APPENDIX 1: **FEEDBACK AND OUTREACH**

Appendix 1. Feedback and Outreach

Meeting with and gaining valuable feedback from stakeholders, non-profit organizations, transit agencies, and other key contributors to the plan was a continuous effort throughout the duration of this planning effort. A total of 25 separate meetings, conferences, and gatherings, in addition to multiple surveys, occurred during which information regarding this Plan was shared and input or feedback was gathered from the participants.

Iowa Transportation Commission Meetings

- **March 10th, 2020:** Ames, Iowa
- **July 14th, 2020:** Ames, Iowa

External Stakeholder Meetings

- **September 18th, 2019:** Ankeny, Iowa
- **November 18th, 2019:** Online/Conference Call

Internal Stakeholder Meetings

- **November 25th, 2019:** Ames, Iowa

External & Internal Stakeholder Meetings

- **March 23rd, 2020:** Online/Conference Call
- **May 18th, 2020:** Online/Conference Call

Metropolitan Planning Organization (MPO)/Regional Planning Affiliation (RPA) Quarterly Meetings

- **March 27th, 2019:** Ames, Iowa
- **June 26th, 2019:** Online/Conference Call
- **September 25th, 2019:** Ames, Iowa
- **December 18th, 2019:** Online/Conference Call

Iowa Public Transit Association (IPTA) Meetings

- **April 2nd, 2019:** Ankeny, Iowa
- **June 26th, 2019:** Newton, Iowa

Iowa Transportation Coordination Council (ITCC) Meetings

- **January 9th, 2019:** Des Moines, Iowa
- **March 13th, 2019:** Des Moines, Iowa
- **July 10th, 2019:** Des Moines, Iowa
- **November 13th, 2019:** Des Moines, Iowa
- **March 11th, 2020:** Des Moines, Iowa
- **May 13th, 2020:** Online/Conference Call
- **July 8th, 2020:** Online/Conference Call

Public Transit Advisory Committee (PTAC) Meetings

- **February 7th, 2019:** Online/Conference Call
- **August 1st, 2019:** Online/Conference Call
- **May 7th, 2020:** Online/Conference Call

Summits and Conferences

- **May 23rd, 2019:** Passenger Transportation Summit, Ankeny, Iowa
- **September 11th, 2019:** Midwest Transit Conference, Kansas City, Missouri

Information regarding the planning effort and announcements requesting public input was also disseminated through three separate press releases.

- Oct. 18, 2019: News release regarding the public survey, which sought input on public transit strategies and transportation mode choices.
- May 18, 2020: News release regarding the 45-day public comment period to help refine the final draft of the Iowa Public Transit Long Range Plan.
- September 11, 2020: News release regarding the publication of the Iowa Public Transit Long Range Plan.

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APPENDIX 2: **TRANSIT DEPENDENCY ANALYSIS**

Appendix 2. Transit Dependency Analysis

1. Introduction

The Iowa Department of Transportation (DOT) conducted an update of its Public Transit Long Range Plan between 2018 and 2020 to plan for the modernizing and rightsizing of the transit system, better aligning resources to meet the needs of public transit for the state of Iowa. Early on in the planning process, distinct challenges were identified that are unique to various sizes of transit systems, suggesting that a "one-size-fits-all" approach would not be sufficient to meet the needs of transit agencies and the transit-riding public.

In order to adequately understand the unique characteristics of transit systems' riders, a comprehensive approach needed to be taken to compare different regions of Iowa. While some ridership data was available for study, it was determined that this data was inherently skewed because it only measured ridership on existing service routes. To properly assess transit needs, a different approach needed to be taken in order to determine potential ridership demand, including in areas that do not have regular fixed-route service. Understanding the unique characteristics or factors that contribute to an area's potential for transit ridership could lead to a better focusing of resources and efforts for targeted expansion of transit services.

Following a literature review, the methodology that was selected for studying potential transit ridership dependency in Iowa was based on a 2015 study conducted by the Mineta Transportation Institute at San José State University titled "Investigating the Determining Factors for Transit Travel Demand by Bus Mode in US Metropolitan Statistical Areas."[1] The study noted that while there were existing studies that focused on identifying ridership dependency criteria, those factors were unique to specific transit systems. There were no existing studies that utilized a generalized approach that could be universally and generally applied to larger geographic areas. The Mineta study was an attempt to determine general conclusions to provide policy recommendations regarding public transit, and was used as a basis for the Transit Dependency Analysis that was conducted in order to address these points and to provide an additional analytical input into the development of the Iowa Public Transit Long Range Plan.

[1] https://transweb.sjsu.edu/research/Investigating-Determining-Factors-Transit-Travel-Demand-Bus-Mode-US-Metropolitan-Statistical-Areas

Background

Determining 'needs' and assessing the public transit system for gaps and issues occurred early in the planning process. While the Transit Needs Assessment survey was being completed by the transit agencies in March 2019, other discussions took place in order to adequately forecast or predict the locations of "hot spots" where transit need, or dependency, was highest in Iowa. The Mineta study that was utilized as the basis for a transit dependency analysis in Iowa shared several common themes that were reproduced for the purposes of this Plan which include:

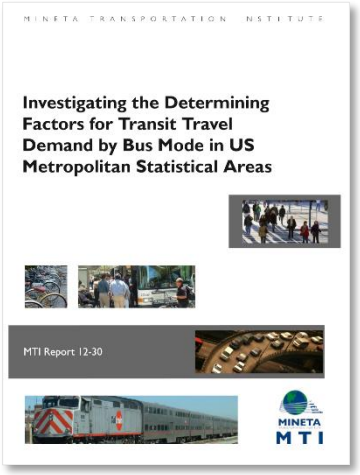
- Predicting areas of transit need
- Not relying on ridership statistics or other reported transit data
- Utilizing general characteristics, universally applied throughout the entire study area

Objective of the Analysis

The goals for this analysis can be summarized by a single question: where are there gaps in Iowa's public transit system? In order to answer this question, a measure of public transit need, or dependency, must be formulated.

2. Mineta Study Key Findings

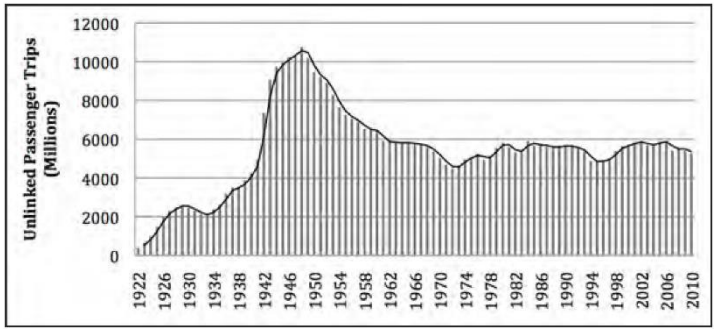
As previously mentioned, the basis for the methodology of Iowa's transit dependency analysis is a study conducted by the Mineta Transportation Institute from San José State University in May 2015, titled "Investigating the Determining Factors for Transit Travel Demand by Bus Mode in US Metropolitan Statistical Areas." The intention of the researchers was to go beyond specific studies on the uniqueness of a single or a few transit systems in order to determine general conclusions to provide policy recommendations regarding public transit.



The authors of the study noted that nationwide transit ridership has gradually declined since its height around 1950, as shown in Figure A2.1. This trend of declining ridership has occurred for most transit systems which suggests that there may be general characteristics that can help explain what factors contribute toward it.

Unfortunately, there were few studies conducted at the nationwide scale that attempted to describe ridership factors for multiple transit systems in general terms. Most research prior to the Mineta study had been focused on smaller regions and only took into account unique aspects of those local areas to explain local ridership trends. Additionally, many of those studies tended to only focus on a particular aspect, characteristic, or factor of that local system rather than try to understand the complex relationship and influence that multiple variables have upon one another.

Figure A2.1: Annual transit ridership trend by bus, 1922 to 2010

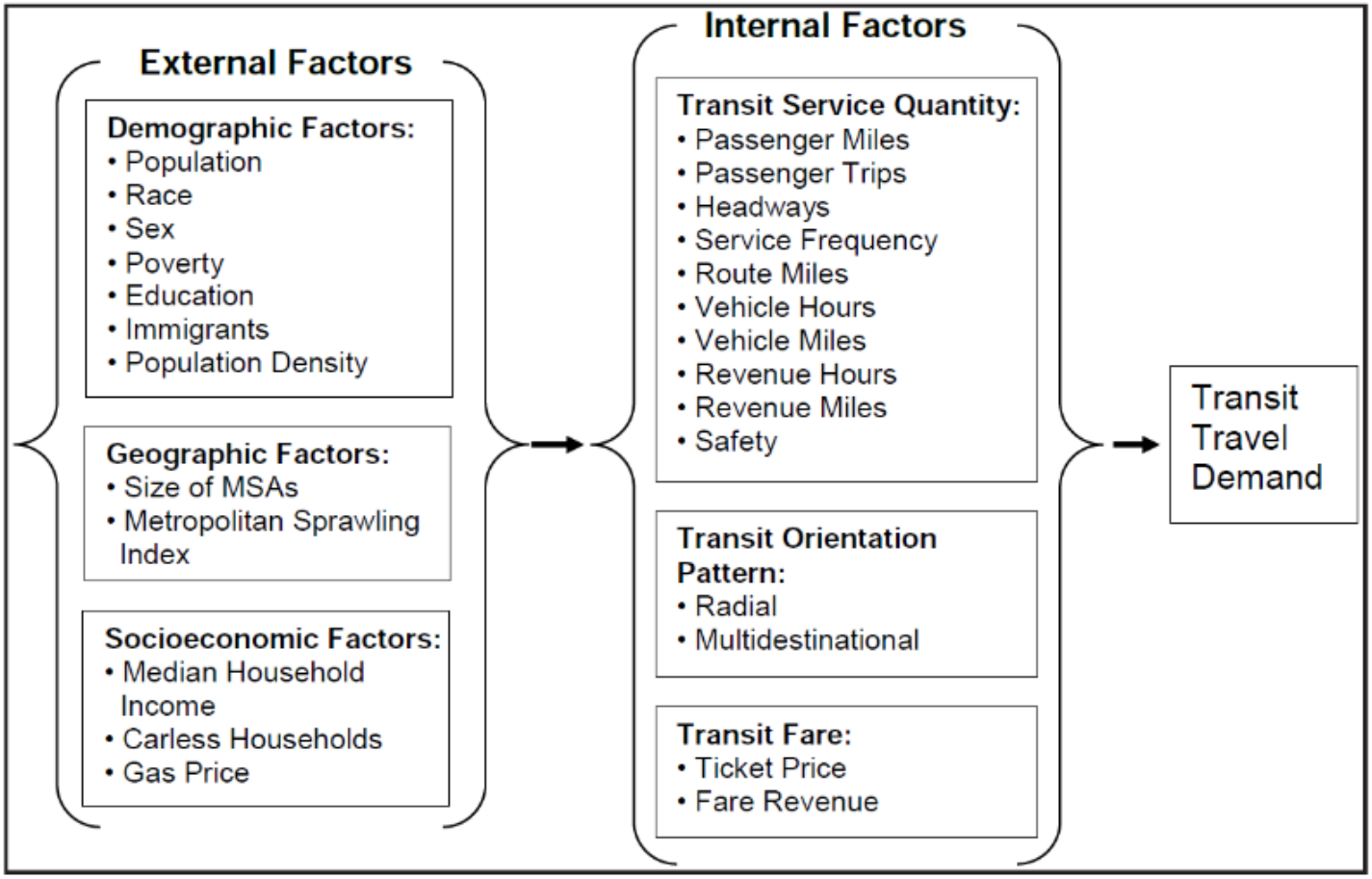


Source: Mineta Transportation Institute

The Mineta study divided the list of factors that contribute to transit ridership dependency into internal and external factors. Internal factors were described as characteristics that are directly controlled by transit agencies. As Figure A2.2 shows, these factors primarily consist of things like bus fares, hours of service, frequency of routes, and the type of routes traveled (i.e., a circular ring-route, multi-stop route, or express route).

External factors, on the other hand, are characteristics that describe the relationship between land use and transit ridership. These attributes cover a spectrum of areas including household income, fuel prices, metropolitan sprawl, and other socioeconomic characteristics. The combination of these internal and external factors results in the net transit travel demand or ridership.

Figure A2.2: Internal and external factors



Source: Mineta Transportation Institute

The primary takeaways from the study are that it is possible to take a generalized, regional approach to examining transit ridership dependency and that there are a number of internal and external factors that can be drawn upon in order to conduct the analysis. It is for these reasons that the Mineta study was used as a starting point for the Iowa transit dependency analysis. However, there are a few departures that the Iowa transit dependency analysis makes from the original source methodology that are worth noting.

1 Decision Point

What will be the scope of the analysis (internal factors vs. external factors)?

This analysis will focus on external factors only. Allows for an "apple-to-apples" comparison between different transit agencies.

The Mineta study focused on comparing and contrasting metropolitan statistical areas (MSAs) to each other; each of these areas had their own fixed route transit systems and routes. In the Iowa analysis, the comparison is statewide, which includes transit systems of various sizes: large urban transit agencies in several of Iowa's largest metropolitan areas; small urban transit agencies found in smaller cities that may be the only urban area within several counties yet lack many of the resources of larger metros; and regional transit systems that rely primarily on an on-demand format of delivering transit service in rural areas.

Another departure is the focus on external factors rather than internal factors as the basis for the analysis. Ultimately, the desire for this planning effort was to analyze factors that were independent of any factors or variables that could be directly influenced by transit agencies. This worked well for utilizing the analysis as a predictive tool incorporating publicly available demographic data that can be projected into the future. It also better supported an "apples-to-apples" comparison between very different sizes and types of transit systems in Iowa.

