CITIZENS ADVISORY COMMITTEE

August 26, 2020

6:30 - 8:00 p.m.

Virtual Location via Zoom https://bloomington.zoom.us/j/96641615573

Clicking on the link will take you to the meeting. You will automatically receive a dial-in number if you want to use your phone for audio and not your computer microphone.

Suggested Time:	
~6:30 p.m.	I. Call to Order and Introductions
	II. Approval of Meeting Agenda*
	III. Approval of Minutes* a. June 24, 2020
	IV. Communications from the Chair and Vice Chair
	V. Reports from Officers and/or Committees
	VI. Reports from the MPO Staff
~7:00 p.m.	VII. Old Business - None
	VIII. New Business a. FY 2020 – 2024 Transportation Improvement Amendments (1) DES#2001708 & DES#2001709 – Statewide Safety Consulting (2) DES#1700735 - B-Line Trail Extension (3) DES#1700976 - Crosswalk Improvements (4) DES#1900403 - Curb Ramp (5) DES#1900404 - Guardrail (6) DES#1500398 - Jackson Creek Trail
~7:30 p.m.	b. Draft BMCMPO 2045 Metropolitan Transportation Plan
	IX. Communications from Committee Members *(non-agenda items)* a. Topic Suggestions for Future Agendas
	X. Upcoming Meetings c. Policy Committee – September 11, 2020 at 1:30 p.m. (Virtual) d. Technical Advisory Committee – September 23, 2020 at 10:00 a.m. (Virtual) e. Citizens Advisory Committee – September 23, 2020 at 6:30 p.m. (Virtual)
~8:00 p.m.	Adjournment

**Action Requested / Public comment prior to vote (limited to five minutes per speaker).*

Auxiliary aids for people with disabilities are available upon request with adequate notice. Please call 812-349-3429 or e-mail human.rights@bloomington.in.gov.

STIP AMENDMENT and/or MODIFICATION REQUEST

	Amendme
	Modificati

Date: 6/23/2020

Requestor: *Emmanuel Nsonwu*

Sponsor	DES	Route	Work Type	Location	County	District	Miles	Federal Category	Asset Program - (State Projects Only)	Phase	Federal	Match	2021	2022	2023	2024	Estimated Cost Left to Complete Project	Remarks
INDOT	2001708	Various	Other Type Project (Miscellaneous)	Statewide; Various Locations	Various	Multiple	Varies	STP	Statewide	PE	$666,263.00	$166,566.00	$832,829.00				$832,829.00	PE Funding for FY 2021 for Statewide Safety Consulting.
INDOT	2001709	Various	Other Type Project (Miscellaneous)	Statewide; Various Locations	Various	Multiple	Varies	STP	Statewide	PE	$200,000.00	$50,000.00	$250,000.00				$250,000.00	PE Funding for FY 2021 for Statewide Safety Consulting.

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Project Request Form

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Fax: (812) 349-3530

Section 1: Local Public Agency Information

- ☒ City of Bloomington
- ☐ Monroe County
- ☐ Town of Ellettsville
- ☐ Indiana University
- ☐ Bloomington Transit
- ☐ Rural Transit
- ☐ INDOT
- ☐ _____

Employee in Responsible Charge (ERC): Roy Aten
Phone: 812-349-3423
Email: atenro@bloomington.in.gov

Section 2: Verification

I hereby certify that the information submitted as part of this form is complete and accurate. Furthermore, if applicable, I certify that the project complies with the BMCMPO Complete Streets Policy.

Employee in Responsible Charge (ERC) — Date: 8/18/20

Section 3: Project Information

A. Project Name: B-Line Trail Connection

B. Is project already in the TIP?
☒ Yes ☐ No

C. DES # (if assigned): 1700735

D. Project Location (detailed description of project termini):

Project will connect the existing B-Line Trail terminus at Adams Street with the multiuse path on the 17th Street I-69 overpass. The project is expected to follow the railroad corridor from Adams Street to Fountain Drive, follow Fountain Drive from the railroad corridor to Crescent Road, and then follow Crescent Road from Fountain Drive to 17th Street.

E. Please identify the primary project type (select only one):

- ☒ Bicycle & Pedestrian
- ☐ Bridge
- ☐ Road – Intersection
- ☐ Road – New/Expanded Roadway
- ☐ Road – Operations & Maintenance
- ☐ Road – Reconstruction/Rehabilitation/Resurfacing
- ☐ Sign
- ☐ Signal
- ☐ Transit

F. Project Support (local plans, LRTP, TDP, etc.):
Bicycle and Pedestrian Transportation & Greenways System Plan; ADA Transition Plan; current TIP; project is consistent with visions of both MPO and City long range plans; this project has also been the source of discussions between City of Bloomington and Monroe County officials regarding the need to improve connectivity between the trails systems of these two entities.

G. Allied Projects: B-Line Trail, 17th Street (I-69 overpass to Arlington/Monroe roundabout), 17th Street I-69 Overpass, Vernal Pike Multiuse Path, Karst Farm Trail/County Trail System.

H. Does the Project have an Intelligent Transportation Systems (ITS) component?
☐ Yes ☒ No
If yes, is the project included in the MPO's ITS Architecture?
☐ Yes ☐ No

I. Anticipated Letting Date: November 2021

Section 4: Financial Plan

Identify all anticipated costs for all phases of the project, including any costs anticipated in years beyond the scope of this TIP. All phases must incorporate a four percent (4%) per year inflation factor per BMCMPO policy. All CN phases must include an appropriate amount of funding for construction inspection in addition to project construction costs.

Note: Fiscal Year 2021 begins on July 1, 2020, and ends on June 30, 2021.

Phase	Funding Source	FY 2021	FY 2022	FY 2023	FY 2024	Future	*Outlying Years*
PE			$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
RW	Local	$ 179,410	$	$	$	$	$
	STP	$ 717,640	$	$	$	$	$
		$	$	$	$	$	$
CE	Local	$	$ 225,000	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
CN	Local	$	$ 1,800,000	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
	Totals:	$ 897,050	$ 2,035,000	$	$	$	$

Section 5: Complete Streets Policy

A. Select one of the following:

☒ **Compliant** - This project is subject to the Complete Streets Policy because it involves the new construction or reconstruction of local roadways that will use federal funds through the BMCMPO for any phase of project implementation. *Additional Information items **1-8** (below) must be submitted for Compliant projects.*

☐ **Not Applicable** - This project is not subject to the Complete Streets Policy because it is a transit project, a non-roadway project, a resurfacing activity that does not alter the current/existing geometric designs of the roadway, or is a project that uses federal funds for which the BMCMPO does NOT have programming authority. *No Additional Information items (below) have to be provided for projects to which the Complete Streets Policy does not apply.*

☐ **Exempt** – The LPA is requesting that this project be exempted from the Complete Streets Policy due to certain circumstances or special constraints, as detailed in Section IV of the Complete Streets Policy. Please provide a detailed explanation of why the project should be exempted. *Additional Information items **1, 4-8** (below) must be submitted for Exempt projects.*

Justification for Exemption: _____

B. Additional Information:

Attach to this application form the following information as required by the Complete Streets Policy. If any items are unknown at the time of application, the applicant may indicate that "specific information has not yet been determined." Any required information not provided at the time of this application must be reported to the MPO as soon as it becomes available.

1) Detailed Scope of Work – Provide relevant details about the project that would be sufficient to use when seeking consulting services (detailed project description, vehicular elements, non-vehicular elements, new construction/reconstruction).
Project will connect the existing B-Line Trail terminus at Adams Street with the multiuse path on the 17th Street I-69 overpass. The project is expected to follow the railroad corridor from Adams Street to Fountain Drive (multiuse trail), follow Fountain Drive from the railroad corridor to Crescent Road (multiuse path), and then follow Crescent Road from Fountain Drive to 17th Street (multiuse path). Project is also expected to include intersection modifications along the corridor to improve both safety and mobility.

2) Performance Standards – List specific performance standards for multimodal transportation, including, but not limited to transit, pedestrian, bicycle, and automobile users, ADA and Universal Design, environmental, utilities, land use, right of way, historic preservation, maintenance of services plan, and any other pertinent design component in relation to current conditions, during implementation/construction, and upon project completion.
Project will be constructed to improve safety and comfort for users of all ages and abilities. Project will comply with PROWAG, the City's adopted accessibility standards. Project will comply with all required environmental and historical regulations per the federal process. Project will have an appropriate maintenance of traffic plan to accommodate all users during construction.

3) Measurable Outcomes – Identify measurable outcomes the project is seeking to attain (e.g. safety, congestion and/or access management, level-of-service, capacity expansion, utility services, etc.).
Project seeks to improve safety, comfort, and accessibility for people using active transportation. Project will improve overall street capacity by providing transportation options.

4) Project Timeline – Identify anticipated timelines for consultant selection, public participation, design, right-of-way acquisition, construction period, and completion date.
Preliminary engineering is underway and nearly 95% complete. Public participation was completed in 2019. Right of way acquisition was delayed in 2020 in the title research phase, it has progressed to appraisals and is waiting for completion of the Environmental Review before advancing to acquisition. Construction is expected in 2022.

5) Key Milestones – identify key milestones (approvals, permits, agreements, design status, etc.).
All permits will be applied for at the appropriate time in project development. Engineering is nearly completed. Public participation was completed in 2019. Right of way acquisition is expected to continue in 2020. Construction is expected in 2022.

6) Project Cost – Identify any anticipated cost limitations, additional funding sources, project timing, and other important cost considerations not included in the table above.
Project is limited by amount of available MPO funding. Local match is expected to be significantly larger than 20%. Construction and Construction Inspection will be 100% locally funded.

7) Public Participation Process – Describe the public participation process (types of outreach, number and type of meetings, etc.), and the benchmark goals for the project (participation rates, levels of outreach, levels of accountability and corresponding response methods to input received, etc.).
Project will be discussed at the MPO and the Bloomington Bicycle and Pedestrian Safety Commission. Those groups will receive updates about the project during development. Individual property owners adjacent to the project will be contacted after right of way impacts are determined. A public information meeting was held in 2019 and another meeting is anticipated in 2021. Additional meetings or hearings may be necessary. Final details on public participation will be developed during the design phase. All comments and questions regarding the project will be considered and addressed as appropriate.

8) Stakeholder List – Identify the key parties/agencies/stakeholders/interest groups anticipated to be engaged during project development and their respective purpose for being on the list.
INDOT, BMCMPO, various City of Bloomington Departments, Bicycle and Pedestrian Safety Commission, adjacent neighborhood associations, adjacent property owners/tenants, and other interested parties.

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Section 1: Local Public Agency Information

- ☒ City of Bloomington
- ☐ Monroe County
- ☐ Town of Ellettsville
- ☐ Indiana University
- ☐ Bloomington Transit
- ☐ Rural Transit
- ☐ INDOT
- ☐ _____

Employee in Responsible Charge (ERC): Neil Kopper
Phone: 812-349-3423
Email: koppern@bloomington.in.gov

Section 2: Verification

I hereby certify that the information submitted as part of this form is complete and accurate. Furthermore, if applicable, I certify that the project complies with the BMCMPO Complete Streets Policy.

Employee in Responsible Charge (ERC) — Date: 8/18/2020

Section 3: Project Information

A. Project Name: Crosswalk Improvements Project

B. Is project already in the TIP?
☒ Yes ☐ No

C. DES # (if assigned): 1700976

D. Project Location (detailed description of project termini):
This project is expected to include improvements at roughly 25 crosswalks located on streets maintained and operated by the City of Bloomington.

E. Please identify the primary project type (select only one):

- ☒ Bicycle & Pedestrian
- ☐ Bridge
- ☐ Road – Intersection
- ☐ Road – New/Expanded Roadway
- ☐ Road – Operations & Maintenance
- ☐ Road – Reconstruction/Rehabilitation/Resurfacing
- ☐ Sign
- ☐ Signal
- ☐ Transit

F. Project Support (local plans, LRTP, TDP, etc.):
Bicycle and Pedestrian Transportation & Greenways System Plan; ADA Transition Plan; currently in TIP; project is consistent with the visions of both the MPO and City long range plans

G. Allied Projects: Downtown Curb Ramps Project, Pedestrian Safety and Accessibility at Signalized Intersections, School Zone Enhancements Project

H. Does the Project have an Intelligent Transportation Systems (ITS) component?
☐ Yes ☒ No
If yes, is the project included in the MPO's ITS Architecture?
☐ Yes ☐ No

I. Anticipated Letting Date: ___December 9, 2020_____

Section 4: Financial Plan

Identify all anticipated costs for all phases of the project, including any costs anticipated in years beyond the scope of this TIP. All phases must incorporate a four percent (4%) per year inflation factor per BMCMPO policy. All CN phases must include an appropriate amount of funding for construction inspection in addition to project construction costs.

Note: Fiscal Year 2021 begins on July 1, 2020, and ends on June 30, 2021.

Phase	Funding Source	FY 2021	FY 2022	FY 2023	FY 2024	Future	*Outlying Years*
PE		$	$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
RW		$	$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
CE	Local	$ 5,250	$	$	$	$	$
	HSIP	$ 47,250	$	$	$	$	$
		$	$	$	$	$	$
CN	Local	$ 38,424	$	$	$	$	$
	HSIP	$ 341,576	$	$	$	$	$
		$	$	$	$	$	$
	Totals:	$ 432,500	$	$	$	$	$

Section 5: Complete Streets Policy

A. Select one of the following:

☒ **Compliant** - This project is subject to the Complete Streets Policy because it involves the new construction or reconstruction of local roadways that will use federal funds through the BMCMPO for any phase of project implementation. *Additional Information items **1-8** (below) must be submitted for Compliant projects.*

☐ **Not Applicable** - This project is not subject to the Complete Streets Policy because it is a transit project, a non-roadway project, a resurfacing activity that does not alter the current/existing geometric designs of the roadway, or is a project that uses federal funds for which the BMCMPO does NOT have programming authority. *No Additional Information items (below) have to be provided for projects to which the Complete Streets Policy does not apply.*

☐ **Exempt** – The LPA is requesting that this project be exempted from the Complete Streets Policy due to certain circumstances or special constraints, as detailed in Section IV of the Complete Streets Policy. Please provide a detailed explanation of why the project should be exempted. *Additional Information items **1, 4-8** (below) must be submitted for Exempt projects.*

Justification for Exemption: _____

B. Additional Information:

Attach to this application form the following information as required by the Complete Streets Policy. If any items are unknown at the time of application, the applicant may indicate that "specific information has not yet been determined." Any required information not provided at the time of this application must be reported to the MPO as soon as it becomes available.

1) Detailed Scope of Work – Provide relevant details about the project that would be sufficient to use when seeking consulting services (detailed project description, vehicular elements, non-vehicular elements, new construction/reconstruction).

This project will install or enhance pedestrian crosswalks. Improvements may include marked crosswalks, accessible curb ramps, warning signs, flashing beacons, median refuge islands, curb bulbouts, raised crosswalks, and other traffic calming features.

2) Performance Standards – List specific performance standards for multimodal transportation, including, but not limited to transit, pedestrian, bicycle, and automobile users, ADA and Universal Design, environmental, utilities, land use, right of way, historic preservation, maintenance of services plan, and any other pertinent design component in relation to current conditions, during implementation/construction, and upon project completion.

Project will be designed and constructed to meet current accessibility requirements.

3) Measurable Outcomes – Identify measurable outcomes the project is seeking to attain (e.g. safety, congestion and/or access management, level-of-service, capacity expansion, utility services, etc.).

Project seeks to reduce crash risk for pedestrians by improving safety and accessibility of crosswalks.

4) Project Timeline – Identify anticipated timelines for consultant selection, public participation, design, right-of-way acquisition, construction period, and completion date.

Consultant selection, public participation, and design expected to begin in 2019. Work is expected to take place within existing right of way. Construction and completion are expected in 2021.

5) Key Milestones – identify key milestones (approvals, permits, agreements, design status, etc.).

All applicable permits and approvals will be secured at appropriate times. Key milestones will include Stage 3 and Final Tracings submissions.

6) Project Cost – Identify any anticipated cost limitations, additional funding sources, project timing, and other important cost considerations not included in the table above.

None.

7) Public Participation Process – Describe the public participation process (types of outreach, number and type of meetings, etc.), and the benchmark goals for the project (participation rates, levels of outreach, levels of accountability and corresponding response methods to input received, etc.).

Public involvement is currently expected to involve one meeting to discuss location and type of crosswalk improvements. This discussion may be scheduled to be a part of another public meeting for a relevant group such as the Bicycle and Pedestrian Safety Commission (BPSC).

8) Stakeholder List – Identify the key parties/agencies/stakeholders/interest groups anticipated to be engaged during project development and their respective purpose for being on the list.

Project may receive input from city staff, MPO TAC, MPO CAC, BPSC, and the general public.

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Project Request Form

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Fax: (812) 349-3530

Section 1: Local Public Agency Information

- ☒ City of Bloomington
- ☐ Monroe County
- ☐ Town of Ellettsville
- ☐ Indiana University
- ☐ Bloomington Transit
- ☐ Rural Transit
- ☐ INDOT
- ☐ _____

Employee in Responsible Charge (ERC): Roy Aten
Phone: 812-349-3423
Email: atenro@bloomington.in.gov

Section 2: Verification

I hereby certify that the information submitted as part of this form is complete and accurate. Furthermore, if applicable, I certify that the project complies with the BMCMPO Complete Streets Policy.

Employee in Responsible Charge (ERC) — Date: 8/18/20

Section 3: Project Information

A. Project Name: Downtown Curb Ramps Phase 3

B. Is project already in the TIP?
☒ Yes ☐ No

C. DES # (if assigned): 1900403

D. Project Location (detailed description of project termini): Numerous locations in and near downtown Bloomington that require accessible curb ramps.

E. Please identify the primary project type (select only one):

- ☒ Bicycle & Pedestrian
- ☐ Bridge
- ☐ Road – Intersection
- ☐ Road – New/Expanded Roadway
- ☐ Road – Operations & Maintenance
- ☐ Road – Reconstruction/Rehabilitation/Resurfacing
- ☐ Sign
- ☐ Signal
- ☐ Transit

F. Project Support (local plans, LRTP, TDP, etc.):

BMCMPO 2040 Metropolitan Transportation Plan – Goals include "Use local Americans with Disabilities Act (ADA) Transition Plans to identify deficiencies and implement projects that ensure and promote integration of ADA components into the transportation system."
BMCMPO Complete Streets Policy – Goals include "To ensure that the safety and mobility of all users of the transportation system are accommodated…."
Bloomington Comprehensive Plan – Policies include "Prioritize safety and accessibility over capacity in transportation planning, design, construction, and maintenance decisions."

G. Allied Projects: Downtown Curb Ramps Phase 1, Downtown Curb Ramps Phase 2

H. Does the Project have an Intelligent Transportation Systems (ITS) component?

☐ Yes ☒ No

If yes, is the project included in the MPO's ITS Architecture?

☐ Yes ☐ No

I. Anticipated Letting Date: October 13, 2022

Section 4: Financial Plan

Identify all anticipated costs for all phases of the project, including any costs anticipated in years beyond the scope of this TIP. All phases must incorporate a four percent (4%) per year inflation factor per BMCMPO policy. All CN phases must include an appropriate amount of funding for construction inspection in addition to project construction costs.

Note: Fiscal Year 2021 begins on July 1, 2020, and ends on June 30, 2021.

Phase	Funding Source	FY 2021	FY 2022	FY 2023	FY 2024	Future	*Outlying Years*
PE	HSIP	$ 81,858	$	$	$	$	*$*
	Local	$ 9,096	$	$	$	$	*$*
		$	$	$	$	$	*$*
RW		$	$	$	$	$	*$*
		$	$	$	$	$	*$*
		$	$	$	$	$	*$*
CE	HSIP	$	$	$ 61,393	$	$	*$*
	Local	$	$	$ 6,822	$	$	*$*
		$	$	$	$	$	*$*
CN	HSIP	$	$	$ 409,291	$	$	*$*
	Local	$	$	$ 45,477	$	$	*$*
		$	$	$	$	$	*$*

	Totals:	$ 90,954	$	$ 522,983	$	$	$

Section 5: Complete Streets Policy

A. Select one of the following:

☒ **Compliant** - This project is subject to the Complete Streets Policy because it involves the new construction or reconstruction of local roadways that will use federal funds through the BMCMPO for any phase of project implementation. *Additional Information items **1-8** (below) must be submitted for Compliant projects.*

☐ **Not Applicable** - This project is not subject to the Complete Streets Policy because it is a transit project, a non-roadway project, a resurfacing activity that does not alter the current/existing geometric designs of the roadway, or is a project that uses federal funds for which the BMCMPO does NOT have programming authority. *No Additional Information items (below) have to be provided for projects to which the Complete Streets Policy does not apply.*

☐ **Exempt** – The LPA is requesting that this project be exempted from the Complete Streets Policy due to certain circumstances or special constraints, as detailed in Section IV of the Complete Streets Policy. Please provide a detailed explanation of why the project should be exempted. *Additional Information items **1, 4-8** (below) must be submitted for Exempt projects.*

Justification for Exemption: _____

B. Additional Information:

Attach to this application form the following information as required by the Complete Streets Policy. If any items are unknown at the time of application, the applicant may indicate that "specific information has not yet been determined." Any required information not provided at the time of this application must be reported to the MPO as soon as it becomes available.

1) Detailed Scope of Work – Provide relevant details about the project that would be sufficient to use when seeking consulting services (detailed project description, vehicular elements, non-vehicular elements, new construction/reconstruction).

Project will modify or reconstruct curb ramps and accessible routes in the downtown Bloomington area to meet current accessibility guidelines. Work may include curb bumpouts, accessible connections to transit stops, or other modifications based on site specific context. Work will take place in and around the downtown area and locations will be prioritized to focus on locations with low accessibility compliance and high levels of interaction between pedestrians and motor vehicles.

2) Performance Standards – List specific performance standards for multimodal transportation, including, but not limited to transit, pedestrian, bicycle, and automobile users, ADA and Universal Design, environmental, utilities, land use, right of way, historic preservation, maintenance of services plan, and any other pertinent design component in relation to current conditions, during implementation/construction, and upon project completion.

Project will be designed and constructed to meet current accessibility requirements.

3) Measurable Outcomes – Identify measurable outcomes the project is seeking to attain (e.g. safety, congestion and/or access management, level-of-service, capacity expansion, utility services, etc.).

Project seeks to reduce crash risk for pedestrians by ensuring accessible transitions between the sidewalk and the street at crosswalk locations.

4) Project Timeline – Identify anticipated timelines for consultant selection, public participation, design, right-of-way acquisition, construction period, and completion date.

Consultant selection, public participation, and design expected to begin in 2021. Work is expected to take place within existing right of way. Construction and completion are expected in 2023.

5) Key Milestones – identify key milestones (approvals, permits, agreements, design status, etc.).
Minimal permits and approvals are anticipated for this project. Key milestones will include Stage 3 and Final Tracings submissions.

6) Project Cost – Identify any anticipated cost limitations, additional funding sources, project timing, and other important cost considerations not included in the table above.
None.

7) Public Participation Process – Describe the public participation process (types of outreach, number and type of meetings, etc.), and the benchmark goals for the project (participation rates, levels of outreach, levels of accountability and corresponding response methods to input received, etc.).
This project is primarily a maintenance effort to bring curb ramps and accessible routes into compliance with accessibility requirements. Public involvement is currently expected to involve one meeting and focus on prioritization of curb ramp locations. This discussion may be scheduled to be a part of another public meeting for a relevant group such as the Council for Community Accessibility (CCA) or the Bicycle and Pedestrian Safety Commission (BPSC).

8) Stakeholder List – Identify the key parties/agencies/stakeholders/interest groups anticipated to be engaged during project development and their respective purpose for being on the list.
Project may receive input from city staff, MPO TAC, MPO CAC, CCA, BPSC, and the general public.

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Section 1: Local Public Agency Information

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- ☐ Bloomington Transit
- ☐ Rural Transit
- ☐ INDOT
- ☐ _____

Employee in Responsible Charge (ERC): Roy Aten
Phone: 812-349-3423
Email: atenro@bloomington.in.gov

Section 2: Verification

I hereby certify that the information submitted as part of this form is complete and accurate. Furthermore, if applicable, I certify that the project complies with the BMCMPO Complete Streets Policy.

Employee in Responsible Charge (ERC) — Date: 8/18/20

Section 3: Project Information

A. Project Name: Guardrail Improvement Project

B. Is project already in the TIP?
☒ Yes ☐ No

C. DES # (if assigned): 1900404

D. Project Location (detailed description of project termini): Numerous locations throughout the City of Bloomington that require new or improved guardrail.

E. Please identify the primary project type (select only one):

- ☐ Bicycle & Pedestrian
- ☐ Bridge
- ☐ Road – Intersection
- ☐ Road – New/Expanded Roadway
- ☒ Road – Operations & Maintenance
- ☐ Road – Reconstruction/Rehabilitation/Resurfacing
- ☐ Sign
- ☐ Signal
- ☐ Transit

F. Project Support (local plans, LRTP, TDP, etc.):

BMCMPO 2040 Metropolitan Transportation Plan – Goals include "Improve the safety of the transportation system for all modes and all users" and "Directly focus on maintaining existing transportation facilities before building new ones." Action items include "low-cost capital improvements for the preservation of safety and roadway capacity through intersection signalization, improved signage, pavement markings, and guardrail improvements…."
BMCMPO Complete Streets Policy – Goals include "To ensure that the safety and mobility of all users of the transportation system are accommodated…."
Bloomington Comprehensive Plan – Policies include "Prioritize safety and accessibility over capacity in transportation planning, design, construction, and maintenance decisions."

G. Allied Projects: 2019 Guardrail Assessment Project (Locally funded)

H. Does the Project have an Intelligent Transportation Systems (ITS) component?

☐ Yes ☒ No

If yes, is the project included in the MPO's ITS Architecture?

☐ Yes ☐ No

I. Anticipated Letting Date: October 14, 2021

Section 4: Financial Plan

Identify all anticipated costs for all phases of the project, including any costs anticipated in years beyond the scope of this TIP. All phases must incorporate a four percent (4%) per year inflation factor per BMCMPO policy. All CN phases must include an appropriate amount of funding for construction inspection in addition to project construction costs.

Note: Fiscal Year 2021 begins on July 1, 2020, and ends on June 30, 2021.

Phase	Funding Source	FY 2021	FY 2022	FY 2023	FY 2024	Future	*Outlying Years*
PE	Local	$ 38,000	$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
RW		$	$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
CE	HSIP	$	$ 56,000	$	$	$	$
	Local	$	$ 6,250	$	$	$	$
		$	$	$	$	$	$
CN	HSIP	$	$ 414,684	$	$	$	$
	Local	$	$ 46,100	$	$	$	$

		$	$	$	$	$	$
	Totals:	$ 38,000	$ 523,034	$	$	$	$

Section 5: Complete Streets Policy

A. Select one of the following:

☒ **Compliant** - This project is subject to the Complete Streets Policy because it involves the new construction or reconstruction of local roadways that will use federal funds through the BMCMPO for any phase of project implementation. *Additional Information items **1-8** (below) must be submitted for Compliant projects.*

☐ **Not Applicable** - This project is not subject to the Complete Streets Policy because it is a transit project, a non-roadway project, a resurfacing activity that does not alter the current/existing geometric designs of the roadway, or is a project that uses federal funds for which the BMCMPO does NOT have programming authority. *No Additional Information items (below) have to be provided for projects to which the Complete Streets Policy does not apply.*

☐ **Exempt** – The LPA is requesting that this project be exempted from the Complete Streets Policy due to certain circumstances or special constraints, as detailed in Section IV of the Complete Streets Policy. Please provide a detailed explanation of why the project should be exempted. *Additional Information items **1, 4-8** (below) must be submitted for Exempt projects.*

Justification for Exemption: _____

B. Additional Information:

Attach to this application form the following information as required by the Complete Streets Policy. If any items are unknown at the time of application, the applicant may indicate that "specific information has not yet been determined." Any required information not provided at the time of this application must be reported to the MPO as soon as it becomes available.

1) Detailed Scope of Work – Provide relevant details about the project that would be sufficient to use when seeking consulting services (detailed project description, vehicular elements, non-vehicular elements, new construction/reconstruction).

Project will utilize a guardrail assessment completed in 2019 to prioritize areas for improvement. Work will focus on upgrading guardrail end treatments to meet current standards. It is expected that replacing/improving/installing guardrail runs will also be necessary. In most instances, this project will be primarily focused on motor vehicle, freight, and transit vehicle safety. However, the project will ensure compliance with the complete streets policy by not adding guardrail in any location or manner that would prevent safe and comfortable use of the right of way by any mode of transportation. The project will also ensure that accommodations are maintained for all modes of transportation during construction operations.

2) Performance Standards – List specific performance standards for multimodal transportation, including, but not limited to transit, pedestrian, bicycle, and automobile users, ADA and Universal Design, environmental, utilities, land use, right of way, historic preservation, maintenance of services plan, and any other pertinent design component in relation to current conditions, during implementation/construction, and upon project completion.

Project will be designed and constructed to meet current requirements for guardrails.

3) Measurable Outcomes – Identify measurable outcomes the project is seeking to attain (e.g. safety, congestion and/or access management, level-of-service, capacity expansion, utility services, etc.).

Project seeks to reduce crash severity by improving/installing guardrails.

4) Project Timeline – Identify anticipated timelines for consultant selection, public participation, design, right-of-way acquisition, construction period, and completion date.

Consultant selection, public participation, and design expected to begin in 2020. Work is expected to take place within existing right of way. Construction and completion are expected in 2022.

5) Key Milestones – identify key milestones (approvals, permits, agreements, design status, etc.).

Minimal permits and approvals are anticipated for this project. Key milestones will include Stage 3 and Final Tracings submissions.

6) Project Cost – Identify any anticipated cost limitations, additional funding sources, project timing, and other important cost considerations not included in the table above.

None.

7) Public Participation Process – Describe the public participation process (types of outreach, number and type of meetings, etc.), and the benchmark goals for the project (participation rates, levels of outreach, levels of accountability and corresponding response methods to input received, etc.).

This project is primarily a maintenance effort to bring existing guardrails into compliance with current regulations. Public input may not be particularly influential for this project. However, unless granted approval by the MPO to waive this requirement, the City anticipates hosting one public meeting to discuss the project and stay in compliance with the complete streets policy. The public meeting for this project may be combined with another public meeting to improve efficiency.

8) Stakeholder List – Identify the key parties/agencies/stakeholders/interest groups anticipated to be engaged during project development and their respective purpose for being on the list.

Project is expected to receive input from city staff, MPO TAC, MPO CAC, neighborhood associations, and the general public.

BLOOMINGTON • MONROE COUNTY
mpo

FY 2020-2024 Transportation Improvement Program
Project Request Form

Mail: Bloomington/Monroe County MPO
401 N. Morton Street, Suite 130
Bloomington, Indiana 47402
Email: martipa@bloomington.in.gov or clemensr@bloomington.in.gov
Fax: (812) 349-3530

Section 1: Local Public Agency Information

- ☒ City of Bloomington
- ☐ Monroe County
- ☐ Town of Ellettsville
- ☐ Indiana University
- ☐ Bloomington Transit
- ☐ Rural Transit
- ☐ INDOT
- ☐ _____

Employee in Responsible Charge (ERC): Roy Aten
Phone: 812-349-3423
Email: atenro@bloomington.in.gov

Section 2: Verification

I hereby certify that the information submitted as part of this form is complete and accurate. Furthermore, if applicable, I certify that the project complies with the BMCMPO Complete Streets Policy.

Employee in Responsible Charge (ERC) — Date: 8/18/20

Section 3: Project Information

A. Project Name: Jackson Creek Trail

B. Is project already in the TIP?
☒ Yes ☐ No

C. DES # (if assigned): 1500398

D. Project Location (detailed description of project termini):

Northern project terminus is located on Arden Drive at the Southeast Park entrance. Project then heads west to High Street and south to Sherwood Oaks Park/Goat Farm at the High Street and Winslow Road roundabout. Project then follows existing trail south until its terminus and continues heading south to Rhorer Road and then east to Sare Road.

E. Please identify the primary project type (select only one):

- ☒ Bicycle & Pedestrian
- ☐ Bridge
- ☐ Road – Intersection
- ☐ Road – New/Expanded Roadway
- ☐ Road – Operations & Maintenance
- ☐ Road – Reconstruction/Rehabilitation/Resurfacing
- ☐ Sign
- ☐ Signal
- ☐ Transit

F. Project Support (local plans, LRTP, TDP, etc.):
Jackson Creek Trail Master Plan (2003), Bicycle and Pedestrian Transportation and Greenways System Plan (2008), and the 2030 Long Range Transportation Plan. Currently in TIP. Project is consistent with the visions of both MPO and City long range plans.

G. Allied Projects: Rogers Road Multiuse Path, Jackson Creek Trail Phase 1, and Fullerton Pike

H. Does the Project have an Intelligent Transportation Systems (ITS) component?
☐ Yes ☒ No
If yes, is the project included in the MPO's ITS Architecture?
☐ Yes ☐ No

I. Anticipated Letting Date: November 2020

Section 4: Financial Plan

Identify all anticipated costs for all phases of the project, including any costs anticipated in years beyond the scope of this TIP. All phases must incorporate a four percent (4%) per year inflation factor per BMCMPO policy. All CN phases must include an appropriate amount of funding for construction inspection in addition to project construction costs.

Note: Fiscal Year 2021 begins on July 1, 2020, and ends on June 30, 2021.

Phase	Funding Source	FY 2021	FY 2022	FY 2023	FY 2024	Future	*Outlying Years*
PE		$	$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
RW		$	$	$	$	$	$
		$	$	$	$	$	$
		$	$	$	$	$	$
CE	Local	$ 54,000	$	$	$	$	$
	STP	$ 216,000	$	$	$	$	$
		$	$	$	$	$	$
CN	Local	$ 383,890	$	$	$	$	$
	STP	$ 1,266,360	$	$	$	$	$
	TAP	$ 155,801	$	$	$	$	$
	Totals:	$ 2,076,051	$	$	$	$	$

Section 5: Complete Streets Policy

A. Select one of the following:

☒ **Compliant** - This project is subject to the Complete Streets Policy because it involves the new construction or reconstruction of local roadways that will use federal funds through the BMCMPO for any phase of project implementation. *Additional Information items **1-8** (below) must be submitted for Compliant projects.*

☐ **Not Applicable** - This project is not subject to the Complete Streets Policy because it is a transit project, a non-roadway project, a resurfacing activity that does not alter the current/existing geometric designs of the roadway, or is a project that uses federal funds for which the BMCMPO does NOT have programming authority. *No Additional Information items (below) have to be provided for projects to which the Complete Streets Policy does not apply.*

☐ **Exempt** – The LPA is requesting that this project be exempted from the Complete Streets Policy due to certain circumstances or special constraints, as detailed in Section IV of the Complete Streets Policy. Please provide a detailed explanation of why the project should be exempted. *Additional Information items **1, 4-8** (below) must be submitted for Exempt projects.*

Justification for Exemption: _____

B. Additional Information:

Attach to this application form the following information as required by the Complete Streets Policy. If any items are unknown at the time of application, the applicant may indicate that "specific information has not yet been determined." Any required information not provided at the time of this application must be reported to the MPO as soon as it becomes available.

1) Detailed Scope of Work – Provide relevant details about the project that would be sufficient to use when seeking consulting services (detailed project description, vehicular elements, non-vehicular elements, new construction/reconstruction).
Northern project terminus is located on Arden Drive at the Southeast Park entrance. Project then heads west to High Street and then south to Sherwood Oaks Park/Goat Farm at the High Street and Winslow Road roundabout (multiuse path). Project then follows existing trail south until its terminus and continues heading south to Rhorer Road (multiuse trail) and then east to Sare Road (multiuse path). Project also includes accessible curb ramps and other minor intersection/curb modifications.

2) Performance Standards – List specific performance standards for multimodal transportation, including, but not limited to transit, pedestrian, bicycle, and automobile users, ADA and Universal Design, environmental, utilities, land use, right of way, historic preservation, maintenance of services plan, and any other pertinent design component in relation to current conditions, during implementation/construction, and upon project completion.
Project will be constructed to improve safety and comfort for users of all ages and abilities. Project will comply with PROWAG, the City's adopted accessibility standards. Project will comply with all required environmental and historical regulations per the federal process. Project will have an appropriate maintenance of traffic plan to accommodate all users during construction.

3) Measurable Outcomes – Identify measurable outcomes the project is seeking to attain (e.g. safety, congestion and/or access management, level-of-service, capacity expansion, utility services, etc.).
Project seeks to improve safety, comfort, and accessibility for people using active transportation. Project will improve overall street capacity by providing transportation options.

4) Project Timeline – Identify anticipated timelines for consultant selection, public participation, design, right-of-way acquisition, construction period, and completion date.
Engineering is nearly completed. Public participation was conducted in 2019. Right of way acquisition is nearly completed. Construction is expected in 2021.

5) Key Milestones – identify key milestones (approvals, permits, agreements, design status, etc.).
Engineering is nearly completed. Public participation was completed in 2019. Right of way acquisition is nearly completed. Construction is expected in 2021.

6) Project Cost – Identify any anticipated cost limitations, additional funding sources, project timing, and other important cost considerations not included in the table above.
Additional funding/local match provided through 2016 general obligation bond.

7) Public Participation Process – Describe the public participation process (types of outreach, number and type of meetings, etc.), and the benchmark goals for the project (participation rates, levels of outreach, levels of accountability and corresponding response methods to input received, etc.).
Project will be discussed at the MPO and the Bloomington Bicycle and Pedestrian Safety Commission. Those groups will receive updates about the project during development. Individual property owners adjacent to the project will be contacted after right of way impacts are determined. A public information meeting was held during design, particularly in relation to facility type options along Arden Drive. An additional virtual meeting may be held prior to construction. Staff has already met and discussed the project with MCCSC. All comments and questions regarding the project will be considered and addressed as appropriate.

8) Stakeholder List – Identify the key parties/agencies/stakeholders/interest groups anticipated to be engaged during project development and their respective purpose for being on the list.
INDOT, BMCMPO, various City of Bloomington Departments, Bicycle and Pedestrian Safety Commission, MCCSC, adjacent neighborhood associations, adjacent property owners/tenants, and other interested parties.

Chapter 1: Executive Summary

The *2045 Metropolitan Transportation Plan* (MTP) constitutes the long-range, multi-modal transportation plan for the Bloomington, Indiana Urbanized Area as required by Federal statutes (23 USC 134 and 23 CFR, Section 450.300) for the programming of Federal funds for transportation project planning and implementation of ground transportation modes (roadway, transit, bicycle, and pedestrian facilities). The Plan study area included all of Monroe County in order to make it coordinated and comprehensive in its scope. The City of Bloomington, Monroe County, the Town of Ellettsville, Bloomington Transit, IU Campus Bus, Rural Transit, and INDOT participated in a cooperative process through the BMCMPO to develop the Plan.

The *2045 Metropolitan Transportation Plan* supersedes the *2040 Long Range Transportation Plan* adopted by the Metropolitan Planning Organization's Policy Committee in the year 2017.

The *2045 Metropolitan Transportation Plan* is a "living" document, and complements the ongoing operational and capital improvement programs of the City of Bloomington, Monroe County, the Town of Ellettsville, Bloomington Transit, IU Campus Bus, Rural Transit, and INDOT in accordance with 23 CFR, Section 450.324

The Governor of the State of Indiana designated the City of Bloomington Plan Commission as the MPO responsible for transportation planning when Bloomington became an Urbanized Area in 1980. The BMCMPO completed the first long range transportation plan in 1984 and has since updated and adopted subsequent plans through a comprehensive, coordinated, and continuous process. The *2045 Metropolitan Transportation Plan* is a reflection of the community wants and needs. The Plan additionally demonstrates a long-term commitment to comprehensive, coordinated, and continuous transportation planning.

The *2045 Metropolitan Transportation Plan* incorporates all of Monroe County into its study area to improve project coordination on the edge of the expanding urban area. Upon adoption, the *2045 Metropolitan Transportation Plan* will:

- Serve as the basis from which to draw transportation projects involving Federal surface transportation funds for the Transportation Improvement Program for the Bloomington Urbanized Area;

- Be incorporated by reference into the Indiana Statewide Long-Range Multi-Modal Transportation Plan when it is updated; and

- Provide guidance of an advisory nature to Monroe County and the Indiana Department of Transportation on projects outside the Urbanized Area boundary.

The *2045 Metropolitan Transportation Plan* shall undergo an update at least every five years in order to maintain the minimum 20-year time horizon with more frequent amendments as needed and approved by the BMCMPO Policy Committee.

The *2045 Metropolitan Transportation Plan* document consists of four key chapters supported by an extensive set of technical appendices. Key chapters include:

- Chapter 2 outlining the BMCMPO's "Vision and Guiding Principles" that further establish transportation policies for preparing, evaluating and implementing multi-modal transportation improvements;

- Chapter 3 providing an overview and basis for multimodal "Future Transportation Needs", which identifies transportation needs through the year 2045 given current socioeconomic demand circumstances and the projected transportation system;

- Chapter 4 forecasts financial resources available for transportation investments and demonstrates a "Cost Feasible Plan" by illustrating BMCMPO fiscal constraints through the year 2045; and

- Chapter 5 details the analytical Travel Demand Model Scenarios initially developed in 2013-2017 for the *2040 Metropolitan Transportation Plan* that still remain valid as a guiding reference for the 2045 Metropolitan Transportation Plan using a range of local multimodal system performance measures. The recommended scenario policy, Urban Infill, meets or shall meet all FHWA national performance goals for safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and potentially reduced project delivery delays.

2045 Metropolitan Transportation Plan Development

The development of this plan satisfies federal and state planning requirements ensures the eligibility of the BMCMPO to receive multimodal federal transportation funding. ***Appendix A*** details the primary federal requirements. Additional Metropolitan Transportation Plan requirements include:

- Operational and management strategies maximizing system safety with a Vision Zero goal;

- Projected transportation demand of persons and goods;

- Existing and proposed transportation facilities for all modes;

- improve the performance of existing transportation facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods;

- Assessment of capital investment to preserve the existing and projected future infrastructure and provide for multi-modal capacity increases based on regional priorities;

- A discussion of types of potential environmental mitigation;

- Pedestrian walkway and bicycle transportation facilities in accordance with 23 U.S.C. 217(g);

- Transportation and transit enhancement activities; and

- A financial plan that demonstrates implementation feasibility.

Public Outreach Process

Public and stakeholder outreach was continuous throughout development of the 2045 MTP despite unprecedented COVID-19 pandemic challenges that necessitated a shift to electronic platforms using Zoom video conferencing (https://zoom.us/), Facebook Live (https://www.facebook.com/facebookmedia/solutions/facebook-live), and the Monroe County Public Library Community Access Television Services (https://www.catstv.net/about.php). Through a variety of stakeholder interviews, initial public workshops, and interagency consultation and coordination meetings, the BMCMPO received ample input and direction regarding a community transportation vision, goals, and strategies.

Outreach opportunities additionally included public meeting notices, media press releases, electronic contact list mailings, telephone calls, several in-person meetings, and a highly successful community survey. All public meeting locations prior to the implementation of Centers for Disease Control and Prevention (CDC) CONVID-19 guidelines used fully accessible locations. Appendix C summarizes the methods for gathering public participation and public input for plan development. Public responses obtained from a survey of four hundred fifty-nine (459) respondents assisted with a refinement of MTP guiding principles. The BMCMPO employed the following opportunities throughout MTP development to inform the public and obtain their opinions.

- BMCMPO Committee Presentations for the 2045 Metropolitan Transportation Plan
    - January 2020
        - Policy Committee
        - Technical Advisory Committee
        - Citizens Advisory Committee
    - February 2020
        - Policy Committee
        - Technical Advisory Committee
        - Citizens Advisory Committee

- March 2020
  - Policy Committee
- April 2020
  - Technical Advisory Committee
  - Citizens Advisory Committee
- May 2020
  - Policy Committee
  - Technical Advisory Committee
  - Citizens Advisory Committee

- June 2020
  - Policy Committee
  - Technical Advisory Committee
  - Citizens Advisory Committee
  - 2045 Metropolitan Transportation Plan Public Survey Posting
- July 2020
  - 2045 Metropolitan Transportation Plan Public Survey Posting
- August 2020
  - Technical Advisory Committee
  - Citizens Advisory Committee
- September 2020
  - Policy Committee
  - Technical Advisory Committee
  - Citizens Advisory Committee
- October 2020
  - Policy Committee - Final Adoption

- Public Workshops
  - #1 – March 4, 2020 - Bloomington Transit Transfer Center; Noon – 2:00 P.M.
  - #2 – March 4, 2020 - Ellettsville Town Hall; 6:00 p.m. – 8:00 P.M.

