Forward 2045 Metropolitan Transportation Plan

Appendix

FORWARD 2045

Appendix

Appendix A
Public Engagement

Public Engagement Plan

Project Description

The Ames Area Metropolitan Planning Organization (AAMPO) and member jurisdictions are updating their regional Metropolitan Transportation Plan (MTP). The MTP, named Forward 2045, is a 25-year plan that will define how the metropolitan area will manage and operate a multi-modal transportation system, including transit, highway, bicycle, pedestrian, and accessible transportation. The AAMPO is committed to implementing a comprehensive and coordinated planning process that will meet the area's economic, transportation, development, and sustainability goals.

Public Engagement Goals & Objectives

Public engagement for Forward 2045 will be designed to align with the AAMPO's Public Participation Plan adopted on May 24, 2016, which outlines how the AAMPO engages the community to have well-informed participants who are able to contribute meaningful input on transportation decisions through a variety of locally developed strategies.

The overall goal for MTP public engagement is to educate the public and stakeholders on the Forward 2045 effort and allow audiences to have ample opportunities for engagement and input on the planning of Ames' future transportation network.

The success of public engagement will be measured by completion of the following objectives:

- Develop a comprehensive stakeholder database that will help tailor the communications and outreach process and engage a diverse set of stakeholders.
- Develop and implement a brand strategy that will make all public engagement efforts easily recognizable, and will serve as a brand the community can get excited about and motivated by.
- Educate and engage the public and stakeholders through public meetings, online public meetings, video, social media, surveys, and other tools and tactics as outlined in the Engagement Tools & Techniques section.

Public Engagement Team

The public engagement team is responsible for managing and implementing all public involvement and community outreach for Forward 2045. The team will also be responsible for managing, responding, and monitoring all public and stakeholder communication and media relations. The following table identifies members of the team:

Table 1: Public Engagement Team

Organization	Name	Role	Phone Number	Email
AAMPO	Damion Pregitzer	Project Manager	515-239-5160	dpregitzer@city.ames.ia.us
AAMPO	Mark Gansen	Public Works	515-239-5291	MGansen@city.ames.ia.us
AAMPO	McKinlee Ritter	Public Works	515-239-5164	MRitter@city.ames.ia.us
HDR	Brian Ray	Project Manager	402-548-5066	Brian.Ray@hdrinc.com
HDR	Kristen Veldhouse	Public Engagement Lead	402-399-1405	Kristen.Veldhouse@hdrinc.com
HDR	Jason Carbee	Transportation Planner	402-399-1370	Jason.Carbee@hdrinc.com

Issue & Audience Analysis

Issue Analysis

Throughout the MTP development process, various issues may arise via public or stakeholder input or media attention. The engagement team will take the following steps to address any issues:

Step 1 – Verify and Assess the Issue. Identify as many facts as possible. What is the issue? Why is it an issue? Who has the issue (stakeholder, elected official, media, etc.)? How can the concern be mitigated? Issues may be identified through a variety of means, such as news stories, phone calls or emails.

Step 2 – Develop a Response Strategy. The engagement team will convene to determine the appropriate response to the issue (for example, press release, phone call, or email) in order to disseminate unified messaging.

Step 3 – Respond and Evaluate. AAMPO will execute the response strategy and determine if the issue was adequately addressed. Repeat these steps as needed.

Audience Analysis

A wide variety of stakeholders should be targeted so that feedback throughout the planning process is comprehensive and that the MTP reflects community values. The following stakeholders are the primary targets for key messages and communication tools and tactics.

1. **Local, State, and Federal Representatives** (*member jurisdictions, elected officials, city engineers, planning staff*)

   Motivators: Want to include all relevant decision-makers that will be involved in MTP implementation so that the project team does not explore concepts that will not be supported by agencies and elected officials; want to be engaged in the project and transparent to their customers/constituents. These stakeholders will include:

- Cities of Ames and Gilbert
- Boone County, Story County
- Ames Transit Agency (CyRide)
- Iowa State University
- Emergency Responders
- Police
- Public Works
- Iowa Department of Transportation
- Federal Transit Administration, Federal Highway Administration

2. Businesses and Iowa State University (ISU)

Motivators: Want to know how the MTP will benefit and impact them; want to know what options are available to improve regional mobility and safety; want to feel their input is ultimately reflected in the MTP. These stakeholders will include:

- Ames Chamber of Commerce
- Neighborhood groups/chairs
- Hospitals
- Local developers
- ISU students, employees and CRP staff

3. **Area Residents**

Motivators: Want to know how much it will cost taxpayers; want to know what options are available to improve regional mobility and safety, especially during peak travel times; want to feel their input is ultimately reflected in the MTP. These stakeholders will include:

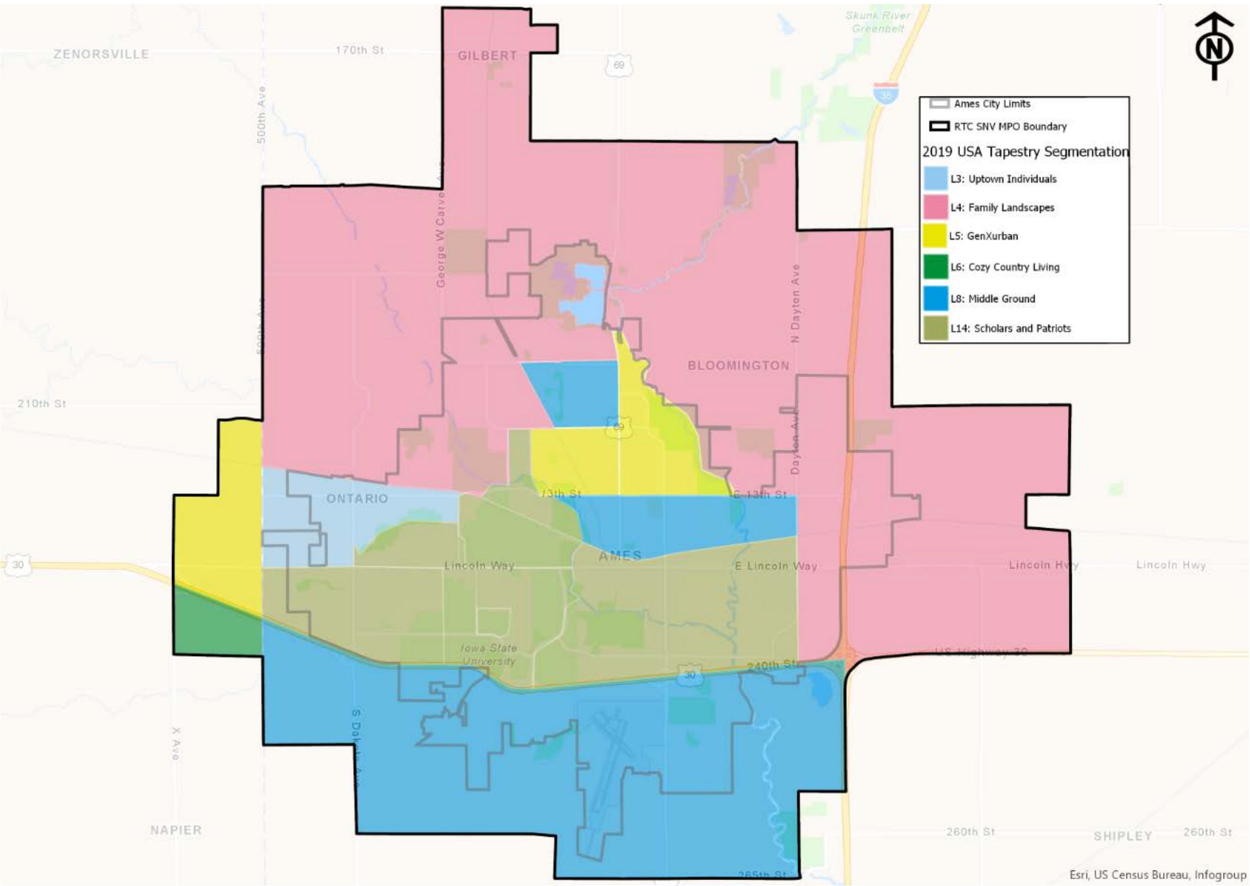
- Commuters
    - Transportation to work
        - 69.5% drove alone to work
        - 7.8% took public transportation
        - 5.2% carpooled
        - 9.3% walked to work
        - 3.2% biked to work
    - Most Ames area workers' commutes fall between five to nineteen minutes.
- Residents of Cities of Ames and Gilbert, Boone County, Story County
    - Median age: 24.7
    - 26,562 households
    - Average household size: 2.3
    - Education
        - No high school diploma: 2%
        - High school graduate: 12%
        - Some college: 21%
        - Degree or higher: 64%
    - Race and Ethnicity
        - The largest group: White Alone (78.86)

- The smallest group: Pacific Islander Alone (0.03)

Indicator	Value	Difference	
White Alone	78.86	-9.16	
Black Alone	3.72	-0.24	
American Indian/Alaska Native Alone	0.26	-0.16	
Asian Alone	13.42	+10.59	
Pacific Islander Alone	0.03	-0.08	
Other Race	1.19	-1.14	
Two or More Races	2.51	+0.18	
Hispanic Origin (Any Race)	3.96	-2.40	

*Bars show deviation from Iowa

o Living Segmentation



Appendix A contains a detailed list of stakeholders that have been updated from the Ames Mobility 2040 effort. These stakeholders should be included throughout the planning process.

Key Messages

1. The purpose of the Forward 2045 Metropolitan Transportation Plan update is to provide a long-term study to:
   - Engage community members to understand their transportation concerns, to identify opportunities for improved regional travel, and establish a collective community vision for the Ames area transportation system.
   - Evaluate current and long-term mobility and safety performance of the area transportation system and identify locations that do not meet locally-established performance standards. This evaluation will be multimodal, including an integrated network assessment of vehicular, transit, bicycle, and pedestrian mobility.
   - Develop and test a range of improvement strategies and alternatives to address identified issues. The transportation strategies that are selected for testing should address regional mobility and accessibility needs while fitting within the community fabric.
   - Lay out a prioritized, financially-constrained implementation plan for transportation investments through 2045 that reflects the values of the community.
2. AAMPO encourages the public and interested stakeholders to get involved and provide their active participation in order to help the project team meet the immediate and long-term needs of the community.
   - AAMPO will provide a variety of platforms throughout the course of the project (website, in-person and online open houses, comment form, online mapping tool, etc.) so the public can provide their input on Forward 2045.
   - AAMPO is committed to engaging with the public and stakeholders to garner their feedback on their priorities, motivations, and habits and how this plan can contribute to transportation demands.

Additional key messages will be developed as the project progresses.

Engagement Tools & Techniques

The engagement team will use the following tools and tactics to reach stakeholders with public engagement opportunities and outreach.

Website

Target Audience	Implementation/Duration	Responsibility
All	October 2019 – October 2020	HDR to provide content and graphics support. AAMPO to maintain website.

91.4% of adults in the Ames area used the Internet in the last 30 days at home, as of August 1, 2019. To offer online information to these users, a study-specific webpage will be developed and hosted on the existing AAMPO website at: https://www.cityofames.org/government/aampo/ames-mobility-2040-MTP.

Site content will include a Home landing page (project description, goals, and schedule), Resources/In the News Page (MTP resources and media tools/mentions, event information, online meeting, open house information, materials, etc.), FAQs Page (frequently asked questions), and Get Involved Page (Contact form, comment mapping tool, project notifications, email, etc.).

Informational & Goal Videos

Target Audience	Implementation/Duration	Responsibility
Businesses, ISU, Area Residents	Informational video: November 2019	Businesses, ISU, Area Residents

A variety of videos will be developed to communicate details about the MTP effort. An informational video approximately 60 to 90 seconds in length will be developed to communicate the purpose of a MTP and the process in which a prioritized, financially-constrained implementation plan for transportation investments through 2045 will reflect the values of the community.

Additionally, up to six 15 to 20 second videos will be developed to promote identified goal area topics, raise awareness of the MTP effort and drive viewers to the website or online meeting for more information about the project.

Outreach

As of August 1, 2019, over 39,000 Ames area adults watched a video on a social network in the last 30 days. HDR will develop social media posts for each video to roll out via AAMPO Facebook and Twitter sites. AAMPO will upload each video on the project website and their YouTube channel. HDR will also provide a website update content document for the project subpage.

Materials

The following materials will be developed for the informational video and the goal area promotional videos:

- Outlines
- Scripts/Storyboards
- Draft videos
- Final videos
- Production team agendas and meeting summaries

In-person Open Houses

Target Audience	Implementation/Duration	Responsibility
All	Visioning Open House: November 2019	All

AAMPO will offer two, in-person open houses for the Forward 2045 effort. The purpose of each meeting is listed below:

Visioning Open House Meeting – This meeting will solicit input on the goals and vision of the project. The meeting will be an open house format with a possible short presentation at the beginning.

Alternatives Open House Meeting – This meeting will provide an update to the public on project activities. The meeting will be an open house format with a possible short presentation at the beginning.

Outreach

All outreach will be launched two weeks in advance of open houses.

Press releases will be used to announce each upcoming open house and generate interest in Forward 2045. HDR will develop content, and press releases will be distributed by AAMPO to area media outlets, including radio, newspaper and television stations.

Social media posts and corresponding graphics and will be developed and posted to announce upcoming open houses. See the Social Media Strategy section for more details.

Direct mail invitations will be used to invite all stakeholder with a mailing address in the database to the open houses. The invitations will include information on signing up for email notifications to drive interested stakeholders to electronic communications.

Email notifications will be used as the primary source communication and sent to invite interested stakeholders to the open houses. Each email sent will include a link to the Forward 2045 website, links to “Follow Us” on AAMPO’s Facebook and Twitter. To drive email participation, the engagement team will collect email addresses at open houses and through the project website.

Website updates will include details regarding upcoming open houses. After each open house, the following meeting materials will be available on the project website:

- PowerPoint presentation
- Handout
- Display boards
- Scroll maps

Meeting Materials

HDR will prepare the following for each open house:

- Workback schedule (detailing all activities to be accomplished before the meeting)

- Meeting plan (including staffing, meeting logistics, media contact, meeting manager, supplies, etc.)
- PowerPoint presentation
- Handout
- Display boards
- Interactive exercises (TBD)
- Scroll maps
- Comment forms
- Collateral materials (Staff nametags, directional signage, etc.)

Online Meetings

Target Audience	Implementation/Duration	Responsibility
All	Online Visioning Open House: November 2019 Online Alternatives Open House: April 2020	HDR to provide content, graphics and ArcGIS Storymap. AAMPO to link on the project subpage.

Each in-person open house will have an associated online meeting. HDR will develop an interactive online meeting that will expand the reach of the Visioning Open House Meeting and Alternatives Open House Meeting, and provide an additional input opportunity on the project. The online meeting, hosted on an ArcGIS Storymap, will replicate in-person open houses using the display boards content with supplemental text, Zoho comment mapping tool and videos, if desired. A link to the online meetings will be provided on all outreach associated with the in-person open houses.

Social Media Strategy

The City of Ames hosts active Facebook and Twitter pages that can be used by Forward 2045 to enhance project communication and allows for easy sharing of project information and input opportunities. This section of the public engagement plan will provide details regarding the successful execution of a social media strategy that will be utilized to promote awareness of Forward 2045 and allow for proactive public participation and input.

Goals & Objectives

The primary goal of using social media is to raise awareness of the 2045 MTP update effort. This goal will be accomplished by consistent and clear messaging that:

- is transparent, with up-front and honest, using clear, non-technical language.
- educates the public on MTP goals and key milestones.
- encourages feedback by providing details on how to submit input or ask questions of the project team.

Communication Response & Guidelines

[Name], the AAMPO social media manager, should alert the project team immediately for activity and conversations about Forward 2045. Most posts made by the public will not require a response. However, if a question is asked, generally a 24-hours response time is appropriate.

For activity on social media that has the potential to be problematic, or for harmful posts or conversations, the AAMPO Project Manager will be notified and will respond within 24 hours. Urgent or abusive posts will be addressed immediately.

The AAMPO Project Manager will evaluate the issue and plan further action using the guidelines below (all actions may not apply to every instance):

- *Identify the problem*
  - Assess the nature of the feedback
    - Determine whether the criticism is confined to an individual or is widespread.
    - Establish the core issues of the criticism so the response is appropriate and focused.
- *Determine the validity of the feedback*
  - If not valid, your response may be modest and encourage continued interaction to learn more about Forward 2045.
  - If valid, respond more tactically and strategically using guidelines listed below.
- *Keep the conversation going*
  - Post updates that reflect the facts and provide additional context and factual information for a controversial issue.
  - Maintain a consistent, conversational tone; avoid jargon or inflammatory tones.
- *Connect with stakeholders in the most appropriate way*
  - Encourage commenters to keep positive conversation threads going online to help build momentum or support for the project.
  - Consider asking supportive followers, or commenters, for permission to repost their comments online if they align with the communication objectives.
  - Take time to post a “thank you” response if the commenter says something positive or constructive.
  - Consider taking negative or problematic conversations offline to resolve the concern, using private or direct messages, email or other methods as appropriate.
  - Empower others (i.e. members of the project team or other organizations) to speak up to address misinformation either online or in-person.

Positive Engagement Opportunities

Connecting with influential groups or organizations (those with high follower counts or a tendency to promote certain causes) and entering relevant online conversations in the community will increase awareness and present Forward 2045 as active and forward-thinking. Specifically, the social media manager should look for opportunities to connect the MTP purpose and objectives to Facebook pages and Twitter accounts aligned with advocacy groups and groups with a common purpose. Positive media articles regarding this effort can also be shared on the AAMPO’s social media channels.

Content

To keep the public and stakeholders interested and informed, creating and publishing engaging content is vital. A consistent variety of content keeps social media sites fresh and exciting to followers and helps to establish an online presence. Suggestions for content include:

- Posts promoting upcoming in-person open houses, online meetings, and the input opportunities surrounding these activities. A Facebook event should be created for each in-person open house.
- Posts promoting the informational video and goal videos.
- Content from appropriate or related transportation plan websites and blogs.
- Relevant posts from stakeholder organizations.
- Relevant transportation tidbits and stats (including advocating for local public transit, campaigning for roadway and bicyclist safety, and the promotion of a healthy, active lifestyle)

All posts related to the Forward 2045 effort should include a link to the project subpage.

Performance Indicators

It will be important to track the progress, traction, and outcomes of social media. Indicators will include metrics to track qualitative and quantitative changes in the audience's level of interaction, overall tone of communications, and behavioral changes. Tracking performance will allow for adjustments to be made to better reach and communicate with stakeholders. Indicators and metrics will report social media impressions and statistics.

To understand the public's sentiment towards Forward 2045, HDR will use a social listening tool that will track the project's volume, sentiment, reach, and spread. It will also identify project influencers that the project team may consider targeting outreach towards.

Contact & Comment Management

All engagement activities implemented by the Forward 2045 team will require conscientious documentation, including a record of contacts, outreach, media mentions, and comments/input received throughout the project. The results of this documentation should be reviewed at key project milestones so that stakeholder input is considered.

To help track engagement, all contacts and communications should be collected and stored in the Forward 2045 ZOHO™ database. The database will be used to generate distribution lists, track levels of engagement for each stakeholder, and record stakeholder comments that are tied to a specific stakeholder contact.

Comment Tracking

All comments will be entered into the database including the name of the commenter, the date received, and contact information provided.

Comments received by:

Email – should be forwarded to Kristen Veldhouse for inclusion in the database.

Phone – conversation**s** should be summarized in an email and should be forwarded to Kristen Veldhouse for inclusion in the database.

Web Comments/Mapping Comments – any comments received via the web form on the website will be automatically entered into the database.

Direct Mailing/Paper Comment Forms – paper copies of comments received via the postal system or comment forms received at public meetings should be scanned and forwarded to Kristen Veldhouse for inclusion in the database.

All comments received electronically should be issued a notification of receipt. The web form will automatically generate and distribute this acknowledgement of comments received through the website.

Comment Response Timing

All comments should be acknowledged and responded to within 48 hours of receipt. Typically, the AAMPO Project Manager will be responsible for development of comment responses and distribution, unless otherwise determined. All responses should be forwarded to Kristen Veldhouse for inclusion in the database.

Regional Travel Survey Executive Summary

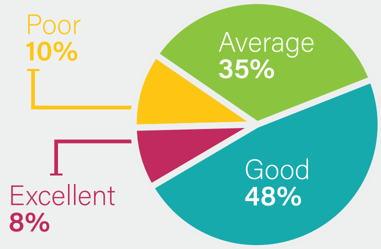
The **Ames Area Metropolitan Planning Organization (AAMPO)** conducted a regional transportation survey of residents during fall 2019 in support of the Forward 2045 Metropolitan Transportation Plan update.

404 people were surveyed regarding multi-modal transportation issues and opportunities relating to transportation planning and improvements within the region. Survey results told a story about how Ames residents feel about the **current state of the transportation system** and hopes for the **future of the transportation system.**

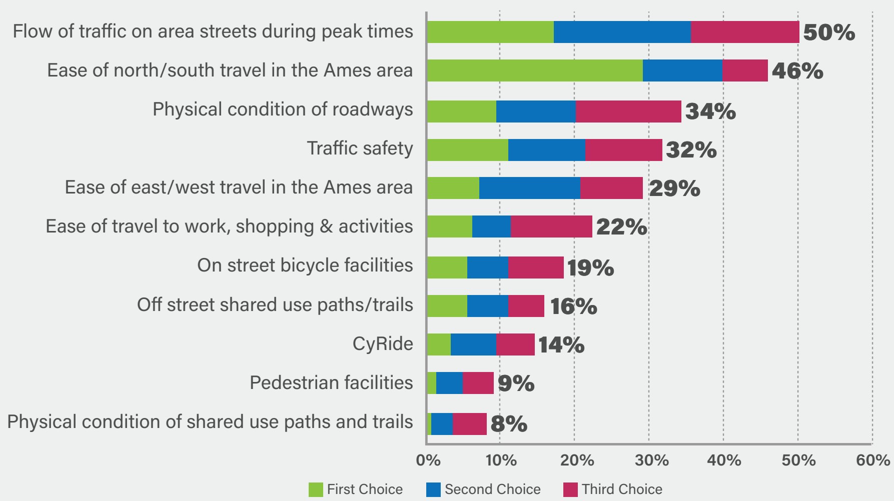
The Current Ames Transportation System

Overall

Would you rate the transportation system in the Ames area as excellent, good, average, or poor?



Most important transportation issues:



Key sentiment across multiple modes:

ROADWAYS

- **30%** of respondents are dissatisfied with the physical condition of roadways.

BICYCLE FACILITIES

- **19%** of respondents feel safe or very safe on major streets without bike lanes.
- **42%** of respondents feel safe or very safe on streets with an on-street bike lane.
- **79%** of respondents feel safe or very safe on shared use paths or trails.

PEDESTRIAN FACILITIES

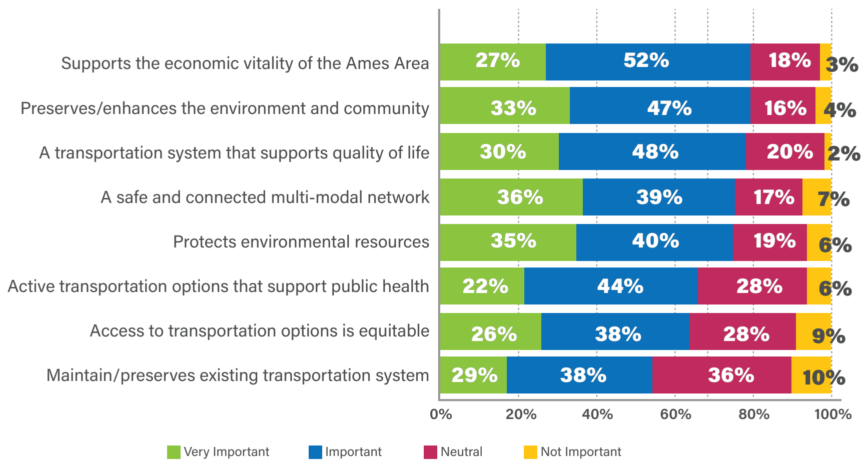
- **74%** of respondents feel safe or very safe walking or using a wheelchair on shared-use paths or trails where they live.

TRANSIT

- **76%** of respondents rate the availability of public transit in Ames good or excellent.

The Future of the Ames Transportation System

Importance of Long-Range Goals:



As the AAMPO plans for the future, the most important characteristics to consider for the Ames transportation system include:

- Facilitating reliable & efficient travel
- Providing safe transportation options
- Ensuring ease of connecting to destinations

Ames Area MPO Regional Travel Survey

Findings Report

...helping organizations make better decisions since 1982

2019

Conducted for City of Ames, IA Public Works Dept.

by:
ETC Institute
725 W. Frontier Lane,
Olathe, Kansas 66061
In association with HDR

January 2020

Contents

Ames Area MPO 2019 Regional Travel Survey Executive Summary

Overview

Purpose. ETC Institute, in association with HDR, conducted a regional transportation survey of residents in the City of Ames during the fall of 2019. The purpose of the survey was to gather input from residents regarding issues and opportunities relating to transportation planning for the region. Some of the specific topics that were addressed in the survey included:

- Perceptions of current transportation issues.
- Commute issues for those who worked outside of the home.
- Methods of transportation used.
- Perception of the current transportation system in Ames.
- Concern about traffic safety.
- Perceived quality of public transit.
- Barriers to using public transit.
- Bicycle and pedestrian issues.
- The importance of various issues to transportation improvements.

Methodology. The survey was mailed to a random sample of residents in the winter of 2019. The goal of 400 surveys was met, with 404 surveys being completed. The overall results for 404 surveys have a precision of at least +/- 4.8% at the 95% level of confidence.

Contents of the Report. This report contains:

- an executive summary of the methodology and major findings
- charts depicting the overall results of the survey
- tables that show the results of the survey
- a copy of the survey instrument

Major Findings

- **Perceptions of Current Transportation Issues.** Those surveyed were asked about their level of satisfaction with various transportation issues. The issues with which residents were most satisfied included: the ease of travel to work, shopping, and activities (55%), CyRide (52%), the physical condition of shared use paths and trails (47%), and the ease of east/west travel in the Ames area (46%). Respondents were least satisfied with on street bicycle facilities (23%) and the flow of traffic on area streets during peak times (21%). **When respondents were asked to name the most important issues, they selected flow of traffic on area streets during peak times, the ease of north/south travel in the Ames area, and the physical condition of roadways.**

  TRENDS. There were declines in satisfaction in all perception categories that were measured in both 2004 and 2019, with the most notable being the physical condition of roadways. In 2004, satisfaction was 69% and in 2019 it was 37%.

- **Overall Rating of the Transportation System in Ames.** Fifty-six percent (56%) of those surveyed rated the transportation system in Ames as "excellent" or "good," compared to 76% who rated it as "excellent" or "good" in 2004.

- **Public Transit.** The availability of public transit was rated "excellent" or "good" by 76% of respondents, compared to 88% in 2004. Those surveyed were asked how satisfied they were with various aspects of transit in the Ames area; 90% were satisfied ("very satisfied" or "satisfied") with the physical condition of the bus, 79% were satisfied with the availability of information about public transit services, and 68% were satisfied with the distance to the nearest transit stop from home.

  TRENDS. There was an increase in satisfaction with the availability of information about public transit (79% in 2019 vs. 75% in 2004). All of the other four areas had declines from 2004.

- **Bicycling in Ames.** The percentage of respondents who reported riding a bike in the Ames area during the past year was 47%, compared to 48% in 2004. Of the 47% who reported riding a bike, 19% felt safe on major streets without bike lanes; 19% were neutral, and 62% felt unsafe. Additionally, of the 47% who rode a bike in the past year, 42% felt safe bicycling on streets with an on-street bike lane, and 79% felt safe bicycling on a shared-use path or trail.

- **Walking in Ames.** Sixty-seven percent (67%) of those surveyed indicated they felt "very safe" or "safe" walking or using a wheelchair on sidewalks along major streets; 23% were neutral, and 10% felt unsafe. Additionally, 58% felt safe using pedestrian crossings on major streets, and 74% felt safe walking or using a wheelchair on a shared-use path, trail or sidewalk in the area where they live.

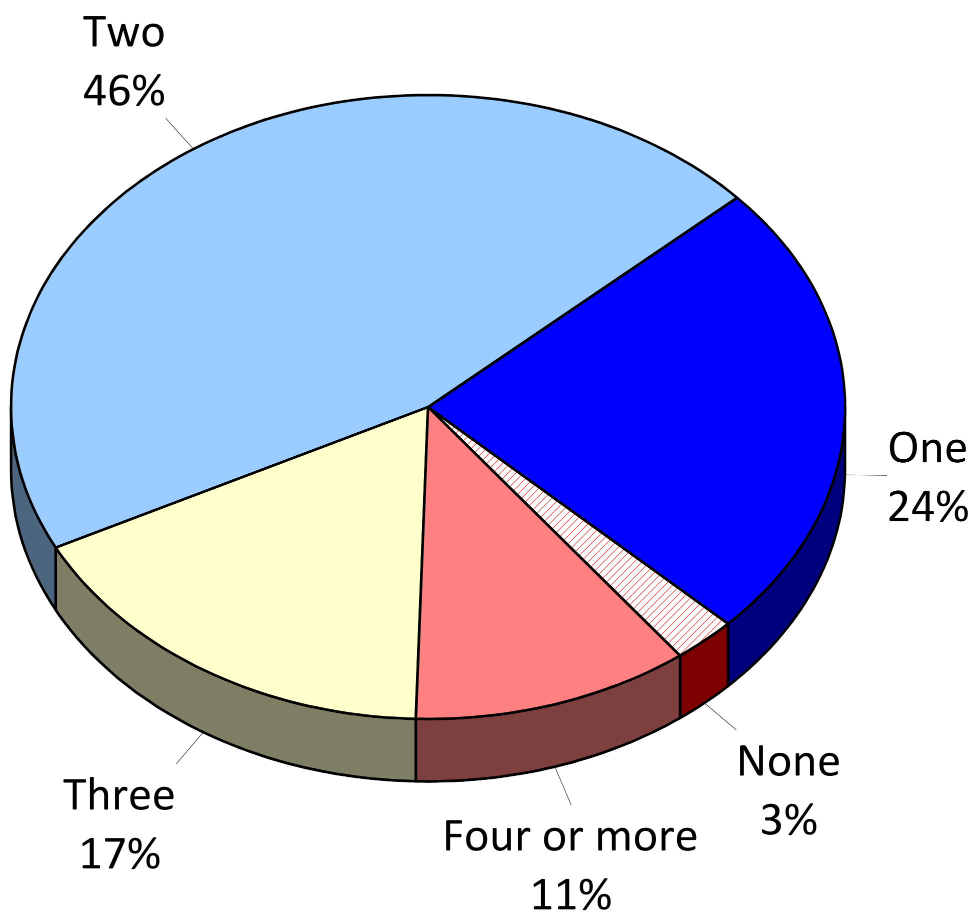
- **Support for System Enhancements.** Those surveyed indicated the most important system enhancements of 8 that were presented were: 1) adding more turn lanes at critical intersections to improve traffic operations and 2) implementing targeted safety improvements at high crash locations.

- **Importance of Issues Related to Transportation Improvements.** Of several possible issues related to long-range transportation improvements, those most important to respondents were: 1) supporting the economic vitality of the Ames area, 2) preserving/enhancing the environment and community, and 3) having a transportation system that supports quality of life.

Section 1:
Charts and Graphs

Q1. How many operating vehicles do you have in your household?

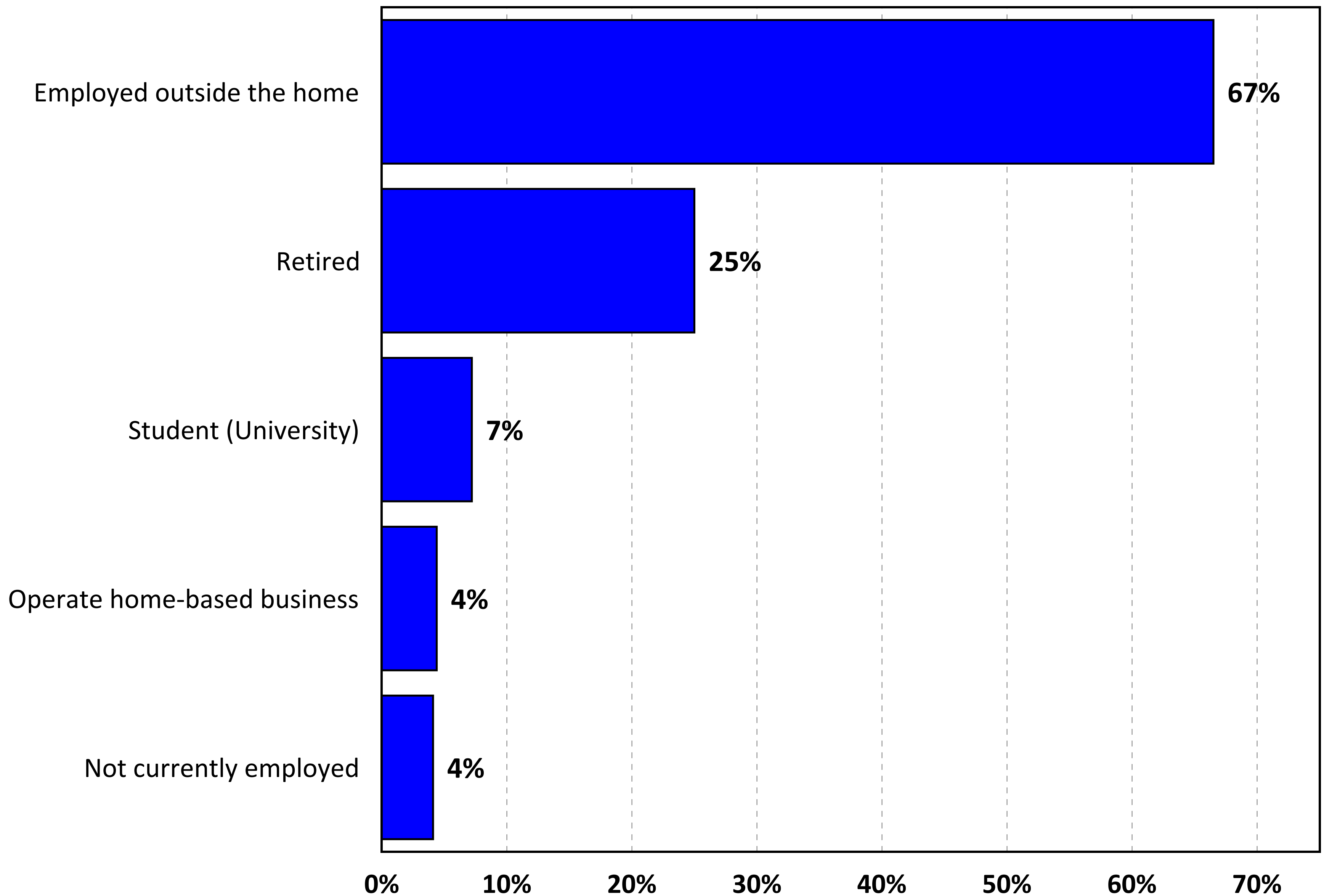
by percentage of respondents (excluding "not provided")



Source: ETC Institute Regional Travel Survey (2019)

Q2. What is your employment status?

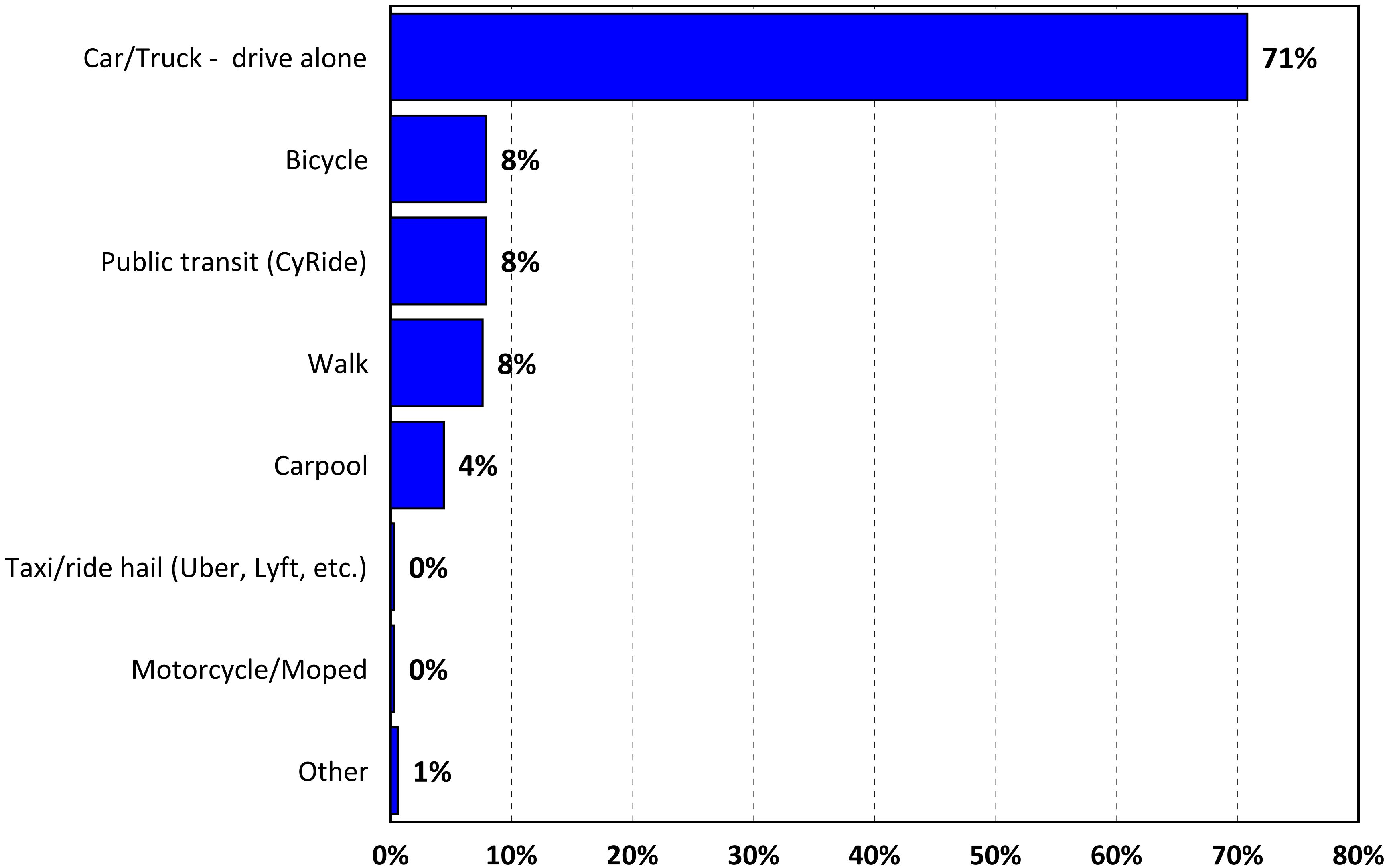
by percentage of respondents (excluding "not provided" - multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q2b. What method of transportation do you normally use to go to work or school?

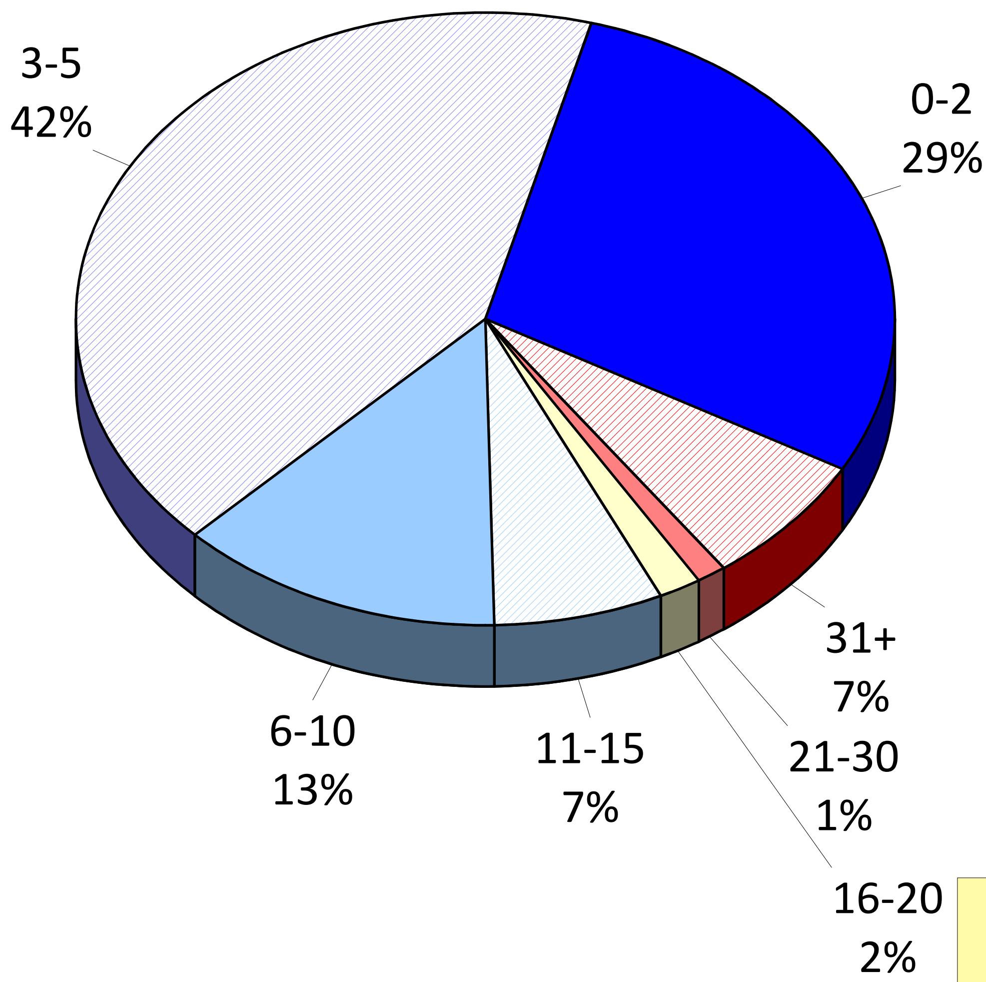
by percentage of respondents who indicated they work outside the home or go to school
(multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q2c. How many miles is your place of employment/school from your home?

by percentage of respondents (excluding "not provided")

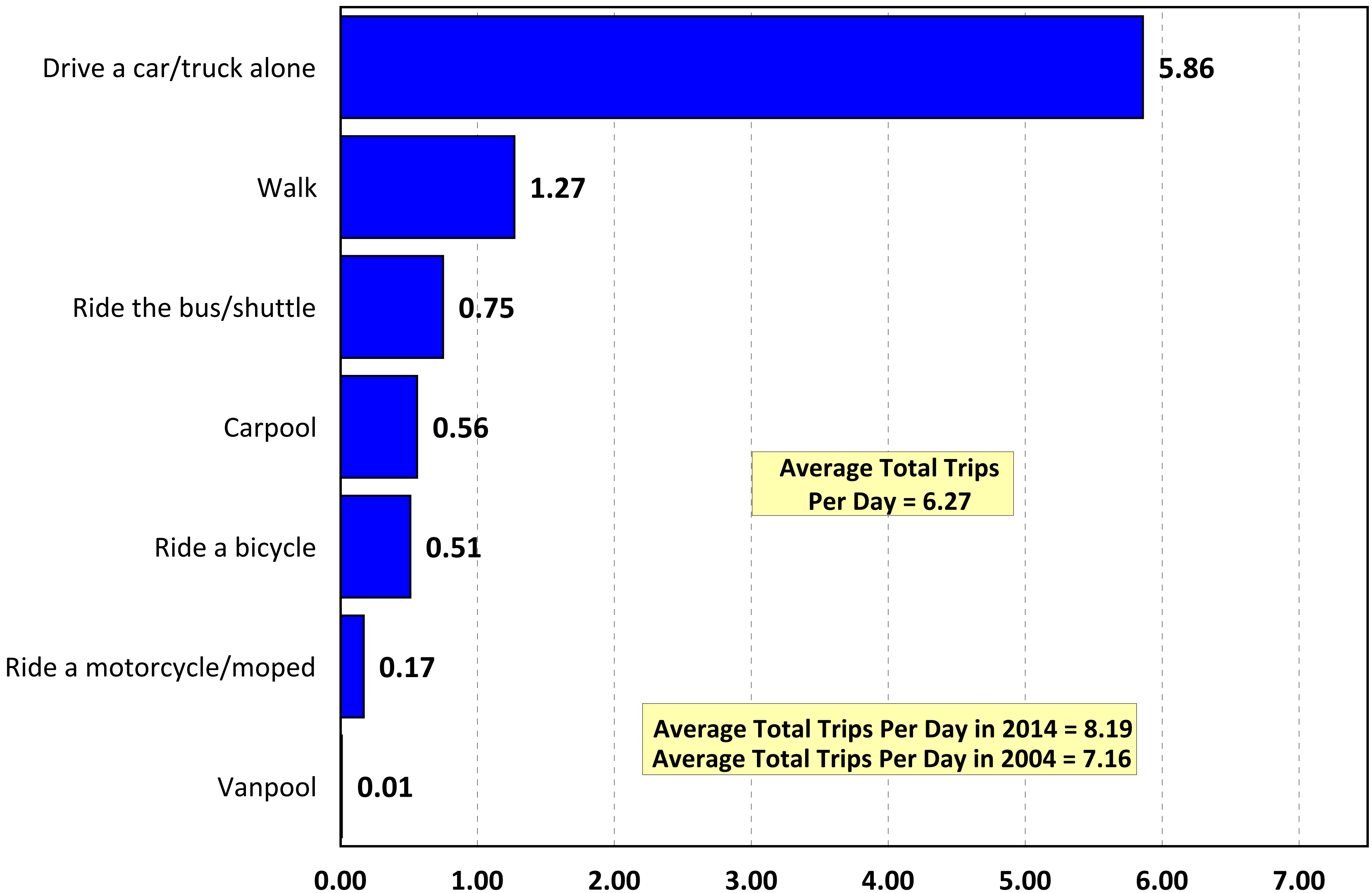


Mean number of miles from home to school or place of employment = **11.78 miles**

Source: ETC Institute Regional Travel Survey (2019)

Q3. On a typical weekday, how many one-way trips do you normally make using the following types of transportation?

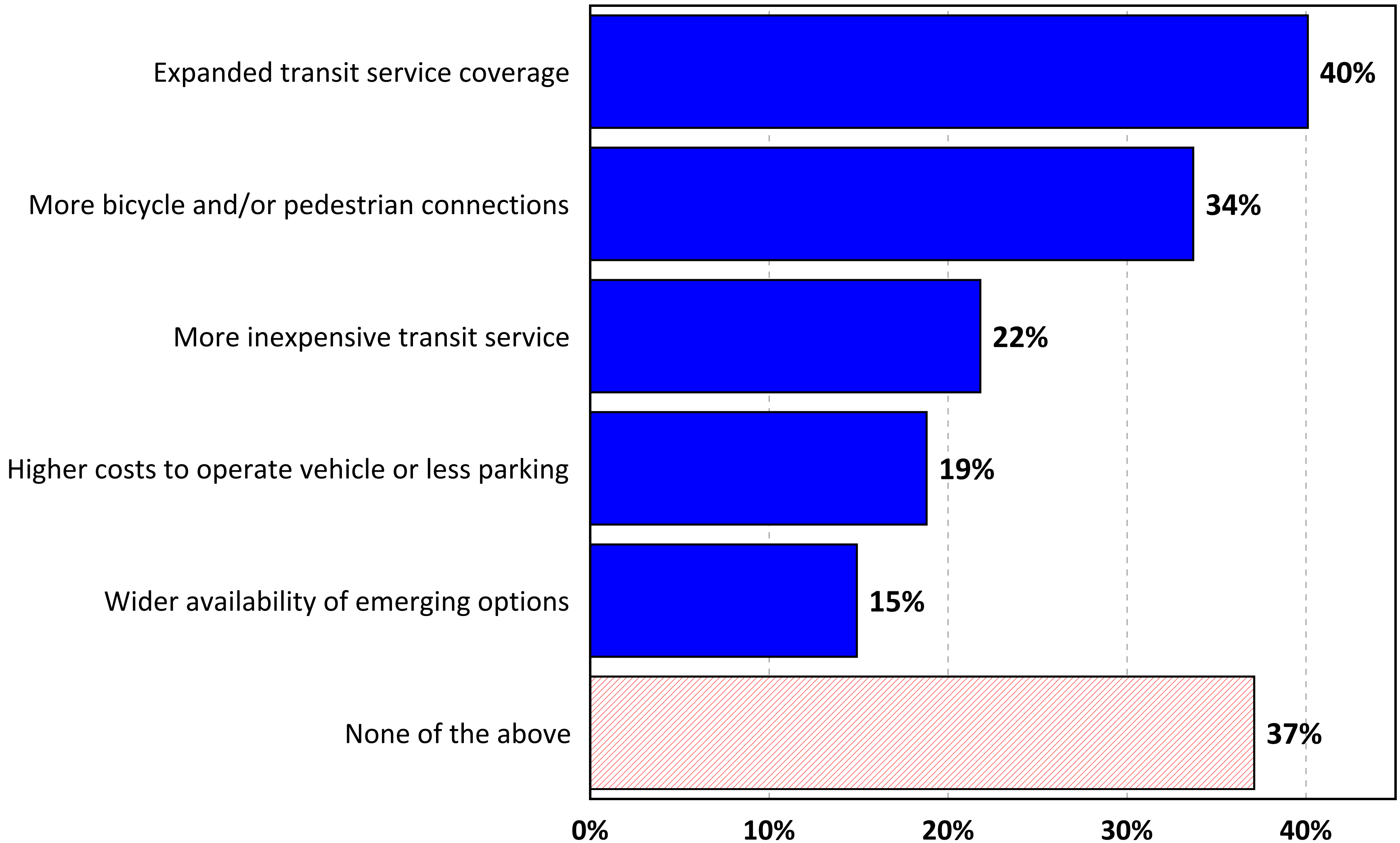
by percentage of respondents (multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q4. Which THREE of the following would encourage you to use a mode of transportation other than driving a personal vehicle to complete your daily trips?

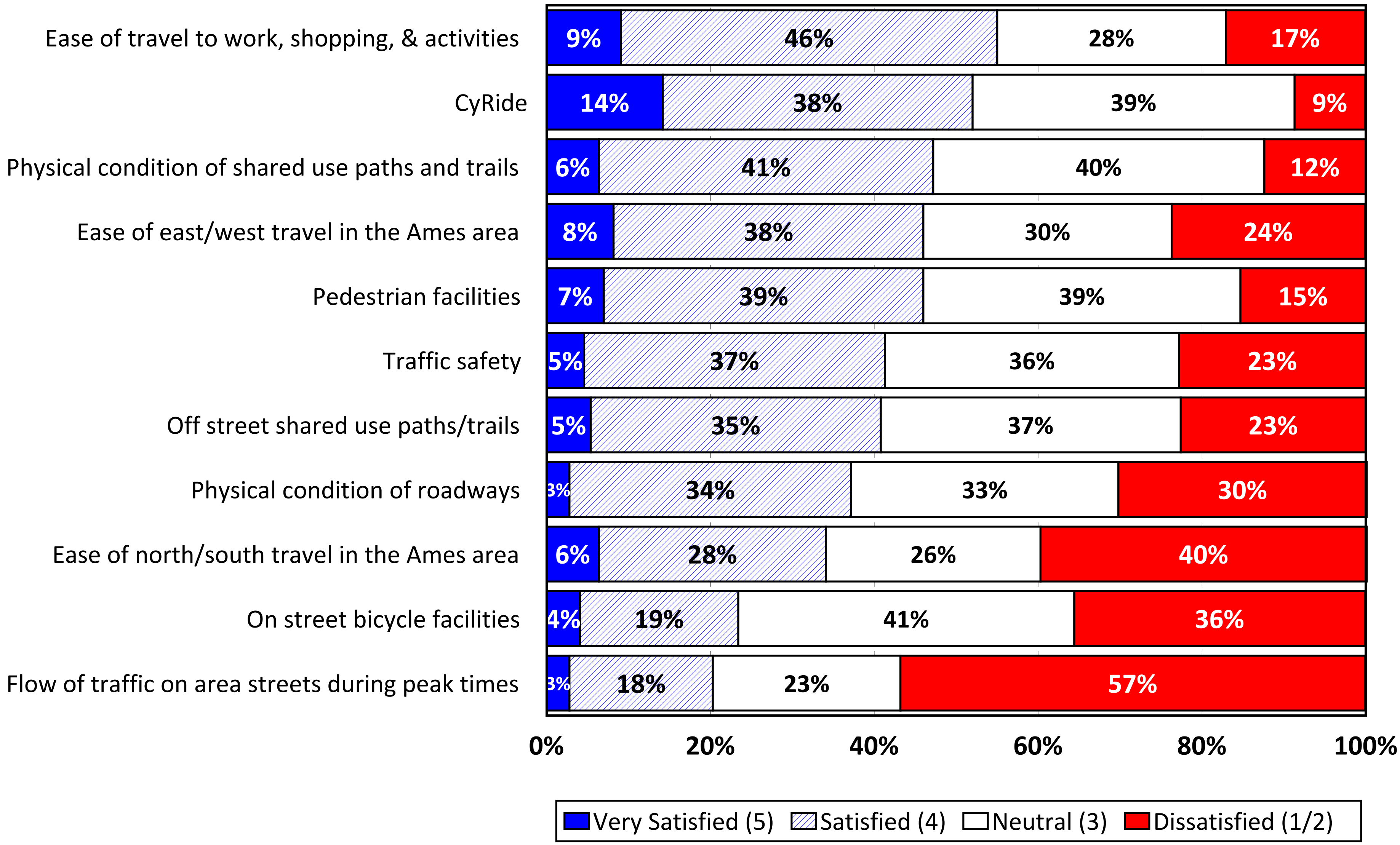
by percentage of respondents (multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q5. Satisfaction With Perceptions of Current Transportation Issues

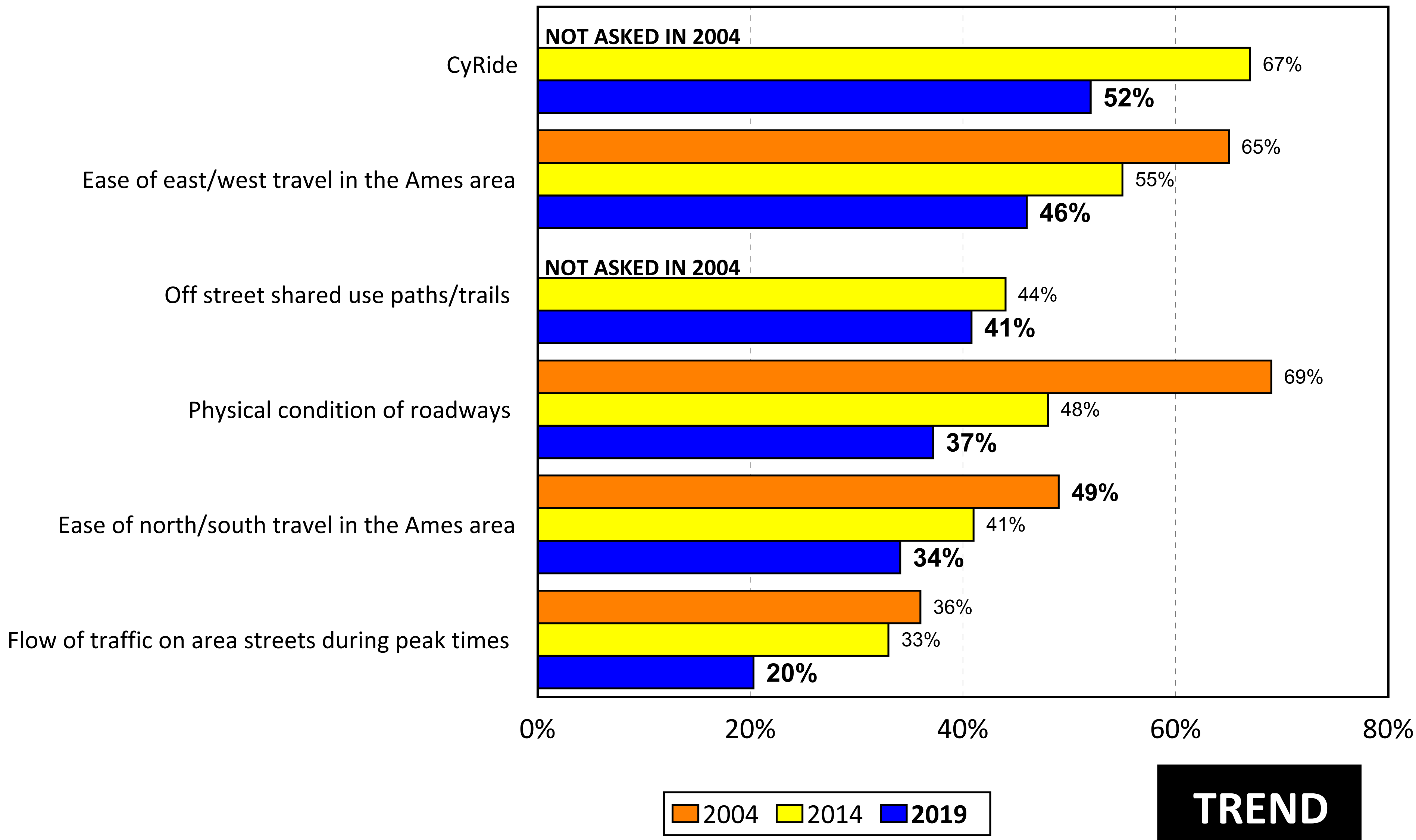
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q5. Satisfaction With Perceptions of Current Transportation Issues

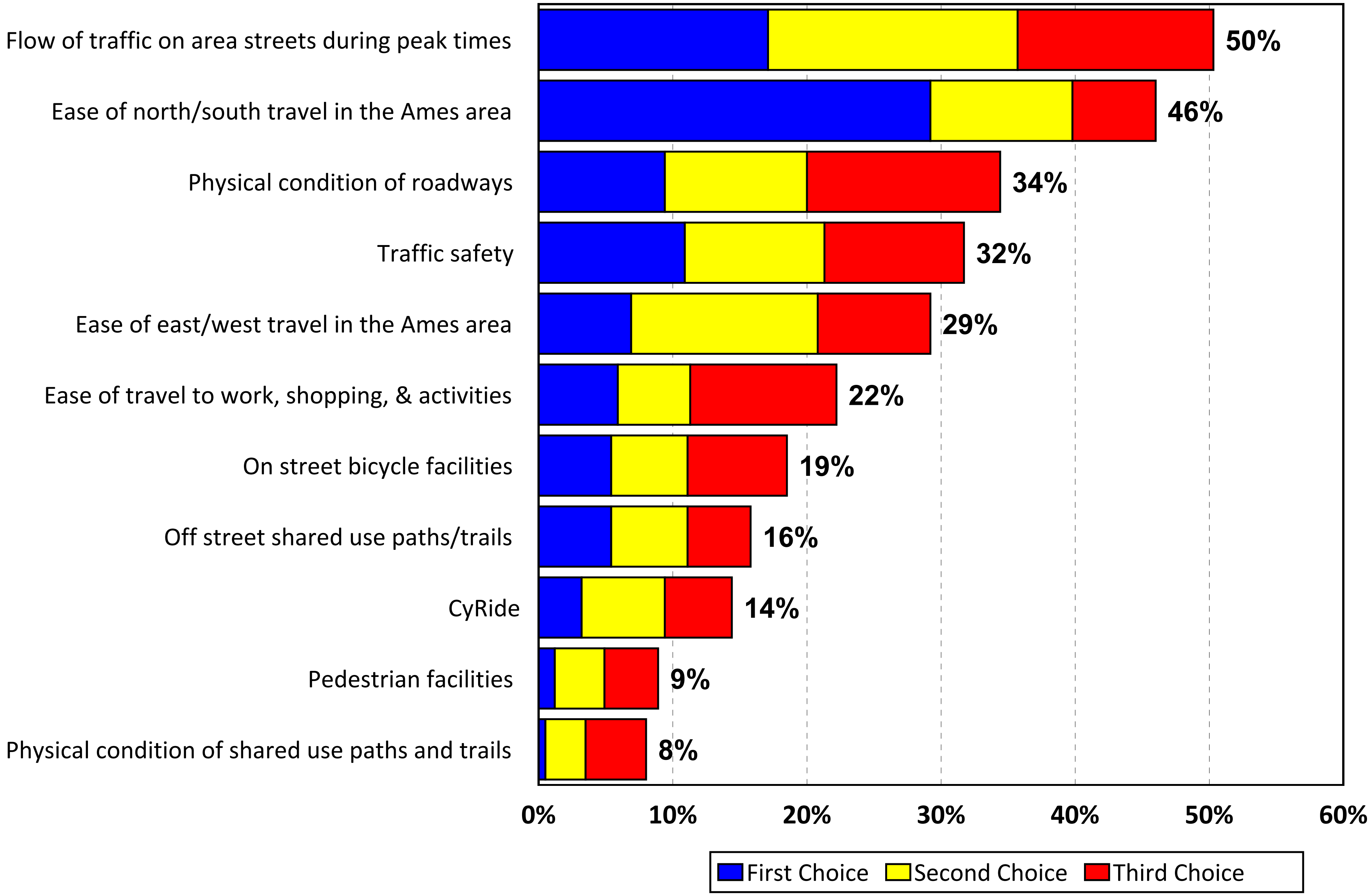
by percentage of respondents who rated the item as a 4 or 5 on a 5-point scale (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q6. Most Important Transportation Issues

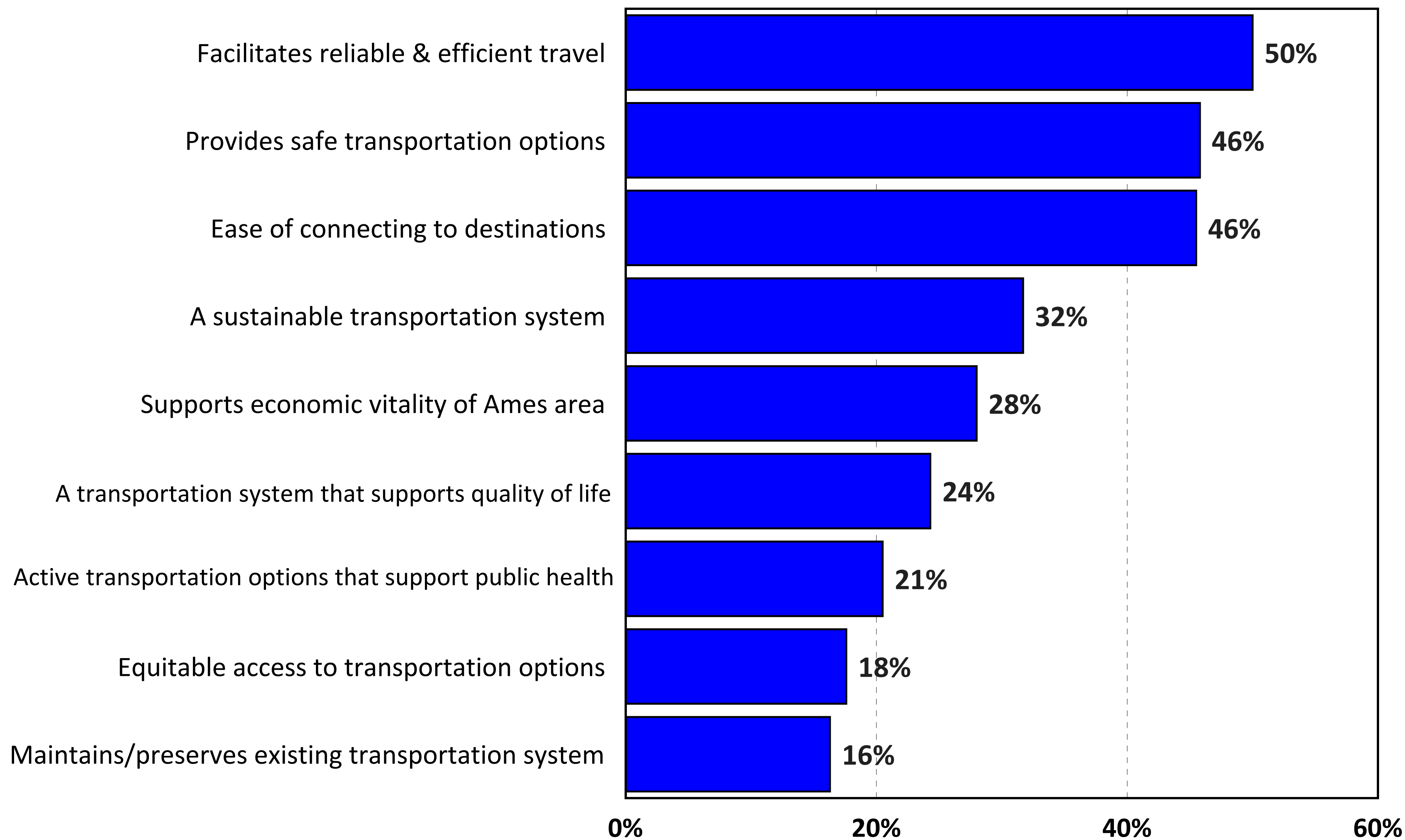
by percentage of respondents who selected the item as one of their top three choices



Source: ETC Institute Regional Travel Survey (2019)

Q7. Most Important Characteristics of the Ames Area Transportation System for the Future

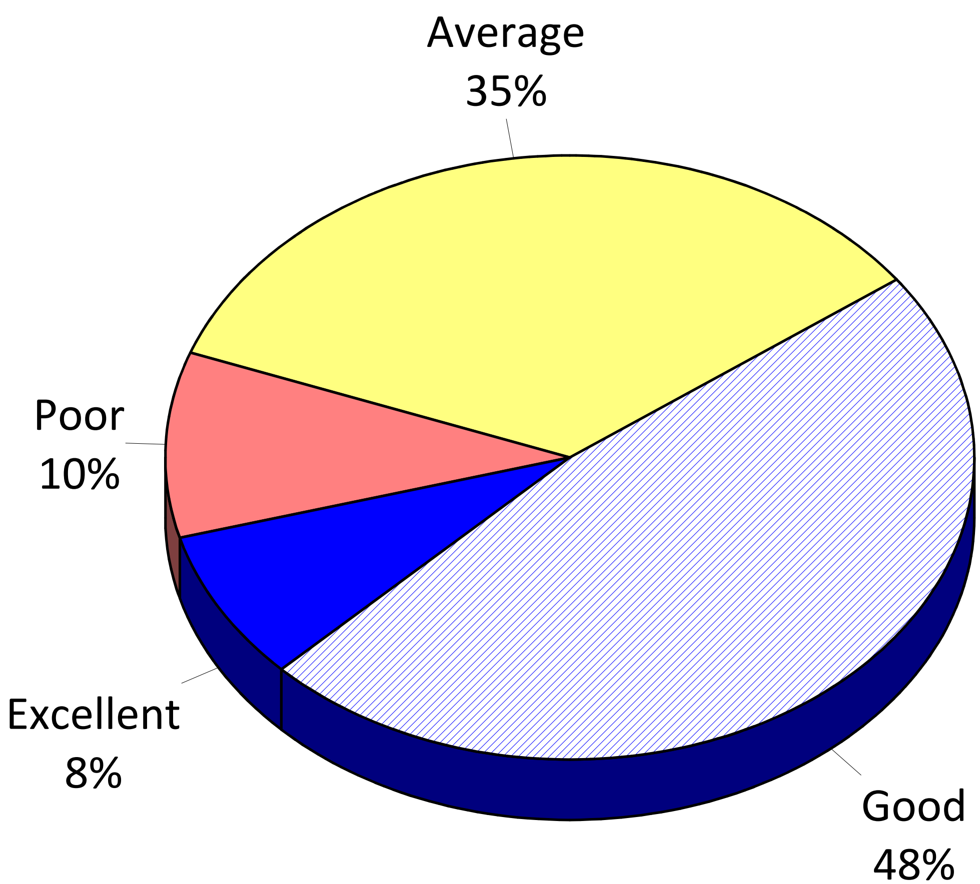
by percentage of respondents (multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q8. Overall, would you rate the transportation system in the Ames Area as excellent, good, average, or poor?

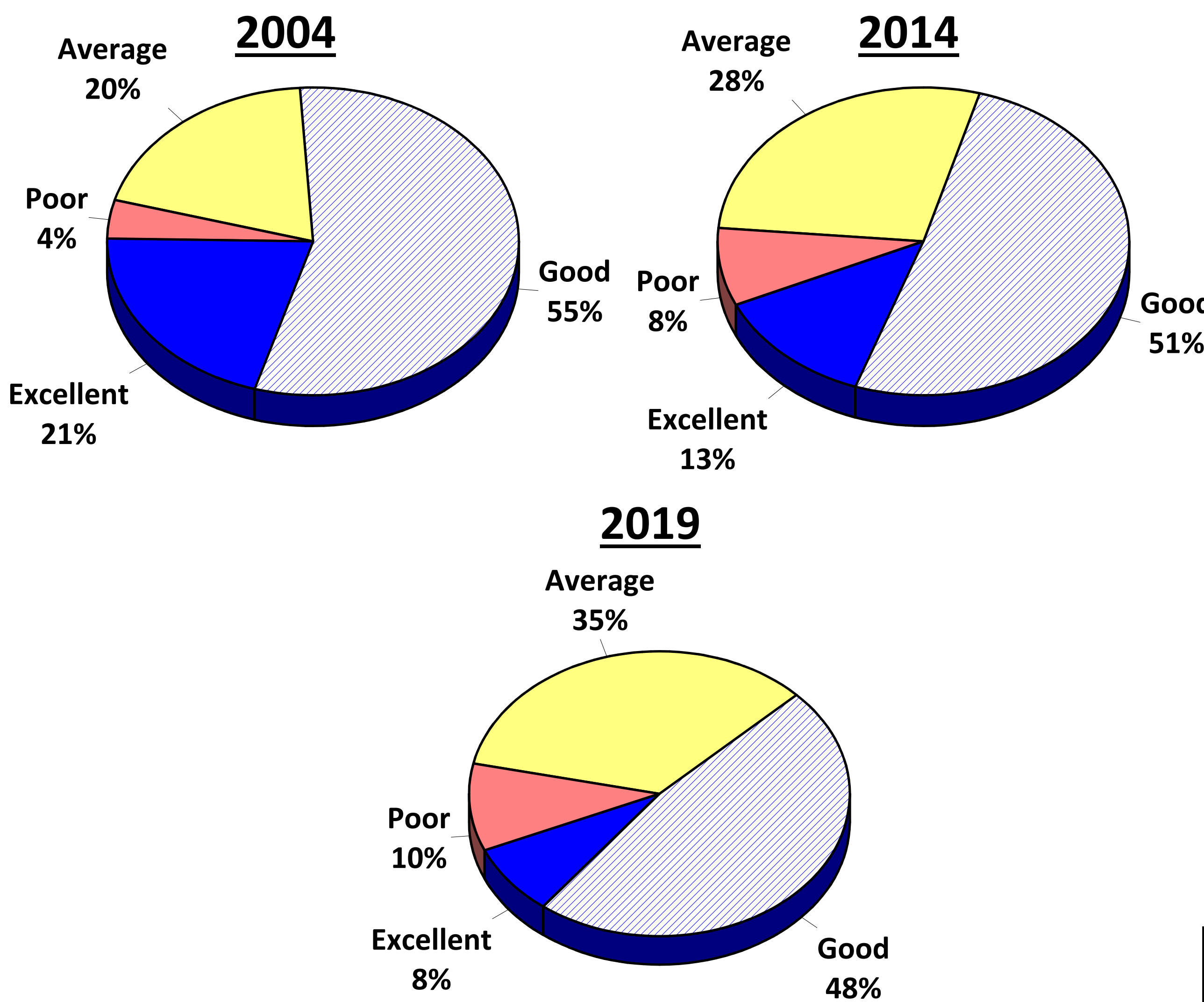
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q8. Overall, would you rate the transportation system in the Ames area as excellent, good, average, or poor?

by percentage of respondents (excluding "don't know")

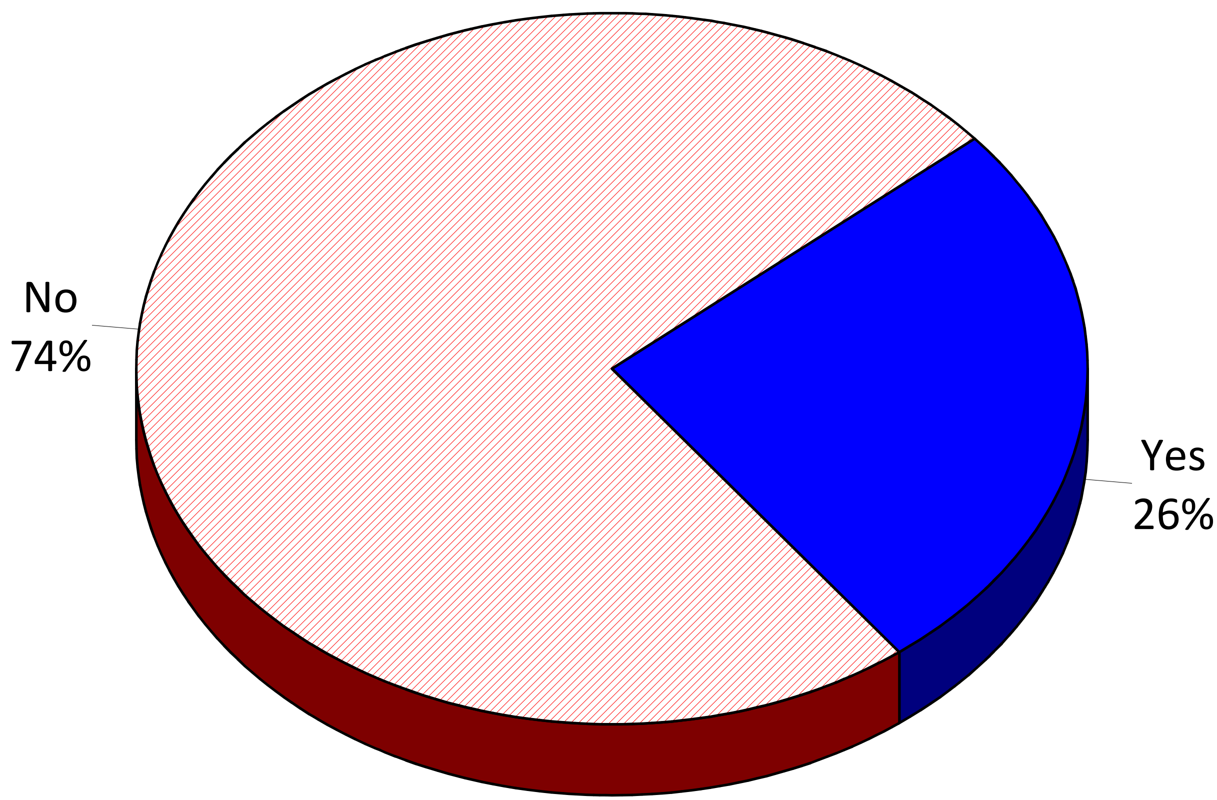


TREND

Source: ETC Institute Regional Travel Survey (2019)

Q9. Have you used public transit (CyRide) in the past 12 months?

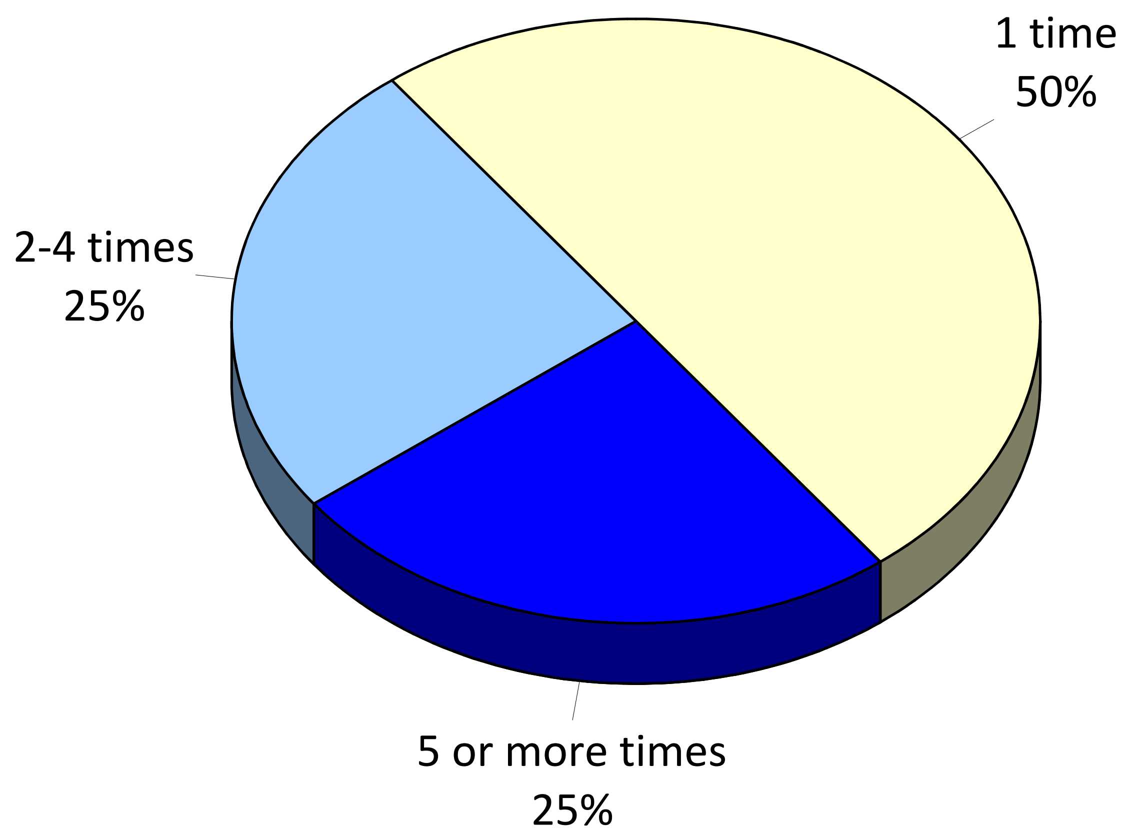
by percentage of respondents



Source: ETC Institute Regional Travel Survey (2019)

Q9a. How often do you use CyRide during a typical week?

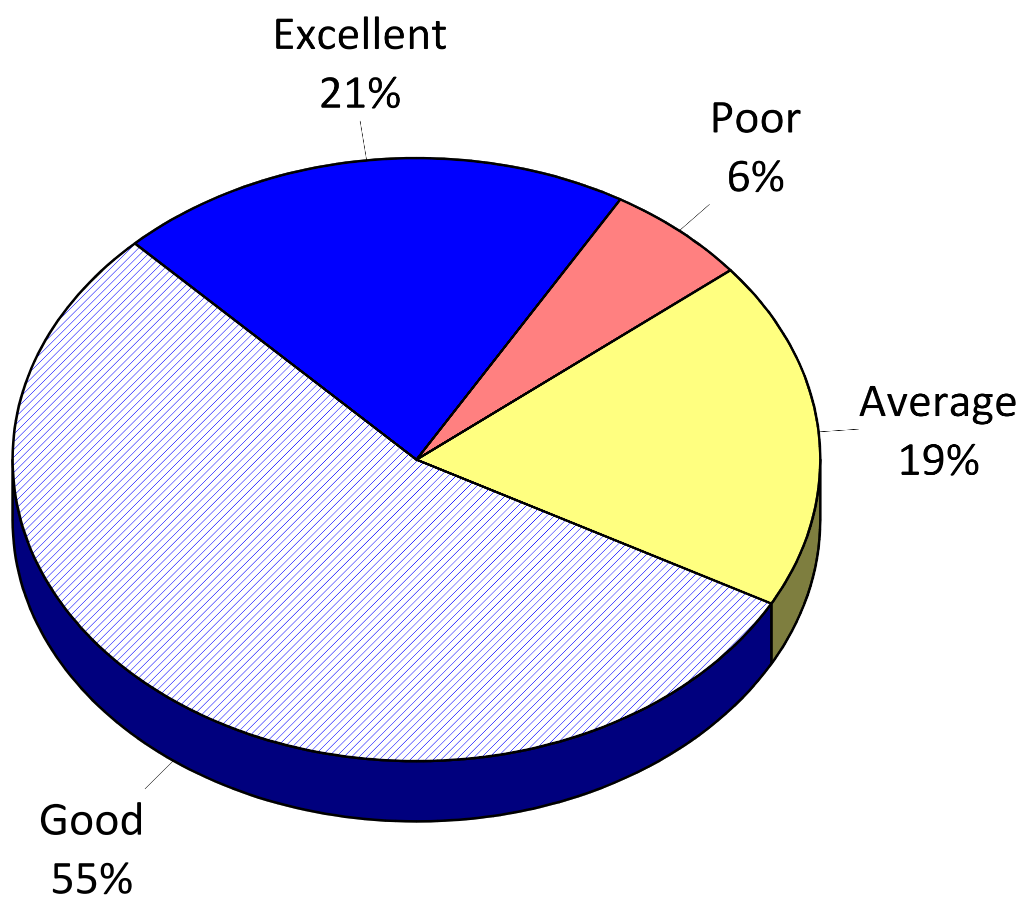
by percentage of respondents who have used CyRide in the past 12 months (excluding "not provided")



Source: ETC Institute Regional Travel Survey (2019)

Q9b. How would you rate the availability of public transit in Ames?

by percentage of respondents who have used CyRide in the past 12 months (excluding "don't know")

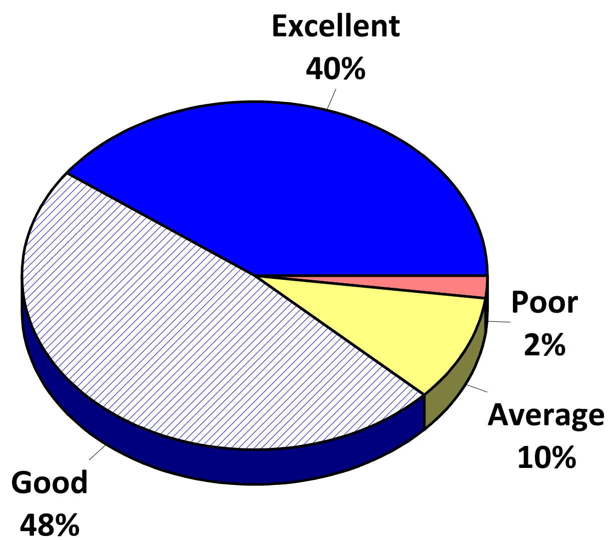


Source: ETC Institute Regional Travel Survey (2019)

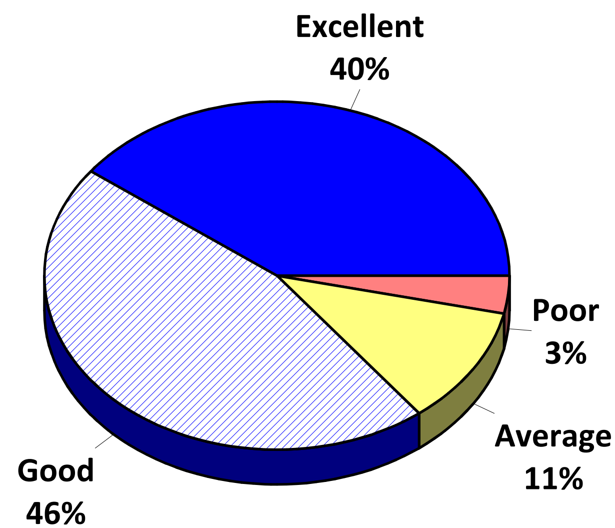
Q9b. How would you rate the availability of public transit in Ames?

by percentage of respondents who have used CyRide in the past 12 months (excluding "don't know")

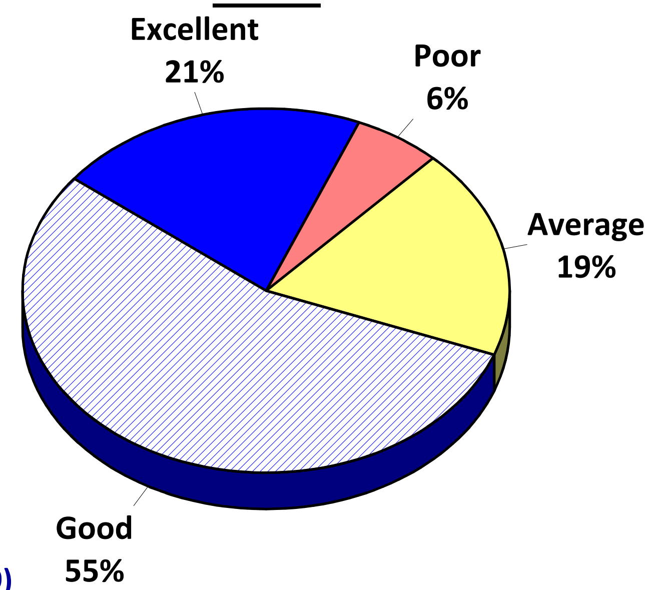
2004



2014



2019

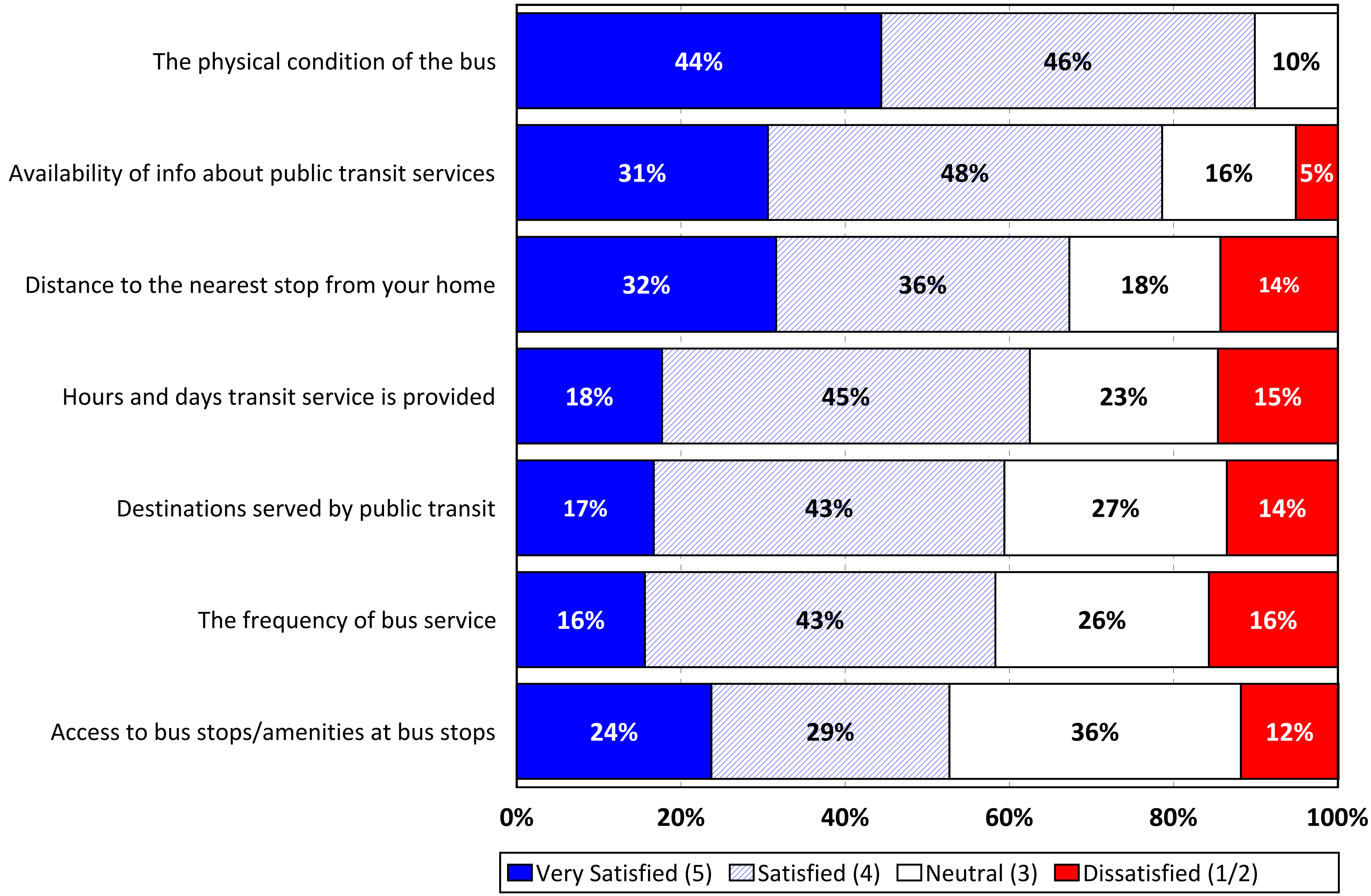


TREND

Source: ETC Institute Regional Travel Survey (2019)

Q9c. Satisfaction With Transit Availability in the Ames Area

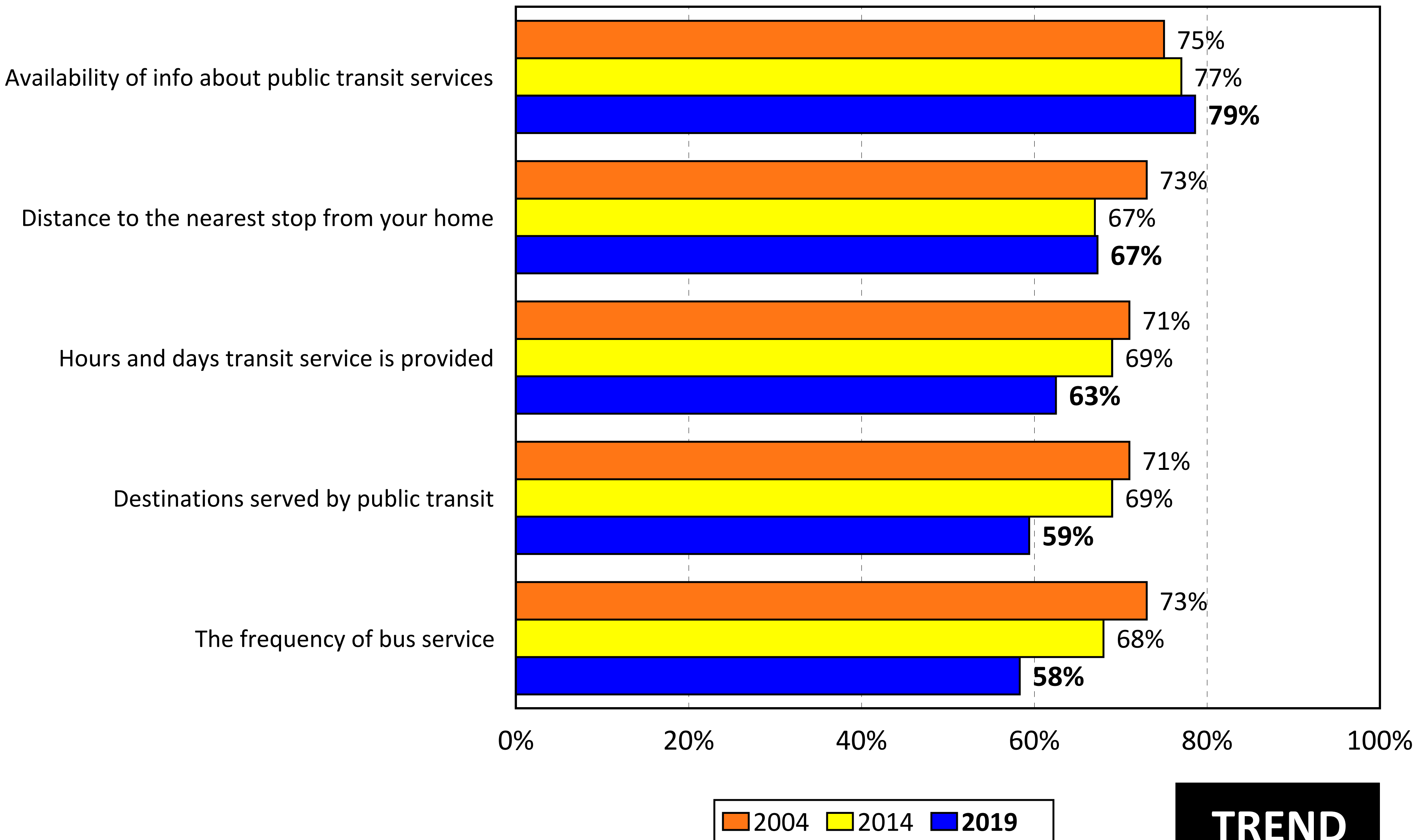
by percentage of respondents who have used CyRide in the past 12 months (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q9c. Satisfaction With Transit Availability in the Ames Area

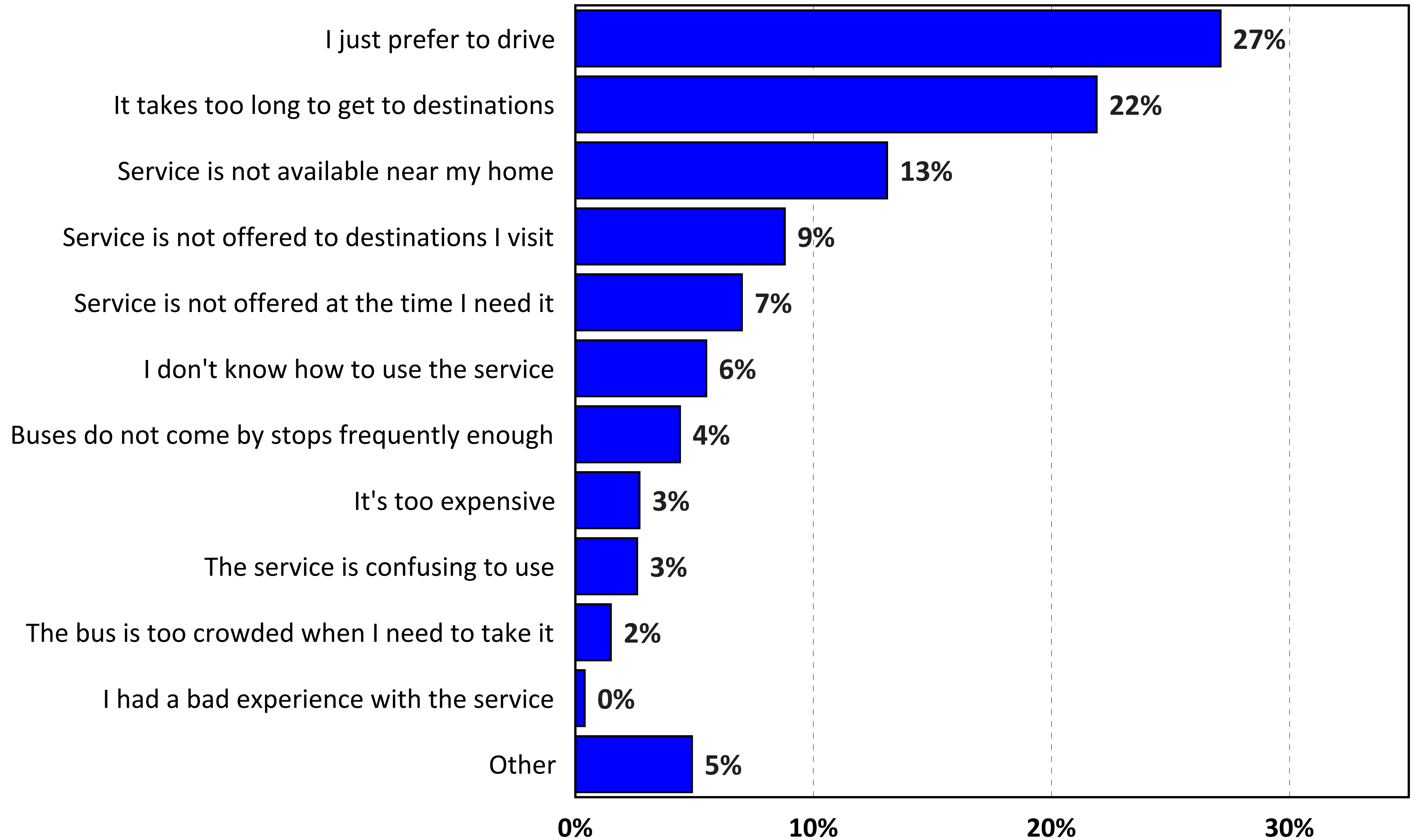
by percentage of respondents who rated the item as a 4 or 5 on a 5-point scale (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q10. Which of the following are reasons that you do not use public transit more often?

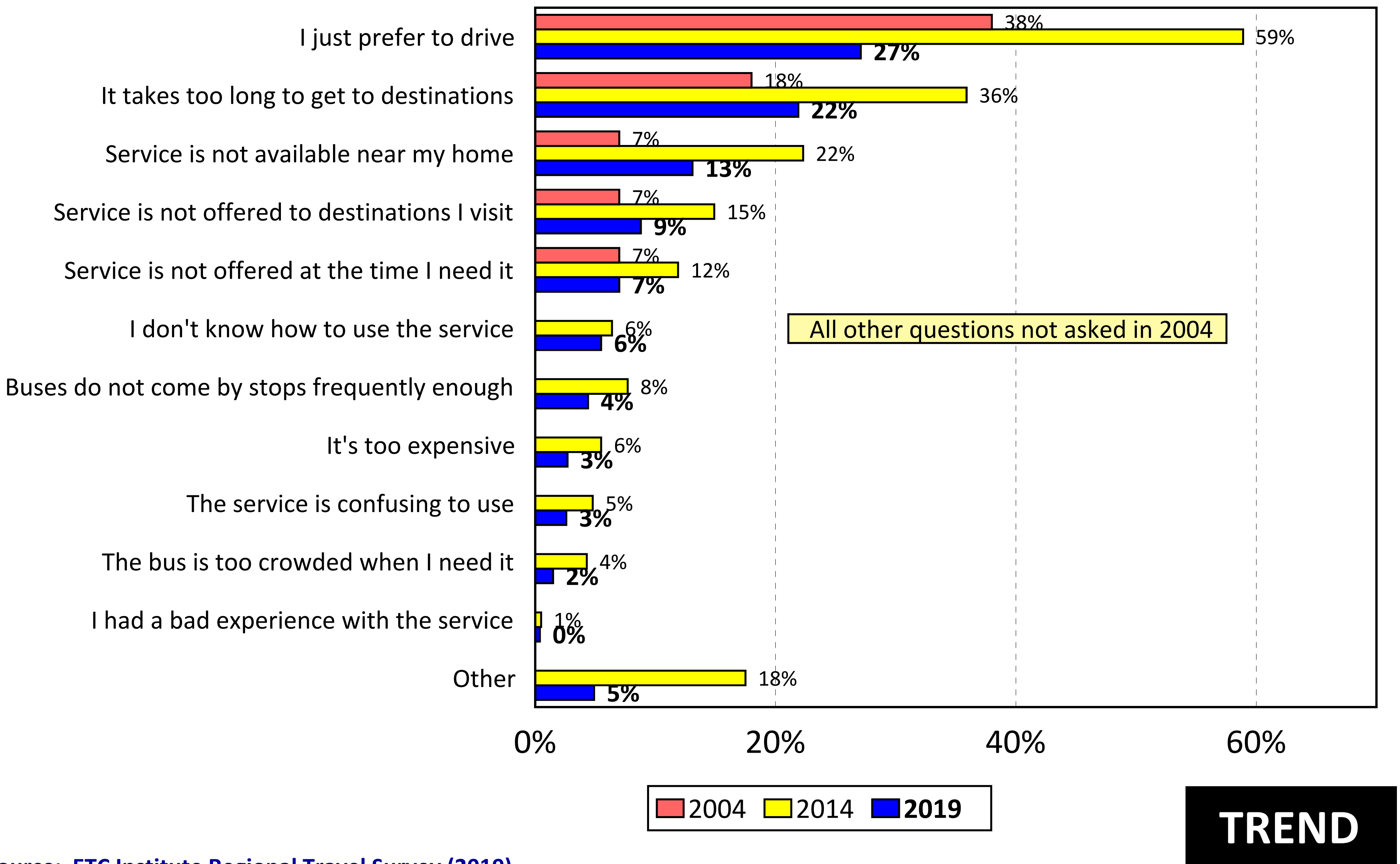
by percentage of respondents (multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q10. Which of the following are reasons that you do not use public transit more often?

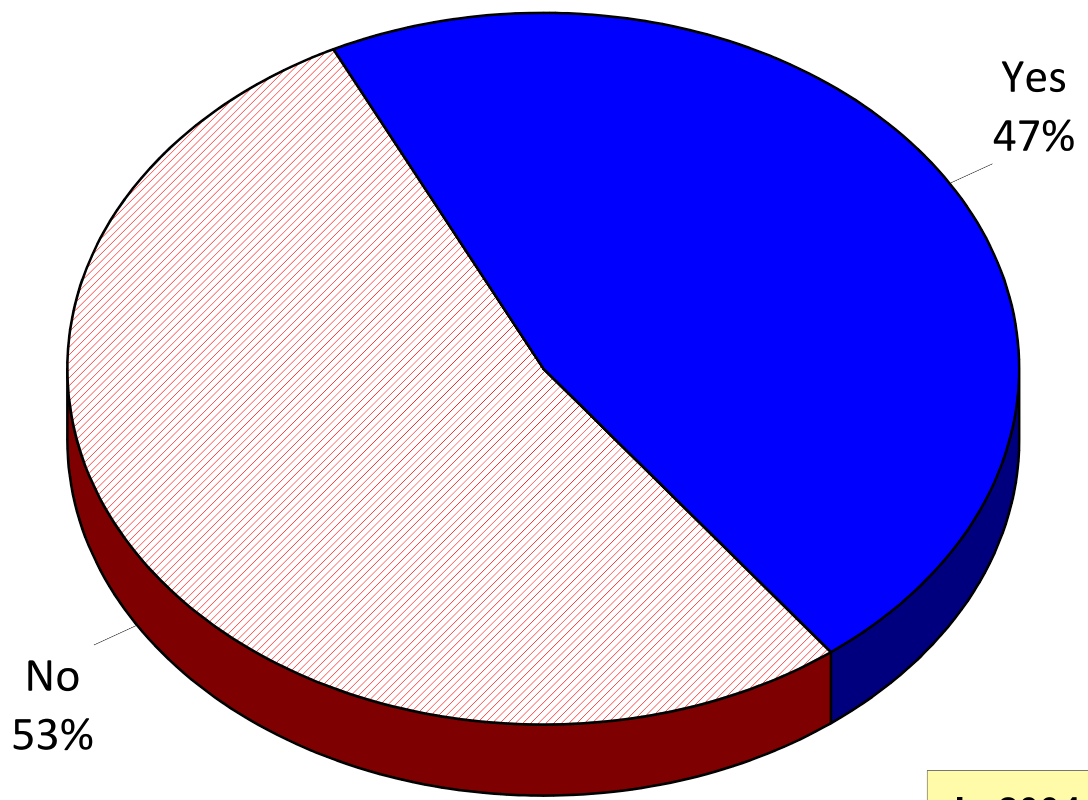
by percentage of respondents (multiple selections could be made)



Source: ETC Institute Regional Travel Survey (2019)

Q11. Have you ridden a bicycle in the Ames area during the past year?

by percentage of respondents (excluding "not provided")

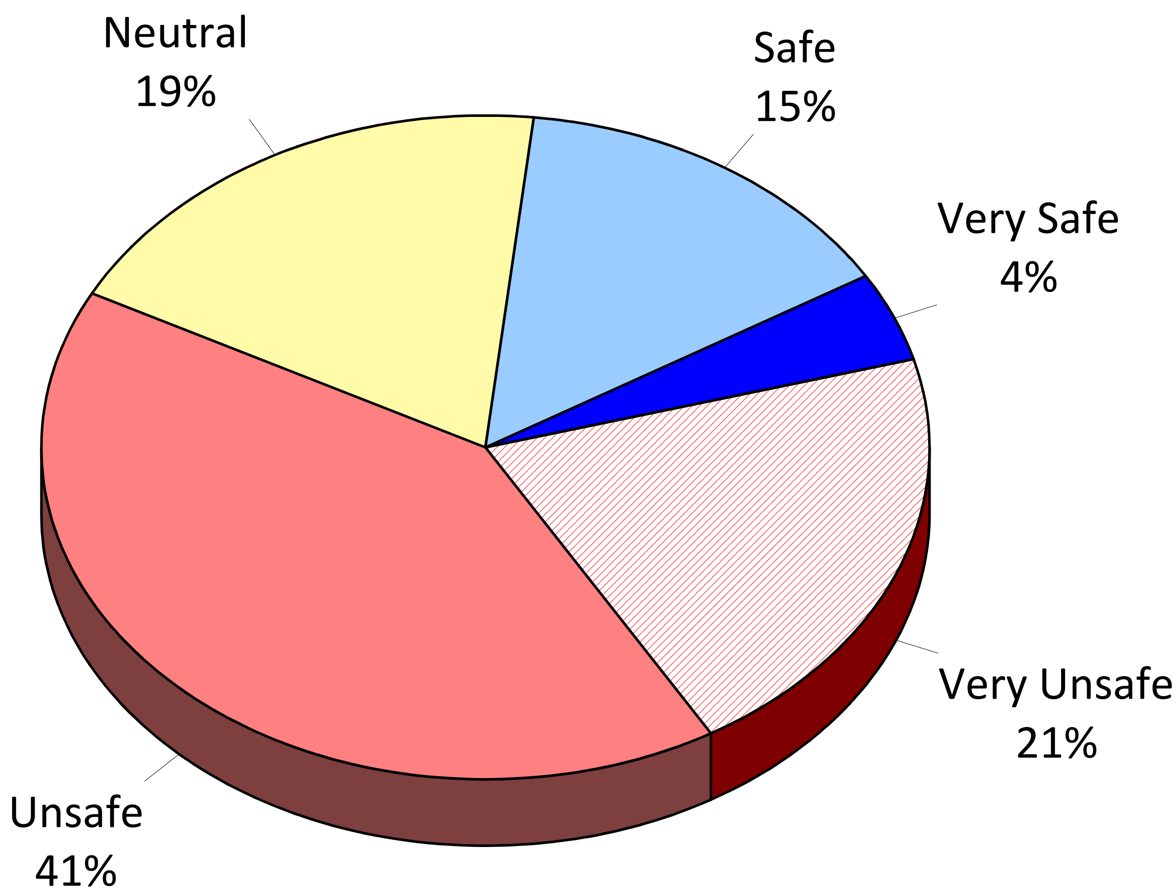


In 2004, 48% had ridden a bike in the past year. In 2014, it was 53%

Source: ETC Institute Regional Travel Survey (2019)

Q11a. How safe do you feel bicycling on major streets without bike lanes?

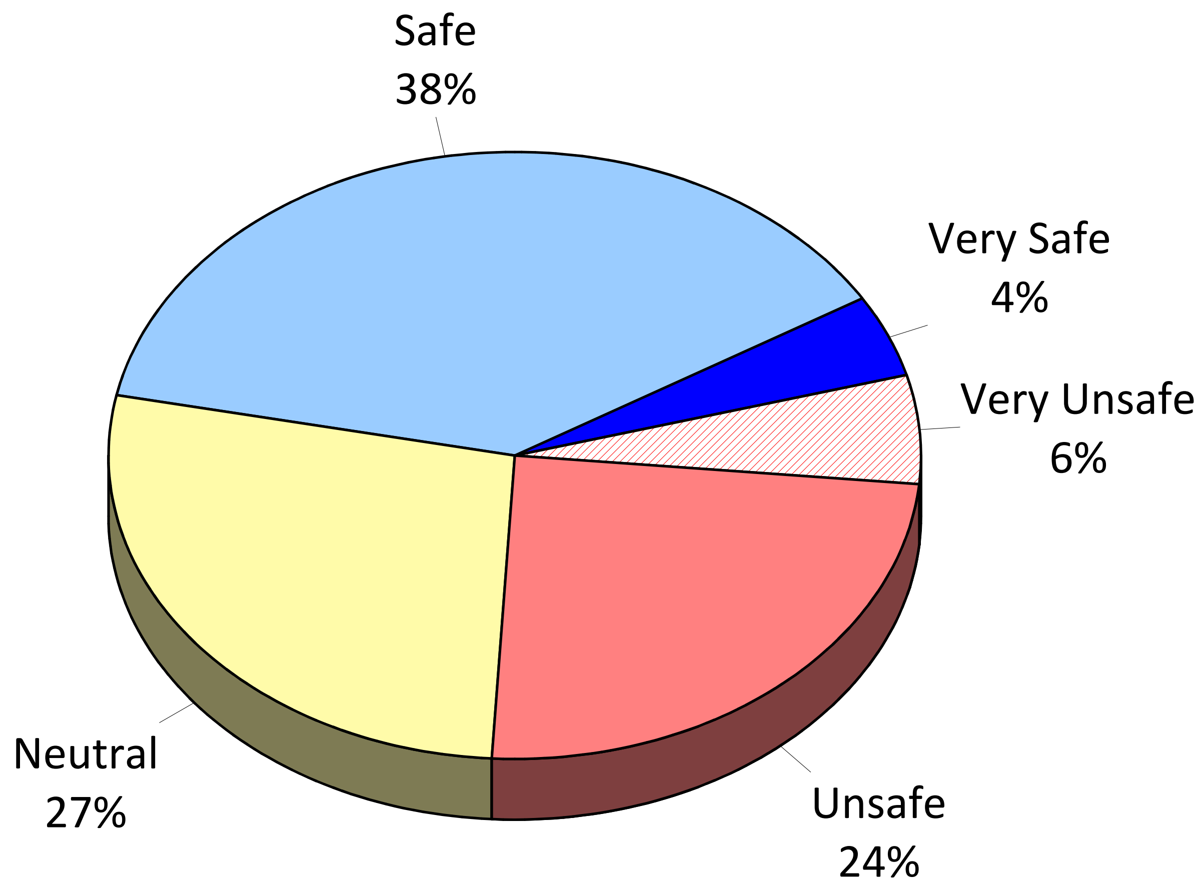
by percentage of respondents who have ridden a bicycle in the Ames area during the past year (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q11b. How safe do you feel bicycling on streets with an on-street bike lane?

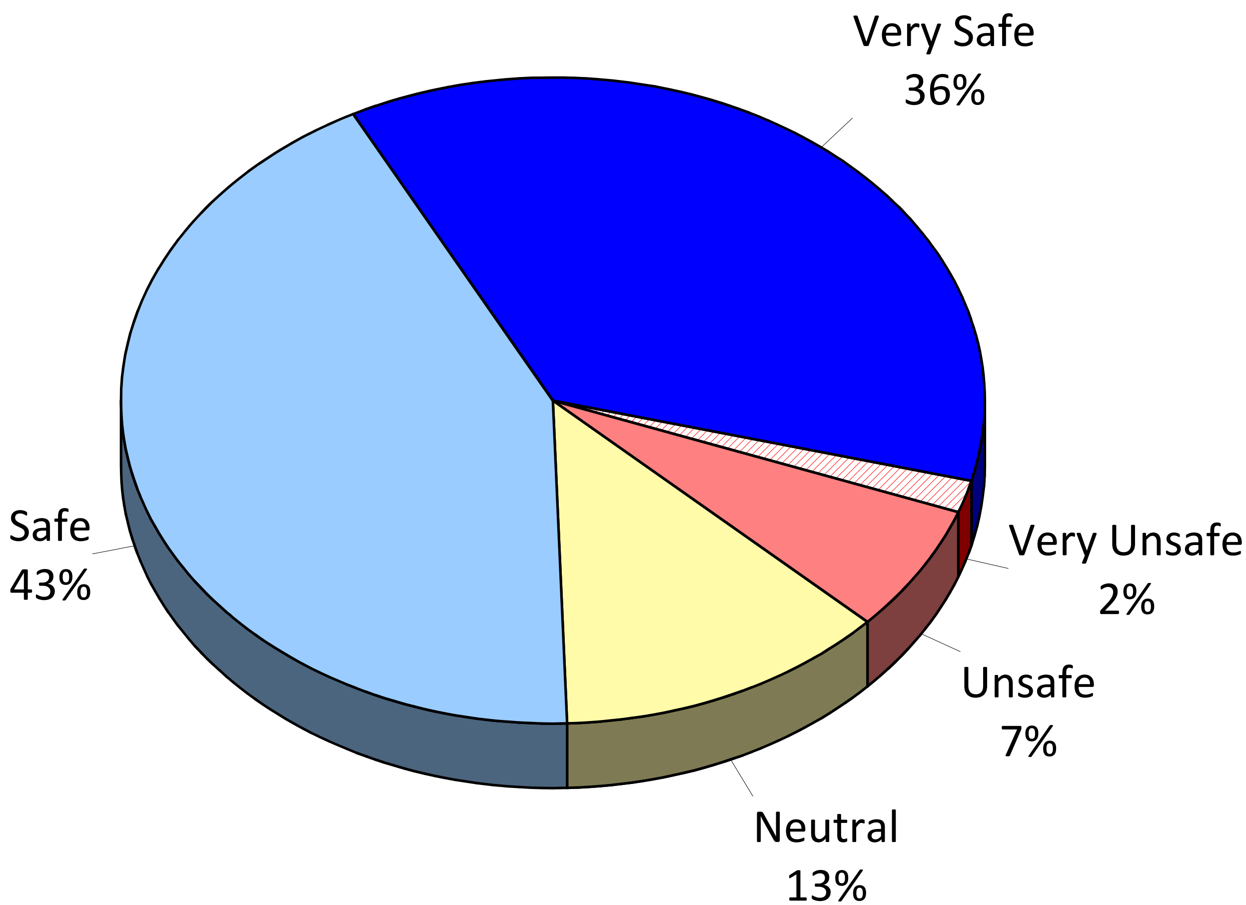
by percentage of respondents who have ridden a bicycle in the Ames area during the past year (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q11c. How safe do you feel bicycling on a shared-use path or trail?