3. Inputs

The variables used in the Mineta study were reviewed for the selection of external factors to use in our analysis. For the purposes of this Plan, only external factors were leveraged for the transit dependency analysis. This was mainly due to the fact that internal factors can vary greatly across different regions and transit agencies, making it nearly impossible to describe the entire state under one universal set of characteristics and factors. Additionally, several external factors from the original study were removed or adjusted due to their limited applicability to Iowa or because they were redundant with other factors. The Mineta study external factors consisted of:

- Rail Transit
- Metropolitan Sprawling Index
- MSAs in the South
- Vehicles per Household
- Percent of Immigrant Population
- Percent of African American Population
- Gas Price
- Median Household Income
- Percent of Carless Households
- Percent of College Population
- Population Density

2 Decision Point

Which factors to use?

Only external factors that are relevant to Iowa and could be broadly applied to urban and rural regions.

While the overall goals of the Mineta study were the same with regards to identifying transit dependent areas in Iowa, the factors that the study utilized needed to be evaluated and adapted in order to tailor them to be relevant in an Iowa statewide study. Iowa DOT staff complied the list of external factors and examined each factor individually for consideration for inclusion in the analysis.

Factors that were not utilized

Rail Transit

The Mineta study relied upon rail transit mainly as an alternate competing mode of public transit with transit via bus. This could be more accurately described as commuter rail service, which is not presently available in Iowa. The only other rail-based modes of passenger transit in the state are two tourist or heritage railroads which are mainly recreational or educational in nature, and two Amtrak intercity passenger routes for traveling much longer distances to locations such as Chicago and the east coast, or Denver and west coast. The two

Amtrak routes are found in southern Iowa running between Omaha, Nebraska and Burlington, Iowa with another line briefly running through Fort Madison in Lee County.

Since the only passenger service routes in Iowa are mainly for long distance interstate travel rather than supporting local or commuter transportation, it was determined that rail transit would not be utilized as a factor for the analysis.

Metropolitan Sprawling Index

Metropolitan Sprawling Index (MSI) refers to a quantified value representing urban sprawl that combines a variety of individual factors such as population density, human activity, and density of streets and other urban development. MSI was not utilized in this analysis as our statewide study includes all sizes and types of transit agencies in Iowa. These transit agencies can be found in larger metro urbanized areas, smaller towns and cities, and across vast regions of rural area. As such, this factor was not relevant and was disregarded in the analysis.

MSAs in the South

The US Census Bureau reports that the United States Office of Management and Budget (OMB) defines a Metropolitan Statistical Area (MSA) as having at least one urbanized area of 50,000 or more inhabitants. In the Mineta study, MSAs represented a common unit of analysis with which to compare and contrast different transit systems. As with the MSI factor, MSAs were not included in the Iowa analysis due to the inclusion of both urban and rural regions in the study.

Vehicles per Household

The factor for Vehicles per Household is a value the represents the average number of vehicles a family or household has access to within a given US Census Block Group area. The data was obtained from the US Census Bureau like most of the other datasets and was also the same dataset used in the determination of the Percent of Carless Households factor, described below. The primary difference was that Vehicles per Household represented households across a range of different numbers of personally owned vehicles, whereas the Percent of Carless Households focused only on those households without vehicles, indicating there was no access to a personally owned vehicle.

After the working group considered this factor, it agreed that this seemed to be duplicative of the Percent of Carless Households factor and the factor was disregarded. Additionally, since the intent of the analysis was to predict locations of transit dependent populations, Percent of Carless Households seemed to more closely align with that intent. Households that have one or more vehicles could also be transit riders; however, the Iowa analysis is primarily concerned with transit dependency in which riders have little or no choice rather than transit riders who may typically have a choice of transportation options.

Factors that were utilized but altered

Percent of Immigrant Population

The original Mineta study called out this variable's usage as it represented a significant portion of the labor pool, but due to this demographic having a lower income on average, this meant that they were likely more disposed to depending on public transit for their transportation.

Feedback received from Iowa transit agencies suggested that immigrant populations may become less dependent on transit over time and thus this may not be a factor that should be used. Additionally, the Mineta study was using this factor partially to reflect a transit dependent low-income population, which may be redundant with other factors.

In leu of country-of-origin data, the group decided to utilize English language proficiency instead. This was based on feedback received from stakeholders in the form of certain strategy and action item recommendations. One of these strategies that resonated greatly through the results of a public survey conducted in October 2019 was a strategy seeking to improve accessibility of all transit information to include service notifications, bus route information, and language translation services for multilingual riders. Adjusting this factor to describe non-English speaking populations allows for the analysis to be better tailored to the strategies that are planning to be implemented.

Percent of African American Population

The Mineta study used the Percent of African American Population; their literature review noted that a larger portion of the African American population rides public transit. As such, the Mineta researchers used this demographic category to represent all minority riders of transit. Given that the demographic characteristics of Iowa are much different than many of the states used in the Mineta study, the group decided to broaden the definition of this factor to encompass all non-White minority populations in Iowa. The intent was that this broader category would be more inclusive of the variety of backgrounds and ethnicities of Iowa residents.

Factors that were utilized and unchanged

The Mineta study factors of Gas Price, Median Household Income, Percent of Carless Households, Percent of College Population, and Population Density were utilized without modifications.

Data Sources

After the factors were selected and adjusted, the next step was to gather the necessary data in order to conduct the analysis. After reviewing the available datasets, it was determined that the smallest, most granular geographic until that most of the factors could be described at was U.S. Census block groups.

Data from the American Community Survey 5-year estimates were used to obtain tabular data for all of the external factors except for gas prices. This includes geometry for the U.S. Census block groups which was joined to the tabular demographic data and rendered in geographic information system (GIS) software.

Obtaining information on gas prices proved to be the most difficult aspect of gathering data. Efforts were made to contact a variety of state agencies for this information; however, none provided average gas prices at a geographic level smaller than statewide. Through online searches, the AAA gas prices website[2] was found to have average retail prices of gas, both unleaded and diesel, at the county level. These gas prices change daily which was reflected in an interactive map. Contacting the operator of the AAA website led to a third-party website maintainer who only permitted direct access to the data as a download through a pre-determined price bundle based on the period of time one wished to gather the data for. Thus, the gas price data was recorded based on the website's live data at the beginning of each month between June and November 2019. Data was gathered for all counties in Iowa except for O'Brien County, which did not have data available through the website.

O'Brien County data was gathered from the Gas Buddy website[3], which also depicted average gas prices; however, the data is much more specific to various regions in Iowa and not reflected on a county basis. The town of Primghar was consistently used through the data gathering period as it represented the largest town in its vicinity which had at least two gas stations, and it was located approximately in the center of the county.

Figure A2.3 shows the seven factors used in the transit dependency analysis and their definitions.

[2] "Gas Prices", American Automobile Association (AAA), https://gasprices.aaa.com/?state=IA
[3] "Gas Price Map", GasBuddy, https://www.gasbuddy.com/

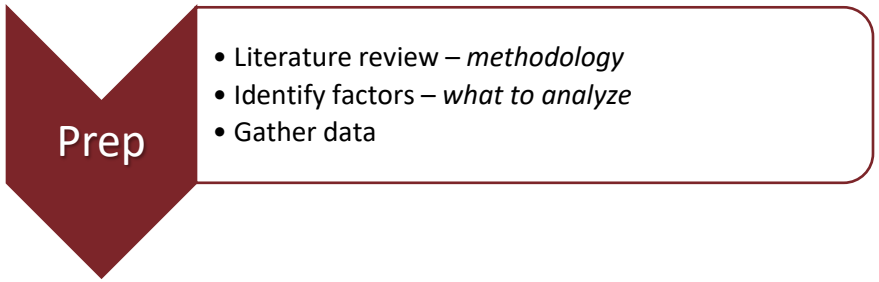
Figure A2.3: Transit dependency factors

Factor	Scale	Description
Gas Prices	County	Average gas prices from AAA web site with samples taken between June and November 2019. O'Brien County data from Gas Buddy website (not available from AAA).
Median Household Income	Block Group	Median household income for the block group.
Carless Households	Block Group	Percentage of all households with zero vehicles available.
Language	Block Group	Percentage of households where English is spoken "not well" or "not at all."
Race	Block Group	Percentage of households not classified solely as "White."
College Enrolled	Block Group	Percentage of households that are enrolled in "college, undergraduate, graduate or professional school."
Population Density	Block Group	Density of population per square kilometer (land area only – water area not included).

Source: Iowa DOT

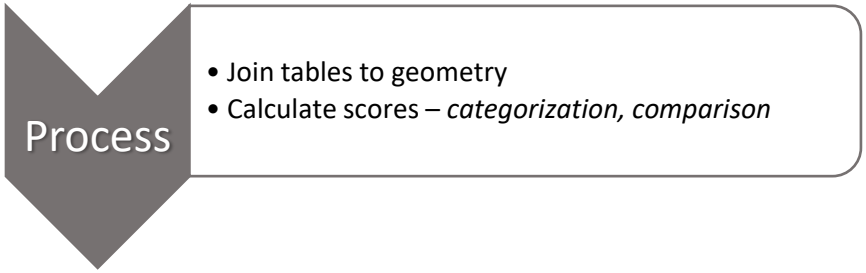
4. Methodology

This section will cover the key steps of the process to describe how the results were generated, enabling the process to be transparent and allowing for the analysis to be replicated. This section is divided into three distinct steps: Prep, which will briefly discuss actions taken to initiate the analysis; Process, which discusses how the raw data that was gathered during initial preparations was manipulated; and Analyze, which discusses the generation of the final overlays.



This Prep section will not restate was has already been described in the previous section, other than to highlight the importance to conduct a literature review in order to provide clarity on how the analysis is expected to take shape. The identification of the factors was especially important for this analysis as previous studies conducted through other groups will invariably have aspects that are not applicable to the study area, in this case a statewide analysis of Iowa.

As such, the Prep or preparation phase of the analysis proved crucial in helping prevent the need to go back and reexamine previous aspects of the Mineta study. Furthermore, efforts taken to gather and document the data with metadata ahead of time helped save time later on when the results needed to be posted online or shared with partner agencies and organizations.



The Process step of the analysis encompasses the manipulation of the raw data in order to make it useable as an input into the analysis. All of these steps utilize ArcMap GIS software developed by Esri with some brief data formatting within Microsoft Excel.

Join tables to geometry

After the data was downloaded (in the case of the American Community Survey (ACS) 5-year Estimates) or transcribed (in the case of the gas prices), all data was initially previewed in Microsoft Excel. Since these tables would be joined in a GIS with vector data, all tabular information needed to be checked to ensure it had unique identifying attributes that could be used in the joining.

For ACS data, this meant having an ID field marking the appropriate U.S. Census Block Group identifier. This information could also be extracted from the GEO_id field. This field is a smart key whose format includes the state number, country name, block group number, and tract number.[4]

For gas prices data, this meant having the county name or county number in the same alphanumeric format as the data type in the joinable boundary layer. The county name and number was already included in the table when it was originally set up to receive the month average gas price information recorded from the AAA and Gas Buddy websites.

Having unique identifier fields available allowed for the tabular ACS data to be joined with the block group vector data available as TIGER/Line Shapefiles from the U.S. Census Bureau[5] and country boundary vector data available from the Iowa DOT.[6]

Calculate scores

Each unique factor was described using a variety of different metrics. Some factors were represented as percentages, some as whole integer values, and others as decimal numbers. The raw values themselves do not allow for easy comparisons between the factors, nor does it allow for any cross-factor calculations unless everything is described in similar terms.

[4] https://www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html
[5] Block Group vector data: https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html
[6] Iowa County vector data: https://data.iowadot.gov/datasets/county-5

The working group decided to utilize an existing scale for applying scores and evaluating them that was based on the methodology currently used in the Infrastructure Condition Evaluation (ICE) analysis that the Iowa DOT performs on an annual basis. The ICE analysis tool uses scores applied to several different criteria and then weights those individual scores before combining them to form an overall composite score for a particular portion of the roadway network.[7]

3 Decision Point

How to compare the factors?

Utilized a similar scoring process like that used in the annual ICE analysis.

For this analysis, each of the individual external factors would be assigned a score ranging from 1 to 10, with the lowest score of 1 indicating an area being more transit dependent with the highest score of 10 indicating an area being the least transit dependent. Having a 1 through 10 score for each of the external factors will then allow for all factors to be added together to form a composite overlay representing the overall transit dependency of a given area.

4 Decision Point

How to score the values?