Technical Assistance

The BMCMPO retained a transportation consulting firm in 2013 - 2016 for development of a county-wide travel demand forecast model. The successful development of this model completed for the 2040 MTP are carried over to the 2045 MPT in terms of travel demand model data, collection, methodologies, model development, and extensive future scenario evaluations. Further detail is found in Appendices B, C, and D. Professional consultant technical assistance focused on the following objectives in developing this MTP:

- Data Collection and Analysis;
- Socioeconomic Forecasts;
- Transportation Analysis Zones (TAZ);
- Land Use Forecasts;

- Travel Demand Model; and
- Performance Measures.

Future Transportation Needs

The determination of future transportation needs involved an extensive public involvement process previously noted with elected and appointed officials, transportation engineers and their representatives, managers, planners, and citizens through a very broad community-wide survey. Themes that emerged included:

- An explicit demand for a variety of multimodal transportation options founded on the traditional determinants of price, income, age, modal options, tastes, convenience, and (given COVID-19 concerns) safety.

- Modest elderly population growth as the individuals and families choose to remain in a diverse, active, dynamic, culturally rich, and responsive community environment after retirement.

- Deep environmental quality and scientifically documented climate change, plus health concerns associated with the use of fossil fuels, and

- Broad support of system-wide safety improvements, accessibility, operations, maintenance, and preservation of the current transportation infrastructure that includes roadways, public transit, bicycling, and walking.

The consensus finding was that current needs of the BMCMPO transportation network are virtually identical to the urbanized area's future needs, especially when examining safety, convenience, mode choice, and accessibility needs. The 2045 MTP therefore takes an aggregate systems approach by focusing toward performance measures and future scenarios instead of focusing on specific projects. This approach is consistent with guidance and requirements by the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Indiana Department of Transportation (INDOT).

Public transit needs include

- Maintaining COVID-19 safety protocols directed by the CDC into a currently undefined period

- Implementing route optimization study recommendations for Bloomington Transit and Rural Transit completed with the assistance of metropolitan transportation (PL) funds in FY 2019

- Passenger service and convenience improvements

- Facility modernization at the Grimes Lane facility used by Bloomington Transit and Indiana University Campus Bus,
- Continuing additions of passenger amenities (e.g., new shelters) at prioritized transit stop

- Cost-feasible fleet replacements with electric vehicles that are less dependent on fossil fuels

- Continuing pursuit of a Regional Transit Authority, and perhaps most critically

- The establishment of micro-transit service areas for the most vulnerable system users thereby enabling social equity access to jobs, services, recreation, and all other elements of the movement of people and goods. Social equity access is one of the most important ways government can enable residents to live safe, healthy, and productive lives.

Given the continued presence of COVID-19, the key challenges for public transportation are ensuring operator and passenger safety, the long-term availability of capital funding revenues for future fleet replacements with electric vehicles under flat to declining federal/state assistance ceilings encompassed within a deep and potentially extensive national and state economic recessionary period brought about by the national pandemic.

State highway needs voiced by elected officials and the general public center on multimodal safety, mobility, and connectivity for pedestrian and bicycles along and within selected corridor areas. INDOT's July 2020 "road diet" conversion of the SR 46 corridor from Clarizz Boulevard to SR 446 from a four-lane corridor to a three-lane corridor with bicycle lanes and intersection ADA curb ramp replacements represents a best practice model.

Local road and street needs for Monroe County, the Town of Ellettsville and the City of Bloomington predominantly emphasize multimodal safety and connectivity, operations, maintenance and system preservation. In the face of a COVID-19 recessionary economy, local jurisdictional operations, maintenance and system preservation will face extremely challenging revenue streams in the near and intermediate terms.

Active transportation users identified a demand for separated and/or protected multi-use facilities for pedestrians and bicyclists along high volume corridors; facilities that address users of all ages and abilities.

Financial Forecasts

The Bloomington and Monroe County metropolitan planning area forecast suggests the receipt of approximately $83.3 million in Federal Surface Transportation Block Grant (STBG) program, $14.2 million in Highway Safety Improvement Program (HSIP), and $4.7 million in

Transportation Alternatives (TA) funds through Fiscal Year 2045 for transportation infrastructure investments.

The sum total of revenue sources from Monroe County and the City of Bloomington Motor Vehicle Highway Account, Wheel Tax, Local Road and Street, Cumulative Bridge Funds, Cumulative Capital Development, and Alternative Transportation Funds suggest that, given forecast assumptions, the BMCMPO planning area will have over $706.2 million in local funds available for safety, maintenance, preservation, and added multi-modal transportation system capacity activities for Fiscal Years 2021 through 2045. However, some of these funds are for other priorities within each local public agency. This sum total assumes the investment of all available local funds to transportation projects – a "very best case" financial forecast that may not reflect actual local funding spent over time on transportation-related projects.

The sum total of revenue sources for Bloomington Transit under formula grants, capital investment grants, and locally derived income suggest that, given forecast assumptions, the BMCMPO metropolitan planning area will have over $211.2 million available for transit service activities for Fiscal Years 2021 through 2045.
A final note: The current economic fallout resulting from the COVID-19 pandemic is unprecedented since the Great Depression. It is therefore import to note that the full implications of the current health and economic crisis has yet to "play out". A reasonably accurate forecast of domestic, state, and regional economic recovery is currently impossible.

Fiscal Year 2045 MTP Scenarios

The BMCMPO 2040 Metropolitan Transportation Plan (MTP) travel demand model (TDM) examined macro-level transportation system network scenarios under an extensive assortment of policy considerations and associated socioeconomic/land use changes. Model validation (see Appendix D) documented a high degree of correlation between observed network volumes and predicted volumes to the Year 2040. The 2045 MTP did not reexamine the TDM given that detailed 2020 Census socioeconomic data are not available until Calendar Years 2021-2022.

The future transportation system scenarios examined with the TDM relied upon guidance from a public Metropolitan Transportation Plan Task Force, general public input, and MPO staff experience as reasonable comparable examples. The travel demand model (TDM) used Federal Highway Administration/Federal Transit Administration (FHWA/FTA) performance measures to further examine all scenarios.

The BMCMPO travel demand model examined a "Do Nothing" Scenario and twelve (12) Travel Demand Model alternative scenarios using Base Year 2013 forecast to the Year 2040.

The adopted policy, Scenario #12, using an established transportation policy orientation of projects programmed in the BMCMPO FY 2016-2019 Transportation Improvement Program plus a strong land use focus on urban infill (TIP + Urban Infill), clearly demonstrated the best multi-modal system performance in the Year 2040.

The BMCMO 2045 Metropolitan Transportation Plan recommends a continuation of Scenario #12 transportation policy focused on urban infill.

The benefits of urban infill for the core planning area include

- Adaptive reuse of land and infrastructure fostering a regeneration of sustainable urban vitality,
- Increased accessibility to public transit, cycling and walking alternatives leading to a reduction of car dependency,
- Air quality improvements through a reduction of vehicle greenhouse gas emissions,
- Reduced energy consumption,
- The preservation of green environmental space, and
- A higher quality of social and economic life for urban residents.

The recommended transportation policy of Scenario #12 meets FHWA national performance goals for safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and potentially reduced project delivery delays.

Chapter 2: Guiding Principles

Vision

We will plan, build, and maintain a transportation system that ensures the safe, efficient movement of people and goods through multiple modes of travel as directed by locally adopted land use and transportation plans; that is compatible with citizen desires; and that ultimately links our communities to each other, our region, our state, and our nation.

Goals

Safety

- ***Improve the safety of the transportation system for all modes and all users***
  - Promote projects that focus on improving safety for all transportation modes recognizing that distracting driving, speed, and alcohol impairment are the leading causes of fatal and serious injury crashes.
  - Analyze crash data and identify causes of crashes and safety hazards using the most current federal and state transportation best management practices and pursue a "Vision Zero" Action Plan goal as a road map for safer streets and roads for all modes and all users.
  - Annually evaluate the top ten (10) crash locations by crash rate and crash severity and implement quick, low-cost improvements while also seeking funding for more comprehensive changes if necessary.
  - Ensure that all streets and intersections are clearly marked with identification signage.
  - Fund projects that encourage and educate the public about safe driving, biking, walking, and transit system use.

Mobility & Accessibility

- ***Improve the movement of people and goods through the transportation system as a means to create social and modal equity within the transportation system community***
  - Select transportation projects that are sensitive to community character, promote a sustainable compact urban form and "Complete Streets" that include transit, bicycle, and pedestrian opportunities are integral to an equitable transportation network.
  - Encourage new developments to incorporate grid street patterns that are more walkable, bikeable, connected, and readily served by both transit

and public services including local government service operations and emergency response providers.

- Identify, maintain and enhance a dedicated freight and truck roadway network that facilitates a high degree of travel time reliability and the efficient movement of goods consistent with local, state, and interstate transportation needs.

- Target intersections that experience high levels of congestion for investment and improvements to increase mobility for all users, reduce accident risks and decrease greenhouse gas carbon emissions.

- Encourage infill land use development to most effectively utilize existing utilities and infrastructure.

- Enhance the safe, efficient, and effective movement of people and goods through an annual planning process that defines a five-year outlook for infrastructure maintenance, operational and capital investment needs.

- Annually target an average of 20% of STPB (or its equivalent in future transportation bills), to fund non-motorized projects that are not part of a larger capacity-expanding roadway project.

- Use local Americans with Disabilities Act (ADA) Transition Plans to identify deficiencies and implement projects that ensure and promote integration of ADA components into the transportation system.

Transit

- ***Provide the community with efficient, affordable, frequent and reliable transit services***
  - Prioritize projects that will create or improve direct access to transit services throughout the identified urban area.

  - Pursue all prudent and feasible funding opportunities to increase public transit capital and operating investments.

  - Use the BMCMPO *Coordinated Human Services Transportation Plan* to identify and remove gaps in transit services to elderly, disabled and low-income, and socially disadvantaged citizens within the identified urban area.

  - Encourage transit projects that increase “choice-riders” who choose to take transit even though they may have other travel options.

- Continue to fund transit projects that maintain or upgrade current facilities.

- Encourage the expansion of both geographic coverage and hourly services offered by transit.

- Encourage the use of electric, compressed natural gas and autonomous buses in regular transit services and operations for increased cost-efficiency, reliable service, and for the eventual elimination of carbon emissions.

Preservation

- ***Directly focus on maintaining existing transportation facilities before building new ones***
  - Support projects that maximize the use of existing infrastructure by all users through the use of recognized national and state transportation agency best management practices and operational standards.

  - Adopt a "fix-it-first" mentality that directs funding and project selection to prioritize maintenance and renewal of existing transportation facilities.

  - Support projects that maximize the use of existing infrastructure through systematic, systemic, and operational best practices.

  - Maintain and improve existing infrastructure through projects such as surface treatment, bridge repairs, improved striping, and sign replacements.

  - Construct a Transportation Improvement Program that effectively directs spending in compliance with this Metropolitan Transportation Plan

Community

- ***Ensure that transportation projects maximize the community's quality of life and are compatible with local land use plans and policies***
  - Pursue federal and state grant opportunities, or utilize local funding, to complete missing street grid connections and/or major links to increase mobility for all users, reduce traffic congestion and carbon emissions, while increasing sustainability and public services/emergency response access.

  - Involve the public in transportation project selection, scoping, and implementation.

- Incorporate context sensitive solutions and best practices into all project designs as set forth in transportation plans, comprehensive plans, subdivision control ordinances and site design review processes.

- Pursue possible funding opportunities to increase trail/path use and investment.

- Plan, design, develop, construct and maintain transportation facilities to minimize adverse impacts on environmentally sensitive areas, public parks and recreation areas, historic structures and neighborhoods.

- Incorporate aesthetic elements such as streetscape features as deemed desirable by local public agencies into transportation projects such that they are compatible with the adjacent area.

Chapter 3: Future Transportation Needs

Introduction

Multimodal transportation plays an incredibly important role in all lives of the Bloomington-Monroe County area, the State of Indiana, and the nation. Future transportation needs for the Bloomington-Monroe County urban area encompass a wide array of multimodal options that directly reflect the unique social, economic and environmental characteristics of the community.

Several transportation themes are relevant to the current the 2045 Metropolitan Transportation Plan development process from a community-wide survey documented in ***Appendix C***. The key themes include:

- As a community somewhat geographically isolated from the balance of Indiana, the urban area economy depends heavily on external and internal motor carrier and truck freight transportation for the delivery of residential and commercial goods, and for Monroe County manufacturing industry products.

- The urban area public transportation system moves more passengers per capita than any other Indiana community. Transit ridership is high given the presence of a large world-class university. School corporation bus transportation ridership is additionally high with growing primary and secondary educational populations.

- Personal vehicle ownership is extensive. The American League of Bicyclists, however, recognizes Bloomington as a "Gold" Bicycle Friendly Community. The American League of Bicyclists additionally recognizes Indiana University as the state's only Bicycle Friendly University. Community residents and students expect a safe, efficient, and extensive city/county multi-use pathway system for the accommodation of bicycles and pedestrians.

- The urban area places a very high priority on environmental responsibility, sustainability, addressing the existential threat of climate change brought about by greenhouse gas emissions, climate resilience, Black Lives Matter, addressing systemic economic justice issues, racial justice, social equity, and community health equity far exceeding the balance of other statewide Indiana communities.

- The Bloomington-Monroe County urban area believes in evidentiary records of scientifically-based facts for meeting future challenges.

- The community supports the conversion of the public transit vehicles from fossil fuel dependency to electric vehicles. The community further supports the installation of additional of electric vehicle charging stations within the urban area.

- The Bloomington-Monroe County is highly educated or actively pursuing higher education degrees thus bringing together "world views" for the analysis and the promotion of alternative solutions to current and future challenges.

- Household income of the urban area is greater than that of most Indiana communities, but persistent areas of lesser income are clearly evident. The development of affordable housing is major priority.

- The community places a high and continuing investment emphasis directed toward safety, maintenance, operations and the preservation of current transportation infrastructure as a means to address needs.

- Increasing elderly and "baby boomer" population growth and their influences on transportation accessibility and/or services;

- The use of fossil fuels with resultant carbon emissions and greenhouse gases account for impacts and changes that address the influences travel has on air quality, health, and the environment.

Socioeconomic Forecast

The *BMCMPO 2045 MTP* must satisfy anticipated future transportation and mobility needs of residents within Monroe County since it shall serve as a comprehensive policy "blueprint" by guiding future transportation projects and programs that have an expected implementation within the multi-decade analysis period.

The following discussion examines a range of considerations regarding future needs, reviews existing conditions, and outlines specific characteristics of the Metropolitan Planning Area that play a key role in transportation and mobility. This assessment summarizes a range of future transportation and mobility needs in addition to public feedback. Together the future needs and Guiding Principles can result in an implementable, sustainable plan.

Regional Profile

A majority of the population living within Monroe County is located within the urbanizing area, which includes the Town of Ellettsville, the City of Bloomington, and portions of Monroe County adjacent to these incorporated areas. Stats Indiana has the current population estimate for Monroe County at approximately 143,000. Of this total, approximately 83,000 people live within Bloomington, and 6,400 people within Ellettsville. Coupled with Bloomington's density compared to the rest of Monroe County and the presence of Indiana University students (43,700 in September 2017), these two factors have a significant impact on the local transport system and modal choice with a specific clear emphasis on walking, cycling, and transit.

Several national and regional trends offer an important context to transportation and mobility needs for the BMCMPO. Just as "do nothing" or "no build" are often considerations for future investments, the following trends can offer local policy guidance on choices and future investment decisions:

- The lack of reliable and efficient transportation is a barrier to upward social mobility for many households especially within traditional areas of Bloomington and in rural areas of Monroe County, a fact that can hinder economic growth and stability.

Monroe County historically has avoided national/state economic cycles of boom and bust conditions. Historic trends demonstrate a relatively stable economy and modest population growth. The estimated population growth provided in the following Table shows a conservative 1% per year in population growth will likely continue given large stable employment within the public education, medical appliances and equipment, health services, and pharmaceutical sectors of the local economy. Monroe County additionally serves as a regional retail and service hub for the surrounding counties which facilitates sustainable stable economic conditions for consumer goods and services.

Monroe County's population growth rates establish daily trip demands based on employment, shopping, school, or pleasure. This in turn factors into the functionality of the whole transportation network, which is projected into anticipated future needs.

A simple growth projection of traffic volumes is not a sufficient means to account for future trip generation and network needs. Using more detailed demographic, household, land use, and employment data, projections can better incorporate these attributes which influence household trip generation. For example, the very young and elderly often are dependent upon others for their daily transportation needs and tend to generate fewer daily trips. Conversely, the employed and higher income households tend to generate more daily trips than other cohorts. Using a range of household and employment attributes is beneficial way to project future trip generation and network needs.

The BMCMPO took into account many important attributes in order to better reflect existing conditions and subsequently project relatively accurate future needs tailored more specifically to Monroe County. Another step to this future projection took into account how and how fast Monroe County would grow over time. The following table illustrates low density, standard, and high density growth patterns in combination with a slow, moderate, and fast growth rates. Chapter 5 details a further accounting in scenario analysis.

Land Use Scenario Development Forecasts 2040	Overall Growth Scenario ---> / Development Style --->	Low Growth			Mid-Range Growth			High Growth		
		Standard	Compact	Low Density	Standard	Compact	Low Density	Standard	Compact	Low Density
Control Totals - TAZ Global Assumptions										
	Number of households by scenario	64,431	64,431	64,431	72,952	72,952	72,952	82,552	82,552	82,552
	Total population by scenario	153,209	153,209	153,209	173,784	173,784	173,784	185,234	185,234	185,234
	Total employment by scenario	94,240	94,240	94,240	107,135	107,135	107,135	116,443	116,443	116,443
	School enrollment	15,762	15,762	15,762	17,879	17,879	17,879	19,057	19,057	19,057
	IU enrollment forecast	48,500	48,500	48,500	49,000	49,000	49,000	50,000	50,000	50,000
Employmnet Global Development Assumptions										
	Emp. Growth Existing	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
	Emp. Growth Undeveloped	70.0%	40.0%	80.0%	70.0%	40.0%	80.0%	70.0%	40.0%	80.0%
	Emp. Growth Redevelopment	20.0%	50.0%	10.0%	20.0%	50.0%	10.0%	20.0%	50.0%	10.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	New Housing - Low Density	50.0%	10.0%	80.0%	50.0%	10.0%	80.0%	50.0%	10.0%	80.0%
	New Housing - Medium Density	25.0%	50.0%	19.0%	25.0%	50.0%	19.0%	25.0%	50.0%	19.0%
	New Housing - High Density	25.0%	40.0%	1.0%	25.0%	40.0%	1.0%	25.0%	40.0%	1.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Residential Global Assumptions										
	Infill Medium Density	10.0%	50.0%	1.0%	10.0%	50.0%	1.0%	10.0%	50.0%	1.0%
	Redevelopment High Density	70.0%	90.0%	30.0%	70.0%	90.0%	30.0%	70.0%	90.0%	30.0%
	Rural SFR Units per acre	0.2	0.1	2	0.2	0.1	2	0.2	0.1	2
	Urban SFR Units per acre	8	12	5	8	12	5	8	12	5
	Max. Rural Growth	0.5%	0.1%	1.0%	0.5%	0.1%	1.0%	0.5%	0.1%	1.0%

Detailed Summary After Applying Assumptions:	Overall Growth Scenario ---> / Development Style --->	Low Growth			Mid-Range Growth			High Growth		
		Standard	Compact	Low Density	Standard	Compact	Low Density	Standard	Compact	Low Density
Total Employment 2040										
	RETAIL	2,443	2,443	2,443	2,777	2,777	2,777	3,070	3,070	3,070
	INDUST	7,228	7,228	7,228	8,217	8,217	8,217	9,084	9,084	9,084
	OFFICE	10,972	10,972	10,972	12,473	12,473	12,473	13,789	13,789	13,789
	SERVICE	73,597	73,597	73,597	83,668	83,668	83,668	92,499	92,499	92,499
	TOTAL_EMP	94,240	94,240	94,240	107,135	107,135	107,135	118,443	118,443	118,443
Net Employment Growth 2010-2040										
	RETAIL	(476)	(476)	(476)	(142)	(142)	(142)	151	151	151
	INDUST	(1,148)	(1,148)	(1,148)	(159)	(159)	(159)	709	709	709
	OFFICE	900	900	900	2,401	2,401	2,401	3,717	3,717	3,717
	SERVICE	15,353	15,353	15,353	25,423	25,423	25,423	34,254	34,254	34,254
	TOTAL_EMP	14,627	14,627	14,627	27,522	27,522	27,522	38,830	38,830	38,830
Employment Growth in Existing Establishments										
	RETAIL	(571)	(571)	(571)	(170)	(170)	(170)	15	15	15
	INDUST	(1,377)	(1,377)	(1,377)	(190)	(190)	(190)	71	71	71
	OFFICE	90	90	90	240	240	240	372	372	372
	SERVICE	1,535	1,535	1,535	2,542	2,542	2,542	3,425	3,425	3,425
	TOTAL_EMP	(323)	(323)	(323)	2,422	2,422	2,422	3,883	3,883	3,883
Employment Growth in Undeveloped Sites										
	RETAIL	74	74	74	22	22	22	106	61	121
	INDUST	179	179	179	25	25	25	496	284	567
	OFFICE	630	360	720	1,681	960	1,921	2,602	1,487	2,974
	SERVICE	10,747	6,141	12,283	17,796	10,169	20,339	23,978	13,702	27,404
	TOTAL_EMP	11,629	6,754	13,255	19,524	11,176	22,306	27,182	15,533	31,066
Employment Growth in Re-developed Sites										
	RETAIL	21	21	21	6	6	6	30	30	30
	INDUST	51	51	51	7	7	7	142	142	142
	OFFICE	180	180	180	480	480	480	743	743	743
	SERVICE	3,071	3,071	3,071	5,085	5,085	5,085	6,851	6,851	6,851
	TOTAL_EMP	3,323	3,323	3,323	5,578	5,578	5,578	7,766	7,766	7,766
Residential Growth - Rural	Total Rural Housing Units	11,273	9,804	13,411	11,273	9,804	13,411	11,273	9,804	13,411
	Net growth in rural	1,806	337	3,944	1,806	337	3,944	1,806	337	3,944
	Rural acres needed	9,028	3,370	1,972	9,028	3,370	1,972	9,028	3,370	1,972
Residential Growth - Urban	Total Urban Units	53,158	54,626	51,020	61,679	63,148	59,541	71,279	72,748	69,141
	Net growth in urban	8,141	9,609	6,003	16,662	18,131	14,524	26,262	27,731	24,124
Residential Growth Distribution	New vacant site low density	4,070	961	4,802	8,331	1,813	11,619	13,131	2,773	19,299
	New vacant site med. density	1,832	2,402	1,129	3,749	4,533	2,732	5,909	6,993	4,538
	New in-fill med. density	204	2,402	11	417	4,533	28	657	6,993	46
	New vacant site high density	611	384	42	1,250	725	102	1,970	1,109	169
	New redeveloped site high density	1,425	3,459	18	2,916	6,527	44	4,596	9,983	72
	Urban acres needed	509	80	960	1,041	151	2,324	1,641	231	3,860

Table 3-1: 2040 socioeconomic household and employment sector data by low, medium, high growth rates with data subsequently allocated into land use development of standard, compact, and low density development styles.

The *2045 Metropolitan Transportation Plan* differs from prior plans with a focus directed toward public policy opinions, performance measures and scenarios rather than specific projects. ***Appendix C*** highlights the community's public involvement/policy approach. ***Appendix D*** discusses the urban area travel demand model, base year conditions, and future year projections.

Actions that can accomplish addressing future transportation needs include:

- *For Safety Improvements & Localized Congestion Relief:* low-cost capital improvements for the preservation of safety and roadway capacity through intersection signalization, improved signage, pavement markings, and guardrail improvements based on safety, congestion, and access management programs.

- *For Commuting & Recreation:* the on-going day-to-day operation and maintenance of the existing roadway system and bicycle and pedestrian facilities, the public transportation fixed-route services, the demand-response transit services for the elderly and special needs;

- *For Capital Replacement:* the preservation of the built environment of roadways through resurfacing and reconstruction based on a pavement management program, the rehabilitation and reconstruction of bridges through a bridge management program, the on-going improvement of transit service facilities and replacement of diesel buses with electric vehicles through a public transportation capital assets management program; and

Future Needs

Capacity preservation projects are often identified in short-term system modernization needs planning based on responses to local development investments and travel pattern adjustments. The identification and funding of capacity preservation projects are defined, as appropriate, in the annual operating and capital improvement programs of the Town of Ellettsville, Monroe County, the City of Bloomington, and in the Transportation Improvement Program (TIP) of the Bloomington-Monroe County Planning Organization (BMCMPO).

Projecting capital investment needs between the BMCMPO, the INDOT Seymour District, and INDOT's Central Office rely on the use of asset management systems for planning and programming. The same is true for Monroe County, the Town of Ellettsville, and the City of Bloomington.

Anticipated Transportation Needs

Current needs of Bloomington-Monroe County urban area transportation network are in many ways similar to future needs, especially when examining the priorities of safety, accessibility, convenience, and mode choice. This is fairly easy to equate into future needs when developing specific projects. This could include safety improvements to a location with a high incidence of

crashes, a new multi-use pathway project connecting a school to a neighborhood or recreational facility, extended transit service times to meet consumer demands, and updating an existing corridor for improving east-west connectivity.

In addition to safety, accessibility, convenience, and mode choice needs, "big picture" input from the general public, local agencies, and elected officials indicates overwhelmingly strong preferences towards a cleaner environment with lower carbon emissions, less dependence on automobiles, and increased mode shares for transit, bicycle trips and walking. Big picture ideas on the influence of land use conversions, employment and education centers, housing investment strategies, the growth of freight, and emerging technologies are additional considerations when anticipating future needs as these will have a significant impact upon the transportation network.

Public Transit Needs

Bloomington Public Transportation Corporation (BPTC), Indiana University Campus Bus, and Rural Transit are the three (3) public transportation service providers operating within Bloomington-Monroe County urban area. The Bloomington Public Transportation Corporation (BPTC), known as Bloomington Transit, provides public transportation services exclusively within the Bloomington corporate limits. Indiana University Campus Bus primarily serves student transportation needs on the Indiana University campus. Rural Transit, operated by the Area 10 Agency on Aging, serves demand response transportation needs within the 244,000 population service area covering Monroe, Lawrence, Owen, and Putnam Counties. Ridership demands within this service area are growing with an aging of the population.

The *2045 Metropolitan Transportation Plan* identifies a number of macro-level transit service and capital improvements necessary to ensure the safe, efficient and effective provision of transportation mobility management options that include the following transit provider future service and capital needs:

Service

- Transit service should be provided seven days a week including Sundays on all routes not campus-oriented;
- Transit service should be provided on holidays that are major shopping days such as New Year's Day, Memorial Day, and Independence Day;
- Transit daily service hours should be increased;
- The frequency of transit service should be increased;
- The coverage of transit service areas are increased to reflect population and employment growth;

- Employ mobility management strategies for persons with disabilities and the general public (Examples: partnerships with ridesharing companies);

- Pursue new local funding sources for expanding transit services (Example: Local Option Income Tax as a possible choice for significantly expanding transit services for Monroe County and the City of Bloomington); and

- Employ travel training as a means to encourage and train persons with disabilities who are currently using specialized transit services to use fixed route service.

Facilities, Fleet, and Amenities

- Continue transit fleet replacement according to the prescribed duty cycles, including specialized fleet providing service to people with disabilities replacing transit vehicles with electric powertrains;

- Continue researching, testing and, when practical, the use of emerging propulsion system technologies (e.g., autonomous vehicles) to further operational/capital cost efficiencies, promote the advancement of these technologies, and minimize environmental impacts;

- Continue modernization of the existing Bloomington Transit Grimes Lane facility nearing the end of productive service life;

- Explore a potential Grimes Lane facility expansion to accommodate fleet growth; and

- Update passenger amenities as prioritized at all transit stops, downtown facilities, and onboard passenger vehicles to promote and encourage transit use for persons of all abilities.

Regional Transit Authority

- Pursue legislative efforts to overcome the existing barriers to development of regional transit authorities; and

- Maintain consideration of further efficiencies through the development of an overarching regional transit authority for the distribution of Federal funding resources.

State Highway Needs

The Indiana Department of Transportation's *2045 Long Range Transportation Plan* (https://www.in.gov/indot/3714.htm) guides INDOT's needs-based strategic planning approach. The management of INDOT's bridge and highway network system are directed by business models emphasizing a combination of federal/state economic and engineering performance goals to further derive bridge and highway needs.

INDOT facilities within Monroe County include I-69, SR 45, SR 46, the SR 45/46 Bypass, SR48, and SR 446. The functional use of these transportation network facilities fulfill urban and rural, Interstate, arterial, and collector distributive roles. The I-69 corridor will continue evolution after the completion of construction to Indianapolis in 2024. The remaining balance of INDOT roadway corridor facilities will additionally evolve to the Year 2045, but at lesser rates dependent upon local, regional, and state economic/population growth needs.

Through an extensive set of BMCMPO public input and involvement opportunities, residents identified a set of state highway system needs within Monroe County. A majority of the citizen identified needs focus on safe and comfortable facilities for pedestrians and bicyclists along State Roads outside of the I-69 corridor. These needs emphasize safety, mobility and connectivity fully consistent with current FHWA and INDOT performance measures.

The following is a summary of future area desires for state highways. These projects increase accessibility, comfort, and safety for pedestrians and bicyclists, and improve the safety and operation for all modes of travel:

- Sidewalks on both sides of State Road 45 with trees and/or separation from north of University Elementary School to the 45/46 Bypass;
- Dedicated on-street bicycle facilities on State Road 45 from near University Elementary to the 45/46 Bypass;
- Improved intersection safety at SR 46 Bypass/College Mall Road/East 3rd Street;
- Completion of SR 45/46 Bypass pedestrian/bicycle facility accommodations "missing link" between Kinser Pike and College Avenue;
- Increased pedestrian connections along State Road 446, especially where there are opportunities for existing sidewalk networks.

Local Needs

Future local road and street needs for Monroe County, the Town of Ellettsville and the City of Bloomington predominantly focus on safety, maintenance and preservation, and multi-use pathway connectivity. Safety needs include pedestrian, bicycle and vehicular intersection improvements based on crash reports, corridor safety improvements (e.g., sidewalks, multi-use pathways) and public comments. **Appendix G** of the *2045 Metropolitan Transportation Plan* identifies a projected listing of local jurisdictional projects.

The following section is a summary of future area needs for people who walk and/or bicycle:

- The walking and bicycling network must include facilities on high-volume roads as most often, this is where destinations are located;

- Higher-volume roads should have balanced high-comfort accommodations for all users;

- Facilities need to address users of all ages and abilities, especially the young, the old, people without personal vehicles, people with disabilities, and people accessing transit;

- Facilities near transit stops should undergo review and prioritization to improve transit connections; and

- The walking and bicycling network must not require the most vulnerable users to travel out of their way to access facilities.

Local Needs – City of Bloomington

Recover Forward is designed to help Bloomington recover from the COVID-19 pandemic and subsequent economic downturn. Rather than restoring a pre-pandemic normal, Recover Forward seeks to lean into a future consistent with our values, toward a Bloomington more thoroughly embodying our community's goals for racial equity, a sustainable and inclusive economy, and climate action. Important funding mechanisms are needed to provide Bloomington the tools to recover quickly, and develop programming and infrastructure supporting racial, climate and economic justice in the next decade and beyond.

Recover Forward's initial phase entails passing the 2020 $2M special appropriation request from 2019 reversion funds, followed by the 2021 budget that will include a reallocation of funds among City departments and access to $4M of reserves to protect basic services and accelerate equity projects. These appropriations will position Bloomington to make the infrastructure upgrades needed to meet current challenges and continue to provide basic City services.

- Improve Mobility Options Sidewalk and Path Enhancements: $400K. This program addresses ADA curb ramp improvements, pavement improvements to bike lanes and bike paths, and sidewalk damage caused by street trees, with investments focused in lower-moderate income areas. The Department of Public Works will use overall condition index data from its asset management system to identify specific locations for investment. The department also intends to break up the work into several smaller contracts in order to attract local small businesses to the projects, including a focused effort in promoting the work to minority and women-owned business enterprises.

- Sidewalk/Path Improvements for Bloomington Transit Stops: $250K Based on Bloomington Transit's (BT) 2019 transit stop inventory assessment, a comprehensive bus stop assessment and inventory that evaluated and rated each bus stop according to ADA and accessibility guidelines. City staff will work with a local engineering firm on preliminary designs to make accessibility improvements to BT bus stops. These improvement projects include creating paved landing zones, installing benches, and adding crosswalks and other pedestrian infrastructure where needed to make bus stops more easily accessible. To generate the greatest impact, the bus stops prioritized for improvement will include those rated lowest in accessibility that also serve large numbers of riders. Improvements to bus stop infrastructure will make public transit more accessible and convenient for the entire Bloomington community.

Chapter 4: Financial Forecast

Introduction

Financial resources define the feasibility, timing, and scope of transportation project implementation. This chapter defines reasonable financial forecasts that support the recommended multi-modal transportation needs plan for the Bloomington and Monroe County urbanized area. The resulting fiscally constrained plan of projects is a requirement first set forth in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Successive Federal transportation legislation (TEA-21, SAFETEA-LU, MAP-21 and FAST) continued this requirement and permitted the inclusion of "illustrative" transportation projects for potential implementation if additional funding were to become available during the established Year 2045 planning period.

Financial resources for federal, state, and local highway transportation projects are typically set aside for three categorical areas:

- *eSafety and Security* - represent the highest multi-modal transportation system priority by protecting people, system users, and infrastructure investments

- *Facility maintenance and Preservation* – protects existing capital investments which include operation and maintenance and reconstruction (including pavement resurfacing, bridge rehabilitation transit operations, and bicycle/pedestrian facilities) of existing transportation facilities and services

- *Capacity Expansion* – adds to the functional capacity of the multi-modal transportation system through the addition of travel lanes, new transit facilities, sidewalks, and new bicycle/pedestrian multi-use pathways.

- *New Facilities* – represent major new capital investments including new roadways, bridges and interchanges where such facilities do not currently exist.

Federal Resource Programs

Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94) governs current federal funding for highway, transit and railroad facilities. The FAST Act authorizes $305 billion over fiscal years 2016 through 2020 and maintains a focus on safety, keeps intact the established structure of the various highway-related programs, continues to streamline project delivery, and provides a dedicated source of federal dollars for freight projects.

The FAST Act apportions Federal program funds using a formula or a set of formulas, takedowns, and set-aside's. Legally established formulas determine initial lump sum amounts for each State's federal-aid apportionment. The lump sums may further subdivide among different programs (outlined below) based upon legally defined percentages. Federal legislation

further requires the distribution of some programs within the State to promote the fair and equitable use of funds and to meet certain priorities. Apportioned funds account for the overwhelming majority of Federal Highway Administration (FHWA) funds. Current congressional rules prohibit earmarking, which historically achieved accomplishment through allocations. Because of the limited funding for these programs, not every State will receive an allocation in a given fiscal year.

Major funding programs administered by the FHWA and the Federal Transit Administration (FTA) under current FAST Act legislation include the:

- **National Highway Performance Program (NHPP):** This program provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of federal-aid funds in highway construction directly support progress toward the achievement of performance targets established in a State of Indiana's asset management plan for the NHS.

- **Surface Transportation Block Grant Program (STBG):** This program provides flexible funding for use by states and localities to preserve and improve the conditions and performance on any federal-aid highway or bridge on any public road, pedestrian and bicycle infrastructure, and transit capital projects.

- **Highway Safety Improvement Program (HSIP):** Within the Surface Transportation Block Grant Program, the Highway Safety Improvement Program serves as a core federal-aid program with the purpose of achieving significant reductions in traffic fatalities and serious injuries on all public roads, including non-state-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. The main elements of HSIP include the Strategic Highway Safety Plan (SHSP), the State HSIP or program of highway safety improvement projects, and the Railway-Highway Crossings Program (RHCP).

- **Congestion Mitigation and Air Quality Improvement Program (CMAQ):** This program directs flexible funding resources to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas). The Bloomington-Monroe County metropolitan planning area is an air quality attainment area.

- **Metropolitan Planning Program (PL):** Under the FAST Act, the Metropolitan Planning Program directs a cooperative, continuous, and comprehensive multimodal planning framework for making transportation investment decisions in metropolitan areas. Program oversight is a joint Federal Highway Administration and Federal Transit

Administration responsibility. The FAST Act continues to require metropolitan transportation plans and transportation improvement programs (TIPs) to provide for facilities that enable an intermodal transportation system, including pedestrian and bicycle facilities.

- **National Highway Freight Program (NHFP):** This program provides States with highway-focused formula funding for use on freight-related projects, and a new program (FASTLANE) which provides discretionary grants for nationally-significant freight and highway projects.

Federal Funding Projections

Surface Transportation Block Grant (STBG)

The Surface Transportation Block Grant (STBG) program funds represent the primary source of federal support for improvements to Bloomington-Monroe County urbanized area roadways. The FAST Act converts the long-standing Surface Transportation Program (STP) into the Surface Transportation Block Grant (STBG) program. As statutorily cited [FAST Act § 1109(a)] by the Federal Highway Administration, "The STBG promotes flexibility in State and local transportation decisions and provides flexible funding to best address State and local transportation needs."

Urbanized areas with a population of 200,000 or more persons (referred to as Group I areas) have a dedicated funding allocation stipulated by federal statute. Indiana urbanized areas, such as Bloomington, with a population of 50,000 to less than 200,000 persons (referred to as Group II areas) receive funding allocations based on a proportion of statewide population.

Under a sharing agreement for surface transportation programs, the Indiana Department of Transportation (INDOT) retains 75% of the federal funds received by the State of Indiana. INDOT distributes the remaining 25% federal fund balances to local jurisdictions, including Metropolitan Planning Organizations.

The federal-aid STBG fund allocation for the Bloomington Metropolitan Planning Area (MPA) in Fiscal Year 2021 was approximately $2.75 million. The forecast of STBG funds available between fiscal years 2021 and 2045 assumed a conservative, constant and real dollar growth rate of 2.0%.

As shown below, the Bloomington metropolitan planning area is likely to receive a total of approximately $86,076,367 in STBG funds between fiscal years 2021 and 2045 for locally initiated capital roadway system improvements.

Fiscal Years 2021 through 2030 = $28,695,667
Fiscal Years 2031 through 2045 = $54,630,567
Total = $83,326,234

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) provides federal funding for eligible safety improvement projects on local roadways. The Bloomington metropolitan planning area received an annual allocation of $470,684 for fiscal year 2020. The forecast of HSIP funds available between fiscal years 2021 and 2045 assumed a conservative, constant and real dollar growth rate of 2.0%.

Fiscal Years 2021 through 2030 = $4,911,250
Fiscal Years 2031 through 2045 = $9,349,997
Total = $14,261,247

Transportation Alternatives (TA)

Within the Surface Transportation Block Grant program, Transportation Alternatives (TA) provides federal funding for programs and projects defined as transportation alternatives, including on and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation, and enhanced mobility. The Bloomington urbanized area received an annual allocation of $155,801 for fiscal year 2020. The forecast of TA funds available between fiscal years 2021 and 2045 assumed a conservative, constant and real dollar growth rate of 2.0%.

Fiscal Years 2021 through 2030 = $1,625,672
Fiscal Years 2031 through 2045 = $3,094,940
Total = $4,720,612

State of Indiana Investments

The Indiana Department of Transportation does not have any committed major capital projects identified for construction in Bloomington and Monroe County between Fiscal Year 2021 and Fiscal Year 2045 given the recent completion of the I-69 corridor through the metropolitan planning area.

A majority of investment priorities shall focus on safety enhancements and system preservation to existing state roads. With the knowledge that these improvements rely upon an as-needed basis, no firm estimate of future investments in such projects is currently available.

Indiana's *Next Level Roads Plan* announced in 2017 resulting from House Enrolled Act 1002 (Effective July 1, 2017) focused funding in the BMCMPO area on preservation, maintenance, and safety investments with a 3-year investment total equaling $13,033,146 from 2018 through 2020. House Enrolled Act 1002 established an increase of ten-cents per gallon for gasoline, special fuels, and motor carrier surcharge taxes. The Act further established an indexation against inflation thereby maintaining constant dollar revenues in relation to overall indexed costs.

Local roads statewide received an estimated $264.0 million in additional dollars in FY 2019 and shall receive up to an estimated $340.0 million by FY 2024. The House Enrolled Act should raise $1.2 billion in new state and local revenues beginning in 2024.

INDOT's Community Crossing Local Road and Bridge Matching Grant Fund Program provides an additional source of revenue to the BMCMPO area through discretionary awards for systems preservation, maintenance, replacements, reconstruction, and similar activities. INDOT has awarded over $1.0 billion since 2013 to local public agencies to aid in modernizing local roads and bridges. No future funding availability is possible given the variable discretionary nature of this program, the size of requests in relation to available funds, and the year-to-year needs of Monroe County, the City of Bloomington, and the Town of Ellettsville. Therefore a reasonable financial forecast is not possible.

Federal Transit Program Formula Grants, Capital Investment Grants, and State Assistance

Federal transit program formula grants and capital investment grants and state assistance are critical to the success of Bloomington Transit and its provision of service over 1,178,700 vehicle miles traveled for 3.14 million annual customers in 2018. This equates to 2.66 miles per customer trip.

Federal transit formula operating and capital investment grants for Bloomington Transit totaled $2,770,000 in calendar year 2020. The forecast of Federal Transit Administration (FTA) funds available between fiscal years 2021 and 2045 assumed a conservative, constant and real dollar growth rate of 2.0%. As shown below, Bloomington Transit is likely to receive a total of $86,076,367 in formula grants and capital investment grants for Fiscal Year 2021 through Fiscal Year 2045.

Fiscal Years 2021 through 2030 = $30,937,342
Fiscal Years 2031 through 2045 = $59,561,067
***Total* = $90,498,409**

State transit program assistance to Bloomington Transit totaled $2.6 million in 2020. A conservative, constant dollar growth rate of 2.0% used to forecast these funds available between 2021 and 2045 projects Bloomington Transit will likely receive a total of $88,937,271 in formula grants and capital investment grants for Fiscal Year 2021 through Fiscal Year 2045.

Fiscal Years 2021 through 2030 = $29,500,694
Fiscal Years 2031 through 2045 = $56,795,209
Total = $86,295,903

Federal transit formula operating and capital investment grants for Rural Transit totaled $748,544 in 2020. The forecast of Federal Transit Administration (FTA) funds available between fiscal years 2021 and 2045 assumed a conservative, constant and real dollar growth rate of 2.0%. As shown below, Rural Transit is likely to receive a total of $24,455,610 in federal formula grants and capital investment grants for Fiscal Year 2021 through Fiscal Year 2045.

Fiscal Years 2021 through 2030 = $8,360,275
Fiscal Years 2031 through 2045 = $16,095,336
Total = $24,455,610

State transit program assistance to Rural Transit totaled approximately $306,875 in 2020. A conservative, constant dollar growth rate of 2.0% used to forecast these funds available between 2021 and 2045 projects Rural Transit will likely receive a total of $10,025,884 in formula grants and capital investment grants for Fiscal Year 2021 through Fiscal Year 2045.

Fiscal Years 2021 through 2030 =$3,427,400
Fiscal Years 2031 through 2045 = $6,598,485
Total = $10,025,884

Local Resources

Primary resources for locally initiated transportation projects include Motor Vehicle Highway Account (MVHA) fund receipts, Local Road and Street Funds (LRS), the Wheel Tax, the Cumulative Bridge Fund, Cumulative Capital Development Funds, alternative transportation funds and, in certain instances, Tax Increment Financing (TIF) District funds.