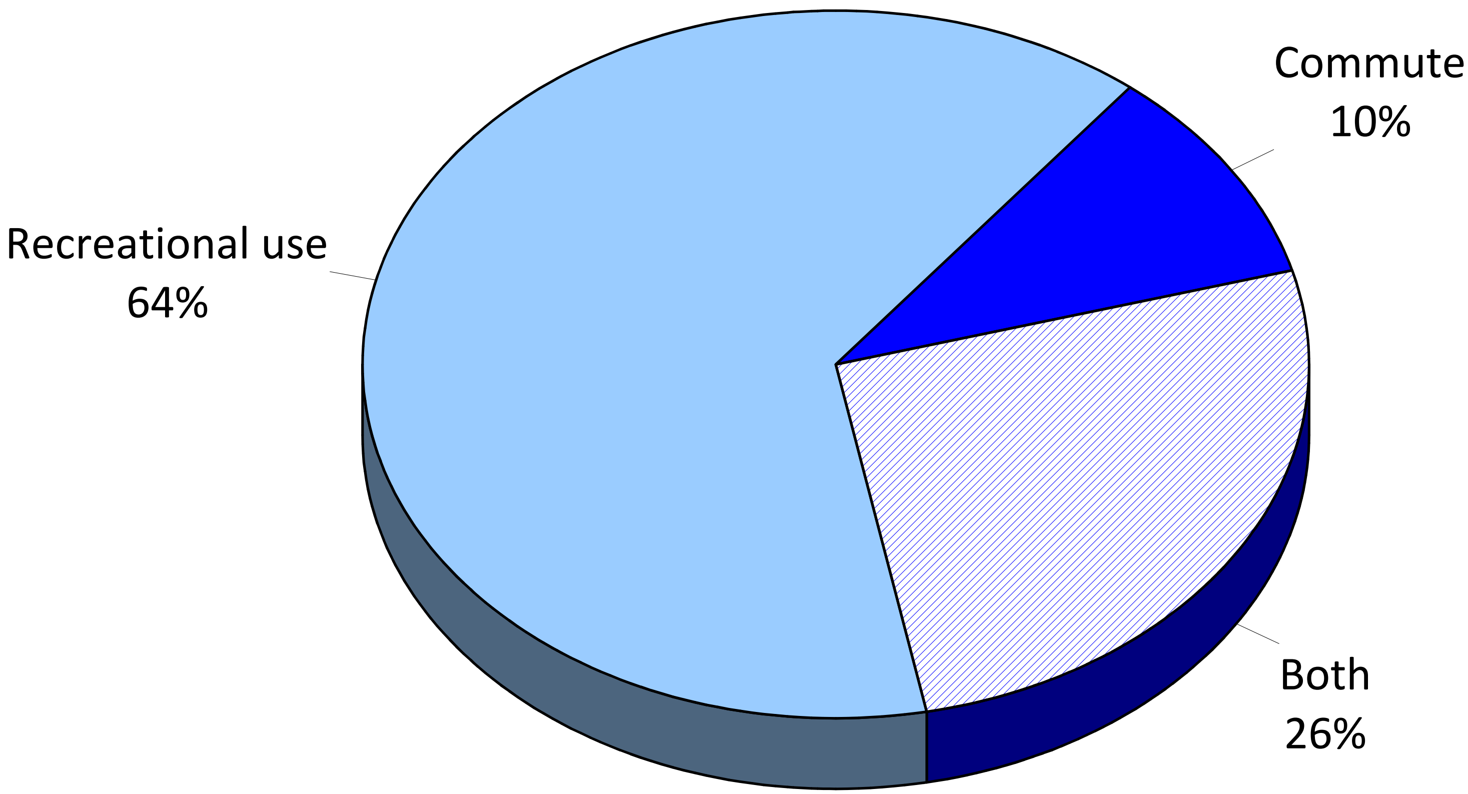
by percentage of respondents who have ridden a bicycle in the Ames area during the past year (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q11d. What is the primary reason why you ride your bike?

by percentage of respondents who have ridden a bicycle in the Ames area during the past year (excluding "not provided")

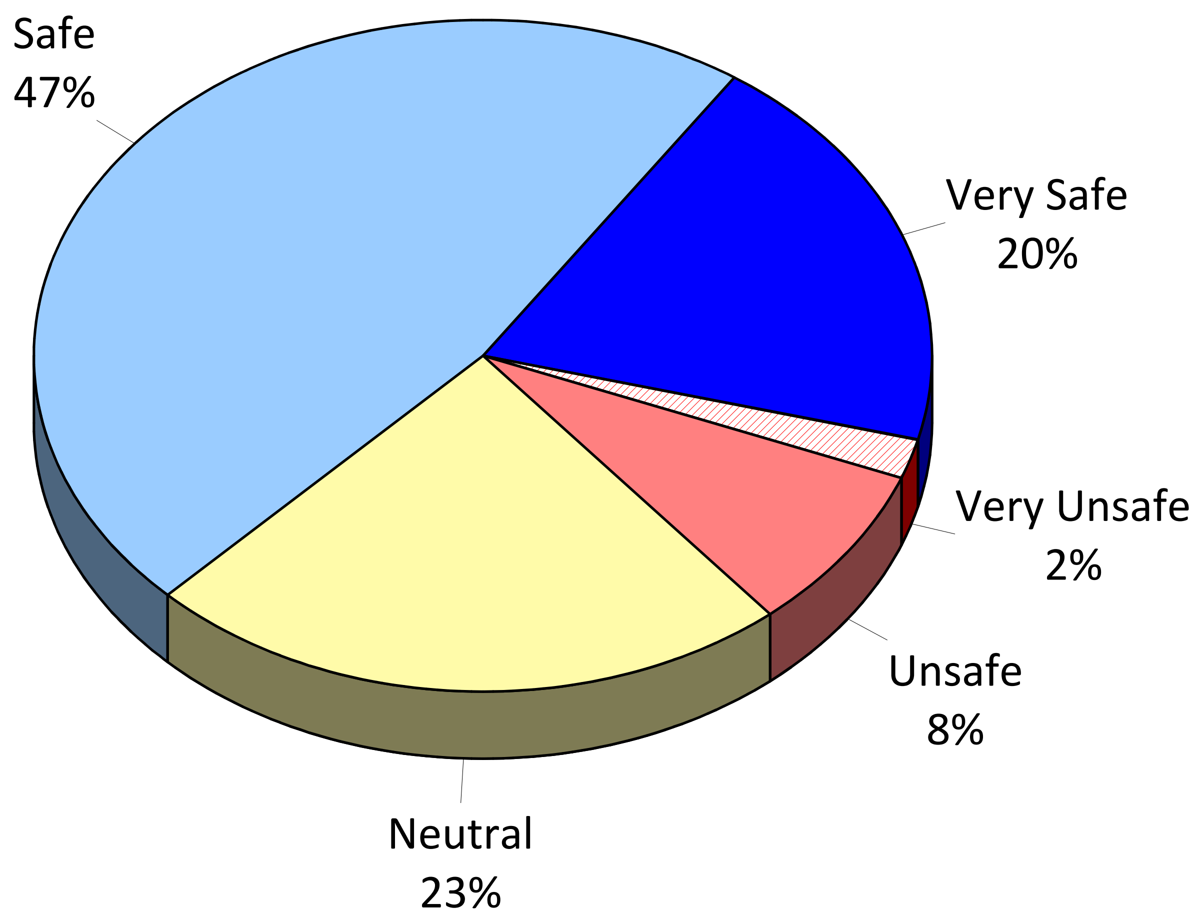


In 2014, 63% rode for recreation, 7% rode to commute, and 30% rode for both purposes.

Source: ETC Institute Regional Travel Survey (2019)

Q12. How safe do you feel, walking or using a wheelchair on sidewalks along major streets?

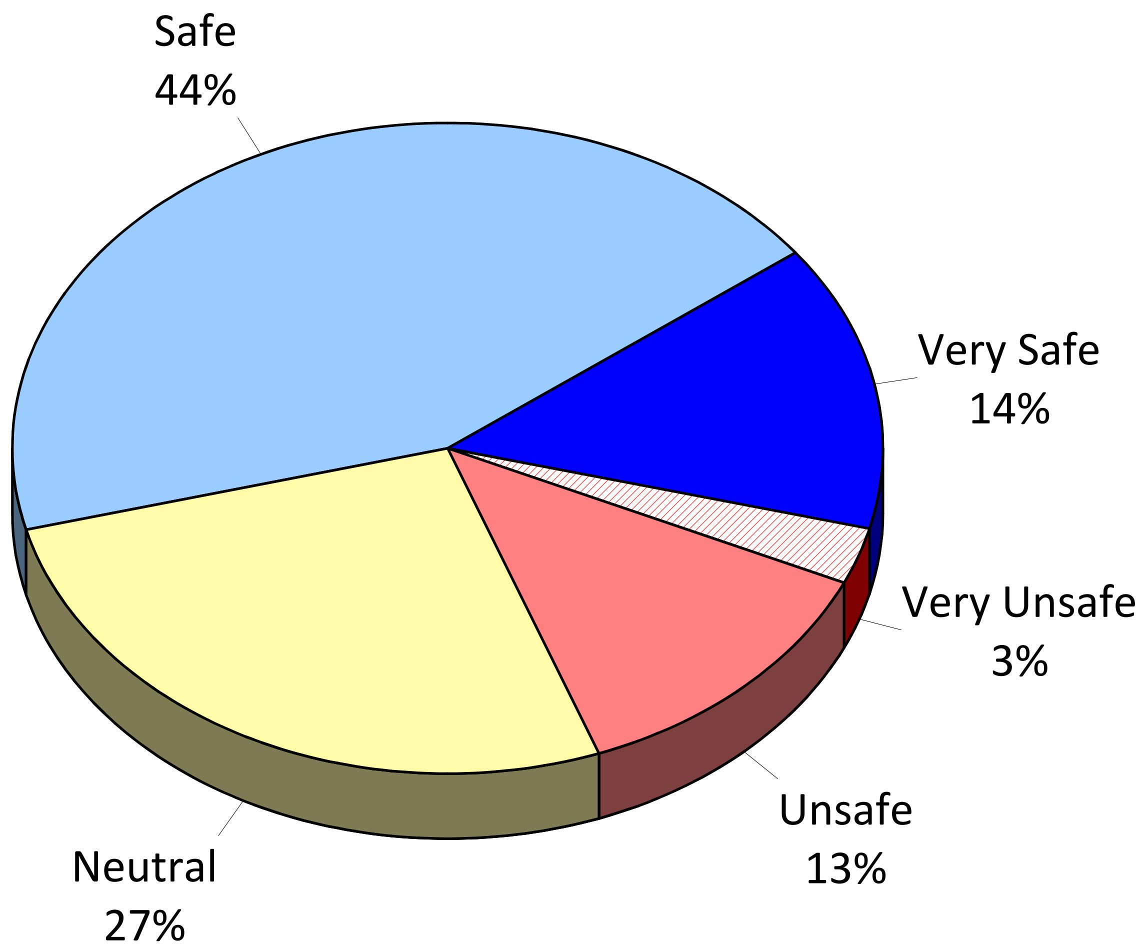
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q13. How safe do you feel using pedestrian crossings on major streets?

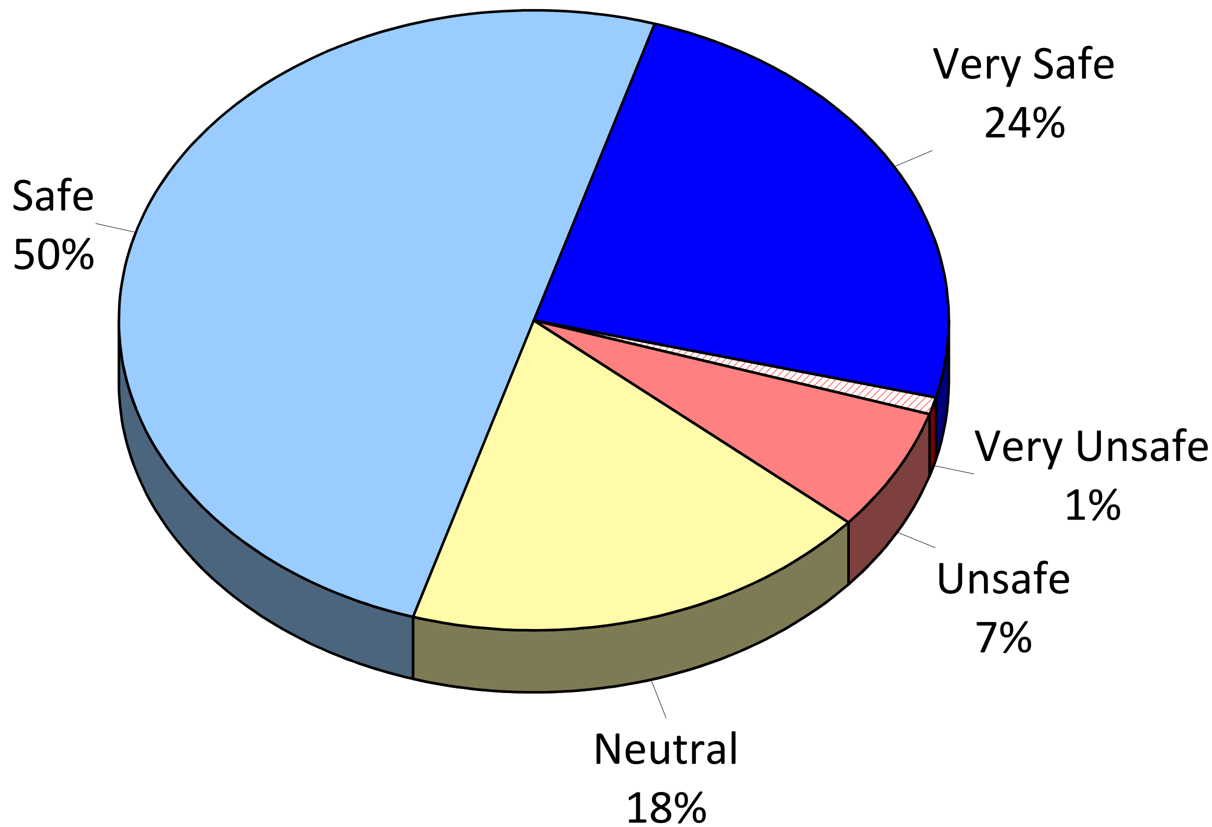
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q14. How safe do you feel walking or using a wheelchair on a shared-use path or trail or sidewalk in the area where you live?

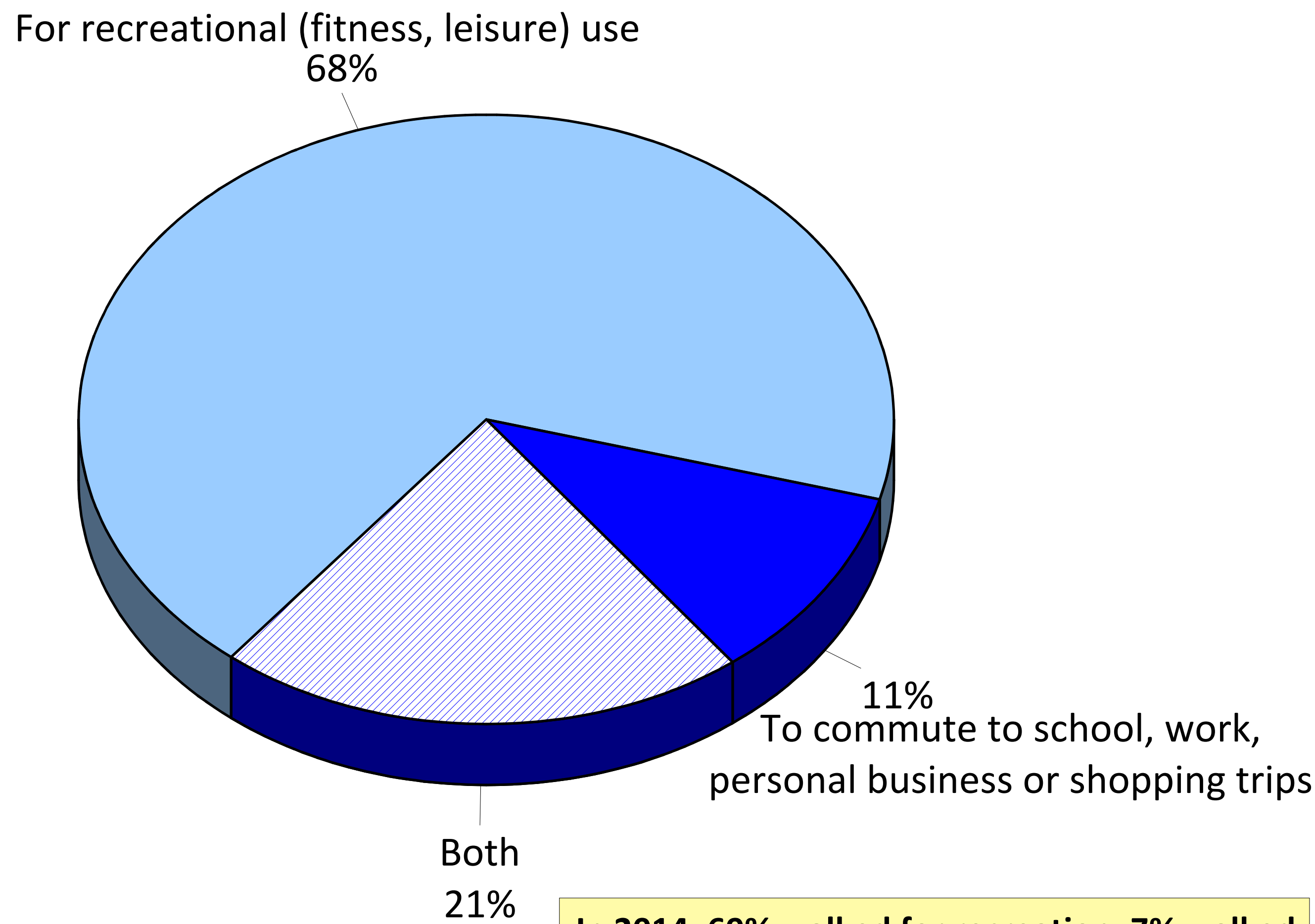
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q15. What is the primary reason for your pedestrian travel?

by percentage of respondents (excluding "not provided")

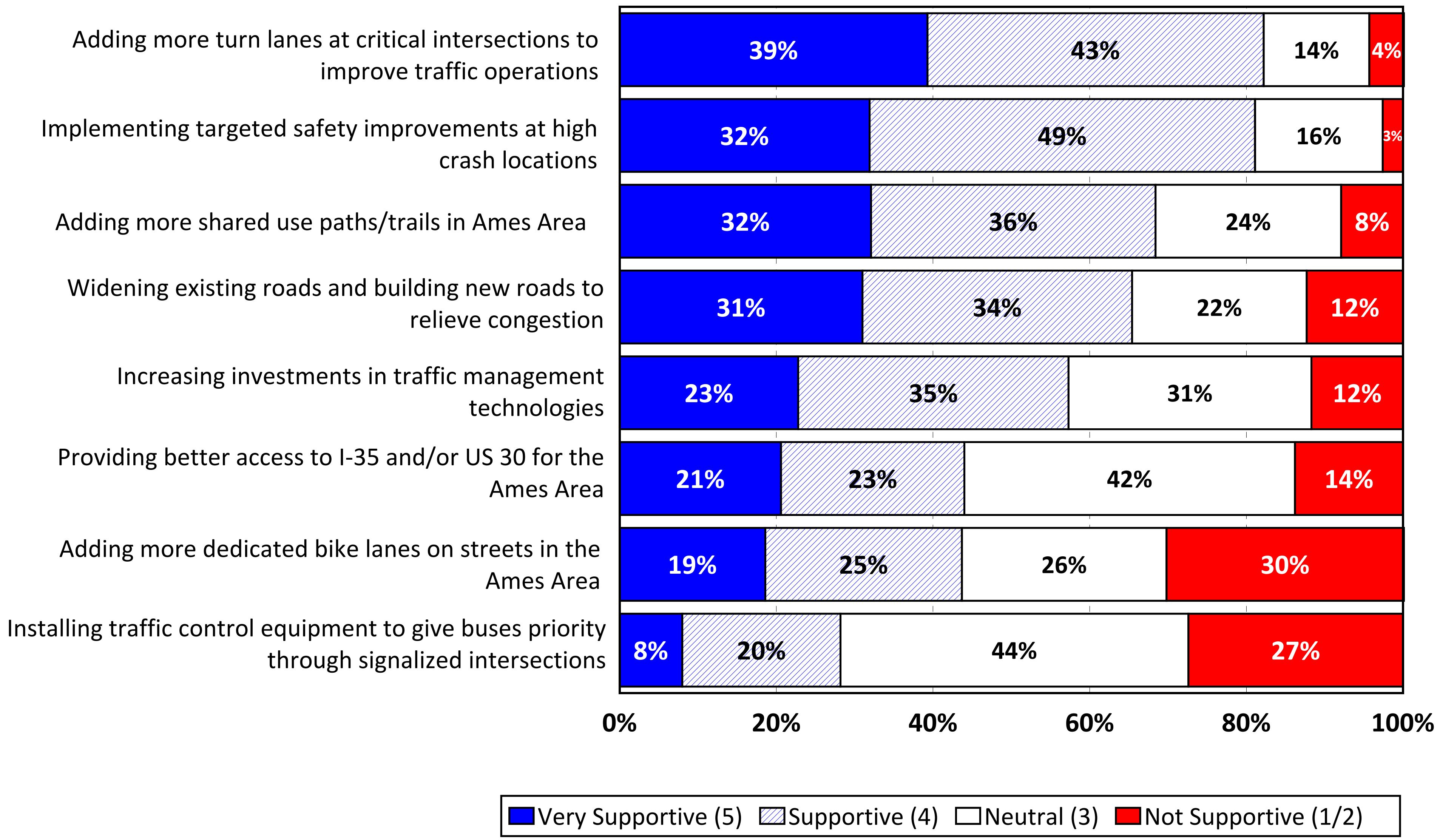


In 2014, 69% walked for recreation, 7% walked to commute, and 22% walked for both purposes.

Source: ETC Institute Regional Travel Survey (2019)

Q16. Support for the Following System Enhancements

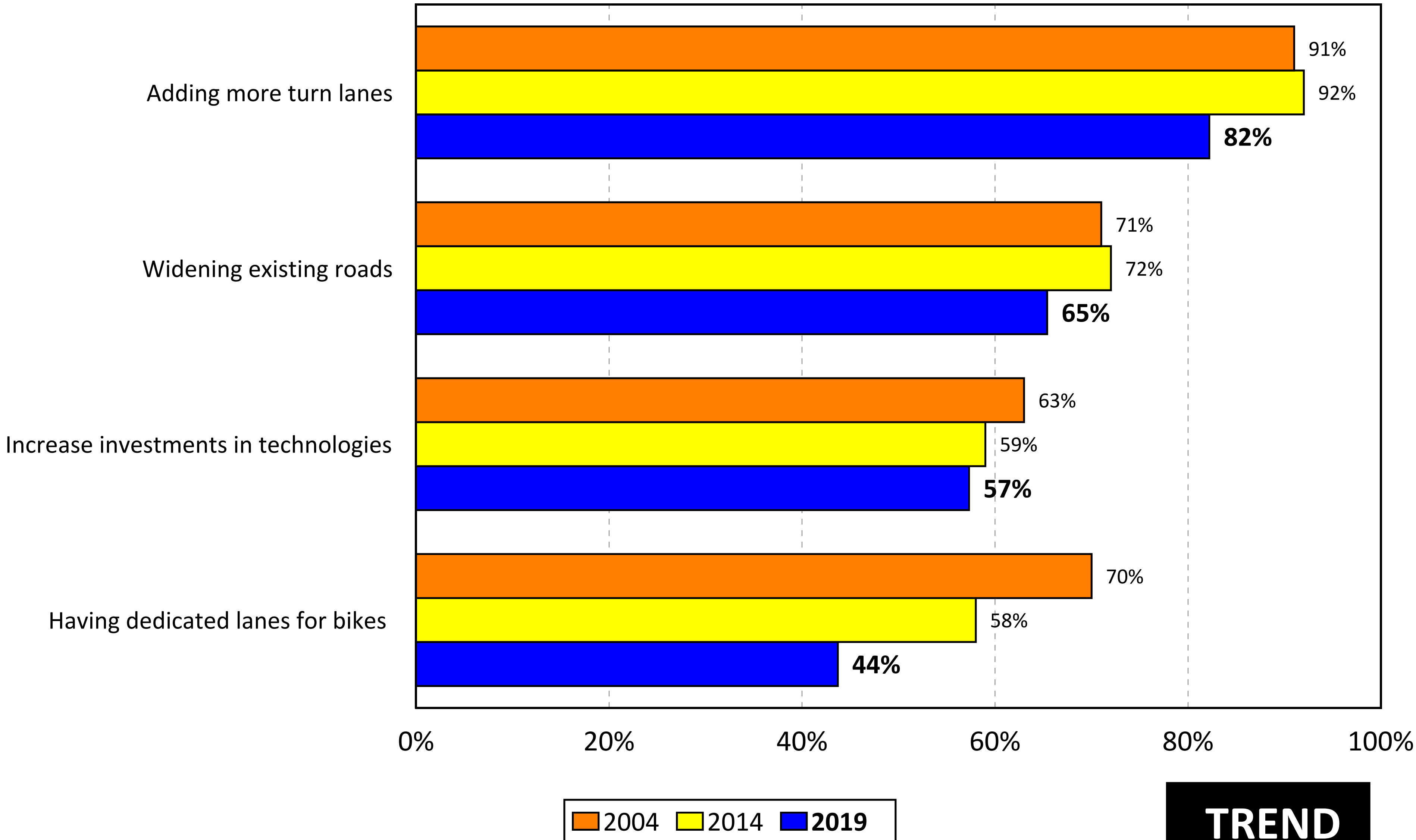
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q16. Support for the Following System Enhancements

by percentage of respondents who were "very supportive" or "supportive" (excluding "don't know")

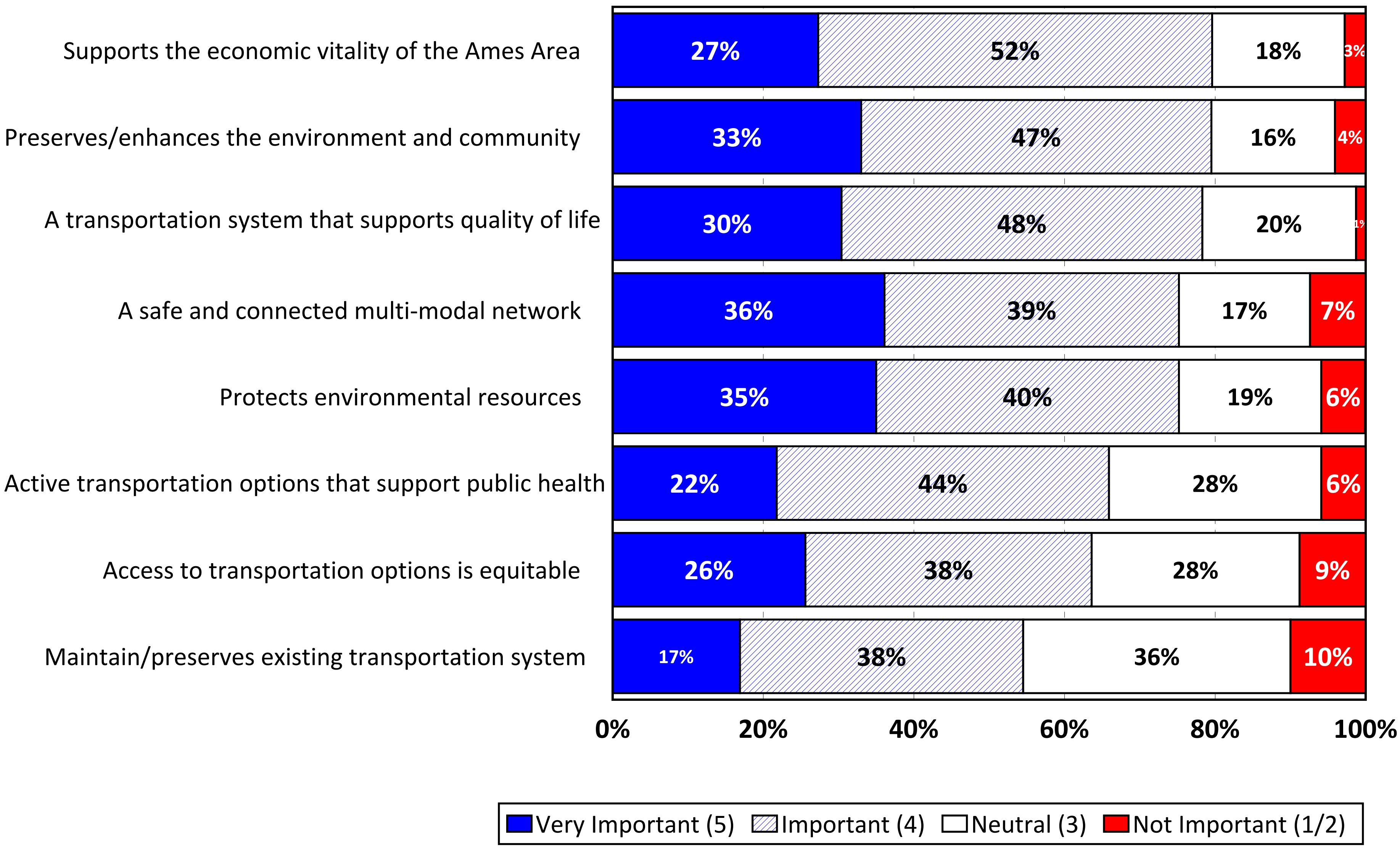


TREND

Source: ETC Institute Regional Travel Survey (2019)

Q17. Importance of the Following Long-Range Goals

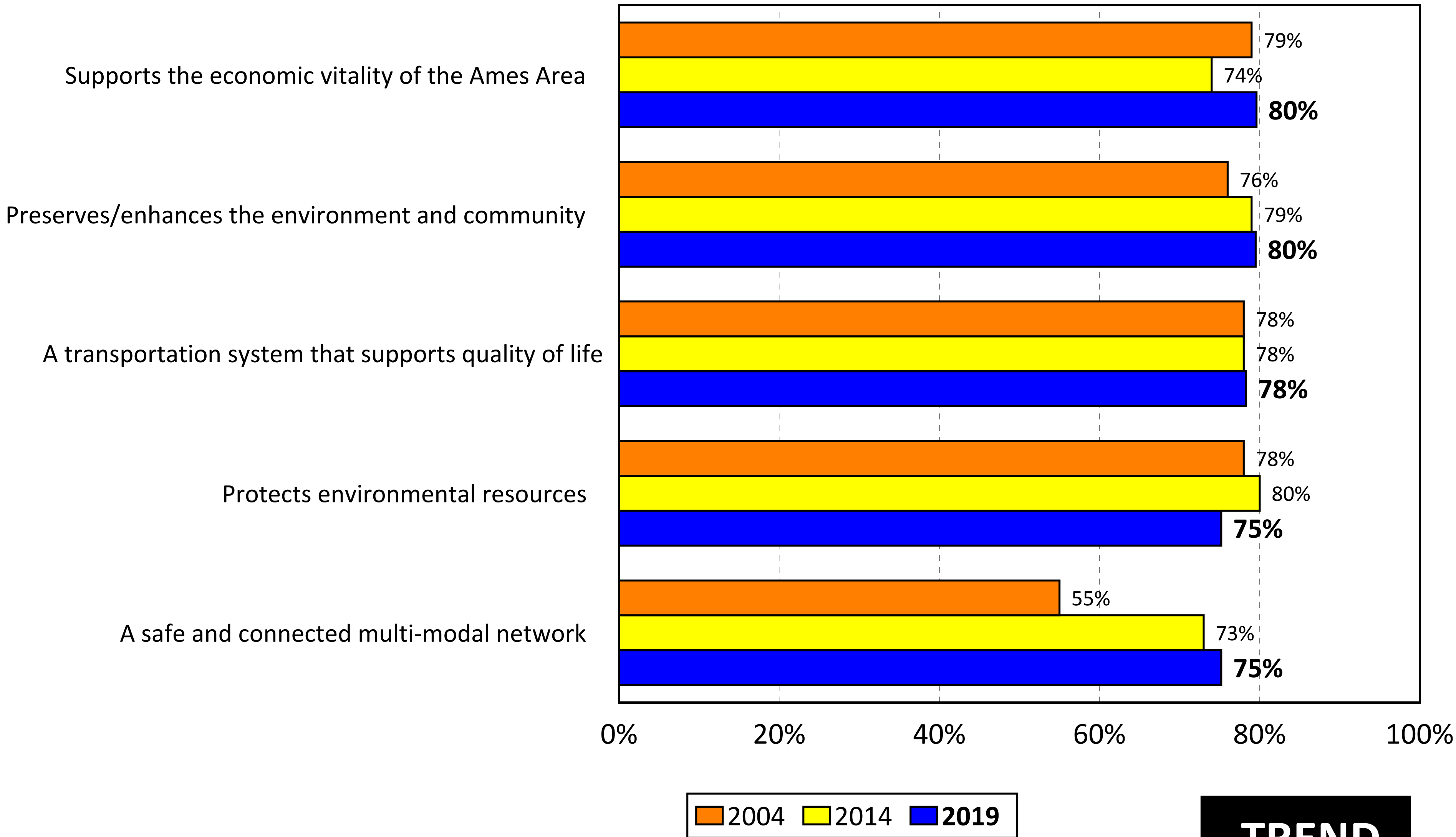
by percentage of respondents (excluding "don't know")



Source: ETC Institute Regional Travel Survey (2019)

Q17. Importance of the Following Long-Range Goals

by percentage of respondents who rated the item as a 4 or 5 on a 5-point scale (excluding "don't know")

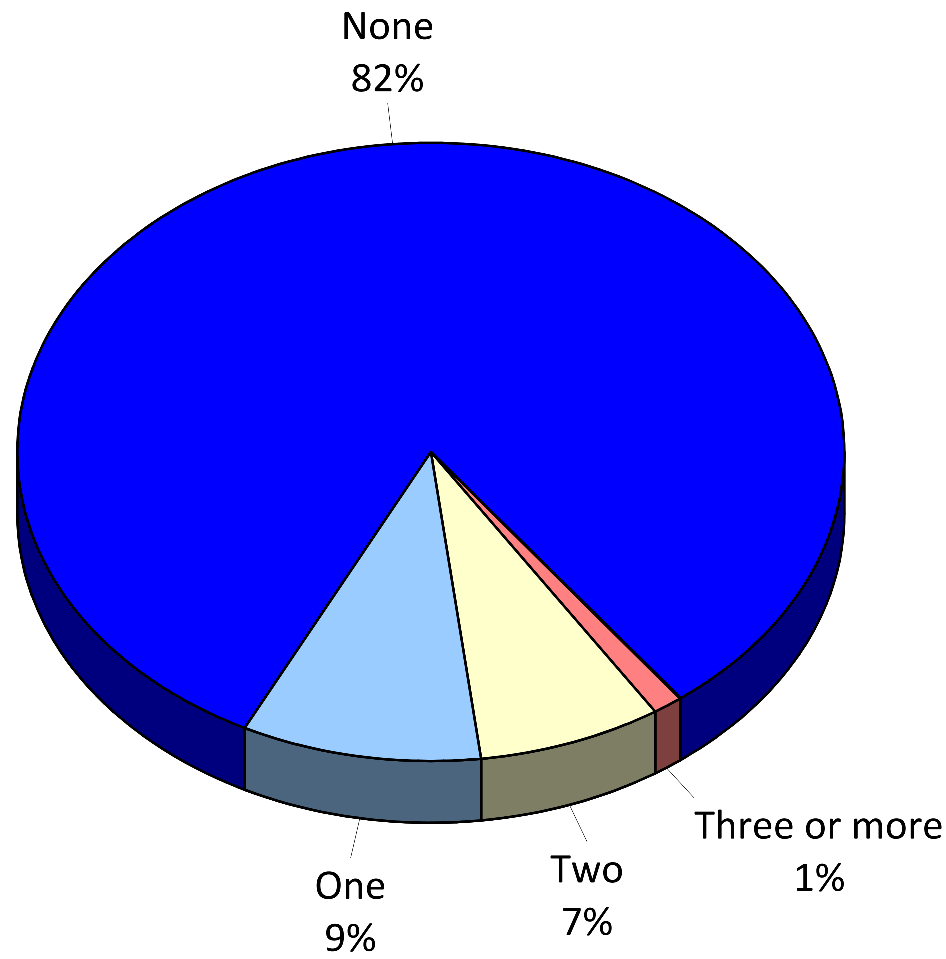


TREND

Source: ETC Institute Regional Travel Survey (2019)

Q18. How many persons in your household are dependent on public transit or rides from friends/relatives because they do not have a car or do not drive?

by percentage of respondents



Source: ETC Institute Regional Travel Survey (2019)

Section 2:
Tabular Data

Q1. How many operating vehicles (cars, trucks, motorcycles/mopeds, vans) do you have in your household?

Q1. How many operating vehicles do you have in your household	Number	Percent
0	10	2.5 %
1	96	23.8 %
2	183	45.3 %
3	69	17.1 %
4	30	7.4 %
5+	13	3.2 %
Not provided	3	0.7 %
Total	404	100.0 %

WITHOUT NOT PROVIDED

Q1. How many operating vehicles (cars, trucks, motorcycles/mopeds, vans) do you have in your household? (without "not provided")

Q1. How many operating vehicles do you have in your household	Number	Percent
0	10	2.5 %
1	96	23.9 %
2	183	45.6 %
3	69	17.2 %
4	30	7.5 %
5+	13	3.2 %
Total	401	100.0 %

Q2. What is your employment status?

Q2. What is your employment status	Number	Percent
Employed outside home	258	63.9 %
Student (University)	28	6.9 %
Operate home-based business	17	4.2 %
Not currently employed	16	4.0 %
Retired	97	24.0 %
Not provided	16	4.0 %
Total	432	

WITHOUT NOT PROVIDED

Q2. What is your employment status? (without "not provided")

Q2. What is your employment status	Number	Percent
Employed outside home	258	66.5 %
Student (University)	28	7.2 %
Operate home-based business	17	4.4 %
Not currently employed	16	4.1 %
Retired	97	25.0 %
Total	416	

Q2a. In which city do you work?

Q2a. In which City do you work	Number	Percent
AMES AND ANKENY	1	0.4 %
AMES AND NEVADA	1	0.4 %
ANKENY	1	0.4 %
Ames	222	87.1 %
Boone	4	1.6 %
Charles City	1	0.4 %
Denver, CO	1	0.4 %
Des Moines	8	3.1 %
GILBERT, AMES	2	0.8 %
Gilbert	1	0.4 %
Iowa Falls	1	0.4 %
JEWELL	1	0.4 %
Johnston	2	0.8 %
Marshalltown	3	1.2 %
NEVADA	1	0.4 %
POLK CITY	1	0.4 %
Pleasant Hill	1	0.4 %
STATE CENTER	1	0.4 %
WEST DES MOINES	1	0.4 %
WOODWARD	1	0.4 %
Total	255	100.0 %

Q2b. What method of transportation do you normally use to go to work/school?

Q2b. What method of transportation do you normally use to go to work/school	Number	Percent
Car/truck-drive alone	223	70.8 %
Carpool	14	4.4 %
Walk	24	7.6 %
Taxi/ride hail (Uber, Lyft, etc.)	1	0.3 %
Bicycle	25	7.9 %
Public transit (CyRide)	25	7.9 %
Motorcycle/moped	1	0.3 %
Other	2	0.6 %
Total	315	100.0 %

Q2b-9. Other

Q2b-9. Other	Number	Percent
I fly to CO for work	1	50.0 %
Varies	1	50.0 %
Total	2	100.0 %

Q2c. How many miles is your place of employment/school from your home?

Q2c. How many miles is your place of employment/school from your home	Number	Percent
0-2	70	27.1 %
3-5	100	38.8 %
6-10	31	12.0 %
11-15	16	6.2 %
16-20	4	1.6 %
21-25	1	0.4 %
26-30	2	0.8 %
31+	17	6.6 %
Not provided	17	6.6 %
Total	258	100.0 %

WITHOUT NOT PROVIDED

Q2c. How many miles is your place of employment/school from your home? (without "not provided")

Q2c. How many miles is your place of employment/school from your home	Number	Percent
0-2	70	29.0 %
3-5	100	41.5 %
6-10	31	12.9 %
11-15	16	6.6 %
16-20	4	1.7 %
21-25	1	0.4 %
26-30	2	0.8 %
31+	17	7.1 %
Total	241	100.0 %

Q3. On a typical weekday, how many one-way trips do you normally make using the following types of transportation?

Q2c. On a typical weekday, how many one-way trips do you normally make using the following types of transportation	Avg. Trips Per Day
Drive a car/truck alone	5.86
Carpool	.56
Vanpool	.01
Ride the bus/shuttle	.75
Ride a motorcycle/moped	.17
Walk (to a destination)	1.27
Ride a bicycle	.51

Q4. Which THREE of the following would encourage you to use a mode of transportation other than driving a personal vehicle to complete your daily trips?

Q4. What would encourage you to use a mode of transportation other than driving a personal vehicle to complete your daily trips	Number	Percent
Expanded transit service coverage	162	40.1 %
More inexpensive transit service	88	21.8 %
More bicycle and/or pedestrian connections (trails, bike lanes) to employment & commercial destinations	136	33.7 %
Wider availability of emerging transportation options like bike sharing, ridesharing (Uber, Lyft), & electric scooters	60	14.9 %
Higher costs to operate a personal vehicle or less parking availability	76	18.8 %
None of the above	150	37.1 %
Total	672	

Q5. Perceptions of Current Transportation Issues. Please rate your satisfaction with the following.

(N=404)

	Very satisfied	Satisfied	Neutral	Dissatisfi-ed	Very dissatisfi-ed	Don't know
Q5-1. Ease of north/south travel in Ames area	6.2%	26.7%	25.2%	26.2%	12.1%	3.5%
Q5-2. Ease of east/west travel in Ames area	7.9%	36.4%	29.2%	17.1%	5.7%	3.7%
Q5-3. Ease of traveling to work, shopping, & recreational activities in Ames area	8.9%	44.8%	27.2%	13.6%	3.0%	2.5%
Q5-4. CyRide (public transit in Ames) service	9.4%	25.0%	26.0%	4.2%	1.5%	33.9%
Q5-5. On street bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	3.0%	13.9%	29.5%	18.1%	7.4%	28.2%
Q5-6. "Off street" shared use paths/trails	4.2%	27.5%	28.5%	12.1%	5.4%	22.3%
Q5-7. Pedestrian facilities	5.4%	30.4%	30.2%	9.7%	2.2%	22.0%
Q5-8. Traffic safety, including automobiles, bicycle, & pedestrian safety	4.2%	33.9%	33.2%	15.8%	5.2%	7.7%
Q5-9. Flow of traffic on area streets during peak times ("rush hours")	2.7%	16.8%	22.0%	35.9%	18.6%	4.0%
Q5-10. Physical condition of roadways	2.7%	33.2%	31.4%	24.0%	5.2%	3.5%
Q5-11. Physical condition of shared use paths & trails	5.0%	31.7%	31.4%	8.7%	1.0%	22.3%

WITHOUT DON'T KNOW

Q5. Perceptions of Current Transportation Issues. Please rate your satisfaction with the following. (without "don't know")

(N=404)

	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
Q5-1. Ease of north/south travel in Ames area	6.4%	27.7%	26.2%	27.2%	12.6%
Q5-2. Ease of east/west travel in Ames area	8.2%	37.8%	30.3%	17.7%	5.9%
Q5-3. Ease of traveling to work, shopping, & recreational activities in Ames area	9.1%	45.9%	27.9%	14.0%	3.0%
Q5-4. CyRide (public transit in Ames) service	14.2%	37.8%	39.3%	6.4%	2.2%
Q5-5. On street bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	4.1%	19.3%	41.0%	25.2%	10.3%
Q5-6. "Off street" shared use paths/trails	5.4%	35.4%	36.6%	15.6%	7.0%
Q5-7. Pedestrian facilities	7.0%	39.0%	38.7%	12.4%	2.9%
Q5-8. Traffic safety, including automobiles, bicycle, & pedestrian safety	4.6%	36.7%	35.9%	17.2%	5.6%
Q5-9. Flow of traffic on area streets during peak times ("rush hours")	2.8%	17.5%	22.9%	37.4%	19.3%
Q5-10. Physical condition of roadways	2.8%	34.4%	32.6%	24.9%	5.4%
Q5-11. Physical condition of shared use paths & trails	6.4%	40.8%	40.4%	11.1%	1.3%

Q6. Which THREE of the items in Question 5 do you think are the most important Transportation issues?

Q6. Top choice	Number	Percent
Ease of north/south travel in Ames area	118	29.2 %
Ease of east/west travel in Ames area	28	6.9 %
Ease of traveling to work, shopping, & recreational activities in Ames area	24	5.9 %
CyRide (public transit in Ames) service	13	3.2 %
On street bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	22	5.4 %
"Off street" shared use paths/trails	22	5.4 %
Pedestrian facilities	5	1.2 %
Traffic safety, including automobiles, bicycle, & pedestrian safety	44	10.9 %
Flow of traffic on area streets during peak times ("rush hours")	69	17.1 %
Physical condition of roadways	38	9.4 %
Physical condition of shared use paths & trails	2	0.5 %
None chosen	19	4.7 %
Total	404	100.0 %

Q6. Which THREE of the items in Question 5 do you think are the most important Transportation issues?

Q6. 2nd choice	Number	Percent
Ease of north/south travel in Ames area	43	10.6 %
Ease of east/west travel in Ames area	56	13.9 %
Ease of traveling to work, shopping, & recreational activities in Ames area	22	5.4 %
CyRide (public transit in Ames) service	25	6.2 %
On street bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	23	5.7 %
"Off street" shared use paths/trails	23	5.7 %
Pedestrian facilities	15	3.7 %
Traffic safety, including automobiles, bicycle, & pedestrian safety	42	10.4 %
Flow of traffic on area streets during peak times ("rush hours")	75	18.6 %
Physical condition of roadways	43	10.6 %
Physical condition of shared use paths & trails	12	3.0 %
None chosen	25	6.2 %
Total	404	100.0 %

Q6. Which THREE of the items in Question 5 do you think are the most important Transportation issues?

Q6. 3rd choice	Number	Percent
Ease of north/south travel in Ames area	25	6.2 %
Ease of east/west travel in Ames area	34	8.4 %
Ease of traveling to work, shopping, & recreational activities in Ames area	44	10.9 %
CyRide (public transit in Ames) service	20	5.0 %
On street bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	30	7.4 %
"Off street" shared use paths/trails	19	4.7 %
Pedestrian facilities	16	4.0 %
Traffic safety, including automobiles, bicycle, & pedestrian safety	42	10.4 %
Flow of traffic on area streets during peak times ("rush hours")	59	14.6 %
Physical condition of roadways	58	14.4 %
Physical condition of shared use paths & trails	18	4.5 %
None chosen	39	9.7 %
Total	404	100.0 %

SUM OF TOP 3 CHOICES

Q6. Which THREE of the items in Question 5 do you think are the most important Transportation issues? (top 3)

Q6. Sum of Top 3 Choices	Number	Percent
Ease of north/south travel in Ames area	186	46.0 %
Ease of east/west travel in Ames area	118	29.2 %
Ease of traveling to work, shopping, & recreational activities in Ames area	90	22.3 %
CyRide (public transit in Ames) service	58	14.4 %
On street bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	75	18.6 %
"Off street" shared use paths/trails	64	15.8 %
Pedestrian facilities	36	8.9 %
Traffic safety, including automobiles, bicycle, & pedestrian safety	128	31.7 %
Flow of traffic on area streets during peak times ("rush hours")	203	50.2 %
Physical condition of roadways	139	34.4 %
Physical condition of shared use paths & trails	32	7.9 %
None chosen	19	4.7 %
Total	1148	

Q7. Which THREE of the following characteristics of the Ames Area transportation system do you think are most important for the future?

Q7. What characteristics of Ames area transportation system are most important for the future	Number	Percent
Provides safe transportation options	185	45.8 %
Facilitates reliable & efficient travel	202	50.0 %
Ease of connecting to destinations	184	45.5 %
Supports economic vitality of Ames area	113	28.0 %
Maintains & preserves existing transportation system	66	16.3 %
A sustainable transportation system	128	31.7 %
A transportation system that supports quality of life	98	24.3 %
Active transportation options that support public health	83	20.5 %
Equitable access to transportation options	71	17.6 %
Total	1130	

Q8. Overall, would you rate the transportation system in the Ames Area as excellent, good, average, or poor?

Q8. Your rate of transportation system in Ames area	Number	Percent
Excellent	32	7.9 %
Good	186	46.0 %
Average	135	33.4 %
Poor	38	9.4 %
Don't know	13	3.2 %
Total	404	100.0 %

WITHOUT DON'T KNOW

Q8. Overall, would you rate the transportation system in the Ames Area as excellent, good, average, or poor? (without "don't know")

Q8. Your rate of transportation system in Ames area	Number	Percent
Excellent	32	8.2 %
Good	186	47.6 %
Average	135	34.5 %
Poor	38	9.7 %
Total	391	100.0 %

Q9. Have you used public transit (CyRide) in the past 12 months?

Q9. Have you used public transit (CyRide) in past 12 months	Number	Percent
Yes	103	25.9 %
No	295	74.1 %
Total	398	100.0 %

Q9a. How often do you use CyRide during a typical week?

Q9a. How often do you use CyRide during a typical week	Number	Percent
1 time per week	44	42.7 %
2-4 times per week	22	21.4 %
5+ times per week	22	21.4 %
Not provided	15	14.6 %
Total	103	100.0 %

WITHOUT NOT PROVIDED

Q9a. How often do you use CyRide during a typical week? (without "not provided")

Q9a. How often do you use CyRide during a typical week	Number	Percent
1 time per week	44	50.0 %
2-4 times per week	22	25.0 %
5+ times per week	22	25.0 %
Total	88	100.0 %

Q9b. How would you rate the availability of public transit in Ames?

Q9b. How would you rate availability of public transit in Ames	Number	Percent
Excellent	21	20.4 %
Good	56	54.4 %
Average	19	18.4 %
Poor	6	5.8 %
Don't know	1	1.0 %
Total	103	100.0 %

WITHOUT NOT PROVIDED

Q9b. How would you rate the availability of public transit in Ames? (without "don't know")

Q9b. How would you rate availability of public transit in Ames	Number	Percent
Excellent	21	20.6 %
Good	56	54.9 %
Average	19	18.6 %
Poor	6	5.9 %
Total	102	100.0 %

Q9c. Transit Availability in the Ames Area. Please rate your satisfaction with the following.

(N=103)

	Very satisfied	Satisfied	Neutral	Dissatisfi-ed	Very dissatisfi-ed	Don't know
Q9c-1. Availability of information about public transit services	29.1%	45.6%	15.5%	2.9%	1.9%	4.9%
Q9c-2. Destinations served by public transit	15.5%	39.8%	25.2%	11.7%	1.0%	6.8%
Q9c-3. Distance to nearest public transit stop from your home	30.1%	34.0%	17.5%	8.7%	4.9%	4.9%
Q9c-4. Frequency of bus service	14.6%	39.8%	24.3%	10.7%	3.9%	6.8%
Q9c-5. Hours & days transit service is provided	16.5%	41.7%	21.4%	9.7%	3.9%	6.8%
Q9c-6. Physical condition of the bus	42.7%	43.7%	9.7%	0.0%	0.0%	3.9%
Q9c-7. Access to bus stops/amenities at bus stops	21.4%	26.2%	32.0%	9.7%	1.0%	9.7%

WITHOUT DON’T KNOW

Q9c. Transit Availability in the Ames Area. Please rate your satisfaction with the following. (without "don't know")

(N=103)

	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
Q9c-1. Availability of information about public transit services	30.6%	48.0%	16.3%	3.1%	2.0%
Q9c-2. Destinations served by public transit	16.7%	42.7%	27.1%	12.5%	1.0%
Q9c-3. Distance to nearest public transit stop from your home	31.6%	35.7%	18.4%	9.2%	5.1%
Q9c-4. Frequency of bus service	15.6%	42.7%	26.0%	11.5%	4.2%
Q9c-5. Hours & days transit service is provided	17.7%	44.8%	22.9%	10.4%	4.2%
Q9c-6. Physical condition of the bus	44.4%	45.5%	10.1%	0.0%	0.0%
Q9c-7. Access to bus stops/amenities at bus stops	23.7%	29.0%	35.5%	10.8%	1.1%

Q10. Which of the following are reasons that you do not use public transit (CyRide) more often?

Q10. What are reasons that you do not use public transit (CyRide) more often	Number	Percent
Service is not available near my home	107	13.1 %
Service is not offered to destinations I visit frequently	72	8.8 %
I don't know how to use the service (need information about routes/fees/schedules)	45	5.5 %
I had a bad experience with the service (treated poorly, arrived late, did not feel safe)	3	0.4 %
It takes too long to get to destinations compared to travel by car	178	21.9 %
Service is confusing to use	21	2.6 %
Service is not offered at the time I need it	57	7.0 %
It's too expensive	22	2.7 %
Buses do not come by stops frequently enough	36	4.4 %
Bus is too crowded when I need to take it	12	1.5 %
I just prefer to drive	221	27.1 %
Other	40	4.9 %
Total	814	100.0 %

Q11. Have you ridden a bicycle in the Ames area during the past year?

Q11. Have you ridden a bicycle in Ames area during past year	Number	Percent
Yes	188	46.5 %
No	213	52.7 %
Not provided	3	0.7 %
Total	404	100.0 %

WITHOUT NOT PROVIDED

Q11. Have you ridden a bicycle in the Ames area during the past year? (without "not provided")

Q11. Have you ridden a bicycle in Ames area during past year	Number	Percent
Yes	188	46.9 %
No	213	53.1 %
Total	401	100.0 %

Q11a. How safe do you feel bicycling on major streets without bike lanes?

Q11a. How safe do you feel bicycling on major streets without bike lanes	Number	Percent
Very safe	8	4.3 %
Safe	27	14.4 %
Neutral/neither safe nor unsafe	35	18.6 %
Unsafe	75	39.9 %
Very unsafe	38	20.2 %
Don't know	5	2.7 %
Total	188	100.0 %

WITHOUT DON'T KNOW

Q11a. How safe do you feel bicycling on major streets without bike lanes? (without "don't know")

Q11a. How safe do you feel bicycling on major streets without bike lanes	Number	Percent
Very safe	8	4.4 %
Safe	27	14.8 %
Neutral/neither safe nor unsafe	35	19.1 %
Unsafe	75	41.0 %
Very unsafe	38	20.8 %
Total	183	100.0 %

Q11b. How safe do you feel bicycling on streets with an on-street bike lane?

Q11b. How safe do you feel bicycling on streets with an on-street bike lane	Number	Percent
Very safe	8	4.3 %
Safe	69	36.7 %
Neutral/neither safe nor unsafe	49	26.1 %
Unsafe	44	23.4 %
Very unsafe	10	5.3 %
Don't know	8	4.3 %
Total	188	100.0 %

WITHOUT DON'T KNOW

Q11b. How safe do you feel bicycling on streets with an on-street bike lane? (without "don't know")

Q11b. How safe do you feel bicycling on streets with an on-street bike lane	Number	Percent
Very safe	8	4.4 %
Safe	69	38.3 %
Neutral/neither safe nor unsafe	49	27.2 %
Unsafe	44	24.4 %
Very unsafe	10	5.6 %
Total	180	100.0 %

Q11c. How safe do you feel bicycling on a shared-use path or trail?

Q11c. How safe do you feel bicycling on a shared-use path or trail	Number	Percent
Very safe	67	35.6 %
Safe	79	42.0 %
Neutral/neither safe nor unsafe	23	12.2 %
Unsafe	12	6.4 %
Very unsafe	3	1.6 %
Don't know	4	2.1 %
Total	188	100.0 %

WITHOUT DON’T KNOW

Q11c. How safe do you feel bicycling on a shared-use path or trail? (without "don't know")

Q11c. How safe do you feel bicycling on a shared-use path or trail	Number	Percent
Very safe	67	36.4 %
Safe	79	42.9 %
Neutral/neither safe nor unsafe	23	12.5 %
Unsafe	12	6.5 %
Very unsafe	3	1.6 %
Total	184	100.0 %

Q11d. What is the primary reason why you ride your bike?

Q11d. What is the primary reason why you ride your bike	Number	Percent
To commute to school, work, personal business, or shopping trips	19	10.1 %
For recreational (fitness, leisure) use	119	63.3 %
Both	49	26.1 %
Not provided	1	0.5 %
Total	188	100.0 %

WITHOUT NOT PROVIDED

Q11d. What is the primary reason why you ride your bike? (without "not provided")

Q11d. What is the primary reason why you ride your bike	Number	Percent
To commute to school, work, personal business, or shopping trips	19	10.2 %
For recreational (fitness, leisure) use	119	63.6 %
Both	49	26.2 %
Total	187	100.0 %

Q12. How safe do you feel, walking or using a wheelchair on sidewalks along major streets?

Q12. How safe do you feel walking or using a wheelchair on sidewalks along major streets	Number	Percent
Very safe	71	17.6 %
Safe	171	42.3 %
Neutral/neither safe nor unsafe	85	21.0 %
Unsafe	30	7.4 %
Very unsafe	7	1.7 %
Don't know	40	9.9 %
Total	404	100.0 %

WITHOUT DON'T KNOW

Q12. How safe do you feel, walking or using a wheelchair on sidewalks along major streets? (without "don't know")

Q12. How safe do you feel walking or using a wheelchair on sidewalks along major streets	Number	Percent
Very safe	71	19.5 %
Safe	171	47.0 %
Neutral/neither safe nor unsafe	85	23.4 %
Unsafe	30	8.2 %
Very unsafe	7	1.9 %
Total	364	100.0 %

Q13. How safe do you feel using pedestrian crossings on major streets?

Q13. How safe do you feel using pedestrian crossings on major streets	Number	Percent
Very safe	55	13.6 %
Safe	171	42.3 %
Neutral/neither safe nor unsafe	104	25.7 %
Unsafe	50	12.4 %
Very unsafe	11	2.7 %
Don't know	13	3.2 %
Total	404	100.0 %

WITHOUT DON'T KNOW

Q13. How safe do you feel using pedestrian crossings on major streets? (without "don't know")

Q13. How safe do you feel using pedestrian crossings on major streets	Number	Percent
Very safe	55	14.1 %
Safe	171	43.7 %
Neutral/neither safe nor unsafe	104	26.6 %
Unsafe	50	12.8 %
Very unsafe	11	2.8 %
Total	391	100.0 %

Q14. How safe do you feel walking or using a wheelchair on a shared-use path or trail or sidewalk in the area where you live?

Q14. How safe do you feel walking or using a wheelchair on a shared-use path or trail or sidewalk in area where you live	Number	Percent
Very safe	82	20.3 %
Safe	169	41.8 %
Neutral/neither safe nor unsafe	62	15.3 %
Unsafe	22	5.4 %
Very unsafe	3	0.7 %
Don't know	66	16.3 %
Total	404	100.0 %

WITHOUT DON'T KNOW

Q14. How safe do you feel walking or using a wheelchair on a shared-use path or trail or sidewalk in the area where you live? (without "don't know")

Q14. How safe do you feel walking or using a wheelchair on a shared-use path or trail or sidewalk in area where you live	Number	Percent
Very safe	82	24.3 %
Safe	169	50.0 %
Neutral/neither safe nor unsafe	62	18.3 %
Unsafe	22	6.5 %
Very unsafe	3	0.9 %
Total	338	100.0 %

Q15. What is the primary reason for your pedestrian travel?

Q15. What is the primary reason for your pedestrian travel	Number	Percent
To commute to school, work, personal business, or shopping trips	41	10.1 %
For recreational (fitness, leisure) use	264	65.3 %
Both	81	20.0 %
Not provided	18	4.5 %
Total	404	100.0 %

WITHOUT NOT PROVIDED

Q15. What is the primary reason for your pedestrian travel? (without "not provided")

Q15. What is the primary reason for your pedestrian travel	Number	Percent
To commute to school, work, personal business, or shopping trips	41	10.6 %
For recreational (fitness, leisure) use	264	68.4 %
Both	81	21.0 %
Total	386	100.0 %

Q16. For each of the following systems enhancements, please indicate whether you would be very supportive, somewhat supportive, or not supportive. Please recognize that there is an increased cost to some of these elements.

(N=404)

	Very supportive	Supporti-ve	Neutral	Not supportive	Not supportiv-e at all	Don't know
Q16-1. Adding more dedicated bike lanes on streets in Ames area	17.8%	24.0%	25.0%	16.3%	12.6%	4.2%
Q16-2. Adding more shared use paths & trails in Ames area	30.2%	34.2%	22.3%	4.5%	3.0%	5.9%
Q16-3. Increasing investments in traffic management technologies such as real-time traveler information & advanced traffic signal systems	21.3%	32.2%	29.0%	7.9%	3.0%	6.7%
Q16-4. Widening existing roads & building new roads to relieve congestion	30.0%	33.2%	21.5%	9.7%	2.2%	3.5%
Q16-5. Adding more turn lanes at critical intersections to improve traffic operations	38.4%	41.8%	13.1%	3.5%	0.7%	2.5%
Q16-6. Installing traffic control equipment to give buses priority through signalized intersections	7.4%	18.8%	41.3%	16.8%	8.7%	6.9%
Q16-7. Implementing targeted safety improvements at high crash locations	30.4%	47.0%	15.6%	2.2%	0.2%	4.5%
Q16-8. Providing better access to I-35 and/or US 30 for Ames area	19.6%	22.3%	40.1%	9.4%	3.7%	5.0%

WITHOUT DON'T KNOW

Q16. For each of the following systems enhancements, please indicate whether you would be very supportive, somewhat supportive, or not supportive. Please recognize that there is an increased cost to some of these elements. (without "don't know")

(N=404)

	Very supportive	Supportive	Neutral	Not supportive	Not supportive at all
Q16-1. Adding more dedicated bike lanes on streets in Ames area	18.6%	25.1%	26.1%	17.1%	13.2%
Q16-2. Adding more shared use paths & trails in Ames area	32.1%	36.3%	23.7%	4.7%	3.2%
Q16-3. Increasing investments in traffic management technologies such as real-time traveler information & advanced traffic signal systems	22.8%	34.5%	31.0%	8.5%	3.2%
Q16-4. Widening existing roads & building new roads to relieve congestion	31.0%	34.4%	22.3%	10.0%	2.3%
Q16-5. Adding more turn lanes at critical intersections to improve traffic operations	39.3%	42.9%	13.5%	3.6%	0.8%
Q16-6. Installing traffic control equipment to give buses priority through signalized intersections	8.0%	20.2%	44.4%	18.1%	9.3%
Q16-7. Implementing targeted safety improvements at high crash locations	31.9%	49.2%	16.3%	2.3%	0.3%
Q16-8. Providing better access to I-35 and/or US 30 for Ames area	20.6%	23.4%	42.2%	9.9%	3.9%

Q17. Understanding the long-range goals and vision of Ames area residents is vital to the Plan. Help us by telling us how important each of the following statements are to you. Please rate each goal area by choosing a number between 5 and 1, where 5 means it is "Very Important" and 1 means "Not at all Important." (without "not provided")

(N=404)

	Very important	Important	Neutral	Not important	Not at all important
Q17-1. A safe & connected multi-modal network, including bikes, pedestrians, transit & autos	36.1%	39.1%	17.4%	5.9%	1.5%
Q17-2. A transportation system that supports quality of life	30.4%	47.9%	20.4%	1.0%	0.3%
Q17-3. Preserves & enhances environment & community	33.0%	46.5%	16.4%	2.8%	1.3%
Q17-4. Supports economic vitality of Ames area	27.3%	52.3%	17.6%	1.3%	1.5%
Q17-5. Maintains & preserves existing transportation system	16.9%	37.6%	35.5%	6.9%	3.1%
Q17-6. Active transportation options that support public health	21.8%	44.1%	28.2%	4.1%	1.8%
Q17-7. Protects environmental resources	35.0%	40.2%	18.9%	3.8%	2.0%
Q17-8. Access to transportation options is equitable	25.6%	38.0%	27.6%	5.7%	3.1%

Q18. How many persons in your household, ages 16 and older, are dependent on public transit or rides from friends/relatives because they do not have a car or do not drive?

Q18. How many persons in your household are dependent on public transit or rides from friends/ relatives	Number	Percent
0	333	82.4 %
1	37	9.2 %
2	29	7.2 %
3+	5	1.2 %
Total	404	100.0 %

Q19. Including yourself, how many persons in your household are...

	Mean	Sum
number	2.44	975
Under age 5	0.13	52
Ages 5-9	0.10	40
Ages 10-14	0.11	44
Ages 15-19	0.12	49
Ages 20-24	0.17	69
Ages 25-34	0.26	103
Ages 35-44	0.34	137
Ages 45-54	0.34	134
Ages 55-64	0.43	170
Ages 65+	0.44	177

Q20. Would you say your total Household income is...

Q20. Your total household income	Number	Percent
Under $30K	49	12.1 %
$30K to $59,999	83	20.5 %
$60K to $99,999	102	25.2 %
$100K+	110	27.2 %
Not provided	60	14.9 %
Total	404	100.0 %

WITHOUT NOT PROVIDED

Q20. Would you say your total Household income is... (without "not provided")

Q20. Your total household income	Number	Percent
Under $30K	49	14.2 %
$30K to $59,999	83	24.1 %
$60K to $99,999	102	29.7 %
$100K+	110	32.0 %
Total	344	100.0 %

Q21. Which of the following best describes your race?

Q21. Your race	Number	Percent
African American/Black	13	3.2 %
American Indian	2	0.5 %
Asian/Pacific Islander	36	8.9 %
White/Caucasian	328	80.8 %
Other	11	2.7 %
Prefer not to disclose	16	3.9 %
Total	406	100.0 %

Q21-5. Other

Q21-5. Other	Number	Percent
Hispanic	9	81.8 %
Mixed	2	18.2 %
Total	11	100.0 %

Q22. Are you currently a student at Iowa State University?

Q22. Are you currently a student at Iowa State University	Number	Percent
Yes	27	6.7 %
No	371	91.8 %
Not provided	6	1.5 %
Total	404	100.0 %

WITHOUT NOT PROVIDED

Q22. Are you currently a student at Iowa State University? (without "not provided")

Q22. Are you currently a student at Iowa State University	Number	Percent
Yes	27	6.8 %
No	371	93.2 %
Total	398	100.0 %

Q23. Your gender:

Q23. Your gender	Number	Percent
Male	197	48.8 %
Female	196	48.5 %
Prefer not to disclose	11	2.7 %
Total	404	100.0 %

WITHOUT NOT PROVIDED

Q23. Your gender: (without "prefer not to disclose")

Q23. Your gender	Number	Percent
Male	197	50.1 %
Female	196	49.9 %
Total	393	100.0 %

Section 3:
Survey Instrument

October 2019

RE: Ames Area Regional Transportation Survey

Dear Resident:

On behalf of local governments in Story and Boone Counties, I want to encourage you to take a few minutes to complete this important Survey. Your input will be used by community leaders to set transportation priorities for our region.

The Ames Area Metropolitan Planning Organization is an organization of local governments in Story and Boone Counties that is responsible for regional transportation planning. We are in the process of updating the region's metropolitan transportation plan, and the results of this survey will help us identify which transportation improvements are needed most.

Since only a limited number of households in the region were selected at random to receive the survey, your participation will ensure residents in your area are well represented in the transportation plan.

A postage-paid return envelope addressed to ETC Institute has been provided for your convenience. We have selected ETC Institute as our partner for this project. They will compile the results and present a report to the community in a few weeks.

If you have any questions, please call me at 515.239.5160.

Thank you for your support of this important effort.

Sincerely,

Damion Pregitzer
Traffic Engineer

Ames Area Metropolitan Planning Organization • 515 Clark Avenue • Ames, IA 50010

2019 Regional Travel Survey

One of the first considerations for planning the future of a region is the need for adequate transportation. Because of the time it takes to implement and the investment required, long range transportation planning is vital to successfully shaping the future of any region. We would like your help today in shaping the future of the Ames Region. Thank you for taking time to complete the survey. When you are finished, please return your completed survey in the postage-paid envelope addressed to ETC Institute, 725 W. Frontier Circle, Olathe, KS 66061. If you prefer, you can complete the survey online at *www.aamposurvey.org*.

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1. How many operating vehicles (cars, trucks, motorcycles/mopeds, vans) do you have in your household?

______ vehicle(s)

2. What is your employment status? *[Check all that apply.]*

____(1) Employed outside the home *[Answer Q2a-2c.]*
____(2) Student (K-12) *[Answer Q2a-2c.]*
____(3) Student (University) *[Answer Q2a-2c.]*
____(4) Operate home-based business *[Skip to Q3.]*
____(5) Not currently employed *[Skip to Q3.]*
____(6) Retired *[Skip to Q3.]*

2a. In which city do you work? ____

2b. What method of transportation do you normally use to go to work/school?

____(1) Car/Truck - drive alone
____(2) Carpool
____(3) Vanpool
____(4) Walk
____(5) Taxi/Ride hail (Uber, Lyft, etc.)
____(6) Bicycle
____(7) Public transit (CyRide)
____(8) Motorcycle/Moped
____(9) Other: ____________________________________

2c. How many miles is your place of employment/school from your home? ______ miles

3. On a typical weekday, how many one-way trips do you normally make using the following types of transportation? Please count all trips completed, including return trips to your home. If you make multiple stops on your way, please count each destination you visit as a separate trip. For example, if you stop at a gas station on the way to work, this would count as two trips.

1. Drive a car/truck alone ______ trips
2. Carpool ______ trips
3. Vanpool ______ trips
4. Ride the bus/shuttle ______ trips
5. Ride a motorcycle/moped ______ trips
6. Walk (to a destination) ______ trips
7. Ride a bicycle ______ trips

4. Which THREE of the following would encourage you to use a mode of transportation other than driving a personal vehicle to complete your daily trips?

____(1) Expanded transit service coverage
____(2) More inexpensive transit service
____(3) More bicycle and/or pedestrian connections (trails, bike lanes) to employment and commercial destinations
____(4) Wider availability of emerging transportation options like bike sharing, ridesharing (Uber, Lyft), and electric scooters
____(5) Higher costs to operate a personal vehicle or less parking availability
____(6) None of the above

5.	**Perceptions of Current Transportation Issues** Please rate your satisfaction with the following.	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Don't Know
01.	Ease of north/south travel in the Ames area	5	4	3	2	1	9
02.	Ease of east/west travel in the Ames area	5	4	3	2	1	9
03.	Ease of traveling to work, shopping, and recreational activities in the Ames Area	5	4	3	2	1	9
04.	CyRide (public transit in Ames) service	5	4	3	2	1	9
05.	"On street" bicycle facilities (e.g. bike lanes, sharrows, cycle tracks)	5	4	3	2	1	9
06.	"Off street" shared use paths/trails	5	4	3	2	1	9
07.	Pedestrian facilities	5	4	3	2	1	9
08.	Traffic safety, including automobiles, bicycle, and pedestrian safety	5	4	3	2	1	9
09.	Flow of traffic on area streets during peak times ("rush hours")	5	4	3	2	1	9
10.	Physical condition of roadways	5	4	3	2	1	9
11.	Physical condition of shared use paths and trails	5	4	3	2	1	9

6. Which THREE of the items in Question 5 do you think are the most important Transportation issues? *[Write in your answers below using the numbers from the list in Question 5.]*

1st: ____ 2nd: ____ 3rd: ____

7. Which THREE of the following characteristics of the Ames Area transportation system do you think are most important for the future?

____(1) Provides safe transportation options
____(2) Facilitates reliable and efficient travel
____(3) Ease of connecting to destinations
____(4) Supports the economic vitality of the Ames Area
____(5) Maintains and preserves the existing transportation system
____(6) A sustainable transportation system
____(7) A transportation system that supports quality of life
____(8) Active transportation options that support public health
____(9) Equitable access to transportation options

8. Overall, would you rate the transportation system in the Ames Area as excellent, good, average, or poor?

____(1) Excellent ____(2) Good ____(3) Average ____(4) Poor ____(9) Don't know

Public Transit in the Ames Area

9. Have you used public transit (CyRide) in the past 12 months?

____(1) Yes *[Answer Q9a-c.]* ____(2) No *[Skip to Q10.]*

9a. How often do you use CyRide during a typical week?

____(1) 1 time per week ____(2) 2-4 times per week ____(3) 5 or more times per week

9b. How would you rate the availability of public transit in Ames?

____(1) Excellent ____(2) Good ____(3) Average ____(4) Poor ____(9) Don't know

9c.	**Transit Availability in the Ames Area** Please rate your satisfaction with the following.	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Don't Know
1.	Availability of information about public transit services	5	4	3	2	1	9
2.	Destinations served by public transit	5	4	3	2	1	9
3.	Distance to the nearest public transit stop from your home	5	4	3	2	1	9
4.	The frequency of bus service	5	4	3	2	1	9
5.	Hours and days transit service is provided	5	4	3	2	1	9
6.	The physical condition of the bus	5	4	3	2	1	9
7.	Access to bus stops/amenities at bus stops	5	4	3	2	1	9

10. Which of the following are reasons that you do not use public transit (CyRide) more often? *[Check all that apply.]*

____(01) Service is not available near my home
____(02) Service is not offered to destinations I visit frequently
____(03) I don't know how to use the service (need information about routes/fees/schedules)
____(04) I had a bad experience with the service (treated poorly, arrived late, did not feel safe)
____(05) It takes too long to get to destinations compared to travel by car
____(06) The service is confusing to use
____(07) Service is not offered at the time I need it
____(08) It's too expensive
____(09) Buses do not come by stops frequently enough
____(10) The bus is too crowded when I need to take it
____(11) I just prefer to drive
____(12) Other: ________________________________

Bicycling in the Ames Area

11. Have you ridden a bicycle in the Ames area during the past year?

____(1) Yes *[Answer Q11a-d.]* ____(2) No *[Skip to Q12.]*

11a. How safe do you feel bicycling on major streets without bike lanes?

____(1) Very Safe
____(2) Safe
____(3) Neutral/neither safe nor unsafe
____(4) Unsafe
____(5) Very Unsafe
____(9) Don't know

11b. How safe do you feel bicycling on streets with an on-street bike lane?

____(1) Very Safe
____(2) Safe
____(3) Neutral/neither safe nor unsafe
____(4) Unsafe
____(5) Very Unsafe
____(9) Don't know

11c. How safe do you feel bicycling on a shared-use path or trail?

____(1) Very Safe
____(2) Safe
____(3) Neutral/neither safe nor unsafe
____(4) Unsafe
____(5) Very Unsafe
____(9) Don't know

11d. What is the primary reason why you ride your bike?

____(1) To commute to school, work, personal business, or shopping trips
____(2) For recreational (fitness, leisure) use
____(3) Both

Walking in the Ames Area

12. How safe do you feel walking or using a wheelchair on sidewalks along major streets?

____(1) Very Safe
____(2) Safe
____(3) Neutral/Neither safe nor unsafe
____(4) Unsafe
____(5) Very Unsafe
____(9) Don't know

13. How safe do you feel using pedestrian crossings on major streets?

____(1) Very Safe
____(2) Safe
____(3) Neutral/Neither safe nor unsafe
____(4) Unsafe
____(5) Very Unsafe
____(9) Don't know

14. How safe do you feel walking or using a wheelchair on a shared-use path or trail or sidewalk in the area where you live?

____(1) Very Safe
____(2) Safe
____(3) Neutral/Neither safe nor unsafe
____(4) Unsafe
____(5) Very Unsafe
____(9) Don't know

15. What is the primary reason for your pedestrian travel?

____(1) To commute to school, work, personal business or shopping trips
____(2) For recreational (fitness, leisure) use
____(3) Both

General Questions

16. For each of the following systems enhancements, please indicate whether you would be very supportive, somewhat supportive, or not supportive. Please recognize that there is an increased cost to some of these elements.

	System Enhancements Please rate your support for the following.	Very Supportive	Supportive	Neutral	Not Supportive	Not Supportive at All	Don't Know
1.	Adding more dedicated bike lanes on streets in the Ames Area	5	4	3	2	1	9
2.	Adding more shared use paths and trails in the Ames Area	5	4	3	2	1	9
3.	Increasing investments in traffic management technologies such as real-time traveler information and advanced traffic signal systems	5	4	3	2	1	9
4.	Widening existing roads and building new roads to relieve congestion	5	4	3	2	1	9
5.	Adding more turn lanes at critical intersections to improve traffic operations	5	4	3	2	1	9
6.	Installing traffic control equipment to give buses priority through signalized intersections	5	4	3	2	1	9
7.	Implementing targeted safety improvements at high crash locations	5	4	3	2	1	9
8.	Providing better access to I-35 and/or US 30 for the Ames Area	5	4	3	2	1	9

17. **Understanding the long-range goals and vision of Ames area residents is vital to the Plan. Help us by telling us how important each of the following statements are to you. Please rate each goal area by choosing a number between 5 and 1, where 5 means it is "Very Important" and 1 means "Not at all Important".**

	Importance of Various Issues to Transportation Improvements	Very Important	Important	Neutral	Not important	Not at all Important
1.	A safe and connected multi-modal network, including bikes, pedestrians, transit and autos	5	4	3	2	1
2.	A transportation system that supports quality of life	5	4	3	2	1
3.	Preserves and enhances the environment and the community	5	4	3	2	1
4.	Supports the economic vitality of the Ames Area	5	4	3	2	1
5.	Maintains and preserves the existing transportation system	5	4	3	2	1
6.	Active transportation options that support public health	5	4	3	2	1
7.	Protects environmental resources	5	4	3	2	1
8.	Access to transportation options is equitable	5	4	3	2	1

To ensure our survey is representative of the community, please provide the following.

18. **How many persons in your household, ages 16 and older, are dependent on public transit or rides from friends/relatives because they do not have a car or do not drive?**

______ persons

19. **Including yourself, how many persons in your household are...**

Under age 5: ____ 15 - 19 years: ____ 35 - 44 years: ____ 65+ years: ____
5 - 9 years: ____ 20 - 24 years: ____ 45 - 54 years: ____
10 - 14 years: ____ 25 - 34 years: ____ 55 - 64 years: ____

20. **Would you say your total Household income is...**

____(1) Under $30,000 ____(2) $30,000 to $59,999 ____(3) $60,000 to $99,999 ____(4) $100,000 plus

21. **Which of the following best describes your race?** *[Check all that apply.]*

____(1) African American/Black ____(3) Asian/Pacific Islander ____(5) Other: ________________________
____(2) American Indian ____(4) White/Caucasian ____(6) Prefer not to disclose

22. **Are you currently a student at Iowa State University?** ____(1) Yes ____(2) No

23. **Your gender:** ____(1) Male ____(2) Female ____(3) Prefer not to disclose

FORWARD 2045

c/o Kristen Veldhouse
1917 S 67th St
Omaha, NE 68106

Save the Date!
Visioning Open House

DATE
Thursday, November 14, 2019

TIME
5:30 – 7:30 p.m.

LOCATION
**Ames Public Library –
Farwell T. Brown Auditorium
515 Douglas Ave, Ames, IA 50010**

The Ames Area Metropolitan Planning Organization (AAMPO) is initiating an update to their regional Metropolitan Transportation Plan (MTP), known as Forward 2045, and is requesting your feedback to help establish a vision for transportation in the Ames metropolitan area.

Developing an MTP is a community-driven process and your involvement is important.

Please plan to join us for a Visioning Open House!

Date: Thursday, November 14, 2019

Time: 5:30 – 7:30 p.m

Location: Ames Public Library – Farwell T. Brown Auditorium, 515 Douglas Ave, Ames, IA 50010

There will be no formal presentation. Attendees are welcome to attend any time to participate in interactive exercises to contribute ideas to establish a transportation vision and goals for Forward 2045. Community input is important to the planning efforts - please plan to attend and participate.

For more information about Forward 2045, visit **www.cityofames.org/forward45**. If you are unable to attend the Visioning Open House in-person, an online meeting will be available at **amesgisweb.city.ames.ia.us/forward45** from November 14 through November 27.

About Forward 2045

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

FORWARD 2045

Press Release

FOR IMMEDIATE RELEASE
October 30, 2019

Media Contact
Damion Pregitzer, MTP Project Manager, AAMPO, 515-239-5160, dpregitzer@city.ames.ia.us

AAMPO Seeking Community Input on the Future of Transportation in Ames

AMES, IA – The Ames Area Metropolitan Planning Organization (AAMPO) is initiating an update to the Ames area's regional Metropolitan Transportation Plan (MTP), known as Forward 2045, and is requesting feedback from the community to better inform their efforts and ensure the MTP incorporates transportation strategies and techniques that reflect community values.

The public is invited to learn about the MTP planning process and provide their input at a Visioning Open House meeting held on Thursday, November 14 from 5:30 to 7:30 p.m. at the Ames Public Library – Farwell T. Brown Auditorium, 515 Douglas Ave, Ames, IA 50010. There will be no formal presentation. Attendees are welcome to attend any time to participate in interactive exercises to contribute ideas to establish a transportation vision and goals for Forward 2045. Community input is important to the planning efforts - please plan to attend and participate.

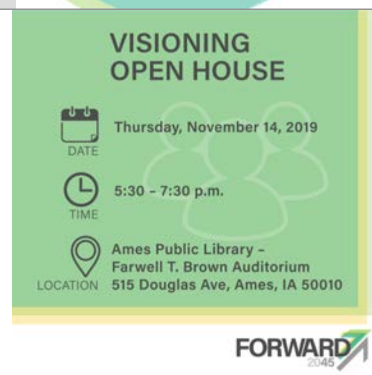
"We want to understand what concerns the Ames community has for transportation today, as well as what the community wants for the future of transportation," said Damion Pregitzer, MTP Project Manager at AAMPO. "This feedback will help guide us in creating a vision and goals that will frame the Forward 2045 plan as we analyze transportation data and evaluate alternatives and strategies that suit Ames."

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

For more information about Forward 2045, visit www.cityofames.org/forward45. If you are unable to attend the visioning open house in-person, an online version of the meeting will be available at amesgisweb.city.ames.ia.us/forward45 from November 14 to November 27.

###

Open House

Launch Date	Content	Graphics
10/30/2019	We're kicking off our Metropolitan Transportation Plan and we want to know YOUR vision for transportation in Ames. Join us at a Visioning Open House on November 14! #Forward45 www.cityofames.org/forward45	
11/7/2019	How do you get around in the area? We are updating our plan for the future and need your input. Join us next week! Learn more www.cityofames.org/forward45 #Forward45	
11/13/2019	T-minus one day until our #Forward45 visioning open house! We can't wait to see everyone there tomorrow at City Hall – Council Chambers, from 5:30-7:30pm #Forward45 www.cityofames.org/forward45	
11/15/2019	Even if you missed last night's open house for #Forward45, you didn't miss your opportunity to learn more about it or provide input on the future of transportation in Ames. amesgisweb.city.ames.ia.us/forward45	[Picture from meeting – KV to send]
11/23/2019	The online meeting for the #Forward45 visioning open house is closing on November 27. Don't miss your chance to contribute your ideas for Ames' future! #MTP amesgisweb.city.ames.ia.us/forward45	-

Survey

Launch Date	Content	Graphics
11/5/2019	We've just launched #Forward45 and we need your help! We want to understand transportation behavior in Ames, and you can help us by taking this survey: www.surveymonkey.com/r/Forward45	
11/19/2019	Have an extra 15 minutes right now? Take our Community Transportation Assessment survey to help us understand transportation behavior in Ames. #Forward45 www.surveymonkey.com/r/Forward45	
11/26/2019	Today and tomorrow are your last chances to take our Community Transportation Assessment survey. Don't miss your chance to be a part of the future of Ames! www.surveymonkey.com/r/Forward45	
11/27/2019	Before you break for Turkey Day, take a quick Community Transportation Assessment survey. We'll be thankful! www.surveymonkey.com/r/Forward45	

From: AAMPO - Forward 2045 Metropolitan Transportation Plan
To: Veldhouse, Kristen
Subject: Don"t Forget - the Forward 2045 Visioning Open House is Tomorrow!
Date: Wednesday, November 13, 2019 10:59:22 AM

View this email in your browser

DON'T MISS THIS CHANCE TO HELP DEFINE A TRANSPORTATION VISION FOR AMES

Don't forget that the visioning open house for the Forward 2045 Metropolitan Transportation Plan update is **tomorrow**!

Date:

Time:
Location:

Thursday, November 14, 2019
5:30 – 7:30 p.m.
Ames Public Library – Farwell T. Brown Auditorium, 515 Douglas Ave, Ames, IA 50010

The Ames Area Metropolitan Planning Organization (AAMPO) is seeking community feedback to gain a better understanding of the community's transportation priorities, current and future transportation needs, and how to best address those needs with available transportation funding for the Forward 2045 Metropolitan Transportation Plan. Transportation planning helps users of any transportation system move around safely, reliably, and efficiently.

There will be no formal presentation. Attendees are welcome to attend any time to participate in interactive exercises to contribute ideas to establish a transportation vision and goals for Forward 2045. Community input is important to the planning efforts - please plan to attend and participate.

For more information about Forward 2045, visit the project website at www.cityofames.org/forward45. If you are unable to attend the visioning open house in-person, an online version of the meeting will be available at amesgisweb.city.ames.ia.us/forward45 from November 14 to November 27.

We'll see you tomorrow!

About Forward 2045

Forward 2045 will result in a 25-year prioritized plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes buses, cars, bicycles, and pedestrians. The plan will identify various transportation alternatives and strategies that will improve the Ames transportation system, consider financial constraints, and will then be prioritized based on collected data and community feedback. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

Our mailing address is:
Forward 2045 Metropolitan Transportation Plan
1917 S 67th St
Omaha, NE 68106-2973

From: AAMPO - Forward 2045 Metropolitan Transportation Plan
To: Veldhouse, Kristen
Subject: Join us for the Forward 2045 Visioning Open House!
Date: Wednesday, October 30, 2019 8:29:25 AM

View this email in your browser

HELP US DEFINE A VISION FOR AMES

The Ames Area Metropolitan Planning Organization (AAMPO) is initiating an update to their regional Metropolitan Transportation Plan (MTP), known as Forward 2045, and is requesting feedback from YOU to help establish a vision for transportation in the Ames metropolitan area.

Developing an MTP is a community-driven process, which is why you are

invited to a visioning open house! Join us:

Date:
Time:
Location:

Thursday, November 14, 2019
5:30 – 7:30 p.m.
Ames Public Library – Farwell T. Brown Auditorium, 515 Douglas Ave, Ames, IA 50010

There will be no formal presentation. Attendees are welcome to attend any time to participate in interactive exercises to contribute ideas to establish a transportation vision and goals for Forward 2045. Community input is important to the planning efforts - please plan to attend and participate.

For more information about Forward 2045, visit the project website at www.cityofames.org/forward45. If you are unable to attend the visioning open house in-person, an online version of the meeting will be available at amesgisweb.city.ames.ia.us/forward45 from November 14 to November 27.

We look forward to receiving your input on Forward 2045!

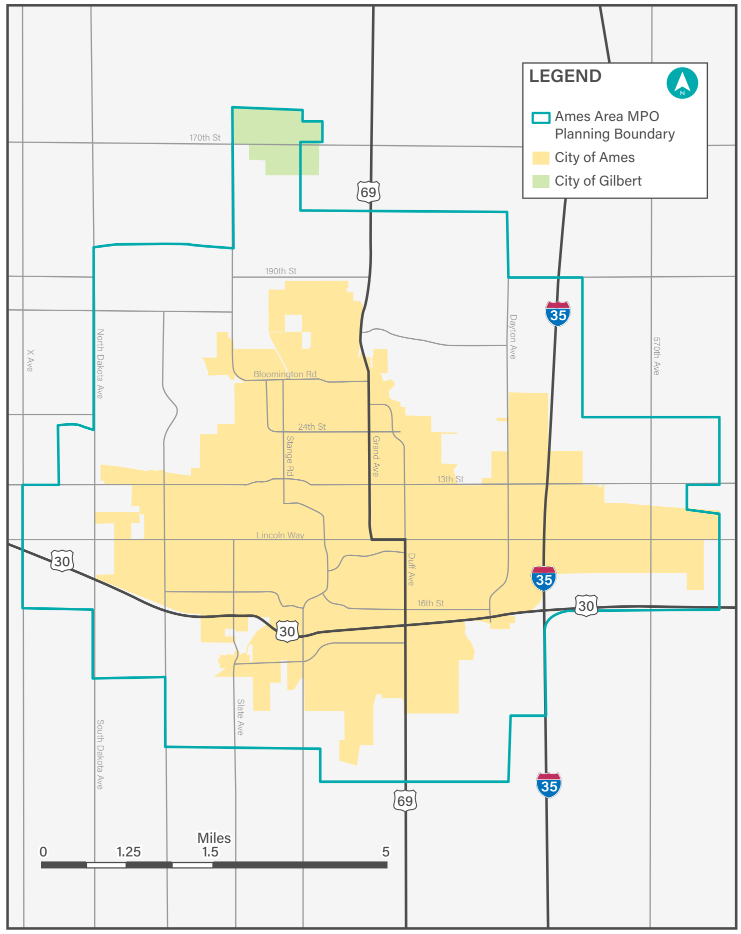
About Forward 2045

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

FORWARD 2045

Welcome

The Ames Area Metropolitan Planning Organization (AAMPO) is initiating an update to the Ames area's regional Metropolitan Transportation Plan (MTP), known as Forward 2045. Forward 2045 will result in a plan for the next 25 years that will define how the metropolitan area will manage and operate the multi-modal transportation system, which includes busses, cars, bicycles and pedestrians. The plan will identify various transportation alternatives and strategies that will improve the Ames transportation system, consider financial constraints, and will then be prioritized based on collected data and community feedback.



The AAMPO is committed to implementing a holistic planning process that will foster:

- **Wider regional inclusion and prosperity**
- **High standards of living**
- **Connections for people throughout the community.**

We need you to be a part of Forward 2045!

Today's open house will focus on **YOUR** desires for the future of transportation in Ames. We want to gain a better understanding from you of your transportation priorities, our current and future transportation needs, and how to best address those needs with available transportation funding, so that users of the Ames transportation system can move around the system safely, freely, and efficiently. As you participate in our interactive exercises, consider the following:

How do you get to your home, work or any other destination? Do you drive, walk, bus or bike?

Would you like to use a different mode of transportation to reach your destination instead of your current mode of transportation?

How would you like to see Ames' transportation system change in the next 25 years?

What technologies would you like to see implemented in Ames?

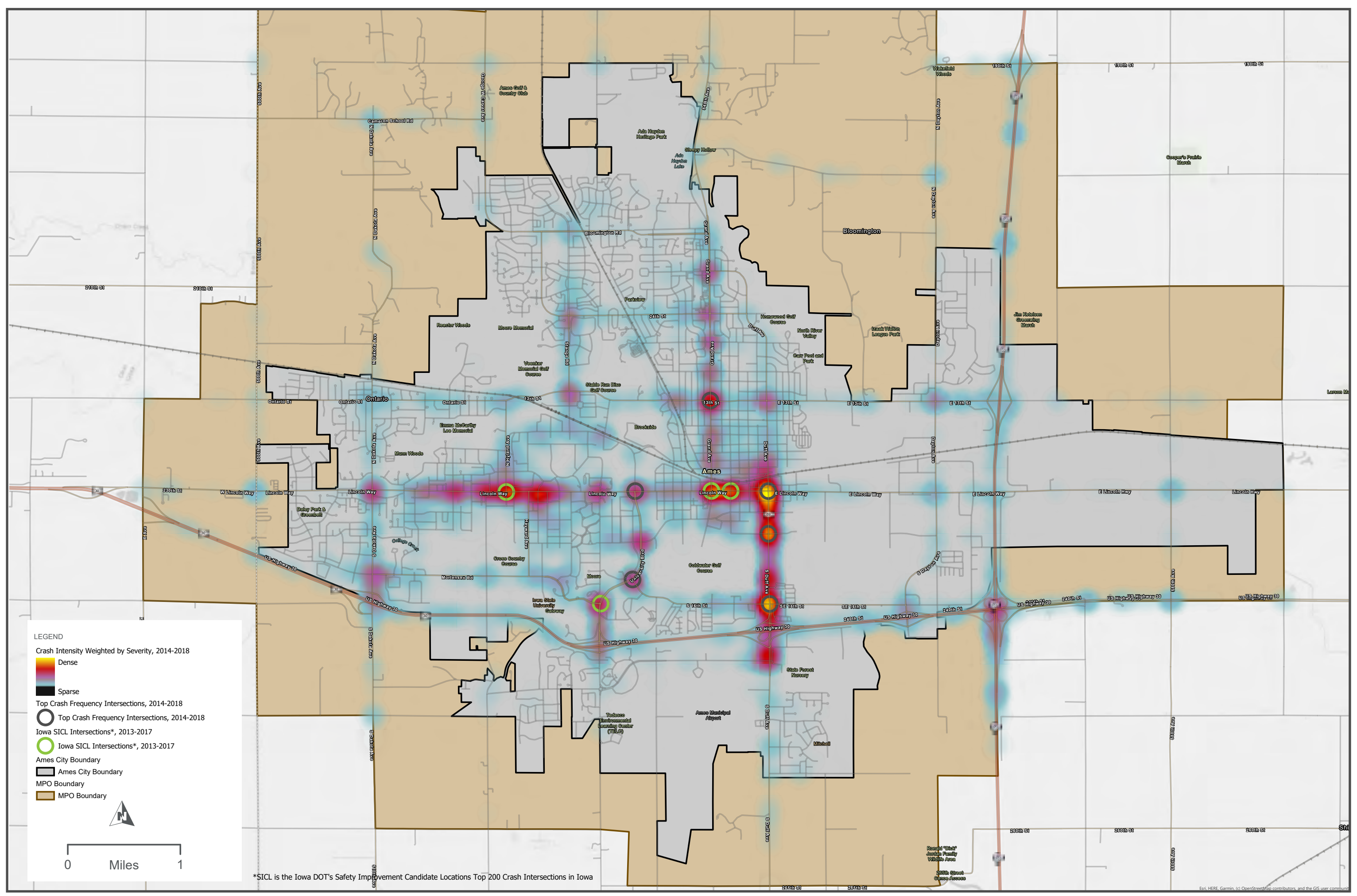
HAVE SOMETHING ELSE TO SAY AFTER THE VISIONING OPEN HOUSE?

We're hosting an online meeting at **amesgisweb.city.ames.ia.us/forward45** until November 27.

In addition to taking your thoughts and ideas into consideration for Forward 2045, AAMPO also considers historical data such as crashes and congestion in the metropolitan area in order to recommend the best transportation improvement strategies and practices.

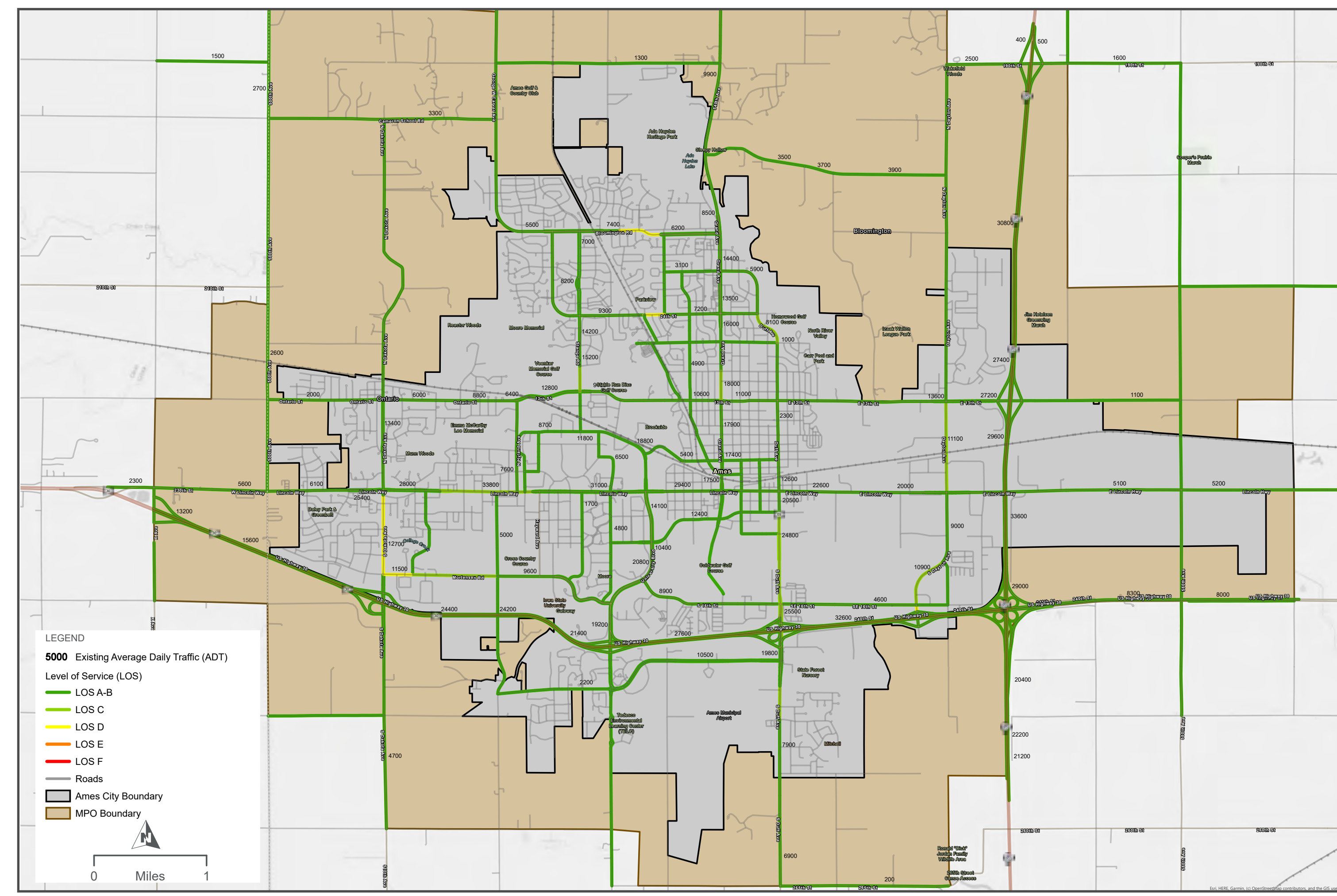
Traffic Safety

Traffic safety is a priority throughout the area. This map provides a historical representation of crashes that have occurred and areas where safety improvements may be considered.



Congestion

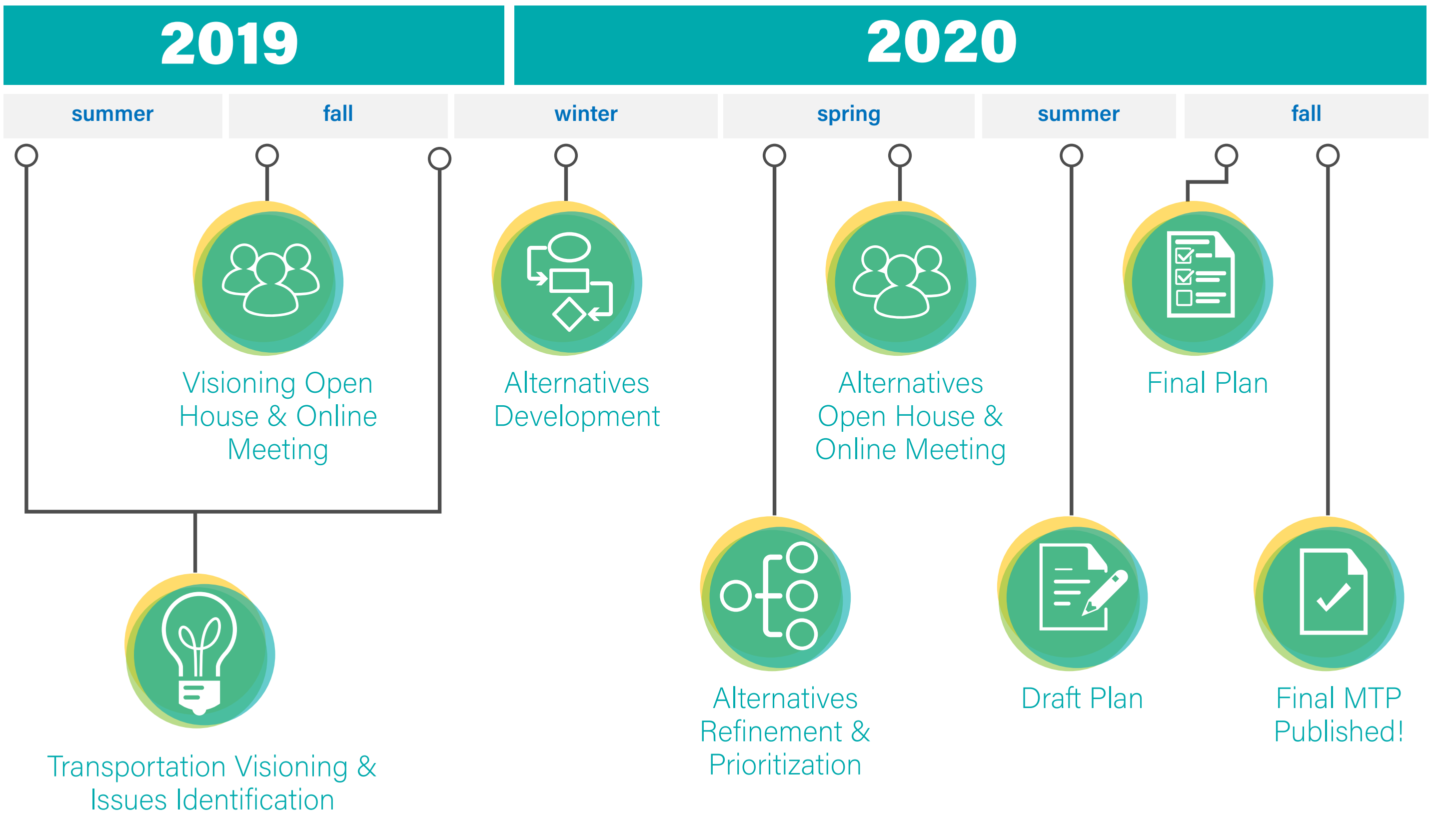
This map shows the metropolitan areas that experience congestion during peak hours like morning and evening rush hours.



Next Steps

Your feedback is critical in defining Forward 2045's vision and goals. Over the next year the project team will assess how well the system performs today and how well it is anticipated to perform in the future. A comprehensive list of transportation projects and programs will then be selected and included in a 25-year implementation plan that reflects the community's vision and fits within the area's expected transportation budget.

Project Schedule



Submit Your Feedback!

We hope to see you at our next open house meeting where you will learn more about the vision and goals for Forward 2045 and the proposed concepts to improve transportation in Ames.

In the meantime, we want your input and ideas to be a part of the Forward 2045 planning process. Visit www.cityofames.org/forward45 where you can submit location-specific comments for the Ames area.

If you have any questions, please email Traffic@cityofames.org.

Community Transportation Assessment Survey

Visit **www.surveymonkey.com/r/Forward45** by November 27 to take our Community Transportation Assessment Survey, which will help us understand transportation behavior, preferences and opinions in Ames.

FORWARD 2045

Welcome

Thank you for joining us at our Visioning Open House!

We need your thoughts and ideas on the future of transportation as we develop our Metropolitan Transportation Plan, known as Forward 2045.

1. Take a moment to review the handout and displays that feature today's transportation system in Ames.
2. Participate in the interactive exercises that will help get you thinking about the changes you would like to see for transportation.
3. Don't hesitate to ask questions or share your ideas with project team members!

Forward 2045 Overview

Forward 2045 represents a 25 year plan that considers community priorities, financial constraints and defines how the Ames area will manage and operate its multi-modal transportation system:

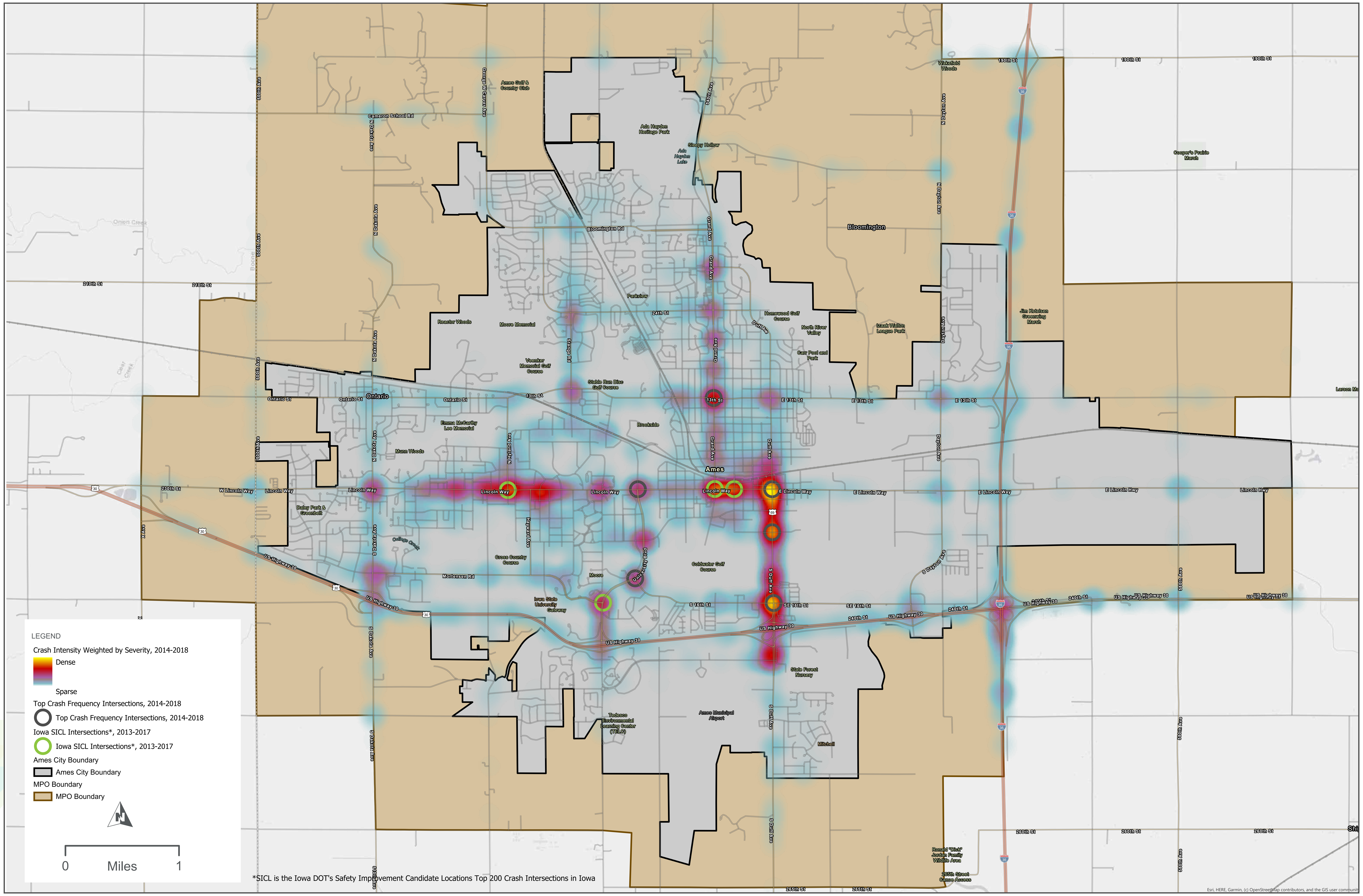
The plan will identify various transportation alternatives and strategies that will improve the Ames transportation system based on collected data and community feedback.

Throughout this process, the AAMPO is committed to implementing a holistic planning process that will foster:

- Wider regional inclusion and prosperity
- Higher standards of living
- Connections for people throughout the community

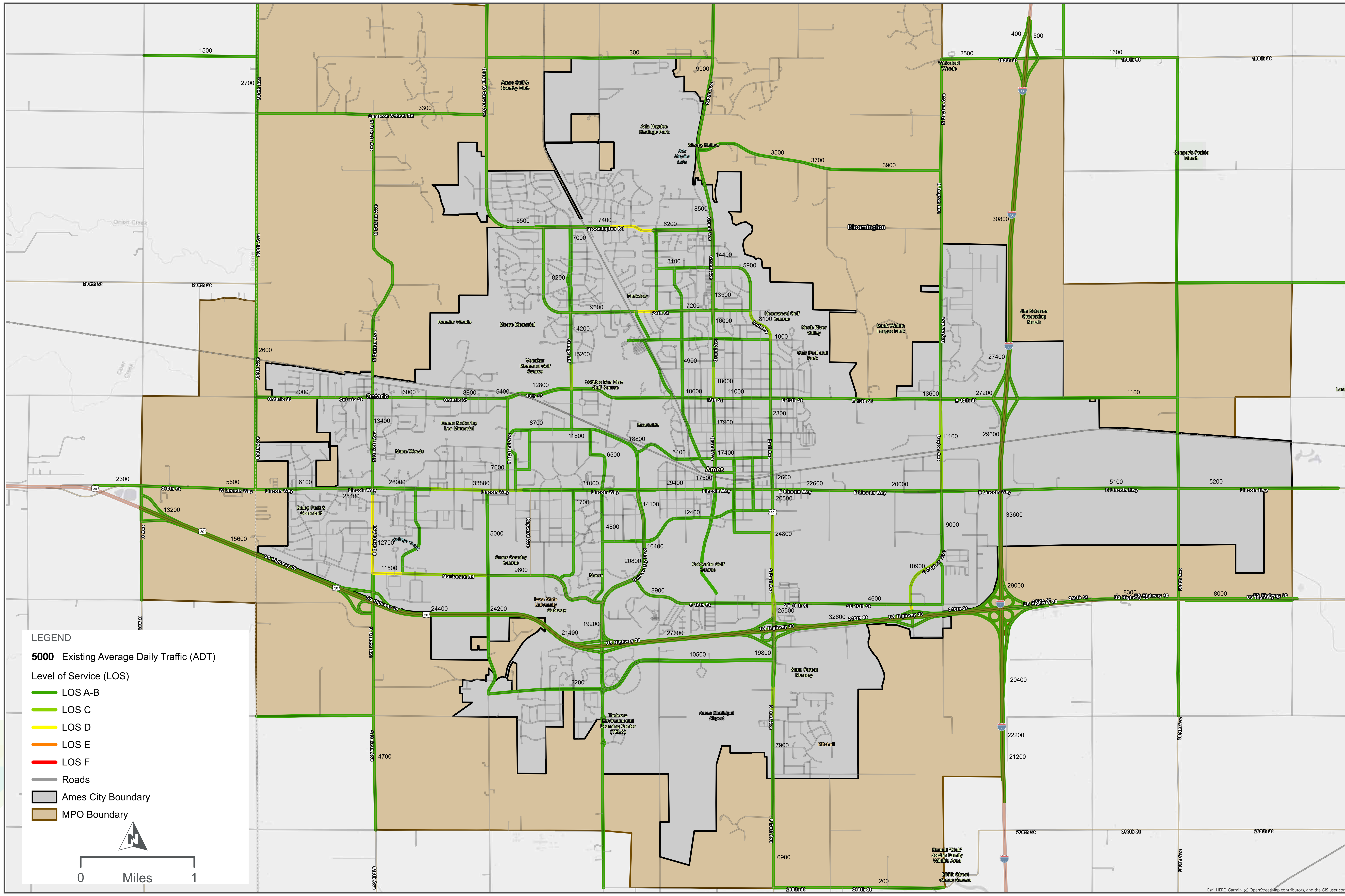
Traffic Safety

Traffic safety is a priority throughout the area. This map provides a historical representation of crashes that have occurred and areas where safety improvements may be considered.