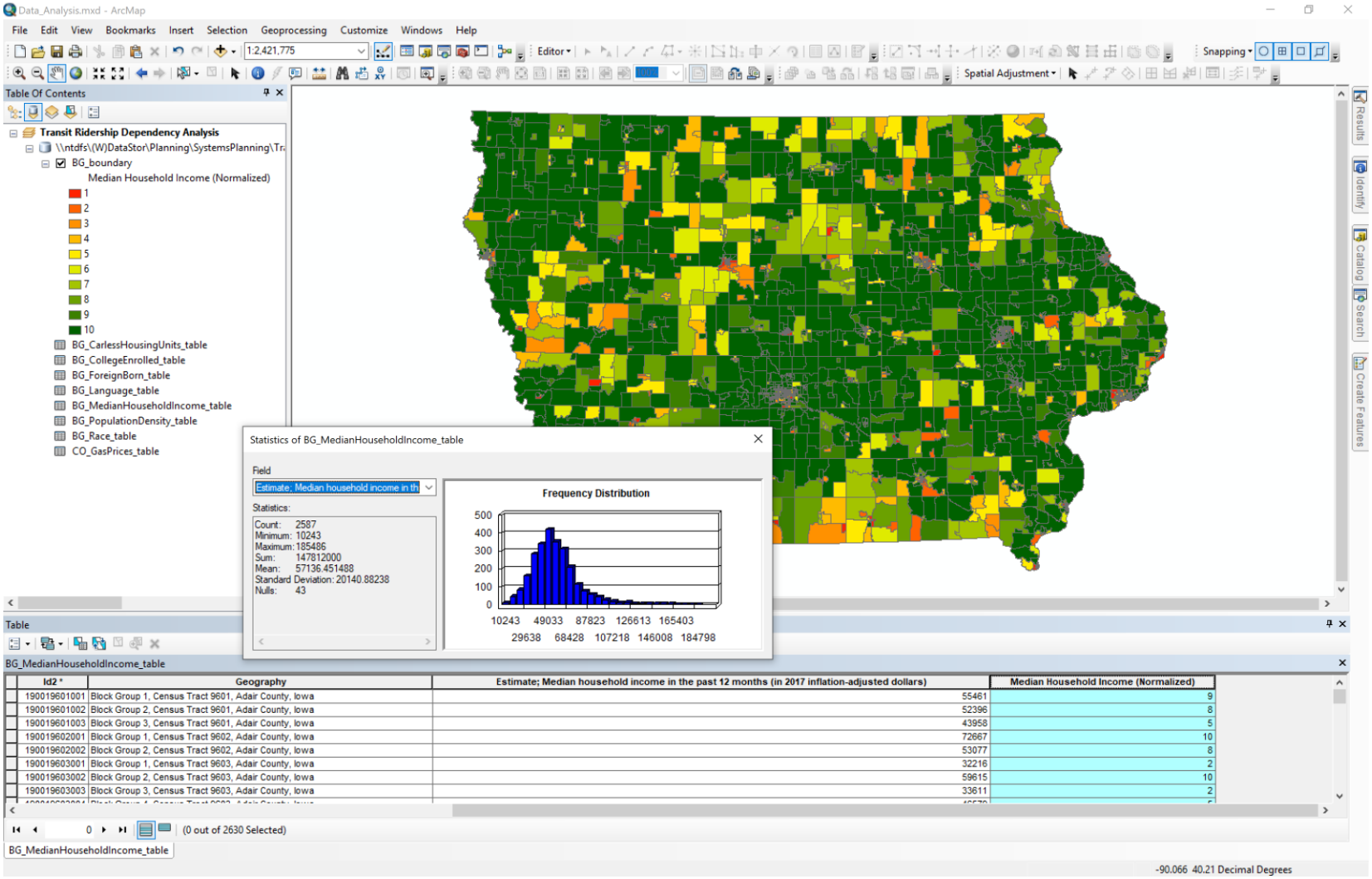
Values greater than or equal to the state average set to 10 indicating least transit dependent. Remaining values binned evenly between 9 categories.

Another decision requiring the group's feedback involved the 1 through 10 scoring for each of the factors. Dividing the entire range of values for a given factor by 10 was originally considered; however, the group did not think that this would result in a product that would accurately depict transit dependency due to the high likelihood that less transit dependent regions would possibly skew the results. The final determination of the working group was to calculate the overall statewide average for each of the factors and assign a score of 10 to those values at or above the statewide average. The remaining regions in the state with values below the statewide average would then be divided into nine equal categories.

The addition of a score field and calculation of the statewide average was performed in a GIS using ArcMap by Esri. Each of the external factors had an additional field added to its table with its alias marked with "(Normalized)" indicating that the 1 through 10 scoring was based on the related value of that factor. Right-clicking and selecting the 'Summarize' option allowed for quickly determining the statewide average for a factor. As shown in Figure A2.4, the statewide average for median household income was determined as being $57,136.45. Using the 'Field Calculator' tool, all median household income values at or higher than the statewide average was assigned a value of 10 for the normalized score.

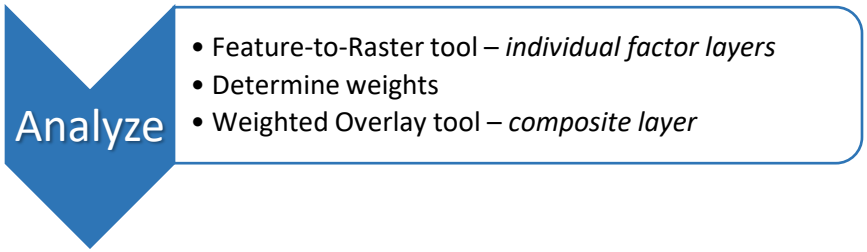
[7] Iowa Infrastructure Condition Evaluation: ICE 2018 Data Year, Iowa DOT, 2019, https://iowadot.gov/systems_planning/pr_guide/Plans and Studies/ICE-2018.pdf

Figure A2.4: Example of calculating normalized scores



Source: Iowa DOT

In order to assign scores 1 through 9 to the remaining records, the total number of remaining unscored records was divided by nine with that result indicating how many records would be binned together. Sorting the values in descending order allowed for quick selecting of the next lowest binned group of records. This process, while manual, was able to be quickly performed. In future iterations of this analysis, a scripted query could be executed to perform this task to decrease the number of instances in which an analyst would need to manually manipulate the data or calculate scores.



The generation of the overlays take place during this step of the analysis. Before an overall overlay is created though, overlays for each of the individual factors must be created first. To do so, the 'Feature-to-Raster' tool was utilized to represent the normalized scores that were calculated in the previous step. The factor overlays then served as inputs into the 'Weighted Overlay' tool.

Feature-to-Raster tool

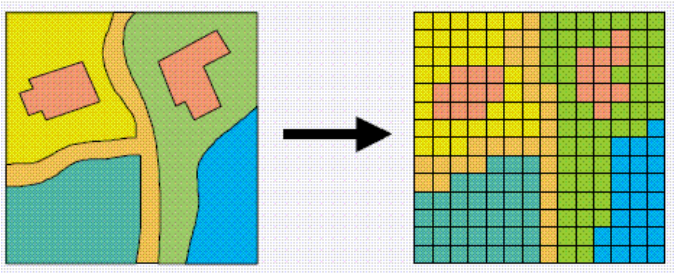
The 'Feature-to-Raster' tool is found as part of the raster group of tools available to users of ArcMap. This tool takes the joined result of the vector boundaries with the tabular data and produces a raster overlay with each cell of the raster representing the calculated normalized score. Esri's online resource[8] was utilized as a reference for this process and provides additional details on the tool.

The premise of the 'Feature-to-Raster' tool, as shown in Figures A2.5 and A2.6, is to convert vector data into an image consisting of cells which represent the resolution of the raster image. Converting vector data into a raster gives it a pixelated appearance and while it is rarely a perfect fit to the original data, it serves as a good representation of the data trends that were depicted by the normalized values for the overlay. By running the process across all of the factors and producing multiple raster overlays, this then enables calculations across the different rasters such as with the 'Raster Calculator' tool, or, for this analysis, use of the 'Weighted Overlay' tool.

[8] Esri, "Converting Features to Raster Data", https://desktop.arcgis.com/en/arcmap/10.7/tools/conversion-toolbox/converting-features-to-raster-data.htm

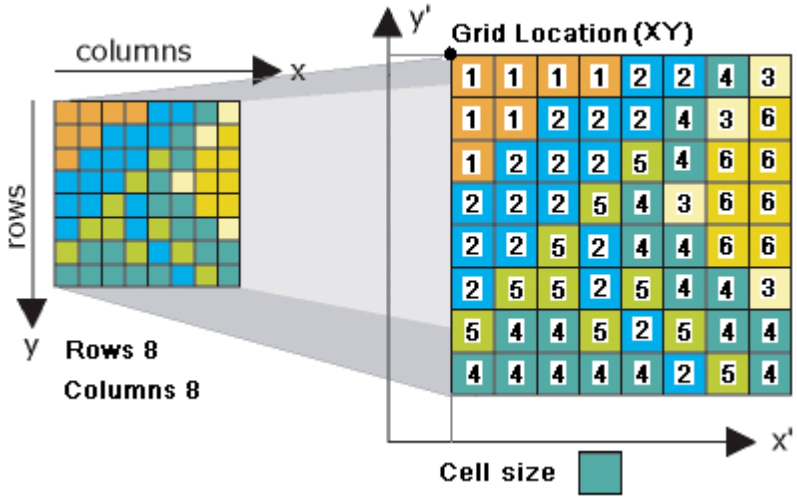
For the purposes of this analysis, the default cell sizes (roughly 75 x 75 meters for county and 10 x 10 meters for block groups) populated by the tool were utilized as they were deemed appropriate for a statewide level analysis. Consideration should be given to this though, as the smaller the cell size that is used, the longer the processing time, particularly over large regions. Additionally, smaller or finer resolution cells do not provide as much benefit when the original vector features do not have as many vertices or the shapes are not very complex. For example, county sized shapes are much less complex than U.S. Census block groups or water features which tend to have a lot more curves and unique shapes.

Figure A2.5: Vector data converted to a raster



Source: Esri

Figure A2.6: Raster cells representing values



Source: Esri

Determine weights

Before the 'Weighted Overlay' tool can be used in the next set of overlay production, weighted values are needed in order to emphasize which factors influence transit dependency more than other factors.

In other possible future follow-on studies, the literature review or examples used in other studies could serve the basis for determining factor weights. Through discussions within the working group, it was decided that the transit agencies should be asked to help provide this information by supplying a set of scoring values for each of the seven factors, based on their background, experience, and

perspective. The higher the value assigned to the factor, the more weighting, or influence, was given to that particular factor. Lower values for a factor indicate less influence on ridership.

An email was sent to each of the transit agency managers and directors requesting weighting data for the factors utilized in the Iowa analysis. They were asked to assign a weight or percentage to each of the seven factors, and told that the total for all the weights should equal 100. Assigning a higher weight to a factor means it has more relative importance than factors with lower weights.

A total of 15 responses were received out of 35 agencies, resulting in just under a 43 percent response rate. Of the agencies that responded, 5 of 12 (42 percent) large urban, 3 of 7 (43 percent) small urban, and 7 of 16 (44 percent) regional transit agency responses were received. The work group was happy with both the total number of responses, as well as the balance of large urban, small urban, and regional transit responses.

5 Decision Point

How to weight the values?

The transit agencies have more localized knowledge and experience with the ridership in their areas. Feedback was solicited through their directors.

The responses were recorded in a Microsoft Excel spreadsheet with each of the responding agencies weighted values aligned vertically with the factors. Figure A2.7 shows the results with the transit agencies being grouped by the type of transit system.

Figure A2.7: Transit agency assigned weights to the factors

	Large Urban					*Small Urban*			*Regional*						
Factor	DART	Iowa City	UoI CamBus	Sioux City	Bettendorf	Mason City	Marshalltown	Muscatine	Soutern Iowa Trolley	ECICOG	INRCOG	SWIPCO	SEIRPC	River Bend	SIMPCO
1. Gas Prices	15	20	30	5	10	10	5	10	65	20	10	40	15	10	15
2. Household Income	30	40	10	40	15	20	40	35	0	10	25	5	35	20	20
3. Carless Households	25	20	10	30	25	50	40	40	0	10	10	40	35	30	40
4. Language	0	0	0	10	10	0	5	5	10	2.5	5	5	5	10	0
5. Race	0	0	0	10	10	0	5	5	0	2.5	5	5	5	10	0
6. Enrolled in College	0	10	30	0	15	5	0	5	0	5	5	5	2	5	10
7. Population Density	30	10	20	5	15	15	5	0	25	50	40	0	3	15	15

Source: Iowa DOT

The results, in some ways, were not unexpected. For example, areas that had universities and colleges tended to weight the Enrolled in College factor higher. Some results posed interesting questions in and of themselves; for example, a large urban transit system may have weighted Population Density higher because it reflected the local land use patterns and density of urban development in that area, whereas a regional transit system located in a much more rural area might have weighted Population Density higher because the lack of dense urban development results in significantly fewer transportation options available and thus increases transit dependency. Neither of these interpretations is necessarily wrong, and so all the results were kept.

In addition to the numeric weighted values, a few transit agencies provided further clarifying statements pertaining to the usage of the external factors in this study.

> *"…another factor that we believe is driving some (especially college aged) trips away from transit is the onset of Transportation Network Companies. There are more options today to dial up quick and easy transportation, and the options keep evolving (e.g. bike share, micromobility, etc)."*
>
> *"When gas was over $4.00 per gallon, [the transit agency] found little or no elasticity in demand for rides. Eighty percent or more of our ridership falls into the demographic groups of low income households, carless households, and elderly."*
>
> *"Along with a community infrastructure built for automobiles, creating a public transit service that appeals to and motivates people with a choice is quite difficult."*
>
> *"Race and language factors in for newly arrived immigrants. Once settled and employed, those two weighted factors dissipate."*
>
> *"As you are no doubt aware, the critical factors are service reliability (the bus is consistently on time), headways are ½ hour or less, and service hours operate to 10:00 PM or later."*

While these statements, in and of themselves, did not change the methodology of this study, they did highlight a few examples in which this study could be modified in future efforts. A future external factor could be the presence of alternate transportation modes such as Transportation Network Companies (TNCs) which include ride hailing companies like Uber and Lyft. The original Mineta study included commuter rail transportation due to it being a possible competing mode; however, in the Iowa study it was disregarded since there were no commuter rail options in Iowa. The presence of other locally competing modes of transportation could possibly be used in lieu of commuter rail.

