



Transportation Demand Management Plan Indiana University Bloomington

November 2012

PREPARED FOR



Indiana University

PREPARED BY



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In Collaboration with
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Transportation Policy Advisory Committee
Indiana University Bloomington



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Executive Summary

This executive summary has been prepared to provide background information and an overview of the Transportation Demand Management (TDM) study and recommended TDM Plan developed for Indiana University, Bloomington (IUB). The IUB Campus Master Plan, completed in 2010, sets the stage for how the campus will evolve over the upcoming 10 year planning horizon and 20 year construction horizon. The Master Plan calls for conducting a TDM study to better understand current employee and student commuting behavior to the IUB campus. Further, the Master Plan calls for the development of a TDM Plan that recommends TDM programs and transportation related infrastructure improvements to encourage the reduction of employee and student commuting by single occupant vehicles.

TDM is the art of influencing travel behavior for the purpose of reducing the demand for single occupant vehicle use. The development and implementation of TDM programs is wholly consistent with the Campus Master Plan which calls for a commitment to a “Walkable Campus” as one of its key visions. As expressed in the Campus Master Plan “campus improvement initiatives must focus growth in and around the core campus and discourage remote development.” Concentrating development and collocating functions around the core campus will promote a stronger campus community and lead to an academic social environment that is more communal, interconnected, convenient, and intellectually engaging. Increased reliance on pedestrian circulation and public transit combined with discrete parking infrastructure improvements will further enhance the

viability of this concentrated campus initiative. This TDM study and recommended TDM programs encourage, support and incentivize the use of public transit, carpooling, bicycling and walking to campus. Further, the TDM programs promote the use of campus bus, bicycling and walking within the campus.

The TDM programs also support the Campus Sustainability Report, completed in 2008. Reductions in commuting to campus by drive alone commuters will have a significant impact on reducing IUB’s carbon footprint through the reduction in greenhouse gas emissions. The Campus Sustainability Report calls for “ensuring that individuals have a broad range of safe and convenient transportation options to walk, bicycle, carpool, or ride public transit to and around campus.”

The TDM study and program recommendations were undertaken by the transportation consulting firm of VHB, Inc. under contract to Indiana University Bloomington Auxiliary Business Services, working with representatives of the Offices of Parking Operations, Sustainability, Human Resources, Campus Bus, and Auxiliary Information Technology, and received input and guidance from the Transportation Policy Advisory Committee (TPAC), as well as student and faculty focus groups. It should be noted that TPAC has played a critical role in the development of this TDM Plan. Over the course of several meetings and presentations, they have represented the interest of their respective groups and have presented valuable insight into the existing transportation system and their colleague’s commuter behavior and attitudes toward transportation.

Technical Analysis

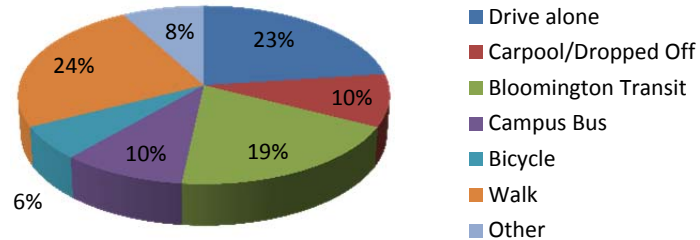
As part of the TDM study, an extensive employee and student transportation survey was conducted in the spring of 2012, in collaboration with Indiana University Bloomington Center for Survey Research. The survey focused on three areas for gathering commuting information; how do employees and students who live off-campus currently commute to campus; how aware are employees and off-campus students of currently offered TDM programs; and what TDM programs and campus transportation infrastructure improvements would encourage more use of alternative modes for commuting to IUB.

All employees and off-campus students were surveyed, with a high response rate (55 percent for faculty and staff and 33 percent for students)

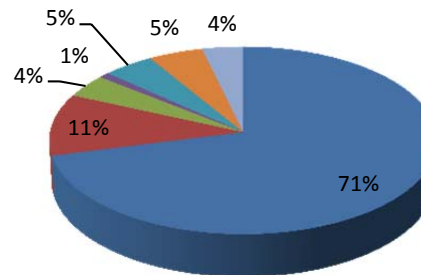
received from both groups indicating a high level of interest in the survey topic and questions. The survey data show that currently 23 percent of students who live off-campus drive alone to campus, 24 percent walk, 19 percent use Bloomington Transit and 10 percent use Campus Bus. This differs sharply from employee commuting behavior where the survey data found that currently 71 percent of employees drive alone to campus, 11 percent carpool or are dropped off, 4 percent use Bloomington Transit and 5 percent walked. The survey results identified the need for the TDM Plan to initially target employees rather than students when developing programs and policies.

Exhibit 1: Off-Campus Student and Employee Mode Split

Off-Campus Student Mode Split



Employee Mode Split



The key findings of the survey were as follows:

- **Awareness and knowledge of how to access current TDM programs is low (with a few exceptions)** – The survey showed that over 80% of employees were not familiar with or did not know how to access many of TDM programs currently being offered at IUB. Additionally, approximately half of the employees were unaware that employees can ride Campus Bus and Bloomington Transit fare-free. Students had a higher level of awareness of existing TDM program offered at IUB. The survey identified the need to expand the awareness of both existing and new TDM programs with both employees and students.

- **Infrastructure improvements would encourage drive alone commuters to walk and bike more to campus** – Another goal of the survey was to understand what would encourage drive alone commuters to use alternative transportation and how IUB can better support current users of alternative transportation so that they continue to use their respective alternative transportation mode. For example, Exhibit 2 and Exhibit 3 illustrate that infrastructure improvements such as improved/additional sidewalks and on-road bicycle accommodations would encourage drive alone commuters to walk and bike to campus.

Exhibit 2: Encouragement to Walk to Campus

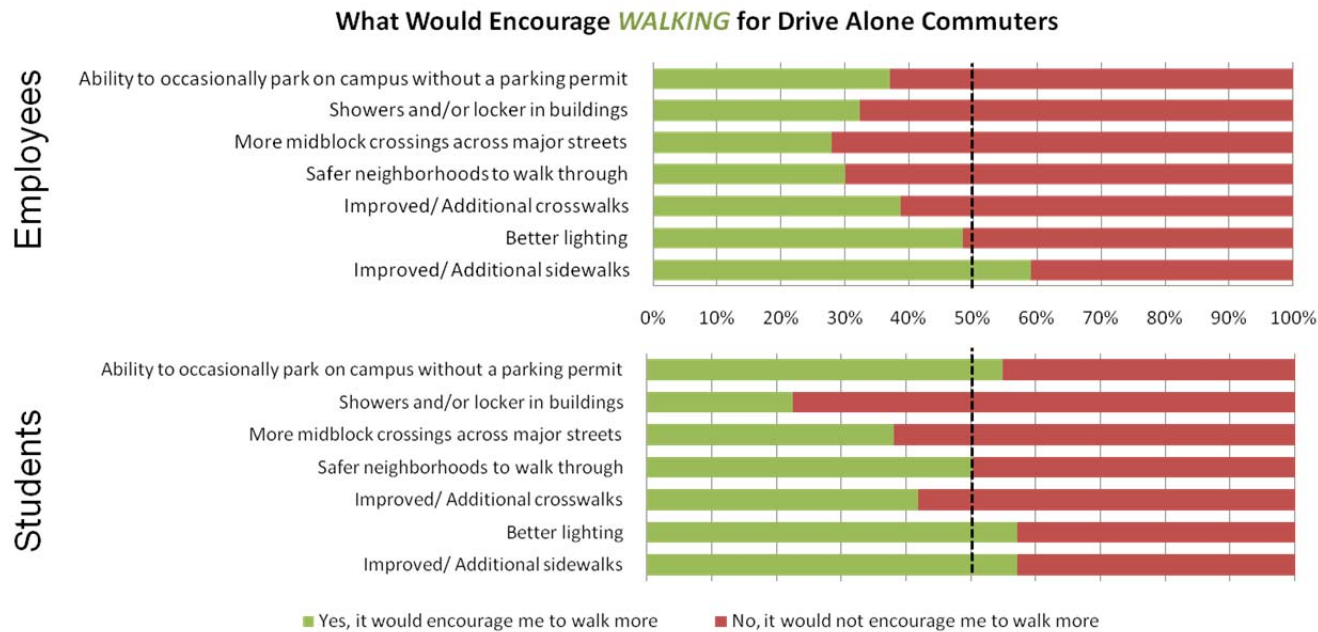
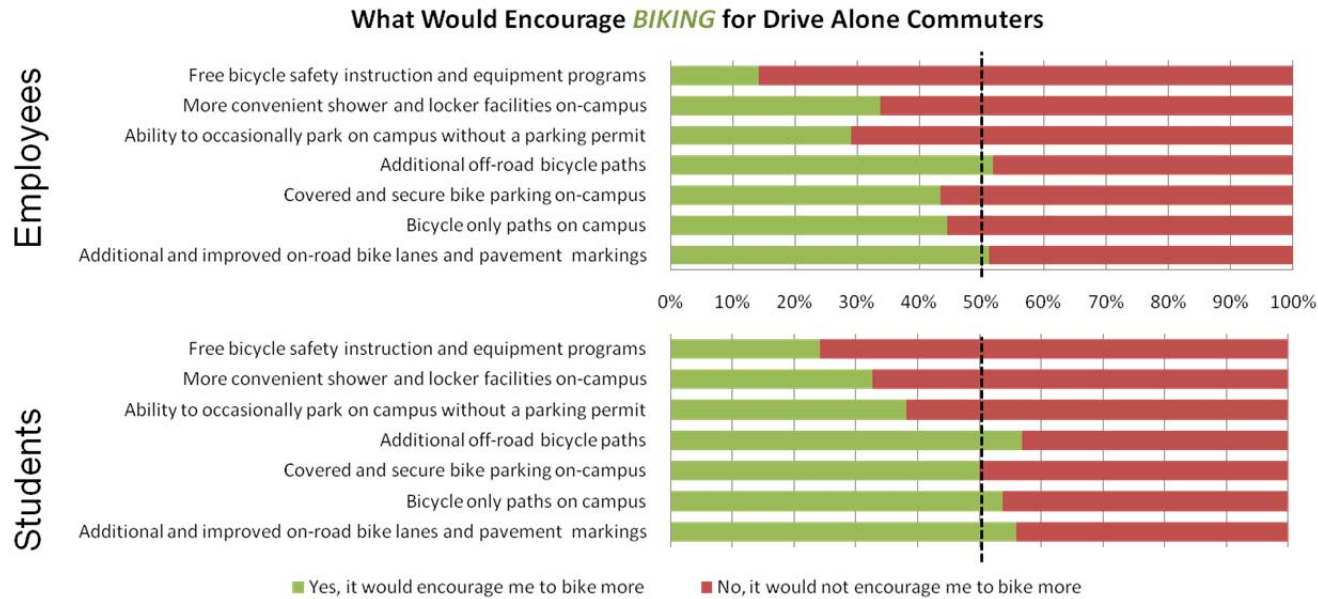


Exhibit 3: Encouragement to Bike to Campus



- **Employees and students felt that improvements would influence their commuting choice** – Employees and students expressed that they could be encouraged to use alternative transportation options. While the influence of individual programs can vary, the fact that programs have any influence at all is encouraging. Many employees at IUB are willing to use an alternative transportation mode to commute to campus given the right set of programs and incentives.

- **Ability to occasionally park on campus would encourage use of alternative transportation** – While the majority of employees commute driving alone to campus, many commute via alternative mode once a week. Purchasing a parking permit at IUB is an all or nothing decision; either employees buy a full permit or don't buy a permit at all. As demonstrated in the results of the survey and from the employee focus group discussions, an occasional parking permit with the ability to park on campus several days per month would encourage and empower employees to

commute via alternative transportation when their schedules allow for it.

- **Current carpool incentives are doing little to encourage carpools between non-cohabitants** – According to the results of the survey, 85 percent of all carpoolers carpool with a family member and 91 percent of all carpools are 2-person carpools. Currently IUB defines a carpool as 3-persons for receipt and participation in carpool incentive programs. Those data indicate that the great majority of carpools that are being formed by IUB commuters are being formed irrespective of current incentives being offered. While carpool incentives are not intended to reward those who already carpool, it appears that the lack of access to these incentives and possibly the incentives themselves are doing little to encourage non-family member carpools.

Several technical analyses were carried out to identify the likelihood of employees to change their commuting mode and to establish a reasonable and achievable shift of employees and students from drive alone commuting. This included an analysis of market catchment areas for the use of various commuting modes and the development of scenarios employing different combinations of mode shifts from drive alone commuting to an alternative mode to achieve around a 10 percent drive alone reduction. Based on experience with other institutions, a drive alone reduction of 10 percent to 15 percent is achievable over a ten year time frame if a significant commitment, effort and investment is made by the institution. Each scenario sought to maximize the potential mode shift for one mode or a combination of modes while accounting for the size of the respective market for each alternative mode.

The outcome of the technical analysis is the recognition that based on the number of current parking permit holders in each market catchment area, a 10% shift from drive alone commuting requires an increase in the use of all modes with a recommended emphasis on transit, walk and bicycle modes supplemented by participation in carpool and telework modes. The focus on transit, walk and bicycle use capitalizes on the general walkability and bikeability of the area and the relationship between the University, Campus Bus, Bloomington Transit and the City of Bloomington. The City of Bloomington is actively implementing bicycle and pedestrian improvements and the City's greenway systems plan enhances walking and bicycling to IUB.

The recommended TDM programs are focused towards employee commuters to IUB. They do not focus on measures intended to reduce student-resident driving; from the survey, most students already use alternative modes to commute to campus. Additionally, current parking management policy does a good job of deterring students from driving to multiple sites once on campus.

Currently, IUB has a sufficient total number of parking spaces however these spaces are not all located in desirable locations close to the campus core. Continuing to expand the number of parking spaces in the campus core is not a sustainable approach to providing access to the campus, either fiscally or environmentally. This approach calls for an understanding of the true cost of building, leasing and operating parking and "right-sizing" of facilities in a way that off-sets additional growth through parking management and policy. Adopting a policy of only replacing existing parking in the campus core needs to be fully supported by successful TDM initiatives. The University's Transportation Policy Advisory Committee (TPAC) can be an integral partner in making drive alone

commuting less attractive through parking management strategies which

The most effective way to reduce commuter parking demand is by increasing the price of parking permits. This has been demonstrated through research and case studies on parking price elasticity. However, sufficient transportation options and supporting programs need to be present to offset any apprehension of using alternative transportation. The TDM Plan recommends a 50% increase in the average cost of an A and C parking permit over the next ten years because the parking price elasticity study undertaken shows this level of parking permit fee increase

Recommended TDM Plan

IUB has made some positive strides to decrease the number of drive alone commuters coming to campus. However, it is clear that these TDM programs are underutilized and not sufficiently leveraged since many employees are not aware of the programs or do not know how to access them.

TDM Plan priorities were developed to present the critical elements needed for the success of the TDM plan. These priorities are:

- Establish strong administrative stance to reduce drive alone commuting to campus
- Elevate status of walking, biking, and carpooling to equal status as drive alone mode
- Build awareness to capitalize on existing programs and build momentum for alternative transportation use
- Provide financial incentives for alternative mode use (paid for by financial disincentives for drive alone commuting)

constrain the growth in parking supply through pricing.

can provide a decrease in the number of parking permits sold close to the 10% target shift from drive alone commuting to the use of an alternative transportation mode. The permit fee increase is also estimated to result in a considerable increase in parking fee revenues in the order of \$850,000 to \$1.3M. A smaller permit price increase of 30 percent is estimated to result in an increase in parking fee revenues of \$550,000 to \$800,000 and an approximate 5 percent shift from drive alone commuting.

- Provide additional TDM programs and supportive infrastructure improvements

Although particular measures and programs are included in the recommended TDM Plan it is important to recognize that the degree of commitment to TDM is a more important determinant of success than the specific combination of programs. Also, some programs have a higher direct impact on travel behavior (e.g. parking pricing) while others support people's understanding of and willingness to use alternatives (e.g. TDM marketing program). A robust combination of these types of measures will provide the most effective program.

Based on adopting a moderately aggressive goal to reduce drive alone commuting to campus by 10 percent by 2022, the following TDM Programs are recommended to be implemented as indicated in Exhibit 4.

Exhibit 4: Recommended TDM Programs

- Parking Price Increase – 5% per year for 10 years*
- Carpool Parking Location**
- Carpool Financial Incentive – 20 % Discount for 2-person carpools
- Bicycle Improvements
- Pedestrian Improvements
- Fare-Free Transit**
- Transit Improvements
- Hoosier Commuter Club
- Member Spot-Rewards
- Transportation Events
- Ridesharing**
- Carsharing**
- Flexible Work Arrangements**
- Occasional Parking Pass Program
- TDM Coordinator
- Enhanced Program Marketing
- Website Enhancements
- Guaranteed Ride Home**
- Addition of A+ Permit
- Expand Availability of Reserved Parking Permit
- Single University Card

* This recommended increase should be considered a *minimum* at which to increase prices. Higher parking price increases would place IUB in a stronger position to achieve its drive alone mode share reductions. In addition, this increase is intended to be implemented above and beyond any annual adjustments due to inflation.

** Although IUB offers some of the TDM Programs listed above, many were not accessible to employees due lack of awareness of the programs or not qualifying for access.

Exhibit 5 presents the estimated additional annual cost to run the suggested TDM programs (above current program expenditures).

Exhibit 5: TDM Program - Estimated Additional Annual Costs

TDM Program Activity	Estimate of Annual Cost
Redefine Carpool as 2-person and offer 20% discount off A Permit*	\$110,000
Full Time TDM Coordinator	\$56,000 (\$40,000 salary + benefits)
Transit subsidy for additional Bloomington Transit Riders	\$70,000 (in addition to the current \$80,000 cap) as ridership grows
Carpool Parking Location	NA
Occasional Parking Program	Varies (see <i>Occasional Parking Program</i> page 58)
Commuter Club Program Management	TDM Coordinator
Transportation Events	\$5,000
Ride Matching Services	Zimride (continue)
Car Sharing	Zipcar (continue)
Guaranteed Ride Home	\$2,000
Marketing	TDM Coordinator, Zimride, Zipcar
Marketing/Prize TDM Program Budget	\$10,000
Biennial Employee/Staff Commuter Survey	\$10,000/in-house through Center for Survey Research
Total Annual Cost for Additional TDM Programs	\$263,000

* Current IUB carpool is defined as 3-person

In order to offset some or all of the additional operational costs of the TDM programs, several parking pricing and revenue generation initiatives could be implemented such as:

- Recommended parking permit fee increase of 50% provides considerable increase in revenue part of which should be used to support TDM programs, transit services, and alternative mode infrastructure improvements.

Implementation

The following is a list of implementation steps important to the success of the TDM Plan going forward:

- Develop and convene a Transportation Coordination Committee (TCC) composed of campus transportation operators and infrastructure providers – The Transportation Coordination Committee (TCC) should include representation from the following IUB Offices: Auxiliary Business Services, Parking Operations, Campus Bus, Capital Planning and Facilities and the University Architects Office. The primary purpose of the committee is to coordinate existing transportation services and future land-use planning, including new development on campus. It should also coordinate the implementation of the existing and proposed TDM programs working with the TDM Coordinator (as noted below). The committee should meet on a monthly basis. A mechanism for the TCC to meet with the City of Bloomington Planning Department, Bloomington Transit, Bloomington Department of Public Works and other local and regional transportation providers and agencies on a regular quarterly basis should be established.

- Increase the number of available reserved parking spots
- Change the parking permit zones to include an “A+ zone” for the most desirable parking facilities on campus (campus core)
- Establish a duty on all new campus development to account for the cost of providing transportation to new building

- **Hire A TDM Coordinator** – The TDM Coordinator will plan, program, coordinate and implement strategic TDM programs and infrastructure improvements in addition to manage marketing of TDM programs. The TDM Coordinator will participate as a member of the newly formed TCC and utilize the committee as a means to develop and implement TDM policies, programs and services. Given the nature of the position, the TDM Coordinator should be affiliated with an internal department which plans and operates elements of the transportation system at Indiana University.
- **Develop Hoosier Commuter Club and Implement** – The Hoosier Commuter Club provides an opportunity for promoting and organizing TDM programs and alternative transportation incentives, in addition to providing a highly visible and broadly attractive IUB TDM initiative.
- **Establish timing for implementing each program** – As part of the deployment of the Hoosier Commuter Club, the timing for the implementation of each program should be established and promoted.