Congestion

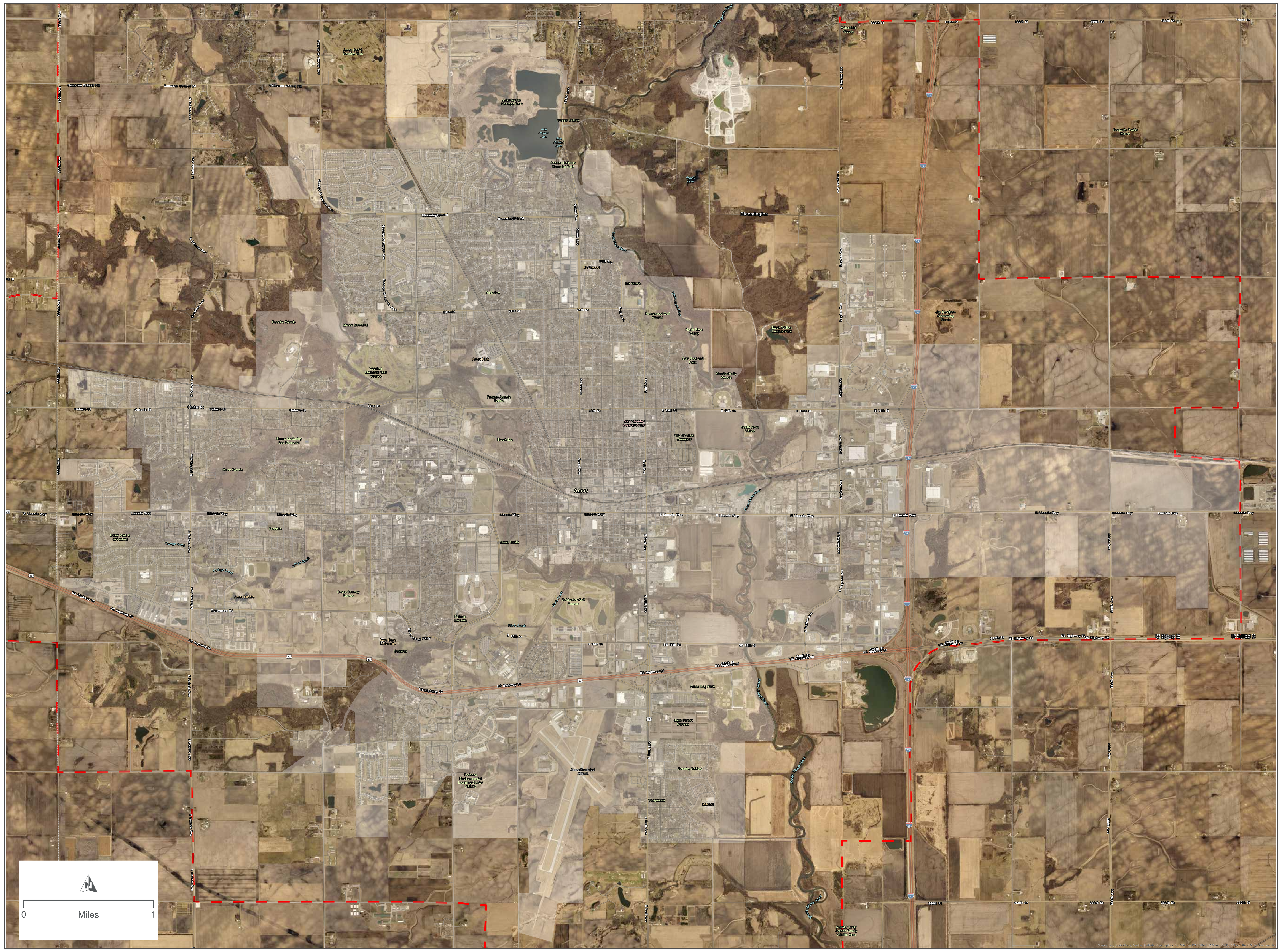
Traffic congestion is another consideration. This map shows the metropolitan areas that experience congestion during peak hours like morning and evening rush hours.



Roadway Issues Mapping Exercise

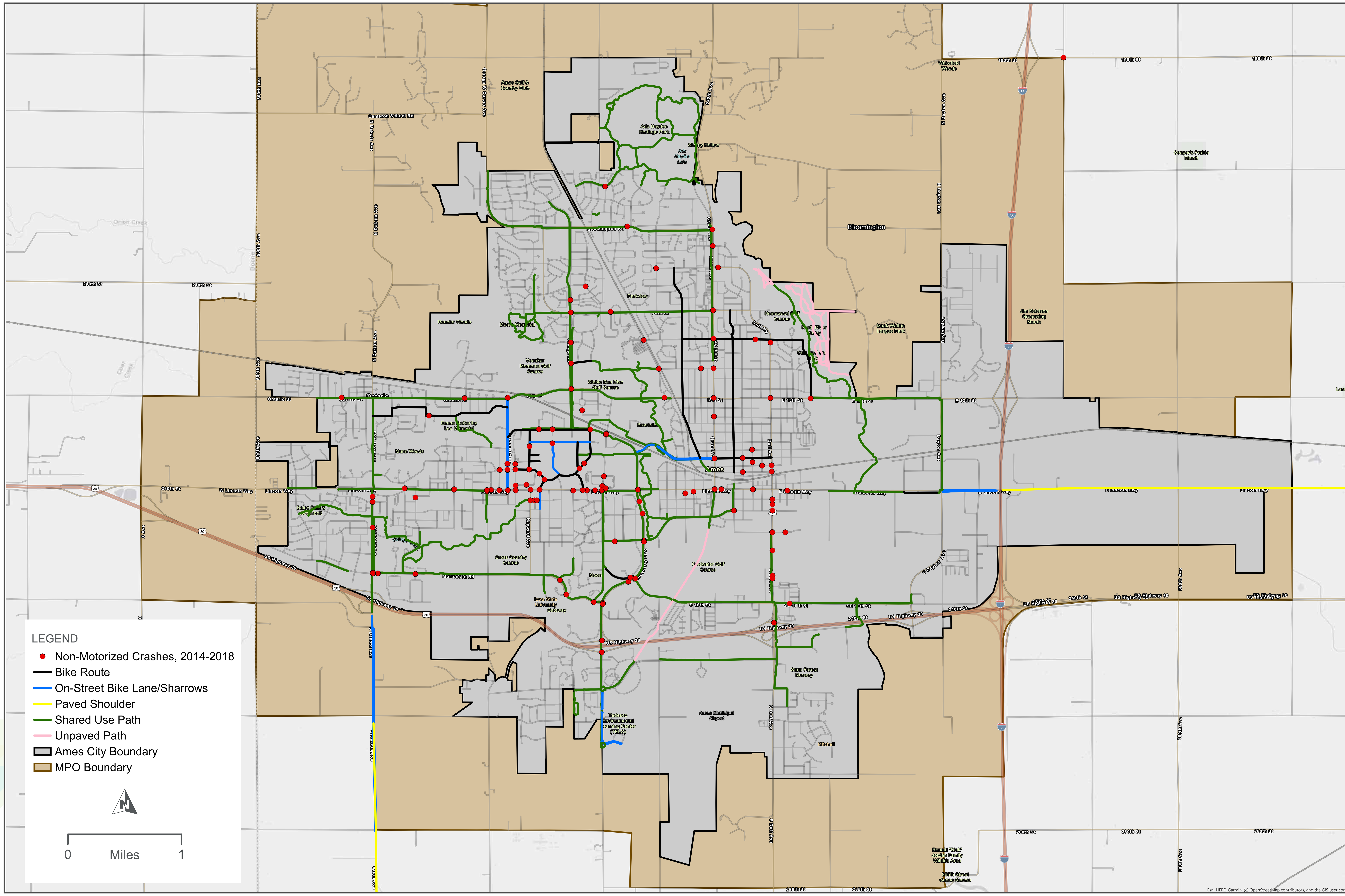
Now that you have an understanding of the crash and congestion data in the Ames metropolitan area, we want you to tell us about the issues you face when traveling in the Ames area. Please use our color-coded sharpie markers and stickers to indicate:

- Safety Issues
- Roadway Congestion
- Connectivity Issues



Bicycle and Pedestrian System

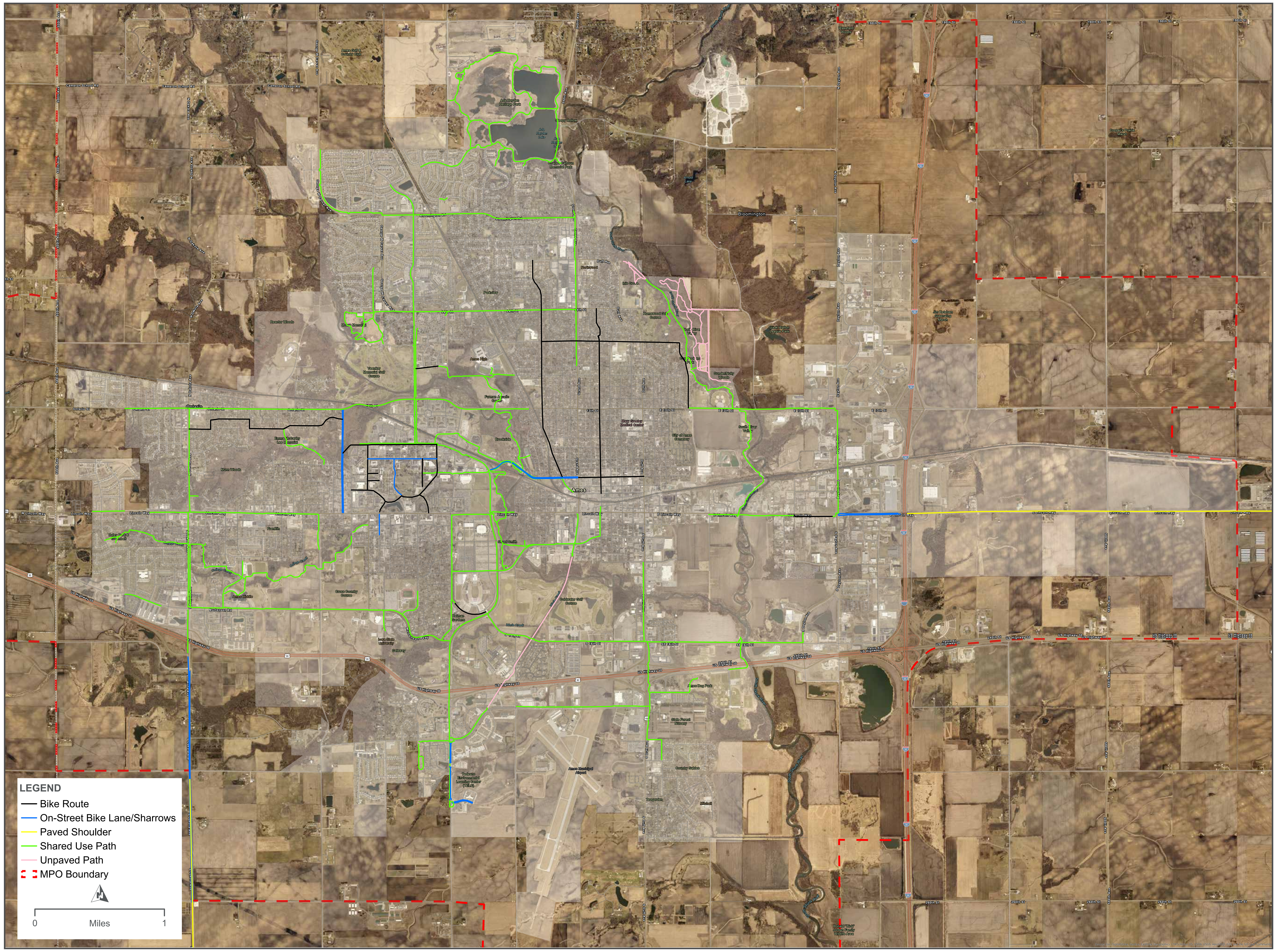
This map shows the existing bicycle and pedestrian facilities in the metropolitan area, along with data on non-motorized crashes.



Bicycle and Pedestrian Issues Mapping Exercise

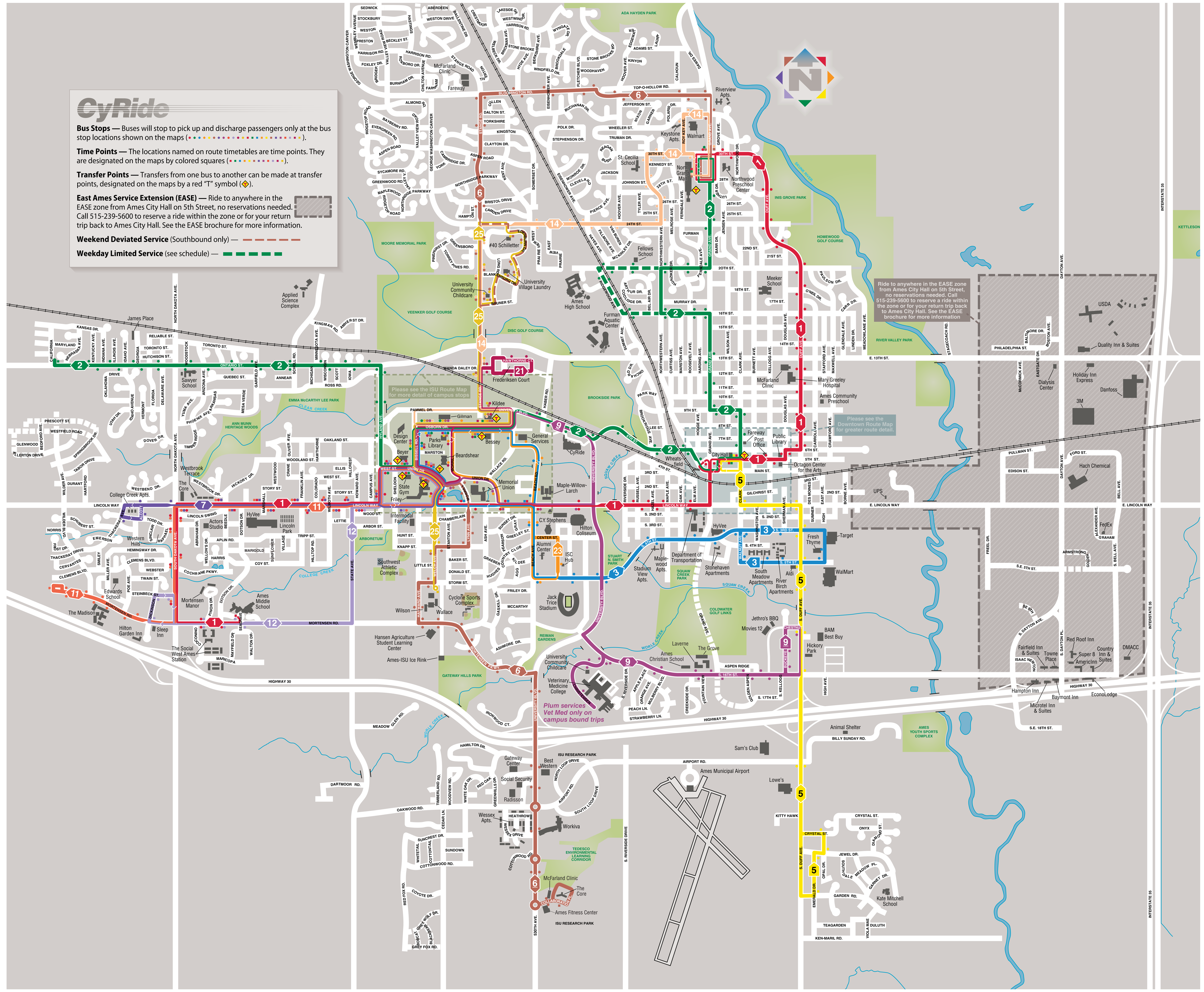
Now that you know where existing bike lanes and shared use paths exist today, grab some color coded sharpie markers and stickers and tell us about:

- Where people bike or walk today
- Where people wish they could bike or walk
- Safety issues for bicyclists or pedestrians
- Where barriers exist for bicyclists or pedestrians



Existing Transit Routes

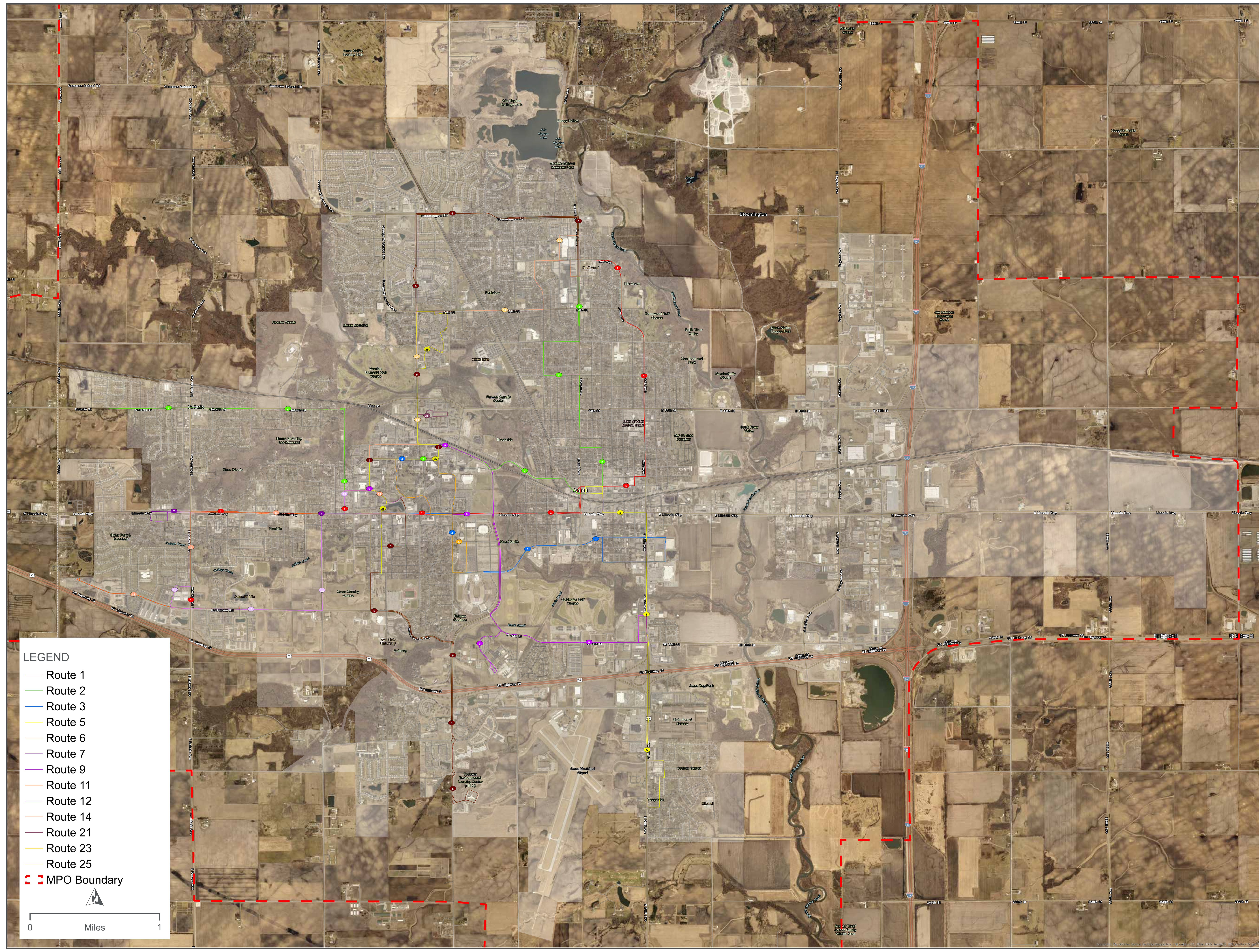
This is a map of CyRide's existing bus routes throughout the metropolitan area.



Transit Issues Mapping Exercise

Tell us about your experience with public transit by using our color-coded sharpie markers and stickers to identify:

- Areas that currently do not have transit service, but need it
- Areas that currently do have transit service, but need to be better connected



Transportation Vision Priorities

Help us define a vision for the future of transportation in Ames! Choose your top three transportation priorities that you would like to see reflected in the Forward 2045 Metropolitan Transportation Plan.

ACCESSIBLE

The ease of connecting people to goods and services in the Ames area, as well as providing choices for different modes of transportation (car, bike, bus, etc.)

SAFETY

Reducing the risk of harm to users of the Ames transportation system

HEALTH

Supporting mobility choices that improve personal and community health and well-being

SUSTAINABLE

Reducing or eliminating negative environmental impacts from the Ames transportation system

EFFICIENCY AND RELIABILITY

Provide for the efficient and reliable movement of people, services, and goods

PLACEMAKING

Integrating the transportation system with land use to create well-designed places and complete communities

INNOVATIVE

Incorporate emerging trends and technologies into the transportation system

PRESERVATION

Maintain the existing transportation system in a state of good repair

Name	Contact Information (Optional)
Name Mike Stark Organization (if applicable)	Address City/Zip
Name Jeremy Withers Organization (if applicable)	Address City/Zip
Name Erwin Klaas Organization (if applicable)	Address City/Zip
Name Crystal D. Davis Organization (if applicable) Ames Convention & Visitors Bureau	Address City/Zip

Name	Contact Information (Optional)
Name Jacob Nolte Organization (if applicable) ABC	Addr City/Z
Name +1 Organization (if applicable)	Addre City/Z
Name Tracy Warner Organization (if applicable) City of Ames	Addre City/Z
Name +1 Organization (if applicable)	Addre City/Z

Name	Contact Information (Optional)
Name Joshua Stephens Organization (if applicable) Iowa State Undergrad CRP Club	Address City/Zip
Name Shari Atwood Organization (if applicable) CyRide	Address City/Zip
Name Mike + Deanna Clayton Organization (if applicable)	Address City/Zip
Name Andrew Rifel Organization (if applicable)	Address City/Zip

Name	Contact Information (Optional)	
Name Zachary Huggins Organization (if applicable) Ames CRP Club	Address City/Zip	
Name Matthew Smith Organization (if applicable) Ames CRP Club	Address City/Zip	
Name +1 Organization (if applicable)	Address City/Zip	
Name Allison McLaren Organization (if applicable) Ames CRP Club	Address City/Zip	

Name	Contact Information (Optional)
Name KEVIN BOURKE Organization (if applicable) AMES CVB	Address City/Zip
Name Phil Bohnenkamp Organization (if applicable) +1	Address City/Zip
Name Steve Libbey Organization (if applicable) ABC	Address City/Zip
Name Steele Harter Organization (if applicable) ISU CRP Undergrad club	Address City/Zip

Name	Contact Information (Optional)
Name Carol Williams Organization (if applicable) ABC	Address City/Zip
Name Kevin Gries Organization (if applicable) CyRide	Address City/Zip
Name Hunter Gearhart Organization (if applicable) ISU	Address City/Zip
Name Jon Popp Organization (if applicable) Popp Engineering Inc.	Address City/Zip

Name	Contact Information (Optional)
Name Josh Powell Organization (if applicable)	Address City/Zip
Name Julia Hertaus Organization (if applicable) ISU CRP Undergrad	Address City/Zip
Name Jasmine Khammany Organization (if applicable) ISU CRP Undergrad	Address City/Zip
Name John Cramer Organization (if applicable)	Address City/Zip

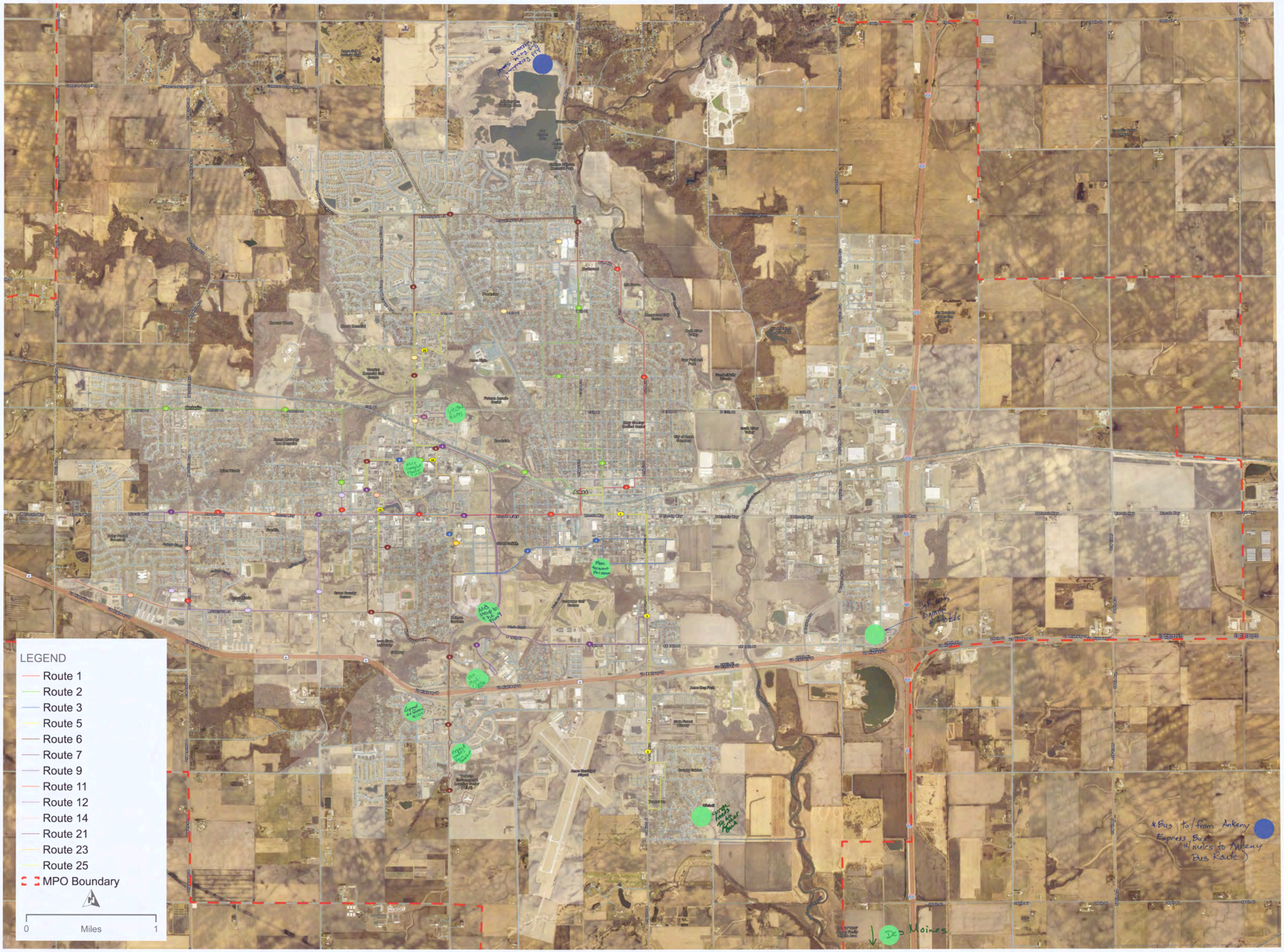
Name	Contact Information (Optional)
Name Emily Varek Organization (if applicable)	Address City/Zip
Name Allison Brundy Organization (if applicable)	Address City/Zip
Name Jerry Moore Organization (if applicable) Story County Planning & Development	Address City/Zip
Name Rosie Francis Organization (if applicable) Am	Address City/Zip

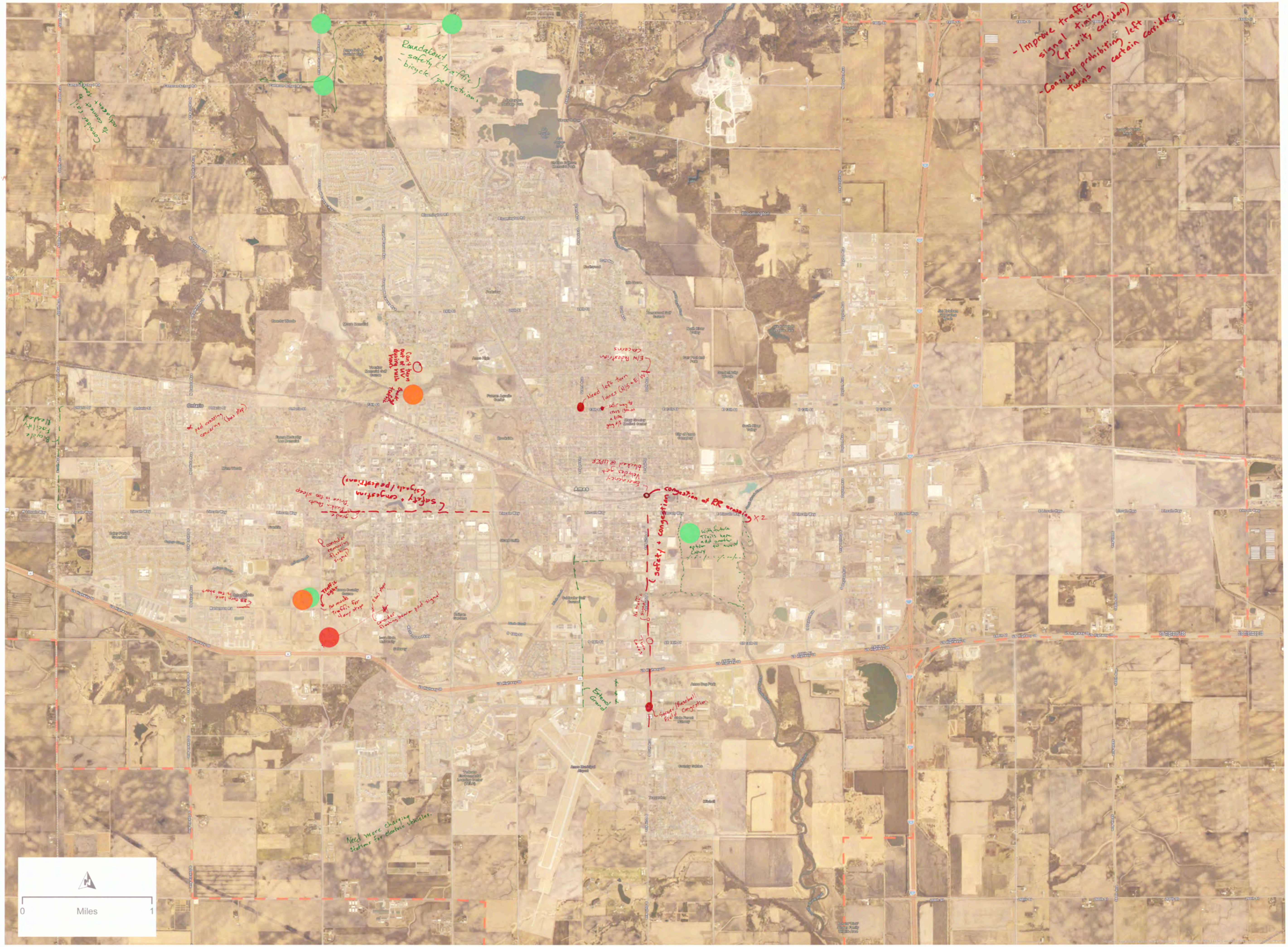
Name	Contact Information (Optional)
Name Andy Loonan Organization (if applicable) Iowa DOT	Addr City/Z
Name Catherine Scott Organization (if applicable)	Addre City/Z
Name +2 Organization (if applicable)	Addre City/Z
Name Organization (if applicable)	Addre City/Z

Forward 2045 Metropolitan Transportation Plan
Visioning Open House – November 14, 2019
Sign-In Sheet

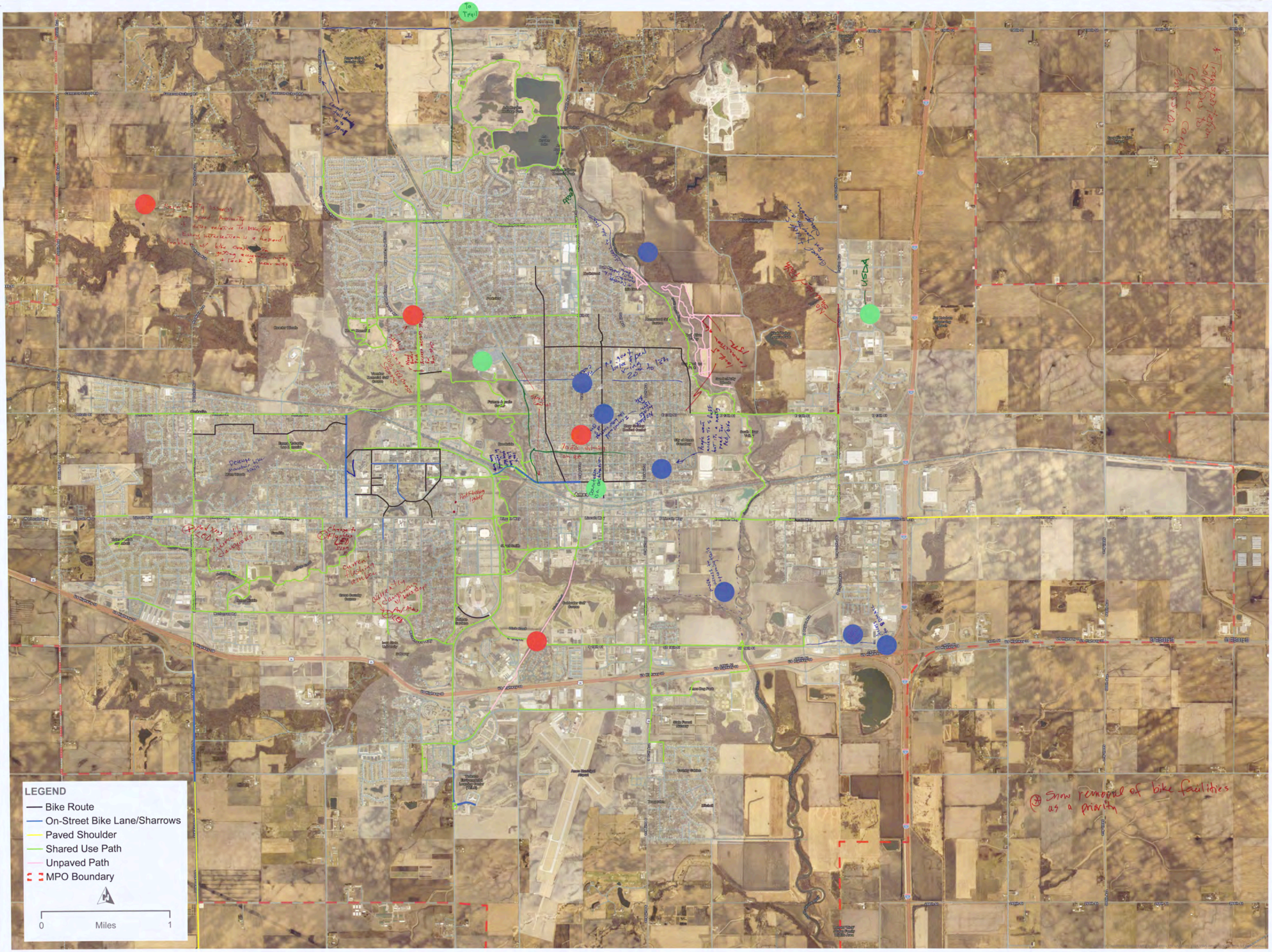
Name	Contact Information (Optional)
Name Aaron Lucius Organization (if applicable) Iowa State	Address City/Zip
Name Organization (if applicable)	Address City/Zip
Name Organization (if applicable)	Address City/Zip
Name Organization (if applicable)	Address City/Zip

FORWARD 45


LEGEND
Route 1
Route 2
Route 3
Route 5
Route 6
Route 7
Route 9
Route 11
Route 12
Route 14
Route 21
Route 23
Route 25
MPO Boundary
0
Miles
1
*Bus to/from Ankeny
Express Bus
(14 miles to Ankeny
Bus Route)
Des Moines



Roundabout
- safety (traffic)
- bicycle / pedestrians.
- Improve traffic signal timing (priority corridors)
- Consider prohibiting left turns on certain corridors
Can't turn out of UV during rush hour
Need left turn lanes (N/S + E/W)
E/W Pedestrian concerns
Emergency Vehicles get blocked @ UPRR
congestion at RR crossing x2
Safety + congestion
With future Trails here add another option to avoid LNWY
Safety + congestion (signals/pedestrians)
Soccer/Baseball Field Congestion
Extend Grand
Need more charging stations for electric vehicles.
Traffic light
too much traffic for 4 way stop
consider removing flashing signal
consider flashing beacon ped signal
Miles
0
1



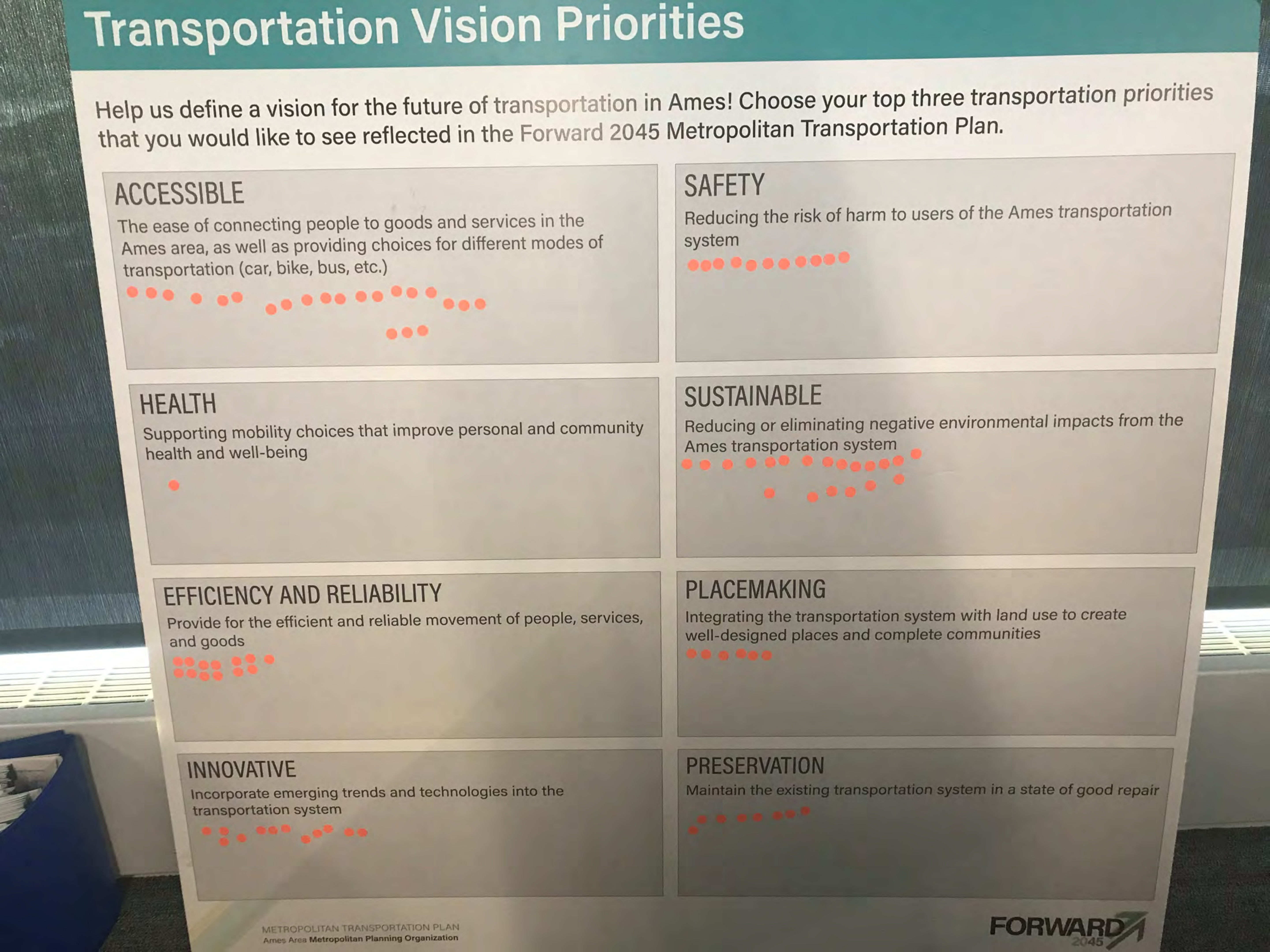
To Trail
USDA
Ames
* Snow removal of bike facilities as a priority
LEGEND
Bike Route
On-Street Bike Lane/Sharrows
Paved Shoulder
Shared Use Path
Unpaved Path
MPO Boundary
0
Miles
1

What would you do to improve the Ames transportation system?

Mentimeter

weekend cy-ride
strange and 13th
better bus shelters
stange and 13th
more street lights
connect existing paths
floating bus stops
vulnerable user law
more bike lanes
lower speed limits
better plum routes
lanes
less
more weekend routes
add stops
green
sustainable
reduce carbon emissions
protected bike lanes
more trees
campus
longer cyride hours
shorter buses on routes
walkable neighborhoods
wider lanes
scooters
safer crosswalks
roundabouts
more trees at bus stops
separated bike lanes
bikeable bike paths
weekend bus routes 25
congestion
protected left turn light
night pedestrian safety
increase pull-in space
safety driver training

29

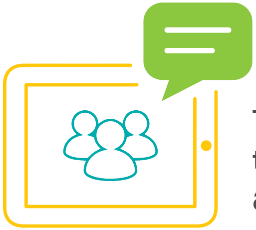

Transportation Vision Priorities
Help us define a vision for the future of transportation in Ames! Choose your top three transportation priorities that you would like to see reflected in the Forward 2045 Metropolitan Transportation Plan.
ACCESSIBLE
The ease of connecting people to goods and services in the Ames area, as well as providing choices for different modes of transportation (car, bike, bus, etc.)
SAFETY
Reducing the risk of harm to users of the Ames transportation system
HEALTH
Supporting mobility choices that improve personal and community health and well-being
SUSTAINABLE
Reducing or eliminating negative environmental impacts from the Ames transportation system
EFFICIENCY AND RELIABILITY
Provide for the efficient and reliable movement of people, services, and goods
PLACEMAKING
Integrating the transportation system with land use to create well-designed places and complete communities
INNOVATIVE
Incorporate emerging trends and technologies into the transportation system
PRESERVATION
Maintain the existing transportation system in a state of good repair
METROPOLITAN TRANSPORTATION PLAN
Ames Area Metropolitan Planning Organization
FORWARD 2045

FORWARD 2045

c/o Kristen Veldhouse
1917 S 67th St
Omaha, NE 68106

Visit our virtual meeting to provide input on the Ames transportation system!

amesgisweb.city.ames.ia.us/forward45



The virtual meeting is available now, through April 14, 2020 at:
amesgisweb.city.ames.ia.us/forward45

As a precautionary measure, instead of an in-person open house, the Ames Area Metropolitan Planning Organization (AAMPO) is hosting a virtual public meeting for the Metropolitan Transportation Plan (MTP), known as Forward 2045. This virtual meeting is an opportunity for the public to learn about the vision and goals for Forward 2045 and review, comment and provide ideas (big or small!) on potential alternatives and strategies within the Ames transportation system.

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians.
The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

FORWARD 2045

For more information about Forward 2045, visit **www.cityofames.org/forward45**.

Press Release

FOR IMMEDIATE RELEASE
March 31, 2020

Media Contact
Damion Pregitzer, MTP Project Manager, AAMPO, 515-239-5160, dpregitzer@city.ames.ia.us

Ames Area MPO Seeks Public Input on Area Transportation Alternatives and Improvements!

AMES, IA – As a precautionary measure, instead of an in-person open house, the Ames Area Metropolitan Planning Organization (AAMPO) is hosting a virtual public meeting for the Metropolitan Transportation Plan (MTP), known as Forward 2045. This virtual meeting is an opportunity for the public to learn about the vision and goals for Forward 2045 and review, comment and provide ideas (big or small!) on potential alternatives and strategies within the Ames transportation system.

The virtual meeting is available now, through April 14, 2020 at: amesgisweb.city.ames.ia.us/forward45

This is the second input opportunity that the AAMPO has hosted for during the Forward 2045 development process. AAMPO hosted a Visioning Open House in November 2019 where attendees were asked to identify priorities for the transportation system and pinpoint issues when using Ames' roads, bicycle, pedestrian and transit facilities.

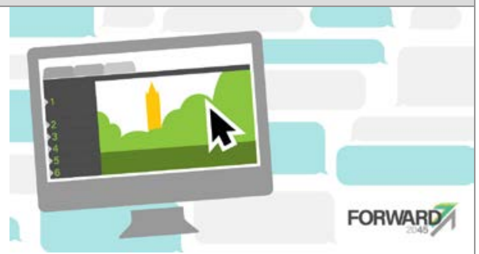
“We got great feedback from the first open house that helped us define the vision and goals for Forward 2045,” said Damion Pregitzer, MTP Project Manager at AAMPO. “At the virtual meeting we'll seek input on potential alternatives that meet these goals. It is important that Ames area residents participate so that the transportation strategies and techniques that are incorporated in Forward 2045 truly reflect community values.”

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

For more information about Forward 2045, visit www.cityofames.org/forward45.

###

Social Media Launch Date	Content	Graphics
3/26/2020	**FB** As a precautionary measure, we'll be hosting the public meeting for the Forward 2045 Metropolitan Transportation Plan virtually instead of in-person. We'd love to hear your feedback on transportation strategies and alternatives in Ames! Be sure to check it out March 31 through April 14. We'd appreciate your participation! **Twitter** As a precautionary measure, we'll be hosting the public meeting for the Metropolitan Transportation Plan, #Forward 45, virtually instead of in-person. We'd love to hear your feedback on transportation strategies and alternatives in Ames! Be sure to check it out March 31 through April 14.	
3/31/2020 [Boosted post!]	Help shape the future of transportation in Ames 🚶 🚲 🚗 🚌 🚆. Please take a few minutes to review the #Forward45 open house and complete online activities. We want to understand what's important to you. Join the meeting here: amesgisweb.city.ames.ia.us/forward45 We'd love to hear from you!	
4/2/2020	**FB** Our Metropolitan Transportation Plan, #Forward45, has the opportunity to incorporate emerging transportation trends and technologies like autonomous shuttles or smart traffic signal controls. Do you want Ames to consider these technologies? Tell us at our virtual meeting today! amesgisweb.city.ames.ia.us/forward45 **Twitter**	

	Our Metropolitan Transportation Plan, #Forward45, has the opportunity to incorporate emerging transportation trends and technologies like autonomous shuttles or smart traffic signal controls. What do you think? Tell us at our virtual meeting today! amesgisweb.city.ames.ia.us/forward45	
4/7/2020	**FB** Help plan the future of transportation in Ames! Visit our virtual meeting and review, comment and provide ideas (big or small!) on potential alternatives and strategies. Your input will help shape the next 25 years of transportation in Ames! #Forward45 amesgisweb.city.ames.ia.us/forward45 **Twitter** Help plan the future of transportation in Ames! Visit our virtual meeting to provide input on potential alternatives and strategies. Your input will help shape the next 25 years of transportation in Ames! #Forward45	
4/11/2020 Boosted Post?	**FB** Don't miss out on your chance to review, comment and provide ideas (big or small!) on potential alternatives and strategies for the future of transportation in Ames. #Forward45 Check it out at: amesgisweb.city.ames.ia.us/forward45 **Twitter** Don't miss out on your chance to review, comment and provide ideas (big or small!) on potential alternatives and strategies for the future of transportation in Ames. #Forward45 Check it out at: amesgisweb.city.ames.ia.us/forward45	

4/14/2020	**FB** It's the last day for public input on #Forward45. Help inform the potential transportation alternatives and strategies for Ames and tell us what you think. amesgisweb.city.ames.ia.us/forward45 **Twitter** It's the last day for public input on #Forward45. Help inform the potential transportation alternatives and strategies for Ames and tell us what you think. amesgisweb.city.ames.ia.us/forward45	

From: AAMPO - Forward 2045 Metropolitan Transportation Plan
To: Veldhouse, Kristen
Subject: Visit our Virtual Public Meeting for Forward 2045!
Date: Tuesday, March 31, 2020 10:59:25 AM

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

View this email in your browser

Ames Area MPO Seeking YOUR Input on Area Transportation Alternatives and Improvements!

As a precautionary measure, instead of an in-person open house, the Ames Area Metropolitan Planning Organization (AAMPO) is hosting a virtual public meeting for the Metropolitan Transportation Plan (MTP), known as Forward 2045.

This virtual meeting is your opportunity to learn about the vision and goals for Forward 2045 and review, comment and provide ideas (big or small!) on potential alternatives and strategies within the Ames transportation system.

Visit our Virtual Meeting Now! >>

The virtual meeting is available now, through April 14, 2020 at: amesgisweb.city.ames.ia.us/forward45

About Forward 2045

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

From: AAMPO - Forward 2045 Metropolitan Transportation Plan
To: Veldhouse, Kristen
Subject: Don"t Forget! Our Virtual Public Meeting for Forward 2045 is Ending Soon!
Date: Friday, April 10, 2020 9:14:20 AM

View this email in your browser

NOW is your chance to provide input for Ames area transportation alternatives and improvements!

The Ames Area Metropolitan Planning Organization (AAMPO) is hosting a virtual public meeting, available now through April 14, for the Metropolitan Transportation Plan (MTP), known as Forward 2045. Forward 2045 is a community-driven process that establishes a vision for the future of transportation in the Ames metropolitan area.

AAMPO is seeking YOUR input for the plan! You (and your family and friends) have a chance to review, comment and provide ideas (big or small!) on potential transportation alternatives and strategies in Ames.

Visit our Virtual Meeting Now! >>

The virtual meeting is available now, through April 14, 2020 at: amesgisweb.city.ames.ia.us/forward45

About Forward 2045

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians. The AAMPO is committed to implementing a holistic planning process that fosters wider regional inclusion and prosperity, higher standards of living, and connections for people throughout the community.

Our mailing address is:
Forward 2045 Metropolitan Transportation Plan
1917 S 67th St
Omaha, NE 68106-2973

1 Welcome!

Welcome to the Forward 2045 virtual public meeting. We are hosting this virtual public meeting in place of an in-person open house as a precautionary measure. **However, we still need and value your input!**

Throughout this virtual meeting, you will have the opportunity to review, comment and rank preferences and ideas for potential alternatives and strategies within the Ames transportation system.

Begin by clicking on each number in this bar on the left to navigate through each page of the virtual meeting.

Before you begin providing input, watch the video on the right for a quick refresher on the Forward 2045 Metropolitan Transportation Plan.

Forward 2045 will result in a 25-year prioritized and financially constrained plan that will define how the metropolitan area will manage and operate our multi-modal transportation system, which includes transit, highway, bicycles, and pedestrians.

The AAMPO is committed to implementing a holistic planning process that fosters:

· Wider regional inclusion and prosperity
· Higher standards of living
· Connections for people throughout the community.

1 Welcome!

2 Forward 2045 Overview

3 Visioning Open House Results

The first input opportunities was in fall 2019, where we asked the public to help us define the overall vision and goals for Forward 2045. All of our proposed strategies, policies, projects and transformational technologies that will be incorporated in Forward 2045 will be shaped around these goals:

- Accessible
- Safe
- Sustainable
- Efficient and Reliable
- Placemaking
- Preservation

Click play on the video to the right for more information about what each goal will accomplish for the Ames transportation system.

You can review materials from the first open house here.

4 Let's Get Started!

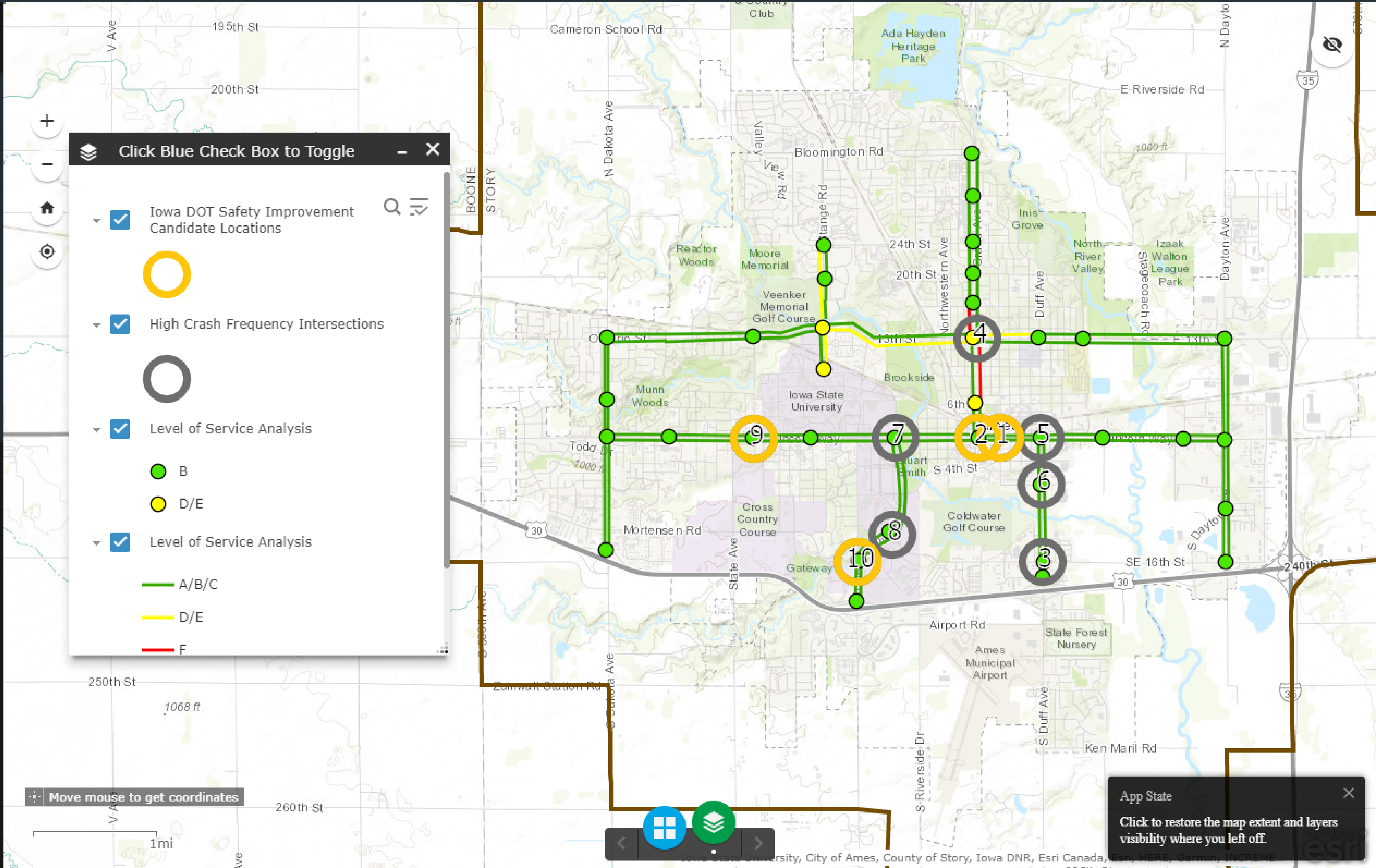
Now that you are up to speed on the Forward 2045 Metropolitan Transportation Plan, it's time to review our analyses and provide input. You will have the chance to review data for roadways, bicycle and pedestrian facilities, transit, and emerging trends and technologies. Separate feedback activities will be associated with each of these items.

5 Roadway Analysis Results

The map on the right shows the Level of Service (LOS) for highways in Ames. The LOS indicates the quality of traffic flow on a particular roadway. As you can see, Ames overall maintains a good level of service, with only a few areas that do not maintain a good LOS.

In addition to LOS, the map shows high crash frequency intersections in Ames.

You are able to toggle each analysis layer on or off in the legend. You can zoom in and out of the map on the right using the '+' and '-' buttons on the upper left-hand corner.



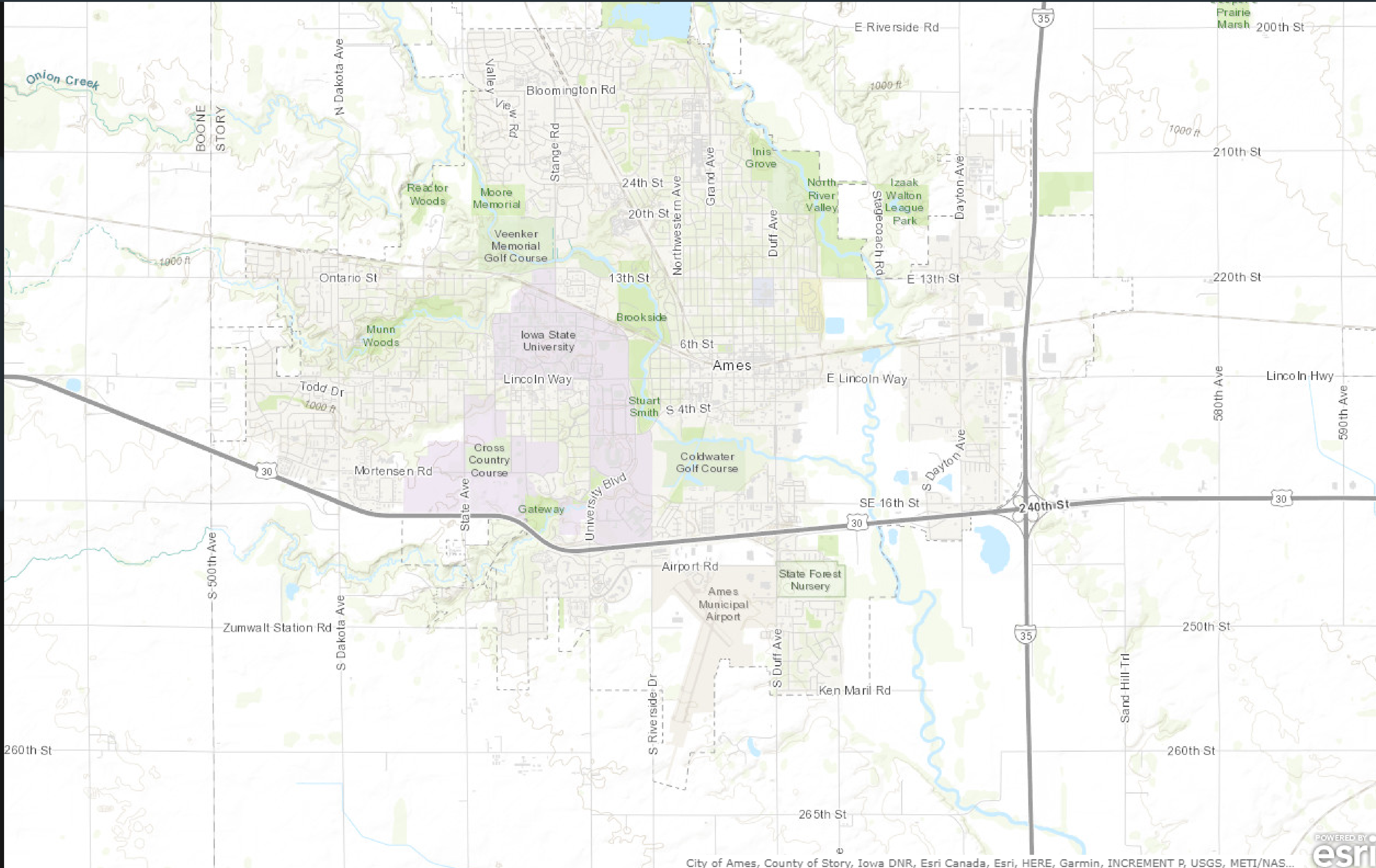
6 Roadway Strategies & Treatments

There are several strategies and treatments that can be used to improve Ames' roadways. Please review the list below and then use the comment mapping tool to the right to help us consider what roadway alternatives should be where.

Your options include the following:

- **More Travel Lanes (Street Widening)**
- **New Traffic Signals**
- **Traffic Signal Timing Optimization /Coordination**
- **Roundabouts**
- **Turn Lanes**
- **Medians**
- **Expressway**
- **Grade Separations**

Click here for an example photo, overview, pros and cons for each proposed strategy and treatment.



FORWARD 2045 - Online Meeting

7 Bicycle & Pedestrian Analysis (Issues)

There are several bicycle and pedestrian facilities in the Ames area. The map on the right shows existing bike facilities as well as high stress roads, which means that these roads are not comfortable for bicyclists or pedestrians to use due to high traffic speeds, high traffic volumes or lack of bike lanes and infrastructure. The map also shows non-motorized crashes in Ames.

You are able to toggle each analysis layer on or off in the legend. You can zoom in and out of the map on the right using the '+' and '-' buttons on the upper left-hand corner.

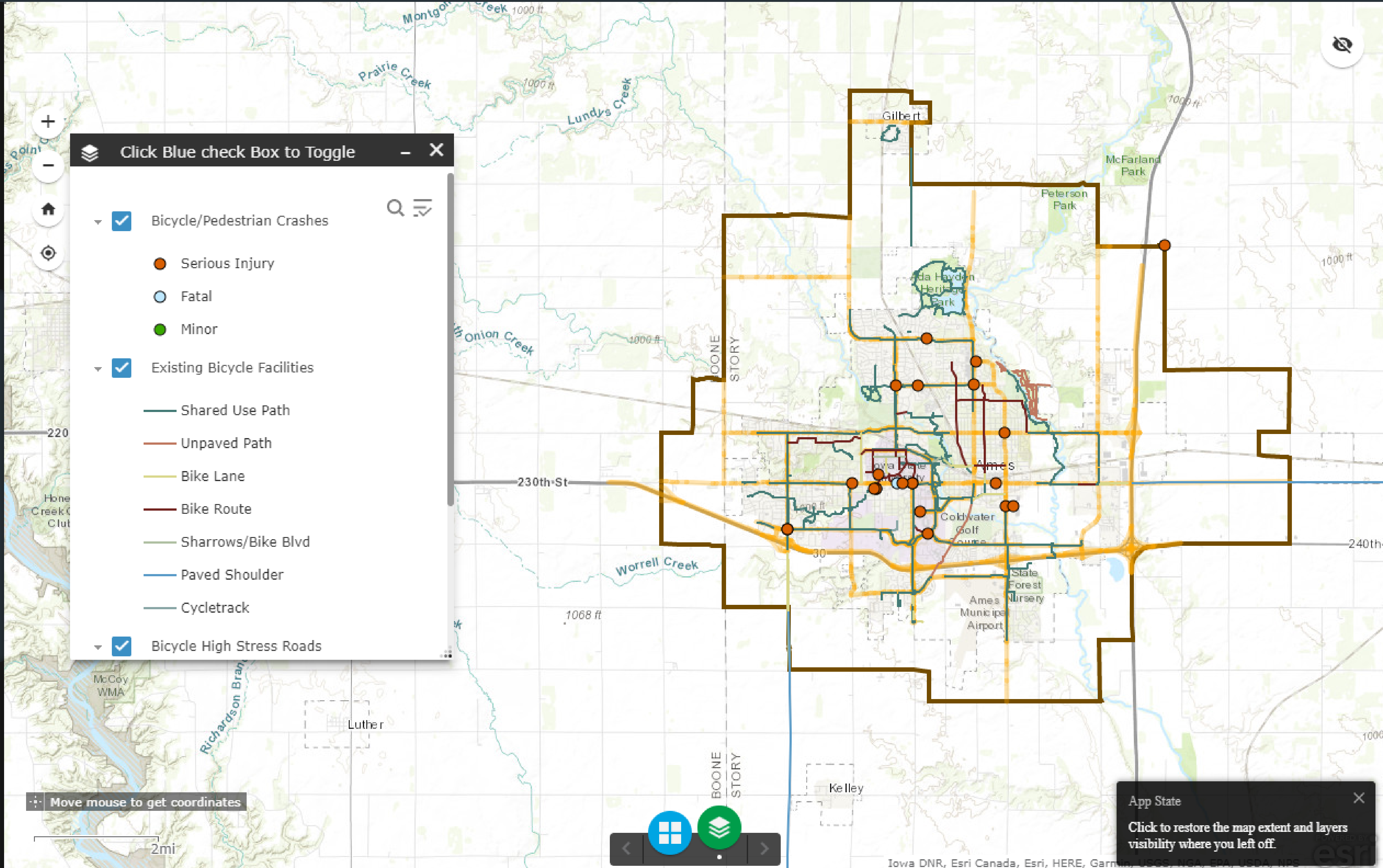
8 Bicycle & Pedestrian Analysis (Opportunities)

9 Bicycle & Pedestrian Strategies & Treatments

10 Transit System

11 Transit Analysis Results

12 Transit Prioritization



8 Bicycle & Pedestrian Analysis (Opportunities)

While the last slide displayed the issues within the existing system, the map to the right shows which roads are good future candidates for shared lanes, bicycle lanes or separated bicycle infrastructure.

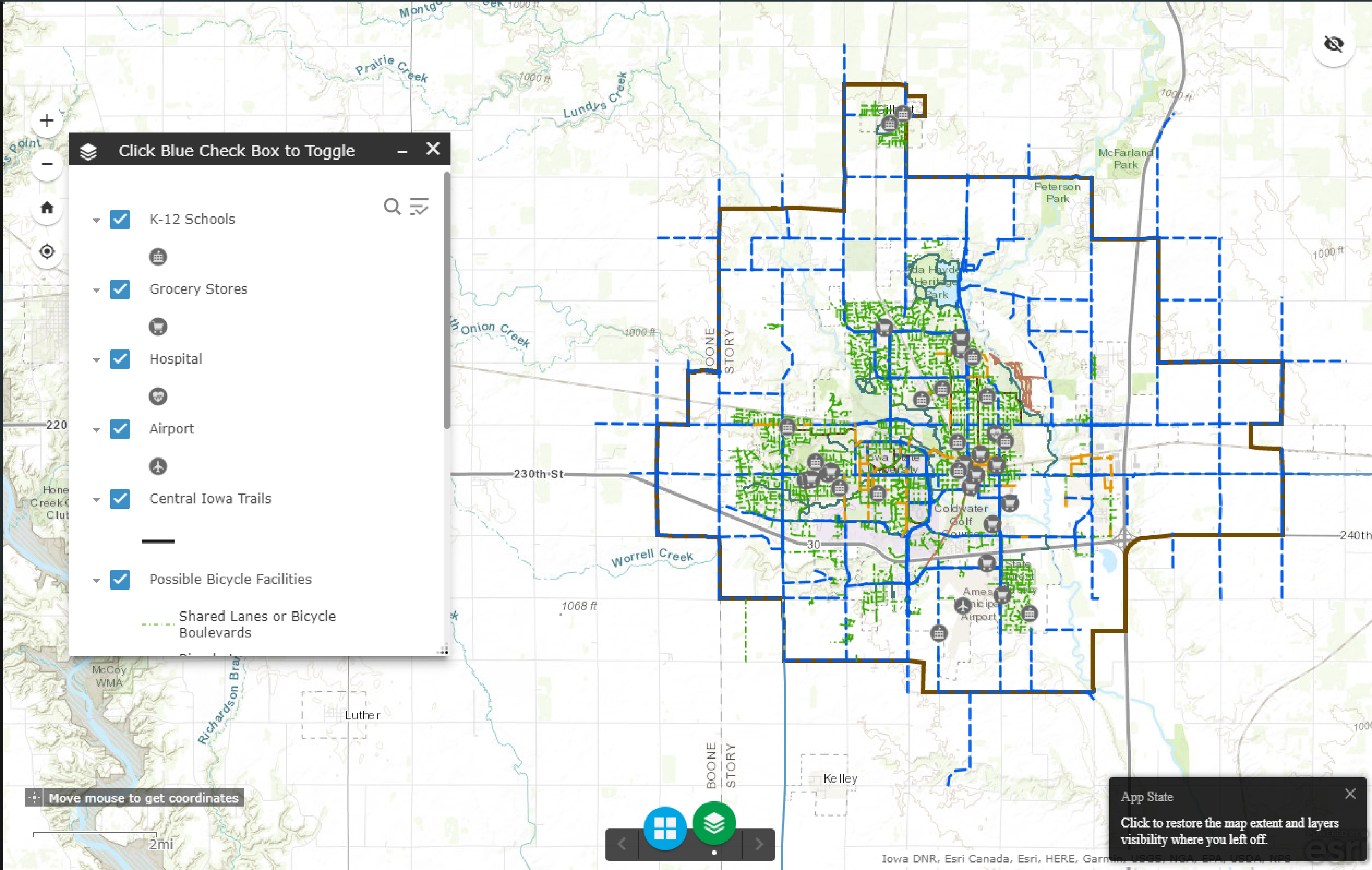
Green roads are good candidates for shared lanes or bike boulevards because the speed limits are 25 miles per hour (MPH) or less and traffic volumes are 3,000 vehicles per day or less.

Orange roads are good candidates for bike lanes because the speed limits are 30 MPH or less and traffic volumes are between 3,000 and 6,000 vehicles per day.

Blue roads for separated bicycle infrastructure have speed limits above 30 MPH or have more than 6,000 vehicles per day.

The map also displays common destinations around Ames, such as schools, grocery stores, or hospitals. You can toggle on or off the existing bike system as well.

You are able to toggle each analysis layer on or off in the legend. You can zoom in and out of the map on the right using the '+' and '-' buttons on the upper left-hand corner.



FORWARD 2045 - Online Meeting

Ames Area MPO

8 Bicycle & Pedestrian Analysis (Opportunities)

9 Bicycle & Pedestrian Strategies & Treatments

There are several strategies and treatments that can be used to improve Ames' bicycle and pedestrian facilities. Please review the list below and then use the comment mapping tool to the right to help us consider *what* bicycle and pedestrian alternatives should be *where*.

Your options include the following:

Pedestrian Strategies

- High Visibility Crosswalks
- Shorter Crossings
- Leading Pedestrian Interval

Bicycle Strategies

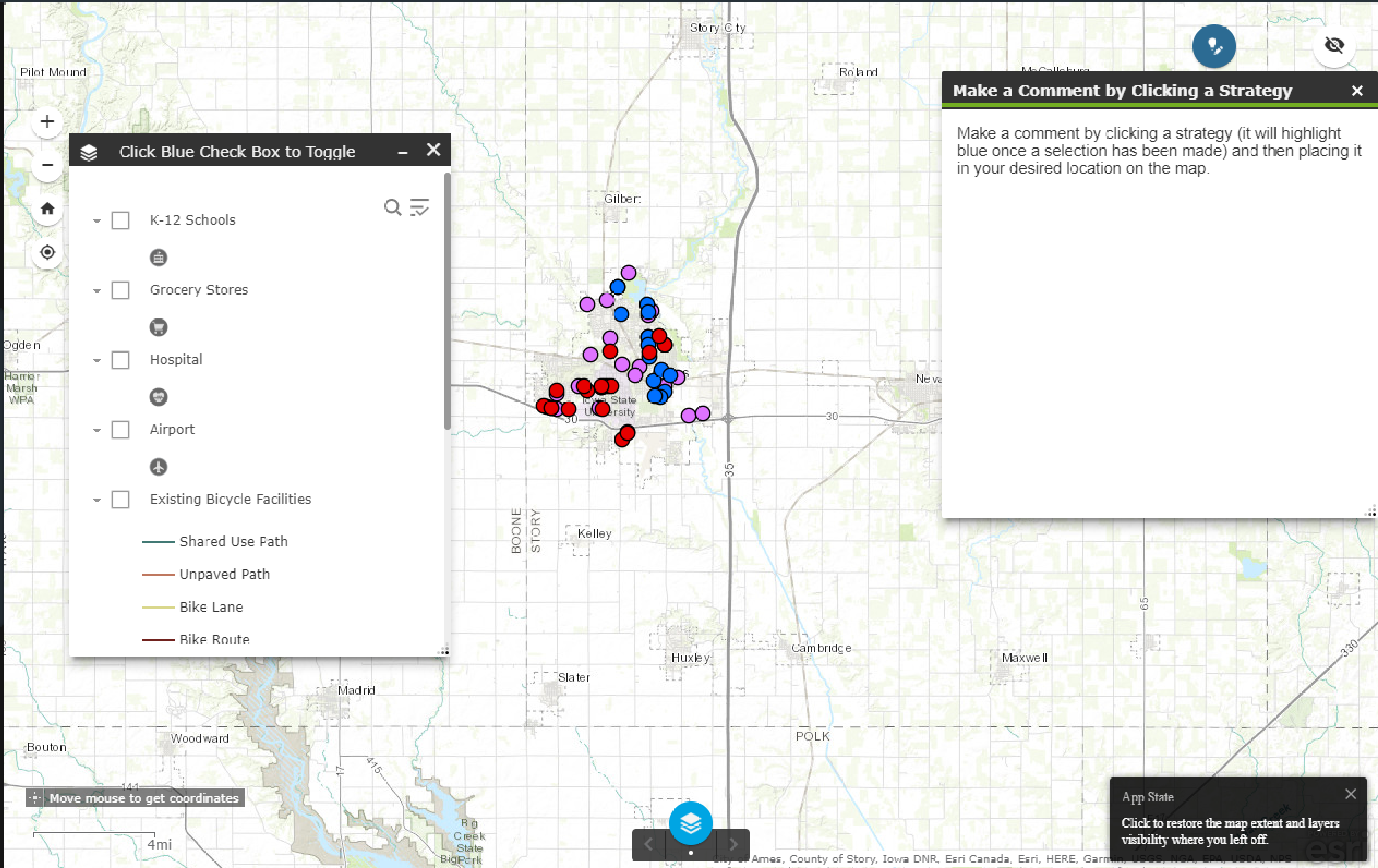
- Bike Boulevard
- Bike Lanes
- Cycle Tracks / Protected Bike Lanes
- Intersection Treatments for Bike Facilities
- Wayfinding
- Actuated Signals

Bicycle & Pedestrian Strategies

- New / Improved Trail or Sidepath
- Grade-Separated Crossing

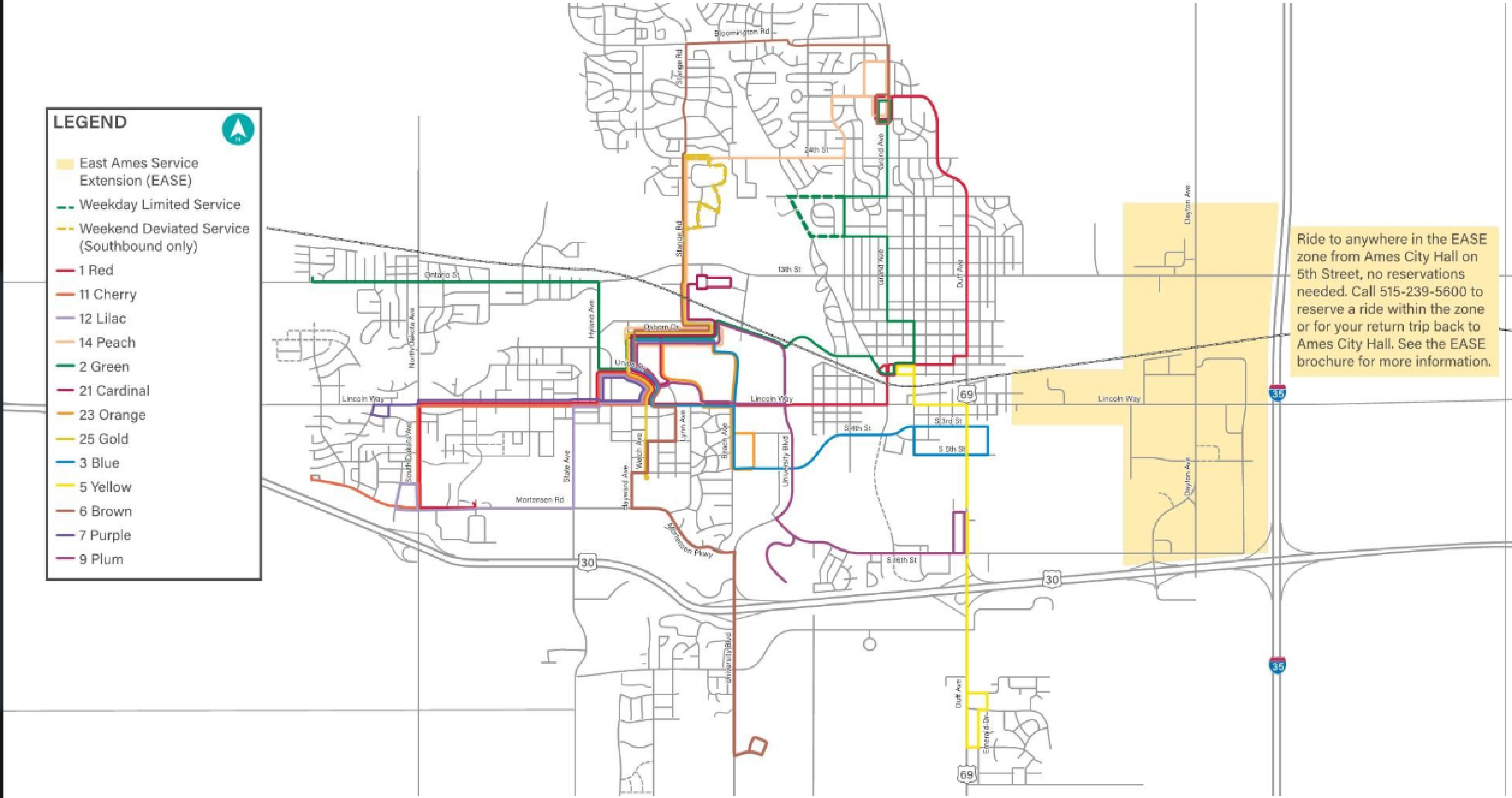
Click here for an example photo, overview, pros and cons for each proposed strategy and treatment.

10 Transit System



10 Transit System

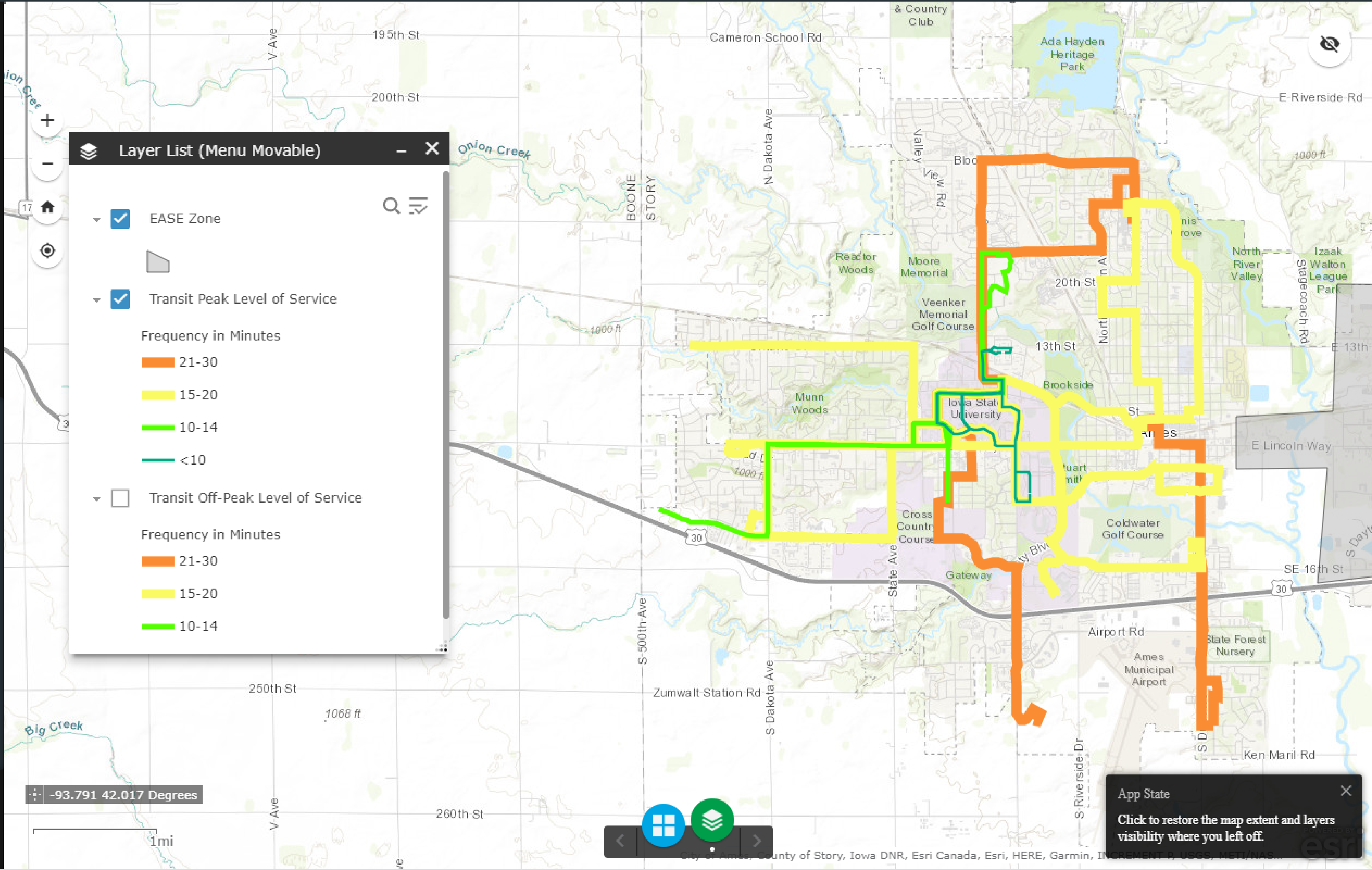
The map to the right shows CyRide's existing bus service in Ames.



11 Transit Analysis Results

The map to the right shows on-peak and off-peak Level of Service (LOS) for transit operations. On-peak Level of Service is the quality of traffic flow during weekday commuting hours (from 6 a.m. to 9 a.m.; 3 p.m. – 6 p.m.). Off-peak Level of Service is the quality of traffic flow during weekday non-commuting hours (all other hours that transit service is provided).

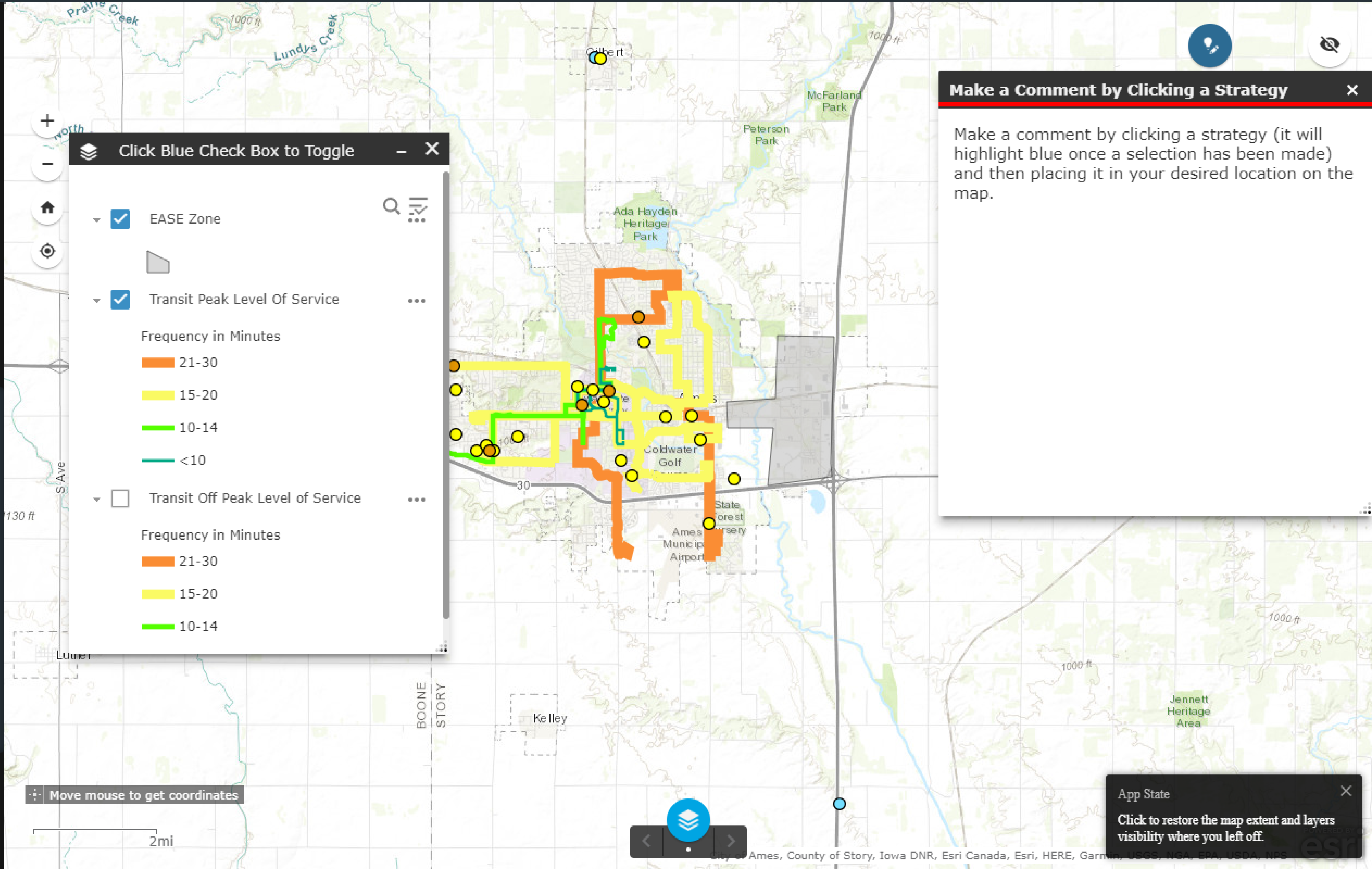
You are able to toggle each analysis layer on or off in the legend. You can zoom in and out of the map on the right using the '+' and '-' buttons on the upper left-hand corner.



FORWARD 2045 - Online Meeting

There are several strategies that can be used to improve transit in Ames. Please review the list below and then use the comment mapping tool to tell us which strategies you would like to see implemented on each route.

Your options include the following:
A. Increased Hours of Service
B. Increased Frequency
C. New Route or Extension
D. Express Route
E. Intercity Bus
F. Ridesharing



Transportation is entering a phase of unprecedented transformation. A host of new technologies and options for mobility are already having significant impacts, with further disruptions to come. This plan needs to account for these emerging trends & technologies.

The transportation industry is constantly evolving to include new technologies that will help cities, counties and states manage traffic better.

Please review the reference sheet here to get a better understanding of the proposed technologies and then use the tool to the right to rate how important it is to you that each technology is incorporated throughout Ames.

Prioritization

Mobility as a Service (MaaS)

Facilitate an integrated mobility platform, capturing trip planning and payment across multiple modes to increase transportation access and decrease per-mile cost.

1 - Least Important | 2 | 3 - Neutral | 4 | 5 - Most Important

MaaS Parking Strategy

Establish a "futureproofing" strategy for parking, considering autonomous vehicle impacts of decreased future parking demand and gained efficiencies based on self-parking vehicles.

1 - Least Important | 2 | 3 - Neutral | 4 | 5 - Most Important

Autonomous and Connected Vehicles

Prepare for the coming shift to autonomy by considering strategies encouraging shared mobility, reduction of vehicle miles travelled due to induced demand, and finding more efficiencies in the existing roadway network.

1 - Least Important | 2 | 3 - Neutral | 4 | 5 - Most Important

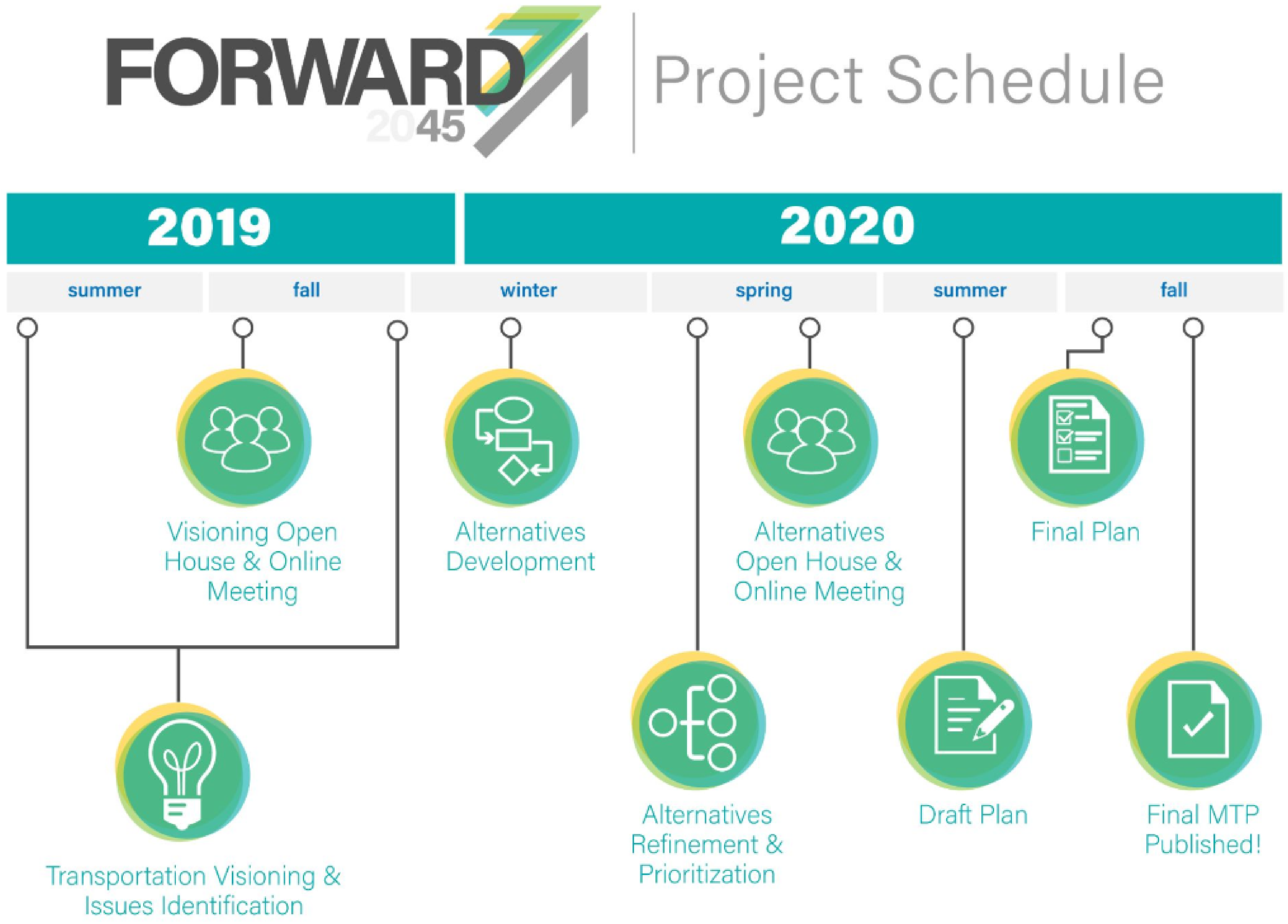
Autonomous Shuttles

Establish autonomous shuttle pilot projects to test coordination with real-world roadway conditions and to familiarize the public with AV operations.

1 -Least Important | 2 | 3 - Neutral | 4 | 5 - Most Important

15 Next Steps

We're approximately mid-way through our Forward 2045 development process. Our next steps will be to continue to analyze, refine and prioritize proposed alternatives and begin preparing the Draft Forward 2045 Plan.



Thank you so much for your time and participation. If you would like to stay up-to-date with Forward 2045 or provide additional comments, fill out the comment form to the right.

For more information about Forward 2045, visit our website at www.cityofames.org/forward45.

Stay Involved

First and Last Name

Email

Would You like to receive future emails about Forward 2045?

- [ ] Yes
- [ ] No

Address

City

Roadway Strategies & Treatments

Strategy: More Travel Lanes (Street Widening)

Source: Google Street View

Source: Omaha.com

Strategy Purpose:

Additional travel lanes through road and street widening can provide increased vehicle throughput and reduced travel delays in arterial corridors.

Pros:

- Provides significantly more through capacity and reduced travel delays for vehicles.
- In some locations, can reduce vehicle crashes.

Cons:

- Wider streets are typically less safe for pedestrians and bicyclists.
- Can impact livability of adjacent neighborhoods.

Strategy: New Traffic Signals

Source: FHWA

Strategy Purpose:

Move traffic, pedestrians, bicyclists, and transit vehicles more efficiently on existing streets by enhancing existing traffic signals, or adding traffic signals to intersections.

Pros:

- More efficient use of existing street and roads with relatively low cost.
- Limited impacts to neighborhoods and does not require more road right-of-way.

Cons:

- Often has less traffic capacity increases than major widening.
- Signalized intersections on higher-speed facilities can experience more severe crashes.

Strategy: Traffic Signal Timing Optimization/Coordination

Source: FHWA

Strategy Purpose:

Leading pedestrian intervals allow people walking to start crossing the street before the light turns green for automobiles. They are usually applied at major signalized intersections with high volumes of people walking.

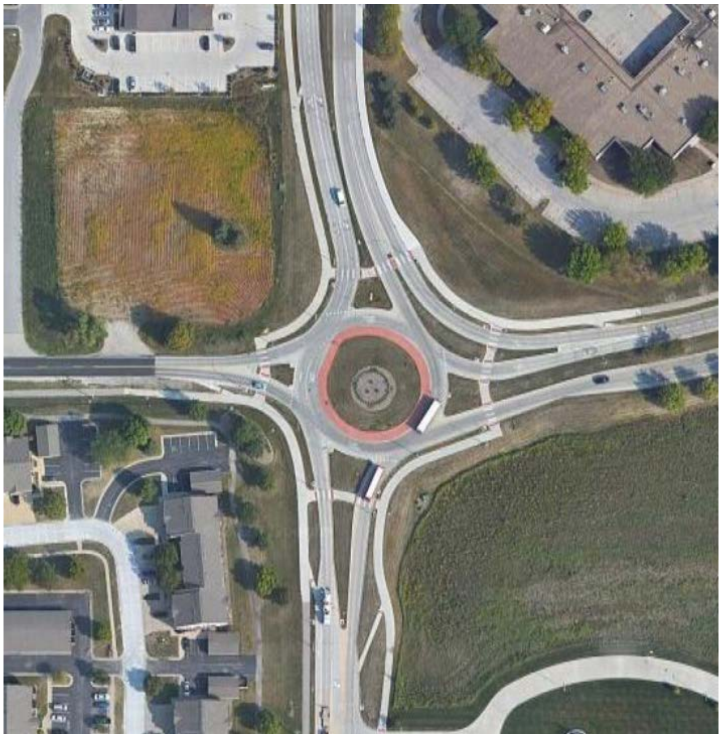
Pros:

- Provides enhanced pedestrian visibility in the intersection, often reducing pedestrian-vehicle collisions.
- Communicates to vehicles that pedestrians has the right-of-way.

Cons:

- Increases the “all red” phase of the traffic signal providing less “green time” to vehicles.

Strategy: Roundabouts



Source: Google Earth

Strategy Purpose:

Roundabouts are an alternative option to signalized intersections. They continuously move traffic in a counterclockwise circle around a center island. The vehicles entering the intersection are required to yield to traffic coming from the left.

Roundabouts provide constant traffic flow with no need to cut across traffic or stop abruptly. They can reduce speeds to 15 to 20 mph, causing a reduction in crashes. Many roundabouts provide an apron for trucks to allow them to more easily complete the turn.

Pros:

- Reduces injury crashes by 75 percent – low chance of a head-on collision (most deadly collision).
- Eliminates left turns – increased safety.
- Reduces average vehicle delay at intersections.
- Increases fuel efficiency (non-stop travel).
- Cheaper to build, maintain, and decommission than full signalized intersections.
- More effective during power outages.

Cons:

- Significantly lowers the speed of traffic.
- Hard to accommodate pedestrian traffic.
- Creates larger right-of-way footprint.

Strategy: Turn Lanes (Left or Right)

Source: Google Earth

Strategy Purpose:

Exclusive left or right turn lanes are commonly used in higher class facilities. They provide a lane exclusively for the left or right turn. They remove queued turning vehicles from through traffic lanes, causing less delay.

Pros:

- Reduces the amount of green time needed for through lanes.
- Reduces the impedance between turning vehicles and through vehicles.
- Reduces crashes by an average of 50 percent.
- Increases capacity on roadway.
- Improves sight distance.

Cons:

- Queue accumulation can cause delay in through lane.

Strategy: Medians

Source: Google Earth

Strategy Purpose:

The median is the area between opposing lanes of traffic – the types include raised, flushed, and depressed. Medians work to separate opposing vehicle travel lanes in order to increase safety for drivers, passengers, and pedestrians. They do this by converting two-way roads into two one-way roads.

Raised medians have a higher elevation than the surrounding road. Raised medians are common in high volume and high crash rate areas. They provide safer pedestrian crossing capabilities, improve traffic flow, and provide enhanced aesthetic.

Flushed medians have the same elevation as the surrounding road and are designated by markings on the pavement. Studies on flushed medians have shown an increase in capacity, decrease in delay, and decrease in crashes. There are no opportunities for landscaping with flushed medians.

Depressed medians have a lower elevation than the surrounding area. These medians are typically covered in grass. They improve survival rates in crashes, provide landscaping opportunities, and are effective at reducing crashes.

Pros:

- Separates opposing vehicle travel lanes – lower chance at head-on collisions.
- Enhances the visual aesthetic of the road by providing more landscape space.
- Increases pedestrian safety by adding a pedestrian refuge in the median.
- Reduces vehicle crashes by around 15 percent.
- Decreases vehicle delays by around 30 percent.

Cons:

- May require on-street parking removal.
- Not effective in slowing traffic speeds.

Strategy: Expressway

Source: Wikipedia

Strategy Purpose:

An expressway is a multilane highway designed to increase traffic flow for high-speed traffic. They contain few to zero intersections, limited points of access or exit, and a divider between lanes for traffic moving in opposite directions. Freeways, parkways, and turnpikes are types of expressways.

Entrance lanes on expressways require enough length to reach full speed before merging. Deceleration lanes are provided to prevent delays in the through lanes.

Pros:

- Increases traffic flow.
- Fewer points of access lead to constant travel speeds and increased safety.
- Increases fuel efficiency.

Cons:

- Not an option for drivers wanting to travel short distances.
- Missing an exit becomes a larger problem.
- Prohibits pedestrians and bicycles from traveling on expressways.

Strategy: Grade Separations

Source: Google Earth

Strategy Purpose:

Grade separations aim to improve safety, improve network connectivity, and potentially improve travel efficiency by going over or under a barrier such as the Interstate or Railroad.

Pros:

- Improves vehicular safety and reliability.
- Increases network connections and reduces out-of-direction travel.

Cons:

- Grade separations are expensive.

Bicycle & Pedestrian Strategies & Treatments

Pedestrian Strategy: High Visibility Crosswalks

Source: Getty Images

Strategy Purpose:

High visibility, or “zebra,” crosswalks clearly indicate the pedestrian crossing zone and make it more visible to people driving. Raised crosswalks take the marked crossing up higher than the road, and have the additional benefit of acting as a speed hump. Both treatments can be applied at midblock locations or intersections.

Pros:

- Increases visibility of people crossing for drivers.
- Decreases risk of pedestrian collisions.
- Improves yield compliance from drivers.

Cons:

- Enhanced crosswalks may require additional maintenance.

Pedestrian Strategy: Shorter Crossings

Strategy Purpose:

Pedestrian crossings can be made shorter by adding curb extensions or pedestrian refuge islands. Curb extensions typically extend the sidewalk into the parking lane at a marked crossing location. They make it easier for people driving to see people waiting to cross. Refuge islands create designated space in the roadway median so that people walking may cross the street in two stages. They are usually applied on streets with high speeds, higher traffic volumes and/or three or more travel lanes.

Pros:

- Creates a more pedestrian-friendly and safer environment.
- Can be incorporated into improved streetscape aesthetics.

Cons:

- Curb extensions typically require removal of one or more on-street parking spaces.

Pedestrian Strategy: Leading Pedestrian Interval

Strategy Purpose:

Leading pedestrian intervals allow people walking to start crossing the street before the light turns green for automobiles. They are usually applied at major signalized intersections with high volumes of people walking.

Pros:

- Provides enhanced pedestrian visibility in the intersection, often reducing pedestrian-vehicle collisions.
- Communicates to vehicles that pedestrians has the right-of-way.

Cons:

- Increases the “all red” phase of the traffic signal providing less “green time” to vehicles.

Bicycle Strategy: Bike Boulevard

Strategy Purpose:

Bike boulevards are designated bike routes on lower-volume and lower-speed streets that combine shared-lane markings ("sharrows") with features that calm and divert traffic. They can also include crossing treatments at intersections with major streets. They are typically applied on streets with posted speeds of 25 mph or less and daily motor vehicle traffic of 3,000 or fewer.

Pros:

- Creates bicycle priority corridors in locations that are not intended for high volumes of motor vehicle traffic.
- Provides traffic calming to neighborhood streets and can address challenging crossing locations for both people biking and people walking.

Cons:

- Calming features can be expensive and sometimes pose maintenance or snow removal challenges.

Bicycle Strategy: Bike Lanes

Strategy Purpose:

Bike lanes use pavement markings and striping to designate exclusive roadway space for people riding bicycles. They are most helpful on streets with more than 3,000 average daily motor vehicle traffic and speeds of 25 mph or greater.

Buffered bike lanes add an additional striped buffer space separating the bicycle lane from the motor vehicle and/or parking lane. They are recommended on streets with higher traffic volumes and speeds.

Pros:

- Increases cyclist comfort and clearly identifies bicyclists' space on streets.
- Creates separation between bicyclists and automobiles.

Cons:

- Dedicated bike lanes may require narrowing or re-purposing of travel lanes or on-street parking lanes.

Bicycle Strategy: Cycle Tracks / Protected Bike Lanes

Strategy Purpose:

Cycle tracks, also known as protected bike lanes, include the same striping and lane markings as a buffered bike lanes, with the addition of a physical buffer such as bollards, planters, or a raised curb. They can be one-way or two-way.

Pros:

- Increases cyclist comfort and clearly identifies bicyclists' space.
- Creates physical separation between bicyclists and automobiles.

Cons:

- Cycle tracks require additional street space and may require narrowing or re-purposing of travel lanes and on-street parking lanes.

Bicycle Strategy: Intersection Treatments for Bike Facilities

Strategy Purpose:

A bike box is a bike-only area that extends across a traffic lane at a signalized intersection. They give people bicycling a safe and visible way to get ahead of traffic at a red light and make turning left easier.

Left-turn queue boxes provide a designated space for people bicycling to make a left turn in two stages, by pulling out of traffic and waiting until it is safe to cross all motor vehicle lanes. They can be used at signalized and unsignalized intersections.

Bike lane markings through intersections help prevent conflicts by alerting people driving that the bike lanes continues through the intersection and giving bicyclists guidance as to where to position themselves.

Bike signals can be installed to improve safety at signalized intersections where bicyclist movement may be unexpected, such as two-way cycle tracks, or at intersections where there are large volumes of turning vehicles.

Pros:

- Reduces the amount of collisions between through bicycles and right-turning vehicles.
- Provides more predictable movements for both vehicles and bicycles.
- Reduces vehicle delay.

Cons:

- Enforcement of the bike box may be difficult.

Bicycle & Pedestrian Strategy: Wayfinding

Strategy Purpose:

Wayfinding includes signs, kiosks, or technology that increases people's awareness and understanding of nearby destinations and the best route to reach them. The intent is to provide necessary information without disrupting traffic flow.

Pros:

- Provides a straightforward path for travelers to reach their desired destination.
- Symbols and arrows provide ease to travelers who understand different languages.

Cons:

- Can be a challenge to present the information in the ideal location.
- Can easily be overlooked or missed by travelers.

Bicycle & Pedestrian Strategy: Actuated Signals

Strategy Purpose:

Rectangular Rapid Flashing Beacons (RRFBs) and High Intensity Activated Crosswalks (HAWKs) are signals that are activated by pushing a button. They alert people driving to the presence of people waiting to cross at a crosswalk. They are typically installed at midblock crossings or at the intersection of a minor road with a major one in areas where there is a lot of bike or pedestrian traffic.

Pros:

- Significantly increases vehicles yielding to crossing pedestrians.
- Often decreases pedestrian-involved crashes.

Cons:

- Should only be used where they can be easily seen by drivers (not near driveways and cross-street entrances).

Bicycle & Pedestrian Strategy: New / Improved Trail or Sidepath

Strategy Purpose:

Trails and sidepaths designate space outside of the roadway for people walking and bicycling. Potential improvements to trails and sidepath include pavement markings and striping to delineate space between people walking and bicycling and crossing treatments at driveways and intersections.

Pros:

- Separation from vehicular traffic can improve the experience for some users.
- A boulevard section can be landscaped to add to aesthetics and user comfort.
- In corridors with limited street right-of-way width, sidepaths can be constructed at the curb without a boulevard.

Cons:

- Sidepaths add to total right-of-way width requirements.
- Drivers turning out of driveways and side streets may have a harder time seeing people bicycling on a sidepath than on an on-street facility. Sidepaths may not be appropriate for streets with large numbers of driveways.

Bicycle & Pedestrian Strategy: Grade-Separated Crossing

Strategy Purpose:

Grade-separated crossings are typically found where a trail or sidepath intersects with a waterway or a major road, such as a highway. They can be bridges or undercrossings.

Pros:

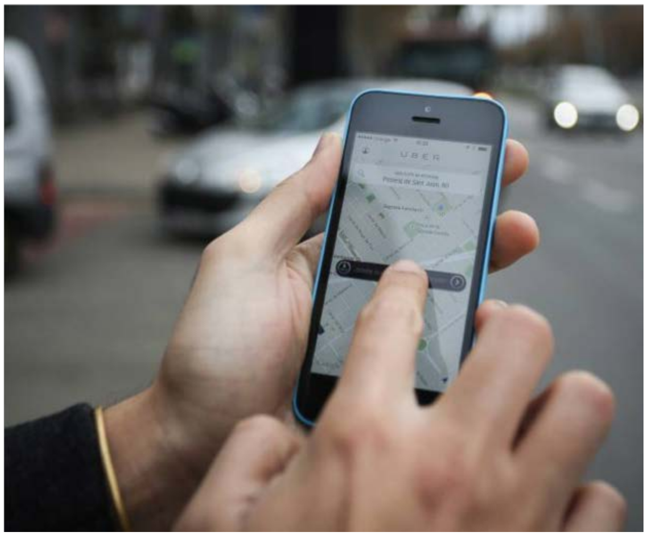
- Separation from vehicular traffic can provide a direct and safe connection.
- Provides connections across barriers that cannot otherwise be crossed.

Cons:

- Grade separations are expensive.

Emerging Trends & Technologies Strategies & Treatments

Strategy: Mobility as a Service (MaaS)



Strategy Purpose:

Facilitate an integrated mobility platform, capturing trip planning and payment across multiple modes to increase transportation access and decrease per-mile cost.

Pros:

- Decreased cost of mobility when paired with autonomous vehicle technology.
- Innovative approaches to personal mobility.
- Benefits to land use/housing/density.
- Better access to transit with a larger catchment area through mobility hubs and short-range mobility options.

Cons:

- Uncoordinated implementation.
- Unintended impacts to existing system (curbs, traffic flow, ped. access).
- Induced demand if costs to consumers drops.

Strategy: MaaS Parking Strategy

Strategy Purpose:

Establish a “futureproofing” strategy for parking, considering autonomous vehicle impacts of decreased future parking demand and gained efficiencies based on self-parking vehicles.

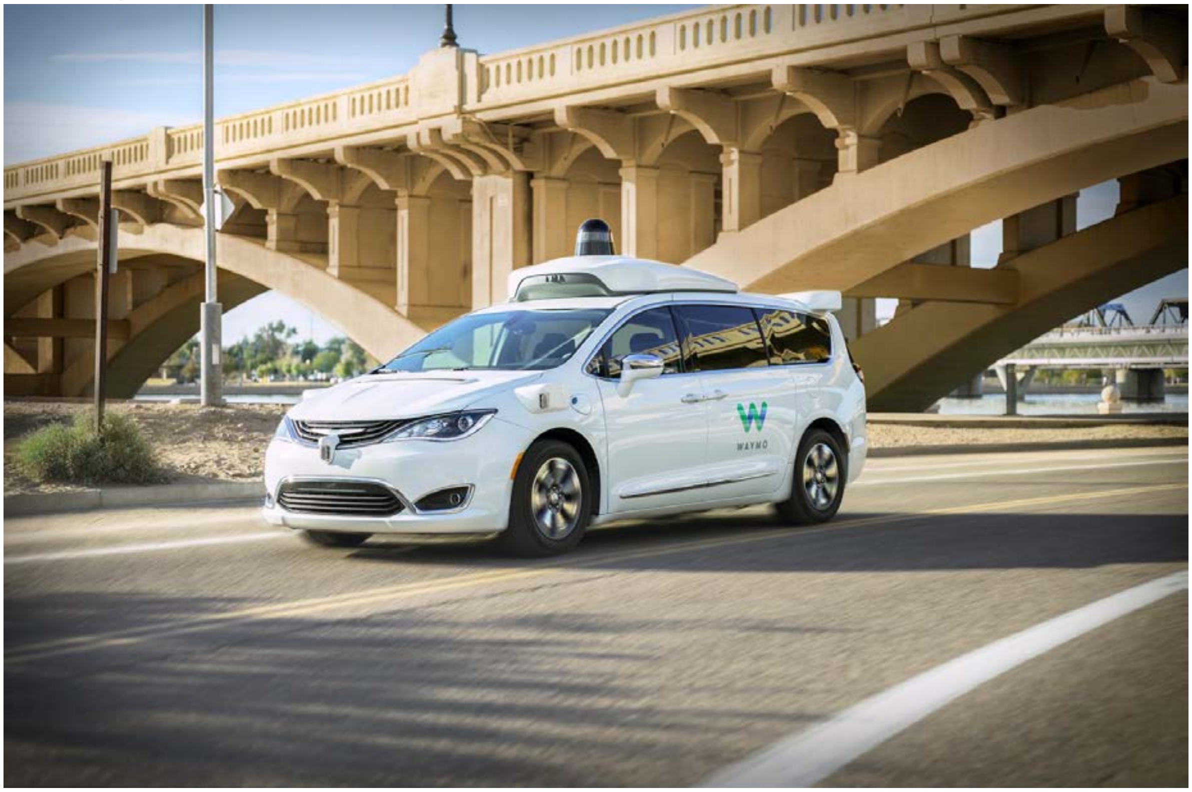
Pros:

- Reuse of well-located existing structures.
- More efficiency (added spaces) in existing structures.
- Allows temporary use of surface parking to accommodate off-site storage.

Cons:

- Many current structures will become obsolete.
- Transition to MaaS will not be uniform, so triggers must be determined.

Strategy: Autonomous and Connected Vehicles



Strategy Purpose:

Prepare for the coming shift to autonomy by considering strategies encouraging shared mobility, reduction of vehicle miles travelled due to induced demand, and finding more efficiencies in the existing roadway network.

Pros:

- Decreased costs of mobility.
- Enabling of MaaS at substantial scale.
- Greater development density/less parking.

Cons:

- Unintended vehicle uses.
- Induced demand/negative impacts on system.
- Inability to regulate/coordinate effectively.