Other future study modifications could incorporate different demographics such as older populations that may not be able to drive and populations with a disability or medical condition preventing them from driving.

Lastly, the final quote from the transit agencies included a reference to service reliability and frequency, as well as off peak hours of service. These factors would be considered internal factors for the purposes of this study and, like the other internal factors described in the Literature Review in section 2, will not be included in this study. However, it does highlight the important role that internal factors can play in driving local transit demand, despite being highly variable when compared to other transit agencies across Iowa.

In order to better understand the data, some simple statistical functions were applied to the results as shown in Figure A2.8. In addition to these functions being applied to each of the types of transit systems, and overall All category was also utilized to represent an across-the-board result without respect to the type of transit system the responses originated from. This was done to help understand how far different types of transit systems departed from the overall average.

Figure A2.8: Statistical evaluation of transit agency weights

	All						*Large Urban*						*Small Urban*						*Regional*					
Factor	Low	High	Average	Median	Median *(adjusted)*	Std. Deviation	Low	High	Average	Median	Median *(adjusted)*	Std. Deviation	Low	High	Average	Median	Median *(adjusted)*	Std. Deviation	Low	High	Average	Median	Median *(adjusted)*	Std. Deviation
1. Gas Prices	5	65	18.67	15	20	15.33	5	30	16.00	15	15	8.60	5	10	8.33	10	10	2.36	10	65	25.00	15	20	18.90
2. Household Income	0	40	23.00	20	20	12.88	10	40	27.00	30	25	12.49	20	40	31.67	35	30	8.50	0	35	16.43	20	20	11.25
3. Carless Households	0	50	27.00	30	30	14.00	10	30	22.00	25	25	6.78	40	50	43.33	40	40	4.71	0	40	23.57	30	30	15.29
4. Language	0	10	4.50	5	5	3.89	0	10	4.00	0	5	4.90	0	5	3.33	5	5	2.36	0	10	5.36	5	5	3.39
5. Race	0	10	3.83	5	5	3.75	0	10	4.00	0	5	4.90	0	5	3.33	5	5	2.36	0	10	3.93	5	5	3.23
6. Enrolled in College	0	30	6.47	5	5	7.54	0	30	11.00	10	10	11.14	0	5	3.33	5	5	2.36	0	10	4.57	5	5	2.87
7. Population Density	0	50	16.53	15	15	14.10	5	30	16.00	15	15	8.60	0	15	6.67	5	5	6.24	0	50	21.14	15	15	17.13

Source: Iowa DOT

The primary purpose of doing a statistical evaluation of the results is to ensure that the results are an accurate representation of the transit agencies' feedback and that they all total to 100 across the factors.

The most notable issues arose for results in which the standard deviation was high, indicating a wide range of values and greater discrepancy between the feedback from individual transit agencies. For factors with double digit standard deviations, the average and median values were scrutinized to ensure that there were no outliers having a disproportionate influence over the results. A few of the results were adjusted slightly, reflected in the Median (adjusted) results in Figure A2.8, in order to compensate for some of these deviations. Whole number values were utilized for the Median (adjusted) values due to the Weighted Overlay tool restriction on using non-decimal values.

Figure A2.9 shows the final weighted values which correspond to the Median (adjusted) values from Figure A2.8. Note that the All category is also included which represented values derived from Large Urban, Small Urban, and Regional transit systems. Since the Regional results and the All results are identical, all graphics discussed from this point will treat both Regional and All results as one and the same.

One of the main takeaways from these results is the fact that the external factors characterized as being more economic in nature, such as gas prices, median household income, and percent of carless households, were weighted much higher than characteristics that could be described as more social in nature including language, race, and percent enrolled in college.

Additionally, it is worth noting that population density was weighted lower among Small Urban transit systems compared to Large Urban and Regional transit systems. This could be due to the fact that Small Urban towns lack the density of urban land use and development like their larger urban counterparts, while at the same time not having its population dispersed over larger areas like their Regional transit system counterparts.

Figure A2.9: Final weighted values

Factor	Final			
	Large Urban	*Small Urban*	*Regional*	All
1. Gas Prices	15	10	20	20
2. Household Income	25	30	20	20
3. Carless Households	25	40	30	30
4. Language	5	5	5	5
5. Race	5	5	5	5
6. Enrolled in College	10	5	5	5
7. Population Density	15	5	15	15

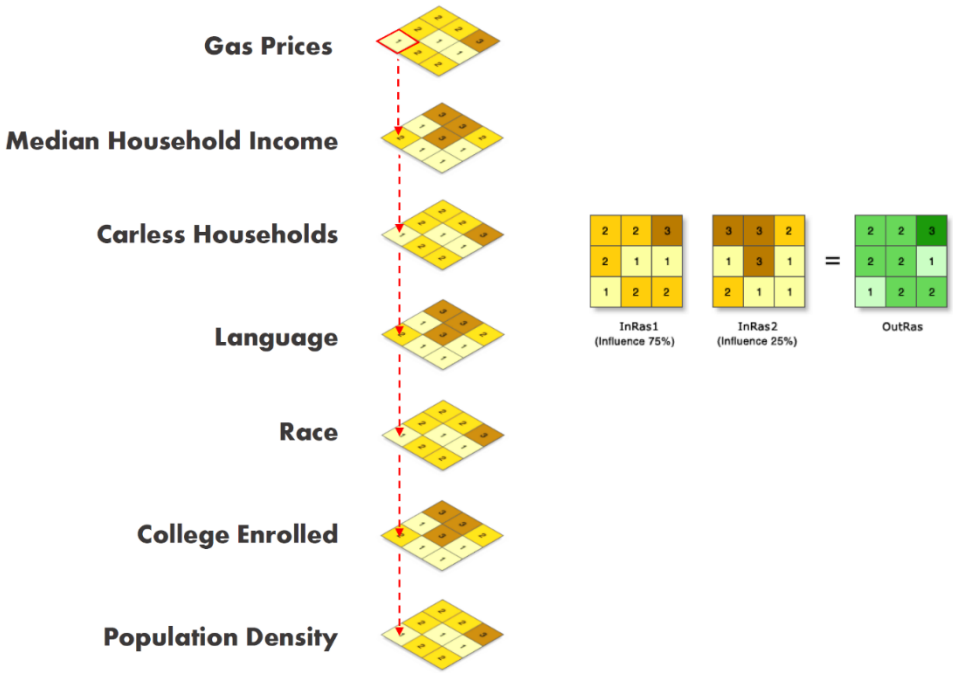
Source: Iowa DOT

Weighted Overlay tool

At this point in the analysis the 'Weighted Overlay' tool can be run with a raster overlay depicting the normalized score for each of the individual factors as the first input and the weighted values for each of the factors as the second input.

Similar, to the 'Feature-to-Raster' tool, the 'Weighted Overlay' tool is also found as part of the raster group of tools available to users of ArcMap.[9] This tool takes the normalized score for each factor and multiplies by that factor's weight. This process is done for each of the factor overlays and then added together to produce an overall composite raster with the final transit dependency score. The graphic shown in Figure A2.10 conceptually depicts the multiple overlays of rasters as they are combined together to generate a new result.

Figure A2.10: Concept diagram of multiple rasters combined to create the final output



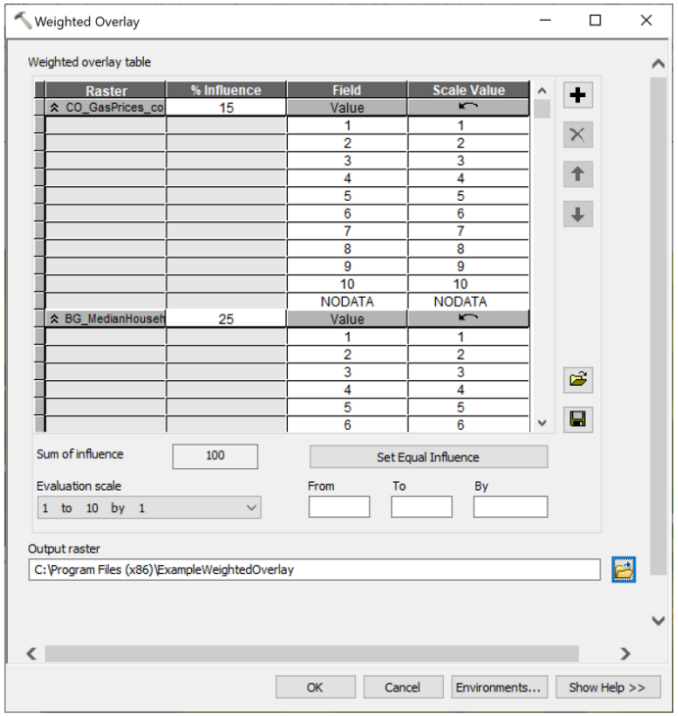
Sources: Esri, Iowa DOT

[9] Esri, "How Weighted Overlay works", https://desktop.arcgis.com/en/arcmap/latest/tools/spatial-analyst-toolbox/how-weighted-overlay-works.htm

The 'Weighted Overlay' tool, as shown in Figure A2.11, was run multiple times in order to compare and contrast how different weighting affected the results. The primary differences lie in the weighted values utilized within the tools' interface. Four sets of values were utilized to produce these results:

- **Non-weighted:** all percent influence values for the weights were set at or as close as possible to being equal for all factors. This was quickly set using the 'Set Equal Influence' option in the tool interface.
- **Large Urban weighted:** weighting values used the Large Urban transit system values from the transit agency survey results.
- **Small Urban weighted:** weighting values used the Small Urban transit system values from the transit agency survey results.
- **Regional/All weighted:** weighting values used the average results from all transit system values from the transit agency survey results to include Large Urban, Small Urban, and Regional. The final All weighted and Regional weighted were identical and so this set of values was only run once as a single overlay.

Figure A2.11: Weighted Overlay tool



Sources: Esri, Iowa DOT

Workflow Summary

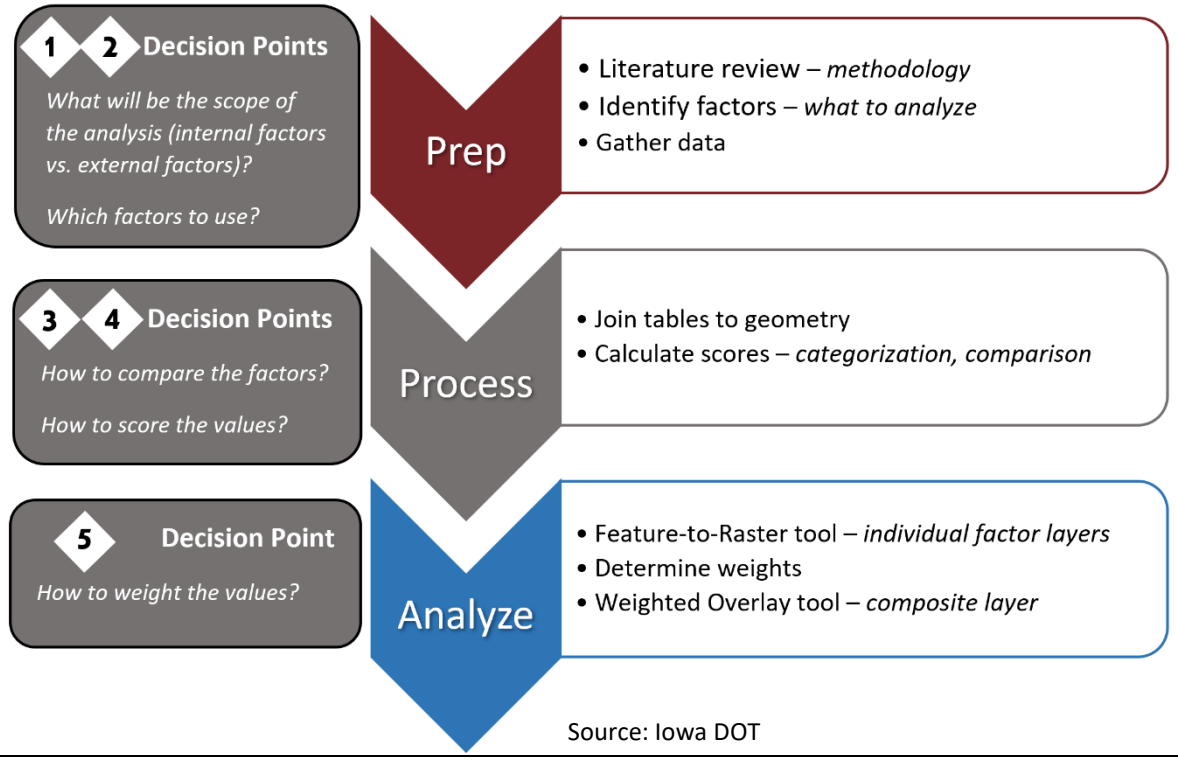
The workflow for this analysis was not particularly complicated but it did necessitate a number of smaller, discrete steps to be taken in order to produce the desired end products as shown in Figure A2.12. Likewise, there were a number of sequential key decision points throughout the analysis that were vital to shaping the final results.

In the Prep or preparation phase of the analysis, having a solid methodology and understanding of the data provided the foundation for which the build the rest of the analysis. Additional time invested in this phase invariably proved beneficial and saved time later on, by preventing going back and defining new or additional factors, identifying alternative sources of the data, or redoing portions of the analysis. The decision points in this phase helped focus those efforts by keeping the scope of the study appropriate in terms of relevance and applicability for the study area.