Chapter 1: Background of TDM Plan

Indiana University, Bloomington (IUB) is at a pivot point in its storied history. The walkable, compact campus continues to grow outwards as new academic, research, and housing facilities are constructed on the periphery of the historical campus footprint. Congestion on and around campus, especially during peak commuter and class change periods, continues to increase with approximately three-quarters of

employees commuting to campus by driving alone. While several implemented programs at IUB support the use of alternative transportation to commute to campus, a comprehensive transportation demand management (TDM) study has not been conducted.

Planning Context

The IUB Campus Master Plan, completed in 2010, sets the stage for how the campus will evolve over the upcoming 10-year planning horizon and 20-year construction horizon. It analyzes the complete context of the campus, including its facilities, land use, and operations. This is IUB's first comprehensive campus master plan, incorporating all previous, smaller campus planning documents and the Campus Sustainability Report.

The Master Plan has five "key themes" that are relevant to the campus transportation infrastructure; one of which is the preservation and reinvigoration of the campus core. The goal of this effort is to "energize the historic core with student life, activity, and academic purpose." This involves the renovation and densification of academic and residential buildings within the campus core. This will bring more students closer to their daily destinations and will bring a revival of life back into the core. It will also facilitate increased interaction of all IUB community members across colleges and groups. As consequence of the densification of the campus core, new

academic or student life buildings will be built on surface parking lots located in the core, and the parking spaces will be relocated and aggregated into new parking garages outside or along the periphery of the campus.

Parallel to the densification of the campus core, another Master Plan goal is to return IUB to a more walkable campus. While a more walkable campus is a byproduct of a dense campus core, it also necessitates improved pedestrian amenities and safer, quicker connections. Walking is generally the mode of choice to get between points on campus for most students and campus employees. The campus master plan recognizes that there are some barriers to moving between areas on campus and has plans to work on removing them.

Campus sustainability and consciousness of the campus's carbon footprint is a growing concern on IUB's campus. The Indiana University Task Force on Campus Sustainability published the Campus Sustainability Report in 2008, which

focused on improving all aspect of sustainability on-campus, including academics, energy use, environmental and land use, resource use, food, and transportation. The report was integrated into the master plan, and its themes are prevalent throughout the plan. According to the Campus Sustainability Report, sustainable transportation planning hopes “to promote a sustainable transportation system that will provide safe access and mobility for students, faculty, staff and visitors, and to ensure that individuals have a broad range of safe and convenient transportation options to walk, bicycle, carpool, or ride public transit to and around campus.”

IUB’s Master Plan addresses transportation planning on campus, but does not significantly address how students and employees commute to campus. However, the Master Plan does call out the need for a TDM study to address commuter travel and transportation comprehensively.

On a regional basis, commuter travel is addressed in a planning study conducted by the Bloomington/Monroe County Metropolitan Planning Organization (MPO), who’s responsibility is to look at planning for City of Bloomington, Monroe County, and the Town of Ellettsville. Their latest plan, 2030 Long Range Transportation Plan, was adopted in 2006 and

revised in 2010. The MPO takes “input of community leaders and citizens on transportation policies and problems” to create a vision of the future transportation goals and aligns these goals to planned improvements within its jurisdiction. The goals of the MPO’s plan match up well with the IUB Campus Master Plan and the Campus Sustainability Report, in that it calls for:

- Development of a truly multi-modal system;
- Creation of a fully developed network of alternative transportation facilities;
- Reducing the number and length of auto trips;
- Achieving a better relationship between land uses to reduce auto dependency;
- Achieving the widest possible range of alternatives to the automobile;
- Making transportation investments that protect the environment, promote energy conservation, and improve quality of life; and
- Increasing safety for all users of the transportation system.

Why a TDM Plan is Necessary

Transportation Demand Management (TDM) is the art of influencing travel behavior for the purpose of reducing single occupant vehicle use. It is not only a crucial component of a balanced and sustainable campus plan, but can yield positive return for Indiana University with relatively modest investment. The goal of a TDM Plan is to reduce drive alone commuting thereby reducing parking demand, congestion, and associated environmental impacts. The TDM plan also supports enhancement of intra-campus mobility by promoting walking, bicycling and use of transit. As such, the TDM Plan overlaps with other key campus plan elements - parking demand and supply and infrastructure improvements.

There are many benefits in reducing drive-alone commuting to IUB, ranging from financial to health advantages for people individually and as a campus on the whole. Exhibit 6 presents some of these benefits.

Exhibit 6: Benefits of Reducing Drive Alone Commuting

TRANSPORTATION <ul style="list-style-type: none"> ■ Reduce peak period traffic congestion ■ Reduce parking demand ■ Reduce personal travel costs 	SOCIAL <ul style="list-style-type: none"> ■ Increase choice ■ Develop a more livable community ■ Improve health ■ Change behavior and lifestyle ■ Make a more interactive environment
UNIVERSITY <ul style="list-style-type: none"> ■ Manage land-use ■ Support broader university/ environmental policies ■ Support a more sustainable campus 	ENVIRONMENTAL <ul style="list-style-type: none"> ■ Lower greenhouse gas (GHG) emissions ■ Save energy

Current Economic Conditions

The economic challenges faced by the University over the past several years generated a sense of urgency to “do more with less”. Funding for state educational institutions has tightened in this down economy. Institutions, including IUB, are looking for ways to maintain or increase the quality of provided services to stay competitive while working with smaller capital and operating budgets. Transportation operations and capital expenses at IUB are largely supported by revenue collected

from the sale of parking permits and collected student fees. As such, costs such as new parking garages and increasing operating expenses are borne by their users. Continuing to build parking structures to meet growing and/or shifting needs and passing the cost onto employees and students is politically challenging in any environment particularly during tough economic times. TDM programs offer a cost-effective means to

reduce drive alone commuting from the demand side in an

environmentally friendly and sustainable way.

Growth and Land Use

It is anticipated that the campus will experience only modest population growth over the next decade; however, this modest growth coupled with development on existing surface parking lots requires the University to make important decisions on whether to build additional parking garages to accommodate

new commuters and consolidate parking supply. Parking garages require a significant initial capital investment for construction and annual operations/maintenance cost in addition to taking up valuable real estate that could be used for important University purposes.

Comprehensive Plan

Transportation works as a system, each mode affecting the other. TDM plans aim to increase the use of modes of transportation other than drive alone through the introduction or improvement of infrastructure and amenities, quality of service improvement, and/or the provision of incentives to attract new or more frequent users. Also, comprehensive review of all modes will enable IUB to maximize the utilization and refinement of their programs. IUB has advanced various TDM programs for the past several years, but they are

underutilized due to lack of awareness by the University community members. Increased marketing will increase program awareness and give a variety of options to users, allowing them to choose the best one that fits their lifestyle and commute. Furthermore, the existing and proposed programs can be positioned as realistic commuting options with strong supporting programs in order to reduce the anxiety associated with trying a new way of commuting or commuting using less convenient means.

Goals of Study

The goals of this study all work towards the development of a plan with defined strategies on how to reduce drive alone commuting to IUB and to commute via more sustainable means, such as walking, biking, taking transit, or carpooling. The goals are the following:

1. Understand current and determine future campus transportation needs and trends
2. Understand differing needs of commuters and the barriers to using alternative transportation modes
3. Identify economically and environmentally sustainable strategies that will facilitate access to IUB for students, faculty, staff, visitors and others
4. Develop a long-term plan with emphasis on expanding sustainable practices and modes of travel other than single-occupant vehicles.
5. Develop a plan that guides individual, short-term decisions to be consistent with strategic, long-term goals.

TDM Keys to Success

There are challenges to modifying travel behavior. The desire for convenient, reasonably priced parking can currently be satisfied for many. Until there are incentives or deterrents for altering behaviors, drivers will likely not change. As such, there are several challenges to implementing a successful TDM program including an historic auto culture, sensitivity to increasing parking prices, physical barriers in the pedestrian and bike environment, and the current fiscal environment. While there are challenges to implementing an effective TDM plan at Indiana University, it can certainly be accomplished. The following are keys to implementing a successful TDM program:

- Integral part of broader vision and policies
- Behavior change
- Lifestyle change
- Tailor for different land uses and user groups
- Attractive commuting options
- Both incentives and disincentives
- Communicate and promote
- Couple with parking management
- Reinforced by physical design elements
- Periodically monitor and modify.

TDM Plan Development Methodology

The steps to develop the TDM Plan were developed using the elements outlined and explained below. It should be noted that TPAC has played a critical role in the development of this TDM Plan. Over the course of several meetings and presentations, they have represented the interest of their respective groups and have presented valuable insight into the existing transportation system and their colleague's commuter behavior and attitudes toward transportation.

Assessing Existing Conditions

The VHB team worked with IUB to establish an understanding of existing transportation operations and conditions on the IUB campus.

■ *Kickoff Meeting and Issues Charrette*

VHB met with representatives of IUB to kick off the TDM Plan, confirm the goals and objectives for the TDM Plan, discuss critical issues that the plan should address, and lay a foundation for the work to come. This meeting was also used to explore the range of ideas to be considered in addressing the critical transportation issues. As part of this activity, VHB completed field observations of transportation conditions on and around the campus and conducted visits to appropriate offices and agencies to obtain plans, studies, and data.

■ *Operational Assessment*

VHB provided a list of data needs to IUB. These data were critical for analyzing the transportation context and conditions on campus. The operational assessment determined the constraints and opportunities surrounding the transportation network and infrastructure.

■ *Campus Focus Group Workshops*

The VHB team held three workshops, tailored by user group, to gain input and insight about the TDM principles, approaches, and tools that could be successfully applied on campus.

■ *Travel Choice Benchmarking Survey and Satisfaction Assessment*

VHB worked with Indiana University's Center for Survey Research to develop travel choice benchmarking surveys to capture existing transportation choices and satisfaction with the available services. The team developed and analyzed two surveys – targeted at commuting students and employees – to seek input on the existing on/off-campus transportation experiences and needs.

■ *Financial Context*

VHB reviewed financial data provided by IUB parking and transportation.

Assessing Future Conditions

VHB worked with IUB to develop an understanding of population growth and parking demand for future years. IUB provided VHB with an estimate of annual percentage population growth for future conditions describing expected changes in enrollment, staffing, and the campus transportation system anticipated within a 10-year horizon.

TDM Plan Scenario Development

VHB worked with IUB to develop future alternative scenarios for the campus TDM Plan

- *Identification of Potential TDM Market*

The VHB team analyzed available data and information to answer the following two questions - 1) what is the market potential for utilizing various modes of commuting based on each modes service catchments area and IUB TDM target commuter residential locations, and 2) what is the likelihood that commuters will switch modes based on the TDM programs and their level of implementation. Potential markets were quantified using recent GIS geo-coded residential data of IUB employees and students.

- *Candidate TDM Programs*

VHB worked with IUB staff to identify TDM programs for evaluation as part of the TDM plan development

- *TDM Scenario Assessment*

VHB qualitatively assessed candidate TDM program scenarios.

- *Steering Committee Workshop*

VHB led a workshop with the Steering Committee to review our preliminary analysis of the TDM programs and scenarios. In the session, VHB previewed options and their anticipated effects with each scenario.

TDM Plan Preferred Scenario Analysis and Implementation Guidance

- *TDM Plan Preferred Scenario Analysis*

VHB provided TDM Plan recommendations and the rationale that supports the selection of a preferred scenario, including a pros and cons assessment of the various alternatives considered. VHB analyzed the preferred scenario TDM plan including a quantitative calculation of effectiveness in the reduction of single-occupancy vehicle travel to campus and the number of parking spaces required to support IUB commuter travel.

- *TDM Marketing/Communications Plan*

VHB used the results of the focus groups and travel choice benchmarking/satisfaction assessment survey to identify marketing and communications opportunities. VHB developed campus marketing and communications plan to increase awareness of TDM programs and commuting alternatives with the IUB community.

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Chapter 2: Existing Conditions Analysis

IUB Transportation Context

With over 8,000 employees traveling to campus daily, Indiana University is the largest employer not only in Bloomington, but also Monroe County and the surrounding area. These commuter trips generate a need for transportation options and infrastructure to get commuters to and from the University safely and efficiently and enable them to access different parts of campus while they are at work.

Employee commuters are not the only group that depends on a range of quality transportation options. IUB is a University first, with approximately 42,000 students enrolled; two thirds of

students live off-campus and must commute to class and campus activities. IUB is also a destination for a range of cultural and special events, from the performing arts to sporting events. Assembly Hall (17,472 person capacity) hosts Indiana University Basketball games and consistently sells out throughout the regular season. IUB football, in the 2011 season, averaged an attendance of over 40,000 fans per game and the Little 500 cycling event attracts over 25,000 spectators every year. This puts a demand on the surrounding infrastructure and creates a need for viable alternative modes of transportation.

The Bloomington Area

The Bloomington area is a small city of approximately 80,000 residents according to the 2010 US Census. The IUB campus is deeply integrated into the City of Bloomington, with the campus covering the northeast quarter of the city. Many stores, shops, and restaurants are located near campus to serve the IUB community. This enables IUB community members to quickly and easily access much of what they need adjacent to campus.

The City's topography is relatively flat, with the exception of several rolling hills, which makes it ideal for walking and biking. The City of Bloomington is capitalizing on its relatively flat topography, large student population, and the area's general interest in cycling and has begun to implement roadway and infrastructure programs to encourage walking and biking as alternative modes of transportation.

Surrounding Transportation Systems

The preferred mode of transportation in the area is personal vehicles. IUB is served by a well connected network of roadways, including limited access highways, such as State Route 37, local access highways, such as the Bypass (State Route 45/46), collector roadways, such as 3rd Street and Indiana Avenue, and local various roads. The roadway network is laid out for easy access, with the vast majority of the streets in a north/south and east/west grid system. However, as the University and city have continued to grow over the past 10 to 15 years, the current roadway infrastructure is beginning to approach its capacity limits and congestion, especially around the University during class changes and peak commuter periods, has increased.

From observations and interviews, the most noticeable example of this is 10th Street, which runs along the campus core. The congestion is caused by the mix of transportation modes using the street as a major east-west connector to the Bypass, campus core, and downtown Bloomington. There are vehicles trying to enter the campus core to park and access the campus; numerous transit routes, both Bloomington Transit (BT) and Campus Bus, along 10th Street; cyclists riding along the side of the road; and high volumes of pedestrians crossing the road. This mix creates potentially dangerous conflicts and delay between modes.

The Bloomington area is served by two transit agencies, Bloomington Transit and Area 10 Rural Transit.

- Bloomington Transit offers nine fixed routes serving much of Bloomington. Seven of these

routes have a stop on or adjacent to campus. The two busiest routes, the 6 and 9, serve popular student residential neighborhoods in the area and have multiple bus stops in the core of campus.

- Rural Transit runs both on fixed routes and demand response/ scheduled pick-ups. Although no fixed routes lie adjacent to the IUB campus, they do serve a stop about a quarter mile from campus near downtown Bloomington.

Regional transportation options in the Bloomington area, other than the use of personal vehicles, are limited. There is limited direct bus service to Indianapolis. Those traveling between Indianapolis and Bloomington can travel on a private coach bus (Miller Trailways) scheduled twice a day. Two airport shuttles provide a total of 18 round trips between IUB and Indianapolis International Airport daily but does not have any stops in downtown Indianapolis. There is no passenger train service in the area. Students visit Indianapolis on weekends, for shows, events, etc., and many employees of the University need to travel to Indianapolis for business and pleasure purposes. The current services do not support this without owning a vehicle.

Biking at IUB has a long history, dating back to 1951 with the inception of the Little 500. This 200 lap race brings cycling to the forefront of the IUB community each year. Biking is not a once a year thought though, as it continues to grow as a commute option in the area. The City of Bloomington published the Bicycle and Pedestrian Transportation & Greenways System Plan in 2008. This plan, aimed to mitigate

traffic congestion and improve the quality of life for residents, is a working blueprint on how the city wants to improve and expand bike and pedestrian facilities through the city. Many of

these routes run to and through the IUB campus and tie into improvement planned on campus through the IUB Master Plan.

Anticipated Campus Improvements

The IUB Master Plan proposes many new campus improvements in the coming years. One of the major themes is the densification of the campus core by bring back academics and student housing into its historical location. This will invigorate the campus core with life by student residents and bring many closer to their academic and student life destinations. Less demand will be put on the various transportation options as more students will be within walking distance to their daily destinations.

The Master Plan also outlines its commitment to a walkable campus. The sprawl that has taken place on the campus has made travel distances to locations on campus out of the comfortable walking range, especially with the expansion over the past few years to the east side of the Bypass. This creates a demand for more vehicles on campus to get around, creating more congestion near campus and a need for more parking at IUB.

To create room on campus for the new buildings within the core, many surface parking lots are proposed to be removed and consolidated into parking garages outside the campus core. This will decrease the amount of vehicles on campus, potentially decrease pedestrian and bicycle conflicts with vehicles, thus encouraging walking and biking within the core.

One of the major infrastructure improvements of the Master Plan is the Woodlawn Avenue redesign. This new north-south connector will connect existing roadways, currently separated by the railroad tracks. This connection would greatly increase the connectivity of the north and south side of campus. It is especially true for Campus Bus trips, as travel times will be reduced from the residential buildings and parking lots to the campus core.

Existing Transportation Conditions

The following section summarizes the existing transportation conditions on the Indiana University Bloomington campus. This information is intended to provide context and help shape the opportunities and challenges in developing an effective and successful Transportation Demand Management Plan. As part

of the existing conditions assessment, a review of existing pedestrian, bicycle, parking, transit, and traffic accommodation were reviewed as well as the barriers to using each transportation mode.

Where IUB Commuters Live

A critical part of this study analyzes where Indiana University commuters live and how many drive to campus. The Office of Parking Operations collects information about its permit holders as part of the registration process. Registered addresses for parking permit holders were geo-coded to determine where faculty, staff, and students reside off campus. Auto commute distances were then estimated using network measurements for each type of permit. These data are reflected in Exhibit 7. The result of this analysis shows that the average commute distance for IUB faculty and staff is

approximately 9 miles. An average commute distance for students, particularly undergraduates, could not be calculated since some students register for parking permits using their permanent addresses (e.g., parent's home address). Approximately 73 percent and 49 percent of faculty and staff parkers, respectively, live within 5 miles of campus. Because they live relatively close to campus, these populations are prime candidates to choose walking, biking, or transit. Those living farther away are candidates for ridesharing, particularly carpooling.

Students

There were approximately 42,000 students enrolled at IUB during the 2011-2012 academic year. Of these, approximately one-third lived on-campus. All freshmen are required to live on campus, unless they meet an exception. On-campus residences include 11 residence halls, clustered in three neighborhoods, and several on-campus apartment complexes throughout and around the University.