Strategy: Autonomous Shuttles

Strategy Purpose:

Establish autonomous shuttle pilot projects to test coordination with real-world roadway conditions and to familiarize the public with AV operations.

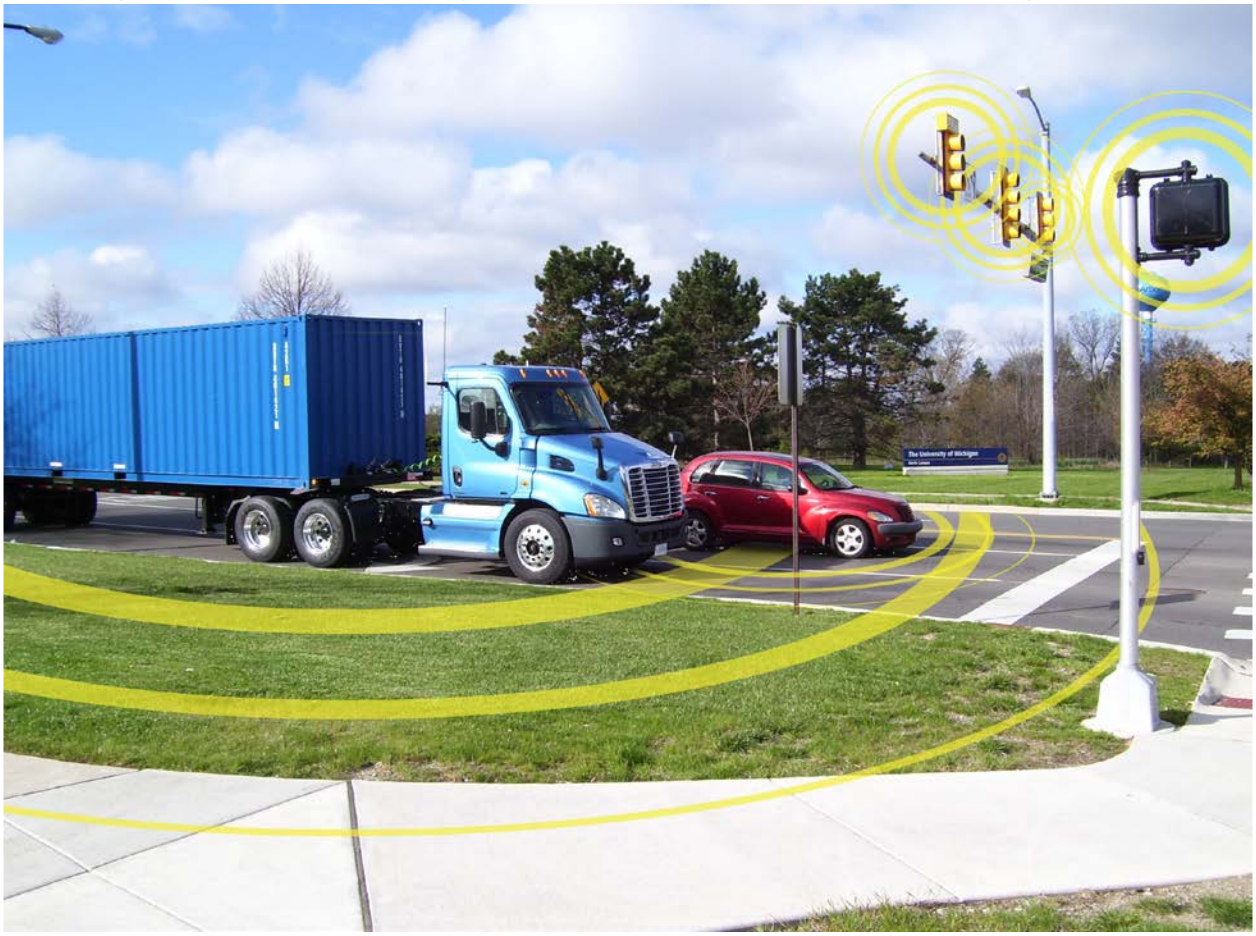
Pros:

- Lower cost/increase effectiveness of transit with better first mile/last mile connectivity.
- More efficient - fewer trips to serve same number of people when compared to privately owned vehicles.
- Introduce AV technology to broader public.

Cons:

- Integration with other modes on roadways.
- Initial tests limited to fixed routes.

Strategy: Smart Traffic Signal Controls and System Management



Strategy Purpose:

Move traffic, pedestrians, bicyclists, and transit vehicles more efficiently on existing streets by coordinating traffic signals through vehicle to infrastructure communication.

Pros:

- Improved traffic flow – speeds, capacity.
- More efficient ROW configurations.
- Communications – V2I and V2X.

Cons:

- Increased efficiency could be at the expense of new mobility options.
- Uncoordinated implementation among multiple providers for CAV aspects.

Strategy: Electrification / Charging Stations

Strategy Purpose:

Accelerate the shift to low-emissions vehicles by providing access to a regionwide system of charging stations.

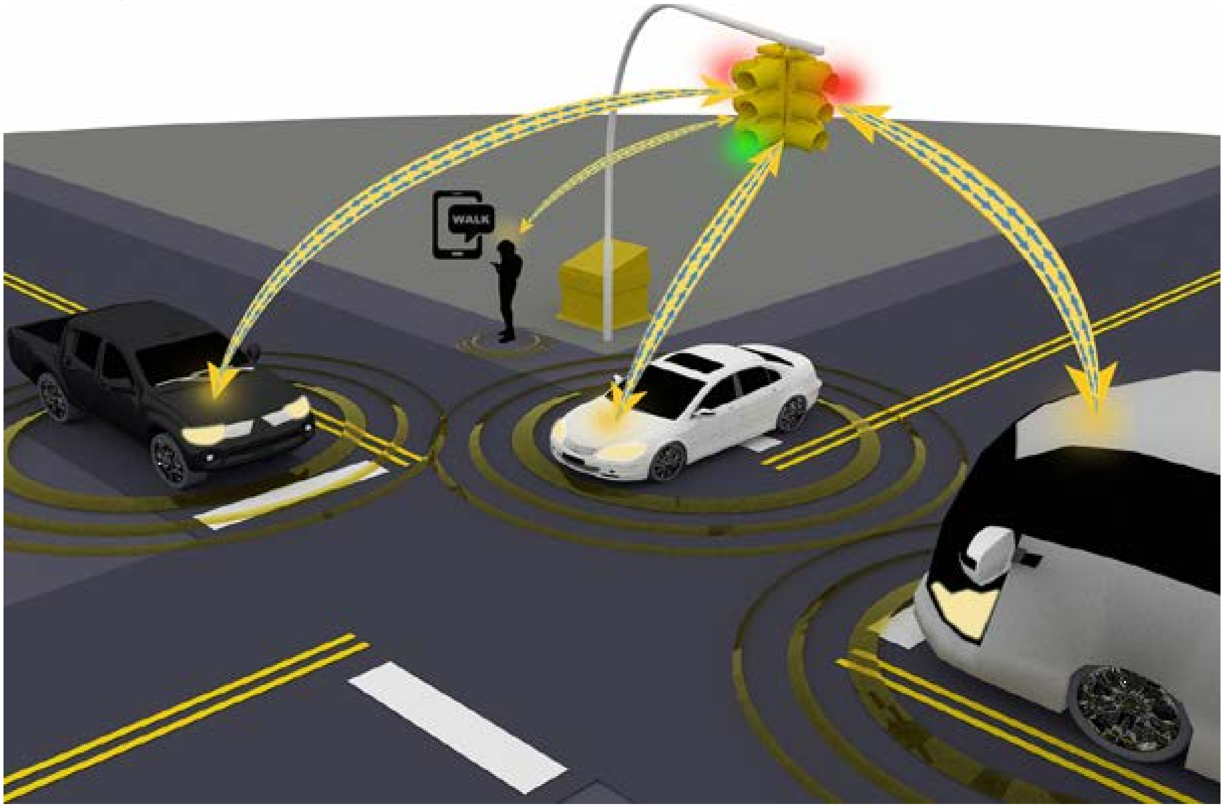
Pros:

- No tailpipe emissions and lower carbon emissions than internal combustion engine.
- Price for consumers is rapidly declining.
- Overall cost of ownership for travelers is typically less than a comparable internal combustion engine vehicle.

Cons:

- Insufficient supporting infrastructure for power distribution and charging.
- Transportation system reliant upon power grid.

Strategy: 5G / Communications



Strategy Purpose:

Establish the communication backbone needed for the function of connected and autonomous vehicles and the links to smart infrastructure.

Pros:

- Data-based decision-making and insights.
- Creation of backbone infrastructure that enables advanced safety and traffic management capabilities.
- Real-time system conditions and ability to react.

Cons:

- Data security and privacy.
- No access to proprietary data.
- No transparency in public access/ownership of data.
- Too much data/inability to draw conclusions.

Strategy: Micromobility

Strategy Purpose:

Provide additional transportation options to complement the changing mobility network, particularly improving first-last mile access as well as opportunities for underserved populations.

Pros:

- Expansion of mobility options.
- Better access to transit with a larger catchment area through mobility hubs and short-range mobility options.
- Availability to wide range of users.

Cons:

- Conflicts with other modes.
- Lack of “slow lane” options in ROW.
- Conflicts with sidewalk uses – pedestrians.

Strategy: Curb Management

Strategy Purpose:

Anticipate the growing competition for limited curb space resulting from increases in shared mobility and urban freight delivery due to e-commerce and automation.

Pros:

- Coordination of curb access with increasing competition.
- Shared mobility pick-up / drop-off.
- Urban freight delivery designation areas/times.

Cons:

- Conflicts with on-street parking.
- Enforcement challenges.
- Reconfiguration of curb lane.

Strategy: Robotic Delivery

Strategy Purpose:

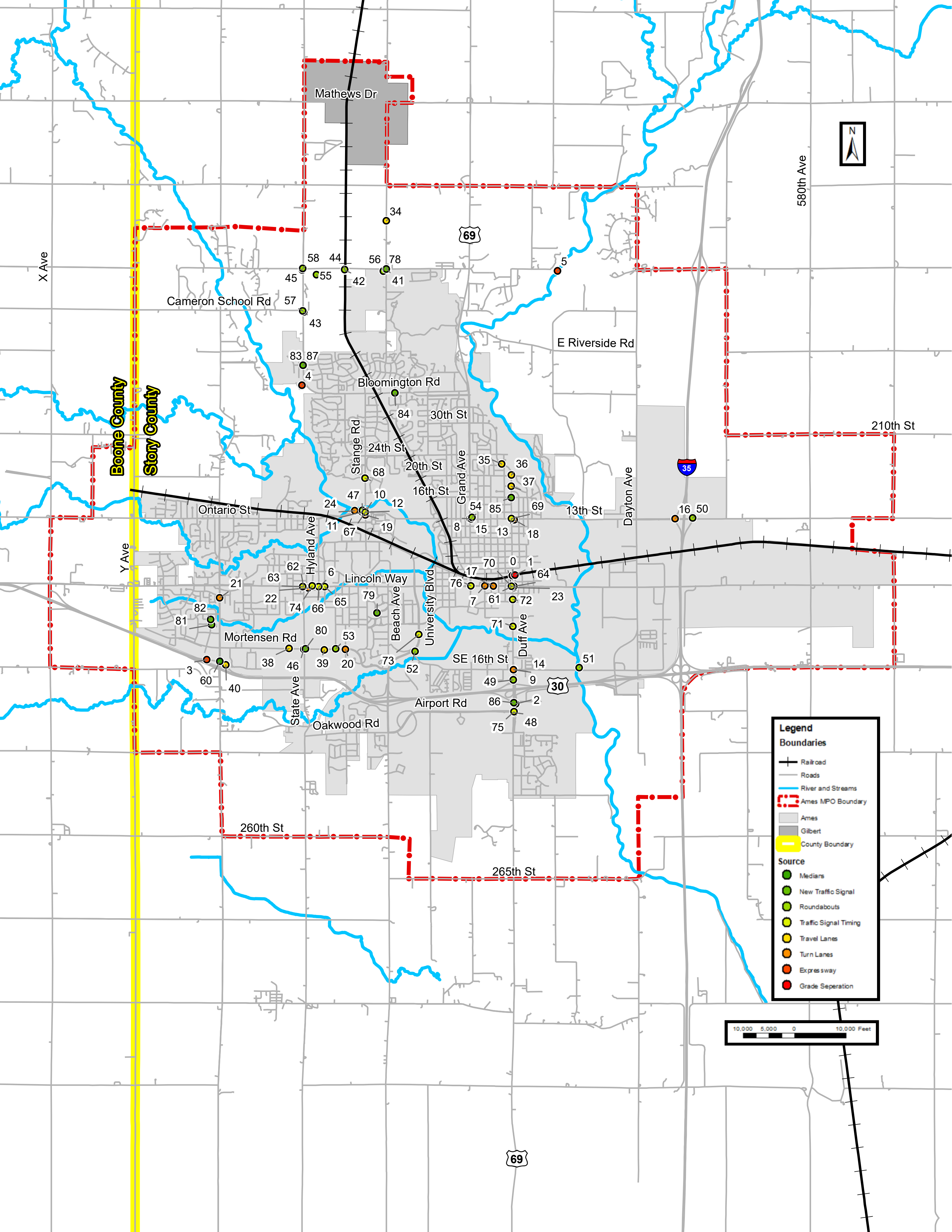
Respond to the rapidly growing e-commerce sector and prepare our roadway and sidewalk networks to accommodate ground-based robotic drone delivery vehicles.

Pros:

- “Right-size” trip options per delivery.
- E-commerce efficiency.
- Reduce truck delivery trips.

Cons:

- Greatly increased number of individual deliveries.
- Overwhelm ROW or sidewalks.



Mathews Dr
X Ave
Cameron School Rd
580th Ave
E Riverside Rd
Bloomington Rd
30th St
24th St
20th St
16th St
Stange Rd
Grand Ave
Dayton Ave
13th St
210th St
Boone County
Story County
Ontario St
Hyland Ave
Y Ave
Lincoln Way
Beach Ave
University Blvd
Duff Ave
Mortensen Rd
SE 16th St
State Ave
Airport Rd
Oakwood Rd
260th St
265th St
69
35
30
N
Legend
Boundaries
Railroad
Roads
River and Streams
Ames MPO Boundary
Ames
Gilbert
County Boundary
Source
Medians
New Traffic Signal
Roundabouts
Traffic Signal Timing
Travel Lanes
Turn Lanes
Expressway
Grade Seperation
10,000 5,000 0 10,000 Feet

FID	Comment	Source
0	Grade separation similar to Grand and RR with exit lane to access Main St businesses?	Grade Separation
1	Maybe grade separation for all four lanes of Duff Avenue is too expensive and disruptive. Maybe two lanes of grade separation for Des Moines Ave north to E 5th Street would provide some relief for traffic when trains slow down or stop downtown.	Grade Separation
2	There's not an "other" comment option, but need a new way to access sports complex.	Expressway
3	Improve road and connect to apartments to provide secondary access and reduce traffic around kids on Mortensen.	Expressway
4	Don't need an Xway, but no other way to put this on the map. Need an east-west connection between GW Carver and County Line, either from about 24th along the power line ROW or Bloomington. Traffic volumes on Cameron School are increasing rapidly	Expressway
5	Really need to connect 190th over Skunk River to connect to I-35	Expressway
6	Left turns on Lincoln Way would help.	Turn Lanes
7	Left turn lanes would help	Turn Lanes
8	Left turn lanes would be a great addition.	Turn Lanes
9	Turn lanes east/west bound	Turn Lanes
10	Turn only lanes east/west bound	Turn Lanes
11	Extend left turn lane traveling from 13th st to Stange. Left turning traffic often blocks west->east traffic.	Turn Lanes
12	Right turn lanes at this intersection all around.	Turn Lanes
13	Add dedicated turn lanes at any cost.	Turn Lanes
14	Turn lanes on S 16th St.	Turn Lanes
15	EB and WB traffic on 13th gets backed up pretty bad when Grand Ave has a lot of traffic. A single car trying to turn left (either NB or SB on Grand Ave), can back up 13th. An extra turning lane, or a brief turn arrow would be helpful.	Turn Lanes

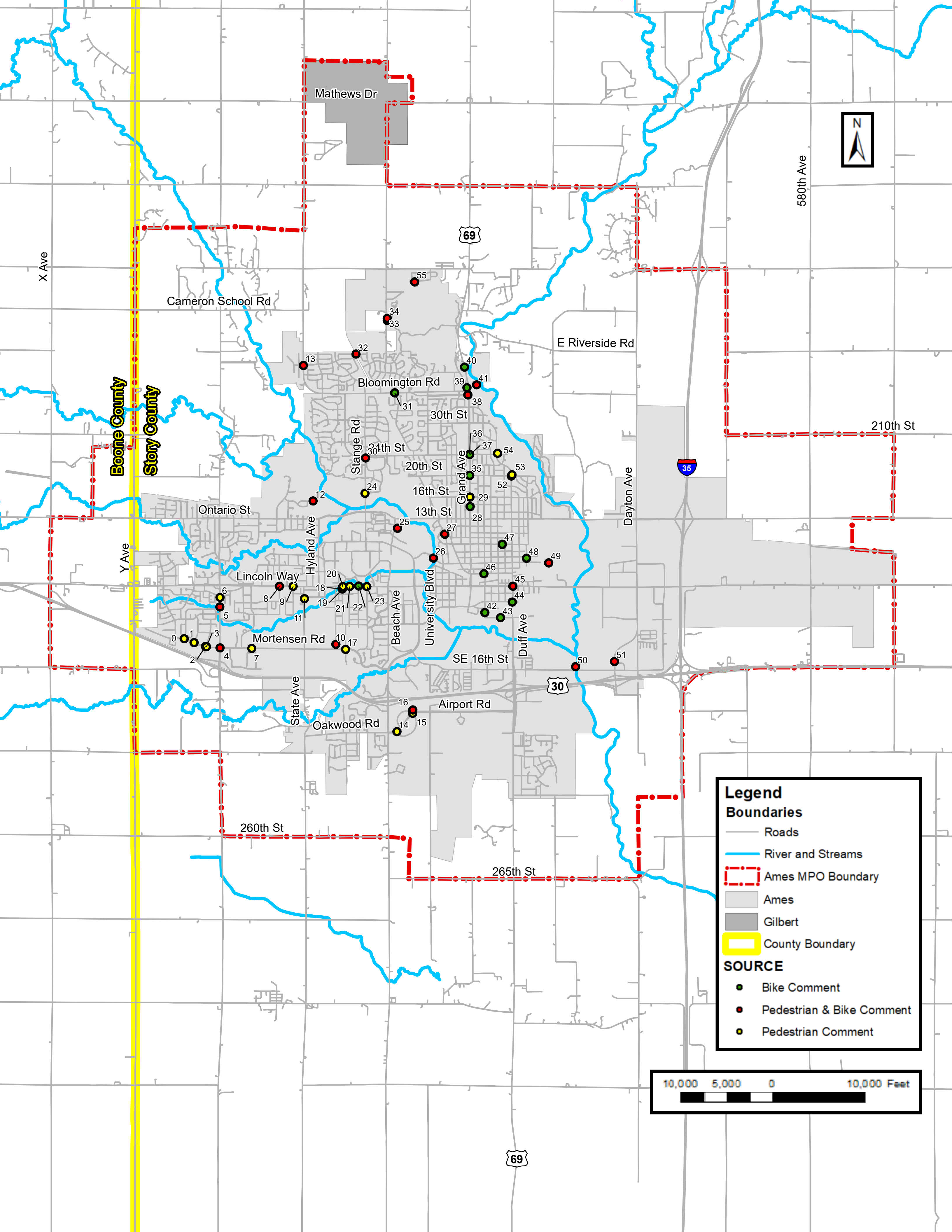
16	Need a right turn lane coming off SB 35 at 13th, 90% of the traffic is making a right turn. Roundabout would be nice, but traffic volume is minimal making left turn, so turn lane would be adequate	Turn Lanes
17	Many 4-lane streets in Ames could be changed to 3-lanes w bike lanes. Center turning lanes are much safer than turning from a travel lane.	Turn Lanes
18	A 3-lane street with bike lanes would be safer than 4 lanes. Center turning lanes would allow for left turn signals for both NB & SB at the same time.	Turn Lanes
19	Stange between Pammel & 24th changed to 3-lane w bike lanes. Thru cars would not be blocked by L turning cars. NB & SB Left turn arrows could be on at the same time.	Turn Lanes
20	Change Mortensen to 3-lane street w bike lanes between State and Ash. PED xing at Welch is very dangerous. Needs flashing intermittent LED PED signal.	Turn Lanes
21	Continue 3-lanes on S DAK north to Lincoln Swing. PED xing at Todd DR is very dangerous. Needs flashing intermittent LED PED signal. Crossing 3 lanes is safer than 4 lanes.	Turn Lanes
22		Turn Lanes
23	Maybe have two turning lanes	Turn Lanes
24	Need to add double left ono Stange, or mixed turn or straight on middle lane	Turn Lanes
25		Turn Lanes
26		Travel Lanes
27		Travel Lanes
28		Travel Lanes
29		Travel Lanes
30		Travel Lanes
31		Travel Lanes
32		Travel Lanes
33		Travel Lanes
34		Travel Lanes
35	Duff from 20th St. all the way north to Grand needs to be two lane.	Travel Lanes

36	Need to widen Duff from 20th St. North to where it meets Grand Ave.	Travel Lanes
37	The 1800 Block of North Duff is a Speedway at all times!	Travel Lanes
38		Travel Lanes
39		Travel Lanes
40	This is one of the worst â€œnew laneâ€• ive ever driven on, either the turning lane must be introduced more gradually or the turning lane needs to be way longer allowing cars to switch lanes and come to a stop in a comfortable safe manner	Travel Lanes
41	needs roundabout	Roundabouts
42	needs roundabout	Roundabouts
43	needs roundabout	Roundabouts
44		Roundabouts
45	needs roundabout	Roundabouts
46	State and Mortensen intersection is intermittently overwhelmed and would benefit from a roundabout.	Roundabouts
47	13th/Stange roundabout needed. Big ones like this work in Wisconsin and I think it could work in Ames. There is a lot of land available to build a very nice one similar to University/Airport Rd	Roundabouts
48	Duff/Hwy 30: Add roundabout similar to those in Neenah and Appleton WI on Hwy 41. It will move traffic quicker and also allow access to sports complex	Roundabouts
49	Duff/Hwy 30, north side of 30, add roundabout, could also flow into a second roundabout at S.16/Duff, similar to Hwy 41/Bell exit in Neenah WI. If Wisconsonites can figure it out, Iowans should be able to do it easier	Roundabouts
50	Roundabout need on east side of 35 at 13th. Mostly left turns from 35 to 13th WB and also mostly left turns from 13th to NB 35. Traffic backs up almost on to 35 in afternoon. This should be paid for by IDOT.	Roundabouts
51	S 16th at Dayton does not need roundabout now, but when S 16th fills in, there will be more traffic coming of 30/Dayton exit. Probably needed in about five years	Roundabouts
52	S 16th/University; lots of turning traffic in all directions. Big roundabout like University/Airport can fit in here and move traffic well	Roundabouts
53		Roundabouts

54		Roundabouts
55	Roundabouts needed at several intersections on NW city boundary.	Roundabouts
56	Needs a round about	Roundabouts
57	Needs a roundabout to help with traffic backup and flow	Roundabouts
58	Needs a roundabout to help with traffic backup and flow	Roundabouts
59		Roundabouts
60	Reduce NB Dakota to one thru lane, create dedicated turn feature from offramp onto NB Dakota.	Medians
61	Longer time for left turns	Traffic Signal Timing
62		Traffic Signal Timing
63	Coordinated signal timing on Lincoln Way between State Avenue and Duff Avenue.	Traffic Signal Timing
64	Coordinated signal timing between Lincoln Way & Duff south through US 30.	Traffic Signal Timing
65	Sheldon and S Hyland Traffic lights are less than one block apart, yet always end up stopping at both!	Traffic Signal Timing
66	Sheldon and S Hyland Traffic lights are poorly coordinated!	Traffic Signal Timing
67	Right turn arrows for this intersection?	Traffic Signal Timing
68	Replace traffic signal of average intelligence with smart traffic signal.	Traffic Signal Timing
69	Need a smarter traffic signal here.	Traffic Signal Timing
70	I avoid this intersection completely due to the horrible traffic signal here.	Traffic Signal Timing
71	Traffic signal here was a massive failure of imagination. Please get rid of this idiotic traffic signal and find another way for people to access these businesses.	Traffic Signal Timing

72	Signal timing is something that needs to be addressed	Traffic Signal Timing
73	Seems inconsistent in timing, often get all reds traveling south from LW to Hwy 30	Traffic Signal Timing
74		Traffic Signal Timing
75	Better coordination of traffic signals / road alignment for sports complex traffic. There are always near misses here when parents are rushing to get kids to practices and people are heading home from work.	Traffic Signal Timing
76	Walk light needs to be longer for physically handicapped people trying to cross to get to Hy-Vee; talking ones would be ideal, as there are independent blind people in Ames	Traffic Signal Timing
77		Traffic Signal Timing
78		New Traffic Signal
79	SMART TRAFFIC CONTROLS are a good innovation. I would still like to see more TRAFFIC SLOWING devices ("speed bumps") particularly in the South Campus/Colonial Village areas. (Ash Ave. and Country Club Blvd., between Ash and Fourth is bad.	New Traffic Signal
80	There is so much traffic here on busy hours and if coming to the stop westbound then the big hill sometimes prevents the driver from seeing the stopped traffic and in the winter it gets very dangerous	New Traffic Signal
81	This area need stop signs, 4 way traffic and no stop or yield gets very risky and unsafe especially at night	New Traffic Signal
82	Needs a stop sign	New Traffic Signal
83	Don't need a traffic signal; but a signaled crosswalk at Weston and GWC is really needed for safety	New Traffic Signal
84	very difficult to cross intersection north/south. especially for bicyclists	New Traffic Signal
85	4 way stop encourages drag race to merge before lanes drop to 2-way traffic at 20th St.	New Traffic Signal

86	Traffic crossing from Hwy 30 ramp creates dangerous situation during high traffic times.	New Traffic Signal
87	Needs a traffic light. Traffic and pedestrican crossing	New Traffic Signal



Mathews Dr
X Ave
Cameron School Rd
Boone County
Story County
Ontario St
Y Ave
Lincoln Way
Hyland Ave
Mortensen Rd
State Ave
Oakwood Rd
Bloomington Rd
30th St
Stange Rd
24th St
20th St
16th St
13th St
Grand Ave
University Blvd
Beach Ave
Duff Ave
SE 16th St
Airport Rd
E Riverside Rd
Dayton Ave
210th St
580th Ave
260th St
265th St
69
30
35
N
Legend
Boundaries
Roads
River and Streams
Ames MPO Boundary
Ames
Gilbert
County Boundary
SOURCE
Bike Comment
Pedestrian & Bike Comment
Pedestrian Comment
10,000 5,000 0 10,000 Feet

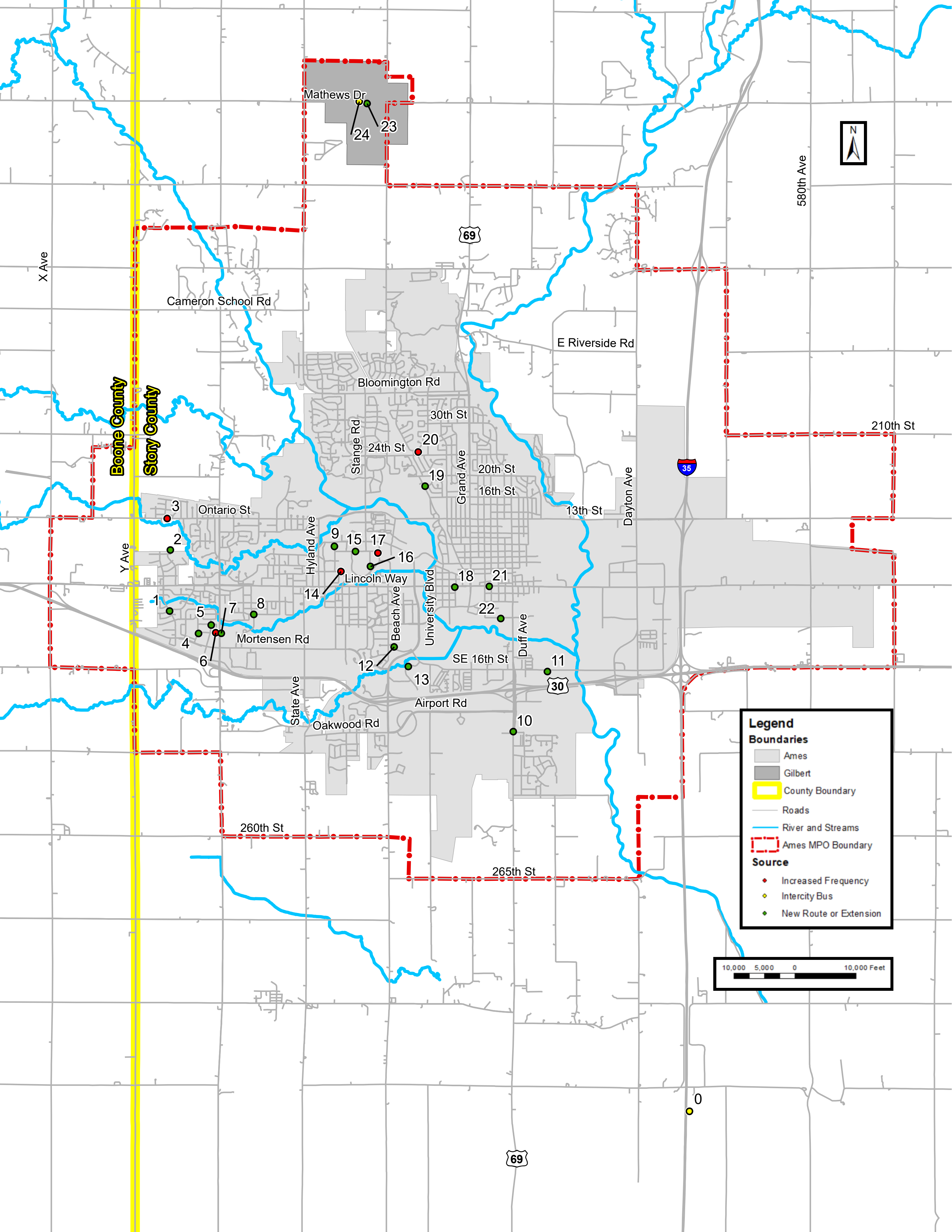
FID	STRATEGY	COMMENT	Source
0	High Visibility Crosswalks		Pedestrian
1	High Visibility Crosswalks		Pedestrian
2	New/Improved Trail or Side Path	This is not a pedestrian or bike friendly road at this point, but it should be as long as there is an elementary school in the area.	Pedestrian & Bike
3	High Visibility Crosswalks		Pedestrian
4	Grade Separate Crossing	The high traffic volume due to growth in this area has led to high traffic volume and unsafe conditions for bicyclists and pedestrians.	Pedestrian & Bike
5	Grade Separate Crossing	South Dakota is very busy and this crosswalk is frightening. Add a grade separation to avoid being sued when a kid gets hit by a car walking to school.	Pedestrian & Bike
6	High Visibility Crosswalks	Continue 3-lanes on S DAK north to Lincoln Swing. PED xing at Todd DR is very dangerous. Needs flashing intermittent LED PED signal. Crossing 3 lanes is safer than 4 lanes.	Pedestrian
7	High Visibility Crosswalks	Drivers ""tune out"" the continuous flashing amber light at the crosswalk. Use flashing intermittent LED PED x-ing lights. Intermittent lights are better at getting a driver to pay attention.	Pedestrian
8	New/Improved Trail or Side Path	For cyclists who are uncomfortable riding on the road, there should never be sidewalk pedestrian crossing that have a "hump" in between the meeting point of two perpendicular crosswalks. These humps cause crashes and unnecessary bicycle damage (i.e fla	Pedestrian & Bike
9	High Visibility Crosswalks	Dangerous crossing for students using CyRide. Use flashing intermittent LED PED x-ing lights. Intermittent lights are better at getting a driver to pay attention.	Pedestrian
10	New/Improved Trail or Side Path	Need sidewalk along Hayward from Mortensen to Wilson Hall	Pedestrian & Bike
11	High Visibility Crosswalks	Drivers ""tune out"" the continuous flashing amber light at the crosswalk. Use flashing intermittent LED	Pedestrian

		PED x-ing lights. Intermittent lights are better at getting a driver to pay attention.	
12	New/Improved Trail or Side Path	Bike trail between Moore Memorial and Scholl Avenue or Amherst Drive.	Pedestrian & Bike
13	New/Improved Trail or Side Path	Need lighted crosswalk for safety	Pedestrian & Bike
14	High Visibility Crosswalks	Need a crosswalk here.	Pedestrian
15	High Visibility Crosswalks	Signs promoting walking in this area, but no crosswalks across Airport Road!	Pedestrian
16	New/Improved Trail or Side Path	Paved, shared-use path to replace old gravel path here!	Pedestrian & Bike
17	High Visibility Crosswalks	Change Mortensen to 3-lane street w bike lanes between State and Ash. PED xing at Welch is very dangerous. Needs flashing intermittent LED PED signal.	Pedestrian
18	Leading Pedestrian Interval	Suggest a ped mall for campustown even though no strategy option for this.	Pedestrian
19	Bike Lanes	Need bike lanes throughout campustown.	Bike
20	Shorter Crossings	A ped bridge would work here from the elevation at the Fire Station to a similar elevation near Friley.	Pedestrian
21	High Visibility Crosswalks	I don't know if high visibility crosswalks are the answer but something has to be done about all the ISU students jaywalking across Lincoln near campus. I'm always scared I'm going to run over someone darting out into traffic.	Pedestrian
22	Cycle Tracks/Protected Bike Lanes	No where to bike through campus town. Add bike lanes.	Bike
23	Shorter Crossings	Think big. Pedestrian bridge at Ash would work. Elevation at Gable/Ash and near Geoffrey Hall is same at North side of Mem Union. Peds will use a bridge where there is no grade change. Emmalee Jacobs would be alive today if you had done this in the pas	Pedestrian
24	High Visibility Crosswalks	Lots of peds cross Stange dangerously to get to CyRide, need a yellow flasher like on 13th east of	Pedestrian

		Stange, either at Bruner or Veenker or in between the two	
25		...go another ten or twenty seconds (e.g. L-Way & University) before the light changes. Please make them uniform!	Pedestrian & Bike
26		6th St was never intended as a regular auto commute route and should be restricted to a low speed (20 mph) or one-way road, esp. adj park, with priority given to bike/ped users who rely heavily on this route to go between campus, residential and downtown	Pedestrian & Bike
27		Every city I've ever visited with pedestrian countdown signals has the signal go to yellow when the countdown hits zero. In Ames, there's no rhyme or reason to the countdowns. The signal may turn yellow at zero, but more often than not, the signal may...	Pedestrian & Bike
28	Cycle Tracks/Protected Bike Lanes	People are going to keep riding on Grand despite Northwestern and Clark being the bike paths they should use. Just make it more convenient like you've done north of 16th.	Bike
29	High Visibility Crosswalks	zebra crosswalks for crossing Grand	Pedestrian
30	New/Improved Trail or Side Path	Make this sidewalk connection on the east side of the road	Pedestrian & Bike
31	Actuated Signals	Crossing for both pedestrians and cyclists very difficult here crossing north/south	Bike
32	Grade Separate Crossing	Crossing over Railroad	Pedestrian & Bike
33			Bike
34	New/Improved Trail or Side Path	Bike access to Ada Hayden from Hyde	Pedestrian & Bike
35	Intersection treatments for bike facilities		Bike
36	Cycle Tracks/Protected Bike Lanes	Improved bike access to this area.	Bike

37	Intersection treatments for bike facilities		Bike
38	New/Improved Trail or Side Path	Some connection is needed from Bloomington rRd path to Ada Hayden, either put side path along US 69 all the way to park or far enough to connect to a bike lane on Dawes Dr	Pedestrian & Bike
39	Bike Lanes	A bike land on Dawes Dr could connect to a short side path along US69 to get to shared use path going down Grand	Bike
40	Cycle Tracks/Protected Bike Lanes	Improve bike access to Grand Avenue from Lincolnway to Aden Hayden is desperately needed!	Bike
41	New/Improved Trail or Side Path	Bike trail from Sports Complex (south of hwy 30) through to Ada Hayden!	Pedestrian & Bike
42	Bike Lanes	Need to continue bike lane south on Walnut then east on S. 5th over to Duff.	Bike
43	Bike Lanes	Add bike lane to S. 5th and walnut for continuity with s. Duff path	Bike
44	Bike Lanes	Bike lane to no where here currently?	Bike
45	New/Improved Trail or Side Path	Another comment was made about crosswalk timers not coordinating with the traffic lights. I agree! They count down at random. Sometimes I see it counting down and slow down in anticipation, but it stays green. It would be very helpful for drivers.	Pedestrian & Bike
46	Bike Lanes	Bike lanes throughout downtown.	Bike
47	Bike Lanes	9th Street could have bike lane from Northwestern to the Cemetery	Bike
48	Bike Lanes	6th St bike route could continue toCrawford and then up Crawford to Cemetery	Bike
49	New/Improved Trail or Side Path	trail to connect to Skunk River Trail	Pedestrian & Bike
50	New/Improved Trail or Side Path	Complete bike trail/shared path connection between SE 16th and Lincolnway!	Pedestrian & Bike

51	New/Improved Trail or Side Path	Shared use path on S Dayton desperately needed.	Pedestrian & Bike
52	Bike Lanes	Installed planned bike lanes from 16th to Grand	Bike
53		Sidewalks on East side of Duff and North side of 20th St at Homewood	Pedestrian
54		Sidewalks on the East side of Duff and North side of 24th to access Inis Grove paths	Pedestrian
55	New/Improved Trail or Side Path	Bike access to Ada Hayden from W 190th St.	Pedestrian & Bike

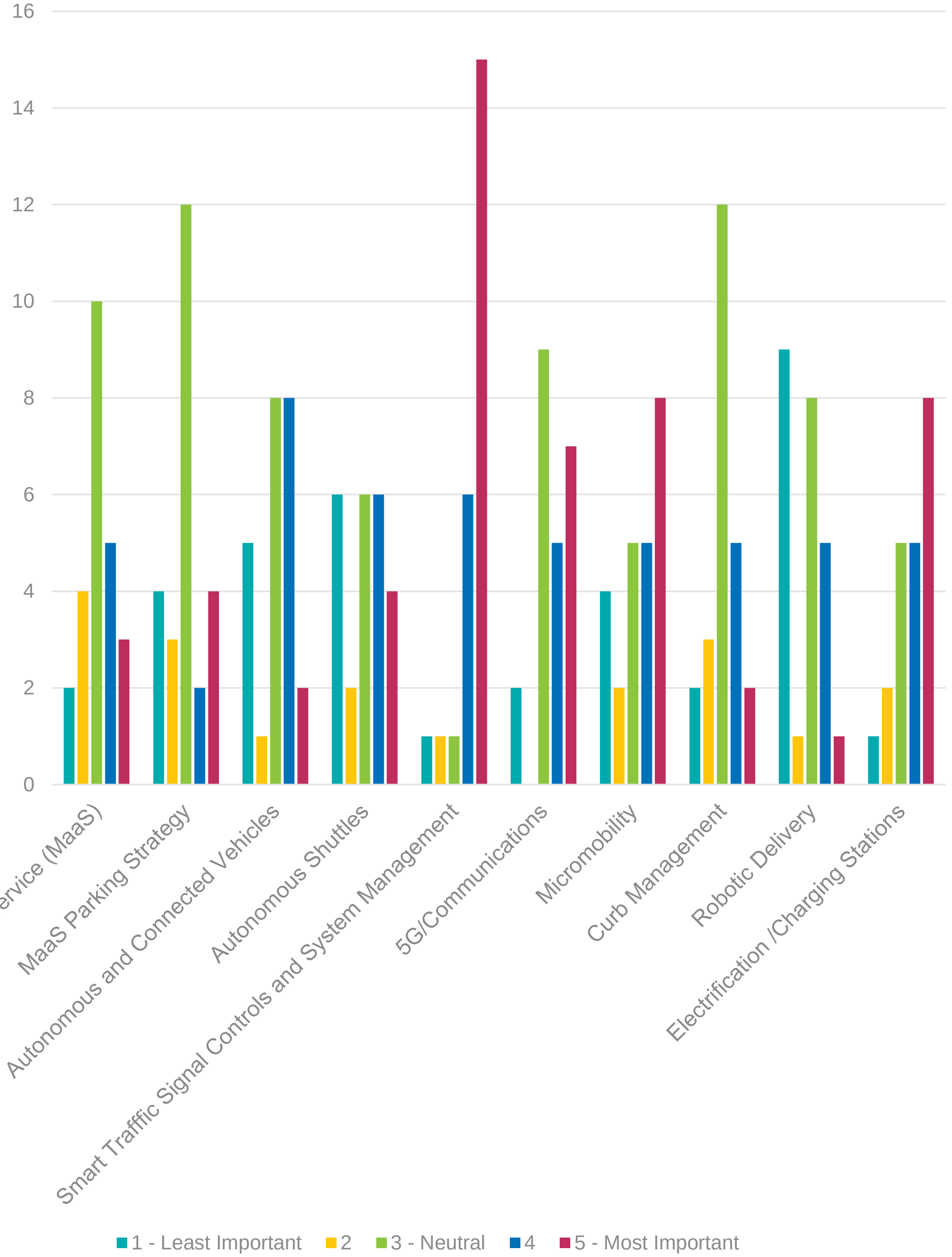


Mathews Dr
24
23
69
X Ave
580th Ave
N
Cameron School Rd
E Riverside Rd
Bloomington Rd
30th St
210th St
Boone County
Story County
Stange Rd
24th St
20
19
Grand Ave
20th St
16th St
Dayton Ave
35
3
Ontario St
13th St
Hyland Ave
9
15
17
16
2
Y Ave
Lincoln Way
14
University Blvd
18
21
Beach Ave
1
5
7
8
22
4
Mortensen Rd
Duff Ave
6
12
SE 16th St
11
13
30
State Ave
Airport Rd
Oakwood Rd
10
260th St
265th St
Legend
Boundaries
Ames
Gilbert
County Boundary
Roads
River and Streams
Ames MPO Boundary
Source
Increased Frequency
Intercity Bus
New Route or Extension
10,000
5,000
0
10,000 Feet
0
69

FID	COMMENT	Source
0	Update DSM MPO study that showed bus between Ames and DSM would be successful. Need to have the creative people move easily between Ames and DSM via bus. Stops at Research Park and ISU and DSM East Village and Downtown	Intercity Bus
1	A bus route on Wilder, Thackeray, or Clemens could reduce walking distance to bus stops for the inner residences of this area.	New Route or Extension
2	Serving future expansion in this area with a bus route closer than Lincoln Way/Ontario St/N500th Ave would be ideal.	New Route or Extension
3	Increased Frequency.	Increased Frequency
4		New Route or Extension
5		New Route or Extension
6	Lilac needs to double up busses or make them more frequent when school is in session, ESPECIALLY in the first weeks of semester	Increased Frequency
7	How come there is a bus stop directly across the street going southbound but not a single bis picks up to go northbound? At time when lilac does not run, citizens of ames either have to walk all the way up to the Mary greely bus stop which can take 14 mi	New Route or Extension
8	Running a bus on Dotson could significantly reduce walking distance to a bus stop for residences in the vicinity of Harris/Coy/Marigold.	New Route or Extension
9	There are no near stops here and plenty of people go to town ENGR or park near here	New Route or Extension
10	9 Plum should extend south of S. 16th and eliminate 5 Yellow south end. 1 Red should extend to Buckeye and eliminate north half of 5 Yellow	New Route or Extension
11	Extend the Plum Route to DMACC to better serve SE 16th Street and to reduce the size of EASE. Change to 30 minute frequency for regular buses and add ""extras"" on ISU class days where needed.	New Route or Extension
12	This stop is completely necessary, as a student who pays for these facilities and as a resident of ames with no car, there is no near bus stop, the summer can be extremely hot and prevent me from going bc of the far walk	New Route or Extension

13	Create a new shuttle service between the Commuter Lots, the South Lots and VET MED. Remove VET MED from the Plum Route so it can return to an express service.	New Route or Extension
14		Increased Frequency
15	New eastbound stop needs to be added here	New Route or Extension
16	This is the most inconvenient area of campus, there is no nearby stops and the walk from library is almost 10 minutes making anyone late for class, also when the temperatures get well below freezing it is very horrible to walk to this area	New Route or Extension
17	Scheduled transfers are lousy between UV and S. Duff; often have to wait 20 or 30 minutes. Either schedule buses to meet or combine routes	Increased Frequency
18	1 Red should run every 15 minutes to downtown, every 30 north of downtown	New Route or Extension
19	Green route should go to High School all the time. Low income students are primary riders and you make it hard for them to participate in after school activities	New Route or Extension
20	14 Peach should run every 20 minutes	Increased Frequency
21	1 Red should replace 5 Yellow for one seat ride from west Ames to S. Duff commercial area	New Route or Extension
22	Need some combined routes in evening and weekends, UV should be connected to S. Duff commercial area without need to transfer	New Route or Extension
23	Route between campus and Gilbert can serve ISU employees, but also Gilbert HS and Middle School students	New Route or Extension
24		Intercity Bus
25	Need 30 or 60 minute interval to Nevada. Current HIRTA service is horrible an invisible. Nevada will be in the MPO after next census	New Route or Extension

Emerging Trends & Technology Survey Results



FORWARD 2045

PUBLIC COMMENTS	CREATED TIME
I think the road diet proposal for Lincolnway from Duff to the DOT is insane. When people claim that road diets work in other places so a road diet for Lincolnway will work, they are wrong! Other areas using road diets are not on the one street that passes completely through town. Truck traffic is already bypassing South Duff, but may use the South 16th to Grand Avenue option. Think what would happen if you were heading East on Lincolnway and approaching Duff Avenue. You have a center turn lane, you have one lane Eastbound and that is going to have to handle traffic that wants to go East and traffic that will turn right/South at Duff. It will be a nightmare. If road diets work, why don't you put Duff avenue on a road diet? Because it wouldn't work and it won't work on Lincolnway.	Oct 30, 2019 09:39 AM
As a former bicycle commuter before moving to Ames, I've pretty much dropped bike commuting as a transportation option. Ames' reliance on shared-use paths may make drivers feel better but intermingling cyclists and pedestrians is less efficient for cyclists and creates conflict and potential safety issues between these groups. Please consider phasing out the shared-use paths in favor of on-street bike lanes and lane markings (and don't be afraid to enforce traffic regulations on cyclists).	Nov 15, 2019 07:16 AM
The west-bound traffic needs to use the far right and far left lanes (get rid of the middle lane). Everyone trys to get into the middle lane to turn left or go straight. It would be safer if the middle lane was the one that was closing (not the right)	Nov 18, 2019 09:09 AM
South-bound traffic is speeding up to merge in the same place where pedestrians are trying to cross. Need to find a way to make cars more aware of the pedestrians	Nov 18, 2019 09:11 AM
East Ross Road needs a sidewalk. There is parking on both sides of the street (west end of the road) and no place for pedestrians, kids on bikes, people with strollers and walkers, to go.	Nov 18, 2019 09:12 AM
But this ignores the fact that there is a designated bike path right next to 6th street. It would be much safer for all concerned for bikes to be directed onto the bike path when the bike lanes end at the entrance to Brookside Park. I have twice been hit by vehicles while rigging on shared streets, and I feel strongly that where bike lanes are available they should be used. As it is, the city is telling people to share a traffic lane that has a curb and no shoulder when there is a bike path available right next to it. Moreover, if a cyclist is riding westbound on 6th street he comes out at University and has no bike lanes or even a crosswalk available to continue the trip. Crossing to the bike path at the entrance to Brookside Park leaves cyclists on the south side of 6th street and when they reach University the can cross with the light to continue east onto campus or north on the bike path that follows University, or they can continue south on the bike path into the Stewart Smith Park - they have three good and safe options.	Nov 19, 2019 08:39 AM
Hi! I read an article in the Ames Tribune that you wanted feedback on intersections that don't work well. Definitely the intersection of 13th St and Grand!!!!! Eastbound and Westbound. It's nice that the North and South bound traffic have their own lights. Would be SOOOOO much better if the same was done for the other two directions. I come from the East and it can be impossible to turn left or South when its two way traffic from the East and the West. I imagine those wanting to turn North, coming from the West say the same thing. Since 13th St is one of the gateways into Ames, I'm shocked that only one car can turn left when traffic is coming from the West! Not a very warm welcome to Ames! Thank You	Nov 22, 2019 05:32 AM

There is ample evidence proving that we are in the midst of a global climate emergency, with very little time to reverse, or at least stem, its effects. The City of Ames MUST declare a climate emergency and act accordingly in future planning, including for transportation, which is a significant contributor to climate change. I support the Ames Climate Action Team's recommendations involving transportation planning and climate action for the City of Ames:General MTP Comments: • Plan for the risks and hazards of climate change when planning for the next 25 years.• Promote a vision and plan for Ames to be resilient and prepared to adapt to the challengesand opportunities of climate change.• Include temperature and precipitation trends from climate change models in planning.• Plan and design to minimize future impacts of climate change, such as increases in heatwaves and flooding.• Prioritize equity, diversity and inclusion in Ames.• Promote emergency preparedness and safety for all people.• Look for ways to reduce the community of Ames' carbon emissions.• Scale and accelerate progress to reduce greenhouse gas emissions in Ames.Specific transportation actions:• Prioritize multi-modal transportation.• Require, incentivize, and reward accommodation of multi-modal transportation optionssuch as bikes, pedestrians, buses, electric vehicles, and car sharing.• Connect and expand bike and pedestrian trail networks.• Encourage Ames to limit further geographic sprawl. Longer distances make cyclingharder and less viable. Sprawl causes longer distances that increases cost for servicessuch as school buses, ambulances, city water services, and travel in general.• Explore electric railroad connections.	Nov 28, 2019 11:00 AM
State and Mortensen needs a traffic light Lincoln Way and Clark needs left turning lanes. How do you navigate a street with bicycles, skate boards and scooters on the road?! It is scary to be making a right turn and see a bicycle pop up in your right window. Street lights are obscured by trees in the parking, so it does not make for safe walking after dark. The lights have limited illumination to begin with. It would be helpful to have more red light runners apprehended.	Nov 29, 2019 11:30 AM
Kansas City recently made headlines when they implemented a fare-free bus service. After minimal looking around online, there are actually several cities in the US that already have free bus service, including Iowa City's CAMBUS. Could Ames also go in this direction with CyRide? I feel like the city is really pushing bicycle riding, but for a sizable portion of the year, riding a bike just isn't feasible for a majority of our population. And for many, it isn't an option at all, no matter the weather. I would really love to see Ames give this fare-free service a try, even on a short-term basis of a year or two, then determine if it would be something we could do on a more permanent level. This is something that could be of great benefit to Ames citizens and ISU students alike.	Jan 6, 2020 03:05 PM

Most of the road widening projects in the Forward 2045 Plan are unnecessary. Sizing roads for peak loads is financially unsustainable.If vehicle drivers feel that their route during peak use is congested, the vehicle driver has the option to: 1) start their trip earlier; 2) start their trip later; 3) seek an alternate route; 4) seek an alternate mode; or 5) a combination of the previously mentioned.Adding lanes to a road is the equivalent of adding rooms to a house. In a home scenario, adding rooms will increase the yearly heating, cooling, and maintenance costs due to the additional cubic footage. This 2045 transportation plan does not factor in the financial sustainability of increased yearly costs associated with maintaining more cubic footage of vehicle pavement.Decreasing vehicle congestion is not accomplished by adding lanes. Decreasing vehicle congestion is accomplished by creating more favorable conditions for alternative transportation modes; it's about converting more vehicle trips to carpooling, transit, walking, and bicycling. The cost of constructing shared use paths is dirt cheap compared to road projects. Increased levels of walking and bicycling has health benefits.On document page 179, the largest word in the word cloud for "What would you do to improve the Ames transportation system" is "sustainable". Adding car lanes is not sustainable for the environment or the city's finances.	10/20/2020 10:34 AM
The Ames Bicycle Coalition appreciates the thorough approach to developing this plan. Our overriding vision for the plan is that it achieves transportation equity for cyclists, pedestrians, and transit. We prioritize increasing the ease and safety for getting around Ames by something other than personal motorized vehicles. We are seeing significant increases in alternate transportation in the form(s) of walking, bicycling, electric skateboards and scooters, and expect these trends to continue as younger generations face economically and socially destructive challenges caused by COVID, climate change, etc. To reiterate our priorities for transportation planning, financing and implementation: • Prioritize multi-modal transportation. • Require, incentivize, and reward accommodation of multi-modal transportation options such as bikes, pedestrians, buses, electric vehicles, and car-sharing. • Connect and expand bike and pedestrian trail and commuter networks. • Encourage Ames to limit further geographic sprawl. o Sprawl often creates conditions -- such as proximity to high volume, high speed vehicle traffic; unsafe or poorly designed intersections; minimalist bike and walking facilities, and streetscapes empty of people and places – that discourage folks from healthy habits of riding and walking. o Sprawl creates longer distances that increase the cost for services such as school buses, ambulances, city water services, and travel in general. • Ongoing project implementation should continue to prioritize evaluation and adaptions that increase safe and efficient travel for all modes. Thank you for your service to the people of Ames. Respectfully, Jeri Neal,	10/22/2020 3:20 PM

On behalf of the Ames Bicycle Coalition steering committee and members	
Thank you for your efforts to develop a balanced, well-rounded 2045 Long Range Transportation Plan in Ames. Because the climate crisis urgently needs to be addressed at all levels of planning, we urge you to build medium and long-term solutions into transportation planning to reduce greenhouse gases and integrate climate adaptation solutions as much as possible, whenever possible. A few examples that we would like to emphasize support for include: • Prioritize multi-modal transportation. • Require, incentivize, and reward accommodation of multi-modal transportation options such as bikes, pedestrians, buses, electric vehicles, and car-sharing. • Connect and expand bike and pedestrian trail and commuter networks. • Encourage Ames to limit further geographic sprawl. Longer distances make cycling harder and less viable. Sprawl causes longer distances that increase the cost for services such as school buses, ambulances, city water services, and travel in general. Thank you for your service to the people of Ames. Respectfully, On behalf of the Ames Climate Action Team Steering Committee: Allison Brundy, Erv Klaas, Jeri Neal, Shellie Orngard, and Vivian Cook (ISU Graduate Student)	10/22/2020 3:20 PM

Resource Agency Coordination

Resource Agency Coordination

As part of the development of the AAMPO Metropolitan Transportation Plan, Forward 2045, all Federal, State, and Tribal agencies concerned with management, regulation, and wildlife were notified regarding the Plan's development. The purpose of coordinating with these agencies was to hold discussions about the specific resources that could be impacted by the Plan and identify potential mitigation strategies. **Table 1** below lists the agencies that were contacted by the AAMPO; following the table is a copy of the letter sent by AAMPO and copies of the responses received.

Table 1: List of Resource Agencies Contacted

Name	Line 2	Street	City	State	ZIP
Iowa Department for the Blind		524 4th St.	Des Moines	IA	50309
Iowa Dept. of Ag. And Land Stewardship	Wallace State Office Building	502 E. 9th St.	Des Moines	IA	50319
Iowa Department of Cultural Affairs		600 E. Locust St.	Des Moines	IA	50319
Iowa Economic Development Authority		1963 Bell Ave, Suite 200	Des Moines	IA	50315
Iowa Department of Education		400 E. 14th St.	Des Moines	IA	50319
Iowa Department of Human Rights	Lucas State Office Building	321 E. 12th St.	Des Moines	IA	50319
Iowa Department of Human Services,	Story County	126 S. Kellogg Ave.	Ames	IA	50010
Iowa Department of Public Safety		215 E. 7th St.	Des Moines	IA	50319
Iowa Department on Aging	Jessie M. Parking Building	510 E. 12th. St., Suite 2	Des Moines	IA	50319
Iowa Homeland Security and Emergency Management		7900 Hickman Rd., Suite 500	Windsor Heights	IA	50324
Iowa Utilities Board		1375 E. Court Ave., Room 69	Des Moines	IA	50319
Iowa Workforce Development		1000 E. Grand Ave.	Des Moines	IA	50319
FHWA, Iowa Division	Attn: Darla Hugaboom	105 6th St.	Ames	IA	50010
FTA, Region 7	Attn: Eva Steinman	901 Locust St., Suite 404	Kansas City	MO	64106
U.S. Army Corps of Engineers	Clock Tower Building	P.O. Box 2004	Rock Island	IL	61204
U.S. EPA, Region 7		11201 Renner Blvd	Lenexa	KS	66219
U.S. Department of Agriculture, NRCS		501 S. 11th St.	Nevada	IA	50201
Story County Conservation		56461 180th St.	Ames	IA	50010
Iowa Department of Natural Resources		503 E. 9th St.	Ames	IA	50319
U.S. Fish and Wildlife Services		1511 47th Ave	Moline	IL	61265
Office of the State Archaeologist	The University of Iowa	700 S. Clinton St.	Iowa City	IA	52242
State Historical Society of Iowa	Attn: Review and Compliance Program	600 East Locust St.	Des Moines	IA	50319

September 23, 2020

[Name]

[Line 2]

[Street]

[City], [State] [ZIP]

The Ames Area Metropolitan Planning Organization (AAMPO) is currently updating its Metropolitan Transportation Plan (MTP) to the year 2045. The MPO is the designated transportation planning body for the Ames, Iowa metropolitan area, charged with carrying out the area's federally required metropolitan transportation planning process. More information on the MPO is available at: https://www.cityofames.org/government/aampo.

The MPO has worked with its constituent organizations, stakeholders and the public on updating the MTP, called *Forward 2045*, over the past year. The MPO is currently soliciting input on the draft transportation plan. More information on the plan is available at https://www.cityofames.org/government/aampo/ames-mobility-2040-lrtp. This input, along with technical analysis of these projects, has been used to develop draft list of roadway, bicycle/pedestrian, public transit, and freight projects included in the draft 2045 plan.

As a part of the LRTP update, the MPO is consulting with other agencies responsible for planning activities in the region that are affected by transportation, consistent with 23 CFR § 450.324(g). We are seeking your input on the draft Forward 2045 plan. We ask that your agency review the draft plan, particularly the list of fiscally constrained projects and provide feedback by October 22, 2020. The Draft MTP document can be accessed at https://www.cityofames.org/forward45 under the Get Involved section.

Comments can be sent to Kyle Thompson, AAMPO Transportation Planner at:

Mail:
Ames Area MPO
Attn: Kyle Thompson
Ames City Hall
515 Clark Ave
Ames, IA 50010

E-Mail:
kyle.thompson@cityofames.org

Thank you in advance for your review and input. Feel free to reach out to me with any questions.

Sincerely,

Kyle Thompson

Transportation Planner

FORWARD 2045

Response Received —United States Army Corp of Engineers

October 1, 2020

Kyle,

Any proposed activity which would result in the discharge of dredged or fill material into a jurisdictional stream or wetland would require a Department of the Army Section 404 permit. If activities are designed to impact streams or wetlands we recommend submitting a joint application through the Iowa DNR PERMT program.

Thank you,

Matt Zehr
Chief, Iowa Branch
Regulatory Division
Rock Island District
309-794-5372

Response Received—United States Environmental Protection Agency

October 22, 2020

Dear Mr. Thompson:

Thank you for including the US Environmental Protection Agency in the early coordination for the Ames Draft MTP. After reviewing the document, EPA has no comments that would delay the city from moving forward on its plan as there is not enough information for the EPA to determine any environmental effects that might arise from projects covered under this plan. EPA would like to comment that the maps and layout of the document are very well designed and we look forward to working with you on the individual projects covered in this plan.

If you have any questions or comments, please contact me at (913) 551-7029 or via email at summerlin.joe@epa.gov.

Sincerely,

Joe Summerlin

NEPA Project Manager

Office of Intergovernmental Affairs

EPA Region 7

Appendix B
Existing System Performance

Roadway System Conditions

The evaluation of traffic operations, including peak period congestion, travel reliability, and bridge and pavement conditions was conducted to assess the existing conditions of the AAMPO roadway system. Supplementing these analyses is an overview of the existing Federal functional classifications for Ames area roads and a description of the regional Interstate and non-Interstate National Highway System (NHS).

Roadway Classifications

Roadways within the Ames Area MPO boundary are classified according to a Federal functional classification system developed by the Federal Highway Administration (FHWA). This system categorizes roads, streets, and highways by the purpose they serve, in terms of the traffic levels and access they are designed for. The main purpose of Federal functional classifications is for general transportation planning, but this system also serves as reference for construction standards and determining transportation program eligibility. The functional classifications for AAMPO roadways are presented in **Figure 1** while the FHWA definitions are below[1]:

- **Interstate**: Limited access, divided highways that offer high levels of mobility while linking major urban areas of the country.
- **Other Principal Arterial**: Serve major centers of metropolitan areas, provide a high degree of mobility while serving abutting land uses directly.
- **Minor Arterial**: Provide service for moderate length trips, geographic areas smaller than arterial roads, and offer direct connections to the higher arterial system.
- **Major Collector**: Designed to “collect” traffic from local roads and distribute to the arterial network, major collectors provide access and traffic circulation between residential areas and commercial/industrial areas. Major collector roads do not accommodate long-distance travel.
- **Local**: Provide direct access to land, but lowest levels of mobility. Local roads account for the largest percentage of roadways in an urban area.

Many of the performance measures reported for the MPO relate to the condition and operations of the Interstate and non-Interstate NHS, which are presented in **Figure 2**.

[1] Federal Highway Administration, Highway Functional Classification Concepts, Criteria, and Procedures. https://dot.sd.gov/media/documents/HwyFunctionalClassification.pdf.

Figure 1: Functional Classifications for Ames Area MPO Roadways

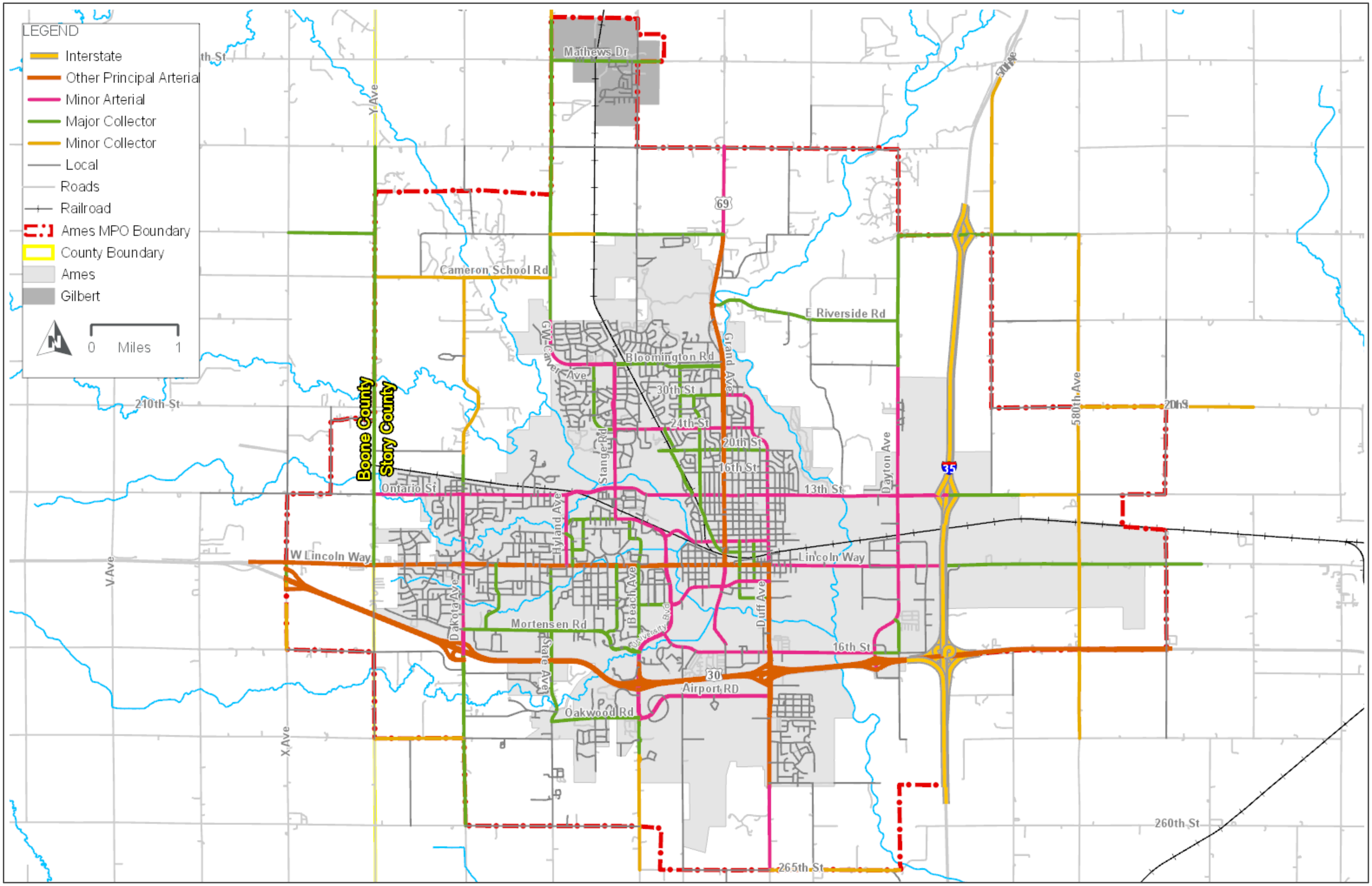
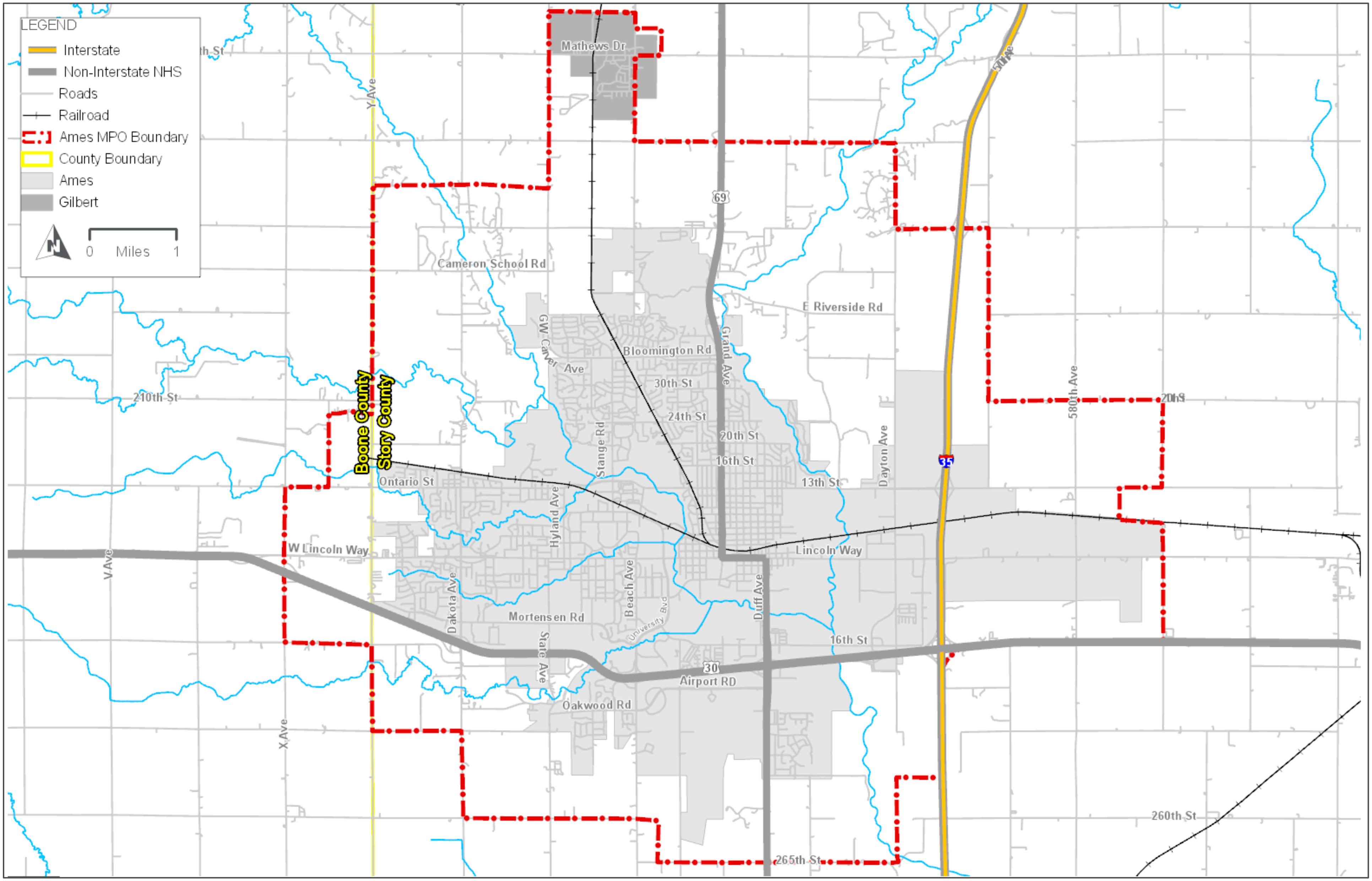


Figure 2: AAMPO Interstate and National Highway System



Traffic Operations

Traffic operations of all functionally-classified roads were evaluated to delineate the existing conditions of the Ames area roadways. Traffic operations were reviewed from two different perspectives:

- Peak period travel conditions
- Passenger and freight travel reliability

Peak Period Traffic Operations

The traffic operations analysis focused on evaluating congestion levels during typical peak period conditions. Two different approaches to traffic operations analysis were used.

- ARTPLAN analysis, based on the Highway Capacity Manual (HCM) methodology for traffic operations, was applied for 20 miles of key, selected arterials in the study area. ARTPLAN was developed for use in Florida, but includes the ability to tailor local parameters for corridor-level planning analyses.
- A planning-level approach based on the Highway Capacity Manual methodology was used to supplement traffic operations analysis on the remainder of the Federal Aid system. This approach incorporated 2015 traffic count data from the Iowa DOT to estimate traffic operations. Daily traffic volumes are the most complete data source for the Ames area system. However, during the majority of the day there are no traffic operational issues related to congestion. The most congested periods occur only during the peak hours of travel. Thus, the daily traffic data volumes were evaluated by applying capacities that reflected volume threshold that represented peak period capacity issues.

ARTPLAN Analysis

The 20 miles of selected arterials used in the ARTPLAN analysis included the following roads:

- **13th Street**: From Dayton Avenue to Hyland Avenue
- **North Dakota Avenue**: From U.S. 30 to Ontario Street
- **Dayton Avenue**: From U.S. 30 to 13th Street
- **Duff Avenue**: From Lincoln Way to U.S. 30
- **Grand Avenue**: Lincoln Way to Dawes Drive
- **Lincoln Way**: From North Dakota Avenue to Dayton Avenue
- **Ontario Street**: From Hyland Avenue to North Dakota Avenue
- **Stange Road**: From University Avenue to 24th Street
- **University Boulevard**: From Lincoln Way to U.S. 30

Highway Capacity Manual Volume-to-Capacity Analysis

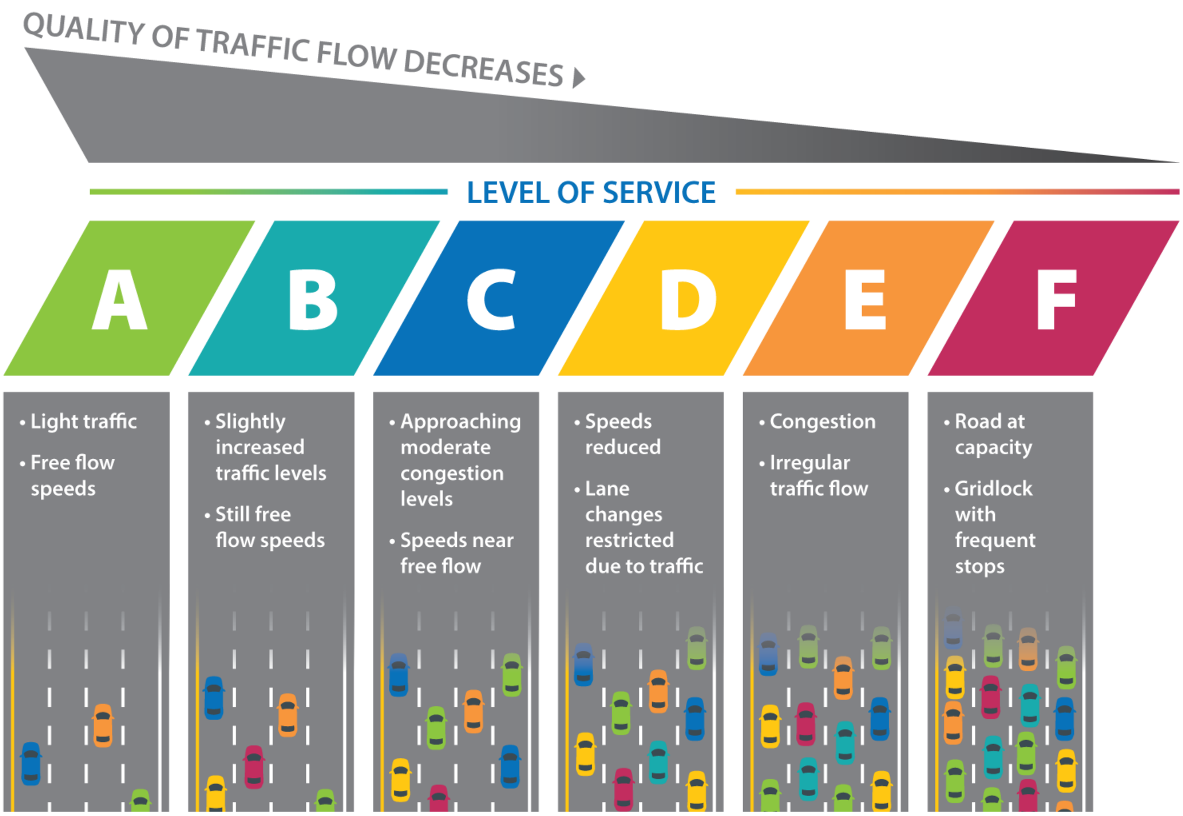
Several sources of roadway capacities were evaluated for potential inclusion in the peak period traffic operations analysis. The Florida Department of Transportation (FDOT) Quality Level of Service provides a flexible planning methodology rooted in the HCM. After some review of draft results with different methodologies with local staff, a set of capacities based on the FDOT Quality Level of Service tables were used. **Table 1** presents the capacity thresholds for Level of Service (LOS) F and the corresponding functional classes. **Figure 3** presents an illustration and definitions of traffic LOS.

Table 1: Daily Traffic Capacities by Roadway Classification, AAMPO

Federal Functional Classification	2 lane	2 lane WTL*	4 lane	4 lane WTL*	6 lane	6 lane WTL*
Interstate			84,600		130,600	
Freeways and expressways						
Principal arterial	14,160	17,700	29,850	39,800	44,925	59,900
Minor arterial	12,744	15,930	26,865	35,820	40,433	53,910
Major/minor collector	9,600	12,000	20,237	26,983	30,458	40,610

Source: Florida DOT Quality Level of Service Tables
**WTL=With Turn Lane*

Figure 3: Level of Service Definitions



After delineating roadway capacities and associating the most recent traffic volume data with their corresponding street segments within the AAMPO region, volume-to-capacity ratios were calculated and LOS thresholds were determined. The LOS thresholds used for this planning-level operations assessment were:

- **LOS A-B**: volume-to-capacity ratio below 0.70
- **LOS C**: volume-to-capacity ratio between 0.70 and 0.80
- **LOS D**: volume-to-capacity ratio between 0.80 and 0.90
- **LOS E**: volume-to-capacity ratio between 0.90 and 0.99
- **LOS F**: volume-to-capacity ratio over 1.00

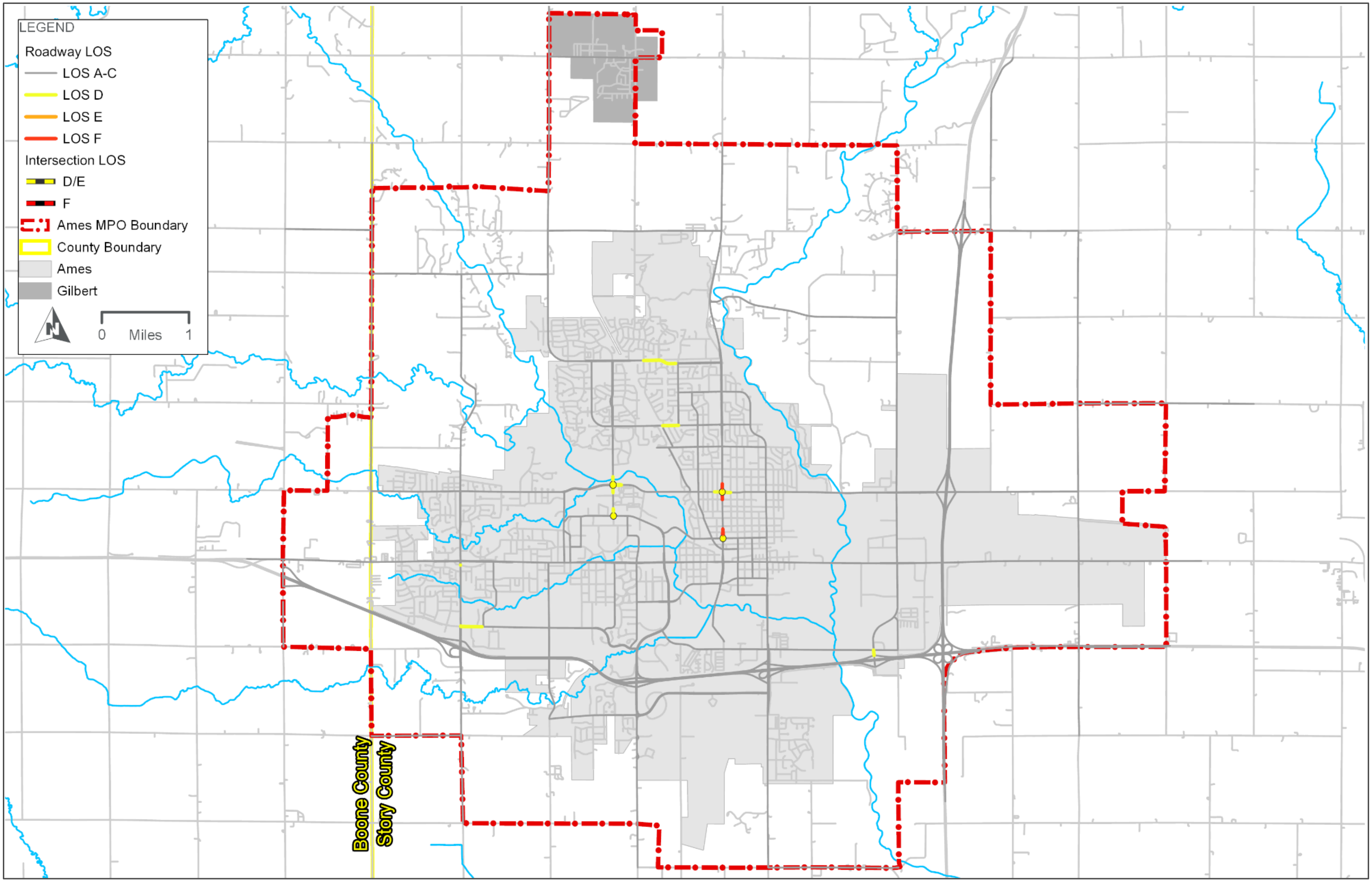
It should be noted that daily traffic volumes are the most complete data source for the Ames area system. However, during the majority of the day there are no traffic operational issues related to congestion. The most congested periods occur only during the peak hours of travel. Thus, the daily traffic data volumes were evaluated by applying capacities that reflected volume threshold that represented peak period capacity issues.

The resulting ARTPLAN and volume-to-capacity analyses showed existing congestion issues of LOS D or worse at the following roadway segments and intersections:

- Bloomington Road, from Eisenhower Avenue to Hoover Avenue
- 24th Street, from Hoover Avenue to Northwestern Avenue
- Mortensen Road, from South Dakota Avenue to Dotson Drive
- Intersection of Stange Road and 13th Street
- Intersection of Stange Road and Pammel Drive
- Intersection of 13th Street and Grand Avenue
- Intersection of 6th Street and Grand Avenue

Figure 4 shows the results of the traffic operations analysis.

Figure 4: Ames Area MPO Roadway Level of Service



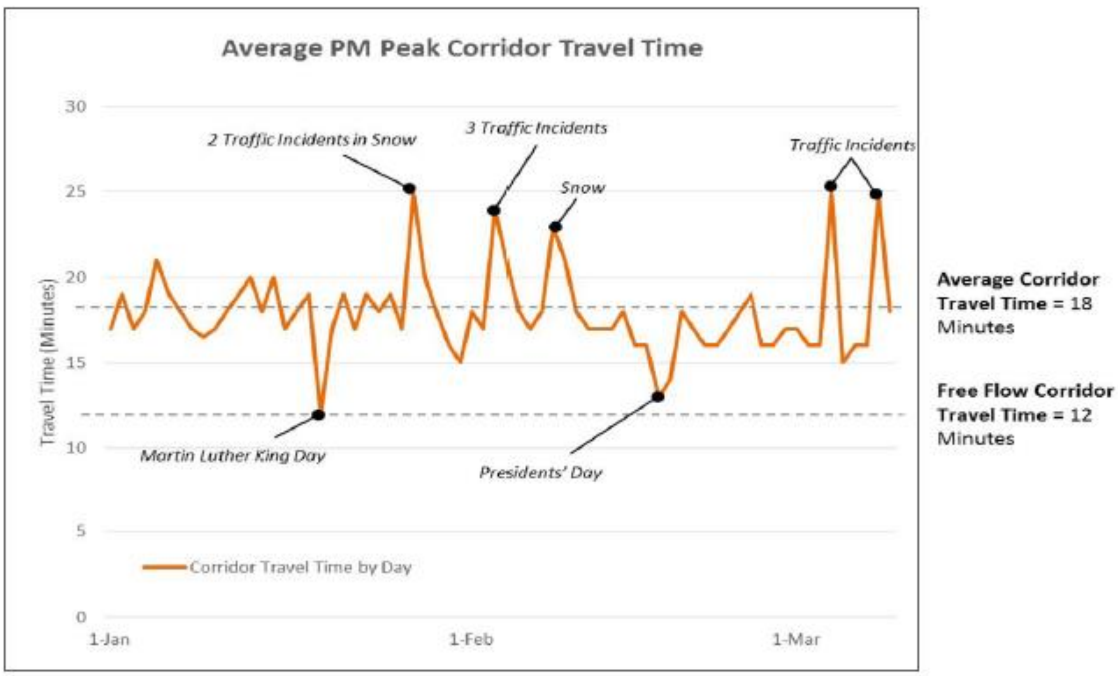
Travel Reliability

Traditionally, transportation planning efforts focus on identifying and dealing with locations where reoccurring congestion occurs during the hours of heaviest traffic. The concept of travel time reliability, or reliability for short, is an emerging area in traffic and transportation planning that focuses on non-reoccurring congestion for passenger and freight travel.

Studying the reliability of key corridors in a regional transportation plan is important for a number of reasons. Unreliable roads can disrupt freight, commerce, delivery, other services and supply chain functions critical to a regional economy. Because of this it is critical to measure and understand the causes of non-recurring congestion and unexpected disruptions to the reliability of travel in a region.

Figure 5 provides a basic overview of the travel reliability. The line charts shows the average travel times through a given corridor during evening peak traffic is 18 minutes. The chart also highlights how events such as traffic incidents and bad weather impact travel times. Due to the fluctuations in reliability resulting in higher travel times, a traveler in this corridor would regularly plan for a higher travel time than they would for free flow conditions.

Figure 5: An Illustration of Travel Time Reliability in a Corridor



Source: FHWA

Travel Time Reliability Performance Measures

The FHWA has established specific performance measures for reliability to be used by State DOTs and MPOs. Two of these measures are based on a statistic called the Level of Travel Time Reliability or LOTTR.

An LOTTR is the ratio of a longer, unexpected travel time to a "normal" travel time. Specifically LOTTR is the 80th percentile travel time in a segment or corridor divided by its 50th percentile travel time across a series of observations made for the same time period. An LOTTR of 1.5 or greater is considered unreliable. The freight measure is Truck Travel Time Ratio (TTTR), and is calculated as the 95th percentile travel time for heavy or medium sized trucks on a segment or corridor divided by the 50th percentile travel time for these vehicles.

These measures of reliability can be calculated for any time frame, but the morning peak, midday, and afternoon peak on weekdays, weekends, and overnight are used for reporting reliability performance measures. Data for the calculation of reliability performance measures are made available through the National Performance Management Research Data Set (NPMRDS). NPMRDS is a repository of travel time and speed information for the nation's interstates, highways and major roads.

The Specific Federal Reliability Performance Measures for Regions are:

- **Percentage of person-miles traveled on Interstates that are reliable:** The percent of person-miles traveled on Interstates where the LOTTR is less than 1.5.
- **Percentage of person-miles traveled on non-Interstates that are reliable:** The percent of person-miles traveled on the non-Interstate NHS where LOTTR is less than 1.5.
- **Truck Travel Time Reliability Index (TTTR):** Based on overall regional system performance.

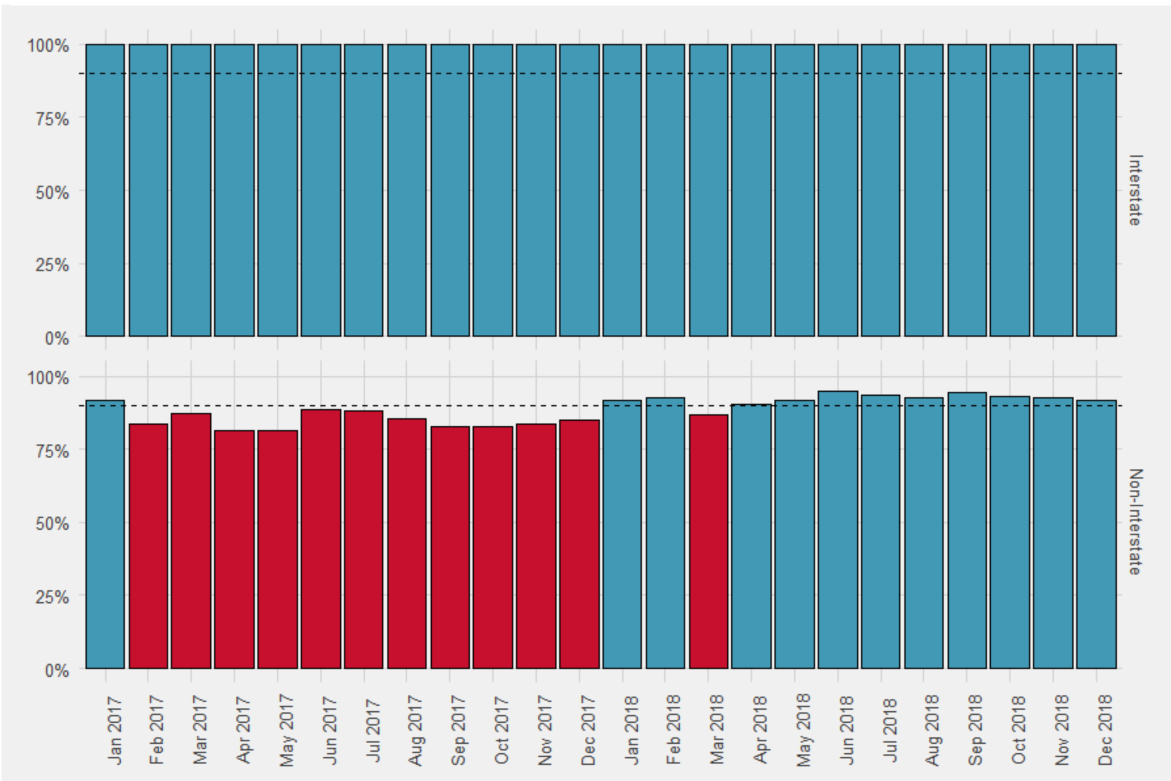
The Ames Area MPO has an annual performance target of 90% for the percentage of person-miles traveled that are reliable on the Interstate and non-Interstate NHS. In 2017 and 2018, 100% of the Interstate segments were considered reliable. The AAMPO non-Interstate NHS contained unreliable road segments during this same period, but saw improvement between 2017 and 2018. For the non-Interstate NHS, the annual percentage of person-miles traveled that are reliable were 87.8% in 2017 and 96.6% in 2018. **Figure 6** illustrates this performance measure by month. In 2018, March was the only month that did not meet the regional performance target of 90%.

Figures 7 and **8** illustrate the maximum LOTTRs reported in any time period for road segments in 2017 and 2018. The least reliable areas in the AAMPO region were:

- **Duff Avenue**: From Lincoln Way to 265th Street
- **Lincoln Way**: From Grand Avenue to S Dayton Avenue
- **Grand Avenue**: From 170th Street to 30th Street / Duff Avenue

Figure 9 illustrates the monthly Truck Travel Time Reliability Index (TTTR). The regional TTTR performance target of 1.50 was met in both 2017 and 2018. In 2017, the average regional TTTR was 1.10 and rose to 1.12 in 2018. TTTR peaked slightly during the winter months of 2017-2018, but was still well below 1.5. For reference, the values 0.0 through 1.5 pertain to TTTR levels. Lower values represent higher reliability, and any TTTR over 1.5 would be considered an unreliable corridor.

Figure 6: AAMPO, Percentage of Person-Miles Traveled that are Reliable by Month, 2017-2018



Source: NPMRDS

Figure 7: AAMPO, Max LOTTR PM Peak Traffic, Any Time Period, 2017

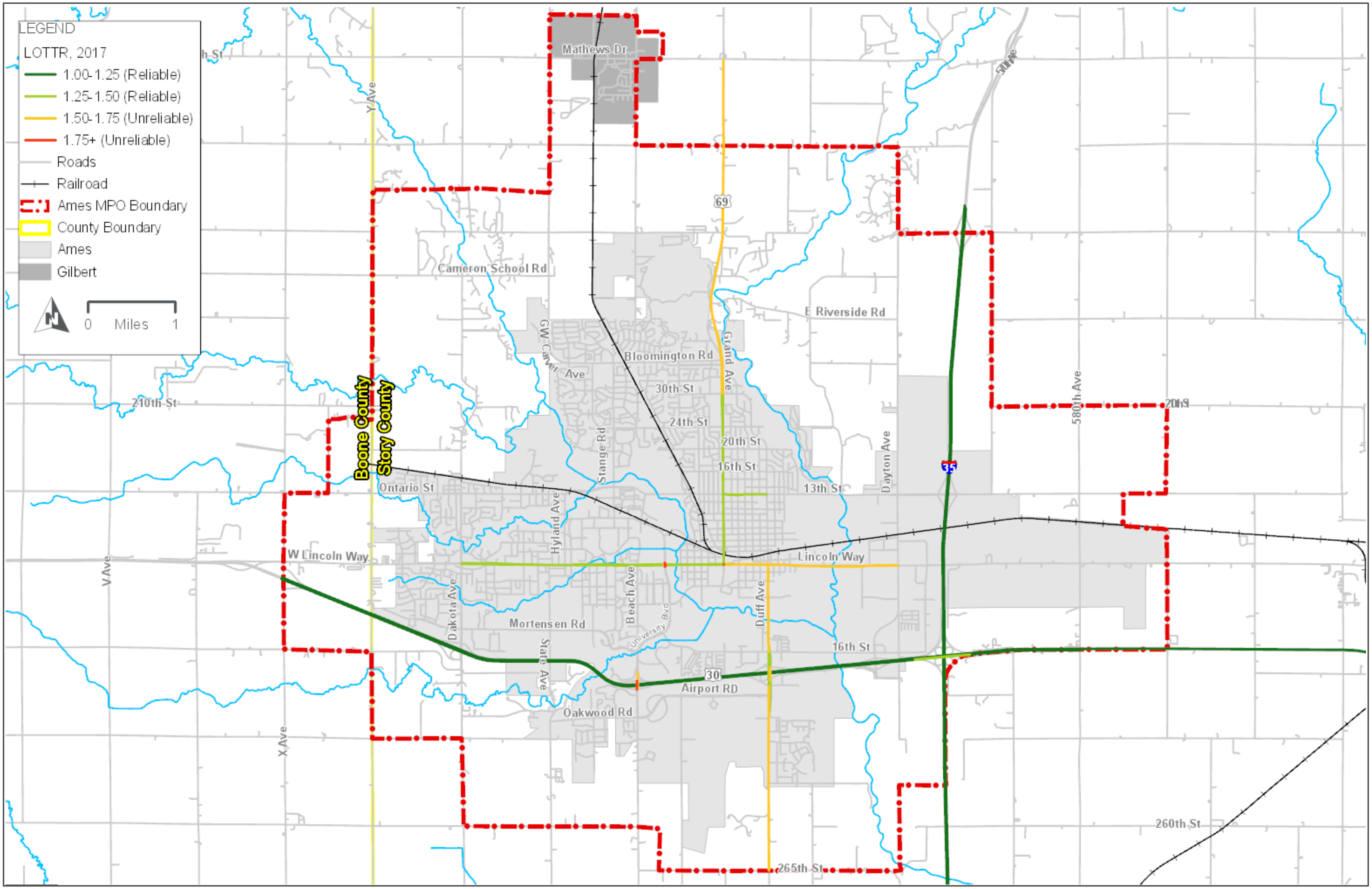


Figure 8: AAMPO, Max LOTTR PM Peak Traffic, Any Time Period, 2018

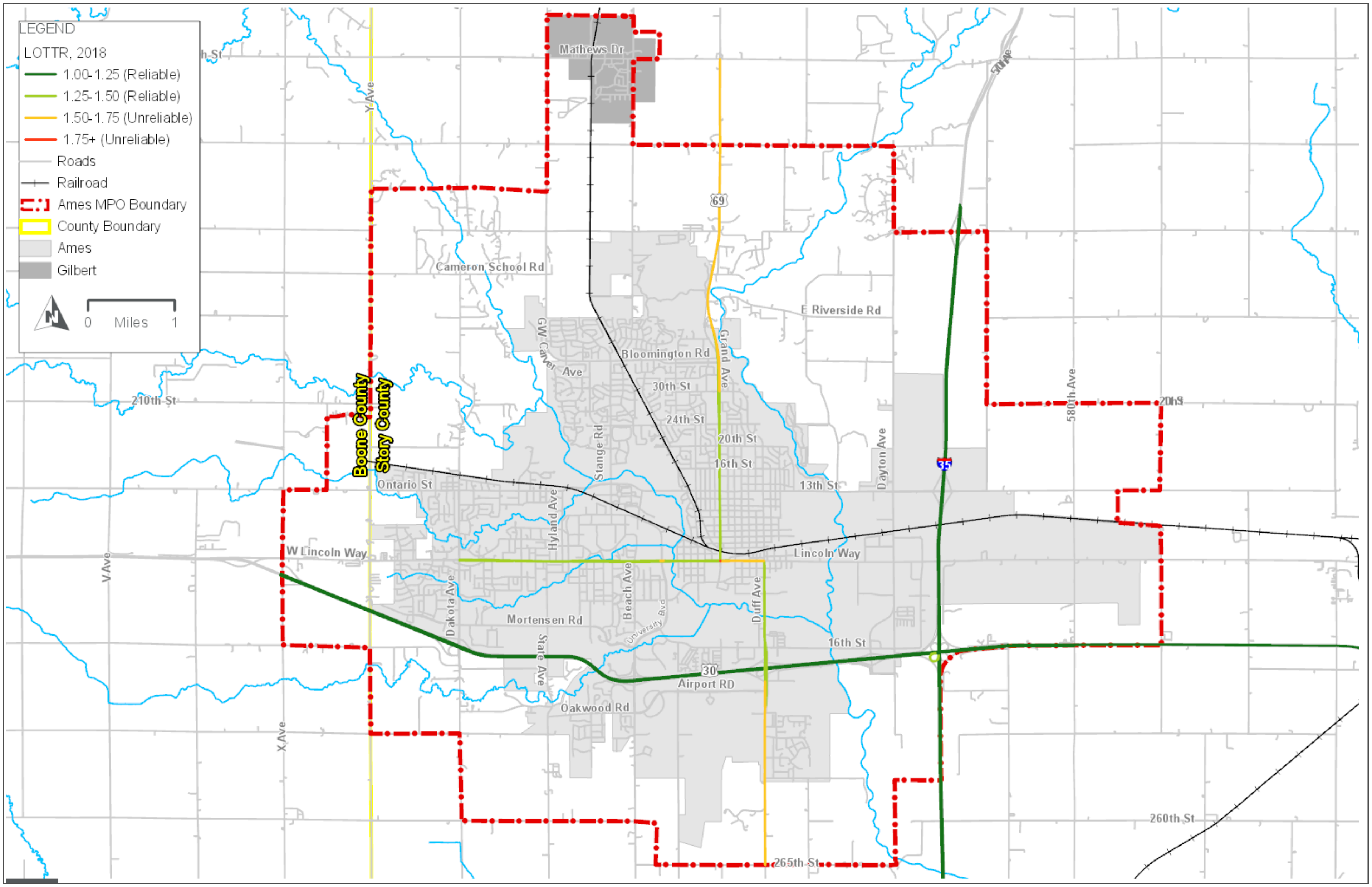
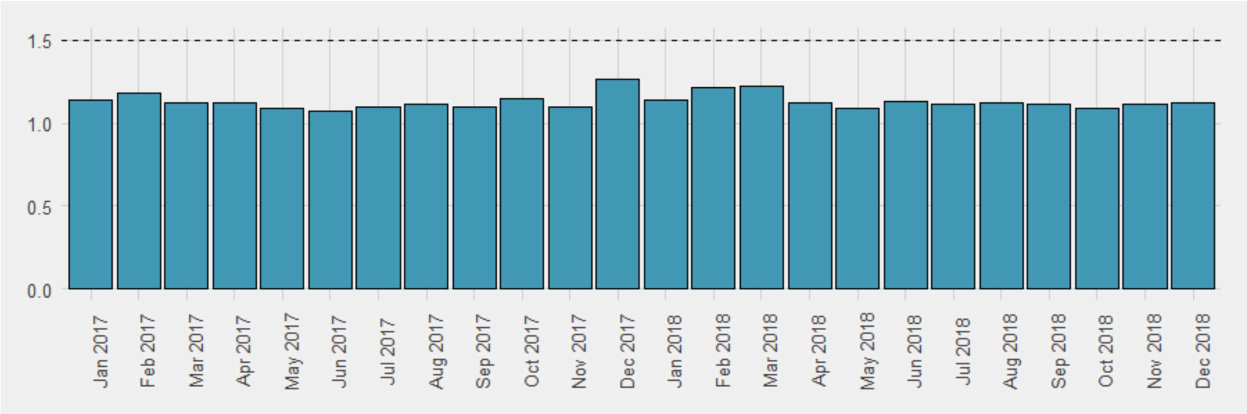


Figure 9: AAMPO, Truck Travel Time Reliability Index (TTTR) by Month, 2017-2018



Source: NPMRDS

System Condition

Ames Area MPO Bridges

Federal Bridge Performance Measures

Infrastructure condition is an important element of the transportation system for State DOTs and MPOs to monitor, as the maintenance and expansion of roadway infrastructure requires substantial investment from both state and local entities. Bridges serve as critical pieces of infrastructure that facilitate the flow of vehicles in geographically-constrained areas and the condition of these structures have significant implications for the efficiency and reliability of local transportation networks.

FHWA performance measure requirements obligate state DOTs and MPOs to report on the condition of all bridges on the Interstate and non-Interstate NHS that are within their jurisdiction. Specifically, the performance measures required to be reported are:

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

The National Bridge Inventory (NBI) dataset provides annual data related to the conditions of all bridges in the United States at the county level, including those on the Interstate and non-Interstate NHS, as well as those that are not. This dataset was utilized for reporting the condition of all bridges on the Interstate and non-Interstate NHS within the Ames area.

For the purpose of meeting Federal performance measure reporting requirements, the NBI condition ratings of the deck, superstructure, substructure, and culvert (if applicable) were assessed to determine the current condition of each structure within the MPO. The NBI classifies these ratings on a scale of 0 (Failed Condition) to 9 (Excellent Condition); to be considered in Good condition, a bridge's deck, superstructure, substructure, and culvert (if applicable) must all have a rating of 7 or higher-should any of these ratings be recorded as a 5 or 6, then the bridge is considered as being in Fair condition. A bridge is considered in Poor condition if a rating for any of the above items is 4 or below.

Ames Area MPO Bridge Conditions

There are 58 bridges in the AAMPO boundary, and 20 of these structures are located on the Interstate or non-Interstate NHS. **Table 2** presents the condition of all bridges in the AAMPO region, as well as the condition of all bridges on the Interstate and non-Interstate NHS.

Table 2: Condition of AAMPO Bridges

Bridge Ratings	Interstate and non-Interstate NHS Bridges	All AAMPO Bridges
Good	4	19
Fair	16	37
Poor	0	2

As **Table 2** indicates, all AAMPO bridges on the Interstate and non-Interstate NHS are considered as being in at least Fair condition, with four of these structures being in Good condition. For all AAMPO bridges, most are in Fair condition while 2 bridges are in Poor condition and the remaining 19 reported as being in Good condition. Although it is not required to report the conditions of bridges not on the Interstate or non-Interstate NHS, it is important for the MPO to monitor these structures. The locations of the bridges rated as Poor are:

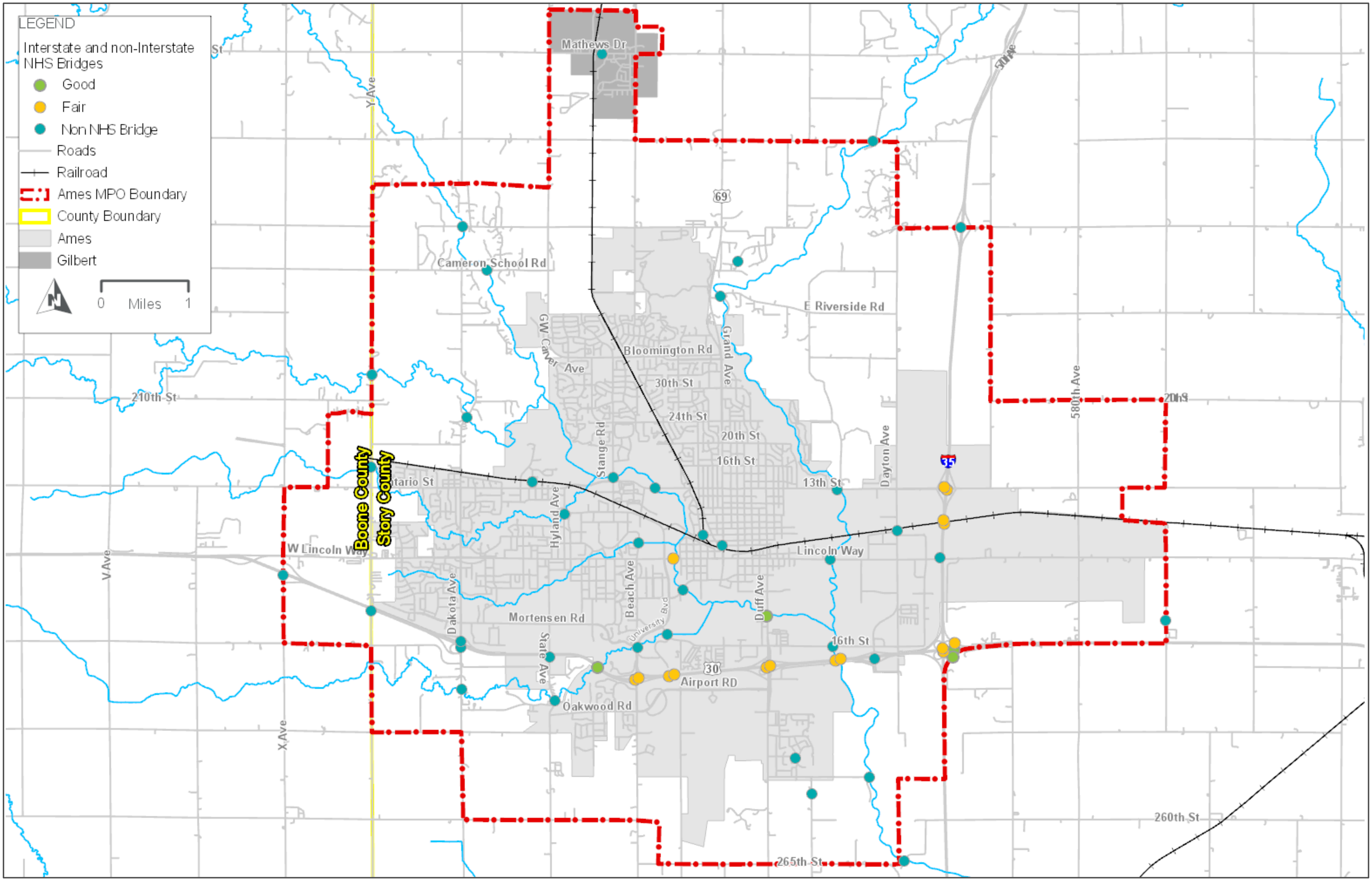
- **W 190th Street**: Northwest of Ames, over Squaw Creek
- **Ken Maril Road**: Southeast Ames, over the Skunk River

Table 3 displays conditions of Interstate and non-Interstate NHS bridges as well as non-NHS bridge by deck area (in square meters). For those bridges located on the Interstate or non-Interstate NHS, 15% of total deck area is rated as being in Good condition while the remaining 85% of total deck area is classified as being in Fair condition. For all AAMPO bridges, a greater share of the total deck area is rated as being in Good condition while roughly 2/3rds of the total deck area is in Fair condition. The two bridges in Poor condition, as identified above, make up 1% of the total deck area.

Table 3: AAMPO Bridge Condition by Total Deck Area

Bridge Rating	Interstate and non-Interstate NHS Bridges	% of Total Deck Area	All AAMPO Bridges	% of Total Deck Area
Good	2,239.93	15%	12,201.61	31%
Fair	13,131.21	85%	26,533.33	68%
Poor	-		463.65	1%
Total	15,371.14		39,198.59	

Figure 10: AAMPO Bridge Locations



Ames Area MPO Pavement

Federal Pavement Performance Measure

To meet the Federal performance measure reporting requirement for pavement conditions, state DOT's and MPO's must report the percentage of the Interstate and non-Interstate NHS pavement that is in good condition and in poor condition. These two condition ratings are defined by the FHWA as[2]:

- **Good condition**: Suggests no major investment is needed.
- **Poor condition**: Suggests major reconstruction investment is needed.

For the purpose of meeting these Federal requirements, pavement conditions in the Ames Area MPO roadway network were analyzed using the Iowa DOT's 2017 Pavement Management Information System (PMIS) data for Interstate and non-Interstate NHS roads. Local roadway pavement conditions were analyzed using the Iowa Pavement Management Program (IPMP), which is a database maintained by Iowa State University's Institute for Transportation.

Ames Area MPO Pavement

The pavement analysis conducted for AAMPO based on the IPMP database used a CityPCI rating. CityPCI is a condition rating index that scores all paved roadways on a scale of 0 to 100, based on the assessment of a number of variables such as pavement cracking, smoothness, and rutting. The scores were then categorized into the following:

Pavement Condition	CityPCI Score
Poor	0-40
Fair	41-60
Good	61-80
Excellent	81-100

For non-Interstate and non-NHS pavement classified using the CityPCI rating, 45% of pavement is rated as being in Fair condition. The majority of roads rated in Fair condition are local roads while the next largest share of pavement that is rated as Fair is on collector roads. 21% of the non-Interstate and non-NHS roads in the AAMPO region received a Poor pavement rating, with the majority of these roads being principle arterial streets. **Table 4** presents pavement condition ratings by functional classification for these non-Interstate and non-NHS roads.

[2] Federal Highway Administration, PM2 Pavement Fact Sheet. https://www.fhwa.dot.gov/tpm/pubs/PM2PavementFactSheet.pdf

Table 4: Pavement Condition Ratings for Non-Interstate, Non-NHS Roads

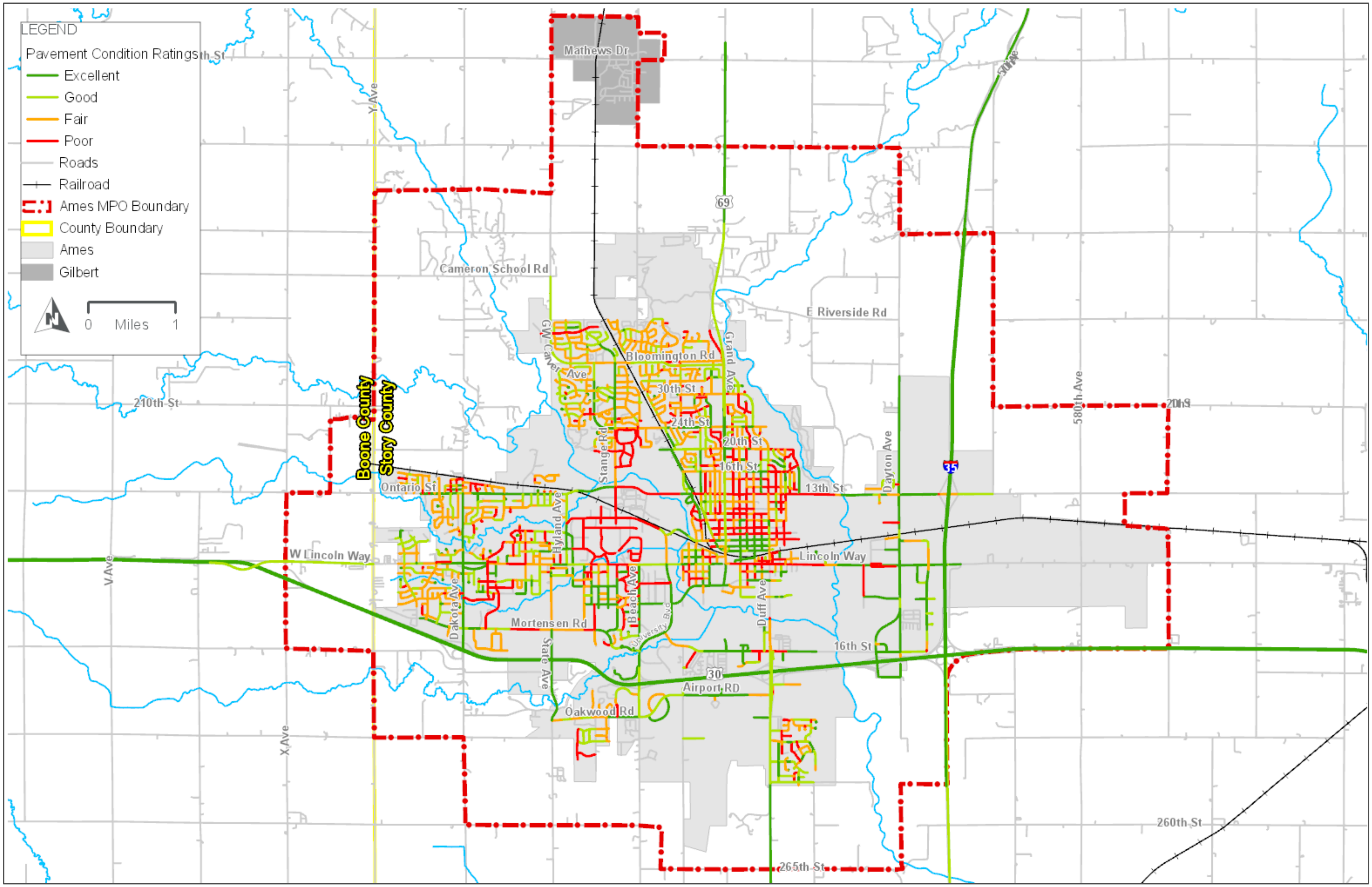
Functional Classification	Pavement Condition Rating (CityPCI)		
	Poor	Fair	Good
Collector	13%	46%	41%
Local	22%	49%	28%
Minor Arterial	17%	25%	58%
Principle Arterial	24%	31%	45%
Total	21%	45%	35%

The resulting pavement condition analysis for Interstate and non-Interstate NHS roads found that this system contains 168.57 lane miles within the AAMPO boundary, and of these 168.57 lane miles, 56.71 are found on the Interstate system while the remaining 111.68 lane miles are on the non-Interstate NHS. Regarding pavement condition ratings, 100% of pavement on the Interstate system is in Good condition. For the non-Interstate NHS, 87% of total lane miles are rated in Good condition while 9% and 4% are rated as being in Fair and Poor condition, respectively. **Table 5** summarizes the findings of the pavement condition analysis for Interstate and non-Interstate NHS roads.