Motor Vehicle Highway Account (MVHA) & Wheel Tax

The Motor Vehicle Highway Account (MVHA) receipts for Monroe County and the City of Bloomington typically exhibit an annual variability. The construction or reconstruction and maintenance of streets and alleys rely upon MVHA funds. These funds represent the primary operating and maintenance expenditures for Monroe County and the City of Bloomington between 2021 and 2045. The forecast assumption for the 2045 MTP is that MVHA receipts will remain at a constant real dollar growth rate of 2.0% until the Year 2045 and that these funds will continue use for basic operations and maintenance.

Monroe County and Bloomington use Wheel Tax funds for resurfacing and minor roadway rehabilitation projects. The forecast assumption for the 2045 MTP is that Wheel Tax receipts will remain at a constant real dollar growth rate of 2.0% until the Year 2045 and that these funds will continue for the purposes prescribed by the Indiana General Assembly.

Given MVHA and Wheel Tax receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2021 through 2030 = $112,497,308
Fiscal Years 2031 through 2045 = $207,949,604
Total = $320,446,912

Local Road and Street (LRS) Funds

Local Road and Street account (LRS) funds, including accelerated allocations, are available for capital investment; however, a portion of the funds must be set aside for preservation projects such as resurfacing, intersection/signalization projects, and safety improvements.

Based on past and present budgets, Monroe County and the City of Bloomington allocate variable portions of these funds for capital investments. These funds represent the primary expenditures that Monroe County and the City of Bloomington use for engineering, land acquisition, construction, resurfacing, restoration, and rehabilitation of roadway facilities. The forecast assumption for the 2045 MTP is that LRS receipts will remain at a constant real dollar growth rates of 2.0% until the Year 2045 and that these funds will continue use for the purposes prescribed by the Indiana General Assembly.

Given LRS receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2021 through 2030 = $21,718,454
Fiscal Years 2031 through 2045 = $41,812,716
Total = $63,531,169

Cumulative Bridge Funds

The Monroe County Cumulative Bridge Fund will continue dedication to bridge preservation for the cost of construction, maintenance, and repair of bridges, approaches, grade separations and county-wide bridge inspections. The forecast assumption for the 2045 MTP is that the Cumulative Bridge Fund will remain at a constant real dollar growth rate of 2.0% until the Year 2045 and that these funds will continue use for the purposes prescribed by the Indiana General Assembly.

Given Cumulative Bridge receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2021 through 2030 = $18,491,741
Fiscal Years 2031 through 2045 = $35,600,597
Total = $54,092,338

Major Bridge Fund

The Major Bridge Fund established under (IC § 8-16-3.1) is a special fund to address major obstructions between commercial or population centers which are capable of causing an economic hardship because of excess travel time to conduct a normal level of commerce between the two (2) centers. A major bridge is defined as a structure of 200-feet or longer or 100-feet in a qualified city. The tax levy shall not exceed $0.0333 per $100 assessed valuation within the eligible county. The Major Bridge Fund has no forecast for the 2045 MTP.

Cumulative Capital Development Funds

The forecast assumption for the 2045 Metropolitan Transportation Plan is that the Cumulative Capital Development Fund will remain at a constant real dollar growth rate of 2.0% until the Year 2045 and that these funds will continue use for the purposes prescribed by the Indiana General Assembly.

Given Cumulative Capital Development Fund receipts for Monroe County and the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2021 through 2030 = $49,018,809
Fiscal Years 2031 through 2045 = $76,084,055
Total = $125,102,864

Tax Increment Financing (TIF) Funds

Tax Increment Financing (TIF) District revenue receipts are occasionally used by Monroe County and the City of Bloomington for capital infrastructure investments including roadway and drainage improvements. Forecasts for these districts are inexact given their direct link to project development, property values, and sunset provisions. The Monroe County TIF District Funds have no forecast for the 2045 MTP.

Alternative Transportation Funds

The City of Bloomington established Alternative Transportation funding exclusively for pedestrian and bicycle infrastructure maintenance, preservation, and facility expansions more than a decade ago. The Common Council allocates funds through annual municipal budget approvals. The forecast assumption for the 2045 Metropolitan Transportation Plan is that the Alternative Transportation fund allocations will remain at a constant real dollar growth rate of 2.0% until the Year 2045 and that these funds will continue use for the purposes prescribed by the City of Bloomington.

Given Alternative Transportation Fund allocations from 2012 through 2019 for the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2021 through 2030 = $8,378,638
Fiscal Years 2031 through 2045 = $16,130,689
***Total = $*24,509,328**

Public Transportation Locally Derived Income

Federal transit program formula grants and capital investment grants help to support Bloomington Transit's service. Bloomington Transit is additionally supported by locally derived income (LDI) consisting of fare revenue, contract/other revenue, and local assistance. Bloomington Transit's locally derived income have no forecast for the 2045 MTP.

General Obligation Bonds

Monroe County and the City of Bloomington may use General Obligation (GO) bonds for transportation infrastructure investments. The use of this funding mechanism, however, is subject to a variety of unique circumstances. General Obligation Bonds have no forecast for the 2045 MTP given a measurable level of uncertainty over their use.

Conclusion

The Bloomington and Monroe County metropolitan planning area forecast suggests the receipt of approximately $83.3 million in Federal Surface Transportation Block Grant (STBG) program, $14.2 million in Highway Safety Improvement Program (HSIP), and $4.7 million in Transportation Alternatives (TA) funds through Fiscal Year 2045 for transportation infrastructure investments.

The sum total of revenue sources from Monroe County and the City of Bloomington Motor Vehicle Highway Account, Wheel Tax, Local Road and Street, Cumulative Bridge Funds, Cumulative Capital Development, and Alternative Transportation Funds suggest that, given forecast assumptions, the BMCMPO planning area will have over $706.2 million in local funds available for safety, maintenance, preservation, and added multi-modal transportation system capacity activities for Fiscal Years 2021 through 2045. However, some of these funds are for other priorities within each local public agency. This sum total assumes the investment of all available local funds to transportation projects – a "very best case" financial forecast that may not reflect actual local funding spent over time on transportation-related projects.

The sum total of revenue sources for Bloomington Transit under formula grants, capital investment grants, and locally derived income suggest that, given forecast assumptions, the BMCMPO metropolitan planning area will have over $211.2 million available for transit service activities for Fiscal Years 2021 through 2045.

A final note: The current economic fallout resulting from the COVID-19 pandemic is unprecedented since the Great Depression. It is therefore import to note that the full implications of the current health and economic crisis has yet to "play out". A reasonably accurate forecast of domestic, state, and regional economic recovery is currently impossible.

Chapter 5: Travel Demand Model Scenarios

Introduction

This chapter highlights the fundamental aspects to the *2045 Metropolitan Transportation Plan* (MTP) used as a policy level decision-making guide for future transportation investment by the BMCMPO. The Guiding Principles, the financial forecast, and the future needs discussed in the previous chapters reflect the course of future decisions by the BMCMPO.

The travel demand modeling process establishes a quantifiable framework through which the BMCMPO Committees and the general public can

- Examine the existing transportation system under current performance assumptions
- Examine alternative future investment policy scenarios, and
- Achieve a broad policy-level investment consensus of solutions that meet the established Guiding Principles vision, goals, and objectives and satisfy fiscally constrained transportation needs and wants of the urban area.

The MTP provides direction for these considerations from the beginning project concept through implementation. The MTP provides general policy direction during the project concept phase by using the Guiding Principles; during the financial feasibility by considering the financial forecast or available resources and; during the technical design by addressing future needs.

The Bloomington-Monroe County Travel Demand Model (TDM) is another powerful tool of the MTP to assist in the 3C process. Again, this should inform and establish a framework for all BMCMPO members to work towards the best solution. Appendix C (Methodology) and Appendix D (Travel Demand Model) provide TDM technical information not detailed in this chapter. The TDM was developed to project future growth and travel demands (as discussed in Chapter 2) and to apply these to the 2013 base year conditions (existing and committed projects) and then to the year 2040. The TDM also uses multiple growth and development scenarios. This is a unique aspect of this TDM and a new analysis for the BMCMPO. What is important to this analysis is it allows the TDM to consider different rates of growth and allocate the growth into several different development styles as land uses and people are the most significant influences on transportation needs. Finally, another unique aspect and new tool for the BMCMPO is a TDM performance measure analysis. Together these components of the TDM provide results to further guide decision.

Travel Demand Model

The BMCMPO Travel Demand Model (TDM) established 2013 baseline conditions for Monroe County. This “Base Year” snapshot used travel demand forecast model methodology for measuring transportation network changes over time given alternative policy scenarios. The BMCMPO TDM quantified travel demand growth through land use, county-specific socioeconomic characteristics, and modal choices. This standard approach identified basic

future transportation network needs in the absence of network considerations such as political, topographical, and technical feasibility for system improvements. Needs derived from public comments, feedback from various agencies, and even land development activities can further assist planners formulate a TDM to reasonably reflect transportation needs. This list could include bigger buses to aid in serving busy bus routes, a roundabout for a dangerous intersection, and new road to serve business park growth.

Factors related to financial aspects, political support, technology, environmental constraints, societal trends, and public policy can introduce complexity into a TDM. Projections twenty-five years into the future make this exercise much more complicated. While the TDM does aid in this process by assessing socioeconomic trends, anticipated land use changes, and some transportation improvements highly anticipated, the future is nevertheless uncertain. What the TDM can achieve is aid with understanding the magnitude of future needs by considering a range of scenarios. The TDM can further assist planners and public officials to understand possible consequences of scenarios and near-term decisions by using performance measures. Together the TDM can guide decisions based on preferred courses of action or trajectories to meet our future expectations.

Network Scenarios

The BMCMPO travel demand model examined transportation system network scenarios to determine the macro-level performance impacts under an assortment of policy considerations. Scenario identifications evolved through general public input and BMCMPO committees. Staff evaluations through the MTP steering committee resulted in the identification of thirteen (13) network scenarios. These scenarios provided an understanding of the implications that may result from public policy investments strategies within the transportation network and associated socioeconomic changes, land use changes and other defined parameter conditions.

All scenarios examined with the BMCMPO TDM relied upon guidance from the public Metropolitan Transportation Plan Task Force, general public input, and the MPO staff. The overall assumption for most scenarios is that general operations and maintenance shall continue at existing necessary baseline levels. Scenarios 2, 3, 4, 6, and 11 did examine aspects of changing operations, maintenance, or potential external factors impacting travel demand. The financial forecast (see Chapter 4) accounted for general operations and maintenance as an element of all scenarios.

The BMCMPO TDM examined a no build or “Do Nothing” scenario and twelve (12) additional scenarios using the modeled Base Year 2013. The E+C network (Existing plus Committed) is included as part of all other scenarios with the single exception of Scenario 3 which did not include I-69 corridor development through the BMCMPO, and is intended only to compare it with the E+C network to better understand local impacts associated with I-69. Each scenario is detailed on the following pages below:

Scenario Statistics		Scenario									
	Scen #-->	0	1	2	4	5	6	9	10	11	12
	Land Use-->	Base	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	IURP	Bed Comm.	Mid-Stnd	Infill
Category	Measure	Net--> Base	E+C	E+C+BRT	E+C	TIP	TIP+	TIP	TIP	2-Ways	TIP
Demand	Vehicle Miles (VMT)	2,955,625	3,584,415	3,564,909	3,297,662	3,694,826	3,731,774	3,700,595	4,107,402	3,570,078	3,469,918
Demand	Vehicle Hours (VHT)	108,575	152,246	154,597	135,499	152,050	154,939	152,203	166,833	153,584	148,175
Demand	Work Trip - Vehicle Occupancy	1.08	1.08	1.07	1.09	1.08	1.08	1.07	1.07	1.08	1.08
Demand	Person Trips	589,162	690,749	690,748	690,748	690,738	690,738	692,285	702,061	690,744	685,964
Demand	Transit Share	4.49%	5.50%	6.39%	8.14%	5.50%	5.45%	5.51%	5.30%	5.50%	5.67%
Demand	Daily Ridership	27,792	39,892	46,555	59,038	39,895	39,496	40,458	39,056	39,897	40,808
Demand	Transit Trips	26,468	37,992	44,128	56,227	37,995	37,615	38,168	37,196	37,997	38,864
Demand	Transit Person Miles	51,875	60,819	72,535	91,984	60,818	60,210	60,955	61,815	60,819	60,398
Demand	Transit Person Hours	3,435	4,028	4,591	6,092	4,028	3,987	4,023	4,094	4,028	4,000
Demand	Non-Motorized Share	38.3%	37.2%	36.7%	40.9%	37.2%	36.8%	37.2%	34.7%	37.2%	39.0%
Demand	Non-Motorized Trips	225,589	256,619	253,542	282,280	256,617	254,051	257,262	243,832	256,619	267,385
Demand	Non-Motorized Person Miles	278,934	327,028	320,831	359,731	327,024	323,754	327,756	310,732.84	327,026	306,894
Demand	Non-Motorized Person Hours	42,974	50,384	49,435	55,421.94	50,383	49,879	50,496	48,176	50,383	47,287
Efficiency	Vehicle Hours Under Delayed Conditions	5,976	28,416	28,826	25,006	28,379	28,168	28,294	28,002	29,717	28,368
Efficiency	Avg. PM Peak Speed	27.22	23.54	23.06	24.34	24.30	24.09	24.31	24.62	23.25	23.42
Efficiency	Avg. Auto Trip Length	6.78	6.50	6.55	9.36	6.50	6.57	6.51	6.43	6.50	6.24
Efficiency	Lane Miles at LOS E or worse	9.93	65.88	65.91	58.00	65.79	64.48	65.59	64.92	68.89	65.52
Environ	Vehicle Emissions (Daily Tons CO2)	1,418	1,845	1,835	1,697	1,902	1,921	1,905	2,114	1,838	1,786
Safety	Fatal Accidents	12	15	15	14	16	16	16	17	15	15
Safety	Injury Accidents	1,111	1,453	1,461	1,313	1,472	1,494	1,474	1,626	1,457	1,410
Safety	Property Damage Accidents	3,068	4,011	4,034	3,626	4,066	4,126	4,071	4,489	4,023	3,894
Econ	Avg. Daily Roadway User Costs in 2040 ($2013 millions)	$ 2.697	$ 4.830	$ 4.412	$ 5.362	$ 4.405	$ 4.339	$ 4.409	$ 4.739	$ 4.398	$ 4.290
Econ	Daily User Cost per Vehicle Trip (Autos and Trucks)	$ 8.00	$ 12.19	$ 11.22	$ 13.64	$ 11.12	$ 10.95	$ 11.11	$ 11.26	$ 11.10	$ 11.30
Econ	Present Value ($2013 millions) 2013-2040 lifecycle user and safety benefits	n/a	n/a	$ 1,106.67	$ (430.04)	$ 1,019.04	$ 1,042.39	$ 993.90	$ (1,064.14)	$ 1,176.28	$ 1,820.47
Econ	Capacity Added to Meet Standards (Road Lane Miles)	9.93	65.88	65.91	58.00	65.79	64.48	65.59	64.92	68.89	65.52
Econ	Est. Cost to Achieve LOS D ($Million)	$ 7.45	$ 49.41	$ 49.43	$ 43.50	$ 49.34	$ 48.36	$ 49.20	$ 48.69	$ 51.67	$ 49.14

Scenario Statistics		Scenario									
	Scen #-->	0	1	2	4	5	6	9	10	11	12
	Land Use-->	Base	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	Mid-Stnd	IURP	Bed Comm.	Mid-Stnd	Infill
Measure	Net-->	Base	E+C	E+C+BRT	E+C	TIP	TIP+	TIP	TIP	2-Ways	TIP
Acres with a 5D Score > 0.8		1,208	1,623	1,623	1,623	1,623	1,620	1,682	1,548	1,623	1,794
Population with a 5D Score > 0.8		27,367	32,734	32,734	32,734	32,734	32,555	35,144	29,386	32,734	39,468
Households with a 5D Score > 0.8		6,575	9,516	9,516	9,516	9,516	9,461	10,013	7,397	9,516	10,956
Employment with a 5D Score > 0.8		35,293	52,307	52,307	52,307	52,307	52,183	47,637	47,311	52,307	57,080
Aggregate 5D Score (sum of 600 zones)		318.58	329.46	329.47	329.47	329.53	327.06	329.61	326.83	329.58	333.58
Average 5D Score		0.53	0.55	0.55	0.55	0.55	0.55	0.55	0.54	0.55	0.56
Aggregate Number of HH Autos		93,780	122,578	122,577	122,577	122,561	123,176	122,769	128,522	122,555	116,672
Population		152,952	188,760	188,760	188,760	188,760	188,760	189,464	188,229	188,760	188,759
Households		57,191	75,011	75,011	75,011	75,011	75,011	75,389	75,011	75,011	75,011
Jobs		79,611	107,138	107,138	107,138	107,138	107,138	107,138	107,136	107,138	107,138
Autos per Household		1.64	1.63	1.63	1.63	1.63	1.64	1.63	1.71	1.63	1.56
Pct. Of Acres with a 5D Score > 0.8		0.48%	0.64%	0.64%	0.64%	0.64%	0.64%	0.66%	0.61%	0.64%	0.71%
Pct. Of Population with a 5D Score > 0.8		17.9%	17.3%	17.3%	17.3%	17.3%	17.2%	18.5%	15.6%	17.3%	20.9%
Pct. Of Households with a 5D Score > 0.8		11.50%	12.69%	12.69%	12.69%	12.69%	12.61%	13.28%	10.01%	12.69%	15.11%
Pct. Of Employment with a 5D Score > 0.8		44.33%	48.82%	48.82%	48.82%	48.82%	48.71%	44.46%	44.16%	48.82%	53.28%

Color Coding
Best Performer
Better than Avg.
Average
Worse than Avg.
Worst Performer
n/a

5D/Urban Design Score

Category	*Range*	*Characteristics*
Auto oriented	0.0 to 0.2	Low density, low diversity, no destinations within walking distance, road design favors autos, little or no transit
More auto oriented than avg.	0.2 to 0.4	^
Average for area	0.4 to 0.6	|
More walk oriented than avg.	0.6 to 0.8	v
Walk/Bike/Transit oriented	0.8 to 1.0	High density, mixed land uses, many destinations within walking distance, road design favors walking, good access to transit

Table 5-1: TDM Scenario Results

Scenario 0 - "Do Nothing"

This scenario, also known as the Existing plus Committed Network (E+C), operates under the Base Year 2013 transportation network conditions (roadway configurations, operations of traffic control devices, transit services, and bicycle and pedestrian facilities, population, employment, households, and land use) and only with the committed transportation projects scheduled for then near-term construction (i.e., bid awards by FY 2014). All the other scenarios represent Year 2040 projections.

The "Do Nothing" Scenario in not comparable to other scenarios. The committed projects included within this scenario included the following Existing + Committed (E+C) projects:

- ***I-69 Section 4*** – New Major roadway/interchange construction from U.S. 231 near Crane NSWC/NSA to State Road 37 south of Bloomington.

- ***I-69 Section 5*** – Major roadway/interchange construction and the roadway conversion of SR 37 to a fully access controlled interstate from Kinser Pike to Victor Pike.

- ***Fullerton Pike/Gordon Pike/Rhorer Road*** - Road reconstruction and safety improvements including bituminous pavement, curb, gutter, sidewalk, multi-use side path, bridges and drainage appurtenances. This project included turn lanes and the installation of a new traffic signal at the Walnut Street Pike intersection from 475 feet west of the intersection of Old SR 37 and proceeding east to the end point, 200 feet east of Walnut Street Pike.

- ***Karst Farm Greenway (Phase I)*** – Preliminary engineering, Right-of-Way and construction of a multi-use pathway for non-motorized use, including site amenities (~4.00 miles long) from South of Vernal Pike to Karst Farm Park.

- ***Karst Farm Greenway (Phase IIa)*** – Preliminary engineering, Right-of-Way and construction of a multi-use pathway for non-motorized use, including site amenities (approximately 1.1 mile length) from Vernal Pike to Woodyard Road.

- ***Karst Farm Greenway (Phase 3)*** – Multi-use pathway construction with amenities from railbanked area to Hartstrait Road.

- ***17th St. & Arlington Rd. Roundabout*** – Construction to replacement of "K" intersection with a modern roundabout to serve this intersection of three streets to improve safety and facilitate better traffic flow from the Intersection of Arlington Road, West 17th Street and North Monroe Street.

- ***17th St. & Jordan Avenue*** – Construction to improve vertical geometry and sight distance at the intersection and on approaches from the Intersection of East 17th Street and North Jordan Avenue.

- ***17th St. & Jordan Avenue Pathway*** – Construction of a new non-motorized side path on 17th Street at Jordan Avenue.

- ***Old SR 37 & Dunn St. Intersection Improvements*** – Construction to Improve horizontal and vertical geometry and sight distance at the intersection and on approaches.

- ***Tapp Rd & Rockport Rd Intersection Improvements*** - Intersection improvements to correct a skew, improve sight distance & geometry and add bicycle and pedestrian facilities at the intersection of Tapp Rd/Country Club Drive and Rockport Road.

- ***Black Lumber Trail Spur*** - Construction of a multi-use trail for non-motorized use from Henderson Street to B-Line Switchyard property (approximately 0.3 mile length).

- ***Ellettsville Heritage Trail (Phase 1)*** – Construction of a multi-use pathway for non-motorized use, including site amenities along the former rail line from Main Street to Depot Road.

- ***Ellettsville Heritage Trail (Phase II)*** – Construction of a multi-use trail bridge for non-motorized use over Jack's Defeat creek

Scenario #1 - I-69 Section 5

This scenario assumes the full construction of I-69 Section 5 as committed and the following associated, committed projects benefiting the Bloomington-Monroe County local area including:

- ***Fullerton Pike Phase I*** - Construction for the installation of a new traffic signal and turn lanes at the Walnut Street Pike intersection from approximately 500 feet west of South Walnut Street to just east of Walnut Street Pike.

- ***Karst Farm Trail Phase 2a*** – Construction from of a multi-use path on publicly owned land connecting Ellettsville, Bloomington, three educational institutions, several large residential areas, several major, employment centers, the Monroe County Airport, and Karst Farm Park.

- ***Mt. Tabor Road*** – Roadway reconstruction as an element of I-69 Section 5.

- ***17th Street/Arlington Road/Monroe Street roundabout*** – Construction to resolve significant grade and sight distance problems.

- ***17th Street and Jordan Avenue*** – Pathway construction and reconstruction.

- ***Old SR 37 and Dunn Street*** – Improve horizontal and vertical geometry and sight distance at the intersection and approaches. Construction and reconstruction of a multiuse trail.

- ***The Black Lumber Trail*** - Construction of a multi-use trail for non-motorized use from Henderson Street to B-Line Switchyard property (approximately 0.3 mile length).

Scenario #2 - Bus Rapid Transit Route #3

This scenario converts and slightly modifies Bloomington Transit's existing Route #3 by converting it into a bus rapid transit route. This route would have 10-minute headways and signal preemption for added time-efficiency. This scenario demonstrates the system impacts associated with a major east-west bus rapid transit route.

Scenario #3 - State Road 37

In this scenario, the only modification to the E+C network is to exclude the I-69 Section 5 project and all associated local projects previously noted. This scenario analysis provided further understanding of the transportation system impacts associated with the construction of I-69 Section 5 beyond the proposed construction/operational corridor as well as a means to identify other local needs outside the I-69 Section 5 corridor. Table 5-1 does not show final results.

Scenario #4 - Peak Oil/COVID-19 Pandemic Proxy

This scenario considered the impacts of rising gasoline and diesel fuels an element affecting aggregate vehicle miles of travel (VMT) and mode choice decisions. This scenario did not modify the E+C network, but did illustrate the reduction of trips as fuel prices increased leading to economic and behavioral influences with fuel prices at $5.00 per gallon. Fuel efficiencies as well as alternative fuels and new technologies will play a long-term mitigating factor, but scenario serves as a reasonable economic constraint factor, i.e., cost, into the mode-choice process for the BMCMPO planning area.

This transportation demand behavioral scenario for Monroe County did not foresee the 2020 COVID-19 pandemic. This scenarios does, however, serve as a useful proxy measure for a broad aggregate decline of passenger and commercial vehicle VMT. The key difference is the absence of a distinct modal shift to public transportation. Indiana Governor Eric Holcomb's March "stay-at-home or place-of-residence" order (E.O. 20-08 effective March 24, 2020, expiring on May 18, 2020) restricted population movements except for closely-defined essential businesses and operations. As a consequence of this action, Monroe County VMT declined by as much as 39% according to available metadata. Bloomington Transit ridership declines by 95% during the stay-at-home period.

The FHWA Office of Highway Policy Information reported travel on all roads and streets declined by -18.6% for March 2020 as compared with March 2019; travel on all roads and streets declined by -39.8% for April 2020 as compared with April 2019, and; travel on all roads

and streets declined by -25.5% for May 2020 as compared with May 2019. Prior to a COVID-19 stay-at-home order, FHWA data for January and February 2020 showed VMT growth at approximately increased by 2.1% and 2.2%, respectively over the same months in 2019. Aggregate VMT and public transit ridership for Monroe County and the balance of Indiana are likely to remain suppressed for the length of the economic recession generated by the COVID-19 pandemic which began in March 2020. A potential economic recovery is dependent upon control of the pandemic and health crisis. Economic insecurity will very likely remain elevated for a considerable period of time pending the effective adoption of widespread scientifically documented COVID-19 control measures advocated by the Centers for Disease Control and Prevention (CDC).

Scenario #5 - Transportation Improvement Program (TIP)

This scenario modified the E+C network with programmed projects of the adopted BMCMPO FY 2016-2019 TIP scheduled for completion well before 2040. The new transportation projects for this scenario included the following:

- Rogers Road Multi-Use Pathway construction.
- Winslow Road Multi-Use Pathway construction.
- 10th Street and Law Lane new road connection construction.
- 17th Street reconstruction.
- Fullerton Pike Phases 1 & 2 construction and modernization.
- South Henderson Multi-Use Pathway construction, and
- Jackson Creek Trail Extensions construction.

Scenario #6 - TIP + Public Workshop Allocation

This scenario uses the TIP network with the addition of priorities identified by two (2) public workshops. The additional new transportation projects included:

- The construction of a B-Line Trail extension westward to the Karst Farm Trail
- The construction of a Fullerton Pike connection from I-69 to Rogers Road (3-lane with sidewalks and pathway that connects to Clear Creek Trail)
- The construction of a competed Jackson Creek Trail, and

- The implementation of a new Bloomington Transit service route along Tapp/Winslow/Rogers/Country Club from Curry Pike and SR 45 to Sare Road and Rogers Road with 30 minute headways

Results demonstrated by this scenario provided system performance information on the community-based transportation projects previously noted.

Scenario #7 - TIP + MTP 2035 Carryover Projects

This scenario evaluated older local project priorities that had yet to achieve fruition. Several of these projects did not move forward for a variety of reasons because of changes in local investment and private sector funding priorities. Generally speaking, these improvements included completing South Adams Street, connecting East 14th Street to Law Lane, completing Sudbury Drive, connecting Fullerton Pike from I-69 to Walnut Street, the modernization of Curry Pike from Constitution Avenue to Tapp Road, the realignment of Weimer Road, and the total completion of the Jackson Creek Trail. System performance information derived from this scenario aided in a reassessment of challenging local project needs previously identified in the 2030 Long Range Transportation Plan.

Scenario #8 - TIP + MTP 2030 Limited Carryover

This scenario is identical to Scenario #7 except it omits the construction of improvements to Weimer Road, 14th Street, Curry Pike, Sudbury Drive, and sections of the Jackson Creek Trail that are not part of the TIP. This analysis primarily illustrates information for a new 3-lane connection of Fullerton Pike from I-69 to Rogers Road, and projects included within the FY 2014-2017 TIP. Table 5-1 does not show these final results.

Scenario #9 - TIP + IU Research Park

This scenario examined the transportation system impact of Bloomington Hospital's relocation to the Indiana University Research Park neighborhood at East 10th Street and SR 45/46 Bypass. Land at the vacated current Bloomington Hospital site located at 2nd Street and Roger Street would then convert to a traditional single family housing neighborhood. This scenario provided a system understanding of the associated changes that would potentially occur with a Bloomington Hospital relocation to the east side of the city.

Scenario #10 - TIP + Sample Road Bedroom Community

This scenario examined the construction of a new I-69 Section 5 interchange at Sample Road and demonstrated transportation system impacts associated with a conceptual new bedroom community having new access to either Bloomington or to Indianapolis. In this scenario, the BMCMPO TDM model allocated a majority of new population growth around this interchange to demonstrate the maximum impacts for an urban sprawl type of land use development.

Scenario #11 - TIP + 2-Way Streets

This scenario converts many of the existing local one-way streets back into two-way street corridors for College Avenue, Walnut Street, 3rd Street, and Atwater Avenue. This scenario demonstrated the impacts of one-way streets in Scenario #5 when compared with the results of this scenario (i.e., Rogers Road Pathway, Winslow Road Pathway, 10th Street and Law Lane new road connection, 17th Street reconstruction, Fullerton Pike Phases 1 & 2 modernization, the South Henderson Multi-use Pathway, and the Jackson Creek Trail Extensions).

Scenario #12 - TIP + Urban Infill

This scenario allocated to growth to existing housing by minor increases in neighborhood densities through the inclusion of accessory dwelling units, or so-called "granny flats". This scenario eliminated the potential for allocating new population growth with new bedroom communities. This scenario offered an additional examination of impacts on land use policy similar to a relocation of the Bloomington Hospital and a subsequent adaptive reuse/conversion of that land into a traditional single family housing neighborhood.

Performance Measures

The Bloomington-Monroe County Travel Demand Model (TDM) examined a range of performance measures to further shed insight on outcomes of the thirteen scenarios considered to the year 2040. These performance measures used MAP-21 and current FAST Act federal performance guidance with the expectation that performance measures shall remain a requirement for all future transportation projects using federal resources.

The TDM additionally considered local performance measures to further assess the conditions of the built environment and influences on travel. The first tier of performance measures use attributes based on safety, travel demand, travel efficiency, environmental considerations, and economic factors. Respectively they include multiple measureable values such as the crash frequency and severity, person trips, delay and accessibility, greenhouse gas emissions, and multiple economic factors.

A second tier of local performance measures used various urban design variables (a land use density score called "5D") that included density, diversity, design, destinations, and distance to transit elements. This scoring process further assessed the relationship between land uses and transportation.

Conclusion - 2040 MTP Scenarios Summary

The BMCMPO examined a "Do Nothing" Scenario and twelve additional travel demand model (TDM) scenarios using Base Year 2013 conditions and forecasting to the Year 2040. The TDM additionally used a range of local performance measures (travel demand, efficiency, environmental, safety, economic, and a "5D" land use score) to further examine the overall performance of the thirteen (13) scenarios. The information in Table **5-XX** illustrates the summary results of each scenario by their respective performance. The scenarios summary

analysis shows that Scenario #4 (Peak Oil), and Scenario #12 (Urban Infill), respectively out-performed other scenarios using the local performance measures.

Coupled with the 5D land use scores, Scenario #12 stands out from all other scenarios. Using an adopted transportation policy orientation of projects programmed in the BMCMPO FY 2016-2019 TIP plus a strong focus on urban infill (TIP + Urban Infill), clearly demonstrated the best multi-modal system performance in the Year 2040. Furthermore, Scenario #12 meets or shall meet all FHWA national performance goals for safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and potentially reduced project delivery delays.

Appendix A:
Transportation Planning Requirements

Introduction

The BMCMPO *2045 Metropolitan Transportation Plan* was prepared in compliance with the Federal Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94) and predecessor federal legislation applicable to metropolitan transportation planning. Metropolitan Planning Organizations are required to have a continuous, cooperative and comprehensive ("3C") planning processes that implement projects, strategies and services that will address the ten (10) core planning factors. This Appendix addresses the core Federal planning factors (23 CFR 450.306(d)(4)(vi))and further notes how the 2045 Metropolitan Transportation Plan incorporates each core planning factor.

Federal Transportation Planning Factors

Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency.

The BMCMPO 2045 Metropolitan Transportation Plan supports and builds upon the locally adopted 2012 Monroe County Comprehensive Plan, the 2018 City of Bloomington Comprehensive Plan, the 2018 Monroe County Transportation Alternatives Plan, and the 2019 City of Bloomington Transportation Plan in supporting the local economic development goals of partner communities. *Transform2045* promotes an efficient compact urban form transportation network with high levels of travel time reliability and on-time delivery/service maintenance by strengthened network circulation. One objective this Plan incorporates is connectivity and ease of movement by persons and goods in and through the area by making multi-modal investments thereby ensuring the availability of multiple sustainable travel options and bringing balance to the transportation system.

Increase the safety of the transportation system for motorized and non-motorized users. Safety investments are a high priority for the 2045 Metropolitan Transportation Plan.

The *2045 Metropolitan Transportation Plan* focuses on increased safety of the transportation system for motorized and non-motorized users in the following ways:

- The Plan advocates system preservation over capacity expansion, thereby limiting the addition of lane-miles where potential multi-modal user conflicts could occur.

- The Plan supports increased investment in bicycle, pedestrian, and transit modes, providing opportunities for safer and more efficient travel by users of those modes.

- The projects contained in the Plan reduce congestion by providing alternative routes for user needs thereby decreasing system conflicts and enhancing safety.

- The BMCMPO Complete Streets Policy requires local planning agencies (LPAs) to consider the needs of all users within a corridor when designing a project.

- As a new safety polity, the Plan urges the adoption of a "Vision Zero" goal with the premise that traffic deaths and severe injuries are largely preventable. This commitment shall define a timeline and bring stakeholders together to ensure a basic right of safety for all transportation system users through clear, measurable strategies.

Increase the security of the transportation system for motorized, non-motorized and transit users.

Transform2045 enhances the security of all transportation users in several ways. Increasing roadway connectivity provides redundancy in the system, allowing for multiple routes of ingress and egress and flexibility in planning evacuation routes in emergency situations. Monroe County Emergency Management Administration (EMA) is the lead county agency for security issues and BMCMPO will play a supporting role providing assistance as needed.

Bloomington Transit has several security strategies in operation including access control, surveillance and monitoring on system vehicles as well as office and maintenance facilities. Operations include Computer-Aided Dispatching and Automatic Vehicle Locater technology.

Increase the accessibility and mobility options available to people and freight.

Transform2045 strengthens and creates accessibility on two distinct levels. One focuses on improving the continuity of the road network. The other provides additional connections and improvements between modes of travel. All citizens, travelers and businesses benefit from this dual approach. This Plan reduces travel and delivery time by increasing accessibility through the completion of key new connections and the enhancement of existing corridors. Access to the I-69 highway corridor through Monroe County increases statewide and national connectivity for local and regional interstate system users, including the movement pf freight origin-destination operations within the BMCMPO.

Transform2045 increases bicycle and pedestrian mobility, as well as the safety of transit riders since all proposed road improvements are required to include provisions for these modes through an adopted Complete Streets Policy. Transit user's, bicyclists, and pedestrians achieve greater safety with the availability of well-maintained sidewalks, curb ramps meeting current ADA standards, side-paths, multi-use pathways, and trails.

Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.

Transform2045 clearly supports these goals by recommending the implementation of transportation projects that are consistent with adopted local land use plans. It is clear from analysis of the MPO region that local land use decisions have the greatest impact on transportation system performance. It is thus paramount that transportation investments made by the MPO are supportive of best practices in land use planning, including focusing development density in existing urban centers rather than encouraging sprawl development.

Transform2045s focus on system preservation over expansion as well as emphasis on investment in non-motorized transportation facilities shall support environmental protection and enhancement.

Finally, *Transform2045* strongly supports additional public transit systems services that will reduce single-occupant vehicle usage on the roadway network.

Enhance the integration and connectivity of the transportation system, across and between modes.

Transform2045 sets forth a program of goals and projects that support the integration and connectivity of the transportation system. Roadway network improvements focus on enhancing the existing system while providing key new connections, particularly with the completion of the I-69 corridor through Monroe County. Investments across surface transportation modes will expand travel options for community residents.

Transform 2045 additionally builds upon the multi-modal plans and programs of previous adopted metropolitan transportation plans where freight movements, transit system use, bicycling, and walking play an increased regional role. *Transform2045* makes specific recommendations for public transit, bicycling, and walking because multi-modal travel promotes reduced congestion, energy conservation and quality of life improvements.

Promote efficient system management and operation

The BMCMPO's local partners have refined pavement, bridge, traffic, and transit asset management systems. These systems allow responsible jurisdictions to monitor system performance, identify deficiencies, specify needs, and then define target projects to address needs.

Pavement, bridge, traffic, transit and other asset management systems jurisdictional authorities the ability to use existing transportation facilities more efficiently and

effectively in response to every changing system needs. All jurisdictions within the BMCMPO are continuously updating individual asset management systems to address Americans with Disabilities Act needs and to establish investment priorities.

Bloomington Transit, IU Campus Bus and Rural Transit have mature asset and system management practices that promote safety, mobility and more efficient use of their existing transportation infrastructure as evidenced by the employment of information management, fleet maintenance and acquisition, marketing, schedule adherence and strategic planning, all contributing to public transit systems that successfully provides an alternative to automobiles.

Emphasize the preservation of the existing transportation system.

System preservation is a key tenet of the *Transform2045* Vision and Goals. *Transform2045* advocates a "fix it first" mentality to ensure that maintenance and system preservation represent a higher priority over investments that would expand the capacity of existing roads or the creation of new corridors.

Virtually all *Transform2045* proposed roadway and roadway reconstruction improvements are on existing transportation corridors. Projects identified within *Transform2045* follow changes in land use thereby necessitating modernization investments for roadway safety, and the accommodation of multi-modal transit, bicycle and pedestrian users.

Improve the resiliency and reliability of the transportation system and reduce or mitigate storm water impacts of surface transportation.

The Monroe County Emergency Management Agency (EMA) is the local community's lead for crisis and disaster response. The MPOs local partners have representation on the Local Emergency Planning Committee. The EMA additionally works in close cooperation with Community Organizations Active in Disaster (COAD) for Monroe County as well as District 8 Indiana EMA, a multi-county regional EMA. Established local asset management systems allow for the timely assessment, speedy repair and recovery from unexpected infrastructure damage. Bloomington and Monroe County have long operated storm water utilities that manage such infrastructure and provide for its maintenance and enhancement over time. All new or upgraded roadway corridors include storm water runoff control as a mandatory design component.

Enhance travel and tourism.

Monroe County and the City of Bloomington are historically recognized throughout the Midwest United States and Indiana as major travel and tourism destinations for:

- *Arts and Cultural Opportunities* within and outside of the Indiana Arts Commission's recognized Bloomington Entertainment and Arts District (BEAD). BEAD includes the "what to do" element of art galleries, museums, cultural

centers, historic landmarks, and regional trails. The "what to eat" element of BEAD incorporates American and International cuisine restaurants, food trucks and carts, coffee & sweet shops, bars & pubs, breweries, and wineries and distilleries. BEAD's "where to say" element includes hotels and motels, inns and Bed & Breakfasts, cabins and guesthouses, and apartments and suites.

- *Outdoor Recreation Opportunities* given the presence of the Hoosier National Forest, the Deem Wilderness, the Paynetown State Recreational Area, Lake Monroe, Lake Lemon, Griffy Lake Reservoir, nature preserves, hiking/biking trails, extensive county and community parks, recreational facilities, and alternative transportation multimodal pathway systems offering a full range of alternative active or passive recreational choices for all citizens and visitors.

- *Major "Big Ten Conference" Sporting Events and Cycling Events* through Indiana University and the Bloomington Bicycle Club including the women's and men's Little 500 Bike Races on the Indiana University Campus and the Hilly Hundred Bike Ride.

- Regional and local retail shopping locations, and

- Access to high quality regional health care providers, diverse health care services, and regional health care facilities.

Given this context of travel and tourism, Monroe County and the City of Bloomington will maintain and continually modernize existing multimodal transportation system corridors while continually expanding pedestrian and bicycle infrastructure investments with new investments directed toward safety, convenience and seamless connectivity.

Appendix B: Performance Measures

Introduction

The Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94) and the Moving Ahead for Progress in the 21st Century (MAP-21) Act (P.L. 112-141) established new requirements for transportation planning performance management. The following National performance goals meet established in seven (7) key areas in accordance with 23 USC 150: *National Performance Measure Goals*. States and MPO must establish performance targets in support of the national goals. The national performance goals for Federal Highway Administration (FHWA) programs are:

- **Safety** – To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Condition -** To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion Reduction** – To achieve a significant reduction in congestion on the National Highway System (NHS).
- **System Reliability** – To improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality** – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental Sustainability -** To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays** – To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through the elimination of delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

The following discussion notes each of these key areas.

Performance Measures

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) issued new transportation planning rules on the statewide and metropolitan transportation planning processes to reflect the use of a performance based approach to decision-making in support of the national goals. These processes must document in writing how the Metropolitan Planning Organizations (MPOs), the Indiana Department of Transportation (INDOT) and providers of

public transportation shall jointly agree to cooperatively develop and share information related to transportation performance data, the selection of performance targets, the reporting of performance to be used in tracking progress toward attainment of critical outcomes for the region of the MPO (see 23 CFR 450.306(d)), and the collection of data for the INDOT asset management plan for the National Highway System as specified in 23 CFR 450.314(h).

The FTA's performance measures for Transit Asset Management are published and currently in effect. FHWA currently has performance measures and final regulations published for Safety, Bridge and Pavement Conditions, Congestion Reduction and System Reliability; however, only the Safety Performance Measure regulation is in effect at the present time.

INDOT along with the MPOs and FHWA will continue collaborating to identify Performance Targets for each Performance Measure. Once Performance Targets are established, the Transportation Improvement Program (TIP) and Statewide Transportation Improvement Program (STIP) shall require modification reflecting this information.

For FHWA and FTA to approve any TIP amendments after May 27, 2018, INDOT, MPOs and Public Transit Operators must reflect this information and describe how projects in the TIP/STIP, shall (to the maximum extent practicable) achieve the Federally required performance targets identified in the Statewide and Metropolitan Transportation Plans, linking investment priorities to these performance targets.

Safety

INDOT, the MPOs, FHWA, and the Indiana Criminal Justice Institute (ICJI) actively discuss and collaborate on the Indiana's Safety Performance Measures and Safety Performance Targets. INDOT initially submitted Safety Performance Target Measures in 2018 followed by an updated 2020 target submission.

Indiana's MPOs collectively support INDOT's Safety Targets. The Highway Safety Improvement Program (HSIP) is a primary source of federal funds for qualifying safety improvement projects. INDOT and the Indiana's MPOs use HSIP along with other funding sources for the implementation of safety improvements with the purpose to reduce roadway crashes, and a corresponding reduction in fatalities and serious injuries on all public roads. The five specific safety performance measures are:

- Number of fatalities;
- Rate of fatalities;
- Number of serious injuries;
- Rate of serious injuries; and
- Number of non-motorized fatalities and non-motorized serious injuries

The Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) agreed in January 2020 to support the 2020 safety targets established by the Indiana Department of

Transportation as reported to the National Highway Traffic Safety Administration and Federal Highway Administration.

The Indiana Department of Transportation's 2020 safety maximum targets based on five-year rolling averages are:

- Number of Fatalities = 965
- Number of Serious Injuries= 3,628
- Fatality Rate (fatalities per 100 million miles traveled)= 1.154
- Serious Injury Rate (serious injuries per 100 million miles traveled = 4.342
- Total Number of Non-Motorist Fatalities and Serious Injuries= 420

The Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) will support INDOT's maximum safety targets by incorporating planning activities, programs, and projects in the 2045 Metropolitan Transportation Plan and the FY 2020 - 2024 Transportation Improvement Program. The BMCMPO Policy Committee approved this action at their regularly scheduled meeting on January 10, 2020.

