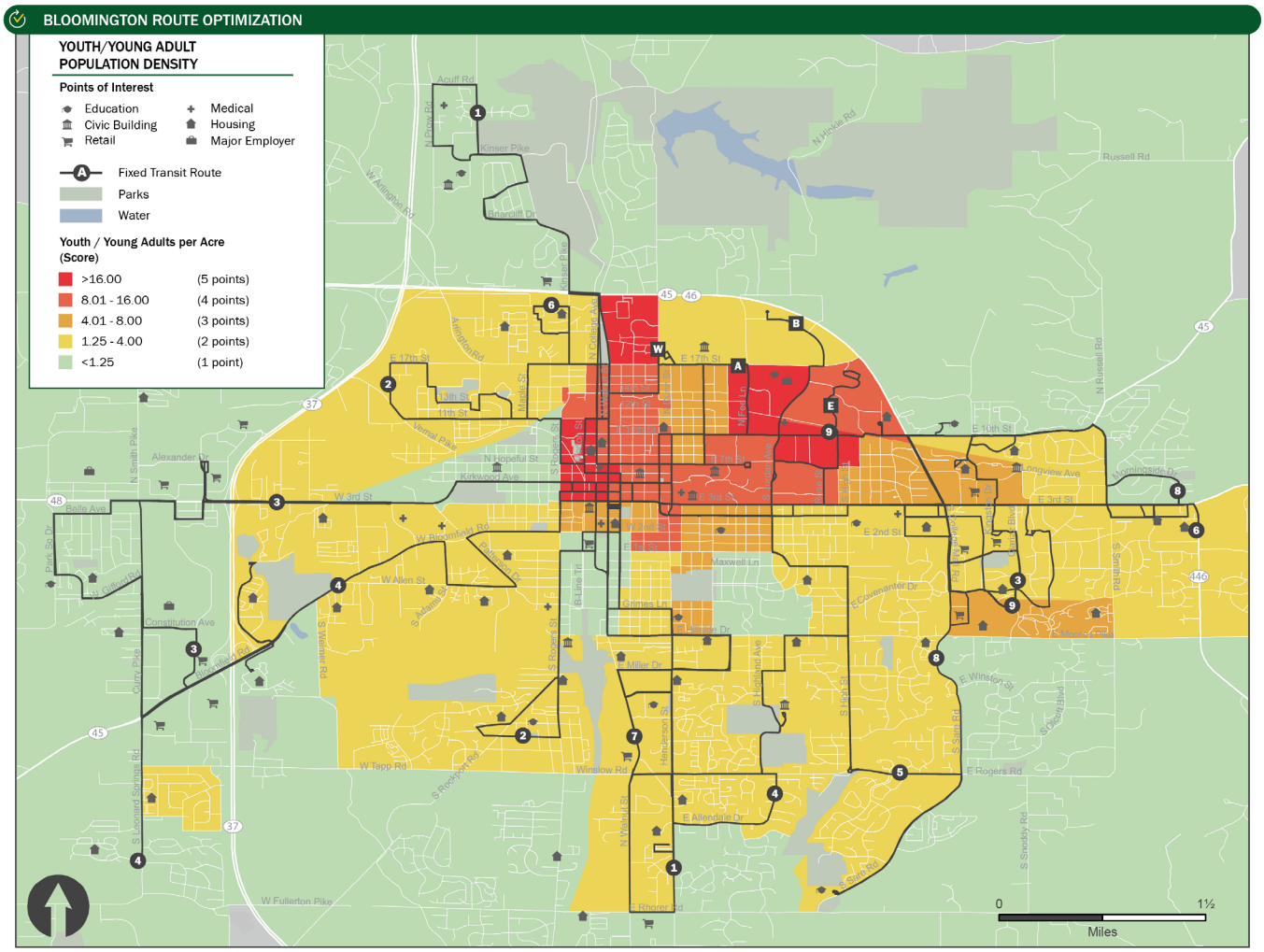
Figure 8: Bloomington Low-Income Population Density



Youth/Young Adult Population Density

Figure 9 shows the population density of youths and young adults aged 24 or younger in Bloomington. This demographic group is most concentrated in and around downtown as well as the IU campus. Higher densities of youths and young adults can also be found along East 3rd Street, north of East Moores Pike, and north of Bloomfield Road. All areas receiving four or five points in this analysis are served by multiple BT and IU Campus Bus fixed-route service.

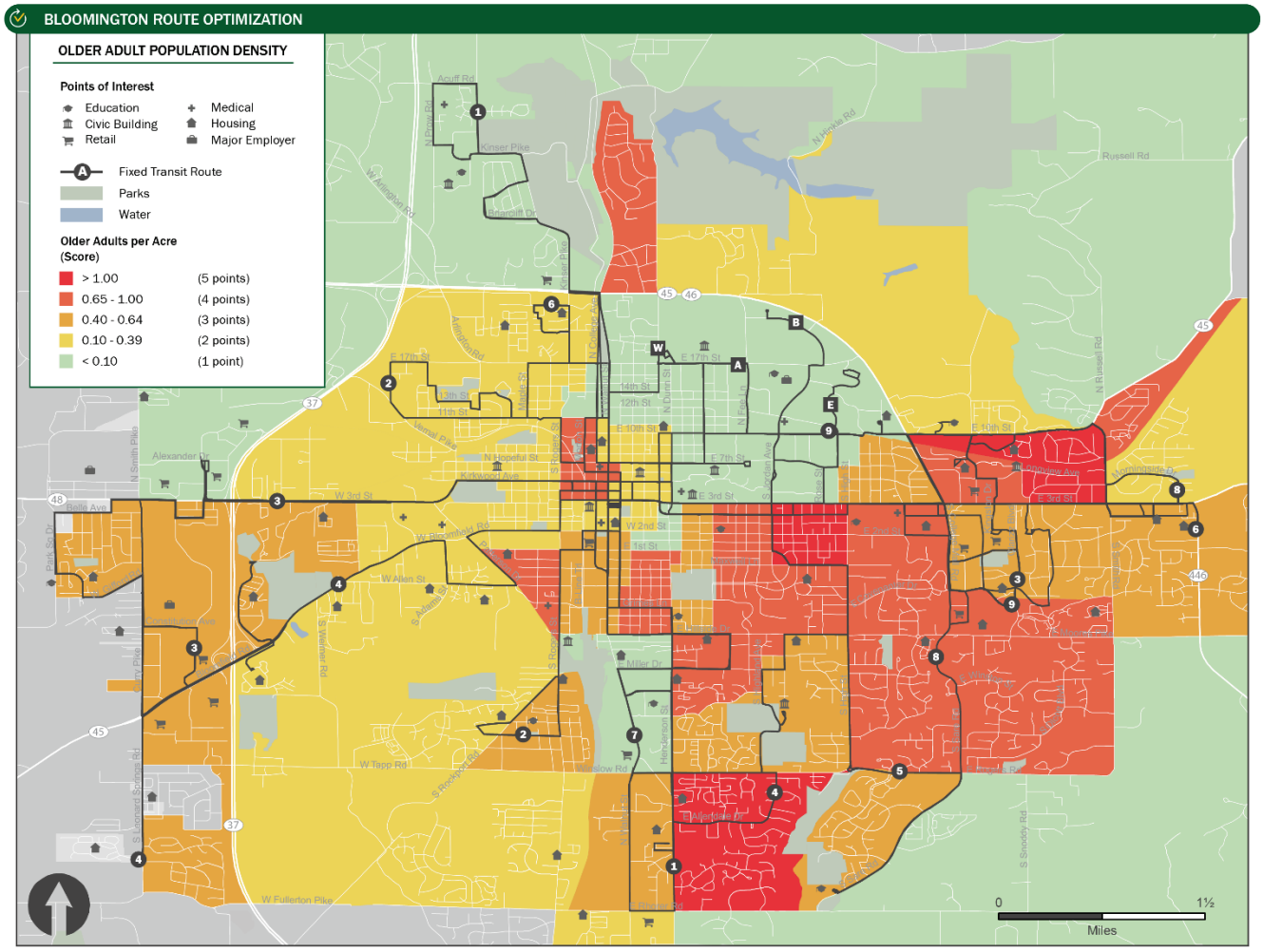
Figure 9: Bloomington Youth/Young Adult Population Density



Older Adult Population Density

Figure 10 shows the density of adults aged 65 and older in Bloomington. This population is most concentrated south of East 3rd Street and east of South Henderson Street, as well as south of Winslow Road. Additional pockets of high density can be found along North Walnut Street north of State Route 45/46; along portions of North Morton Street; along portions of South Roger Street; and in southeast Bloomington. In some of these areas—including north of State Route 45/46—fixed-route service is not available.

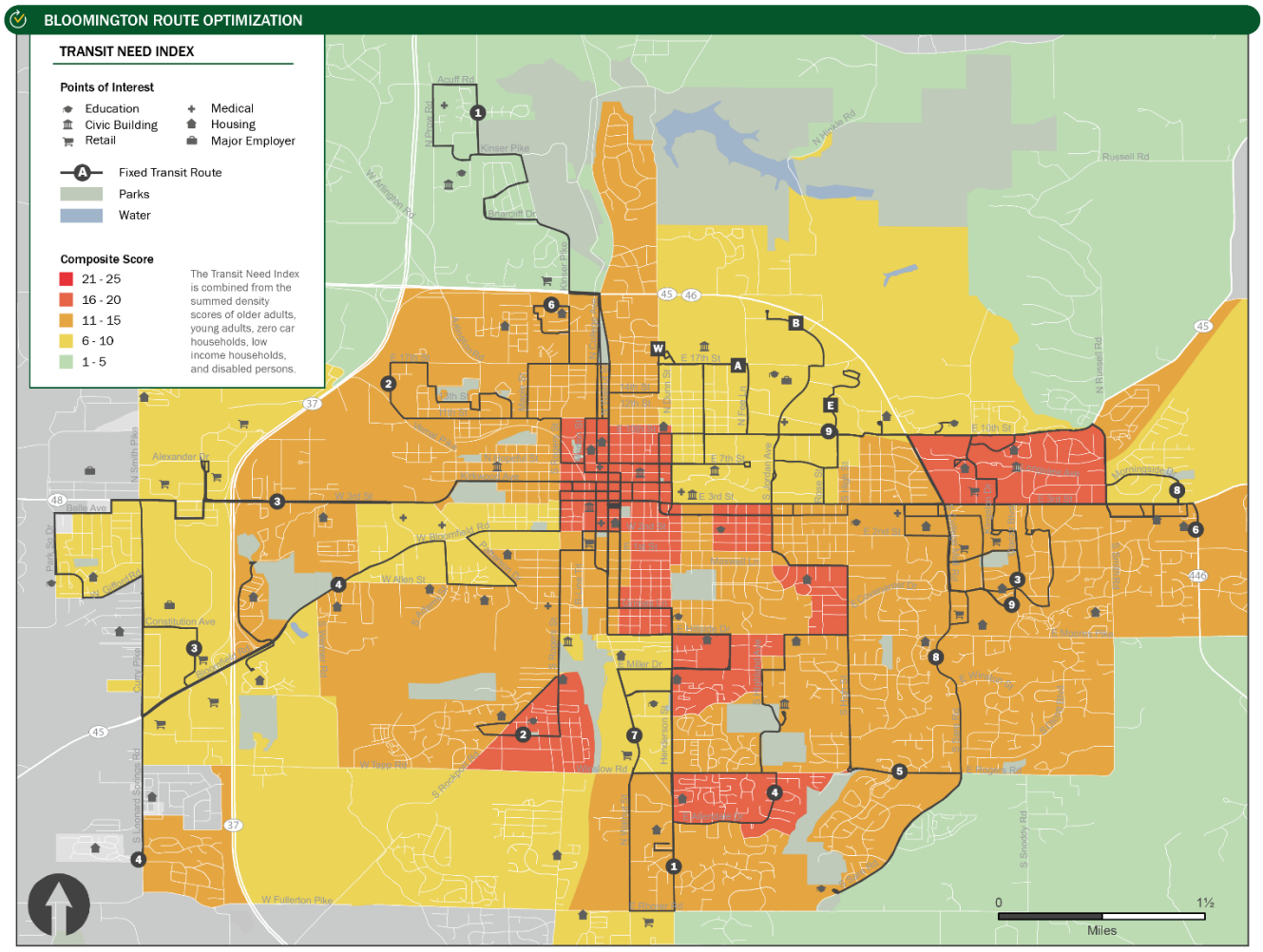
Figure 10: Bloomington Older Adult Population Density



Transit Need

Figure 11 combines the five density maps into one composite Transit Need Index. Transit Need Index values are highest in downtown Bloomington, and along portions of East 3rd Street and South Henderson Street. Pockets of higher Transit Need are also found along South Roger Street and South High Street. Areas of Bloomington scoring relatively high have at least one fixed-route within close proximity. However, areas with moderate transit need – including the northern portion of North Walnut Street, and along South Smith Road – are not currently served by fixed-route service.

Figure 11: Bloomington Transit Need Index



2. ASSESSMENT OF EXISTING CONDITIONS

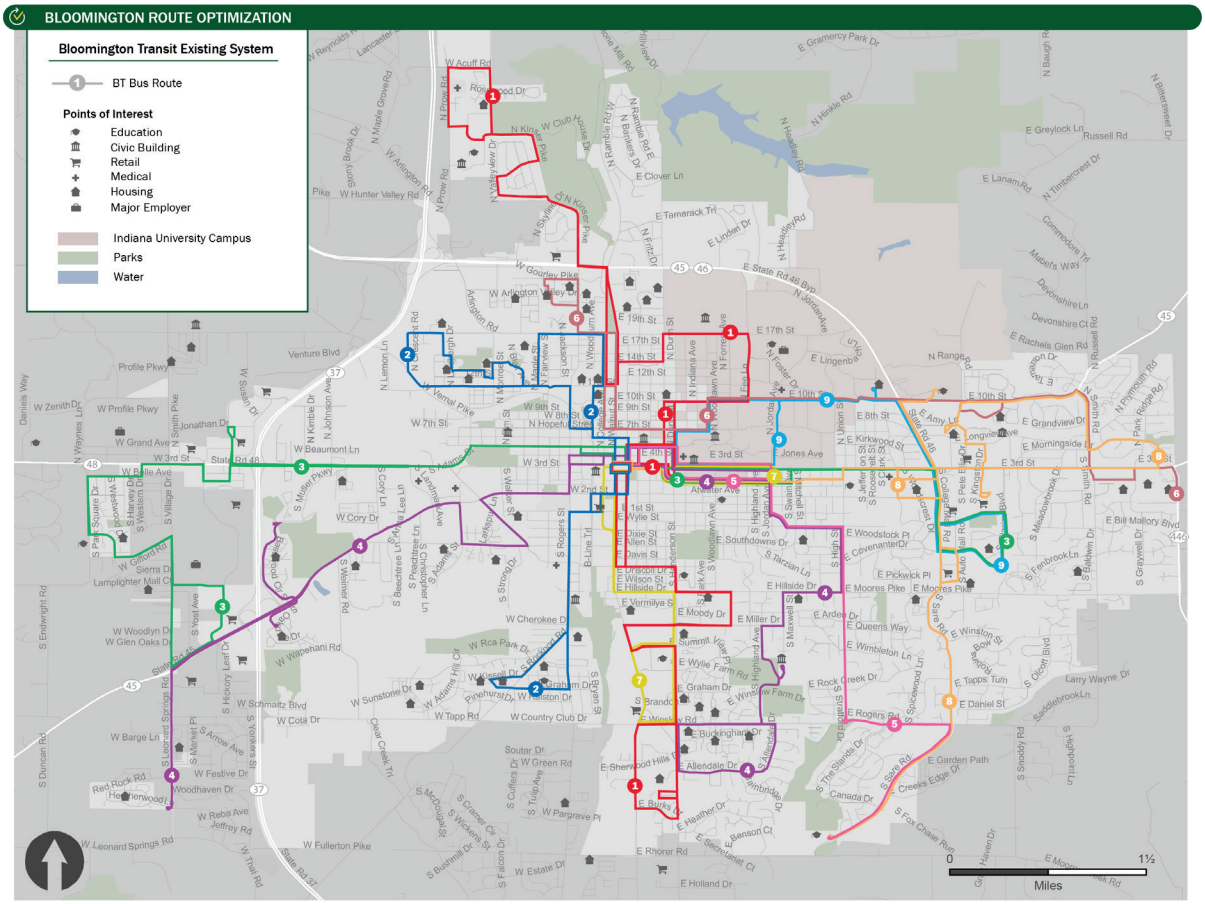
Overview of Existing Services

Bloomington Transit

During regular service periods[1], Bloomington Transit operates nine fixed routes, between approximately 6:00 a.m. and midnight on weekdays; eight routes between 7:25 a.m. and 11:30 p.m. on Saturdays; and two routes between 9:30 a.m. and 9:45 p.m. on Sundays. **Figure 12** shows a system map of the current BT network, and service characteristics for each route are summarized in **Table 1**.

While BT routes are numbered 1 through 9, six of the routes consist of two "interlocked" branching serving different parts of the BT service area. For example, Route 1 operates between Meadows Hospital and downtown Bloomington on its northern branch, and between downtown Bloomington and Clear Creek Shopping Center on its southern branch. These branches essentially function as independent routes and are presented as separate schedules on the Bloomington Transit website. In addition, Routes 6 and 9 each feature limited-stop service variants. Thus, **Table 1** summarizes 15, rather than nine, fixed-route services operated by Bloomington Transit.

Figure 12: Bloomington Transit System Map



[1] Regular service periods coincide with the IU fall and spring semesters, not including spring break, fall break, Thanksgiving break, winter break, MLK Day, or Labor Day.

Table 1: Bloomington Transit Fixed-Route Services Characteristics

Route	Name	Service Description	Service Span	Average Service Frequency
1	North Fee Ln/ Bloomington High School North	Local service operating between downtown Bloomington, Indiana University campus, and Meadows Hospital	**Monday-Friday:** 6:30 a.m.–11:35 p.m.	60 minutes
			Saturday: 7:35 a.m.–6:35 p.m.	60 minutes
1	South Walnut/Clear Creek	Local service operating between downtown Bloomington and Clear Creek Shopping Center	**Monday-Friday:** 6:25 a.m.–11:30 p.m.	30 minutes (60 minutes after 6:10 p.m.)
			Saturday: 7:25 a.m.–6:30 p.m.	60 minutes
2	South Rogers/ Countryview Apartments	Local service operating between downtown Bloomington and Countryview Apartments	**Monday-Friday:** 6:21 a.m.–11:04 p.m.	30 minutes (60 minutes after 6:40 p.m.)
			Saturday: 7:51 a.m.–6:51 p.m.	60 minutes
2	West 11th Street via Showers Complex	Local service operating between downtown Bloomington and the intersection of Crescent Rd and W 17th Street	**Monday-Friday:** 6:19 a.m.–11:28 p.m.	30 minutes (60 minutes after 6:10 p.m.)
			Saturday: 8:10 a.m.–6:36 p.m.	60 minutes
3	College Mall/ East 3rd Street	Local service operating on East 3rd Street between downtown Bloomington and Reserve apartments	**Monday-Friday:** 6:31 a.m.–11:37 p.m.	30 minutes (60 minutes after 10:00 p.m.)
			Saturday: 7:31 a.m.–7:01 p.m.	30 minutes
3	Highland Village/Curry Pike	Local service between downtown Bloomington and Walmart on Bloomfield Road	**Monday-Friday:** 6:02 a.m.–11:32 p.m.	30 minutes (60 minutes after 7:30 p.m.)
			Saturday: 7:32 a.m.–7:01 p.m.	60 minutes
4	High Street/ Sherwood Oaks	Local service between downtown Bloomington and Allendale Drive & Walnut Street Pike	**Monday-Friday:** 6:35 a.m.–11:35 p.m.	60 minutes
			Saturday: 8:10 a.m.–6:35 p.m.	60 minutes
4	Bloomfield Rd/Heatherwood	Local service between downtown Bloomington and Heatherwood Mobile Homes	**Monday-Friday:** 6:35 a.m.–11:50 p.m.	60 minutes
			Saturday: 8:10 a.m.–6:50 p.m.	60 minutes

Route	Name	Service Description	Service Span	Average Service Frequency
5	Sare Road	Local service between downtown Bloomington and Jackson Creek Middle School on Sare Road	**Monday-Friday:** 7:03 a.m.–11:00 p.m.	60 minutes
			Saturday: 8:03 a.m.–7:00 p.m.	60 minutes
6	Campus Shuttle	Shuttle service between The Arch and Knightridge apartments through IU campus	**Monday-Thursday:** 6:50 a.m.–11:30 p.m.	20 minutes (40 minutes after 6:30 p.m.)
			Friday: 6:50 a.m.–11:30 p.m.	20 minutes (40 minutes after 5:50 p.m.)
			Saturday: 7:30 a.m.–11:30 p.m.	80 minutes
			Sunday: 9:30 a.m.–7:30 p.m.	80 minutes
6	6 Limited	Limited service between Smallwood and Fountain Park apartments	**Monday-Thursday:** 7:30 a.m.–9:50 p.m.	20 minutes
			Friday: 7:10 a.m.–2:10 p.m.	20 minutes
7	Henderson/Walnut Express	Express service Winslow Plaza and 3rd Street south of campus	**Monday-Thursday:** 7:00 a.m.–9:40 p.m.	15/20 minutes (35 minutes after 7:20 p.m.)
			Friday: 7:00 a.m.–7:25 p.m.	15/20 minutes (35 minutes after 5:40 p.m.)
8	Eastside Local	Local service between Jackson Creek Middle School and the intersection of 3rd Street and Morningside Drive[2]	**Monday-Saturday:** 8:27 a.m.–7:08 p.m.	60 minutes
9	IU Campus/Mall/ Convenanter & Clarizz	Local service between the intersection of Convenanter Drive and Clarizz Boulevard and IU campus; Loop service around campus	**Monday-Thursday:** 7:24 a.m.–10:38 p.m.	10 minutes
			Friday: 7:25 a.m.–10:45 p.m.	12 minutes (45 minutes after 7:45 p.m.)
			Saturday: 8:30 a.m.–10:30 p.m.	28 minutes (45 minutes after 6:20 p.m.)

[2] Route 8 also offers a deviation service at 8:10 a.m. on weekday mornings from the Transit Center to Stone Belt Center. 7:40 a.m. service on this trip is also available upon request; interested parties must call 336-RIDE before 7:25 a.m..

Route	Name	Service Description	Service Span	Average Service Frequency
			Sunday: 10:30 a.m.–9:45 p.m.	45 minutes
9	IU Campus Limited	Limited service between the intersection of Convenanter Drive and Clarizz Boulevard and 3rd Street south of campus	**Monday-Friday:** 7:30 a.m.–6:30 p.m.	30 minutes

During IU break periods and major holidays, BT reduces service as follows:

- Reduced service on Route 6 and Route 6 Limited
- No service on Route 7
- Reduced service on Route 9 and Route 9 Limited

Indiana University Campus Bus Service

During regular service periods, the Indiana University Campus Bus Service operates five routes between approximately 7:20 a.m. and 3:00 a.m. on weekdays; four routes from 10:00 a.m. to 3:00 a.m. on Saturdays; and three routes between 12:10 p.m. and 10:30 p.m. on Sundays.

Figure 13 shows a system map of the current IU Campus Bus network, followed by a summary of service characteristics in **Table 2**. During the summer session, IU operates significantly reduced service, including no service on Routes B, W, W Limited, or the Night Owl.

Figure 13: IU Campus Bus System Map

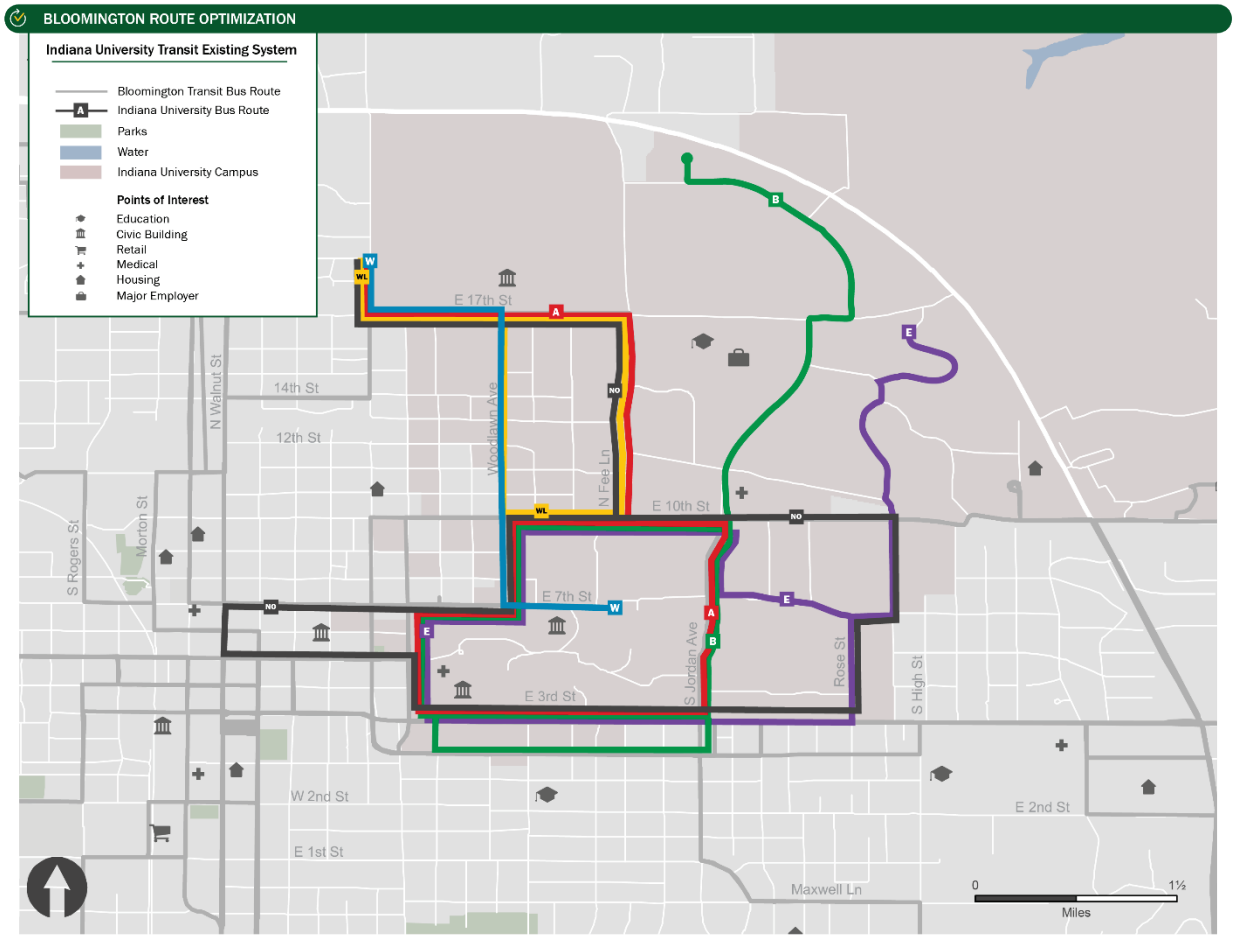


Table 2: IU Campus Bus Route Services Characteristics

Route	Name	Service Description	Service Span	Average Service Frequency
A	A Route	Shuttle service between Memorial Stadium and the intersection of 3rd Street and Jordan Ave; Loop service around campus	**Monday-Thursday:** 7:25 a.m.–12:35 a.m.	**Day:** 8 minutes **Evening:** 19 minutes
			Friday: 7:20 a.m.–10:20 p.m.	**Day:** 10 minutes **Evening:** 21 minutes
			Saturday: 10:00 a.m.–9:44 p.m.	30/45 minutes
			Sunday: 12:10–10:29 p.m.	30/45 minutes
B	B Route	Shuttle service along Jordan Ave between Fisher Court and 3rd Street south of campus	**Monday-Thursday:** 7:30 a.m.–12:20 a.m.	**Day:** 11 minutes **Evening:** 27 minutes
			Friday: 7:30 a.m.–10:40 p.m.	**Day:** 18 minutes **Evening:** 32 minutes
			Saturday: 10:20 a.m.–9:40 p.m.	30-35 minutes
			Sunday: 12:30–9:40 p.m.	30-35 minutes
E	E Route	Shuttle service between Evermann Apartments and the intersection of 3rd Street and Indiana Ave; Loop service around campus	**Monday-Thursday:** 7:25 a.m.–12:10 a.m.	**Day:** 15 minutes **Evening:** 34 minutes
			Friday: 7:30 a.m.–11:20 p.m.	**Day:** 20 minutes **Evening:** 36 minutes
			Saturday: 10:15 a.m.–10:10 p.m.	35/60 minutes
			Sunday: 12:15–10:40 p.m.	35/60 minutes
W	W Route	Shuttle service between Memorial Stadium and Indiana University Auditorium	**Monday-Thursday:** 7:25 a.m.–10:27 p.m.	**Day:** 10 minutes **Evening:** 29 minutes
			Friday: 7:30 a.m.–5:19 p.m.	12 minutes
WL	W Limited Route	Limited stop route that serves Luddy Hall, Psychology, and Kelley School	**Monday-Thursday** 7:20 a.m.–7:51 p.m.	10 minutes
Night Owl	Night Owl Route	Friday and Saturday night service between IU campus and downtown Bloomington	**Friday and Saturday:** 10:05 p.m.–2:58 a.m.	25 minutes

BTaccess

BTaccess is a paratransit service for persons with disabilities who are unable to use BT fixed-route service. All BTaccess vans are equipped with wheelchair lifts. Eligible riders may request service between any two addresses within the City of Bloomington, and no service is provided outside of the city limits. Eligibility is determined by BPTC staff through an application and verification process.