Table 5: Pavement Condition Ratings for Interstate and non-Interstate NHS Roads, Ames Area MPO

Functional Classification	Pavement Condition						
	Poor		Fair		Good		Total
Interstate	0	0%	0	0%	56.71	100%	56.71
Non-Interstate NHS	4.37	4%	10.03	9%	97.46	87%	111.86
Total	4.37	3%	10.03	6%	154.17	91%	168.57

Figure 11: Pavement Condition Ratings for Ames Area MPO Roads



System Safety

An analysis of traffic safety conditions for the Ames Area MPO was conducted using crash data sourced from the Iowa DOT's Iowa Crash Analysis Tool (ICAT) database[3]. This data includes all motor vehicle crashes that occurred within the boundary of the AAMPO between the years 2014 and 2018. The three major elements of this analysis were:

- **Intersection Crash Frequency**: Total number of crashes occurring at intersections within the Ames Area MPO
- **Intersection Crash Rates**: The number of crashes occurring at intersections per million entering vehicles
- Overview of the 2019-2023 Iowa Strategic Highway Safety Plan (SHSP)

Federal Performance Measures for Traffic Safety

Safety is major component of the Federal performance measures program, and an emphasis is placed on improving traffic safety conditions for State DOTs and MPOs. The FHWA's Transportation Performance Management program has established the following as safety performance measures[4]:

1. Number of fatalities
2. Rate of fatalities per 100 million vehicle miles traveled (VMT)
3. Number of serious injuries
4. Rate of serious injuries per 100 million VMT
5. Number of non-motorized fatalities and non-motorized serious injuries

Crash Frequency

The Top 10 AAMPO Crash Intersections were delineated based on the frequency of vehicle collisions at each intersection during the 5-year period of 2014 to 2018. **Crash frequency** refers to the total number of crashes that occurred at an intersection during the study period; this measure provides a broad overview of traffic safety and is an important indicator of specific locations where crashes occur frequently, but it fails to consider traffic exposure which can under-emphasize intersections with lower traffic volumes and over-emphasize intersections with larger traffic volumes.

Figure 12 displays the locations of the AAMPO intersections with the highest crash frequencies. Included in **Figure 12** are top crash frequency intersections for the Ames Area that are also identified in the Iowa DOT's Top 200 Safety Improvement Candidate Locations (SICL). These intersections were designated as SICLs as part of a statewide safety analysis; intersections across the state were designated to the candidate list based on crash frequency, crash severities, and crash rates based on 5-year crash data for the years 2013 through 2017.

In addition to **Figure 12**, **Table 6** below presents summary statistics for each of the top ten intersections, including crash severity. Crash severity is categorized as:

- Fatal crash
- Suspected serious injury crash
- Suspected minor injury crash
- Possible/unknown injury crash
- Property damage only

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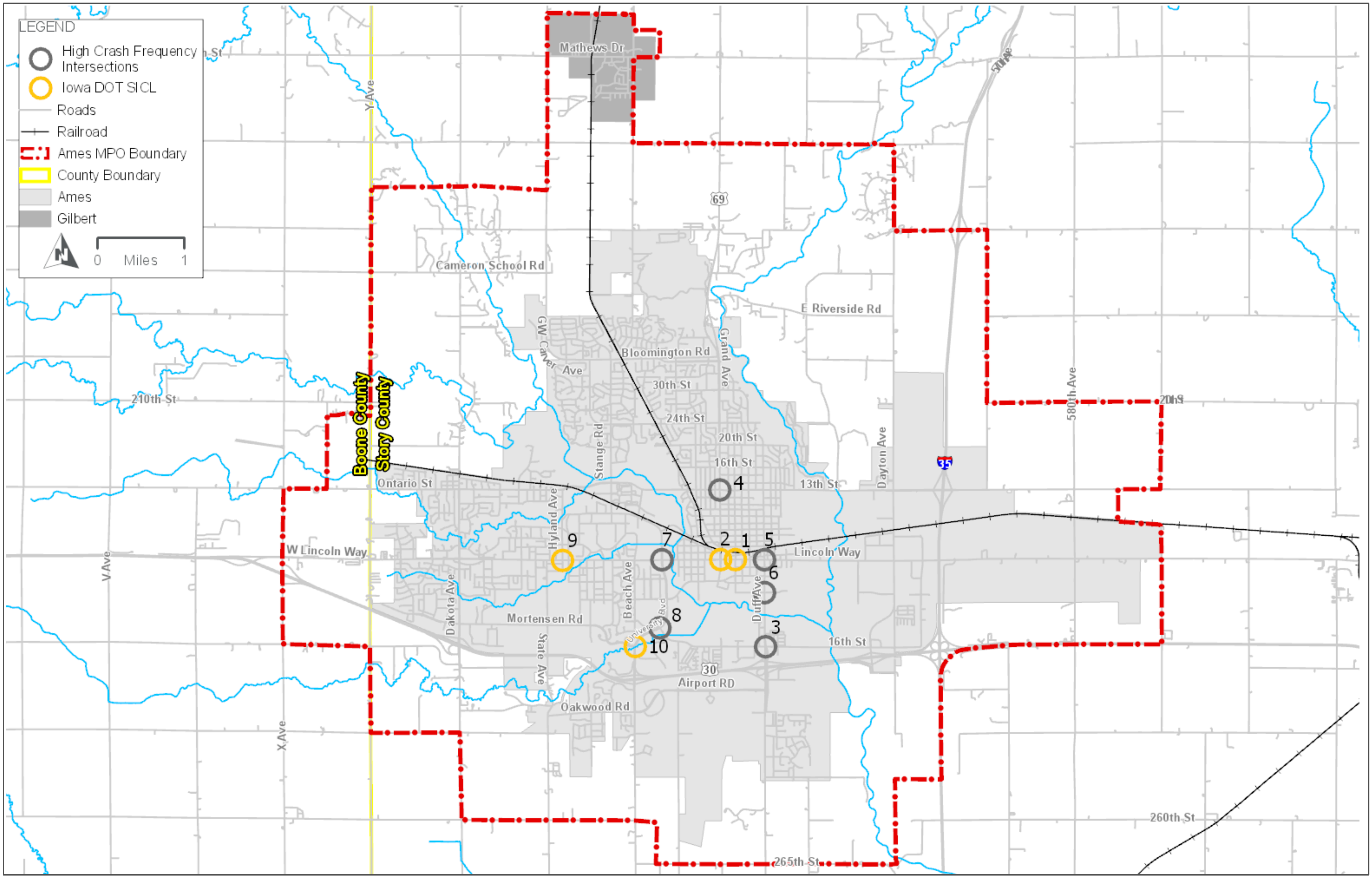
[3] Iowa Department of Transportation, https://icat.iowadot.gov/
[4] Federal Highway Administration Safety Performance Management, https://safety.fhwa.dot.gov/hsip/spm/

Table 6: Top Ranking Crash Frequency Intersections, 2014-2018

Rank	Intersection	Count	Fatal Crash	Serious Injury Crash	Minor Injury Crash	Possible/Unknown Injury Crash	Property Damage Only	Daily Entering Volume	Crash Rate (Crashes/MEV*)
1	Lincoln Way & Walnut Ave	77	0	0	5	13	59	20,065	2.10
2	Lincoln Way & Grand Ave	75	0	1	3	14	57	29,600	1.39
3	S Duff Ave & S 16th St	66	0	1	5	5	55	32,825	1.10
4	Grand Ave & 13th St	57	0	0	3	8	46	28,750	1.09
5	Lincoln Way & Duff Ave	56	0	0	1	11	44	29,750	1.03
6	S Duff Ave & S 5th St	53	0	1	4	8	40	31,800	0.91
7	University Blvd & Lincoln Way	50	0	0	2	7	41	27,000	1.01
8	University Blvd & S 16th St	46	0	0	1	11	34	23,300	1.08
9	Lincoln Way & Hyland Ave	44	0	1	4	3	36	20,622	1.17
10	University Blvd & Mortensen Pkwy	44	0	2	4	8	30	27,209	0.89

**MEV=Million Entering Vehicles*

Figure 12: Locations of Top Crash Frequency Intersections for the AAMPO, 2014-2018



Highest Crash Rate Intersections

To supplement the intersection crash frequency analysis for the AAMPO region, intersection crash rates were calculated. Intersection **crash rate** is defined as the number of vehicular crash occurrences per one million entering vehicles at an intersection. This measure is useful for normalizing crashes on traffic exposure levels so that a more realistic picture of traffic safety can be delineated. The data used for the crash rate calculations was sourced from the Iowa DOT's Roadway Asset Management System (RAMS) database that contains traffic volumes for functionally-classified roads within the AAMPO boundary, and City of Ames traffic count maps maintained by the Iowa DOT.

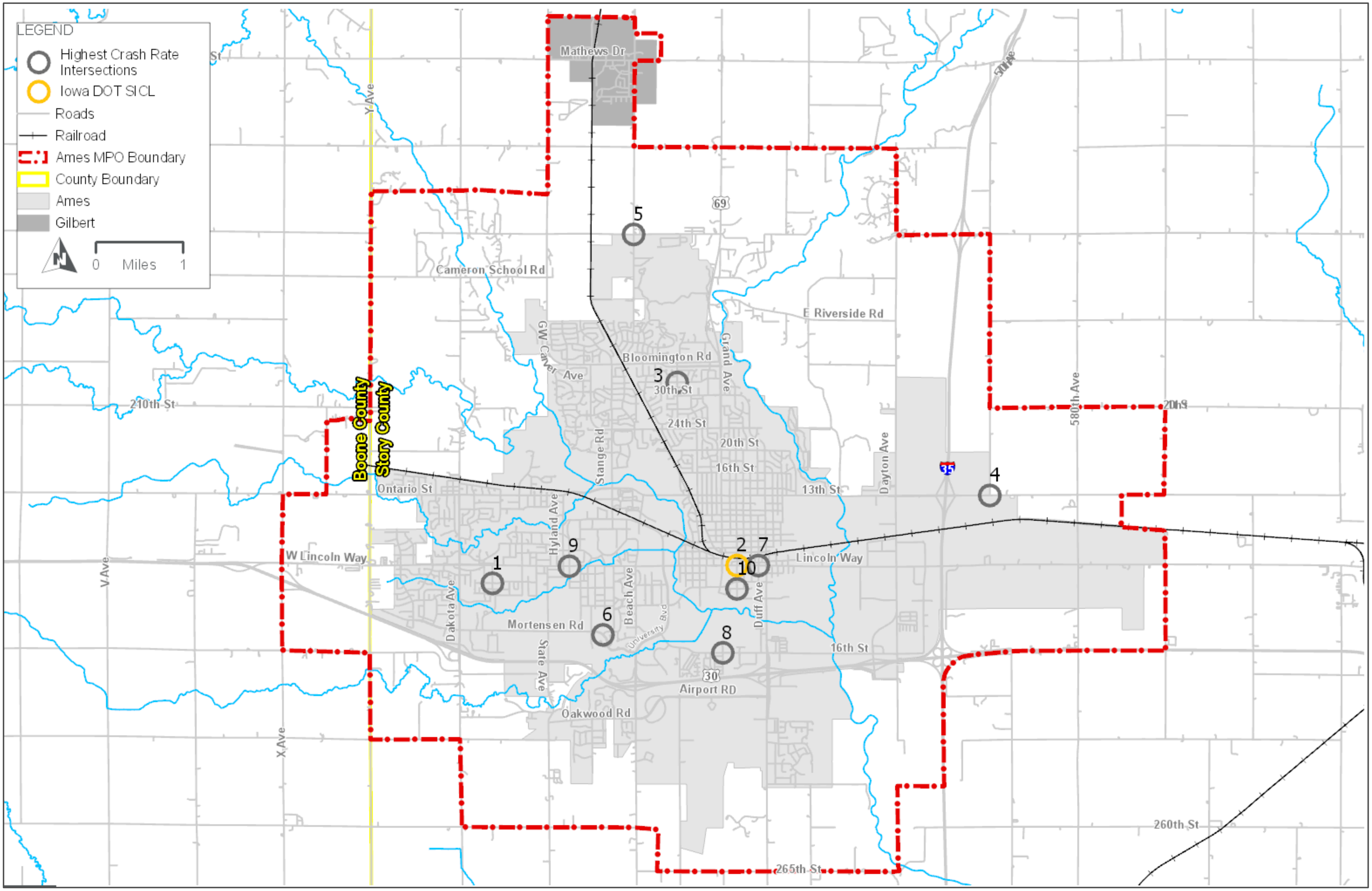
Table 7 below presents the ten intersections with the highest crash rates in the AAMPO region while **Figure 13** depicts their locations as well as the top crash rate intersections identified in the Iowa DOT's SICL list.

Table 7: Top Ranking Crash Rate Intersections

Rank	Intersection	Count	Entering Volume	Crash Rate (Crashes/MEV*)
1	Dotson Dr & Aplin Rd	9	2,160	2.28
2	Lincoln Way & Walnut Ave	77	20,065	2.10
3	Hoover Ave & Wheeler St	2	569	1.93
4	570th Ave & E 13th St	4	1,140	1.92
5	Hyde Ave & W 190th	5	1,445	1.90
6	Mortensen Pkway & Ash Ave	18	9,485	1.80
7	Lincoln Way & Sherman Ave	26	16,050	1.75
8	Grand Ave & S 16th St	15	9,168	1.74
9	Lincoln Way & Sheldon Ave	40	20,975	1.71
10	S Walnut Ave & S 4th St	10	3,312	1.65

**MEV=Million Entering Vehicles*

Figure 13: Highest Crash Rate Intersections, 2014-2018



Bike and Pedestrian Crashes

There were 174 reported collisions involving someone walking, bicycling, skateboarding or using a mobility device from 2014 through 2018. **Table 8** presents the statistics of bicycle and pedestrian related crashes that occurred in the AAMPO region between 2014 and 2018. Crashes are categorized by crash severity; as indicated in the table, the majority of bicycle and pedestrian crashes that occurred during the 5-year period resulted in minor injury. 61 of the crash incidents recorded possible injury, while 22 reported a serious injury. One fatal crash bicycle/pedestrian crash occurred in 2015.

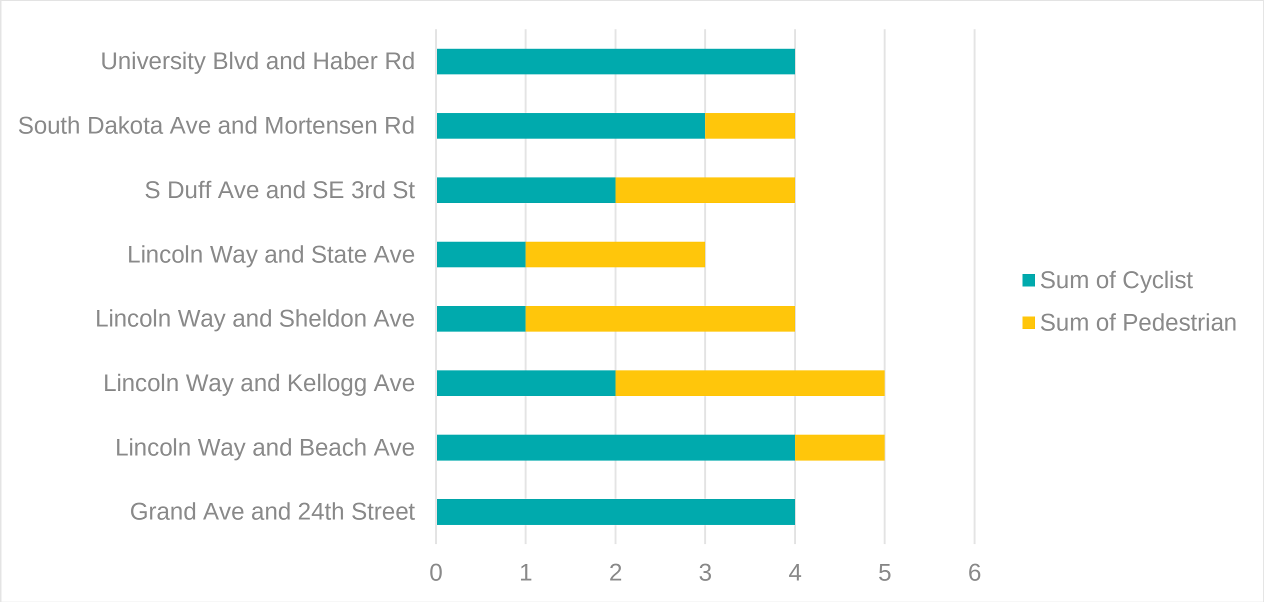
Table 8: Bicycle and Pedestrian Crashes within the AAMPO Boundary, 2014-2018

Year	Fatal Crash	Serious Injury Crash	Minor Injury Crash	Property Damage Only	Possible/Unknown Injury Crash	Total
2014	0	6	14	0	5	25
2015	1	2	20	0	14	37
2016	0	5	25	1	18	49
2017	0	6	16	0	9	31
2018	0	3	14	0	15	32
Total	1	22	89	1	61	174

Data Source: Iowa DOT SAVER

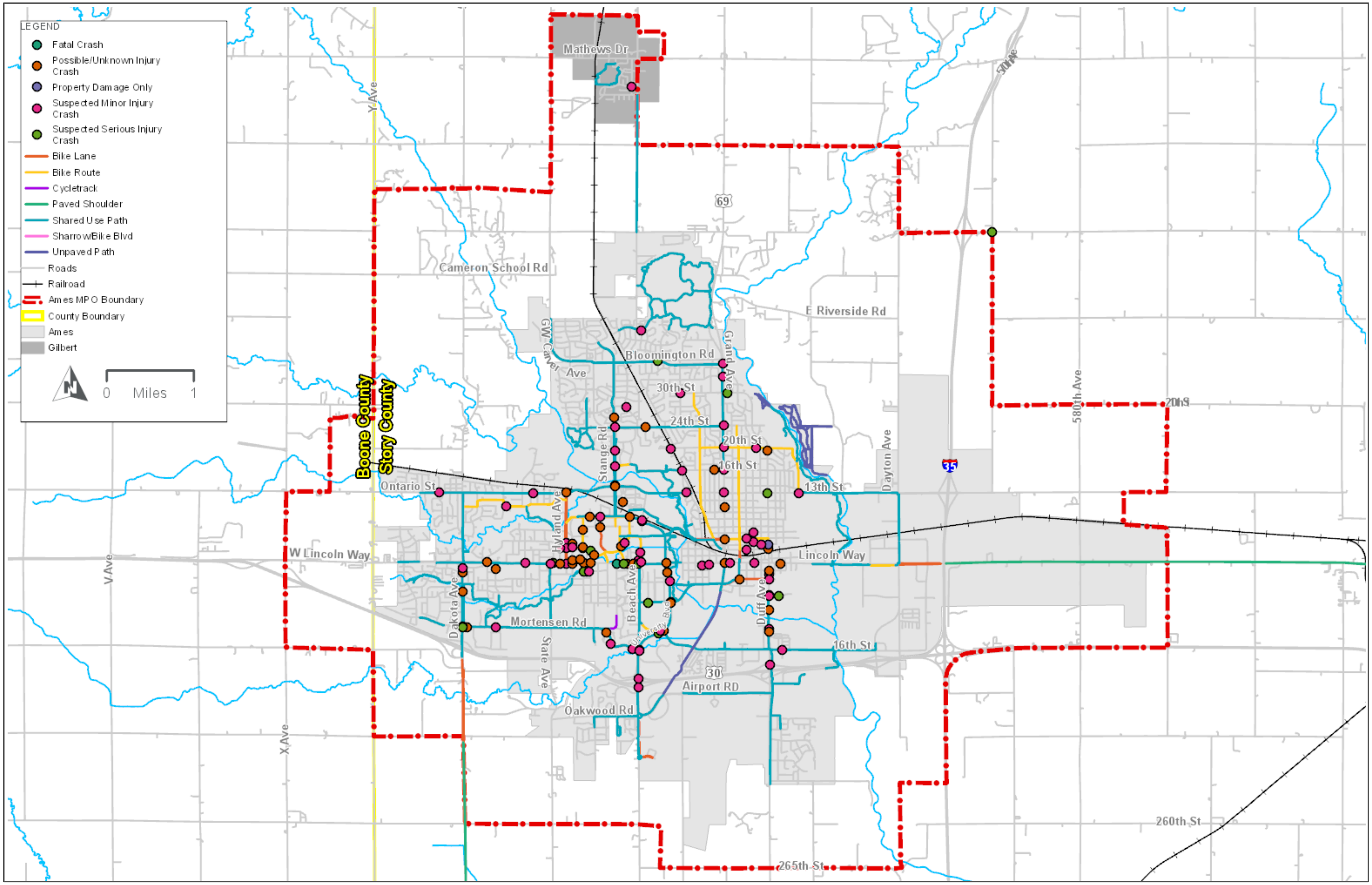
Three-quarters of collisions involving people walking or bicycling took place at intersections. The most common cause of a collision was failure of the driver to yield the right of way. The intersections with the highest number of collisions are described in **Figure 14**. **Figure 15** shows the locations of all the collisions involving people using non-motorized modes from 2014 through 2018.

Figure 14: Highest-Collision Intersections and Non-motorized Parties, 2014-2018



Data Source: Iowa DOT SAVER

Figure 15: AAMPO Bicycle and Pedestrian Crashes by Severity, 2014-2018



State of Iowa Strategic Highway Safety Plan

FHWA Highway Safety Improvement Plan (HSIP) guidelines mandate that state DOT's publish a statewide plan detailing goals, objectives, and key areas of emphasis for improving highway traffic safety conditions. The development of safety goals and objectives for the Metropolitan Transportation Plan for the Ames Area MPO will be guided in part by the Iowa DOT's Strategic Highway Safety Plan (SHSP), which was last updated in 2019. The SHSP prioritizes 18 different safety emphasis areas that support the principle vision of *Zero Fatalities* as well as interim goals related to this vision and presents 8 key emphasis areas:

Lane Departures and Roadside Collisions

- Evaluate high lane departure crash corridors for two-lane highways and deploy road safety audit (RSA) teams to evaluate
- Evaluate high-friction surface treatments (HSFT) at targeted locations on state-owned and local systems
- Place centerline and/or shoulder rumble strips on rural two-lane highways on state-owned and local systems. Where necessary, install or widen paved shoulders
- Continue median cable barrier installations on the Interstate system. Initiate median cable barrier installations on multi-lane divided highways
- Focus on the road, don't overcorrect or veer for objects or animals in the roadway

Speed-Related

- Educate drivers on the importance of controlling and managing vehicle speed
- Identify corridors with a high frequency of speed-related crashes and implement high-visibility enforcement campaigns
- Evaluate and implement signing and geometric design strategies to moderate speeds and enhance safety
- Implement speed feedback signs at targeted locations
- Give yourself enough time to reach your destination. Be patient, slow down, and don't engage with aggressive drivers

Unprotected Persons

- Conduct public awareness campaigns focused on generating awareness of the risks associated with unprotected persons
- Include medical professionals in educational efforts
- Conduct highly publicized enforcement campaigns focused on restraint use
- Buckle up everyone and every time

Young Drivers

- Improve content and delivery of driver education curriculum
- Continue educating young drivers in school-based settings using various training techniques, including those that simulate impairment
- Support a broad-based coalition to plan for addressing age-based transportation needs
- Support young drivers to avoid distractions and impairment

Intersections

- Develop educational resources informing the public of alternative intersection types, traffic signals, and laws
- Conduct enforcement campaigns related to bicycle and pedestrian awareness at targeted intersections
- Use of systematic approaches to improve visibility and awareness of intersections
- Implement alternative intersection designs that reduce conflict points and enhance safety and mobility
- Develop an intersection configuration/evaluation tool to aid planners and designers in selecting appropriate intersection types
- Approach intersections with caution and get familiar with new designs in your community

Impairment Involved

- Educate drivers on the different types of impairments and their effects on driving
- Employ screening and brief interventions in healthcare settings
- Support trainings for 60 new drug recognition expert (DRE) officers and 500 new advanced roadside impaired driving enforcement (ARIDE) officers
- Develop and implement a standardized approach for law enforcement to identify impaired drivers
- Expand 24/7 program, place of last drink program, and ignition interlock program
- Enhance detection through special OWI patrols and related traffic enforcement
- Implement countermeasures at access locations to reduce wrong-way driving on multi-lane divided highways
- Designate a driver, call a cab, but don’t risk driving impaired

Older Drivers

- Support a broad-based coalition to plan for addressing age-based transportation needs
- Provide educational and training opportunities for mature drivers that address driver safety, road engineering and signage, vehicle technology, driver licensing, health and vision concerns, and planning for driver retirement
- Update procedures for assessing medical fitness to drive
- Know when to put the keys down, or when to have a conversation with family members who may pose a hazard to others on the road

Distracted or Inattentive Drivers

- Develop targeted interventions and education programs for high-risk populations
- Support high-visibility enforcement campaigns for hands-free cell phone law
- Put the cell phone down, avoid distractions, be alert, and focus on the roadways

Active Transportation System Conditions

Walking, bicycling, and other human-powered modes of travel such as scooters, skateboards, and wheelchairs are often referred to collectively as "active transportation." Active travel options are affordable, boost personal health, produce no carbon emissions, and contribute to lively, interesting public spaces. Many types of trips include a walk, roll, or bike ride—a shopping trip may include parking downtown and taking a walk on Main Street, or a student may bike to a bus stop to catch CyRide to campus. The ability to walk and bike safely and comfortably can be an increasing part of what makes the Ames metropolitan region an appealing place to live, work, and learn.

Aspects of a high-quality active transportation system include:

- **Network Connectivity**: Continuous sidewalks, paths, and bike lanes must directly connect origins and destinations, without gaps. A designated network for walking and bicycling informs existing and future facility upkeep and expansion.
- **Complete Streets**: On the walking and bicycling networks, streets are designed to be comfortable for all ages and abilities. This means that treatments must vary based on roadway traffic volumes, speed, and width.
- **Land Use and Urban Design**: Mixed land uses and densities facilitate short trips easily accomplished by foot or bicycle. Human-scale urban design, with business entrances facing the sidewalk and limited surface parking lots, creates a more inviting environment.

Street Typologies

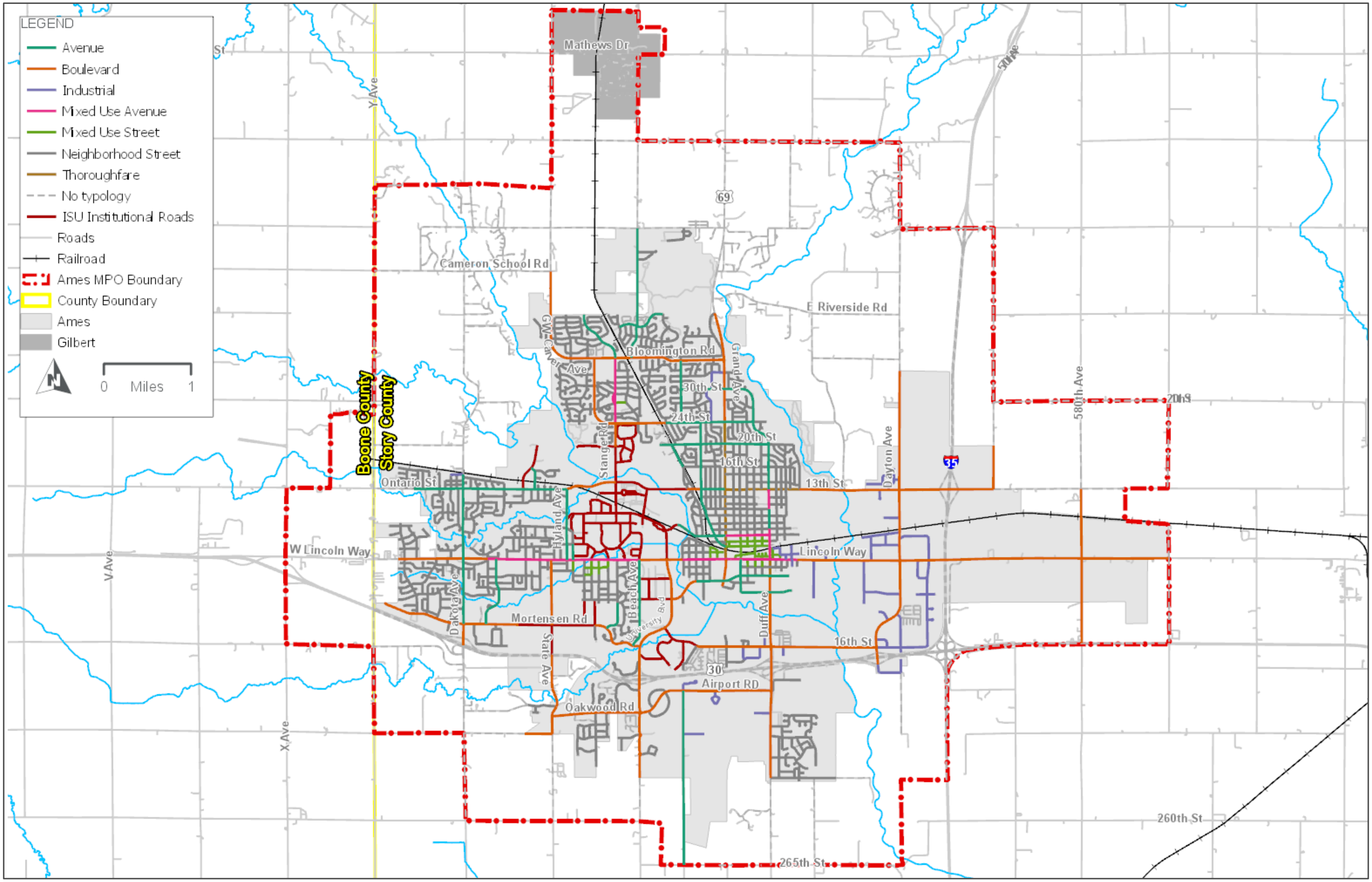
Street typologies support active transportation by providing guidance on where the walking or bicycling experience should be elevated and the types of facilities needed for safety and comfort. The Complete Streets Ames Plan, adopted by the City of Ames in 2018, created space allocation recommendations for different users on a variety of street types, including unique parameters for roadway and pedestrian zones, as detailed in **Table 9**. Street type categories based on existing and planned development patterns, current traffic volumes, and estimated bicycle and pedestrian demand, as presented in **Figure 16**, will help inform Forward 2045 investments.

Table 9: Street Type Space Allocation Parameters

Street Type	Total Pedestrian Zone Width (per side)		Total Roadway Width			Center Turn Lane / Median	Default Bikeway Type
	Pref.	Min.	Max.	Typ.	Min.		
Shared Street*	N/A	N/A	Varies	Varies	20’	Not compatible	N/A
Industrial Street	11’	7’	36’	25’	25’	Optional	Shared roadway
Neighborhood Street	15’	7’	35’	25’	20’	Not compatible	Shared roadway or bicycle boulevard
Mixed Use Street	22’	8’	62’	40’	20’	Not preferred	Shared roadway
Avenue	16’	7’	72’	48’	30’	Optional	Bike lanes or separated bike lanes
Thoroughfare	14’	7’	78’	56’	32’	Standard	Separated bike lanes or shared use path
Mixed Use Avenue	22’	7’	94’	58’	30’	Optional	Bike lanes or separated bike lanes
Boulevard	18’	9’	92’	60’	40’	Median standard	Separated bike lanes or shared use path

**There are no shared streets in Ames today*
Source: Complete Streets Ames Plan, 2018

Figure 16: Complete Streets Ames Typologies



Existing Bicycling Network

Existing bikeways consist of a mix of on-street bicycle facilities (bike lanes, bike routes, paved shoulders, and sharrows) and off-street shared-use paths. **Figure 17** shows the existing bikeways of the MPO region while **Figure 18** shows the existing bikeways of the central part of the City of Ames.

The existing on-street bikeway network consists of roughly 9 miles of bike lanes, 13 miles of paved shoulders, and 13 miles of signed bike routes and shared lanes. In many cases, the existing bike facilities area consistent with the street typologies. For example, Bloomington Road is a Boulevard with a default bikeway of a path or separated bike lane, and the actual facility today is a sidepath. In other cases, there is a mismatch, such as on Northwestern Avenue. This street is an Avenue with a default bikeway of bike lanes or separated bike lanes, but the actual facility is a signed bike route. The goal of Forward 2045 is to determine what is needed to create the desired bikeway system, and prioritize those needs based upon factors like demand, safety, and equity.

Shared-use paths include both sidepaths that run directly adjacent to the street and off-street paths through campus, parks and other recreation areas. This category is the backbone of the existing network, with 60 miles of paved paths and 6 miles of unpaved paths. Sidepaths are found on most arterial and collector streets; some are directly against traffic while others have a landscaped buffer. The mix of paving materials on sidepaths and the lack of signs, makes it difficult to distinguish sidepaths from standard sidewalks.

Existing Walking Network

The existing walking network includes sidewalks for pedestrian use only and shared-use paths for bicyclists and pedestrians. The sidewalk network is complete in most areas of Ames, with only a few significant gaps on arterial and collector streets, such as George Washington Carver Ave in northwest Ames and University Boulevard in south central Ames. In these locations, a sidewalk is present only on one side of the street. Many shared-use paths and sidepaths are unmarked, meaning people walking may not expect to share the path with people bicycling. **Figure 19** shows the existing pedestrian network of the Ames Area MPO.

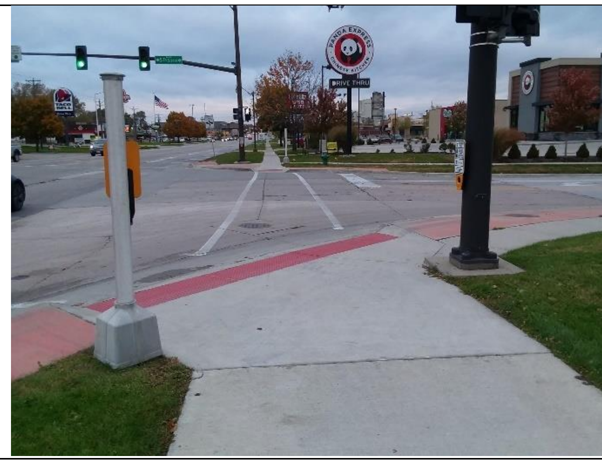
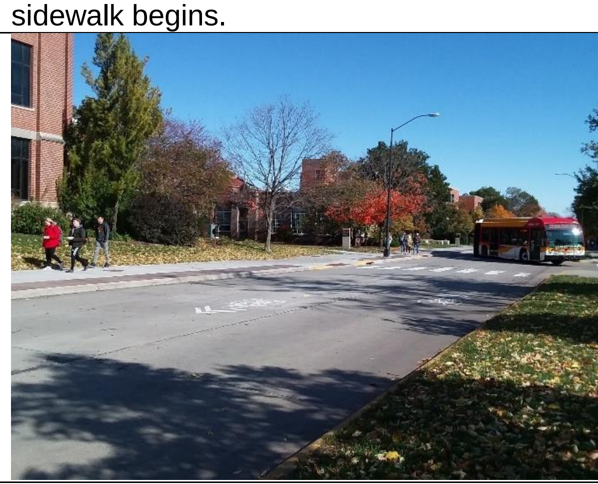
	
The sidepath on University Boulevard has a landscape buffer.	Many sidepaths are adjacent to the motor vehicle lane.
	
On Ontario Street the sidepath is very narrow and in poor condition.	On S Duff Avenue there are no signs indicating where the sidepath ends and the sidewalk begins.
	
On-street facilities include bike lanes, like the ones on S 3rd Street/S 4th Street.	Sharrows are found on Pammel Drive on the ISU campus, which is restricted to transit, bike and pedestrian use only.

Figure 17: Existing Bicycle Network

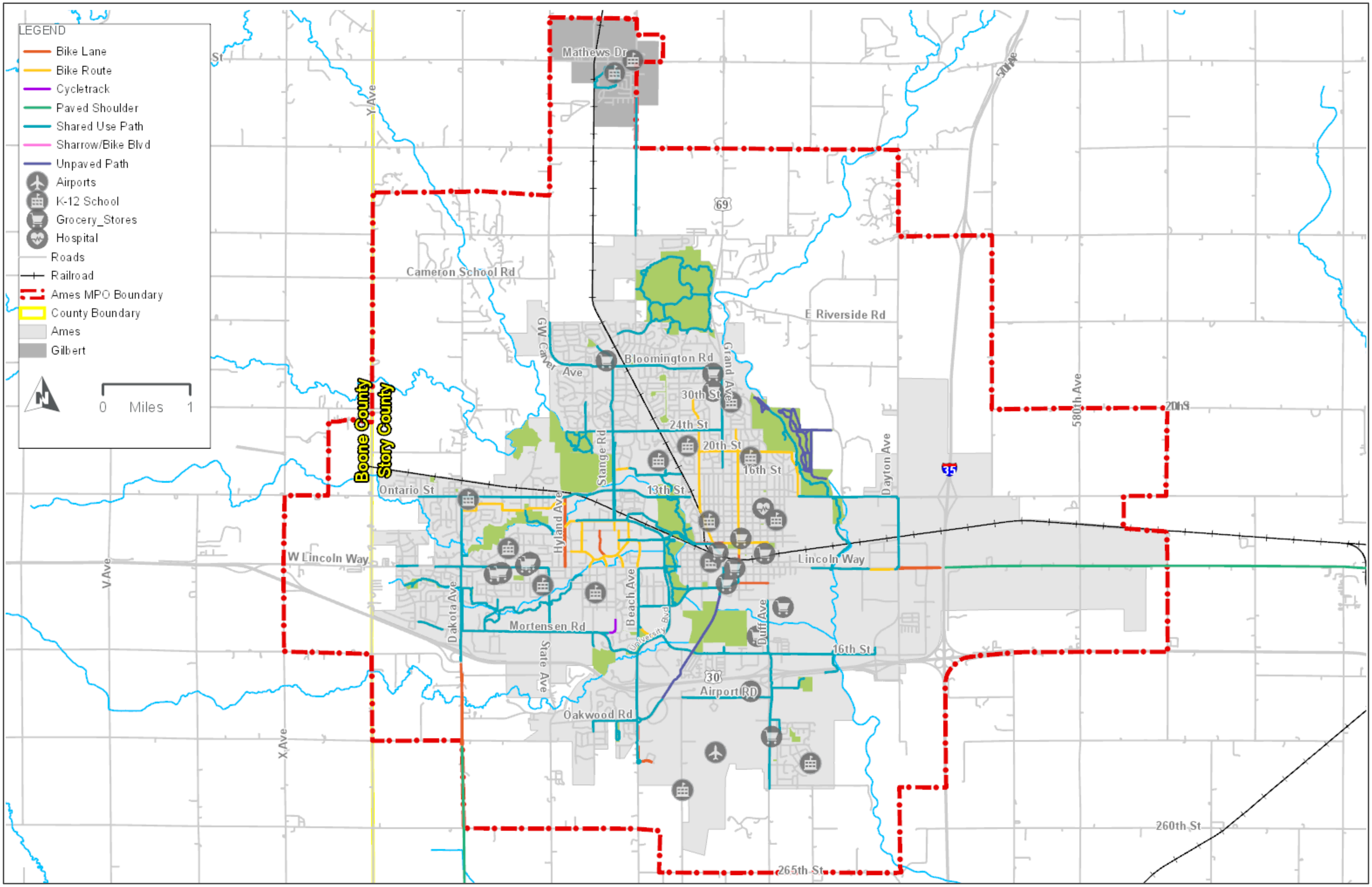


Figure 18: Existing Bicycle Network in Central Ames

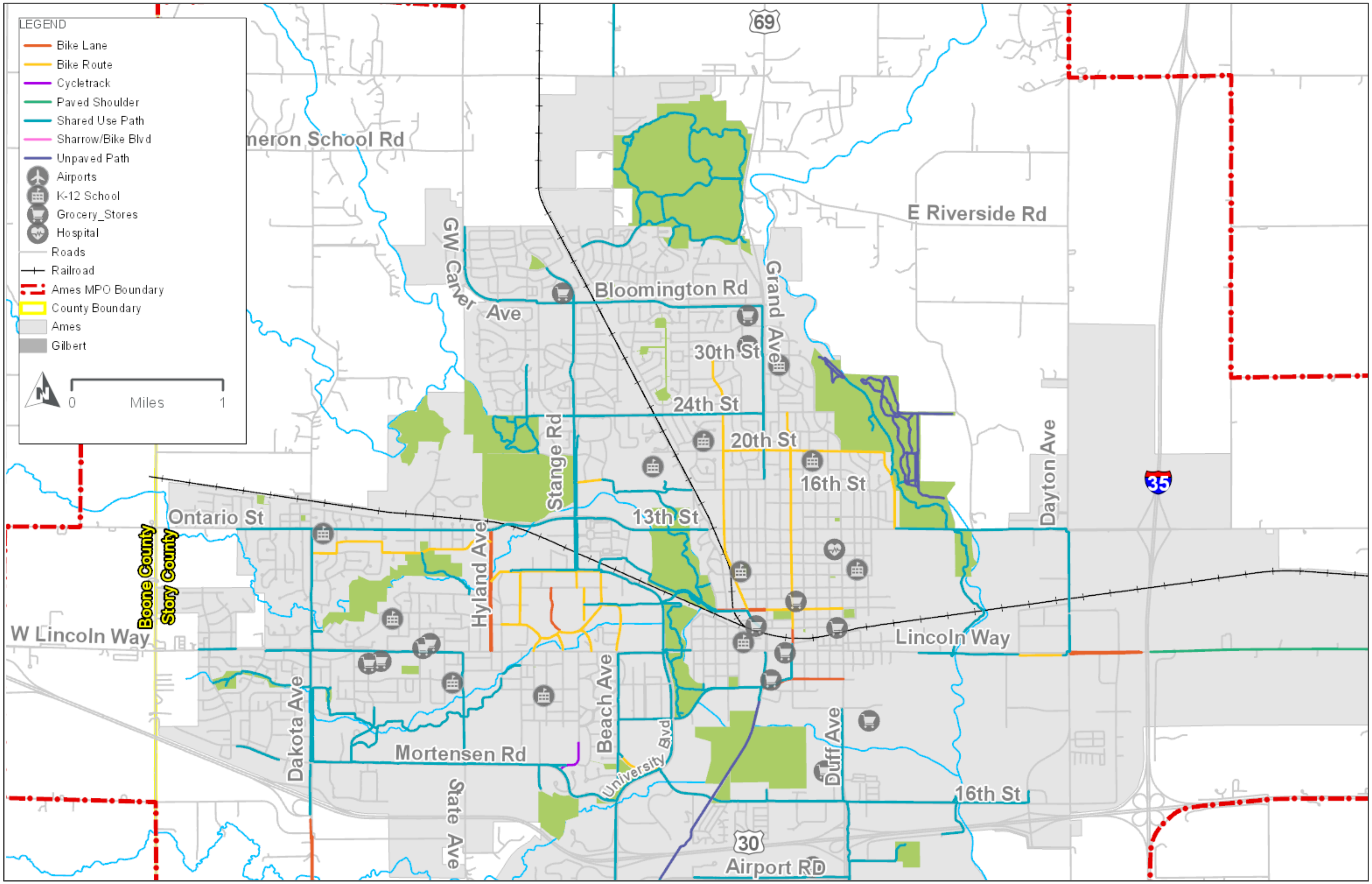
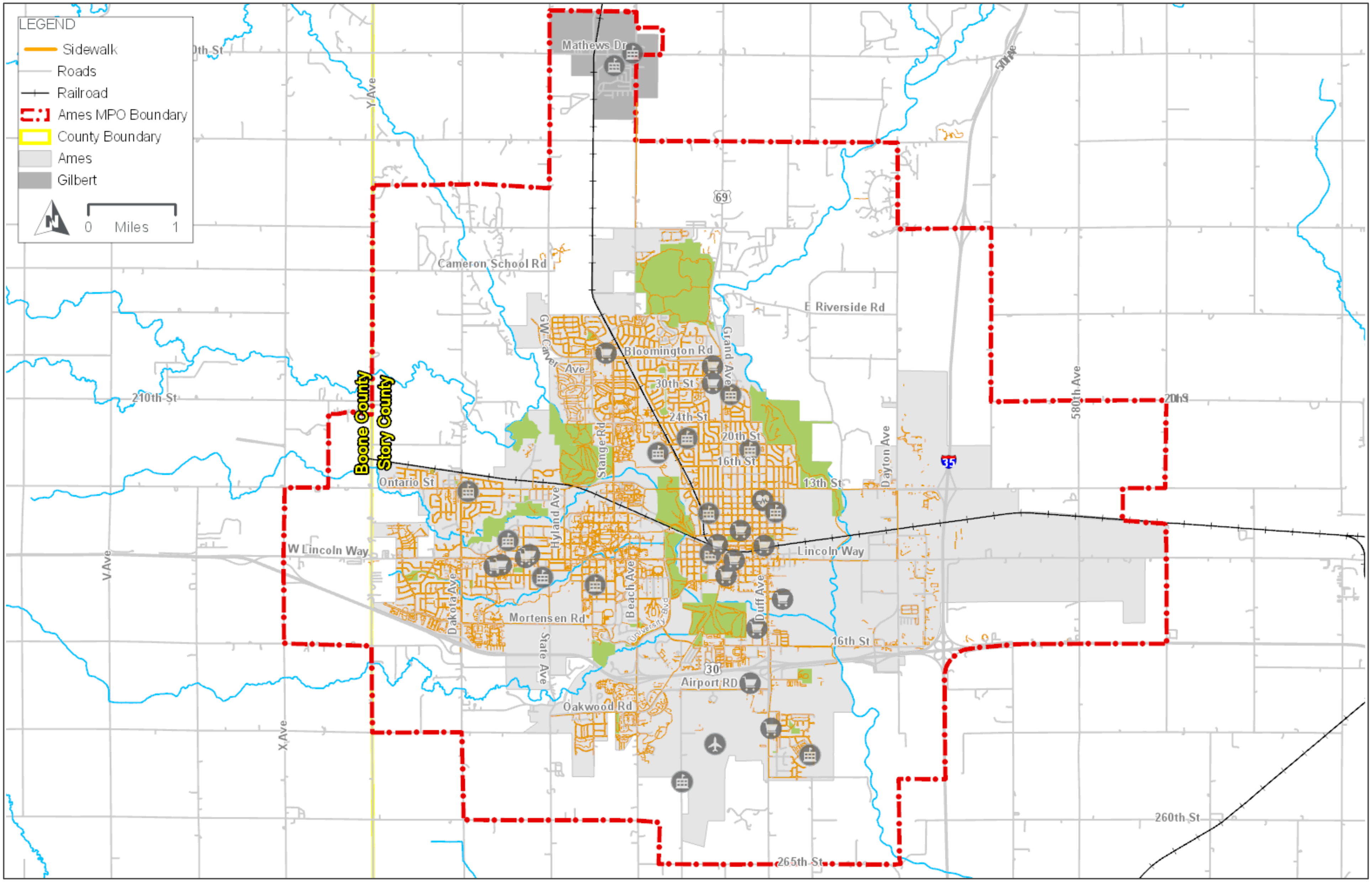


Figure 19: Existing Walking Network



Programs and Policies

Current programming for the Ames area active transportation system includes the following efforts:

- **Safe Routes to School**: A collaboration of AAMPO, the City of Ames and the Ames Community School District to encourage K-8 students and their families to choose active transportation to get to and from school. The program developed maps of suggested routes and crossing locations for the district's five elementary schools and one middle school.
- **Bike Walk Drive SMART**: A City of Ames campaign to increase safety through education and awareness.
- **Complete Streets Policy**: A major component of the 2018 Complete Streets Plan adopted by he City of Ames. The Policy states "The City of Ames will design, build, maintain, reconstruct, and resurface public streets in order to provide for the safety and comfort of all users of a corridor."
- **Bicycle Friendly Community**: A recognition received by the City of Ames from the League of American Bicyclists for being a Bronze-level Bicycle Friendly Community in 2016. The Bicycle Friendly Community report card provides some useful metrics for how Ames's bicycle infrastructure, programs and policies compare to other communities.

BICYCLE FRIENDLY COMMUNITY Spring 2016
BRONZE
THE LEAGUE OF AMERICAN BICYCLISTS

AMES, IA

TOTAL POPULATION 61,792
POPULATION DENSITY 2543
TOTAL AREA (sq. miles) 24.3

OF LOCAL BICYCLE FRIENDLY BUSINESSES 1
OF LOCAL BICYCLE FRIENDLY UNIVERSITIES 0

10 BUILDING BLOCKS OF A BICYCLE FRIENDLY COMMUNITY

	Average Silver	Ames
Arterial and Major Collector Streets with Bike Lanes	45%	0%
Total Bicycle Network Mileage to Total Road Network Mileage	30%	27%
Public Education Outreach	GOOD	LITTLE
Share of Transportation Budget Spent on Bicycling	7%	LESS THAN 1%
Bike Month and Bike to Work Events	GOOD	GOOD
Active Bicycle Advocacy Group	ACTIVE	YES
Active Bicycle Advisory Committee	ACTIVE	NONE
Bicycle-Friendly Laws & Ordinances	SOME	FEW
Bike Plan is Current and is Being Implemented	YES	NO
Bike Program Staff to Population	1 PER 70K	1 PER 154,480

CATEGORY SCORES

ENGINEERING *Bicycle network and connectivity*	2/10
EDUCATION *Motorist awareness and bicycling skills*	1/10
ENCOURAGEMENT *Mainstreaming bicycling culture*	2/10
ENFORCEMENT *Promoting safety and protecting bicyclists' rights*	3/10
EVALUATION & PLANNING *Setting targets and having a plan*	1/10

KEY OUTCOMES

	Average Silver	Ames
RIDERSHIP *Percentage of Commuters who bike*	3.5%	2.7%
SAFETY MEASURES CRASHES *Crashes per 10k bicycle commuters*	180	UNKNOWN
SAFETY MEASURES FATALITIES *Fatalities per 10k bicycle commuters*	1.4	0

Network Assessment

A network assessment of the existing bicycle and pedestrian system was performed. This assessment was twofold and looked at:

- **Bicycle Level of Traffic Stress**: Ratings applied to road segments and/or intersections for traffic stress experienced by cyclists while traveling along that segment.
- **Ease of Crossing**: Identifies the degree of difficulty experienced by pedestrians when crossing an intersection or road segment.

Bicycle Level of Traffic Stress

Level of Traffic Stress (LTS) incorporates traffic volumes, roadway speed, presence of bike lanes, and presence of parking to assign a stress level to each road segment.[5] LTS rankings and descriptions are:

- **LTS 1**: Suitable for most people, including children (low stress)
- **LTS 2**: Suitable for the mainstream adult population (low stress)
- **LTS 3**: Tolerated by confident bicyclists that still prefer dedicated bikeways (high stress)
- **LTS 4**: Tolerated by very confident bicyclists willing to interact with high levels of motor vehicle traffic (high stress)

Figure 20 shows the results of the bicycle LTS the existing network.

Bicycle Level of Traffic Stress at Intersections

To supplement LTS along a road segment, LTS at major intersections in the bicycling network was calculated. This methodology considered speed limit and street width and outputs a 1-4 score similar to segment LTS. **Table 10** summarizes the criteria for determining intersection LTS for unsignalized intersections. Crossings with a full signal are automatically given a score of LTS 1.

High-stress intersections on the existing and planned bike network in Ames are mostly located towards the outer edges of the city limits, where speed limits are higher and there are fewer traffic signals. Multiple intersections on Dakota Avenue, Oakwood Road, Mortensen Road, 13th Street, 16th Street and South 16th Street are considered high-stress intersections. **Figure 21** presents the results of the Bicycle LTS at intersections.

[5] Mekuria, Maaza C., Peter G. Furth, and Hilary Nixon. "Low-stress bicycling and network connectivity." MTI Report 11-19. Mineta Transportation Institute (2012). Downloaded from http://transweb.sjsu.edu/sites/default/files/1005-low-stress-bicycling-network-connectivity.pdf

Table 10: Criteria for Intersection Level of Traffic Stress at Unsignalized Crossings

a. NO CROSSING ISLAND	**Width of Street Being Crossed**		
Speed Limit or Prevailing Speed	Up to 3 lanes	4 - 5 lanes	6+ lanes
Up to 25 mph	LTS 1	LTS 2	LTS 4
30 mph	LTS 1	LTS 2	LTS 4
35 mph	LTS 2	LTS 3	LTS 4
40+	LTS 3	LTS 4	LTS 4

b. WITH CROSSING ISLAND	**Width of street being crossed**		
Speed Limit or Prevailing Speed	Up to 3 lanes	4 - 5 lanes	6+ lanes
Up to 25 mph	LTS 1	LTS 1	LTS 2
30 mph	LTS 1	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 4
40+	LTS 3	LTS 4	LTS 4

Source: Furth (2017)[6]

Ease of Crossing

The ease of crossing assessment helps to visualize where it is most difficult for people walking to cross the street. Traffic volume, speed, road width, and presence of traffic signals are combined to reach an overall score for each street segment. A corridor with many segments classified as “very challenging to cross” is generally one where signalized intersections are far apart and it is unsafe to cross at unsignalized intersections due to multiple lanes of traffic, higher speed limits, and higher traffic volumes.

Figures 22 and **23** show the results of the ease of crossing analysis for the AAMPO region and the central part of the City of Ames. Specific intersections identified in this analysis that pose a challenge for pedestrian crossings at them are:

- South Duff Avenue
- 13th Street
- University Boulevard
- Stange Road
- SE 16th Street
- Lincoln Way
- Grand Avenue

[6] Furth, Peter. “Level of Traffic Stress Criteria for Road Segments, Version 2.0, June, 2017.” http://www.northeastern.edu/peter.furth/wpcontent/uploads/2014/05/LTS-Tables-v2-June-1.pdf

Figure 20: Bicycle Level of Traffic Stress

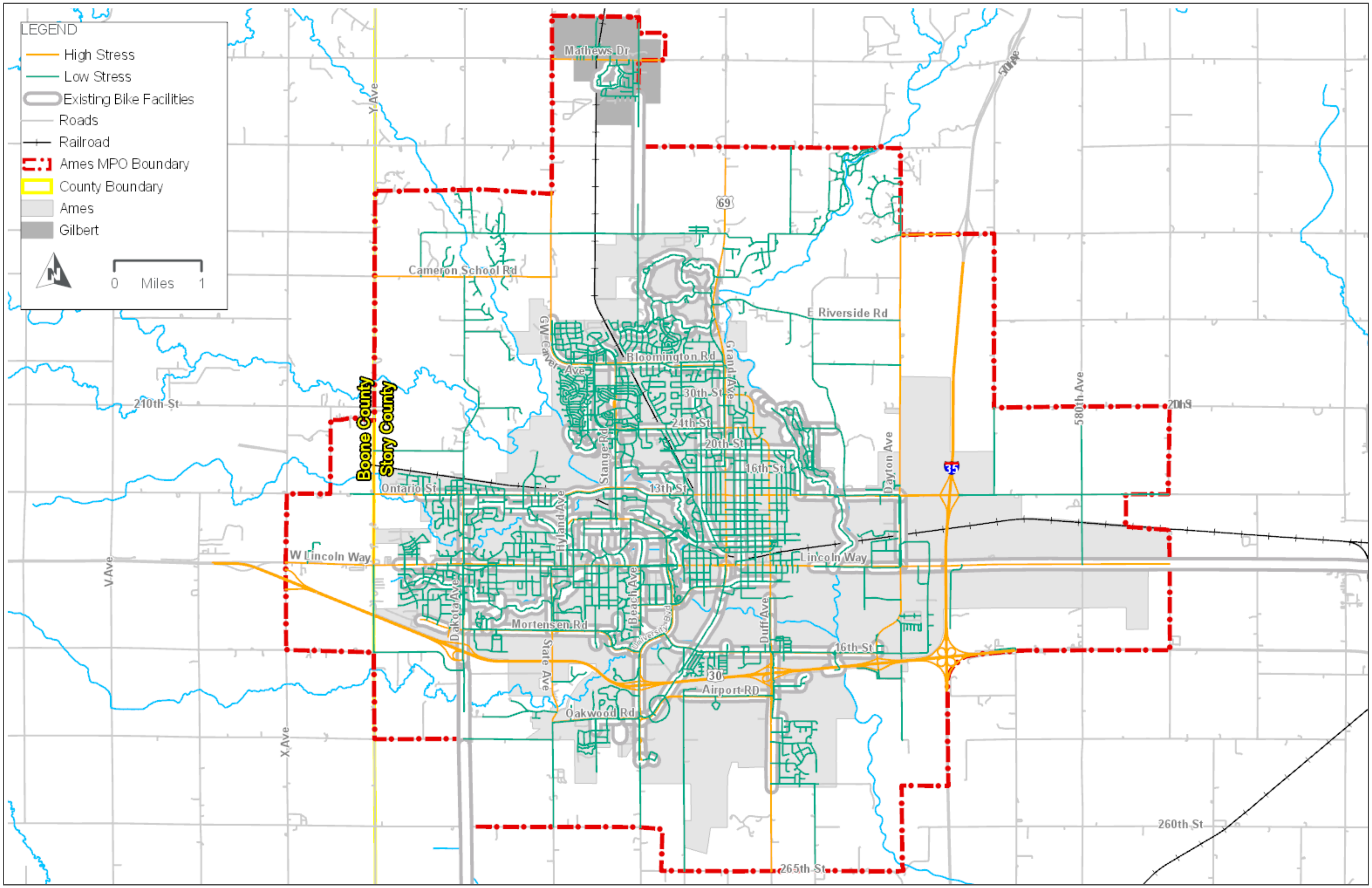


Figure 21: Bicycle Level of Traffic Stress at Intersections

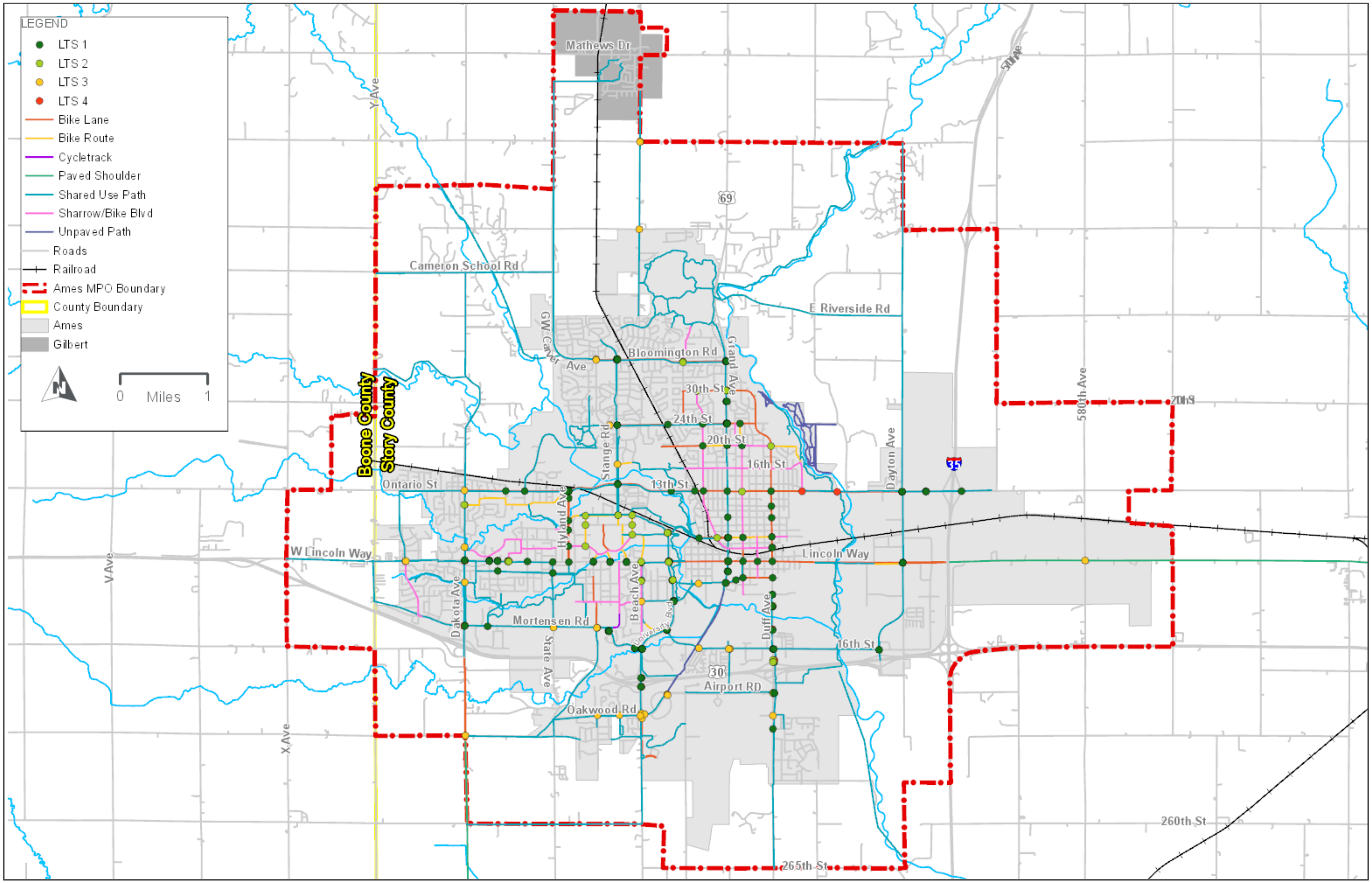


Figure 22: Ease of Crossing

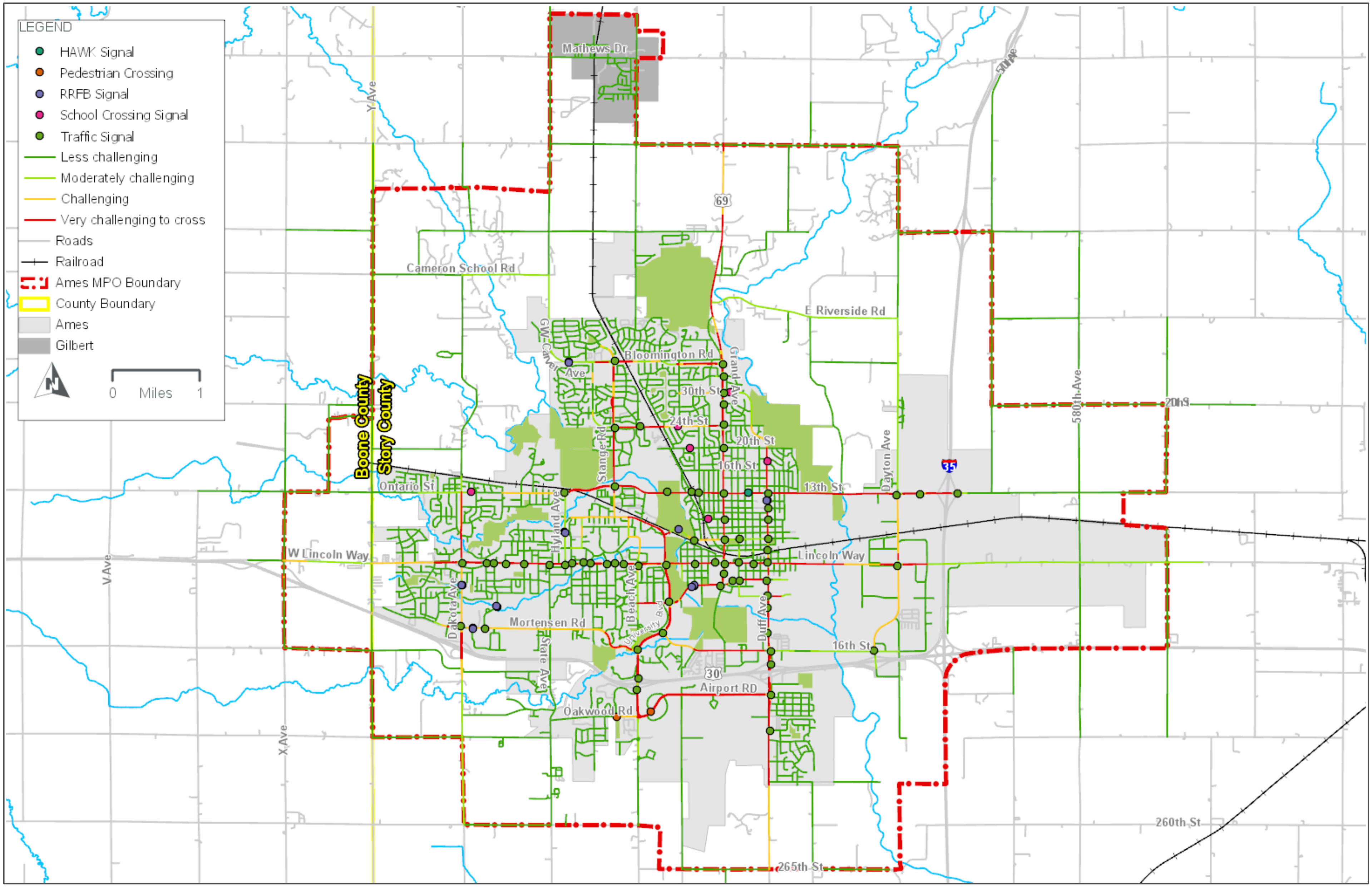
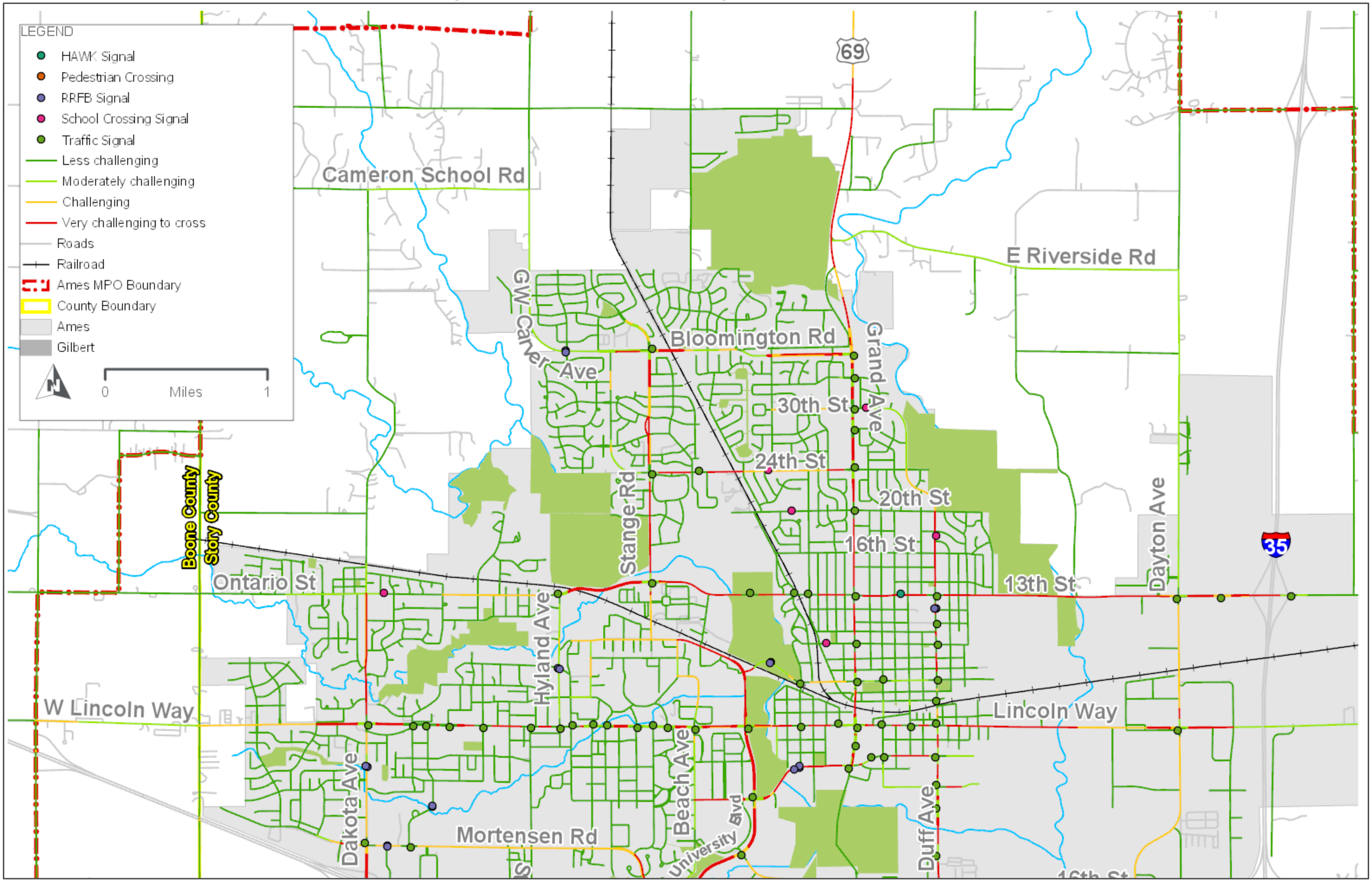


Figure 23: Ease of Crossing in Central Ames



Bicycle Network Gaps

Three methods were used to identify key bikeway gaps: unfinished Mobility 2040 projects, visual inspection, and Complete Streets Plan review.

All of the planned active transportation projects from Mobility 2040, as well as TIP and CIP projects that have not yet been implemented, are opportunities to complete the network in the Ames area. Some projects are “quick wins”— filling small gaps or adding a low-stress link in high-demand areas. These opportunities include:

- Bike boulevards on Welch Ave (ON 16), Storm/Cessna Street (ON 33), and Ash Ave (ON 30) connecting the existing Campustown pilot project area on Welch to the two-way cycletrack segment on Ash.
- West Mortensen sidepath gap to the west of South Dakota Ave (OFF 2)
- West Street Bike Boulevard (ON 21)
- 16th Street Bike Boulevard (ON 24)
- Clark Avenue Bike Boulevard and/or Bike Lanes

The most significant gaps are on Lincoln Way between State Avenue and Beach Avenue and on S Duff Avenue between Lincoln Way and SE 5th Street. These segments have many destinations and high active transportation demand but are major arterials with limited right-of-way availability. There are opportunities to create comfortable alternate routes by implementing planned projects on parallel streets and ensuring clearly marked connections.

In addition, there are opportunities to align key elements of the existing bike network with the default bikeway types in the Complete Streets plan.

Walking Network Gaps

On several of the busier streets in the City of Ames, a sidewalk is present on only one side. University Boulevard north of S 4th Street, 13th Street bordering campus, and 24th Street east of Stange are all missing sidewalk on one side and also ranked as “very challenging to cross” in the ease of crossing analysis.

Crossing Improvement Opportunities

Crossing a wide street with high traffic volumes and speeds is often the most stressful part of a non-motorized trip. As seen in the Bicycle Intersection Level of Traffic Stress analysis in **Figure 20** and **Figure 21**, some existing and planned bike low-stress facilities become high stress when the person reaches a large intersection. Opportunities for crossing improvements on the bicycle network include:

- Intersection of planned bike boulevard on Beach Avenue and existing sidepath on South 4th Street
- Intersection of planned bike boulevard on 16th Street and Stange Road (improvements at 16th and Grand are planned)
- Intersections of planned and existing facilities with North Dakota Avenue: planned bike lane on Ontario Street, existing shared-use path at Westbrook Street, existing shared-use path south of Lincoln Way
- Intersection of existing shared-use paths at Mortensen Road and State Avenue
- Intersection of planned bike lanes on Welch Avenue with Mortensen Road
- Crossings of 13th Street: planned bike boulevard on Meadowlane Avenue, existing shared-use path through River Valley Park

The ease-of-crossing analysis (**Figure 22** and **Figure 23**) pinpoints locations where additional or improved crossings are needed. Difficult to cross locations in areas of high demand include:

- 13th Street between Grand Avenue and Stange Road
- University Boulevard
- Parts of Lincoln Way

The analyses described above assume that crossing at a signalized intersection is relatively comfortable; however, of those intersections that had four or more collisions from 2014-2018, seven out of eight are signalized. These locations require additional analysis to determine why collisions are happening.

- Lincoln Way and Beach Avenue
- Lincoln Way and Kellogg Avenue
- Lincoln Way and State Avenue
- Lincoln Way and Sheldon Avenue
- South Dakota and Mortensen Road
- Grand Avenue and 24th Street
- S Duff Avenue and SE 3rd Street

Lincoln Way and Beach was one of the signalized intersections with a higher number of bike and pedestrian collisions.

Crossing improvement projects are already planned at the following locations:

- University Boulevard and Mortensen Road
- University Boulevard and South 16th Street
- Duff Avenue and South 5th Street
- Grand Avenue and 6th Street
- Grand Avenue and 30th Street
- U.S. 30 and University Boulevard ramps
- Grand Avenue and 16th Street
- Lincoln Way and Clark Avenue
- Stange Road and 13th Street
- Hyland Avenue and Ontario Street
- Grand Avenue and Bloomington Road
- 20th Street and Grand Avenue
- Dayton Avenue and S 16th Street

Transit System Conditions

Transit Services

CyRide is the primary transit service provider in the AAMPO region and operates local bus and paratransit services to riders throughout the City of Ames. CyRide is a division of the City of Ames and operates in partnership with Iowa State University (ISU) and Iowa State University's Government of the Student Body (GSB).

Local Bus

CyRide operates 13 fixed routes primarily serving Downtown Ames and ISU's campus, which are shown in **Figure 24**. Each route's operating characteristics (service hours, frequency, etc.) are summarized in **Table 11.** A regular one-way fare costs $1, and ISU students ride free through an agreement between GSB and CyRide.

East Ames Service Extension (EASE)

EASE service is an on-demand curb-to-curb service that serves the eastern Ames area, as seen **25**. The bus picks up customers at Ames City Hall and takes them anywhere they need to go within the eastern Ames zone for $1.

Safe Ride Home

CyRide provides a fare-free safe ride home service known as Moonlight Express. Moonlight Express consists of three main routes—shuttles A, B, and D. An additional door-to-door service, Shuttle E, is provided as a call-to-schedule service to ensure Ames residents living outside of other shuttle coverage areas still have access to a safe ride home. Moonlight Express operates Friday and Saturday evenings from approximately 10:30 p.m. to 3:00 a.m. during the Fall and Spring semesters only (mid-August through early May). Specific frequencies and alignments of each Moonlight route are provided in **Table 11** and **Figure 26** below.

Paratransit

Dial-A-Ride is a door-to-door paratransit service operated by CyRide and contracted through Heart of Iowa Transit Agency (HIRTA), which serves individuals living with a disability within the City of Ames. Passengers must meet the requirements of the Americans with Disabilities Act (ADA). Dial-A-Ride can be booked by phone or through a mobile app by 4:30 p.m. the day prior to travel. Same-day rides can be accepted providing there is time and space available.

Regional Public Transit Service

In addition to Dial-A-Ride service, HIRTA also provides regional door-to-door transportation in a seven-county swath of Central Iowa, including Story County. Service is open to the general public with a 24-hour advance reservation. A one-way trip within Story County costs $5. A variety of intercity bus operators also provide connections from the Intermodal Transportation Facility located in Ames.

Figure 25: CyRide Fall 2019 Route Network

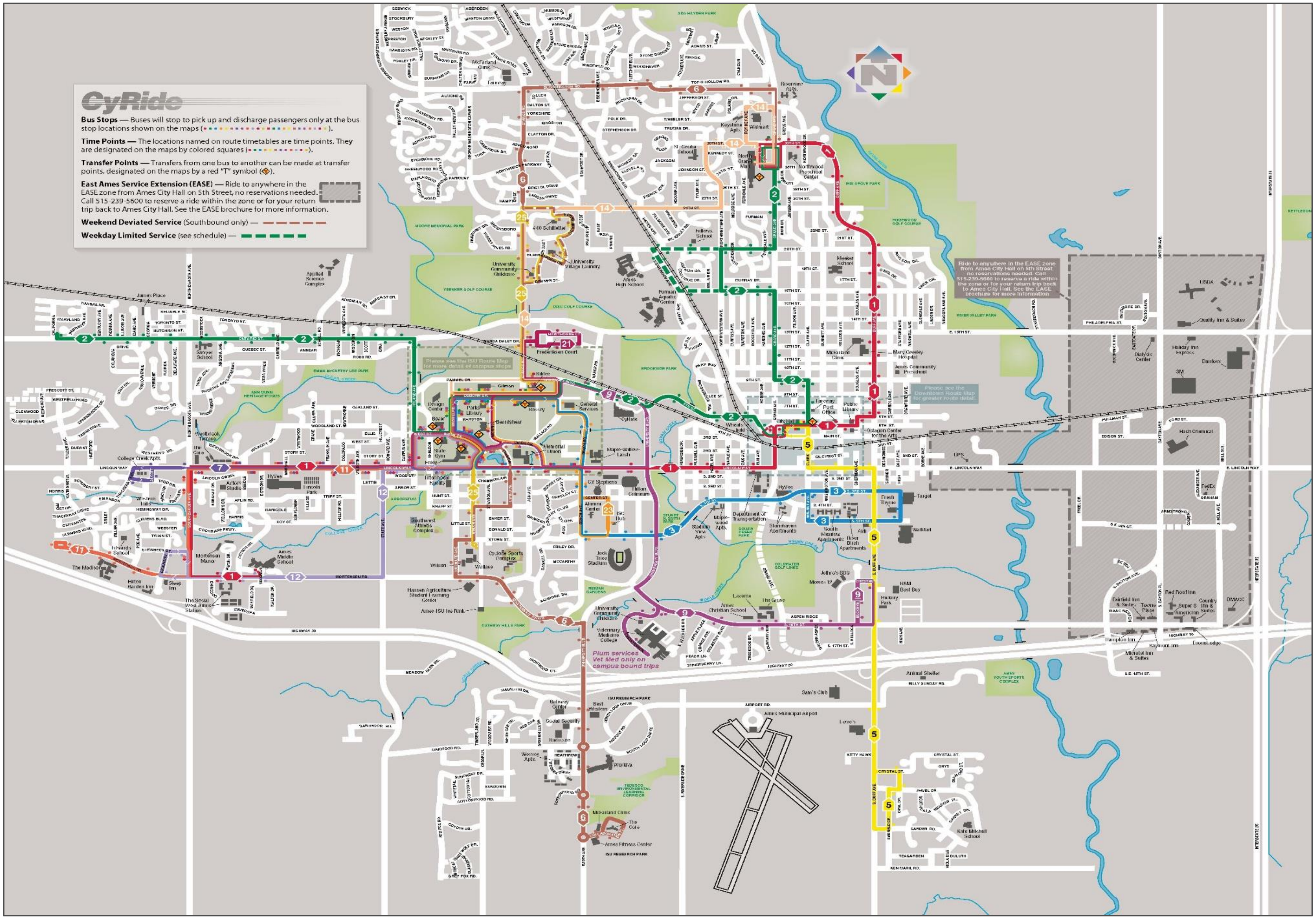
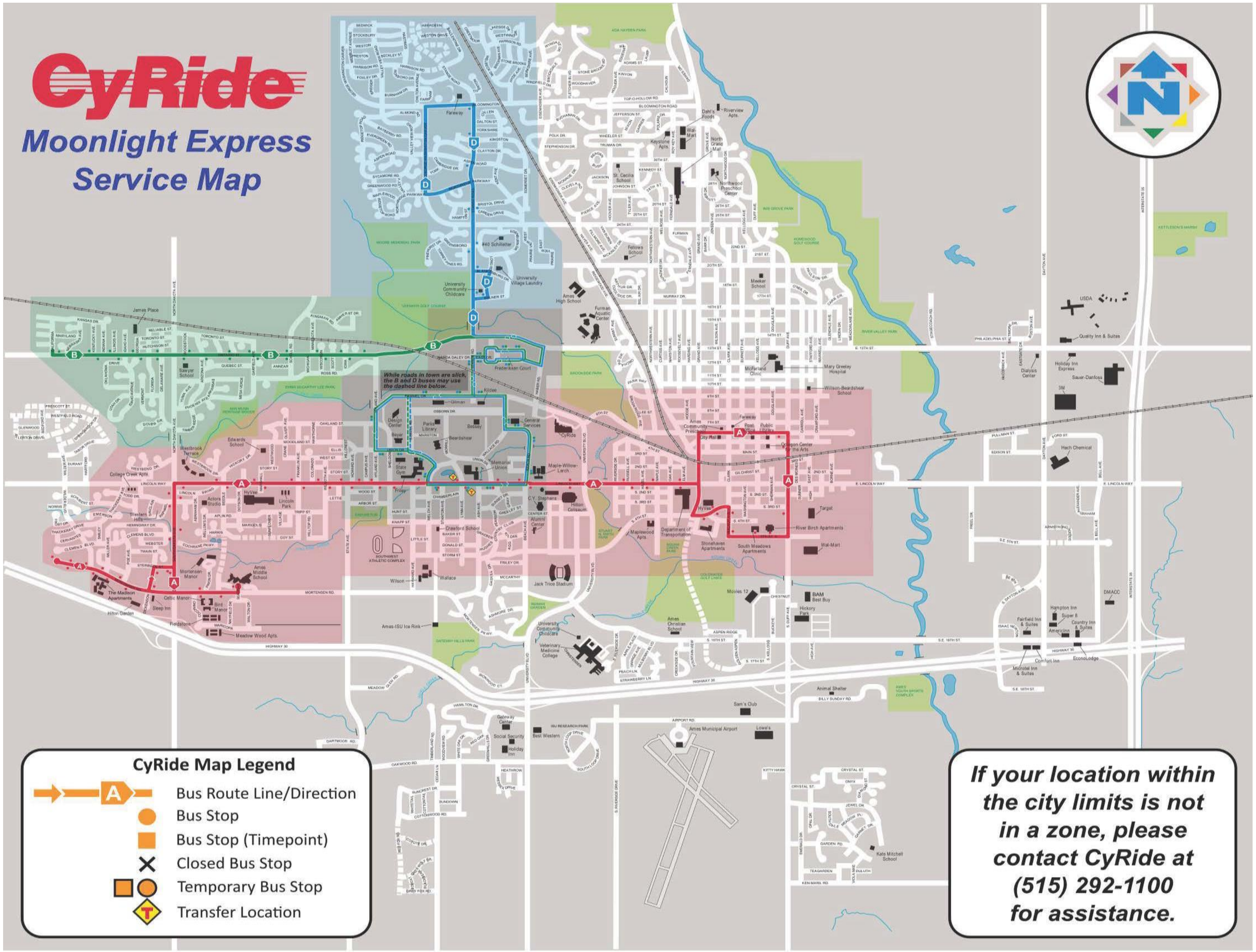


Table 11: CyRide Service Hours & Frequency

	Weekday				Saturday			Sunday		
Route	**Hours**	**Peak**	**Off-Peak**	**Night**	**Hours**	**Day**	**Night**	**Hours**	**Day**	**Night**
Local										
#1 Red	6:30 AM- 12:30 AM	15	20	40	7:30 AM- 10:00 PM	20	20	8:30 AM- 11:10 PM	40	40
#2 Green	6:30 AM- 11:30 PM	20	20	40	8:00 AM- 10:00 PM	40	40	8:30 AM- 10:30 PM	40	40
#3 Blue	6:30 AM- 12:30 AM	10	15-20	40	7:30 AM- 9:30 PM	20-40	40	8:30 AM- 11:10 PM	20-40	40
#5 Yellow	6:45 AM- 6:45 PM	30	30	No Service	9:15 AM- 6:45 PM	30	No Service	No Service		
#6 Brown	6:30 AM- 10:00 PM	20	30	30	8:00 AM- 8:00 PM	40	No Service	8:30 AM- 7:50 PM	40	40
#7 Purple	7:00 AM- 9:45 AM 2:30 PM- 5:00 PM	15-30	No Service		No Service			No Service		
#8 Aqua*	12:30 PM- 8:00 PM	30	30	30	30	30	30	30	30	30
#9 Plum	7:00 AM- 9:40 PM	20	20	30	No Service			No Service		
#11 Cherry	7:00 AM- 10:30 PM	10	10-15	40	No Service			No Service		
#12 Lilac	7:00 AM- 5:15 PM	20	40	No Service	No Service			No Service		
#14 Peach	6:40 AM- 6:40 PM	30	30	No Service	No Service			No Service		
#21 Cardinal	7:00 AM- 10:20 PM	10	10	20	No Service			No Service		
#23 Orange	6:30 AM- 10:15 PM	5	15	20	No Service			No Service		
#24 Silver*	6:00 PM- 10:00 PM	No Service			No Service			No Service		40
#25 Gold	7:00 AM- 12:00 AM	10	20	30-40	No Service			No Service		
EASE	7:00 AM- 6:00 PM	60	60	No Service	No Service			No Service		
Moonlight Express										
A Shuttle	10:30 PM- 3:00 AM	No Service		20	10:30 PM- 2:30 AM	No Service	20	No Service		
B Shuttle	10:40 PM- 3:00 AM	No Service		40	10:40 PM- 2:15 AM	No Service	40	No Service		
D Shuttle	10:20 PM- 3:00 AM	No Service		40	10:20 PM- 2:30 AM	No Service	40	No Service		
E Shuttle	10:30 PM- 3:00 AM	No Service		N/A	10:30 PM- 2:30 AM	No Service	N/A	No Service		

Figure 26: Moonlight Express Route Map



Intermodal Transportation Facility

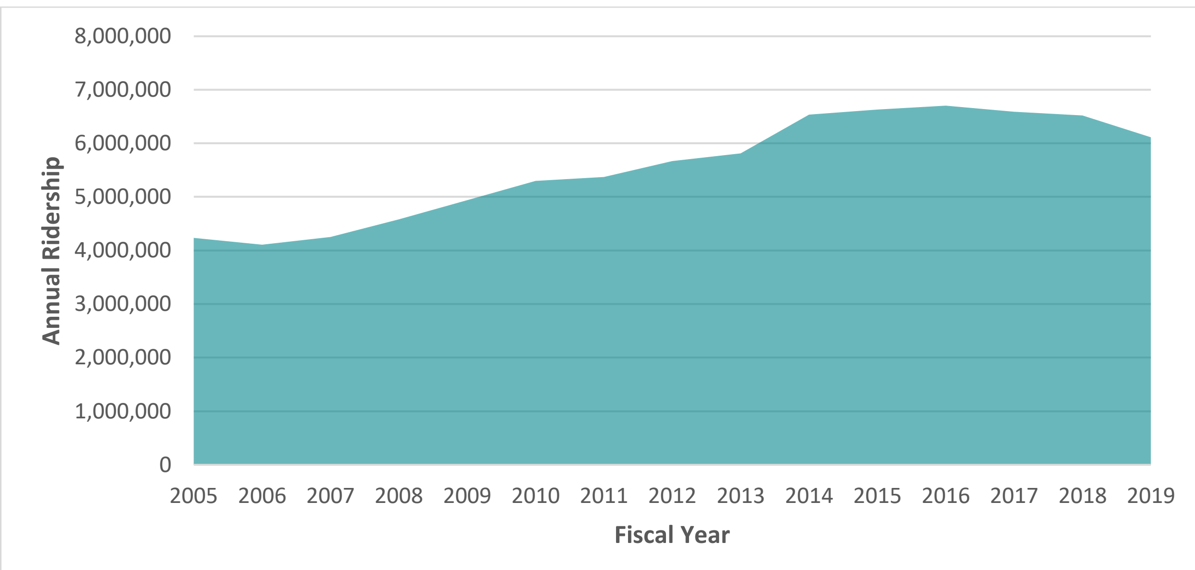
Located at the intersection of Hayward Avenue and Chamberlain Street, the Ames Intermodal Transportation Facility is a transportation hub combining access to public and private transportation services, bike facilities, and parking. The facility is open to the general public and provides one-stop access to transportation outside of Ames, with operators including Greyhound, Jefferson Lines, Burlington Trailways, Indian Trails, and Lamers Bus Lines. The facility opened in 2012 and was developed by ISU and city partners through a 2009 $8.5 million Transportation Investment Generating Economic Recovery (TIGER) grant.

System and Route Performance

System Level Performance

Demand for fixed-route transit service in Ames grew continually from 2006-2016; however, in recent years overall ridership has declined as seem in **Figure 27**. In FY2019, CyRide fixed-route service saw a 6.9% decrease in overall ridership. A total of 350,956 fewer rides were provided during FY2019 compared to FY2018, likely due to decreased ISU enrollment (218,000 fewer rides), ISU academic calendar adjustments (50,000 fewer rides), and ISU inclement weather cancellations (83,000 fewer rides).[7] Additional ridership decline and fluctuation may be attributed to the bi-annual occurrence of an event known as Odyssey of the Mind. The FY2018 Odyssey of the Mind event accounted for approximately 73,000 passengers who were not present in FY2019 but will likely see comparable attendance and ridership in 2020. Student enrollment decreased again in Fall 2019 (FY2020) by 1,601 students, which will likely lead to future decreases in overall ridership.

Figure 27*:* Annual Fixed-Route CyRide Ridership



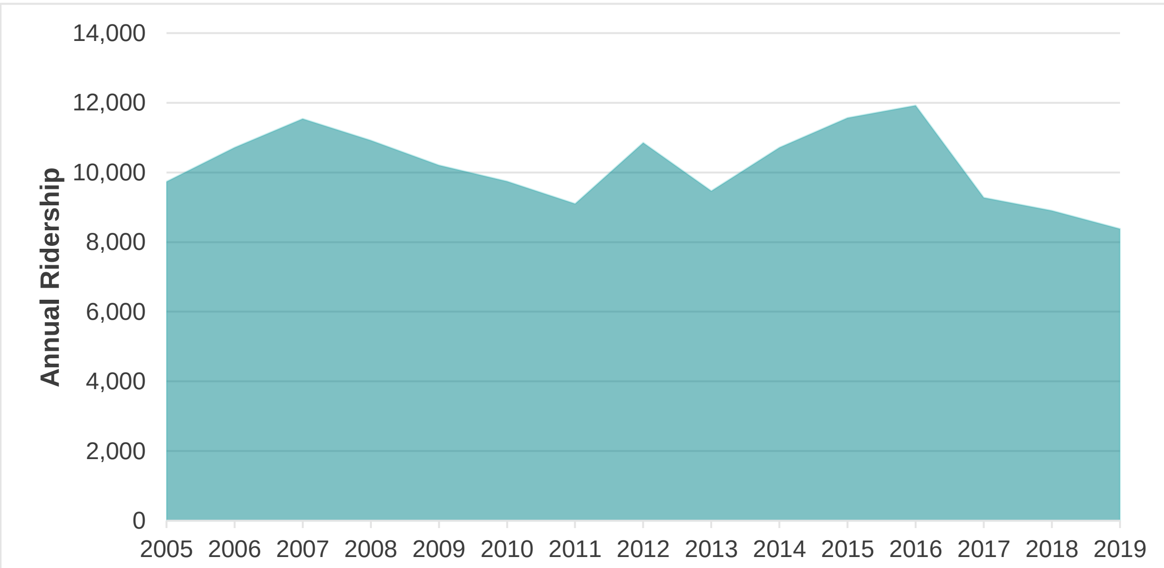
Source: CyRide

[7] Source: CyRide

Figure 28 presents annual ridership for the City of Ames Dial-a-Ride service. Demand for Dial-a-Ride service has fluctuated throughout the years but has seen a steady decrease between FY2016 to FY2019.

A summary of CyRide system operating statistics is shown in **Table 12**. In FY2018, CyRide provided a total of 131,746 revenue hours, carried 6.6 million passengers, and cost a total of $8.6 million to operate. Transit system effectiveness and efficiency is measured by the ratio of resources provided to services consumed. Transit performance metrics applied to CyRide are shown in **Table 13**.

Figure 28: Annual Dial-a-Ride Ridership



Source: CyRide

Table 12: Operating Data for Bus and Paratransit Services (FY 2018)

Mode	Ridership	Revenue Hours	Revenue Miles	Farebox Revenue	Total Cost
Bus	6,563,162	127,537	1,327,382	$5,455,754	$8,386,461
Dial-a-Ride	8,903	4,209	41,323	$14,720	$183,472
Total	6,572,065	131,746	1,368,705	$5,470,474	$8,569,933

Source: CyRide

Table 13: Performance Metrics for Bus and Paratransit Services (FY 2018)

Mode	Passengers per Revenue Hour	Passengers per Revenue Mile	Operating Cost per Revenue Hour	Operating Cost per Revenue Mile	Operating Cost Per Passenger	Farebox Recovery Ratio	Average Fare per Passenger	Average Subsidy per Passenger
Bus	51.46	4.9	$65.76	$6.32	$1.28	65.05%*	$0.83	$0.45
Dial-A - Ride	2.12	0.2	$43.59	$4.44	$20.61	8.02%	$1.65	$18.95

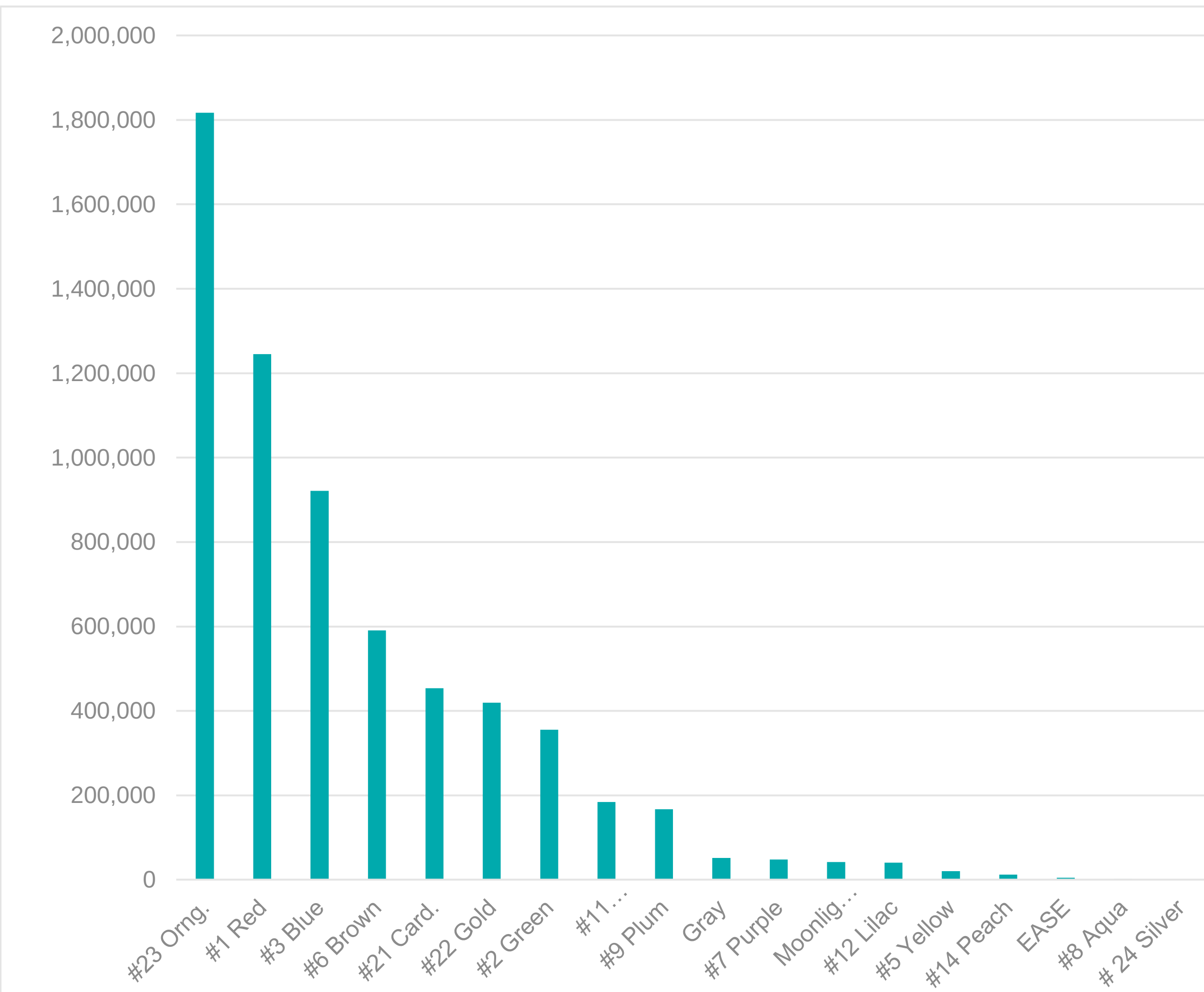
** Includes funding from the ISU's GSB*
Source: CyRide

Route Level Performance

A route-level analysis of FY2018 CyRide data shows a wide variation in ridership among routes. The route with the highest ridership in 2018 was #23 Orange, with a total of more than 1.8 million trips—roughly 30% of overall system ridership. The second highest ridership route was #1 Red with more than 1.2 million passengers, and the third highest was #3 Blue with approximately 921,000 passengers. Together, these three routes make up 65% of overall system ridership. The year-round regular fixed-route service with the lowest ridership was #14 Peach with 12,033 riders, comprising less than 1% of system ridership. Route-level performance is summarized in **Figure 29**.

In the past, several CyRide routes experienced conditions where peak ridership demand exceeded bus capacity, requiring extra peak buses. During the past few years, CyRide has been able to significantly reduce the number of extras through route reconfigurations and frequency adjustments.

Figure 29: FY2018 CyRide Ridership Per Route



Source: CyRide

Transit Level of Service

Level of Service Results

A major factor in a person's decision to take transit is how convenient the service is. Convenience includes many elements—for example, ease of access to the bus stop, whether the route is direct or requires a transfer—but a key part of convenience is service frequency. At high service frequencies, passengers do not have to worry about consulting a schedule but can arrive at a bus stop and be confident that a bus will arrive fairly soon. Low frequencies degrade convenience as passengers must plan the trip around a specific timepoint and if they miss the bus, must wait a long time for the next bus. The Transit Cooperative Research Program (TCRP) created a Level of Service metric to assess service frequency. The metric equates wait time (in minutes) ranges to how passengers must accommodate to those ranges. **Table 14** contains the LOS metric that was developed by TCRP.

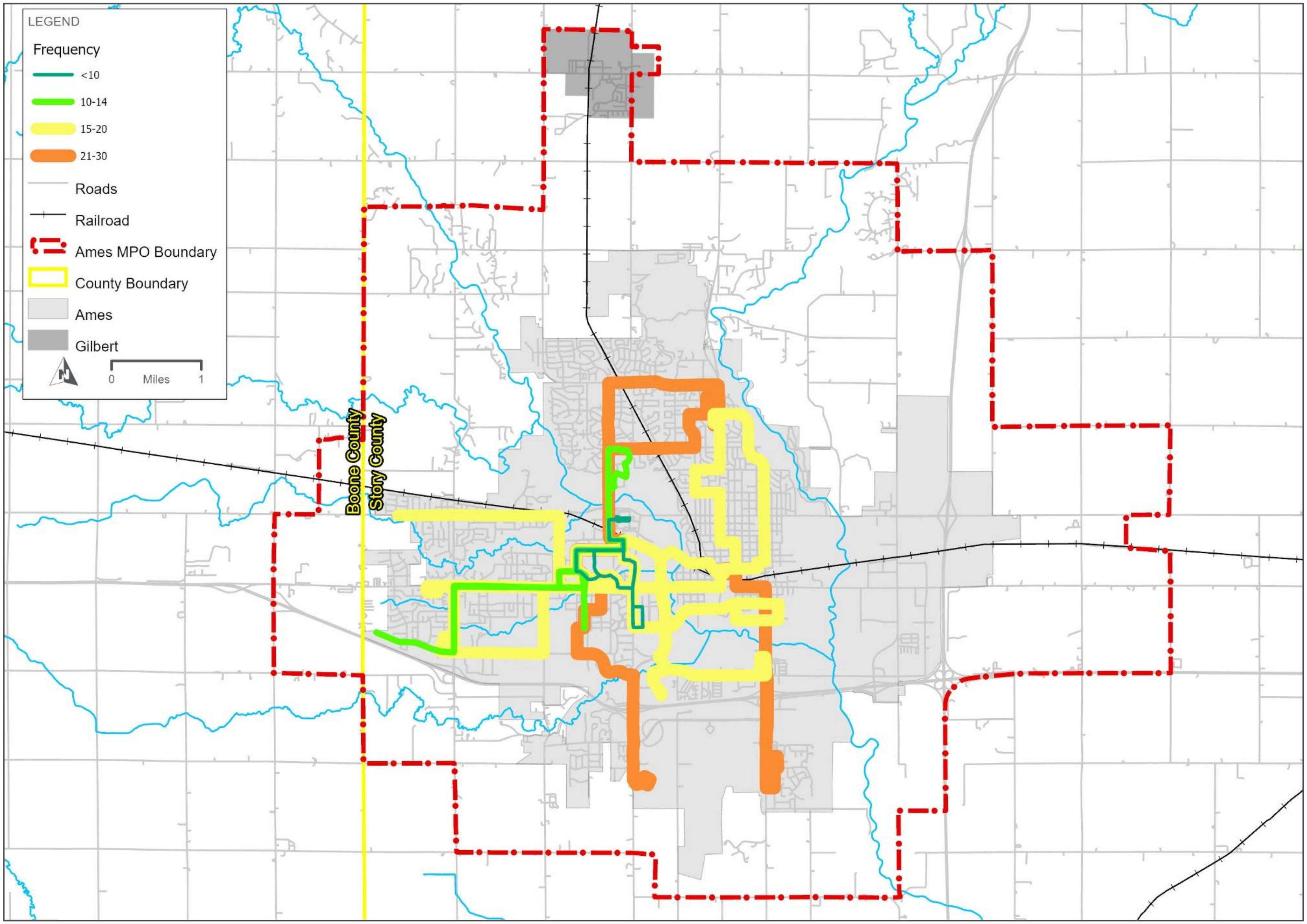
Figure 30 shows how this metric applies to Ames' fixed-route network for 2019. The highest levels of service during this period are concentrated in and near ISU campus. Additionally, high frequency service extends north to Schilletter-University Village, west on Lincoln Way towards Ames Middle School, and southeast of campus along South 4th Street towards Wal-Mart and Target.

Table 14: Fixed-Route Service Frequency Level of Service in Minutes

Frequency (Minutes)	Description
<10	No bus schedule needed
10 - 14	Passengers may consult schedules
15 - 20	Passengers will consult schedules to minimize wait time
21 - 30	Passengers adapt travel to transit schedule
31 - 40	Provides minimal service to meet basic travel needs

Source: TCRP

Figure 30: CyRide Fall 2019 Route Network



Previous Transit Studies

CyRide System Redesign (2017)

With productivity metrics that rival and exceed many urban bus systems, CyRide service functions extremely efficiently. In 2017, a System Redesign study was conducted to develop a sustainable plan for the future of the system while also examining opportunities to extend transit service to better meet the needs of the community in Ames. Key issues addressed in the System Redesign included:

- **Balancing Coverage and Productivity.** While CyRide is incredibly effective at serving ISU students, there are opportunities to enhance service quality for other members of the community. Development occurring on the city's fringes that is difficult to serve with fixed-route transit service was also evaluated as part of the System Redesign.
- **Examining Constraints.** In addition to financial constraints, CyRide faces very real physical constraints in terms of vehicle storage capacity. This study looks at optimizing use of peak vehicles to limit the use of "extra" vehicles when possible with a goal of relieving stress on the current storage facility and streets on ISU's campus.
- **Managing Demand.** CyRide operates highly efficient service, to the point that even evening service has experienced overcrowding. A thorough, data-driven understanding of ridership patterns allows CyRide to allocate service more effectively to meet demand in the system.

Important steps in the System Redesign process included gathering meaningful stakeholder involvement throughout the project, understanding the market for transit, analyzing strengths and weaknesses of existing service, developing and evaluating service options, and creating implementable recommendations.

Ames-Des Moines I-35 Commuter Corridor Feasibility Study

The Des Moines I-35 Commuter Corridor Feasibility Study examined the feasibility of transit operations along the I-35 corridor between downtown Des Moines, Ankeny, and Ames. Although the Des Moines Regional Transit Authority (DART) Route 98 connects Ankeny with downtown Des Moines, there is not currently a transit service linking the economic and educational centers between Ames, Ankeny, or Des Moines. This lack of connectivity prevents residents without a car from taking advantage of educational and employment opportunities throughout the corridor.

Using U.S. Census data and data provided by major employers in the area, travel patterns were examined to understand commuter and student movement along this corridor. As seen in **Table 15**, the Des Moines to Ankeny segment experiences the highest level of commuter and student flow. Based on these movement patterns, it was recommended that a 30-minute commuter express bus service be implemented along the corridor during the weekday peak period. Further, a mid-day deviated fixed route was recommended to meet non-commute demand and provide access for rural areas. The express service annual operating cost was estimated at $1.2 million with a $4.1 million initial capital investment. The mid-day connection to rural areas would be eligible for Federal Transit Administration funding though the Intercity Bus Assistance program.

Table 15: I-35 Corridor Commuter and Student Movement

Commuter Trips		Student Trips	
Direction	**Commuters**	**Direction**	**Commuters**
Ankeny to Des Moines	7,844	Des Moines to DMACC-Ankeny	3,249
*Ankeny to Downtown Des Moines	4,720	Ames to DMACC-Ankeny	1,096
Ankeny to West Des Moines	2,231	West Des Moines to DMACC-Ankeny	841
Des Moines to Ankeny	3,246	Urbandale to DMACC-Ankeny	689
Ames to Des Moines	1,474	Des Moines to DMACC-West	552

Source: Ames-Des Moines I-35 Commuter Corridor Commuter Study

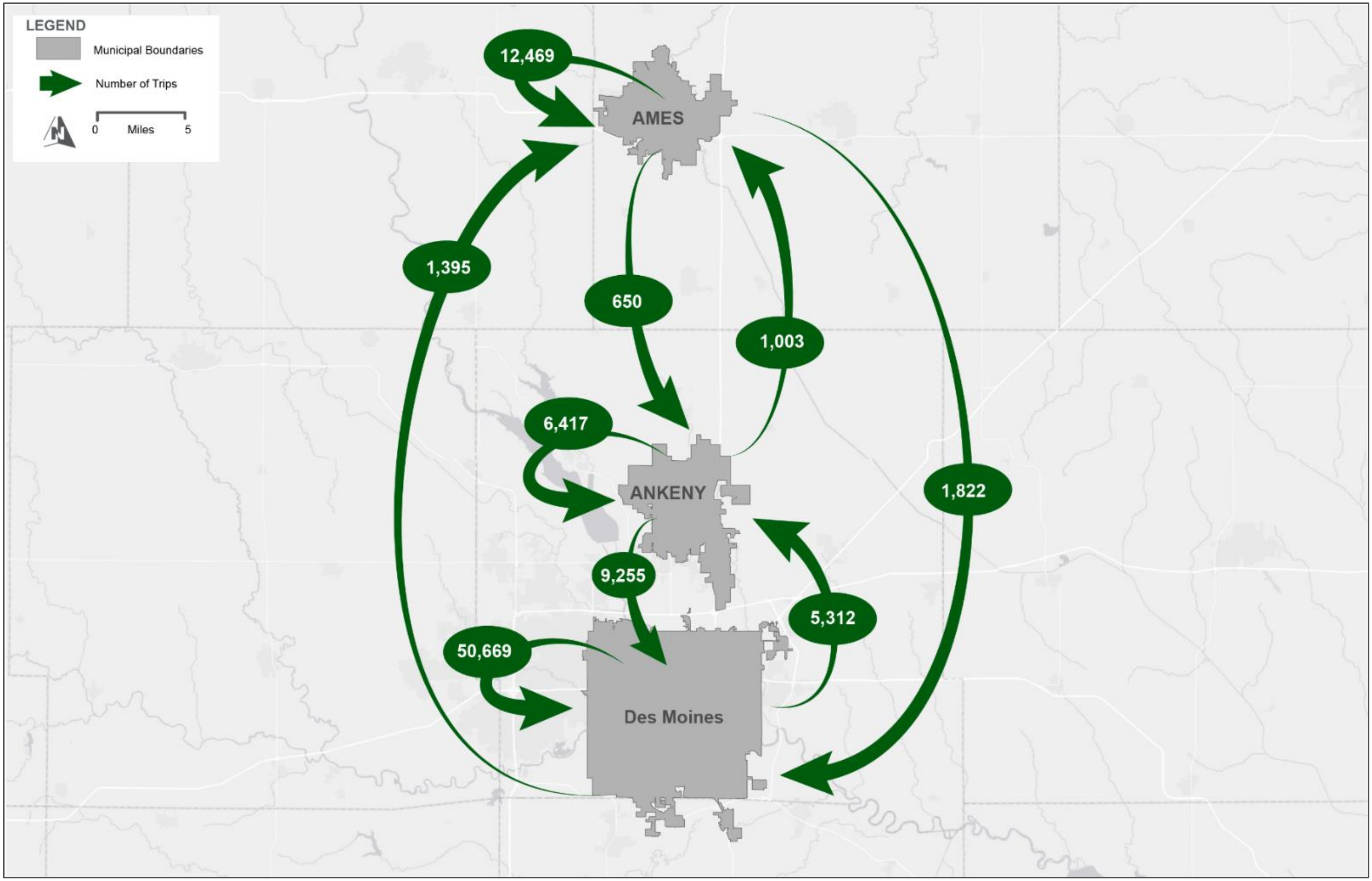
LEHD Analysis

The goal of travel pattern analysis is to quantify market demand and identify markets that may support CyRide transit services. The primary dataset used in this analysis was U.S. Census Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics, which provides insight into travel flows from home location to work location at the Census block level. The areas of focus within this LEHD analysis included Ames, Ankeny, and Des Moines. A limitation of the dataset for Ames is that LEHD data strictly reflects employment-related commute information and therefore student commute patterns are not reflected.

Inter-City Commute Patterns

As seen in **Figure 32**, the largest number of trips occurs within the boundaries of Des Moines, Ames, and Ankeny. The city with the largest flow of inbound travel is Des Moines, likely due to its higher population and greater concentration of economic and educational opportunities. Significant flow occurs along the Ankeny-Des Moines segment in both directions. The Ankeny-Des Moines segment sees between 1,300-1,800 commuters and the Ankeny-Ames segment sees between 600-1,000. As stated previously, the only segment currently served by transit is the Ankeny-Des Moines with DART Route 98. There may be opportunity for increased inter-city public transportation connections in the future.

Figure 32: LEHD Analysis



Freight

Freight activities provide a foundation for regional economy of the AAMPO area, as several critical state and national freight corridors are within the MPO boundary. In addition to the critical highway facilities located within the MPO area, several freight rail lines are operated in the region. This section of the plan will present an overview of the existing highway, rail, and pipeline freight system conditions.

Highway Freight

The efficient movement of goods is contingent upon a reliable freight network that is capable of maintaining multi-modal connections. Within the AAMPO boundary, there are 7 major freight routes that serve the industrial and manufacturing facilities within the region:

- Interstate 35
- U.S. Highway 30
- U.S. Highway 69
- S. Duff Avenue
- S. 16th Street (east of S. Duff Avenue)
- Lincoln Way (east of S. Duff Avenue)

2015 truck traffic counts for Iowa's primary road network were obtained from the Iowa DOT and presented in **Figure 33**. The data reveal that Interstate 35 carries the bulk of the regional truck traffic, with other 5,000 trucks traveling on this road each day in 2015. The next highest truck volume route in the Ames Area was U.S. 30, which carried between 2,500 and 5,000 trucks per day during this same year.

To better understand the expected growth in highway freight activities in the AAMPO region, the FHWA's Freight Analysis Framework Version 4 (FAF 4) database was reviewed. FAF 4 integrates data from several sources to develop a comprehensive picture of freight activities across the United States and major metropolitan areas, as well as forecasts freight movements out to the horizon year of 2045.[8] FAF 4 forecasts estimate truck volumes to increase 113% by the year 2045 while commodity tonnages flowing through the MPO are predicted to rise by 57% in the same year. **Figure 34** presents the estimated 2012 Freight Tonnage Commodity Flows through the MPO boundary.