Pavement Condition Target Performance Measures

The Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) agreed in October 2018 to support the 2019 and 2021 Pavement Condition targets established by the Indiana Department of Transportation (INDOT) as reported to the Federal Highway Administration (FHWA). The 2019 and 2021pavement targets based on a certified Transportation Asset Management Plan are:

- Percent of Interstate pavements in Good condition
- Percent of Interstate pavements in Poor condition
- Percent of non-Interstate NHS pavements in Good condition
- Percent of non-Interstate NHS pavements in Poor condition

The BMCMPO agreed to support the Indiana Department of Transportation's 2019 and 2021 Pavement Condition targets established by the Indiana Department of Transportation for reporting to the Federal Highway Administration. The 2019 and 2021 pavement targets based on a certified Transportation Asset Management Plan are:

- 2019 Percent of Interstate pavements in Good condition - 84.24%
- 2019 Percent of Interstate pavements in Poor condition - 0.80%
- 2019 Percent of non-Interstate NHS pavements in Good condition - 78.71%
- 2019 Percent of non-Interstate NHS pavements in Poor condition - 3.10%
- 2021 Percent of Interstate pavements in Good condition - 84.24%
- 2021 Percent of Interstate pavements in Poor condition - 0.80%
- 2021 Percent of non-Interstate NHS pavements in Good condition - 78.71%
- 2021 Percent of non-Interstate NHS pavements in Poor condition - 3.10%

The BMCMPO will support the Pavement Condition targets by incorporating planning activities, programs, and projects in the Adopted Metropolitan Transportation Plan and the current Transportation Improvement Program. The BMCMPO Policy Committee approved this action at their regularly scheduled meeting on October 12, 2018.

Bridge Performance Measures

The Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) agreed in October 2018 to support the Indiana Department of Transportation's 2019 and 2021 statewide National Highway System (NHS) Bridge Condition targets for the following performance measures:

- Percent of NHS bridges by deck area classified as in Good condition
- Percent of NHS bridges by deck area classified as in Poor condition

The BMCMPO will support the 2019 and 2021 NHS Bridge Condition targets established by the Indiana Department of Transportation for reporting to the Federal Highway Administration. The 2019 and 2021 NHS Bridge Condition targets based on a certified Transportation Asset Management Plan are:

- 2019 Percent of NHS bridges by deck area classified in Good condition - 48.32%
- 2019 Percent of NHS bridges by deck area classified in Poor condition -2.63%
- 2021 Percent of NHS bridges by deck area classified in Good condition -48.32%
- 2021 Percent of NHS bridges by deck area classified in Poor condition -2.63%

The BMCMPO will support the NHS Bridge Condition targets by incorporating planning activities, programs, and projects in the Adopted Metropolitan Transportation Plan and the current Transportation Improvement Program. The BMCMPO Policy Committee approved this action at their regularly scheduled meeting on October 12, 2018.

System Performance

The system performance measures are also applicable to the Interstate and non-Interstate NHS. These performance measures assess National Highway System (NHS) truck travel time reliability and interstate freight reliability targets, and performance measures for on-road mobile source emissions consistent with the national Congestion Mitigation and Air Quality (CMAQ) Program.

NHS Truck Travel Time Reliability Targets

The Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) has elected to plan and program projects so that they contribute towards the accomplishment of the Indiana Department of Transportation's 2019 and 2021 NHS Truck Travel Time Reliability targets for the performance measures are as follows:

- Level of Travel Time Reliability on Interstate
- Level of Travel Time Reliability on non-Interstate NHS

The BMCMPO agrees to support the 2019 and 2021 NHS Truck Travel Time Reliability targets established by the Indiana Department of Transportation for reporting to the Federal Highway Administration. The 2019 and 2021 statewide travel time reliability targets based on percent of person miles that are certified as reliable:

- 2019 Percent of person miles reliable on Interstate - 90.5%
- 2021 Percent of person miles reliable on Interstate - 92.8%
- 2021 Percent of person miles reliable on non-Interstate - 89.8%

The BMCMPO will support the NHS Truck Travel Time Reliability targets by incorporating planning activities, programs, and projects in the Adopted Metropolitan Transportation Plan and the current Transportation Improvement Program. The BMCMPO Policy Committee approved this action at their regularly scheduled meeting on October 12, 2018.

Interstate Freight Reliability Targets

The Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO} elected to plan and program projects so that they contribute towards the accomplishment of the Indiana Department of Transportation's 2019 and 2021 Interstate Freight Reliability targets for the following performance measure:

- Interstate Freight Reliability

The BMCMPO agrees to support the 2019 and 2021 Interstate Freight Reliability targets established by the Indiana Department of Transportation for reporting to the Federal Highway Administration. The 2019 and 2021 Interstate Freight Reliability targets based on the truck travel time reliability index are:

- 2019 Interstate freight reliability index -1.27
- 2021 Interstate freight reliability index -1.24

The BMCMPO will support the Interstate Freight Reliability targets by incorporating planning activities, programs, and projects in the Metropolitan Transportation Plan and the current Transportation Improvement Program. The BMCMPO Policy Committee approved this action at their regularly scheduled meeting on October 12, 2018.

On-Road Mobile Source Emission Target Performance Measures

The Bloomington-Monroe County Metropolitan Planning Organization (BMMPO) has elected to plan and program projects so that they contribute towards the accomplishment of the Indiana Department of Transportation's 2019 and 2021 On-Road Mobile Source Emission targets for the performance measures listed below.

- CMAQ project reduction volatile organic compounds (VOC)
- CMAQ project reduction carbon monoxide (CO)

- CMAQ project reduction oxides of nitrogen (NOx)
- CMAQ project reduction particulate matter less than 10 microns (PM10)
- CMAQ project reduction particulate matter less than 2.5 microns (PM2.5)

The BMCMPO agrees to support the 2019 and 2021 On-Road Mobile Source Emission reduction targets established by the Indiana Department of Transportation for reporting to the Federal Highway Administration. The 2019 and 2021 On-Road Mobile Source Emission reduction targets based on kilograms per day are:

- 2019 Volatile Organic Compounds (VOCs) reduction of 1,600 kilograms per day
- 2019 Carbon Monoxide (CO) reduction of 200 kilograms per day
- 2019 Oxides of Nitrogen (NOx) reduction of 1,600 kilograms per day
- 2019 Particulate Matter (PMl0) less than 10 microns reduction of 0.30 kilograms per day
- 2019 Particulate Matter (PM2.5) less than 2.5 microns reduction of 20 kilograms per day
- 2021 Volatile Organic Compounds (VOCs) reduction of 2,600 kilograms per day
- 2021 Carbon Monoxide (CO) reduction of 400 kilograms per day
- 2021 Oxides of Nitrogen (NOx) reduction of 2,200 kilograms per day
- 2021 Particulate Matter (PM10) less than 10 microns reduction of 0.50 kilograms per day
- 2021 Particulate Matter (PM2.5) less than 2.5 microns reduction of 30 kilograms per day.

The BMCMPO will support the On-Road Mobile Source Emission reduction targets by incorporating planning activities, programs, and projects in the Metropolitan Transportation Plan and the current Transportation Improvement Program. The BMCMPO Policy Committee approved this action at their regularly scheduled meeting on October 12, 2018.

Transit Performance Measures

The Transit Asset Management Final Rule requires transit providers to set performance targets for state of good repair by January 1, 2017. The Federal Transit Administration extended that deadline to January 1, 2018. The Planning Rule requires each MPO to establish targets not later than 180 days after the date on which the relevant provider of public transportation establishes its performance targets. The BMCMPO will adopt the targets established by Bloomington Transit. Targets will be established in the following categories:

- Rolling Stock - Percent of revenue vehicles that have met or exceeded their useful life benchmark.

- Equipment - Percent of service vehicles that have met or exceeded their useful life benchmark.

- Facility - Percent of facilities rated below 3 on the condition scale

BMCMPO Performance Measures

The BMCMPO independently developed urban area Performance Measures for alignment with *Transform 2045* vision and goals. These Performance Measures additionally reflect the community's character and goals for the transportation network. The Performance Measures grouped into five (5) larger categories include Travel Demand, Travel Efficiency, Economic, Safety, and Environmental issues. Each of these Performance Measures underwent analysis through the BMCMPO Travel Demand Model. A second tier of Performance Measures used a 5D score shown in the table above.

Vision and Performance Measures

Travel Demand

- Person trips per day
- Daily vehicle trips
- Daily vehicle miles
- Daily vehicle hours
- Daily transit boarding's
- Mode shares

Travel Efficiency

- Vehicle hours of delay
- Accessibility by mode
  - Number of jobs within X minutes
  - Shopping within X minutes
- Transit person hours
- Weighted average transit walk distance
- Weighted average transit headway
- 5D Variables

Economic

- Infrastructure costs
- Monetized System User benefits (time, cost, etc.)
- Potential jobs impacts
- Prosperity index

Safety

- Predicted number of accidents
  - Fatal, Injury, Property Damage

Environmental

- Greenhouse gas emission tonnage
- GHG per trip
- GHG per capita

Aggregate Statistics

Urban Design Variables				
Elements	**Variables**	**Data Source**		**Units**
Density				
DENS1	Households Densiity	*No. Households from TAZ data*	*TAZ land area in sq.mi*	*Households per sq. mi. jobs per sq.mi.*
DENS2	Employment Density	*No. of Jobs from TAZ data*	*TAZ land area in sq.mi*	
Diversity				
DIVERS	Jobs/Housing Ratio	*No. of Jobs within 1 mile radius/No. Households within 1 mile radius*		*Jobs per household ratio*
Design				
DESGN1	Walkability	*Pct. Of TAZ streets that are walkable*		*Miles walkable per total centerline miles*
DESGN2	Avcragc Blockfacc (milcs)	*Centerline miles of road (non-freeway)*	*Number of links (non-freeway)*	*Miles per link*
DESGN3	Street Density	*Centerline miles of road (non-freeway)*	*Land area of TAZ*	*Road miles/square mile*
Destinations				
DEST1	Commercial establishments within 10 min walk	*Selection set of commercial parcels*	*Count parcels within 0.1667 mi*	*Number of establishments*
DEST2	Retail jobs within 10 min walk	*No. of Retail jobs from TAZ data*	*Count jobs within 0.1677 mi*	*Number of retail jobs*
Distance to Transit				
DTT1	Street Coverage within 10min. Walk to Transit Stop	*Street miles within a 10 min walk of transit stops*		*Pct. Of Centerline Miles*
DTT2	Access to destinations via transit	*Number of stops within 5 miles via transit*		*Number of stops*

Appendix C: Plan Development Methodology

Introduction

The 2045 MTP prepared by the BMCMPO staff relied on consultation guidance from the Federal Highway Administration-Indiana Division, the Indiana Department of Transportation Indianapolis central office and Seymour District staff, Monroe County, the Town of Ellettsville, Rural Transit, Bloomington Transit, IU Campus Bus, and the City of Bloomington.

As a non-technical MTP update, the staff focused on an extensive public involvement/public input process through open meetings of the Citizen Advisory Committee (CAC), Technical Advisory Committee (TAC), and Policy Committee. The adoption of Centers for Disease Control and Prevention (CDC) COVID-19 guidelines as a preventative safety measure beginning in April 2020 necessitated a shift to virtual digital platforms for all meetings using Zoom and Facebook Live. All meetings of the Policy Committee routinely recorded for community viewing by the Citizens Access Television System (CATS https://www.catstv.net/) continued uninterrupted throughout the calendar year as the staff presented draft MTP chapters. Draft MTP chapters had additional postings on the BMCMPO website (https://bloomington.in.gov/mpo/metropolitan-transportation-plan) along with a discussion/adoption schedule.

Staff presentations and public meeting discussions adhered to the following schedule throughout calendar year 2020:

- January 10, 2020 - Policy Committee Meeting
  - Proposed development timetable
  - Purpose and need
  - Anticipated plan content

- January 13, 2020 – FHWA/INDOT/BMCMPO 2045 MTP Plan Scope Meeting
  - Proposed development timetable
  - Purpose and need
  - Anticipated plan content
  - Plan requirements and considerations

- January 22, 2020 - Technical Advisory Committee Meeting
  - Proposed development timetable
  - Purpose and need & anticipated plan content
  - MTP Kick-off Coordination Meeting with INDOT/FHWA

- January 22, 2020 - Citizens Advisory Committee Meeting
  - Proposed development timetable
  - Purpose and need & anticipated plan content
  - MTP Kick-off Coordination Meeting with INDOT/FHWA

- February 14, 2020 - Policy Committee Meeting
    - 2045 Metropolitan Transportation Plan - Introduction, Background, Requirements
    - Financial Forecast
    - Environmental Justice
    - Air Quality
    - Draft 2045 MTP Discussion - Glossary

- February 26, 2020 - Technical Advisory Committee Meeting
    - Guiding Principles
    - Transportation Planning Requirements
    - Performance Measures

- February 26, 2020 - Citizens Advisory Committee Meeting
    - Guiding Principles
    - Transportation Planning Requirements
    - Performance Measures

- March 13, 2020 - Policy Committee Meeting
    - Guiding Principles
    - Transportation Planning Requirements
    - Performance Measures
    - Financial Forecast

- April 13, 2020 - Policy Committee Meeting
    - Guiding Principles
    - Transportation Planning Requirements
    - Performance Measures

- April 22, 2020 - Technical Advisory Committee Meeting
    - Public Workshops, Comments, Schedules, Next Steps
    - 2045 Metropolitan Transportation Plan Public Survey

- April 22, 2020 - Citizens Advisory Committee Meeting
    - Public Workshops, Comments, Schedules, Next Steps
    - 2045 Metropolitan Transportation Plan Public Survey

- May 8, 2020 - Policy Committee Meeting
    - Public Workshops, Comments, Schedules, Next Steps
    - 2045 Metropolitan Transportation Plan Public Survey
    - BMCMPO Comprehensive Website Postings

- May 27, 2020 - Technical Advisory Committee Meeting
    - 2045 Metropolitan Transportation Plan Public Survey
    - BMCMPO Comprehensive Website Postings

- May 27, 2020 - Citizens Advisory Committee Meeting
    - 2045 Metropolitan Transportation Plan Public Survey
    - BMCMPO Comprehensive Website Postings

- June 12, 2020 - Policy Committee Meeting
    - Guiding Principles
    - Financial Forecast
    - Transportation Planning Requirements
    - Environmental Justice
    - Air Quality
    - Performance Measures
    - Travel Demand Model
    - Travel Demand Model Scenarios
    - Glossary
    - 2045 Metropolitan Transportation Plan Public Survey

- June 24, 2020 - Technical Advisory Committee Meeting
    - Guiding Principles
    - Financial Forecast
    - Transportation Planning Requirements
    - Environmental Justice
    - Air Quality
    - Performance Measures
    - Travel Demand Model
    - Travel Demand Model Scenarios
    - Glossary
    - 2045 Metropolitan Transportation Plan Public Survey

- June 24, 2020 - Citizens Advisory Committee Meeting
    - Guiding Principles
    - Financial Forecast
    - Transportation Planning Requirements
    - Environmental Justice
    - Air Quality
    - Performance Measures
    - Travel Demand Model
    - Travel Demand Model Scenarios
    - Glossary
    - 2045 Metropolitan Transportation Plan Public Survey

- August 28, 2020 - Technical Advisory Committee Meeting
    - 2045 Metropolitan Transportation Plan: 90% Complete Draft including public survey results

- August 28, 2020 - Citizens Advisory Committee Meeting
    - 2045 Metropolitan Transportation Plan: 90% Complete Draft including public survey results
- September 11, 2020 - Policy Committee Meeting
    - 2045 Metropolitan Transportation Plan: 90% Complete Draft including public survey results

- September 23, 2020 - Technical Advisory Committee Meeting
    - 2045 Metropolitan Transportation Plan: 95% Complete Final Draft including public survey results

- September 23, 2020 - Citizens Advisory Committee Meeting
    - 2045 Metropolitan Transportation Plan: 95% Complete Draft including public survey results

- October 9, 2020 - Policy Committee Meeting
    - 2045 Metropolitan Transportation Plan Adoption

Public Outreach Process

The public outreach process began with the following advertised workshop meetings prior to the COVID-19 crisis:

- *MTP Public Workshop #1 - Bloomington Transit Downtown Transfer Center, March 4th from 12:00 p.m. to 2:00 p.m.* Presentation materials included an overview of the MTP purpose and need, an urban area boundary map, project types, guiding principles plus two open-ended workshop participant questions: (1) How would you describe transportation conditions in the community today, and (2) What should the community transportation system look like in 2045?

- MTP Public Workshop #2 - Ellettsville Town Hall, March 4th from 6:00 p.m. to 8:00 p.m. Presentation materials included an overview of the MTP purpose and need, an urban area boundary map, project types, guiding principles plus two open-ended workshop participant questions: (1) How would you describe transportation conditions in the community today, and (2) What should the community transportation system look like in 2045?

Interagency Consultation & Coordination - 2020

The BMCMPO staff continuously consulted and coordinated with federal, state and local transportation agencies throughout the 2045 MTP development process from mid-2019 through October 2020 to ensure the attainment of federal and state requirements.

The consultation/coordination process further ensured the receipt of corresponding comments. This interagency consultation and coordination ensured the completion of appropriate technical level reviews prior final 2045 MTP adoption by the BMCMPO Policy Committee in October 2020.

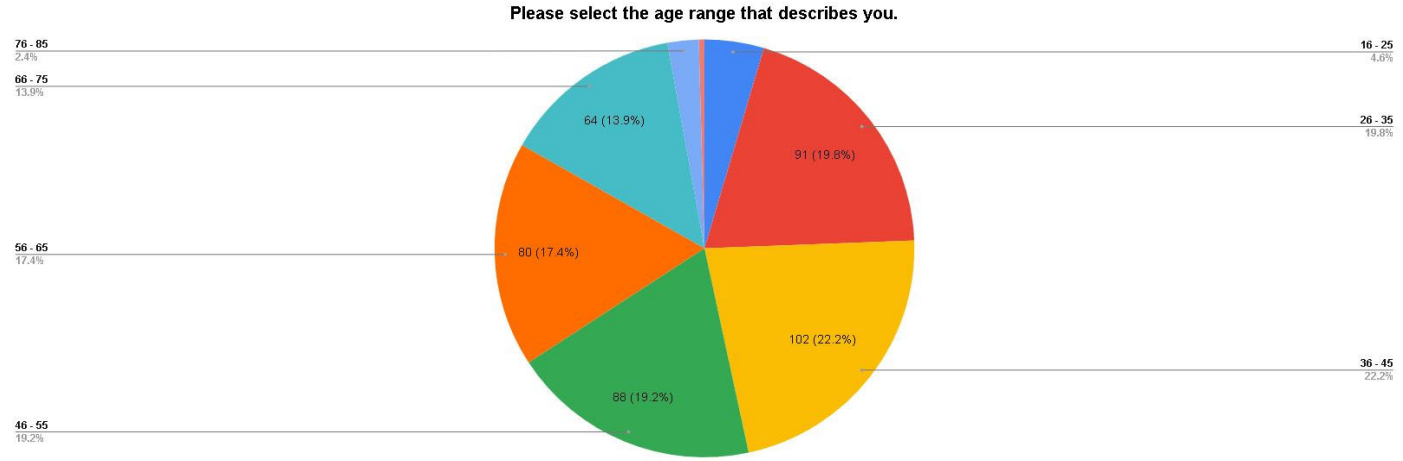
2045 Metropolitan Transportation Plan Survey

The issuance Indiana Executive Order 20-02 Declaration of a Public Health Emergency for COVID-19 on March 6, 2020 by Governor Eric Holcomb necessitated the cancellation of all scheduled in-person MPO committee meetings and public workshops. As an active engagement initiative, the staff developed the *Bloomington-Monroe County Metropolitan Planning Organization's Draft 2045 Metropolitan Transportation Plan - Public Comment Form* (https://docs.google.com/forms/d/1HUKR6sq9MMO5CnB32BHCyFy_3TNh8maJSP_z85tRKoM/viewform?edit_requested=true) with the following message:

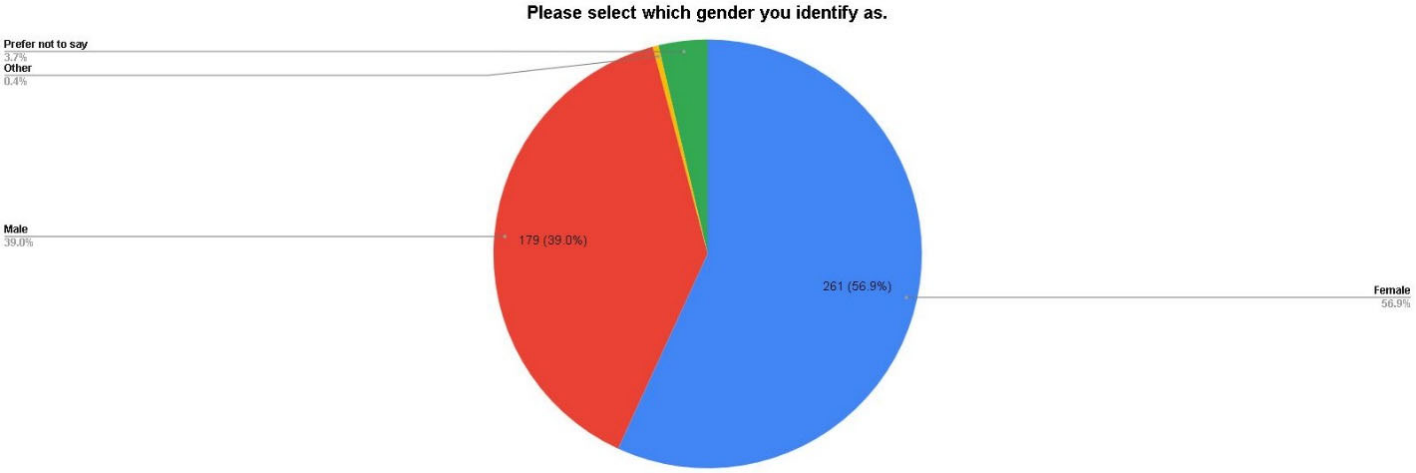
> *Welcome to the Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) Draft 2045 Metropolitan Transportation Plan (MTP) Public Comment Form. The purpose of this form is to gather comments about this Draft 2045 MTP, which can be found online or obtained in person at the City of Bloomington Planning and Transportation Department. Written comments on the Draft 2045 MTP are accepted beginning on March 4, 2020 and ending on October 2, 2020. Comments may be submitted through this form. Comments may also be submitted in person or by mail to the City of Bloomington Planning and Transportation Department located at 401 N Morton Street, Suite 130, Bloomington, IN 47404. The BMCMPO Policy Committee will vote on the BMCMPO Draft 2045 MTP at their meeting held on October 9, 2020. Thank you for participating.*

The 2045 MTP Survey focused on mode choice, transportation policy priorities, and the impact of COVID-19 on personal transportation use. The BMCMPO staff received a total of four hundred fifty-nine (N = 459) individualized voluntary survey responses. All questions required completion for submittal. The following graphical images documents the *2045 Metropolitan Transportation Plan* survey question responses.

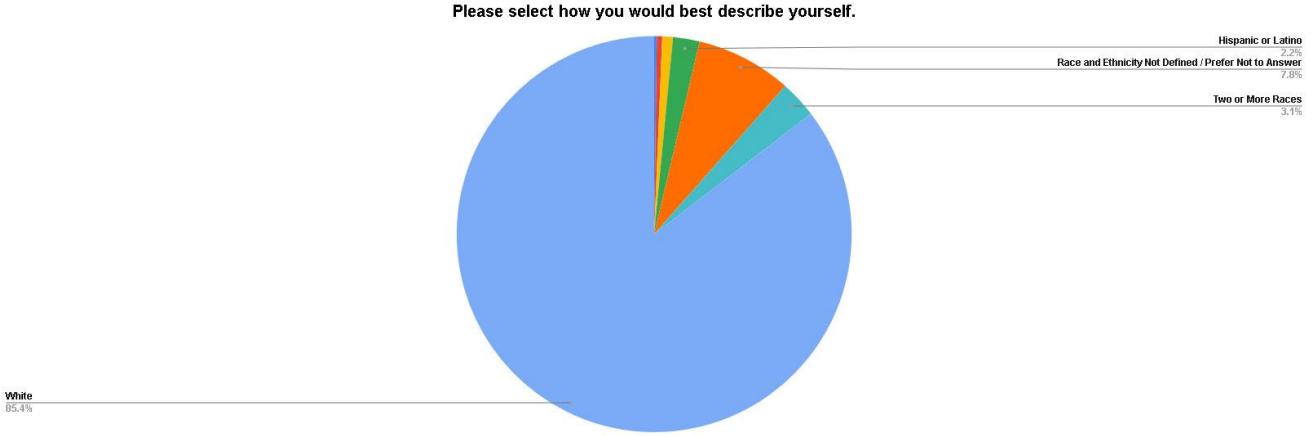
Age of Survey Respondents



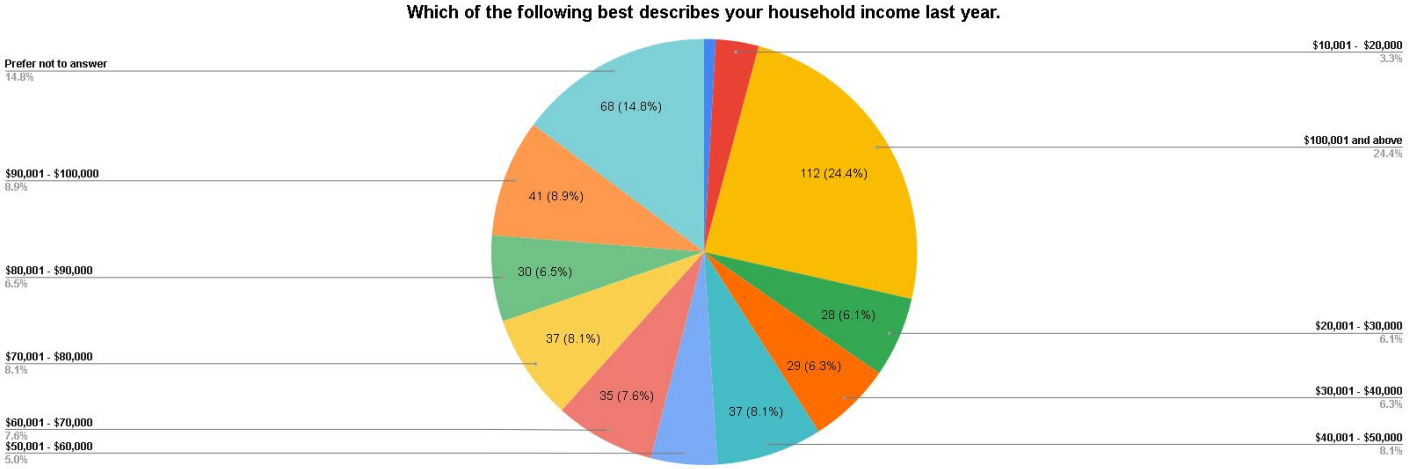
Gender of Survey Respondents



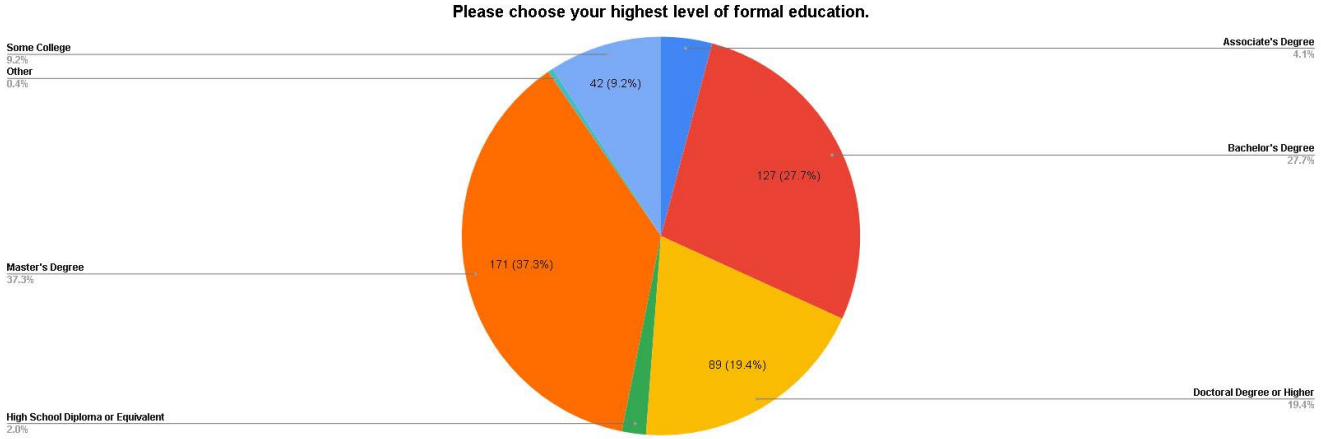
Race of Survey Respondents



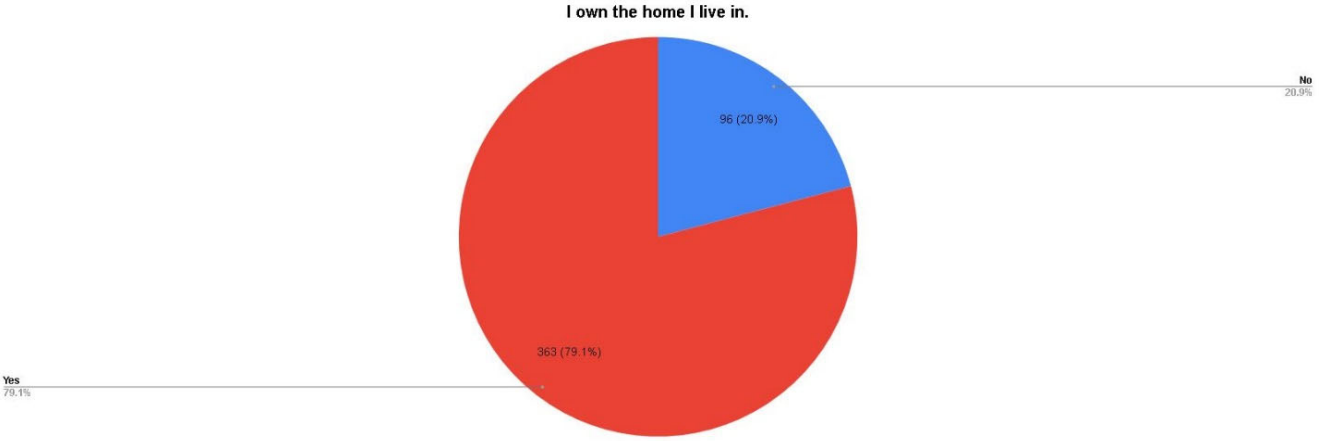
Household Income last year of Survey Respondents



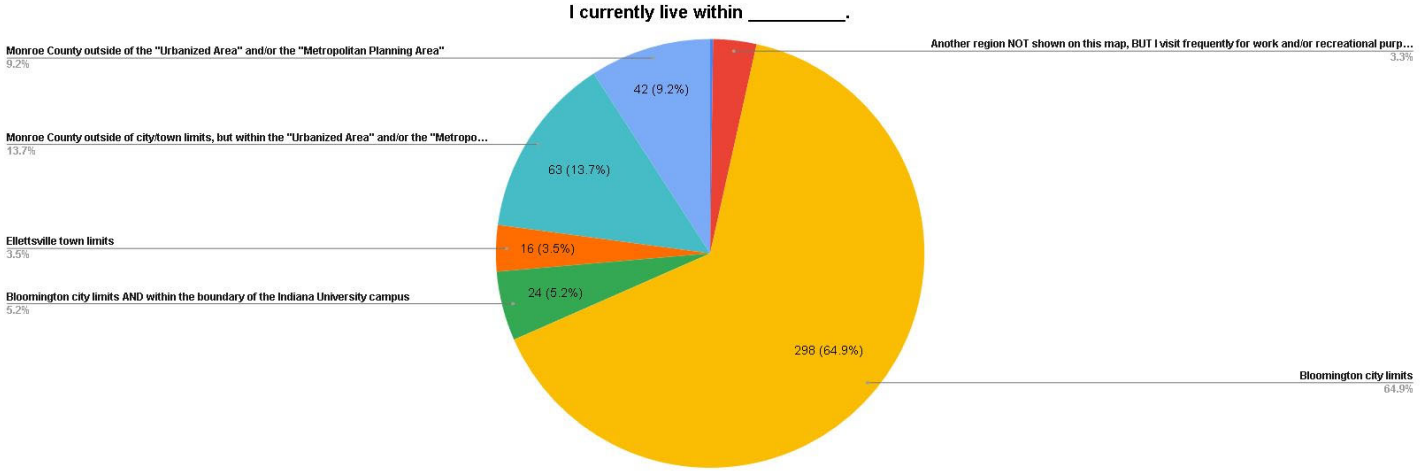
Highest level of formal education of Survey Respondents



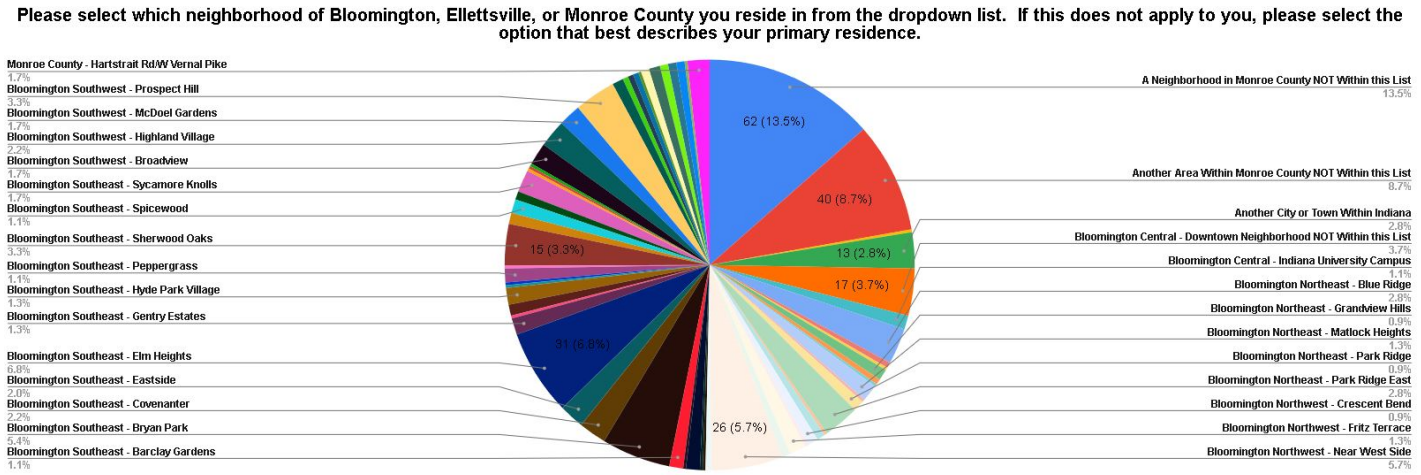
Residence Ownership of Survey Respondents



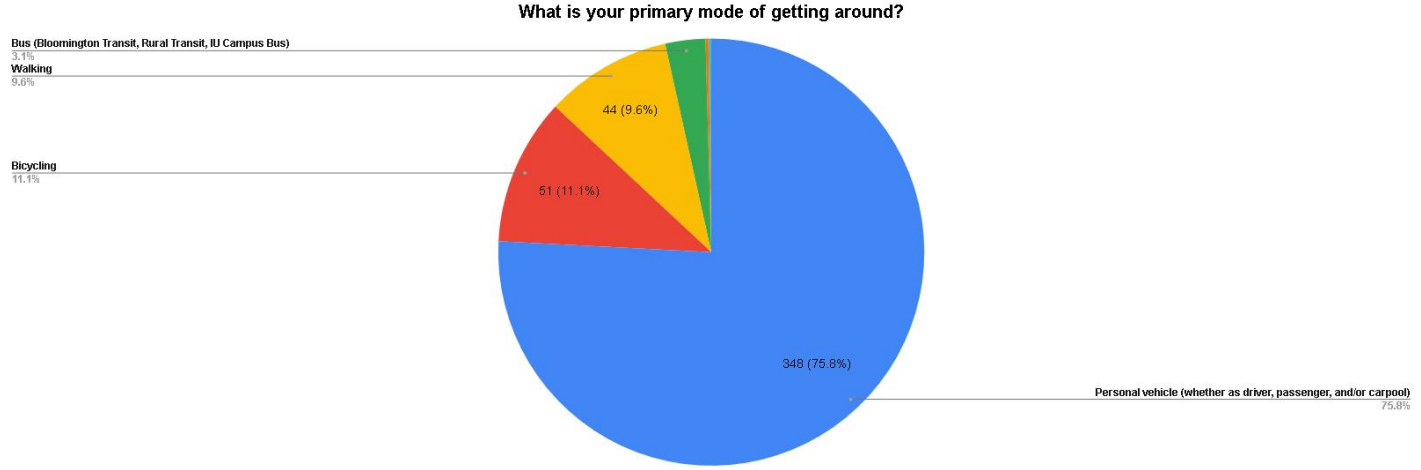
Monroe County Community Residence of Survey Respondents



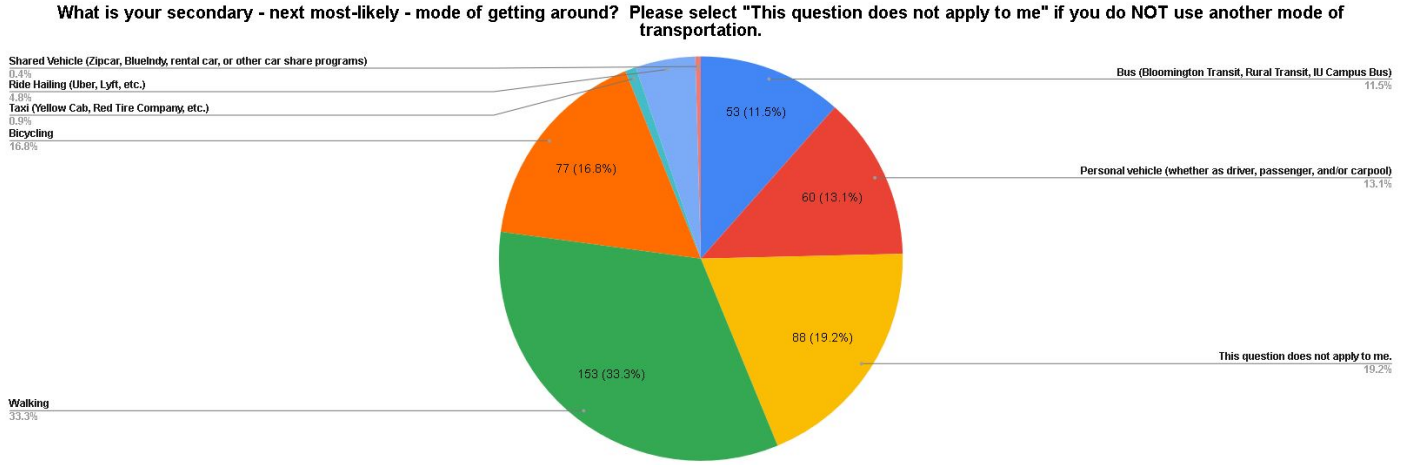
Neighborhood Residence of Survey Respondents



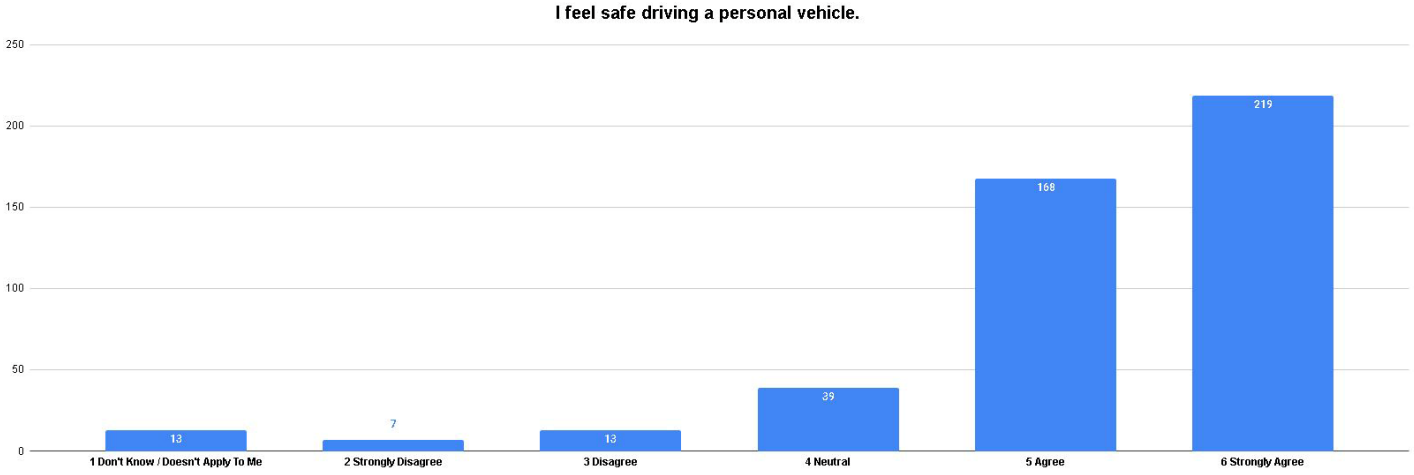
Transportation Mode Choice: Primary



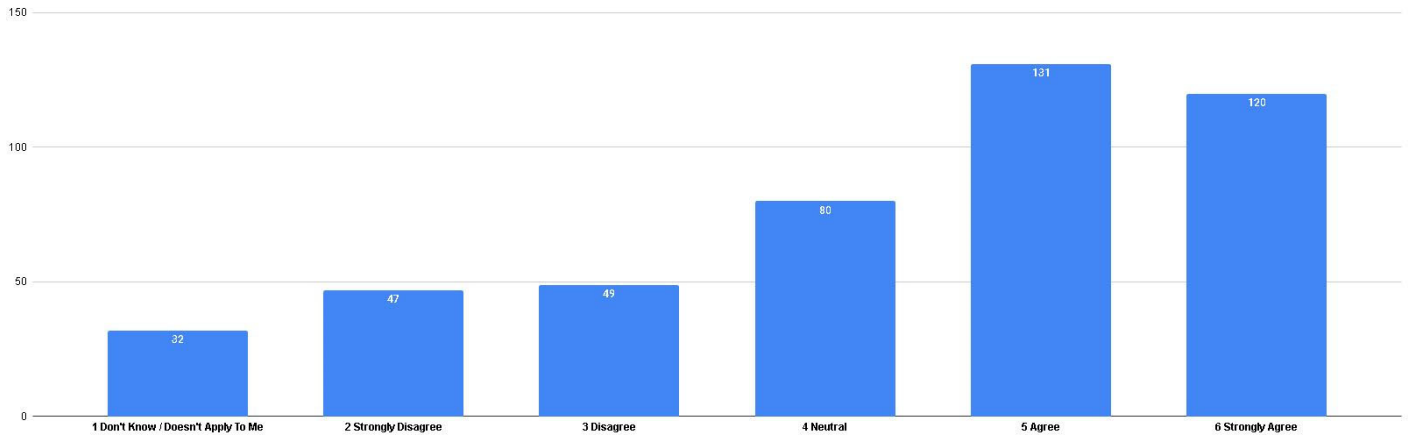
Transportation Mode Choice: Secondary



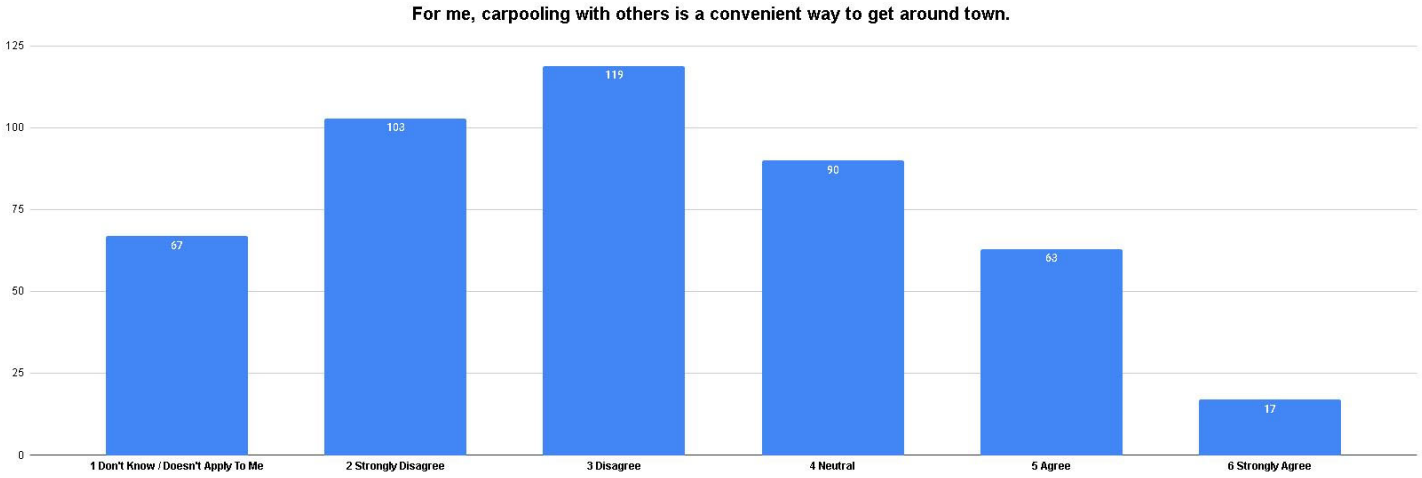
Transportation Mode Choice: Personal Vehicle Safety