The Process phase of the analysis was spent organizing and manipulating the data that was gathered in the previous phase. The most important steps in this phase were calculating the normalized values that would be used in the next phase of the analysis and generating of the overlays. Decision points in this phase revolved around the means of scoring and comparing the values between each of the overlays using common and like terms or units.

The Analyze phase took the outputs from the previous steps and used those as input into the geoprocessing tools used to generate the raster overlays and ultimately the weighted overlay results. It was critical to identify the weights that were used in the calculation of the weighted overlay by seeking input from knowledgeable sources. While the consultation of other previous studies through a literature review could provide those values, it was the determination of the working group that direct feedback from the transit agencies would supply the needed information.

Figure A2.12: Workflow and decision points by phase of the analysis



Source: Iowa DOT

5. Analysis and Results

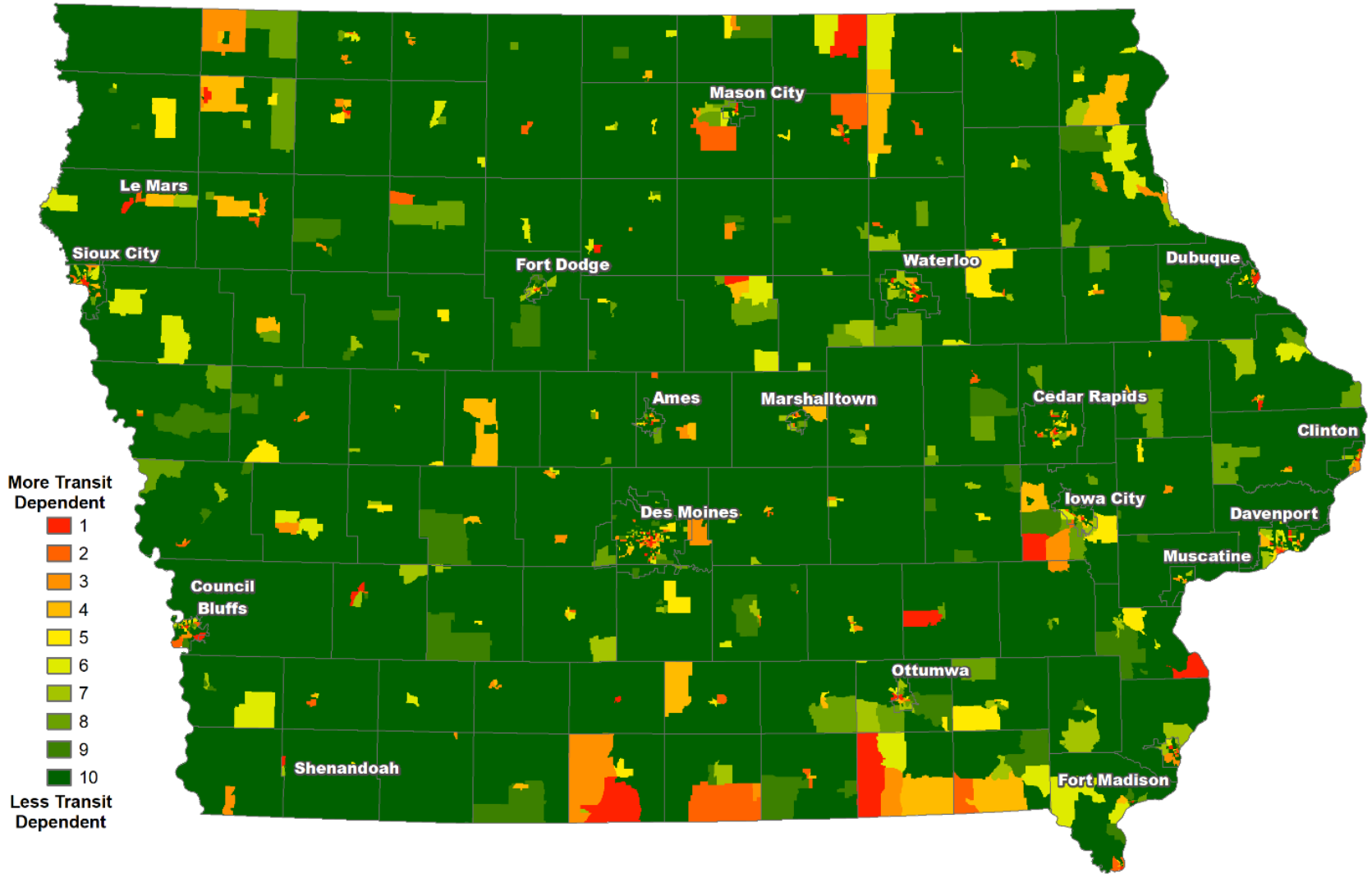
As discussed in the previous section, individual overlays were generated for each of the external factors using the normalized value to assign a score. This score is represented on a thematically symbolized scale between 1 and 10 with 1 indicating more transit dependency symbolized as red with 10 indicating less transit dependency symbolized as green.

Both the overall composite overlays, as well as the individual factor overlays each provide useful insight for better understanding the factors, characteristics, and circumstances that affect how some areas and populations are more or less dependent upon public transit for their passenger transportation needs. This also assists with implementation of different strategies that could be used to enhance access and increase transit ridership through targeted marketing, outreach, or tailoring of transit services to these transit dependent demographics.

Carless Households

While the U.S. Census Bureau's American Community Survey 5-year estimates includes the average number of vehicles per household, this analysis focused only on those households with zero vehicles available for transportation. The resulting overlay for the carless households factor in Figure A2.13 shows clusters of populations mostly in southern Iowa that do not own a vehicle. This is partly explained by the presence of Amish communities in the southern two tiers of counties in the State. However, other characteristics such as medical conditions or disabilities could impact the ability to own or operate a car. Additionally, college students and other working adults may also lack vehicles due to lower income or simply as a choice due to a number of other transportation options.

Figure A2.13: Carless Households



Source: Iowa DOT

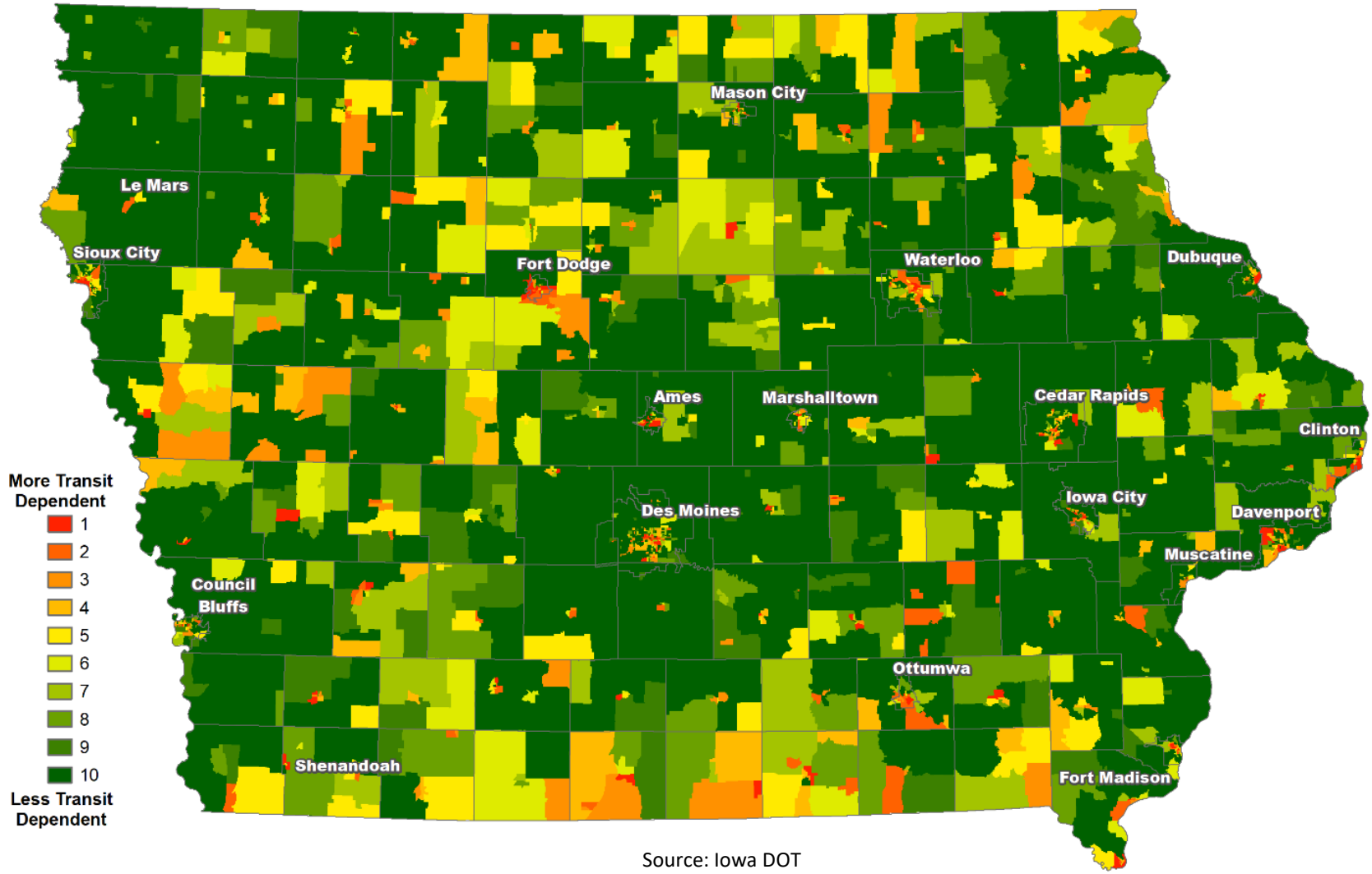
Median Household Income

The factor of Median Household Income produced results that the working group found interesting. As can be seen in Figure A2.14, the map shows an increased variety of colors indicating much more equal distributions across the different dependency categories. However, the most striking results are the very clear distinctions between the larger metro areas and the suburbs and rural areas surrounding them. While the metros themselves had a wide variety of income levels, it is the rural areas surrounding them that are almost entirely shown in dark green, indicating they are higher than the statewide average in median household income and thus considered less transit dependent.

A possible explanation for this could be that households with higher than average income can afford to live further away from workplaces and commute. Not only that, these populations may be more willing to live far enough away to live in a rural area but close enough to take advantage of wide variety of services, recreational options, and businesses in the metro.

Another perspective could be that while this analysis is focused on transit dependency, the dark green non-transit dependent areas shown in Figure A2.14 could indicate larger concentrations of potential choice riders who are not dependent on transit for their transportation needs. Targeted outreach and marketing may need to take this into consideration if attempts are made to connect with these groups of choice riders in order to entice them to leverage public transit rather than single occupancy, personally owned passenger vehicles.

Figure A2.14: Median Household Income



Source: Iowa DOT

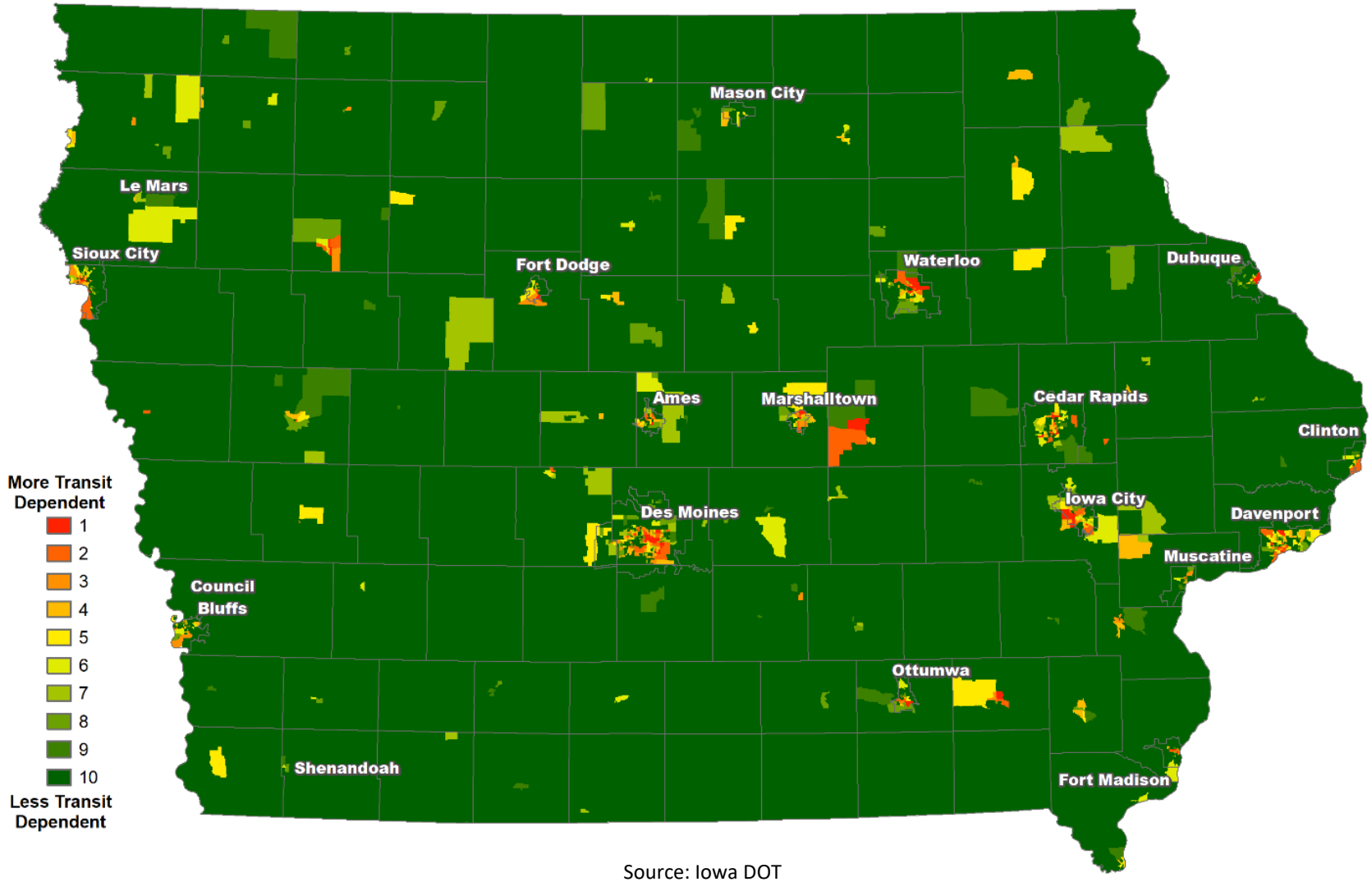
Race

According to the U.S. Census Bureau's QuickFacts, data as of July 1, 2019 show that Iowa's White, non-Hispanic or Latino population is 85.0 percent.[10] As such, it is not surprising to find that using the statewide average for Non-White population would yield an overlay depicting most of Iowa as less transit dependent for this factor.