BTaccess trips must be scheduled by 5:00 p.m. the day before service is being requested. **Table 3** shows the BTaccess service calendar and schedule.

Table 3: BTaccess Service Calendar and Schedule

Time of Year	Days	Span of Hours	Service Area
Year Round[3]	Monday-Friday	6:10 a.m.–11:30 p.m.	All areas within Bloomington incorporated area
IU Fall and Spring Semesters	Saturday Sunday	7:30 a.m.–11:30 p.m. 9:30 a.m.–10:30 p.m.	All areas within Bloomington incorporated area
IU Break Periods	Saturday Sunday	7:30 a.m.–7:30 p.m. 9:30 a.m.–7:30 p.m.	All areas within Bloomington incorporated area

Passenger Amenities and Transit Facilities

Transit Center

BPTC's primary transit hub is the Transit Center located at 301 S Walnut Street (**Figure 14**). The facility is served by BT Routes 1, 2, 3, 4, 5, and 7. In addition, the Transit Center is served by Miller Transportation's Hoosier Ride Service and Rural Transit (see Regional Transit Service). Passenger amenities include real-time bus tracker displays, system maps, ticket/pass sales, seating, restrooms, ATM machines, vending machines, bicycle racks and lockers, Wi-Fi, and public art. The facility is monitored by security cameras. Besides serving as Bloomington's main transit hub, the Transit Center also includes a large multipurpose room and houses City and County 911 police dispatch offices.

Figure 14: Bloomington's Downtown Transit Center

Image source: bloomingtontransit.com

[3] BTaccess service is not provided on the following holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, and Christmas Day. If these holidays fall on a Sunday, they will be observed the following Monday. Service ends by 7:30 pm on Christmas Eve and New Year's Eve.

Bus Stops and Amenities

Bloomington Transit has 512 bus stops, including 72 with shelters, and six with benches only. The IU Campus Bus Service includes 56 bus stops with 13 shelters.

Passenger Information

BT passenger schedules and system maps (**Figure 15**) are available at the Transit Center and online at https://bloomingtontransit.com/. In addition to maps and schedules, the website includes a trip planner and how-to-ride guide.

IU Campus Bus information, including schedules and system maps (**Figure 16**) can be found at https://iubus.indiana.edu/campus_bus/. IU does not post paper copies of schedules or maps.

Real-time bus tracking is available for both systems at https://bloomington.doublemap.com/map/.

Figure 15: Bloomington Transit Published System Map

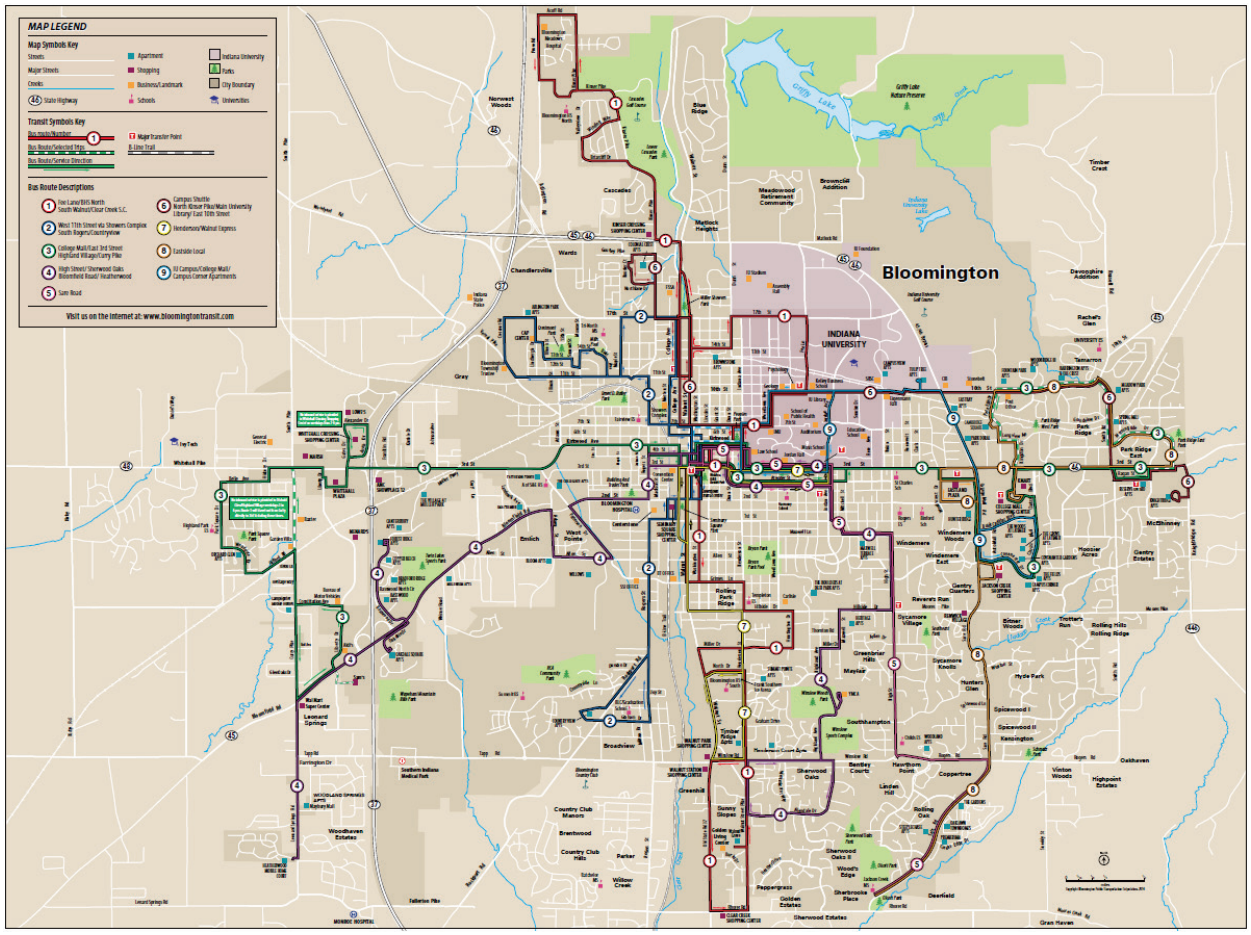
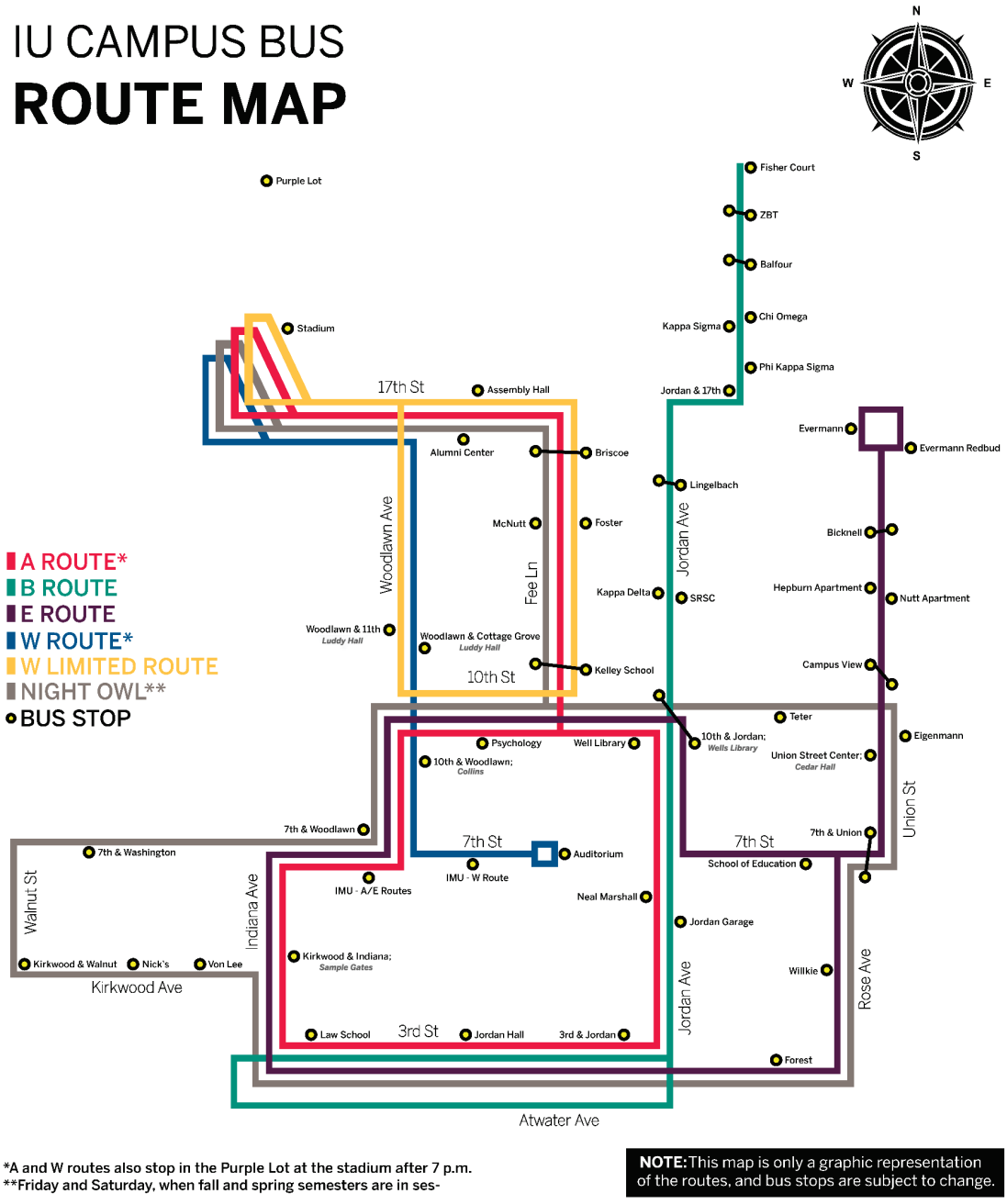


Figure 16: IU Campus Bus Published System Map



Regional Connections

Rural Transit

Rural Transit is a service of the Area 10 Agency on Aging, a private, non-profit organization. Rural Transit offers scheduled bus service on weekdays between Spencer, IN and downtown Bloomington from 6:00 a.m. to 7:00 p.m.; and between Ivy Tech Community College and downtown Bloomington from 6:40 a.m. to 5:45 p.m. Services include:

- **Scheduled Routes** operating in Monroe and Owen Counties. Route information and schedules can be found online at http://www.area10agency.org/ruraltransit/. Fares for one-county trips are $1.00 and fare for two-county trips are $2.00.
- **Door-to-Door Service** provided with ADA-compliant vehicles on request. Service is available in Lawrence, Monroe, Owen, and Putnam Counties. Fares are $3.00 per county traveled.
- **Group Transportation** for shopping, field trips, or special events. Fares vary depending on duration and location.

Intercity Bus

Departing from the Transit Center in Bloomington, the Hoosier Ride Service provides access to destinations in Indiana, Michigan, Illinois, Ohio, Kentucky, and Tennessee. Via Hoosier Ride, connections to Greyhound Lines may be made in Indianapolis, Evansville, and Terre Haute, Indiana; and in Louisville, Kentucky.

Airport Shuttle

GO Express Travel operates a shuttle service between Bloomington and Indianapolis International Airport every two hours from 4:40 a.m. until 12:25 a.m. on Tuesdays, Wednesdays, and Saturdays; and hourly from 3:40 a.m. until 12:25 a.m. on Mondays, Thursdays, Fridays, and Sundays. This service departs from the Monroe Convention Center.

Fares and Passes

Bloomington Transit accepts cash fares in exact change on buses. Passes may be purchased at the Transit Center and at the BT office. Detailed information on fixed-route and paratransit fares is described below.

Fixed-Route Fares

BT's regular cash bus fare for adults is $1.00, with free transfers. Reduced fares are offered to senior citizens age 60 and older, students enrolled in grades K-12, and qualifying persons with disabilities. Payment by reduced fare requires presentation of a valid Reduced Fare ID, BPTC-issued student ID card, or Medicare card to the bus driver. In addition, IU Bloomington students, faculty, and staff ride BT buses fare-free with a University-issued Crimson Card. IU Campus Bus routes are free of charge for all riders.

Transfers between BT Routes are free and are valid at locations where routes intersect. Transfers are only issued at the time of boarding to customers who pay a fare or board with a Bloomington Transit ticket. Valid for one hour, transfers may not be used for return trips and are not necessary for monthly and semi-annual pass holders except for transfers to Rural Transit. At the Downtown Transit Center, Rural Transit accepts BT transfers and BT accepts Rural Transit transfers within an hour of issuance.

BT offers a series of fare options, as summarized in **Table 4**.

Table 4: Bloomington Transit Fixed-Route Fare and Pass Prices

	Regular Fare	Senior Citizens (60 and older with ID Card)	Persons with Disabilities	Students enrolled in grades K-12	IU Bloomington Students, Faculty, and Staff (with Crimson Card)	Children (Under the Age of 4)	City of Bloomington, Monroe County (Including Public Library), and IU Health Employees
Cash Fare	$1.00	$0.50	$0.50	$0.50	Free (All Routes)	Free (All Routes)	Free (All Routes)
10-Ride Ticket	$10.00	$5.00	$10.00	$5.00	-	-	-
Monthly Pass	$30.00	$15.00	$30.00	$15.00	-	-	-
Semi-Annual Pass	$150.00	$75.00	$150.00	$75.00	-	-	-
Summer Fun Pass	-	-	-	$12.00	-	-	-

BTaccess Fares

Each one-way trip on BTaccess costs $2.00. Ten and 30-ride cards cost $20.00 and $60.00, respectively, and are available at the Transit Center, BT office, and by mail. With notice (the day before a trip) a companion may accompany the registered customer paying the same fare, while Personal Care Attendants ride free.

System Performance and Peer Comparison

To put the service characteristics of Bloomington Transit and IU Campus Bus in perspective, the two systems' productivity and performance were compared to a set of peer systems. Peer transit systems were selected from metropolitan areas of comparable size to Bloomington in which both local and university transit systems operate. **Table 5** and **Table 6** present the selected peers for BT and IU Campus Bus, respectively, along with key service and service area characteristics for each system.

The data presented in the following tables is from 2017, the most recent annual data available for all peers in the National Transit Database.

Table 5: Peer System Overview (Bloomington Transit)

City	Service Provider	Service Area Population	Service Area (sq. mi.)	Service Area Population Density (pop./sq. mi)	Total Operating Expenses	Peak Vehicles
Bloomington, Ind.	**Bloomington Public Transportation Corporation**	**80,405**	**21**	**3,829**	**$6,677,764**	**29**
Athens, Ga.	Athens Transit System	119,980	44	2,727	$5,563,824	22
Charlottesville, Va.	Charlottesville Area Transit	85,755	38	2,257	$7,421,700	23
Flagstaff, Ariz.	Northern Arizona Intergovernmental Public Transportation Authority	65,760	29	2,268	$6,311,651	20
Iowa City, Iowa	Iowa City Transit	74,220	25	2,969	$4,972,829	21
Missoula, Mont.	Missoula Urban Transportation District	72,087	70	1,030	$4,998,917	24
Muncie, Ind.	Muncie Indiana Transit System	70,085	27	2,596	$5,399,284	26
Peer Average		***81,185***	***36***	***2,525***	***$5,906,567***	***24***

Source: National Transit Database, 2017

Table 6: Peer System Overview for (IU Campus Bus)

City	University	University Transit System	Student Population	Total Operating Expense	Peak Vehicles
Bloomington, Ind.	**Indiana University**	**Campus Bus**	**43,710**	**$5,076,569**	**22**
Athens, Ga.	University of Georgia	UGA Bus	38,246	$5,959,757	51
Charlottesville, Va.	University of Virginia	University Transit Service	24,360	$4,934,000	26
Flagstaff, Ariz.	Northern Arizona University	Campus Shuttle Service	31,057	$2,369,000	14
Iowa City, Iowa	University of Iowa	CAMBUS	32,948	$3,057,193	25
Missoula, Mont.	University of Montana	UDASH	10,962	$536,349	5
Muncie, Ind.	Ball State University	Shuttle Bus	22,513	Not separated from other services	7
Peer Average			***29,114***	***$3,655,478***	***21***

Source: Student Population: (Various Universities). Operating Expense and Peak Vehicles: (National Transit Database, 2017)

Primary Comparison Metrics

To get a sense of how Bloomington Transit and Indiana University Campus Bus compare to peer agencies, the following primary metrics were compared at the annual level:

- Passenger trips
- Operating expenses
- Revenue hours
- Revenue miles

These characteristics are compared across peer city transit agencies in **Table 7**, and across peer university systems in **Table 8**. Among city agencies, Bloomington Transit has the highest ridership, and second-to-highest operating expense, revenue hours, and revenue miles.

Ridership on Bloomington Transit is over 50 percent higher than the next highest system, Charlottesville Area Transit, and over double that of several other systems. One reason this may be is that while Indiana University Campus Bus serves only the IU campus, several peer university systems (University of Georgia, University of Virginia, University of Montana, and Ball State University) provide off-campus service as well. Thus, BT serves the high-ridership student commuter market in a way that is served by university transit systems in other communities. This also helps explain the below-average service statistics for IU Campus Bus in terms of ridership, revenue hours, and revenue miles.

IU Campus Bus appears to have a higher operating cost than its peers, but it is worth noting that unlike with public transit systems that report to NTD, there is no standardized reporting system for most university shuttle services. In some cases, operating costs for these systems may refer to driver hours only, while in other cases they may be fully allocated costs including fuel or maintenance.

Table 7: Primary Variables Comparison (Bloomington Transit)

City	Service Provider	Passenger Trips	Total Operating Expense	Revenue Hours	Revenue Miles
Bloomington, Ind.	**Bloomington Public Transportation Corporation**	**3,303,444**	**$6,677,764**	**94,594**	**998,863**
Athens, Ga.	Athens Transit System	1,553,282	$5,563,824	72,314	826,286
Charlottesville, Va.	Charlottesville Area Transit	2,189,612	$7,421,700	97,665	1,005,147
Flagstaff, Ariz.	Northern Arizona Intergovernmental Public Transportation Authority	2,078,694	$6,311,651	75,136	913,510
Iowa City, Iowa	Iowa City Transit	1,571,818	$4,972,829	54,636	713,188
Missoula, Mont.	Missoula Urban Transportation District	1,558,262	$4,998,917	50,244	697,824
Muncie, Ind.	Muncie Indiana Transit System	1,377,416	$5,399,284	55,714	771,934
Peer Average		***1,947,504***	***$5,906,567***	***71,472***	***846,679***

Source: National Transit Database, 2017

Table 8: Primary Variables Comparison for (IU Campus Bus)

University	University Transit System	Passenger Trips	Total Operating Expense	Revenue Hours	Revenue Miles
Indiana University	**Campus Bus**	**2,602,085**	**$5,076,569**	**44,533**	**285,205**
University of Georgia	UGA Bus	5,604,793	$5,959,757	105,362	902,419
University of Virginia	University Transit Service	~4,500,000	$4,934,000	~60,000	~555,000
Northern Arizona University	Campus Shuttle Service	1,386,992	$2,369,000	not tracked	not tracked
University of Iowa	CAMBUS	3,977,395	$3,057,193	70,975	689,815
University of Montana	UDASH	331,229	$536,349	9,982	110,051
Ball State University	Shuttle Bus	~1,000,000	Not separated from other services	Not tracked	Not tracked
Peer Average		***2,771,785***	***$3,655,478***	***58,170***	***508,498***

Source: National Transit Database, 2017; Personal communication

Secondary Comparison Metrics

Secondary comparison metrics highlight the service efficiency of transit systems on a per-unit (generally, hours, miles, or passenger trips) basis. Normalizing larger metrics by units allows for an accurate comparison across different services. For example, while high operating costs coupled with a high number of passenger trips may indicate an efficient service, high operating costs coupled with a low number of passenger trips may indicate that per-passenger movement is relatively expensive and inefficient. Secondary metrics, analyzed for city transit agencies in **Table 9** and university systems in **Table 10**, are listed below:

- Operating expense per passenger trip
- Operating expense per revenue hour
- Passenger trips per revenue hour
- Passenger trips per revenue mile

In comparison with peer agencies, Bloomington Transit is relatively more efficient, reporting the lowest operating expense per passenger trip and operating expense per revenue hour. The system also has the highest passenger trips per revenue hour and passenger trips per revenue mile. Among university systems, while Indiana University Campus Bus reports the highest operating costs per passenger trip and per revenue hour, this may be a function of different cost allocations among the university systems. In terms of passengers per hour and passengers per mile, which have far less variability in reporting, IU Campus Bus performs better than all of the university peer systems.

Table 9: Secondary Variables (Bloomington Transit)

City	Service Provider	Operating Expense Per Passenger Trip	Operating Expense Per Revenue Hour	Passenger Trips Per Revenue Hour	Passenger Trips Per Revenue Mile
Bloomington, Ind.	**Bloomington Public Transportation Corporation**	**$2.02**	**$70.59**	**34.92**	**3.31**
Athens, Ga.	Athens Transit System	$3.58	$76.94	21.48	1.88
Charlottesville, Va.	Charlottesville Area Transit	$3.39	$75.99	22.42	2.18
Flagstaff, Ariz.	Northern Arizona Intergovernmental Public Transportation Authority	$3.04	$84.00	27.67	2.28
Iowa City, Iowa	Iowa City Transit	$3.16	$91.02	28.77	2.20
Missoula, Mont.	Missoula Urban Transportation District	$3.21	$99.49	31.01	2.23
Muncie, Ind.	Muncie Indiana Transit System	$3.92	$96.91	24.72	1.78
Peer Average		***$3.19***	***$84.99***	***27.28***	***2.27***

Source: National Transit Database, 2017

Table 10: Secondary Variables (IU Campus Bus)

University	University Transit System	Operating Expense Per Passenger Trip	Operating Expense Per Revenue Hour	Passenger Trips Per Revenue Hour	Passenger Trips Per Revenue Mile
Indiana University	**Campus Bus**	**$1.95**	**$114.00**	**58.43**	**9.12**
University of Georgia	UGA Bus	$1.06	$56.56	53.20	6.21
University of Virginia	University Transit Service	$1.10	$82.23	75	8.11
Northern Arizona University	Campus Shuttle Service	$1.71	-	-	-
University of Iowa	CAMBUS	$0.77	$43.07	56.04	5.77
University of Montana	UDASH	$1.62	$53.73	33.18	3.01
Ball State University	Shuttle Bus	Not tracked	Not tracked	Not tracked	Not tracked
Peer Average		***$1.37***	***$69.92***	***55.17***	***6.44***

Source: National Transit Database, 2017; Personal communication

Additional Peer Information[4]

Transit Amenities

Peer agencies were also asked about availability of transit amenities. Bloomington Transit peers have, on average, shelters at 21 percent of bus stops (**Table 11**). By comparison, Bloomington Transit has shelters at 14 percent of its stops.

Table 11: Additional Peer Information (Shelters and Benches)

City	Service Provider	Shelters/Total Stops	Benches without shelters
Bloomington, Ind.	**Bloomington Public Transportation Corporation**	**72/512 (14%)**	**6/512**
Athens, Ga.	Athens Transit System	158/559 (28%)	Approximately 95%
Charlottesville, Va.	Charlottesville Area Transit	32/327 (10%)	56/327 (17%)
Flagstaff, Ariz.	Northern Arizona Intergovernmental Public Transportation Authority	80/165 (48%)	43/165 (26%)
Missoula, Mont.	Missoula Urban Transportation District	58/449 (13%)	56/449 (13%)
Muncie, Ind.	Muncie Indiana Transit System	61/1,163 (5%)	2/1,163 (0.2%)
Peer Average		***21%***	***30%***

Source: Personal communication.

Peers were also asked about availability of real-time information at stops (**Table 12**). Bloomington Transit currently provides real-time information via web-based system as well as at its Downtown Transit Center. Only one peer agency—Missoula Urban Transportation District—has real-time information at two transfer stations. One peer, Athens Transit System, is investigating the possibility of installing real time information boards. All responding peer agencies use an application for real-time information, and three have both an app and real-time information available on their website.

Table 12: Additional Peer Information (Real Time Information)

City	Service Provider	Real time information at stops?	Real time information on app / web app?	Real time information via a public API?
Bloomington, Ind.	**Bloomington Public Transportation Corporation**	**Yes, at Downtown Transit Center**	**Web-based**	**Unavailable**
Athens, Ga.	Athens Transit System	None, but investigating	Both app and web-based	Yes
Charlottesville, Va.	Charlottesville Area Transit	None	Two apps, one created internally and one supplied by AVL vendor	Yes
Flagstaff, Ariz.	Northern Arizona Intergovernmental Public Transportation Authority	None, but have sings showing number can text for information	Both app and web-based	API, but not public. Working to make public, but having data issues

[4] Iowa City Transit did not respond to requests for additional peer information and is not included in this section.

City	Service Provider	Real time information at stops?	Real time information on app / web app?	Real time information via a public API?
Missoula, Mont.	Missoula Urban Transportation District	Six signs at two transfer center locations	App.	None
Muncie, Ind.	Muncie Indiana Transit System	None	Both app and web-based	None

Source: Personal communication.

Innovative Demand Response

Lastly, peers were asked to provide information on innovative demand response systems. Athens Transit System has a circulator that runs on a deviated fixed-route. Riders may request a deviation of up to one mile, either through the call center or directly to the driver. In addition, Northern Arizona Intergovernmental Public Transportation Authority has developed a taxi/transportation network company (TNC) subsidy (Mountain Lift Taxi Program) for paratransit customers, whereby the Authority will pay 80 percent (up to $250 per month) into a declining balance credit card that can be used on taxi or TNC rides. The agency is currently working on an on-demand feasibility study that will examine microtransit, increasing capacity on paratransit vans, and further partnerships with TNCs (**Table 13**).

Table 13: Additional Peer Information (Innovative Demand-Responsive Services)

City	Service Provider	Demand responsive other than paratransit?	Dial-a-ride and/or app-based?	Partnerships with TNCs?
Bloomington, Ind.	**Bloomington Public Transportation Corporation**	**No**	**No**	**No**
Athens, Ga.	Athens Transit System	Yes	Dial-a-ride	No
Charlottesville, Va.	Charlottesville Area Transit	No	No	No
Flagstaff, Ariz.	Northern Arizona Intergovernmental Public Transportation Authority	No, but studying	No	Taxi/TNC partnership for paratransit customers
Missoula, Mont.	Missoula Urban Transportation District	No	No	No
Muncie, Ind.	Muncie Indiana Transit System	No	No	No

Source: Personal communication.

3. STAKEHOLDER OUTREACH

Among the best ways to understand how well a transit system is serving its community, is to ask the people who interact with it the most. This includes riders, who in many cases experience the system daily, and non-riders who may still be considered stakeholders in their capacity as prospective riders, employers, advocates, service providers, or simply tax-payers.

In the fall of 2018, the study team conducted a series of stakeholder outreach activities aimed at assessing service perceptions and ridership characteristics, as well as to gain valuable feedback on potential improvements to both Bloomington Transit and IU Campus Bus service. The stakeholder outreach consisted of the following two phases:

- In-person meetings with the general public, Indiana University students, community leaders, and Bloomington Transit operators.
- An online survey of riders and non-riders.

Stakeholder Meetings

Stakeholder meetings were held on November 12th and 13th, 2018 at the Downtown Transit Center and the Indiana Memorial Union. Each meeting included a review of the project background, goals, and study approach. Participants were briefed on the results of the market analysis, including transit potential and transit need in the Bloomington region. At the conclusion of the presentation, attendees were posed a series of questions to invite discussion. A summary of these discussions is provided in **Appendix B**. The list below highlights key themes and comments:

- Service is needed to Ivy Tech.
- Bus priority lanes on 10th Street would be welcomed, as would better pedestrian conditions.
- Integrating the IU and BT service information on one phone application would be very helpful.
- Park & Rides for commuters would be helpful.
- BT's interlocking system can sometimes cause confusion.
- Service should be simplified.
- On-time performance is an issue due to downtown congestion.

Online Survey

To complement in-person public outreach, an online survey was available for the general public from November 12th to December 31st, 2018. The survey asked respondents to provide basic demographic information, details about their transit use, and preferences with respect to Bloomington Transit and Indiana University Campus Bus transit service.