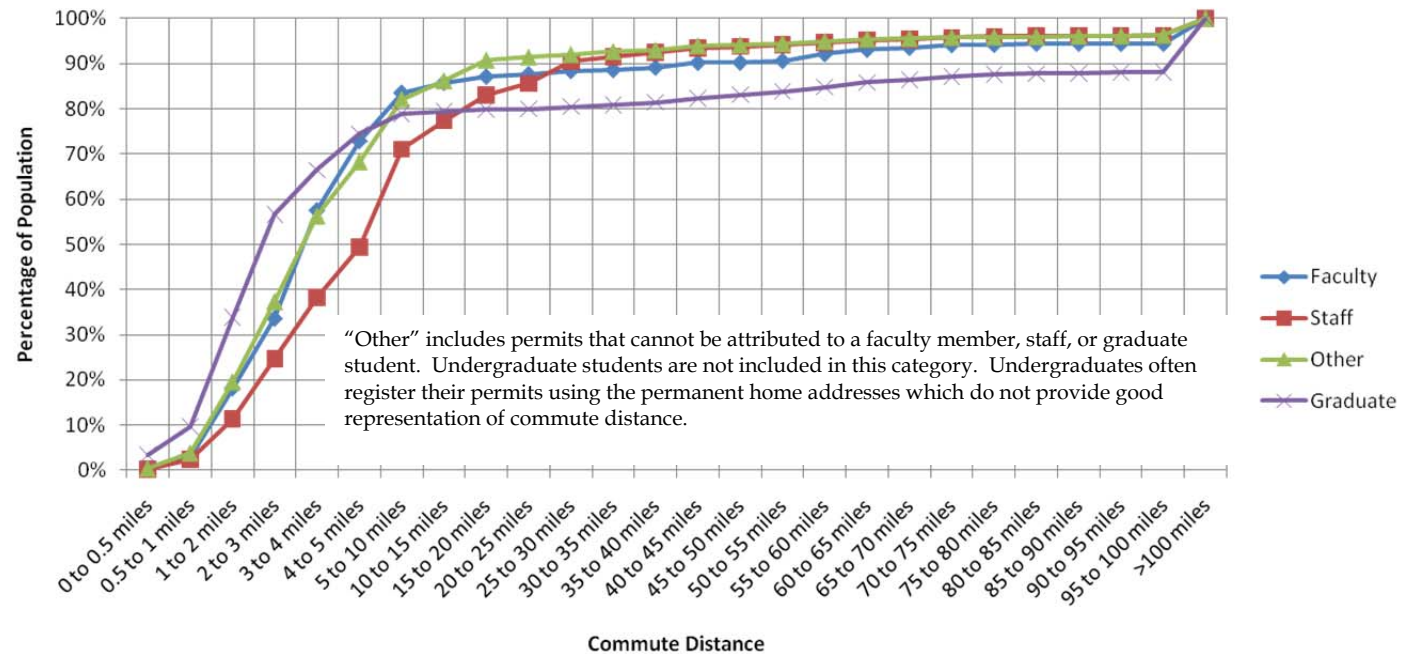
The remaining two-third of students live off-campus in apartment complexes, houses, and condos throughout the city. Most off-campus students choose to live in locations that are near campus, as 90 percent of undergraduate and 75 percent of graduate students live within 3 miles according to the Master Plan. Many off-campus student housing locations are served by Bloomington Transit. In addition, many complexes now offer shuttle for residents to and from the University.

Employees

Employees of IUB tend to live further away from campus than do students but many still live in neighborhoods near campus. According to a survey done for the Master Plan, “57 percent of faculty, and 35 percent of staff, live within 3 miles of campus.” The most common areas for employees’ residences are South

and West Bloomington and in nearby Ellettsville with many living throughout Monroe County. As shown in Exhibit 7, faculty members tend to live closer to campus than do staff members. Higher housing prices near campus and salary differentials may be contributing factors to this difference.

Exhibit 7: Commute Distances by Group



How Commuters Get to Campus

There are currently several transportation modes that students and employees can use to commute to campus. As part of this effort, a comprehensive transportation survey was conducted. This section summarizes the information about the commute mode. The survey will be covered in greater detail later in this report.

The survey asked the how the survey taker commuted to campus the previous week. Mode splits were generated based

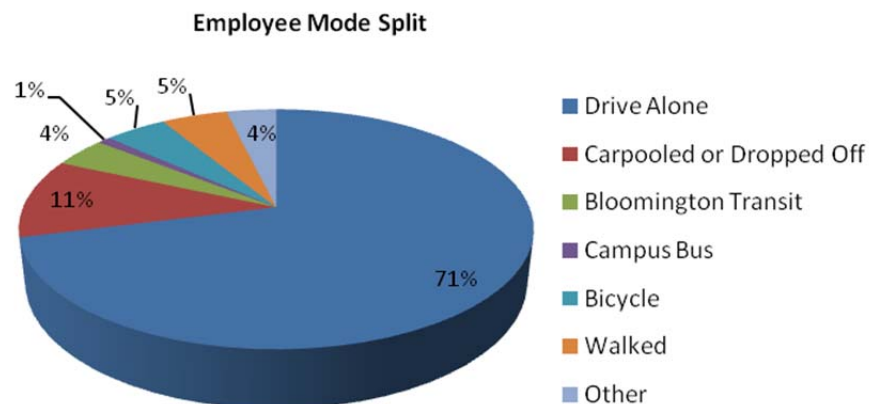
on their responses. While many individuals use the same mode to commute every day, there are some who commute using several modes during the same week and some work from home (telecommute). These commute trips were tallied to develop a composite mode split for each group. While weekend trips were captured in the survey responses, the presented data only reflects weekday commutes.

Employees

The survey data responses results in the employee mode share data are presented in Exhibit 8. Approximately 71 percent of employees drive alone to campus each day. The mode share by employee group (faculty, staff, and hourly) varied slightly with higher proportion of faculty members using alternative

transportation than staff members. The mode share for these groups is provided in the Appendix. Approximately, 11 percent of respondents said that they carpooled to campus or were dropped off. No other mode of transportation has more than a 5% share.

Exhibit 8: Employee Mode Share



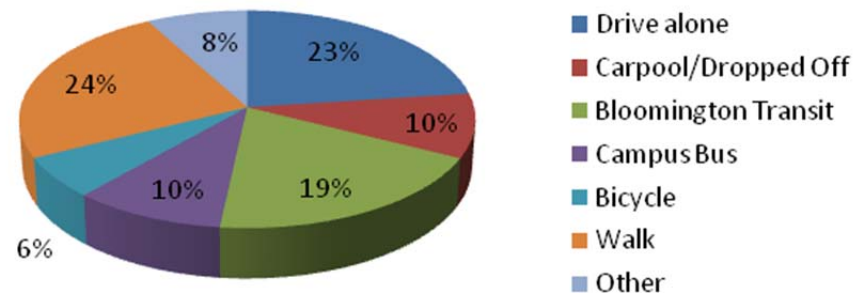
Off Campus Students

For off-campus resident students, approximately 23 percent of them said that they drive alone commute to campus. Most undergraduate students who drive to campus are only eligible for E parking permits. However, some undergraduate students park at pay facilities. Many graduate students are eligible for A and C parking permits. A significantly higher proportion (77 percent) of off-campus resident students commute via alternative transportation compared to employees using alternative modes (29 percent). Exhibit 9 presents the mode

split percentages of off-campus students. Approximately 24 percent of students walk to campus from their off-campus residences. Bloomington Transit provides good connections to student off-campus housing and that is reflected in the relatively high number of commuters using Bloomington Transit to commute to campus. The “Other” category includes those students who live in an off-campus residential complex which provides a shuttle to campus.

Exhibit 9: Off-Campus Student Mode Split

Off-Campus Student Mode Split



Pedestrians

Like many campus environments, walking is a common means of travel between campus destinations and the adjacent retail and residential neighborhoods in Bloomington. Students walk between residences and academic buildings, faculty and staff walk between offices and teaching locations, and many members of the community are able to walk to restaurants, shops, and other nearby services. In addition, approximately 5 percent of faculty, staff, and students commute to the campus by walking.

Many faculty, staff, and students walk between their on-campus destinations because the longest travel time between any typical destination on-campus is no more than a 15-min walk. Based on anecdotal responses from IUB community members, most park their car or bike for the entire day and walk between each on-campus destination. In general, pedestrian travel is well accommodated while on-campus. However, there are some physical barriers to on-campus pedestrian flow. The major barriers are presented in Exhibit 10.

Exhibit 10: Major Pedestrian Movement Barriers

Street	Segment	Movement
Fee Lane	Between 10 th and 17 th Street	East to West
Jordan Avenue	Between 3 rd and 10 th Streets	East to West
3 rd Street	Between Indiana Ave and High Street	North to South
10 th Street	Between Woodlawn and Jordan Ave	North to South
Law Lane	At SRSC	North to South
Railroad tracks	All	North to South

In the recent years, there have been several accidents involving pedestrians crossing major roadway on campus. These incidents led to the formation of the Commission on Personal Safety Bike and Pedestrian Safety subcommittee whose primary concerns are to educate people on campus about bike and pedestrian safety, respond to concerns regarding safety, and maintain safe infrastructure around campus. The City paid for and installed three pedestrian crosswalks and the University installed a HAWK signal across N Dunn Street. Along the Bypass (SR 45 & SR 46) there are currently no pedestrian signals or crosswalks to allow pedestrians to cross safely from campus to the residences to the north.

The following are general findings regarding campus pedestrian connections:

- Pedestrian connections are largely sufficient within campus, with the University actively improving crossing on-campus.
- Many walk between all on-campus destinations throughout the day.
- The Bypass (SR 45 & SR 46) is a barrier to external connectivity north and east of campus.
- Due to high vehicular volumes and few protected pedestrian crossings, Fee Lane, North Jordan Avenue, 3rd Street, 10th Street, and Law Lane are barriers to internal connectivity.

- Distances between campus and residential neighborhoods to the northwest, north, and east of campus make walking to campus somewhat prohibitive.
- Distance and alternative options between campus core and on-campus/Greek housing along North Jordan Avenue make walking to campus unlikely.
- Signage and wayfinding for pedestrians is limited within campus as well as to/from off-campus locations.
- Most feel comfortable and safe walking on-campus and around Bloomington

There are currently no University sponsored programs to encourage walking as a form of commuting.

Bicycling

Bicycling is an important means of transportation, primarily for students and faculty. The University has a deep tradition in cycling, and is planning for more bike facilities and better circulation as described in the 2010 *Campus Master Plan*. In addition, the City of Bloomington has recently completed the *Bloomington Bicycle and Pedestrian Transportation and Greenways System Plan* and begun to implement a strategic city-wide bicycle master plan. These plans propose the

expansion of the existing network of bicycle facilities to better connect destinations. The existing and proposed system of bicycle routes supports bicycling as a way to travel to and from the University and the surrounding Bloomington area.

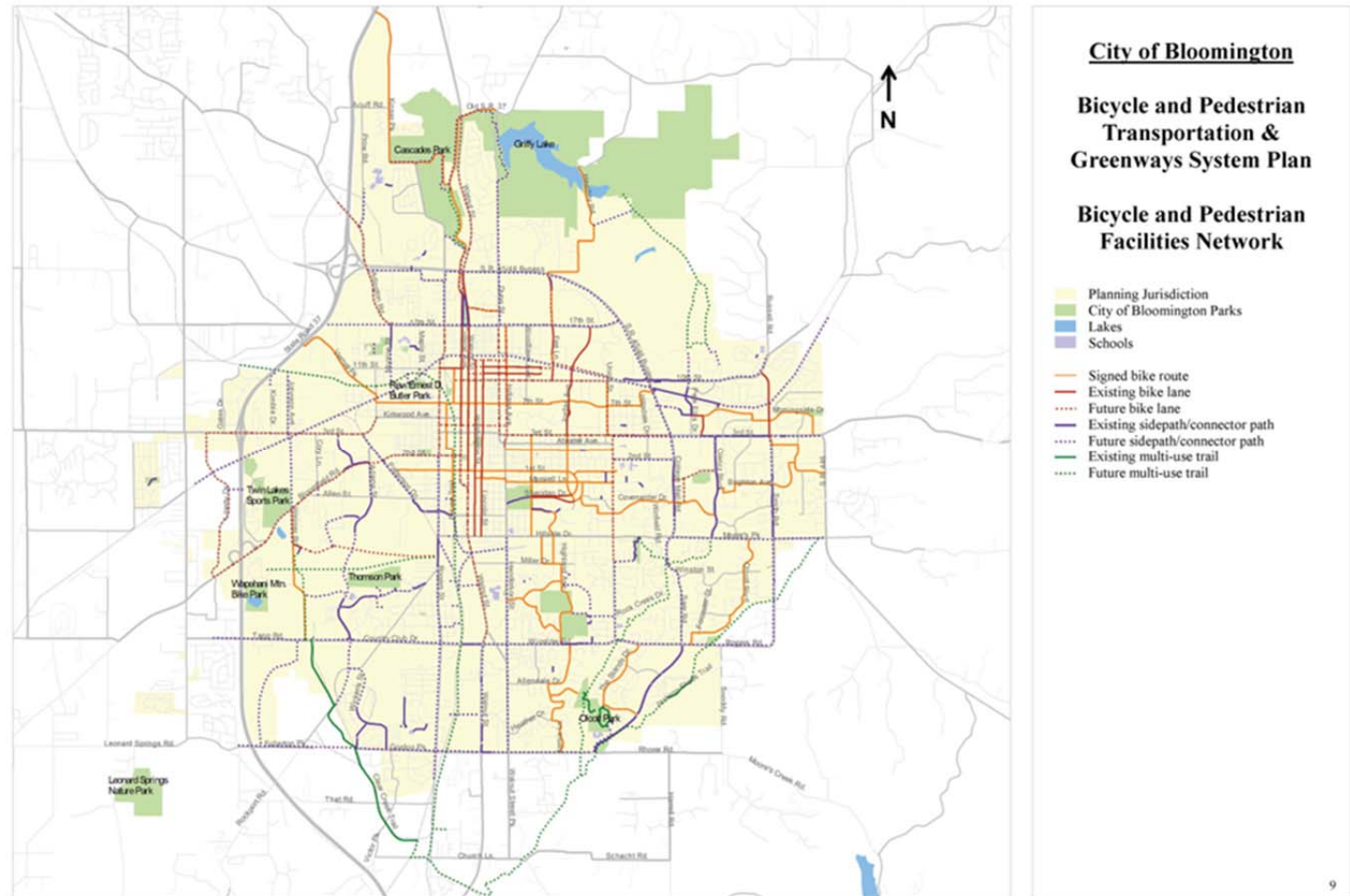
Based on the resources and existing facilities on campus, IUB was recently awarded the “Bike Friendly University” bronze level by the League of American Bicyclists.

Existing Bicycle Facilities

Both the University’s and City of Bloomington’s bicycle facilities vary between shared roads (in which bicyclists share the road with vehicular traffic), exclusive on-road bicycle lanes, and off-road multi-use paths (in which bicyclists and pedestrians share the path but general vehicular access is prohibited). In

addition, the City has begun to implement its first of five proposed neighborhood greenways. These greenways transform quiet neighborhood streets into suggested, safe, marked bike routes. The location and type of bicycle facilities on and proximate to the campus are noted in Exhibit 11.

Exhibit 11: City of Bloomington Bicycle and Pedestrian Facilities Network



It should be noted that, although there are some bike lanes and shared lane markings painted on roadways on- or adjacent to campus, the majority of routes used by cyclists are unmarked. Cyclists are required to either ride with traffic in the roadway or with pedestrians if riding through campus on a mixed-use path.

Based on a bicycle rack inventory conducted during Spring 2008, there are 3,417 bicycle parking spaces on the Bloomington campus. Approximately 32 percent of these racks

are “wheel only” racks. Wheel only racks are generally considered less secure due to the difficulty in locking the bicycle’s frame to the rack and since many bicycles have quick-release wheels. Approximately 6 percent of the total bicycle parking spaces are covered spaces and protected from precipitation. Residential Programs and Services (RPS) has recently installed bike lockers near residence halls. These lockers may be rented for the year and provide as storage and shelter for the bike.

Bicycle Sharing Program

At the time of this report, the University had not engaged in a bicycle sharing program. A bicycle sharing program allows for the short term loan of common bicycles available on a network of unattended locations. Indiana University Student Assembly

(IUSA) was in the process of funding a pilot of a bicycle share program of approximately 50 bicycles which would be available to students only, but plans for this program are currently on hold.

Bicycle Registration Program

The University requires that all bicycles parked on-campus to be registered with the Office of Parking and Transportation. The current price to register a bicycle is \$10 and this registration is valid for as long as they own the bicycle. Unregistered or improperly parked bicycles (i.e., not in parked

in designated areas) are subject to a fine and/or impoundment. Current fines for either are \$20 per violation. Approximately 25 percent and 19 percent of employee and student bicycle commuters, respectively, have bicycles registered with the Office of Parking Operations.

Planned Bicycle Improvements

The City of Bloomington has several high priority proposed bicycle routes in their 2008 Bicycle and Pedestrian Transportation & Greenways System Plan that will greatly

increase the connectivity to residential neighborhoods where IUB community members reside. Exhibit 12 highlights the proposed bicycle links connecting to campus.

Exhibit 12: City of Bloomington High Priority Bicycle Facility Network Projects

Road	Type of Facility*	From	To
Fess Avenue	Bike Boulevard	7 th Street	17 th Street
7th Street	Bike Boulevard	Adams Street	Hillside Drive
Hawthorn Drive	Bike Boulevard	Sheridan Drive	3 rd Street
Union Street	Bike Boulevard	Maxwell Lane	10 th Street
3rd Street	Bike Lane	Indiana Avenue	The Bypass
The Bypass	Sidepath	Walnut Street	2 nd Street
Railroad Right-of-Way	Sidepath	Within the City Limits	

* Bicycle boulevards are low-speed street designed to provide priority to bicyclists (may or may not include bicycle lanes; Bicycle lanes are exclusive marked lanes for bicycle use separated from motor vehicle travel lanes)

These routes will greatly add to the bicycle connectivity to campus and will be used by IUB students and employees.

Indiana University's Architect's Office developed a proposed plan of mixed use (pedestrian and bicycle) paths which will

support the use of bicycles throughout the campus by providing clearly marked and sufficiently wide paved pathways. Funding for these paths is being sought, however, there is no clear source of funding for capital bicycle improvements.

Summary

The following summarizes existing state of bicycle connectivity.

- Bicycling is a reasonable means of transportation for travel between campus and the surrounding communities within 5 miles.
- Although bicycle facilities are present and are being added to surrounding streets, the bike network within campus is incomplete.
- The City of Bloomington has a comprehensive bike plan and has begun to implement the first phases; many of these facilities connect the campus to the surrounding Bloomington area.
- The Bypass, 3rd Street, and Atwater Avenue act as linear barriers to cycling to and from campus due to the volume of traffic and lack of bicycle accommodations.
- Signage and wayfinding for bicycles is very limited within campuses as well as to/from off-campus locations.

Parking

Parking Supply

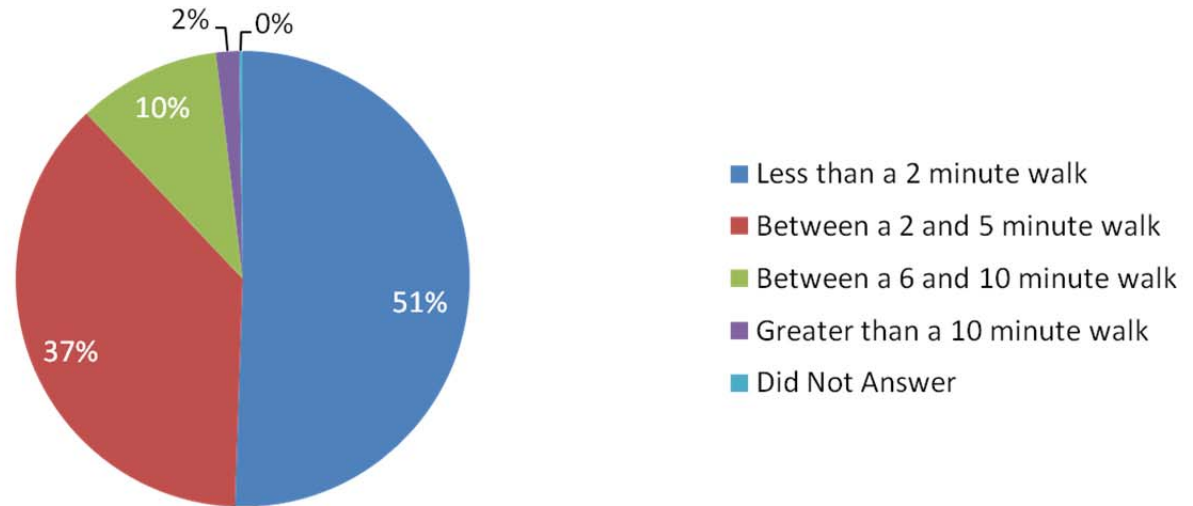
Parking on campus is provided by surface lots and parking garages located throughout campus. There is a total of 20,408 parking spaces on-campus. The largest concentration of parking is located in the lots surrounding the Stadium (6,296 spaces); these lots are largely utilized during game days, as satellite parking for commuter students, and as long term student vehicle parking. With the exception of Athletic Department employees, employees do not typically park in these parking facilities adjacent to the Stadium. Bus connections between the Stadium parking facility and the campus core can add an additional 10-15 minutes to a commute. While the X route travels on the west side of campus, avoiding most of the congested areas of campus, the A route travels south to 3rd Street via Jordan Avenue and

continues to the southwest corner of campus (Dunn Street) before returning via Atwater Avenue. During peak travel periods (i.e., commuting hours and class changes) congestion due to vehicular and pedestrian traffic can cause significant delays for Campus Bus along these adjacent roadways. Most employee commuters park in surface lots and parking garages in and around the campus core.