However, while there are block group areas within all of the larger metros with larger non-White populations, metro's alone are not the only places in Iowa to find different demographic groups. As seen in Figure A2.15, places such as Fairfield with the presence of Maharishi Vedic Observatory, the Sac and Fox / Meskwaki Settlement west of Tama, and employment centers in Decorah, Postville, and West Union in northeastern Iowa show that diverse populations are still found in a variety of settings and regions.

[10] U.S. Census Bureau QuickFacts for Iowa V2019 results for population estimates for July 1, 2019: https://www.census.gov/quickfacts/IA

Figure A2.15: Non-White Population



Source: Iowa DOT

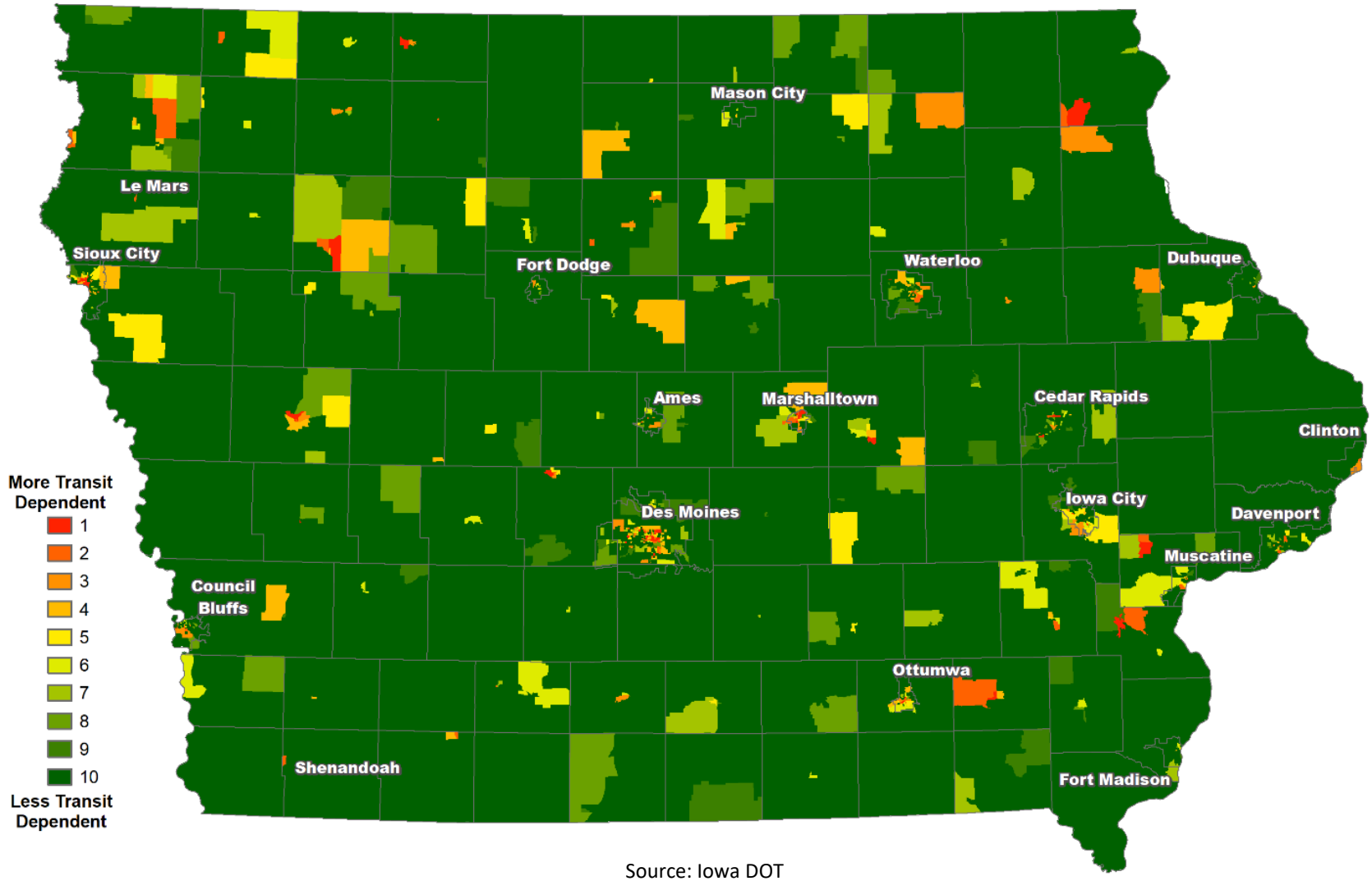
Language

The Language factor, shown in Figure A2.16, is based on the percentage of households that do not speak English at all or do not speak English very well, as defined by the U.S. Census Bureau. This information is collected so that local communities and government agencies can comply with regulations, plan for language translating services, conduct research or studies, or assist organizations and businesses in their outreach to different demographics.[11]

Specifically, for public transit and transportation purposes, identifying unique language characteristics is important in order to support transit agencies as they provide service to individuals speaking languages other than English. This also helps agencies comply with the Safe Harbor Provision included as part of Federal Title VI requirements and guidelines. These regulations note that in regions in which 5 percent or 1,000 persons, whichever is less, of the total population speaks a language other than English and does not speak English well or very well, the transit agency should provide written translation of important documents.[12]

[11] U.S. Census Bureau, "American Community Survey Redesign of Language-Spoken-At-Home Data", 2016, https://www.census.gov/library/working-papers/2018/demo/SEHSD-WP2018-31.html
[12] Federal Transit Administration (FTA), Circular FTA C 4702.1B, 1 October 2012, "Title VI Requirements and Guidelines for Federal Transit Administration Recipients", https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf

Figure A2.16: Non-English Speaking Population



Source: Iowa DOT

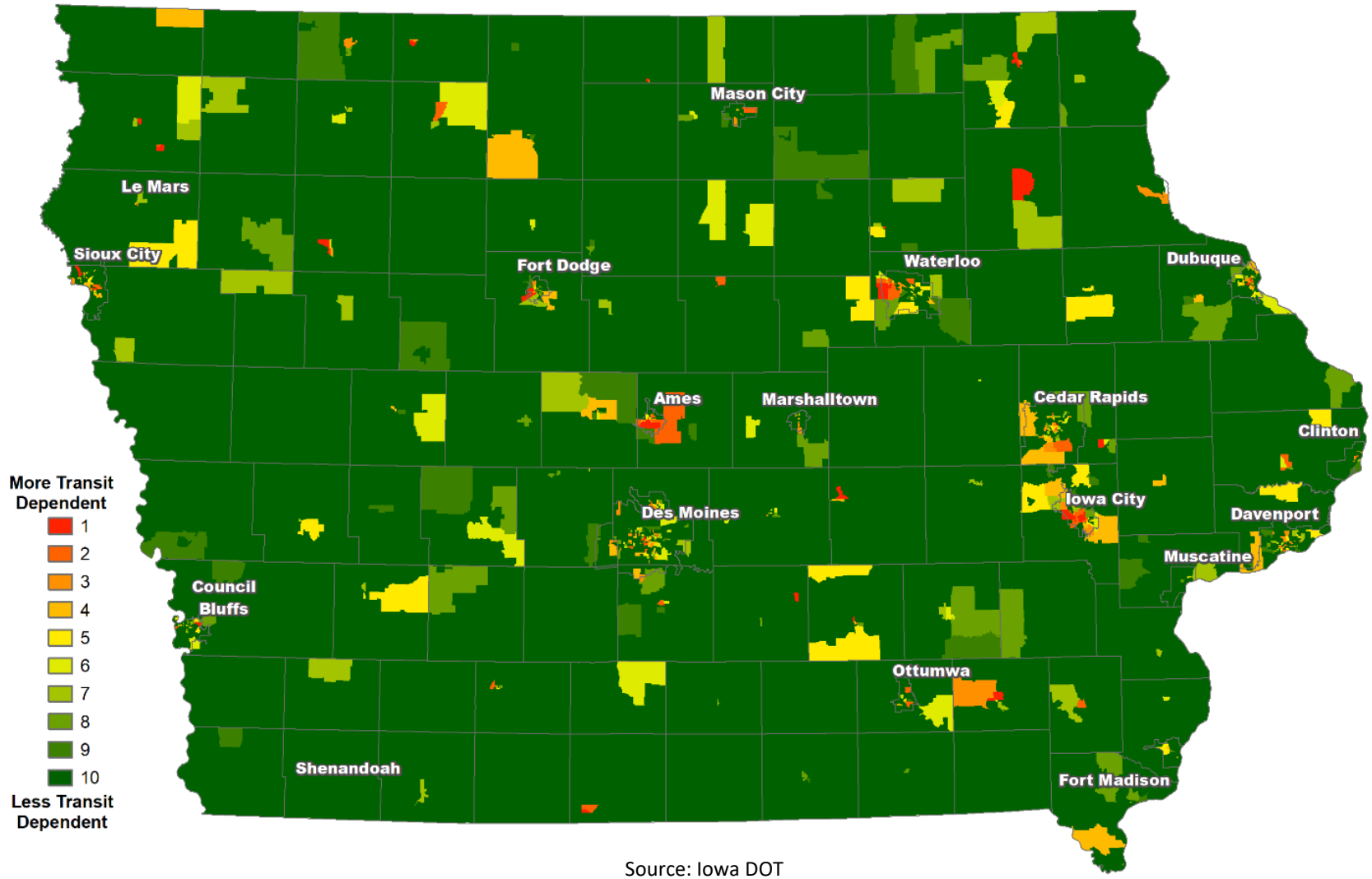
College Enrolled

Like some of the other factors described above, the College Enrolled populations with increased transit dependency is somewhat predictable in that those demographics are found within the large college towns in Iowa, which include the Ames, Waterloo, and Iowa City urban areas. However, these three areas are not the only places to find college students. According to the 2015 edition of the Carnegie Classification of Institutions of Higher Education,[13] there are 65 colleges and universities across Iowa. These institutions include everything from technical schools and community colleges to traditional 4-year baccalaureate universities to advanced doctoral or research institutes, and includes public and private schools.

Figure A2.17 shows how widespread the college population is in Iowa. This reinforces the idea that a majority of the counties in Iowa and every single region in the state will have some residents that are taking college courses in-person or online but likely do not have a means of traveling beyond public transit. These college students encompass most age categories, have a diverse range of backgrounds, and come from families with a wide range of income brackets. The transportation needs of this population could be everything from basic trips to the grocery store to connection trips with airline, passenger railroad, or long-distance intercity bus services.