625 survey responses were received in total. Regarding transit usage, respondents were almost evenly split: 33 percent reported not being regular transit riders, 36 percent were occasional riders, and 30 percent were regular riders. Several key themes and findings emerged from the summary and analysis of the rider survey responses, including the following:

- The presence of Indiana University has an obvious effect on the makeup of transit ridership in Bloomington, including the number of riders who are students, young, lower income, and those who directly attributed their transit use with concern for the environment and lack of affordable parking options.
- Survey results revealed that there appear to be a relatively high percentage of "choice riders" in Bloomington, or individuals who choose transit over other modes. 58 percent of riders indicated that they have regular access to a personal vehicle, but nonetheless use transit either regularly or occasionally. 51 percent of riders reported that they choose to ride transit because it is cheaper than paying for gas, parking is expensive, or that they prefer to do things other than drive during their commute. Furthermore,

when asked how they would complete their trip if transit were not an option, 22 percent of riders indicated that they would have driven alone.

- Riders are generally pleased with the quality of transit service in Bloomington, particularly with respect to reasonable fares, comfortable and clean buses, and professional and courteous staff and drivers. On the whole, existing schedules adequately satisfy people's needs, but some riders expressed dissatisfaction with this aspect of service provision.
- Both riders and non-riders prefer more frequent service to additional coverage at a rate of two to one. Riders expressed a preference for more weekend service relative to weekday service, although non-riders were more evenly split.
- An analysis of open-ended comments revealed that requests for more weekend service was the most common topic mentioned. Service to new neighborhoods and more frequent service were also mentioned frequently.

A full summary of the online survey responses is included in **Appendix B**.

4. IDENTIFICATION OF SERVICE ISSUES AND OPPORTUNITIES

The market analysis and assessment of existing conditions, together with stakeholder input, provide context for the route-by-route analysis of transit service in the study area. Using these analyses as a starting point, the study team developed detailed, diagnostic profiles of each Bloomington Transit and IU Campus Bus route. The route profiles, found in **Appendix A**, describe each fixed route's service characteristics, ridership patterns, productivity, and on-time performance. At the conclusion of each route profile is a list of potential service improvement options for the route. The service improvement options are based on the technical findings of the route profiles (such as low ridership, poor on-time performance, or inadequate connections), as well as a set of guiding principles representing industry best practices. Transit services are most successful when they are easy to use and intuitive to understand. The principles below describe the characteristics of a such a transit system:

- Service should operate at regular intervals.
- Routes should operate along a direct path.
- Routes should be symmetrical.
- Routes should serve well-defined markets.
- Service should be well coordinated.

Application of Guiding Principles

Service Should Operate at Regular Intervals

In general, people can easily remember repeating patterns, but have difficulty remembering irregular sequences. Transit riders therefore may find transit routes that operate at different times each hour cumbersome to use. Irregular schedules increase the likelihood a rider will miss a trip or a transfer, thus decreasing the utility of the service. In many cases, operating a service at regular intervals provides a better transit experience for riders, even if doing so results in slightly decreased service frequency.

Ideally, transit routes that operate less frequently than every 15 minutes should utilize clockface scheduling. With a clockface schedule, each bus arrives at the same time or times each hour. For example, a bus route with 20-minute frequency might arrive at :00, :20, and :40 each hour throughout a service period.

Clockface scheduling significantly enhances transit service usability, especially in systems with relatively low frequency service, as it allows passengers to easily remember when their bus will come without having to rely on paper or online schedules. Regular clockface schedules can also help simplify transfers between routes. Even if two routes do not arrive at a stop at the same time, clockface frequencies ensure that wait times between buses are consistent and predictable.

Most Bloomington Transit routes do currently operate with clockface frequencies during weekday peak periods. However, some routes operate with non-clockface headways of 35, 40, 45, or 80 minutes during off-peak and weekend periods (see **Table 1**). IU service operates with more irregular frequencies than Bloomington Transit (see **Table 2**), but service is frequent enough (at least on weekdays) that riders generally do not need to refer to schedules.

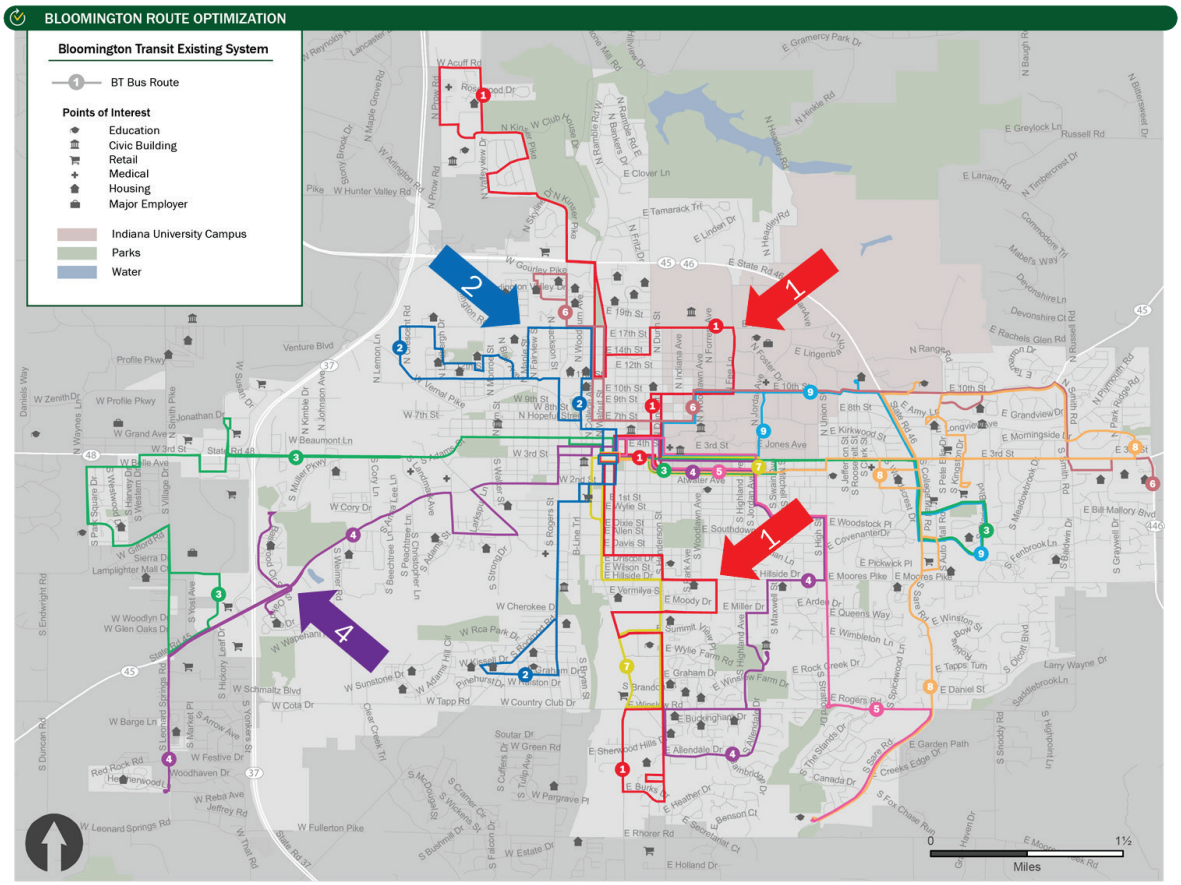
Routes Should Operate Along a Direct Path

The fewer directional changes a route makes, the easier it is to understand. Circuitous alignments are disorienting and difficult to remember. Some deviations from the most direct path of travel are necessary and justifiable given that major destinations are sometimes located off of major arterial roadways. However, frequent deviations from the most direct path of travel will increase travel times for the majority of passengers, and thus should be avoided unless there is a strong justification.

Figure 17 highlights examples of circuitous alignment in the current Bloomington Transit network. These examples are described below:

- **Route 1 North**. The current alignment of Route 1, north of downtown Bloomington, requires riders to ride through the IU campus before finally reaching downtown. This may limit the appeal of the route for residents of neighborhoods north of the bypass, who are not affiliated with the University.
- **Route 1 South**. South of downtown, Route 1 deviates from Henderson Street to serve two large apartment communities on Miller Drive. While these properties do generate dozens of transit trips daily, a far larger number of riders board along Henderson Street and are inconvenienced by the deviation onto Miller. In addition, both apartment communities are within a quarter-mile of Henderson, and have fairly good pedestrian connections.
- **Route 2 West**. Passengers boarding Route 2 at several Bloomington Housing Authority properties between 11th Street and 13th Street are currently forced to travel north to 17th Street before continuing on to downtown. Similarly, passengers with destinations along 17th Street are forced to ride as far west as Crescent Road before reaching their intended destinations.
- **Route 4 West**. Route 4 buses currently deviate from the route's primary alignment along Bloomfield Road to serve a large concentration of apartment communities along Basswood Drive and Oakdale Drive. These deviations force many riders to travel out of direction to reach their final destination.

Figure 17: Circuitous Alignments (Bloomington Transit)



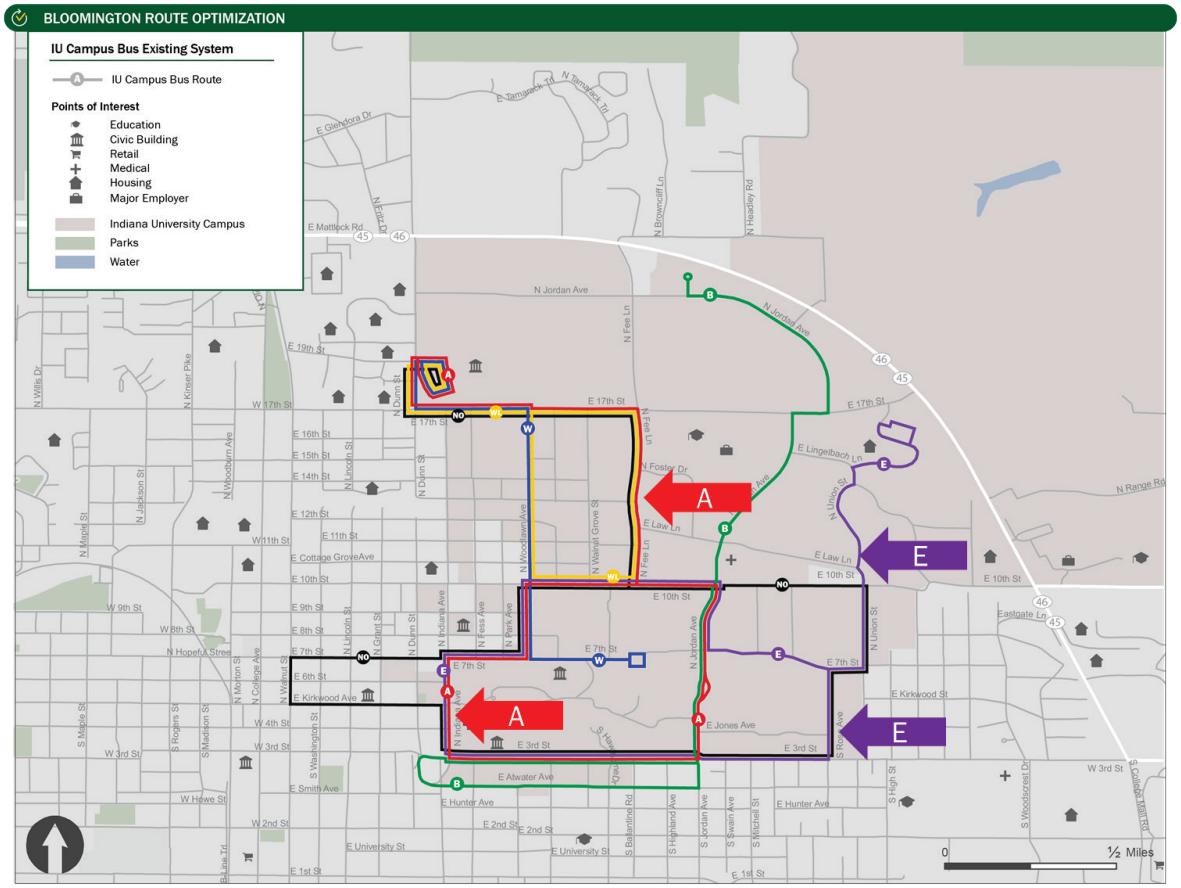
Routes Should be Symmetrical

Routes should operate along the same alignment in both directions to make it easy for riders to know where to catch the bus for their return trip. Providing service on different streets, depending on direction, is sometimes unavoidable due to one-way traffic patterns, but to the extent possible, bus stops for service in opposite directions should be across from one another on opposite sides of the same street.

Large one-way loops can also frustrate riders by forcing out-of-direction travel on either the outbound or return leg of their trip. In most circumstances, transit riders prefer bi-directional services that they have to walk somewhat further to access, over a closer but one-way route.

One-way service is a prominent feature of the IU Campus Bus network. The A and W Routes, for example, both operate clockwise-only through the core of campus. This design makes transit service a relatively unappealing option in the core of campus as passengers are forced to travel greater distances to reach their destinations than they would if service operated bi-directionally. On-campus circulation is further complicated by the fact that both the A Route and the W Route have "tails" that preclude full circulation through the core of campus on either route (**Figure 18**). In other words, passengers traveling between 10th Street and 3rd Street on either route are forced to travel as far north to Memorial Stadium or the Redbud Hill Apartments before continuing to their final destination on the south side of campus.

Figure 18: One-Way Loops with Tails (IU Campus Bus)

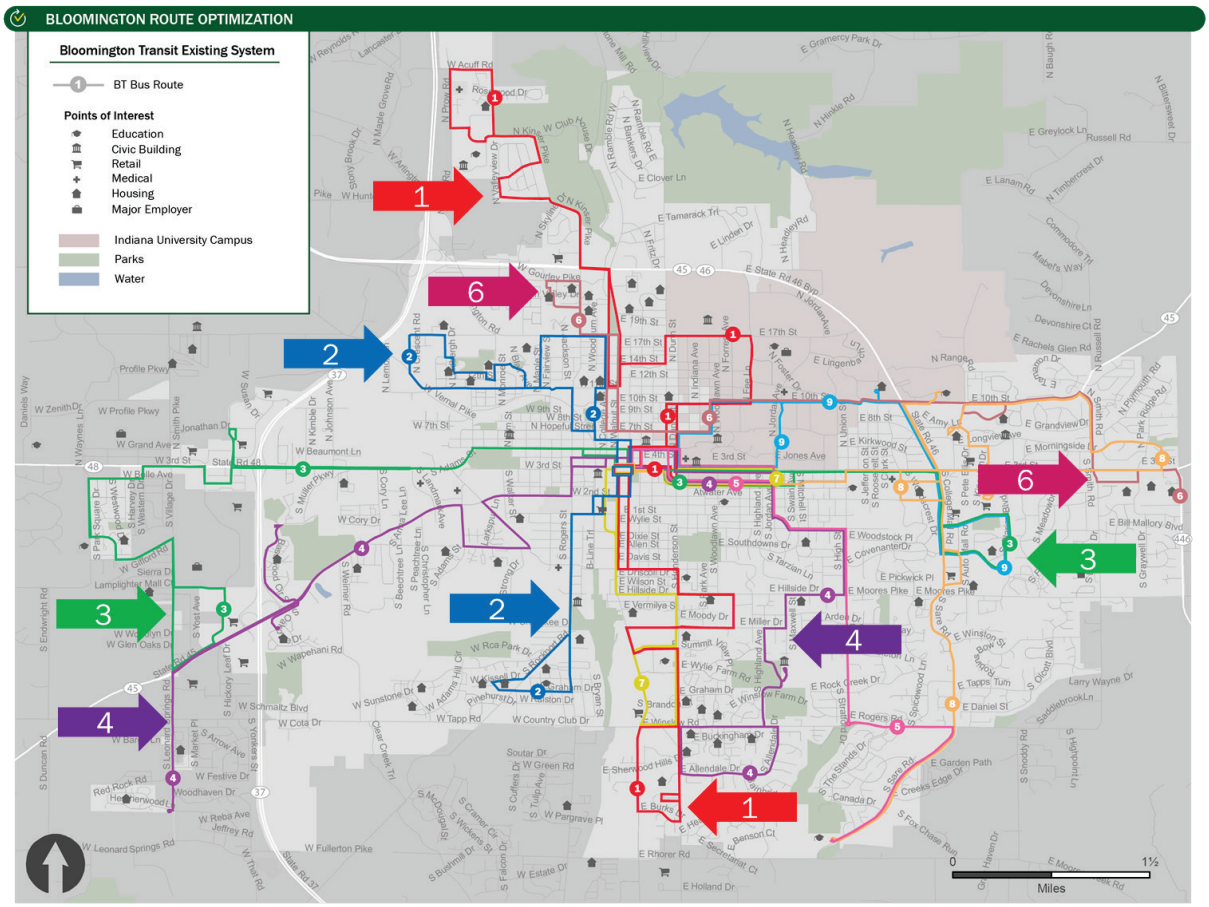


Routes Should Serve Well-Defined Markets

The purpose of a transit route should be clear. Each route should include strong anchors and a mix of origins and destinations. Service duplication should be avoided unless it is for a specific purpose such as to increase effective frequency in a high ridership corridor. In addition, to avoid confusion at major transfer locations, routes should not carry the same name when serving different corridors.

Figure 19 highlights multiple examples of Bloomington Transit routes that operate under the same name in different corridors. This approach not only increases the likelihood of a passenger accidently boarding the wrong bus, it also links together routes that may in fact justify very different service characteristics. Decoupling routes that serve different markets would provide Bloomington Transit with more flexibility when it comes to service scheduling. Even if routes are interlined, they should maintain different names in different corridors to allow for new interline combinations when necessary.

Figure 19: Routes Serving Unrelated Markets



Service Should be Well Coordinated

At major transfer locations, schedules should be coordinated to the greatest extent possible to minimize connection times between services. In general, there are two approaches to coordinating transit service. The first approach is to establish clockface service frequencies on all routes. This ensures a certain predictability for transfers as passengers know when to expect each route regardless of the hour of the day. Clockface schedules can also facilitate pulsing, which is when several routes are designed to arrive at a particular transfer location at the same time. Pulsing is usually used when a transit network has a single primary hub.

The second approach to coordinating transit service is simply to maximize service frequencies on all routes. High frequencies reduce the need to pulse services at a particular location because passengers who miss a connection anywhere in the system can catch the next bus in a relatively short time. If service frequencies cannot be increased at all times due to budget constraints, it is best to increase frequencies during peak-periods when the majority of transfers between services occur.

Bloomington Transit service is currently designed to pulse at the Downtown Transit Center, where most buses meet up at 10 and/or 40 minutes past the hour. IU Campus Bus routes do not have a pulse design, and instead rely on high frequency to ensure good connections during peak periods.

Other Identified Issues and Opportunities

New Markets

New market opportunities were identified through a variety of sources over the course of the Route Optimization Study, including the market analysis and stakeholder input. The most imminent market opportunities include the following:

- **Bloomington Hospital**. Indiana University Health is relocating its IU Health Bloomington Hospital from southwest Bloomington to a new location at 2000 North Range Road, the current site of the IU golf driving range just off the State Route 45/46 bypass. The new location is not currently served by any transit service, but is expected to be a major transit trip generator.
- **Ivy Tech**. The Ivy Tech campus is located just outside of the Bloomington city limits, and is currently served by Rural Transit via closed-door service between the campus and the Downtown Transit Center. A desire for more frequent and convenient service (potentially by Bloomington Transit) was a recurring theme among stakeholder outreach participants.
- **Villages at Muller Park**. The Villages at Muller Park is a large apartment community located along Muller Parkway, south of W. 3rd Street. The property currently operates its own shuttle service to and from IU, but has approached Bloomington Transit about the possibility of replacing the shuttle with BT service that would be financially supported by the property.
- **Social Security Administration**. The Bloomington Social Security Administration office on Patterson Drive currently has no direct fixed-route service. The closest stop to the facility is on Rogers Street, one block away. Providing more direct service to the Social Security office will likely increase ridership and potential shift some trips from BTaccess to fixed-route service.
- **Tapp Road.** Tapp Road has been improved in recent years to include sidewalks and signalized intersections. The corridor has also seen new development such as the Adams Village Apartments, and has a very strong western anchor at Walmart on Leonard Springs Road. These features suggest that Tapp Road has the potential to support transit service in the near future.

Service Consistency

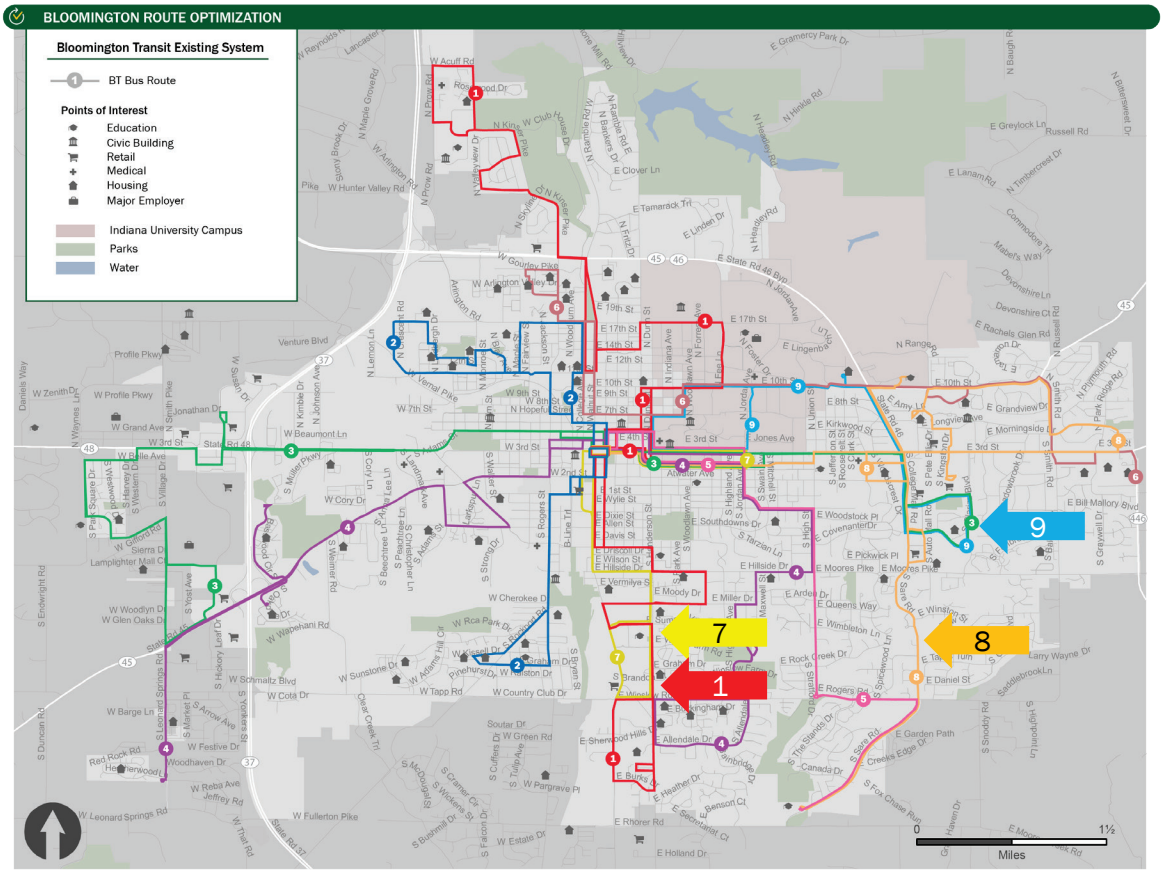
Bloomington Transit service currently alternates between regular and reduced service, depending on whether IU is in session. For example, during IU break periods (including summer break, when IU does offer limited classes), Route 7 does not operate. This reduction of service is understandable based on the reduced in ridership demand when IU is not in regular session, but it creates a hardship for non-student riders who have come to rely on the eliminated service. A more preferable approach would be for Bloomington Transit to reduce service characteristics such a span and frequency of service, when ridership demand drops, without fully eliminating service coverage. This approach would serve to minimize the disruption and possible alienation of existing ridership, which could have a positive long-term impact on overall ridership.

Unproductive or Redundant Service

Bloomington Transit generally performs well relative to its peers in terms of ridership and productivity. However, the system's productivity could improve further by addressing a handful of routes that are either unproductive or redundant with other services. **Figure 20** highlights three such examples, which are described below:

- **Route 1 and Route 7.** Routes 1 and 7 both serve the Walnut Street/Henderson Street corridor south of downtown Bloomington. The two alignments are not identical, but are similar enough to be used interchangeable by many riders in the corridor. Serving the corridor with a single high-frequency route would simplify service for current and prospective riders and make better use of resources by eliminating bus "bunching" when two or more buses serve the same or near-by location in quick succession.
- **Route 8.** Route 8 is the least productive route in the current BT network, carrying fewer than 100 passengers per day and only 7.2 passengers per trip. The route overlaps with other services along much of its alignment, and the service segments that are unique to the route along Sare Road and E. 3rd Street generate very little ridership. Eliminating Route 8 would inconvenience very few riders and would free up resources to invest in other service.
- **Route 9.** While Route 9 is itself a very productive route, its coverage area (including the 9L variant) overlaps with Route 3 and Route 6 in the 3rd Street and 10th Street corridors. Consolidating these routes into fewer route numbers would help simplify service and reduce the likelihood of unproductive trips due to bus bunching.

Figure 20: Unproductive or Redundant Service Segments



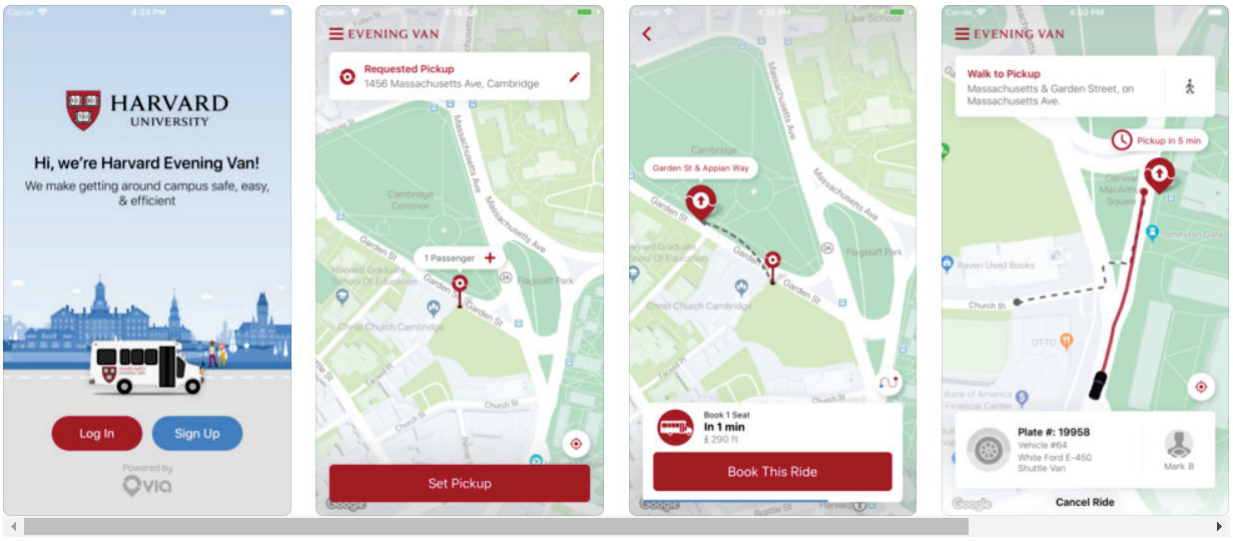
New Technology

On Friday and Saturday evenings, IU Campus Bus provides Night Owl service between the IU Campus and downtown Bloomington. The Night Owl is a fairly circuitous route as it combines a large one-way loop with a mid-route deviation to connect the core of campus with Memorial Stadium. A passenger boarding at downtown Bloomington, for example, would not be able to reach Rose Avenue or 3rd Avenue without first traveling by Memorial Stadium. Because of its circuitous alignment and relatively long travel times, some prospective riders choose to use ride-hailing services like Uber or Lyft for more direct service.

In recent years, the same type of ride-hailing technology that has made Uber and Lyft a popular alternative to transit service has begun to make its way into the transit industry. Microtransit is a type on demand-response transit service that allows users to directly request trips with the use of a mobile app. Microtransit typically uses vans or cut-away buses, within a designated service zone.

Universities are beginning to apply the microtransit model to services like IU's Night Owl because microtransit can provide greater coverage than a fixed-route service and greater responsiveness than a traditional dial-a-ride service (**Figure 21**). In the short term, the weekend Night Owl service is a strong candidate for microtransit service, as it can offer riders shorter and more direct trips than the current fixed-route service. Longer term, microtransit could have numerous applications at IU and throughout Bloomington, including weekday evening service on campus, new service in dense neighborhoods just south of campus that are difficult to serve with larger buses, and replacement service for under-performing fixed-route service in lower-density neighborhoods of Bloomington.