Most employee commuter parking facilities are located adjacent to or near the buildings they support. The employee survey asked commuters how far they typically park from their final destination on campus. Nearly 90 percent of the drive alone respondents said that they park a 5 minute walk or less from where they work. The results of the survey questions are presented in Exhibit 13.

Exhibit 13: Distance between Parking and Workplace

**Q: How far is your parking space from your final destination (typically)?
(Employees only)**



In addition to surface lots, the University has five parking garages totaling 2,546 parking spaces. Additionally, the A and X routes Campus Bus routes support the more remote Stadium parking facilities by transporting people between these parking facilities and the campus core.

Parking supply in the campus core is very desirable and heavily used during the day. However, when considering the available

parking at the perimeters of the University and the Stadium, it appears that the overall parking supply is adequate to support employee commuting and student parking needs. Parking oriented to the visitors of the University can be found in several locations throughout campus and in all parking garages.

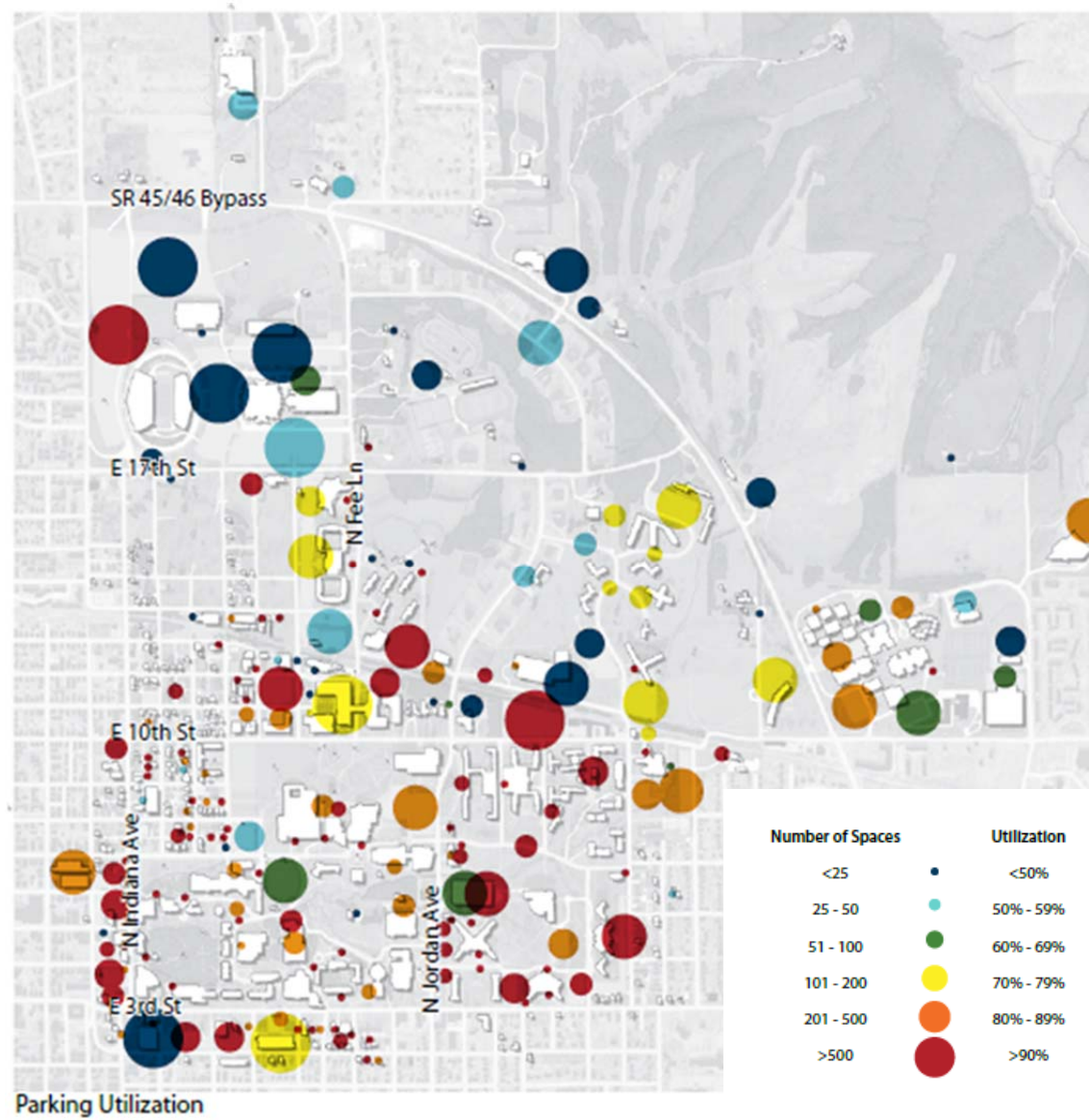
Parking Utilization

Parking utilization was determined based on several sources of data.

- Conversations with Doug Porter (Director of Parking Operations), Kent McDaniel (Auxiliary Business Services), TPAC, and other members of the project's technical committee.
- Responses from focus group participants
- Observations during campus visits
- Parking demand analysis as part of the Campus Master Plan effort

In general, parking facilities in and near the core of campus are well utilized during the majority of the work day. According to the demand analysis conducted as part of the Campus Master Plan, approximately 62% percent of the campus's parking spaces are utilized, with the parking facilities near the core of campus generally full and utilization tapering the further from the campus core the facility is located (e.g., the surface parking lots near the stadium are typically less than 50 percent utilized). The following exhibit was taken from the 2010 Campus Master Plan and shows the capacity and utilization of campus parking facilities.

Exhibit 14: Parking Utilization



Parking Permit Program

A majority of the parking spaces on campus require permits and are used by employees, students, and other University affiliates. IUB maintains an extensive permit program in order to manage the daily use of this parking.

All employees, students, and other University affiliated personnel must purchase and display parking permits on their vehicles in order to park in University lots. There are approximately 24,000 permits issued by the University related employees and students. Parking facilities and permits are organized into zones: A, C, D, E, and F.

- The A permit is only available to faculty and staff, with some exceptions made for undergraduate and graduate students, and allows the user to park in any University lot or garage.
- The C permit is also only available to faculty and staff, with a limited number available to students, but only allows holders to park in designated C lots.

- The D permit is for students living in on-campus resident housing. This permit is issued by Residential Programs and Services, unlike the other permits that are issued by Parking Operations. Students must apply for this permit, as only a limited number are issued and preference is given to upperclassmen. This permit is only valid in specific lots proximate to residence halls.
- The E permit is available to all students and allows them to park in the Stadium lots or along North Jordan Avenue. All students are allowed to bring a car to campus.
- The F permit allows parking anywhere (with the exception of 24 hour A spaces, handicapped parking spaces, and reserved spaces) on campus, but only from 5PM to 7AM.

Parking permit fees and designated number of spaces for the 2011/2012 academic year are listed in Exhibit 16.

Exhibit 15 Parking Permit Rates, School Year 2012/2013

Parking Space Categorization	Number of Designated Spaces	Academic Year Cost
A	1,862	\$378.60
C	2,869	\$131.64
D	3,014	\$144.00
E	6,866	\$110.88
F	n/a	\$55.44
Other*	5,797	n/a
	20,408	

* Other = Handicapped, Metered, Reserved, Motorcycles, and Service

Parking Permit Sales

The Office of Parking sold 23,700 parking permits for the 2010-2011 fiscal year and 23,760 for fiscal year 2011-2012.

Exhibit 16 shows the number of permits sold by type.

Exhibit 16 Number of permits sold in the 2010/2011 academic year

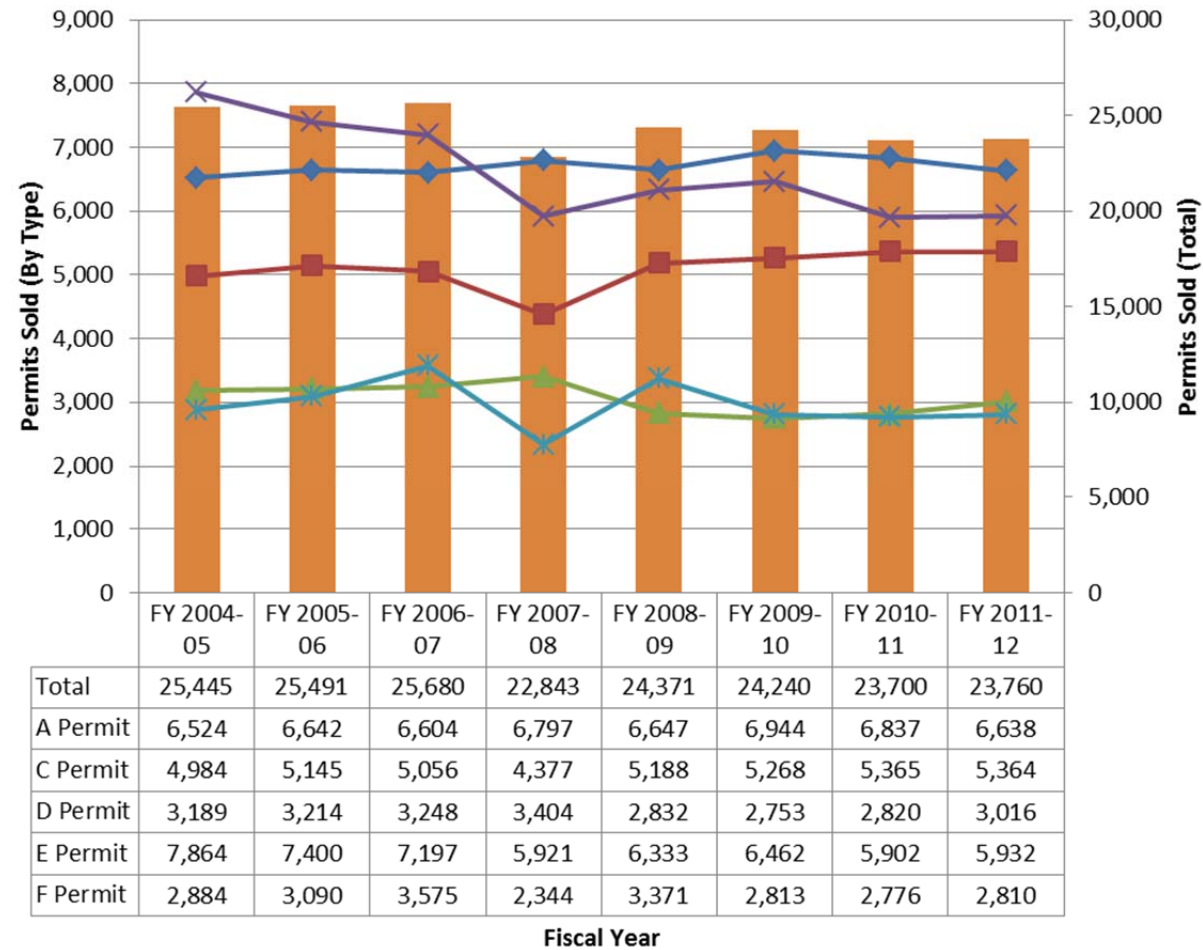
Permit Type	Permits Sold	
	FY 2010/2011	FY 2011/2012
A	6,837	6,638
C	5,365	5,364
D	2,820	3,016
E	5,902	5,932
F	<u>2,776</u>	<u>2,810</u>
	23,700	23,760

The Office of Parking Operations utilizes the practice of overselling their parking spaces, a common practice of selling a larger number of permits compared to the total number of parking spaces to maximize parking space utilization. An accurate oversell percentage cannot be determined based on the data provided.

D permits and spaces are controlled by Residential Programs and Services (RPS). Holders of D permits are able to parking in specific residential areas and are issued based on student seniority. There is a waiting list for all D permits.

Exhibit 18 shows the historical permit sales for the past seven years.

Exhibit 17 Historic Permit Sales



The total number of permits sold over the last seven years has declined by approximately 2,000 permits. Much of this decline can be attributed to the sharp decline in student E permits sold. Over this same period, the number of A and C permits,

predominantly purchased by IUB employees, has increased slightly.

Transit

Two transit services and several transit routes are available for those traveling to, from or within the IUB campus. These include the five fixed-routes operated on-campus by IUB

Campus Bus and nine fixed-routes operated by Bloomington Transit, seven of which travel through or along campus.

Bloomington Transit

Bloomington Transit (BT) provides bus transit service throughout the greater Bloomington area. Seven bus routes, (Route 1,3,4,5,6,7, and 9), service IUB by having stops within or adjacent to campus. These routes provide access to shopping and residential destinations in the City. Exhibit 18 presents a map of the BT system.

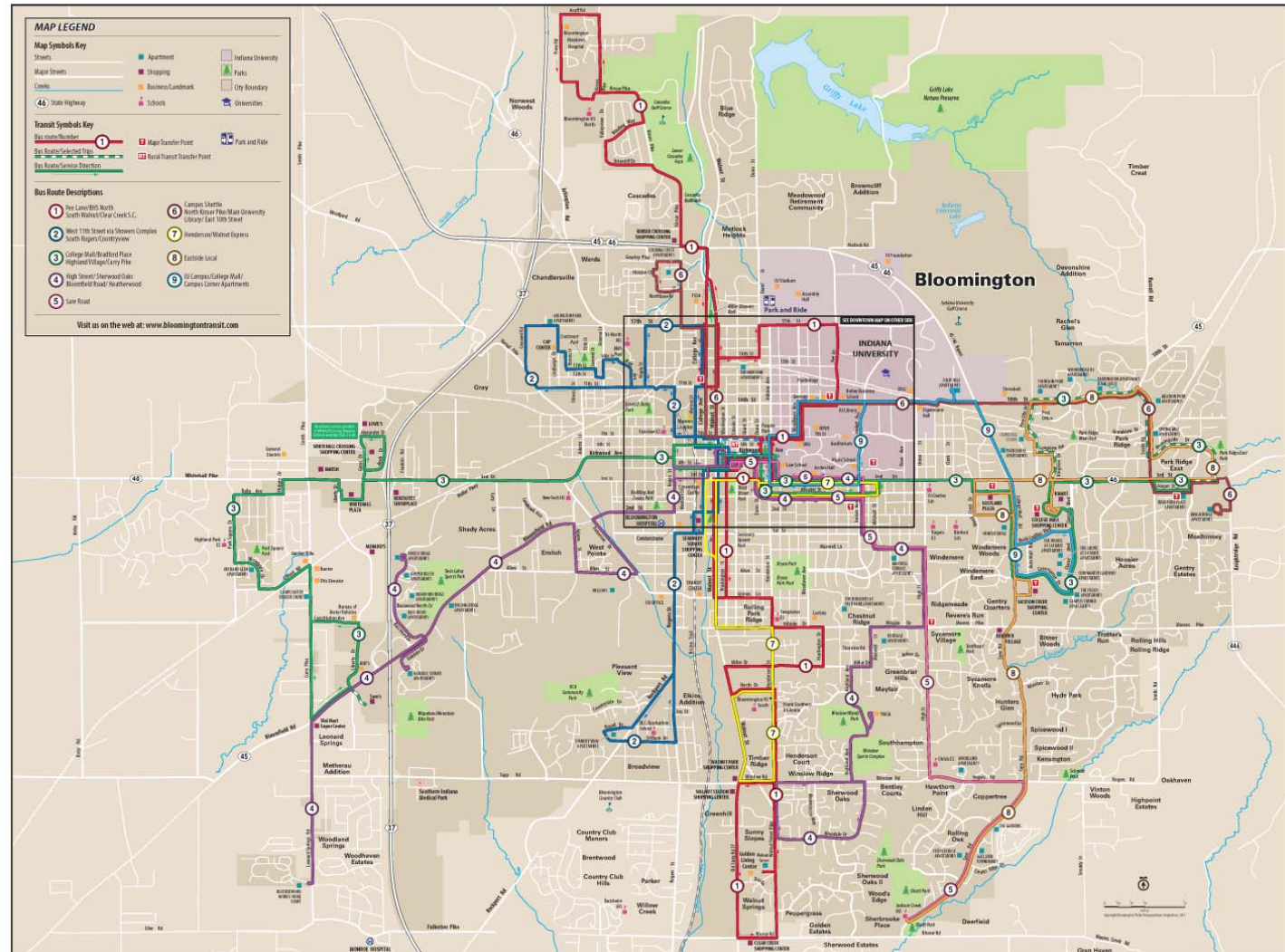
BT is prepaid for all IUB students. BT counts the number of faculty and staff riders and charges \$0.60 per trip. The funding source of the students is through the Student Transportation Fee and the employee trips are paid by the Office of Parking Operations. Students simply show their student ID when boarding. Employees are required to obtain an additional BT bus pass from Campus Card Services and display this card when boarding a BT bus.

Two routes in particular, Routes 6 and 9, have mostly University riders. Both of these routes connect the campus core to off-campus housing complexes that are densely populated with IUB students. Route 9 also travels along College Mall Road, which is a popular shopping destination in Bloomington.

Route 6 is operated both as a local bus, making all stops, and as an express bus, making a limited number of stops. Both variations run at a 20 minute frequency throughout the day.

Route 9 also operates both as a local and express bus. The local bus frequency is 9 minutes in the morning, 10-15 minutes in the afternoon, and 20-25 minutes in the evening. The express bus has a 30 minute frequency throughout the day.

Exhibit 18: Bloomington Transit System Map



Campus Bus is operated by IUB and consists of five fixed-routes that connect the outer campus to the campus core. The routes are the A, B, D, E, and X. Campus bus operates 7:30 AM to midnight Monday-Thursday, 7:30 AM to 3:00 AM on Friday, 10:00 AM to 3:00 AM Saturday, and 12:00 PM until 10:00 PM on Sunday. All buses are accessible to all riders. All buses are also equipped with GPS trackers, allowing patrons to access real time data on bus locations and next arrival times. Campus Bus operates as a fare free system. Exhibit 19 shows a map of the Campus Bus system.

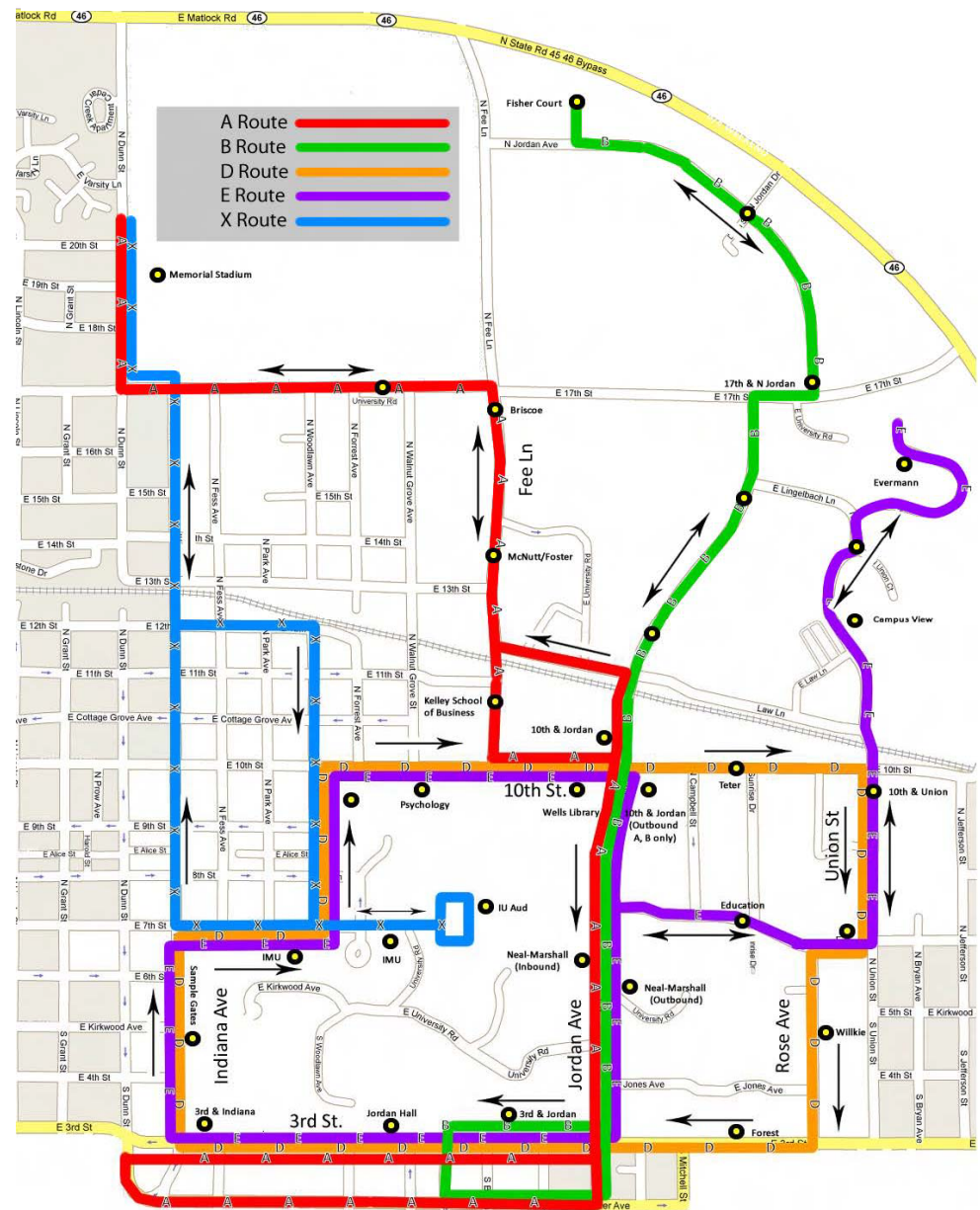


Exhibit 20 provides details regarding Campus Bus routes. The exhibit presents the key connections that are made by each route and the frequency of the route during various time periods. The frequencies shown represent Monday-Thursday academic year service. Some routes increase service during class change periods. All routes run on a reduced schedule on

Fridays and the A, B, and E Routes also provide weekend service. Summer service is offered on a reduced/limited routes schedule, with only the A Route operating Monday-Friday during summer class session and the E Route operating Monday-Saturday all summer.