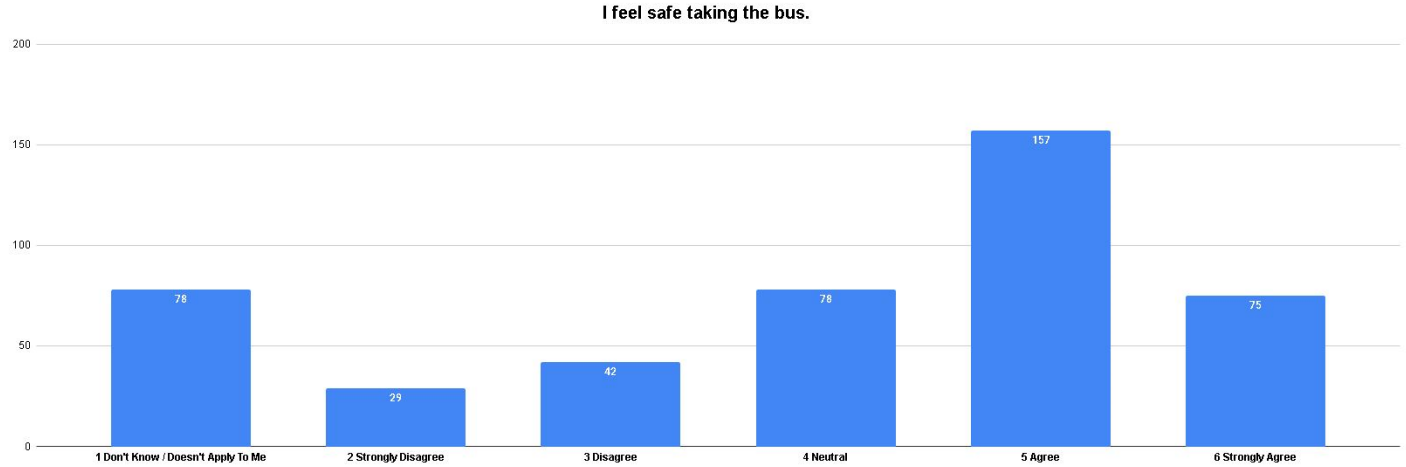
Transportation Mode Choice: Individual Electric Vehicle Purchase



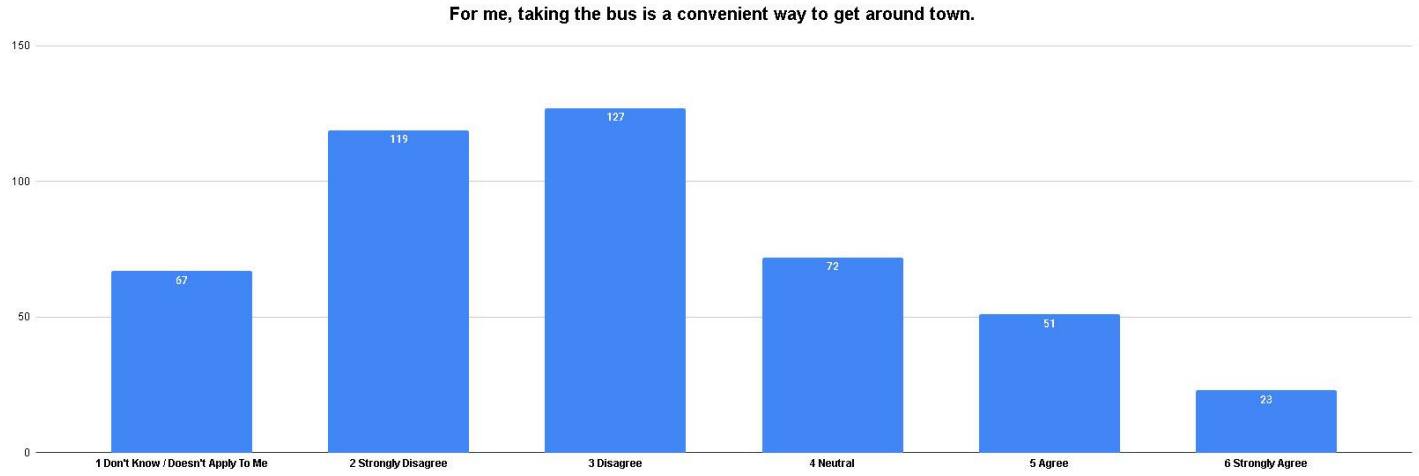
Transportation Mode Choice: Carpooling Convenience



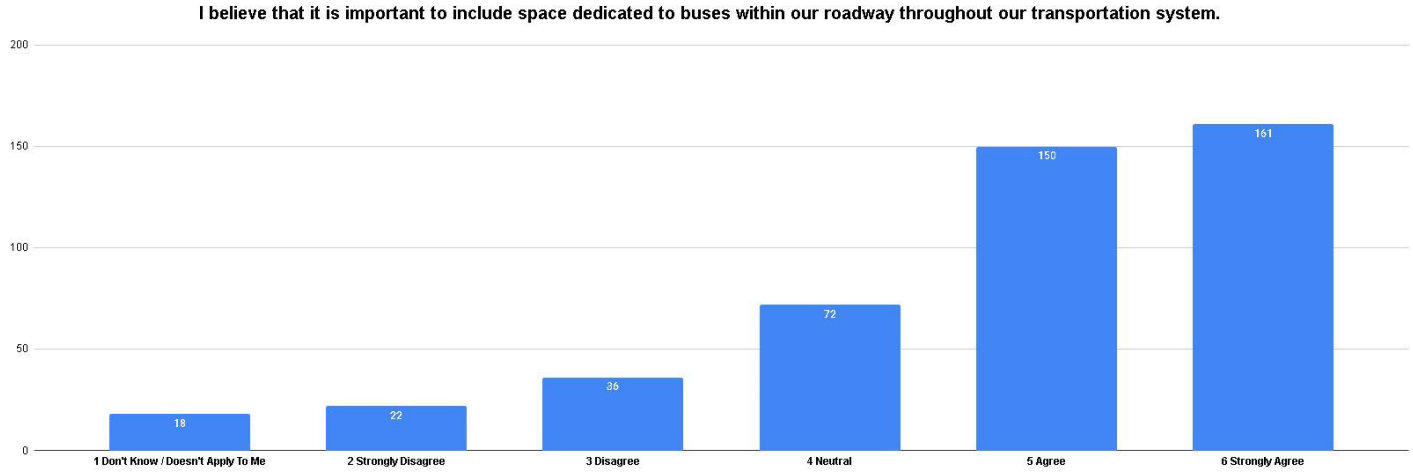
Transportation Mode Choice: Public Transit Service Safety



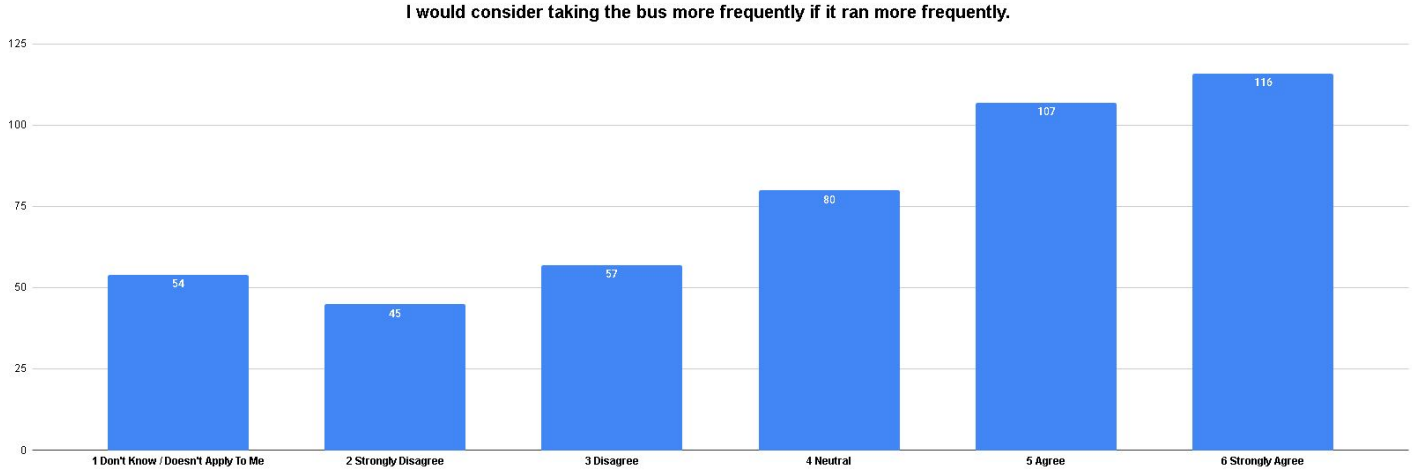
Transportation Mode Choice: Public Transit Service Convenience



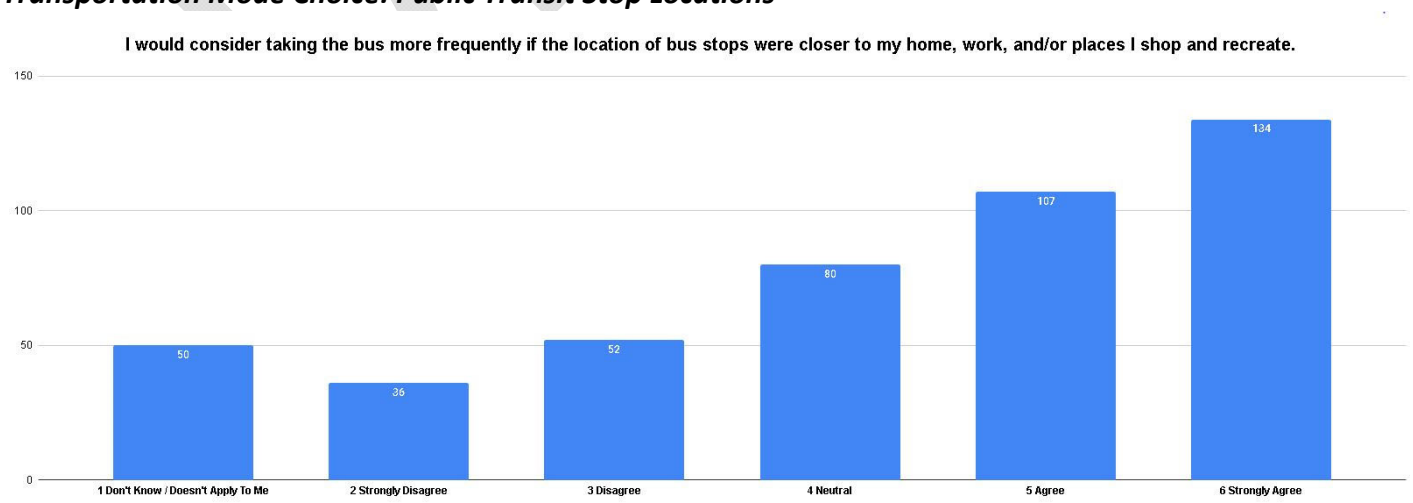
Transportation Mode Choice: Public Transit Vehicle Travel Lanes



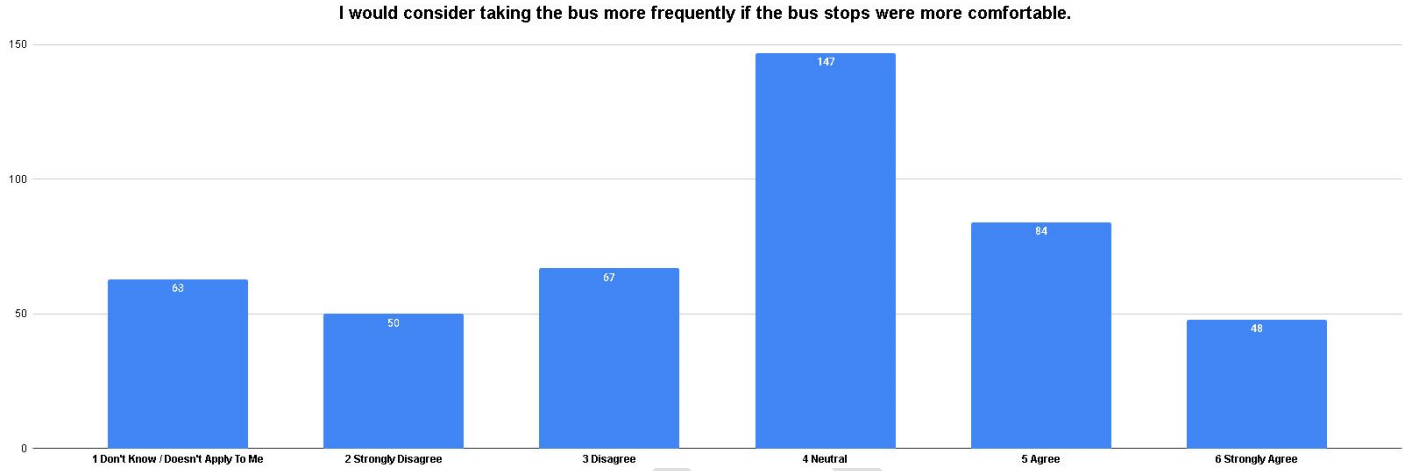
Transportation Mode Choice: Public Transit Service Frequency



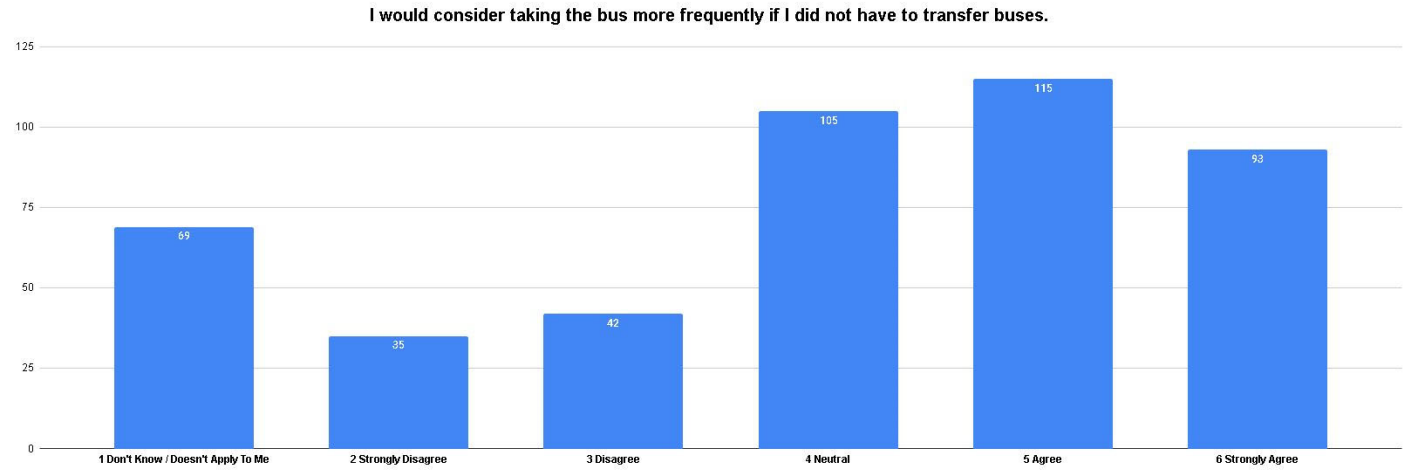
Transportation Mode Choice: Public Transit Stop Locations



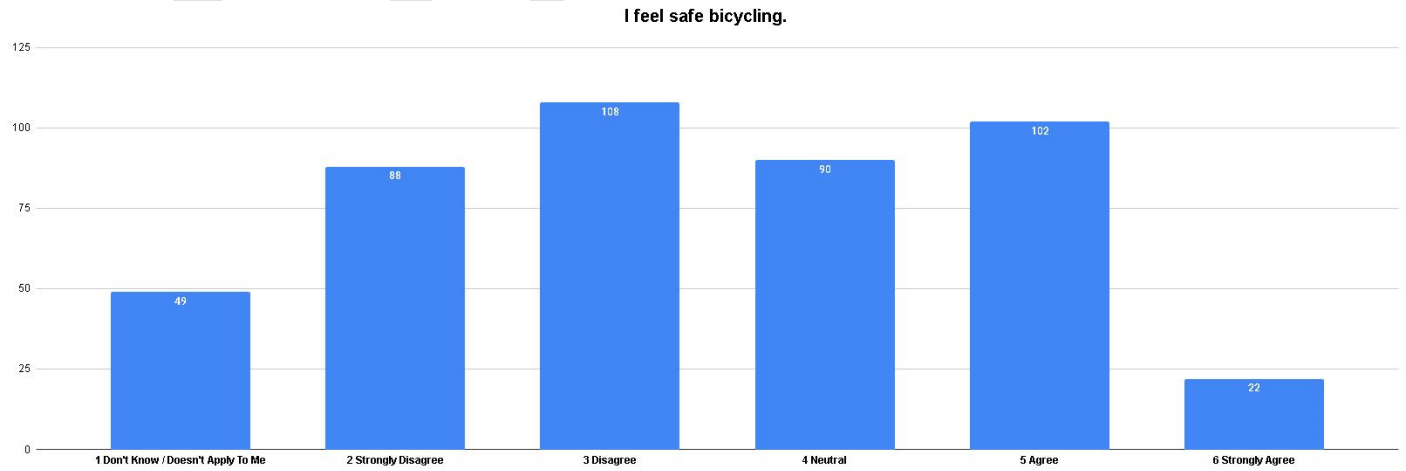
Transportation Mode Choice: Public Transit Stop Comfort



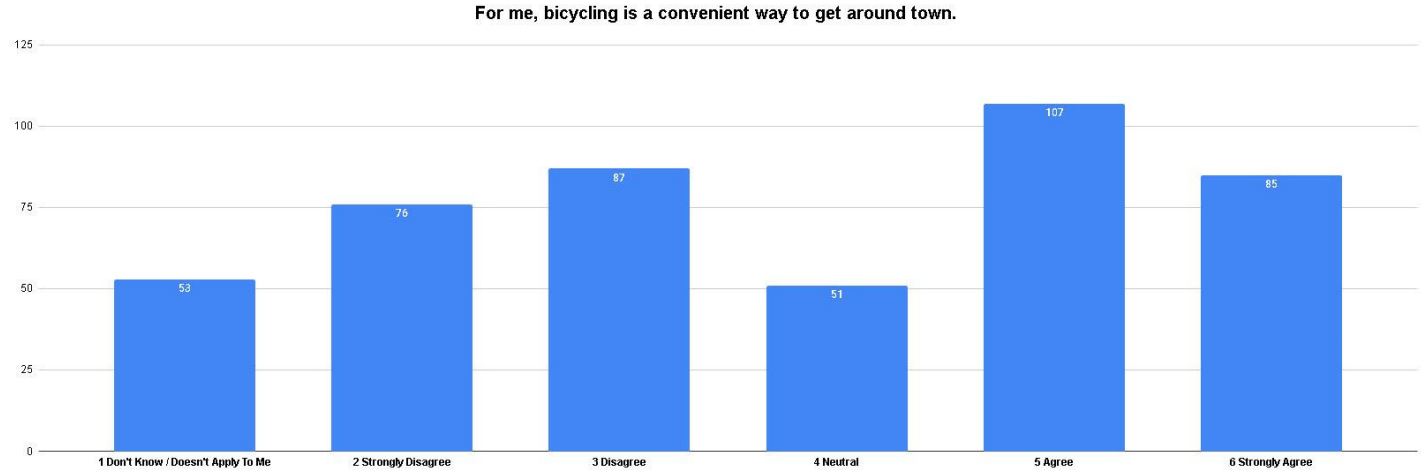
Transportation Mode Choice: Public Transit Route Transfers



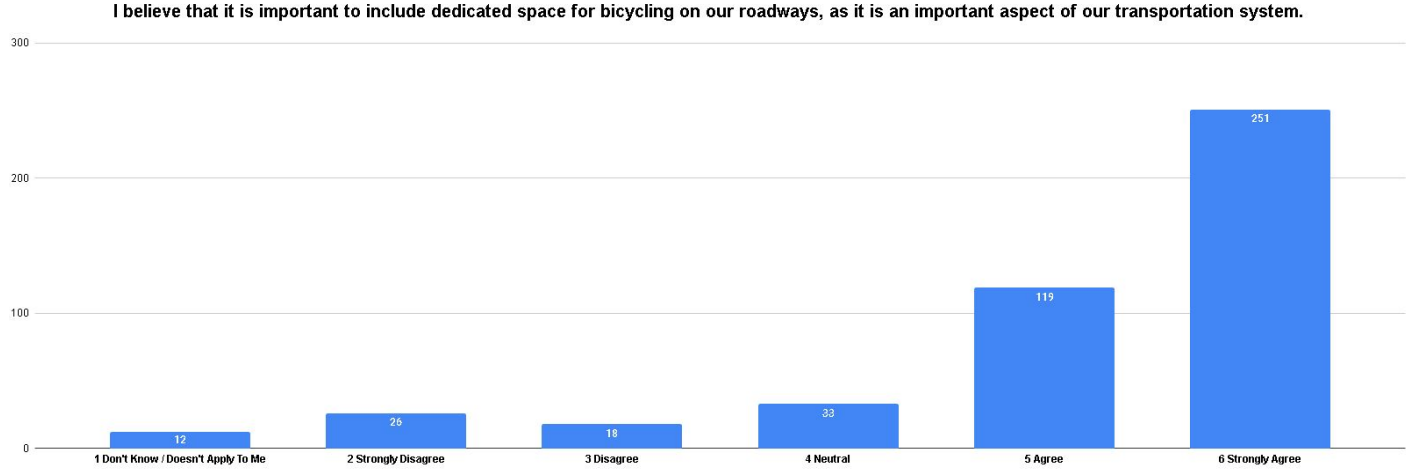
Transportation Mode Choice: Bicycle Safety



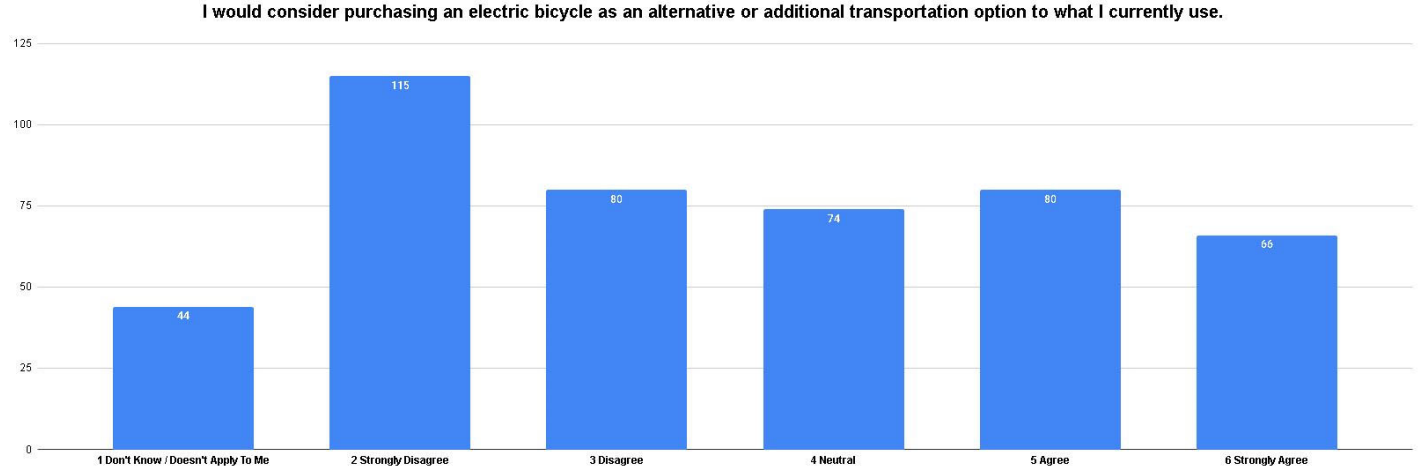
Transportation Mode Choice: Bicycle Convenience



Transportation Mode Choice: Bicycle Roadway Accommodations



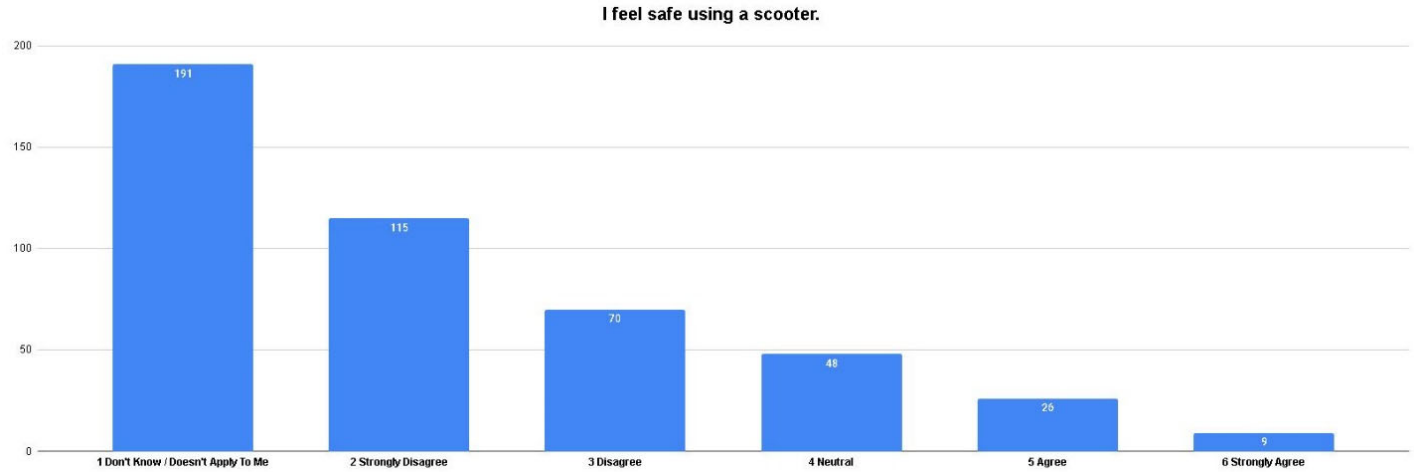
Transportation Mode Choice: Electric Bicycle Purchase and Use



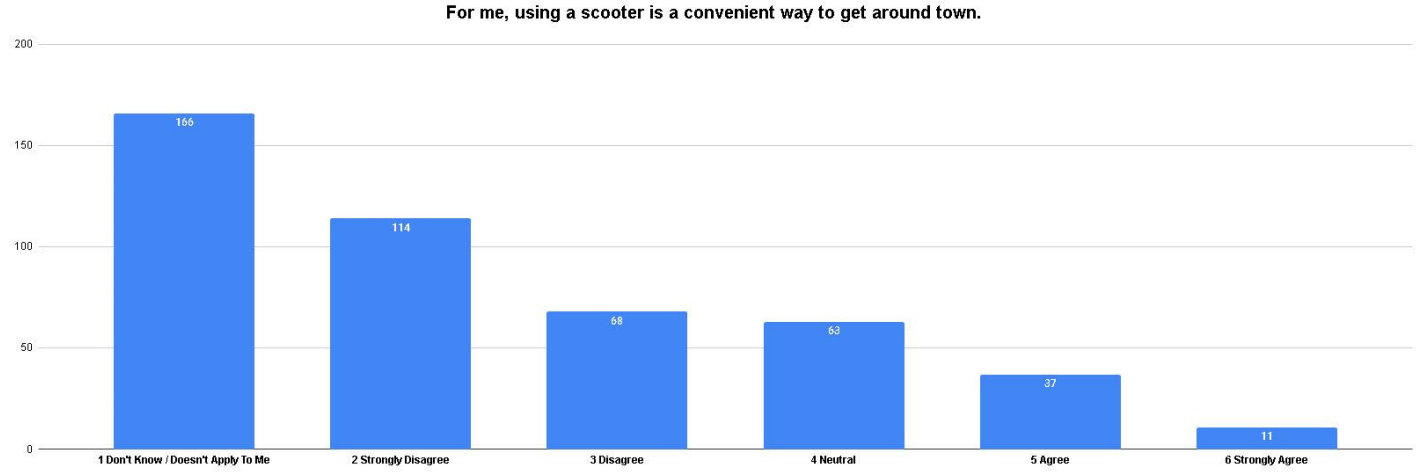
Transportation Mode Choice: Pedestrian Safety

Transportation Mode Choice: Pedestrian Convenience

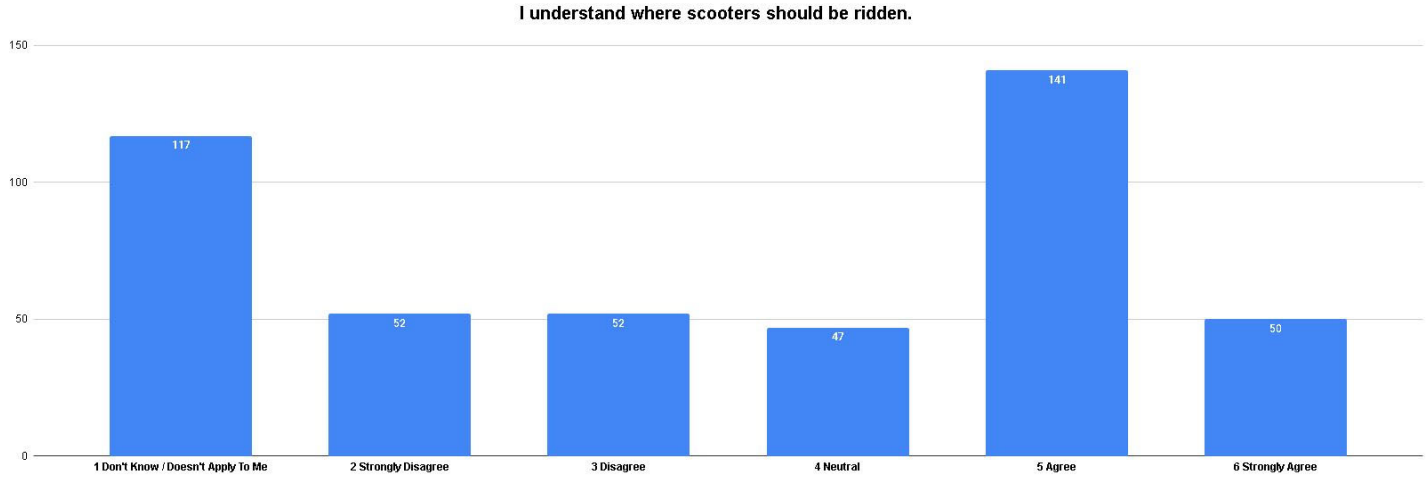
Transportation Mode Choice: Scooter Safety



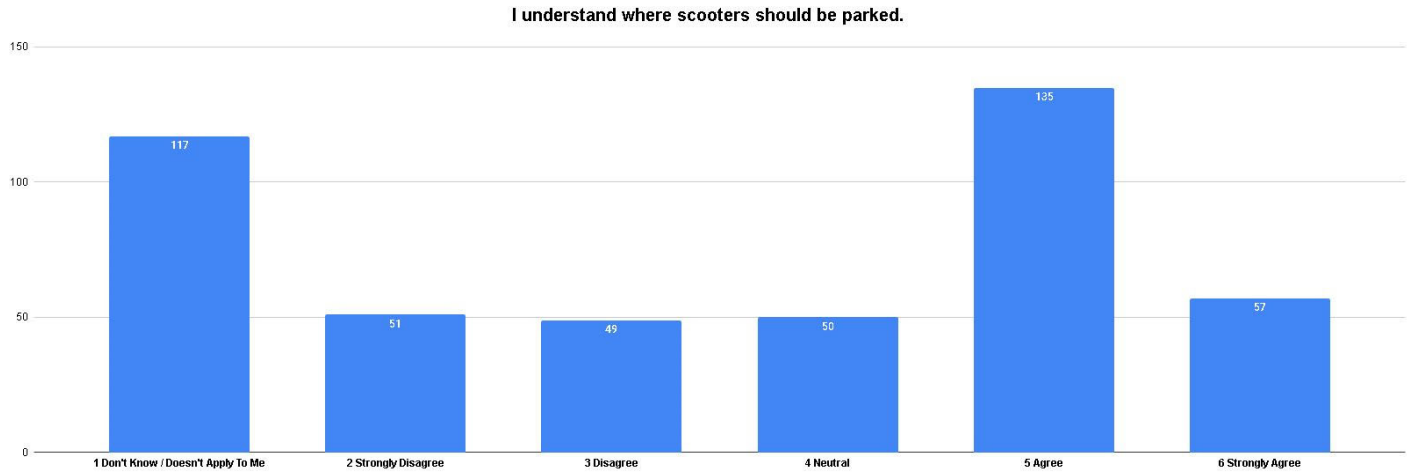
Transportation Mode Choice: Scooter Convenience



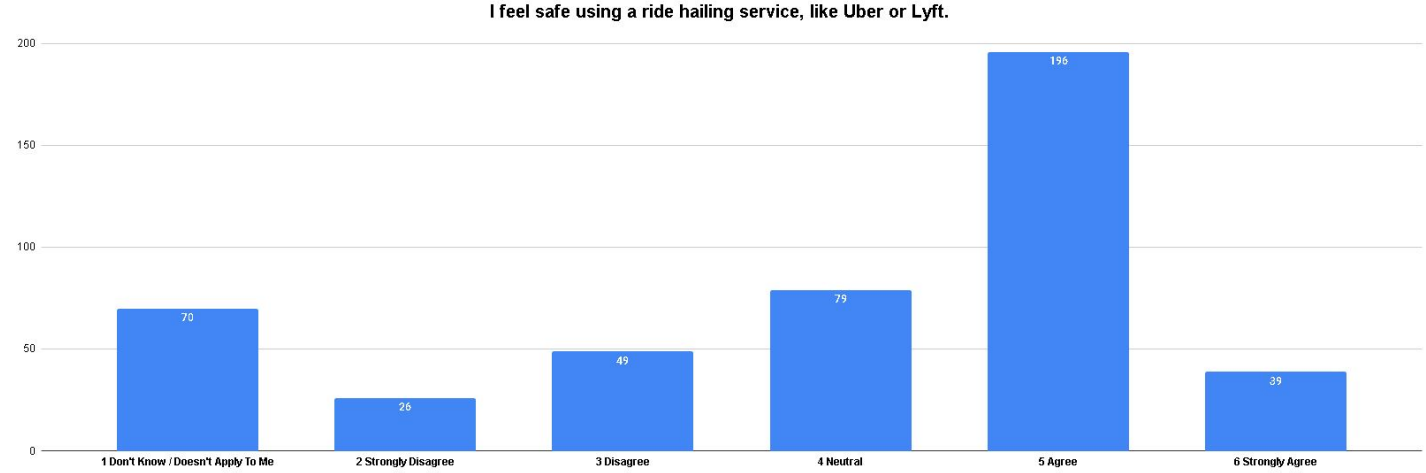
Transportation Mode Choice: Scooter Operational Use



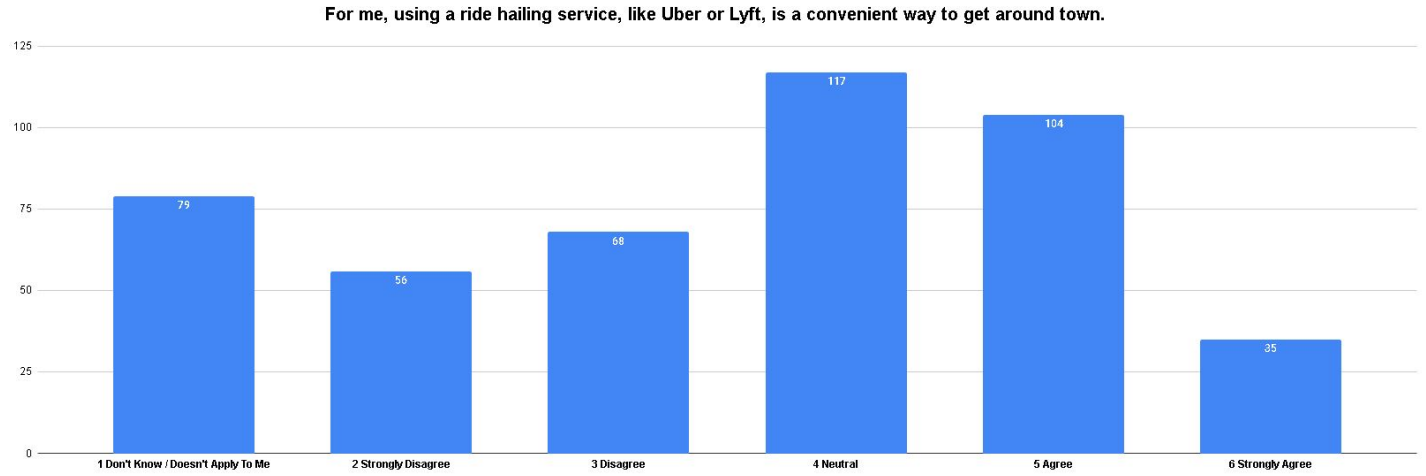
Transportation Mode Choice: Scooter Operational Parking



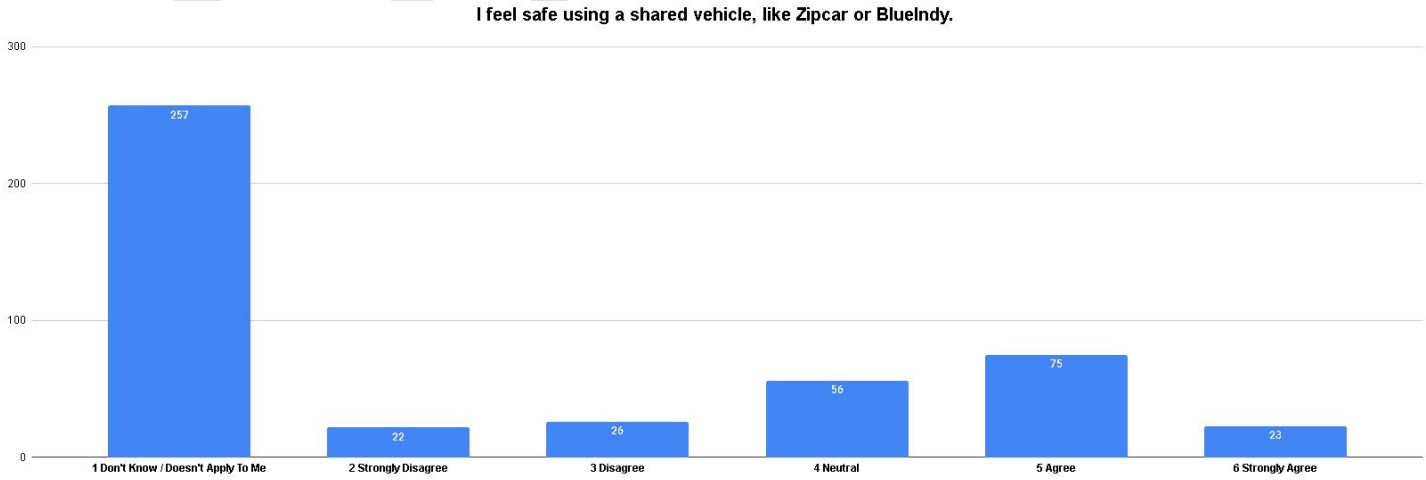
Transportation Mode Choice: Ride Hailing Service Safety



Transportation Mode Choice: Ride Hailing Service Convenience

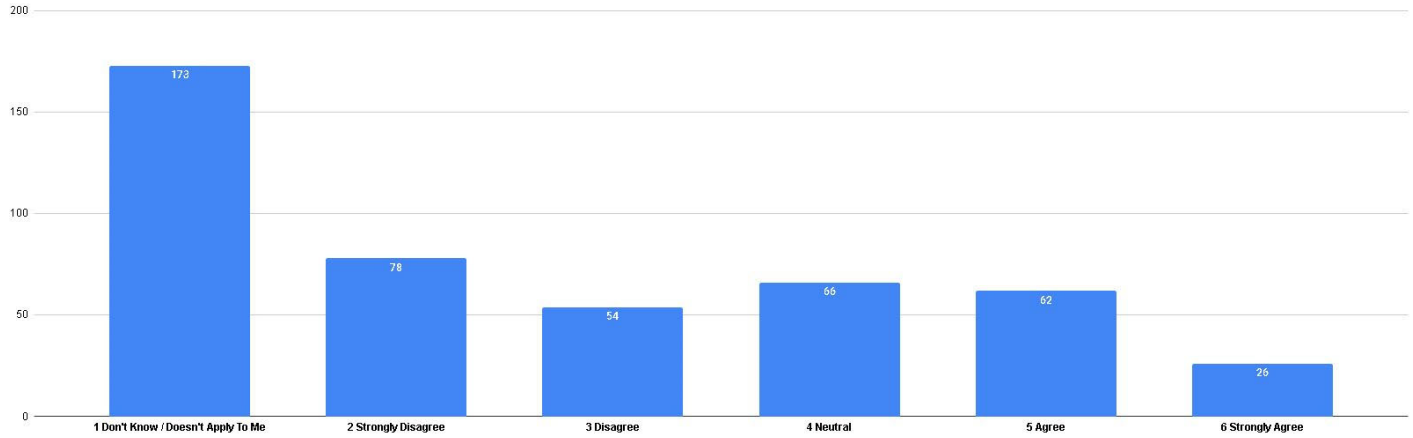


Transportation Mode Choice: Shared Vehicle Safety



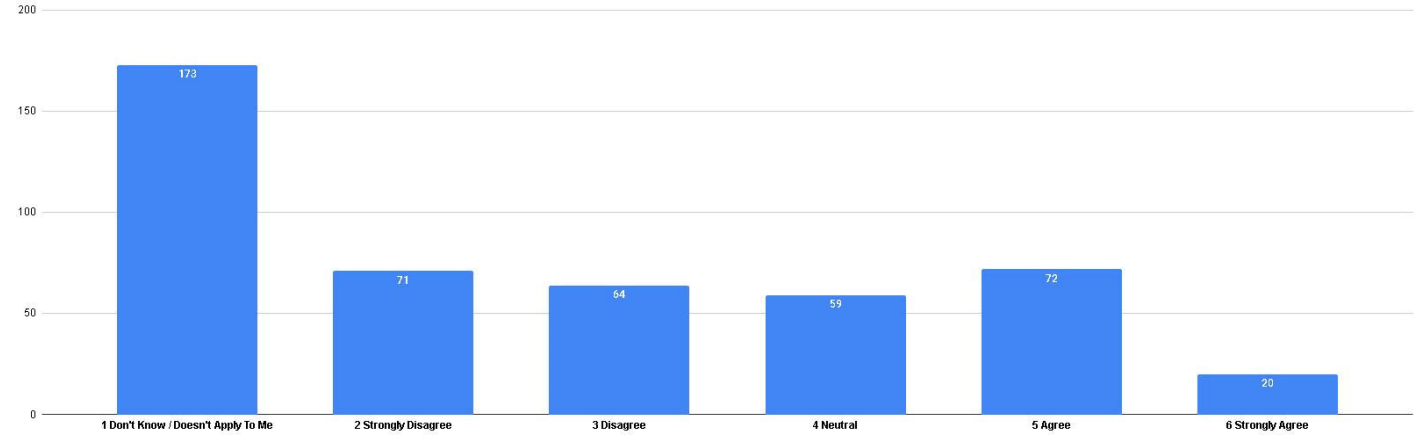
Transportation Mode Choice: Shared Vehicle Expense

I would consider using a shared vehicle, like Zipcar or BlueIndy, because it is less expensive than owning a personal vehicle.