[13] Carnegie Classification of Institutions of Higher Education, "Carnegie Classifications Data File", 2015, https://carnegieclassifications.iu.edu/downloads/CCIHE2015-PublicDataFile-01Feb16.xlsx

Figure A2.17: College Enrolled



Source: Iowa DOT

Population Density

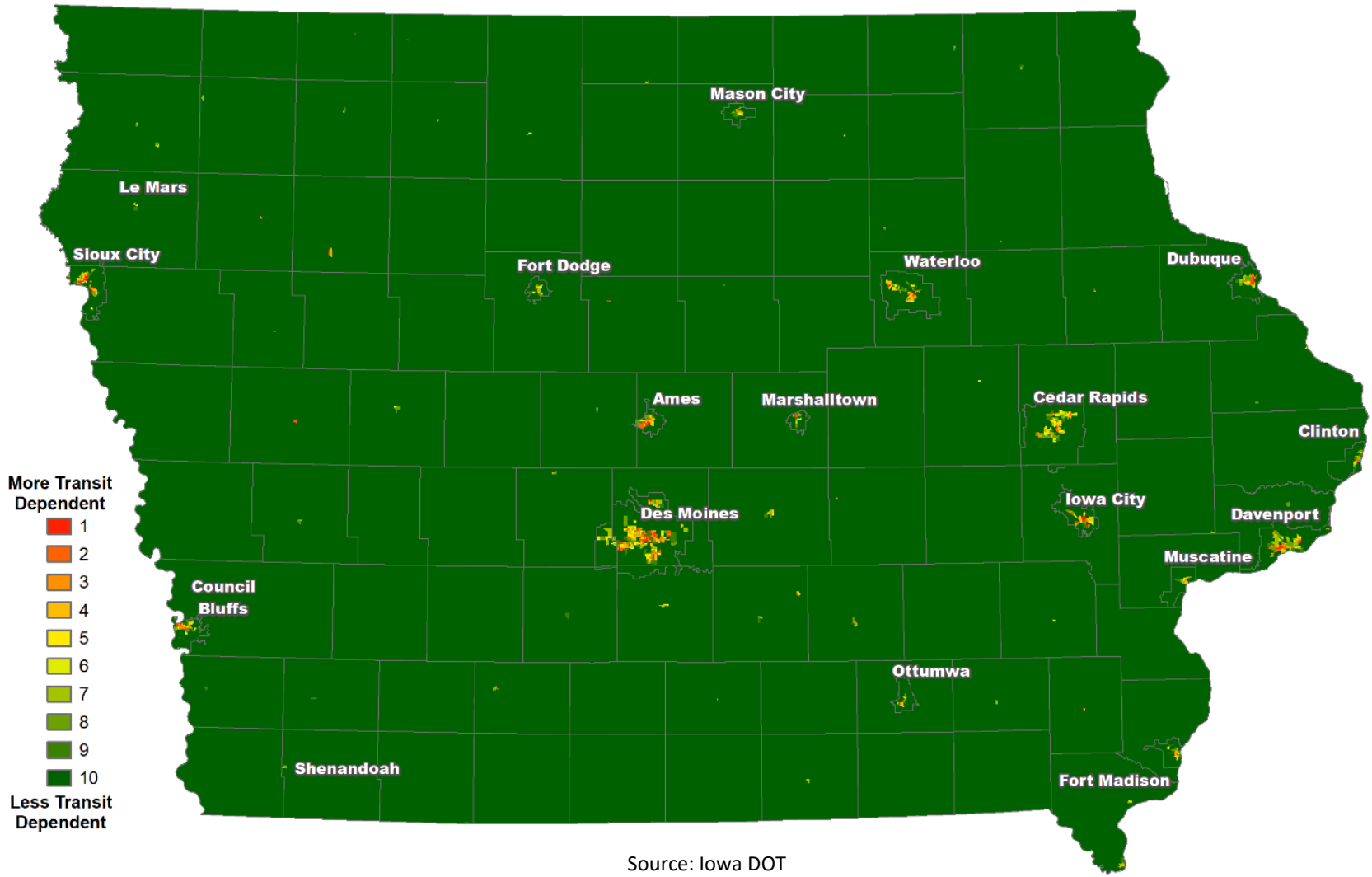
As can be clearly seen in Figure A2.18, using the statewide average for population density in Iowa results in nearly the entire state covered in a dark green category of being less transit dependent. The only exceptions to this are the larger metro areas and small urban centers dotted across the state.

On the one hand, having higher population densities indicates more traffic, more people, and more need for public transit. On the other hand, having significantly less population density poses other issues such as dispersed populations with higher overall transportation costs. One option lies in the intercity bus feeder system which was conceived of by Jefferson Lines in 1980 with pilot programs with routes for Creston to Chariton and Jefferson to Osceola as well as, demand response service from several counties in northern Iowa to Mason City.[14] In the 1990's intercity transit service reorganizations and fleet reductions decreased the number of stops and miles that the service operated.

Intercity bus service and dispersed communities with low population densities aligns with other trends seen in the decreasing populations of rural communities. Understanding the relationship between rural areas and the small urban centers that appear as dots across multiple counties is equally important of a consideration for transit planning, as much as it is important to understand large concentrations of dense urban development.

[14] Bonnie Buchanan, Jefferson Lines, Iowa Passenger Transportation Summit, 23 May 2019, "Intercity Bus/Public Transit Partnerships Panel Discussion"

Figure A2.18: Population Density



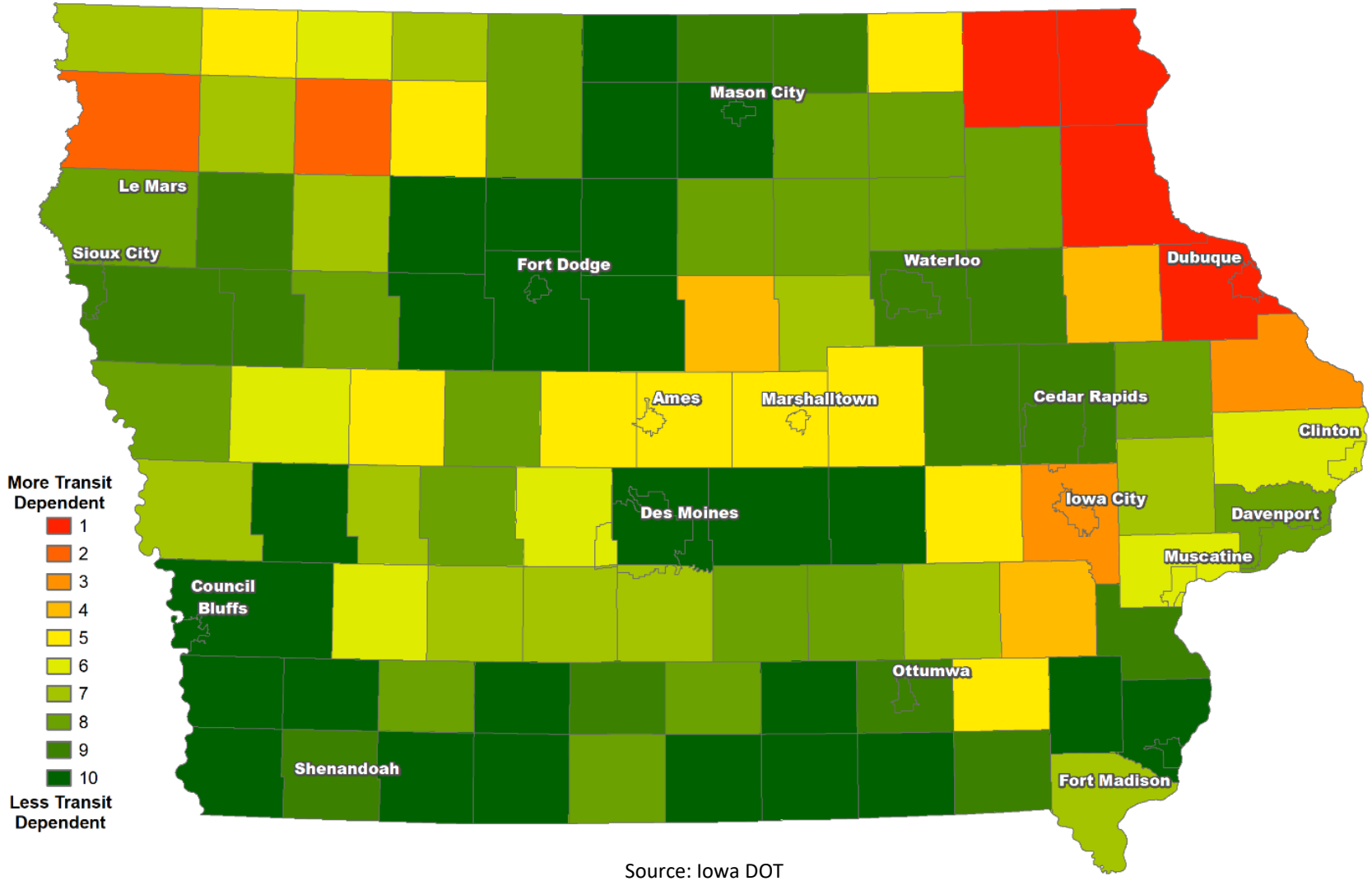
Source: Iowa DOT

Gas Prices

Beyond the difficulties of obtaining gas price information at a granular level, there were also unique trends in the data itself that led to follow-up research and analyses in order to validate it. As shown in Figure A2.19, there are clear areas within Iowa that routinely showed higher than average gas prices. While these results did change a bit when symbolized using standard deviation (indicating gas price stability or volatility), the general trends remained mostly the same.

Publicly available pipeline maps were also compared to the overlay but nothing conclusive could be determined from it. Some areas that have high concentrations of oil pipelines and terminals would have higher or lower gas prices; likewise, regions with few or no pipelines or terminals may or may not have high gas prices. The conclusion was that the underlying circumstances related to increased gas prices was likely a combination of unavailable data such as the number and concentration of competing gas stations within a county or across state borders, in addition to consumer-based pricing, population density, and estimated vehicle miles traveled by customers. While these factors would be interesting to study for their own merits, such an effort was beyond the scope of this analysis and thus the gas prices overlay was accepted and used as is.

Figure A2.19: Gas Prices

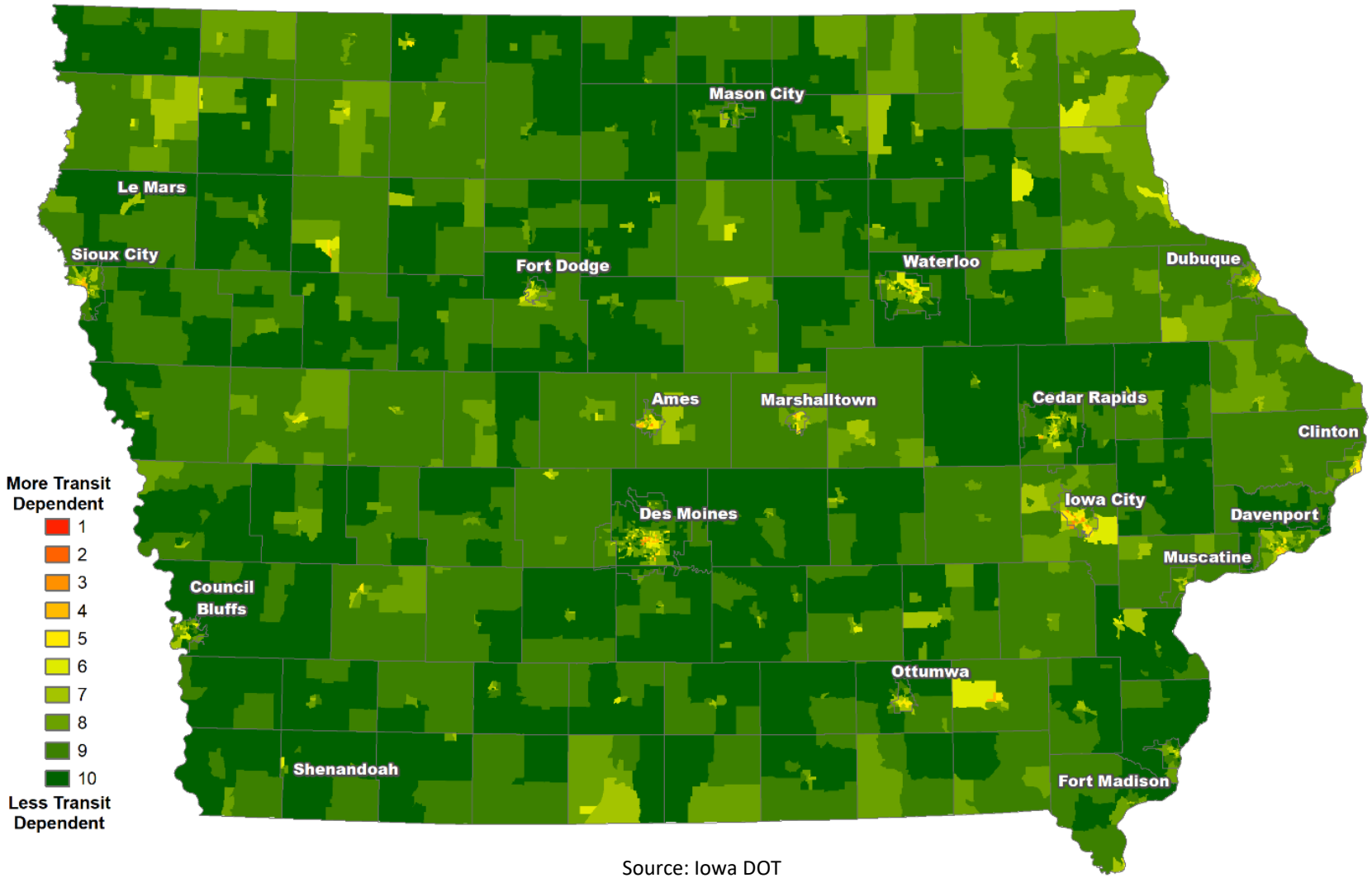


Source: Iowa DOT

Non-Weighted Composite

A non-weighted overlay, shown in Figure A2.20 was produced by using the 'Set Equal Influence' option in the Weighted Overlay geoprocessing tool. Since the tool only permitted whole numbers for the weighting and there was an odd number of factors, this resulted in a few factors being weighted one percent higher than the others, but this did not seem to significantly alter the resulting overlay. The purpose of creating a non-weighted overlay was to serve as a basis of comparison in the event that unusual results appeared in the overlays using the weighted criteria determined by the transit agencies.