Figure 21: Example of University Microtransit Service



5. DEVELOPMENT OF SERVICE SCENARIOS

To address the service issues and opportunities identified through the market analysis, service analysis, and stakeholder input, the study team developed two preliminary service redesign scenarios for both the Bloomington Transit and IU Campus Bus services. Both scenarios incorporate service improvement ideas that emerged from the route profiles.

Scenario 1: Bloomington Transit

Bloomington Transit Scenario 1, shown in **Figure 22** and described in **Table 14**, was designed to provide "out and back" service over long corridors. Under this alternative, each fixed route would operate linearly to form a grid network. Scenario 1 includes microtransit service in the Bloomfield Road corridor and adjacent neighborhoods that are difficult to serve effectively with fixed-route service. Most routes in this scenario would provide both local and regional connections. Transfers would accommodate movement between corridors.

Figure 22: Bloomington Transit Scenario 1 Map

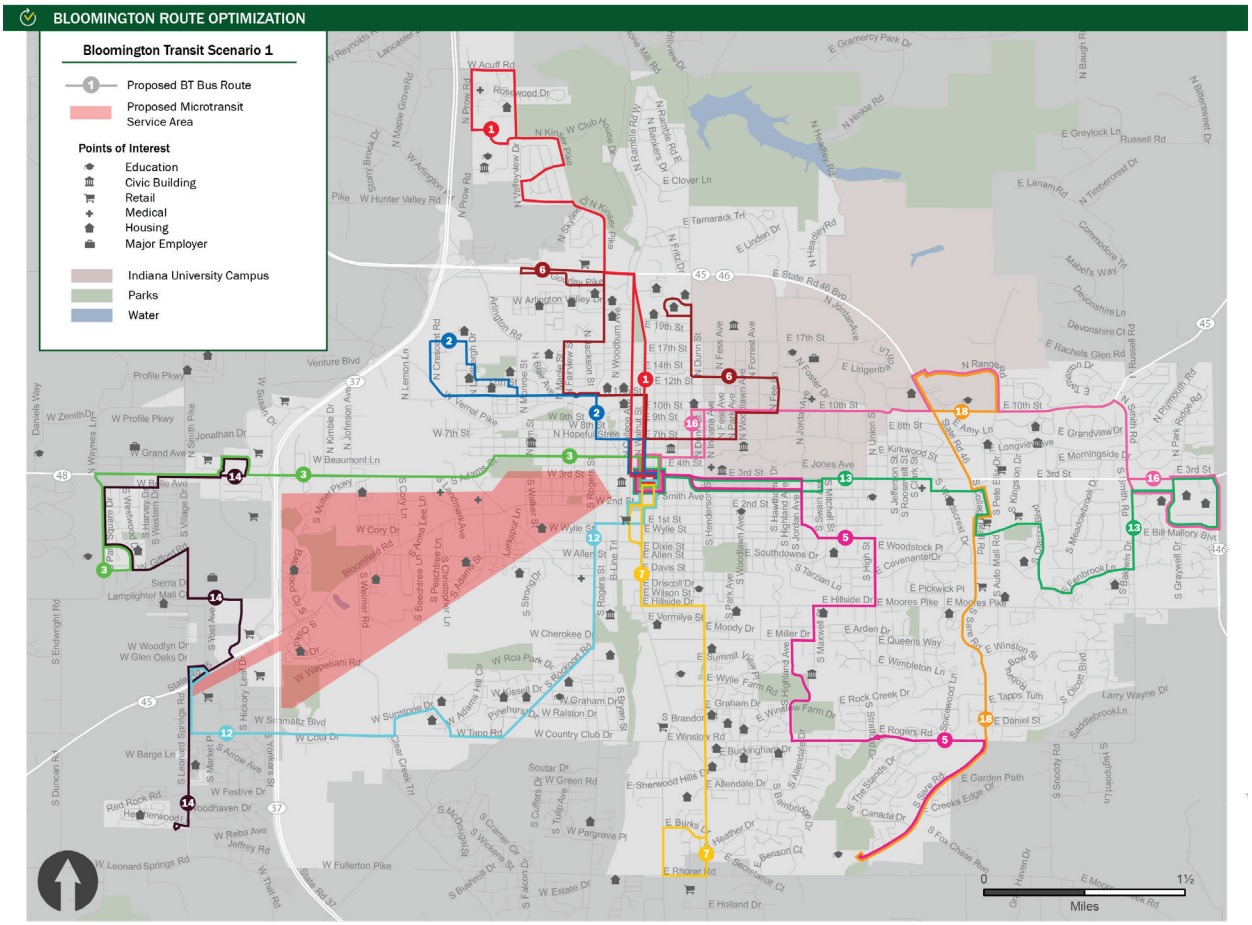


Table 14: Bloomington Transit Scenario 1 Route Descriptions

Route	Description
1	Streamlined version of the current Route 1 North from downtown to Bloomington Meadows Hospital via College Avenue and Walnut Street.
2	Streamlined version of the current Route 2 West, with service from downtown to Crescent Road and Bloomington Housing Authority properties. Would no longer serve Blair Avenue, Maple Street, or 17th Street.
3	Direct service from downtown to Orchard Glen Apartments via 3rd Street. The route would cover the majority of the current Route 3 East.
5	Similar to the current Route 5, operating between Sare Road corridor and downtown. New route would operate on Highland Avenue/Maxwell Street in place of High Street between Rogers Road and Hillside Drive.
6	Route 6 would run from the intersection of Monroe Street and State Route 45-46 to Stadium Crossing Apartments via large concentrations of multifamily housing and IU. The route would cover portions of the current Routes 2 West, 1 North, and 6.
7	Streamlined and extended version of the current Route 7 operating between downtown and Clear Creek Shopping Center via Walnut Street Pike. The route would cover portions of the current Routes 1 South, 4 South, and 7.
12	Service from downtown to Walmart via Rockport Road and Tapp Road. The route would cover pieces of the current Routes 2 South and 4 West.
13	Service from downtown to Knightridge Apartments via 3rd Street. The route would cover the majority of the current Route 3 East and serve College Mall as well as several large apartment complexes along Covenanter Drive.
14	Service from Whitehall Crossing to Heatherwood Park via Orchard Glen Apartments, Aldi, and Walmart. The route would cover portions of current Routes 3 West and 4 West.
16	Operating from Knightridge Apartments to downtown via the future hospital site and 10th Street. The route would cover segments of a variety of current services, most notably Routes 6 and 6 Limited.
18	Service from the Sare Road corridor to the future hospital site via College Mall Road. The route would cover the majority of the current Route 8.
Microtransit	Demand responsive microtransit, designed to serve relatively short trips not suitable for fixed route service, would operate within a zone in southwest Bloomington. The zone would consist primarily of areas currently served by Route 4 West and surroundings.

Scenario 1: IU Campus Bus

IU Campus Bus Scenario 1, shown in **Figure 23** and described in **Table 15**, was designed around the concept of a "dedicated circulator" serving the core of campus. This alternative envisions a network build around a clockwise circulator operating continuously along a fairly compact loop (10th Street, Jordan Avenue, 3rd Street, Indiana Avenue, and Woodward Avenue). Other routes would provide feeder service into campus, with on-campus circulation provided by the clockwise loop. Transfers would accommodate first and last mile connections.

Figure 23: IU Campus Bus Scenario 1 Map

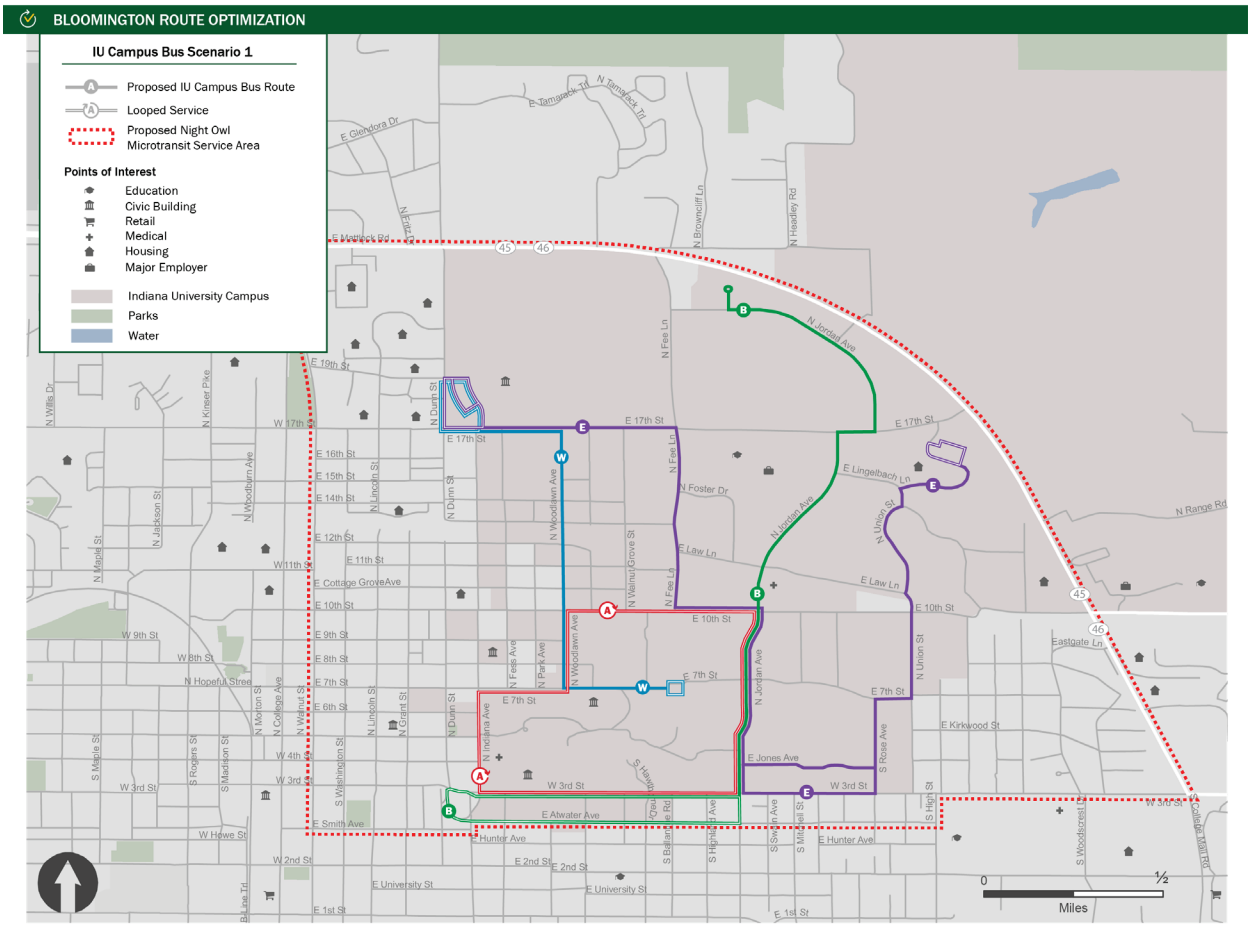


Table 15: IU Campus Bus Scenario 1 Route Descriptions

Route	Description
A Route	Clockwise circulator around the campus core, covering the current A Route as far north as 10th Street. The route would cover portions of the current A, E, and W Limited Routes
B Route	Identical to current B Route
E Route	Bi-directional service between Memorial Stadium and Redbud Hill/Evermann Apartments via Fee Lane, Jordan Avenue, and Union Street. The route would cover portions of the current A, E, and W Limited Routes
W Route	Identical to current W Route
Night Owl Microtransit	On Friday and Saturday nights, demand responsive microtransit service would operate in place of the current Night Owl Service

Scenario 2: Bloomington Transit

Bloomington Transit Scenario 2, shown in **Figure 24** and described in **Table 16**, was designed as a series of "corridors and circulators." Under this alternative, which incorporates several elements of Scenario 1, fast and frequent service would operate along key corridors. To complement this service, bi-directional circulators would provide local access in neighborhoods beyond the key corridors. Transfers would accommodate first and last mile connections.

Figure 24: Bloomington Transit Scenario 2 Map

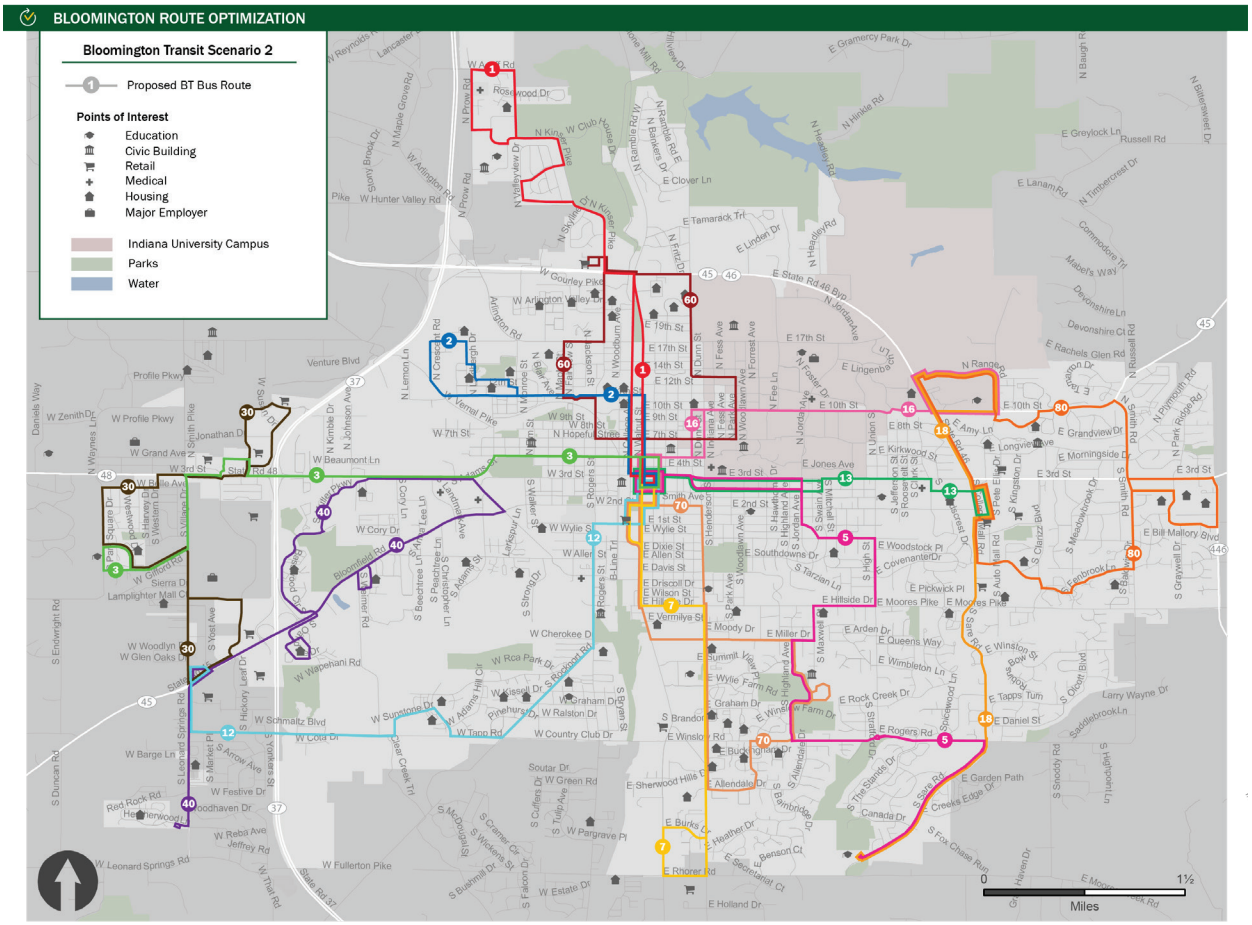


Table 16: Bloomington Transit Scenario 2 Route Descriptions

Route	Description
1	Streamlined version of the current Route 1 North from downtown to Bloomington Meadows Hospital via College Avenue and Walnut Street
2	Streamlined version of the current Route 2 West, with service from downtown to Crescent Road and Bloomington Housing Authority properties. Would no longer serve Blair Avenue, Maple Street, or 17th Street
3	Direct service from downtown to Orchard Glen Apartments via 3rd Street. The route would cover the majority of the current Route 3 East
5	Similar to the current Route 5, operating between Sare Road corridor and downtown. New route would operate on Highland Avenue/Maxwell Street in place of High Street between Rogers Road and Hillside Drive
6	Route 6 would run from the intersection of Monroe Street and State Route 45-46 to Stadium Crossing Apartments via large concentrations of multifamily housing and IU. The route would cover portions of the current Routes 2 West, 1 North, and 6
7	Streamlined and extended version of the current Route 7 operating between downtown and Clear Creek Shopping Center via Walnut Street Pike. The route would cover portions of the current Routes 1 South, 4 South, and 7
12	Service from downtown to Walmart via Rockport Road and Tapp Road. The route would cover pieces of the current Routes 2 South and 4 West

Route	Description
13	Direct service from College Mall to downtown via 3rd Street, covering a portion of the current Route 3 East
14	Service from Whitehall Crossing to Heatherwood Park via Orchard Glen Apartments, Aldi, and Walmart. The route would cover portions of current Routes 3 West and 4 West
16	Similar to current 6 Limited service, this route would operate between downtown and the future hospital site
18	Service from the Sare Road corridor to the future hospital site via College Mall Road. The route would cover the majority of the current Route 8
30	West side route providing service to Walmart, Aldi, Orchard Glen Apartments, and Whitehall Crossing. The route would cover portions of the current Route 3 West
40	West side circulator serving Basswood Apartments and Heatherwood Park via Leonard Springs Road and Bloomfield Road. The route would cover much of the current Route 4 West
60	East side circulator serving a similar alignment to Scenario 1 Route 6. The route would cover portions of the current Routes 2 West, 1 North, and 6, serving multifamily housing, downtown, IU, and Kroger
70	South side circulator covering areas of Winslow Road, Westminster Way, and Allendale Drive not served by proposed Routes 5 or 7. The route would cover portions of current Routes 1 South and 4 South
80	East side circulator connecting College mall, the future hospital site, and multiple large apartment complexes. The route would cover portions of several current routes

Scenario 2: IU Campus Bus

IU Campus Bus Scenario 2, shown in **Figure 25** and described in **Table 17**, was designed as a "bi-directional service" model. In this alternative, two-way movement would be available throughout the shuttle network. Each route segment in this scenario is either bi-directional or within one block of service operating in the opposite direction.

Figure 25: IU Campus Bus Scenario 2 Map

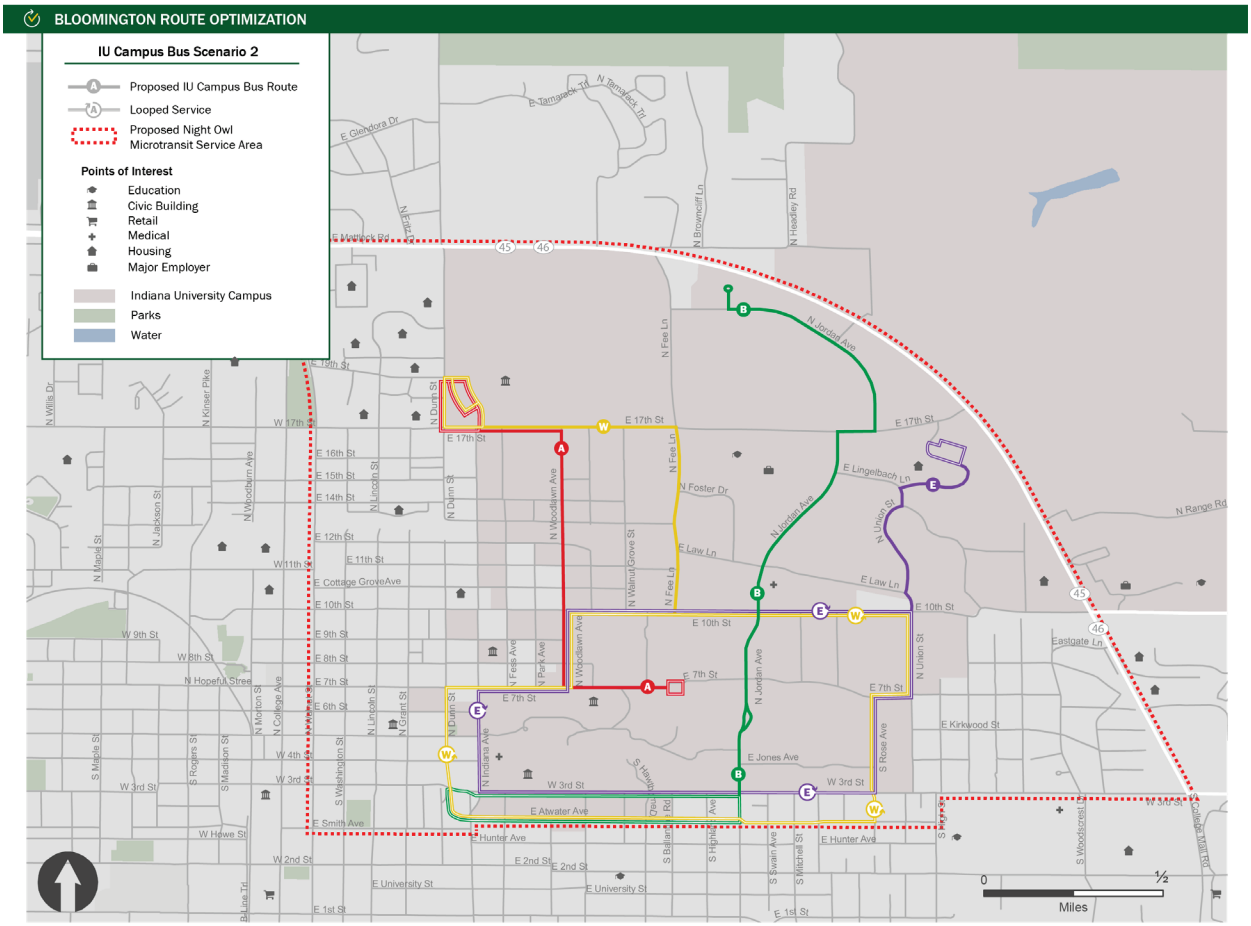


Table 17: IU Campus Bus Scenario 2 Route Descriptions

Route	Description
A Route	Identical to current W Route
B Route	Identical to current B Route
E Route	Similar to current E Route alignment with service shifted from 7th Street to 10th Street between Union Street and Jordan Avenue. This clockwise loop would cover portions of the current A, E, W, and W Limited Routes
W Route	Counter-clockwise loop service around the campus via Fee Lane, 10th Street, Atwater Avenue, and Union Street. The route would cover portions of the current A, W, and W Limited Routes
Night Owl Microtransit	On Friday and Saturday nights, demand responsive microtransit service would operate in place of the current Night Owl Service

Public Feedback

In late March 2019, the two alternative scenarios were presented to the public and transit agency front-line staff via a series of meetings and outreach events. Following the presentations, two service scenario surveys (one for BT and one for IU scenarios) were posted online for approximately a month. The combined surveys received over 1,200 responses. A majority of respondents to the Bloomington Transit survey indicated a preference for current service over either proposed scenario. Respondents to the IU Campus Bus survey relatively evenly split preferences among current service and Scenarios 1 and 2. A full summary of the scenario preference survey is provided in **Appendix C**.

Feedback on BT Scenario 1

The most well-received element of Scenario 1 was the proposed Route 16, which would provide fairly direct service between downtown Bloomington and Knightridge Road, via IU, 10th Street, and the new Bloomington Hospital. Several survey takers noted the importance of preserving direct one-seat service between Smith Road in east Bloomington and IU. The proposed Route 16 would preserve this connection. The proposed Route 13 in Scenario 1, which would connect downtown Bloomington, IU, and the 3rd Street corridor to College Mall, was also received favorably by survey takers.

Negative comments regarding Scenario 1 were often in relation to routes serving south and southeast Bloomington. Several survey takers criticized the lack of direct service on Route 7 to the IU campus. Others disliked the proposal to remove Route 5 service from High Street, between Highland and Rogers. Some respondents questioned whether the proposed consolidation of Route 4 and 5 would leave adequate capacity to meet ridership demand. In southwest Bloomington, there was opposition to removing service from Graham Drive, near Rogers Road. Finally, there was skepticism regarding the proposed application of microtransit service along the Bloomfield Road corridor, especially if it does not also serve the Downtown Transit Center.

Feedback on BT Scenario 2

Scenario 2 elicited positive comments for its overall greater coverage than Scenario 1. More robust service along the S. Henderson corridor was also well-received. Route 13, which was more streamlined in Scenario 2 than in Scenario 1, was positively reviewed for preserving a direct link between downtown, IU, and College Mall. Finally, the proposed bi-directional circulation of Route 80 received a number of positive comments, along with negative comments relative to the transfer the route would require for travel to IU or downtown.

As with Scenario 1, Scenario 2 did not provide direct service between the Henderson Street corridor and IU, or Route 5 service on High Street between Highland and Rogers. These omissions received negative reviews, along with the elimination of service along Graham Drive.

Feedback on IU Scenario 1

The proposed A Route presented in Scenario 1, which would serve as a dedicated circulator through the core of campus, was generally well received by participants in the IU Scenarios survey. Other positive comments regarding Scenario 1 referred to improved access to the Kelley School and increased bi-directional service along Jordan Avenue, compared to both scenarios and the current service network.

Negative comments regarding Scenario 1 commonly focused on the length of the proposed E Route, which would link Memorial Stadium with the Red Hill Apartments, via Fee Lane, Jordan Avenue, and Union Street. Survey takers did not appear to appreciate that this route would likely serve as a feeder service connecting riders from the Union Street corridor and the stadium/Fee Lane corridor to Jordan Avenue, where connections could be made to the A Route circulator. In fact, several comments focused on the need for a transfer between the two routes as a negative feature of this scenario.

Feedback on IU Scenario 2

The most positive comments regarding Scenario 2 were related to access to Memorial Stadium, which would be served by both the proposed A Route from the Showalter Fountain and the proposed W Route circulator. The prospects of clockwise and counter-clockwise circulation along 10th Street and throughout the core of campus were also very well-received.

Negative feedback to Scenario 2 included dissatisfaction with the lack of direct service from Jordan Avenue to Memorial Stadium, and the elimination of service along 7th Street near the School of Education. Finally, several comments noted that the proposed size of the W Route loop is too large and would result in long travel times, although the network is designed for bi-directional travel via complementary routes.

6. FINAL RECOMMENDATIONS

This Route Optimization Study assumes that no new significant funding will become available to Bloomington Transit or IU Campus Bus in the short term. Thus, the recommendations presented in this section are divided into short and long-range recommendations. Short-range recommendations are meaningful changes that can be implemented relatively quickly (within one year), using existing resources. On the other hand, long term recommendations are not cost-constrained, meaning that there is a recognition that these changes will not be possible without either new funding sources or a shifting of resources from current or recommended short-range service.

The short-range recommendations presented in this document have a projected annual operating cost that is within 0.5 percent of the current Bloomington Transit operating budget and within 1.5 percent of the current IU Campus Bus operating budget[5]. Small tweaks to the recommendations, such as adjusting service hours and/or the number of hours that are allocated to peak and off-peak service, respectively, can make the short-range recommendations cost-neutral. This level of fine-tuning is typically done by transit agency staff as part of the implementation process.

Short-Range Recommendations: Bloomington Transit

Based on the feedback received online and at the March 2019 stakeholder meetings, the study team developed Bloomington Transit Scenario 3 (**Figure 26**), the recommended short-range service scenario. Scenario 3 combines elements of Scenario 1 and Scenario 2, but also preserves the most popular and effective features of the current BT network. In addition, Scenario 3 includes some new design features that were not part of either of the preliminary scenarios, but emerged out of the second round of stakeholder outreach.