Exhibit 20: Campus Bus Route Operations

Route	Serves	Frequency
A	Stadium⇒N Fee Lane ⇒ Jordan Avenue⇒3 rd Street ⇒ Dunn Street ⇒Atwater Ave	5 min (Class Change) 10 min (Day) 15 min (Eve)
B	N Jordan Ave⇒3 rd Street⇒Ballantine Road⇒Atwater Avenue	6-8 min (Day) 15-20 min (Eve)
D	Union St ⇒ Rose Ave ⇒ Campus Core Loop	10-15 min
E	E Lingelbach Lane ⇒ N Union St ⇒ Campus Core Loop	20 min
X	Stadium ⇒ West side of Campus Core ⇒ Indiana Ave	5 min (Day) 10-25 min (Eve)

The A Route serves riders coming from the Stadium, but also serves many residence halls and the campus core. The A travels from the stadium, down Fee Lane, before doing the entire “campus core loop”. The campus core loop is bounded by 7th and 10th Street to the north, Jordon Avenue to the east, 3rd Street to the south, and Indiana and Woodlawn Avenue to the west. The A route has an annual ridership of about 1.6 million riders, or about 45% of all Campus Bus trips. The route has additional buses operating during class change periods, reducing the headway to 5 minutes.

The B Route connects students living along North Jordon Avenue to the east side of the campus core.

The D Route connects the dorms in the southeast part of campus to the campus core area.

The E Route connects the dorms in the east part of campus to the campus core area. The E bus does a full loop around the campus core.

The X Route is the also known as the Stadium eXpress route. It operates at a frequency of 5 minutes during the entire day. The X runs along the northwest sides of the campus core, but also is the only route to enter the campus core, with stops at both the Indiana Memorial Union (IMU) and the Auditorium.

In addition to the normal service listed above, Campus Bus also serves as a shuttle service on nights that there are shows at the Auditorium. The shuttle serves both the Poplars Garage and Atwater Garage.

Ridership on Campus Bus has grown over the last six fiscal years with the exception of FY 2008-09 as shown in Exhibit 21. Exhibit 22 presents the number of passenger trips on Campus Bus per person on campus (i.e., the sum of the number of students and FTEs) in order to correct for population growth. As shown in Exhibit 22, ridership across each route has generally increased over the past five years with the exception of the X route. The X route generally serves the surface parking lots adjacent to the stadium which serves E parking permits. This decrease in ridership corresponds with the decrease in the number of E parking permits (see Exhibit 18) sold during the same period.

Exhibit 21: Campus Bus Trips per Person

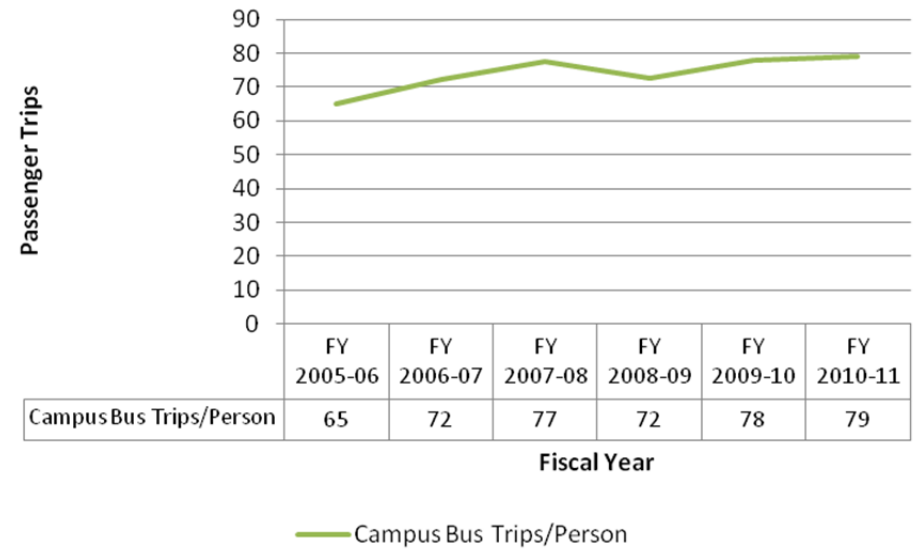
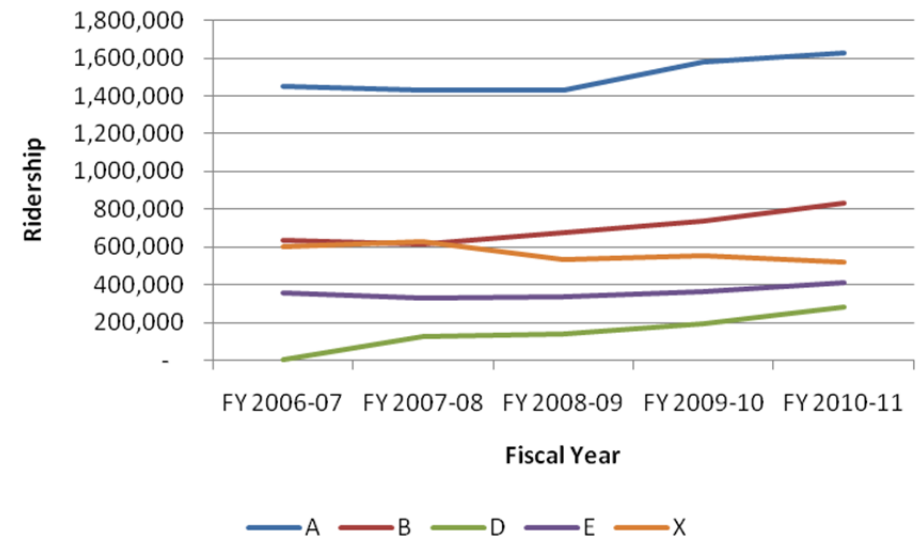


Exhibit 22: Campus Bus Ridership by Route



Existing TDM Programs

Carpool Programs

IUB classifies a carpool as a vehicle commuting to campus with three or more IUB employees. By registering, the carpool is eligible to receive a Carpool Permit with the rights of an A parking permit for the price of a C parking permit. The carpool also receives a reserved parking space in a location of its choice (Exhibit 23). All occupants of the carpool get 10 single day parking passes per year to use on days when they need their own vehicle on campus. Carpoolers are eligible for the Guaranteed Ride Home program, which allows members of the carpool a reimbursed taxi ride home if an unscheduled or unexpected event occurs and they are not able to ride with their carpool. IUB had 19 registered carpools during the 2011-2012 academic year.



Exhibit 23 Carpool Permit Sign

Transit Programs

The campus is served by Bloomington Transit (BT), providing transit access to and from the campus, and IUB Campus Bus, which provides transit service to locations around campus. Seven of nine BT bus routes and all Campus Bus routes have stops on or adjacent to campus. To further encourage the use of transit, IUB has a financial arrangement with BT so that rides are fare-free for IUB students and employees. In order to

ride on a BT route, IUB riders need to flash a card (for students, their ID card, and for employees, a IUB issued BT bus pass) to board. Campus Bus has no fare collection system on board the buses. BT had nearly 2.5 million UPass passenger trips and Campus Bus provided over 3.7 million unlinked passenger trips in the 2010-2011 academic year.

Car Sharing Program

The car sharing program Zipcar has been on campus since 2010. Zipcar currently has five cars on campus and almost 700 approved members as of December 2011. The service requires users to purchase a \$25 annual membership and then pay either a \$7.50 or \$8.50 hourly fee (depending on the type of

vehicle) for each hour they reserve the car. Each Zipcar reservation includes gas and insurance.

According to a Zipcar generated report, Zipcars on campus are utilized 30 percent of the time or over 7 hours a day.

Ride Sharing Program

The ridesharing program Zimride is an Indiana University Student Association initiative that services students and employees. Zimride is a ride matching service which takes member's origins, destinations, schedules, and other trip criteria and matches them with other members who have very

similar criteria. Zimride can be used for both one-time only trips (such as traveling to Indianapolis or out of state for the weekend) and daily commute trips (such as forming a carpool). Zimride has over 3,800 registered users as of September 2012.

Bicycle Program

While IUB does not currently have any formal programs promoting bicycle commuting, approximately 5 percent of employee and student commuters bicycle to campus. The City of Bloomington and Indiana University achieved the designation of a Bicycle Friendly University, Silver and Bronze Level by the League of American Bicyclist. This achievement recognizes that the City and IUB demonstrate sufficient achievement in five categories to support bicycling: engineering, education, encouragement, enforcement, and evaluation and planning.

The Office of Parking Operations has a formal bicycle registration program and enforces bicycle parking regulations. The bicycle registration program enables Parking Operations to identify lost or stolen bicycles, enforce bicycle parking restrictions, identify victims riding bicycles in the event of an accident, and the registration fee helps to pay for bicycle accommodations around campus.

Existing Employee and Student Commuter Behavior

As part of this study, a transportation survey of all employees and students was conducted. The survey asked each group several questions to determine:

- how they normally commuted to campus,
- why they use that mode, and
- their experience with that mode and what would encourage them to use alternative modes of transportation (if they drove alone to commute to campus).

It also asked general work, transportation, and information access questions. The goals of the survey were as follows:

- Understand the IUB community's commuting behavior
- Determine transportation needs of the community
- Identify what might encourage community members to use alternative transportation
- Determine awareness and opinion of current transportation programs
- Identify means to communicate with community

The survey was developed in collaboration with the Indiana University Center for Survey Research. The Center provided

valuable feedback regarding the format, wording, and types of questions asked in the survey in addition to distributing and administering the surveys. The survey was designed to maximize the response rate while gaining an understanding of the participant's behavior and commute choices. To that end, the survey was setup to ask questions dynamically based on the participant's responses to previous questions.

Both groups had strong response rates. The high response rate is indicative of the importance of transportation to all members of the IUB community.

Exhibit 24 details the response rate and the statistical significance of the collected data.

Exhibit 24: Transportation Survey Response Rate

	Faculty/Staff	Student
Population (Sent Surveys)	9,439	41,916
Sample (Valid Surveys Returned)	5,185	13,628
Desired Response Rate	45%	22%
Response Rate	55%	33%
Confidence Level	95%	99%
Confidence Interval	±1%	±1%

A high response rate was needed to ensure the desired ± 1 percent confidence interval was met. This confidence interval demonstrates that the actual value for the population is within is within 1 percent of the resulting value from the survey response. This precision was needed due to some of the small percentages that were expected for some questions.

Survey results are used throughout this report to reinforce the reasoning behind suggested TDM programs and determining potential effectiveness of programs.

The following is a summary of the key findings from the survey:

- Drive alone commuter mode share is 71 percent and 23 percent for employees and students respectively (see section *How Commuters Get to Campus*).

- Awareness and knowledge of how to access current TDM programs is low (with a few exceptions)
- Infrastructure improvements would encourage drive alone commuters to walk and bike more to campus
- An ability to occasionally park on campus would encourage use of alternative transportation
- Current carpool incentives are doing little to encourage carpools between non-cohabitants

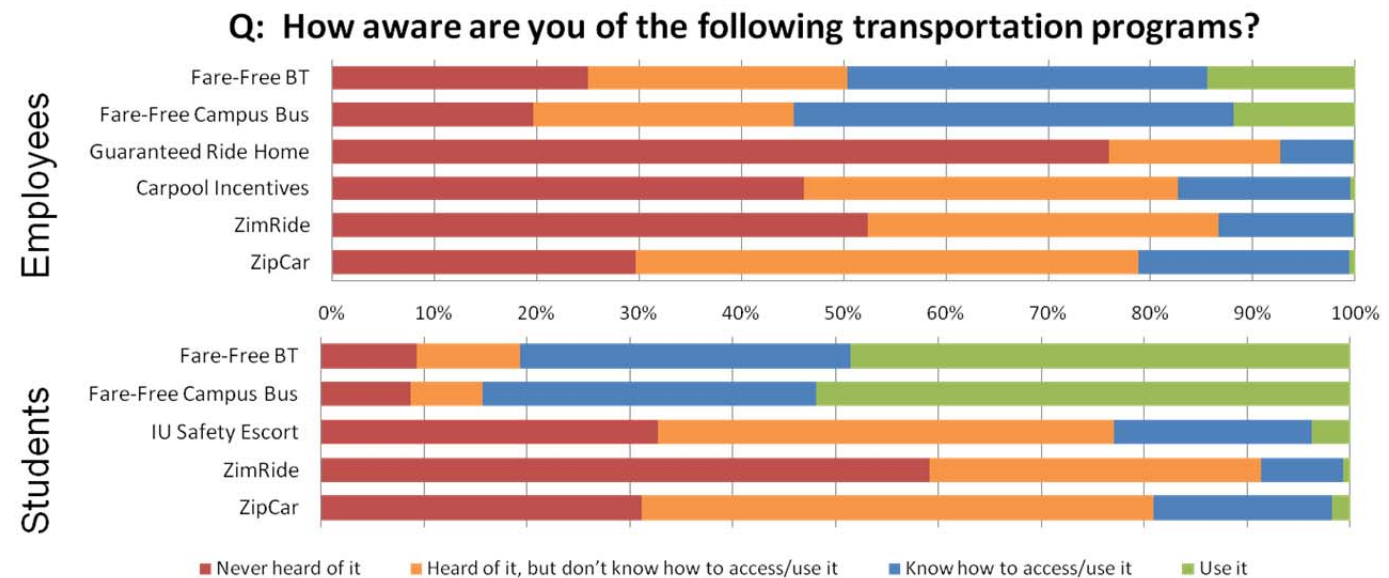
Two key findings from the survey, current program awareness and desired improvements to each alternative mode of transportation, are discussed in the following sections.

Program Awareness

Although IUB currently offers a range of TDM programs, the survey data indicated that many employees and students are

not aware or don't know how to access these programs. The survey results are shown in Exhibit 25 below.

Exhibit 25: TDM Program Awareness



Approximately 75 percent of IUB employees have never heard of the Guaranteed Ride Home program offered at IUB. Another 18 percent of employees have heard of the Guaranteed Ride Home program but don't know how to access or use it. Between 75 and 85 percent of employees have never heard or do not know how to access the existing Zipcar, ZimRide, or Carpool programs. Employees seem to be more aware of the

transit program since approximately half of them know they can ride Campus Bus and Bloomington Transit fare-free.

Over 80 percent of students are aware of the fare-free programs on BT and Campus Bus. However, their awareness of the ZimRide and Zipcar programs is similar to employees where the majority of the students have either not heard of the programs or know how to access them.

While some of these programs have existed for several years the employee and student commuter population has limited exposure to their existence or how to access them. Awareness

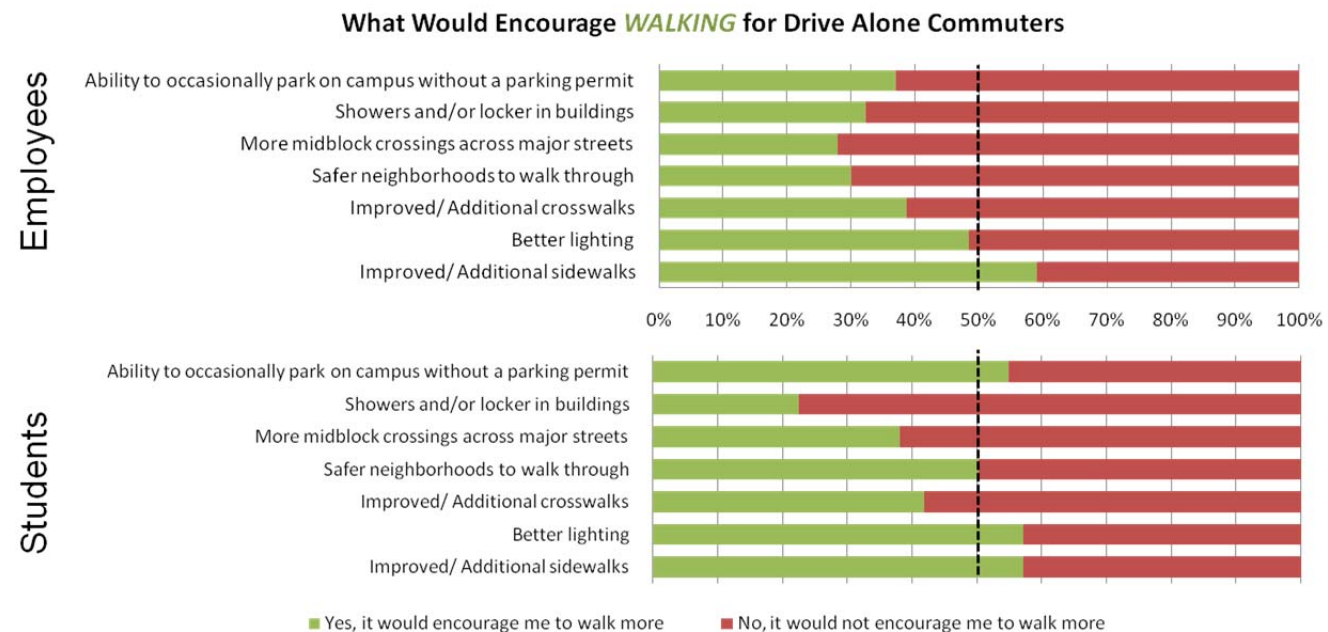
levels of these programs as well as the efforts to curb drive alone commuting should be targeted in the TDM plan.

Programs to Encourage Use of Alternative Transportation

A main goal of the survey was to understand what would encourage drive alone commuters to use alternative transportation and how IUB can better support current users of alternative transportation. A series of survey questions addressed this goal. These questions were asked to identify

programs and improvements that would benefit current and potential users in an effort to encourage more commuters to use alternative modes. The following exhibits provide the results of the survey questions regarding what programs would encourage the use of alternative transportation modes.

Exhibit 26: Encouragement to Walk to Campus



As shown in Exhibit 26, better lighting and improved or additional sidewalks would encourage employees and students who live within a mile of campus to commute by walking to campus. The ability to occasionally park on campus without a

parking permit would also encourage a shift from drive alone commuting. Students are also interested in safer neighborhoods to walk through.