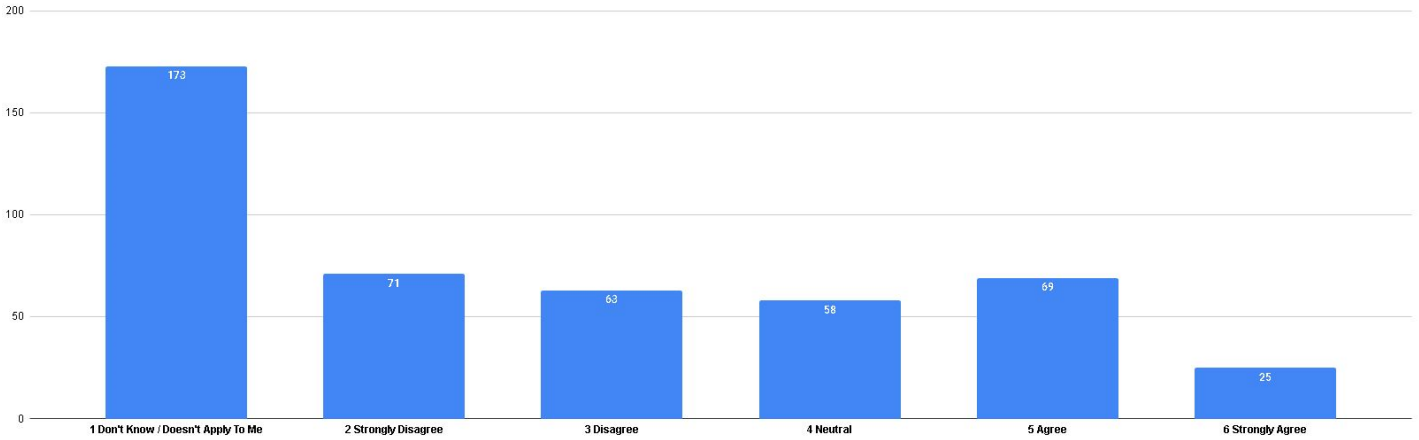
Transportation Mode Choice: Shared Vehicle Locations

I would consider using a shared vehicle, like Zipcar or BlueIndy, more frequently if one were available closer to my home, work, and/or places I shop and recreate.

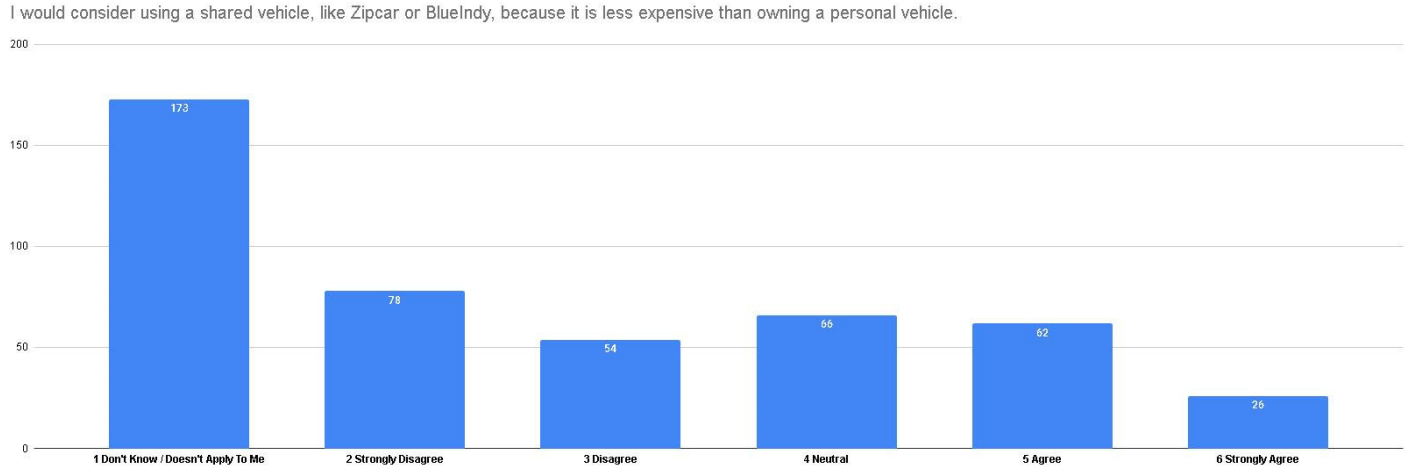


Transportation Mode Choice: Shared Vehicle Availability

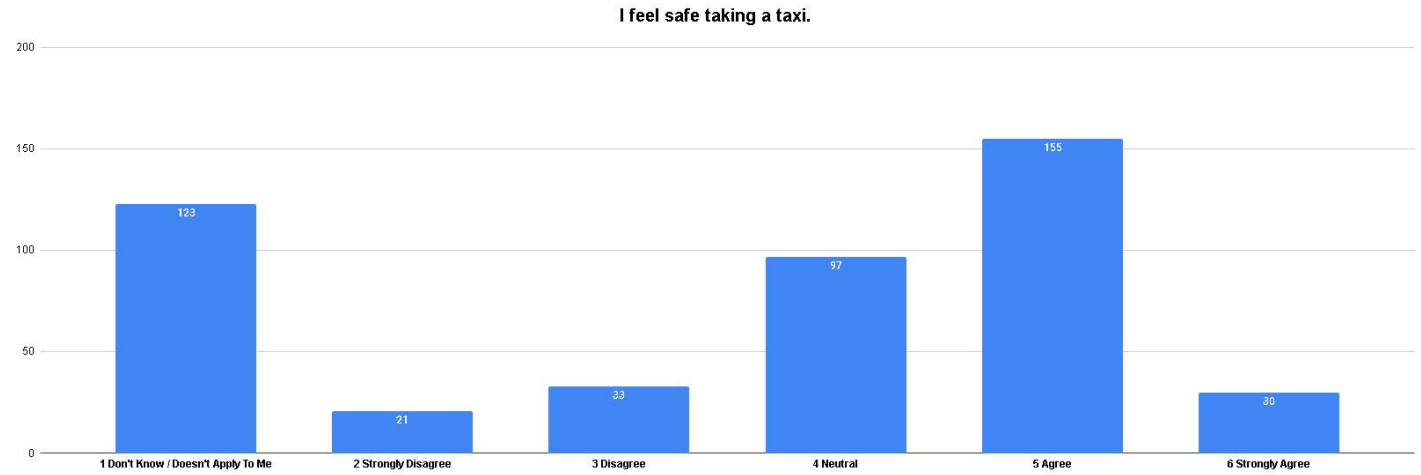
I would consider using a shared vehicle, like Zipcar or BlueIndy, more frequently if more of these vehicles were available at any given time.



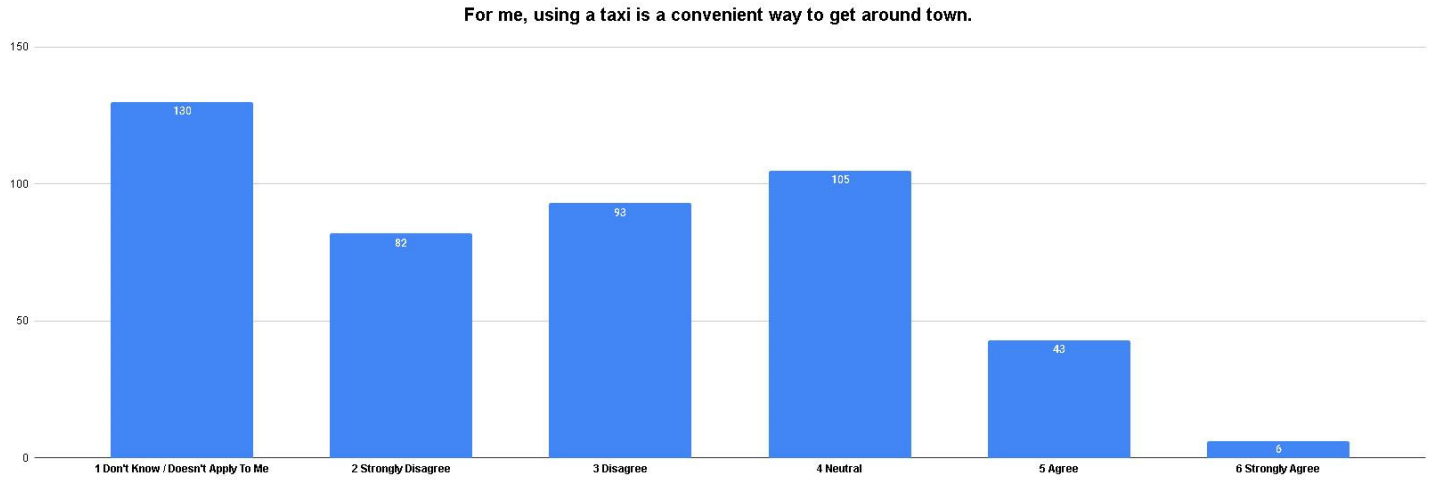
Transportation Mode Choice: Shared Vehicle Expense



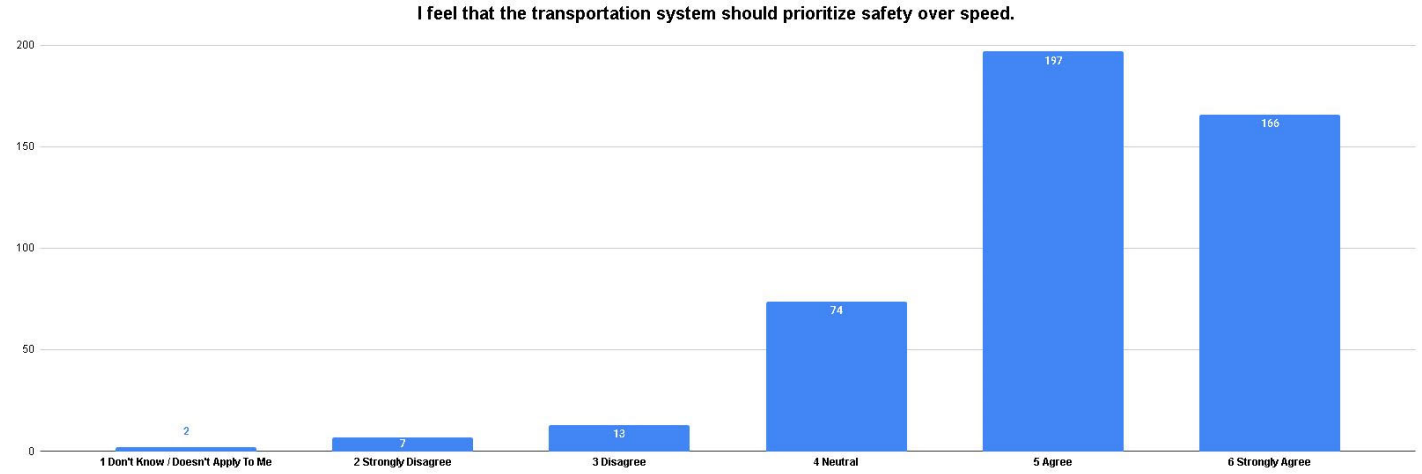
Transportation Mode Choice: Taxi Service Safety



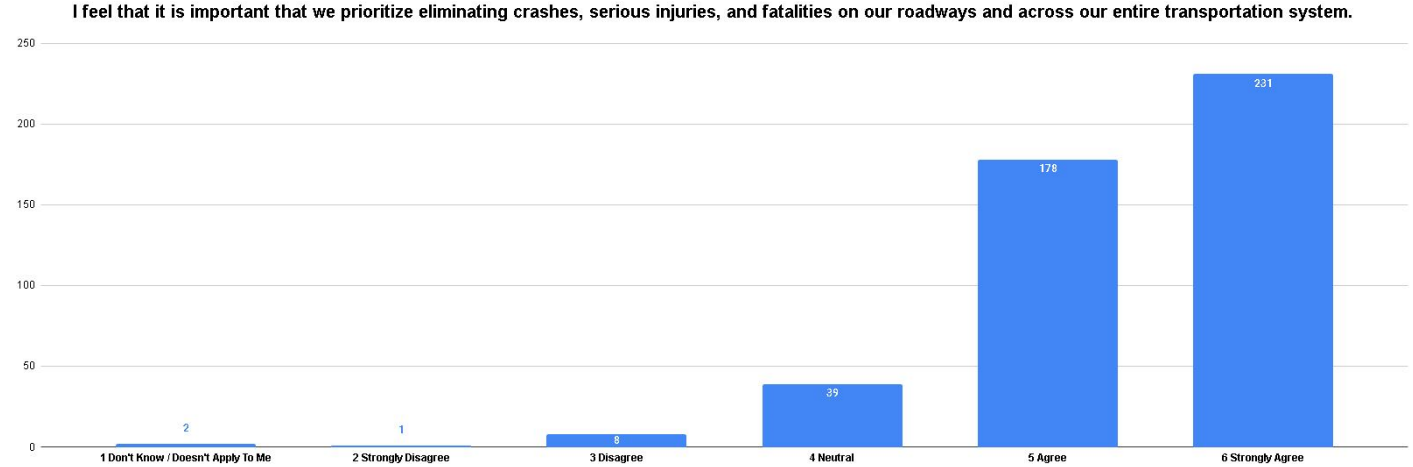
Transportation Mode Choice: Taxi Service Convenience



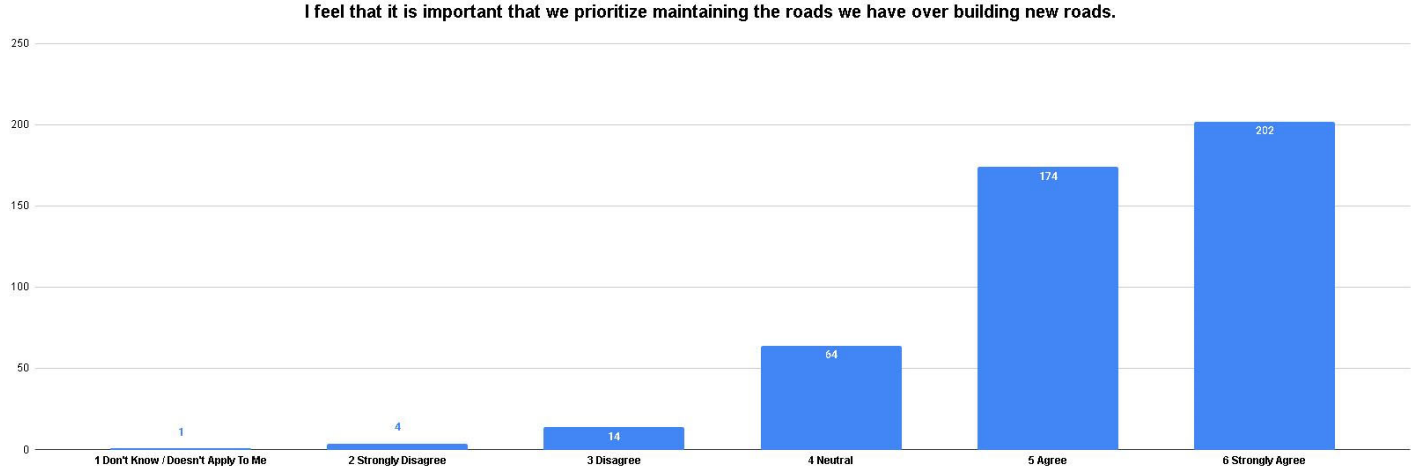
Transportation System Policy Priority: Safety and Speed



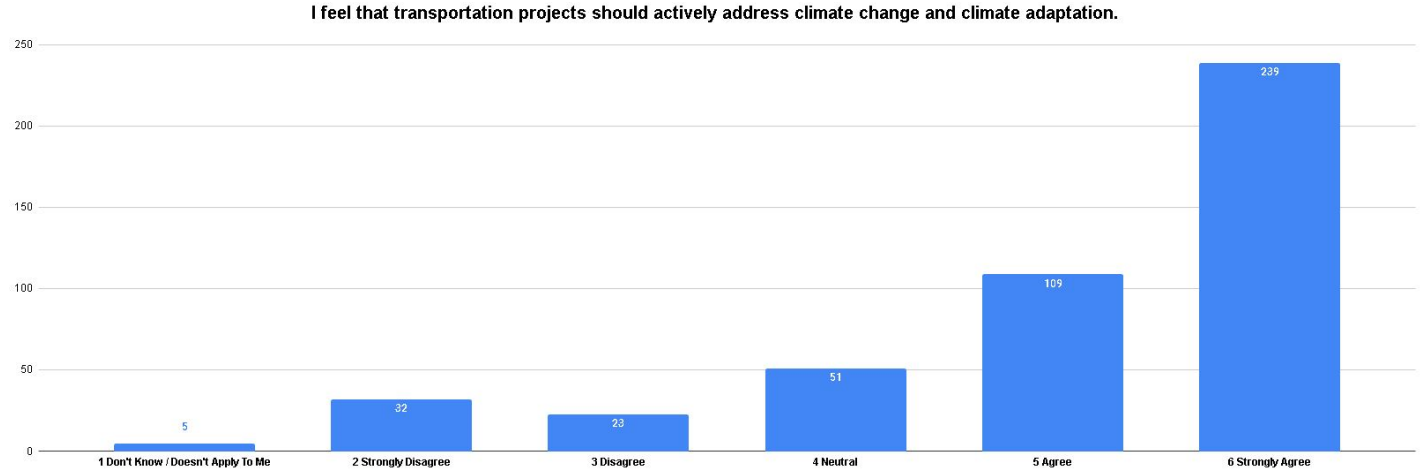
Transportation System Policy Priority: Vision Zero



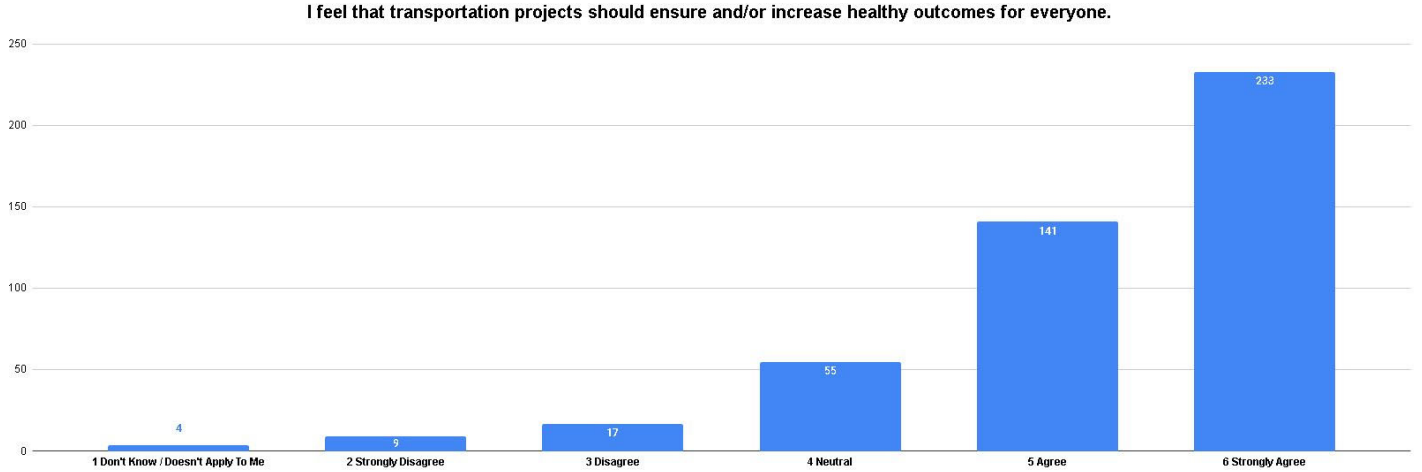
Transportation System Policy Priority: Maintenance of Existing Roadway System



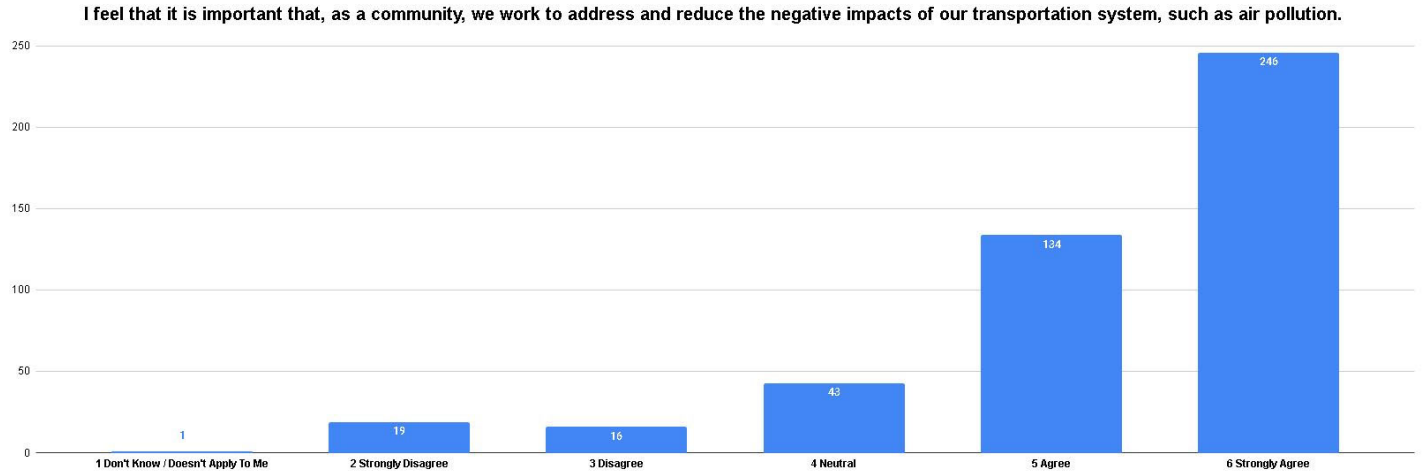
Transportation System Policy Priority: Addressing Climate Change



Transportation System Policy Priority: Ensure Public Health Outcomes



Transportation System Policy Priority: Transportation System Air Pollution



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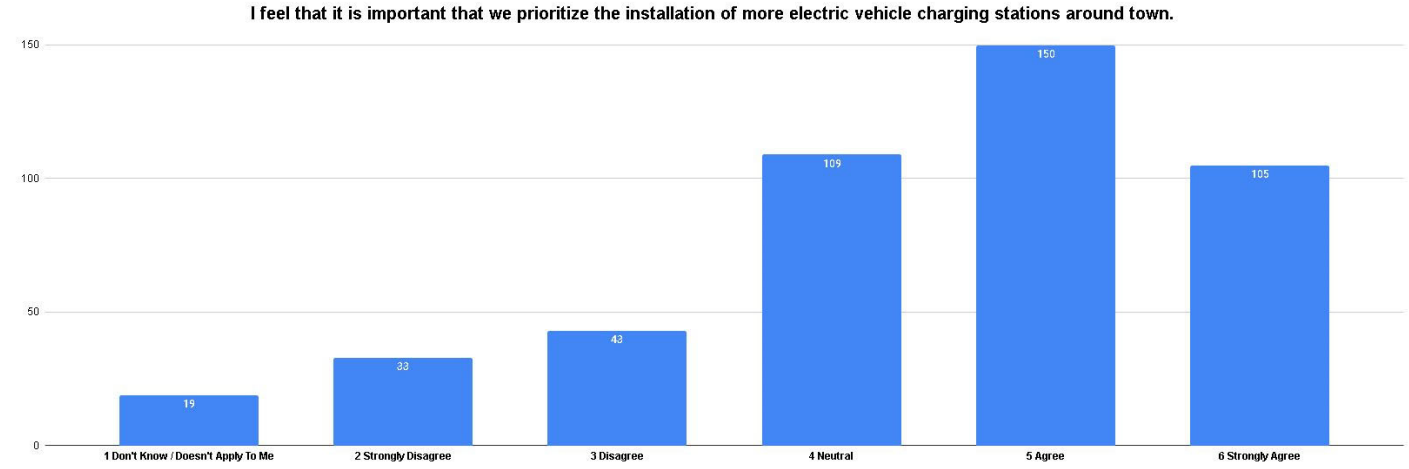
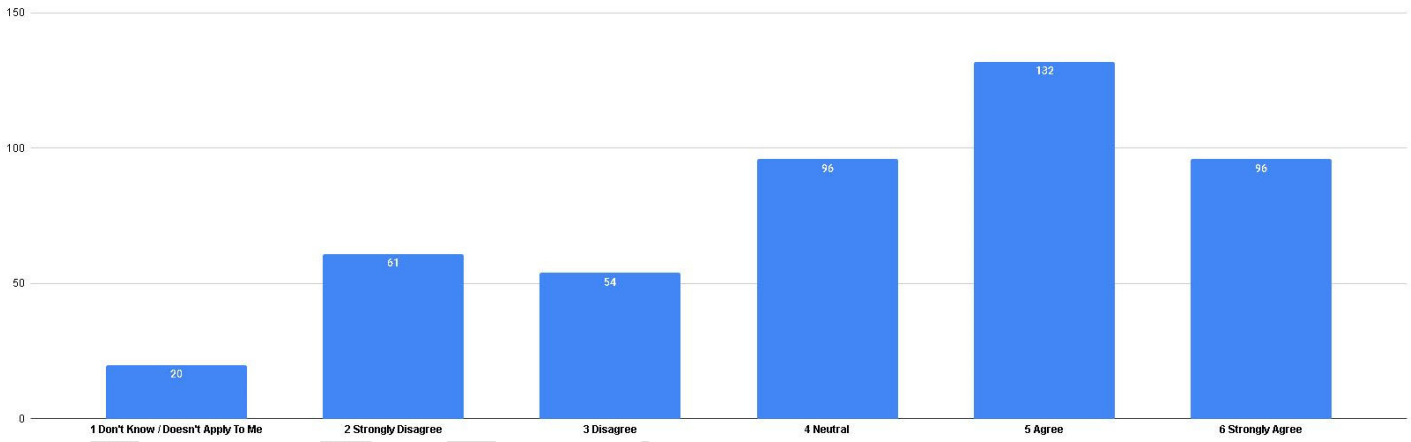
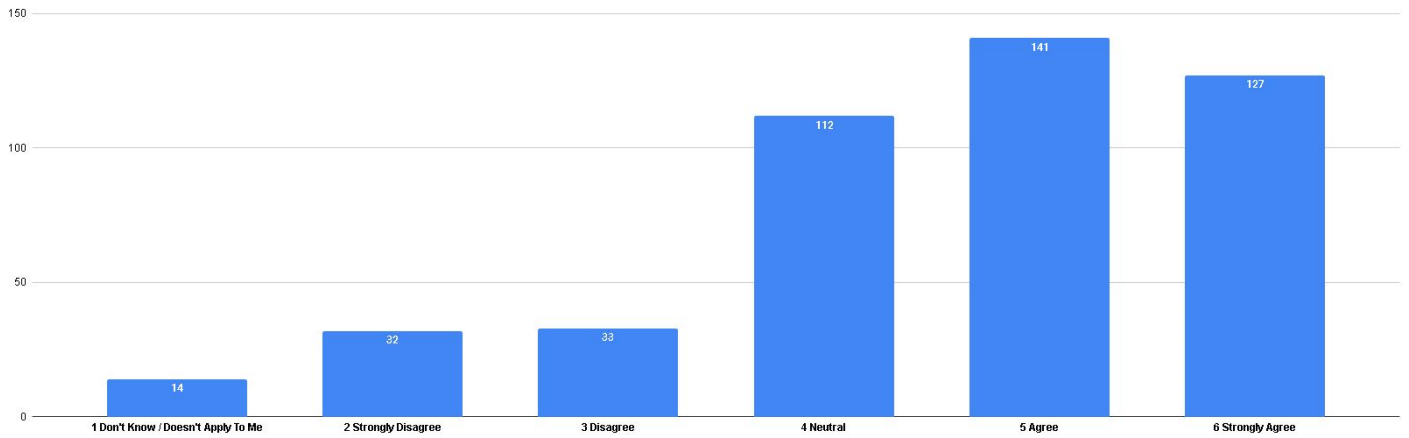


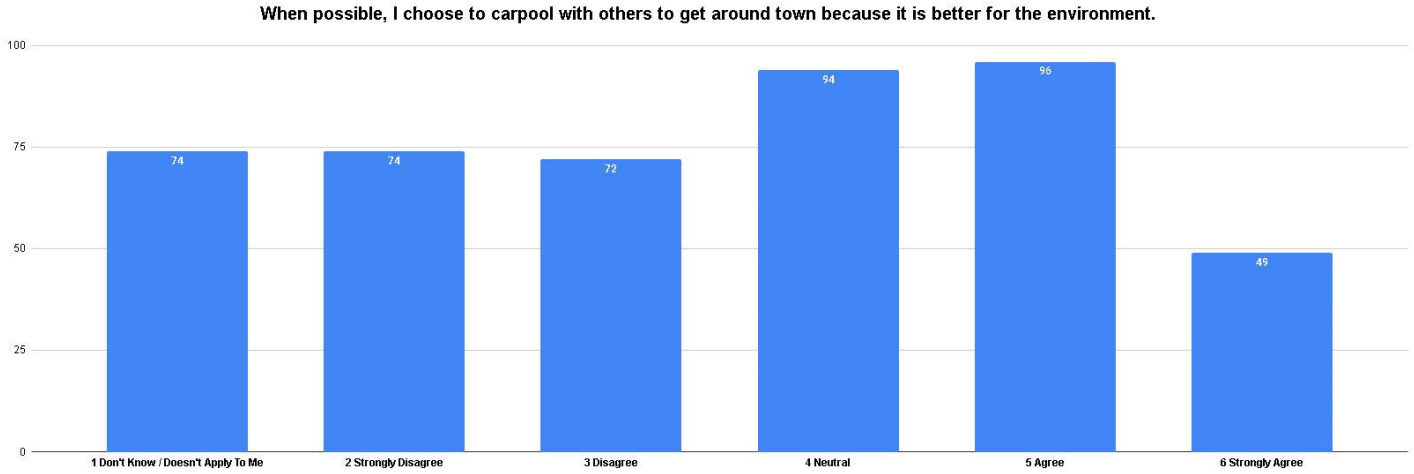
Transportation System Policy Priority: Public Transportation and Environmental Quality



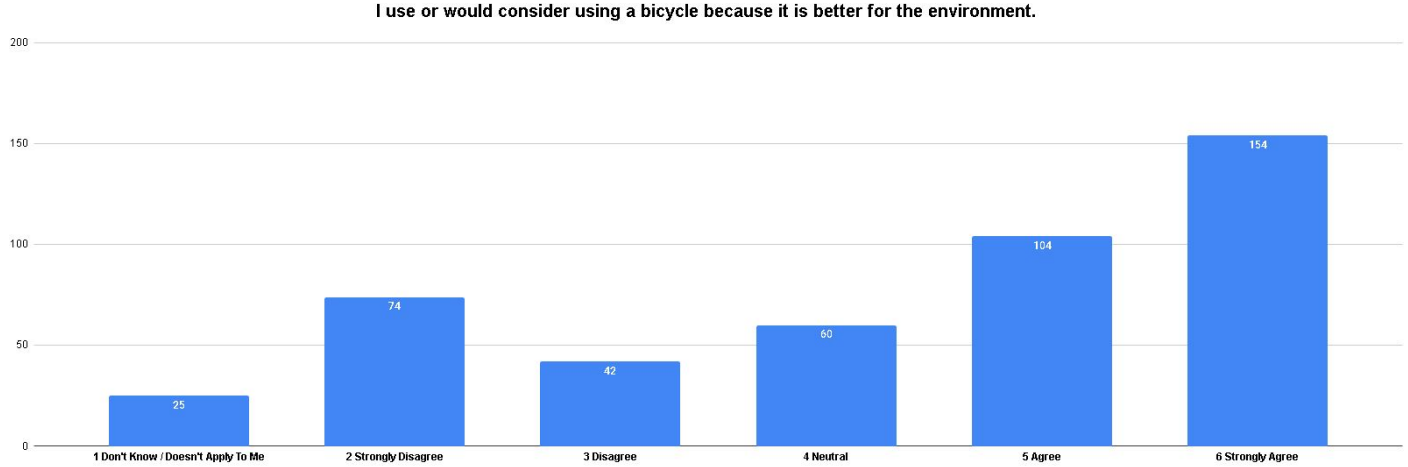
Transportation System Policy Priority: Public Transportation and Electric Vehicle Conversion



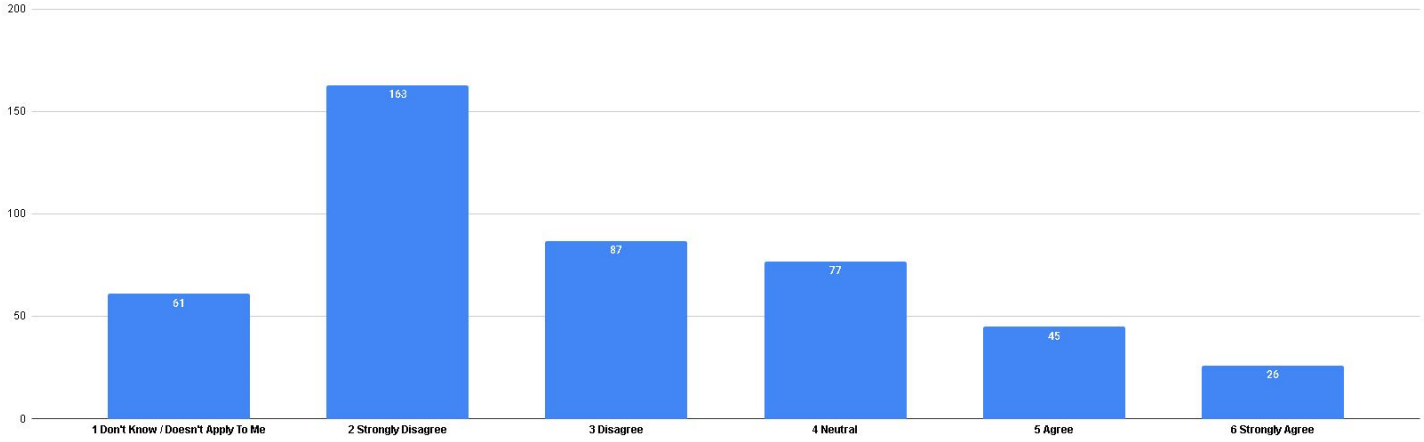
Transportation System Policy Priority: Carpools and Environmental Quality



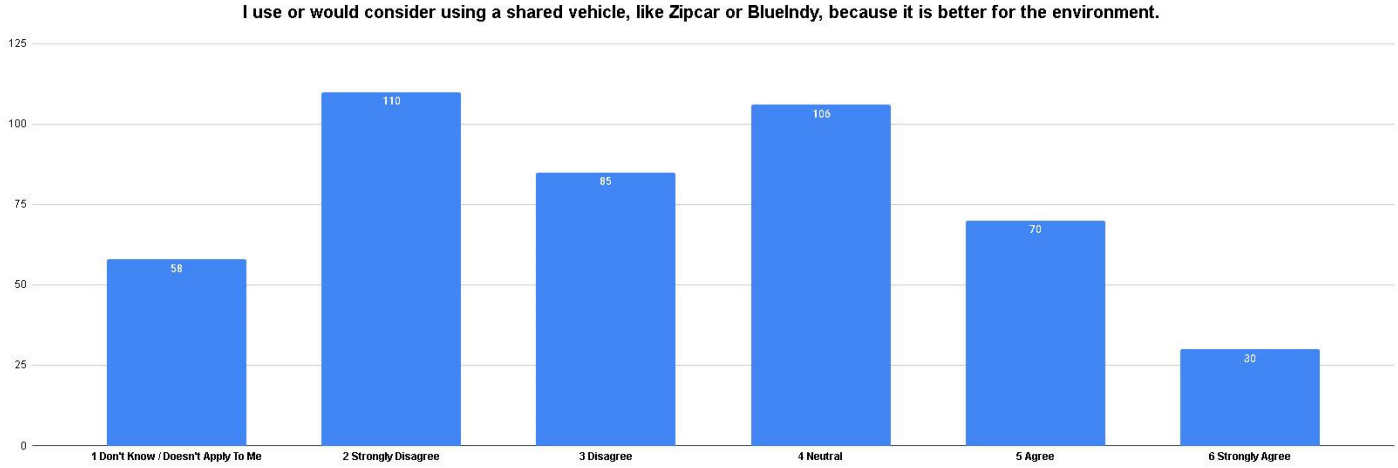
Transportation System Policy Priority: Bicycles and Environmental Quality



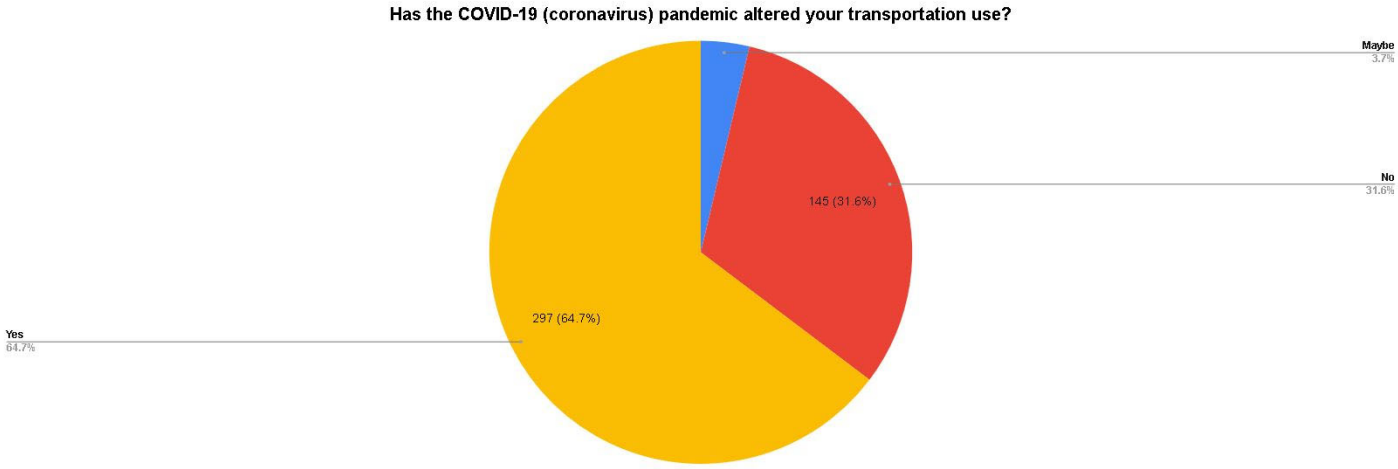
Transportation System Policy Priority: Scooters and Environmental Quality



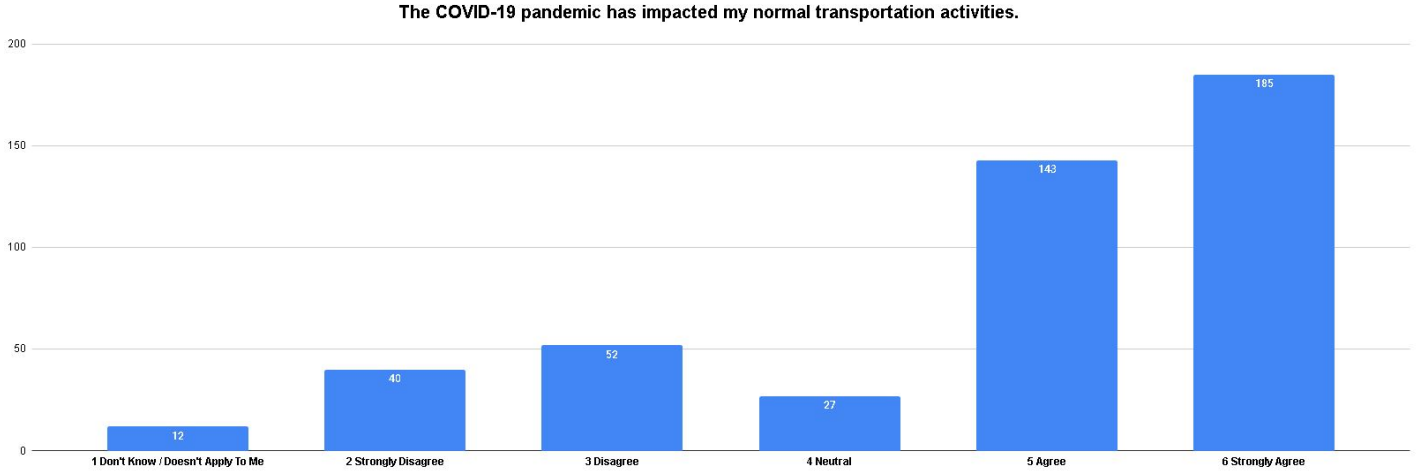
Transportation System Policy Priority: Shared Vehicles and Environmental Quality



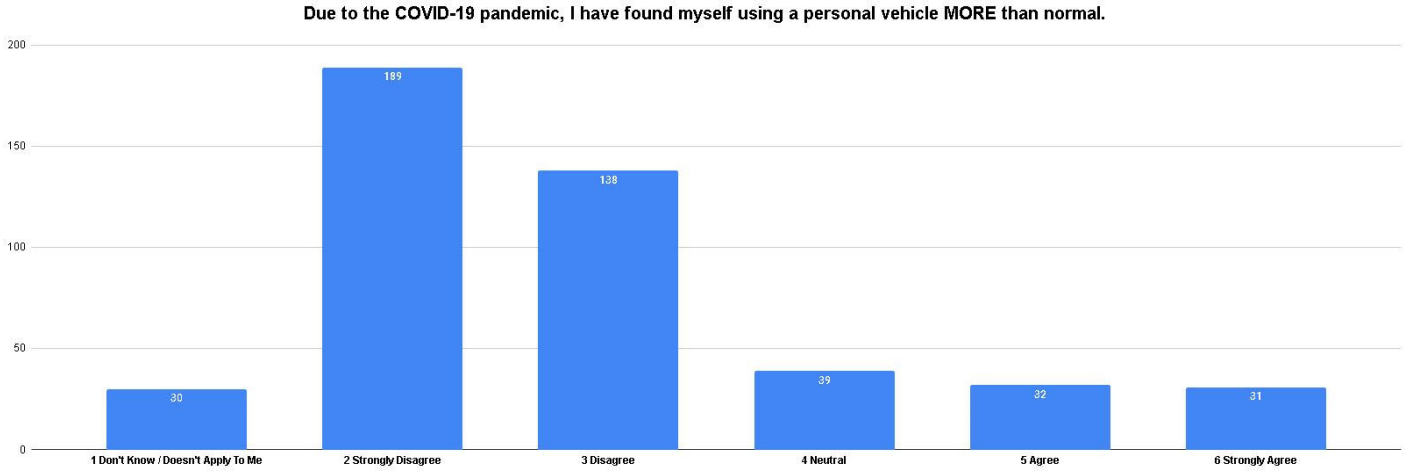
COVID-19 Pandemic: Alterations to Transportation System Use