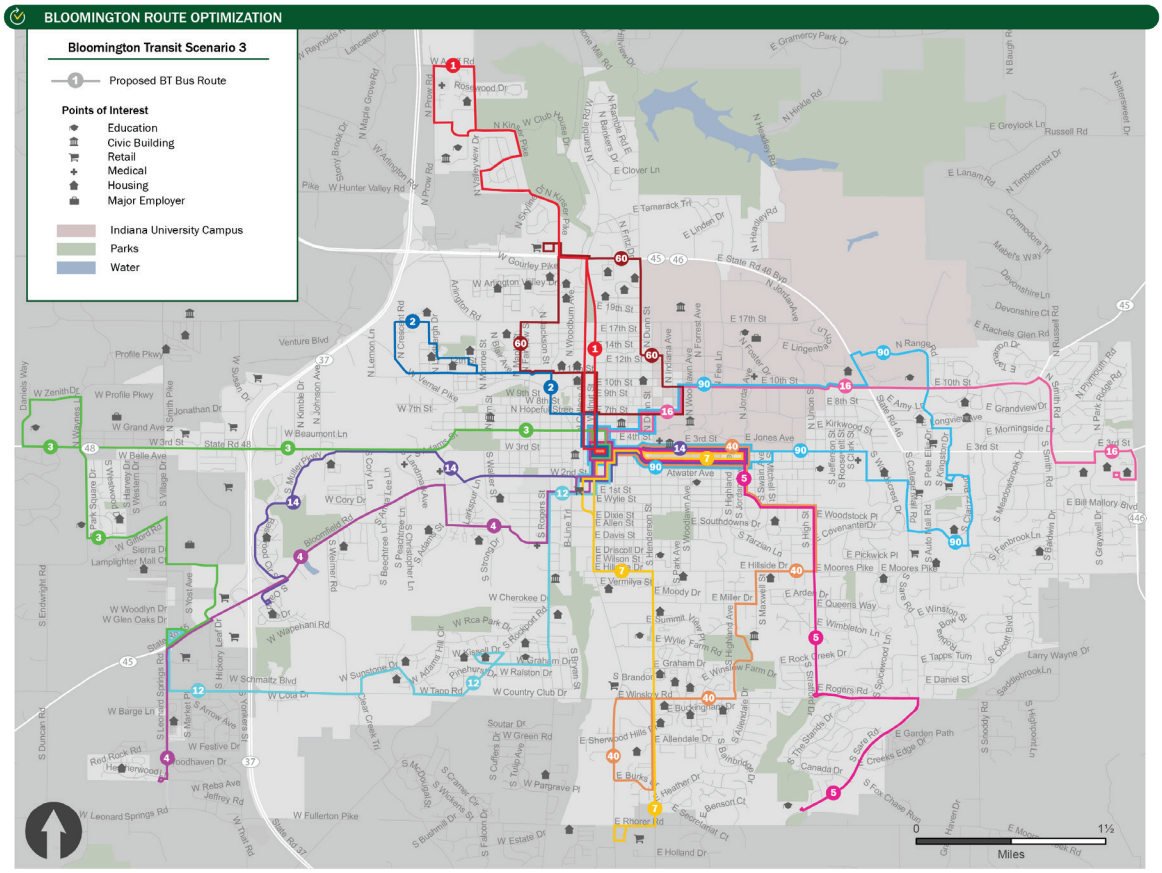
Key features of Scenario 3 include the following:

- New service to Ivy Tech and the future site of Bloomington Hospital
- New bi-directional service along Muller Parkway, Basswood Drive, and Oakdale Drive
- New service along Tapp Road
- Additional access to Walmart and the Social Security Administration office
- Simplified and consolidated service in east Bloomington and along the Henderson Street corridor
- Streamlined access to downtown Bloomington from the 11th Street and Kinser Pike corridors
- Bi-directional circulation in high-density neighborhoods north of downtown, and high-density retail corridors east of IU
- One-seat ride from Henderson Street and Muller Parkway/Basswood Drive corridors to IU campus.
- Elimination of unproductive service along portions of Sare Road
- Clockface frequency on all routes
- Reduced schedules, but no reduced coverage, during IU break periods

Finally, Bloomington Transit Scenario 3 does not recommend microtransit service as a short-range recommendation. Microtransit service is, however, included as a long-range recommendation for Bloomington Transit and a short-range recommendation for IU.

[5] The proposed service scenario for IU Campus Bus, designed for regular semester service only, is estimated to have a lower annual operating cost than is currently the case.

Figure 26: Bloomington Transit Scenario 3 Map



Service Characteristics

To simplify service changes and reduce disruption for existing riders, the recommended short-range service scenario features consistent service coverage year-round. However, two separate service schedules are recommended, to correspond to regular semester and break periods at IU.

Table 18 lists the assumed number of Bloomington Transit service days by day type. The agency would operate service during 360 total service days, 216 of which would apply to regular semester service.

Table 18: Bloomington Transit Service Days by Day Type

Service Day Type		Service Days per Year
Weekday	Regular Semester Service	157
	Reduced Service	99
Saturday	Regular Semester Service	29
	Reduced Service	23
Sunday	Regular Semester Service	30
	Reduced Service	22

Table 19 through **Table 24** shows the proposed weekday, Saturday, and Sunday service characteristics of each route, including peak vehicles and daily revenue hours, during regular and reduced service periods. Routes that are shown together in one row are proposed for interlining. Interlining is the practice of operating a single

bus or group of buses on multiple routes. Interlining is often used to optimize cycle times and recovery times[6]. For example, if one route has insufficient recovery time while another has excessive recovery time, interlining the routes can result in a cycle with an optimal mix of running time and recovery time.

Clockface schedules are proposed for all routes, and recovery times are projected to fall between 10 and 25 percent of total cycle time for every route. When recovery time is less than 10 percent of total cycle time, there is a high risk of poor on-time performance because there is insufficient buffering between trips. With insufficient recovery time, one late trip can lead to another, causing a bus to get further and further behind schedule. On the other hand, if recovery time is particularly high, buses may end up sitting unproductively for long periods of time.

During regular semester service, the proposed service plan calls for a 12-hour weekday peak period (with off-peak hours varying by route); 10 to 11 hours of service on Saturdays; and 10 hours of service on Sundays (for those routes that operate on Sundays). During reduced service periods, service hours and frequencies are reduced for a majority of proposed routes.

The recommended short-range service scenario would require 28 weekday peak vehicles and would result in 384 weekday revenue hours during regular service periods. By comparison, existing Bloomington Transit regular semester weekday service requires 29 peak vehicles and 389 vehicle revenue hours. On Saturdays, during regular service periods, 15 peak vehicles would be needed, resulting in 155 vehicle revenue hours; on Sundays, the proposed system would require five vehicles and 50 vehicle revenue hours during regular service periods. Current Saturday service requires 13 peak vehicles and 166 vehicle revenue hours; Sunday service currently requires two peak vehicles and 22 vehicle revenue hours. Assuming the service days listed in **Table 18**, the proposed short-range service recommendations would result in 0.26 percent more annual revenue hours than the current service.

The service characteristics shown below are followed by detailed descriptions of the changes being proposed for each route in the short-range.

[6] Recovery time is the time between trips that allows a driver to use the restroom or just prepare for the next trip. For a given trip, cycle time is the running time plus recovery time.

Weekday Operating Plan: Regular Semester Service

Table 19: Proposed Short-Range Bloomington Transit Weekday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehic.	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehic.	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
1+5[7]	19.0	12	1:35	0:09	1:44	2:00	0:25	21%	1:00	12:00	12	2	1:00	1:00	1	2	13	13:00	26:00
2+3	20.2	12	1:41	0:10	1:51	2:00	0:19	16%	0:30	12:00	24	4	1:00	4:00	4	2	28	16:00	56:00
4	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	12:00	12	1	1:00	1:00	1	1	13	13:00	13:00
7	9.5	12	0:47	0:04	0:52	1:00	0:12	21%	0:20	12:00	36	3	1:00	4:00	4	1	40	16:00	40:00
12	11.7	13	0:54	0:05	0:59	1:00	0:06	10%	0:30	12:00	24	2	1:00	1:00	1	1	25	13:00	25:00
14	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	0:30	12:00	24	2	1:00	1:00	1	1	25	13:00	25:00
16	9.8	12	0:49	0:04	0:53	1:00	0:11	18%	0:20	12:00	36	3	0:30	5:00	10	2	46	17:00	46:00
40	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	0:30	12:00	24	2	1:00	1:00	1	1	25	13:00	25:00
60	10.0	12	0:50	0:05	0:55	1:00	0:10	17%	0:15	12:00	48	4	0:30	4:00	8	2	56	16:00	56:00
90 Peak	16.0	12	1:20	0:08	1:28	1:40	0:20	20%	0:20	12:00	36	5	--	--	--	--	36	12:00	60:00
90 Off-Peak	16.0	12	1:20	0:08	1:28	1:30	0:10	11%	--	--	--	--	0:30	4:00	8	3	8	4:00	12:00

[7] Routes separated by a "+" sign indicate interlining, meaning that the same vehicle would serve trips on two routes.

Weekday Operating Plan: Reduced Service

Table 20: Proposed Short-Range Bloomington Transit Weekday Reduced Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehic.	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehic.	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
1+5	19.0	12	1:35	0:09	1:44	2:00	0:25	21%	1:00	11:00	11	2	1:00	1:00	1	2	12	12:00	24:00
2+3	20.2	12	1:41	0:10	1:51	2:00	0:19	16%	0:30	11:00	22	4	1:00	4:00	4	2	26	15:00	52:00
4	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	11:00	11	1	1:00	1:00	1	1	12	12:00	12:00
7	9.5	12	0:47	0:04	0:52	1:00	0:12	21%	0:30	11:00	22	2	1:00	4:00	4	1	26	15:00	26:00
12	11.7	13	0:54	0:05	0:59	1:00	0:06	10%	1:00	11:00	11	1	1:00	1:00	1	1	12	12:00	12:00
14	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	1:00	11:00	11	1	1:00	1:00	1	1	12	12:00	12:00
16	9.8	12	0:49	0:04	0:53	1:00	0:11	18%	0:30	11:00	22	2	1:00	4:00	4	1	26	15:00	26:00
40	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	11:00	11	1	1:00	1:00	1	1	12	12:00	12:00
60	10.0	12	0:50	0:05	0:55	1:00	0:10	17%	0:30	11:00	22	2	1:00	4:00	4	1	26	15:00	26:00
90	16.0	12	1:20	0:08	1:28	1:30	0:10	11%	0:30	11:00	22	3	0:30	4:00	8	3	30	15:00	45:00

Saturday Operating Plan: Regular Semester Service

Table 21: Proposed Short-Range Bloomington Transit Saturday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	All-Day Frequency	Peak Vehicles	Daily Trips	Daily Hrs. Service	Revenue Hours
1+5	19.0	12	1:35	0:09	1:44	2:00	0:25	21%	1:00	2	10	10:00	20:00
2+3	20.2	12	1:41	0:10	1:51	2:00	0:19	16%	1:00	2	10	10:00	20:00
4	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	1	10	10:00	10:00
7	9.5	12	0:47	0:04	0:52	1:00	0:12	21%	1:00	1	10	10:00	10:00
12	11.7	13	0:54	0:05	0:59	1:00	0:06	10%	1:00	1	10	10:00	10:00
14	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	1:00	1	10	10:00	10:00
16	9.8	12	0:49	0:04	0:53	1:00	0:11	18%	1:00	1	10	10:00	10:00
40	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	1	10	10:00	10:00
60	10.0	12	0:50	0:05	0:55	1:00	0:10	17%	0:30	2	22	11:00	22:00
90	16.0	12	1:20	0:08	1:28	1:30	0:10	11%	0:30	3	22	11:00	33:00

Saturday Operating Plan: Reduced Service

Table 22: Proposed Short-Range Bloomington Transit Saturday Reduced Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	All-Day Frequency	Peak Vehicles	Daily Trips	Daily Hrs. Service	Revenue Hours
1+5	19.0	12	1:35	0:09	1:44	2:00	0:25	21%	1:00	2	10	10:00	20:00
2+3	20.2	12	1:41	0:10	1:51	2:00	0:19	16%	1:00	2	10	10:00	20:00
4	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	1	10	10:00	10:00
7	9.5	12	0:47	0:04	0:52	1:00	0:12	21%	1:00	1	10	10:00	10:00
12	11.7	13	0:54	0:05	0:59	1:00	0:06	10%	1:00	1	10	10:00	10:00
14	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	1:00	1	10	10:00	10:00
16	9.8	12	0:49	0:04	0:53	1:00	0:11	18%	1:00	1	10	10:00	10:00
40	10.7	12	0:53	0:05	0:58	1:00	0:06	11%	1:00	1	10	10:00	10:00
60	10.0	12	0:50	0:05	0:55	1:00	0:10	17%	1:00	1	10	10:00	10:00
90	16.0	12	1:20	0:08	1:28	1:30	0:10	11%	0:30	3	20	10:00	30:00

Sunday Operating Plan: Regular Semester Service

Table 23: Proposed Short-Range Bloomington Transit Sunday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	All-Day Frequency	Peak Vehicles	Daily Trips	Daily Hrs. Service	Revenue Hours
16	9.8	12	0:49	0:04	0:53	1:00	0:11	18%	1:00	1	10	10:00	10:00
60	10.0	12	0:50	0:05	0:55	1:00	0:10	17%	1:00	1	10	10:00	10:00
90	16.0	12	1:20	0:08	1:28	1:30	0:10	11%	0:30	3	20	10:00	30:00

Sunday Operating Plan: Reduced Service

Table 24: Proposed Short-Range Bloomington Transit Sunday Reduced Service Characteristics

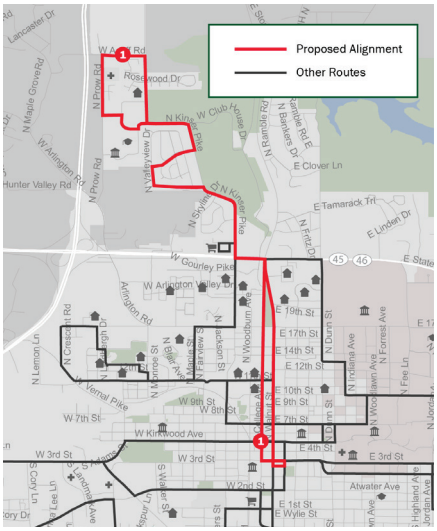
Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	All-Day Frequency	Peak Vehicles	Daily Trips	Daily Hrs. Service	Revenue Hours
16	9.8	12	0:49	0:04	0:53	1:00	0:11	18%	1:00	1	8	8:00	8:00
60	10.0	12	0:50	0:05	0:55	1:00	0:10	17%	1:00	1	8	8:00	8:00
90	16.0	12	1:20	0:08	1:28	1:30	0:10	11%	0:30	3	16	8:00	24:00

Overview of Proposed Routes

Route 1

The proposed Route 1 (**Figure 27**) would provide hourly weekday and Saturday service between the Downtown Transit Center and Bloomington Meadows Hospital. While covering a large portion of the current Route 1 North, the proposed route would provide a more streamlined service, remaining on College Avenue and Walnut Street between Kirkwood Avenue and 11th Street to cover a portion of the current Route 6.

Figure 27: Proposed Route 1



Key destinations along the proposed alignment include:

- Family and Social Services Administration
- Bloomington High School North
- Bloomington Meadows Hospital
- Kinser Crossing Shopping Center

Table 25 shows proposed service levels for Route 1. Route 1 would be interlined with Route 5. During regular service, Route 1 would provide hourly service over 13 weekday service hours and 10 Saturday service hours.

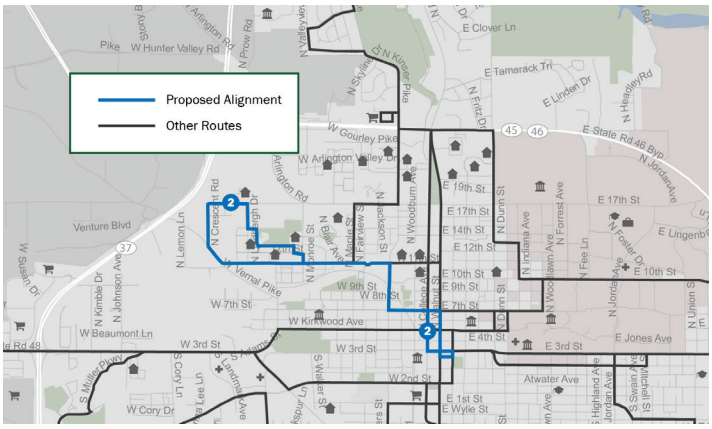
Table 25: Proposed Route 1 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-7:00 p.m.	60	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-6:00 p.m.	60	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 2

The proposed Route 2 (**Figure 28**) would provide weekday and Saturday service between the Downtown Transit Center and the Reserve at Chandler's Glen apartment complex. Although the proposed Route 2 would cover a large portion of the current Route 2 West, the new alignment is intended to minimize one-way and out-of-direction service for the majority of riders along the route. Service would no longer operate along Blair Avenue, and service on Maple and 17th Streets would be provided by the proposed Route 60 instead.

Figure 28: Proposed Route 2



Key destinations along the proposed alignment include:

- Reserve at Chandler's Glen
- Bloomington Housing Authority
- Bloomington Township Trustee
- Bloomington City Hall

Table 26 shows proposed service levels for Route 2. Route 2 would be interlined with Route 3. During regular service, Route 2 would provide 30-minute peak service and hourly off-peak service over 16 service hours. The route would provide hourly service over 10 hours on Saturdays.

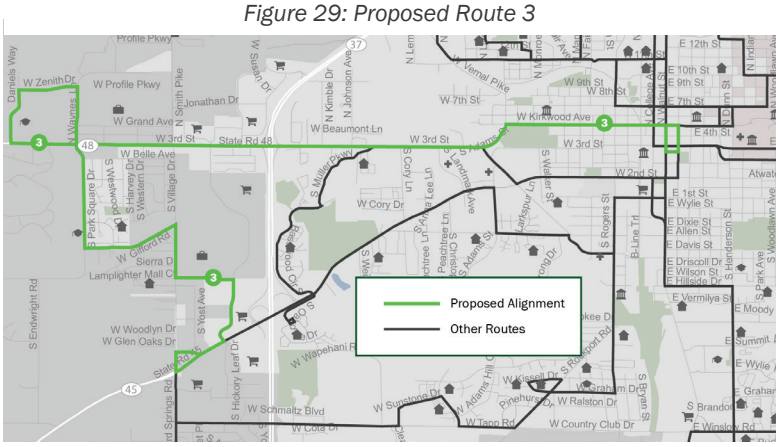
Table 26: Proposed Route 2 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-10:00 p.m.	30	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-9:00 p.m.	30	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 3

The proposed Route 3 (**Figure 29**) would provide weekday and Saturday service between the Downtown Transit Center and Walmart at Bloomfield Road and Curry Pike. Route 3 is also proposed to serve Ivy Tech Community College, an institution currently served by Rural Transit. As Ivy Tech is currently located outside Bloomington Transit's legal jurisdiction, service to this destination may require an agreement with Rural Transit and/or adjustments to Bloomington Transit's serviceable boundaries.

Figure 29: Proposed Route 3



The proposed Route 3 would cover a similar alignment to the current Route 3 West with some notable differences. First, the new route would not service Curry Pike between Industrial Boulevard and Constitution Way. Second, it would provide consistent bi-directional service on its southwestern end (between Walmart and 3rd Street). Currently, Route 3 West provides northbound service on Curry Pike on weekdays between 3:00 and 6:00 p.m. only, and does not provide service to Orchard Glen/Highland Village during this time. Third, the proposed Route 3 would avoid deviations into Whitehall Plaza or Whitehall Crossing, instead serving the shopping centers via a streamlined service along 3rd Street.

Key destinations along the proposed alignment include:

- Whitehall Crossing/Whitehall Plaza
- Ivy Tech Community College
- Orchard Glen Apartments
- Bureau of Motor Vehicles
- Aldi
- Walmart

Table 27 shows proposed service levels for Route 3. Route 3 would be interlined with Route 2. During regular service, Route 3 would offer 30-minute weekday peak service and hourly off-peak service over 16 service hours. Route 3 would provide hourly Saturday service over 10 hours.

Table 27: Proposed Route 3 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-10:00 p.m.	30	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-9:00 p.m.	30	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 4

The proposed Route 4 (**Figure 30**) would provide weekday and Saturday service between the Downtown Transit Center and Heatherwood Mobile Home Park. The route would operate as a streamlined version of the current Route 4 West via Bloomfield Road. To improve route directness, deviations into the Oakdale Square and Basswood apartment complexes would be transferred to the proposed Route 14.

Key destinations along the proposed alignment include:

- Bloomington Hospital
- Willows Apartments
- Twin Lakes Recreation Center
- Walmart
- Woodland Springs Apartments
- Heatherwood Mobile Homes

Figure 30: Proposed Route 4

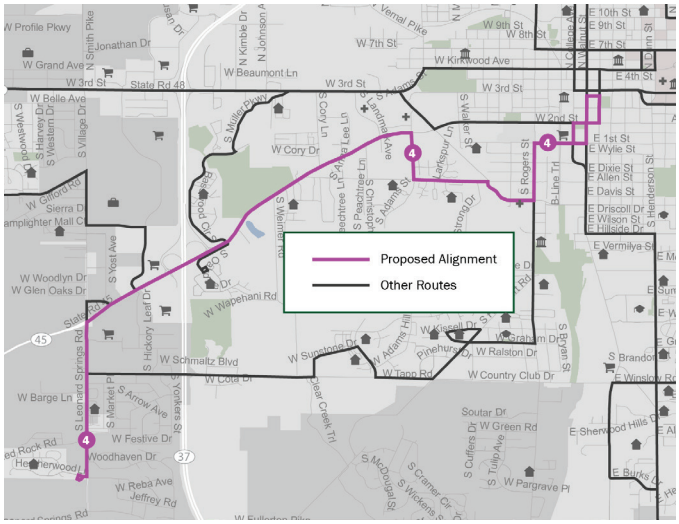


Table 28 shows proposed service levels for Route 4. During regular service, Route 4 would operate hourly on weekdays (13 service hours) and on Saturdays (10 service hours).

Table 28: Proposed Route 4 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-7:00 p.m.	60	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-6:00 p.m.	60	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 5

The proposed Route 5 (**Figure 31**) would provide weekday and Saturday service between the Downtown Transit Center and Jackson Creek Middle School. The route's alignment would be identical to the current Route 5, with the exception of no service on Dunn Street and Indiana Avenue north of 3rd Street.

Key destinations along the proposed alignment include:

- Jackson Creek Middle School
- Woodland Apartments
- Heritage Apartments
- Maxwell Terrace Apartments
- Indiana University – Jacobs School of Music, Jordan Hall, Maurer School of Law

Figure 31: Proposed Route 5

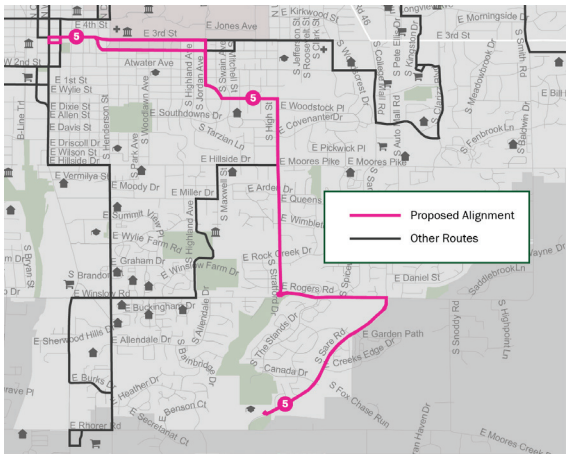


Table 29 shows proposed service levels for Route 5. Route 5 would be interlined with Route 1. During regular service, Route 5 would provide hourly service over 13 weekday service hours and 10 Saturday service hours.

Table 29: Proposed Route 5 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-7:00 p.m.	60	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-6:00 p.m.	60	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 7

The proposed Route 7 (**Figure 32**) would provide weekday and Saturday service between the Clear Creek Shopping Center and 3rd Street and Jordan Avenue, via the Downtown Transit Center. Combining elements of the current Routes 1 South and 7, the proposed Route 7 would provide a link from south Bloomington to the IU campus via Walnut Street Pike and Henderson Street. However, one-way service would no longer be provided on Walnut Street between North Drive and Winslow Road/Country Club Drive.

Key destinations along the proposed alignment include:

- Clear Creek Shopping Center
- Walnut Grove Apartments
- Bloomington High School South
- Regency Place Apartments
- Indiana University – Optometry School, Maurer School of Law, Swain Hall, Jacobs School of Music

Figure 32: Proposed Route 7

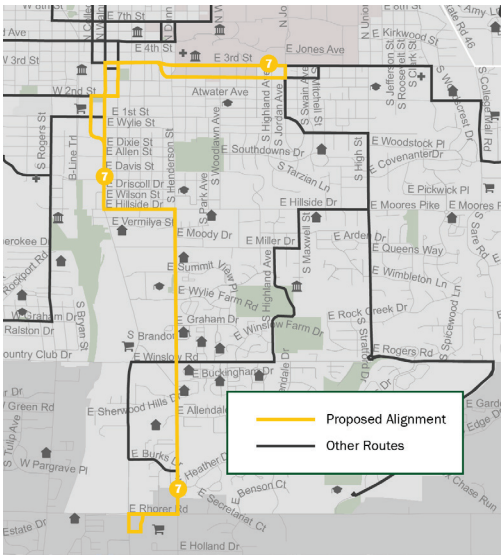


Table 30 shows proposed service levels for Route 7. During regular service, Route 7 would offer 20-minute weekday peak service and hourly off-peak service over 16 service hours. Route 7 would provide hourly Saturday service over 10 hours.

Table 30: Proposed Route 7 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-10:00 p.m.	20	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-9:00 p.m.	30	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 12

The proposed Route 12 (**Figure 33**) would provide weekday and Saturday service between the Downtown Transit Center and Walmart at Bloomfield Road and Curry Pike. Route 12 would cover the majority of the current Route 2 South alignment, but would then extend east along Tapp Road to Walmart on Curry Pike.

Key destinations along the proposed alignment include:

- Seminary Square Shopping Center
- Community Kitchen
- Countryview Apartments
- Adams Village Apartments
- Southern Indiana Medical Park
- Walmart

Figure 33: Proposed Route 12

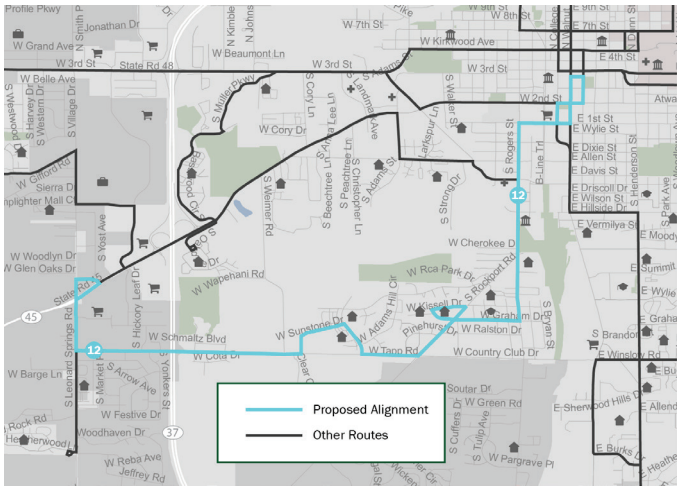


Table 33 shows proposed service levels for Route 12. During regular service, Route 12 would offer 30-minute weekday peak service and hourly off-peak service over 13 service hours. Route 12 would provide hourly Saturday service over 10 hours.

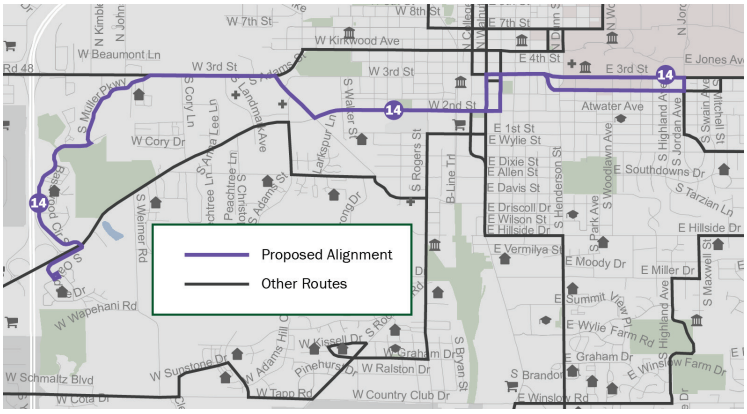
Table 31: Proposed Route 12 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-7:00 p.m.	30	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-6:00 p.m.	60	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 14

The proposed Route 14 (**Figure 34**) would provide weekday and Saturday service between the Oakdale Square Apartments and 3rd Street and Jordan Avenue, via the Downtown Transit Center. Route 14 would offer simplified and streamlined service between multiple west side apartment communities and both downtown Bloomington and the IU campus. The proposed route would also allow for significant streamlining of Route 4 serving Walmart via Bloomfield Road.

Figure 34: Proposed Route 14



Key destinations along the proposed alignment include:

- Oakdale Square Apartments
- Basswood Apartments
- Canterbury Apartments
- The Dillon Apartments
- Indiana University – Jacobs School of Music, Jordan Hall, Maurer School of Law

Table 32 shows proposed service levels for Route 14. During regular service, Route 14 would offer 30-minute weekday peak service and hourly off-peak service over 13 service hours. Route 14 would provide hourly Saturday service over 10 hours.

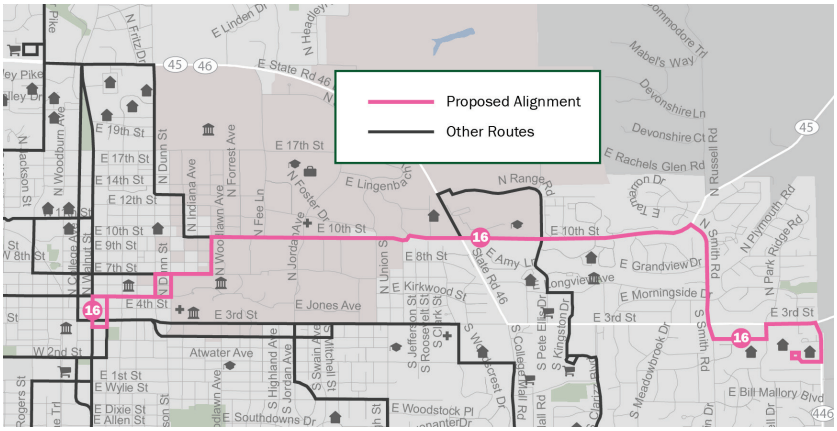
Table 32: Proposed Route 14 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-7:00 p.m.	30	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-6:00 p.m.	60	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 16

The proposed Route 16 (**Figure 35**) would provide weekday, Saturday, and Sunday service from the Knightridge Apartments to the Downtown Transit Center. Route 16 would operate frequent service through the busy 10th Street corridor, replacing much of the current Route 6's alignment. The proposed route would link the Indiana University campus with downtown Bloomington, as well as several apartment complexes on Bloomington's eastside. Under the proposed scenario, this route would be one of three Bloomington Transit routes to offer Sunday service.