[8] Freight Analysis Framework Version 4, Federal Highway Administration. https://faf.ornl.gov/fafweb/

Figure 33: 2015 AADTT for the Ames Area MPO's Primary Freight Network

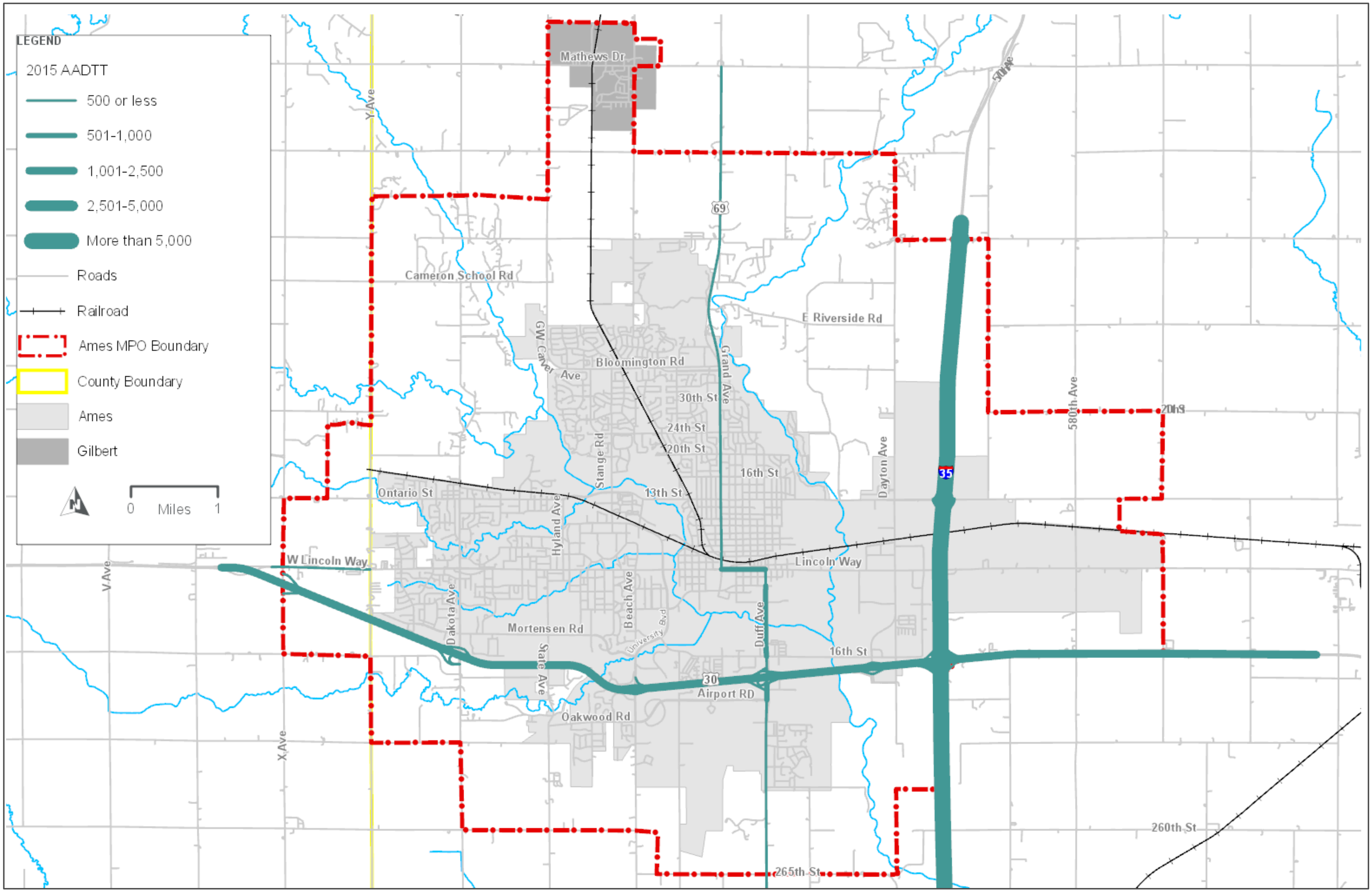
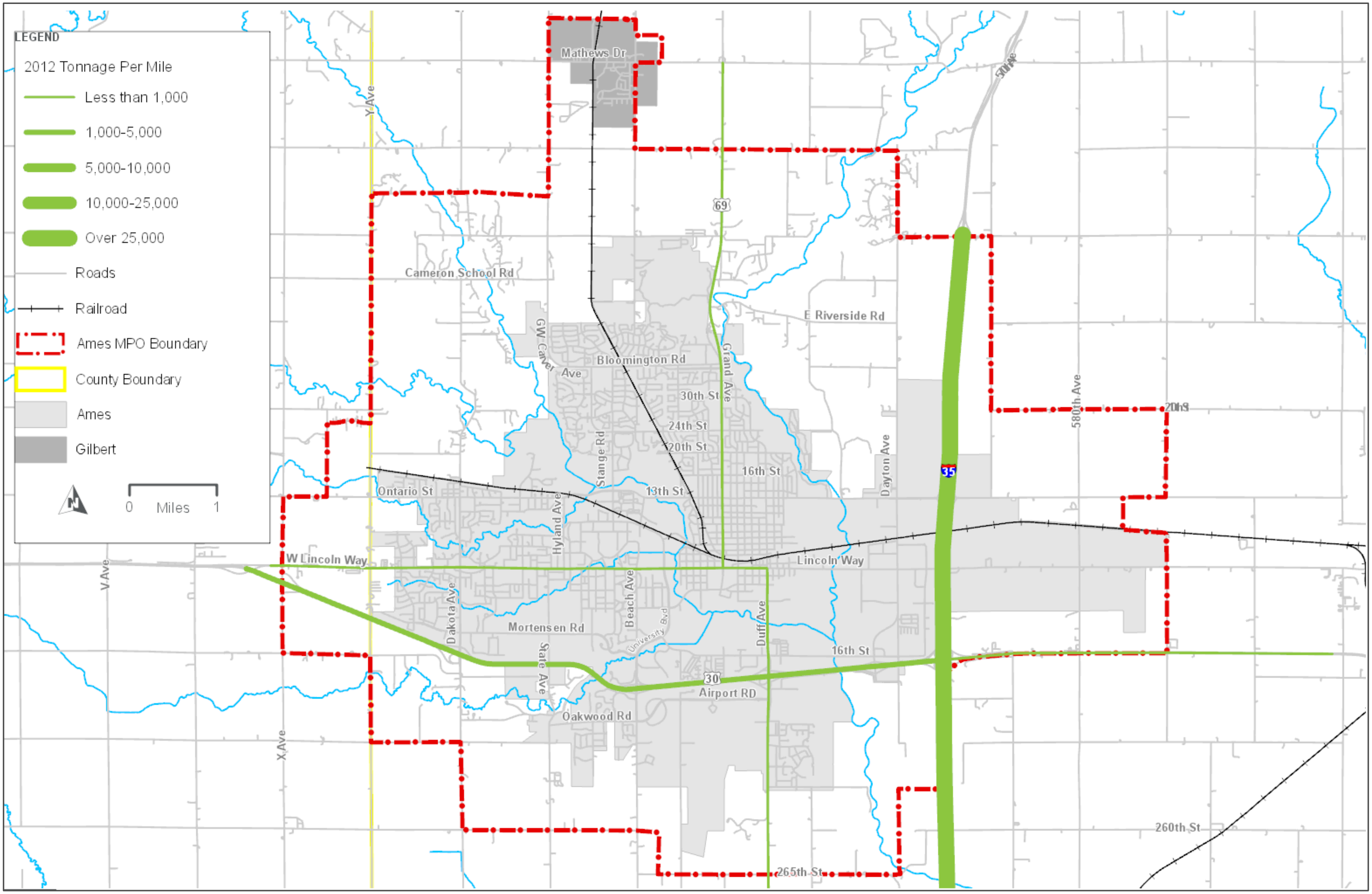


Figure 34: Estimated 2012 Annual Tonnage of Commodity Flows, AAMPO



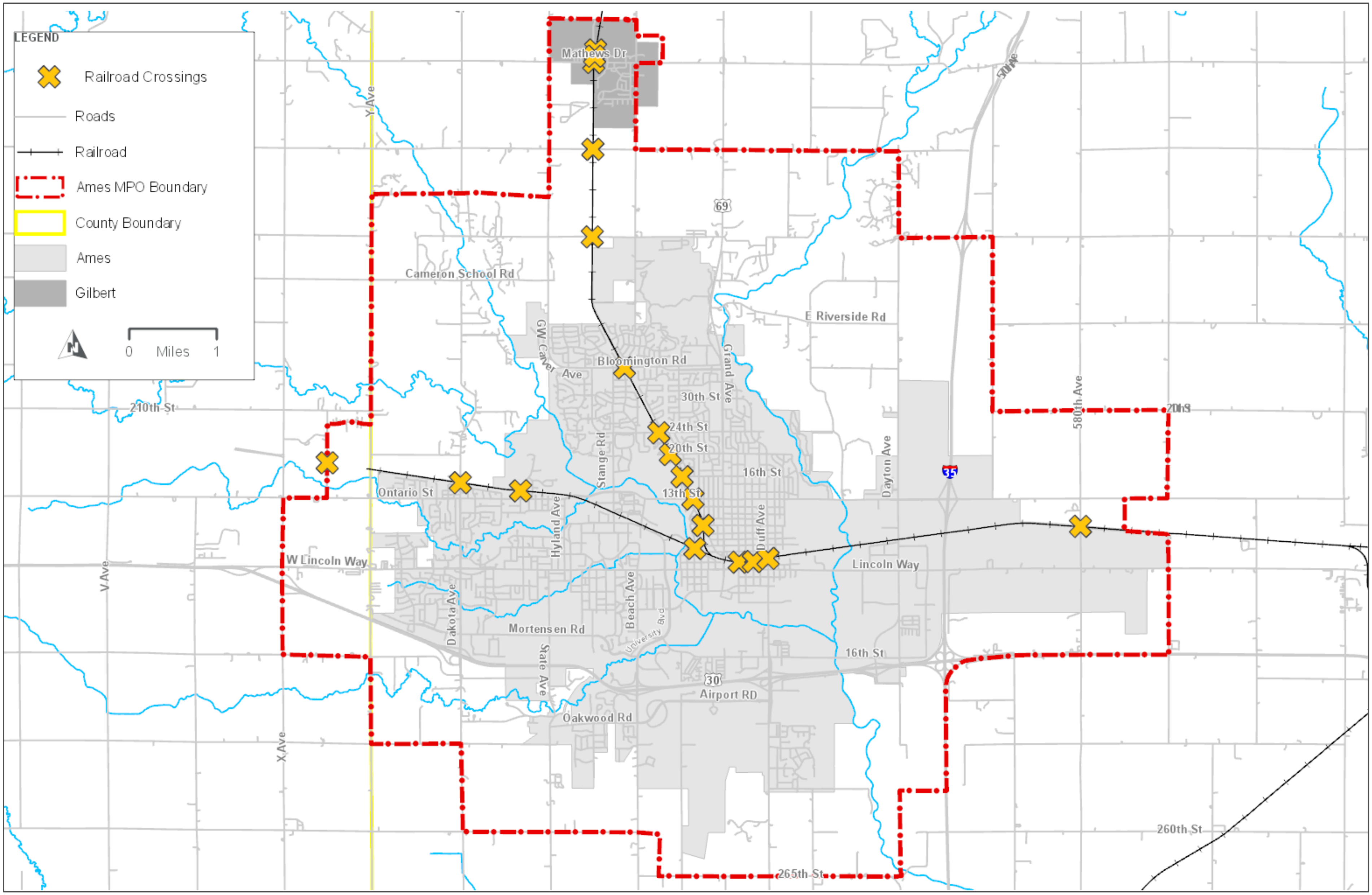
Rail Freight

Union Pacific Railroad (UPRR) operates several freight lines within the AAMPO boundary. The east-west mainline track consists of two tracks that run through the City of Ames, north of Lincoln Way, while the north-south track is a single track that passes through the City of Gilbert and meets the east-west line just west of Grand Avenue and Lincoln Way. **Figure 35** displays the locations of the UPRR lines and the at-grade crossings found in the AAMPO region. **Table 16** contains characteristics of the at-grade stops within the AAMPO boundary, including average number of trains per day, train speed, and crossing-wise AADT.

Table 16: At-Grade Rail Crossing Characteristics, AAMPO

Street Name	Number of Tracks	Trains Per Day	Gates	Flashers	Warning Signs	Pavement Markings	Number of Bells	Raised Median	Max Train Speed	AADT	AADT Year
13th Street	1	2	2	Yes	Yes	Yes	2	No	30	10,600	2015
16th St	1	2	2	Yes	Yes	Yes	2	No	30	1,090	2015
180th St	1	2	0	Yes	Yes	No	0	No	40	30	2015
190th St	1	2	2	Yes	Yes	Yes	2	No	40	1,100	2015
1st St	1	2	0	Yes	Yes	Yes	1	No	40	130	2015
20th St	1	2	2	Yes	Yes	Yes	2	No	30	3,340	2015
24th St	1	2	2	Yes	Yes	Yes	2	No	30	9,300	2011
2nd St	1	2	0	Yes	Yes	Yes	1	No	40	180	2015
9th St	1	2	2	Yes	Yes	Yes	2	No	30	1,070	2015
Bloomington Rd	1	2	2	Yes	Yes	Yes	2	Yes	40	9,400	2015
Mathews St	1	2	0	Yes	Yes	Yes	1	No	40	2,100	2015
Clark Ave	2	60	2	Yes	Yes	Yes	1	Yes	40	4,930	2015
Duff Ave	2	60	4	Yes	Yes	Yes	4	No	40	13,600	2015
Kellogg Ave	2	60	2	Yes	Yes	Yes	1	Yes	40	4,050	2011
North Dakota Ave	2	60	2	Yes	Yes	Yes	2	Yes	70	1,290	2015
North Hazel Ave	2	60	2	Yes	Yes	Yes	1	Yes	70	1,360	2015
Scholl Rd	2	60	2	Yes	Yes	Yes	2	Yes	70	190	2015
XL Ave	2	60	2	Yes	Yes	No	2	No	70	50	2011
580th Ave	3	60	2	Yes	Yes	Yes	1	No	70	860	2015

Figure 35: Rail lines and At-Grade Crossings, AAMPO Region



Pipelines

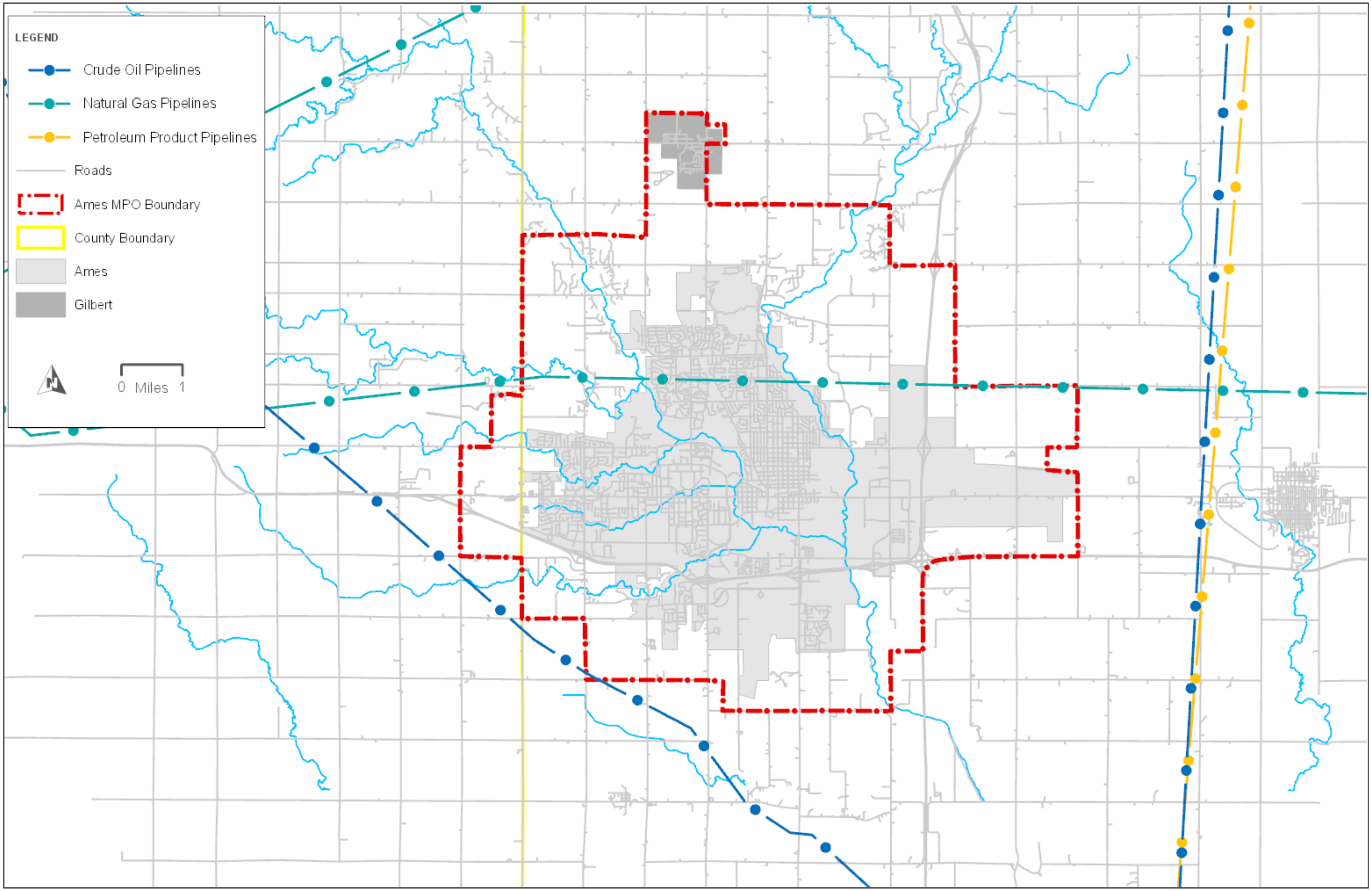
Pipelines are a critical transportation mode that are often overlooked. According to the 2017 State Freight Plan published by the Iowa DOT, there are over 41,000 miles of active pipelines in the state, with the majority of these facilities carrying natural gas, liquefied petroleum, and anhydrous ammonia for residential and industrial use.

Currently, there are 195.12 total miles of active pipelines in Story County, with 99.23 miles dedicated to gas transmission and the remaining 95.89 miles used for hazardous liquid mileage. Meanwhile in neighboring Boone County, there are 282.12 miles of active pipelines—253.32 miles of gas transmission pipeline and 28.81 miles of hazardous liquid pipeline.[9]

Figure 36 depicts the location of these pipeline locations within the AAMPO boundary.

[9] National Pipeline Mapping System, Active Pipeline Database

Figure 36: Pipelines within the AAMPO Boundary



Existing Regional Connections

While private vehicle travel is the predominate mode within the AAMPO area, the reliability of the local transportation system is contingent upon its ability to remain balanced and maintain connections with other transportation modes. This section of the plan discusses the existing regional connections, including rail, aviation, and waterways.

Passenger Rail

While Union Pacific operates several freight lines in the AAMPO region, there are currently no passenger rail lines in operation. However, the Boone & Scenic Valley Railroad operates several seasonal passenger lines, such as the Wolf Dinner Train and the Santa Express. These lines operate between the City of Boone and Fraser, IA.

Amtrak offers passenger rail service from their stations located in Creston, IA and Osceola IA; the Creston station is located 106 miles south of the City of Ames while the Osceola station is located 85 miles to the south.

Aviation

Aviation services within the AAMPO boundary are provided by the Ames Municipal Airport, which is located two miles southeast of the City of Ames. While the airport is open to the public, the only service offered is general aviation; the nearest facility offering commercial aviation is the Des Moines International Airport, located approximately 40 miles south of the City of Ames. Executive Express, a shuttle service operated from the Des Moines International Airport, offers regular service to and from the City of Ames.

The Ames Municipal Airport is in the National Plan of Integrated Airport Systems (NPIAS), which is a biennial report developed by the Federal Aviation Administration that plans the five-year development needs for airports within the national system.[10] Due to eligibility in the NPIAS, the Ames Municipal Airport is in consideration for being a recipient of FAA funding for facility improvements.

Airport operational statistics are available from Airnav.com. The main operational statistics for the Ames Municipal Airport include:

- 78 aircraft based on the field
  - 53 single engine airplanes
  - 7 multi-engine airplanes
  - 2 jet airplanes
  - 13 glider airplane
  - 3 ultralight airplanes
- 92 aircraft operations per day
  - 56% transient general aviation
  - 37% local general aviation
  - 5% air taxi
  - 1% military

[10] Iowa Aviation System Plan, https://iowadot.gov/aviation/studiesreports/technicalreport/4%20-%20Chapter%201.pdf

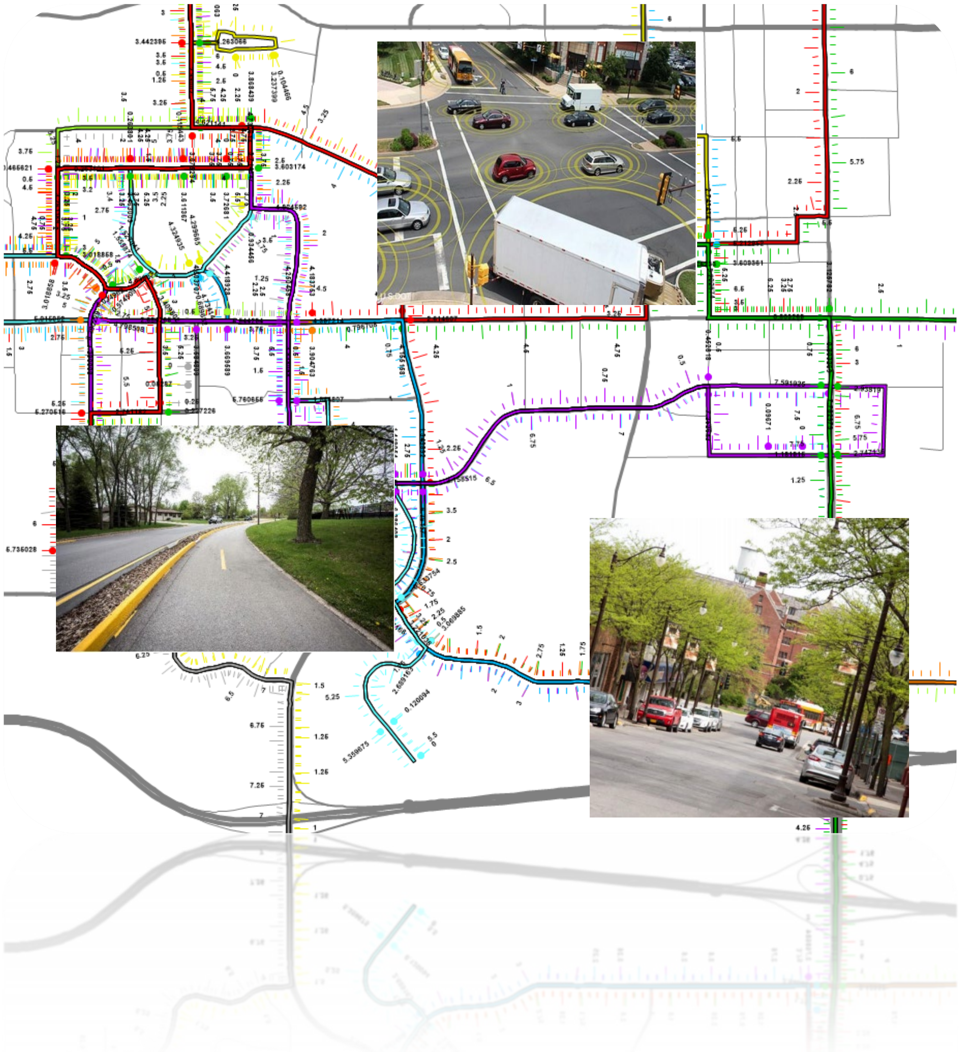
Waterways

A notable recreational waterway located in the AAMPO region is the Skunk River Water Trail. Beginning in Story City and passing through the City of Ames, this popular water trail provides a scenic route for paddlers of all skill levels. Numerous access points are found within the AAMPO boundary and offers residents an outdoor recreation activity for the spring and summer months.

Alternate Mobility Providers

Travelers within the AAMPO region have a slate of mobility options to choose from in addition to public transit and the bicycle and pedestrian network. Uber and Lyft, two popular ridehailing services, operate in Ames and allow users to connect with drivers via a smart phone application. The carsharing service Zipcar operates on the Iowa State University campus and is aimed towards providing students and university staff with a low-cost mobility option through providing vehicles that can be rented on an hourly basis; these vehicles are rented at an on-campus location and must be returned to the same location. Zipcar is available to the public, but users must be 18 years or older and hold a valid driver's license. Cyclone Cab provides a traditional taxi service within the City of Ames.

Appendix C
Travel Demand Model Documentation



2045 Ames Area Metropolitan Planning Organization Model Validation and Analysis

Contents

Process Overview

MPO Overview

The Ames Area MPO (AAMPO) provides a regional forum to ensure coordination between the public and local, state, and federal agencies in regard to planning issues and to prepare transportation plans and programs. The main responsibilities of the MPO is to develop both long and short-range multi-modal transportation plans from which projects are selected and approved for federal funding based upon regional priorities and public input.

The AAMPO travel demand model (TDM) is used to analyze the roadway transportation system of the metropolitan planning area and to test specific land use or roadway changes in the short-term or long-term. The primary purpose of the travel model is to support the development of the long-range transportation plan. The model has a base year of 2015, interim years of 2025, 2035, and a horizon year of 2045.

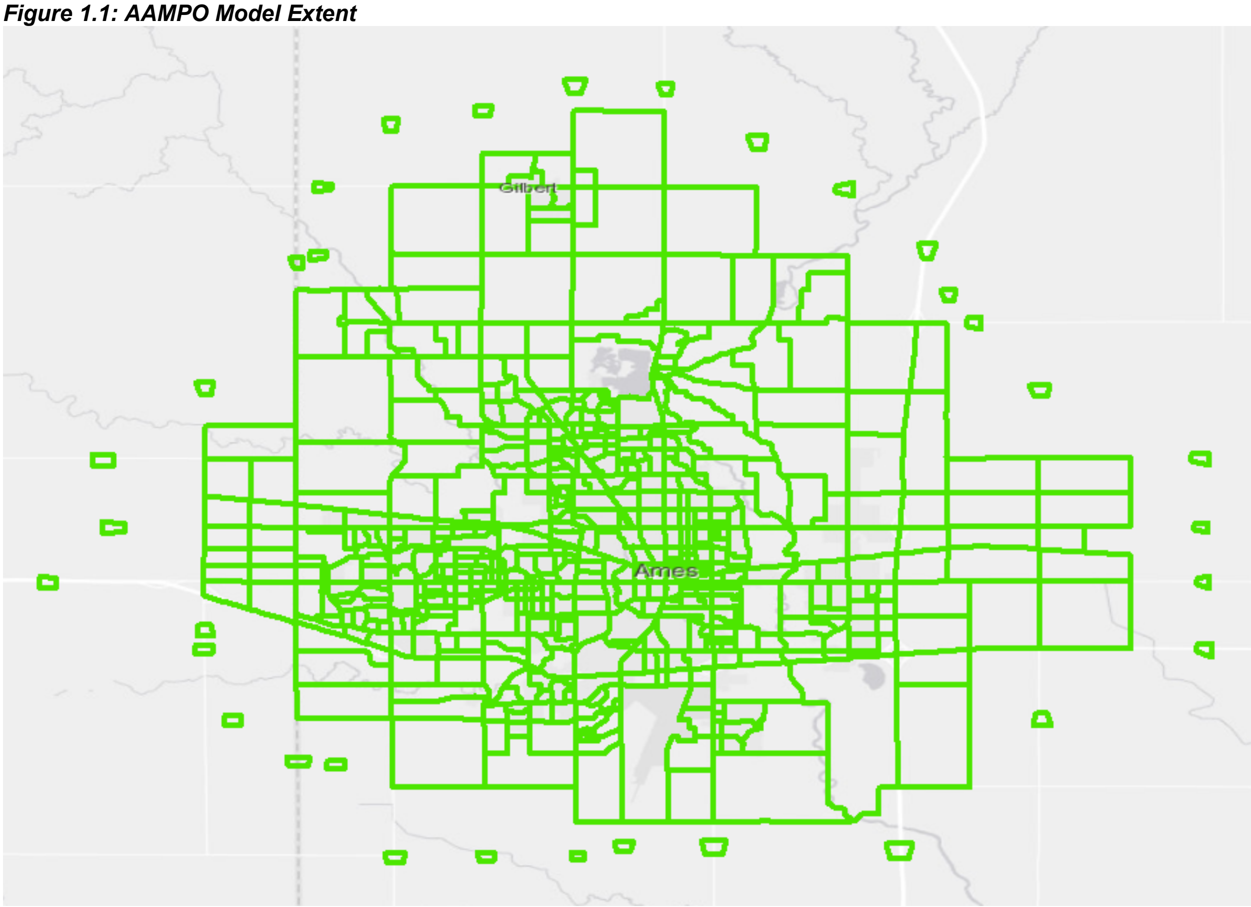
The Ames Area Metropolitan Planning Organization (AAMPO) is located in central Iowa near the junction of Interstate 35 and US Highway 30, and along the Union Pacific main line. The planning area includes Ames, Iowa, the town of Gilbert, and portions of Story and Boone County. One of the most distinguishing features of the AAMPO planning area is the presence of Iowa State University, with an enrollment of approximately 36,000 students and 13,000 full-time-equivalent employees in 2015.

The City of Ames is the largest jurisdiction in the AAMPO area with a population of approximately 67,000. The other community within the AAMPO planning area, Gilbert, is a smaller town with a population of just over 1,000 in 2010. One unique feature within Gilbert is the presence of a new High School that was built in 2012 to accommodate the growth in population on the north side of Ames. All households north of Bloomington Road in Ames are part of the Gilbert School District.

The majority of the area surrounding the AAMPO planning area is rural. However, south of Ames along Interstate 35 is the Des Moines metropolitan area, which includes the quickly growing town of Ankeny at the northern outskirts. There are a significant and growing number of trips between Ames and the Des Moines metropolitan area, particularly on Interstate 35.

The extent of the model boundary and transportation analysis zones (TAZ) is shown in **Figure 1.1**.

Figure 1.1: AAMPO Model Extent



Federal requirements mandate AAMPO develop a coordinated Long-Range Transportation Plan to document deficiencies and needs of the region's transportation system, and to establish a technical process to select projects and expend federal transportation funds. The TDM is a state-of-the-practice tool used in the transportation planning sector to identify transportation needs and deficiencies, as well as forecast the impact of growth and development in the metropolitan area.

Travel Demand Model Overview

A TDM is an important tool for transportation planning. The TDM estimates and distributes an area's trips across its transportation network. The modeling process attempts to replicate existing travel patterns and traffic levels, and forecast future travel patterns and traffic volumes based on anticipated population and employment growth. One of the primary purposes of the TDM is to support the development of the MPO's Long-Range Transportation Plan. The model can be used to identify potential deficiencies in the transportation network, and to estimate the impacts of various scenarios such as adding new roads, changing the capacity of existing roads, adding more transit routes, or removing roads.

To estimate and evaluate future transportation deficiencies, a new TDM for the 2045 Long-Range Transportation Plan (LRTP) was built. The updated TDM has a base year of 2015 and a horizon year of 2045. The previous model had a base year of 2010 and a horizon year of 2040. Interim forecast year land use information was updated for 2030, and other interim year values can be interpolated during the model runtime. The model was completely rebuilt using the Iowa DOT's Iowa Standardized Model Structure (ISMS) which is further detailed in the next section.

A Model Project Team (MPT) led the development and calibration of the model. An MPT consists of members from the MPO staff, DOT staff, and any consultants hired to assist with the model update.

Iowa Standardized Model Structure

The AAMPO TDM is based on the Iowa Standardized Model Structure (ISMS). ISMS, developed by the Iowa DOT, provides a standardized yet scalable travel demand modeling architecture for use by all MPO's across Iowa. Past MPO models have relied on employment data from private vendors to estimate non-residential economic activity. The ISMS architecture uses parcel data as an input as it is generally a more accurate and widely-available data source.

Additional inputs to the MPO 2045 TDM include U.S. Census data; National Household Travel Survey (NHTS) Add-on data from nearby MPOs for the Des Moines and Waterloo-Cedar Falls areas; K-12 school enrollment; city existing and future land use information; traffic signal and stop sign locations; Iowa statewide travel model data; Iowa DOT RAMS road network data; and input from communities on employment and population and non-residential growth locations. The model network includes all non-local Federal Functional Classification (FFC) roads in the MPO area and some local roads critical for connectivity. The Iowa DOT's 2015 traffic counts were used as the benchmark for replicating existing traffic levels.

The traffic volumes in the model are based on the area's population and employment activities which are broken into 539 internal and 33 external Traffic Analysis Zones (TAZs), the basic geographic unit of the TDM. Each internal TAZ includes base year population and non-residential land use data. Local planners then assigned their jurisdiction's anticipated growth to the TAZs out to a horizon year of 2045. TAZ boundaries are typically manmade or natural features that divide the landscape. Each TAZ includes a centroid, which is usually placed near the center of activity, and centroid connectors, which are links that connect the centroid to the network.

The modeling process includes four steps, each addressing a separate element of travel:

- **Trip generation** – How many trips occur in an area?
- **Trip distribution** – Where trips are coming from and going to?
- **Mode choice** – What mode of transportation trips are using?
- **Trip assignment** – What routes are used?

The distribution of trips in the TDM is based on a traditional gravity model formula which assumes that the amount of travel between two TAZs is based on the relative attractiveness between the origin and the destination. A gravity model in physics is a function of mass and distance. When applied to TDMs, the gravity model's "mass" or attractiveness is measured by the number of complementary trips in a TAZ, and the attractiveness between the two TAZs decreases as the distance between them increases. The TDM assigns trips to segments of the road network using Multi-Modal, Multi-Class Assignment (MMA), a process which allows for unique trip tables to be assigned to unique sets of links within the network such as truck trip tables assigned to links that do not restrict truck movements.

The ISMS TDM generates reports in HTML format that are used to diagnose and document the model's performance. Performance reports provide summaries of trip generation, trip distribution, mode choice, assigned trips, daily assignment, and assignment speed. Network statistics in the report include, but are not limited to: Vehicle Hours Traveled (VHT), Vehicle Miles Traveled (VMT), congested VHT and VMT, average trip lengths, and person trip productions and attractions.

The ISMS model framework is built for use on the Caliper TransCAD software platform, Version 7.0. The run process is automated using an add-in tool within TransCAD. Model scenarios are executed and managed using the add-in tool. The ISMS add-in also allows for batch model runs. Different scenarios using a different combination of inputs can be set up and run in series automatically.

For more details on the ISMS process and user-guide information, please refer to the ISMS General Travel Demand Modeling/Forecasting Protocols and Procedures Manual.

Description of ISMS Model Steps

Each step in the ISMS model architecture involves data. This model documentation report mirrors the ISMS Manual's Architecture Details chapter. Each step documents the data in one of six ways:

- **Input** – Data used directly in the model step to generate outputs for subsequent use in the demand modeling process. The source of the data varies depending upon the specific step.
- **Estimation** – Data used to develop the architecture or to estimate parameters used in the modeling step.
- **Validation** – Data that is used to measure the output of the model step for reasonableness.
- **Output** – Data developed by the ISMS model, either as final output or intermediate files.
- **Calibration** – Steps involved to adjust data so that final results were reasonable and accurate.
- **Future Considerations** - Elements that may be modified as part of a future year analysis run.

AAMPO Model Architecture Details

Trip Purposes

Travel characteristics vary depending upon the reason trips are made. Some types of trips can only fulfill the intended purpose of that trip at very specific locations, such as travel to schools. Other types of trips are less sensitive to the distance between the origin point and the choices of destination, such as work trips. The ISMS process uses 14 detailed trip purposes, allowing for development of specific parameters to better model observed differences between unique travel needs. The AAMPO model uses all 14 trip purposes in its structure. **Table 2.2.1** defines the trip purposes.

Table 2.2.1: Trip Purposes

Generic Purpose	Specific Purpose	Description
Home-based work	Home-based work low income (HBWL)	Matches low-income workers to low-income jobs in trip distribution.
	Home-based work medium income (HBWM)	Matches medium-income workers to medium-income jobs in trip distribution.
	Home-based work high income (HBWH)	Matches high income-workers to high-income jobs in trip distribution.
Home-based non-work	Home-based K-12 school (HBSC)	Trips to or from K-12 schools.
	Home-based shopping (HBSH)	Separates retail land uses that generate higher volumes of trips per unit.
	Home-based other (HBO)	Other trips with one end of the trip at the home.
Non-home based	Non-home based (NHB)	Neither trip end as at the homeplace.
Special purposes	University (UNIV)	Large generator with unique generation, parking, temporal and modal characteristics.
	Hospital (HOSP)	Unique generators that draws trips from throughout and beyond the region.
	Airport (APRT)	Unique generator that draws trips from throughout and beyond the region.
	Regional recreation (RREC)	Unique generators that draw trips from throughout and beyond the region.
	Hotel (HOT)	Unique generators that interact with both external stations and internal activities.
Trucks	Single-unit truck (SU)	Incorporates freight trips
	Combination truck (COMBO)	Incorporates freight trips

Input Data

Trip purposes do not require input data directly, only a decision about which trip purposes best represent travel in Ames.

Estimation Data

Estimating the need of trip purposes requires analyzing a detailed household travel survey. The National Household Travel Survey (NHTS) is the typical survey instrument for assessing various demand model parameters including trip purposes. AAMPO does not have a local household travel survey available to justify any variations from the ISMS trip purposes.

Validation Data

Since the ISMS default trip purposes were used, no external validation datasets were needed.

Output Data

Trip purpose definitions do not directly result in outputs.

Calibration

No formal calibration is required. Non-ISMS models for communities the size of AAMPO typically do not have more than four or five trip purposes. The 14 ISMS trip purposes should sufficiently cover the types of trips made in the AAMPO area for modeling purposes.

Future year Considerations

No changes in trip purposes are made in future year analyses.

Time of Day

Each land use has unique travel characteristics, including the times during the day in which travel to and from the land use occurs. Shopping centers have a significant portion of their activity in the PM period, while an industrial manufacturing plant may have three active work shifts with activity spread throughout the 24-hour day. Select land uses, such as office parks, have heavy weekday travel and little weekend activity, while religious centers have heavy weekend activity and limited weekday activity.

The ISMS travel demand modeling process subdivides daily person trip activities and various network elements into four time periods: AM (6:00-8:59), mid-day (9:00-14:59), PM (15:00-17:59), and off-peak (18:00-5:59). The ISMS architecture conducts time of day analysis as part of trip generation to take advantage of specific temporal characteristics of land use. **Table 2.3.1** shows the factors used to disaggregate daily trip activity to the four time periods for each land use code for both weekday and weekend time frames, which were borrowed from the 2017 Des Moines Area National Household Travel Survey (NHTS) Add-on. Please refer to the ISMS Manual for details on the land use codes (LUC)[1].

[1] Pw:\\projectwise.dot.int.lan:PWMain\Documents\Planning\Systems Planning\TrafficModeling\+ISMS\Manual\

Table 2.3.1: Time of Day Percentages for Attractions by Land Use and Day of Week (Please Refer to the ISMS Manual Appendix I for LUC Details)

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
0	AM	65.08%	100.00%	2.98%	28.96%	18.82%	12.78%	0.00%	12.84%	11.38%	8.53%
	PM	6.34%	0.00%	25.43%	16.67%	18.24%	0.00%	0.00%	6.74%	8.82%	19.71%
	OP	12.96%	0.00%	46.21%	23.63%	11.73%	12.78%	0.00%	14.92%	20.97%	35.20%
	MD	15.62%	0.00%	25.37%	30.73%	51.21%	74.44%	100.00%	65.50%	58.83%	36.56%
10	AM	15.99%	26.04%	6.18%	10.25%	8.57%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	51.29%	55.70%	18.73%	30.97%	22.90%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	21.19%	0.00%	35.28%	25.29%	19.40%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	11.53%	18.26%	39.81%	33.49%	49.13%	37.12%	0.00%	58.78%	47.33%	46.08%
11	AM	23.15%	34.72%	5.07%	14.29%	14.66%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	38.86%	40.93%	38.92%	41.22%	45.87%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	25.09%	0.00%	16.53%	15.70%	5.48%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	12.91%	24.35%	39.48%	28.79%	34.00%	37.12%	0.00%	58.78%	47.33%	46.08%
19	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
20	AM	14.02%	0.00%	0.00%	4.67%	0.00%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.23%	100.00%	0.00%	21.65%	9.71%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	30.76%	0.00%	52.47%	27.74%	0.00%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	0.00%	0.00%	47.53%	45.94%	90.29%	37.12%	0.00%	58.78%	47.33%	46.08%
21	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
22	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
23	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
24	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
25	AM	9.84%	6.14%	6.14%	7.37%	6.14%	1.93%	0.00%	1.93%	1.93%	1.93%
	PM	9.84%	20.50%	20.50%	16.95%	20.50%	19.05%	0.00%	19.05%	19.05%	19.05%
	OP	49.87%	24.40%	24.40%	32.89%	24.40%	64.60%	100.00%	64.60%	64.60%	64.60%
	MD	30.45%	48.96%	48.96%	42.79%	48.96%	14.42%	0.00%	14.42%	14.42%	14.42%
26	AM	0.00%	0.00%	0.00%	26.19%	0.00%	0.00%	0.00%	0.00%	26.19%	0.00%
	PM	0.00%	0.00%	0.00%	20.39%	0.00%	0.00%	0.00%	0.00%	20.39%	0.00%
	OP	0.00%	0.00%	0.00%	22.46%	0.00%	0.00%	0.00%	0.00%	22.46%	0.00%
	MD	0.00%	0.00%	0.00%	30.96%	0.00%	0.00%	0.00%	0.00%	30.96%	0.00%
27	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
28	AM	13.39%	34.72%	9.82%	11.01%	9.82%	7.46%	0.00%	5.88%	5.60%	3.47%
	PM	55.55%	40.93%	18.00%	30.52%	18.00%	28.50%	0.00%	18.40%	27.94%	36.91%
	OP	14.46%	0.00%	36.06%	28.86%	36.06%	26.92%	100.00%	16.94%	19.13%	13.55%
	MD	16.61%	24.35%	36.12%	29.62%	36.12%	37.12%	0.00%	58.78%	47.33%	46.08%
30	AM	29.34%	9.69%	9.69%	16.24%	9.69%	13.36%	0.00%	0.00%	6.99%	7.61%
	PM	28.84%	26.43%	26.43%	27.23%	26.43%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	21.48%	21.90%	21.90%	21.76%	21.90%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	20.33%	41.98%	41.98%	34.76%	41.98%	17.07%	0.00%	100.00%	55.23%	48.62%
31	AM	29.34%	9.69%	9.69%	16.24%	9.69%	13.36%	0.00%	18.57%	13.18%	7.61%
	PM	28.84%	26.43%	26.43%	27.23%	26.43%	25.43%	0.00%	18.57%	24.41%	29.22%
	OP	21.48%	21.90%	21.90%	21.76%	21.90%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	20.33%	41.98%	41.98%	34.76%	41.98%	17.07%	0.00%	62.86%	42.85%	48.62%
32	AM	33.71%	33.71%	12.98%	23.79%	24.68%	13.36%	0.00%	0.00%	6.99%	7.61%
	PM	31.42%	31.42%	29.80%	30.93%	31.58%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	20.45%	20.45%	0.00%	8.37%	4.66%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	14.43%	14.43%	57.22%	36.91%	39.08%	17.07%	0.00%	100.00%	55.23%	48.62%
33	AM	33.71%	33.71%	12.98%	23.79%	24.68%	13.36%	0.00%	0.00%	6.99%	7.61%
	PM	31.42%	31.42%	29.80%	30.93%	31.58%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	20.45%	20.45%	0.00%	8.37%	4.66%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	14.43%	14.43%	57.22%	36.91%	39.08%	17.07%	0.00%	100.00%	55.23%	48.62%
34	AM	33.71%	33.71%	12.98%	23.79%	24.68%	13.36%	0.00%	0.00%	6.99%	7.61%
	PM	31.42%	31.42%	29.80%	30.93%	31.58%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	20.45%	20.45%	0.00%	8.37%	4.66%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	14.43%	14.43%	57.22%	36.91%	39.08%	17.07%	0.00%	100.00%	55.23%	48.62%
35	AM	33.71%	33.71%	12.98%	23.79%	24.68%	13.36%	0.00%	0.00%	6.99%	7.61%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	PM	31.42%	31.42%	29.80%	30.93%	31.58%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	20.45%	20.45%	0.00%	8.37%	4.66%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	14.43%	14.43%	57.22%	36.91%	39.08%	17.07%	0.00%	100.00%	55.23%	48.62%
36	AM	33.71%	33.71%	12.98%	23.79%	24.68%	13.36%	0.00%	0.00%	6.99%	7.61%
	PM	31.42%	31.42%	29.80%	30.93%	31.58%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	20.45%	20.45%	0.00%	8.37%	4.66%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	14.43%	14.43%	57.22%	36.91%	39.08%	17.07%	0.00%	100.00%	55.23%	48.62%
40	AM	0.00%	0.00%	0.00%	16.37%	0.00%	0.00%	0.00%	0.00%	8.00%	0.00%
	PM	0.00%	0.00%	0.00%	30.78%	0.00%	0.00%	0.00%	0.00%	26.00%	0.00%
	OP	0.00%	0.00%	0.00%	27.41%	0.00%	0.00%	0.00%	0.00%	22.00%	0.00%
	MD	0.00%	0.00%	0.00%	25.44%	0.00%	0.00%	0.00%	0.00%	44.00%	0.00%
41	AM	29.34%	9.69%	9.69%	16.24%	9.69%	13.36%	0.00%	0.00%	6.99%	7.61%
	PM	28.84%	26.43%	26.43%	27.23%	26.43%	25.43%	0.00%	0.00%	18.22%	29.22%
	OP	21.48%	21.90%	21.90%	21.76%	21.90%	44.14%	0.00%	0.00%	19.57%	14.55%
	MD	20.33%	41.98%	41.98%	34.76%	41.98%	17.07%	0.00%	100.00%	55.23%	48.62%
42	AM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	OP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
43	AM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	OP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
44	AM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	OP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
45	AM	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
	PM	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
	OP	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
	MD	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
50	AM	19.61%	0.00%	25.96%	19.17%	11.92%	13.09%	0.00%	11.74%	11.08%	8.40%
	PM	29.80%	0.00%	48.83%	36.14%	29.79%	20.00%	0.00%	17.21%	19.10%	20.08%
	OP	22.85%	0.00%	7.98%	11.28%	3.01%	29.80%	0.00%	17.39%	22.92%	21.56%
	MD	27.73%	100.00%	17.23%	33.41%	55.27%	37.11%	0.00%	53.65%	46.91%	49.96%
51	AM	16.73%	0.00%	8.19%	10.63%	6.96%	13.09%	0.00%	11.74%	11.08%	8.40%
	PM	29.41%	53.83%	31.99%	30.24%	29.32%	20.00%	0.00%	17.21%	19.10%	20.08%
	OP	29.72%	46.17%	21.82%	22.68%	16.52%	29.80%	0.00%	17.39%	22.92%	21.56%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	MD	24.14%	0.00%	38.01%	36.45%	47.20%	37.11%	0.00%	53.65%	46.91%	49.96%
52	AM	25.66%	0.00%	0.28%	11.69%	9.13%	15.00%	0.00%	5.31%	7.11%	1.03%
	PM	43.00%	53.83%	27.00%	32.26%	26.76%	24.28%	0.00%	29.48%	22.26%	13.01%
	OP	24.38%	46.17%	48.29%	28.17%	11.83%	31.88%	0.00%	10.99%	17.56%	9.81%
	MD	6.96%	0.00%	24.43%	27.89%	52.28%	28.84%	0.00%	54.22%	53.07%	76.14%
53	AM	19.50%	0.00%	23.37%	15.56%	3.81%	15.00%	0.00%	5.31%	7.11%	1.03%
	PM	39.62%	53.83%	5.73%	19.56%	13.32%	24.28%	0.00%	29.48%	22.26%	13.01%
	OP	30.50%	46.17%	31.54%	27.33%	19.94%	31.88%	0.00%	10.99%	17.56%	9.81%
	MD	10.38%	0.00%	39.36%	37.56%	62.93%	28.84%	0.00%	54.22%	53.07%	76.14%
55	AM	34.93%	9.97%	9.97%	17.76%	8.38%	15.00%	0.00%	5.31%	7.11%	1.03%
	PM	10.40%	9.76%	9.76%	23.38%	49.99%	24.28%	0.00%	29.48%	22.26%	13.01%
	OP	32.04%	0.00%	0.00%	10.68%	0.00%	31.88%	0.00%	10.99%	17.56%	9.81%
	MD	22.63%	80.27%	80.27%	48.18%	41.63%	28.84%	0.00%	54.22%	53.07%	76.14%
56	AM	12.17%	0.00%	14.75%	15.49%	19.55%	15.00%	0.00%	5.31%	7.11%	1.03%
	PM	13.62%	0.00%	26.98%	20.79%	21.78%	24.28%	0.00%	29.48%	22.26%	13.01%
	OP	63.47%	100.00%	30.31%	37.62%	19.07%	31.88%	0.00%	10.99%	17.56%	9.81%
	MD	10.74%	0.00%	27.96%	26.10%	39.60%	28.84%	0.00%	54.22%	53.07%	76.14%
57	AM	10.56%	10.56%	3.27%	6.19%	4.75%	1.08%	0.00%	1.08%	4.05%	10.00%
	PM	45.11%	45.11%	21.25%	28.67%	19.66%	29.44%	0.00%	29.44%	27.20%	22.71%
	OP	10.23%	10.23%	38.11%	24.58%	25.39%	22.69%	0.00%	22.69%	19.05%	11.77%
	MD	34.10%	34.10%	37.37%	40.56%	50.20%	46.80%	0.00%	46.80%	49.71%	55.53%
58	AM	26.87%	26.87%	4.68%	12.24%	5.18%	11.76%	0.00%	11.76%	8.20%	1.08%
	PM	24.36%	24.36%	30.97%	28.66%	30.64%	14.76%	0.00%	14.76%	17.25%	22.23%
	OP	30.65%	30.65%	36.47%	28.19%	17.43%	33.83%	0.00%	33.83%	28.43%	17.62%
	MD	18.12%	18.12%	27.88%	30.92%	46.75%	39.64%	0.00%	39.64%	46.12%	59.07%
59	AM	18.63%	100.00%	1.50%	8.02%	3.93%	3.87%	3.87%	3.87%	3.87%	3.87%
	PM	16.07%	0.00%	12.73%	21.82%	36.66%	3.56%	3.56%	3.56%	3.56%	3.56%
	OP	42.16%	0.00%	30.07%	29.37%	15.88%	10.33%	10.33%	10.33%	10.33%	10.33%
	MD	23.15%	0.00%	55.69%	40.79%	43.54%	82.23%	82.23%	82.23%	82.23%	82.23%
60	AM	44.92%	52.05%	6.78%	24.75%	22.55%	55.72%	0.00%	15.00%	25.17%	4.81%
	PM	35.55%	37.36%	10.79%	19.86%	13.24%	26.22%	0.00%	7.62%	18.05%	20.30%
	OP	6.62%	0.00%	37.56%	16.58%	5.57%	0.00%	0.00%	17.71%	8.16%	6.78%
	MD	12.91%	10.59%	44.87%	38.81%	58.64%	18.06%	0.00%	59.67%	48.61%	68.11%
61	AM	59.07%	59.07%	3.31%	21.89%	3.31%	55.72%	0.00%	15.00%	25.17%	4.81%
	PM	40.93%	40.93%	33.16%	35.75%	33.16%	26.22%	0.00%	7.62%	18.05%	20.30%
	OP	0.00%	0.00%	37.49%	24.99%	37.49%	0.00%	0.00%	17.71%	8.16%	6.78%
	MD	0.00%	0.00%	26.04%	17.36%	26.04%	18.06%	0.00%	59.67%	48.61%	68.11%
62	AM	53.31%	54.56%	0.00%	31.37%	40.80%	20.92%	20.92%	20.92%	20.92%	20.92%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	PM	33.16%	45.44%	0.00%	20.57%	28.54%	50.23%	50.23%	50.23%	50.23%	50.23%
	OP	5.98%	0.00%	82.43%	30.46%	2.99%	4.40%	4.40%	4.40%	4.40%	4.40%
	MD	7.55%	0.00%	17.57%	17.60%	27.67%	24.45%	24.45%	24.45%	24.45%	24.45%
63	AM	37.67%	37.67%	2.21%	14.03%	2.21%	37.67%	37.67%	2.21%	14.03%	2.21%
	PM	21.03%	21.03%	61.16%	47.79%	61.16%	21.03%	21.03%	61.16%	47.79%	61.16%
	OP	21.29%	21.29%	10.00%	13.76%	10.00%	21.29%	21.29%	10.00%	13.76%	10.00%
	MD	20.00%	20.00%	26.62%	24.42%	26.62%	20.00%	20.00%	26.62%	24.42%	26.62%
64	AM	17.46%	17.46%	2.02%	13.45%	20.86%	37.67%	37.67%	2.21%	14.03%	2.21%
	PM	26.19%	26.19%	31.82%	26.00%	20.00%	21.03%	21.03%	61.16%	47.79%	61.16%
	OP	43.78%	43.78%	9.98%	17.92%	0.00%	21.29%	21.29%	10.00%	13.76%	10.00%
	MD	12.57%	12.57%	56.17%	42.63%	59.14%	20.00%	20.00%	26.62%	24.42%	26.62%
65	AM	17.46%	17.46%	2.02%	9.49%	8.98%	7.66%	7.66%	7.66%	7.66%	7.66%
	PM	26.19%	26.19%	31.82%	29.78%	31.32%	14.26%	14.26%	14.26%	14.26%	14.26%
	OP	43.78%	43.78%	9.98%	20.91%	8.96%	14.46%	14.46%	14.46%	14.46%	14.46%
	MD	12.57%	12.57%	56.17%	39.83%	50.74%	63.63%	63.63%	63.63%	63.63%	63.63%
66	AM	59.07%	59.07%	3.31%	21.89%	3.31%	7.66%	7.66%	7.66%	7.66%	7.66%
	PM	40.93%	40.93%	33.16%	35.75%	33.16%	14.26%	14.26%	14.26%	14.26%	14.26%
	OP	0.00%	0.00%	37.49%	24.99%	37.49%	14.46%	14.46%	14.46%	14.46%	14.46%
	MD	0.00%	0.00%	26.04%	17.36%	26.04%	63.63%	63.63%	63.63%	63.63%	63.63%
67	AM	13.75%	13.75%	2.83%	6.47%	2.83%	13.75%	13.75%	2.83%	6.47%	2.83%
	PM	35.00%	35.00%	25.34%	28.56%	25.34%	35.00%	35.00%	25.34%	28.56%	25.34%
	OP	36.25%	36.25%	28.54%	31.11%	28.54%	36.25%	36.25%	28.54%	31.11%	28.54%
	MD	15.00%	15.00%	43.29%	33.86%	43.29%	15.00%	15.00%	43.29%	33.86%	43.29%
68	AM	26.05%	61.94%	7.22%	13.50%	7.22%	80.00%	80.00%	80.00%	80.00%	80.00%
	PM	30.27%	38.06%	31.46%	31.06%	31.46%	5.00%	5.00%	5.00%	5.00%	5.00%
	OP	10.37%	0.00%	12.43%	11.74%	12.43%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	33.31%	0.00%	48.89%	43.70%	48.89%	15.00%	15.00%	15.00%	15.00%	15.00%
69	AM	0.00%	0.00%	0.00%	0.00%	0.00%	7.66%	7.66%	7.66%	7.66%	7.66%
	PM	35.19%	35.19%	35.19%	35.19%	35.19%	14.26%	14.26%	14.26%	14.26%	14.26%
	OP	35.19%	35.19%	35.19%	35.19%	35.19%	14.46%	14.46%	14.46%	14.46%	14.46%
	MD	29.63%	29.63%	29.63%	29.63%	29.63%	63.63%	63.63%	63.63%	63.63%	63.63%
70	AM	0.00%	0.00%	0.00%	44.10%	0.00%	0.00%	0.00%	0.00%	42.72%	0.00%
	PM	0.00%	0.00%	0.00%	18.56%	0.00%	0.00%	0.00%	0.00%	30.21%	0.00%
	OP	0.00%	0.00%	0.00%	17.43%	0.00%	0.00%	0.00%	0.00%	12.51%	0.00%
	MD	0.00%	0.00%	0.00%	19.92%	0.00%	0.00%	0.00%	0.00%	14.56%	0.00%
71	AM	42.71%	100.00%	2.91%	18.42%	9.64%	19.25%	19.25%	19.25%	19.25%	19.25%
	PM	38.10%	0.00%	33.34%	31.98%	24.50%	3.83%	3.83%	3.83%	3.83%	3.83%
	OP	1.25%	0.00%	46.30%	19.01%	9.47%	3.83%	3.83%	3.83%	3.83%	3.83%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	MD	17.94%	0.00%	17.46%	30.60%	56.39%	73.09%	73.09%	73.09%	73.09%	73.09%
73	AM	53.55%	53.55%	0.00%	17.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	21.16%	21.16%	19.15%	19.82%	19.15%	25.94%	20.05%	20.05%	22.01%	20.05%
	OP	4.33%	4.33%	18.74%	13.94%	18.74%	9.26%	19.74%	19.74%	16.25%	19.74%
	MD	20.95%	20.95%	62.11%	48.39%	62.11%	64.80%	60.21%	60.21%	61.74%	60.21%
74	AM	37.90%	37.90%	53.77%	48.48%	53.77%	37.90%	37.90%	53.77%	48.48%	53.77%
	PM	62.10%	62.10%	6.44%	24.99%	6.44%	62.10%	62.10%	6.44%	24.99%	6.44%
	OP	0.00%	0.00%	5.61%	3.74%	5.61%	0.00%	0.00%	5.61%	3.74%	5.61%
	MD	0.00%	0.00%	34.18%	22.79%	34.18%	0.00%	0.00%	34.18%	22.79%	34.18%
75	AM	0.00%	0.00%	0.00%	29.48%	0.00%	0.00%	0.00%	0.00%	29.48%	0.00%
	PM	0.00%	0.00%	0.00%	29.48%	0.00%	0.00%	0.00%	0.00%	29.48%	0.00%
	OP	0.00%	0.00%	0.00%	16.04%	0.00%	0.00%	0.00%	0.00%	16.04%	0.00%
	MD	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%
76	AM	20.37%	20.37%	21.27%	20.97%	21.27%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	10.45%	10.45%	41.62%	31.23%	41.62%	8.23%	8.23%	8.23%	8.23%	8.23%
	OP	48.27%	48.27%	12.86%	24.67%	12.86%	8.23%	8.23%	8.23%	8.23%	8.23%
	MD	20.91%	20.91%	24.25%	23.14%	24.25%	83.54%	83.54%	83.54%	83.54%	83.54%
77	AM	20.37%	20.37%	21.27%	20.97%	21.27%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	10.45%	10.45%	41.62%	31.23%	41.62%	8.23%	8.23%	8.23%	8.23%	8.23%
	OP	48.27%	48.27%	12.86%	24.67%	12.86%	8.23%	8.23%	8.23%	8.23%	8.23%
	MD	20.91%	20.91%	24.25%	23.14%	24.25%	83.54%	83.54%	83.54%	83.54%	83.54%
78	AM	20.37%	20.37%	21.27%	20.97%	21.27%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	10.45%	10.45%	41.62%	31.23%	41.62%	8.23%	8.23%	8.23%	8.23%	8.23%
	OP	48.27%	48.27%	12.86%	24.67%	12.86%	8.23%	8.23%	8.23%	8.23%	8.23%
	MD	20.91%	20.91%	24.25%	23.14%	24.25%	83.54%	83.54%	83.54%	83.54%	83.54%
79	AM	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	0.00%	0.00%	0.00%	14.20%	0.00%	0.00%	0.00%	0.00%	12.90%	0.00%
	OP	0.00%	0.00%	0.00%	21.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	0.00%	0.00%	0.00%	49.09%	0.00%	0.00%	0.00%	0.00%	87.10%	0.00%
80	AM	77.06%	51.16%	18.50%	38.02%	18.50%	50.00%	50.00%	7.66%	7.66%	7.66%
	PM	0.00%	39.64%	79.22%	52.82%	79.22%	50.00%	50.00%	14.26%	14.26%	14.26%
	OP	22.94%	0.00%	0.00%	7.65%	0.00%	0.00%	0.00%	14.46%	14.46%	14.46%
	MD	0.00%	9.20%	2.28%	1.52%	2.28%	0.00%	0.00%	63.63%	63.63%	63.63%
81	AM	37.13%	50.78%	25.54%	29.40%	25.54%	50.00%	9.38%	9.38%	9.38%	9.38%
	PM	36.06%	35.44%	32.63%	33.77%	32.63%	50.00%	0.00%	0.00%	0.00%	0.00%
	OP	5.91%	2.13%	6.73%	6.46%	6.73%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	20.91%	11.65%	35.10%	30.37%	35.10%	0.00%	90.62%	90.62%	90.62%	90.62%
82	AM	38.15%	54.60%	22.99%	28.04%	22.99%	4.57%	4.57%	4.57%	4.57%	4.57%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	PM	40.01%	27.90%	43.84%	42.57%	43.84%	4.15%	4.15%	4.15%	4.15%	4.15%
	OP	6.09%	0.00%	6.04%	6.06%	6.04%	2.26%	2.26%	2.26%	2.26%	2.26%
	MD	15.75%	17.50%	27.12%	23.33%	27.12%	89.01%	89.01%	89.01%	89.01%	89.01%
83	AM	48.06%	50.88%	28.84%	35.25%	28.84%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	51.94%	27.43%	19.63%	30.40%	19.63%	90.18%	90.18%	90.18%	90.18%	90.18%
	OP	0.00%	3.31%	4.84%	3.23%	4.84%	3.91%	3.91%	3.91%	3.91%	3.91%
	MD	0.00%	18.38%	46.70%	31.13%	46.70%	5.91%	5.91%	5.91%	5.91%	5.91%
84	AM	36.54%	43.22%	31.79%	33.37%	31.79%	25.53%	25.53%	11.49%	16.17%	11.49%
	PM	20.65%	15.84%	19.93%	20.17%	19.93%	37.23%	37.23%	16.76%	23.58%	16.76%
	OP	17.78%	1.33%	8.33%	11.48%	8.33%	37.23%	37.23%	16.76%	23.58%	16.76%
	MD	25.03%	39.61%	39.95%	34.97%	39.95%	0.00%	0.00%	55.00%	36.66%	55.00%
86	AM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	OP	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	MD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
89	AM	36.54%	43.22%	31.79%	33.37%	31.79%	36.54%	43.22%	31.79%	33.37%	31.79%
	PM	20.65%	15.84%	19.93%	20.17%	19.93%	20.65%	15.84%	19.93%	20.17%	19.93%
	OP	17.78%	1.33%	8.33%	11.48%	8.33%	17.78%	1.33%	8.33%	11.48%	8.33%
	MD	25.03%	39.61%	39.95%	34.97%	39.95%	25.03%	39.61%	39.95%	34.97%	39.95%
90	AM	26.32%	26.32%	0.00%	8.77%	0.00%	22.66%	22.66%	22.66%	22.66%	22.66%
	PM	26.93%	26.93%	0.00%	21.26%	36.86%	28.32%	28.32%	28.32%	28.32%	28.32%
	OP	26.93%	26.93%	54.72%	27.22%	0.00%	13.77%	13.77%	13.77%	13.77%	13.77%
	MD	19.82%	19.82%	45.28%	42.75%	63.14%	35.24%	35.24%	35.24%	35.24%	35.24%
91	AM	0.00%	0.00%	0.00%	12.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	0.00%	0.00%	0.00%	23.61%	0.00%	0.00%	0.00%	0.00%	37.95%	0.00%
	OP	0.00%	0.00%	0.00%	52.39%	0.00%	0.00%	0.00%	0.00%	24.10%	0.00%
	MD	0.00%	0.00%	0.00%	12.00%	0.00%	0.00%	0.00%	0.00%	37.95%	0.00%
92	AM	0.00%	0.00%	0.00%	20.19%	0.00%	0.00%	0.00%	0.00%	24.75%	0.00%
	PM	0.00%	0.00%	0.00%	2.47%	0.00%	0.00%	0.00%	0.00%	20.54%	0.00%
	OP	0.00%	0.00%	0.00%	47.68%	0.00%	0.00%	0.00%	0.00%	31.08%	0.00%
	MD	0.00%	0.00%	0.00%	29.66%	0.00%	0.00%	0.00%	0.00%	23.63%	0.00%
93	AM	85.91%	48.22%	76.63%	56.46%	6.82%	10.00%	10.00%	10.00%	10.00%	10.00%
	PM	14.09%	36.89%	0.00%	16.84%	36.42%	11.75%	11.75%	11.75%	11.75%	11.75%
	OP	0.00%	7.44%	0.00%	6.27%	18.80%	5.00%	5.00%	5.00%	5.00%	5.00%
	MD	0.00%	7.44%	23.37%	20.44%	37.95%	73.25%	73.25%	73.25%	73.25%	73.25%
94	AM	85.91%	48.22%	76.63%	56.46%	6.82%	1.31%	1.31%	1.31%	1.31%	1.31%
	PM	14.09%	36.89%	0.00%	16.84%	36.42%	24.32%	24.32%	24.32%	24.32%	24.32%
	OP	0.00%	7.44%	0.00%	6.27%	18.80%	11.66%	11.66%	11.66%	11.66%	11.66%

LUC	Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
	MD	0.00%	7.44%	23.37%	20.44%	37.95%	62.71%	62.71%	62.71%	62.71%	62.71%
95	AM	37.82%	45.40%	43.29%	31.58%	13.63%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	43.53%	54.60%	26.71%	44.26%	62.53%	34.12%	34.12%	34.12%	34.12%	34.12%
	OP	10.46%	0.00%	15.00%	14.29%	17.40%	27.05%	27.05%	27.05%	27.05%	27.05%
	MD	8.19%	0.00%	15.00%	9.87%	6.43%	38.82%	38.82%	38.82%	38.82%	38.82%
96	AM	37.82%	45.40%	43.29%	31.58%	13.63%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	43.53%	54.60%	26.71%	44.26%	62.53%	50.00%	0.00%	35.01%	39.65%	33.94%
	OP	10.46%	0.00%	15.00%	14.29%	17.40%	0.00%	0.00%	64.99%	28.15%	19.45%
	MD	8.19%	0.00%	15.00%	9.87%	6.43%	50.00%	0.00%	0.00%	32.20%	46.61%
99	AM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	OP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	MD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 2.3.2 shows the factors used to disaggregate trip production rates into the four time periods for both weekday and weekend trips. These are also from the Des Moines Area 2017 NHTS Add-on.

Table 2.3.2: Time of Day Percentages by Trip Production Purpose

Time Period	WD HBW	WD HBSC	WD HBSH	WD OTHER	WD NHB	WE HBW	WE HBSC	WE HBSH	WE OTHER	WE NHB
AM	36.51%	49.59%	6.38%	12.74%	12.69%	23.96%	25.00%	14.54%	11.29%	8.76%
PM	26.72%	31.47%	24.01%	25.31%	20.86%	23.30%	10.00%	20.39%	20.81%	25.56%
OP	18.71%	2.75%	32.27%	36.52%	19.17%	26.11%	10.61%	20.27%	29.44%	23.53%
MD	18.06%	16.19%	37.35%	25.43%	47.28%	26.63%	54.39%	44.79%	38.46%	42.15%

Directional factors are important when modeling time of day. Directional factors signify the percent of trips going from the production to attraction direction by time period, as opposed to the opposite direction. For example, most trips go from home (production) to work (attraction) in the weekday AM time period, thus HBW trips have 97-100% of trips going from home to work depending on the income level. **Table 2.3.3** shows the input factors developed from the Des Moines Area NHTS Add-on. Special trip purposes had small sample sizes or samples were non-existent, so the factors were adjusted to 0.50 (half of trips make P-A direction, and half take A-P direction).

Table 2.3.3: Directional Factors by Trip Purpose

	Weekday				Weekend			
Trip Purpose	AM	MD	PM	OP	AM	MD	PM	OP
HBWL	0.97	0.55	0.07	0.38	1.00	0.55	0.15	0.23
HBWM	0.99	0.54	0.07	0.42	0.88	0.54	0.15	0.42
HBWH	1.00	0.51	0.07	0.27	1.00	0.51	0.15	0.33
HBSC	0.99	0.29	0.03	0.11	1.00	0.29	0.03	0.11
HBSH	0.83	0.48	0.40	0.27	0.77	0.47	0.38	0.26
HBO	0.81	0.61	0.48	0.38	0.84	0.62	0.58	0.30
NHB	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
HOSP	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
APRT	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
RREC	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
HOT	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
SU	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
COMBO	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Input Data

The 2017 Des Moines Area MPO (DMAMPO) NHTS Add-on was the primary input for directional factors.

Estimation Data

Time period factors and directional factors were developed using the 2017 NHTS Add-on data.

Validation Data

Two sets of validation data were used to check results by time period. First, a subset of 130 available hourly traffic counts provided by the Iowa DOT were used. The goal was the match the percent of daily distribution for each time period. Without adjusting time period factors, the largest differences by time period were 2% (AM and off-peak).

Table 2.3.4: Percent of VMT Comparison by Time Period for Subset of Counts

Time Period	Count VMT	Model VMT
AM	17%	19%
MD	34%	35%
PM	25%	24%
OP	24%	22%

A second validation check used INRIX speed data. A non-random sample of model congested network speeds was compared to available INRIX speeds for the peak time periods. **Table 2.3.5** shows the average speeds by data source for each time period and day of the week. The model and the INRIX data both show higher speeds during the AM peak compared to the PM peak of less than 1 mph overall.

Table 2.3.5: Average speed comparison by peak time periods

Time Period	INRIX Average Speed	Model Estimated Average Speed
Weekday AM	49.49	50.48
Weekday PM	48.70	49.92

Output Data

These factors are applied prior to applying trip rates during the NHTS Add-on processing. The outputs are the resulting model input trip rates.

Calibration

No adjustments were deemed necessary to the time period factors based on the time period validation checks.

Future year Considerations

No changes in time of day elements are made in future year analysis.

Parcel Data and Land Use Codes

TDMs rely on data about economic activity by location to predict transportation decisions and trip generation. In residential areas, the number of housing units determines trip-making potential. In non-residential areas, economic activity is represented by building area, land use area, and student enrollment (K-12 and post-secondary). The ISMS architecture uses parcel data as an input to trip generation for the following reasons:

- Parcel data is generally accurate because it is used to collect property taxes.
- Building use codes describing the parcels are detailed and can be aggregated to land use categories that better reflect trip generation potential as opposed to a small number of employment categories.
- Location accuracy is high because the parcels are obtained as spatial data from administrative records rather than through address geocoding.
- Parcel data is readily available from the assessor's office of local jurisdictions.

A base year parcel dataset was obtained from the county assessors. MPT members reviewed parcel data for errors (e.g. incorrect land use category or anomalies in coding and made corrections when necessary. In addition, a number of parcel edits were completed to prepare parcel data for the modeling process, including:

- Reviewing residential parcels within each county to ensure housing units were correctly identified and not over- or under-counted
- Assigning activity and land use code information in tax exempt parcels
- Counting mobile home housing units using aerial photos
- Translating county parcel land uses to ISMS land use categories

The final parcel model input file for the AAMPO model area contains 16,706 separate parcel records. Parcel data nests within the TAZs, making it possible to aggregate results to the TAZs. The model aggregates each individual parcel record to the TAZ level during the model run.

A cross-walk table was developed to relate Story County property sub-classes to the ISMS land use codes (**Table 2.4.1**). This table streamlined the development of the parcel data file, and exists as a reference for future model updates so the ISMS parcel file is reproducible.

For most uses, building area is measured by thousands of square feet (KSF). School enrollment is used for K-12 and Post-Secondary schools rather than building area. The trip generation potential of a number of low-generating uses such as parks, golf courses, and extractive industries use acres as the predictive variable. Residential land uses utilize housing units. **Table 2.4.2** shows the parcel file structure.

Table 2.4.1: MPO Land Use Code Cross-Walk

Code	Land Use Name	Predictive Variable	Story County Property SubClass	Description
10	Residential	Housing Units		Residential units can be coded as a generic residential use if detailed codes (11-24) are not used. Note all units should be included in totals, not only occupied units.
11	Single-Family Detached	Housing Units	R 020 thru R 090, 190	Single family detached housing units are the most common residential use.
19	Mobile Home Park	Housing Units	M 810	Mobile home park or manufactured home housing units are usually clustered in a single development with multiple units per parcel. These units are usually missing from parcel dwelling unit counts.
20	Single Family Attached	Housing Units	R 120, 180, 160, 260	Single family attached housing units include duplexes where 2-3 units are on a single parcel; and condominium units which are multi-unit developments in a multi-story building, or single story buildings with shared common walls or buildings grouped around common areas.
21	Apartment Building	Housing Units	R 210, 220, 280, 320 M 108, 192,	Apartment buildings are rental units with four or more units on a single parcel. Apartment buildings are usually included in commercial building files by tax assessor agencies.
22	Dormitory	Students	E 940	Dormitory units are usually located within universities and would often not be identified as a separate use.
23	Student Housing	Housing Units	E 950	Student housing units are units occupied by college and university students without a head of household.
24	Retirement Community	Housing Units	E 330 M 640	Retirement communities are occupied by senior citizens and usually have multiple units on a single parcel.
25	Skilled Nursing Facility Assisted Living	KSF	E 320 M 640	Skilled nursing facilities, assisted living facilities, and hospices may have individual units that are included in US Census totals but whose occupants make few if any trips.
26	Hotel/Motel	KSF	C 620, 630	Hotel and motel developments may have adjoining restaurants or meeting space.
27	Group Quarters Residence Hotel	Housing Units		Group quarters are relatively rare, including transition housing, halfway housing, drug treatment residences and long term residence hotels. These uses are usually assigned an exempt classification code by tax assessor agencies.
28	Fraternity Sorority	Students	R 200	Fraternity and sorority houses are rare and would usually only be identified as a separate use when located off-campus; otherwise, they would be included as a university use.
30	Manufacturing	KSF	I 500	Manufacturing uses are relatively rare and usually feature large complexes which include heavy industrial and other major manufacturing activities. There may be multiple shifts and other adjoining uses such as offices and storage areas.

Code	Land Use Name	Predictive Variable	Story County Property SubClass	Description
31	Industrial Park Light Industry	KSF		Industrial parks and light Industrial areas are one of the most common non-residential uses and would include a range of businesses such as small industries and contractors. These uses are often in mixed development areas with other uses such as offices and commercial.
32	Warehousing	KSF	C 710, 715, 720	Warehousing uses are relatively common and feature large buildings with truck bays.
33	Freight Terminal	Acres		Freight terminals are rare, often consisting of truck staging areas near freeways with few in any structures.
34	Public Storage	Acres	C 880	Public storage uses are relatively common and can be identified visually by adjoining storage sheds with small parking areas.
35	Extraction Industry	Acres		Extractive industrial uses are rare. They feature large tracts of land with few in any structures where sand a gravel mining often occurs.
36	Junkyard Landfill	Acres	NONE	Junkyards, dumps and landfills are rare. They feature large tracts of land with few in any structures and are usually visually easy to identify.
40	Commercial Airport	Annual Thousands of Enplanements	NONE	Commercial airports have scheduled flights by commercial carriers. There is usually one commercial airport in each urban area. Parcels often include terminals, runways, parking lots and hangers.
41	General Aviation Airport	Acres	E 910 I 200	General aviation airports and landing strips are rare. They feature large tracts of land with few in any structures and are usually visually easy to identify.
42	Right-of-way	N/A		Road rights-of-way are not included in parcel files. Other rights-of-way for uses such as utility easements are relatively rare. These uses feature large, elongated parcels with no development.
43	Communication Utility	N/A		Communication towers and other utility uses are rare.
44	Parking	N/A	E 910 C 030	Most parking lots are included with adjoining uses. Stand-alone parking lot uses are rare and usually only occur in downtown areas.
45	Passenger Terminal	N/A		Passenger terminals for buses and railroads are rare. Commercial airport passenger terminals are included with the commercial airport use (40).
50	Street Front Commercial	KSF	C 210	Street front commercial uses are one of the most common non-residential uses. They are usually stand-alone business along streets with limited on-site parking and may include businesses such as beauty shops, small hardware stores, and dry cleaners.
51	Neighborhood Shopping Center	KSF	C 250, 430	Neighborhood shopping centers are quite common and feature a single building, adjoining buildings, or multiple buildings clustered around a common parking lot. They often include a range of businesses such as grocery stores, restaurants, small shops and offices.
52	Community Shopping Center Big Box	KSF	C 200	Community shopping centers and big box developments are usually larger in size than neighborhood shopping centers and include one or more major tenants. They feature buildings clustered around a common parking lot

Code	Land Use Name	Predictive Variable	Story County Property SubClass	Description
53	Regional Shopping Center	KSF	C 270	There are usually only one or two regional shopping centers in an urban area with several anchor stores.
55	Auto Dealership	KSF	C 370	Auto dealerships feature large parcels with large parking areas. Lower-end used car dealers would usually be coded as other commercial (59).
56	Service Station	KSF	C 990	Service or gas stations are quite common and often include mini-markets.
57	Fast Food	KSF	C 510 C 530	Fast food restaurants are usually located on small stand-alone parcels with a high turnover restaurant, often with drive-through facilities.
58	Sit-down Restaurant	KSF	C 520 C 540 C 550 C 570	Sit-down restaurants are usually located on stand-alone parcels that are usually larger than fast food restaurant parcels and may have larger parking facilities.
59	Other Commercial	KSF	C 990	Other commercial uses are meant to identify a range of commercial uses that generate fewer trips than the other commercial land uses (50-58) and may include repair shops, equipment rental shops and stores that are in decline.
60	General Office	KSF		General office uses are one of the most common non-residential uses and would include a range of businesses such as insurance agencies, legal firms, real estate agencies, tech firms, and corporate offices. These uses are often in mixed development areas with other uses such as light industrial and commercial.
61	Government Office	KSF	E 910	Government offices include municipal buildings, court houses, and Department of Motor Vehicle offices. Large state office buildings are rare and would be assigned a general or high-rise office code (60, 62). Government offices are usually assigned an exempt classification code by tax assessor agencies
62	High Rise Office	KSF	C 420	High rise office uses are rare, usually located in downtown areas, and identify office buildings with 4 or more floors.
63	Library	KSF	E 910	Libraries identify stand-alone libraries not affiliated with schools. Libraries are usually assigned an exempt classification code by tax assessor agencies.
64	Post Office Shipping Office	KSF	E 940	Post offices and other shipping offices such as FEDEX and UPS are relatively rare. Post offices are usually assigned an exempt classification code by tax assessor agencies.
65	Bank	KSF	C 460, 470	Banks and credit unions are a relatively common non-residential use. These uses may be located inside shopping centers or general office buildings in which case they would not be separated out.
66	Fire Station Police Station	KSF		Fire and police stations are usually assigned an exempt classification code by tax assessor agencies.
67	Cemetery	Acres	E 910	Cemeteries feature large tracts of land with few if any structures and are usually visually easy to identify.
68	Religious Facility	KSF	E 110 C 990	Religious facilities including churches, synagogues and mosques are usually assigned an exempt classification code by tax assessor agencies.
69	Other Public Service	KSF		Other public service uses are relatively rare. They include a range of low generating uses such as water treatment plants and municipal storage yards. They are usually assigned an exempt classification code by tax assessor agencies.

Code	Land Use Name	Predictive Variable	Story County Property SubClass	Description
70	Hospital	KSF	E 910	There are usually only a few hospital parcels in an urban an urban area.
71	Other Health Care	KSF		Other health care uses are rare, most often medical office buildings near hospitals.
73	Recreational Use	KSF		Recreational uses are relatively rare and would include skating rinks and other recreational facilities housed in indoor facilities. Outdoor recreational uses would usually be categorized as active parks (93).
74	Cultural Facility	KSF		Cultural facilities are rare and would include museums, historical sites, botanical gardens, concert halls, and performance theaters.
75	Convention Center	KSF		Convention centers are rare. Most urban areas would only have one and many would not have any. Convention centers that are a part of hotel uses (26) would not be separated out.
76	Public Assembly	KSF		Public assembly uses are rare, including such uses as fraternal organizations and union halls.
77	Military	Acres		Military bases include uses such as barracks, administrative offices, airfields used by the US Army, US Air Force or National Guards. Military bases are usually assigned an exempt classification code by tax assessor agencies.
78	Prisons Jails	KSF		Prisons and jails uses are usually assigned an exempt classification code by tax assessor agencies.
79	Tourist Attractions	KSF		Tourist attractions are rare and may not be present in some urban areas. Uses include amusement parks, water parks, zoos, and fairgrounds.
80	Day Care Preschool	KSF	C 090	Day care and pre-school uses are relatively common non-residential uses. In-home child care would be assigned a residential use (10 or 11).
81	Elementary School	Enrollment		Elementary schools can include grades kindergarten through eight, although the range of grade levels varies. In some instances, elementary schools occur on parcels with religious facilities or other schools. Those parcels should be split if possible. School parcels are usually assigned an exempt classification code by tax assessor agencies
82	Junior High Middle School	Enrollment	E 930	Junior high and middle schools can include grades six through nine, although the range of grade levels varies. In some instances, junior high schools occur on parcels with religious facilities or other schools. Those parcels should be split if possible. School parcels are usually assigned an exempt classification code by tax assessor agencies.
83	Senior High	Enrollment	E 930	Senior high schools can include grades nine through twelve, although the lower grade level varies. In some instances, high schools occur on parcels with religious facilities or other schools. Those parcels should be split if possible. School parcels are usually assigned an exempt classification code by tax assessor agencies.
84	Post-Secondary	KSF		Post-secondary community colleges, technical colleges and other small colleges are usually commuter colleges with limited or no campus housing. School parcels are usually assigned an exempt classification code by tax assessor agencies.
85	Major University Non-Student employment	Non-Student Employees		Major University Non-Student employment including administration, faculty and full time staff

Code	Land Use Name	Predictive Variable	Story County Property SubClass	Description
86	Major university student employment	Student Employees		Major university student employment including various on-campus jobs filled by students such as cafeteria, tutoring, library assistant, student aid, etc.
89	Other School	KSF		Other schools are rare, including beauty and other post-secondary trade schools.
90	Golf Course	Acres	E 910, 950 C 275	Golf course and club houses are rare and feature large, irregularly shaped parcels that are usually visually easy to identify.
91	Casino	KSF		Gaming casinos are rare and may not be present is some urban areas. Casinos may have adjoining uses such as hotels and restaurants which would usually not be separated out.
92	Stadium Arena	KSF		Stadiums and arenas for viewing professional and amateur sports are rare. Stadiums that are located adjacent to schools or within universities are usually not identified as a separate use.
93	Active Park	Acres	E 910	Active parks are relatively common, usually including ball fields, tennis courts or other outdoor sports facilities with few in any structures. Park parcels are usually assigned an exempt classification code by tax assessor agencies.
94	Passive Park	Acres	E 910	Passive parks are rare, featuring large tracts of low intensity uses such as hiking or nature trails. Park parcels are usually assigned an exempt classification code by tax assessor agencies.
95	Intensive Agriculture	Acres		Intensive agriculture uses are rare, including nurseries and seed farms with few if any structures
96	Agriculture	Acres	BARE LAND	Agricultural and farming uses are common in outlying parts of planning areas. Uses can Include crop land, barns, out buildings and farm houses.
99	Vacant	N/A	BARE LAND	Vacant uses are common in developing urban areas where land has been subdivided into parcels but structures have not been built. Most other inactive uses are coded as another use such as right-of-way.

Table 2.4.2: Parcel File Attributes

Attribute	Format	Source	Description
CLASSCODE	Character	Parcel File/MPO	Broad parcel type used to identify agricultural, residential, commercial, industrial, and exempt parcels in the original parcel file
SEQID	Integer	MPO	Sequential identification number, user assigned sequential identification number for each parcel
PID	Integer	Parcel File	Parcel identification number, unique number to assigned each parcel by the tax assessment agency
PFILE	Integer	Parcel File	Parcel file identification number, unique number of the parcel file source for MPOs with multiple tax assessment agencies
PIN	Integer	Parcel File	Parcel identification number
ADDNUM	Integer	Parcel File	Parcel address number
ADDNAME	Character	Parcel File	Street name of the parcel address
ADDCITY	Character	Parcel File	City of the parcel address
ADDZIP	Character	Parcel File	Zip code of the parcel address
OCCODE	Integer	Parcel File	Occupancy or building use code for the parcel from the original parcel file
ACRES	Real	Parcel File/MPO	Acres of the parcel
LUNAME	Character	MPO	Name of land use code
YEAR (-)	Integer	MPO	Year parcel structures were built based on fields in the original parcel files
LUC (-)	Integer	MPO	Generalized ISMS land use code assigned to a parcel based on fields in the original parcel files
HU (-)	Integer	Parcel File/MPO	Number of housing units on the parcel
AMT	Real	MPO	Amount of non-residential square footage or acres (KSF or acres)
TAZ	Integer	Iowa DOT/MPO	TAZ the parcel lies within

Input Data

Parcel data were collected from Story County. The dataset was reviewed and processed to create the parcel model input dataset.

Household and Non-Residential Land Use Projections

The MPO used information from the Ames Plan 2040 Comprehensive Plan as the basis for the 2045 household and non-residential land use forecasts inside the City of Ames' planning boundary. Future household and employment growth control totals were developed for the entire MPO area, based on demographic and employment projections developed as a part of the Ames Plan 2040. Future growth was allocated to specific TAZs based on the growth patterns anticipated as a part of Ames Plan 2040, where appropriate levels of residential and non-residential growth were allocated for the periods of 2015-2030 and 2030-2045. The total amount of growth by land use category is shown in **Table 2.4.3**. Three future land uses were included (Future Office, Future Commercial, and Future Industrial), due to the many unknowns about specific building type makeups for long range future development. These categories represent a blended and generalized combination of detailed land uses than the more specific land uses used in the base year.

Table 2.4.3: AAMPO Model Future Year Non-Residential Attributes

Land Use Name	2015-2030 Growth	2030-2045
Households (HU)	3957	3957
Hotel (KSF)	534	0
Industrial Park (KSF)	10	0
Warehouse (KSF)	1172	1255
Service Station (KSF)	22	0
Fast Food (KSF)	17	0
Hospital (KSF)	0	20
Other Hospitals and Clinics (KSF)	18	18
Elementary School (Enrollment)	647	646
Junior High School (Enrollment)	370	370
Senior High School (Enrollment)	400	400
Future Office (KSF)	373	373
Future Commercial (KSF)	821	822
Future Industrial (KSF)	1495	1495

HU = housing units
KSF = thousands of square feet

School Enrollment

School enrollment for the base year was gathered using statewide enrollment information by building from the Iowa Department of Education for the 2015-2016 school year. Enrollment by school building was forecast by the City of Ames using the growth control totals shown in **Table 2.4.3**. **Table 2.4.4** summarizes the base and 2045 forecast enrollment by school.

Table 2.4.4: K-12 Schools Enrollments

School	Base Year Enrollment	2045 Forecast Enrollment
Ames Christian School	89	89
Ames High School	1,270	1,544
Ames Middle School	990	1250
Edwards Elementary School	383	458
Fellows Elementary School	507	532
Gilbert Elementary School	388	497
Gilbert High School	435	561
Gilbert Intermediate School	325	421
Gilbert Middle School	344	454
Meeker Elementary School	468	493
Mitchell Elementary School	269	427
Northwood Preschool Center	282	282
Saint Cecilia School	202	202
Sawyer Elementary School	288	446

Transportation Analysis Zones Development

Transportation analysis zones (TAZs) are geographical areas containing land use data. Centroids and centroid connectors provide a connection between the TAZ and the transportation network. Each modeled trip starts and ends at a centroid using a centroid connector. Placement of centroid connectors represents how neighborhoods, businesses, and trips from outside the model access the functionally-classified roadway network (collectors, arterials, and freeways).

TAZs are formed to provide a homogeneous amount and type of activity within each zone. TAZ delineations follow the natural and manmade boundaries that segregate different land uses. These boundaries include water features, roads, and railroads. Jurisdictional and census boundaries can be arbitrary in relation to the needs of the model, and their use in TAZ delineations is limited. **Figure 2.5.1** shows the 572 total TAZs (539 internal and 33 external zones) for the MPO, and **Table 2.5.1** shows the TAZ attributes.

Figure 2.5.1: Transportation Analysis Zones

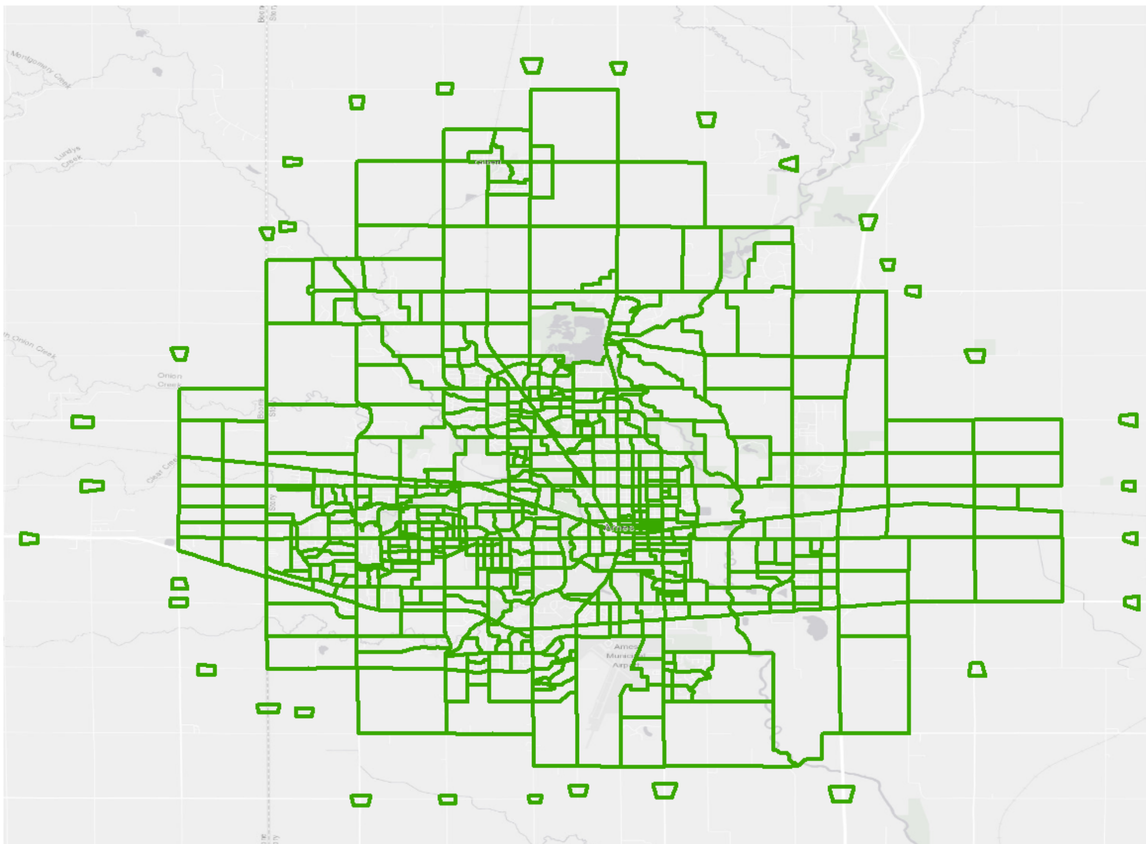


Table 2.5.1: TAZ Attributes

Attribute	Format	Description
ID	Integer	Unique identification value for each TAZ in the database
Area	Real	Area of TAZ in square miles
TAZ	Integer	Unique identification value for the TAZ
CTPP	Real	Used to store the CTPP TAZ GEOID10 identification number for transfer of cross-classification data.
PROD_HOLD	Integer	Flag to hold the productions calculated at the TAZ constant through the trip balancing process: 0 = Balance 1 = Hold Constant
ATTR_HOLD	Integer	Flag to hold the attractions calculated at the TAZ constant through the trip balancing process: 0 = Balance 1 = Hold Constant
DISTRICT	Integer	The K factor district of the TAZ, value of 1 to 50
EXTERNAL	Integer	External station identification: 0 = No 1 = Yes
*TRANSIT (-)	Integer	Transit availability for zone: 0 = No transit 1 = Limited transit 2 = Dense transit (Downtown areas, Campus)
Park_cap	Integer	Public parking availability and capacity: -1 = No parking 0 = No restrictions (unlimited parking) >0 = Capacity of parking within the zone
Park_Cost	Real	Cost in dollars to park for general public.
UPark_Staff_Cap	Integer	University Staff parking availability and capacity: -1 = No parking 0 = No restrictions (unlimited parking) >0 = Capacity of parking within the zone
UPark_Staff_C	Real	Cost in dollars to park for University staff.
UPark_Stud_Cap	Integer	University student parking availability and capacity: -1 = No parking 0 = No restrictions (unlimited parking) >0 = Capacity of parking within the zone
UPark_Stud_C	Real	Cost in dollars to park for University students.
CAMPUS_TAZ	Integer	Campus TAZ flag.
PROJNO1 PROJNO2 PROJNO3	Integer	Project number for the first implemented parking modification in the TAZ; used to join to the project master list.

*Standard ISMS field. Not used by AAMPO model
(-) Indicates attribute has three subsequent entries for project-specific updates.

Input Data

The TAZ structure and data were built from the previous model as a starting point. New TAZs were added in areas where the model boundaries were expanded by the MPO. Several TAZs were subdivided where new roads were added to the model or where future road projects were anticipated. CTPP "geoid" codes were derived directly from CTPP, and the data were processed as described in the ISMS Manual.

Estimation Data

No additional data were used to estimate TAZ data.

Validation Data

The majority of information is housed in the parcel file, and then aggregated up to TAZs. The parcel data were processed by AAMPO staff. Thus, beyond some cursory regional checks of TAZ data totals, little validation of TAZ information is necessary. It is important to ensure TAZ and parcel boundaries are aligned so parcels aggregate to the correct TAZ.

Output Data

Parcel information are used with the overlapping TAZs to develop temporary land use tables for each trip purpose and day of week, which are multiplied by time period-specific trip rates for both productions and attractions.

Calibration

TAZs with the highest number of attractions were reviewed for reasonableness. Trip rate edits were made by land use to revise the relative attractiveness of certain TAZs compared to other TAZs. This will be discussed in more detail in the Person Trip Generation – Attractions section.

Future year Considerations

TAZ structure is maintained through all analysis years.

Transportation Network Development – Links

Model network links represent both roadway driving lanes and centroid connectors that roughly represent the local street network. The master geographic network file contains both the links and nodes. The geographic file for the TDM began with the previous model network, with updates made using the Iowa DOT Roadway Asset Management System (RAMS) data. **Table 2.6.1** summarizes the roadway link attributes used in the 2050 TDM.

Table 2.6.1: Roadway Link Attributes

Attribute	Format	Description
ID	Integer	Unique identification value for each link in the database assigned by TransCAD
Dir (-)	Integer	Directionality of the link: -1 = One-way link in the BA direction 0 = Two-way link 1 = One-way link in the AB direction
Length	Real	Length of the link in miles
NAME	Character	Name of facility
SEC NAME	Character	Secondary name of facility (state or county highway number)
ROUTENUM	Integer	Route number of facility
COUNTY	Integer	Number representing the county
JURIS	Character	Jurisdiction the facility is in (city name)
SYSTEM	Character	Jurisdiction controlling the facility (DOT, Local)
FEDFUNC	Integer	Federal functional classification of facility, used for reporting purposed only: 1= Interstate 2= Other Freeway/Expressway 3 = Other Principal Arterial 4 = Minor Arterial

Attribute	Format	Description
		5 = Major Collector 6 – Minor Collector 7 = Local
FACTYPE (-)	Integer	ISMS functional classification of facility: 0 = Not in existing model 1 = Interstate 2 = Freeway (access limited to entrance/exit ramps) 3 = Expressway 4 = System ramp 5 = Service ramp 6 = Principal arterial 7 = Minor arterial 8 = Collector 9 = Minor Collector 10 = Local 11 = Unpaved 12 = Centroid connectors 13 = Bus only 14 = Walk link
EXTERNAL	Integer	External number of adjusted external station if applicable
MEDIAN (-)	Integer	Median type: 1 = Wide divided median (>20 feet) 2 = Narrow divided median (<20 feet) 3 = Center turn lane 4 = Undivided (all ramps assumed undivided)
ACCESS (-)	Integer	Level of access along link, measured in number of mid-block access points per mile: 1 = No access 2 = Low access (<5 per mile, per direction) 3 = Medium access (5-10 per mile, per direction) 4 = High access (>10 per mile, per direction)
HPMSACCESS	Integer	HPMS-defined access level: 1 = No access 2 = Partial access 3 = Full access
FACILITY_CODE	Integer	Identifier based on the various link attributes: FACTYPE*100 + MEDIAN*10 + ACCESS
RSTRCT (-)	Integer	Restrictions on link: 1 = No restrictions 2 = No trucks 3 = Trucks only
PSPEED (-)	Real	Posted speed of facility in miles per hour
#_TMC_CODE	Character	Traffic Message Channel or INRIX XD code to join link to observed travel speed from INRIX data by time and day of week, either provided as a RAMS attribute or through data conversion.
#_CNT (-)	Integer	Intersection control at end of link (directional attributes) 0 or null = No control 1 = Yield 2 = Stop control/roundabout 3 = Signalized control (sequential) 4 = Signalized control (actuated)
#_Blanes (-)	Real	Number of lanes open throughout the day, by direction
#_TH (-)	Real	Number of through lanes at the intersection (directional attributes); used for intersection-specific penalty calculations

Attribute	Format	Description
#_LF (-)	Real	Number of left-turn lanes at the intersection (directional attributes); used for intersection-specific penalty calculations
#_RT (-)	Real	Number of right-turn lanes at the intersection (directional attributes); used for intersection-specific penalty calculations
PROJNO1 PROJNO2 PROJNO3	Integer	Project number for first implemented project on the link; used to join to the project master list
YRPROJ1 YRPROJ2 YRPROJ3	Integer	Year for first, second, and third implemented project on the link

Indicates unique fields for AB and BA directions, such as AB_BLanes and BA_BLanes.
(-) Indicates attribute has three subsequent entries for project-specific updates.

Input Data

The original model network geography is from the previous model and expanded using Iowa DOT RAMS data. Most of the original model network link attribute datasets were based on RAMS data. PROJNO and YRPROJ attributes are used in scenario modeling.

Estimation Data

Inputs are used directly for the road network, and no estimates are necessary.

Validation Data

Google Earth and Google Street View were used to validate network link attributes, including number of through and turn lanes and intersection control information.

Output Data

The ISMS TDM creates a highway working network geographic file that includes the links and nodes that are to be included within the model scenario being executed. The ISMS framework also generates additional attributes for each link based upon the input attributes of the link. **Table 2.6.2** outlines the output link attributes.

Table 2.6.2: Roadway Link Attributes

Attribute	Format	Description
#_AM_LKCAP #_PM_LKCAP #_OP_LKCAP #_MD_LKCAP	Integer	Total directional link capacity by time period, calculated as the total number of directional lanes multiplied by the per lane capacity from the LINKATT lookup file.
#_LKTM	Integer	Directional travel time along the link, calculated using the link length in miles and the posted speed.
#_FACILITY_CODE	Integer	Identifier based on the various link attributes: FACTYPE*100 + MEDIAN*10 + ACCESS
Alpha	Real	Alpha and beta factors used in traffic assignment; read from the LINKATT lookup file.
Beta	Real	Alpha and beta factors used in traffic assignment; read from the LINKATT lookup file.
A_NODE	Integer	Node number of A node of link
B_NODE	Integer	Node number of B node of link
#_TURNTYPE	Integer	Link description based on intersection control and functional classification of approach
#_INT	Integer	Intersection flag for direction approaching an intersection
#_SAT	Integer	Saturation flow for links approaching an intersection control. Calculated as number of thru lanes*1600 + number of left turn lanes*100 + number of right turn lanes*100
#_G	Integer	Default greentime. Set to 1 for every active link
#_CY	Integer	Default cycle length. Set to 31 for every active link

# Indicates unique fields for AB and BA directions, such as AB_BLanes and BA_BLanes.

Calibration

Accuracy checks are discussed in the ISMS Manual, and many were performed throughout the model development process. For example, link attributes were mapped when confirming the accuracy and completeness of the data. The network connectivity tool, in TransCAD, was used to find disconnected links. The shortest path tool was used throughout the model development and calibration process, to test that logical routes were being used and there were not connectivity, distance, or speed coding errors.

Future year Considerations

The network follows a master network approach and holds data for the base and up to three future year sets of attributes. PROJNO and YRPROJ attributes are used for future year scenario modeling.

Transportation Network Development – Nodes

The roadway nodes represent several different features including:

- Intersections of two or more roadways
- Centroids
- External stations representing where trips enter/leave the model area

Table 2.7.1 summarizes the roadway node attributes used in the TDM.

Table 2.7.1: Roadway Node Attributes

Attribute	Format	Description
ID	Integer	Unique identification value for each node in the database assigned by TransCAD
Longitude	Integer	Geographic coordinate
Latitude	Integer	Geographic coordinate
NODE_TYPE	Integer	Identification for type of node: 0 = Standard node 1 = Intersection node 2 = Internal centroid 3 = External centroid
TAZ	Integer	Unique identification value corresponding with the transportation analysis zone
Control (-)	Integer	Represents the intersection control type: 1 = Yield 2 = Stop control/roundabout 3 = Signalized control (sequential) 4 = Signalized control (actuated) 5 = Other delay (RR crossing, school crossing, etc.) 6 = Centroid loader 7 = Transit stop 8 = Internal centroid 9 = External centroid
PROJNO1 PROJNO2 PROJNO3	Integer	Project number for first, second, and third implemented project on the link; used to join to the project master list
YRPROJ1 YRPROJ2 YRPROJ3	Integer	Year for first, second, and third implemented project on the link

(-) Indicates attribute has three subsequent entries for project-specific updates.

Input Data

TAZ numbering is tied to the transportation analysis zone development which is described earlier in this document. Control data were collected by the MPO.

Estimation Data

Inputs are used directly for the nodes, and no estimates are necessary.

Validation Data

Google Earth and Google Street View were used to validate network node attributes.

Output Data

The ISMS TDM creates a highway working network geographic file that includes the links and nodes included within the model scenario.

Calibration

Intersection controls were mapped and compared to approaching link intersection control coding.

Future year Considerations

Intersection control information is the only node attribute modeled in the future. The network information including intersection control coding should be reviewed when providing a forecast in an area with future road projects.

Transportation Network Development – Turn Penalties

The ISMS framework utilizes both link delay and intersection delay to approximate the time required to travel between points on the transportation network. The intersection delay accounts for time spent decelerating, stopping, and accelerating from intersection control devices such as stop signs and traffic signals. Intersection delay is estimated by developing turn penalties which are first applied based on the functional classification and intersection control, using the "Linktype" definitions shown in **Table 2.8.1**.

Table 2.8.1: Linktype Definitions

Functional Class	Linktype	Intersection Control
Limited access (interstate, freeway, and system ramps	1	n/a
Principal arterials and minor arterials	11 12 13 14	Signalized All Way Stop Controlled (AWSC) Two Way Stop Controlled (TWSC)/roundabout No control
Major and minor collectors	21 22 23 24	Signalized AWSC TWSC/roundabout No control
Local roads, gravel roads, and Centroid connectors	31 32 33 34	Signalized AWSC TWSC/roundabout No control
Service ramps	41 42 43 44	Signalized AWSC TWSC/roundabout No control

Turn penalties are applied based on the "From" and "To" link combination of each respective movement in the network. The ISMS default turn penalties were used as a starting point and were modified during calibration to better reflect observed travel time and network volumes. The turn delays used in the TDM are shown in **Table 2.8.2**.

Table 2.8.2: Linktype Turn Penalties

From Linktype	To Linktype	Minutes of Delay per Turn			
		Left	Right	Thru	U-turn
Limited access	Ramps	0.15	0.15	0.15	99
	All others	0.15	0.15	0.00	99
Signalized Arterial	Arterial/ Ramp	0.13	0.05	0.08	0.75
	Collector	0.13	0.05	0.08	0.75
	Local/CC	0.13	0.05	0.08	0.75
All-Way Stop (AWSC) Arterial	Arterial/ Ramp	0.10	0.05	0.10	0.75
	Collector	0.10	0.05	0.10	0.75
	Local/CC	0.10	0.05	0.10	0.75
Two-Way Stop (TWSC) Arterial	Arterial/ Ramp	0.18	0.08	0.18	0.75
	Collector	0.18	0.08	0.18	0.75
	Local/CC	0.18	0.08	0.18	0.75
Uncontrolled Arterial	All types	0.08	0.03	0.00	0.75
	Collector	0.08	0.03	0.00	0.75
	Local/CC	0.08	0.03	0.00	0.75
Signalized Collector	Arterial/Ramp	0.18	0.08	0.10	0.75
	Collector	0.16	0.06	0.09	0.75
	Local/CC	0.15	0.05	0.08	0.75
AWSC Collector	Arterial/ Ramp	0.13	0.08	0.13	0.75
	Collector	0.11	0.06	0.11	0.75
	Local/CC	0.10	0.05	0.10	0.75
TWSC Collector	Arterial/ Ramp	0.20	0.10	0.20	0.75
	Collector	0.19	0.09	0.19	0.75
	Local/CC	0.18	0.08	0.18	0.75
Uncontrolled Collector	Arterial/ Ramp	0.10	0.05	0.00	0.75
	Collector	0.09	0.04	0.00	0.75
	Local/CC	0.08	0.03	0.00	0.75
Signalized Local/CC	Arterial/ Ramp	0.18	0.10	0.13	0.75
	Collector	0.15	0.08	0.10	0.75
	Local/CC	0.18	0.05	0.08	0.75
AWSC Local/CC	Arterial/ Ramp	0.15	0.10	0.15	0.75
	Collector	0.13	0.08	0.13	0.75
	Local/CC	0.10	0.05	0.10	0.75
TWSC Local/CC	Arterial/ Ramp	0.23	0.13	0.23	0.75
	Collector	0.20	0.10	0.20	0.75
	Local/CC	0.18	0.08	0.18	0.75
Uncontrolled Local/CC	Arterial/ Ramp	0.13	0.08	0.00	0.75
	Collector	0.10	0.05	0.00	0.75
	Local/CC	0.08	0.03	0.00	0.75
Signalized Ramp	Arterial/ Ramp	0.13	0.05	0.08	0.75
	Collector	0.13	0.05	0.08	0.75
	Local/CC	0.13	0.05	0.08	0.75
AWSC Ramp	Arterial/ Ramp	0.10	0.05	0.10	0.75
	Collector	0.10	0.05	0.10	0.75
	Local/CC	0.10	0.05	0.10	0.75
TWSC Ramp	Arterial/ Ramp	0.18	0.08	0.18	0.75
	Collector	0.18	0.08	0.18	0.75
	Local/CC	0.18	0.08	0.18	0.75
Uncontrolled Ramp	Arterial/ Ramp	0.08	0.03	0.00	0.75
	Collector	0.08	0.03	0.00	0.75
	Local/CC	0.08	0.03	0.00	0.75

The turn penalty values were borrowed from the calibrated INRCOG (Waterloo-Cedar Falls) ISMS model. Time was taken during the INCROG model update to evaluate the seconds of delay for each turning movement, as well as the output speeds compared to INRIX data. The resulting Linktype turn penalty values were transferable to the AAMPO model.

Intersection turn movement delays in addition to the Linktype-provided penalties were used at some intersections. These turn movement delays were used to restrict movements at intersections with unique conditions (i.e. no left turn).

Input Data

The ISMS default turn penalties were the starting point for turn penalties, but were adjusted as the model was calibrated. The turn penalties values used in the INRCOG model were a good fit for Ames, and were ultimately used.

Estimation Data

No additional data were used to estimate turn penalty values.

Validation Data

INRIX travel time data for major roadway corridors were used to identify locations where turn penalty information should be adjusted. This travel time data provides a validation target for the combined value of link travel time and the turn penalties. However, segmentation differences between the model network and INRIX TMC segments can make direct comparisons difficult.

The influence of link-to-link turn penalties on model-estimated traffic volumes is noticeable and often the omission of these leads to model estimated volumes of zero. As a result, errors were easy to find and fix on the AAMPO road network.

Output Data

The Linktype value is added to the link attribute table for each network link. Turn penalties by movement are used in the congested travel times report.

Calibration

For most roadways, the turn penalties used are lower than ISMS defaults to limit the dampening affect the penalties have on travel distances and resulting model volumes. The Linktype turn penalty values match those of the calibrated INRCOG ISMS model.

Future year Considerations

Future Linktype turn penalty delays are assumed to be the same as the base year. Location-specific turn penalty information may change with new road alignments, and were coded into the network accordingly.

Transportation Network Development – Transit Route System

TransCAD stores transit routes in a route system file, which is tied to the roadway geographic file. A route system is a map layer containing a collection of routes (links) and route stops (nodes). A route is defined as a series of one or more line features. Each line feature that is part of a route is referred to as a segment. Every route is made up of a series of segments. Several routes in a route system may overlap and operate on the same segment. A route stop is a location where riders board and alight from a transit vehicle. Detailed descriptions of the attributes required for the ISMS transit route and transit stops are shown in **Table 2.9.1** and **2.9.2**.

Table 2.9.1: Attributes of Transit Route File (Routes.rts)

Attribute name	Format	Description
Route_ID	Integer	Unique ID for each transit route assigned by TransCAD
Route_Name	Character	User-defined description (name and/or number) of the transit route
Route	Integer	Route Number used to define the transit route
AMHDWY (-)	Real	Route service frequency for AM transit service
MDHDWY (-)	Real	Route service frequency for midday transit service
PMHDWY (-)	Real	Route service frequency for PM transit service
NTHDWY (-)	Real	Route service frequency for night transit service
Fare (-)	Real	Cost in dollars for riding the transit route
PROJNO1 PROJNO2 PROJNO3	Integer	Project number for first, second, and third implemented project on the route; used to join to the project master list
YRPROJ1 YRPROJ2 YRPROJ3	Integer	Year for first, second, and third implemented project on the route

(-) Indicates attribute has three subsequent entries for project-specific updates.

Table 2.9.2: Transit Stops File Attributes (RoutesS.bin)

ATTRIBUTE NAME	FORMAT	DESCRIPTION
ID	Integer	Unique ID for each transit stop assigned by TransCAD
Longitude	Integer	Longitude coordinate of stop location
Latitude	Integer	Latitude coordinate of stop location
Route_ID	Integer	Transit route ID associated with stop
Pass_Count	Integer	Stop associated with first pass or a later pass along the route alignment
Milepost	Real	Route-specific milepost location of stop
STOP_ID	Integer	Unique TransCAD ID for stop
Physical_Stop_ID	Integer	ID of physical stop locations. Physical stop locations are the inventory of places where route stops can occur.
ROUTEID	Integer	Model-filled ID of the route a stop is associated with
NEARNODE	Integer	Model-filled node ID of nearest highway node
STOPYEAR	Integer	Model-filled field used to select only stops associated with routes that are modeled in scenario year.

Input Data

AAMPO updated the transit route and stops file for the 2015 model base year. In addition, the new route alignments for CyRide 2.0 occurred after the model base year, making them future year routes. AAMPO also updated routes and stops for CyRide 2.0.

Routes often vary by times of the day or days of the week. Whenever there was a variation, the new alignment was modeled as a new route. The attribute for route number is consistent among all variations so that results can be easily grouped.

Estimation Data

No estimation data is required to develop transit route systems and networks with ISMS.

Validation Data

Ridership by route information from 2015 and 2019 was received from CyRide. The 2019 route ridership information reflects the CyRide 2.0 route alignments.

Output Data

The transit route and stops layers are used to find the optimal route or combination of routes between a trip origin and destination. The route is used to skim the attributes of the optimal paths, and eventually assign trips to the routes.

Calibration

No additional calibration was done. A member of the MPT reviewed inputs.