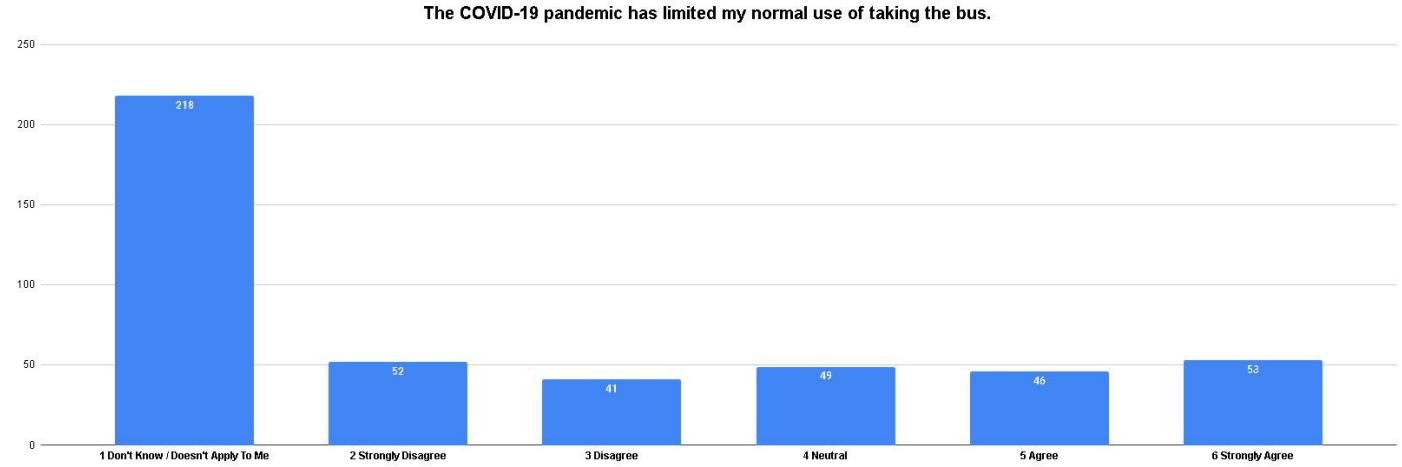
COVID-19 Pandemic: Impact on Normal Transportation Activities



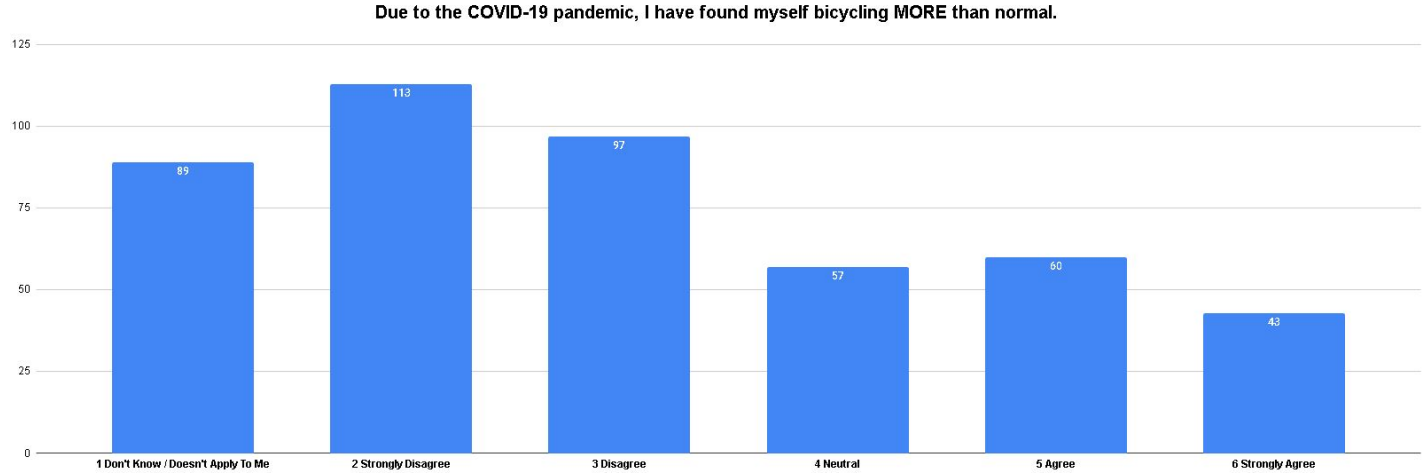
COVID-19 Pandemic: Personal Vehicle Use as a Mode Choice



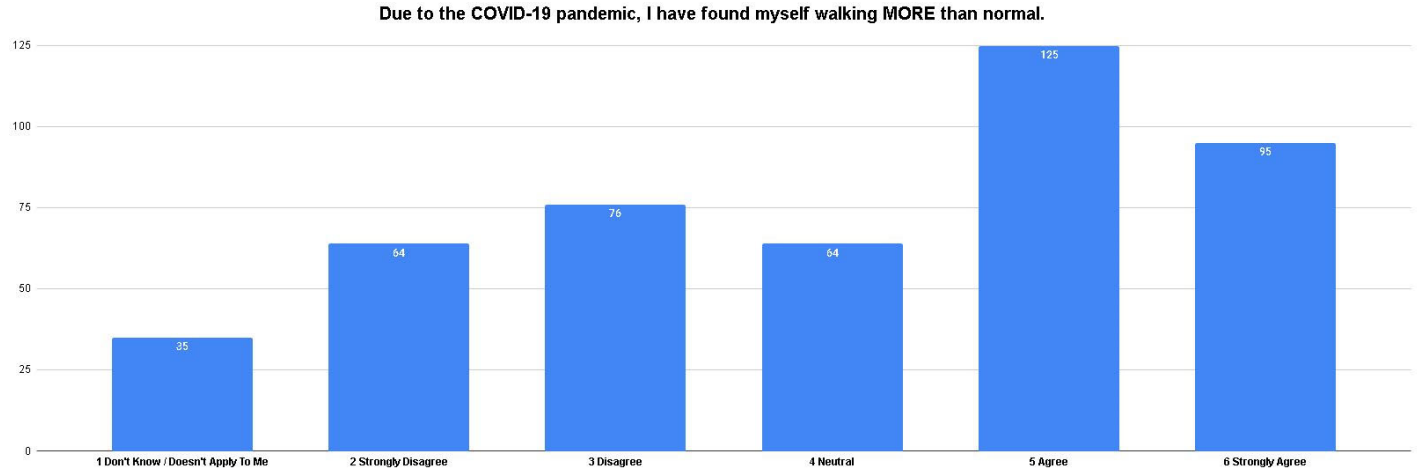
COVID-19 Pandemic: Public Transportation as a Mode Choice



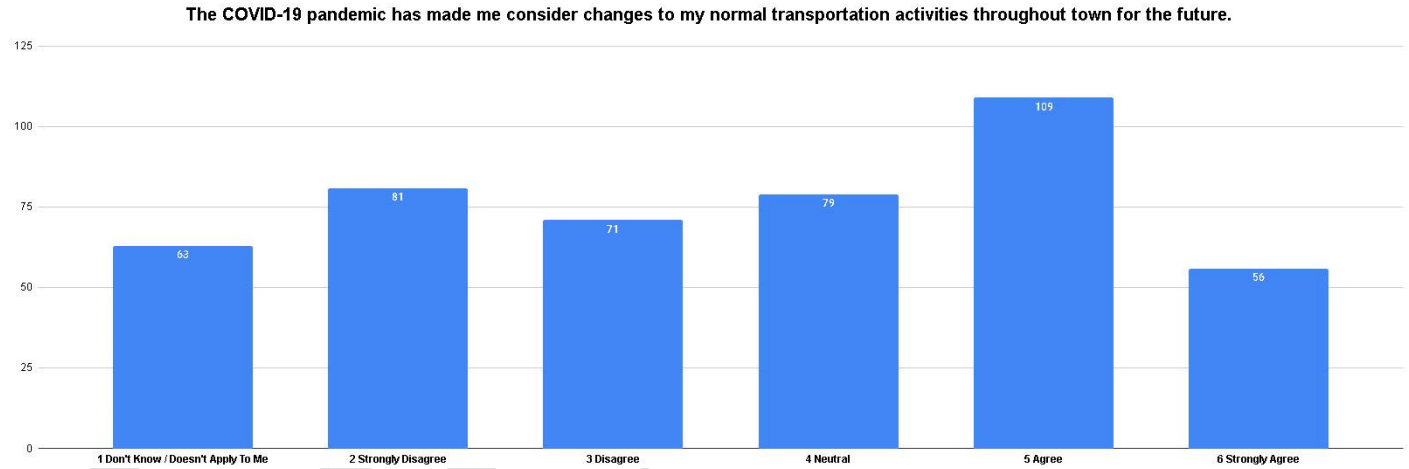
COVID-19 Pandemic: Bicycle Use as a Mode Choice



COVID-19 Pandemic: Walking Bicycle Use as a Mode Choice



COVID-19 Pandemic: Transportation System Activity



2045 Metropolitan Transportation Plan Survey: Key Summary Findings

Survey Respondent Demographic Profiles

- The 2045 Metropolitan Transportation Plan survey received a total of four hundred fifty-nine (459) voluntary citizen responses, thereby a broad cross section representation of Monroe County the Town of Ellettsville, and the City of Bloomington.

- The age of survey respondents extended from 16 years to 85 years with nearly equal distribution between ages 25 through 75.

- Nearly 57% of the survey respondents were women.

- Over 85% of the survey respondents identified themselves as white.

- Approximately 60.5% of the survey respondents had an annual household income exceeding $50,000.

- Approximately 88.5% of the survey respondents had a highest level of formal education beyond high school.

- Over 79% of the survey respondents owned the home that they lived in.

- Approximately 87.3% of survey respondents live within the Bloomington-Monroe county urban area.

- A vast majority of the survey respondents live within identifiable City of Bloomington neighborhood.

Survey Respondent Transportation Mode Choice

- Personal vehicles (75.8%), bicycling (11.1%), walking (9.6%), and transit (3.1%) are the primary mode choices

- Secondary mode choices include walking (33.3%), does not apply (19.2%), bicycling (16.8%), personal vehicles (13.1% or transit (11.5%).

- Approximately 84.3% of personal vehicle users feel safe driving.

- Approximately 54.7% of the survey respondents expressed an interest in purchasing an electric vehicle.

- Survey respondents favored (67.8%) public transit vehicle lanes.

- Survey respondents favored increased transit frequency (48.6%), additional transit stop locations (50.3%), increased transit stop comfort (28.8%), and a need for eliminating route transfers (45.3%).

- Only 27.0% of bicycle users feel safe, but 41.8% enjoy cycling convenience, strongly favor roadway accommodations (80.6%) and nearly 31.8% have an interest in purchasing an electric bicycles.

- A majority (75.8%) of pedestrians felt safe walking; approximately 57.0% believed walking was convenient.

- Only 7.4% of survey respondents felt using a scooter was safe or convenient (10.5%), but 38.5% believed in scooter parking.

- Ride hailing was viewed as safe by 42.5% of survey respondents while convenience rated at only 30.2%.

- Shared vehicle safety (56.0%), expense (37.4%), locations (37.7%), availability (37.4%) raked uniformly low under "I don't know/doesn't apply to me."

- Taxi service received high for "agree" and "strongly agree" for safety (40.3%), but only 10.7% in the same categories for taxi service convenience.

Survey Respondent Transportation System Policy Priorities:

Safety

- Survey respondents overwhelmingly (79.1%) feel that the transportation system should prioritize safety over speed.

Vision Zero

- Survey respondents overwhelmingly (89.1%) feel that it is important that we prioritize eliminating crashes, serious injuries, and fatalities on our roadways and across our entire transportation system.

Maintaining Existing Facilities

- Survey respondents overwhelmingly (81.9%) feel that it is important that we prioritize maintaining the roads we have over building new roads.

Climate Change and Climate Resilience

- Survey respondents overwhelmingly (75.8%) feel that transportation projects should actively address climate change and climate resilience.

Healthy Outcomes

- Survey respondents overwhelmingly (81.5%) feel that transportation projects should ensure and/or increase healthy outcomes for everyone.

Transportation System Negative Impacts – Air Pollution

- Survey respondents overwhelmingly (82.8%) feel that it is important as a community we work to address and reduce the negative impacts of our transportation system, such as air pollution.

Electric Vehicle Charging Stations

- Survey respondents overwhelmingly (79.1%) we should prioritize the installation of more electric vehicle charging stations in the community.

Public Transportation for Environmental Quality

- Survey respondents overwhelmingly (49.7%) feel that they would use or consider using public transportation because it is better for the environment.

Public Transportation Electric Fleet Conversion

- Survey respondents overwhelmingly (58.4%) feel that it important that our public transportation system moves to an entirely electric bus fleet.

Carpooling for Environmental Quality

- Only 31.6% of the survey respondents favored choosing to carpool with others because it is better for the environment.

Bicycle Use for Environmental Quality

- Survey respondents agreed or strongly agreed (56.2%) that they would use or consider using a bicycle because it is better for the environment.

Scooter Use for Environmental Quality

- Only 15.5% of survey respondents agreed or strongly agreed that they would use or consider using a scooter because it is better for the environment.

Shared Vehicles for Environmental Quality

- Only 21.8% of survey respondents agreed or strongly agreed that they would use or consider using a share vehicles because it is better for the environment.

Survey Respondent COVID-19 Pandemic: Alterations to Transportation System Use

- The COVID-19 (coronavirus) Pandemic has altered transportation system use for 64.7% of the survey respondents.

- Survey respondents overwhelmingly (71.5%) noted that the COVID-19 Pandemic has impacted normal transportation activities.

- Survey respondents overwhelmingly strongly disagreed or disagreed (71.2%) that they were using their personal vehicle more than normal due to the COVID-19 Pandemic.

- Only 21.6% of survey respondents agreed or strongly agreed that the COVID-19 Pandemic has limited normal use of taking public transportation.

- Only 22.4% of survey respondents agreed or strongly agreed that they found themselves bicycling more due to the COVID-19 Pandemic.

- Survey respondents agreed or strongly agreed (47.9%) that they found themselves walking more due to the COVID-19 Pandemic.

- Only 35.9% or the survey respondents agreed or strongly agreed that the COVID-19 Pandemic has made them consider changes to normal transportation activities throughout the community for the future.

Appendix D: Travel Demand Model

Introduction

This appendix is a general overview summary of technical aspects related directly to the BMCMPO travel demand model (TDM) developed in 2013-2017 embodied within the BMCMPO 2040 Metropolitan Transportation Plan and the 2045 Metropolitan Transportation Plan. The following narrative provides an overview of the model, the network attributes, traffic analysis zones, trip generation, destination and mode choice, traffic assignments, and statistical model validation. More detailed technical documentation is available upon request.

Model Overview

The BMCMPO maintains a Travel Demand Model covering Monroe County developed with TransCAD Transportation Planning software (https://www.caliper.com/tctraveldemand.htm) for travel demand modeling serving as a macro-level analytical tool for the Bloomington-Monroe County area. Travel demand forecasting commonly uses complex statistical models for predictive changes in transportation system travel patterns resulting from alternative exogenous and endogenous policy assumptions including land use policies and use, demographic characteristics, employment, and multimodal transportation supply networks.

The BMCMPO model design focuses on transportation planning efforts at a regional scale and as a useful tool the 2040 Metropolitan Transportation Plan. The travel demand model further retains vital importance with respect to the 2045 Metropolitan Transportation Plan as an overarching guide for policy-level investment decisions until 2020 Census block geography data becomes available for reassessments and/or recalibration.

Conventional Travel Demand Models use a four-step process. Each step of the TDM simulates the traveler's decision-making on one aspect of trip making. For example, trip generation predicts whether to make a trip while trip distribution finds where to go. Mode split determines which transportation mode to use for specific trip purposes, and traffic assignment estimates which route to take for the trip. This conventional approach follows four sequential steps:

- *Trip Generation* - this initial step translates household and employment data into person trips using trip generation rates established during model calibration.

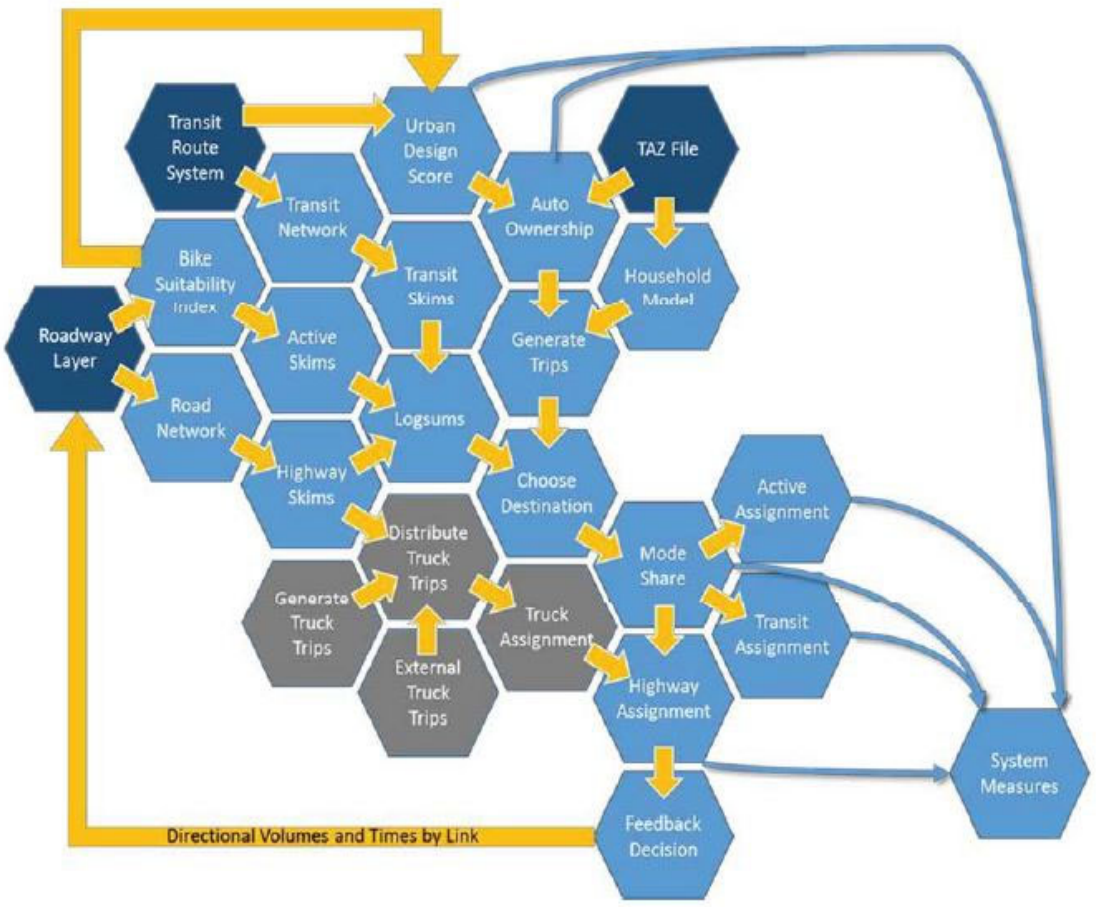
- *Destination Choice* - this second step estimates how many trips travel from one transportation analysis zones (TAZ) to any other zone with the distribution based on the number of trips generated in each of the two zones, and on factors that relate the likelihood of travel between any two zones to the travel time between the two zones.

- *Mode Choice* – this third step estimates the proportions of the total person trips which use transit and ride-sharing modes as opposed to single occupant vehicles for travel between each pair of zones.

- *Trip Assignment* - this final step assigns trips from one zone to another to specific travel routes between the zones. The assignments to routes do consider effects, such as traffic congestion.

The BMCMPO Travel Demand Model uses a feedback loop referenced by the following illustration to pass congested speeds back through the modeling steps so that trip distribution and mode choice components produce results that are consistent with modeled congestion for a given scenario. The following illustration depicts the generalized modeling process.

Development of the BMCMPO Travel Demand Model required various data and information to run each of the four steps of the TDM. Much of these data and information were attributes assigned to each TAZ. Statistical analysis, network attributes, and other parameters used to establish a Base Year (2013) condition for comparisons of future conditions or scenarios employed the same four-step process, but with projected data values. The general aspects of Transportation Analysis Zones, Trip Generation, Destination and Mode Choice, and Traffic Assignment and Validation provided below illustrate the relationships of data, attributes, and model parameters used for the Travel Demand Model.



Transportation Analysis Zones (TAZ)

A total of 591 Transportation Analysis Zones (TAZs), including 34 external stations, were developed for the BMCMPO Travel Demand Model based on 2010 U.S. Census Block geography. Each TAZ identifies total population, households, household characteristics, employment, school enrollment and other socioeconomic data for key attributes. The Travel Demand Model developed in 2013 contains significantly more TAZs than the previous BMCMPO travel demand models (e.g., 1993, 2003) thereby allowed for a more refined level of detail analysis for key spatial attributes. For example, the Base Year 2013 refinement includes group quarters associated with Indiana University which were not been accounted for within TAZ development of models prior to 2013.

The aggregation of population and household data from the 2010 Census into each BMCMPO Travel Demand Model TAZ resulted in a total Monroe County population of 137,976 located within 68,624 households. TAZ attribute development additionally used household and economic data from the 2010 Census. This approach represented key household characteristics, which typically affect the number of trips made by household members (e.g. average household size, median household income, average number of workers per household, average number of vehicles per household).

School enrollment and employment are additional key attributes aggregated into each TAZ. School enrollments identified a total population of 14,660 K-12 students, and a 50,948 higher education enrollment population (41,997 for Indiana University and 8,951 for Ivy Tech) for Monroe County trip assignments. Travel demand model assignments for employment included a total of 79,738 employees for Monroe County by North American Industry Classification System (NAICS-based) employment types. This resulted in a total population of 8,376 retail jobs, 10,066 industry jobs, 3,140 office jobs, and 58,156 service employment jobs.

Another attribute of TAZs used was their classification by area types (rural, suburban and urban). This information is required for speed and capacity estimation of network links. The area types were determined by combined criteria of population and employment density for each TAZ and followed the following tabular guidelines:

TAZ Classification

Area Type	Population Density (Persons/mile2)		Employment Density (Jobs/mile2)
Rural	Less than 1,500	AND	Less than 400
Suburban	400 to 1,000	OR	1,500 to 2,000
Urban	1,000 or greater	OR	2,000 or greater

Trip Generation

Trip generation represents the initial step of the travel demand model development. Attributes assigned to each TAZ translate this information into person trips using trip generation rates, household worker stratification curves, and household market segmentation (automobile ownership). Approximately 75% of the Bloomington-Monroe County households have two people and two or less workers. Household stratification is used because the number of employed workers and size of the household strongly influence the trip generation (e.g. home-based work, home-based other, home-based shop, home-based school).

Likewise, the market segmentation strongly influences trip generation when factoring in the number of autos available to adult household members. The auto ownership variable is key to the trip generation process. The inclusion of the auto ownership model allows the regional travel model sensitivity to different types of urban development and/or non-auto infrastructure (transit and non-motorized). The market segmentation element of the trip generation process categorized household automobile ownership into Zero Auto, Autos Less than Workers, Autos Greater than Workers.

Commercial vehicle (truck) trips represent another aspect that the Travel Demand Model incorporates into the trip generation step. Generally, commercial trips correlate with local employment aspects generated by aggregate commerce (retail, wholesale, manufacturing, mining, etc.) economic activities.

Destination and Mode Choice

The next step of the BMCMPO Travel Demand Model TDM first estimated how many trips travel from one TAZ to another TAZ. The number of trips generated in each of the two zones and use factors such as the likelihood of travel between any two zones to the travel time between the respective two zones determines trip distribution. This step included time of day factors, peak travel, and other attributes to estimate trips. Another aspect that the TDM is the use of a congested travel time feedback loop for assessing consistency with air quality and travel speeds as they are interrelated.

The Travel Demand Model next estimated the proportions of the total person trips by mode type between each pair of zones. This Mode Choice step uses a regression or logit model to assign the probability of using a particular travel mode based upon the utility of that mode in relation to the sum of the utility for all modes. The utility measure is specific to each travel mode, while the coefficients for travel time and cost are generally held constant for all modes for a given trip purpose and population. This regression assumes an improvement in one mode will divert trips proportionately from all other modes. For example, a transit improvement that attracts an additional five percent of all trips would reduce trips on all other modes by five percent. It also has the ability to recognize the potential for something other than equal competition among modes. In this instance, a reasonable assumption for a premium express transit service would attract more diversion from the parallel local bus service than from the

auto modes. Finally, it also relates the mode choice to the type of trip generation (e.g. home-based work, home-based other, home-based shop, and home-based school).

Another unique aspect of the BMCMPO Travel Demand Model is the inclusion of urban design attributes. There are strong correlations in the Bloomington-Monroe County area between land uses and transportation needs. The development and use of a "5D Score" relates land development types and their respective impact on travel behavior (e.g. low density tends to favor high VMT and high density tends to favor low VMT on a per capita basis). The 5D Scores used Density, Destination, Design, Diversity, and Distance to Transit as part of the Mode-Choice step.

Traffic Assignment and Validation

Accurately representing the transportation network of Monroe County is a fundamental part for the successful validation of the BMCMPO TDM. The City of Bloomington and Monroe County provided roadway traffic counts and transit ridership data, and a variety of GIS files of roadways, transit routes, bike routes, trails/paths, traffic signals and parcels data. All these data incorporated for model network development established an accurate representation of transportation infrastructure conditions in Base Year 2013. Technical analysis considered aspects of future networks, highway speeds, capacity estimation, delays, external stations, growth rates, truck traffic, transit network, and other network attributes.

Trip assignment step is the last step of the conventional four-step model process. The standard approach to this process takes trips from the various trip generation tables and assigns trips to the network according to a mathematical algorithm ensuring that all zone to zone trips use paths that minimize the total travel time of all trips on the network. This step is also the last step in the feedback loop that returns updated highway travel times to the trip distribution step which generates revised trip tables based on these updated travel times. This loop ensures the establishment of consistent, stable highway travel times before the final set of highway and transit trips prior to network assignment. Trip assignment uses the following steps: Highway Assignment (equilibrium assignment for peak periods, off peak period, by single occupancy vehicle, high occupancy vehicle, trucks, bikes, and pedestrians), Congested Travel Speeds (standard design curves), and Count Data (local, INDOT).

Validation of the BMCMPO Base Year (2013) Travel Demand Model included comparative measurements against recorded historical data for the Bloomington-Monroe County region. Calibration of a Travel Demand Model takes place at each step in the modelling process involving initial estimations followed by an iterative refinement of the various parameters and coefficients of the model components by comparing model results to observed conditions. This iterative process continues until calibration refinements have resulted in satisfactory results. Once validated, the model becomes a tool for the prediction of future travel patterns with a high degree of confidence.

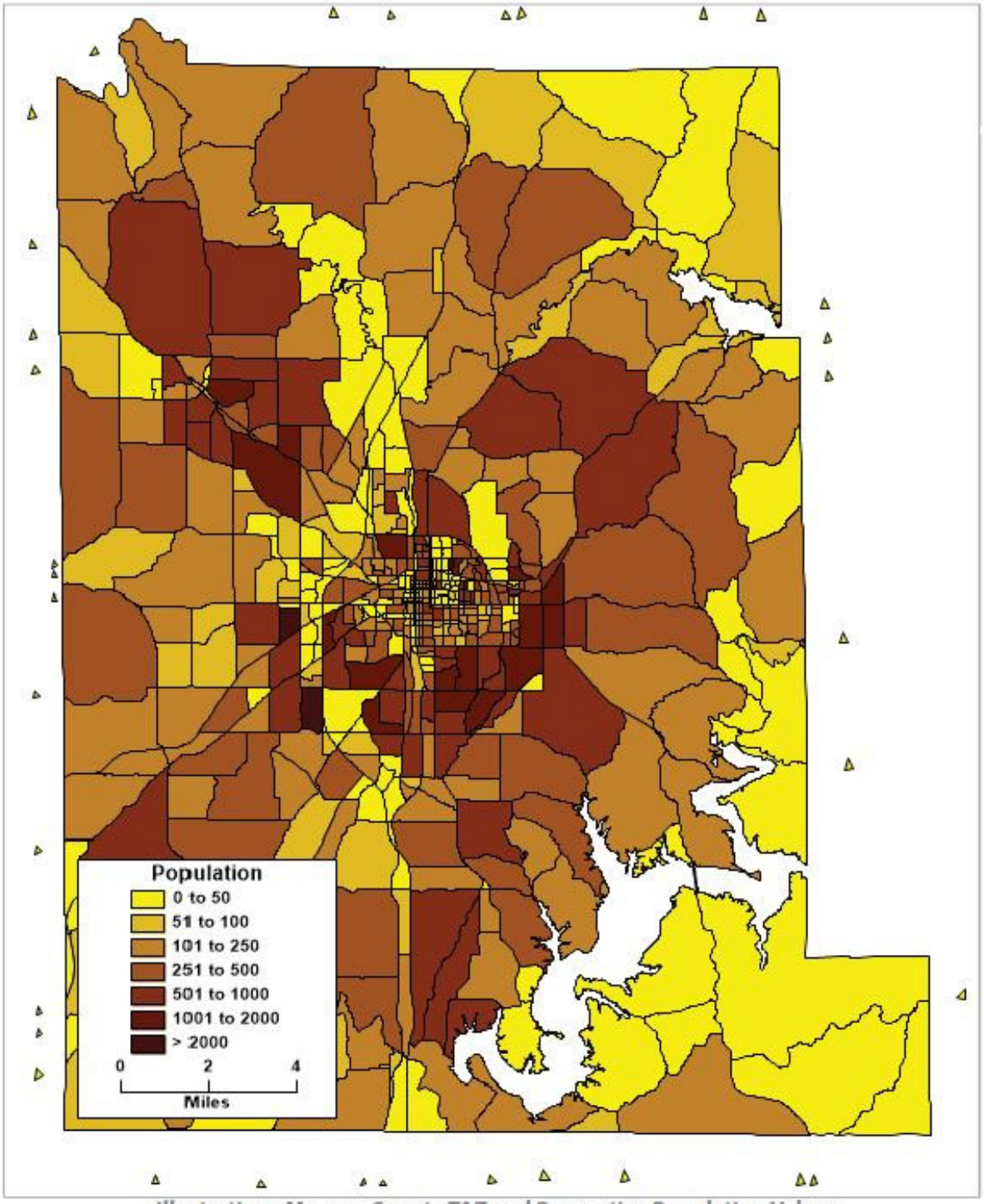
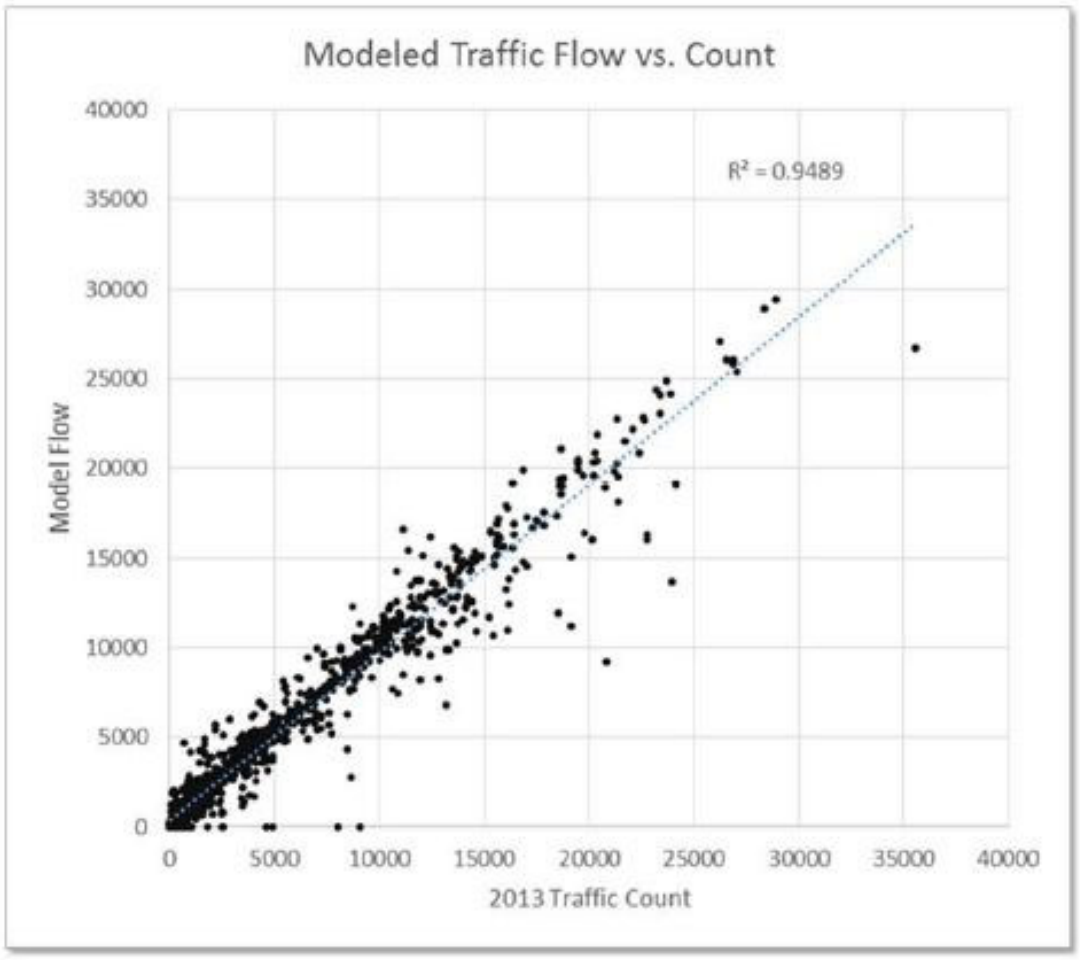


Illustration : Monroe County TAZ and Respective Population Values

A Root Mean Squared Error (RMSE) statistical methodology validated for different volumes, facility and area types. In regard to RMSE, The model is generally within the desirable range of error for high-volume roads and overall, but above desirable targets for low-volume roads, which are more difficult to replicate, given the inherently smaller margins of error afforded.

The BMCMPO travel demand model 2013 Base Year model exhibited a high degree of statistical validation in comparison to documented traffic volume counts showing an overall 26.2% RMSE and a 1.5% count Vehicle Miles of Travel (VMT) error. The system-wide modeled 2013 Base Year VMT estimate is consistent with the 2005 Highway Performance Monitoring System (HPMS) estimate (within -5%). The figure below illustrates in graphical form estimated traffic flows of the BMCMPO Travel Demand Model in relation to actual traffic counts as an element of the validation process.



Appendix E: Environmental Justice

Introduction

Environmental justice is defined by the U.S. Environmental Protection Agency as "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies."

Federal Statutes

Title VI of the Civil Rights Act of 1964 requires that no person in the United States shall on the grounds of race, color, national origin, gender, age, or disability be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any provision or activity of federal aid recipients, sub-recipients or contractors. Title VI established a standard of conduct for all Federal activities that prohibits discrimination.

Executive Order 12898, issued on February 11, 1994 titled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and the President's Memorandum on Environmental Justice, directed every federal agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies and activities on "minority populations and low-income populations".

The institution of environmental justice (EJ) ensures equal protection under federal laws, including the following:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252),
- The National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. § 4321;
- The Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended, 42 U.S.C. § 4601
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq*.) as amended, (prohibits discrimination on the basis of disability);
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq*.), (prohibits discrimination on the basis of age);
- The Americans with Disabilities Act of 1990, as amended, (42 U.S.C. § 12101 *et seq.),* (prohibits discrimination on the basis of disability)

All policies, programs, and other activities undertaken, funded, or approved by the FHWA, FTA, or other US DOT components must comply with EJ requirements from initial concept

development through post-construction operations and maintenance (policy decisions, systems planning, project development and NEPA review, preliminary design, final design, right of way, construction, operations, and maintenance).

The underlying principle of Title VI for the *2045 Metropolitan Transportation Plan* is that minority and low-income residents should:

- Participate in the planning process;
- Benefit from planned transportation improvements; and
- Not bear an unfair burden of the environmental impacts.

The *2045 Metropolitan Transportation Plan* estimates growth patterns using 2010 Census data and future transportation needs which aid in assessing the benefits and burdens that future transportation projects might have on traditionally disadvantaged populations. Plan development provides growth projections to evaluate opportunities for all populations to provide input (Public Participation Plan), assess the effects of future decisions on neighborhoods, the environment, and the economy, and help ensure that the benefits and impacts of future transportation systems are equally distributed.

Methodology & Results

The BMCMPO 2040 MTP environmental justice methodology relied upon demographic and socioeconomic data from the U.S. Bureau of the Census, *American Community Survey (ACS) 2013-2017 Five-Year Estimate, Poverty Status* for each of Monroe County's sixteen (16) Census Tracts. Examinations of each census tract incorporated estimates of total population in relation to minority populations and percentage of population below poverty status. ***Table 1*** summarizes the percentage of non-white and below poverty populations per Census Tract for Monroe County given currently available data. Individual Census Tract identifications relied on two environmental justice characteristics:

- *High minority population tracts where 50 percent or more of the residents in the tract consists of "minority" populations;* and
- *Low income tracts where 50 percent or more of the individuals within the tract are classified as living below poverty level*.

Monroe County census tracts with 50 percent or more of either of the two environmental justice characteristics are locations of importance for transportation planning and project development needs. The identified areas with high proportions of minority population and poverty levels within Monroe County are:

- **Census Tract 1** covering the Bloomington Central Business District and immediate surrounding areas;

- **Census Tract 2.01** covering the northern portion of the Indiana University campus;

- **Census Tract 2.02** covering the southern portion of the Indiana University campus;

- **Census Tract 6.01** covering the west portion of the City of Bloomington

- **Census Tract 6.02** covering the northwestern portion of the City of Bloomington; and

- **Census Tract 16** covering the area north of downtown Bloomington and immediately northwest of the Indiana University campus.

Figure 1 illustrates the Monroe County census tracts with 50 percent or more of the two environmental justice characteristics subject to compliance for current or future transportation system projects. The *2045 Metropolitan Transportation Plan* does not foresee any residential project displacements, commercial project displacements or adverse environmental impact for any project within Monroe County's identified Environmental Justice census tracts.

The Environmental Justice census tracts identified for this plan encompass most of the Indiana University campus and/or have high concentrations of off-campus housing desired by the university's student populations. The high percentage below poverty classification for these tracts is very likely a reflection of the large number of students residing within geographically established boundaries. Furthermore, Tract 2.02 has a high minority proportion possibly reflecting international student residents. By comparison, the Bloomington Housing Authority manages a large low-income housing complex within Tract 6.01 as do several other agencies within this tract. Tract 6.01 is close to meeting the EJ characteristics, but offers some context when comparing it to the balance of environmental justice census tracts that have high student populations. Projects that are within environmental justice census tracts shall require higher levels of analysis during Red Flag Investigations prior to Transportation Improvement Program (TIP) programming. This in turn may require the need to address specific EJ concerns as a project moves forward with implementation.

Public transit service is an additional Environmental Justice consideration. ***Figure 1*** provides a useful reference for assessing the spatial relationship between Transit services and Environmental Justice compliance. Bloomington Transit, Indiana University (IU) Campus Bus, and Rural Transit provide transit services within and in close proximity to Indiana University and the downtown area (Tracts 1, 2.01, 2.02, 6.01, 6.02, and 16). Taken together, Bloomington Transit, IU Campus Bus, and Rural Transit provide a thorough range of transit services to all Environmental Justice Tracts within Monroe County. Future transit investments supported by the *2045 Metropolitan Transportation Plan* shall continue to enhance mobility and service for all Environmental Justice tract populations.

The multi-modal transportation improvements contained in the *2045 Metropolitan Transportation Plan* will benefit areas with a concentration of low-income households through improved mobility and accessibility without having a "disproportionately high" or "adverse" impacts. No households will undergo displacement in implementing transportation improvements within these low-income or high minority areas. Finally, the 2045 MTP makes multi-modal transportation investments within, and to, low-income areas ensuring that low-income groups receive a proportionate share of benefits, without enduring adverse social, economic or environmental impacts. Given these consideration factors, the *2045 Metropolitan Transportation Plan* is in compliance with Title VI relative to Environmental Justice.

Environmental Justice Conclusions

Table 1 and ***Figure 1*** define current Monroe County Environmental Justice census tracts with respective minority populations and poverty thresholds meeting Title VI requirements as they relate to transportation planning. Census tracts 1, 2.01, 2.02, and 16 illustrate a high minority population and poverty level concentrations within and surrounding the Indiana University campus. Conversely, environmental justice census tracts 6.01 and 6.02 reflect the City of Bloomington's poverty levels along the west and northwest corporate boundaries. No other environmental justice areas reside within balance of the metropolitan planning area or more rural areas of Monroe County.

Environmental Justice – Future Reassessments

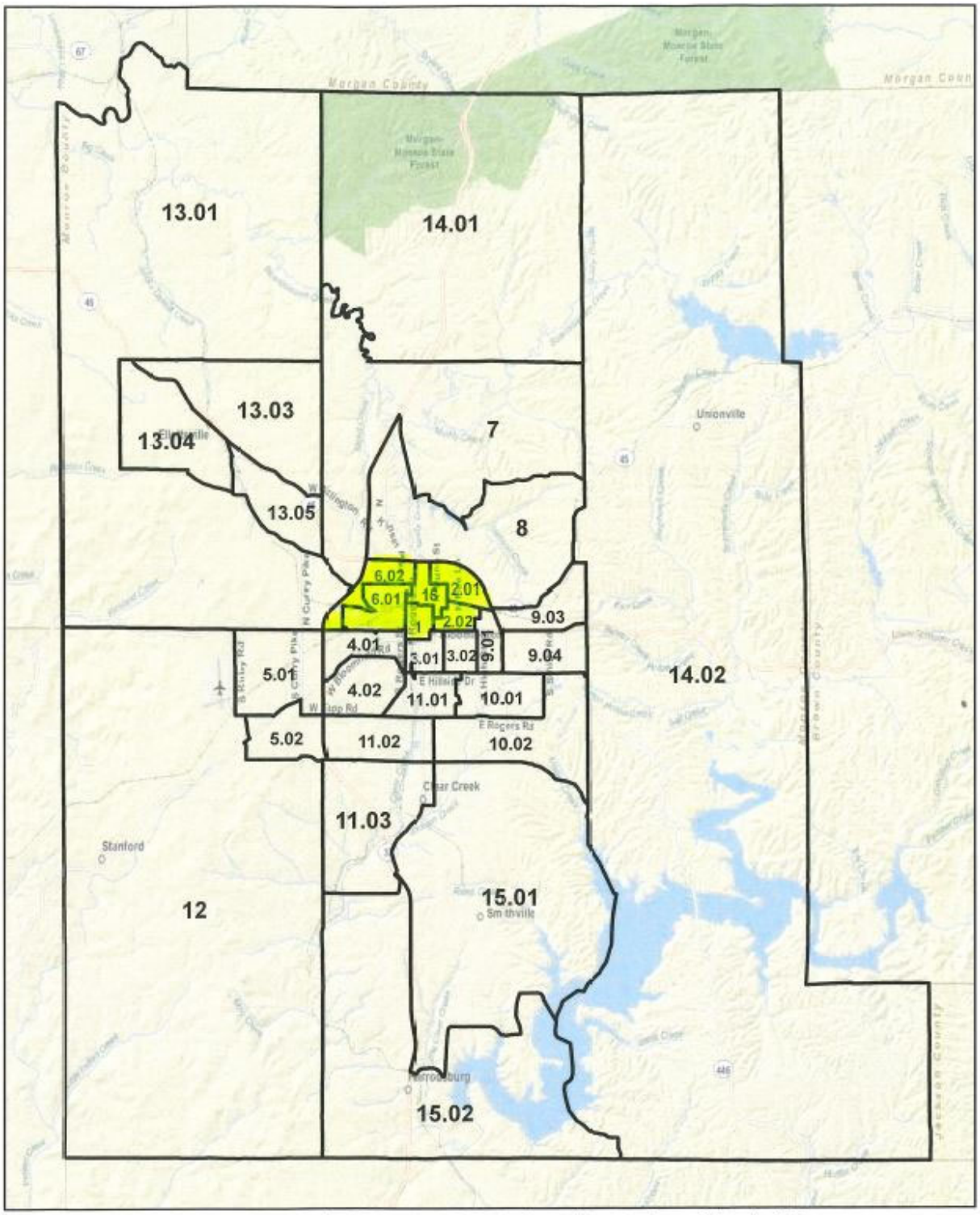
Future reassessments of identifiable Monroe County environmental justice census tracts will coincide with the release of the 2020 Census data in calendar years 2021-2022. At present (08-17-2020), Indiana's self-response rate stands at only 67.2% in comparison to a national self-response rate of 63.0%. These low rates are a reflection of the once-in-a-century global/national COVID-19 pandemic and current domestic economic, social, and political crises exacerbated by the pandemic. The U.S. Census Bureau requested from the U.S. Congress in April 2020 a four-month extension of the 2020 Census allowing for an October 31, 2020, targeted completion given the COVID-19 pandemic plus significant population undercounts in national urban areas with traditionally underrepresented environmental and social justice communities. The Census Bureau announced in August 2020 a prematurely shortened deadline supported by the national administration of September 30, 2020. This action will effectively limit non-response follow-up (NRFU) within the Bloomington urban area, Monroe County, the State of Indiana, and national communities leading to potentially significant undercounts of total populations plus disproportionate undercounts within vulnerable environmental justice and social justice populations who reside in urban political jurisdictions. The long-term consequential impacts of prematurely shortened statutory reporting deadlines on the Bloomington-Monroe County urban area includes (1) significant decade-long losses of federal-fund allocations supporting critical local needs, and (2) continued social inequities which local jurisdictions must solely address without federal support for the linkage of environmental and social justice communities populations to jobs, education, health care, and greater respective jurisdictional communities.