Exhibit 27: Encouragement to Bike to Campus

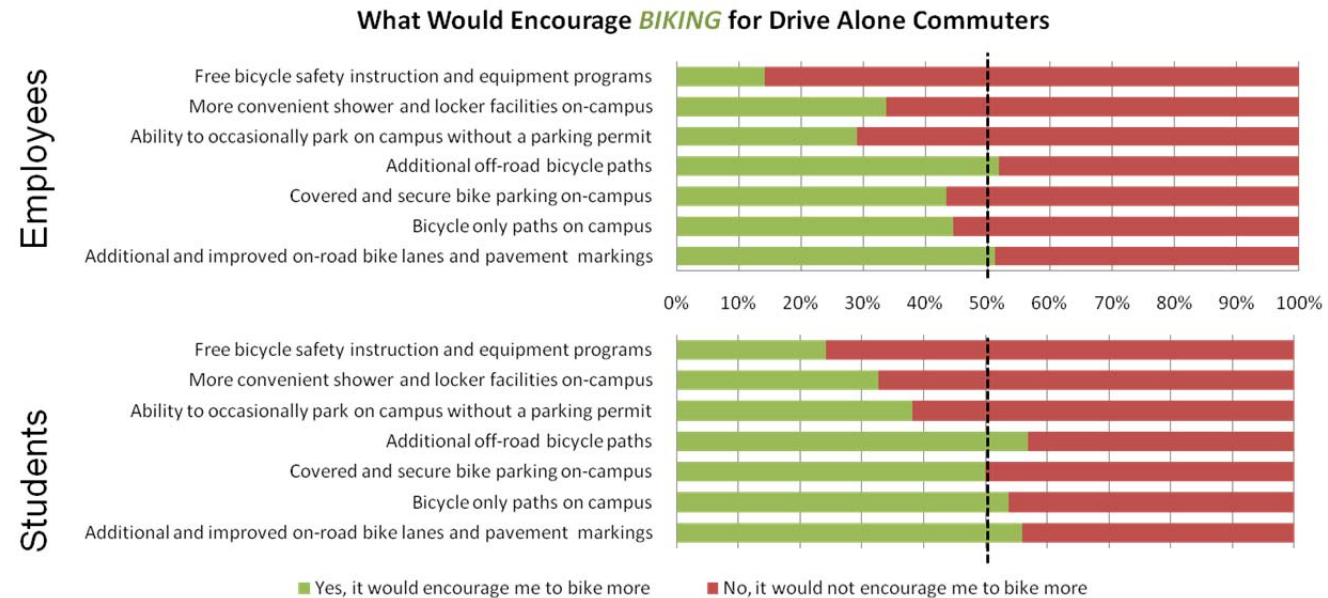
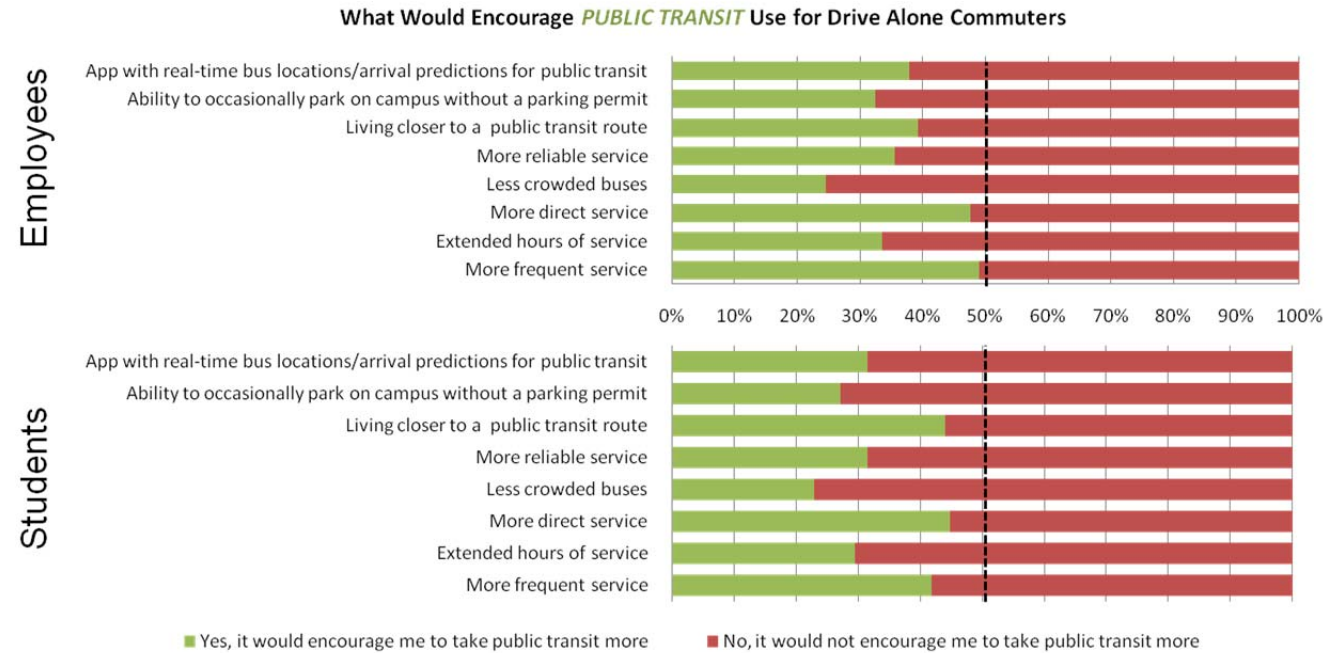


Exhibit 27 presents the programs which would encourage drive alone commuters to commute by bicycle. Generally, infrastructure improvements on and off-campus would encourage drive alone commuting employees and students to

bike to campus more frequently. Off campus infrastructure improvements include additional off-road and on-road bicycle accommodations. On campus improvements include covered and secure bicycle parking as well as campus bicycle paths.

Exhibit 28: Encouragement to Take Transit to Campus



As shown in Exhibit 28, more direct and frequent public transit service would encourage employee and student drive alone commuters to use transit to commute to campus. Many commuters also expressed that living closer to public transit routes would encourage them to commute via public transit.

Exhibit 29 presents the programs that would encourage drive alone commuters to carpool to campus. For both employees

and students, subsidized or free parking permits for carpoolers would encourage them to carpool. While current IUB carpools pay a discounted rate for A permits (the price of a C permit), this benefit is not available to two-person carpools and is not available for students at all.

Exhibit 29: Encouragement to Carpool

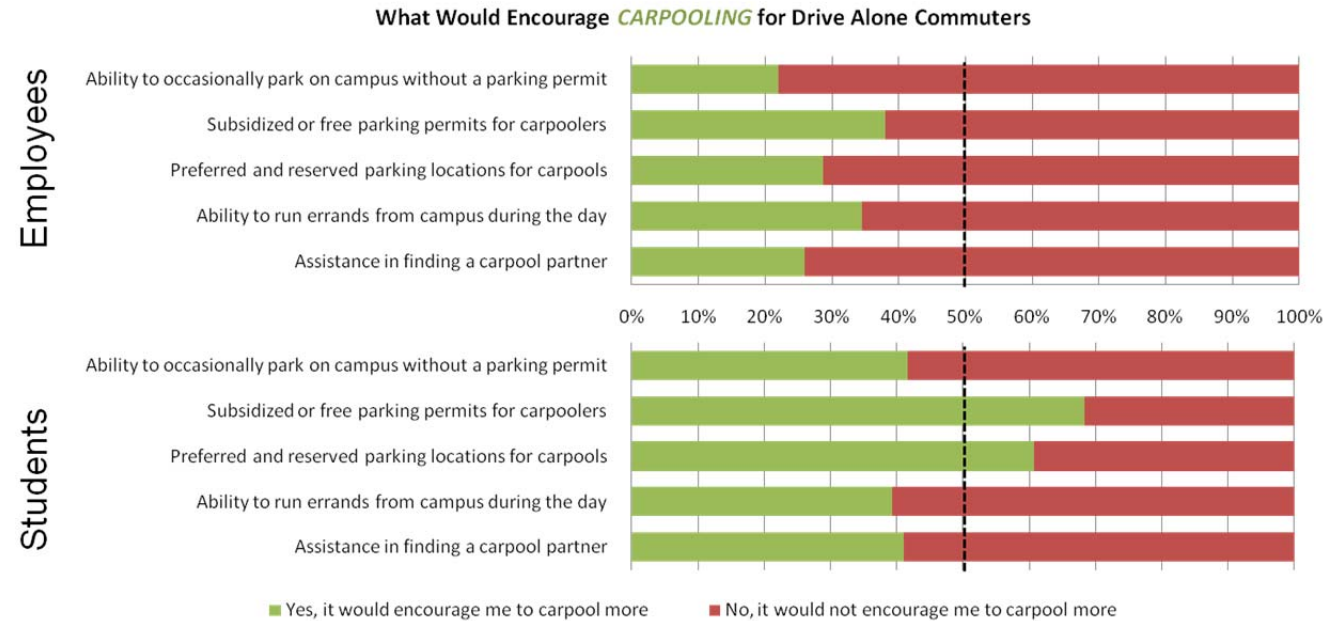


Exhibit 30 summarizes the improvements and programs that would encourage the use of alternative transportation.

Exhibit 30 Improvements/Programs that would most encourage use of Alternative Transportation

Mode	Improvement
Walking	Improved/Additional Sidewalks & Crosswalks
Biking	Additional/Improved On-Road Bike Lanes & Pavement Marking
Transit	More Frequent Service
Carpooling	Subsidized or Free Parking Permits for Carpoolers

All of these, with the exception of carpooling, require collaboration with the City government and agencies. Walking and biking infrastructure improvements typically fall under the City's jurisdiction while any improvements regarding the level

of service of Bloomington Transit routes would require coordination with the agency.

The program which would encourage carpooling is subsidized or free parking permits for carpoolers. IUB currently offers

subsidized parking for registered carpoolers. Registered carpoolers are able to buy an A parking permit for price of a C parking permit. However, commuters may not be officially registered as IUB carpools since they may only have two people in their carpool. These two person carpools may not have incentive enough to find another member to officially become a carpool or they might not be aware of the program.

Another improvement that is desired by the majority of alternative mode commuters is the ability to occasionally park car on campus when necessary. While the majority of

commuters will commute via the same mode every day of the week, many commuters may be able to vary their commute mode several days out of the week. Providing flexibility in the parking permit to allow for occasional parking on campus encourages commuters to use alternative transportation as their commute and schedule allows. The current structure of the parking permits assumes that commuters will park on campus 5 days a week and does not accommodate for commuters who park less frequently. While IUB currently offers day passes for guests (guest single day passes were \$7 in June 2012) it is generally only used by visitors to the University.

Summary SWOT Analysis

A SWOT analysis provides a simple yet effective means to summarize the findings from the existing transportation conditions analysis. The following table presents a summary of

IUB's Transportation services and infrastructure strengths, weaknesses, opportunities and threats.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Sustainability commitment • UPass • Good working relationship with BT • Number of existing programs • Bicycle culture • Active student interest in transportation • Good level of service on Campus Bus • Innovative transportation programs initiated by active and interested students 	<ul style="list-style-type: none"> • Inflexible parking permit • Program awareness • Desirability of existing surface lots • Parking prices not annually adjusted for ↑ costs • No comprehensive marketing plan • No person or group to focus on bike or pedestrian commuting • Disaggregate transportation systems • Unfocused alt transportation programming • One-way roads limit bus route planning
Opportunities	Threats
<ul style="list-style-type: none"> • Strong alt transportation market numbers • High number of commuters living close to campus • Parking price disincentive • Survey data • High gas prices • Bloomington commitment to cycling and walking 	<ul style="list-style-type: none"> • Unknown economic climate • No control over public transit service • University parking capacity • Transportation programs sponsored by IUSA are subject to inconsistent funding and group priorities

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Chapter 3: Transportation Demand Management Plan

Indiana University is in a prime position to develop and implement a strategic and implementable TDM Plan. The following sections outline the process taken to:

- Quantify the market potential of several alternatives to drive alone commuting, including carpooling, transit, walking, bicycling, and teleworking
- Determine the share of each market that would need to be captured to achieve specific drive alone mode share reductions
- Develop drive alone reduction packages based on reasonable mode shift targets and survey results
- Select the best TDM programs which support the desired modal shifts including programs:
 - that encourage the shift from drive alone to alternative transportation modes per survey results
 - which have some measure of success after being implemented at other universities
 - that enhance existing programs

The TDM analysis is focused on IUB employee commuters. Undergraduate students make up a small subset of drive alone commuters, survey results showed that approximately one-

quarter of off-campus students drive alone commute to campus. Undergraduate students who drive alone to campus are limited in their parking choices on campus.

Undergraduates are allowed to purchase “E” or “F” permits. The majority of the “E” parking spaces are located in the Athletic Department parking lots located north of 17th Street. Parking in these parking facilities generally requires a ride on Campus Bus to reach locations in the campus core and can add approximately 10-15 minutes onto a commute. The remoteness of the parking available to students, the limited access to parking within the campus core, and the cost of the parking permits are good deterrents for students from drive alone commuting and are, in effect, TDM strategies. Given these conditions, those who drive alone to campus most likely do so out of necessity or their behavior is not likely to change even with targeted and robust TDM programs and incentives.

Many graduate students are eligible to purchase “A” or “C” permits and could be good targets for TDM programming. The TDM plan presented in the following sections could be applied to graduate students and should be considered based on how successful they are in shifting employee mode choice. Additionally, these programs should be refined to account for graduate student needs and lifestyle.

Identification of Potential Market

Potential markets were established to quantify the number of IUB employees that could potentially be induced to switch their commute mode from driving alone to alternative forms of transportation. The size of these potential markets, the number of IUB employees that hold an IUB parking permit and that live within a defined catchment area, was investigated for carpooling, local transit, walking, and bicycling. The catchment area for each mode was defined as follows:

- Carpool: Percentage of drive alone commuting employees who responded that an element of a carpool program could encourage them to carpool (36 percent)
- Local Transit: employees that live within one-half mile of a Bloomington Transit route that takes them to campus
- Walk: employees that live within one mile of the edge of IUB campus
- Bicycle: employees that live within five miles of the IUB campus

Potential markets were quantified using the 2011 geo-coded address of IUB employee registered parking permits. It should be noted that the markets for local transit, walk and bicycle were adjusted down since they include commuters who currently use these modes. The number of commuters using these modes was estimated based on the mode shares determined from the employee data. The market populations were lowered by the total number of estimated commuters using the respective mode, thus assuming that all current commuters fall within the catchment their modes' respective catchment area. The potential markets provide a reasonable measure to gauge the probability for reducing drive alone trips.

It should be noted that employees may fall into more than one of the catchments below.

While the geo-coded residential dataset indicated that there were 8,630 employees, assumptions provided by IUB indicated that there were 7,956 full-time equivalents (FTEs). The discrepancy in the employee counts may be related to a number of factors, including the inclusion of temporary employees and research assistants, but cannot be fully explained by existing data. Therefore, an adjusted market potential was calculated by multiplying the market potential percents in Table 1 by the 7,956 FTEs. The results are shown in Exhibit 31.

Geo-coded addresses data were not used to define two markets, carpool and telecommute. Carpooling and telecommuting are less defined by the proximity to a physical location (e.g., campus, transit route) and more by trip characteristics and eligibility. We defined a "catchment area" for carpooling based on the survey results. Approximately 36 percent of drive alone survey respondents said that one of the potential programs could encourage them to carpool instead of driving alone to campus. As such we used 36 percent of the campus population as the catchment area.

A potential telework market was established based on research. According to the report *WorldatWork 2011 Survey on Workplace Flexibility*, between 41 and 47 percent of jobs are compatible to at least occasionally work from home. As such, we used the high end of that range to estimate the potential market for telecommuting.

Exhibit 31: Potential Catchment Area

Market	Catchment Area	Potential Market	# of IUB Employees	% of IUB Employees
Carpool	36 percent of current drive alone commuters*	2,053	7,956	25.8%
Local Transit	Permit holders within ½ mile of BT Bus Route	3,567	7,956	44.8%
Walk	Permit holders within 1 mile of edge of campus	652	7,956	8.2%
Bicycle	Permit holders within 5 miles of IMU	4,999	7,956	62.8%
Telecommute	47 percent of current drive alone commuters**	2,681	7,956	33.7%

* Determined based on percentage of drive alone employees who could be encouraged to carpool

** *WorldatWork 2011 Survey on Workplace Flexibility*; WorldatWork, February 2011.

Establish Reasonable Mode Shift Targets

The next step was to identify the share of each potential market that would have to be induced to shift from drive alone to an alternative mode in order to generate specific mode shifts. While not intended to prescribe specific actions, this analysis was intended to identify the mode shifts that could be reasonably achieved with incentive programs, marketing and any necessary infrastructure improvements. This analysis determined the percent of the potential carpool market that would need to switch from driving alone to other modes to generate mode shifts of 0.5%, 1.0%, 2.0%, 2.5%, 3.0%, 4.0%, 5.0%, 6.0%, 7.0%, 8.0%, 9.0%, and 10.0%.

Exhibit 32 shows the number of employees that would need to switch from drive alone to other modes to achieve specific mode share reductions. For example, to generate a 1 percent mode shift, 80 additional employees would need to commute

by an alternative mode, whereas 398 additional employees would need to shift to an alternative mode to achieve a 5 percent drive alone reduction.

Exhibit 32: Additional Employees Needed to Shift to Alternative Modes to Achieve Specific Drive Alone Mode Share Reductions

IUB Affiliation	FY 2011 Drive Alone	FY 2011 Total Population	Drive Alone Mode Share Reduction (# people)											
			0.50%	1%	2%	2.50%	3%	4%	5%	6%	7%	8%	9%	10%
Total	71.0%	7,956	40	80	159	199	239	318	398	477	557	636	716	796

The challenge in achieving significant mode shifts is put into perspective when reviewing Exhibit 33. It shows the percent of each market's potential that is needed to shift from drive alone to achieve specific drive alone mode share reductions. For example, to achieve a 2 percent mode shift from drive alone to carpool, 7.74 percent of the carpool market would have to be captured. This was calculated by dividing 159 commuters (a 2 percent mode share reduction) by the potential carpool market (2,053 commuters). Since the potential walk market is much

smaller than the carpool market, 24.39 percent of the walk potential market would have to switch from drive alone to walk to generate a 2 percent mode shift. With a potential market of only 652 employees, a maximum mode shift of 8 percent can be achieved by walking if 100 percent of employees that live within one mile and driving to the IUB campus can be induced to walk to work. In this light it becomes apparent that any significant drive alone reductions would be significantly helped by substantial transit and bicycle components.

Exhibit 33 Drive Alone Mode Share Reductions - Percent of Market

Market	Population	Drive Alone Mode Share Reduction (% of Market)											
		0.50%	1%	2%	2.50%	3%	4%	5%	6%	7%	8%	9%	10%
Carpool	2,053	1.95%	3.90%	7.74%	9.69%	11.64%	15.49%	19.39%	23.23%	27.13%	30.98%	34.88%	38.77%
Local Transit	3,567	1.12%	2.24%	4.46%	5.58%	6.70%	8.92%	11.16%	13.37%	15.62%	17.83%	20.07%	22.32%
Walk	652	6.13%	12.27%	24.39%	30.52%	36.66%	48.77%	61.04%	73.16%	85.43%	97.55%		
Bicycle	4,999	0.80%	1.60%	3.18%	3.98%	4.78%	6.36%	7.96%	9.54%	11.14%	12.72%	14.32%	15.92%
Telework	2,681	1.49%	2.98%	5.93%	7.42%	8.91%	11.86%	14.85%	17.79%	20.78%	23.72%	26.71%	29.69%

Drive Alone Reduction Packages

Using the results of the previous section, five drive alone reduction packages were identified, employing different combinations of mode shifts to achieve between a 9.5 percent and 10.0 percent drive alone reduction. Based on experience with other institutions, a drive alone reduction is achievable over a ten year time frame if a significant commitment, effort and investment is made by the institution. Each package sought to maximize the potential mode shift for one mode or a combination of modes while accounting for the size of the respective market for each alternative mode.