Figure 35: Proposed Route 16



Key destinations along the proposed alignment include:

- Knightridge Apartments
- Reserve on 3rd Apartments
- Springhill Apartments
- Fountain Park Apartments
- Tulip Tree Apartments
- Indiana University – Cyberinfrastructure Building, Student Recreational Sports Center, Kelley School of Business, Wells Library, Indiana Memorial Union

Table 33 shows proposed service levels for Route 16. During regular service, Route 16 would offer 20-minute weekday peak service and 30-minute off-peak service over 17 service hours. Route 16 would provide hourly Saturday and Sunday service over 10 hours each.

Table 33: Proposed Route 16 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-11:00 p.m.	20	30
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-9:00 p.m.	30	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	10:00 a.m.-6:00 p.m.		60	

Route 40

The proposed Route 40 (**Figure 36**) would provide weekday and Saturday service between the Downtown Transit Center and Burks Drive in south Bloomington. Route 40 would cover the majority of the current Route 4 South alignment and a small portion of the current Route 1 South alignment (along Walnut Street Pike and Walnut Street). Key destinations along the proposed alignment include:

- Walnut Grove Apartments
- Winslow Park Shopping Center
- Henderson Court Apartments
- The Bloomington YMCA
- Heritage Apartments
- Maxwell Terrace Apartments
- Indiana University – Jacobs School of Music, Jordan Hall, Maurer School of Law

Figure 36: Proposed Route 40

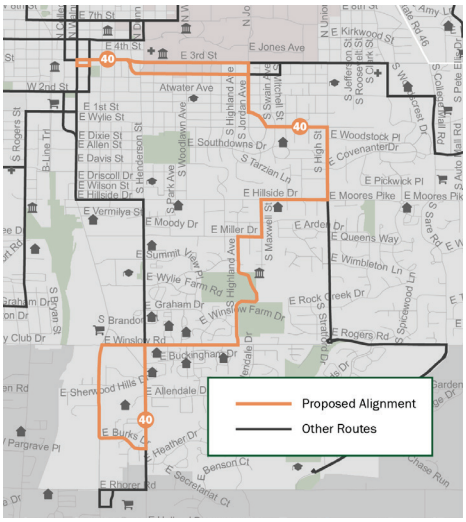


Table 34 shows proposed service levels for Route 40. During regular service, Route 40 would offer 30-minute weekday peak service and hourly off-peak service over 13 service hours. Route 40 would provide hourly Saturday service over 10 hours.

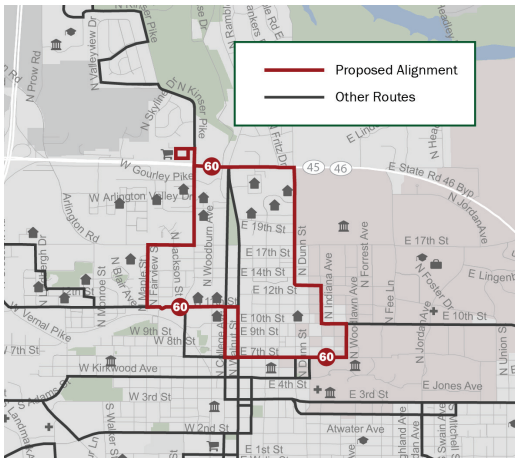
Table 34: Proposed Route 40 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-7:00 p.m.	30	60
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-6:00 p.m.	60	60
Saturday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	--		--	
Reduced Service	--		--	

Route 60

The proposed Route 60 (**Figure 37**) would provide weekday, Saturday, and Sunday circulator service between the IU campus and downtown/north Bloomington via Kinser Pike, Maple Street, College Avenue/Walnut Street, Woodlawn Avenue, 10th Street, and Dunn Street. The proposed route would operate bi-directionally and cover elements of the current Routes 1 North, 2 West, and 6. While the route appears to be a complete loop, buses would actually turn back at Kroger on Kinser Pike, rather than continuing in the same direction.

Figure 37: Proposed Route 60



Key destinations along the proposed alignment include:

- Kroger
- Hoosier Court Apartments
- Jackson Heights Apartments
- Smallwood on College
- Monroe County Circuit Court
- Indiana Memorial Union
- Brownstone Terrace Apartments
- Memorial Stadium
- Stadium Crossing Apartments

Table 35 shows proposed service levels for Route 60. During regular service, Route 60 would offer 15-minute weekday peak service and 30-minute off-peak service over 16 service hours. Route 60 would provide 30-minute Saturday service over 11 hours and hourly Sunday service over 10 service hours.

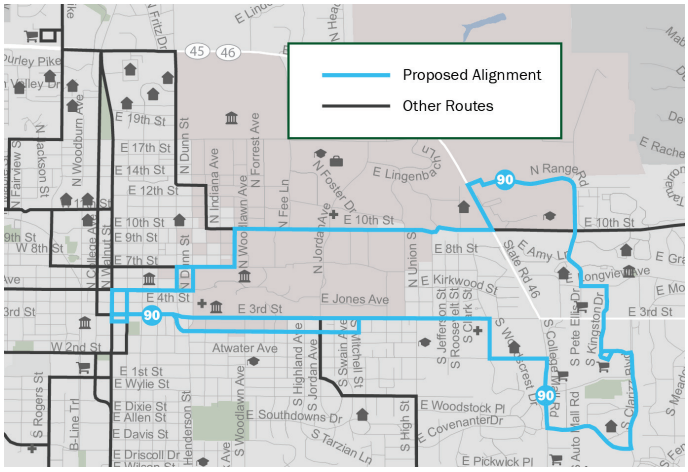
Table 35: Proposed Route 60 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-10:00 p.m.	15	30
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-9:00 p.m.	30	60
Saturday				
Regular Service	8:00 a.m.-7:00 p.m.		30	
Reduced Service	8:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Service	8:00 a.m.-6:00 p.m.		60	
Reduced Service	10:00 a.m.-6:00 p.m.		60	

Route 90

The proposed Route 90 (**Figure 38**) would provide weekday, Saturday, and Sunday circulator service to College Mall, the new IU Health Bloomington Hospital facility, the IU campus, and the Downtown Transit Center via 3rd Street and 10th Street. Route 90 would cover the alignments of several current routes, including Routes 3 East, 8, and 9. The proposed route would provide direct access from College Mall and surrounding residential areas to the IU Campus as well as an important link to the new hospital off Range Road.

Figure 38: Proposed Route 90



Key destinations along the proposed alignment include:

- New IU Health Bloomington Hospital (new site)
- College Mall Shopping Center
- Several apartment complexes off Covenanter Drive and Clarizz Boulevard
- Jackson Creek Shopping Center
- Indiana University – Jacobs School of Music, Jordan Hall, Maurer School of Law, Kelley School of Business, Wells Library

Table 36 shows proposed service levels for Route 90. During regular service, Route 90 would offer 20-minute weekday peak service and 30-minute off-peak service over 16 service hours. Route 90 would provide 30-minute Saturday service over 11 hours and 30-minute Sunday service over 10 hours.

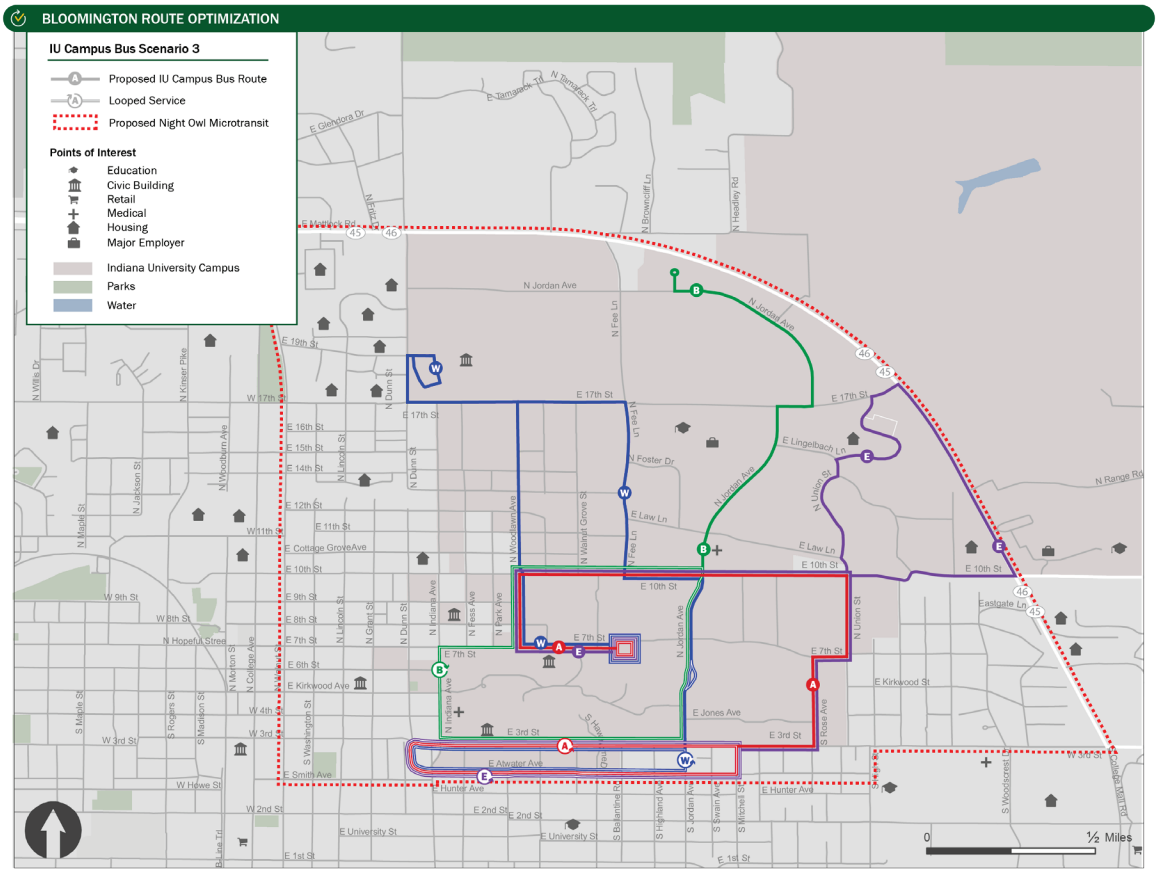
Table 36: Proposed Route 90 Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Weekday				
Regular Service	6:00 a.m.–6:00 p.m.	6:00-10:00 p.m.	20	30
Reduced Service	6:00 a.m.–5:00 p.m.	5:00-9:00 p.m.	30	30
Saturday				
Regular Service	8:00 a.m.-7:00 p.m.		30	
Reduced Service	8:00 a.m.-6:00 p.m.		30	
Sunday				
Regular Service	8:00 a.m.-6:00 p.m.		30	
Reduced Service	10:00 a.m.-6:00 p.m.		30	

Short-Range Recommendations: IU Campus Bus

Based on the feedback received online and at the March 2019 public and stakeholder meetings, the study team developed IU Campus Bus Scenario 3 (**Figure 39**), the recommended short-range service scenario. Scenario 3 streamlines IU Campus service via four core routes: the A Route, B Route, E Route, and W Route. To complement fixed-route service, the recommended scenario proposes to replace the current Night Owl route with a microtransit service on Friday and Saturday nights.

Figure 39: IU Campus Bus Scenario 3 Map



Service Characteristics

The service characteristics presented in this section focus only on regular semester service periods. The IU Campus Bus service operates a variety of reduced service schedules at different points in the school year, but for the purpose of this study, cost-neutral service only refers to the costs associated with regular semester service. IU Campus Bus staff will determine reduced service period schedules as part of any implementation.

Table 37 lists the assumed number of IU Campus Bus regular semester service days by day type, amounting to 219 days in all.

Table 37: IU Campus Bus Regular Semester Service Days by Day Type

Service Day Type	Service Days per Year
Monday-Thursday	126
Friday	31
Saturday	30
Sunday	32

During regular semester service, the recommended short-range service scenario would require 19 peak vehicles and 244 vehicle revenue hours per day for Monday through Thursday service. On Fridays, the recommended scenario would require 12 peak vehicles and 162 daily vehicle revenue hours. By comparison, current IU Campus Bus service requires approximately 22 peak vehicles and results in 244 vehicle revenue hours per day on Mondays through Thursdays; current Friday service results in 149 vehicle revenue hours. On Saturdays, the recommended service scenario would require six vehicles and 42 revenue hours; on Sundays, Scenario 3 would require four vehicles and 32 revenue hours. Currently, IU Campus Bus requires five Saturday vehicles, resulting in 44 vehicle revenue hours and three Sunday vehicles for 30 revenue hours.

The proposed short-range service scenario for IU Campus bus includes microtransit service in place of the current Night Owl Route. It is estimated that the microtransit service would require two vehicles operating concurrently on both Friday and Saturday nights over five service hours each night. Thus, microtransit would account for 10 revenue hours on Fridays and 10 more on Saturdays.

Assuming the service days listed in **Table 37**, the proposed short-range service recommendations would result in approximately 1.18 percent more annual revenue hours than the current service. However, given that microtransit service is generally less expensive to operate than fixed-route service, replacement of the Night Owl Route with microtransit service will likely bring the proposed scenario closer under current annual operating costs for regular semester service.

Table 37 through **Table 41** shows the proposed regular semester service characteristics for IU Campus Bus service, including peak vehicles and daily revenue hours, for Monday-Thursday, Friday, Saturday, and Sunday service periods, respectively. The proposed service plan calls for a 10 to 12-hour weekday peak period (with off-peak hours varying by route); eight-hours of service on Saturdays; and eight-hours on Sundays.

Clockface schedules are proposed for all routes, and while recovery times exceed 20 percent of cycle time for all routes on Mondays through Thursday, this is less of a concern than it would be for Bloomington Transit service for two reasons. First, cycle times are relatively short, so any amount of recovery time appears to be a high percentage of the total cycle time. Second, IU Campus Bus service experiences very high ridership on many trips and operates in an often-congested environment. These factors can weigh on on-time performance. Thus, a bigger recovery time buffer will ensure that late trips are isolated and do not impact subsequent trips.

The service characteristics shown below are followed by detailed descriptions of the short-range changes being proposed for each IU Campus Bus route.

Monday-Thursday Operating Plan: Regular Semester Service

Table 38: Proposed Short-Range IU Campus Bus Monday-Thursday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehic.	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehic.	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
A	5.7	12	0:28	0:02	0:31	0:40	0:11	29%	0:10	12:00	72	4	0:20	4:00	12	2	84	16:00	56:00
B	4.6	12	0:23	0:02	0:25	0:30	0:07	23%	0:10	12:00	72	3	0:30	4:00	8	1	80	16:00	40:00
E	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	0:10	12:00	72	6	0:30	4:00	8	2	80	16:00	80:00
W	8.5	12	0:42	0:04	0:46	1:00	0:17	29%	0:10	10:00	60	6	0:30	4:00	8	2	68	14:00	68:00

Friday Operating Plan: Regular Semester Service

Table 39: Proposed Short-Range IU Campus Bus Friday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehic.	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehic.	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
A	5.7	13	0:26	0:02	0:28	0:30	0:03	12%	0:15	12:00	48	2	0:30	2:00	4	1	52	14:00	26:00
B	4.6	12	0:23	0:02	0:25	0:30	0:07	23%	0:15	12:00	48	2	0:30	2:00	4	1	52	14:00	26:00
E	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	0:15	12:00	48	4	0:30	2:00	4	2	52	14:00	52:00
W	8.5	12	0:42	0:04	0:46	1:00	0:17	29%	0:15	10:00	40	4	0:30	4:00	8	2	48	14:00	48:00
Micro-transit	Variable	Variable	Variable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5:00	Variable	2	Variable	5:00	10:00

Saturday Operating Plan: Regular Semester Service

Table 40: Proposed Short-Range IU Campus Bus Saturday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	All-Day Frequency	Peak Vehicles	Daily Trips	Daily Hrs. Service	Revenue Hours
A	5.7	13	0:26	0:02	0:28	0:30	0:03	12%	0:30	1	16	8:00	8:00
B	4.6	13	0:21	0:02	0:23	0:30	0:08	29%	0:30	1	16	8:00	8:00
E	9.4	13	0:43	0:04	0:47	1:00	0:16	28%	1:00	1	8	8:00	8:00
W	8.5	13	0:39	0:03	0:43	1:00	0:20	35%	1:00	1	8	8:00	8:00
Microtransit	Variable	Variable	Variable	n/a	n/a	n/a	n/a	n/a	n/a	2	Variable	5:00	10:00

Sunday Operating Plan: Regular Semester Service

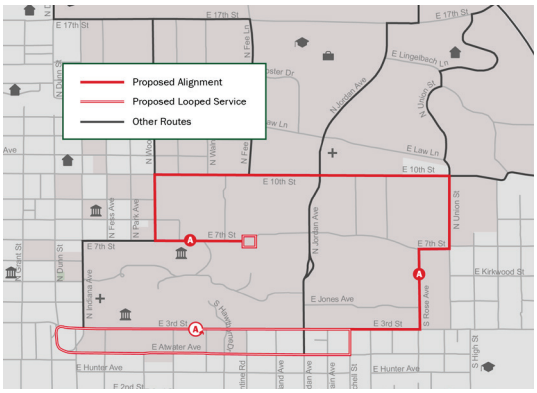
Table 41: Proposed Short-Range IU Campus Bus Sunday Regular Semester Service Characteristics

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	All-Day Frequency	Peak Vehicles	Daily Trips	Daily Hrs. Service	Revenue Hours
A	5.7	13	0:26	0:02	0:28	0:30	0:03	12%	0:30	1	16	8:00	8:00
B	4.6	12	0:23	0:02	0:25	0:30	0:07	23%	0:30	1	16	8:00	8:00
E	9.4	12	0:47	0:04	0:51	1:00	0:13	22%	1:00	1	8	8:00	8:00
W	8.5	12	0:42	0:04	0:46	1:00	0:17	29%	1:00	1	8	8:00	8:00

A Route

The proposed A Route (**Figure 40**) would provide frequent bi-directional circulator service in the core of campus on weekdays, Saturdays, and Sundays. The A Route would operate between Showalter Fountain and 3rd Street, via 10th Street, Union Street, and Ross Street. The proposed alignment would serve multiple dormitories and academic buildings, and help strengthen Showalter Fountain and 3rd Street as major transit hubs for the University.

Figure 40: Proposed A Route



Key destinations along the proposed alignment include:

- Showalter Fountain/IU Auditorium
- Indiana Memorial Union
- Kelley School of Business
- Wells Library
- Ashton Center
- Spruce Hall
- Jacobs School of Music
- Maurer School of Law

Table 42 shows proposed service levels for the A Route during regular semester service. The A Route would provide service every 10 to 20 minutes on Monday through Thursday (over 16 service hours), every 15 to 30 minutes on Friday (over 14 service hours), and every 30 minutes on Saturday and Sunday (over eight service hours each).

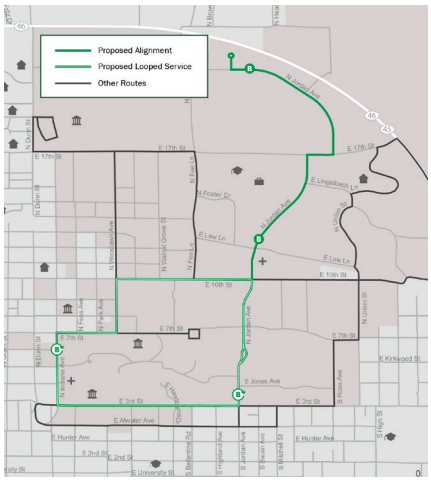
Table 42: Proposed A Route Regular Semester Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Monday-Thursday				
Regular Semester	7:30 a.m.–7:30 p.m.	7:30-11:30 p.m.	10	20
Friday				
Regular Semester	7:30 a.m.–7:30 p.m.	7:30-9:30 p.m.	15	30
Saturday				
Regular Semester	10:00 a.m.-6:00 p.m.		30	
Sunday				
Regular Semester	10:00 a.m.-6:00 p.m.		30	

B Route

The proposed B Route (**Figure 41**) would provide weekday, Saturday, and Sunday service between IU's "Greek Row" on Jordan Avenue, and the core of campus. The proposed route would operate bi-directionally between Alpha Delta Pi House and 10th Street, and then as a clockwise loop along Jordan Avenue, 3rd Street, Indiana Avenue, 7th Street, Woodlawn Avenue, and 10th Street. The one-way segment of the loop would serve as a collector/distributor for passengers traveling to and from destinations along Jordan Avenue, north of 10th Street.

Figure 41: Proposed B Route



Key destinations along the proposed alignment include:

- IU Greek Houses
- Jacobs School of Music
- Maurer School of Law
- Indiana Memorial Union
- Kelley School of Business
- School of Public & Environmental Affairs
- Wells Library

Table 43 shows proposed service levels for the B Route during regular semester service. The B Route would provide service every 10 to 30 minutes on Monday through Thursday (over 16 service hours), every 15 to 30 minutes on Friday (over 14 service hours), and every 30 minutes on Saturday and Sunday (over eight service hours each).

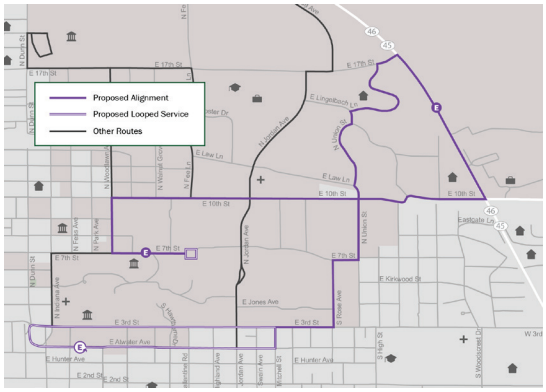
Table 43: Proposed B Route Regular Semester Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Monday-Thursday				
Regular Semester	7:30 a.m.–7:30 p.m.	7:30-11:30 p.m.	10	30
Friday				
Regular Semester	7:30 a.m.–7:30 p.m.	7:30-9:30 p.m.	15	30
Saturday				
Regular Semester	10:00 a.m.-6:00 p.m.		30	
Sunday				
Regular Semester	10:00 a.m.-6:00 p.m.		30	

E Route

The proposed E Route (**Figure 42**) would complement the A Route with similar service along 3rd Street, Union Street, and 10th Street, but would include an additional bi-directional loop serving N. Union Street/Lingelbach Lane, the Bypass, and E. 10th Street. Buses traveling east on 10th Street would complete the loop in a counter-clockwise direction and buses traveling north on Union Street would serve the loop clockwise. The proposed route is designed to provide addition service frequency 10th Street and 3rd Street, while also linking the core of campus to outlying destinations like the Student Recreational Sports Center, new Bloomington Hospital, and the Tulip Tree Apartments.

Figure 42: Proposed E Route



Key destinations along the proposed alignment include:

- Showalter Fountain/IU Auditorium
- Indiana Memorial Union
- Kelley School of Business
- Wells Library
- Tulip Tree Apartments
- New IU Health Bloomington Hospital
- Student Recreational Sports Center
- Jacobs School of Music
- Maurer School of Law

Table 44 shows proposed service levels for the E Route during regular semester service. The E Route would provide service every 10 to 30 minutes on Monday through Thursday (over 16 service hours), every 15 to 30 minutes on Friday (over 14 service hours), and every 60 minutes on Saturday and Sunday (over eight service hours each).

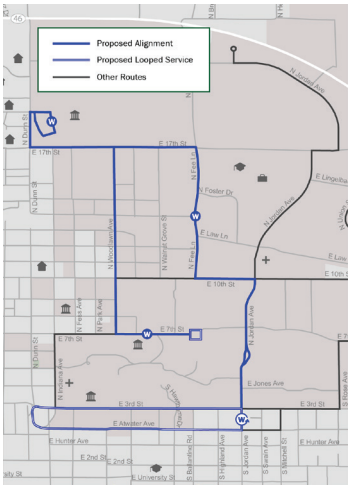
Table 44: Proposed E Route Regular Semester Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Monday-Thursday				
Regular Semester	7:30 a.m.–7:30 p.m.	7:30-11:30 p.m.	10	30
Friday				
Regular Semester	7:30 a.m.–7:30 p.m.	7:30-9:30 p.m.	15	30
Saturday				
Regular Semester	10:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Semester	10:00 a.m.-6:00 p.m.		60	

W Route

The proposed W Route (**Figure 43**) would consist of two branches, providing direct service from remote parking at Memorial Stadium to either Showalter Fountain via Woodlawn Avenue or 3rd Street via Feel Lane and Jordan Avenue. Both branches would provide bi-directional service on weekdays, Saturdays, and Sundays.

Figure 43: Proposed W Route



Key destinations along the proposed alignment include:

- Memorial Stadium
- Indiana Memorial Union
- Showalter Fountain/
- IU Auditorium
- Kelley School of Business
- Wells Library
- Jacobs School of Music
- Maurer School of Law

Table 45 shows proposed service levels for the W Route during regular semester service. The W Route would provide service every 10 to 30 minutes on Monday through Thursday (over 14 service hours), every 15 to 30 minutes on Friday (over 14 service hours), and every 60 minutes on Saturday and Sunday (over eight service hours each).

Table 45: Proposed W Route Regular Semester Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Monday-Thursday				
Regular Semester	7:30 a.m.–5:30 p.m.	5:30-9:30 p.m.	10	30
Friday				
Regular Semester	7:30 a.m.–5:30 p.m.	5:30-9:30 p.m.	15	30
Saturday				
Regular Semester	10:00 a.m.-6:00 p.m.		60	
Sunday				
Regular Semester	10:00 a.m.-6:00 p.m.		60	

Night Owl Microtransit Service

On Friday and Saturday evenings, the current Night Owl Route would be replaced by a microtransit service operating within a designated zone bound by Atwater Avenue to the south, Walnut Street to the west, and the Bypass to the north and east (**Figure 44**).

The proposed service would operate from 10:00 p.m. to 3:00 a.m. using two vehicles each night to ensure sufficient capacity, minimize wait times, and optimize routing. Additional details on the operation of microtransit service are provided in the long-range recommendations of this report.

Table 46 shows proposed service levels for the proposed microtransit service.

Figure 44: Proposed Night Owl Microtransit

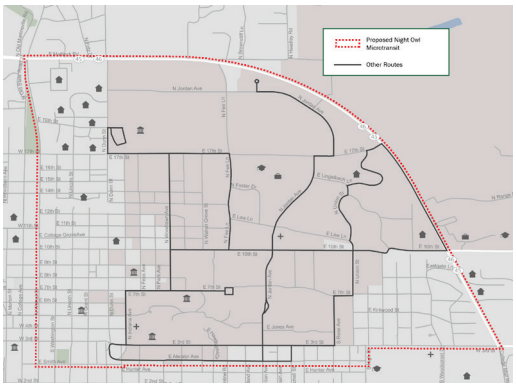


Table 46: Proposed Night Owl Microtransit Route Regular Semester Service Levels

Service Period	Service Span		Frequency (Minutes)	
	Peak	Off-Peak	Peak	Off-Peak
Monday-Thursday				
Regular Semester		--	--	--
Friday				
Regular Semester	--	10:00 p.m.-3:00 a.m.	--	Variable
Saturday				
Regular Semester	10:00 p.m.-3:00 a.m.		Variable	
Sunday				
Regular Semester	--		--	

Short-Range Ridership Estimates

To estimate the ridership impact of the proposed short-range service changes described above, the study team used a three-step process for both Bloomington Transit and IU Campus Bus. First, current system ridership was redistributed among the proposed routes based on geographic coverage. If the service area of an existing route was proposed to be picked up by one or more new routes, the current ridership (estimated during both regular and reduced service for Bloomington Transit) from that route was reassigned proportionally to the new route or routes that will cover the service area. Some ridership was assumed lost if a current route segment was not covered at all in the proposed redesign. However, ridership loss for the recommended service scenarios is minimal.

In the second step, the redistributed ridership calculated in Step 1 formed a new baseline. New ridership was then added to this baseline wherever new service coverage is proposed. In newly served areas, ridership was estimated based on the average boardings at existing stops that serve similar neighborhoods or destinations. A

second new ridership baseline was established at the end of Step 2. This baseline reflected the impacts of only the geographic coverage changes to the routes.