Table 1 - Monroe County Census Tracts - Environmental Justice Population Estimates*

2013-2017 Census Tract	Estimated Population	Estimated White Only**	Estimated Non-White	Estimated % Minority	Est. Population Below Poverty Level	Est. % Population Below Poverty Level
1	5,248	4,651	597	11.4%	3,942	75.1%
2.01	323	53	270	83.6%	243	75.2%
2.02	60	45	15	25.0%	36	60.0%
3.01	3,930	3,332	598	15.2%	1,292	32.9%
3.02	2,871	2,733	138	4.8%	946	33.0%
4.01	4,171	3,329	842	20.2%	1,111	26.6%
4.02	4,697	3,744	953	20.3%	877	18.7%
5.01	4,370	3,903	467	10.7%	699	16.0%
5.02	3,450	2,781	669	19.4%	456	13.2%
6.01	3,956	2,822	1134	28.7%	2,024	51.2%
6.02	3,428	2,748	680	19.8%	1,842	53.7%
7.00	3,021	2,792	229	7.6%	316	10.5%
8.00	5,713	4,818	895	15.7%	1,223	21.4%
9.01	3,262	2,393	869	26.6%	1,357	41.6%
9.03	5,198	4,145	1053	20.3%	1,622	31.2%
9.04	5,434	3,214	2220	40.9%	2,256	41.5%
10.01	5,604	4,601	1003	17.9%	564	10.1%
10.02	6,032	4,814	1218	20.2%	721	12.0%
11.01	5,775	4,276	1499	26.0%	2,147	37.2%
11.02	4,422	3,322	1100	24.9%	610	13.8%
11.03	2,955	2,762	193	6.5%	328	11.1%
12.00	5,994	5,702	292	4.9%	314	5.2%
13.01	5,780	5,376	404	7.0%	407	7.0%
13.03	5,931	5,677	254	4.3%	303	5.1%
13.04	4,278	4,036	242	5.7%	853	19.9%
13.05	2,122	2,029	93	4.4%	198	9.3%
14.01	2,082	2,018	64	3.1%	115	5.5%
14.02	5,749	5,566	183	3.2%	564	9.8%
15.01	5,593	5,237	356	6.4%	492	8.8%
15.02	2,910	2,818	92	3.2%	326	11.2%
16	4,953	4,336	617	12.5%	3,790	76.5%
TOTAL	129,312	110,073	19239	14.9%	31,974	24.7%

*Source: U.S. Census Bureau, ACS 2013-2017 Five-Year Estimate, Poverty Status in the past 12 months, December 2019.
**White alone, not Hispanic or Latino

Figure 1 - Monroe County, Indiana - Environmental Justice Census Tracts *



*Source: U.S. Census Bureau, ACS 2013-2017 Five-Year Estimate, Poverty Status in the past 12 months. Prepared December 2019.

Appendix F: Air Quality

Overview

The Clean Air Act of 1970 (CAA 1970) requires the development of a State Implementation Program (SIP) for achieving National Ambient Air Quality Standards (NAAQS) in non-attainment areas. The relationship between transportation planning and air quality planning formalized with the Clean Air Act Amendments of 1990. Locally, this led to the establishment of a direct relationship between projects in the Bloomington-Monroe County Metropolitan Planning Organization's (BMCMPO) Transportation Improvement Program (TIP) and air quality compliance.

Air quality conformity determinations are required under current federal requirements for major transportation investments in designated air quality "non-attainment" and "maintenance" areas. The composite of major transportation investments contained in a Metropolitan Planning Area's (MPA) Long Range Transportation Plan (LRTP) must therefore demonstrate air quality improvement or, at minimum, no degradation in air quality relative to the "Existing Plus Committed" transportation network. The BMCMPO study area that includes the urbanized area within Monroe County is an air quality attainment area.

The State of Indiana's Ambient Air Quality Monitoring Network includes the operation of one (1) air quality monitoring site within the Bloomington-Monroe County Metropolitan Planning Area. This monitoring site, located at Binford Elementary School (**Figure 1**) and active since April 1, 2009 (https://www.in.gov/idem/airquality/files/monitoring_network_description.xls), continuously samples fine particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$) in hourly increments. The creation of this fine particulate matter primarily originates from industrial processes and fuel combustion.

As noted by the Indiana Department of Environmental Management (IDEM), "the annual standard for $PM_{2.5}$ is 12.0 micrograms per cubic meter ($\mu g/m^3$). Attainment is determined by evaluating the average of the annual arithmetic means over a three-year period. The three-year average of the weighted annual mean of $PM_{2.5}$ concentrations from a single monitor must be less than or equal to 12.0 $\mu g/m^3$. A monitor that measures 12.05 $\mu g/m^3$ or higher identifies as nonattainment. The annual site design value is the average of the annual mean over three-years. An annual mean is the average of that year's four quarterly averages, unrounded. A quarterly mean is the average of all available data from the respective quarter. The annual site design value rounds to one decimal place. The United States Environmental Protection Agency (USEPA) revised the annual standard for fine particulate matter on December 14, 2012. This standard was effective March 18, 2013. Therefore, design values are not comparable to the new annual standard until the year ending 2013."

IDEM's $PM_{2.5}$ Annual Monitoring Data from April 2009 through July 31, 2019 for the Bloomington-Monroe County Binford Elementary School site show a consistent $PM_{2.5}$ decline

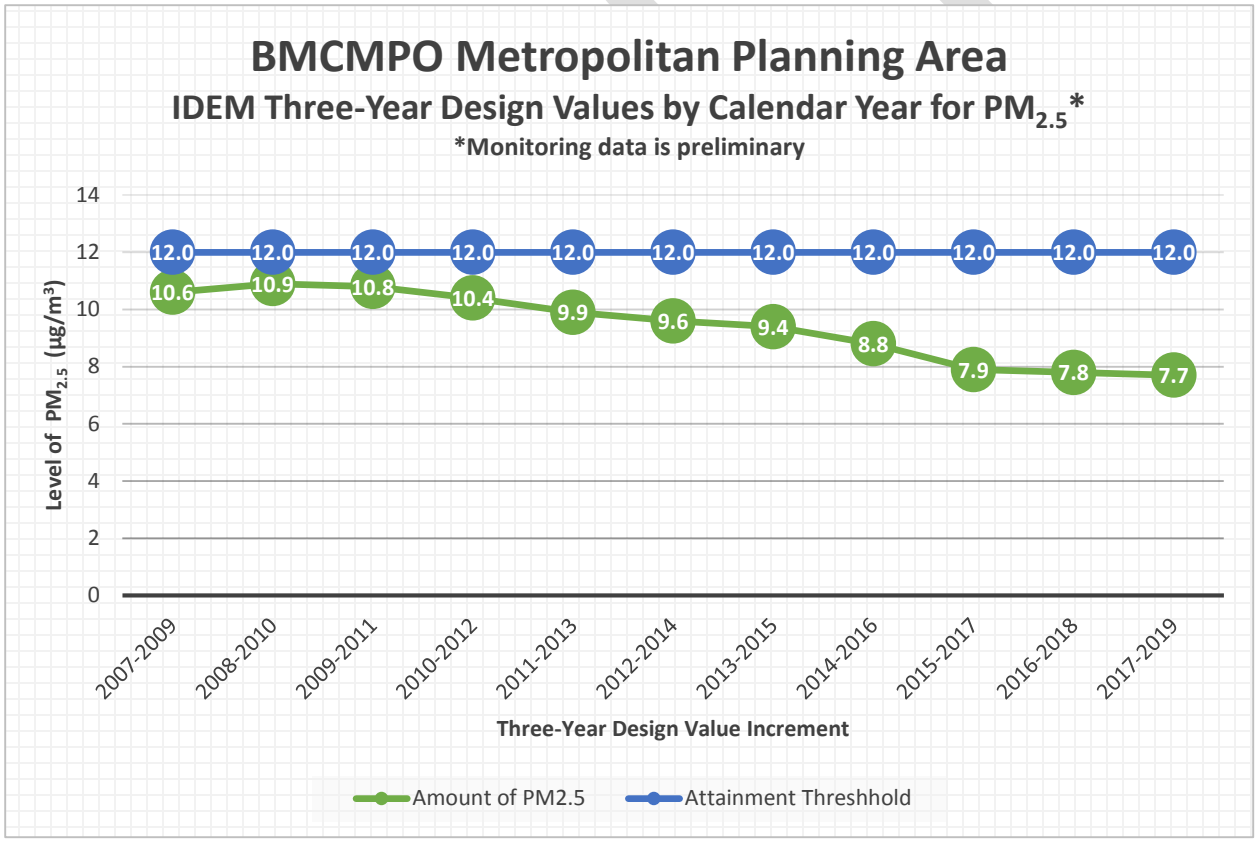
within the urban area from 10.62 µg/m^3 to 7.60 µg/m^3 (Table X). As previously noted, a monitor that measures 12.05 µg/m^3 or higher achieves nonattainment status.

The 2017-2019 three-year design value for the Bloomington-Monroe County $PM_{2.5}$ monitor is 18 µg/m^3. Reference data are available at https://www.in.gov/idem/airquality/files/monitoring_quick_view_pm25.xls.

Air Quality Compliance

Monroe County and the City of Bloomington currently meet federal air quality standards, and the region is therefore in "*attainment*" for criteria pollutants. The NAAQS set limits on atmospheric concentrations of six criteria pollutants—lead, carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, and particulate matter—that cause smog, acid rain, and other health hazards.

Table 1. Annual Air Quality Monitoring Data within the BMCMPO Metropolitan Panning Area.



A conformity determination is not required for the Bloomington and Monroe County Metropolitan Planning Area. The projects programmed in the 2045 Metropolitan Transportation Plan should therefore result in an improvement to air quality given a system-wide investment focus on multimodal safety, maintenance and preservation, public transit, and bicycle/pedestrian facilities. The travel demand model analysis completed for the *2040 Metropolitan Transportation Plan* indicates that vehicle miles of travel (VMT) will increase for

the “No-Build, Do-Nothing” (Existing Plus Committed) and alternative transportation network over the next two decades years given forecast assumptions about:

- System-wide roadway network volume-to-capacity ratios;
- Roadway network miles operating below Level-of-Service “C”;
- Vehicle-miles of travel on facilities operating on below Level-of-Service “C”;
- Congested vehicle-hours of travel; and
- Total vehicle-miles of travel.

The BMCMPO travel demand forecast model suggests that air quality could degrade over the Year 2045 forecast period if agencies within the Bloomington and Monroe County Metropolitan Planning Area make no further major transportation investments for system preservation. This finding assumes a correlation of congestion and air quality to vehicle speeds, total vehicles, and vehicle miles of travel. Simply stated, an increase in mobile source generated carbon monoxide and ozone (hydrocarbons and nitrous oxides) will occur under a “no-build” Transportation Plan alternative scenario.

Conversely, the most favorable of the Travel Demand Model scenario alternatives for air quality (e.g., Peak Oil, a quantitative decrease of overall urban area vehicle miles traveled or a dedicated policy of a compact urban form, e.g., “Urban Infill”) documented in the 2045 MTP focus on public transportation and alternative transportation without adding capacity and focusing on system-wide capacity preservation and maintenance could result in air quality improvements over the no-build condition through the achievement of reductions in:

- System-wide volume-to-capacity ratios;
- Congested roadways;
- Vehicle miles of travel on congested roadways;
- Congested vehicle hours of travel; and
- Continued implementation of federal automobile fuel efficiency standards (i.e., corporate average fuel economy known as “CAFE”).

Forecast growth in population, employment, households, and real disposable income will bring about increased transportation demands within the BMCMPO Metropolitan Planning Area during the forecast period extending to Year 2045 under current economic assumptions. The recommendations of the 2045 Metropolitan Transportation Plan will, however, contribute to

overall air quality improvement through a systematic application of transportation capacity preservation, minimal capacity expansion projects, and continued multi-modal system growth of the public transportation, bicycle, and pedestrian systems.

One additional note not accounted for in the BMCMPO travel demand modeling process involves a formal national-level rollback of the CAFE (https://www.federalregister.gov/documents/2009/03/30/E9-6839/average-fuel-economy-standards-passenger-cars-and-light-trucks-model-year-2011) fuel economy standards for cars, light trucks and SUVs announced by the U.S. Department of Transportation and the Environmental Protection Agency on March 30, 2020. Final Rules published in the Federal Register (https://www.regulations.gov/docket?D=NHTSA-2018-0067) and (https://www.regulations.gov/docket?D=EPA=HQ-OAR-2018-0283) redirects Corporate Average Fuel Economy (CAFE) standards for vehicle manufacturers. This new federal rule takes effect in late 2020 directs manufacturers achieve a 1.5% annual increase in vehicle fuel efficiency in place of a 5% annual increase under the current rule issued in 2012. Under this final federal rule issuance, new cars would have to average approximately 40 miles per gallon instead of closer to 50 miles per gallon by 2026. The major consequence of this decision is an increased scientific modeling probability of vehicle emission air pollutants and a scientific concomitant increase in atmospheric warming and scientifically documented climate change. A protracted set of near-term legal challenges are expected. The transportation sector of the national economy is the largest source of climate change greenhouse gases in the United States according to USEPA scientifically documented data.

The USEPA *Policy Assessment for the Review of the National Ambient Air Quality Standards for Particulate Matter, External Review* (https://www.epa.gov/sites/production/files/2019-09/documents/draft_policy_assessment_for_pm_naaqs_09-05-2019.pdf) rigorously demonstrated that lowering particulate matter (PM) standards could save upward of 67,000 lives nationally according to USEPA scientists. The USEPA nevertheless announced in April 2020 a proposal to retain, without changes, the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM) including both fine particles (PM2.5) and coarse particles (PM10).

In July 2020, the Council on Environmental Quality (CEQ) published in the *Federal Register* a Final Rule to modernize National Environmental Policy Act (NEPA) Regulations. The final rule, the first major update to the CEQ regulations since their promulgation in 1978, will become effective on September 14, 2020

The final rule includes significant changes to the analysis of effects and alternatives:

- Changes the definition of “major federal action,” which triggers NEPA review

- Eliminates direct, indirect, and cumulative effects (e.g., climate change), and focusing the analysis on effects that are reasonably foreseeable and that have a reasonably close causal relationship to the proposed action.

- Redefines “reasonable alternatives” must demonstrate technical and economic feasibility, and meet the proposed action purpose and need.

- Repeals the specific requirement to consider cumulative effects normally used for climate change analysis.

- Newly emphasizes the “need for disclosure” in contrast to a traditional focus on public participation. Specifically, public comments must have high specificity, and comment submissions must occur during prescribed comment periods. Agencies need only respond to “substantive” comments. Comments or objections not submitted within prescribed definitions will be deemed “forfeited as unexhausted.” Agencies would have the *discretionary* need for public meetings or hearings, formally a critical element in the development of an EIS. The CEQ proposed rule additionally eliminates a mandatory 30-day comment period on final Environmental Impact States (EISs).

Climate Change Scientific Assessments

Climate Change is a critical concern of the Bloomington-Monroe County Metropolitan Planning organization. Climate change represents an immediate, near-term, and long-term threat to human health/welfare, existing public infrastructure investments, public water resources, agriculture and forestry, energy generation and use, foreseen urban environments, and aggregate regional ecosystems Climate change within the context of the 2045 MTP means the long-term rise in the average temperature of the Earth’s climate system, a major aspect of climate change scientifically demonstrated by direct temperature measurements and by measurements of various effects of the warming.

The *Indiana Climate Change Impacts Assessment* (https://docs.lib.purdue.edu/climatetr/2/) identifies rising average annual temperatures and rising average annual precipitation for more than a century as the most significant climate change threats to the State of Indiana’s residents. The conclusion of this March 2018 scientific study:

- *“This assessment documents that significant changes in Indiana’s climate have been underway for over a century, with the largest changes occurring in the past few decades. The findings in this assessment highlight the projected future changes using two scenarios representing the rise of heat-trapping gases over the next century. These projections generally suggest that the trends that are already occurring will continue and the rates of these changes will accelerate. They indicate that Indiana’s climate will warm dramatically in the coming decades, particularly in summer. Both the number of hot days and the hottest temperatures of the year are projected to increase markedly. Indiana’s winters and springs are projected to become considerably wetter, and the frequency and intensity of extreme precipitation events are expected to increase, although more research is needed in this area to better determine the details.”*

Climate change vulnerabilities for Monroe County documented through additional independent scientific research by the Indiana University Environmental Resilience Institute (https://hri.eri.iu.edu/index.html and (https://hri.eri.iu.edu/climate-vulnerability/index.html?placeid=MONROE%20County#climateExpoHead) includes primary community metrics in a geographic information system (GIS) format identifying forecast events of extreme temperatures, precipitation levels, land use, and sociological/demographic individualities.

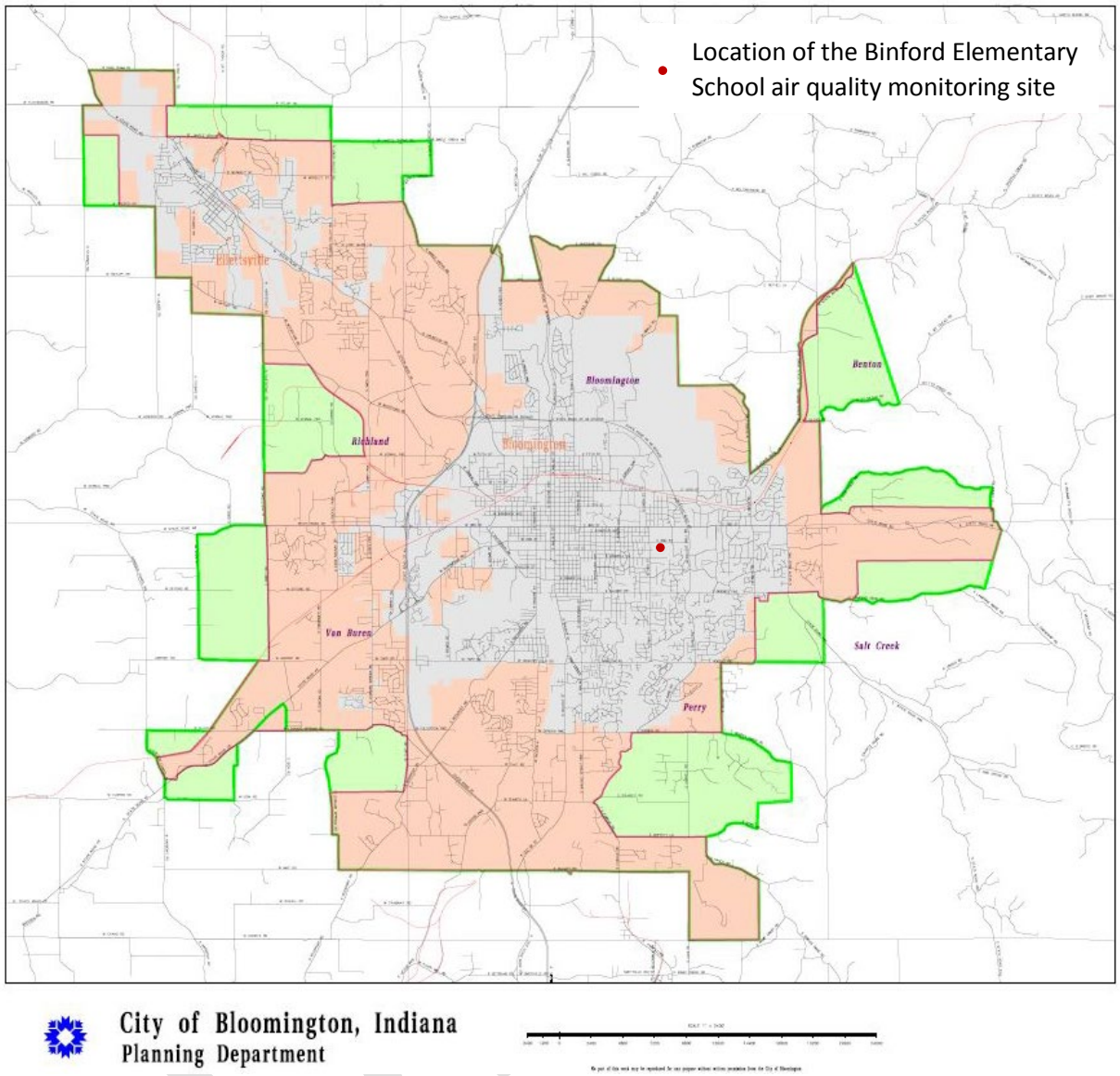
Conclusion

Monroe County currently meets federal air quality attainment standards for criteria pollutants. The systematic application of compact land use form policies, transportation capacity preservation, minimal capacity expansion projects, and continued multi-modal growth investments of the public transportation, bicycle, and pedestrian systems will ensure future air quality attainment status.

Environmental policy rule changes promulgated on the federal level during calendar year 2020 involving a rollback of CAFÉ standards, National Ambient Air Quality Standards (NAAQS) for particulate matter, major changes to the National Environmental Policy Act (NEPA), and a pending proposal which eases methane containment standards point to potentially serious environmental quality challenges in the immediate near-term.

Climate changes documented within the *Indiana Climate Change Impacts Assessment* over the past century show an unequivocal scientific fact: extreme climate events are a clear threat to Indiana communities today, tomorrow, and well beyond the 2045 planning horizon.

Figure 1. Location of the Binford Elementary School air quality monitoring site within the BMCMPO's Metropolitan Planning Area.



Appendix G: Projects

Projects

The following projects index provides a central reference point for the description of recommended BMCMPO 2045 Metropolitan Transportation Plan multi-modal projects administered by Monroe County, the Town of Ellettsville, the City of Bloomington, Bloomington Transit, Indiana University Campus Bus, Area 10 Agency on Aging Rural Transit, and the Indiana Department of Transportation.

This projects index is not all-inclusive nor does it necessarily represent a formal investment commitment by governmental entities or governmental entity partners pending further study, priority establishment, funding availability, and formal programming within the framework of the BMCMPO transportation improvement programming process.

Project Cost Estimation

Project cost estimation is a critical step for project selection, project programming and project scheduling. As an overall guiding plan document however, the *2045 Metropolitan Transportation Plan relied on* project cost estimates from the Local Planning Agencies. The BMCMPO reserves this process for the *FY 2020-2024 Transportation Improvement Program* and future Transportation Improvement Program publications where a multiple steps determines individual infrastructure project cost estimates.

The following projects within this Projects Appendix currently reside within the planning horizon of the *2045 Metropolitan Transportation Plan with s*everal of these projects currently programmed through the BMCMPO FY 2020-2024 TIP and the current *Indiana Statewide Transportation Improvement Program* (INSTIP).

Consideration is given to non-programmed (i.e., “illustrative”) TIP and INSTIP projects in their current form pending formal programming commitments by specific Local Planning Agencies (LPAs). All projects nevertheless reflect a central reference point of local and/or state project intentions.

Project Index - Monroe County Projects

West Church Lane and South Roger Street
Start: West Church Lane
End: South Rogers Street
Description: Capacity Preservation – Intersection realignment. Multiuse pathway on one side of road with sidewalk on opposite side.
Complete Streets Evaluation: Pending.

North Unnamed Way
Start: West Profile Parkway
End: West Jonathan Drive
Description: Capacity Expansion - New road extension for connectivity. Sidewalks on both sides.
Complete Streets Evaluation: Pending

West Church Lane
Start: Jackson Creek Park Connector & South Rogers Street
End: South Old State Road 37
Description: Trail/Non-Motorized - Multiuse path on North side of Church Lane.
Complete Streets Evaluation: Pending.

South Kirby Road
Start: West Airport Road
End: West State Road 45
Description: Capacity Expansion - New road extension for connectivity. Multiuse pathway on one side of road with sidewalk on opposite side.
Complete Streets Evaluation: Pending.

South Old State Road 37
Start: South Orchard Lane
End: South Fairfax Road
Description: Trail/Non-Motorized - Multiuse bicycle and pedestrian trail, and multi-modal and pedestrian improvement of the intersection at S. Old State Road 37 at S. Fairfax Road with W. Church Lane.
Complete Streets Evaluation: Pending.

West Airport Road
Start: West S.R. 45
End: South Leonard Springs Road
Description: Capacity Expansion - New road extension for connectivity. Pathway on one side of road with sidewalk on opposite side.
Complete Streets Evaluation: Pending.

South Fairfax Road
Start: South Old State Road 37
End: South Walnut Street Pike
Description: Trail/Non-Motorized - Multiuse path on North side of South Fairfax Road.
Complete Streets Evaluation: Pending.

JACKSON CREEK PARK - CLEAR CREEK CONNECTOR TRAIL
Start: Clear Creek Trail/West Church Lane
End: Jackson Creek County Park
Description: Trail/Non-Motorized - Multiuse path with a combination of on-street & off-street improvements.
Complete Streets Evaluation: Pending.

MONROE LAKE TRAIL
Start: S.R. 446 & East Moores Pike
End: Paynetown State Recreation Area
Description: Trail/Non-Motorized - Multiuse path with a combination of on-street & off-street improvements along State Road 446 and on South Knightridge Road.
Complete Streets Evaluation: Pending.

Project Index - City of Bloomington Projects

ADAMS STREET
Start: Countryside Lane
End: Allen Street
Description: Capacity Expansion - Construction of new two lane road connection (to be implemented by future development). Pathway on one side of road with sidewalk on other side of road.
Complete Streets Evaluation: Pending

PEDESTRIAN SAFETY AND & ACCESSIBILITY AT SIGNALIZED INTERSECTIONS
Start: Various locations
End: Various locations
Description: Safety - Installation of pedestrian of signal heads with continuous timers & accessible pedestrian push buttons at city-maintained signals and pedestrian hybrid beacons.
Complete Streets Evaluation: Compliant.

Appendix H: Glossary

3C Planning means Comprehensive, Cooperative and Continuous transportation planning process.

Air Quality Conformity means a determination required under current federal requirements for major transportation investments in designated air quality "non-attainment" and "maintenance" areas.

Alternative Transportation Funds means the City of Bloomington's established funding mechanism exclusively for pedestrian and bicycle infrastructure maintenance, preservation, and facility expansions more than a decade ago. Fund allocations come through annual municipal budget approvals.

Analysis Area means any geographic area such as a zone or group of zones combined for the purpose of making an analysis.

Apportionment means any method for dividing federal funds by an established formula. An apportionment operates like a line of credit to sub-federal governments.

Authorization means the level of funding designated by Congress for specific legislation.

Average Daily Traffic (ADT) means the average number of vehicles passing a specified point during a 24 hour period.

Bike Lane means a portion of the road designated and designed for the exclusive use of bicycles with distinct signage and pavement markings.

Bloomington Transit (BT) is a municipal corporation that provides public transportation within the City of Bloomington limits.

Bottleneck means the point of minimum capacity along a highway segment.

Build Condition, Option, Alternative or Alternate means a transportation plan, program or alternative involving a major capital investment.

Capacity means the maximum rate of flow at which persons or vehicles reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic and control conditions, usually expressed in vehicles per hour or persons per hour.

Capacity Expansion Projects means major transportation investments that expand the capacity of any highway or transit system to accommodate additional vehicles. Highway expansion projects involve projects that add through travel lanes including major roadway widening, new roadways, new freeway interchanges, and substantial realignments of existing roadways.

Capacity Preservation Projects means transportation investments to preserve the capacity of the existing highway or transit system. Such projects include bridge rehabilitation and replacement, pavement rehabilitation and reconstruction, and low capital cost investments such as traffic signal improvements or safety improvements (e.g. guardrails and minor horizontal/vertical curve realignments). Typical transit projects involve bus and equipment replacement, transit shelters, and garage facility maintenance.

Carpool means any vehicle (usually a car) or arrangement in which two or more occupants, including the driver, share use or cost in traveling between fixed, multiple, or variable points (also referred to as ridesharing).

Census Tract means small areas with generally stable boundaries, defined within counties and statistically equivalent entities, usually in metropolitan areas and other highly populated counties. The U.S. Census Bureau establishes census tracts as relatively homogeneous with respect to population characteristics, economic status, and living conditions.

Central Business District (CBD) means an area of a city that contains the greatest concentration of commercial activity. The traditional downtown retail, trade and commercial area of a city or an area of very high land valuation, traffic flow, and concentration of retail business offices, theaters, hotels and services.

Citizens Advisory Committee (CAC) is a committee, organized under the MPO comprised of citizens representing a broad spectrum of the community tasked with providing recommendations to the Policy Committee and Technical Advisory Committee on transportation-related topics that affect the MPO.

Climate Change means the long-term rise in the average temperature of the Earth's climate system, a major aspect of climate change demonstrated by direct temperature measurements and by measurements of various effects of the warming. The *Indiana Climate Change Impacts Assessment* (https://docs.lib.purdue.edu/climatetr/2/) identifies rising average annual temperatures and rising average annual precipitation as the most significant climate change impacts in the state. The climate vulnerabilities for Monroe County include extreme heat and extreme precipitation leading to adverse impacts on the built environment and people (https://hri.eri.iu.edu/climate-ulnerability/index.html?placeid=MONROE%20County#climateExpoHead and https://hri.eri.iu.edu/doc/hri-readiness-assessment-20200124.pdf).

Committed Improvement means funded transportation investments including under construction, but not yet open for operation. Committed projects may additionally involve

projects for which design is completed and any environmental clearances approved for construction bid letting.

Complete Streets means a transportation policy and design approach that requires streets to be planned, designed, operated, and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation. Complete Streets allow for safe travel by those walking, cycling, driving automobiles, riding public transportation, or delivering goods.

Comprehensive Planning means a planning process that requires inclusion of land use, transportation, water and sewage, education, health, and other elements.

COVID-19 means the global novel Coronavirus infectious disease 2019, a severe acute respiratory syndrome primarily spread by close personal contact. January 2020 marked the first reported United States COVID-19 case with a subsequent evolution into a once-in-a-century national public health crisis of 5.4 million documented cases and 170,000 deaths as of mid-August. Documented cases are increasing unabated.

Cross-Town Routes means a non-radial bus or rail service which does not enter the Central Business District.

Cumulative Bridge Funds provide revenues for construction, occasional maintenance, and repair of bridges, approaches, and grade separations. Cumulative bridge fund receipts come from a tax levied on each one hundred dollars ($100) assessed valuation of all taxable personal and real property within the county or municipality.

Cumulative Capital Development Funds are sometimes used for major roadway capital investments or other purposes prescribed by the Indiana General Assembly.

Daily Vehicle Miles Traveled (DVMT) means the total number of miles driven per day in a specified area by all vehicle types.

Deadhead Miles means the miles a transit vehicle travels without passengers or cargo on board, often to and from a garage or from one route to another.

Discrimination means any intentional or unintentional act, or any failure to act, which has the effect of excluding or denying a person from participation in benefits, or has otherwise subjected a person to unequal treatment under any program or activity because of, but not limited to, race, color or national origin.

Divided Highway means a multi-lane facility with a positive barrier median, or a median that is four (4) feet or wider.

Economic Recession means a periodic decline in industrial production, employment, real income, and wholesale-retail trade as defined by the National Bureau of Economic Research. The current national recession began in March 2020 with a sharp downturn of economic activities brought about by the COVID-19 pandemic.

Environmental Justice means the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Equity means the just and fair inclusion into a society in which all can participate, prosper, and reach their full potential. Unlocking the promise of the nation by unleashing the promise in us all.

FAST Act means the Fixing America's Surface Transportation Act enacted on December 4, 2015, funding surface transportation programs authorizing a $305 billion investment over fiscal years 2016 through 2020 with provisions for streamlining, performance-based measurements and multi-modal transportation.

Federal Fiscal Year (FFY) means a twelve month period from October 1st to September 30th.

Federal Highway Administration (FHWA) is part of the U.S. Department of Transportation and is responsible for administering federal-aid transportation funds and programs.

Federal Transit Administration (FTA) is part of the U.S. Department of Transportation and is responsible for administering federal-aid public transportation funds and programs.

Geographic Information System (GIS) means spatial data, presented in an electronic map format, which geographically represents the geometry of the roadways, and its geographically referenced component attributes data integrated through cartography and technology to perform analysis.

Grant means an agreement between the federal government and a state or local government, whereby the federal government provides funds or aid-in-kind to carry out specified programs.

Headway means the time between consecutive services. If one catches a transit vehicle that "comes every half hour", then the service you catch has a headway of 30 minutes.

Highway Safety Improvement Program (HSIP) is the FHWA's "core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-state-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. The HSIP consists of three main components, the Strategic Highway Safety Plan (SHSP), State HSIP or program of highway safety improvement projects and the Railway-

Highway Crossing Program (RHCP), In addition, some states also have a High Risk Rural Roads (HRRR) program if they had increasing fatality rate on rural roads."

Indiana Department of Transportation (INDOT) is the agency that administers and funds multimodal transportation needs within the State of Indiana.

Indiana Statewide Transportation Improvement Program (INSTIP) is Indiana's multi-year program of transportation projects that is comprised of the Transportation Improvement Programs from all of the State's MPOs.

Land Use means the purpose or use for land or a structure.

Level of Service (LOS) means a qualitative measure describing operational conditions within a traffic flow stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. Typically, a scoring system of A through F describes the level of service. For highways, the LOS definitions found in the *Highway Capacity Manual* (Transportation Research Board Special Report 209) are used.

Local Road and Street means the account used exclusively for engineering, land acquisition, construction, resurfacing, restoration, and rehabilitation of highway facilities. Local Road and Street account (LRS) funds, including accelerated allocations, are available for capital investment; however, a portion of the funds must be set aside for preservation projects such as resurfacing, intersection/signalization, and safety improvements.

Local Share Local Match means the non-federal matching funds provided by a local entity for federal matching funds.

Long Range Transportation Plan (LRTP, Plan or MTP) means the official multi-modal transportation plan adopted by the MPO for the metropolitan area in accordance with Federal metropolitan transportation planning guidelines. As a minimum, the transportation plan must have a twenty (20) year horizon and updated every five years (every three years in air quality non-attainment areas). INDOT and FHWA/FTA primarily use LRTP. MPOs interchangeably use the term MTP (Metropolitan Transportation Plan).

Maintenance Area means any geographic region of the United States designated as non-attainment pursuant to the Clean Air Act Amendments of 1990 (Section 102e, United States Code 7410 et seq.), and subsequently re-designated to attainment status subject to the requirement to develop a maintenance plan under Section 175 of the Clean Air Act as amended.

Major Bridge Fund means (established under IC8-16-3.1) a special fund to address a major obstruction between commercial or population centers which is capable of causing an economic hardship because of excess travel time to conduct a normal level of commerce between the two (2) centers. A major bridge is defined as a structure of 200-feet or longer or

100-feet in a qualified city. The tax levy shall not exceed $0.0333 per $100 assessed valuation within the eligible county.

Major (metropolitan) Transportation Investment means a high-type highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area scale.

Mass Transportation/Mass Transit means the provision of general or special transportation service, either publicly or privately, to the public on a regular and continuing basis in an urban area. This does not include a school bus, charter or sightseeing service.

Management System means a systematic process, designed to assist decision-makers in selecting cost effective strategies/actions to improve efficiency and safety of, and protect the investment in the nation's infrastructure. Typical management systems include the pavement management system, bridge management system, transit management system, congestion management system, safety management system, and intermodal management system.

MAP-21 means Moving Ahead for Progress in the 21st Century Act signed into law in July 2012. MAP-21 consolidated federal funding programs by two thirds, streamlined environmental reviews, altered bicycle and pedestrian funding, granted development of a national freight policy, and allowed for greater use of innovative financing.

Metropolitan Planning Organization (MPO) means the forum for cooperative transportation decision-making for the metropolitan planning area. The MPO, designated by the governor of each state, is composed of the chief-elected officials of the metropolitan planning area.

Metropolitan Planning Area (MPA) is the transportation planning area designed by the MPO. As a minimum, the MPA must cover the Urbanized Area (UZA) and the contiguous areas as likely urbanized within a minimum twenty (20) year forecast period covered by the metropolitan transportation plan.

Metropolitan Transportation Plan (MTP) means the official inter-modal transportation plan developed and adopted through the metropolitan transportation planning process for the metropolitan area. The MTP is a long range transportation plan with a minimum twenty (20) year horizon.

Motor Vehicle Highway Account (MVHA) means the account which derives receipts from motor vehicle registration fees, licenses, driver's and chauffeur's license fees, gasoline taxes, auto transfer fees, certificate of title fees, weight taxes or excise taxes and all other special taxes, duties or excises of all kinds on motor vehicles, trailers, motor vehicle fuel, or motor vehicle owners or operators.

Multi-Use Trail or Path means a hard surface, off-road path for use by bike, foot and other non-motorized traffic typically not within the road right-of-way.

National Highway System (NHS) means a federal transportation program, authorized in 1995, that includes the Interstate Highway System and other roads important to national defense, commerce, and mobility. The NHS in Indiana includes 2,897 miles of roadways developed by the U.S. Department of Transportation, in cooperation with INDOT and the State's MPOs.

No Build Condition, Option, Alternative or Alternate means a transportation plan, program or alternative involving no major capital investment, additionally known as the "do-nothing" option. The No Build condition typically includes the existing transportation system plus committed or already programmed improvements to the transportation system.

Non-Attainment Area means a geographic region of the United States that fails to meet National Ambient Air Quality Standards (NAAQS) for transportation related pollutants as designated by the Environmental Protection Agency (EPA).

Operational Improvement means a capital investment for the installation of traffic surveillance and control equipment, computerized signal systems, motorist information systems, integrated traffic control systems, incident management programs, and transportation demand management facilities, strategies, or programs.

Operating Expense means the total of all operating costs incurred during the reporting period.

Operating Subsidy means the revenue received through federal, state, and local cash grants or reimbursements to fulfill operating expense obligations not covered by fares or other revenues generated by the transit system.

Pandemic means the COVID-19 global coronavirus pandemic first identified in the latter half of calendar year 2019 leading to socioeconomic disruptions and a global economic recession bordering on economic depression.

Pathway means a hard surface path physically separated from the road with a grass or tree plot within a road right of way for the use of bicyclists, pedestrians and other non-motorized users.

Peak Direction means the direction of higher demand during a peak commuting period.

Peak Hour means that one-hour period during which the maximum amount of travel occurs.

Policy Committee is a committee of the MPO which reviews and approves transportation policy. It is composed of local elected and appointed officials from area municipalities, Indiana University, and state and federal transportation agencies.

Preliminary Engineering (PE) means the first phase of a transportation improvement project which defines scope and project design.

Primary Arterial means a class of street serving major movement of traffic, typically carrying over 20,000 vehicles per day.

Primary Collectors means roadways that typically carry 3,000 to 10,000 vehicles per day.

Racial Justice in the context of this plan means the "Black Lives Matter" movement.

Radial Routes means transit service patterns, in which most routes converge into and diverge from a central transfer point or hub, like spokes of a wheel. Routes timed to arrive and depart at the same time represent a "pulse system".

Regional Transit Authority means a special-purpose district organized as either a corporation chartered by statute, or a governmental agency, created for the purpose of providing public transportation within a specific region.

Revenue means all operating funds associated with the provision of transit service in the context of public transportation.

Roadway means any road, street, parkway, or freeway/expressway that includes right-of-way, bridges, railroad/highway crossings, tunnels, drainage structures, signs, guardrails, and protective structures in connection with highways.

SAFETEA-LU refers to the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users. This is the five-year federal transportation program authorizing the annual funding for federal transportation programs and replaced TEA-21.

Secondary Arterial means a street typically carrying 10,000 to 20,000 vehicles per day.

Secondary Collector means roadways in Bloomington that typically carry less than 3,000 vehicles per day.

Sidewalk means a hard-surface path within the street right-of-way designated for the exclusive use of pedestrian traffic.

Signed Bike Routes means a street that is safe for use by both vehicles and bicycles without a designated bike facility. These routes have appropriate signage markings.

Social Justice means that all people should have equal access to wealth, health, well-being, justice, privileges, and opportunity regardless of their legal, political, economic, or other circumstances.

State Fiscal Year (FY) means the State of Indiana's twelve month period from July 1st to June 30th.

Statewide Transportation Improvement Program (STIP) means the official statewide, multi-modal transportation plan developed through the statewide transportation planning process.

Surface Transportation Block Grant Program (STBG) means the FAST Act [FAST Act § 1109(a)] conversion of the Surface Transportation Program (STP) into the Surface Transportation *Block Grant* Program (STBG) that promotes flexibility in state and local transportation decisions and provides flexible funding to best address state and local transportation needs.

Sustainable Development means a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability means a process or state maintained at a certain level for as long as is wanted.

Thoroughfare Plan means the official plan for the designation and preservation of major public road rights-of-way in accordance with the Indiana Code (IC 36-7-4-506).

Technical Advisory Committee (TAC) is a committee of the MPO which provides technical advice on transportation projects and programs. It consists of planners, engineers, transit system managers, and other relevant managers from local public agencies from within an MPO metropolitan planning area.

TIF (Tax Increment Financing Funds) refers to taxes payable on assessed value in excess of taxes attributable to the assessed value constituting the base—the "base" being the assessed value of the property in the area that existed prior to the designation of the area as a designated redevelopment allocation area.

Transportation Demand Management (TDM) means strategies or actions taken to reduce or shift the peak-hour of travel demand or to shift the mode of travel demand. Typical actions to shift or reduce the peak-hour of travel demand involve programs to shift work hours, limit the trip generation of new development, and congestion tools. Typical actions to shift the mode of travel include transit fare subsidy programs, control of parking fees, and expansion of transit services, construction/designation of high occupancy vehicle lanes or preferential parking areas, and construction of pedestrian and bicycle facilities.

Transportation Alternatives (TA) means a set-aside of Fast Act STBG funding for transportation alternatives encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, community improvements such as historic preservation and vegetation management, and environmental mitigation related to storm water and habitat connectivity. The FAST Act sets aside an average of $844 million per year for TA. Unless a state opts out, it must use a specified portion of its TA funds for recreational trails projects.

Transportation Equity Act for the 21st Century (TEA-21) means a former six-year federal ground transportation program covering highways, transit, and transportation enhancement

activities. TEA-21 authorized annual funding for federal transportation programs prior to the approval of SAFETEA-LU in 2005.

Transportation Improvement Program (TIP) means the staged, multi-year, multi-modal program of transportation projects which is consistent with the metropolitan transportation plan.

Transportation System Management (TSM) means a variety of low-cost capital investments or programs to preserve roadway capacity including signal system improvements, intersection improvements (adding turn lanes), access control policies, and transportation demand management strategies.

Urbanized Area (UZA) means a statistical geographic area defined by the U.S. Census Bureau that consists of a central core and adjacent densely settled territory containing a population of at least 50,000 people.

Unified Planning Work Program (UPWP) means the document describing urban transportation and transportation related activities undertaken in an area during a specified period of time. The Metropolitan Planning Organization (MPO) prepares the UPWP.

Wheel Tax means the motor vehicle excise surtax and wheel tax are county option taxes on motor vehicles which provide revenue to counties, cities, and towns for road construction, reconstruction, repair or maintenance of streets, roads, and bridges.

Vision Zero means a multi-national road traffic safety project that aims to achieve a highway system with no fatalities or serious injuries involving road traffic.

Volume to Capacity (V/C) Ratio means the observed number of vehicles or persons passing a point on a lane, roadway, or travel-way, compared to the maximum rate of flow at that point.