A summary of the mode shifts associated with each strategy is identified in Exhibit 34

- *Package 1: Emphasize carpooling*
Capitalize on mode currently not exploited by existing programs and independent of third party service
- *Package 2: Emphasize use of Local Transit*
Encourage use of existing transit UPass layering support and incentives
- *Package 3: Emphasize Walk and Bicycle modes*
Encourage walk and bicycle modes with emphasis on health and infrastructure improvements near/on campus
- *Package 4: Emphasize Local Transit, Walk and Bicycle*
Combination of Packages 2 and 3
- *Package 5: Emphasize Walk, Bicycle and Telework*
Emphasize non-motorizing commute/work options to reduce GHG emission

Exhibit 34 Drive Alone Reduction Packages

Package		Mode Shift %					
		Drive Alone	Carpool	Local Transit	Walk	Bicycle	Telework
Package 1	% Mode Shift	-9.50%	6.00%	1.00%	0.50%	1.00%	1.00%
	% of Market		23.23%	2.24%	6.13%	1.60%	2.98%
	# of SOV* converts	-757	477	80	40	80	80
Package 2	% Mode Shift	-9.50%	3.00%	4.00%	0.50%	1.00%	1.00%
	% of Market		11.64%	8.92%	6.13%	1.60%	2.98%
	# of SOV converts	-757	239	318	40	80	80
Package 3	% Mode Shift	-10.00%	3.00%	1.00%	2.00%	3.00%	1.00%
	% of Market		11.64%	2.24%	24.39%	4.78%	2.98%
	# of SOV converts	-797	239	80	159	239	80
Package 4	% Mode Shift	-10.00%	2.00%	4.00%	1.00%	2.00%	1.00%
	% of Market		7.74%	8.92%	12.27%	3.18%	2.98%
	# of SOV converts	-796	159	318	80	159	80
Package 5	% Mode Shift	-10.00%	3.00%	3.00%	0.50%	1.00%	2.50%
	% of Market		11.64%	6.70%	6.13%	3.18%	7.42%
	# of SOV converts	-797	239	239	40	80	199

* SOV = Single Occupant Vehicle

As shown in Exhibit 34, achieving a drive alone reduction of 10 percent requires an increase in the use of all modes. Some individuals may not have access to each transportation option. As such, it is necessary for the TDM Plan to be flexible enough and provide incentives and support to these individuals. After a review of these packages, VHB has identified Package 4 as the preferred package since it emphasizes transit, walk and bicycle modes while supplemented by participation in carpool and telework modes. Given the existing and future infrastructure of the campus and surrounding area and the size of the given markets, Package 4 capitalizes on the general walkability and

bikeability of the area and the relationship between the University and Bloomington Transit. As shown in Exhibit 34, for drive alone to decrease in mode share, no more than 10 percent of any potential market would need to shift to commuting by that respective mode with the exception of the walk mode. Package 4 presents the most reasonable combination of mode shifts to occur.

Based on the input from the IUB Transportation Policy Advisory Committee (TPAC), the on-campus focus groups, the 2012 Transportation Survey results, and mode shift package analysis,

three potential TDM scenarios have been developed. Package 4 (from above) is represented in the “Moderate Scenario”. The “Most Aggressive” and “Least Aggressive” Scenarios increase and decrease, respectively, the modal shifts using the same modal focus as Package 4. The Scenarios and their reductions are as follows:

- Most Aggressive Scenario (20 percent drive alone reduction)

- Moderate Scenario (10 percent drive alone reduction)
- Least Aggressive Scenario (5 percent drive alone reduction)
- Baseline or Existing Conditions Scenario

The following table presents the anticipated mode shift for each scenario.

Exhibit 35 Drive Alone Reduction Scenario Resulting Mode Share

		Drive Alone	Carpool/ Dropped Off	Local Transit	Walk	Bicycle	Telework
Existing		73.8%	10.1%	4.7%	4.7%	4.6%	2.1%
Least Aggressive	% Mode Shift	-5.0%	1.0%	2.0%	0.5%	1.0%	0.5%
	% of Market		3.9%	4.5%	6.1%	1.6%	1.5%
	# of SOV converts	-399	80	159	40	80	40
	Resulting Mode Split	68.8%	11.1%	6.7%	5.2%	5.6%	2.6%
Moderate	% Mode Shift	-10.0%	2.0%	4.0%	1.0%	2.0%	1.0%
	% of Market		7.7%	8.9%	12.3%	3.2%	3.0%
	# of SOV converts	-796	159	318	80	159	80
	Resulting Mode Split	63.8%	12.1%	8.7%	5.7%	6.6%	3.1%
Most Aggressive	% Mode Shift	-20.0%	3.0%	5.0%	1.0%	7.0%	4.0%
	% of Market		8.6%	11.2%	12.3%	8.6%	9.2%
	# of SOV converts	-1,592	239	398	80	557	318
	Resulting Mode Split	53.8%	13.1%	9.7%	5.7%	11.6%	6.1%

Achieved Target Reductions

The University currently supports alternatives to the drive alone mode, but there are challenges to modifying commuting behavior. Shifts to alternative modes from drive alone commuting are often not realized due to the availability of convenient, reasonably priced parking, a lack of alternatives, schedules or family constraints that require a car, a lack of awareness about alternatives, or inadequate incentives or deterrents to driving alone.

TDM program effectiveness can vary significantly based on the destination, demographics of the commuters, supporting infrastructure and services, and the level of commitment to TDM program by the institution. The following exhibit presents the ranges of effectiveness the above commuter programs

generally provide. Not all programs have quantifiable reductions in mode use shifts.

Overall plan effectiveness to shift drive alone commuter's mode preference is not cumulative in that one could not select a set of programs and add the estimated reduction levels in the right column to come up with a overall reduction. These programs play off each other and the effectiveness is unique to the environment in which they are in. What might work in one environment may not work in another. What is important to balance is the number of options provided to commuters with the incentives and/or disincentives to use each. It is also critical to provide enough supporting programs to reduce the apprehension to use an alternative form of transportation due to the perceived reduction in convenience.

Cornerstones of a Successful TDM Plan

In addition to incentive programs and supporting transportation options, each successful TDM Plan incorporates other critical components to achieve its goals: parking management, a sustainable transportation policy,

infrastructure improvements, and TDM Coordinator and programs. The following section describes each of these within the context of IUB.

Parking Management

Currently, IUB has a sufficient total number of parking spaces to serve the parking demand; however, the spaces are not all in desirable locations close to the campus core. Continuing to build additional parking supply within the campus core is not a sustainable approach, either fiscally or environmentally. This is not to say that no new parking should be built. Rather, it calls for an understanding of the true cost of building, leasing and operating parking and “right-sizing” of facilities in a way that off-sets additional growth through parking management and policy. Of course, adding new parking only to the extent that realistic alternatives to driving are not available is critically dependent on successful TDM initiatives. The University’s Transportation Policy Advisory Committee (TPAC) can be an integral partner in making drive alone travel less attractive through parking management strategies, as well as providing attractive travel alternatives for faculty, staff and students. Realistically, this will require discouraging drive alone travel

through increasing parking permit pricing. The most effective way to reduce commuter parking demand is by adding additional on-campus housing for students and encouraging employees to live closer to campus, within range of a walking, biking, or transit commute.

A TDM plan levels the playing field between drive alone commuting and commuting alternatives. The ability to control parking supply and pricing is the key to giving TDM strategy and programs a foothold to compete against drive alone commuting. Increasing parking rates is the most cost effective strategy to decreasing parking demand on campus. While politically challenging to implement, raising parking rates provides both disincentive to park on campus (increasing the cost to commute) as well as provides additional revenue to support programs which improve transportation options and supporting programs. As such, a lack of control over supply and pricing undermines the success of a TDM Plan.

Sustainable Transportation Policy

For the TDM Plan to be successful, IUB must formulate a transportation policy within the context of a broader sustainability effort. It is crucial for strong top-down leadership and policy to guide and support the implementation of the plan's recommended transportation and parking management strategies, and the planning and construction of infrastructure improvements. The commitment would facilitate prioritization of commuter programs with respect to other initiatives and provide supporting funding.

The University has made significant strides to bring sustainability to the consciousness of its community through its development of the Office of Sustainability, summer intern program, and other ongoing campus efforts.

In addition, the Office of Sustainability created a transportation working group, a group of faculty, administrators, and students that addresses sustainable transportation issues through research, studies, and strategic planning.

Since student, faculty and staff commuting is one of the most significant contributors to the University's carbon footprint, the Office of Sustainability authored the Campus Sustainability Report and a document called the *2020 Vision* which provides sustainability goals and metrics. While a general goal of 20 percent drive alone mode reduction over 10 years is set out by the 2020 Vision, there is no structured guidance on how to achieve this goal, outlined policy to support this goal, or metrics to determine if the goal is achieved.

A sustainable transportation policy will help the University:

- Demonstrate its commitment to sustainable transportation practices
- Specify monitoring responsibilities and reporting procedures
- Establish continuity and expectations for different University entities
- Provide guidance for future decision making

Infrastructure Improvements

The Campus Master Plan outlines the future of buildings and infrastructure on IUB's campus over the next 10 years. Future transportation infrastructure will coincide with the progression of development outlined in the Master Plan. Physical improvements to the campus and connecting communities provide an important complement to TDM strategies and encourage use of alternate modes of transportation. These

improvements can range from uniform wayfinding signage to intersection treatments that enhance pedestrian and bicycle accommodations. The goal of the improvements is to form a comprehensive system of measures that encourage University faculty, staff, and students to choose alternate modes of transportation when destined to the University and moving between campus locations.

TDM Coordinator

A TDM Coordinator plays a critical role in integrating, promoting, and developing TDM programs into a comprehensive plan. The purpose of the position is to be a resource for university employees and students regarding information on alternative transportation modes and to reduce parking demand and increase demand for alternative modes of transportation through research, promotion, and regional involvement in development of alternative commute modes. The TDM Coordinator would typically work within the Office of Parking and Transportation. Job responsibilities for the TDM Coordinator include:

- Promote non-single occupant transportation options
- Measure effectiveness of alternative transportation programs
- Plan, program and implement strategic TDM programs and infrastructure
- Benchmark and monitor
 - Transportation-related greenhouse gas emissions
 - Commuter mode share
- Produce maps, reports and informational materials
- Keep current on developing TDM strategies
- Promote environmental improvement initiatives
- Develop surveys and studies to explore potential TDM programs (student commuter carpool study, commuter bus survey, etc.)
- Coordinate with other campus, city, and regional organizations to develop and promote TDM programs
- Provide general assistance to divisions and departments

The TDM Coordinator role is critical to the success of the TDM plan. As such, the position could benefit from the experience of a current employee who is familiar with the transportation system, local infrastructure, and IUB environment. It is important, however, that at least half of this employee's time is dedicated to the responsibilities described above. As TDM programs start to mature and develop and new programs are introduced on campus, the TDM Coordinator role will require a dedicated full-time employee.

Recommended TDM Programs

The next step is to match the appropriate TDM programs given the range of target drive alone reduction scenarios. The first scenario (Aggressive) includes all of the appropriate potential measures for consideration by the University. The subsequent scenarios include fewer or less aggressive implementation of the TDM measures. A Baseline condition is also presented to illustrate the conditions without expansion of the University's TDM program. The elements of the scenarios are summarized in Exhibit 36 and a description of each measure is provided in the section following.

Exhibit 36 also notes those cases where the measures are implemented to a different degree. For example, ranges of parking price increase are indicated in the first row of the table. Rows that include an "x" indicate implementation of a program that does not have an easily identifiable range of variability. Although particular measures are included in each of the TDM scenarios, it is important to recognize that the degree of

commitment to TDM indicated by the scenario is a more important determinant of success than the specific combination of programs. Also, some programs have a higher direct impact on travel behavior (e.g. parking pricing) while others support people's understanding of and willingness to use alternatives (e.g., TDM marketing program). A robust combination of these types of measures will provide the most effective program.

It is important to note that while a 5 percent per year increase in parking permit prices is recommended to achieve a 10 percent drive alone mode share reduction, this recommended increase should be considered a *minimum* at which to increase prices. Higher parking price increases would place IUB in a stronger position to achieve its drive alone mode share reductions and should be considered. In addition, this increase is intended to be implemented above and beyond any annual adjustments due to inflation.

Exhibit 36 TDM Scenarios

Drive Alone Mode Share Reduction	Aggressive	Moderate	Least Aggressive	Baseline*
	20%	10%	5%	0%
TDM Measures				
1. TDM Coordinator	x	x	x	
2. Parking Consolidation/Relocation		x		
3. No Parking Expansion	x			
4. Parking Price Increase (over 10 years)	10%/year increase	5%/year increase	2%/year increase	Minor
5. Parking Permit Buyback	x			
6. Preferential Carpool Parking Spaces	x	x	x	x
7. Carpool Financial Incentive	Free & Bonus	100%	Discount	Discount
8. Change definition of Carpool to 2+	x	x	x	
9. Bicycle Improvements	Lanes/Paths	Covered Racks	Racks	
10. Pedestrian Improvements	x			
11. Fare-Free Transit	x	x	x	x
12. Commuter Club	x	x		
13. Member Spot-Rewards	x	x		
14. Transportation Events	x			
15. RideSharing	x	x	x	x
16. CarSharing	x	x	x	x
17. Flexible Work Arrangements	x	x		
18. Occasional Parking Program	x	x	x	x
19. Program marketing	x	x	x	
20. Website Enhancements	x	x	x	
21. Guaranteed Ride Home	x	x	x	x
22. A+ Parking Permit	x			
23. Transit Improvements	x	x	x	
24. Bike/Pedestrian Coordinator	x			
25. Single University Card	x	x		

*Note: Although IUB offers existing TDM Programs, they were assumed not to exist due to low awareness of them by potential users.

x Plan element included. Where appropriate, a level of implementation is identified

TDM Measure Descriptions

A different set of TDM measures are implemented for the scenarios illustrated above. The aggressive scenario includes all of the TDM measures listed below while the least aggressive includes a small number of the potential measures.

TDM Coordinator

A full-time TDM Coordinator is essential to coordinate changes with local and regional transportation authorities, assist commuters with their options, program marketing, and program assessment.

Parking Consolidation/Relocation

While the University continues to expand and build on existing surface parking lots, it may be necessary to maintain existing parking supply within or adjacent to the campus core. Consolidation and relocation of parking allows for greater efficiency in providing connections for Campus Bus feeder and distribution routes.

No Parking Expansion

The University would maintain its current parking supply and not create additional spaces.

Parking Price Increase

An aggressive pricing approach would help IUB decrease the number of drive alone commuters that travel to campus. The scenario includes varying initial and incremental increases thereafter to reinforce use of alternatives to driving. It is expected that a range of permit prices would continue to be available and that pricing for each category would be adjusted

to continue to provide a market-driven balance of supply and demand for the various permit categories.

Parking Permit Buyback

A permit buyback program would reward current parking permit holders for surrendering their parking permit and choosing an alternative commute - be it rideshare, transit, bicycling, or walking. The issue of benefits to employees who do not currently hold a permit may or may not need to be addressed. Additionally, the program could be implemented with a grace period, so that the employee can transition into other modes, improving their comfort with accepting the buyback.

Carpool Parking Location

This is a program that is currently offered to registered carpools. Registered carpools have the opportunity to have a reserved parking space in the location of their choosing.

Carpool Financial Incentive

This is another program that is currently offered to registered carpools. IUB allows registered carpools to purchase a Carpool Permit, with the benefits of an A Permit, for the price of a C Parking Permit. In the Moderate Scenario, IUB would offer carpools a free parking permit to attract more commuters to carpool. An even more aggressive approach to increase carpool participation would be to offer a financial incentive to get commuters to carpool together. IUB would offer a stipend in the range of \$100 to \$200 annually, to commuters who carpool to campus daily. The program could have varied bonus depending on how many people ride in the carpool and which

lot is selected. A perimeter lot might get a larger stipend than a campus core lot.

Bicycle Improvements

The University would address concerns about traffic and bicycle conflicts at certain intersections near campus. Bike lanes/paths would be constructed both on- and off-road. Also bike only paths would be delineated on-campus. These improvements would help improve the safety and convenience of commuting by bicycle. At the less aggressive end of the range, bicycle amenities, like covered and secured storage and access to shower/locker facilities also would aid bicycle commuters.

Pedestrian Improvements

These improvements are essential to getting more commuters to consider walking a viable alternative to driving to campus. Wide, continuous sidewalks provide room and safety to pedestrians, while improved/additional crosswalks and crossing signals would help reduce vehicle conflicts, especially at mid-block locations. Other features, like additional street trees, add shade and visual appeal to streetscapes.

Fare-Free Transit

This is program that is currently offered to all IUB students and employees. Commuters ride Bloomington Transit without paying when boarding. The University maintains a yearly agreement to pay employees' fares on all BT routes.

Hoosier Commuter Club

See below.

Member Spot-Rewards

Providing spot rewards as overall transportation milestones are achieved would help maintain interest in alternative

commuting and possibly lure new participants while encouraging the University community to work together on achieving mode split or parking goals. Spot rewards are inexpensive gifts or benefits to give recognition to individuals who behave in a desirable way. An example, of a spot reward is handing out donuts to bicycle commuters wearing helmets to promote bicycle safety or a gift card to commuter card members who refer a friend.

Transportation Events

University events, like employee and new student orientations, provide great forums to communicate commuting options before people have already developed a travel pattern. The TDM Coordinator would emphasize the cost savings and ecological benefits of alternative commutes, while providing guidance to individuals wondering what the most appropriate option is for them. It could also include local celebrations of national events, like Bike to Work Week in May.

Ridesharing

This program is already offered at IUB, in the form of Zimride. This site helps individuals find for both one-time only trips and daily commute trips. Zimride has had varied success though. A key function of the TDM Coordinator's position should be to help commuters find appropriate ride share partners. Zimride maintains a regional database of participants and the University could help their efforts by providing supplemental service and more personalized attention than the online service.

CarSharing

This program is also already offered at IUB, in the form of Zipcar. Expanding the car sharing service would provide the IUB community with short term car rental options in case someone needed a car to leave campus for errands, appointments, etc.

Flexible Work Arrangements

Telecommuting is an option that some departments and groups currently allow their employees to utilize. It has the clear benefit of taking commuters off the road. Permitting flexible schedules would help shift commuters to different time schedules and may help reduce congestion at the typical peak hours. Another flexible work option is a condensed work week, where employees work the traditional 35-40 hour in a condensed, fewer than five days of work week.

Occasional Parking Program

A flexible parking program provides an option for alternative commuters to take their personal vehicle to campus, a few times a month or so, when their non-single occupancy vehicle commute is not convenient for them. Certain lots and rates would continue to be designated to accommodate these parkers. A flexible parking permit would allow a user to park on campus only a certain number of times, such as two days a week or 30 times a semester, or pay a low fee each day they park on-campus. The later alternative could also escalate in price as a user parks on-campus more often. The implementation and cost of this program can vary greatly. A simpler low-cost implementation could include providing users with a maximum number of scratch-off hang tags per semester or providing scrip books. More expensive implementations include in-car parking meters and installing gate/monitoring

equipment at the entrances of parking lots that are designated for use by flexible parking permits.

Program Marketing

Frequent communications, including email newsletters, articles in student and local newspapers, print advertisements, banners, and involvement University events would help increase the recognition and benefits of alternative modes of commuting.

Website Enhancements

A TDM website would present clear, concise format for the displaying different commuting options. Attention could be given to the various resources available to help people make decisions and the ecological and economic benefits of non-drive alone commutes.

Guaranteed Ride Home

This program is currently offered at IUB, but to registered members of carpools only. The University should expand it to cover all alternative mode commuters: carpoolers, public transit users, walkers and bicyclists. It would allow commuters, in the event of an emergency or a request to stay late at work, to receive transportation service home. This program should help to alleviate commuter's worries about being stuck on-campus in case of various family emergencies.

A+ Parking Permit

This new parking pass would be the only permit valid to park within the core of campus, as the University would define it. The A+ Permit would be priced higher than the A Permit.

Increased Use of Reserved Parking Spaces

Reserved parking space is a program already offered at IUB. It allows, for a premium price, an individual to have any exclusive parking space on-campus. These are spaces that are primarily next to academic and office buildings in the campus core. This program would reduce vehicles traveling in the campus core to a minimum, as only commuters with reserved parking spaces would be entering.

Limit Students Parking

Students do a good job of using alternative modes to commute to campus. However, approximately 45% of on-campus students and 80% of off-campus students still have a car with them at school. Programs to emphasize that students don't need a car in Bloomington would help reduce this, as well as policies such as not allowing freshmen to park on-campus.