The third step of the process estimated the ridership impact of service characteristics such as schedule changes and directness of service. Each service characteristic was assigned an impact factor based on TCRP research and experience with past service redesigns. For example, increased service frequency was expected to correlate with an increase in ridership, while decreased service could reduce ridership. Routes that would provide more direct connections between major destinations were also anticipated to have increased ridership over previous alignments. Baseline impact factor multipliers were assigned as follows:

- **Increase frequency:** multiplier of 0.5
- **Straighten route or make more direct:** multiplier of 0.1
- **Establish repeating headways:** multiplier of 0.02
- **Establish clockface headways:** multiplier of 0.03
- **Decrease frequency:** multiple of -0.5

To more precisely convey the impact of a proposed service characteristic change, the impact factors were further multiplied by secondary factors, ranging from 0 to 1, representing the relevance of the impact factor to the respective route. For example, if the frequency of a route is being increased for its entire service day, its baseline ridership would be multiplied by 0.5 (0.5 x 1) to estimate a ridership increase caused by the frequency increase. However, if frequency is being increased during the peak period only, then the baseline ridership of the route might be multiplied by 0.25 (0.5 x 0.5) to estimate a ridership increase of the partial frequency increase. Impact factors were also generally assumed to have a smaller effect on weekends versus weekdays.

The estimated impact for each route based on proposed service characteristic changes was multiplied by the ridership estimate calculated in Step 2 to arrive at a value representing the expected new ridership resulting from the proposed service characteristics. This value was then added to the ridership baseline established at the end of Step 2 to arrive at a final projected ridership that reflects both the changes in geographic coverage and service characteristics of each route. By system, final impact factors for each route and day type are listed in several tables by day type in **Appendix D**.

The following sections summarize the results of the ridership projection for the Bloomington Transit and IU Campus Bus systems.

Ridership Estimates: Bloomington Transit

Bloomington Transit ridership during both regular semester and reduced service periods is projected in this section. To develop the projection, baseline existing ridership during calendar year 2017 was utilized. The study team estimated average daily baseline weekday, Saturday, and Sunday ridership by service day type (during current regular semester and reduced service) by dividing total ridership by number of days during service periods.

The ridership projection assumes modest new ridership from three generators not previously served: Ivy Tech Community College, the new IU Health facility, Social Security, and the Tapp Road corridor. It also assumes new ridership stemming from the realignment of Route 4 West into Route 4 and Route 14. The TCRP impact factors, described in the section above, were multiplied by secondary factors ranging from 0 to 1 to reflect increased frequencies, improved route directness, new repeating or clockface headways, and in limited cases, reduced frequencies. Secondary factors were calibrated to display realistic ridership growth depending on proposed route interventions as well as service day types. For example, impacts of interventions were assumed to be more marked during weekday as opposed to weekend service, and more evident during regular semester versus reduced service periods. All impact factors for Bloomington Transit and IU Campus bus projections are shown in **Appendix D**.

The recommended service scenario would increase total annual Bloomington Transit ridership by an estimated 6.2 percent. However, the impacts of service improvements can take up to two years to fully materialize, as

riders must learn the new system and adjust their travel habits accordingly. **Table 47** through **Table 57** outlines the abovementioned process for weekday, Saturday, and Sunday regular semester and reduced service.

Weekday Ridership Estimates: Regular Semester and Reduced Service

Table 47: Weekday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership			Proposed Route & Distribution Factor											
Route	Daily Ridership		1	2	3	4	5	7	12	14	16	40	60	90
	Regular	*Reduced*												
1	850	730	0.30	-	-	-	-	0.30	-	-	-	0.05	0.30	-
2	830	826	-	0.45	-	-	-	-	0.45	-	-	-	0.05	-
3	1,496	1,297	-	-	0.35	-	-	-	-	-	0.35	-	-	0.25
4	672	429	-	-		0.30	-	-	-	0.35		0.30		
5	308	130	-	-	-	-	0.95	-	-	-	-	-	-	-
6	6,027	796	0.05	-	-	-	-	-	-	-	0.70	-	0.25	-
7	611	-	-	-	-	-	-	0.90	-	-	-	-	-	-
8	97	87	-	-	-	-	0.25	-	-	-	0.25	-	-	0.25
9	5,380	841	-	-	-	-	-	-	-	-	0.20	-	-	0.75
Total	**16,271**	**5,137**												

Table 48: Weekday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage (Regular Semester Service)

Existing Route	Regular Semester Daily Ridership		Proposed Route & Baseline Ridership											
			1	2	3	4	5	7	12	14	16	40	60	90
1	850		255	-	-	-	-	255	-	-	-	42	255	-
2	830		-	373	-	-	-	-	373	-	-	-	41	-
3	1,496		-	-	524	-	-	-	-	-	524	-	-	374
4	672		-	-	-	202	-	-	-	235	-	202	-	-
5	308		-	-	-	-	293	-	-	-	-	-	-	-
6	6,027		301	-	-	-	-	-	-	-	4,219	-	1,507	-
7	611		-	-	-	-	-	550	-	-	-	-	-	-
8	97		-	-	-	-	24	-	-	-	24	-	-	24
9	5,380		-	-	-	-	-	-	-	-	1,076	-	-	4,035
Total	**16,271**		**556**	**373**	**524**	**202**	**317**	**805**	**373**	**235**	**5,842**	**244**	**1,803**	**4,433**

Table 49: Weekday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage (Reduced Service)

Existing Route	Reduced Service Daily Ridership		Proposed Route & Baseline Ridership											
			1	2	3	4	5	7	12	14	16	40	60	90
1	730		219	-	-	-	-	219	-	-	-	37	219	-
2	826		-	372	-	-	-	-	372	-	-	-	41	-
3	1,297		-	-	454	-	-	-	-	-	454	-	-	324
4	429		-	-	-	129	-	-	-	150	-	129	-	-
5	130		-	-	-	-	124	-	-	-	-	-	-	-
6	796		40	-	-	-	-	-	-	-	557	-	199	-
7	-		-	-	-	-	-	-	-	-	-	-	-	-
8	87		-	-	-	-	22	-	-	-	22	-	-	22
9	841		-	-	-	-	-	-	-	-	168	-	-	631
Total	**5,137**		**259**	**372**	**454**	**129**	**145**	**219**	**372**	**150**	**1,202**	**165**	**459**	**977**

Table 50: Weekday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)		Estimated New Daily Riders (Coverage)		Estimated Total Daily Riders (Pre-Impact)	
	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service
1	556	259	-	-	556	259
2	373	372	-	-	373	372
3	524	454	25	25	549	479
4	202	129	5	5	207	134
5	317	145	-	-	317	145
7	805	219	-	-	805	219
12	373	372	15	15	388	387
14	235	150	10	10	245	160
16	5,842	1,202	-	-	5,842	1,202
40	244	165	-	-	244	165
60	1,803	459	-	-	1,803	459
90	4,433	977	15	15	4,448	992
Total	**15,709**	**4,902**	**70**	**70**	**15,779**	**4,972**

Table 51: Weekday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage		Impact from Service Characteristics Impact Calculator[8]		Projected Ridership	
	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service
1	556	259	0.10	0.10	542	285
2	373	372	-	0.10	411	409
3	549	479	0.10	-	549	479
4	207	134	-	0.10	227	147
5	317	145	(0.13)	-	317	145
7	805	219	-	0.36	705	298
12	388	387	0.35	(0.05)	388	367
14	245	160	0.04	0.05	331	168
16	5,842	1,202	0.25	0.11	6,047	1,334
40	244	165	0.50	(0.05)	305	157
60	1,803	459	0.05	0.08	2,705	494
90	4,448	992	0.10	0.25	4,671	1,240
Total	**15,779**	**4,972**	**-**	**-**	**17,198**	**5,523**

[8] Factors based on TCRP 66: Fixed-Route Transit Ridership Forecasting and Service Planning Methods and industry/analogous project experience

Saturday Ridership Estimates: Regular Semester and Reduced Service

Table 52: Saturday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership			Proposed Route & Distribution Factor											
Route	Daily Ridership		1	2	3	4	5	7	12	14	16	40	60	90
	Regular	*Reduced*												
1	430	366	0.30	-	-	-	-	0.30	-	-	-	0.05	0.30	-
2	344	289	-	0.45	-	-	-	-	0.45	-	-	-	0.05	-
3	1,003	759	-	-	0.35	-	-	-	-	-	0.35	-	-	0.25
4	281	210	-	-		0.30	-	-	-	0.35		0.30		
5	91	45	-	-	-	-	0.95	-	-	-	-	-	-	-
6	655	203	0.05	-	-	-	-	-	-	-	0.70	-	0.25	-
7	-	-	-	-	-	-	-	0.90	-	-	-	-	-	-
8	130	94	-	-	-	-	0.25	-	-	-	0.25	-	-	0.25
9	1,727	300	-	-	-	-	-	-	-	-	0.20	-	-	0.75
Total	**4,660**	**2,267**												

Table 53: Saturday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage (Regular Semester Service)

Existing Route	Regular Semester Daily Ridership	Proposed Route & Baseline Ridership											
		1	2	3	4	5	7	12	14	16	40	60	90
1	430	129	-	-	-	-	129	-	-	-	21	129	-
2	344	-	155	-	-	-	-	155	-	-	-	17	-
3	1,003	-	-	351	-	-	-	-	-	351	-	-	251
4	281	-	-	-	84	-	-	-	98	-	84	-	-
5	91	-	-	-	-	86	-	-	-	-	-	-	-
6	655	33	-	-	-	-	-	-	-	458	-	164	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-
8	130	-	-	-	-	33	-	-	-	33	-	-	33
9	1,727	-	-	-	-	-	-	-	-	345	-	-	1,295
Total	**4,660**	**162**	**155**	**351**	**84**	**119**	**129**	**155**	**98**	**1,187**	**106**	**310**	**1,578**

Table 54: Saturday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage (Reduced Service)

Existing Route	Reduced Service Daily Ridership	Proposed Route & Baseline Ridership											
		1	2	3	4	5	7	12	14	16	40	60	90
1	366	110	-	-	-	-	110	-	-	-	18	110	-
2	289	-	130	-	-	-	-	130	-	-	-	14	-
3	759	-	-	266	-	-	-	-	-	266	-	-	190
4	210	-	-	-	63	-	-	-	74	-	63	-	-
5	45	-	-	-	-	43	-	-	-	-	-	-	-
6	203	10	-	-	-	-	-	-	-	142	-	51	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-
8	94	-	-	-	-	24	-	-	-	24	-	-	24
9	300	-	-	-	-	-	-	-	-	60	-	-	225
Total	**2,267**	**120**	**130**	**266**	**63**	**66**	**110**	**130**	**74**	**492**	**81**	**175**	**438**

Table 55: Saturday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)		Estimated New Daily Riders (Coverage)		Estimated Total Daily Riders (Pre-Impact)	
	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service
1	162	120	-	-	162	120
2	155	130	-	-	155	130
3	351	266	15	15	366	281
4	84	63	5	5	89	68
5	119	66	-	-	119	66
7	129	110	-	-	129	110
12	155	130	10	10	165	140
14	98	74	10	10	108	84
16	1,187	492	-	-	1,187	492
40	106	81	-	-	106	81
60	310	175	-	-	310	175
90	1,578	438	15	15	1,593	453
Total	**4,434**	**2,145**	**55**	**55**	**4,489**	**2,200**

Table 56: Saturday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage		Impact from Service Characteristics Impact Calculator		Projected Ridership	
	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service
1	162	120	0.23	0.23	198	147
2	155	130	0.10	0.10	170	143
3	366	281	-	-	366	281
4	89	68	0.10	0.10	98	75
5	119	66	-	-	119	66
7	129	110	0.51	0.51	195	166
12	165	140	-	-	165	140
14	108	84	0.10	0.10	119	92
16	1,187	492	0.03	0.16	1,223	568
40	106	81	-	-	106	81
60	310	175	0.38	0.33	428	233
90	1,593	453	0.16	0.11	1,840	501
Total	**4,489**	**2,200**	**-**	**-**	**5,027**	**2,494**

Sunday Ridership Estimates: Regular Semester and Reduced Service

Table 57: Sunday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership			Proposed Route & Distribution Factor											
Route	Daily Ridership		1	2	3	4	5	7	12	14	16	40	60	90
	Regular	*Reduced*												
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	467	160	-	-	-	-	-	-	-	-	0.60	-	0.25	0.10
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	928	81	-	-	-	-	-	-	-	-	0.20	-	0.10	0.65
Total	**1,395**	**241**												

Table 58: Sunday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage (Regular Semester Service)

Existing Route	Regular Semester Daily Ridership	Proposed Route & Baseline Ridership											
		1	2	3	4	5	7	12	14	16	40	60	90
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-
6	467	-	-	-	-	-	-	-	-	280	-	117	47
7	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	928	-	-	-	-	-	-	-	-	186	-	93	603
Total	**1,395**	**-**	**-**	**-**	-	-	-	-	-	**466**	**-**	**210**	**650**

Table 59: Sunday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage (Reduced Service)

Existing Route	Reduced Service Daily Ridership	Proposed Route & Baseline Ridership											
		1	2	3	4	5	7	12	14	16	40	60	90
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-
6	160	-	-	-	-	-	-	-	-	96	-	40	16
7	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	81	-	-	-	-	-	-	-	-	16	-	8	53
Total	**241**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**112**	**-**	**48**	**69**

Table 60: Sunday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)		Estimated New Daily Riders (Coverage)		Estimated Total Daily Riders (Pre-Impact)	
	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
7	-	-	-	-	-	-
12	-	-	-	-	-	-
14	-	-	-	-	-	-
16	466	112	-	-	466	112
40	-	-	-	-	-	-
60	210	48	-	-	210	48
90	650	69	15	15	665	84
Total	**1,325**	**229**	**15**	**15**	**1,340**	**244**

Table 61: Sunday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage		Impact from Service Characteristics Impact Calculator		Projected Ridership	
	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service	Regular Semester Service	Reduced Service
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
7	-	-	-	-	-	-
12	-	-	-	-	-	-
14	-	-	-	-	-	-
16	466	112	0.28	0.28	596	144
40	-	-	-	-	-	-
60	210	48	0.27	0.27	265	61
90	665	84	0.28	0.28	851	107
Total	**1,340**	**244**	**-**	**-**	**1,712**	**312**

Annual Ridership, Revenue Hours, and Operating Cost Estimates

Table 62 summarizes current and projected annual system ridership, vehicle revenue hours, and operating costs. These projections reflect the service characteristics of the recommend short-term scenario. The projections are also based on the assumption that routes would operate during regular semester service over 157 weekdays, 29 Saturdays, and 30 Sundays. During reduced service, routes would operate over 99 weekdays, 23 Saturdays, and 22 Sundays.

The recommended short-term service scenario would boost ridership by an estimated 6.2 percent while increasing revenue hours by approximately 0.3 percent. As noted earlier, the impacts of service improvements can take up to two years to fully materialize, as riders must learn the new system and adjust their travel habits accordingly. In addition, current and projected operating costs are estimated based on a factor of $70.90 per vehicle revenue hour. Costs are projected to increase annually by approximately $17,190.

Table 62: Bloomington Transit Fixed-Route Annual Ridership and Revenue Hours Comparison

	Annual Ridership	Annual Vehicle Revenue Hours	Estimated Annual Operating Costs
Current Service	3,303,358	94,593	$6,706,682
Proposed Service	3,508,194	94,836	$6,723,872
Total Difference	204,836	242	$17,190
Percent Difference	6.2%	0.3%	0.3%

Small Transit-Intensive City (STIC) Funding Program

The Federal Transit Administration's Small Transit-Intensive City (STIC) Funding Program is a potential source of funding for Bloomington Transit. STIC funding is automatically awarded to FTA Section 5307 that meet or exceed at least some of the industry averages for urbanized areas with a population of at least 200,000, but not more than 999,999. There are six STIC performance categories: six performance categories: passenger miles traveled per vehicle revenue mile; passenger miles traveled per vehicle revenue hour; vehicle revenue miles per capita; vehicle revenue hours per capita; passenger miles traveled per capita; and passenger trips per capita. Previously, FTA apportioned 1.5 percent of 5307 funding awarded to recipients for STIC; recently, this figure increased to two percent.

Bloomington Transit regularly qualifies annually for between two and four STIC funding factors. As shown in **Table 63**, during FY2019, the agency qualified for three factors: vehicle revenue hours per capita, passenger trips per capita, and passenger miles traveled per vehicle revenue miles.

Table 63: Bloomington Transit Qualification for STIC Factors: FY2019

	Vehicle revenue miles per capita	Vehicle revenue hours per capita	Passenger trips per capita	Passenger miles traveled per capita	Passenger miles traveled per vehicle revenue hour	Passenger miles traveled per vehicle revenue mile
STIC Threshold (Average for UZAs/agencies with 200,000-1,000,000 residents)	11.6	0.7	12.1	79.2	105.1	6.0
Bloomington Transit	**10.5**	**1.0**	**30.7**	**65.2**	**65.2**	**6.2**

Green = currently meets; Yellow = does not currently meet by a small margin; Red = does not currently meet

Because increased ridership is anticipated through the proposed Bloomington Transit system, the agency is likely to continue qualifying for the three STIC factors it currently meets or exceeds. Bloomington Transit could extend its eligibility for STIC by qualifying for additional performance factors, as follows:

- **Vehicle revenue miles per capita.** Although the Bloomington Transit system is not proposed for mileage expansion, if the agency were to operate routes at a faster rate, it could increase its overall mileage. In short, the ability to operate more miles during the same number of revenue hours could increase vehicle revenue miles per capita. Bloomington Transit could operate faster service by promoting roadway measures that favor buses, such as bus-only corridors. In addition, because the proposed system streamlines several services (such as Route 7, and the service of apartment complexes on the current Route 4), it is possible that routes will be able to travel at an overall faster rate of miles per hour.
- **Passenger miles traveled per capita.** While the population of Bloomington Transit's service area is unlikely to change in the short-term, increased ridership via the proposed system should correlate with increased overall passenger miles. In addition, if riders tend to take longer trips while riding the new system, this will also result in increased passenger miles per capita.
- **Passenger miles traveled per vehicle revenue hour.** Like passenger miles traveled per capita, this measure should increase with new ridership. Although revenue hours will not increase significantly in the proposed system, the number of passengers on buses during revenue service is likely to rise, meaning that more passenger miles would be traveled each hour.

BTaccess Ridership Projection

BTaccess is a paratransit service for persons with disabilities who are unable to use BT fixed-route service. Eligible riders may request service between any two addresses within the City of Bloomington, and no service is currently provided outside of the city limits. Under the proposed service plan, Bloomington Transit would provide fixed-route service outside the Bloomington City limits, most notably via Routes 3 and 12. As such, Bloomington Transit may be able to expand its paratransit service area to also include all destinations within three quarters of a mile of these two routes, regardless of Indiana jurisdiction.

According to the 2017 Five-Year American Community Survey, the city of Bloomington has 8,144 disabled residents, all of whom could potentially be eligible for paratransit service. In October 2018, BTaccess provided 3,492 trips. A three-quarter mile buffer of the proposed Routes 3 and 12 intersects with Census block groups housing approximately 1,081 disabled residents. At the current rate of BTaccess ridership by number of residents with a disability, a geographic increase in the size of the BTaccess service area to include the buffer around Routes 3 and 12 would amount to an increase in average monthly BTaccess ridership of about 463 riders, or 13.3 percent.

Ridership Estimates: IU Campus Bus

This section estimates IU Campus Bus projected ridership during regular semester service only. To develop the projection, the study team established a baseline using ridership data collected during fall 2018 via automated passenger counters. Average Monday-Thursday, Friday, Saturday, and Sunday was estimated by multiplying average daily totals by the number of regular semester service days per day type. The exception to this calculation was the current Night Owl service: due to missing APC ridership data, average daily Friday and Saturday Night Owl ridership was estimated by IU Campus Bus Staff.

The proposed IU Campus Bus routes will cover close to the entirety of the original system alignments. However, the structure of routes is proposed to change significantly, including increased bi-directional service. A projection of increased ridership mainly stems from new service to the future IU Health facility (projected to see at least 25 trips on Monday through Thursday) as well as improved route directness and new repeating, clockface headways. With the exception of Night Owl Microtransit (which is projected to improve route directness), primary and secondary impact were applied uniformly across IU Campus Bus fixed routes, on the assumption that impacts would be lessened on Fridays and weekends relative to Monday through Thursday service. All impact factors for Bloomington Transit and IU Campus bus projections are shown in **Appendix D**.

The recommended service scenario would increase total annual ridership by an estimated 4.5 percent. **Table 64** through **Table 79** outlines the abovementioned process for Monday-Thursday, Saturday, and Sunday regular semester service.

Monday-Thursday Ridership Estimates: Regular Semester Service

Table 64: Monday-Thursday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership		Proposed Route & Distribution Factor				
Route	Daily Ridership	A	B	E	W	Night Owl Microtransit
A	8,513	0.50	-	-	0.50	-
B	3,765	-	0.90	-	0.10	-
E	3,319	0.30	0.15	0.50	-	-
W	3,176	-	-	-	1.00	-
Night Owl	-	-	-	-	-	-
Total	**18,773**					

Table 65: Monday-Thursday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage

Existing Ridership		Proposed Route & Baseline Ridership				
Route	Daily Ridership	A	B	E	W	Night Owl Microtransit
A	8,513	4,257	-	-	4,257	-
B	3,765	-	3,389	-	377	-
E	3,319	996	498	1,660	-	-
W	3,176	-	-	-	3,176	-
Night Owl	-	-	-	-	-	-
Total	**18,773**					

Table 66: Monday-Thursday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders (Pre-Impact)
A	5,252	-	5,252
B	3,886	-	3,886
E	1,660	25	1,685
W	7,809	-	7,809
Night Owl Microtransit	-	-	-
Total	**18,607**	**25**	**18,632**

Table 67: Monday-Thursday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact from Service Characteristics Impact Calculator	Projected Ridership
A	5,252	0.12	5,856
B	3,886	0.02	3,945
E	1,685	0.12	1,878
W	7,809	0.02	7,926
Night Owl Microtransit	-	-	-
Total	**18,632**	**-**	**19,605**

Friday Ridership Estimates: Regular Semester Service

Table 68: Friday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership			**Proposed Route & Distribution Factor**				
Route	Daily Ridership		A	B	E	W	Night Owl Microtransit
A	5,201		0.50	-	-	0.50	-
B	1,407		-	0.90	-	0.10	-
E	1,789		0.30	0.15	0.50	-	-
W	1,701		-	-	-	1.00	-
Night Owl	75		-	-	-	-	1.00
Total	**10,173**						

Table 69: Friday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage

Existing Ridership			**Proposed Route & Baseline Ridership**				
Route	Daily Ridership		A	B	E	W	Night Owl Microtransit
A	5,201		2,601	-	-	2,601	-
B	1,407		-	1,266	-	141	-
E	1,789		537	268	895	-	-
W	1,701		-	-	-	1,701	-
Night Owl	75		-	-	-	-	75
Total	**10,173**						

Table 70: Friday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders (Pre-Impact)
A	3,137	-	3,137
B	1,535	-	1,535
E	895	25	920
W	4,442	-	4,442
Night Owl Microtransit	75	-	75
Total	**10,084**	**20**	**10,109**

Table 71: Friday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact from Service Characteristics Impact Calculator	Projected Ridership
A	3,137	0.12	3,498
B	1,535	0.02	1,558
E	920	0.12	1,025
W	4,442	0.02	4,509
Night Owl Microtransit	75	0.05	79
Total	**10,109**	**-**	**10,668**

Saturday Ridership Estimates: Regular Semester Service

Table 72: Saturday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership			Proposed Route & Distribution Factor				
Route	Daily Ridership		A	B	E	W	Night Owl Microtransit
A	510		0.50	-	-	0.50	-
B	215		-	0.90	-	0.10	-
E	343		0.30	0.15	0.50	-	-
W	-		-	-	-	1.00	-
Night Owl	333		-	-	-	-	1.00
Total	**1,401**						

Table 73: Saturday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage

Existing Ridership		Proposed Route & Baseline Ridership				
Route	Daily Ridership	A	B	E	W	Night Owl Microtransit
A	510	255	-	-	255	-
B	215	-	194	-	22	-
E	343	103	51	172	-	-
W	-	-	-	-	-	-
Night Owl	333	-	-	-	-	333
Total	**1,401**					

Table 74: Saturday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders (Pre-Impact)
A	358	-	358
B	245	-	245
E	172	15	187
W	277	-	277
Night Owl Microtransit	333	-	333
Total	**1,384**	**15**	**1,399**

Table 75: Saturday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact from Service Characteristics Impact Calculator	Projected Ridership
A	358	0.12	399
B	245	0.02	249
E	187	0.12	208
W	277	0.02	281
Night Owl Microtransit	333	0.05	350
Total	**1,399**	**-**	**1,486**

Sunday Ridership Estimates: Regular Semester Service

Table 76: Sunday Ridership Projection, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership		Proposed Route & Distribution Factor				
Route	Daily Ridership	A	B	E	W	Night Owl Microtransit
A	691	0.50	-	-	0.50	-
B	232	-	0.90	-	0.10	-
E	283	0.30	0.15	0.50	-	-
W	-	-	-	-	1.00	-
Night Owl	-	-	-	-	-	-
Total	**1,206**					

Table 77: Sunday Ridership Projection, Step Two: New Baseline Ridership Based on Geographic Coverage

Existing Ridership		Proposed Route & Baseline Ridership				
Route	Daily Ridership	A	B	E	W	Night Owl Microtransit
A	691	346	-	-	346	-
B	232	-	209	-	23	-
E	283	85	42	142	-	-
W	-	-	-	-	-	-
Night Owl	-	-	-	-	-	-
Total	**1,206**					

Table 78: Sunday Ridership Projection, Step Two (Continued): New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders (Pre-Impact)
A	430	-	430
B	251	-	251
E	142	15	157
W	369	-	369
Night Owl Microtransit	-	-	-
Total	**1,192**	**15**	**1,207**

Table 79: Sunday Ridership Projection, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact from Service Characteristics Impact Calculator	Projected Ridership
A	430	0.12	480
B	251	0.02	255
E	157	0.12	174
W	369	0.02	374
Night Owl Microtransit	-	0.12	-
Total	**1,207**	-	**1,284**

Annual Ridership, Revenue Hours, and Operating Cost Estimates

Table 62 summarizes current and projected annual system ridership, vehicle revenue hours, and operating costs during regular semester service. These projections reflect the service characteristics of the recommend short-term scenario. The projections are also based on the assumption that routes would operate during regular semester service over 126 Monday-Thursdays, 31 Fridays, 30 Saturdays, and 32 Sundays.

The recommended short-term service scenario would boost ridership by an estimated 7.7 percent while increasing revenue hours by approximately 1.2 percent. Although annual revenue hours would increase, due to reduced operating costs on microtransit versus fixed-route service (estimated to be $55 per hour on microtransit, as opposed to $86 per hour on fixed-route), overall operating costs are projected to fall by approximately 0.4 percent, or over $12,000.

Table 80: IU Campus Bus Annual Ridership and Revenue Hours Comparison

	Annual Ridership	Annual Vehicle Revenue Hours	Estimated Operating Costs
Current Service	2,761,383	**Fixed-Route:** 37,605	**Fixed-Route:** $3,234,009
Proposed Service	2,974,364	**Fixed-Route:** 37,440 **Microtransit:** 610	**Fixed-Route:** 3,188,096 **Microtransit:** 33,550
Total Difference	212,981	445	-$12,363
Percent Difference	7.7%	1.2%	-0.4%

Long-Range Recommendations

While the short-range recommendations focus almost exclusively on service improvements, the long-range recommendations focus on capital improvements and new technologies. These recommendations are described as long-range because funding has not yet been identified for their implementation, and because additional planning, procurement, and design work would be necessary for each.

Bus Stop and Corridor Improvements

To operate most efficiently, fixed-route transit service should run on arterial streets and avoid off-street deviations into parking lots and driveways. However, many arterial streets or street segments lack basic pedestrian amenities such as sidewalks and crosswalks. As development grows along these corridors, pedestrian amenities are not always added, and transit operators like Bloomington Transit find themselves in a position of having to operate "off-street" in order to reach prospective riders who cannot safely access bus stops along arterial streets. Conversely, some arterial streets have so much pedestrian activity that other traffic is sometimes impeded.

The following recommendations highlight bus stop and corridor treatments that can improve transit service by reducing delays and deviations.

Whitehall Crossing/Whitehall Plaza

Bloomington Transit currently serves Whitehall Crossing and White Hall Plaza by deviating Route 3 buses off E. 3Rd Street to circulate through both retail plazas. Westbound buses first turn north from 3rd Street onto Gates Street to serve Whitehall Crossing, and then cross back over 3rd Street to serve the Whitehall Plaza driveway before returning to 3rd Street via Liberty Drive. Eastbound buses follow a similar alignment in reverse. These deviations from 3rd Street are time-consuming and generate relatively little ridership from either plaza. Instead, the highest ridership in the area comes from two stops on either side of 3rd Street, near Liberty Drive. These stops are adjacent to a Kroger on the south side of the street and a Big Lots on the north.