Future year Considerations

A master transit route system approach was used that mimics the one used by the road network. Future route, headway, and fare information can be coded into the route file. CyRide 2.0 routes are coded as the future routes.

Transportation Network Development – Project Master List

Future committed, planned, or potential transportation improvements not included in the 2015 base condition model (e.g., were not constructed in 2015) are stored in the master geographic file. The attributes of these improvements are coded in the node and link attribute tables as described previously. Projects are implemented with the ISMS travel model with a Project Master List File, described in **Table 2.10.1**.

Table 2.10.1: Project Master List

Attribute Name	Format	Description
PROJNO	Real	Unique identification number to join project to the impacted elements in the roadway network file
Description	Character	Text description of the project
Committed	Integer	Year that the project has committed funding, or 9999 if no funding is currently committed
Planned	Integer	Year project is implemented within the constrained LRTP, or 999 if not within the constrained LRTP
Illustrative	Integer	Year project is implemented within an unconstrained LRTP, or 999 if not within the unconstrained LRTP
Model_Impact	Character	Text description of how model network is impacted with project implementation

Transit route changes to the base year are also coded into the Project Master List File.

Input Data

Project collection was coordinated by the MPO, and subsequently used to generate the project master list.

Estimation Data

AAMPO provided future road project information, which was coded into the model. The committed, planned, or illustrative status of projects in the *projlut.bin* file was edited as projects were evaluated. Only future projects impacting corridor travel characteristics, through additional capacity, intersection operations, or adjusted travel speeds, were included in the model.

Validation Data

No separate validation data sources are available for local road project lists.

Output Data

The ISMS master network file includes the links corresponding to the projects included within the project master file. **Table 2.10.2** shows a portion of the project master list file. Road projects completed between the model base year and the time projects were coded with PROJNO values starting with 1. These will not be run with the model base year scenario, but will be run with every future year scenario as long as the Existing road network set is not selected.

Regular future road projects start after the number 200 and go through 4,028, but can go up to 100,000. The CyRide 2.0 future project has a code of 100,000. Every project listed would have an impact to the model in some way, whether through capacity changes, new alignments or some other manner.

Table 2.10.2: Portion of Project Master List File

PROJNO	Description	Committed	Planned	Illustrative
1	S 3rd/S4th Road Diet	2017	2017	2017
2	Grant Ave Paving	2016	2016	2016
12	I35 to H30 Flyover ramp (N to W)	2019	2019	2019
202	500th Ave recons from L Way to Mortensen	9999	2032	2032
206	Widen S Dakota to 5 lanes Lincoln Way to Mortensen	9999	2032	2032
210	State and Mortensen Intersection	9999	2025	2025
211	N Dakota grade separation, Ontario to 215	9999	2040	2040
1002	Hyde Ave & Grant Ave & W 190th	9999	2030	2030
1004	E Riverside Rd to from Grand Ave to N Dayton Ave	9999	9999	9999
1005	E Riverside Rd from N Dayton Ave to 570th Ave -	9999	9999	9999
100000	CyRide 2.0	2018	2018	2018

Calibration

Future road projects were entered and verified. Additional checks should occur when the model is run to verify that outputs seem reasonable.

Future year Considerations

The model has a 2045 horizon. Interim years can be run between 2015 and 2045, but inputs were only created for year 2030. Any other years are interpolated. The projects with years less than or equal to the model scenario year within the modeled network set will be included in a model run.

Travel Time and Speed Data

TDMs use impedance values such as travel time to estimate the costs of traveling a network. The lower the cost, the higher the likelihood of selecting one route compared to other available options. Modelers attempt to develop models that estimate travel times which reasonably represent the observed conditions within the modeled area. Through the Iowa DOT, the AAMPO has access to INRIX speed data for many higher functional class facilities in the modeled area. These data were processed into a separate Comma Separated Values (CSV) file as prescribed in the ISMS Manual that contains average speed and speed standard deviation information for each TMC_Code (INRIX segmentation) by time period.

Input Data

The AAMPO related INRIX TMC Codes to the AAMPO model network. The AAMPO also collected INRIX speed data each month of 2015, which was subsequently processed according to the ISMS Manual into four time periods. The attributes of the processed Speed_output.csv file are shown in **Table 2.11.1** below.

Table 2.11.1: Travel Speed Date File Format

Attribute name	Format	Description
TMC_Code	Character	Unique identification value for each TMC segment
WDOP	Real Number	Weekday off-peak average speed
WDOPSTDV	Real Number	Weekday off-peak speed standard deviation
WDAM	Real Number	Weekday AM average speed
WDAMSTDV	Real Number	Weekday AM speed standard deviation
WDPM	Real Number	Weekday PM average speed
WDPMSTDV	Real Number	Weekday PM speed standard deviation
WDMD	Real Number	Weekday mid-day average speed
WDMDSTDV	Real Number	Weekday md-day speed standard deviation
WDT	Real Number	Weekday daily average speed
WDTSTDV	Real Number	Weekday daily speed standard deviation
WEOP	Real Number	Weekend off-peak average speed
WEOPSTDV	Real Number	Weekend off-peak speed standard deviation
WEAM	Real Number	Weekend AM average speed
WEAMSTDV	Real Number	Weekend AM speed standard deviation
WEPM	Real Number	Weekend PM average speed
WEPMSTDV	Real Number	Weekend PM speed standard deviation
WEMD	Real Number	Weekend mid-day average speed
WEMDSTDV	Real Number	Weekend md-day speed standard deviation
WET	Real Number	Weekend daily average speed
WETSTDV	Real Number	Weekend daily speed standard deviation

Estimation Data

Speed data is a direct input and does not need to be synthesized, so estimation data is not available.

Validation Data

No specific data were used to validate the INRIX information. Instead, INRIX speed data can be used as a validation dataset for the modeled network speeds.

Output Data

No specific output data are created other than the Speed.output.csv file mentioned in the Input Data section.

Calibration

INRIX speed data were used to help calibrate the TDM on an aggregate level. For example, average time period speeds for the sample or roadways that had INRIX data available were used to help balance out time period traffic (see **Table 2.3.5).**

At the disaggregate level, the INRIX speed data were less helpful. TMC segmentation differs from the model network segmentation, so that adjusting speeds on one segment may over- or under-calibrate the speeds. When doing this for an entire network it could throw off relative speed differences. A future recommendation would be to aggregate the INRIX and model-estimated speeds to the corridor level with their own relative segmentation. Then, later compare the average speeds at a corridor by corridor basis.

Future year Considerations

INRIX travel time data are not intended for predicting future speed conditions. However, they do allow for a model calibrated to better represent currently observed speed conditions, which should provide more refined future year speed information from the TDM. Due to the growth in travel assumed for the future, under most future network and growth scenarios, model outputs are expected to indicate slower future travel speeds than the existing condition.

Person Trip Generation – Productions

Each trip has two trip ends. The trip generation model calculates trip ends separately: one end is classified as a trip production and the other end as a trip attraction. In trip generation, productions are the home end of the trip and the non-home end is defined as the attraction. Some trips are classified as non-home based trips when neither end is a home location such as a trip from a work location to a shopping center.

Trip generation is the process of estimating the number of trip productions and attractions at each TAZ based on the socio-economic activity within the zone. This process is conducted independently by trip purpose and typically is done for each discrete time period. The TDM conducts trip generation separately for weekday and weekend travel.

Trip productions by purpose are calculated using a cross-classified count of household size and personal income levels using the constants shown in **Table 2.12.1**. The production rates are stored in the *P_Rates.bin* file.

Table 2.12.1: Household Trip Production Rates by Purpose, Household Size, Income and Weekday/Weekend

Purpose	Household Size	Monday-Friday			Saturday-Sunday		
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Home-Based Work	1	0.74	1.14	1.14	0.34	0.24	0.30
	2	1.50	1.78	1.80	0.75	0.57	0.30
	3	2.23	2.23	2.23	1.67	0.81	0.30
	4	2.75	2.84	2.84	1.75	0.81	0.30
Home-Based School	1	0.02	0.02	0.02	0.02	0.02	0.02
	2	0.19	0.19	0.19	0.03	0.03	0.03
	3	1.56	1.56	1.56	0.08	0.08	0.08
	4	2.04	2.04	2.04	0.09	0.09	0.09
Home-Based Shop	1	0.90	0.93	1.09	1.46	1.46	1.46
	2	**1.32 (1.67)**	**1.35 (1.67)**	**1.58 (1.86)**	2.55	2.55	2.55
	3	**1.32 (1.86)**	**1.35 (2.05)**	**1.58 (2.05)**	3.00	3.25	3.50
	4	**1.58 (2.05)**	**1.80 (2.11)**	2.11	3.50	3.83	5.86
Home-based Other	1	0.90	**1.25 (1.50)**	**1.69 (2.00)**	1.37	1.45	2.70
	2	**1.69 (2.23)**	**1.85 (2.23)**	**1.96 (2.75)**	2.09	2.09	3.55
	3	**2.25 (2.98)**	**2.80 (3.50)**	**3.26 (4.00)**	3.55	4.04	5.02
	4	4.45	4.45	**4.5 (5.00)**	6.20	6.20	7.38
Non-Home Based	1	1.78	2.00	2.21	1.36	1.70	2.21
	2	2.88	3.00	3.03	2.46	2.46	2.50
	3	3.17	3.75	4.06	2.75	3.25	3.75
	4	4.06	4.50	5.17	4.00	4.31	5.83
University	1	N/A	N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	N/A	N/A	N/A	N/A
	3	N/A	N/A	N/A	N/A	N/A	N/A
	4	N/A	N/A	N/A	N/A	N/A	N/A
Hospital	1	0.06	0.06	0.06	0.06	0.06	0.06
	2	0.07	0.07	0.07	0.06	0.06	0.06
	3	0.09	0.09	0.09	0.09	0.09	0.09
	4	0.10	0.10	0.10	0.10	0.10	0.10
Airport	1	0.03	0.03	0.11	0.00*	0.00*	0.00*
	2	0.05	0.05	0.05	0.00*	0.00*	0.00*
	3	0.05	0.11	0.11	0.01	0.01	0.01
	4	0.05	0.11	0.11	0.01	0.01	0.01
Regional Recreation	1	0.02	0.02	0.02	0.18	0.18	0.18
	2	0.03	0.03	0.03	0.18	0.18	0.18
	3	0.11	0.11	0.11	0.18	0.18	0.18
	4	0.11	0.11	0.11	0.41	0.41	0.41
	1	0.06	0.06	0.06	0.04	0.04	0.04
Hotel	2	0.06	0.06	0.06	0.04	0.04	0.04
	3	0.06	0.06	0.06	0.07	0.07	0.07
	4	0.06	0.06	0.06	0.07	0.07	0.07

*Greater than 0 but less than 0.01

The home-based work trip purpose is further disaggregated to distinguish low, medium and high-income trips. Both work productions and attractions are disaggregated, allowing the distribution model and subsequent modeling steps to process work trips that are income-stratified. This stratification aids the distribution model in matching low-income workers with low-income jobs, and the mode choice model in identifying transit-dependent workers.

The daily productions are then disaggregated to the three time periods using time of day factors.

Input Data

Required input to the TDM is the parcel data for the model scenario and the TransCAD TAZ layer including CTPP income stratification data.

Estimation Data

Trip production rates were borrowed from the Des Moines Area MPO model. These trip rates developed using the DMAMPO 2017 NHTS Add-on data.

Validation Data

Trips per household rates from the Travel Model Improvement Program (TMIP) Validation and Reasonableness Checking Manual were used as a validation dataset for comparison to the applied trip rates.

Output Data

Output trip productions by trip purpose are calculated for each TAZ. The total unbalanced trip productions from the ISMS Validation Report for weekday and weekend are shown below.

Table 2.12.2: Person Trip Productions (Unbalanced) - Weekday

HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO	Total
14,959	30,263	19,439	17,674	59,457	89,724	135,070	64,481	8,317	224	2,794	2,523	5,527	2,653	453,104

Table 2.12.3: Person Trip Productions (Unbalanced) - Weekend

HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO	Total
8,684	10,678	3,125	1,006	78,875	104,804	100,052	36,164	3,911	238	7,068	2,337	1,022	1,901	359,865

Calibration

Des Moines Area MPO trip production rates were used for the AAMPO model. Minor adjustments were made to the weekday HBO and HBSH trip rates because of an initial imbalance with attractions. These trip rates were reduced, which was a reasonable adjustment since the Des Moines area trip rates had previously been adjusted up during calibration. Table 2.12.4 shows the model balanced trip productions per household from the ISMS Validation Report compared to the TMIP Validation and Reasonableness Checking Manual trips per household for an MSA with a population less than 250,000.

Table 2.12.4: Balanced Trip Productions per Household

Day of Week	Balanced Trip Productions per Household	TMIP Validation and Reasonableness Checking Manual
Weekday	10.42	10.70
Weekend	8.49	

Future year Considerations

Trip production rates are assumed to be held constant over time.

Person Trip Generation – Attractions

Person trip attractions are calculated based on trip rates by land use codes for each parcel, aggregated to the TAZ level. Trip attraction rates are applied based on commercial building area, school enrollment, site acres, or number of households depending land use. The daily trip attraction rates for weekday and weekend are shown in **Tables 2.13.1** and **2.13.2**.

Table 2.13.1: Weekday Daily Trip Attraction Rates

Weekday Daily Trip Attraction Rates											
LUCODE	LUNAME	HBW	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT
10	RES	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
11	SFD	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000

Weekday Daily Trip Attraction Rates											
19	MHP	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
20	SFA	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
21	APT	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
22	DOR	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
23	STUD	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
24	RET	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
25	SNF	1.949	0.000	0.381	1.306	1.095	0.000	0.000	0.000	0.000	0.000
26	HOT	2.401	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.351
27	GQ	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
28	FRAT	0.166	0.000	0.069	0.802	0.278	0.000	0.000	0.000	0.000	0.000
30	MFG	2.304	0.000	0.000	1.152	1.152	0.000	0.000	0.000	0.000	0.000
31	IPK	1.155	0.000	0.000	0.189	0.212	0.000	0.000	0.000	0.000	0.000
32	WAR	1.306	0.000	0.059	0.283	1.451	0.000	0.000	0.000	0.000	0.000
33	FTER	0.639	0.000	0.000	0.086	0.452	0.000	0.000	0.000	0.000	0.000
34	STOR	0.000	0.000	0.000	0.150	0.127	0.000	0.000	0.000	0.000	0.000
35	EXT	0.003	0.000	0.000	0.498	0.421	0.000	0.000	0.000	0.000	0.000
36	LF	0.003	0.000	0.000	0.498	0.421	0.000	0.000	0.000	0.000	0.000
40	CAIR	4.801	0.000	0.000	0.000	0.000	0.000	0.000	27.040	0.000	0.000
41	GAIR	1.600	0.000	0.000	0.182	0.182	0.000	0.000	0.000	0.000	0.000
42	ROW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	UTL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44	PARK	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TERM	0.177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	**SFC**	**1.950**	**0.000**	**10.638**	**3.932**	**12.269**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
51	NSC	1.950	0.000	10.638	3.932	12.269	0.000	0.000	0.000	0.000	0.000
52	CSC	1.624	0.000	10.335	0.594	9.412	0.000	0.000	0.000	0.000	0.000
53	**RSC**	**2.471**	**0.000**	**3.081**	**1.614**	**7.033**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
55	AUC	2.165	0.000	1.609	0.659	2.222	0.000	0.000	0.000	0.000	0.000
56	SS	2.591	0.000	21.162	6.046	17.905	0.000	0.000	0.000	0.000	0.000
57	FF	1.735	0.000	77.450	16.964	59.515	0.000	0.000	0.000	0.000	0.000
58	SDR	2.592	0.000	15.591	9.105	18.379	0.000	0.000	0.000	0.000	0.000
59	ORC	1.151	0.000	1.884	2.926	3.540	0.000	0.000	0.000	0.000	0.000
60	GO	4.921	0.000	0.000	2.750	3.352	0.000	0.000	0.000	0.000	0.000
61	GOV	4.404	0.000	0.000	5.645	5.100	0.000	0.000	0.000	0.000	0.000
62	HRO	6.016	0.000	0.000	0.894	3.397	0.000	0.000	0.000	0.000	0.000
63	**LIB**	**4.843**	**0.000**	**0.8071**	**9.805**	**12.408**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
64	PO	1.600	0.000	0.000	3.422	10.671	0.000	0.000	0.000	0.000	0.000
65	BNK	4.691	0.000	15.407	8.919	20.878	0.000	0.000	0.000	0.000	0.000
66	FS	1.696	0.000	0.000	1.076	2.257	0.000	0.000	0.000	0.000	0.000
67	CEM	1.506	0.000	0.000	2.202	7.303	0.000	0.000	0.000	0.000	0.000
68	RF	1.823	0.984	0.190	5.310	1.948	0.000	0.000	0.000	0.000	0.000
69	OPS	2.556	0.000	0.000	1.573	0.603	0.000	0.000	0.000	0.000	0.000
70	HOSP	1.719	0.000	0.000	0.000	4.966	0.000	6.536	0.000	0.000	0.000
71	OHC	4.693	0.435	0.000	9.613	6.890	0.000	0.000	0.000	0.000	0.000
73	REC	1.710	0.000	0.000	10.370	4.014	0.000	0.000	0.000	0.000	0.000
74	CUL	6.292	0.000	0.000	6.803	13.607	0.000	0.000	0.000	0.000	0.000
75	CCEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.487	0.000
76	PA	5.301	0.000	1.499	2.573	5.172	0.000	0.000	0.000	0.000	0.000
77	MIL	0.364	0.000	0.000	0.268	0.089	0.000	0.000	0.000	0.000	0.000
78	JAIL	2.556	0.000	0.000	1.076	2.257	0.000	0.000	0.000	0.000	0.000
79	TOUR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.771	0.000
80	PS	1.050	13.248	0.000	26.625	22.334	0.000	0.000	0.000	0.000	0.000
81	ELEM	0.202	1.723	0.000	1.385	1.063	0.000	0.000	0.000	0.000	0.000
82	**JRHS**	**0.202**	**1.723**	**0.000**	**1.385**	**1.063**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
83	SRHS	0.260	1.726	0.000	1.737	0.878	0.000	0.000	0.000	0.000	0.000
84	COLL	0.633	0.719	0.000	0.457	0.330	0.000	0.000	0.000	0.000	0.000
89	ORS	0.211	0.000	0.000	22.497	0.000	0.000	0.000	0.000	0.000	0.000
90	GC	0.431	0.000	0.079	3.591	0.724	0.000	0.000	0.000	0.000	0.000
91	CAS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.445	0.000
92	STAD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.556	0.000
93	APRK	0.916	0.000	0.000	0.363	2.413	0.000	0.000	0.000	0.000	0.000
94	PPRK	0.203	0.000	0.000	1.599	2.459	0.000	0.000	0.000	0.000	0.000
95	IAG	0.002	0.000	0.000	0.903	0.764	0.000	0.000	0.000	0.000	0.000
96	AG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	VAC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: Cells in bold were adjusted from original borrowed Des Moines area trip rate values

Table 2.13.2: Weekend Daily Trip Attraction Rates

Weekend Daily Trip Attraction Rates											
LUCODE	LUNAME	HBW	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT
10	RES	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
11	SFD	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
19	MHP	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
20	SFA	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
21	APT	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
22	DOR	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
23	STUD	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
24	RET	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
25	SNF	0.281	0.000	1.153	3.811	0.913	0.000	0.000	0.000	0.000	0.000
26	HOT	0.507	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.114
27	GQ	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
28	FRAT	0.054	0.000	0.094	1.241	0.228	0.000	0.000	0.000	0.000	0.000
30	MFG	0.406	0.000	0.000	0.756	0.084	0.000	0.000	0.000	0.000	0.000
31	IPK	0.106	0.000	0.000	0.180	0.180	0.000	0.000	0.000	0.000	0.000
32	WAR	0.244	0.000	0.132	0.247	0.247	0.000	0.000	0.000	0.000	0.000
33	FTER	0.135	0.000	0.000	0.124	0.289	0.000	0.000	0.000	0.000	0.000
34	STOR	0.000	0.000	0.000	0.217	0.081	0.000	0.000	0.000	0.000	0.000
35	EXT	0.001	0.000	0.000	0.000	6.208	0.000	0.000	0.000	0.000	0.000
36	LF	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	CAIR	1.014	0.000	0.000	0.000	0.000	0.000	0.000	25.122	0.000	0.000
41	GAIR	0.338	0.000	0.000	6.113	1.611	0.000	0.000	0.000	0.000	0.000
42	ROW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	UTL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44	PARK	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TERM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	SFC	0.648	0.000	1.936	0.339	0.341	0.000	0.000	0.000	0.000	0.000
51	NSC	2.301	0.000	20.838	2.582	15.693	0.000	0.000	0.000	0.000	0.000
52	CSC	2.556	0.000	16.674	4.176	13.078	0.000	0.000	0.000	0.000	0.000
53	RSC	0.279	0.000	3.828	2.203	4.080	0.000	0.000	0.000	0.000	0.000
55	AUC	0.649	0.000	1.442	0.927	0.000	0.000	0.000	0.000	0.000	0.000
56	SS	1.902	0.000	25.584	1.192	23.678	0.000	0.000	0.000	0.000	0.000
57	FF	0.368	0.000	104.423	4.245	77.181	0.000	0.000	0.000	0.000	0.000
58	SDR	0.903	0.000	53.184	8.913	38.549	0.000	0.000	0.000	0.000	0.000
59	ORC	1.644	0.000	4.450	0.417	3.376	0.000	0.000	0.000	0.000	0.000
60	GO	0.284	0.000	0.000	3.691	0.576	0.000	0.000	0.000	0.000	0.000
61	GOV	0.405	0.000	0.000	5.767	4.176	0.000	0.000	0.000	0.000	0.000
62	HRO	0.291	0.000	0.000	0.421	0.930	0.000	0.000	0.000	0.000	0.000
63	LIB	0.338	0.000	0.000	11.071	3.961	0.000	0.000	0.000	0.000	0.000
64	PO	0.338	0.000	0.000	11.071	2.077	0.000	0.000	0.000	0.000	0.000
65	BNK	0.372	0.000	26.729	8.628	20.230	0.000	0.000	0.000	0.000	0.000
66	FS	0.541	0.000	0.000	1.701	1.701	0.000	0.000	0.000	0.000	0.000
67	CEM	2.084	0.000	0.000	10.028	0.063	0.000	0.000	0.000	0.000	0.000
68	RF	0.880	0.000	0.000	22.712	3.735	0.000	0.000	0.000	0.000	0.000
69	OPS	0.541	0.000	0.000	3.646	1.823	0.000	0.000	0.000	0.000	0.000
70	HOSP	1.719	0.000	0.000	0.000	3.494	0.000	4.333	0.000	0.000	0.000
71	OHC	0.507	0.000	0.383	4.116	0.503	0.000	0.000	0.000	0.000	0.000
73	REC	6.267	0.000	0.000	6.402	4.726	0.000	0.000	0.000	0.000	0.000
74	CUL	0.338	0.000	0.000	15.779	11.723	0.000	0.000	0.000	0.000	0.000
75	CCEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.456	0.000
76	PA	0.372	0.000	0.000	0.757	3.844	0.000	0.000	0.000	0.000	0.000
77	MIL	0.541	0.000	0.000	1.558	1.445	0.000	0.000	0.000	0.000	0.000
78	JAIL	0.541	0.000	0.000	1.558	1.445	0.000	0.000	0.000	0.000	0.000
79	TOUR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	17.317	0.000
80	PS	5.860	0.000	0.000	2.249	0.000	0.000	0.000	0.000	0.000	0.000
81	ELEM	0.061	0.139	0.000	0.129	0.117	0.000	0.000	0.000	0.000	0.000
82	JRHS	0.041	0.139	0.000	1.605	0.112	0.000	0.000	0.000	0.000	0.000
83	SRHS	0.041	0.014	0.000	0.217	0.713	0.000	0.000	0.000	0.000	0.000
84	COLL	0.175	0.005	0.000	0.161	0.054	0.000	0.000	0.000	0.000	0.000
89	ORS	0.045	0.000	0.000	11.071	3.476	0.000	0.000	0.000	0.000	0.000
90	GC	0.329	0.000	0.000	1.905	0.438	0.000	0.000	0.000	0.000	0.000
91	CAS	0.338	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.061	0.000

Weekend Daily Trip Attraction Rates											
92	STAD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.224	0.000
93	APRK	0.308	0.000	0.000	5.738	0.735	0.000	0.000	0.000	0.001	0.000
94	PPRK	0.000	0.000	0.000	5.738	1.717	0.000	0.000	0.000	0.000	0.000
95	IAG	0.000	0.000	0.000	1.307	0.489	0.000	0.000	0.000	0.000	0.000
96	AG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	VAC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Input Data

The Des Moines area ISMS trip rates were borrowed, which came from a current NHTS Add-on household travel survey. These trip rates have been used in other ISMS models, and have been compared to Institution of Transportation Engineers Trip Generation Manual (ITE) trip attraction rates, default ISMS trip attraction rates and INRCOG trip attraction rates.

Estimation Data

Trip attraction rates for 67 land uses factored to four time periods and separated out into three income levels for weekday and weekend were developed using the Des Moines Area 2017 NHTS Add-on data.

Validation Data

Unbalanced attractions and productions should be reasonably balanced. In most cases, the ratio of productions to attractions should be between 0.90 – 1.10. **Table 2.13.3** shows the resulting production-to-attraction daily ratios from the model. As shown, the production-to-attraction ratios for the AAMPO TDM were generally within the desired guidelines.

2.13.3: Daily Unbalanced Productions and Attraction Ratios

	HBW													
	HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	HOSP	APRT	RREC	HOT	SU	COMBO	Total
P:A Ratio	1.01	0.87	0.96	1.44	1.14	1.15	1.00	1.04	0.77	0.92	1.02	1.02	1.00	1.00
	0.93													

Output Data

Output trip attractions by trip purpose are calculated for each TAZ. The total unbalanced trip attractions from the ISMS Validation Report for weekday and weekend are shown in **Tables 2.13.4** and **2.13.5**.

Table 2.13.4: Person Trip Attractions (Unbalanced) - Weekday

HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO	Total
16,015	36,297	20,286	12,283	49,612	74,876	135,070	60,196	10,139	233	3,595	2,499	5,527	2,653	429,280

2.13.5: Person Trip Attractions (Unbalanced) - Weekend

HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO	Total
5,651	8,071	3,407	653	76,001	98,050	100,052	39,317	6,839	285	4,794	2,243	1,022	1,901	348,287

Calibration

In most cases, the Des Moines Area trip rates were used without adjustments. Trip rate edits were made by land use to revise the relative attractiveness of certain TAZs compared to other TAZs. This was a reasonable adjustment because trip rates came from a single source (Des Moines Area NHTS Add-on) which has a small sample size for certain land uses. Relative to the Des Moines area, Ames may generate more or fewer trips for a same unique land use. One example is the mall (land use code 53). Initial results showed the North Grand Mall in Ames not one of the Top 10 trip attracting TAZs. As a result trip rates by purpose for land use code 53 were adjusted up to match another trip rate source, the trip rate per thousands of square feet from the Iowa Trip Generation study data. **Table 2.13.6** summarizes trip rates edited from the original Des Moines area trip rate values.

Table 2.13.6: Trip Rate Changes

Land Use Name	New Trip Rate	Unit	New Trip Rate Source
Street Front Commercial	28.7885	Thousands of Square Feet	Des Moines Area NHTS Add-on Neighborhood Shopping Center
Regional Shopping Center	14.1983	Thousands of Square Feet	Iowa Trip Generation
Library	27.8625	Thousands of Square Feet	Waterloo-Cedar Falls NHTS Add-on Library
Junior High School	4.3725	Enrollment	Des Moines Area NHTS Add-on Elementary School

Future year Considerations

Trip attraction rates are assumed to be held constant over time.

Truck Trip Ends

Truck trips are primarily a factor of non-residential land uses. The ISMS architecture builds upon the Quick Response Freight Manual's recommendations on trip generation rates for truck trips.

Input Data

The truck trips are calculated using the square footage by land use type at the TAZ level.

Estimation Data

The AAMPO model uses the default ISMS truck trip rates.

Validation Data

No additional datasets were used to validate the ISMS default truck trip rates.

Output Data

The result of applying truck trip rates to the input land use data is truck trip productions and attractions for each TAZ.

Calibration

Since no changes were made to the default ISMS truck trip rates, no calibration of those rates was done.

Future year Considerations

Truck trip rates are assumed to be held constant over time, as mentioned in the ISMS Manual.

University Sub-Model

Parcel data does not typically include attributes that quantify the activities on major campuses, such as the number of on-campus or off-campus students at major housing centers, or the type of activities conducted within the various buildings on campus. Therefore, the ISMS framework includes an optional sub-model related specifically to the generation of person trips for activities related to Universities. This process generates trips both for the university trip purpose and non-university purposes such as Home-Based Work and Non-Home Based. Because of the major influence of Iowa State University (ISU) within the AAMPO area, the AAMPO model includes a separate university sub-model.

Input Data

On- and off-campus student housing data was collected from ISU, as well as employment by building. All of this information was aggregated up to the TAZ level in which the sub-model operates. Off-campus students living outside the model boundaries were considered University E-I trips.

Estimation Data

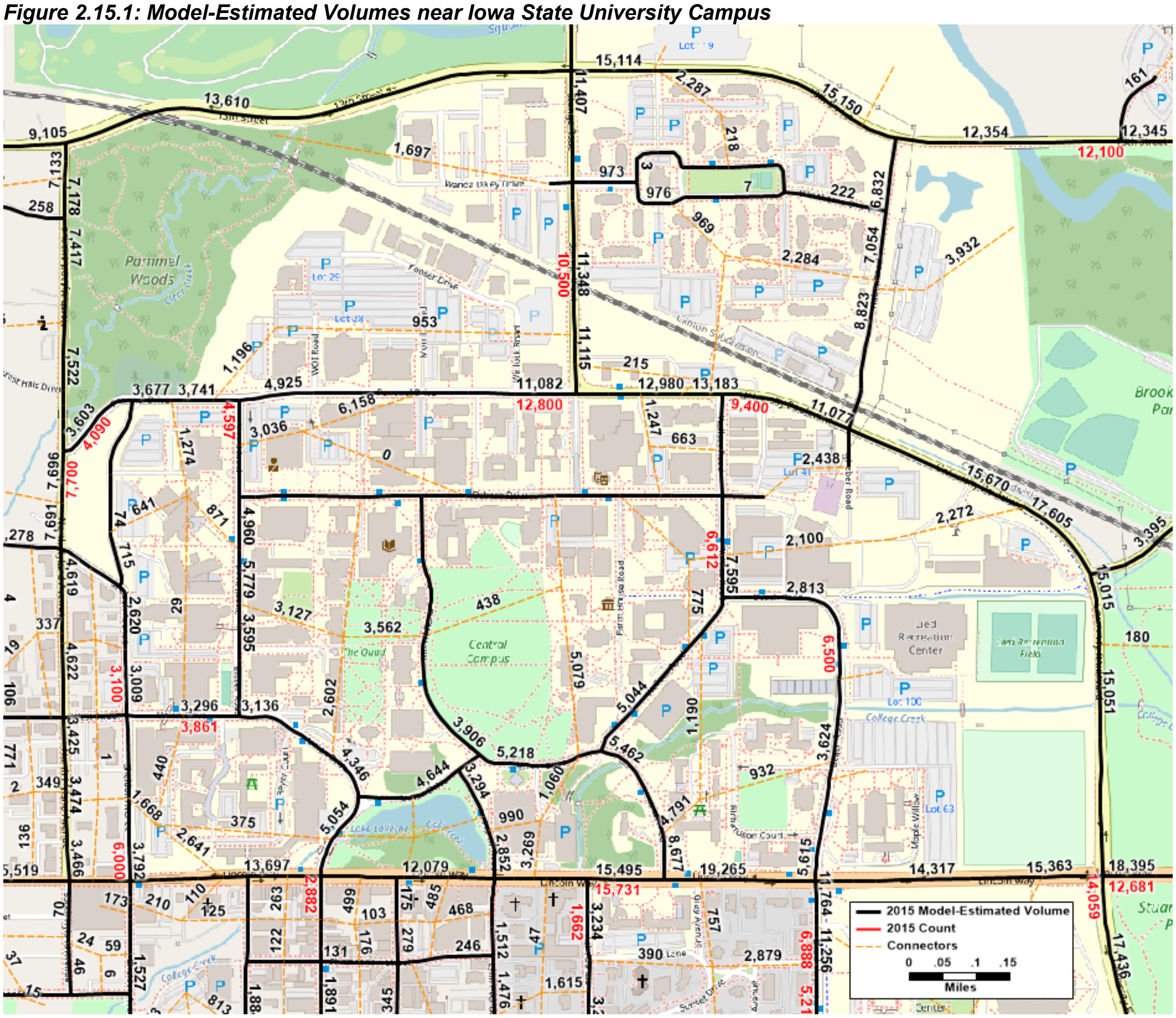
ISMS provides trip rates by time period from one of three sources that have produced university student travel surveys or model procedures: Virginia Department of Transportation university student travel survey, North Carolina State University student travel survey, North Front Range Metropolitan Planning Organization TDM. The Virginia Department of Transportation trip rates provided the best fit for AAMPO.

Weekday versus weekend travel information was not available from the three sources, requiring some assumptions to be made. Originally, the ISMS trip rates for university travel were split equally among weekday and weekends. This led to an excessively high amount of weekend travel. To correct for this, the MPT estimated that 90% of university trips occur during weekdays. Trip rates were factored accordingly.

Validation Data

At a high level, the accuracy of the university sub-model can be reviewed by checking the accuracy of model-estimated volumes near ISU. Model estimated volumes are shown in black and counts are shown in red in **Figure 2.15.1** around ISU central campus. Overall, volumes are very accurate.

Figure 2.15.1: Model-Estimated Volumes near Iowa State University Campus



Output Data

The university sub-model generates the UNIV trip purpose, which appears in output trip generation tables initially, and then is segregated throughout much of the rest of the model process with its own gravity model parameters, mode choice parameters, and auto occupancy values.

Calibration

Very little calibration was necessary since initial results showed very accurate volumes near campus. To improve results further, a process was added to the script that allowed university auto trips to campus to be redistributed away from the campus buildings that are the final destination and to parking lots instead. This provides for more realistic O-D patterns and will be discussed in more detail in a later section.

Future year Considerations

ISU is not projected to increase enrollment beyond the 2015 base year numbers, so forecast student and employment data is largely the same. However, one new residence hall opened after the 2015 base year (Geoffroy Hall), which appears as future on-campus students in the model.

External Trips

Vehicle trips that have one or both ends outside the area covered by the demand model are generally referred to as external trips.

These external trips are further subdivided into three categories:

- **External-external (E-E)**: trips that have both ends of the trip outside the model area
- **External-internal (E-I)**: trips originate outside the model area and terminate inside the model area
- **Internal-external (I-E)**: trips originate inside the model area and terminate outside the model area

Input Data

External centroids and network links were coded per the ISMS standards. TAZ boundaries were also created for external stations. An Iowa statewide travel demand model (iTRAM) sub-area analysis was run for the AAMPO area, which was processed using ISMS-provided macro-enabled spreadsheets.

Estimation Data

iTRAM is used as the primary input data source for the external analysis, per recommended by the ISMS process. A sub-area analysis is run for the AAMPO model area within iTRAM. These values then split into External-Internal/Internal-External (EI/IE) and External-External (EE) trip tables for each time period and all 14 trip purposes.

Validation Data

Various data sources are recommended in the ISMS Manual to use for validation. However, each of these data sources come with a cost in terms of money and/or time. Because of the steep cost of these data sources, none were used for validation. External analysis outputs were provided reviewed by the Project Management Team (PMT), however no changes were recommended.

Output Data

EI/IE tables with estimated productions (EI) and attractions (IE) for each of the 14 AAMPO model trip purposes are used as an input for each model scenario year. There is a separate table for each time period.

EE matrices for each time period for both weekday and weekend are also used as inputs to be added to the internal trip tables during the model run. These matrices include matrix cores for the seven iTRAM trip purposes.

Calibration

Since no changes were recommended by the PMT, no calibration was required. However, the split of HBO trips from iTRAM to the ISMS special trip purposes (within the broader HBO trip purpose) occurs within the external analysis process. These factors were adjusted to better balance the total number of those special trip purposes, making sure that no unreasonable adjustments were made. The final iTRAM to ISMS HBO splits are shown in the tables below. Based on the percentages, more HOSP trips are attracted to the model area than leave the model area. RREC and HOT special trip purposes have a similar amount of trips coming into the model area as are leaving.

Table 2.16.1: iTRAM to ISMS HBO Production Splits

iTRAM to ISMS HBO Production Splits	
School	0
Shop	0.32
Other	0.38
Hospital	0.2
Rrec	0.05
Hotel	0.05

Table 2.16.2: iTRAM to ISMS HBO Attraction Splits

iTRAM to ISMS HBO Attraction Splits	
School	0
Shop	0.48
Other	0.35
Hospital	0.02
Rrec	0.1
Hotel	0.05

Future year Considerations

A similar process is used for the 2045 forecast, using 2045 traffic forecasts provided by the DOT as the volume targets. Other interim forecast years are interpolated between 2015 and 2045.

Trip Balancing

Productions and attractions for each trip purpose, including university sub-model and external trips, are calculated independently as previous described. While these independent processes are likely to estimate different values for productions and attractions, trip-based modeling requires productions and attractions to be equal. Trip balancing systematically modifies either trip productions or attractions throughout the model area to result in an equal number of each. The balancing process varies by trip purpose depending on the level of confidence in the data used to estimate productions and attractions.

Input Data

The TDM produces trip production and attraction data by TAZ. These datasets are inputs to the trip balancing process. **Table 2.17.1** shows the TAZ attributes used to hold productions or attractions constant through the trip balancing process.

Table 2.17.1: Production and Attraction Hold as Entered in TAZ Attributes

Attribute name	Format	Description
Prod_Hold	Integer	Flag to hold the productions calculated at the TAZ constant through the trip balancing process 0=Balance 1=Hold Constant
Attr_Hold	Integer	Flag to hold the attractions calculated at the TAZ constant through the trip balancing process 0=Balance 1=Hold Constant

Estimation Data

No estimates are made during the balancing process.

Validation Data

Prior to balancing trips, unbalanced productions and attractions should be reasonably close. As described above, the pre-balancing ratio for each trip purpose at the daily level was close to a ratio of 1.00, including total trips. When broken down by weekday and weekend, the ratios are still close but slightly more variable. The trip purpose categories with the largest number of trips are generally within the 0.9 to 1.1 ratio.

Table 2.17.1: Weekday Unbalanced Production and Attraction Ratios

	HBW														
	HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO	Total
P:A Ratio	0.93	0.83	0.96	1.44	1.20	1.20	1.00	1.07	0.82	0.96	0.78	1.01	1.00	1.00	1.06
	0.89														

Table 2.17.2: Weekend Unbalanced Production and Attraction Ratios

	HBW														
	HBWL	HBWM	HBWH	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO	Total
P:A Ratio	1.54	1.32	0.92	1.54	1.04	1.07	1.00	0.92	0.57	0.84	1.47	1.04	1.00	1.00	1.03
	1.31														

Output Data

Tables of balanced productions and attractions by trip purpose are produced for each time period for both weekday and weekend.

Calibration

External HBO trips are split into various AAMPO trip purposes were adjusted to better balance productions and attractions. Also, some trip production and attraction rates were adjusted to account for small sample sizes or unreasonable values.

External zones were the only TAZs where trip productions and attractions were not balanced. However, some special trip purposes have a low number of trips within certain time periods and they have high percentages of external trips. As a result, the model will fail if there are more external productions than internal attractions for trip purposes where attractions are held or if there are more external attractions than internal productions for trip purposes where productions are held. This was the case for Hospital trips, where there were many external productions compared too few internal attractions, and Hospital trips are balanced to attractions. This was addressed by changing the internal attraction rate to use just the hospital trip purpose rather than hospital trips and NHB trips. Internal hospital time of day distributions were also altered to be more in line with external trip time of day distributions. These changes have a limited overall impact to the model results, but are necessary in order for the model to run without failing.

Future year Considerations

No differences are made in the future year to the method of balancing trips, nor are any additional TAZ productions or attractions held.

Network Skimming

Auto Travel Time Skim

The TDM develops an auto skim matrix representing a table of travel times between all zones within the model network. This auto travel time skim is used for distributing trips between zones, and includes link travel time, intersection turning delays, and turn prohibitions.

ISMS uses free flow link travel times for auto skims. Intersection turning delays are estimated using the process described in the Transportation Network Development – Turn Penalties section. Manually-developed turn penalties may also be included in the auto network and included in the corresponding skims.

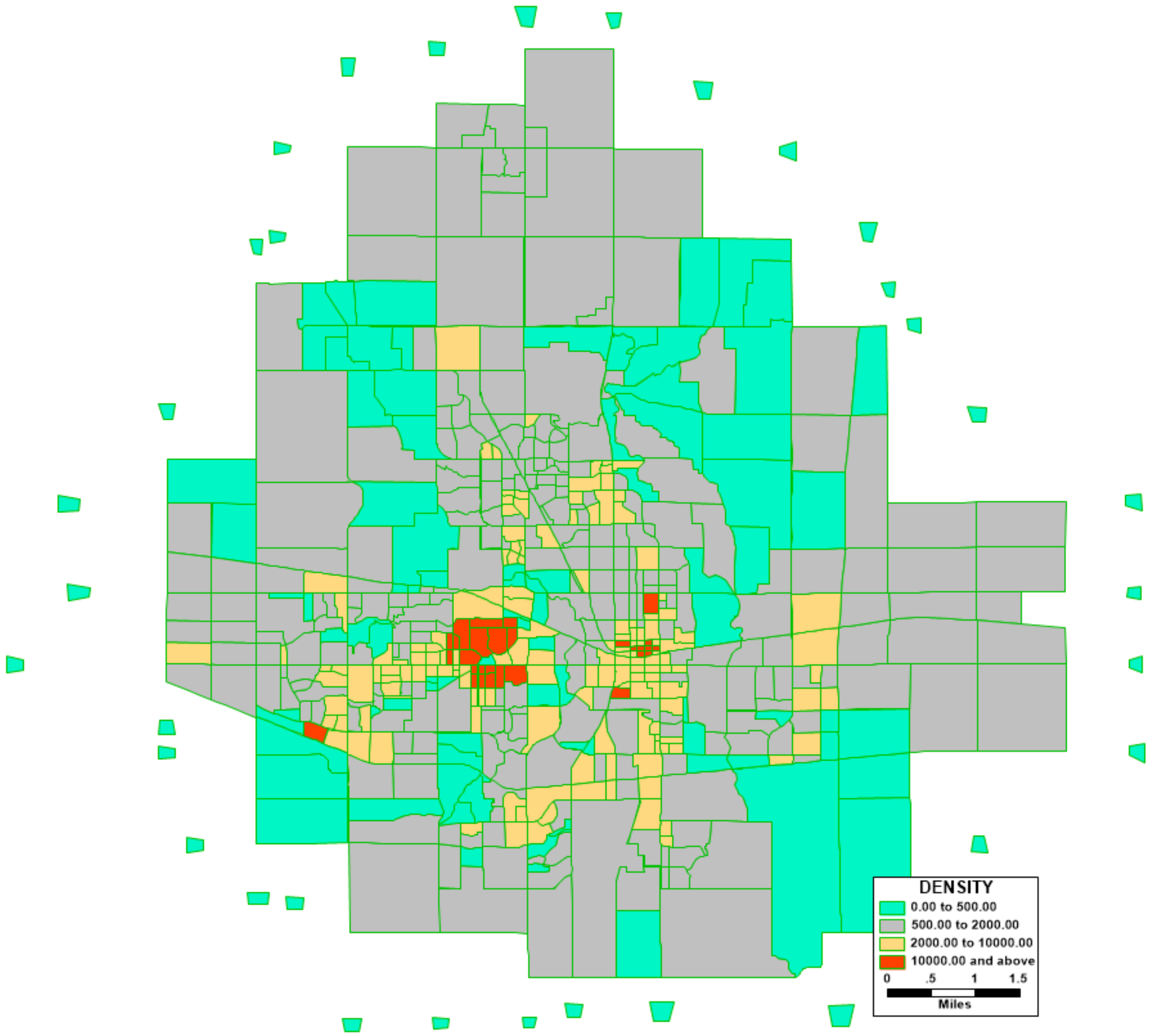
Auto Intrazonal time

For intrazonal travel times, the ISMS Road Density method was used. TAZs with no internal road network were given a value of 0 rather than a null value since null values would lead to a different intrazonal calculation being used and provide uncoordinated results between zones.

Auto Terminal Time

Terminal times are also incorporated into the roadway skim value, including to intrazonal travel times. The TERMFILE.BIN file contains the values used by the TDM. A default set of terminal time values are set by ISMS based on a household and land use density calculated during the model runtime. Higher density zones are assumed to have higher terminal times because in higher density areas it is less likely that one can park very close to the final destination. A density map of the TAZs is shown below in **Figure 2.18.1.**

Figure 2.18.1: TAZ Density Map of AAMPO model



External zone terminal time represents the time spent outside the model network traveling to the metropolitan area. The ISMS script automatically calculates this value at 10 minutes for every external zone.

Walk Distance Skim

The TDM includes a mode split component that incorporates the presence of walkable facilities and bus stops. The walk skim is developed from a selection of links that traditionally allow for pedestrians, and excludes limited access facilities including interstates, freeways and ramps. The walk distance skim does not include turn penalties, intrazonal or terminal times, and is used only to estimate the portion of trips between two zones that would be expected to walk to complete the trip.

Input Data

Roadway and walk-only link distances and travel times are available in the link network data. Intersection delays incorporated into the auto skims are available as described in Transportation

Network Development – Turn Penalties section. TAZ area is also used. Density data are calculated within ISMS at run time.

ISMS default terminal times for both internal and external zones are also used, as they are described above.

Estimation Data

No additional data were used to alter ISMS default information.

Validation Data

No additional data were used to alter ISMS default information.

Output Data

The auto travel time skims are output by the TDM within the scenario's Outputs\2 HighwaySkim folder. One skim is created for each time period, named Spmat**.mtx.

The walk distance skim is output within the scenario's Outputs\4 Mode folder and is named Walkskim.mtx.

Calibration

The TransCAD Shortest Path tool was used at various stages of this model update to ensure travel times between zones were reasonable.

Future year Considerations

Intrazonal and terminal time values are held constant in the future scenario years.

Trip Distribution

The TDM's gravity distribution model uses the balanced trip productions, attractions, the network skims, and friction factors by trip purpose. Friction factors represent the decreasing likelihood of a trip interaction between two zones as the skimmed time between the subject zones increases. Friction factor relationships are dependent upon the purpose of the trip, where work-based trips are less sensitive to longer time and distance while non-home based are much more sensitive.

The ISMS framework provides the user with the ability to utilize district to district K-factors to improve the performance of the gravity model. The district K factors are applied by specifying the district number as an attribute of each TAZ, as shown in **Table 2.19.1**. K factors are used to model individual variations by origin-destination pair that are not otherwise accounted for in the trip distribution model. While K factors may be warranted in some situations, they are ideally not included in a trip distribution model. The AAMPO model does not include any K factors (other than to prevent E-E trips that are not explicitly input).

Table 2.19.1: K Factor Districts as Entered in TAZ Attributes

Attribute name	Format	Responsible Party	Description
District	Integer	MPO	The K factor district of the TAZ, value of 1 to 50.

Input Data

A friction factor table is required for each trip purpose and may be developed for each time period and weekday/weekend uniquely.

The K factors can be entered into a matrix, with one table for each trip purpose. However, the AAMPO model does not include any K factors.

Estimation Data

Gamma coefficients are the parameters used by the gravity model to determine the relative disutility of making trips of various distances. The values of these coefficients result in a friction factor curve that influences how likely trips are to be made to TAZs of various distances. Industry standard default gamma coefficients were initially used for input into the AAMPO model. These were adjusted to better match observed travel time and distance distributions.

Validation Data

Census Transportation Planning Products (CTPP) Journey-to-Work travel time data for trips within the City of Ames were the primary validation source. The model output travel times were compared to CTPP average travel time to work as well as travel time to work grouped into various time bins. The latter method used the CTPP time bins of less than 5 minutes, 5 to 14 minutes, 15 to 19 minutes, 20 to 29 minutes, and 30 to 44 minutes. Anything beyond 44 minutes was excluded as it is not likely that individuals travel more than 45 minutes for a commute within Ames.

Output Data

Person trip tables by trip purpose, time period and day of week are output by the distribution model.

Calibration

Gravity model gamma coefficient values were adjusted to better match CTPP travel time data. The final friction factor curves created by the final gamma coefficients are shown for each trip purpose. The default ISMS coefficients were used for single-unit and combination trucks.

Figure 2.19.1: HBW Friction Factor Curve

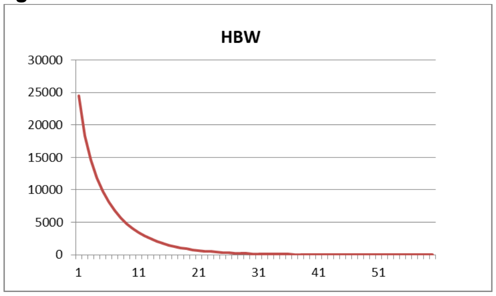


Figure 2.19.2: HBSC Friction Factor Curve

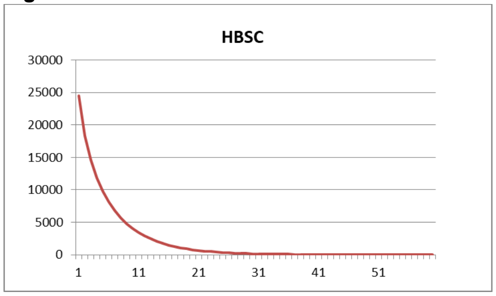


Figure 2.19.13: HBSH Friction Factor Curve

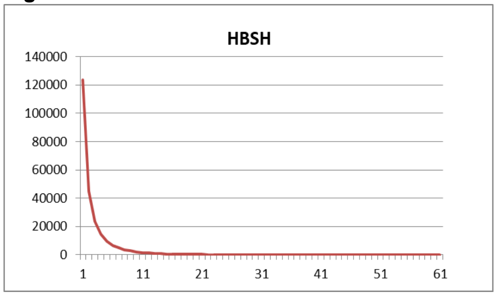


Figure 2.19.4: HBO Friction Factor Curve

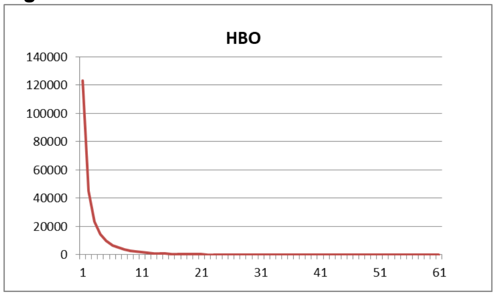


Figure 2.19.5: NHB Friction Factor Curve

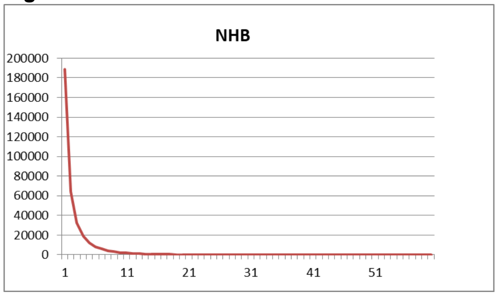


Figure 2.19.6: UNIV Friction Factor Curve

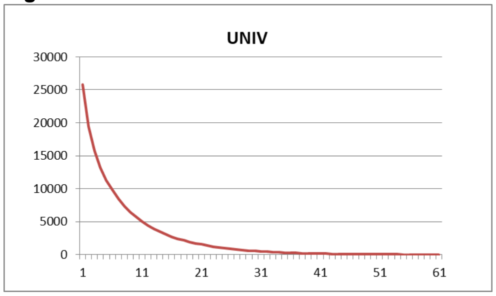


Figure 2.19.7: HOSP Friction Factor Curve

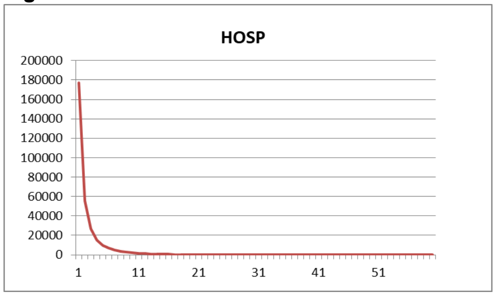


Figure 2.19.8: APRT Friction Factor Curve

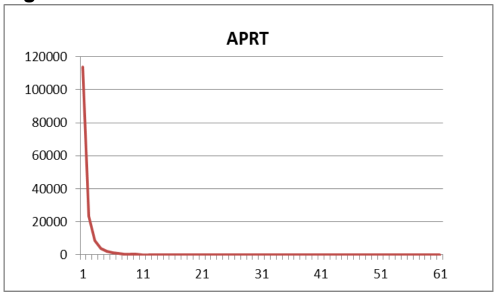


Figure 2.19.9: RREC Friction Factor Curve

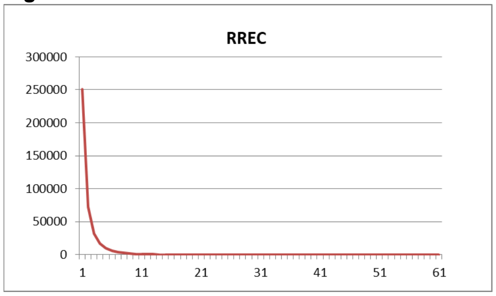


Figure 2.19.10: HOT Friction Factor Curve

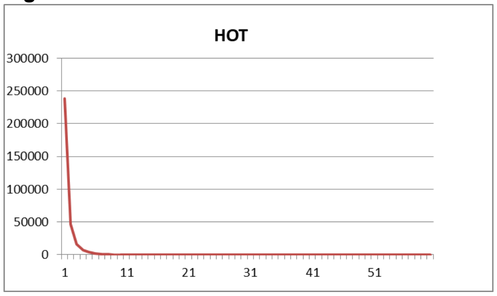


Figure 2.19.11: SU Friction Factor Curve

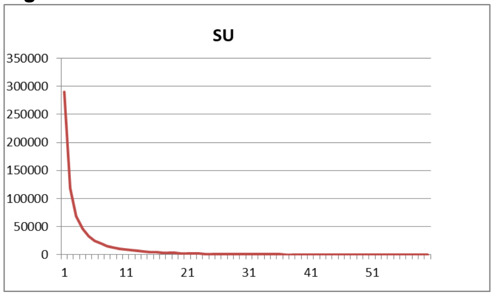
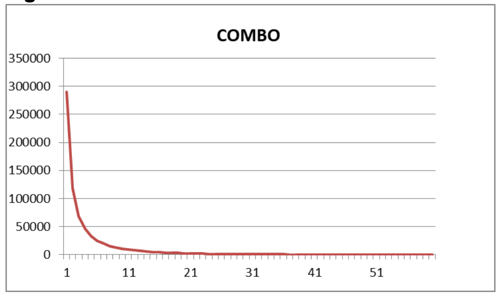


Figure 2.19.12: COMBO Friction Factor Curve



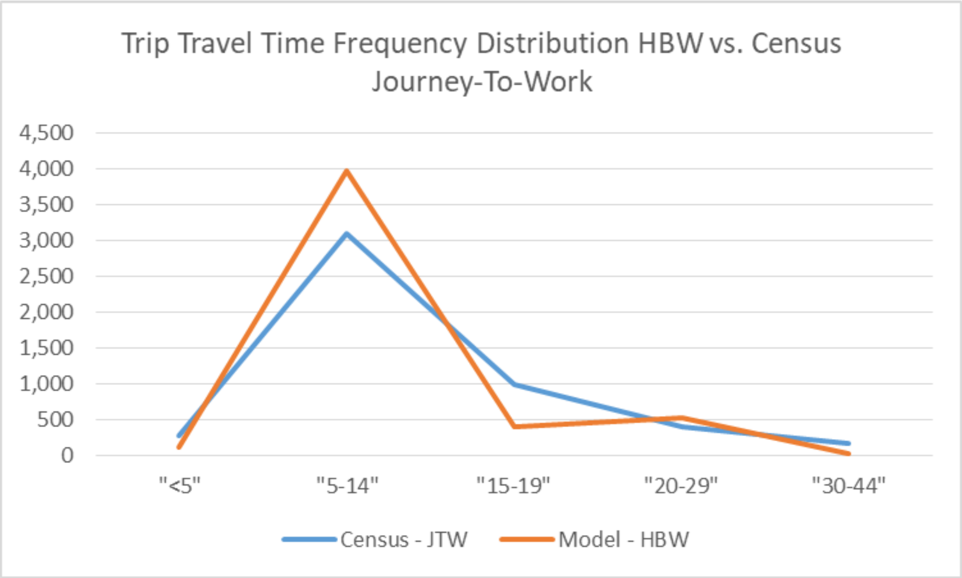
Average trip lengths from the model compared to the survey are shown in **Table 2.19.2**. CTPP data only has Journey-to-Work information that can be compared to the HBW trip purpose. Yet, it is helpful to compare the relative difference in travel time among other trip purposes. For example, it is reasonable to expect HBW trips to be longer than the other primary trip purposes since people tend to travel farther for work than other trip purposes. It is also reasonable to expect the special trip purposes (HOSP, APRT, RREC, and HOT) to have longer average travel times than most other trip purposes since a high percentage of these trips are related to external travel. It is also reasonable to expect truck trips to be longer than most auto trip purposes. The results for the AAMPO model follow these expectations.

Table 2.19.2: Model versus Survey Average Trip Lengths

Average Trip Length - Minutes												
	HBW	HBSC	HBSH	HBO	NHB	UNIV	HOSP	APRT	RREC	HOT	SU	COMBO
CTPP	11.90	-	-	-	-	-	-	-	-	-	-	-
Model	11.81	9.70	10.95	10.46	9.42	8.92	17.28	22.07	13.07	15.74	13.93	17.95

The model HBW trip time distribution compared to CTPP data by time bins is shown in **Figure 2.19.13**. The two curves follow a similar pattern with most trips in the 5-14 minute range. The coincidence ratio, which measures that overlapping areas of the curve is 0.68, which is in-line with other Iowa ISMS models.

Figure 2.19.13: HBW Trip Time Distribution Curve Compared to CTPP



Future year Considerations

The trip distribution parameters will be held constant for future years.

Intermediate Stops/Work Tour

Activity based and tour-based models are more adequately equipped to handle these intermediate stops, as these processes maintain information about the trip's characteristics through the modeling process.

While implementation of activity and tour-based models were deemed to be unnecessary for the intended uses of models within Iowa, the ISMS team explored a hybrid approach to handling a unique portion of the non-home based trips within the ISMS framework. The resulting process functions, but requires an excessive amount of runtime and data processing. Therefore, no intermediate stops process was used in the AAMPO model.

Input Data

N/A. The intermediate stops ISMS process was not used so no input data was necessary.

Estimation Data

N/A. The intermediate stops ISMS process was not used so estimation data was not necessary.

Validation Data

N/A. The intermediate stops ISMS process was not used so a validation dataset was not necessary.

Output Data

N/A. The intermediate stops ISMS process was not used so no outputs are produced from this process.

Calibration

N/A. The intermediate stops ISMS process was not used so no calibration of the process was necessary.

Future year Considerations

N/A. The intermediate stops ISMS process was not used so no future year considerations were necessary.

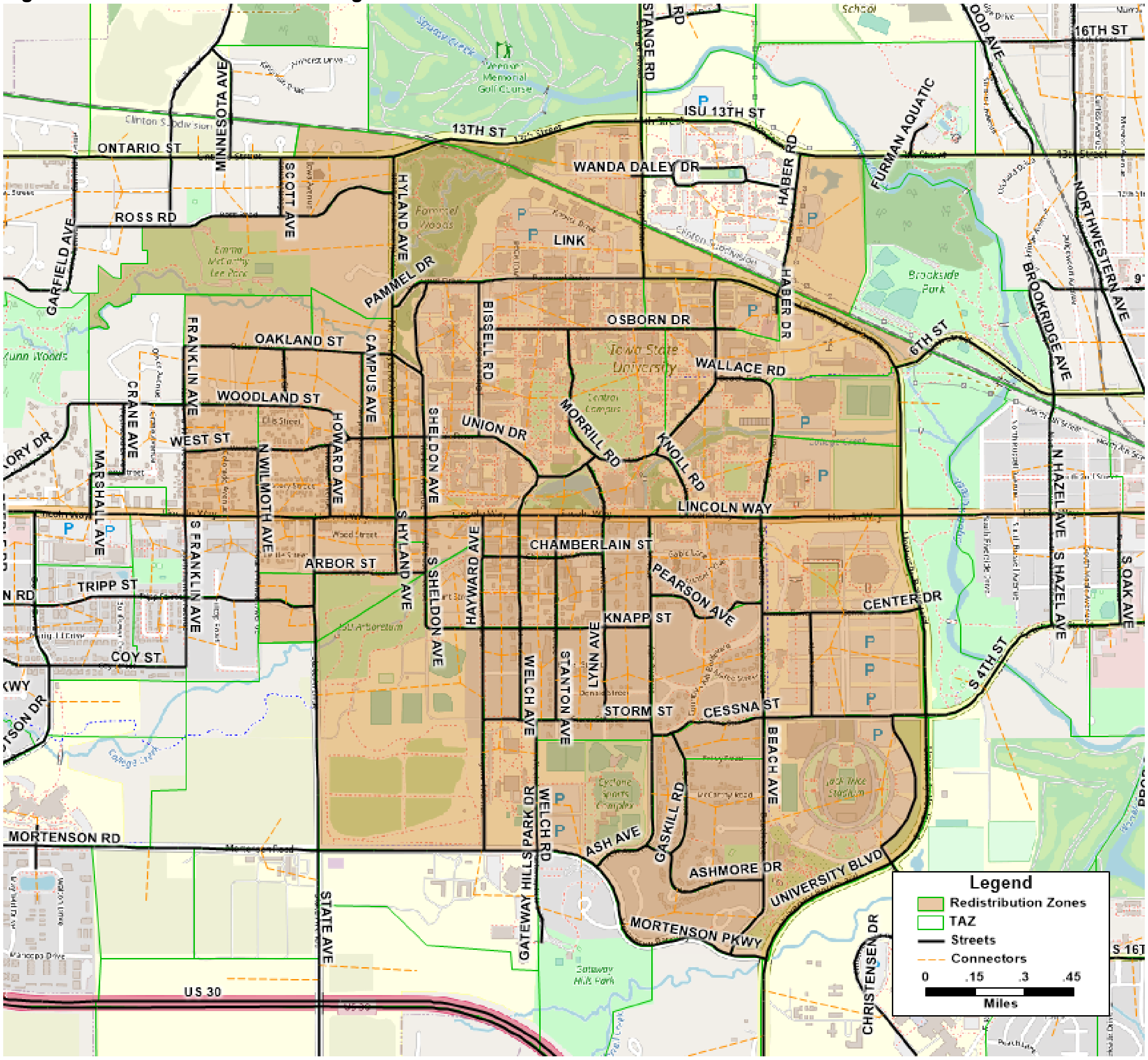
Parking Allocation

Due to restrictions or limited availability of parking, not all vehicle trips end at the same location as the person-trip destination. The ISMS framework uses an approach to parking allocation that redistributes trips within user-defined areas from the person-trips destination to locations of parking availability.

Input Data

The AAMPO model redistributes trips from person-trip destinations to parking lots on the ISU campus. The zones designated are shown in **Figure 2.21.1**, and include TAZs on central campus as well as many nearby zones where students and faculty typically park. Parking capacity data on ISU campus was aggregated to the TAZ level using data from ISU, the previous model and aerial photos. On-street parking was also estimated on nearby roads using aerial photos.

Figure 2.21.1: TAZs used for Parking Redistribution Process



Estimation Data

ISU data and aerial photos were used to estimate the number of parking spaces.

Validation Data

No additional validation data was used.

Output Data

Trip tables with redistributed trips to new destinations are calculated during model runtime.

Calibration

No additional calibration was done. However, the final model-estimated volumes near campus can be reviewed. As shown earlier, the model-estimated volumes near ISU campus are accurate.

FORWARD 2045

Future year Considerations

No changes to the parking reallocation process is made in the future. Number of parking spaces are held constant in the future as well.

Transit Skims

Like roadway skims, transit skims reflect the cost of traveling between TAZs. Transit skims include several cost variables that collectively influence the likelihood of using one mode of transportation over another mode. While travel time is a key variable, other factors such as fare cost also are included into the skims. Each set of skim attributes is collected for each access mode, time period, and both weekday and weekend. **Table 2.22.1** below outlines the various transit skim attributes collected during the transit skim development process. Note that an initial traffic assignment is completed prior to transit skims to generate approximate congested travel speeds along the roadway network for each time period. These congested values are subsequently used to develop the various in-vehicle travel times for the transit skimming process.

Table 2.22.1: Transit Attributes Used in Transit Skim

Attribute name	Format	Description
Fare	Real (dollars)	The initial fare in dollars required to ride the transit mode – a function of the transit route file
In-Vehicle Time	Real (minutes)	Number of minutes required to complete the portion of the trip while in the transit vehicle
Initial Wait Time	Real (minutes)	Number of minutes required to wait for the initial bus needed to complete the trip to arrive at the stop – a function of the headway of routes that serve the OD pair – minimum =2 minutes, maximum = 99999
Transfer Wait Time	Real (minutes)	Number of minutes required to wait for the transfer bus(es) needed to complete the trip to arrive at the transfer stop – minimum = 2 minutes, maximum = 99999, zero if no transfer required
Transfer Walk Time	Real (minutes)	Number of minutes required to walk between the egress point of the first bus and the access point of the second bus within a transfer – a function of the available road/walk links between the bus stops
Access Walk Time	Real (minutes)	Number of minutes required to walk between the trip origin and the first bus stop on the trip – a function of the available road/walk links in the roadway network
Egress Walk Time	Real (minutes)	Number of minutes required to walk between the last bus stop in the trip and the destination of the trip – a function of the available road/walk links in the roadway network
Access Drive Time	Real (minutes)	Number of minutes required to drive between the trip origin and the park and ride stop on the trip – a function of the available road links in the road network
Number of Transfers	Integer	Number of transferred between transit routes required to complete the trip
Access Drive Distance	Real (miles)	Number of miles required to drive between the trip origin and the park and ride stop on the trip – a function of the available road links in the road network
OVTT	Real (minutes)	Out of Vehicle Travel Time – Total time spent outside of a vehicle in completing the trip, including access, egress, wait and transfer times.

Input Data

Transit fare and route information were collected from CyRide. The inputs shown in the table above are calculated based on the transit and roadway network information. Walk speed is a direct input to the ISMS network, with a value of 3 miles per hour.

Estimation Data

Default ISMS parameters were used to create walk-to-transit and drive-to-transit skims, as limited data is available to adjust transit skims.

Validation Data

Transit travel time validation data were not used because any changes to the transit skimming process would require a change in the ISMS script. Defaults were used.

Output Data

Matrix files containing the various skim values outlined in this section are output for each time period, and both weekday and weekend. These skim values are then used in mode choice.

Calibration

If changes to the default skimming process are desired, then additional time should be spent reviewing the travel times between various zones by transit.

Future year Considerations

A master transit route file approach is used to allow for future headway, fare, and alignment changes. While the transit skimming process remains the same in the future years, the new alignments would lead to new modeled transit travel times.

Mode Choice

Roadway networks are coded to obtain zone-to-zone auto in-vehicle travel time and distance matrices. A $0.13 per mile auto operating cost is used to obtain auto operating costs from auto distance matrices. Zone-level average parking costs are coded on TAZ geographic files and added to auto operating costs to obtain total auto costs. Auto terminal (out-of-vehicle) times represent the time spent walking from parking locations to final destinations.

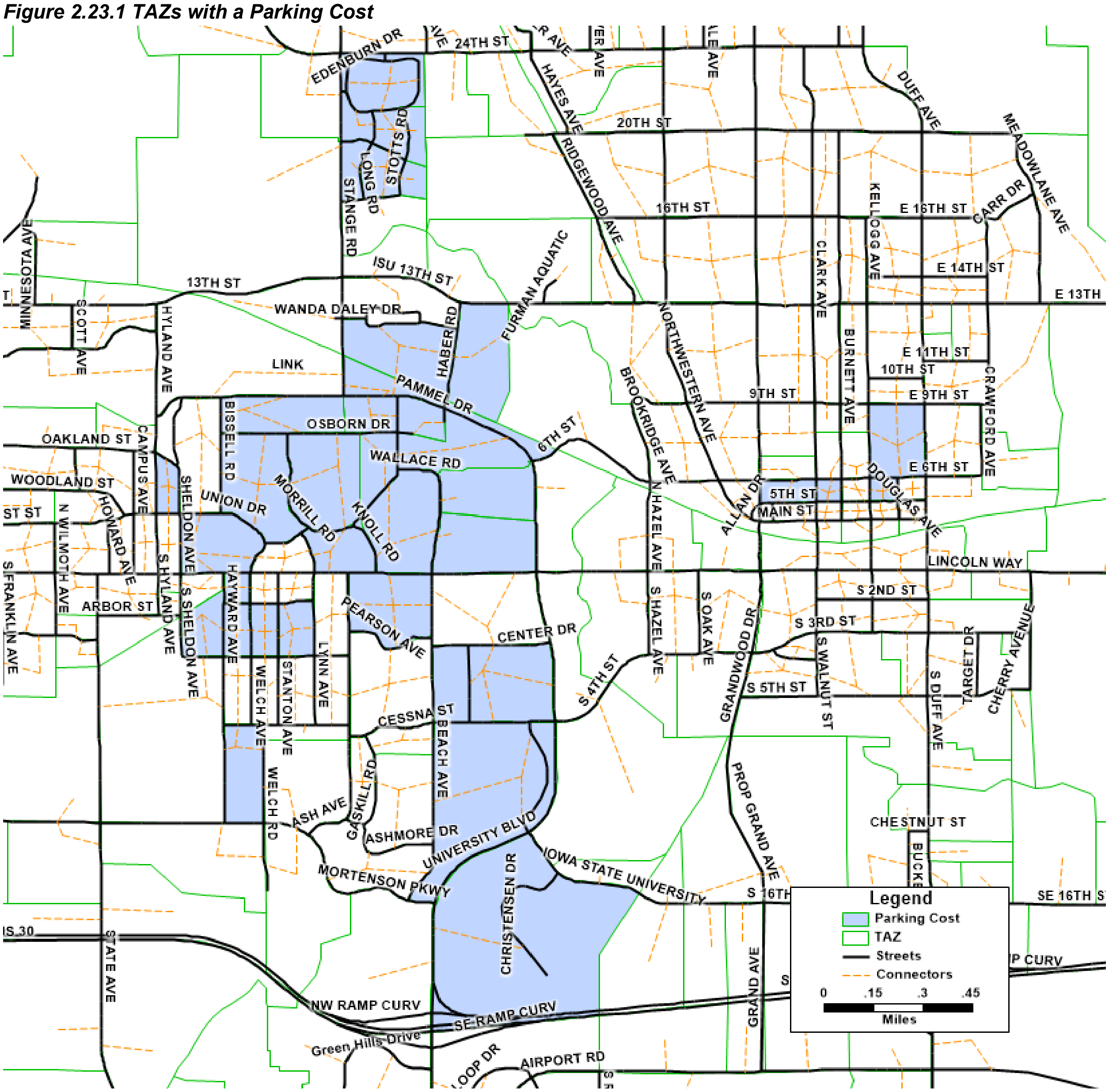
Similarly transit route systems are coded on roadway networks to represent the path, service frequency and fare for each scheduled transit route. TransCAD transit path finding procedures are then used to obtain zone-to-zone transit in-vehicle travel time, initial wait time, walk access/egress time, drive access time, and fare matrices, as described in in the Transit Skims section above.

The file *mcparm.bin* contains the time and cost parameters listed below which are multiplied by times and costs between each zone pair and then added to mode constants to calculate utility measures for each mode for six trip purposes. Finally, TransCAD's Logit Model Application function is used to compute mode shares between zones by time period and trip purpose based on mode utilities. Trips by mode are then obtained by applying mode shares to total person trips after subtracting out non-motorized trips. Resulting trips are accumulated and output in summary reports and as trip tables for the highway and transit assignment process. This is done for both walk-to-transit trips and drive-to-transit trips (park-and-ride).

Input Data

Model inputs include person trips from the trip distribution step, times and costs by mode from the network skimming process, parking costs, and estimated model parameters. Parking costs are included as part of the auto operating cost for any vehicle trips heading to a particular TAZ. The TAZs with a parking cost are shown in **Figure 2.23.1.** The park-and-ride lot at the Iowa State Center parking lot is the only park-and-ride lot coded into the model.

Figure 2.23.1 TAZs with a Parking Cost



FORWARD 2045

Estimation Data

No recent on-board transit survey was available for the AAMPO model area. As a result, mode coefficients and constants were estimated with the goal of matching route-level ridership (obtained from CyRide for the years 2015 and 2019). Initial time and cost coefficients were obtained from the Metropolitan Area Planning Agency (MAPA - Omaha/Council Bluffs) TDM mode choice component that was previously updated by HDR. These coefficients are shown in **Table 2.23.1**. In-vehicle travel time (IVTT), including auto travel times, are consistent across the three modes. Similarly, costs are consistent. The ratio of out-of-vehicle travel time (OVTT) to IVTT is two (-0.06/-0.03 = 2), which means waiting for a bus or walking to a bus is twice as onerous to riders as the time in a vehicle.

Table 2.23.1: Mode Choice Time and Cost Parameters

Time and Cost Component	Parameter
Auto Travel Time	-0.03
Auto Cost	-0.30
Walk to Transit In-Vehicle Travel Time	-0.03
Walk to Transit Out-of-Vehicle Travel Time	-0.06
Walk to Transit Cost	-0.30
Walk to Transit Transfer	-0.15
Drive to Transit In-Vehicle Travel Time	-0.03
Drive to Transit Out-of-Vehicle Travel Time	-0.06
Drive to Transit Cost	-0.30
Drive to Transit Transfer	-0.32

Mode choice constants are shown in **Table 2.23.2**. The more negative a constant is, the more onerous that type of transit trip is compared to the base mode of auto trips. For example, a HBWH drive-to-transit trip is equivalent to an extra 67 minutes of in-vehicle driving time. This preference for the convenience of auto travel is typical in the Midwest, especially in a community where driving and parking is typically easy in most areas in the metropolitan area. Lower income work trips have less penalized walk constants than other types of trips. In this case, a lower income walk-to-transit work trip is equivalent to 35 minutes of in-vehicle driving time while a higher income walk-to-transit work trip is equivalent to 98 minutes. Yet, park-and-ride type trips are more likely for higher income households, which is likely because the one park-and-ride lot in the model is adjacent to ISU campus. University trips have a preference for transit trips over auto trips. This is reasonable given the limited space for vehicles on campus and the lower incomes of many university students.

Table 2.23.2: Mode Choice Mode Constants

Purpose	Walk-Transit Constant	Drive-Transit Constant
HBWL	-1.05	-3.75

HBWM	-2.95	-2.75
HBWH	-2.95	-2.00
HBO	-2.10	-2.50
NHB	-2.10	-5.50
HBU	0.40	0.15

Validation Data

Ridership by route received from CyRide is used as the primary dataset for calibration for years 2015 and 2019. The 2019 data represents ridership for CyRide 2.0 routes. No boarding, alighting or transfer information or time-of-day information as used for the calibration. The reasonableness compared to other model areas of the coefficients and constants are another check that was completed.

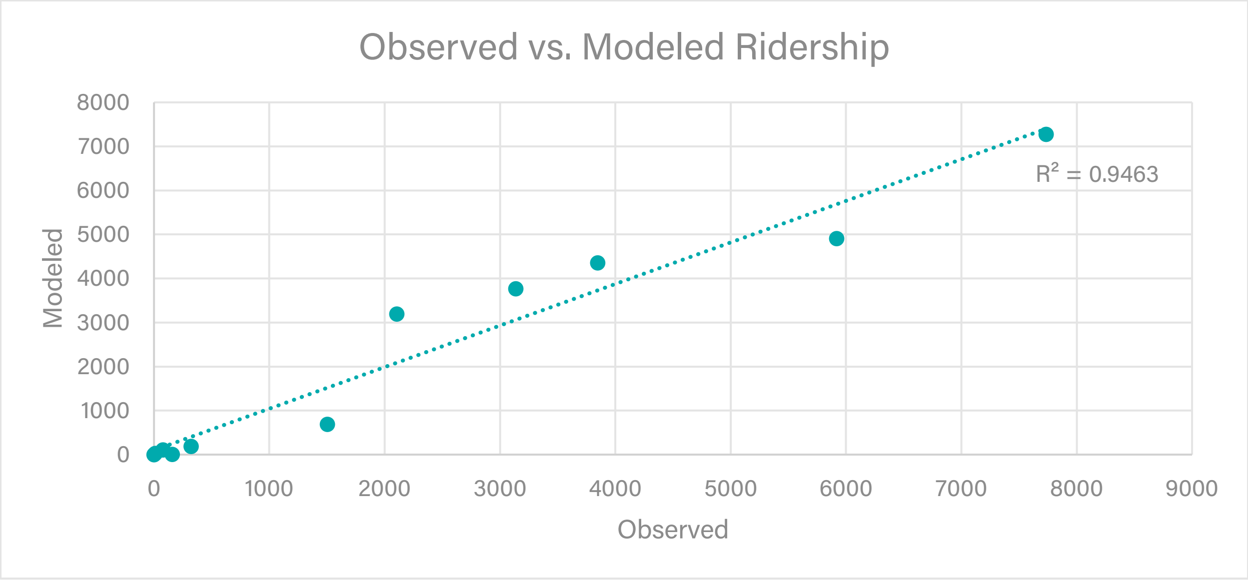
Output Data

The mode choice sub-model produces auto person trip tables by purpose and time-of-day that are subsequently used with auto occupancy factors to generate vehicle trips for highway assignment. Transit trip tables are also produced for transit assignment.

Calibration

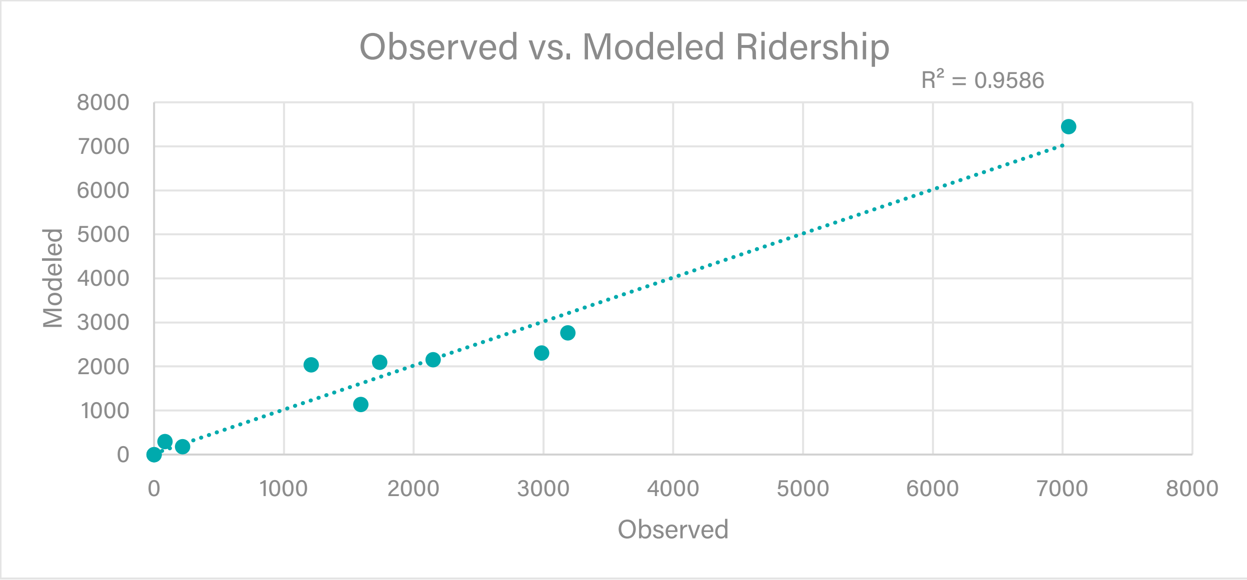
Modal constants were adjusted to calibrate to ridership by route. **Figure 2.9.1** compares the 2015 model-estimated and observed ridership by route results. The R^2 of about 0.95 suggests a very strong relationship.

Figure 2.9.1 Observed Versus Modeled Ridership for 2015 Base Year



Model-estimated ridership from 2015 using the CyRide 2.0 route alignments compared to observed ridership data from 2019 is shown in **Figure 2.9.2**. The R^2 value is even higher. The reason this is possible, despite a difference in years used for the comparison, is that student enrollment at Iowa State University remained relatively stable between 2015 and 2019. University students are the main users of the CyRide bus routes. Thus, a 2015 model-estimated to 2019 observed ridership comparison is a reasonable measure of accuracy.

Figure 2.9.2 Observed Versus Modeled Ridership for 2019 (CyRide 2.0)



Future year Considerations

Mode choice parameters remain the same in future year scenarios. Transit route alignments, headways, and fares can all be adjusted in future year scenarios using the single input transit route layer.

Mode Split

Prior to mode choice, non-motorized trips are first subtracted from total person trips. The remaining person trips are then allocated to auto and transit modes based on the relative times and costs of each mode (see Mode Choice section).

Non-motorized trips are calculated using the distance in miles between the origin and destination zones, as derived by a “skim matrix” that includes walk-only links and excludes access-limited roadway facilities. For any zonal pairs with 0.5 miles or 0.5 – 1.0 miles of each other, a certain percentage of trips are removed based on values provided by the user.

Input Data

The non-motorized sub-model uses the network distance between zones as the predictive variable. This is generated during the model execution process. Non-motorized trip percentages are provided in the *non_motorized.bin*. The AAMPO model uses the ISMS default percentages.

Estimation Data

No household travel survey was available to estimate percentages of non-motorized trips by trip purpose.

Validation Data

No household travel survey was available to validate non-motorized trips by trip purpose percentages.

Output Data

The mode split and mode choice sub-models produce auto-oriented person trip tables by purpose that are subsequently used with auto occupancy factors to generate auto trips. Default ISMS non-motorized trip percentages were used.

Calibration

No additional calibration was done.

Future year Considerations

Mode split percentages are assumed to be constant across analysis years.

Auto Occupancy

Auto occupancy refers to the number of people within a vehicle. In model terms, person vehicle trips are converted to simply vehicle trips to account for an average number of occupants higher than one. Auto occupancy is a function of the type of trip occurring. Work trips are more often made by single occupants, while other trip types such as shopping are more likely to have multiple occupants in the vehicle.

Input Data

Auto-oriented person trip tables by purpose from the mode choice or mode split sub-models are the initial input. These are then divided by auto occupancy factors for each trip purpose and for each time period.

Estimation Data

A household travel survey is typically used to develop auto occupancy factors by trip purpose. Since the AAMPO model does not have a household travel survey, initial inputs were borrowed from the Des Moines Area MPO model. These values were adjusted based on CTPP data for average number of workers per vehicle. Since CTPP data can only be compared to the HBW trip purpose, auto occupancies for all other trip purposes were reduced by the difference in the initial Des Moines area HBW value to the CTPP value for Ames. For example, the Des Moines area HBW auto occupancy of 1.17 was 0.12 higher than the Ames CTPP value of 1.05. All other trip purpose auto occupancies were therefore reduced by 0.12 from the initial Des Moines area values. The final occupancies are shown in **Table 2.25.1.**

Table 2.25.1: Auto Occupancy Factors

AAMPO Model Auto Occupancy Factors					
Purpose	Day of Week	am	pm	op	md
HBWL	wd	1.05	1.05	1.05	1.05
HBWL	we	1.05	1.05	1.05	1.05
HBWM	wd	1.05	1.05	1.05	1.05
HBWM	we	1.05	1.05	1.05	1.05
HBWH	wd	1.05	1.05	1.05	1.05
HBWH	we	1.05	1.05	1.05	1.05
HBSC	wd	1.10	1.10	1.10	1.10
HBSC	we	1.10	1.10	1.10	1.10
HBSH	wd	1.19	1.19	1.19	1.19
HBSH	we	1.19	1.19	1.19	1.19
HBO	wd	1.52	1.52	1.52	1.52
HBO	we	1.52	1.52	1.52	1.52
NHB	wd	1.46	1.46	1.46	1.46
NHB	we	1.46	1.46	1.46	1.46
UNIV	wd	1.08	1.08	1.08	1.08
UNIV	we	1.08	1.08	1.08	1.08
HOSP	wd	1.05	1.05	1.05	1.05
HOSP	we	1.05	1.05	1.05	1.05
APRT	wd	1.50	1.50	1.50	1.50
APRT	we	1.50	1.50	1.50	1.50
RREC	wd	1.23	1.23	1.23	1.23
RREC	we	1.23	1.23	1.23	1.23
HOT	wd	1.07	1.07	1.07	1.07
HOT	we	1.07	1.07	1.07	1.07
SU	wd	1.00	1.00	1.00	1.00
SU	we	1.00	1.00	1.00	1.00
COMBO	wd	1.00	1.00	1.00	1.00
COMBO	we	1.00	1.00	1.00	1.00

Validation Data

No extra validation data sources were used. The Des Moines area auto occupancies were previously validated.

Output Data

The outputs after applying the auto occupancy factors are automobile trip tables by weekday/weekend, time period and trip purpose, and summarized into a single auto trip table by time period for traffic assignment.

Calibration

The final auto occupancies resulted in an accurate amount of overall VMT on the road network compared to counts. Similarly, earlier steps in the model such as trip generation and mode choice had already been calibrated and shown an accurate number of trips compared to validation data. This suggests the auto occupancy factors are a good fit for the AAMPO model area.

Future year Considerations

Auto occupancy factors are assumed to be constant across analysis years. A scenario-specific auto occupancy file may be used to test the impacts of an independently estimated set of auto occupancies by placing a copy of the *Auto_occupancy.bin* file within the Inputs folder of the scenario directory.

Traffic Counts

The TDM conducts detailed analysis by time of day, day of week and vehicle type. Aside from establishing the magnitude of travel at external stations, traffic counts are not used in the demand model process directly. Instead, they are used to validate the accuracy of the model.

Input Data

Traffic count data were supplied by the Iowa DOT staff, from three separate sources: Short Term Counts, Turning Movement Counts, and Interstate Strip Map Counts. Counts are factored to an AADT, and no specific weekend information is available. The RAMS input network single-unit and combination truck values were used for truck counts where existing count information was collected. The short term counts had hourly count information available, which was used to refine the time of day factoring.

Estimation Data

Actual count data were used. Synthetic counts that estimate traffic counts where they were not actually counted were collected from the Iowa DOT as well, but are not used to validate the base year model.

Validation Data

City Traffic Count maps available online from Iowa DOT were used to validate actual traffic counts.

Output Data

In total there are 327 counts in the model area. The count information is available in the AAMPO model road network. The fields associated with the various counts are shown in **Table 2.26.1**.

Table 2.26.1: Count Data Available in Model Road Network

Attribute	Format	Source	Description
AADT_RAMS	Integer	Iowa DOT	RAMS synthetic AADT
SU_RAMS	Integer	Iowa DOT	RAMS synthetic single-unit truck AADT
COMBO_RAMS	Integer	Iowa DOT	RAMS synthetic combination truck AADT
AADT	Integer	Iowa DOT	Actual count, used for validation
TM_TOTAL_VOL	Integer	Iowa DOT	Turning movement total volume count
TM_PVEH	Integer	Iowa DOT	Turning movement passenger vehicles count
TM_TRUCKS	Integer	Iowa DOT	Turning movement trucks count
SHORT_AM	Integer	Iowa DOT	AM time period count from Short Term count
SHORT_MD	Integer	Iowa DOT	Mid-day time period count from Short Term count
SHORT_PM	Integer	Iowa DOT	PM time period count from Short Term count
SHORT_OP	Integer	Iowa DOT	Off-peak time period count from Short Term count

A breakdown of the facility codes and area types of these counts located in from the Validation Report is shown in **Table 2.26.2**.

Table 2.26.2: Number of Links with Counts - AADT

	Central Business District	Fringe Business District	Outlying Business	Residential	Rural	Total
Interstate	--	--	--	--	43	43
Principal Arterial	--	8	20	12	19	59
Minor Arterial	--	10	21	34	11	76
Major Collector	13	2	10	46	29	100
Minor Collector	--	--	0	--	14	14
Local	3	0	3	9	20	35
Total	16	20	54	101	136	327

Calibration

Counts were compared with City Count maps. It should be noted the City Count maps did not extend far into many rural parts of the model, so some rural counts could not be confirmed.

Future year Considerations

Traffic counts are used primarily for base year analysis. Adjusted forecast traffic flow will use the synthetic count information from the RAMS data when actual count information is not available. Prior to providing a traffic forecast using adjusted forecast volumes, these counts should be manually checked to ensure the accuracy.

Roadway Capacity

The TDM uses roadway (or link) capacity within the link delay function of traffic assignment. The definition of capacity within the context of a TDM requires some clarification. In reality, a transportation facility can only accommodate a finite number of units within a specific timeframe, such as vehicles per hour per lane. However, TDMs may predict a number of units within the specified timeframe that exceed the stated capacity. This indicates a demand for the transportation resource that exceeds the supply. ISMS uses capacities close to actual operating capacities (LOS E capacity), however, the definition of capacity is further complicated by the presence of intersection control. Capacity of a roadway segment that is not affected by intersection control is much higher than a segment that approaches a signalized intersection. The model accounts for this by explicitly modeling intersection delay in addition to link-specific delay.

Link capacities are read into the model using a lookup table. The process for estimating the default link capacity values varies by the type of facility. The link capacities used as the starting point were estimated using the process developed for the Corridor MPO TDM. This process has subsequently been adopted by other MPO's across Iowa.

The ideal capacities for uninterrupted, or limited access facilities including Interstates (FACTYPE 1), freeways (FACTYPE 2) and system ramps (FACTYPE 4) are based on the Highway Capacity Manual Version 6.0, exhibit 12-4. These ideal capacities are then adjusted based on the factors outlined in **Equation 2.27.1.**

Equation 2.27.1: Capacity Adjustment Equation for Uninterrupted Facilities

$$C = C_1 * PHF * f_{HV} * f_p - f_s$$

Where:

C = adjusted per lane capacity (passenger cars per hour per lane or pc/hr/ln)

C_1 = ideal per lane capacity (pc/hr/ln)

PHF = peak hour factor; typically 0.88 to 0.92, calculated as the total hourly count divided by four times the highest 15-minute count with the hour; assumed at 0.92 for urban conditions

f_{HV} = heavy vehicle adjustment factor; equals one, as ISMS assigns a passenger car equivalent to heavy vehicles to account for this

f_P = driver population factor; equals one, as ISMS assumes drivers are familiar with the area

f_s = speed adjustment factor; lowers capacity based on lower speeds. ISMS is not currently using this

The TDM assignment process calculates travel delay along links representing facilities with controlled intersections based on both link and node attributes. Specifically, the intersection delay is explicitly calculated, and is therefore not required to be incorporated into the delay calculated on the link as is typically done within traditional TDMs. Therefore, link capacities are influenced by turbulence along the link, such as driveway density and median treatments, as shown in **Equation 2.27.2**. Initial capacities measured in passenger cars per hour per lane (pc/hr/ln) by facility type are shown in **Table 2.27.1**. The capacity reduction factors for median and driveway access are shown in **Table 2.27.2**. An example of resulting capacity calculations for Principal Arterials is shown in **Table 2.27.3**.

Equation 2.27.2: Capacity Adjustment Equation for Interrupted Facilities

$$C = C_1 * PHF - f_m - f_a$$

Where:

C = adjusted per lane capacity (passenger cars per hour per lane or pc/hr/ln)

C_1 = ideal per lane capacity (pc/hr/ln); see **Table 2.27.1**.

PHF = peak hour factor; typically 0.88 to 0.92, calculated as the total hourly count divided by four divided by the highest 15-minute count with the hour; assumed at 0.92 for urban conditions

F_m= median adjustment factor; which reduces the per lane capacity based on the center median treatment; see **Table 2.27.2**.

f_a = driveway access factor, which reduces the per lane capacity based on the density of driveways along the link; see **Table 2.27.2**.

Table 2.27.1: Initial Capacities for Links along Interrupted Facilities

FACTYPE	Initial Capacity (pc/hr/ln)
3-Expressway	1900
5-Service Ramp	1500
6-Principal Arterial	1900
7-Minor Arterial	1800
8-Collector	1600
9-Minor Collector	1200
10-Local	900
11-Unpaved	700
12-Centroid Connector	10,000

Table 2.27.2: Capacity Reduction Factors for Links along Interrupted Facilities

MEDIAN	Capacity Reduction (pc/hr/ln)		Access	Capacity Reduction (pc/hr/ln)
1-Wide divided	0		1-No access	0
2-Narrow divided	0		2-Low (<5/mile)	-50
3-Center turn lane	-100		3-Medium (5-10/mile)	-100
4-Undivided	-200		4-High (>10/mile)	-200

Table 2.27.3: Example Capacity Calculations for Interrupted Facilities

FACTYPE	Initial Capacity	MEDIAN	ACCESS	PHF	Median Reduction	Access Reduction	Adjusted Capacity
6	1900	1	1	0.92	0	0	1750
6	1900	1	2	0.92	0	-50	1700
6	1900	1	3	0.92	0	-100	1650
6	1900	1	4	0.92	0	-200	1550
6	1900	2	1	0.92	0	0	1750
6	1900	2	2	0.92	0	-50	1700
6	1900	2	3	0.92	0	-100	1650

6	1900	2	4	0.92	0	-200	1550
6	1900	3	1	0.92	-100	0	1650
6	1900	3	2	0.92	-100	-50	1600
6	1900	3	3	0.92	-100	-100	1550
6	1900	3	4	0.92	-100	-200	1450

Input Data

The default ISMS capacities as described above are used as the input.

Estimation Data

No changes were made to the default ISMS capacities.

Validation Data

No validation datasets were needed since default ISMS capacities were used as the input.

Output Data

Capacities are factored by time period and applied to the model estimated volumes to adjust the balance of traffic volumes during assignment, as well as to calculate a volume over capacity ratio and show locations of congestion during specific time periods.

Calibration

No calibration of the capacity values was necessary.

Future year Considerations

Roadway capacities are assumed to be constant over time. However, the impending implementation of connected and autonomous vehicles (CAV) may require scenario testing of increased roadway capacities. This may be accomplished by developing a scenario-specific capacity lookup table (*Caplookup.bin*).

Traffic Assignment

The TDM uses the TransCAD Multi-Modal, Multi-Class Assignment (MMA) for traffic assignment. This process allows for unique trip tables to be assigned to unique sets of links within the network, such as truck trip tables assigned to links that do not restrict truck movements. More information about the MMA process can be found in the TransCAD User's Manual or Online Help Menu.

The traffic assignment uses TransCAD's Combined Link and Node Delay function as the assignment volume delay function. This process assigns delay based on attributes of both the link and the node at the departure end of the link. As traffic volumes increase on a particular roadway segment, the delay increases according to the volume delay function formulas for the link and node.

The link delay component is calculated using the traditional Bureau of Public Roads (BPR) volume delay function. Node delay is calculated based on the type of control of the intersection the node represents. Signalized intersection delay and unsignalized delay are calculated independently. Please refer to the ISMS Manual or the TransCAD User Manual for more details on the Combined Link and Node Delay function.

Input Data

Inputs to traffic assignment are generated by earlier model steps. ISMS defaults were kept for the assignment step.

Estimation Data

No changes were made to the ISMS defaults.

Validation Data

Traffic count information is the primary validation data set for traffic assignment. ISMS compares assigned traffic volumes to observed traffic counts on links where both exist, then compiles various comparisons. Traffic counts are discussed in more detail in the Traffic Counts section.

Output Data

The output traffic volumes are by time period and day of week within the \\6 Assignment output folder. These outputs are also post-processed into total weekday and weekend daily volumes, as well as an AADT daily volume in the \\7 PostProcess folder. The output files can be joined with a road network using the ID fields to display the volumes on the road network.

Calibration

Most calibration occurs prior to traffic assignment. The majority of the assignment validation check involve reviewing the attributes of the roadway network for accuracy, such as speed limits or lanes. Centroid locations and centroid connector alignments can also be changed, which impacts the network skims, and resulting flows on the network. In rare cases, the posted speed value could be changed to more accurately model travel times. The AAMPO model does not have any speed adjustments.

A comparison of model-estimated versus observed volume and VMT are shown in **Tables 2.28.1** and **2.28.2**. Overall, modeled volumes and counts are close. Model-estimated volumes are higher than counts in rural areas. Yet, in terms of VMT the model overestimates compared to counts. Regardless, the deviations are within the acceptable levels of error according to recommendations in the ISMS Manual (**Table 2.28.3**). The one potential exception is Minor Collectors, which is based on 14 low volume rural counts. Because of the low-volume nature of these counts and the limited sample size, it is not a cause for concern given the very accurate results of the other functional classes.

Table 2.28.1: Modeled Volume / Count Volume

	Central Business District	Fringe Business District	Outlying Business	Residential	Rural	Total
Interstate	--	--	--	--	104.70%	104.70%
Principal Arterial	--	97.50%	96.50%	106.30%	110.70%	102.20%
Minor Arterial	--	81.10%	96.70%	98.00%	100.90%	95.90%
Major Collector	84.50%	51.10%	87.10%	100.40%	108.70%	97.30%
Minor Collector	--	--	--	--	146.70%	146.70%
Local	102.10%	--	68.40%	114.40%	113.20%	99.80%
Total	86.60%	89.10%	95.00%	101.10%	106.90%	100.30%

Table 2.28.2: Modeled VMT / Count VMT

	Central Business District	Fringe Business District	Outlying Business	Residential	Rural	Total
Interstate	--	--	--	--	101.30%	101.30%
Principal Arterial	--	96.30%	94.80%	104.90%	108.70%	104.30%
Minor Arterial	--	82.70%	96.70%	101.40%	95.90%	97.60%
Major Collector	81.30%	47.30%	83.70%	98.00%	107.80%	100.50%
Minor Collector	--	--	--	--	170.00%	170.00%
Local	107.30%	--	69.20%	95.50%	167.30%	119.00%
Total	84.20%	90.40%	93.90%	101.50%	105.10%	102.40%

Table 2.28.3: Assignment Validation Standards by Facility Type

Facility Type (FACTYPE)	ISMS Acceptable Error Threshold			
	AADT Volume/ Count Ratio	Daily Truck Volume/ Count Ratio	AM/PM Period Volume/ Count Ratios	Total RMSE
Total System	+/- 5%	+/- 10%	+/- 10%	40%
1 = Interstate	+/- 7%	+/- 10%	+/- 10%	30%
2 = Freeway	+/- 7%	+/- 10%	+/- 15%	30%
3 = Expressway	+/- 10%	+/- 15%	+/- 15%	35%
4 = System ramp	+/- 25%	+/- 40%	+/- 35%	x
5 – Service ramp	+/- 25%	+/- 40%	+/- 35%	x
6 = Principal arterial	+/- 10%	+/- 15%	+/- 15%	40%
7 = Minor arterial	+/- 10%	+/- 20%	+/- 20%	40%
8 = Collector	+/- 15%	+/- 30%	+/- 25%	x
9 = Minor collector	+/- 25%	+/- 40%	+/- 35%	x
10 = Local	N/A	N/A	N/A	N/A
11 = Gravel	N/A	N/A	N/A	N/A
12 = Centroid connectors	N/A	N/A	N/A	N/A

In terms of percent Root Mean Squared Error (%RMSE), the overall model is well below the 40% target for the entire system (**Table 2.28.4**). The %RMSE is 22.20%, which suggests a high level of accuracy when comparing model-estimated volumes to counts. By facility type, the model is also comfortably below the recommended level of error. When broken down by volume groups, the

%RMSEs are within preferable levels of error for almost all volume groups based on FSUTMS standards and well within acceptable levels of error for lower volume roads (**Table 2.28.5**).

Table 2.28.4: Percent Root Mean Square Error by Facility Type

	Central Business District	Fringe Business District	Outlying Business	Residential	Rural	Total
Interstate	--	--	--	--	9.80%	9.80%
Principal Arterial	--	9.90%	16.40%	8.80%	16.30%	13.90%
Minor Arterial	--	23.30%	18.30%	20.50%	26.00%	20.80%
Major Collector	31.80%	69.10%	44.10%	46.80%	37.60%	41.60%
Minor Collector	--	--	--	--	103.20%	103.20%
Local	32.40%	--	40.80%	100.90%	132.20%	82.60%
Total	31.70%	16.70%	20.10%	26.40%	20.70%	22.20%

Table 2.28.5: Percent Root Mean Square Error by Volume Groups

Low	High	Mid-Point	Number of Counts	% RMSE	FSUTMS - Acceptable	FSUTMS - Preferable
0	5000	2500	140	54.93%	100%	45%
5001	10000	7500	80	26.02%	45%	35%
10001	15000	12500	71	15.34%	35%	27%
15001	20000	17500	25	10.67%	35%	27%
20001	30000	25000	6	12.70%	35%	27%
30001	40000	35000	2	12.88%	35%	27%

Doing reasonableness checks of where the model predicts roads to be congesting or congested is another helpful calibration/validation check. The figures below show roads that are level-of-service D (volume to capacity ratio of 0.80 – 0.90), E (volume to capacity ratio of 0.90 – 1.00), and F (volume to capacity ratio greater than 1.00) in the weekday AM or PM time period, which represent the most congested conditions overall. The model shows very little congestion during the AM time period overall. The majority of the congestion is predicted in spot locations near ISU campus.

Figure 2.28.2: Base Year Model-Predicted Congesting and Congested Roads for Weekday AM Time Period

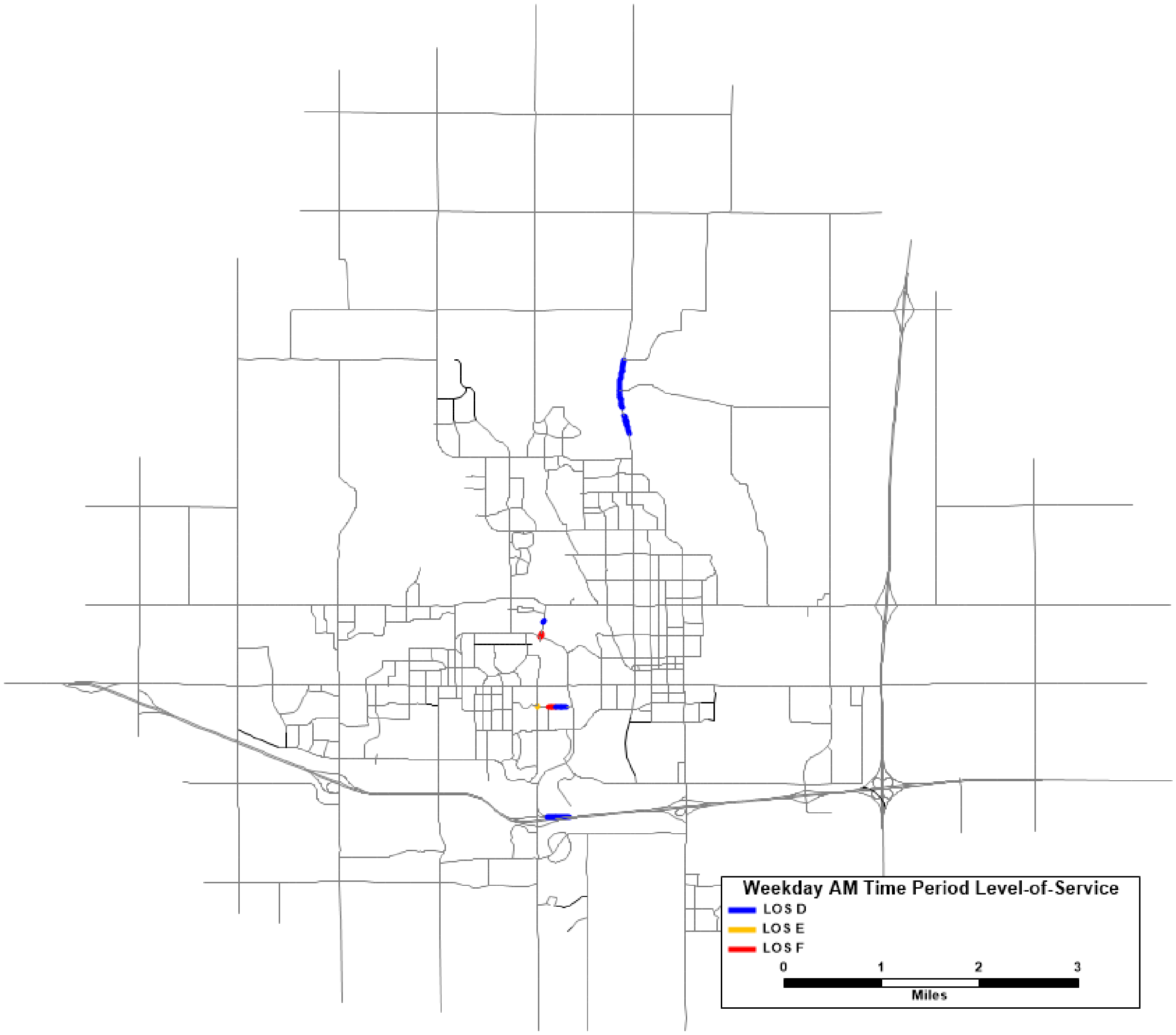
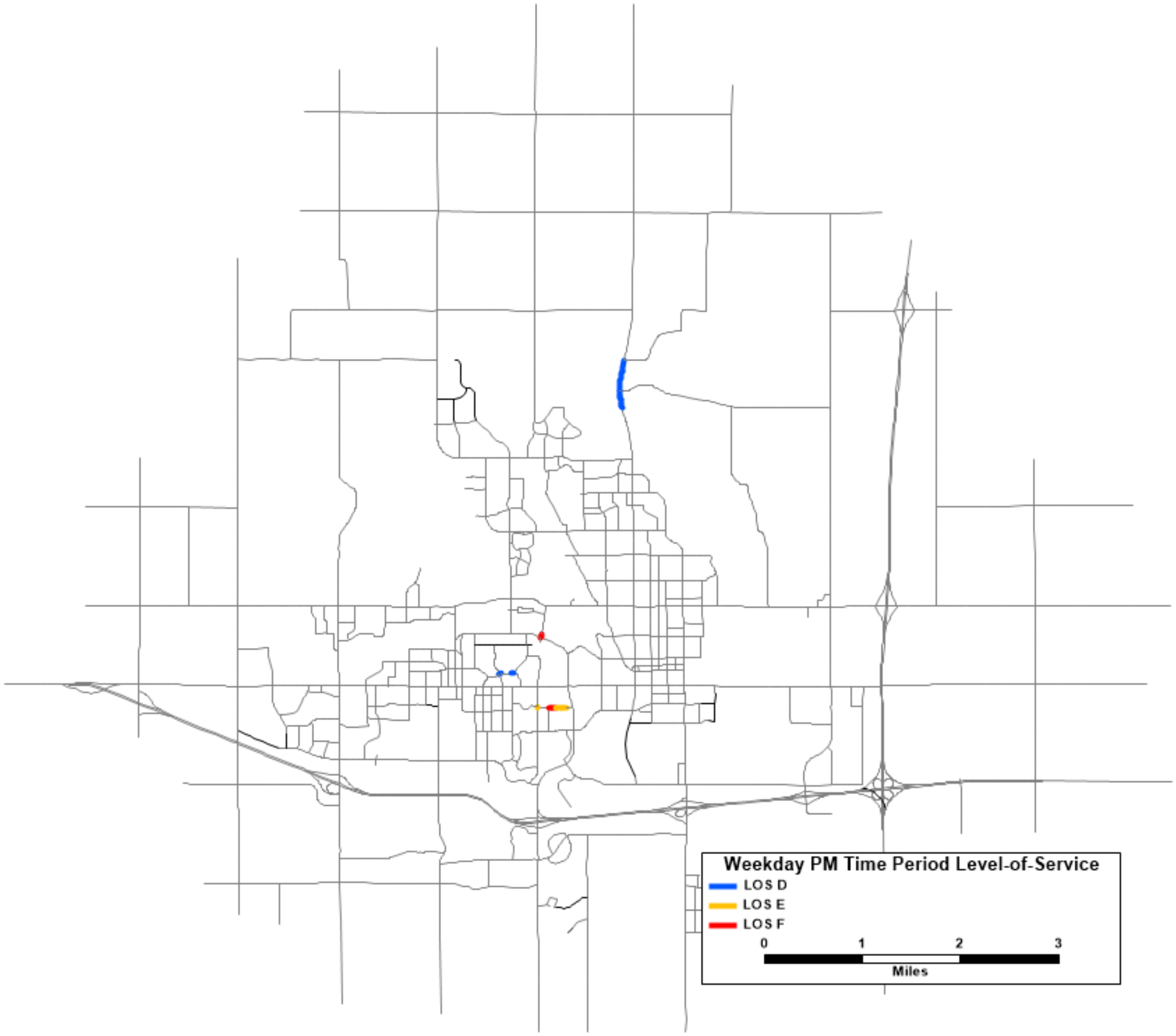


Figure 2.28.3: Base Year Model-Predicted Congesting and Congested Roads for Weekday PM Time Period

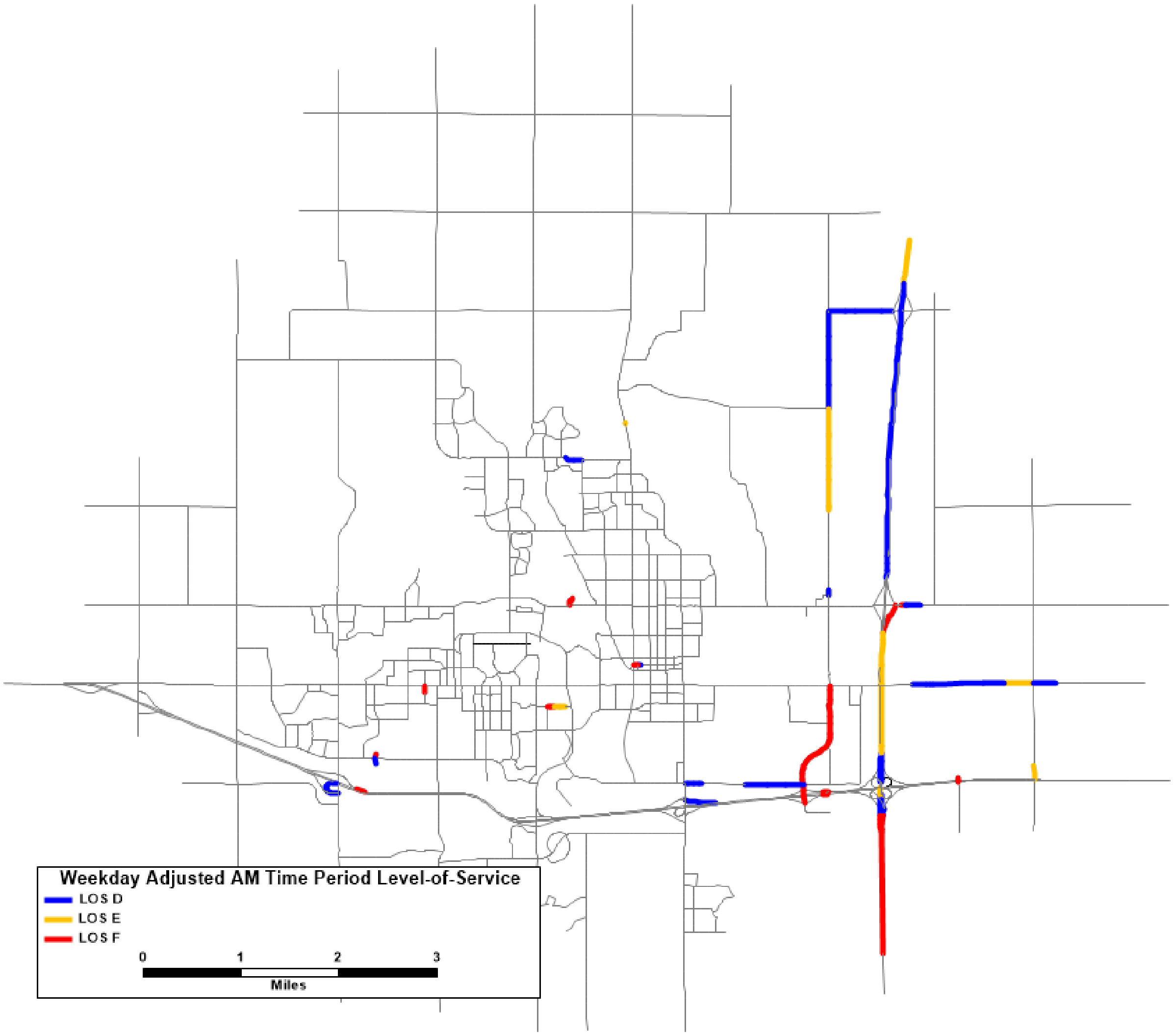


Future year Considerations

These validation results represent base year flows and conditions. Future year volumes will be altered based on the forecast households and non-residential land use growth, provided by City of Ames staff, as well as changes to travel time skims for the road and transit networks and forecasted external volumes. Adjusted forecast volumes are calculated within the script.