Transit Improvements

Improvement to the transit system, specifically BT, would be implemented in all scenarios with varying degrees of aggressiveness. Since so many commuters live near BT routes, IUB should engage them to take transit when possible. Some desired improvements include more direct routes, more

frequent service, extended hours, and improved bus stop amenities. Another way to encourage transit use is to engage commuters before they come to campus in an effort to get them to live near transit routes. All transit improvements would need to be implemented by BT and therefore the University would need to work closely with them.

Bike/Pedestrian Coordinator

Currently, there is no employee at IUB who exclusively focuses on bicycle and pedestrian accommodations and improvements. A bicycle/pedestrian point person would be able to receive concerns about problems on and around campus, work with the city to improve off-campus facilities, ensure on-campus facilities are well maintained. Some of the duties of the

Single University Card

The University and BT currently require a separate BT bus pass for employees to ride BT fare-free. This additional card is a barrier to some to riding BT. A Single University Card would allow employees to just flash their IUB ID card to ride BT, similar to how students board. This program could also be expanded to serve all University needs, such as their parking entry card or bike locker key.

Policy

In addition to a overarching sustainability policy, IUB can adopt other policies to help curb the use of single occupied vehicles. The following are some policies that could be adopted to achieve this end.

- Consider policies for encouraging telecommuting and reduced work week options
- Encourage employees and students to live closer to campus
- Increase on-campus student housing stock
- Campus development transportation fee – include the cost of providing transportation to new campus development cost estimates and require that sufficient funds to support transportation programs be raised as part of the capital campaign
- Increase parking permit prices
- Set aside a specific percent of parking revenue for alternative modes facilities, programs and services

Infrastructure

Physical improvements to the campuses and connecting communities provide an important complement to TDM strategies and encourage use of alternate modes of transportation. These improvements can range from uniform wayfinding signage to intersection treatments that enhance pedestrian and bicycle accommodation. The goal of the improvements is to form a comprehensive system of measures that encourage University faculty, staff, and students to choose alternate modes of transportation when destined to the University and moving between campus locations. It is recognized that infrastructure and capital planning may require the coordination with several departments within IUB as well as city (and potentially county/state agencies). Below is a list of tasks and studies that can help support the case for additional infrastructure.

- Integrate on-campus pedestrian and bicycle accommodations with City of Bloomington ped/bike master plan
- Analyze locations and design of midblock crossings across 3rd Street
- Analyze improving pedestrian and bicycle accommodations across Bypass at:
 - 3rd and 10th Street (priority)
 - Fee Lane and Dunn Street (secondary)
- Analyze dedicated bicycle path between Fee Lane and 10th Street to Woodlawn and 3rd Street
- Invest in parking management gate system to enable Occasional Parking Pass system through permit swipes

Hoosier Commuter Club

Commuter clubs are tools used to market and organize commuter benefits in addition to building a sense of community amongst its participants. The Hoosier Commuter Club would be overseen by the TDM Coordinator. The following are a list of some of the benefits that a commuter club can bring.

- Enables strong initial launch of comprehensive TDM Plan
- Single “one-stop shop” for all commuter information
- Organize and distribute benefits
- Mechanism to collect information about alternative mode use through registration
- Provide commuters a sense of community
- Marketing and commuter benefits branding mechanism
- Elevated level of employee engagement

The table below provides an example of the structure of the commuter club.

Eligibility	Basic Benefits	Additional Benefits
<ul style="list-style-type: none"> ■ Regularly use any of the following commuter transportation modes <ul style="list-style-type: none"> □ Walk □ Bike □ Transit □ Carpool/Vanpool ■ Surrender the ability to purchase individual parking permits ■ Active full-time faculty or staff member of the IUB campus ■ Register for Hoosier Commuter Club 	<ul style="list-style-type: none"> ■ Guaranteed Ride Home eligible ■ 24 passes per year for stadium lot ■ Ability to purchase up to 8 day passes per month for select garages at reduced rate (e.g., \$4/day) ■ Free access to Bloomington Transit ■ Access to ride-matching site- Zimride ■ Member spot rewards ■ Hoosier Commuter of the Month - \$100/month (one person) ■ Twelve consecutive months of membership gets reward (e.g., \$20 deposited to CampusAccess Card) 	<ul style="list-style-type: none"> ■ Carpool (2 individuals): <ul style="list-style-type: none"> □ 20% off permit cost □ Reserved spots from 6am to 10am ■ Carpool (3+ individuals) <ul style="list-style-type: none"> □ Premium reserved parking space □ Split cost of “C” permit ■ Biking <ul style="list-style-type: none"> □ Free bicycle registration

Growth Estimates and the Cost of Building Additional Parking

The Campus Master Plan does not anticipate significant growth within the next 10 years at IUB. Much of the IUB development on and proximate to campus will be backfilling of much needed academic, office, and residential space to support the current number of employees and students on campus. Discussions with campus representatives also suggest that there will be little to no growth in the near future. However, current employee population trends suggest an average growth in the number of employees of approximately 2.3 percent per year, with the largest increase occurring from FY 2009 to FY 2010. To account for the potential future employee population on campus, the analysis assumes a growth rate of 1 percent per year. This modest growth rate of 1 percent was suggested by Indiana University Human Resources based on growth over the past 15 years.

Campus employee growth tends to be one of the largest motivators to initiate a review of parking demand and management practices. As campus population grows there is typically significant pressure to build additional parking to accommodate the new employees in a parking constrained environment. Since TDM can curb the demand for parking, institutions look to TDM to decrease the need to build additional, and typically expensive, parking facilities to support future growth. In the case of Indiana University, the total number of existing unoccupied spaces on campus is sufficient to accommodate any likely new number of employees.

In addition, new campus developments are frequently constructed over surface parking lots, simultaneously adding parking demand to an area of campus that it is reducing the parking supply. As such, the typical question asked is should new parking be built and where should it be built.

Given the anticipated growth in the number of employees, and the limited number of desirable parking spaces located near the core of campus, this analysis provides an estimate of what it would cost to provide parking to all new employees. The following are key assumptions used in the analysis:

■ Assumptions:

- Existing employee commuters: 7,915
- Existing drive alone mode share: 73.8%
- Anticipated growth rate: 1%
- 10 year time frame
- All existing desirable parking spaces are occupied
- Capital cost estimate of \$15,000 per space based on recent analysis performed by Walker Parking

Given the assumptions above, approximately 615 new drive alone commuting employees will require new parking spaces, approximately the size of the Fee Lane parking garage (635 parking spaces). At \$15,000 per space, it would cost approximately \$9.2 million in capital expenditure to provide a garage to support these new parkers. This estimate does not include annual operations and maintenance costs to support a

garage this size or account for the externalities of providing this additional parking (e.g., roadway congestion, greenhouse gas emissions, land use opportunities, etc.).

As shown, the capital cost to construct additional parking facilities to support employee growth on campus is significant. The cost to construct parking facilities on campus is typically borne by current permit holders in the form of increased

permit prices. In addition, the current permit purchasers also pay when additional employees park on campus in the form of additional roadway congestion. While some TDM programs may increase operating costs for the University, typically borne by the Office of Parking Operations and thus passed through to their typical revenue stream (parking permit sales), decreased demand on campus will result in positive externalities such as decreased roadway congestion.

Financial Analysis

The estimated additional annual cost to run the suggested TDM programs outlined in the Moderate TDM scenario (above current program expenditures) is presented in Exhibit 37 .

Exhibit 37: TDM Program - Estimated Additional Annual Costs

TDM Program Activity	Estimate of Annual Cost
Redefine Carpool as 2-person and offer 20% discount off A Permit*	\$110,000
Full Time TDM Coordinator	\$56,000 (\$40,000 salary + benefits)
Transit subsidy for additional BT Riders	\$70,000 (in addition to the current \$80,000 cap) as ridership grows
Carpool Parking Location	NA
Occasional Parking Program	Varies (see <i>Occasional Parking Program</i> page 58)
Commuter Club Program Management	TDM Coordinator
Transportation Events	\$5,000
Ride Matching Services	Zimride (continue)
Car Sharing	Zipcar (continue)
Guaranteed Ride Home	\$2,000
Marketing	TDM Coordinator, Zimride, Zipcar
Marketing/Prize TDM Program Budget	\$10,000
Biennial Employee/Staff Commuter Survey	\$10,000/in-house through CSR
Total Annual Cost for Additional TDM Programs	\$263,000

Notes:

- Carpools are currently defined as 3-person. As an incentive, a Carpool Permit is provided to carpoolers for the price of the C permit. Under this scenario, carpools are redefined as 2-person to increase participation and the discount is reduced from the “A to C” discount of approximately 65% to a discount of 20%. In redefining the definition of carpool, permit discounts are provided current 2-person carpools that are not benefiting from a discount and also applied to the estimated number of new carpools being generated by the TDM programs and incentives.
- The full time TDM Coordinator can also be a recent graduate or current employee who is repurposed and focused on supporting and marketing TDM programs and developing new initiatives. Benefits are assumed to be approximately 40 percent of salary.
- Transit subsidy was estimated as 60 cents per trip x 2 trips per day x 200 working days per year x estimated number of new transit users (318).
- A budget of \$5,000 and \$10,000 is provided for cost for TDM promotional events and general marketing costs respectively.
- Guaranteed ride home estimate was based on 50 requests per year at \$40/request.
- Commuter survey costs include incentives and collaborate with Indiana University Center for Survey Research

Offsetting the Cost of TDM programs

As shown in the previous section, constructing additional parking on campus comes with a significant cost. As such, the cost of implementing and operating TDM programs can be

seen as an investment in reducing the need to build future parking facilities. Additional means to offset cost of TDM programs is presented in the following sections.

Increasing Parking Permit Costs

The most cost effective means to reduce the demand for parking on campus is to increase parking permit costs. TCRP Report 95 – Chapter 13, which synthesizes existing studies on parking price elasticities, reports that most parking price elasticities are between -0.1 and -0.3. That is, for every 10% increase in parking price there is a 1 percent to 3 percent reduction in parking. The average (weighted) price for A and C

permits is \$270 per year. Approximately 12,000 A and C permits are sold per year. Based on parking price elasticity and current sales and revenue of A and C permits, Exhibit 38 presents the net revenue change for the sale of A and C permits. Elasticity is presented for three levels low, medium and high, to represent the range of elasticity.

Exhibit 38: Parking Price/Demand Elasticity and Resulting Parking Revenue

			Total A and C Permits sold			Total A and C Permit Revenue			Net Revenue Change		
			Low	Med	High	Low	Med	High	Low	Med	High
Permit Price Increase	Average Annual Permit Price	Monthly Price	Price Elasticity of -0.01	Price Elasticity of -0.02	Price Elasticity of -0.03						
10%	\$297	\$25	12,080	11,958	11,836	\$3,587,968	\$3,551,726	\$3,515,484	\$293,232	\$256,989	\$220,747
20%	\$324	\$27	11,958	11,714	11,470	\$3,874,610	\$3,795,537	\$3,716,463	\$579,874	\$500,800	\$421,726
30%	\$351	\$29	11,836	11,470	11,104	\$4,154,663	\$4,026,168	\$3,897,674	\$859,926	\$731,432	\$602,937
40%	\$378	\$32	11,714	11,226	10,738	\$4,428,126	\$4,243,621	\$4,059,116	\$1,133,389	\$948,884	\$764,379
50%	\$405	\$34	11,592	10,982	10,372	\$4,695,000	\$4,447,895	\$4,200,789	\$1,400,263	\$1,153,158	\$906,053
60%	\$432	\$36	11,470	10,738	10,006	\$4,955,284	\$4,638,989	\$4,322,695	\$1,660,547	\$1,344,253	\$1,027,958
70%	\$459	\$38	11,348	10,494	9,640	\$5,208,979	\$4,816,905	\$4,424,832	\$1,914,242	\$1,522,168	\$1,130,095
80%	\$486	\$41	11,226	10,250	9,274	\$5,456,084	\$4,981,642	\$4,507,200	\$2,161,347	\$1,686,905	\$1,212,463
90%	\$513	\$43	11,104	10,006	8,907	\$5,696,600	\$5,133,200	\$4,569,800	\$2,401,863	\$1,838,463	\$1,275,063
100%	\$540	\$45	10,982	9,762	8,541	\$5,930,526	\$5,271,579	\$4,612,632	\$2,635,789	\$1,976,842	\$1,317,895

As shown in Exhibit 38, the number of A and C permits sold will reduce due to the increase in parking permit prices. However, net revenue increases overall should parking permit prices increase. So as a TDM measure, increasing parking price permit

costs not only decreases parking demand on campus but can also increase revenue to help pay for additional TDM programs and/or improve commuter options.

A+ Parking Permits

Another way to offset the cost of TDM programs is to create an “A+” parking permit for the most desirable parking locations on campus. To understand the potential revenue that can be generated by creating an A+ parking permit, a cordon was created around a central area of campus. The cordon consisted of the area:

- East of Indiana Avenue and west of Jordan Avenue

- North of 3rd Street and south of 7th Street

There are several parking space designations within this area including spaces for A permits, handicapped permits, service vehicles and reserved spaces. Approximately 250 spaces are designated for A permits. For this analysis, it is assumed that a maximum of 250 A+ permits are available. Exhibit 39 presents the estimated additional revenue generated by designating 250 spaces for A+ permits.

Exhibit 39: Estimated Additional Revenue Generated by A+ Permit Program

Permit Price Increase (above existing price)*	20%	40%	60%	80%	100%	150%	200%
Annual A+ Permit Price	\$454.32	\$530.04	\$605.76	\$681.48	\$757.20	\$946.50	\$1,135.80
Additional Revenue	\$18,930.00	\$37,860.00	\$56,790.00	\$75,720.00	\$94,650.00	\$141,975.00	\$189,300.00

*Current A Permit Price = \$378.60/year

As shown in Exhibit 39, between \$18,930 and \$189,300 of additional revenue can be generated by increasing the permit price of 250 spaces between 20 and 200 percent.

Additional Reserved Parking Spaces

The current parking scheme at IUB is based on designated parking spaces, allowing all those who purchase a permit for a specific permit to park in any parking facility which is designated with the same permit type as the purchased parking permit. The Office of Parking Operations also sells a limited number of reserved parking space permits for a premium (\$1,389.12), enabling an individual or department to reserve a specific parking space on campus. No other vehicle is permitted to park in this reserved space. Expanding this

reserved parking space program creates an opportunity to generate additional revenue. The Office of Parking Operations can provide reserved spaces to any individual or department willing to pay for the reserved parking space permit price. In addition, Parking Operations can set various parameters for these reserved spaces such as:

- Individual/Departmental eligibility
- Maximum number of spaces (by lot, campus wide)

■ Designated parking facilities

For this example, the cordon presented in the previous section was used and the maximum number of spaces that can be

designated as reserved spaces was set to 250. The estimated additional revenue generated by expanding the reserved parking space program is presented in Exhibit 40.

Exhibit 40: Estimated Additional Revenue Generated by Expansion of Reserved Parking Space Program

% of New Reserved Spaces in Cordon	1%	2%	3%	4%	5%	10%	15%	20%
# Additional Reserved Parking Spaces	3	5	8	10	13	25	38	50
Additional Parking Revenue	\$3,031.56	\$5,052.60	\$8,084.16	\$10,105.20	\$13,136.76	\$25,263.00	\$38,399.76	\$50,526.00

Note: Max number of spaces in cordon = 250 spaces; Reserved Space Permit Price = \$1,389.12/year;

Additional Parking Revenue = # spaces * (Price of Reserved Space – Price of A Permit)

Performance Metrics

Success of IUB's TDM Plan is linked to the scenario that the University chooses. Based on the moderate scenario, IUB should expect a drive alone mode share reduction of approximately 10 percent. For this reason, this report recommends that IUB use mode share shift and the reduction in drive alone commuting as the TDM Plan's measure of success.

Mode share is a measurement of the change in the employee mode share. As discussed previously, mode share is the percent of each type of commute mode used by IUB employees. The baseline for this measurement is provided in this report, and would require conducting a survey similar to the 2012 Transportation survey annually or every two years. The survey was prepared in anticipation of using it as a

monitoring tool and the responses to questions by individuals are tracked to see if their travel behavior changes over time.

A secondary metric is to monitor TDM/alternative transportation program use. For example, change in the number of registered carpools, membership in commuter club, etc. could be a good way to monitor the success of programs or to determine whether programs or marketing need to be altered.

While mode share is recommended as the measurement of success of the TDM Plan, there are others means of measurement. They include:

- *Greenhouse Gas Emissions* – This is a measurement in the reduction of greenhouse

gases (GHG) that the University as a whole produces. This includes transportation (commuters and fleet vehicles), campus electricity use, and IUB facilities heating. Often, transportation is the largest GHG emitter; some universities produce 50% of their GHG load through transportation. In these situations, successful TDM plans can have a major effect on GHG emissions. Additional studies would be needed to be conducted for GHG emissions to be a viable option for a measurement for success at IUB.

- *Vehicle Miles Traveled* – This is a measurement of the reduction of vehicle miles traveled (VMT) by IUB community members. VMT are the total miles that IUB community members travel divided by the average number members in the vehicle.

TDM plans reduce drive alone commuters and drive alone trips during the middle of the work day (either by increasing the vehicle occupancy of each vehicle or by removing the drive alone trip due to alternative mode use). Again, additional studies would be needed to be conducted for VMT to be a viable option for a measurement for success at IUB. It is also difficult to quantify the number of trips and their distances conducted during the middle of the day.

- *Program Awareness*- As shown by the survey results, many employees are not familiar with the existing TDM programs or are aware that they exist. As such, subsequent surveys can help IUB know whether marketing efforts are working to increase awareness of new or existing programs.

Performance Monitoring

Performance monitoring should occur in order to measure the effectiveness of existing and future transportation services. Monitoring efforts, such as parking lot data collection and transportation surveys, provide valuable information to the Office of Parking Operations

to better understand current and future behavior on campus and demonstrate the effectiveness and performance of current and future TDM programs. With this data, IUB can adjust policies and strategies to better suit its needs.

Chapter 4: Implementation Plan

The following section describes a series of recommendations to address existing transportation needs at the University and provide a platform for moving forward.

Priority TDM Actions

TDM PROGRAM	TIMELINE	MONITORING REQUIREMENTS
TDM coordinator	Part-Time - Activate in Spring 2013 Full-Time - Activate in Fall 2013	Establish annual work program with defined program development and implementation goals
Marketing and Outreach Budget	Activate in Spring 2013	
UPass	On-going	Record ridership and employee card use
Zimride – Ride Matching Services	On-going	Record membership registration and number carpools generated
Zipcar-Carsharing	On-going	Record vehicle utilization and membership
Guaranteed Ride Home	On-going	Record number of requests and reimbursements
Carpool/Vanpool preferential parking	On-going	Record preferred parking locations by type of user. Record usage of preferred parking by location and time.
Redefine Carpool as 2-person and offer 20% discount off A Permit	Activate in Fall 2013	Record monthly, by semester and annual usership Monitor and enforce against potential fraud Record permit usage by location, time of day, day of week, semester, etc. Record impact on revenues
Occasional Parking Program	Activate paper scratch permits in Fall 2013 Study technology and gate upgrade requirements Activate automated system Fall ???	Record monthly, by semester and annual usership Monitor and enforce against potential fraud Record permit usage by location, time of day, day of week, semester, etc.
Hoosier Commuter Club Program	Initiate Spring 2013 Activate in Fall 2013	Record membership and program use
Enhanced Marketing	Activate in Spring 2013	
Biennial Employee/Staff Commuter Survey	On-going	Record change in the number of participants in TDM programs and change in mode share

Establish Transportation Operations and Planning Working Group	Initiate Fall 2012 Activate Spring 2013
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Near Term TDM Actions

TDM PROGRAM	TIMELINE	MONITORING REQUIREMENTS
Encourage staff/faculty residency in Bloomington/within 1 mile	Ongoing	Monitor number of staff/faculty residing within 1 mile of campus
Commuter parking price increases	Initiate Spring 2013 Activate Fall 2013	Track the impact on number of parking permit and revenue
Establish Sustainability Policy Around Transportation	Activate in 2012-2013	
Work arrangements policy/ program	Initiate Fall 2012 Activate 2013-2014	Record number of participants
Telework policy/program	Initiate Fall 2012 Activate 2013-2014	Record number of participants