To improve transit service in the area, the study team recommends the following steps:

- **Eliminate deviations into Whitehall Crossing and Whitehall Study.** This would help streamline Route 3 service and would negatively impact very few riders.
- **Install passenger shelters at 3rd and Liberty.** When deviations are eliminated, improved on-street passenger amenities like shelters with benches can be presented as a trade-off or consolation. Transit riders are generally willing to accept a longer walk to a bus stop if there are passenger amenities waiting for them at the stop. In addition, the bus stops at 3rd and Liberty are already the highest-ridership stops in the area.
- **Initiate assessment of the pedestrian environment.** The stretch of 3rd Street between Gates Drive and Curry Pike is a destination-rich environment, but pedestrian infrastructure is inconsistent in quality and availability (**Figure 46**). A comprehensive review of the pedestrian environment, in partnership with the City and State, can help document shortcomings in the existing pedestrian network and identify improvement opportunities.

Figure 45: Whitehall Crossing/Whitehall Plaza Stop Area

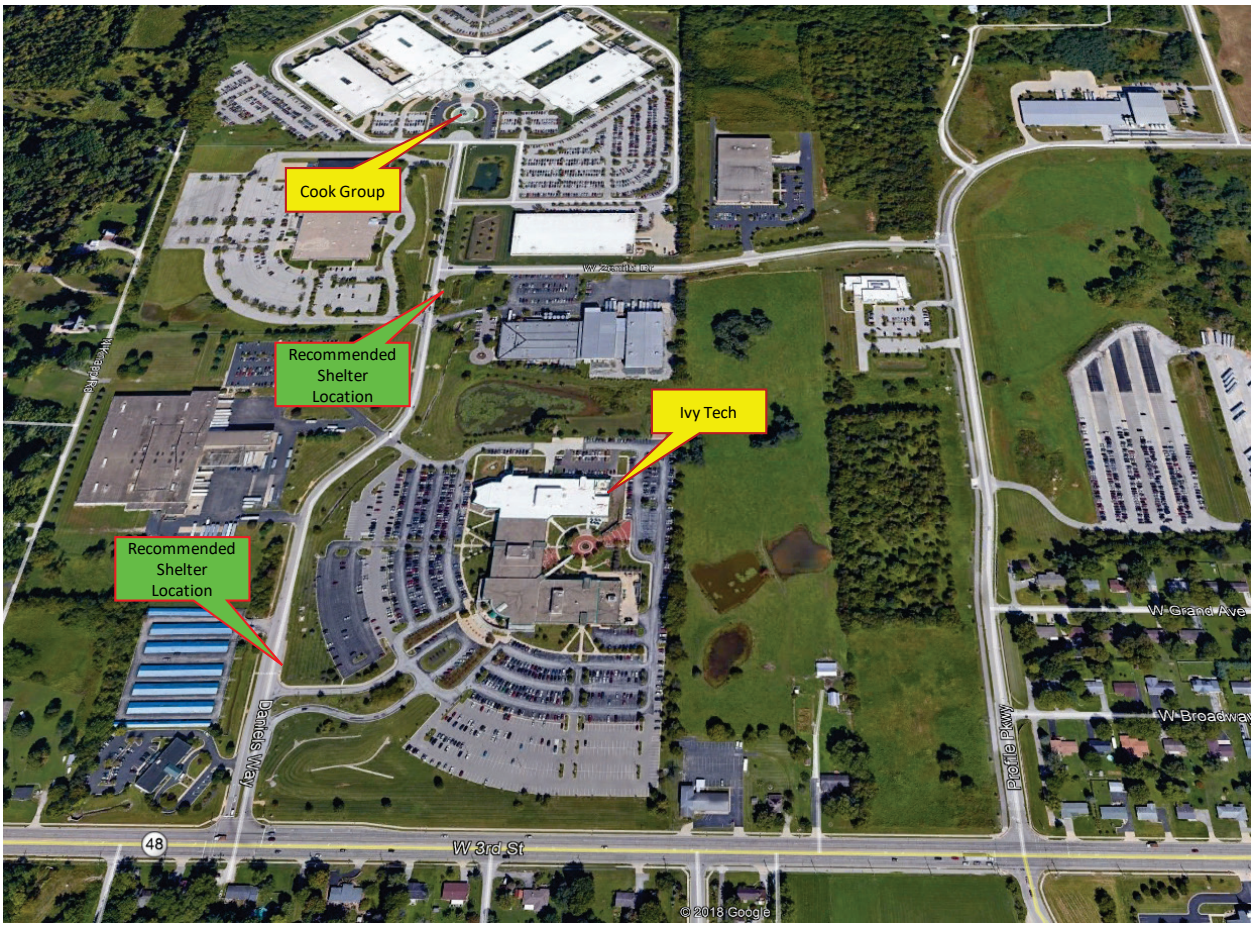
Ivy Tech/Cook Group

If Route 3 is extended to Ivy Tech, ridership to the college and nearby Cook Group office park will likely increase substantially from the current service provided by Rural Transit service. While the extension of the route is certainly justified by the ridership potential of the area, it does represent a deviation for riders with other destinations along the route. The impact of the deviation can be minimized by keeping service on Daniels Way and Zenith Drive, rather than entering either the Ivy Tech or Cook Group campus to pick up and drop off passenger. If the proposed loop serving this area operates clockwise on both inbound and outbound trips, then the current sidewalks are sufficient to support the service, and stops can be placed near the current crosswalk serving the main entrance to Ivy Tech, and at Daniels Way and Zenith Drive (**Figure 47**).

Passenger shelters at both stop locations would further enhance the user experience and would help advertise the presence of transit service in the area. If service operated clockwise only, shelters would only be necessary on one side of Daniels Way.

Passenger shelters along Daniels Way could also serve as visible transfer locations between Bloomington Transit and Rural Transit. Rural Transit's Route Optimization Study suggests that the agency may be able to operate more efficiently by eliminating time-consuming trips into downtown Bloomington. Given the regional draw of Ivy Tech, it may be an ideal location to facilitate transfers between the two transit systems.

Figure 46: Proposed Ivy Tech/Cook Group Stop Area



Walnut Grove Apartments/Burks Drive

Bloomington Transit currently serves the Walnut Grove Apartments by deviating Route 1 off Walnut Street Pike into the apartment complex itself. Buses are forced to back up and make multi-point turns within driveway and parking lot of the complex to turn around. Furthermore, buses must make unprotected left turns out of the apartment complex to return to Walnut Street Pike.

The Walnut Grove Apartments are a high ridership location. Under the proposed short-range service recommendations, the complex would be served by both Route 7 and Route 40. Route 7 would provide bi-directional service along Walnut Street Pike, while Route 40 would operate southbound-only along Walnut Street Pike as part of a loop that also includes Burks Drive, Walnut Street, and Winslow Road.

To effectively serve the Walnut Grove Apartments without buses having to entering the complex, the study team recommends the following steps:

- **Install bus stops along Walnut Street Pike.** There are currently no bus stops along Walnut Street Pike between Allendale Drive and Heather Drive, other than the stops inside the Walnut Grove Apartments. However, there are several other apartment complexes surrounding Walnut Grove that would benefit from access to bus stops in the public right-of-way. Installing stops in the northbound and southbound directions would support the proposed bi-directional design of Route 7, giving area residents access to downtown as well as Kroger on Rhorer Road.
- **Install crosswalk near Walnut Grove Apartments.** A crosswalk across Walnut Street Pike would improve the safety of Walnut Grove residents, and residents of other nearby apartment complexes, who may wish to board or alight a northbound bus.

- **Install passenger shelters near Walnut Grove Apartments.** The Walnut Grove Apartments generate a significant amount of ridership. The installation of passenger shelters for these riders is already justifiable. However, the installation of a shelter or shelters at this location would have several secondary benefits. First, since there is no sidewalk on the northbound side of Walnut Street Pike, the concrete pad needed to support a shelter would also serve as a clear and level waiting/boarding area for passengers. Secondly, a shelter on one or both sides of the street would increase visibility and awareness among passing cars of the transit and pedestrian activity in the area, and thus improve the safety of the stop environment compared to stops without shelters.
- **Install traffic signal or four-way stop at Burks Drive and Walnut Street.** While Route 40 buses are proposed to make all right turns at Burks Drive, Walnut Street and Winslow Road, after serving the Walnut Grove Apartments, Route 7 buses are proposed to continue south to serve Kroger on Rhorer Road. Service to the Kroger and other destinations in the Clear Creek shopping center are key to generating more "reverse" direction ridership on Route 7. However, this plan creates a challenge for turning buses around at the end of the line. If a signal or four-way stop is installed at the Burks Road / Walnut Street intersection, Route 7 buses would be able to turn right onto Burks after serving Walnut Grove, and then safely turn left onto Walnut to begin an end-of-line loop including Rhorer Road and Walnut Street Pike (both signalized intersections).

Figure 47: Walnut Grove Apartments Stop Area

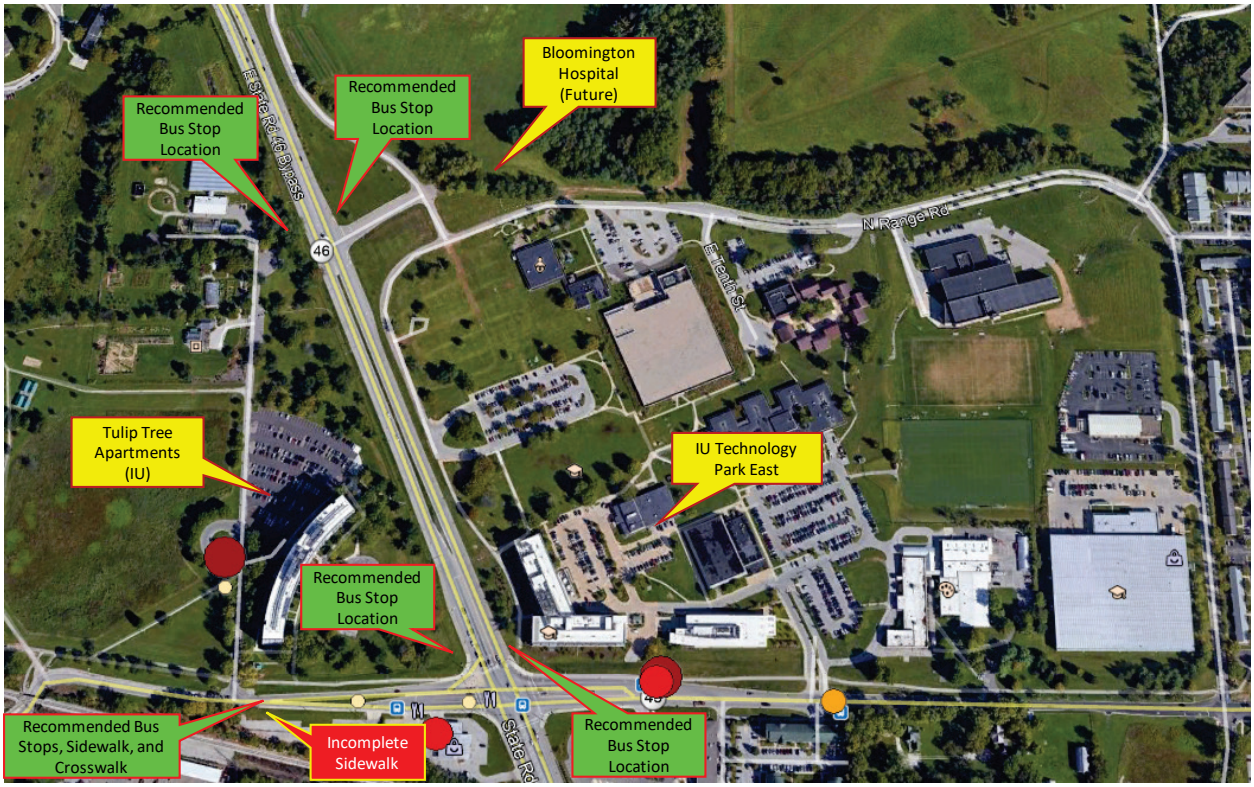
IU Health Bloomington Hospital / Tulip Tree Apartments

The relocation of the IU Health Bloomington Hospital to a site near Range Road and State Road 45/46 Bypass is expected to generate significant demand for transit service to the new location. The recommended short-range service plan proposes serving the new hospital location with two routes. Proposed BT Route 90 would serve the hospital via Range Road, while the proposed IU E Route would serve it from the Bypass, to minimize deviations. Presumably, the intersection of Range Road and the Bypass will be signalized once the hospital opens, to allow traffic to enter and exit the hospital via Range Road and the Bypass. If pedestrian amenities such as sidewalks and crosswalks area also added to this intersection, the intersection could support bus stops as well.

The Indiana Department of Transportation generally does not permit bus stops on state roads such as the SR 45/46 Bypass, but with the level of development now occurring and already in place along this stretch of the Bypass, INDOT may grant an exception. Specific locations where bus stops would be warranted in the vicinity of SR 45/46 Bypass, between Range Road and 10th Street include the following:

- **SR 45/46 Bypass and Range Road (northbound and southbound).** This location would be served by the proposed IU Campus Bus E Route, and would provide access to the new Bloomington Hospital.
- **SR 45/46 Bypass and 10th Street (northbound and southbound).** This location would serve the proposed BT Route 90 and the IU E Route, and would provide access to the Indiana University Technology Park East. The location is already signalized and has crosswalks in all directions.
- **10th Street and Tulip Tree Apartments driveway (eastbound and westbound).** This location would be served by proposed BT Routes 16 and 90, as well as the IU E Route, and would provide access to the Tulip Tree Apartments without buses having to enter the property. Serving the high ridership Tulip Apartments from 10th Street would help cut travel times from locations east of the Bypass to the IU campus, but would require an investment in supporting pedestrian amenities such a crosswalk and sidewalk extension on the south side of 10th Street (**Figure 49**).

Figure 48: Proposed Bloomington Hospital and Tulip Tree Apartments Stop Areas



10th Street near Wells Library

10th Street is one of the busiest and most multimodal arterials in Bloomington, serving as a key corridor for Bloomington Transit and IU Campus Bus routes, as well as private vehicles, bicycles, scooters, and pedestrians. While 10th Street facilitates east-west movement through the IU campus, it also bridges the divide between academic buildings north and south of the corridor.

During class-change times, thousands of pedestrians cross from one side of 10th Street to the other. Many of the heaviest crossing points are signalized, including the intersections with Fee Lane and Jordan Avenue. However, the designated crossing near the Wells Library and the School of Public and Environmental Affairs is not signalized. Without a signal, pedestrians have the right of way at this crossing, and during peak times, the site may experience up to five minutes of uninterrupted pedestrian crossings. During these periods, traffic can back up for blocks in both directions, causing significant delays to vehicles, including transit buses traveling along 10th Street. Given the volume of IU-affiliated transit ridership on the routes serving 10th Street, the current situation has a very negative impact on the IU community (as well as anyone else traveling by car or bus along 10th Street).

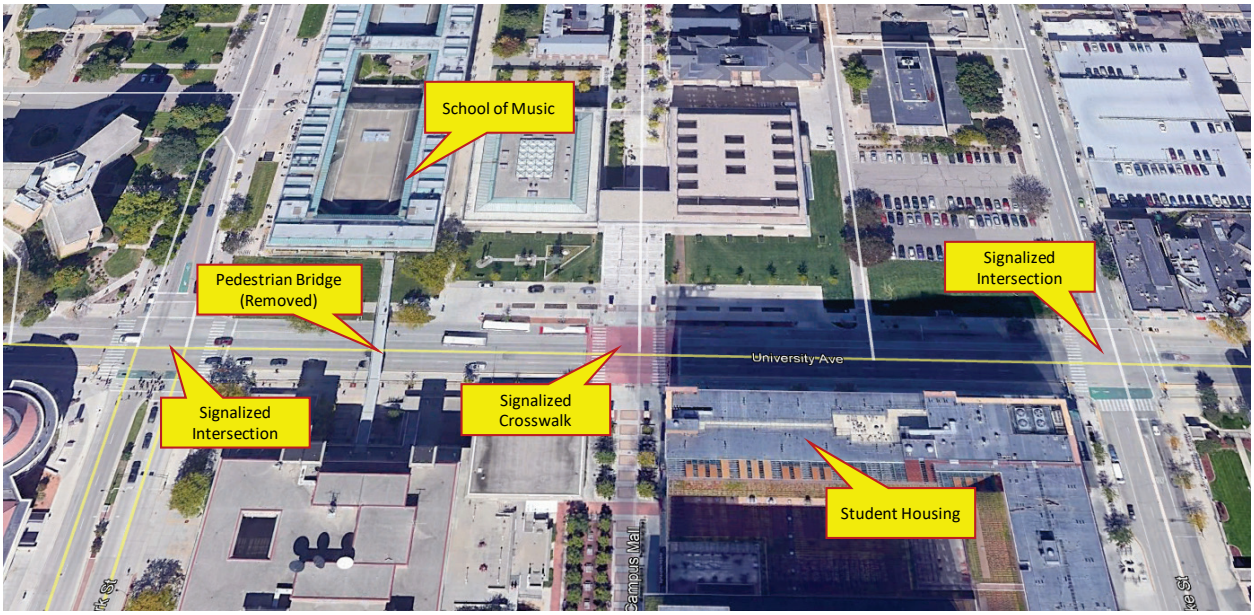
A heavily used mid-block crossing-point along a major arterial street is not unique to Bloomington or Indiana University. In fact, the situation is quite common, especially in places where universities have outgrown their historic boundaries. In many cases, the solution has been to install a traffic signal at the heavily-used crossing, even if the crossing is between two existing signalized intersections (**Figure 50**). Two such examples are highlighted in **Figure 51** and **Figure 52**, which respectively show signalized mid-block crosswalks at the University of Texas at Austin and the University of Wisconsin at Madison. In both cases, the mid-block crossing is 300-500 feet from the signalized intersections on either side. For context, the 10th Street crossing is approximately 400 feet from both the Fee Lane and Jordan Avenue intersections.

A mid-block signal near the Wells Library would help reduce conflict at the busy crossing and ensure that all modes are given sufficient throughput. To facilitate very large pedestrian volumes, the pedestrian refuge could be removed from the median of 10th Street and replaced with a wide unobstructed crosswalk (as seen in the Austin and Madison examples).

Figure 49: 10th Street near Wells Library Pedestrian Crossing Area

Figure 50: Example of Mid-Block Signalized Pedestrian Crossing (Austin, TX)

Figure 51: Example of Mid-Block Signalized Pedestrian Crossing (Madison, WI)



Innovative Services and Emerging Technology Pilot Programs

Transit service can consist of a number of different modes such as fixed-route bus service, light rail, commuter rail, ferry service, and more. Each mode has its own unique characteristics, and its ideal operating environment. For example, to be most effective, fixed-route bus service generally requires a density of more than five people and/or jobs per acre, as well as a built environment that can support both pedestrian activity (i.e. access to bus stops) and transit operations (i.e. appropriate street dimensions).

Areas that lack these characteristics may still have a need for mobility services, even if fixed-route service is not the ideal solution. In many communities, on-demand or demand-response services such as dial-a-ride buses have helped provide coverage in areas that could not support fixed-route service. However, expectations for these services have historically been quite low in terms of ridership and productivity because trips need to be scheduled far in advance, limiting the appeal of the mode for many prospective riders. In recent years, technological advances have led to new types of on-demand services, as well as new approaches to transit service overall.

Many transit systems around the country have launched pilot programs to test the effectiveness of new technologies in meeting the mobility needs of their changing communities. The same approach should be considered in Bloomington. While all of the service concepts described below are promising in their potential, they rely on new and still-evolving technologies. Thus, these long-range service concepts are presented as pilot programs ideas for Bloomington Transit and IU Campus Bus to consider, should applicable funding become available.

Transportation Network Companies (TNCs)/Ride-Hailing Firms

Transportation Network Companies (TNCs) include app-based, on-demand ride-hailing platforms such as Uber and Lyft. At their core, TNCs facilitate the matching of individuals in search of transportation with drivers willing to provide the service for a fee. TNCs are already broadly used in Bloomington, with hundreds of trips taken and provided by private citizens daily. However, other communities have shown that TNCs can support the goals of public transit agencies as well.

Partnerships between TNCs and transit agencies are an area of emerging practice whereby a subsidy is paid to lower the cost to end users. Based on a recent Transit Cooperative Research Program study, transit agencies are partnering with TNCs for a variety of reasons, including the following:

- Providing a first/last mile connection to other transit services
- Demonstrating innovation
- Improving the customer experience
- Supplementing an existing service
- Providing same-day mobility options for paratransit customers
- Reducing the cost of providing paratransit
- Providing service at a new time
- Providing service to transit deserts or to transit-dependent riders
- Improving healthcare outcomes
- Providing connections to activity centers such as health and human services, education/training facilities, employment centers, and more

TNC partnerships can be structured in a variety of ways and since public money is being used, the subsidy's use is usually restricted to a handful of promising use cases. Generally, applicable use cases are those where fixed-route service is not available (e.g. late-night service), and can be classified in the following ways:

- **Geofenced fixed subsidy**. An agency provides a fixed subsidy for TNC trips within a defined zone or area only. As the subsidy is fixed, the total price to the passenger may vary by trip.
- **Geofenced fixed price.** An agency provides a subsidy to ensure a fixed price for TNC trips within a defined zone or area. As the trip price is fixed, the subsidy paid by the agency may vary by trip.

- **Fixed price to specific hubs.** An agency provides a subsidy to ensure a fixed price for TNC trips connecting to transit centers or other key activity centers.
- **Time-bounded subsidy**. An agency provides a subsidy for TNC trips during specific time periods only (e.g. late-night or off-peak), when fixed-route service is limited or not available (**Figure 53**).

Figure 52: Example of Time-Bound TNC Subsidy Program (Detroit, MI)

TNCs can also be used to supplement paratransit service. Eligible paratransit users can be given the option of using a TNC for a medical appointment or other approved trip purposes, rather than scheduling a ride on a paratransit vehicle.

For Bloomington Transit, subsidized TNC service could offer the following benefits:

- **Expand service coverage to relatively low-density residential neighborhoods such as Spicewood, Hyde Park Village, and Hoosier Acres**. The neighborhoods on the east and southeast of Bloomington are best suited for this service approach because trip lengths (and subsidies) could be kept relatively low by limiting service to within a zone extending south and east from College Mall. Passengers wishing to travel further west to IU or downtown Bloomington would be able to transfer to fixed-route service at College Mall.
- **Provide late-night service for job access**. Like most transit systems, Bloomington Transit is designed to accommodate traditional work shifts. Residents with shifts that begin or end in the overnight hours may find it difficult to find affordable transportation to get them to or from work. Bloomington Transit could offer a TNC subsidy for narrowly defined trips between a participant's home and work locations, and for specific times only. This subsidy could also be tied to income level.
- **Replace poorly performing fixed-route service.** The proposed short-range service scenario is designed to create a network of stronger and more productive routes than those that make up the current network. Still, every transit route has a point of diminishing return (either geographically or by time of day), past which ridership and productively drop precipitously. Subsidized TNC service can be used to replace unproductive fixed-route segments or trips. For example, if the productivity of a route drops below five passengers per hour at 7:00 p.m., service can be cut and replaced with subsidized TNC service.
- **Reduce paratransit costs**. Paratransit service typically has a much higher cost per passenger-trip than TNC service. While some paratransit riders require special accommodations such as wheelchair support, others are more ambulatory and can be served with a typical passenger car. Offering the option of subsidized TNC service for paratransit-eligible customers can help relieve the demand for BTaccess vans and reduce wait times both for those riders opting to use the TNC service and those needing to use specialized paratransit vehicles. For BPTC, subsidized TNC service can increase the number of trips that can be provided annually, and reduce the average cost per passenger trip.

An outline of the steps necessary to implement a TNC partnership is included in **Appendix E**.

Microtransit

Microtransit is a form of on-demand transit service that mimics the interface of TNC service, but operates with a fixed fleet of transit vehicles. These transit vehicles are typically vans or cut-away style buses, and can be operated by a transit agency or a third-party vendor (**Figure 54**). Microtransit service has a variety of applications including the following:

- Service in a dense urban area where larger transit coaches cannot easily maneuver
- Service in a suburban area lacking the density or pedestrian environment to support fixed-route service
- Service in a university environment during time periods when demand is relatively low and diffused (i.e. weekend, evening, and/or late-night service
- Service in a rural area where TNCs do not operate
- Paratransit service with updated technology

Figure 53: Example of Microtransit Service (Sacramento, CA)

Microtransit services can be generally grouped into either turnkey service or a technology platform.

- **Turnkey service**. An all-in contract to provide a given level of service based on parameters dictated by the agency. In this model, the vendor would provide the vehicles, drivers, and operations, in addition to the microtransit booking and dispatching platform.
- **Technology platform.** Model in which an agency pays for a software license from a company that improves vehicle dispatch on the back end and provides for ride requests via a smartphone app. The agency would retain control and responsibility for operations, include providing vehicles and drivers.

To be most effective, microtransit service requires more than one vehicle operating in a defined zone simultaneously. With at least two vehicles, the technology platforms used for microtransit service can determine which vehicle to assign to each trip request, with the aim of optimizing routing and minimizing wait times both for passengers waiting for a ride and those already onboard the vehicles. Some microtransit services operate “corner-to-corner” rather than “curb-to-curb.” This approach requires passengers to walk out to the end of their block to meet a transit vehicle rather than having the vehicles spend time serving each individual address.

Microtransit offers a new option for transit agencies wanting to expand their service at a low cost, especially in areas that are not ordinarily considered transit-supportive. In Bloomington, potential markets for microtransit service include the following:

- **Service in neighborhoods just south of IU.** The neighborhoods south of IU, roughly bound by Atwater Avenue, High Street, Hillside Drive, and Walnut Street are fairly dense and walkable, but also often congested with on-street parking, scooters, and cyclists. Transit service in the area is mostly limited to the periphery, and would be even more-so under the recommended short-range service scenario. Microtransit would be ideally suited for this area of Bloomington
- **Late-night service on and around the IU campus**. Microtransit is proposed to replace weekend Night Owl service in the recommended short-range service scenario. However, demand for evening and late-night service exists throughout the week when IU is in session, after fixed-route service has ended. The demand is certainly lower and more dispersed than during daytime hours, and these characteristics make microtransit the ideal tool for the job.
- **Service in areas that lack public streets**. The recommended short-range service scenario proposes a new route (Route 14) to serve the many large apartment complexes on or near Oakdale Drive and Basswood Drive. These complexes are generally quite sprawling and served by private by private roads and driveways. Route 14, for example, would operate along Muller Parkway, which is actually an internal private drive within the Village at Muller Park Apartments. If it is determined that full-size transit coaches are not a viable solution for this environment, Route 14 could instead be redesigned as a microtransit service.
- **Service in neighborhoods and/or at times of day that could also be considered for subsidized TNC service**. Like TNCs, microtransit is better suited to serve lower ridership time periods and/or lower density residential areas that are not likely to support fixed-route service. However, microtransit allows for a more consistent branding and user experience than TNCs. As microtransit features a fixed fleet of vans or buses, vehicles can be branded to match the rest of the Bloomington Transit or IU Campus Bus fleet. In addition, drivers can be trained and vetted using the same standards as other BT or IU Campus Bus personnel.

An outline of the steps necessary to implement microtransit service is included in **Appendix E**.

Autonomous Vehicle (AV) Shuttles

AV shuttles are a form of transit service that leverages emerging autonomous vehicle technology to travel at low speeds on a fixed route or within a geofenced area on a set of preprogrammed paths. AV shuttles are an emerging option for campuses and roadways where vehicle speeds and travel distances are relatively low. Often piloted to showcase technology and to gain an understanding of the operation of this new technology, AV shuttles can be used as internal circulators or first/last mile connectors (**Figure 55**). They can operate both on public streets and on mixed-use pathways, allowing them to potentially access more campus destinations than other transit modes.

Figure 54: Example of Automated Vehicle Shuttle Pilot Program (Denver, CO)

Most AV shuttles are electric vehicles with limited range and passenger carrying capacities similar to a large elevator. On the other hand, the vehicles' relatively small size allows them to access destinations that other vehicles cannot. Virtually all AV shuttle services currently in operation are pilot programs aimed at testing the limits of the technology. For this reason, universities are an ideal setting to consider AV shuttle applications.

In Bloomington, the growing campus environment near the Bypass and 10th Street presents an opportunity to implement an AV Shuttle pilot program. In addition to the new IU Health Bloomington Hospital and associated parking facilities, this emerging campus includes the IU Campus Children's Center, Indiana Institute on Disability, IU Technology Park East, IU Warehouse, and IU Auxiliary Library (**Figure 56**). While the recommended short-range service scenario recommends extending several routes to serve the periphery of the site, they cannot provide closer access to the various destinations within the campus without sacrificing key service characteristics. Thus, AV shuttle service has the potential to bridge the mobility gaps that still remain after the implementation of the recommended service.

An outline of the steps necessary to implement Autonomous Vehicle Shuttle service is included in **Appendix E**.

Figure 55: Growing Campus Environment near State Road 45/46 Bypass and 10th Street