Model-estimated congesting and congested roads for the weekday AM or PM time period of a 2045 model run with planned road projects included are shown in **Figures 2.28.4** and **2.28.5** below. The volumes used for these figures are adjusted for counts by the same percentage daily volumes are adjusted. Many new areas of congestion occur compared to 2015, particularly along the southeastern portion of the model where a growing number of trips are coming to Ames from the Des Moines metro area to the south.

Figure 2.28.4: 2045 Forecast with Planned Road Projects Weekday AM Time Period Model-predicted Congesting and Congested Roads



FORWARD 2045

Figure 2.28.5: 2045 Forecast with Planned Road Projects Weekday PM Time Period Model-predicted Congesting and Congested Roads

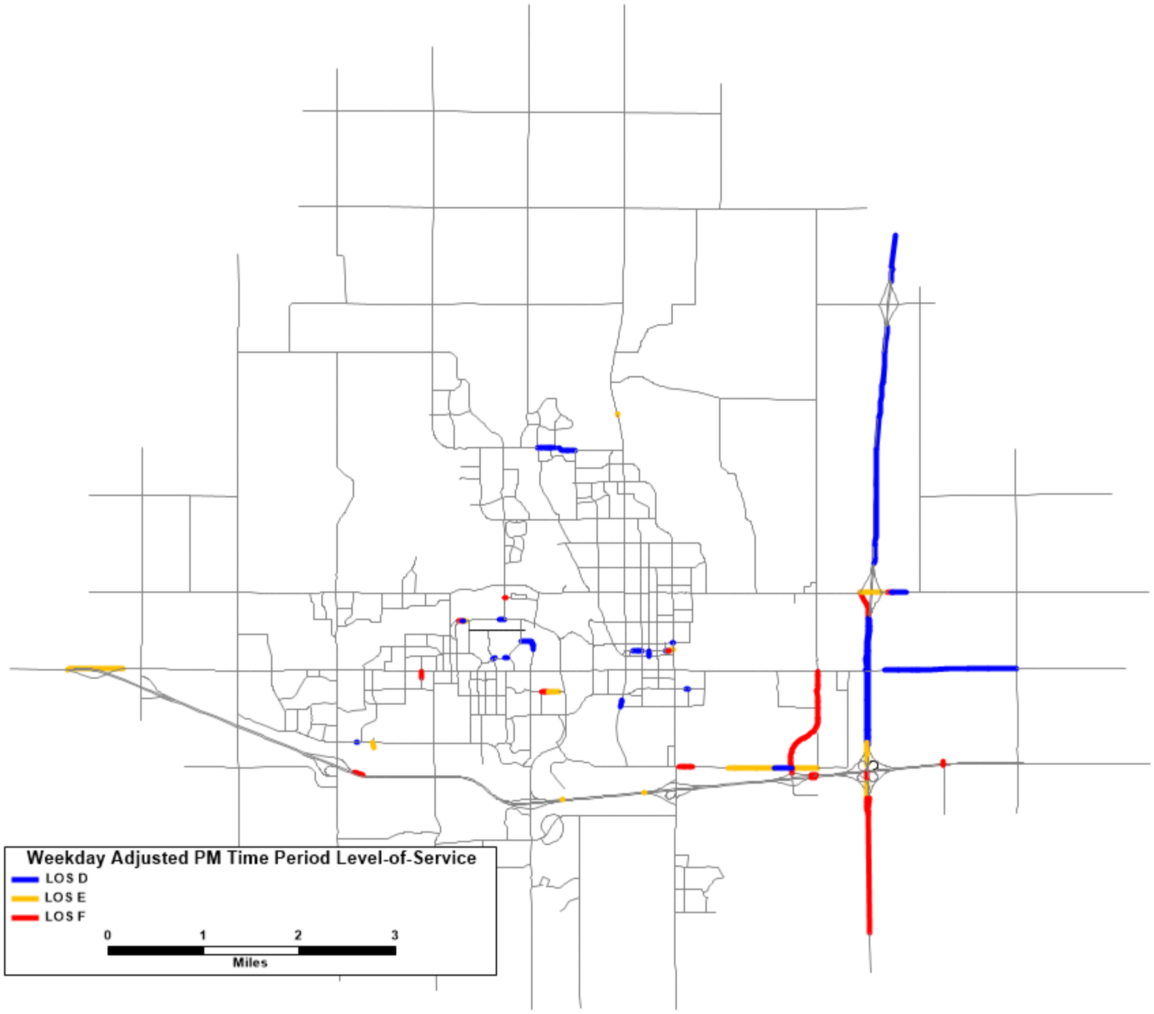


Table 2.28.6 shows a summary of growth from the base year to the 2050 forecast planned network scenario. Households and trips grow about 29-30%. Vehicle Miles Traveled (VMT) increases by more since much of the development is expected to be in the suburban or rural parts of the model area, and coming into the model area from external stations, where longer trips are a necessity. Vehicle Hours Traveled (VHT) increases by a much higher percentage as more vehicles on the road translates to more congestion and delay. These overall results are reasonable for mid-sized Midwestern communities growing at a moderately fast pace.

Table 2.28.6: Weekday Summary of Growth

	2016	2050	Percent Growth
Households	27,508	35,422	28.8%
Balanced Trips	446,059	581,631	30.4%
VMT*	1,388,785	2,102,638	51.4%
VHT*	35,155	59,418	69.0%

* No centroid connectors included

Summary of Changes to the ISMS Script and Approach

Although the ISMS process attempts to standardize each MPO model within Iowa, all individual models have different needs or make approved improvements to the ISMS process. As a result, the ISMS standard approach varies from region to region. This section summarizes those deviations from the standard ISMS approach for the Ames Area TDM.

Approach Changes

The approach changes listed below are items that alter the prescribed methods in the ISMS Manual or resulted in updates to the script. Edits in the AAMPO script can be reviewed by doing a control + F and searching for "HDR", and looking for a data range after August, 2019.

Off-Campus Student Household Equivalent Reduction Process

The ISMS script was originally double-counting trips made by university students by generating productions for both students and households. While this error is minor in most model areas, for the Ames model area the error would be very noticeable.

The script was edited to include an USTUD_HH field to the output TAZ file. This field calculates an estimate of households based on the number of off-campus students per TAZ and a conversion factor parameter set by the user in the user interface. Another new field, NS_HH, is used for the resulting non-student households after USTUD_HH are subtracted. The HH field remains a total household value and is not altered by this process.

Included with this process is a parameter in the user interface to turn the calculations on or off. The calculations can slow down model runtime, so models without a university sub-model can turn these calculations off to speed up model runtime. If the process is turned off, HH will be the field cross-classified and eventually used to generate trips. If the process is turned on, NS_HH will be used instead.

Residential Land Use Summary Update

It was discovered during the off-campus student household equivalent reduction process that only the RES (Residential) land use was aggregating households to the *templu.bin* files instead of all residential-related land uses such as Single Family Attached or Apartment. This had a relatively minor impact in other models since the *templu.bin* files are only used to calculate trip attractions, which are relatively small for households. Also, other ISMS models had set the AMT value equal to the HU value in the parcel data for residential land uses. However, to prevent future errors, this process was updated so that all residential land uses aggregate the HU field. Any additional housing units in non-residential land uses will get added to the RES land use total. For example, in a downtown mixed us building that has a commercial land use on the first floor and an apartment upstairs, the land use code reflects the commercial land uses in ISMS. The housing unit, however, will still be accounted for by adding on to the RES land use total.

University Sub-Model Updates

Three minor updates were made to the university sub-model process. First, a minor error was updated to allow the *UNIV_SE.bin* and *UNIV_Ext.bin* files to use inputs in scenario specific folders instead of the default inputs if they are available.

Second, university attractions for the entire day were originally not being split by time period and for day of the week when disaggregating attractions to the TAZs. This would have resulted in significantly higher university attractions.

Third, the balancing process was edited to allow UNIV trips to balance to productions instead of attractions. This was done because university trips are generated at the production end.

Parking Redistribution Process

The parking reallocation process in ISMS was updated to allow vehicle trips to be redistributed to parking lots instead of their original person trip destination if it is within a designated zone. Two fields are added to the output TAZ file, PARK_ALL and PARK_perc. The total number of parking spaces from the input TAZ file are summed to the PARK_ALL field. Next, a percentage is calculated for each TAZ based on what percent of the total parking within the designated area a TAZ represents.

Finally, the vehicle trip attractions within designated areas are summed to a single total and distributed to the TAZs based on the calculated PARK_perc field. The parking allocation section of this document provides more details.

Park and Ride Flag

The ISMS script originally used a selection of every TAZ with parking as the selection set to determine zones to use for park-and-ride (drive-to-transit model). This selection set interfered with the changes made to the Parking Redistribution Process. To address this, a new PNR field was added that represents a flag for any park-and-ride zones. Selection sets throughout the mode choice process were updated accordingly.

Post-Processing Updates

One minor update to the post-processing step was made to account for existing roads that disappear in the future. Originally, these roads would be included in a selection set used to calculate an adjusted flow (TOT_Flow_FCST). A value would appear in the TOT_Flow_FCST field even though no raw model flow would be produced.

In order to exclude these types of roads from the selection set PSPEED > 0 was added to the selection set. Existing roads that disappear are coded so that their speeds become zero in the future, so all of these links will be excluded.

Appendix D
Objective-Based Project Score

Project Scoring Overview

The Ames MTP has been developed through a performance-based process. Plan decision-making is framed on a set of goals and objectives that are based on National Planning Factors, Performance Measures and locally-tailored vision. Goals and objectives were established based on public and stakeholder feedback received in the early stages of plan development. A methodology for scoring how well projects fit with the plan vision was then established.

The scoring methodology developed a series of quantitative and qualitative project scoring measures that were tied to individual objectives. This scoring methodology allows a range of project types to be evaluated across travel modes, to determine the relative consistency of each potential project with the range of goals and objectives through a project score. The project scoring methodology is summarized in **Table 1**.

Role of Project Scoring

The intent of this project scoring methodology was to encapsulate each project's consistency with goals and objectives. The project scoring methodology assisted in determining the final project list for inclusion in the fiscally-constrained plan, but did not solely focus on the numerical project score itself. This approach acknowledges that some projects are more multi-faceted in nature, while other projects were developed with one goal in mind (like improving safety, or completing a gap in the current off-street trail network). The more multi-faceted projects will check more boxes in this analysis than the single-focus projects, and as a result might receive a slightly higher score than the critically-important single-focus project. In addition to the project scoring results, several other factors were included in determining which projects should be included in the fiscally-constrained plan:

- Current and Future Mobility, Safety, and Connectivity Issues
- Project Timing and Coordination with Other Projects
- Timing of Adjacent Growth
- Project Costs and Anticipated Future Budgets
- Public Input

Project Scoring Results

The project scoring was applied to the list of potential roadway and bicycle / pedestrian projects being considered for inclusion of the plan. The scoring results for each mode were clustered into high, medium, and low scoring tiers. The results of the roadway project scoring are summarized in **Table 2** and shown in **Figure 1**. The results of the bicycle and pedestrian scoring are summarized in **Table 3,** and shown in **Figure 2** for linear bike and pedestrian projects and **Figure 3** for bike and pedestrian crossing projects.

Table 1: Project Scoring Measures by Goal and Objective

Goal	Objectives	Project Scoring Measure	Project Scoring Methodology			
			+2	+1	0	-1
Accessible						
	Improve walk, bike, and transit system connections Improve bicycle and pedestrian access to CyRide routes	Multi-modal connectivity ranking	Creates or improves connection between two or more modes	Creates or improves connections for non-motorized or transit modes	No impact on connectivity for non-motorized or transit modes	Non-motorized or transit connection is removed, or barrier to non-motorized or transit modes is created
	Provide appropriate arterial, collector, bicycle, pedestrian, and transit corridor spacing	System Connectivity Assessment	New Multimodal network connection where a gap of ½ mile or more existing before.	Provides a new connection between two existing facilities, or an extension of an existing facility	-	-
	Provide improved access to transit for transit dependent, disabled, and disadvantaged populations	Transit accessibility ranking	Improves transit accessibility in identified EJ area	-	Does not impact transit accessibility in identified EJ area	Removes or creates barriers to transit accessibility in identified EJ area
	Incorporate bicycle, pedestrian, and transit-friendly infrastructure in new developments	Multi-model corridor extensions	Extends a bike, pedestrian, or transit corridor closer to an identified future development growth area.	-	Does not extend a bike, pedestrian, or transit corridor closer to an identified future development growth area.	Reduces facility connectivity.
Safe						
	Reduce number and rate of crashes Reduce number and rate of serious injury and fatal crashes	Vehicular safety assessment	Has the potential to improve safety at top crash frequency or crash rate intersection	Has the potential to improve safety at any intersection	Does not impact safety at top crash frequency or crash rate intersection	Has the potential to negatively impact safety
	Reduce the number of bicycle and pedestrian crashes	Non-motorized safety assessment	Has the potential to improve non-motorized safety at in corridors with observed non-motorized crash history	Has the potential to improve non-motorized safety in any corridor	Does not impact non-motorized safety at top crash frequency or crash rate intersection	Has the potential to negatively impact non-motorized safety
	Prioritize projects that improve the Ames Area Safe Routes to School Program	K-12 School connectivity assessment	Creates or improves connection to Safe Route to School network for two or more modes	Creates or improves connection to Safe Route to School network	No impact on connectivity to Safe Routes to School network	Removes or creates barrier to Safe Routes to School network
Sustainable						
	Reduce transportation impacts to natural resources	Environmental Screening	Is not located in an identified natural resource area	-	-	Is located in an identified natural resource area
	Limit transportation system emissions of greenhouse gases	VMT/VHT Projection	Provides a significant reduction in system-wide in VMT and VHT	Provides significant reduction system-wide in either VMT or VHT	Does not significantly impact system-wide VMT or VHT	Significantly increases system-wide VMT and VHT
	Make transportation infrastructure more secure, and resilient to natural and manmade events	Corridor Flood Risk	Project would reduce flooding risk for corridor.	-	Project would have no impact on flooding risk for corridor.	Project would increase flooding risk for corridor.
	Promote financially sustainable transportation system investments	Prioritize Investment in Existing Assets	Technology or management strategies on existing infrastructure	Minor system enhancements to existing infrastructure (e.g. turn lanes, protected bike lanes/side path)	Major system enhancements to existing infrastructure or new trails (e.g. roadway widening)	New transportation infrastructure (e.g. new corridor)

Goal	Objectives	Performance Measure	Project Scoring Methodology			
			+2	+1	0	-1
Efficient & Reliable						
	Identify context-sensitive strategies and projects that improve traffic flow in corridors with high levels of peak period congestion (LOS D or worse)	Traffic Level of Service	Improves LOS in corridor estimated to have LOS D or worse in 2045	Improves LOS	Does not impact LOS	Degrades LOS a letter grade or worse
	Maintain acceptable travel reliability on Interstate and principal arterial roadways	Passenger LOTTR	Has potential to improve reliability on an NHS corridor identified as having reliability issues	Has potential to improve reliability on an NHS corridor	Does not impact LOTTR	Worsens LOTTR on a NHS corridor
	Provide frequent transit service to high trip generation locations	Transit density screening	Improves transit frequency in identified high trip location	-	Does not impact transit frequency in identified high trip location	Worsens transit frequency in identified high trip location
	Increase the regional share of trips made by walking, biking, and transit	Walk/bike/transit mode shares	Major Increase to mode share for walking, biking, and/or transit	Slight Increase to mode share for walking, biking, and/or transit	Does not impact mode share for walking, biking, or transit	Reduces mode share for walking, biking, and/or transit
	Improve freight system reliability	Interstate TTTR	Has potential to improve freight reliability on Interstate corridor identified as having freight reliability issues	Has potential to improve freight reliability on Interstate corridor	No expected impact to freight reliability on Interstate corridor	Has potential to worsen freight reliability on Interstate corridor
	Identify technology solutions to enhance system operation	Technology Elements for System Management	Includes technology element that more effectively manages system operation	-	Does not include technology element	-
Placemaking						
	Increase the percentage of population and employment within close proximity to transit and/or walking and biking system.	Multi-modal Connectivity to Dense and Mixed-Use Nodes	Creates new, multi-modal connection between highest tier of dense / diverse land use.	Creates new, multi-modal connection between second highest tier of dense / diverse land use.	Does not create new, multi-modal connection to dense / diverse land use.	Removes multi-modal connection to dense / diverse land use.
	Provide transportation strategies and infrastructure that support current adopted plans	Project and Context Consistency	Project is proposed by other plan or would support neighborhood or district development goals.	-	Project is not included in other plans and is neutral in relation to neighborhood or district development goals.	Project is not included in other plans and would negatively impact neighborhood or district development goals.

Table 2: Roadway Project Scoring Results

Project ID	Project Description	Scoring Tier
16	13th St & Grand Ave - Left Turn Lanes (All Approaches)	High
19	Lincoln Way from Grand Ave to Duff Ave - Road Diet from 4 Lanes to 3 Lanes	High
29	Grand Ave from S 16th Street to Airport Rd - New Road w/ Traffic Signal @ Airport Road	High
30	Duff Ave from S 16th Street to Airport Rd - Widen to 6 Lanes/Reconstruct Interchange to 4 lane Diverging Diamond Interchange	High
32	Duff Ave from Airport Rd to 265th St - Widen to 5 Lanes	High
40	S 16th St from University Blvd to Dayton Ave - Traffic Signal Upgrades	High
44	Grand Ave from Bloomington Rd to 180th St - Widen to 4 Lanes and intersection improvements	High
1	520th Ave & W 190th St - Roundabout	Medium
2	530th Ave/Grant Ave & W 190th St - Roundabout	Medium
3	520th Ave & Cameron School Rd - Roundabout	Medium
4	E Riverside Rd to from Grand Ave to N Dayton Ave - Widen to 3 Lanes	Medium
13	N Dakota from Ontario St to UPRR - Widen to 3 Lanes	Medium
14	13th St & Stange Road - N/S Left Turn Lanes	Medium
17	13th St from Dayton Ave to 570th Ave - Widen to 6 Lanes/Reconstruct Interchange to 4 lane Diverging Diamond Interchange	Medium
18	13th St from 570th Ave to 580th Ave - Widen to 4 Lanes	Medium
20	Lincoln Way from Duff Ave to South Skunk River - Road Diet from 4 Lanes to 3 Lanes	Medium
21	Duff Ave & UPRR Crossing - Grade Separation	Medium
22	Dayton Ave from 13th St to Lincoln Way - Widen to 5 Lanes	Medium
24	Lincoln Way & Cherry Ave - Traffic Signal & Turn Lanes	Medium
25	Lincoln Way & University Blvd - Intersection Diet/Protected Intersection	Medium
26	Y St from Lincoln Way to Mortensen Rd including Mortensen Rd Extension to Y St - Pave 3 Lanes	Medium

Project ID	Project Description	Scoring Tier
28	13th Street & Dayton Ave - Add turn lane(s)	Medium
31	Lincoln Way & Y Street - Traffic Signal & Turn Lanes	Medium
37	Airport Rd from Duff Ave to Sam's Club - Improve Roadway/Access	Medium
38	Grand Ave & 20th St - Left Turn Lanes	Medium
39	Dayton Ave & Riverside Rd - Add Left Turn Lanes	Medium
42	Hyde Ave from Bloomington Rd to 190th St - Traffic Calming	Medium
43	George Washington Carver from Weston Dr to 190th St - Widen to 3 Lanes	Medium
45	190th St from 520th Ave to Grand Ave - Widen to 3 Lanes / Grade Separation w UPRR	Medium
46	Dayton Ave from 13th St to Riverside Rd - Widen to 3 Lanes	Medium
47	Cameron School Rd from George Washington Carver to Grant Ave - Pave to 3 Lanes / Grade Separation w/ UPRR	Medium
49	Lincoln Way from Thackery Rd to Y Ave - Widen to 4 Lanes	Medium
50	Ontario St from Idaho Ave to Y Ave - Widen to 3 Lanes	Medium
52	Lincoln Way from Y Ave to X Ave - Widen to 4 Lane	Medium
1a	520th Ave & W 190th St - Traffic Signal & Turn Lanes	Medium
2a	530th Ave/Grant Ave & W 190th St - Traffic Signal & Turn Lanes	Medium
3a	520th Ave & Cameron School Rd - Traffic Signal & Turn Lanes	Medium
5	E Riverside Rd from N Dayton Ave to 570th Ave - Add New 3-Lane Road & I-35 Overpass	Low
6	E Riverside Rd & I-35 - New Interchange (remove 190th St/I-35 Interchange)	Low
7	550th Ave from Ken Maril Rd to Airport Rd - Pave 2 Lanes	Low
9	Bloomington Rd from Hyde Ave to Hoover Ave - Widen to 4 Lanes	Low
10	580th St and UPPR Grade Separation	Low
12	550th Ave from 265th to Ken Maril Rd - Pave 2 Lanes	Low
27	Freel Dr from Lincoln Way to Dayton Ave - Add New Road	Low
33	265th St from Duff Ave to Skunk River - Pave to 3 Lanes	Low

Project ID	Project Description	Scoring Tier
34	265th St from Skunk River to I-35 - Pave to 2 Lanes	Low
35	265th St & I-35 - New Interchange	Low
36	265th from University Ave to Duff Ave & University Ave from 265th to Collaboration Pl - Pave to 3 Lanes	Low
48	Stange Rd Extension North to Cameron School Rd - Pave 3 Lanes	Low
51	Y Ave from Lincoln Way to Ontario St - Widen to 3 Lanes	Low
53	South Dakota Avenue from Lincoln Way to Mortensen Road - Widen to 5 lanes	Low
54	Lincoln Way from I-35 to 580th Ave - Widen to 3 Lanes	Low

Table 3: Bicycle and Pedestrian Project Scoring Results

Project ID	Project Description	Scoring Tier
CR 14	Intersection of 20th / Grand - Crossing / Signal Improvements	High
CR 25	Intersection of Grand / 24th St- Improvements for crossing visibility and safety	High
CR 36	Intersection of Mortensen Rd / Seagrave Blvd- beacon/signal upgrade	High
CR 41	Intersection of Grand Ave / 13th St - improvements for crossing visibility and safety (on bikeway) Implement with project ON-6 and roadway project 16	High
CR 42	Intersection of Lincoln Way / University - Protected intersection. Roadway project 25	High
CR 43	Intersection of Lincoln Way / Hyland - improvements for crossing visibility and safety (bike and pedestrian)	High
CR 46	Intersection of Lincoln Way / Beach Ave	High
CR 47	Intersection of Beach Ave / S 4th	High
CR 50	Intersection of 24th St and Stange Rd / Improvements for crossing visibility and safety	High
CR 6	Intersection of Lincoln Way / Clark - Improve crossing visibility	High
CR 7	Intersection of Grand / 30th St - Crossing Visibility / Signal improvements	High
OFF 1	East 13th sidepath, Northwestern Ave to Duff Ave.	High
OFF 10	Lincoln Way sidepath, Grand Ave to Duff Ave. With roadway projects 19 and 20.	High
ON 14	20th St Bike Route, Ames High to Grand	High
OFF 15	20th sidepath, Grand Ave to Duff Ave	High
OFF 2	West Mortensen Side Path, fill in gap west of South Dakota	High
OFF 20	Grand Ave Side Path between 6th and 16th Street	High
OFF 27	South Dayton Side Path between S 16th St and Lincoln Way	High
OFF 29	Cherry Street Connection to Squaw Creek	High
OFF 3	24th St sidepath, Grand Ave to Duff Ave	High
OFF 31	Hyland-Hayward South Campus Trail Connection	High
OFF 48	East 6th St to Skunk River Connection	High
OFF 50	South Duff Sidepath	High
OFF 55	Stange Rd Pedestrian Crossing	High
ON 15	Clark / Walnut bike boulevard, South 3rd to S 5th Street	High
ON 16	Welch On-Street Bike Treatment, Mortensen to Union Drive	High
ON 21	Bike Route north of Lincoln Way between North Dakota and Iowa State Campus	High
ON 22	Bike boulevard across Campus between Beach/Lincoln Way and Pammel/Stange	High
ON 26	20th Street Bike Route, Grand to Duff	
ON 29	Kellogg bike boulevard, S 3rd to 6th St	High

Project ID	Project Description	Scoring Tier
ON 30	Ash Ave bike boulevard, current bike lane end to Lincoln Way	High
ON 33	Cessna St Bike Boulevard	High
ON 44	Eisenhower Ave/Hayes Ave/Ridgewood Ave from Harrison Rd to 6th St - Bike Route	High
ON 47	Carroll Avenue Bike Route	High
CR 1	Intersection of University / Mortensen - Improve visibility / safety at Mortensen	Medium
CR 10	Intersection of US 30 / University North Ramp - Crossing Visibility / Signal improvements	Medium
CR 11	Intersection of Lincoln Way / Welch- Improvements for crossing visibility and safety	Medium
CR 12	Intersection of Hyland / Ontario - Improvements for crossing visibility and safety	Medium
CR 17	Stange at Bruner Dr Midblock - Improve crossing visibility / consider crossing signal	Medium
CR 18	Stange at Somerset - Midblock crossing improvements for visibility / consider crossing signal	Medium
CR 2	Intersection of University / S 16th St - Consider median crossing or pedestrian refuge	Medium
CR 20	Intersection of Lincoln Way / Lynn - - Improvements for crossing visibility and safety	Medium
CR 21	Intersection of Grand / Bloomington Rd - Crossing Visibility / Signal improvements	Medium
CR 22	Intersection of Lincoln Way / Ash- Improvements for crossing visibility and safety	Medium
CR 23	Intersection of Lincoln Way / Knoll - Improvements for crossing visibility and safety	Medium
CR 26	Beach / Mortensen crossing to provide safer crossing than University / Mortensen	Medium
CR 27	Lincoln Way / Stanton - Improvements for crossing visibility and safety	Medium
CR 28	Intersection of South Dakota Ave / Todd Dr- Improvements for crossing visibility and safety	Medium
CR 30	Intersection of Bloomington Rd / Eisenhower Ave- Improvements for crossing visibility and safety	Medium
CR 34	Intersection of Mortensen Rd / Welch Ave - ped signal	Medium
CR 35	Intersection of State Ave / Arbor St- beacon/signal upgrade	Medium
CR 37	Intersection of Wilmoth Ave / Lincoln Way- Improvements for crossing visibility and safety	Medium
CR 38	Bike/ped crossing to Ada Hayden from Hyde	Medium
CR 45	Intersection of University / S 4th St - protected intersection	Medium
CR 51	Intersection of Maxwell Ave and 13th St / Bike boulevard crossing improvement	Medium

Project ID	Project Description	Scoring Tier
CR 8	Intersection of Stange / 13th St - Improvements for trail crossing visibility	Medium
CR 9	Intersection of US 30 / University South Ramp - Crossing Visibility / Signal improvements	Medium
OFF 11	On-street facility on Cottonwood connecting Trail Connection	Medium
OFF 12	Worrell Creek Trail with US 30 Crossing (Identify Grade Separation)	Medium
OFF 16	Research Park / University Blvd Trail connection to Heart of Iowa trail (beyond MPO Boundary)	Medium
OFF 25	Riverside Rd Trail (Paved Shoulder is Alternative)	Medium
OFF 26	Dayton Trail or Improved Shoulders north of 13th Street	Medium
OFF 28	E 13th St Trail or Paved Shoulders for Bikes Extension past I-35	Medium
OFF 33	Squaw Creek Trail from Grand Avenue Extension to 4th Street	Medium
OFF 38	South Dakota / R38 Northbound Bike Connection between 240th Street and Mortensen	Medium
OFF 4	Wilder-Ontario Side Path Connection	Medium
OFF 41	Sidepath with S 500th Avenue Improvement between Lincoln Way and Mortenson Extension	Medium
OFF 42	Sidepath along Mortensen Avenue Extension west to S 500th Avenue (Developer Funded Roadway Project *	Medium
OFF 52	Squaw Creek trail	Medium
OFF 53	Skunk River trail connection	Medium
OFF 57	East 13th - 570th to 580th	Medium
OFF 6	North Dakota Side Path	Medium
OFF 7	George Washington Carver Side path or bike lanes on shoulder to Gilbert	Medium
OFF 9	Zumwalt Station to Oakwood Trail	Medium
ON 20	Bike boulevard along Wilder, Mortensen to Lincoln Way, with intersections improvements	Medium
ON 32	6th St bike boulevard east of Duff	Medium
ON 34	Oakland St bike boulevard between Trail and Hyland Ave	Medium
ON 36	Hoover Ave from Bloomington to Ada Hayden	Medium
ON 39	Bike boulevard on Crawford from 6th St up to Municipal Cemetery.	Medium
ON 4	Hoover On-Street Bike Treatment, 30th St to 24th St	Medium
ON 41	Welch Ave Pedestrian Mall (Lincoln to Hunt)	Medium
ON 43	Hazel St from 6th to S 4th - Bike Blvd	Medium
ON 45	Knapp St from path end (near Hayward Ave) to Ash St - bike blvd	Medium
ON 46	Gable/Sunset from Ash St to Beach - Bike blvd	Medium
ON 52	Arterial Widening	Medium
ON 53	Arterial Future	Medium
ON 56	Collector Future	Medium
ON 57	Arterial Future	Medium

Project ID	Project Description	Scoring Tier
ON 59	Collector Future	Medium
ON 60	Collector Future	Medium
ON 62	Collector Future	Medium
ON 63	Collector Future	Medium
ON 68	Collector Future	Medium
ON 69	Collector Future	Medium
ON 70	Collector Future	Medium
ON 71	Collector Future	Medium
ON 74	Arterial Future	Medium
ON 75	Arterial Widening	Medium
ON 78	Arterial Widening	Medium
CR 31	Intersection of Airport Rd / S Loop Dr (location 1)- Improvements for crossing visibility and safety	Low
CR 32	Intersection of Airport Rd / S Loop Dr (location 2)- Crosswalks across Airport Rd	Low
CR 33	Intersection of Mortensen Rd / Wilder Blvd, Mortensen Rd / Miller Ave, Mortensen Rd / Poe Ave- Improvements for crossing visibility and safety	Low
CR 39	Intersection of Weston / George W Carver - add crosswalk/ other safety improvements	Low
CR 48	Grade Separation of RR at 580th	Low
CR 49	Skunk River Trail Grade Separated Crossing of 13th	Low
OFF 21	Recreational Trail Adjacent to Veenker Golf Course and Reactor Woods	Low
OFF 24	South Skunk River Trail extension to MPO Boundary	Low
OFF 34	Bloomington Road and Squaw Creek Trail connection to north MPO Boundary	Low
OFF 36	Cameron School Road sidepath to west MPO Boundary	Low
OFF 37	US 69 South Trail to MPO Boundary	Low
OFF 39	Skunk River Trail connection between soft-surfaced trails near Peterson Park to Ada Hayden Park. Co*	Low
OFF 40	Sidepath with Grand Avenue Roadway Extension between S 16th St and Airport Road	Low
OFF 54	State Ave from Mortenson to MPO boundary	Low
OFF 56	Lincoln Hwy east of Dayton	Low
OFF 58	580th Lincoln to 13th	Low
ON 48	Arterial Widening	Low
ON 49	Arterial Future	Low
ON 50	Arterial Widening	Low
ON 51	Arterial Widening	Low
ON 54	Arterial Widening	Low

Project ID	Project Description	Scoring Tier
ON 55	Collector Future	Low
ON 61	Collector Future	Low
ON 64	Collector Future	Low
ON 65	Collector Future	Low
ON 66	Collector Future	Low
ON 67	Collector Future	Low
ON 72	Arterial Future	Low
ON 73	Arterial Widening	Low
ON 76	Collector Future	Low
ON 77	Collector Future	Low

Figure 1: Alternative Roadway Projects by Scoring Tier

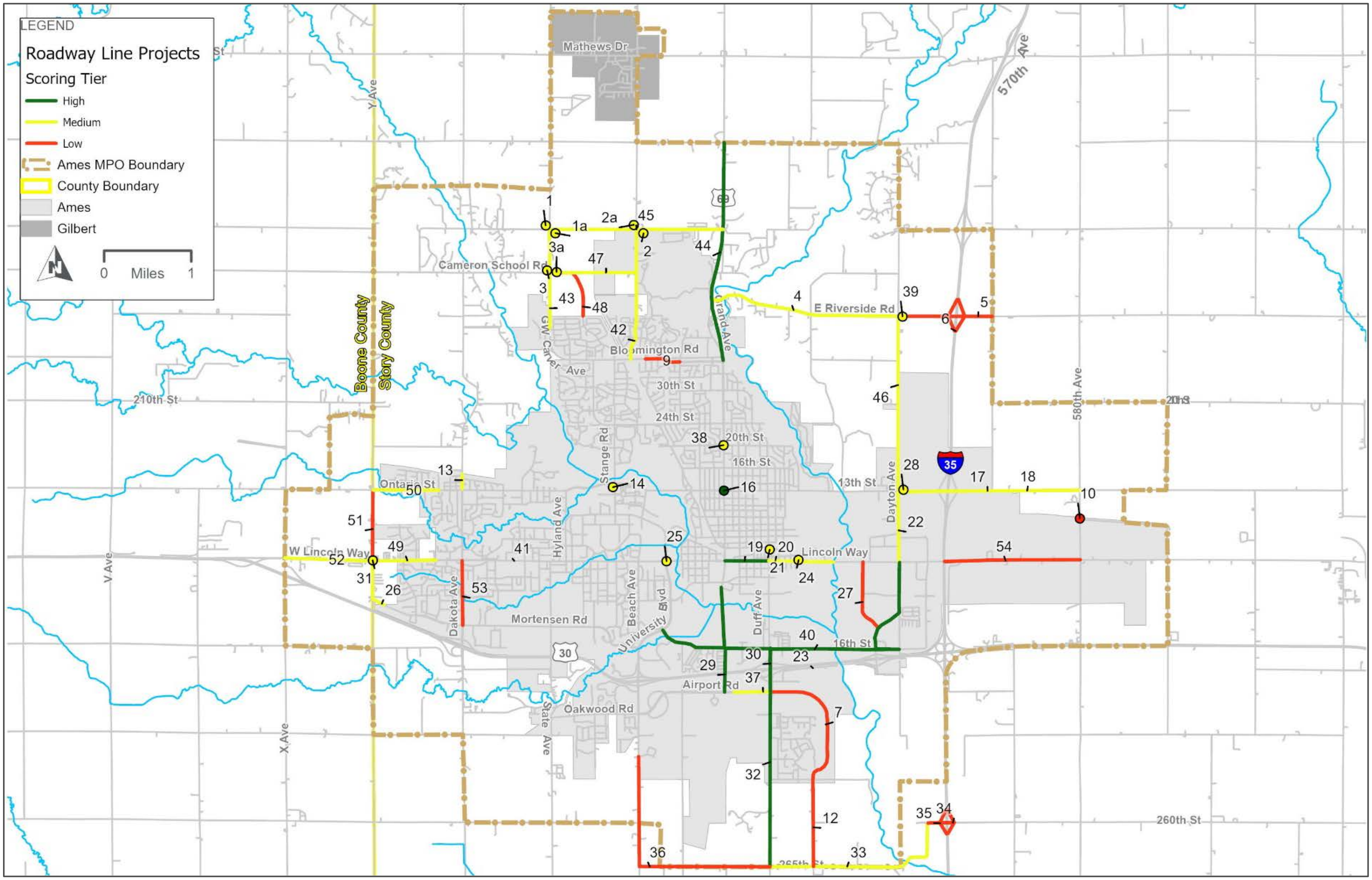


Figure 2: Alternative Bike and Pedestrian Projects by Scoring Tier

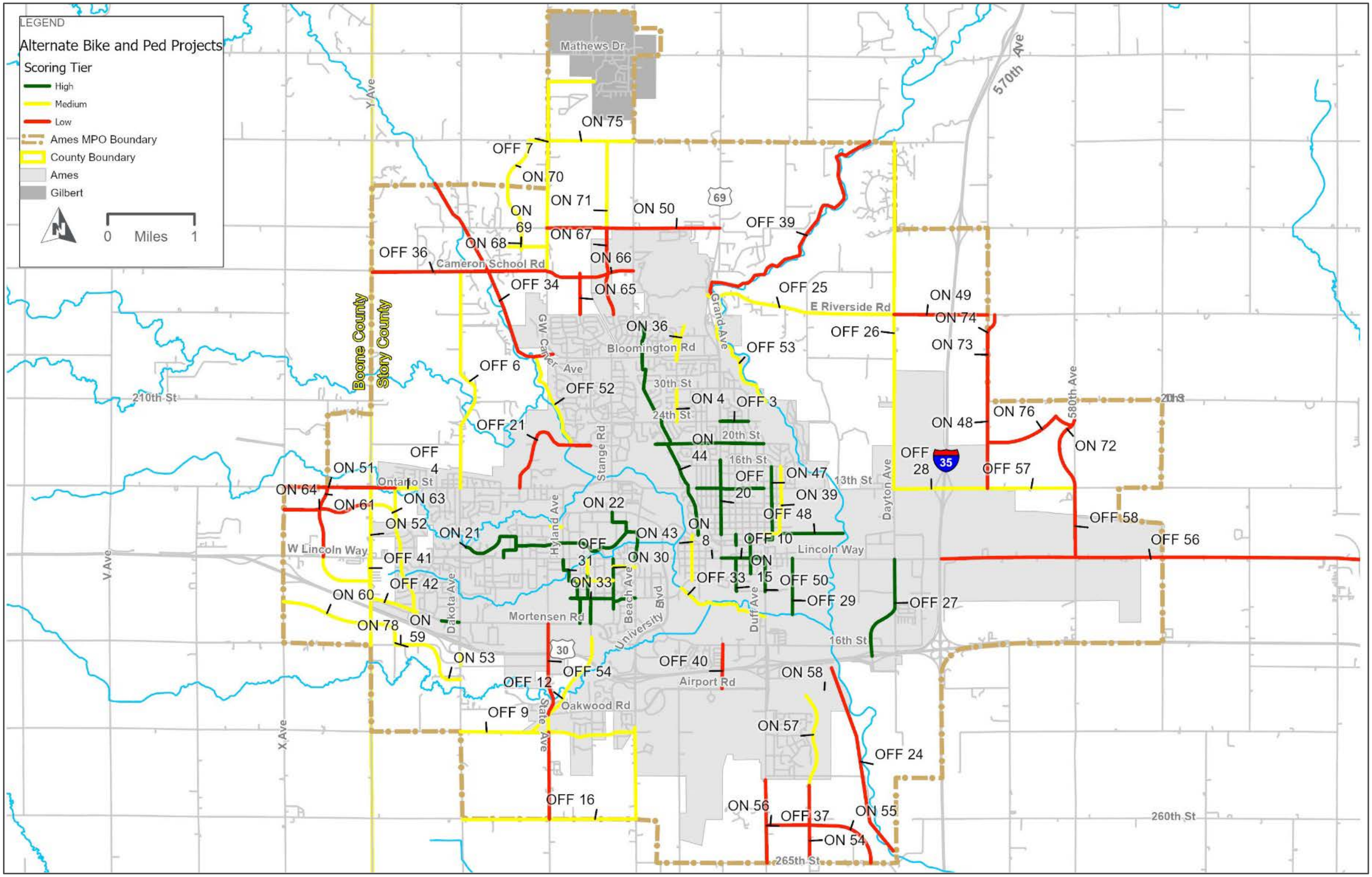
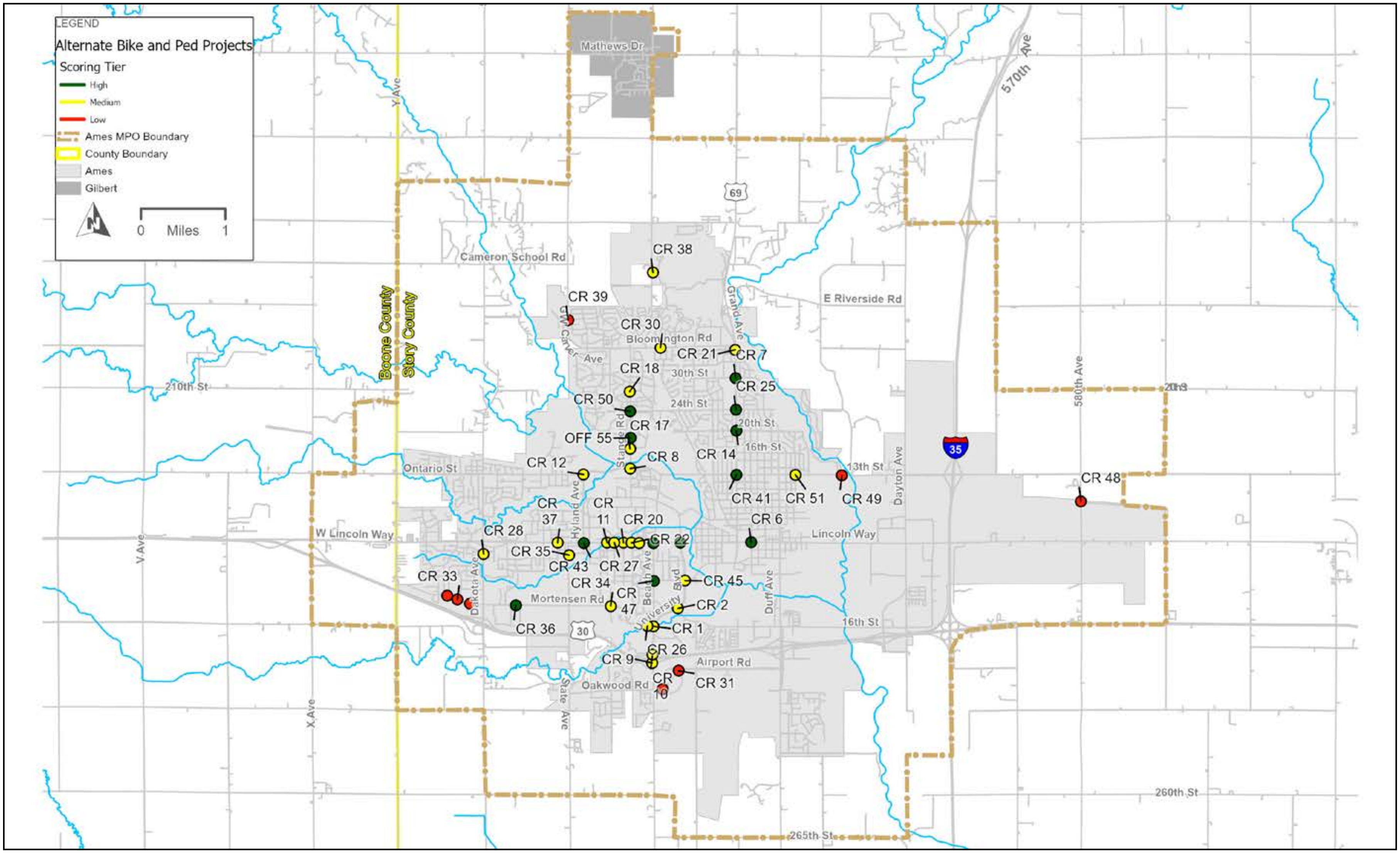


Figure 3: Alternative Bike and Pedestrian Crossing Projects by Scoring Tier



Appendix E
Current TIP

FINAL

Federal Fiscal Years 2021 – 2024 Transportation Improvement Program

Ames Area Metropolitan Planning Organization

The Ames Area MPO prepared this report with funding from the U.S. Department of Transportation's Federal Highway Administration and Federal Transit Administration, and in part through local matching funds of the Ames Area Metropolitan Planning Organization member governments. These contents are the responsibility of the Ames Area MPO. The U.S. government and its agencies assume no liability for the contents of this report of for the use of its contents. The Ames Area MPO approved this document on July 14, 2020. Please call (515) 239.5160 to obtain permission to use.

CONTENTS

INTRODUCTION

The Federal Fiscal Year 2021 - 2024 Transportation Improvement Program is the short-range implementation program for Federally funded and regionally significant transportation projects. The TIP is a requirement of 23 CFR 450.326 for metropolitan planning organizations to develop a program reflecting the investment priorities established in the long-range transportation plan covering at least four (4) years. The Ames Area MPO develops a new TIP annually in cooperation with the Iowa Department of Transportation and CyRide. The Ames Area TIP is included in the State Transportation Improvement Program (STIP), which is developed by the Iowa Department of Transportation.

The TIP can be found online at:
https://www.cityofames.org/government/aampo/tip

The STIP can be found online at:
https://iowadot.gov/program_management/statewide-transportation-improvement-program-stip

Role of the TIP

The Transportation Improvement Program (TIP) is a public document developed of planned transportation improvements within the Ames Area MPO planning boundary that are expected to utilize Federal-aid funds or are considered regionally significant. Each project must include specific information detailing the project including the scope, year-of-expenditure cost, funding sources, and location. Local projects not using Federal funds to construct them may not be listed in the program.

The TIP is a short-range plan and is considered a tool for implementing the long-range transportation plan. Projects must be identified in the long-range plan prior to being listed in the TIP, and a project cannot receive Federal funds unless it is contained in the TIP.

Ames Area MPO Organization

The Ames Area MPO was officially designated the MPO of the Ames urbanized area by the Governor of Iowa in March 2003. This designation was the result of the Ames urbanized area having a population of greater than 50,000 in the 2000 census. As a result of the 2010 Census, the urbanized areas of Ames and Gilbert were combined into one urbanized area, therefore requiring the Metropolitan Planning Area to be expanded to encompass this area in its entirety. The Ames Area MPO approved the current Metropolitan Planning Area boundary on November 13, 2012. The City of Gilbert and Iowa State University were added to the Transportation Policy Committee on March 26, 2013.

Ames is located in central Iowa and is served by Interstate 35, U.S. Highway 30, and U.S. Highway 69. Surface transportation needs are met through over 249 centerline miles of streets. The community has a very progressive transit system, CyRide, which carries over six million bus passengers per year. While the majority of transit users have Iowa State University ties, CyRide serves the entire Ames community.

The Ames Area MPO area includes the Ames Municipal Airport, which serves general aviation needs for business, industry, and recreation users. On average 93 aircraft operations occur per day at the Ames

Municipal Airport. Railroad provides freight service to the area by dual east-west mainline tracks and a northern agricultural spur.

The Ames Area MPO provides continuity of various transportation planning and improvement efforts throughout the Ames urban area. The City of Ames serves as the fiscal agent for the Ames Area MPO.

The Ames Area MPO consists primarily of two standing committees: The Transportation Policy Committee and the Transportation Technical Committee.

TRANSPORTATION POLICY COMMITTEE

The Transportation Policy Committee (TPC) is the policy setting board of the MPO and the membership consists of local officials. Voting membership on the committee includes city and county governments located, wholly or partially, in the Ames Area MPO planning boundary as well as the local transit agency. Currently the TPC membership includes: City of Ames, City of Gilbert, CyRide, Boone County, and Story County. The Iowa Department of Transportation, the Federal Highway Administration, the Federal Transit Administration, and Iowa State University serve as advisory, non-voting, representatives.

TRANSPORTATION TECHNICAL COMMITTEE

The Transportation Technical Committee (TTC) consists of technical personnel from various agencies involved in transportation issues within the planning area. The Transportation Technical Committee formulates the procedural details of the Transportation Planning Work Program. The committee reviews and monitors the output of various MPO activities identified in the work program and makes recommendations to the policy committee. The committee is also responsible for assisting in developing the short and long-range transportation plans. The Iowa Department of Transportation, the Federal Highway Administration, and the Federal Transit Administration serve as advisory, non-voting, representatives.

Public Participation in the Planning Process

This document was developed in coordination with MPO member agencies, regional stakeholders, and members of the public. The MPO planning process includes strategies to disseminate information about the project selection process and provides opportunities for interested parties to provide information to the policy committee.

EDUCATION AND INFORMATION

WEBSITE

The Ames Area MPO utilizes the MPO website at https://www.aampo.org to make draft documents, maps, and other materials accessible anytime of any day in a format that is adaptable to mobile devices and website text which can be translated into any language available through translation services.

E-NOTIFICATION

Anyone with an e-mail address may sign-up for receiving notifications of news and events published from the MPO with our e-notification system. During the development of this program, approximately 160 users receive e-notifications, including announcements of FFY 2021-2024 TIP public meetings, public comment periods, and draft documents.

PUBLIC INVOLVEMENT OPPORTUNITIES

PUBLIC OPEN HOUSE

An open house provides members of the public the opportunity to drop-in to view projects, meet with staff, and leave comments on the proposed program. The event hosted on May 21, 2020, was held virtually via a Microsoft Teams meeting due to COVID-19 restrictions. No formal presentation was given allowing for visitors to come and go at any time during the event.

PUBLIC COMMENT PERIOD

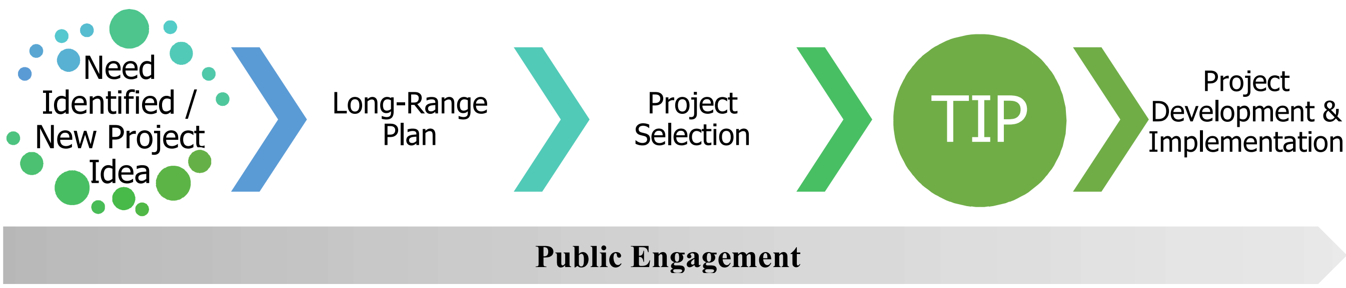
During the comment period, the draft document and maps of the proposed projects are available online or in hardcopy at the Ames Area MPO office.

TRANSPORTATION POLICY COMMITTEE HEARINGS

The Transportation Policy Committee hearings provide time for anyone of the public to address the committee prior to consideration of the program. The meetings are livestreamed on Ames Channel 12 and on Facebook. Meetings are also made available on-demand on the City of Ames website, on the City of Ames Facebook page, and on the City of Ames YouTube channel.

PROGRAM DEVELOPMENT

The Transportation Improvement Program (TIP) serves as a list of DOT and locally sponsored federal-aid eligible and Swap surface transportation improvements within the Ames-Gilbert region. Projects in the Ames Area TIP must be consistent with the long-range transportation plan, known as Ames Mobility 2040. The final document, approved by the Transportation Policy Committee, will be consolidated into the State Transportation Improvement Program (STIP) along with the other 26 planning agencies in the State of Iowa.



Performance Based Planning and Performance Management

Performance based planning and performance management became a focus for State and regional transportation planning with the signing of the 2012 surface transportation bill Moving Ahead for Progress in the 21st Century (MAP-21). The Federal government established a seven national goals through MAP-21, and maintained in subsequent Federal legislation, with the purpose of improving decision-making through performance-based planning and programming.

The Ames Area MPO must establish and use a performance-based approach to transportation decision making to support the national goals.

KEY TERMS:

Goal: a broad statement the describes a desired end state
Objective: a specific, measurable statement that supports achievement of a goal
Performance Measures: metric used to assess progress towards meeting an objective
Target: specific level of performance that is desired to be achieved within a certain timeframe

National Goals

- Safety
- Infrastructure Condition
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability
- Project Delivery

Regional Goals

- Connected, Efficient, and Reliable
- Safety
- Environment
- Accessibility
- Economy and Goods Movement
- Asset Management

ROAD SAFETY

Goal: Significant reduction in traffic fatalities and serious injuries on all public roads.

Performance Measures

Goal Area	Road Safety
Performance Measures	• Number of Fatalities • Rate of Fatalities per 100 million VMT • Number of Serious Injuries • Rate of Serious Injuries per 100 million VMT • Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries

Performance Targets

Rather than setting its own safety targets, the Ames Area MPO has chosen to support the Iowa DOT's safety targets as published in the most recent Iowa Highway Safety Improvement Program Annual Report. The MPO supports those targets by reviewing and programming all Highway Safety Improvement Program (HSIP)[1] projects within the MPO boundary that are included in the DOT's Transportation Improvement Program.

Any Iowa DOT Sponsored HSIP projects within the MPO area were selected based on the strategies included in the Strategic Highway Safety Plan and safety performance measures and were approved by the Iowa Transportation Commission. The Iowa DOT conferred with numerous stakeholder groups, including the Ames Area MPO, as part of its target setting process. Working in partnership with local agencies, Iowa DOT safety investments were identified and programmed which will construct effective countermeasures to reduce traffic fatalities and serious injuries. The Iowa DOT projects chosen for HSIP investment are based on crash history, roadway characteristics, and the existence of infrastructure countermeasure that can address the types of crashes present. The Iowa DOT continues to utilize a systemic safety improvement process rather than relying on "hot spot" safety improvements.

Performance Measure	Five Year Rolling Averages	
	2014-2018 Baseline	2016-2020 Target[2]
Number of Fatalities	337.4	345.8
Fatality Rate – per 100 million VMT	1.046	1.011
Number of Serious Injuries	1,499.1	1,396.2
Serious Injury Rate – per 100 million VMT	4.497	4.083
Non-Motorized Fatalities and Serious Injuries	134.2	138.1

*Ames Area MPO Targets adopted September 24, 2019

[1] https://safety.fhwa.dot.gov/hsip/reports/pdf/2019/ia.pdf
[2] Methodology for Iowa DOT FHWA Safety Targets https://iowadot.gov/systems_planning/fpmam/Iowa-2016-2020-safety-targets.pdf

TRANSIT SAFETY

Goal: Improve safety of all public transportation systems, specifically in the areas of fatalities, injuries, safety events (ex.: collisions, derailments), and system reliability.

Performance Measures

Goal Area	Transit Safety
Performance Measures	• Number of Fatalities • Number of Serious Injuries • Safety Events • System Reliability

Performance Targets

CyRide's Safety Plan, due by December 31, 2020 (deadline extended from July 20, 2020 due to COVID-19), will include processes and procedures to implement Safety Management Systems (SMS) at CyRide to anticipate future risks and detect problems before safety issues occur. This plan, which will be re-certified each year thereafter, will include strategies for minimizing the exposure of the public, personnel, and property to unsafe conditions and again include safety performance targets. SMS will support a data-based framework to identify and analyze safety hazards and risks to prioritize resources towards the mitigation of these issues. As CyRide's Safety Plan and safety performance targets are established for FY2021, this information will be shared annually with the Ames Area MPO as projects are prioritized within the Ames Area MPO's LRTP, TPWP and TIP.

PAVEMENT AND BRIDGE

Goal: Maintain the condition of pavement and bridges in a state of good repair.

Performance Measures

Goal Area	Pavement and Bridge
Performance Measures	• 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 • Percent of NHS bridges classified as in Good condition • Percent of NHS bridges classified as in Poor condition

Performance Targets

Rather than setting its own pavement and bridge targets, the Ames Area MPO has chosen to support the Iowa DOT's pavement and bridge targets as submitted in the most recent baseline period performance report[3]. The MPO supports those targets by reviewing and programming all Interstate and National Highway System projects within the MPO boundary that are included in the DOT's Transportation Improvement Program.

Any Iowa DOT sponsored pavement and bridge projects within the MPO area were determined in alignment with the Iowa Transportation Asset Management Plan (TAMP) and the pavement and bridge performance measures. The TAMP connects Iowa in Motion 2045 and system/modal plans to Iowa DOT's Five-Year Program and the STIP. Iowa in Motion 2045 defines a vision for the transportation system over the next 20 years, while the Five-Year Program and STOP identify specific investments over the next four to five years. The TAMP has a 10-year planning horizon and helps ensure that investments in the Five-Year Program and STIP are consistent with Iowa DOT's longer-term vision. Starting in 2019, the TAMP began to integrate the pavement and bridge performance targets.

The Iowa DOT conferred with numerous stakeholder groups, including the Ames Area MPO and local owners of NHS assets, as part of its target setting process. The methodology used to set targets used current and historical data on condition and funding to forecast future condition. Asset management focuses on performing the right treatment at the right time to optimize investments and outcomes. Management systems are utilized to predict bridge and pavement needs and help determine the amount of funding needed for stewardship of the system. The TAMP discusses the major investment categories that the Commission allocates funding through. Once the Commission approves the funding for these categories, Iowa DOT recommends the allocation of the funds to specific projects using the processes described in the TAMP. Pavement and bridge projects are programmed to help meet the desired program outcomes documented in the TAMP.

Performance Measure	2017 Baseline	4 Year Targets[4]
Percentage of pavements of the Interstate System in Good condition	N/A	49.4%
Percentage of pavements of the Interstate System in Poor condition	N/A	2.7%
Percentage of pavements of the non-Interstate NHS in Good condition	50.9%	46.9%
Percentage of pavements of the non-Interstate NHS in Poor condition	10.6%	14.5%
Percentage of NHS bridges classified as in Good condition	48.9%	44.6%
Percentage of NHS bridges classified as in Poor condition	2.3%	3.2%

*Ames Area MPO Targets adopted September 25, 2018

[3] 2018 Baseline Performance Period Report https://iowadot.gov/systems_planning/fpmam/2018-Baseline-Performance-Period-Report.pdf
[4] Methodology Iowa DOT Pavement and Bridge Performance Measures https://iowadot.gov/systems_planning/fpmam/2018-2021-Pavement-Bridge-Targets.pdf

TRANSIT ASSET MANAGEMENT

Goal: Maintain the condition of public transit assets in a state of good repair.

Performance Measures

Goal Area	Transit Asset Management
Performance Measures	• Equipment: Percent of non-revenue vehicles met or exceeded Useful Life Benchmark • Rolling Stock: Percentage of revenue vehicles met or exceeded Useful Life Benchmark • Facilities: Percentage of assets with condition rating below 3.0 on FTA TERM scale • Infrastructure: (Not applicable)

Performance Targets

Public transit capital projects included in the STIP align with the transit asset management (TAM) planning and target setting processes undertaken by the Iowa DOT, transit agencies, and MPOs. The Iowa DOT establishes a group TAM plan and group targets for all small urban and rural providers while large urban providers establish their own TAM plans and targets. Investments are made in alignment with TAM plans with the intent of keeping the state's public transit vehicles and facilities in a state of good repair and meeting transit asset management targets. The Iowa DOT allocates funding for transit rolling stock in accordance with the Public Transit Management System process. In addition, the Iowa DOT awards public transit infrastructure grants in accordance with the project priorities established in Iowa Code chapter 924. Additional state and federal funding sources that can be used by transit agencies for vehicle and facility improvements are outlined in the funding chapter of the Transit Manager's Handbook. Individual transit agencies determine the use of these sources for capital and operating expenses based on their local needs.

CyRide, the transit agency within the Ames Area MPO, has established their own TAM plan and targets which they review and amend, if needed, each fall by October 1st. In March 2020, the Ames Area MPO adopted these transit asset management targets that also match CyRide TAM targets. The infrastructure performance measure element which FTA requires is limited to rail fixed guideway assets of which there is not any rail passenger service with Ames.

Class	2019 Target	2019 Year-End Results	2020 Performance Target	2021	2022	2023	2024
Rolling Stock 40'-60' Buses	35%	**36%**	**33%** of fleet exceeds CyRide's ULB of 15 yrs.	33%	33%	31%	33%
Rolling Stock Cutaways	67%	**67%**	**67%** of fleet exceeds FTA ULB of **8 yrs.**	89%	89%	0%	0%
Equipment Shop Trucks	0%	**50%**	**0%** of fleet exceeds CyRide's ULB of 10 yrs.	0%	0%	0%	0%
Facilities Admin./Maint.Facility	0%	**0%**	**0%** of facilities rated under 3.0 on TERM scale	0%	0%	0%	0%
Facilities Ames Intermodal Facility	0%	**0%**	**0%** of facilities rated under 3.0 on TERM scale	0%	0%	0%	0%

*Ames Area MPO Targets adopted March 24, 2020

SYSTEM AND FREIGHT RELIABILITY

Goal: Achieve a significant reduction in congestion on the National Highway System.

Performance Measures

Goal Area	System and Freight Reliability
Performance Measures	• Percent of person-miles traveled on the Interstate that are reliable • Percent of person-miles traveled on the non-Interstate NHS that are reliable • Truck Travel Time Reliability Index

Performance Targets

Rather than setting its own system and freight reliability targets, the Ames Area MPO has chosen to support the Iowa DOT's system and freight reliability targets as submitted in the most recent baseline period performance report[5]. The MPO supports those targets by reviewing and programming all Interstate and National Highway System projects within the MPO boundary that are included in the DOT's Transportation Improvement Program.

The Iowa DOT conferred with numerous stakeholder groups, including the Ames Area MPO, as part of its target setting process. Variability within the existing travel time dataset was used to forecast future condition. Projects focused on improving pavement and bridge condition also often help improve system reliability and freight movement. Additional projects focused specifically on improving these areas of system performance are developed in alignment with the target-setting process for related performance measures, and the freight improvement strategies and freight investment plan included in the State Freight Plan. This plan includes a detailed analysis and prioritization of freight bottlenecks, which are locations that should be considered for further study and possibly for future improvements. The process also involved extensive input from State, MPO, RPA, and industry representatives. State projects identified in the freight investment plan and programmed in the STIP were highly-ranked freight bottlenecks.

Performance Measure	2017 Baseline	4 Year Targets[6]
Percent of the person-miles traveled on the Interstate that are reliable	100%	99.5%
Percent of the person-miles traveled on the non-Interstate NHS that are reliable	N/A	95.0%
Truck Travel Time Reliability (TTTR) Index	1.12	1.14

*Ames Area MPO Targets adopted September 25, 2018

[5] 2018 Baseline Performance Period Report https://iowadot.gov/systems_planning/fpmam/2018-Baseline-Performance-Period-Report.pdf

[6] Methodology Iowa DOT System Performance and Freight Measures https://iowadot.gov/systems_planning/fpmam/2018-2021-System-Performance-Freight-Targets.pdf

Air Quality

The Clean Air Act requires the United States Environmental Protection Agency (EPA) to set limits on how much of a particular pollutant can be in the air anywhere in the United States. National Ambient Air Quality Standards (NAAQS) are the pollutant limits set by the Environmental Protection Agency; they define the allowable concentration of pollution in the air for six different pollutants: Carbon Monoxide, Lead, Nitrogen Dioxide, Particulate Matter, Ozone, and Sulfur Dioxide.

The Clean Air Act specifies how areas within the country are designated as either "attainment" or "non-attainment" of an air quality standard and provides the EPA the authority to define the boundaries of nonattainment areas. For areas designated as non-attainment for one or more National Ambient Air Quality Standards, the Clean Air Act defines a specific timetable to attain the standard and requires that non-attainment areas demonstrate reasonable and steady progress in reducing air pollution emissions until such time that an area can demonstrate attainment.

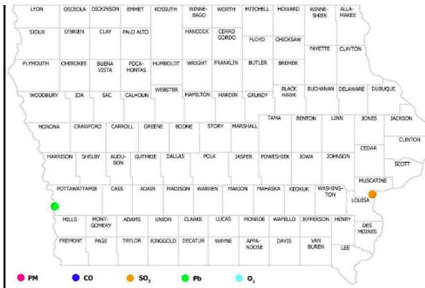


Figure 1. Iowa Non-Attainment Areas (2015)[7]

The **Ames Area MPO does not exceed the National Ambient Air Quality Standards and is considered an attainment area**.

No part of the Ames Area is within Nonattainment; therefore, it is not subject to air quality conformity requirements. However, the Ames Area MPO will perform activities to monitor and promote air quality issues in the region. The State of Iowa provides grant opportunities through the Iowa Clean Air Attainment Program (ICAAP) to promote air quality in Iowa's transportation system.

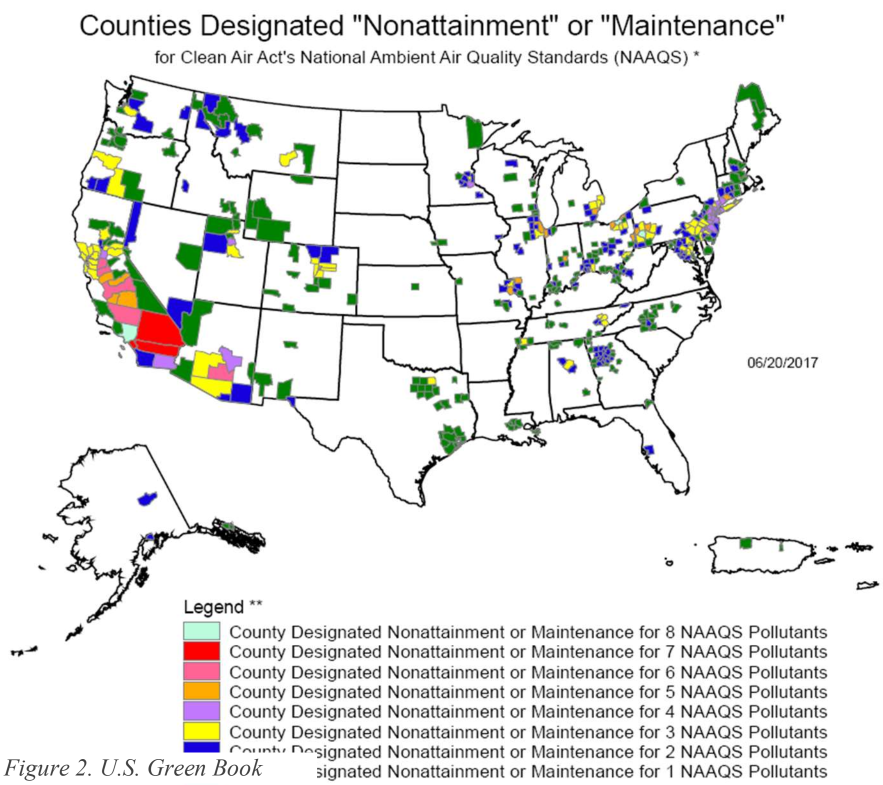


Figure 2. U.S. Green Book

[7] Iowa Department of Natural Resources, Ambient Air Quality Improvements in Iowa, https://www.iowadnr.gov/airmonitoring

Regional Transportation Goals

During the planning process of the Ames Mobility 2040 Long Range Transportation Plan, the community identified six goals to guide the plan. Each goal had a number of objectives identified along with a measure to rank the effectiveness of the project towards reaching the regional goals.

A baseline was identified for each per performance measure for both 2015, the year of the plan, and 2040, the planning horizon year of the plan. The baseline served as the measure to evaluate potential projects to determine if the project would contribute to reaching the regional target.

CONNECTED, EFFICIENT, AND RELIABLE

Goal: Provide a connected transportation system that offers efficient and reliable mobility options for all modes of travel

Performance Measures

Goal Area	Connected, Efficient, and Reliable
Performance Measures	• System Reliability / Reliability Index 80 (RI_{80}) • Miles of On-Street Bicycle Facilities

Performance Targets

Performance Measure	2015 Baseline	2040 E+C Baseline	2040 Targets
System Reliability / Reliability Index 80 (RI_{80})	Arterial System: RI_{80} = 1.20 Freeway System: RI_{80} = 1.03	N/A	Address reliability issues at the two (2) NHS segments with poorest reliability
Miles of On-Street Bicycle Facilities	3.9 Miles On-Street Lanes / Paved Shoulders 57 Miles Shared-Use Paths / Sidepaths	11.1 Miles On-Street Lanes / Paved Shoulders 66 Miles Shared-Use Paths / Sidepaths	Increase the segment-mileage of on-street bicycle facilities by 100% compared to current levels

SAFETY

Goal: Provide a safe transportation system

Performance Measures

Goal Area	Safety
Performance Measures	• Serious Injury / Fatal Crashes

Performance Targets

Performance Measure	2015 Baseline	2040 E+C Baseline	2040 Targets
Serious Injury / Fatal Crashes	< 2.6 fatal crashes/year < 20 major injury crashes/ year	N/A	Address safety issues at five (5) locations with highest crash rates or most serious injury / fatal crashes.

ENVIRONMENT

Goal: Consider and mitigate the impacts of the transportation system on the natural and built environment

Performance Measures

Goal Area	Environment
Performance Measures	• VMT per Household • VHT per Household • Transit Mode Share

Performance Targets

Performance Measure	2015 Baseline	2040 E+C Baseline	2040 Targets
VMT per Household	41.6 daily VMT per household	49.7 daily VMT per household	2040 VMT per household grows by 10% or less compared to 2010 levels.
VHT per Household	1.00 daily VHT per household	1.28 daily VHT per household	2040 VHT per household grows 20% or less compared to 2010 levels.
Transit Mode Share	12.5% of all modeled (auto and transit) trips	12.0% of all modeled (auto and transit) trips	2040 transit mode share is higher than 2010 transit mode share.

ACCESSIBILITY

Goal: Provide an accessible transportation system that fits within the context of its surroundings and preserves community character

Performance Measures

Goal Area	Accessibility
Performance Measures	• Household and Employment Proximity to Transit • EJ Proximity to Transit • Household and Employment Proximity to Bicycle Facilities • EJ Proximity to Bicycle and Pedestrian Facilities

Performance Targets

Performance Measure	2015 Baseline	2040 E+C Baseline	2040 Targets
Household and Employment Proximity to Transit	Households: 74% Access; Employment: 77% Access	Households: 63% Access; Employment: 65% Access	Maintain housing and jobs proximity (¼ mile walk distance) within 5% of 2010 levels.
EJ Proximity to Transit	82% of EJ households	82% of EJ households	Maintain levels of transit proximity (within ¼ of a route) to EJ households within 5% of non-EJ households.
Household and Employment Proximity to Bicycle Facilities	Households: 75% Access; Employment: 67% Access	Households: 73% Access; Employment: 67% Access	Increase the percentage of employment and households within ¼ mile of bicycle facilities by 25%.
EJ Proximity to Bicycle and Pedestrian Facilities	88% of EJ households	88% of EJ households	Provide higher levels of bicycle facility proximity (within ¼ mile of a facility) to EJ households than non-EJ households.

ECONOMY AND GOODS MOVEMENT

Goal: Provide a transportation system that supports the regional economy and efficiently moves goods

Performance Measures

Goal Area	Economy and Goods Movement
Performance Measures	• LOS / Congested Miles of Primary Freight Corridors

Performance Targets

Performance Measure	2015 Baseline	2040 E+C Baseline	2040 Targets
LOS / Congested Miles of Primary Freight Corridors	0.5 Miles	2.0 Miles	2040 congested miles of NHS lower than 2010

ASSET MANAGEMENT

Goal: Maintain transportation infrastructure in a state-of-good-repair

Performance Measures

Goal Area	Asset Management
Performance Measures	• Pavement Condition Index (PCI) • Bridge Condition (NBI Ratings) • Transit State of Good Repair

Performance Targets

Performance Measure	2015 Baseline	2040 E+C Baseline	2040 Targets
Pavement Condition Index (PCI)	105 lane miles of state and Arterial/Collector Roads rated "poor"	N/A	Reconstruct federal-aid roadways rated poor.
Bridge Condition (NBI Ratings)	3 Structurally Deficient Bridges	N/A	Reconstruct structurally deficient bridges.
Transit State of Good Repair	10.9 years avg. vehicle age	35.9 years avg. vehicle age	Maintain avg. fleet age at 15 years old or newer.

Project Selection

Projects are selected from the Ames Mobility 2040 plan for awarding regional transportation funding. Projects identified for in the short-term (years 2016-2025) are prioritized for regional funds. The MPO solicits two applications for the two primary transportation programs: Surface Transportation Block Grant and Iowa's Transportation Alternatives Program.

SURFACE TRANSPORTATION BLOCK GRANT

The Surface Transportation Block Grant (STBG) is generally awarded to regional projects which improve capacity through construction, reconstruction and rehabilitation of the highway network. Projects are evaluated in the long-range plan based on the six goals of the plan.

IOWA'STRANSPORTATION ALTERNATIVES PROGRAM

Iowa's Transportation Alternatives Program (TAP) projects mainly consist of greenbelt trails. TAP projects are evaluated with the following criteria:

- Connectivity with existing facilities
- Cost in relation to public benefit
- Enhancement to existing transportation system
- Identified in the long-range transportation plan.

Applications for both STBG and TAP are made available on the Ames Area MPO website and distributed to MPO member agencies and to a publicly available e-mail distribution list.

Other programs include bridge projects consisting of necessary repairs recommended by the biennial Iowa Department of Transportation (Iowa DOT) bridge inspections. The Iowa DOT requires these inspections for bridges within the local jurisdiction of the Ames Area MPO. A candidate list is created by the Iowa DOT Office of Local Systems based on priority points ranking. Local agencies and the Ames Area MPO work with the Iowa DOT on programming necessary bridge projects based on priority and available funding.

APPLICATIONS FOR SUBMITTING PROJECTS

Instructions for submitting projects for STBG or TAP regional funds are posted by the first of the year on the MPO website. A news notification is distributed to members of the Transportation Technical Committee along with anyone who has signed up for e-notifications on the MPO website. In January 2020, 153 e-notifications were distributed for the STBG application announcement and the TAP application announcement.

Federal Transit Administration Planning Process

In addition to FHWA program projects, the TIP includes all projects which Federal Transit Administration (FTA) funding may be utilized. A portion of Federal fuel tax revenue is placed in the mass transit account of the Federal Highway Trust Fund. These funds, along with General Fund appropriations, are reserved for transit purposes and are administered by the Federal Transit Administration. The transit portion of the TIP was developed in cooperation with CyRide, the urban transit operator in the Ames Area MPO planning area. The following transit projects identified in the FFY 2021-2024 TIP were included within the Passenger Transportation Plan (PTP), meeting the requirement to have the Enhanced Mobility for Seniors and Individuals with Disabilities formulized Federal funding within an approved PTP prior to TIP approval. The following narrative describes the projects within the initial year of the plan.

FFY 2021 PROJECT JUSTIFICATION

GENERAL OPERATIONS (5307/STA)

This funding supports the day-to-day transit operations of the Ames Transit Authority from Ames' urbanized area formula apportionment, Small Transit Intensive Cities (STIC), and State Transit Assistance (STA) funding.

CONTRACTED PARATRANSIT (DIAL-A-RIDE) SERVICES (5310)

According to Federal regulations, public transit agencies providing fixed-route transit service in their community must also provide door-to-door transportation services within a ¾ mile area of that fixed-route service. Therefore, CyRide purchases transportation service for its Dial-A-Ride service operation in order to meet this American Disability Act (ADA) requirement. This service has been expanded to provide services beyond ADA to the entire city limits of Ames.

AUTOMATED VEHICLE ANNUNCIATOR LED SIGNAGE (5310)

In the fall 2019, CyRide integrated automated vehicle annunciator (AVA) system synced with voice annunciators (audible announcements only) to help keep all passengers, disability or not, better informed of where the bus is located along the bus route(s). This system was in response to a request from Iowa State University's Alliance for Disability Awareness group which communicated their desire to have more bus stops announced throughout the Ames' community. Bus drivers must comply with the Americans with Disability Act (ADA) laws and manually announce major transit locations along transit routes along with any stops the public request. While the annunciators were installed for audible announcements, there wasn't enough funding at time of implementation to deploy the visual LED signage within each bus. CyRide plans to install the visual signage for announcements in FY2021. This project is over and beyond ADA requirements.

ANNUNCIATOR ANNUAL SERVICE FEES (5310)

CyRide plans to utilize portions of its elderly & disabled funding towards its annual service fees for the automatic annunciator system to ensure compliance with its ADA announcement requirements. This is a non-traditional project but will allow compliance with the ADA law and improve awareness of where the bus is within the community for passenger's knowledge.

LIGHT DUTY BUS REPLACEMENTS (5310)
Two light duty 176" wheelbase buses have exceeded FTA guidelines for useful life. Bus numbers are: 00390 and 00391. These units will be replaced with light duty 176" wheelbase low-floor buses, equipped with cameras. These replacement vehicles will be ADA accessible.

HEAVY DUTY BUS REPLACEMENTS (5339)
Nine large forty-foot buses have exceeded FTA guidelines for useful life. Bus numbers are: 00957, 07125, 01140, 07132, 07123, 01141, 00958, 00956, 00955. These units will be replaced with 40' heavy-duty buses, equipped with cameras. These replacement vehicles will be ADA accessible.

HEAVY DUTY ARTICULATED BUS EXPANSION (5307-STBG)
Currently, CyRide has six articulated buses within its bus fleet with a goal to attain a total of ten to operate on its #23 Orange Route. Specifically, this transit route carries the highest number of passengers of any route in the State of Iowa at nearly 1.8 million passengers. Over the next few years, CyRide will add Surface Transportation Block Grant (STBG) funding to an already approved contract for a 40-foot bus (federally funded with either CMAQ or 5339) awarded through the Iowa DOT and upgrade the purchase to an articulated (60-foot) bus expansion. The Ames Area Metropolitan Planning Organization has approved funding at $225,000 for FY2021.

HEATING, VENTILATION AND AIR CONDITIONING FACILITY PROJECTS (PTIG)
CyRide is requesting phase two of its heating, ventilation and air conditioning projects from the Iowa DOT under its public transit infrastructure grant (PTIG) program specifically for:

- Maintenance Bay Ventilation Improvements
- Southwest Bus Storage HVAC Replacement.

These updates will provide substantial benefits to employees by providing better heating/cooling as well as ventilation and fresh air throughout the maintenance facility as recommended through a "Diesel Particulate Exposures at CyRide Bus Garage" study conducted in 2006. At that time, the study noted that the ventilation rates needed to be increase throughout the facility to decrease diesel particulate exposures and concentrations by a factor of four. CyRide plans to continue additional HVAC work into FY2022 for a final improvement project under phase three.

The request includes the following areas:

- #1 Multi-stack Unit Replacement (14 years old)
- #2 Bus Wash HVAC Equipment Replacement (17 years old)
- #3 Southwest Bus Storage HVAC Replacement (30 years old)
- #4 Shop Area Office HVAC Improvements (expansion)
- #5 Restroom/Storage 1983 RTU-12 Replacement (36 years old)

MAINTENANCE FACILITY EXPANSION
CyRide will be requesting BUILD funding to proceed with planning requirements towards readying itself toward construction of a second bus maintenance/storage facility to accommodate a total bus fleet of 125 buses – 65 at the new facility with the remainder at the present location. Currently, buses are parking outside the facility which is contrary to CyRide's lease with Iowa State University.

Additionally, CyRide is landlocked and needing more space to store (park) and maintain buses and allow for future expansion of transit service within the Ames community. One of the critical issues is that maintenance (shop) stops servicing buses at 5 p.m. even though service is continued until midnight . The shop area is located directly in the middle of the facility and once buses are fueled and serviced for the evening, they are stored, i.e. parked, in the facility until service begins the next morning. Parked buses, after being fueled and serviced for the evening; restrict access to the shop and any mechanical issues are deferred until the next day due to not being able to access the shop to be fixed. Therefore, even though CyRide's services continue until midnight or beyond on most days throughout the year, buses cannot be repaired until the majority of buses are carefully unpacked from the facility the following day. Therefore, if there is a mechanical breakdown on a bus during night service, the bus is towed back to the facility and not serviced until the following day when the mechanics can drive the bus into the shop for repair. The BUILD planning request will be for real estate market analysis, environmental (NEPA) and historical analysis, land purchase on a preferred site and preliminary building design.

FINANCIAL ANALYSIS

Forecasts of Available Revenue

Projects in the Transportation Improvement Program are fully funded projects using Federal transportation funds or are regionally significant transportation projects. The TIP must demonstrate that all projects are within available funding amounts. The Ames Area MPO allocates regional transportation funds through the STBG, Iowa's TAP, and STBG-TAP-Flex programs. However, projects may also receive Federal or State funds through competitive grants.

REGIONAL TRANSPORTATION FUNDING

The Iowa Department of Transportation Office of Program Management provides the Ames Area MPO estimated STBG/STBG-Swap, Iowa's TAP, and STBG-TAP-Flex funding targets for each of the four years in the program. The MPO is also provided DOT statewide revenue estimates.

The FFY 2021 programming targets are $1,725,427 for STBG, $86,770 for Iowa's TAP, and $66,179 for STBG-TAP-Flex. The project costs shown in the TIP are in year-of-expenditure (YOE) dollars. This is accomplished by developing an estimate of costs in the current bidding environment and then applying an inflation factor of 4 percent per year.

The Ames City Council has programmed city sponsored projects in the City of Ames 2020-2025 Capital Improvements Plan (CIP) for the local funding allocation. These funds are generated from the City of Ames annual Road Use Tax Fund (RUTF) distribution, Local Option Sales Tax, and General Obligation (GO) bonds.

The transit program does not have targets; therefore, the requests involve significant costs in the anticipation of maximizing the amounts received.

OTHER FEDERAL AND STATE FUNDING PROGRAMS

Transportation projects within the Ames region may also receive funding through Federal or State grant programs.

FEDERAL GRANT PROGRAMS

- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Demonstration funding (DEMO)
- Highway Safety Improvement Program (HSIP)
- Metropolitan Planning Program (PL)
- National Highway Performance Program (NHPP)
- State Planning and Research (SPR)
- Federal Lands Access Program (FLAP)
- Tribal Transportation Program (TTP)
- National Highway Freight Program (NHFP)

STATE ADMINISTERED GRANT PROGRAMS

- City Bridge Program
- Highway Safety Improvement Program – Secondary (HSIP-Secondary)
- Iowa Clean Air Attainment Program (ICAAP)
- Recreational Trail Program
- Iowa's Transportation Alternatives Program

FEDERAL AND STATE TRANSIT FUNDING PROGRAMS

- Metropolitan Transportation Planning Program (Section 5303 and 5305)
- Statewide Transportation Planning Program (Section 5304 and 5305)
- Urbanized Area Formula Grants Program (Section 5307)
- Bus and Bus Facilities Program (Section 5339)
- Enhanced Mobility of Seniors and Individuals with Disabilities Program (Section 5310)
- Nonurbanized Area Formula Assistance Program (Section 5311)
- Rural Transit Assistance Program (RTAP) (Section 5311(b)(3))
- TAP Flexible Funds
- State Transit Assistance (STA)
    - STA Special Projects
        - STA Coordination Special Projects
- Public Transit Infrastructure Grant Fund

IOWA DEPARTMENT OF TRANSPORTATION REVENUE ESTIMATES

Each year prior to development of the Iowa DOT's Five-Year Program and the Statewide Transportation Improvement Program both state and Federal revenue forecasts are completed to determine the amount of funding available for programming. These forecasts are a critical component in the development of the Five-Year Program and as such are reviewed with the Iowa Transportation Commission. The primary sources of state funding to the DOT are the Primary Road Fund and TIME-21 Fund. These state funds are used for the operation, maintenance and construction of the Primary Road System. The amount of funding available for operations and maintenance are determined by legislative appropriations. Additional funding is set aside for statewide activities including engineering costs. The remaining funding is available for right of way and construction activities associated with the highway program.

Along with the state funds, the highway program utilizes a portion of the Federal funds that are allocated to the state. A Federal funding forecast is prepared each year based on the latest apportionment information available. This forecast includes the various Federal programs and identifies which funds are allocated to the Iowa DOT for programming and which funds are directed to locals through the MPO/RPA planning process, Highway Bridge Program and various grant programs. Implementation of a Federal aid swap will increase the amount of Federal funds that are utilized by the Iowa DOT.

> More information about the Program Management Bureau's Five-Year Program can be found online at:
> https://iowadot.gov/program_management/five-year-program

Fiscal Constraint Tables

Table 1a: Summary of Costs and Federal Aid

	2021		2022		2023		2024	
PROGRAM	Total Cost	Federal Aid	Total Cost	Federal Aid	Total Cost	Federal Aid	Total Cost	Federal Aid
PL	$125,000	$100,000	$125,000	$100,000	$125,000	$100,000	$125,000	$100,000
STBG	$850,000	$225,000	$850,000	$225,000	$850,000	$225,000	$850,000	$225,000
TAP	$1,856,000	$559,000	$681,000	$159,000	$ 0	$ 0	$ 0	$ 0
NHPP	$ 0	$ 0	$10,404,000	$8,324,000	$9,141,000	$7,313,000	$ 0	$ 0
CMAQ	$1,470,685	$1,176,548	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
STBG-HBP	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

Table 2b: Summary of Costs and SWAP Aid

	2021		2022		2023		2024	
PROGRAM	Total Cost	SWAP	Total Cost	SWAP	Total Cost	SWAP	Total Cost	SWAP
SWAP-HBP	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
STBG-SWAP	$4,900,000	$3,490,000	$5,700,000	$2,500,000	$2,400,000	$1,686,000	$ 0	$ 0

Table 3: STBG/STBG-Swap Fiscal Constraint

	2021	2022	2023	2024
UNOBLIGATED BALANCE (CARRYOVER)	$3,564,337	$1,640,943	$601,943	$442,943
STBG/SWAP TARGET	$1,725,427	$1,686,000	$1,686,000	$1,686,000
STBG-TAP-FLEX TARGET	$66,179	$0	$66,000	$0
SUBTOTAL	$5,355,943	$3,326,943	$2,353,943	$2,128,943
PROGRAM FUNDS	$3,715,000	$2,725,000	$1,911,000	$225,000
BALANCE	**$1,640,943**	**$601,943**	**$442,943**	**$1,903,943**

Table 4: STBG-TAP Fiscal Constraint

	2021	2022	2023	2024
UNOBLIGATED BALANCE (CARRYOVER)	$483,988	$11,758	$5,758	$92,758
SYSTEMTAP TARGET	$86,770	$87,000	$87,000	$87,000
STBG-TAP-FLEX TARGET	$ 0	$66,000	$ 0	$66,000
SUBTOTAL	$570,758	$164,758	$92,758	$245,758
PROGRAM FUNDS	$559,000	$159,000	$ 0	$ 0
BALANCE	**$11,758**	**$5,758**	**$92,758**	**$245,758**

Table 5: Forecasted Operations and Maintenance (O&M) Costs on the Federal-Aid System

SOURCE: 2019 CITY STREET FINANCE REPORT	**2021**	**2022**	**2023**	**2024**
CITY OF AMES TOTAL OPERATIONS	$915,153	$949,048	$982,942	$1,016,837
CITY OF AMES TOTAL MAINTENANCE	$1,690,182	$1,752,781	$1,815,380	$1,877,980
CITY OF GILBERT TOTAL OPERATIONS	$4,943	$5,126	$5,309	$5,492
CITY OF GILBERT TOTAL MAINTENANCE	$6,395	$6,632	$6,868	$7,105
IOWA DOT TOTAL OPERATIONS AND MAINTENANCE	$718,852	$742,106	$765,973	$789,431
TOTOAL O&M	**$3,335,525**	**$3,455,692**	**$3,576,473**	**$3,696,845**

Table 6: Forecasted Non-Federal Aid Revenue

SOURCE: 2019 CITY STREET FINANCE REPORT	2021	2022	2023	2024
CITY OF AMES TOTAL RUTF RECEIPTS	$8,226,831	$8,531,528	$8,836,226	$9,140,923
CITY OF AMES TOTAL OTHER ROAD MONIES RECEIPTS	$6,031,137	$6,254,512	$6,477,888	$6,701,263
CITY OF AMES TOTAL RECEIPTS SERVICE DEBT	$16,590,742	$17,205,214	$17,819,686	$18,434,158
CITY OF GILBERT TOTAL RUTF RECEIPTS	$150,961	$156,552	$162,144	$167,735
CITY OF GILBERT TOTAL OTHER ROAD MONIES RECEIPTS	$24,675	$25,589	$26,503	$27,416
CITY OF GILBERT TOTAL RECEIPTS SERVICE DEBT	$ 0	$ 0	$ 0	$ 0
TOTAL NON-FEDERAL AID ROAD FUND RECEIPTS	**$31,024,346**	**$32,173,396**	**$33,322,445**	**$34,471,495**

Table 7: Iowa DOT Five-Year Program Funding

	($ MILLIONS)			
REVENUES	**2021**	**2022**	**2023**	**2024**
PRIMARY ROAD FUND	$708.60	$719.00	$721.20	$725.80
TIME-21	$135.00	$135.00	$135.00	$135.00
MISCELLANEOUS	$25.00	$25.00	$25.00	$25.00
FEDERAL AID	$393.80	$365.70	$365.70	$365.70
TOTAL	**$1,262.40**	**$1,244.70**	**$1,246.90**	**$1,251.50**
STATEWIDE ALLOCATIONS	**2021**	**2022**	**2023**	**2024**
OPERATIONS & MAINTENANCE	$352.40	$363.80	$375.50	$387.00
CONSULTANT SERVICES	$85.00	$85.00	$85.00	$85.00
CONTRACT MAINTENANCE	$35.40	$35.40	$35.40	$35.40
RAILROAD CROSSING PROTECTION	$5.00	$5.00	$5.00	$5.00
MISCELLANEOUS PROGRAMS	$45.30	$45.30	$45.30	$45.30
TOTAL	**$523.10**	**$534.50**	**$546.20**	**$557.70**
FUNDS AVAILABLE FOR ROW/CONSTRUCTION	**2021**	**2022**	**2023**	**2024**
TOTAL	**$739.30**	**$710.20**	**$700.70**	**$693.80**

FFY 2020 PROJECT STATUS REPORT

	TPMS	Location	In $1,000s		Status	Sponsor
			Awarded	Total		
STBG	16032	In Ames, S Grand Ave from Squaw Creek Dr South 0.1 mile to S 5th St., and S 5th St. from S Grand to S Duff	2,396	3,040	Authorized (Let Date: 7/16/19)	City of Ames
STBG	36986	In Ames, S Grand Ave. from 0.1 miles north of S 16th St North 0.54 miles to S 5th Street	5,300	12,500	Authorized (Let Date: 2/18/20)	City of Ames
STBG	35617	CyRide: Vehicle Replacement	225	800	Authorized	CyRide
TAP	37446	In Ames, SW greenbelt trail from Beedle Dr. east 0.94 miles to Intermodal Facility	159	400	Authorized (Est. Sep. Letting)	City of Ames
TAP	14983	In Ames, Skunk River Trail from SE 16th St to East Lincoln Way	160	521	Rolled over to FFY 2021	City of Ames
TAP	21260	In Ames, Skunk River Trail from SE 16th St to East Lincoln Way	240	835	Rolled over to FFY 2021	City of Ames
PL	34214	Transportation Planning Funds	100	125	Ongoing	City of Ames

CHANGING AN APPROVED TIP

Often after development and subsequent adoption of the TIP, changes may need to be made to the list of programmed projects. Examples of changes might be adding or deleing projects., moving a project between years in the TIP, adjusting project cost, or changing the vehicle numbers of transit vehicles.

A major requirement of a project receiving Federal transportation funds is for the project to be included in the TIP and Statewide Transportation Improvement Program (STIP). Once a project has received Federal Authorization for construction it does not need to be included in the TIP. This is one of two major reasons for adding or deleting a project from the TIP. The other major reason for adding a project is the awarding of a grant for a project, which can happen throughout the year. Projects programmed through the STBG-SWAP program will be included in the TIP as informational items and modifications to these projects will be pursued using the following revision processes as outlined.

Changes to the TIP are classified as either **amendments** or **administrative modifications** and are subject to different AAMPO Transportation Policy Committee and public review procedures.

Amendments

Amendments are major changes involving the following:

Project Cost: Projects in which the recalculated project costs increase Federal aid by more than 30 percent or increase the Federal aid by more than $2 million from the original amount.

Schedule Changes: Projects added or deleted from the TIP.

Funding Source: Projects receiving additional Federal funding sources.

Scope Changes: Changing the project termini, project alignment, the amount of through traffic lanes, type of work from an overlay to reconstruction, or a change to include widening of the roadway.

Amendments are presented to the Transportation Policy Committee and a public comment period is opened, which lasts until the next policy committee meeting (the Transportation Policy Committee meets on an as needed basis, giving a 3-4 week public comment period). Public comments are shared with the Transportation Policy Committee and action is taken on the amendment.

Administrative Modifications

Administrative Modifications are minor changes involving the following:

Project Cost: Projects in which the recalculated project costs do not increase Federal aid by more than 30 percent or does not increase the Federal aid by more than $2 million from the original amount.

Schedule Changes: Changes in schedule for projects included in the first four years of the TIP.

Funding Source: Changing funding from one source to another.

Scope Changes: All changes to the scope require an amendment.

Administrative modifications are processed internally and are shared with the Transportation Policy Committee and the public as information items.

HIGHWAY PROGRAM (FFY 2021-2024)

PL

Project ID Sponsor STIP ID	Project Number Location Work Codes	Approval Level Letting Date		2021	2022	2023	2024	Totals
34214 MPO 22 / AAMPO	RGPL-PA22(RTP)--PL-85 Trans Planning 9514 - Trans Planning	TIP Approved	**Total** **Federal Aid** **Regional** **Swap**	**$125,000** $100,000	**$125,000** $100,000	**$125,000** $100,000	**$125,000** $100,000	**$500,000** **$400,000**

STBG

Project ID Sponsor STIP ID	Project Number Location Work Codes	Approval Level Letting Date		2021	2022	2023	2024	Totals
36918 MPO 22 / AAMPO	RGTR-0155()--ST-85 CyRide: Vehicle Replacement 9513 - Transit Investments	TIP Approved	**Total** **Federal Aid** **Regional** **Swap**	**$850,000** $225,000 $225,000				**$850,000** **$225,000** **$225,000**
38304 MPO 22 / AAMPO	RGTR-0155()--ST-85 CyRide: Vehicle Replacement 9513 - Transit Investments	TIP Approved	**Total** **Federal Aid** **Regional** **Swap**		**$850,000** $225,000 $225,000			**$850,000** **$225,000** **$225,000**
37442 MPO 22 / AAMPO	RGTR-0155()--ST-85 CyRide Vehicle Replacement 9513 - Transit Investments	TIP Approved	**Total** **Federal Aid** **Regional** **Swap**			**$850,000** $225,000 $225,000		**$850,000** **$225,000** **$225,000**
45238 MPO 22 / AAMPO	RGTR-0155()--ST-85 CyRide: Vehicle Replacement 9513 - Transit Investments	TIP Approved	**Total** **Federal Aid** **Regional** **Swap**				**$850,000** $225,000 $225,000	**$850,000** **$225,000** **$225,000**

SWAP-STBG

Project ID Sponsor STIP ID	Project Number Location Work Codes	Approval Level Letting Date		2021	2022	2023	2024	Totals
36919	STBG-SWAP-0155()--SG-85	TIP Approved	**Total**	**$2,400,000**				**$2,400,000**
Ames	In the city of Ames, On Cherry Avenue, from E Lincoln Way South .4 Miles to Southeast 5th Street,		**Federal Aid**					
			Regional	$1,890,000				**$1,890,000**
	1001 - Grade and Pave		**Swap**	$1,890,000				**$1,890,000**
36927	STBG-SWAP-0155()--SG-85	TIP Approved	**Total**	**$2,500,000**				**$2,500,000**
Ames	In the city of Ames, On East 13th Street, from Duff Avenue East .4 Miles to Meadowlane Avenue,		**Federal Aid**					
			Regional	$1,600,000				**$1,600,000**
	1509 - Pavement Rehab		**Swap**	$1,600,000				**$1,600,000**
35616	STBG-SWAP-0155()--SG-85	TIP Approved	**Total**		**$1,500,000**			**$1,500,000**
Ames	In the city of Ames, On North Dakota Avenue, from Ontario Street North 0.17 Miles to Union Pacific Railroad Tracks		**Federal Aid**					
			Regional		$900,000			**$900,000**
	1005 - Pave		**Swap**		$900,000			**$900,000**
38303	STBG-SWAP-0155()--SG-85	TIP Approved	**Total**		**$4,200,000**			**$4,200,000**
Ames	In the city of Ames, On Stange Rd and 24TH ST, from Blankenburg Dr North .4 Miles to 24th ST and East .8 Miles to RR,		**Federal Aid**					
			Regional		$1,600,000			**$1,600,000**
	1001 - Grade and Pave		**Swap**		$1,600,000			**$1,600,000**
45233	STBG-SWAP-0155()--SG-85	TIP Approved	**Total**			**$2,400,000**		**$2,400,000**
Ames	In the city of Ames, on Lincoln Way, from Dotson Dr to S Franklin Ave		**Federal Aid**					
	1001 - Grade and Pave		**Regional**			$1,686,000		**$1,686,000**
			Swap			$1,686,000		**$1,686,000**

STBG-TAP

Project ID Sponsor STIP ID	Project Number Location Work Codes	Approval Level Letting Date		2021	2022	2023	2024	Totals
38306	TAP-U-0155()--8I-85	TIP Approved	**Total**	**$500,000**				**$500,000**
Ames	In the city of Ames, On Vet Med Trail, from S Grand Ave South .53 Miles to S 16th St,		**Federal Aid**	$159,000				**$159,000**
			Regional	$159,000				**$159,000**
	9509 - Ped/Bike Grade & Pave		**Swap**					
21260	TAP-U-0155(SE16TH)--8I-85	TIP Approved	**Total**	**$835,000**				**$835,000**
Ames	Skunk River Trail: From SE 16th Street to East Lincoln Way		**Federal Aid**	$240,000				**$240,000**
			Regional	$240,000				**$240,000**
	9510 - Ped/Bike Structures, 9511 - Ped/Bike Miscellaneous		**Swap**					
14983	TAP-U-0155(SE16th)--8I-85	TIP Approved	**Total**	**$521,000**				**$521,000**
Ames	In the City of Ames, Skunk River Trail: From SE 16th Street to East Lincoln Way		**Federal Aid**	$160,000				**$160,000**
			Regional	$160,000				**$160,000**
	9509 - Ped/Bike Grade & Pave		**Swap**					
DOT Note: Project eligible for FHWA TAP funding								
19249	TAP-U-0155()--8I-85	TIP Approved	**Total**		**$681,000**			**$681,000**
Ames	Squaw Creek: From Skunk River to S. Duff Avenue		**Federal Aid**		$159,000			**$159,000**
			Regional		$159,000			**$159,000**
	9509 - Ped/Bike Grade & Pave		**Swap**					

SWAP-CMAQ

Project ID Sponsor STIP ID	Project Number Location Work Codes	Approval Level Letting Date		2021	2022	2023	2024	Totals
45239	ICAAP-SWAP-0155(702)--SH-85	TIP Approved	**Total**	**$1,470,685**				**$1,470,685**
Ames	First Phase Deployment Ames Traffic Signal Master Plan		**Federal Aid**					
			Regional	$1,176,548				**$1,176,548**
	5041 - Traffic Signals		**Swap**	$1,176,548				**$1,176,548**

PRF

Project ID Sponsor STIP ID	Project Number Location Work Codes	Approval Level Letting Date		2021	2022	2023	2024	Totals
38031	BRFN-69()--39-85	TIP Approved	**Total**		**$265,000**			**$265,000**
Iowa Department of Transportation	US69: GRAND AVE IN AMES 0.1 MI N OF LINCOLN WAY		**Federal Aid**					
	2522 - Bridge Deck Overlay		**Regional**					
			Swap					
45416	IMN-35()--0E-85	TIP Approved	**Total**		**$1,800,000**			**$1,800,000**
Iowa Department of Transportation	I-35: US 30 AND CO RD E15 INTERCHANGE RAMPS		**Federal Aid**					
	1509 - Pavement Rehab		**Regional**					
			Swap					
45391	IMN-35()--0E-85	TIP Approved	**Total**			**$2,400,000**		**$2,400,000**
Iowa Department of Transportation	I-35: US 30 TO CO RD D59 (SB)		**Federal Aid**					
			Regional					
			Swap					

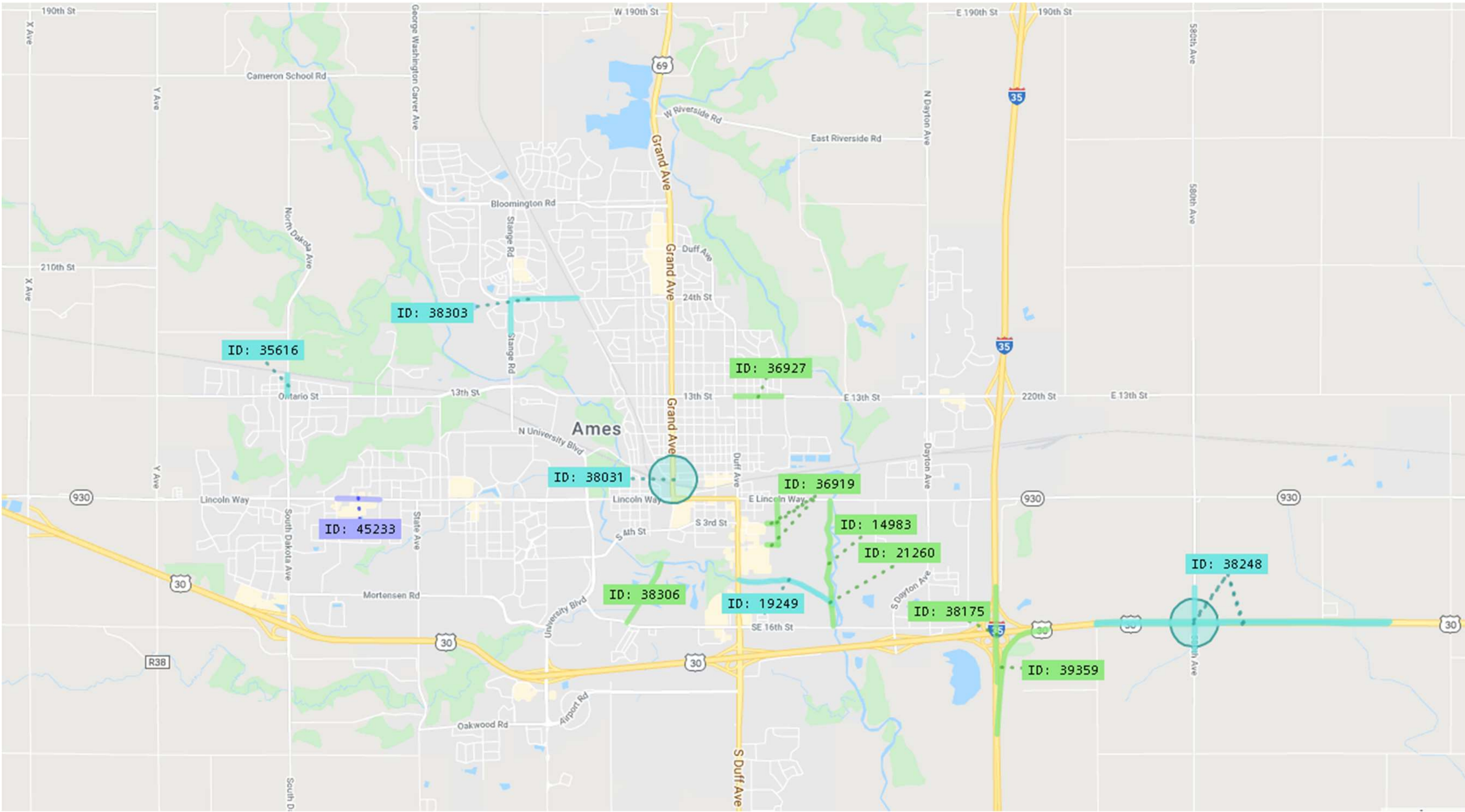
TRANSIT PROGRAM (FFY 2021-2024)

Fund	Sponsor	Transit # Expense Class Project Type	Desc / Add Ons / Addnl Info		FY21	FY22	FY23	FY24
5307	Ames	5575	Heavy Duty Articulated Bus	**Total**	281,250	281,250	281,250	
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	225,000	225,000	225,000	
		Expansion		**SA**				
5339	Ames	6010	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 00957	**SA**				
5310	Ames	6012	Annunciator Annual Service Fees	**Total**	82,146	94,000	94,000	94,000
		Operations		**FA**	65,714	75,200	75,200	75,200
		Misc		**SA**				
PTIG	Ames	6013	Maintenance Bay Ventilation Improvements	**Total**	281,346			
		Capital		**FA**				
		Rehabilitation		**SA**	225,077			
PTIG	Ames	6014	HVAC Rehabilitation	**Total**	187,574	307,329		
		Capital		**FA**				
		Rehabilitation		**SA**	150,059	245,863		
5310	Ames	5100	Annunciators LED Signage	**Total**	126,720			
		Capital		**FA**	101,376			
		Expansion		**SA**				
5339	Ames	4044	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 07125	**SA**				
5339	Ames	4045	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 01140	**SA**				
5339	Ames	4046	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 07132	**SA**				
5339	Ames	4047	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 07123	**SA**				
5339	Ames	4048	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 01141	**SA**				
5339	Ames	4049	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 00958	**SA**				
5339	Ames	4660	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 00956	**SA**				
5339	Ames	4662	Heavy Duty Bus (40-42 ft.)	**Total**	513,032			
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**	436,077			
		Replacement	Unit #: 00955	**SA**				
STA, 5307	Ames	914	General Operations	**Total**	12,086,406	12,569,863	13,072,657	13,595,563
		Operations		**FA**	2,593,894	2,697,650	2,805,556	2,917,778
		Misc		**SA**	809,363	841,738	875,407	910,423

Fund	Sponsor	Transit # Expense Class Project Type	Desc / Add Ons / Addnl Info		FY21	FY22	FY23	FY24
5310	Ames	919	Contracted Paratransit Service	**Total**	175,000	187,500	187,500	187,500
		Capital		**FA**	140,000	150,000	150,000	150,000
		Misc		**SA**				
5310	Ames	5570	Light Duty Bus (176" wb)	**Total**	156,198			
		Capital	UFRC, VSS, Low Floor	**FA**	124,958			
		Replacement	Unit #: 00390	**SA**				
5310	Ames	5571	Light Duty Bus (176" wb)	**Total**	156,198			
		Capital	UFRC, VSS	**FA**	124,958			
		Replacement	Unit #: 00391	**SA**				
PTIG	Ames	6034	Bus Vehicle Exhaust Modifications	**Total**		168,708		
		Capital		**FA**		134,966		
		Rehabilitation		**SA**				
5310	Ames	920	Associated Transit Improvements	**Total**		50,000	50,000	50,000
		Capital		**FA**		40,000	40,000	40,000
		Replacement		**SA**				
5339	Ames	4663	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00954	**SA**				
5339	Ames	4664	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00953	**SA**				
5339	Ames	4665	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00972	**SA**				
5339	Ames	4666	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00974	**SA**				
5339	Ames	5097	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00970	**SA**				
5339	Ames	5098	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00971	**SA**				
5339	Ames	5099	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00977	**SA**				
5339	Ames	4661	Heavy Duty Bus (40-42 ft.)	**Total**		517,615		
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**		439,973		
		Replacement	Unit #: 00975	**SA**				
5339	Ames	5555	Heavy Duty Bus (40-42 ft.)	**Total**			538,320	
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**			457,572	
		Replacement	Unit #: 00973	**SA**				
5339	Ames	5563	Heavy Duty Bus (40-42 ft.)	**Total**			538,320	
		Capital	Diesel, UFRC, VSS, Low Floor, BioDiesel	**FA**			457,572	
		Replacement	Unit #: 00976	**SA**				

Fund	Sponsor	Transit # Expense Class Project Type	Desc / Add Ons / Addnl Info		FY21	FY22	FY23	FY24
5339	Ames	5564 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00950	**Total** **FA** **SA**			538,320 457,572	
5339	Ames	5565 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00952	**Total** **FA** **SA**			538,320 457,572	
5339	Ames	5566 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00951	**Total** **FA** **SA**			538,320 457,572	
5339	Ames	5567 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00949	**Total** **FA** **SA**			538,320 457,572	
5339	Ames	5568 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00504	**Total** **FA** **SA**			538,320 457,572	
5339	Ames	5569 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00502	**Total** **FA** **SA**			538,320 457,572	
5339	Ames	3314 Capital Expansion	Maintenance Facility Expansion	**Total** **FA** **SA**			6,300,166 5,000,000	
5339	Ames	6015 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00501	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6016 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00503	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6017 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00188	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6018 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00186	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6019 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00189	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6020 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00187	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6021 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00785	**Total** **FA** **SA**				559,853 475,875
5339	Ames	6022 Capital Replacement	Heavy Duty Bus (40-42 ft.) Diesel, UFRC, VSS, Low Floor, BioDiesel Unit #: 00762	**Total** **FA** **SA**				559,853 475,875

Project Location Map



SELF-CERTIFICATION OF THE MPO PLANNING PROCESS

AMES AREA METROPOLITAN PLANNING ORGANIZATION
ANNUAL SELF-CERTIFICATION

In accordance with 23 CFR 450.334, the STATE DEPARTMENT OF TRANSPORTATION and the Ames Area Metropolitan Planning Organization for the Ames, Iowa urbanized area(s) hereby certify that the transportation planning process is addressing the major issues in the metropolitan planning area and is being conducted in accordance with all applicable requirements of:

(1) 23 U.S.C. 134, 49 U.S.C. Section 5303, and 23 CFR Part 450;

(2) In nonattainment and maintenance areas, Sections 174 and 176(c) and (d) of the Clean Air Act as amended (42 U.S.C. 7504, 7506(c) and (d) and 40 CFR 93);

(3) Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d-1) and 49 CFR part 21;

(4) 49 U.S.C. 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex or age in employment or business opportunity;

(5) Section 1101(b) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Pub. L. 109-59) regarding the involvement of Disadvantaged Business Enterprises in FHWA and FTA funded planning;

(6) 23 CFR part 230, regarding the implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts;

(7) The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 *et seq.*) and 49 CFR parts 27,37, and 38, and USDOT implementing regulation;

(8) Older Americans Act, as amended (42 U.S.C. 6101);

(9) 23 U.S.C. 324, regarding prohibition of discrimination based on gender; and

(10) Section 504 of the Rehabilitation Act of 1973 and 49 CFR Part 27, regarding discrimination against individuals with disabilities.

For AAMPO:

John Haila

3-24-2020

John Haila, Chair
Transportation Policy Committee

Date

RESOLUTION OF APPROVAL

RESOLUTION NO. 20-360

RESOLUTION APPROVING FINAL FFY 2021-2024 TRANSPORTATION IMPROVEMENT PROGRAM (TIP) FOR SUBMISSION TO THE IOWA DEPARTMENT OF TRANSPORTATION FOR THE CITY OF AMES, IOWA

WHEREAS, the Ames Area Metropolitan Planning Organization is the designated Metropolitan Planning Organization (MPO) for the Ames Metropolitan Area; and,

WHEREAS, the Transportation Policy Committee, in cooperation with the state, is conducting a continuing, cooperative, and comprehensive (30-C) transportation planning process pursuant to 23 CFR 450.114 (c); and,

NOW, THEREFORE, BE IT RESOLVED by the Ames Area Metropolitan Planning Organization Transportation Policy Committee that the Federal Fiscal Year 2021-2024 Transportation Improvement Program is hereby approved, and submittal of the document to the Iowa Department of Transportation for inclusion in its Statewide Transportation Improvement Program is hereby further approved.

ADOPTED THIS 14th day of July, 2020.

Diane R. Voss
Diane R. Voss, City Clerk

John A. Haila
John A. Haila, Chair

Introduced by:	Beatty-Hansen		
Seconded by:	Zinnel		
Voting aye:	Beatty-Hansen, Betcher, Corrieri, Gartin, Haila, Junck, Martin, Olson, Zinnel		
Voting nay:	None	Absent:	Popp, Schrader

Resolution declared adopted and signed by the Chair this 14th day of July, 2020.