Figure A2.20: Non-Weighted Composite



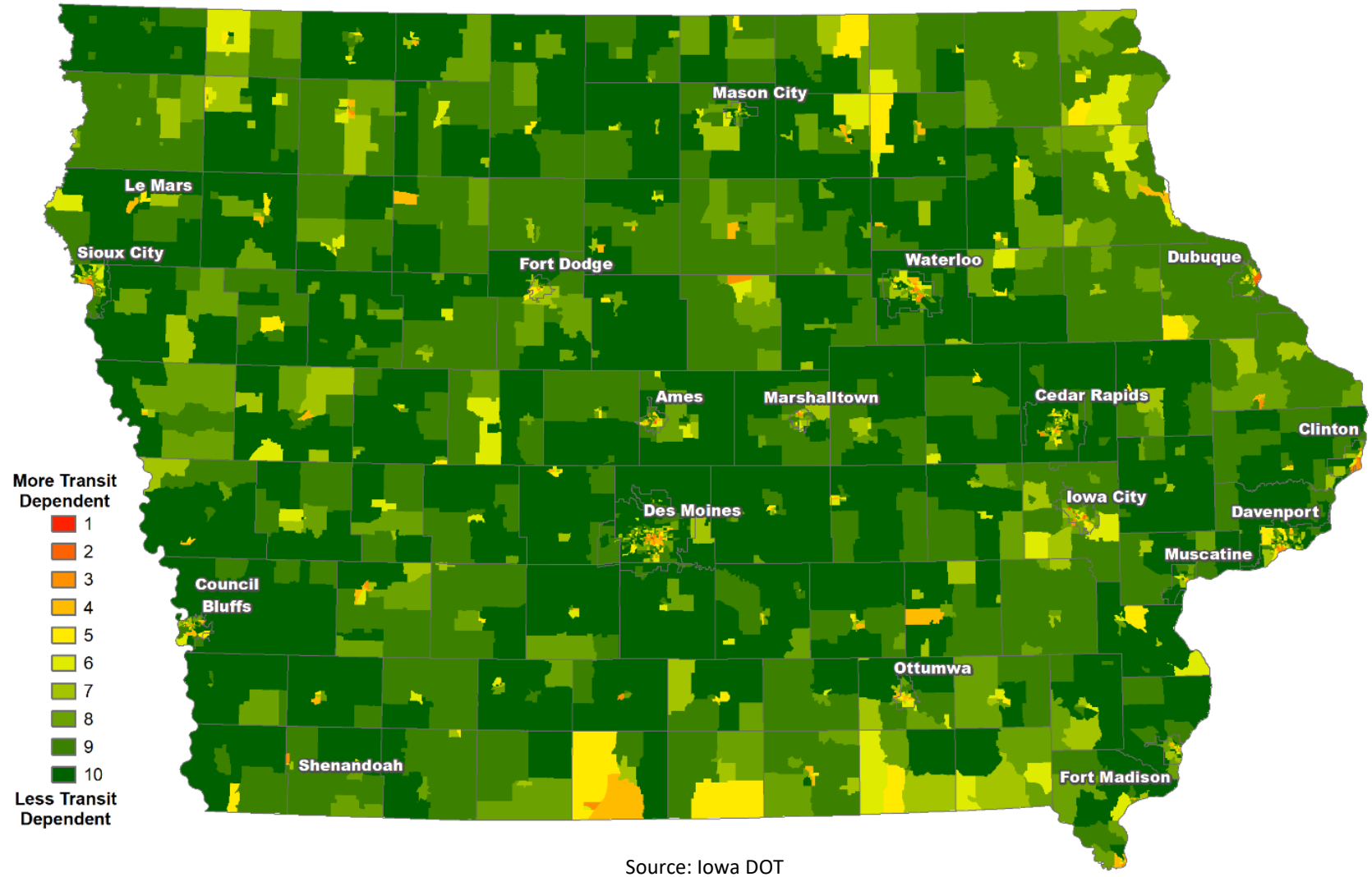
Source: Iowa DOT

Weighted Small Urban Average

The weighted overlay using the small urban transit agency values, shown in Figure A2.21, emphasizes factors that could be considered as being more economically related. In other words, factors including gas prices, median household income, and carless households. The small urban transit agencies weighted carless households as their highest weighted factor; this was the highest that this factor was weighted among transit agencies. This could perhaps indicate that land use and urban development patterns are built with the assumption that single occupant vehicle usage is almost a given or a requirement in order to access community resources and services.

Unlike their large urban transit agency counterparts, college enrolled and population density were not weighted very high at all and were among the lowest weights assigned by the small urban transit agencies. The low population density weighting could be interpreted as an indicator of a community's decreased emphasis on dense development and perhaps indirect encouragement for more spread-out development and land usage. The end result though is a sprawling, albeit smaller, urban area with a transit agency trying to maintain a logistically complex fixed route transit system while relying on a much more limited tax base for support and being much more sensitive to fluctuations in the amount of fares and ticket revenue that is collected.

Figure A2.21: Weighted Composite of Small Urban Agencies



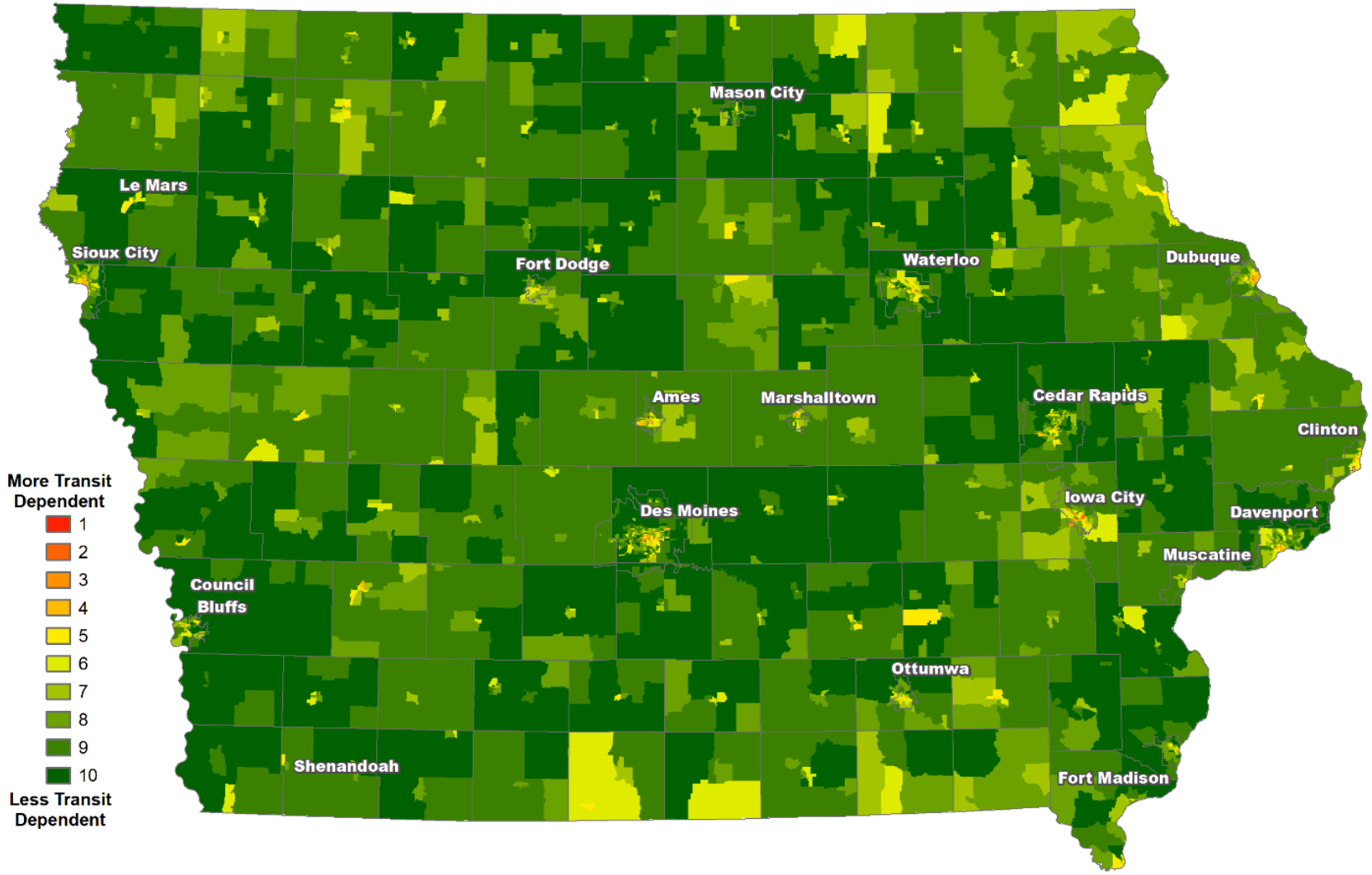
Source: Iowa DOT

Weighted Large Urban Average

Like their small urban transit agency counterparts, most of the weighting of the factors for large urban transit agencies, shown in Figure A2.22, was on economic factors such as gas prices, median household income, and carless households. However, population density and college enrolled factors were weighted higher by large urban agencies. In particular, population density's higher weight is likely because fixed route transit services are more closely aligned with the presence of denser population centers in order to maximize ridership and access multifamily residential areas.

Another difference is the increased emphasis on college enrolled populations of large urbans, although it should be noted that the increased weighting for this factor was not universally shared by all of the large urban transit agencies respondents.

Figure A2.22: Weighted Composite of Large Urban Agencies



Source: Iowa DOT

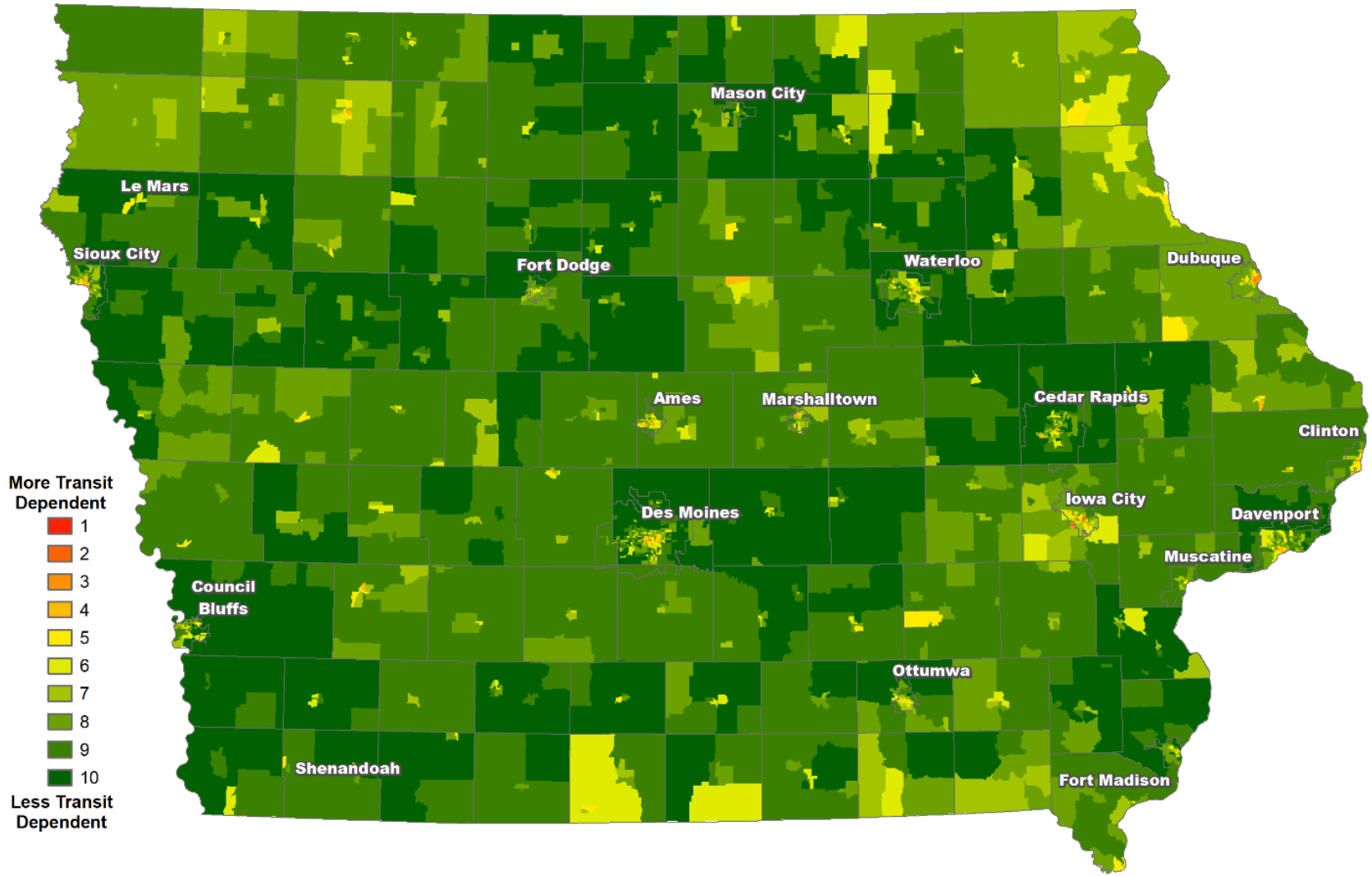
Overall Composite

As mentioned previously, the overall composite overlay, shown in Figure A2.23, is identical to the regional transit agency weighted feedback, thus only one overlay was produced for it. For the most part, the weighted values that were averaged across all of the transit agencies balanced some of the key differences noted above between the small and large urban transit agency feedback.

The economic factors of gas prices, median household income, and carless households were weighted relatively higher than some of the other factors, although carless households was not weighted as high as the small urbans set it. Population density was also weighted higher than regional or small urbans set it, although this factor still falls far short of being among the highest weighted factors. While the college enrolled factor was weighted higher for large urbans, this higher weighting was not reflected in the final averaged weights.

One aspect that was fairly consistent across all transit agencies (large, small, and regional) was the low weighting placed on the non-White population factor and the non-English speaking factor. As mentioned earlier, one of the transit agency respondents described how these factors may be more important when refugees or immigrant populations initially moved into a community, but then become less important factors as far as transit dependency is concerned once these populations are able to afford other transportation options. It could be that the other transit agencies are observing similar trends in their communities which resulted in universal agreement on weighting these factors lower.

Figure A2.23: Weighted Composite of All Agencies



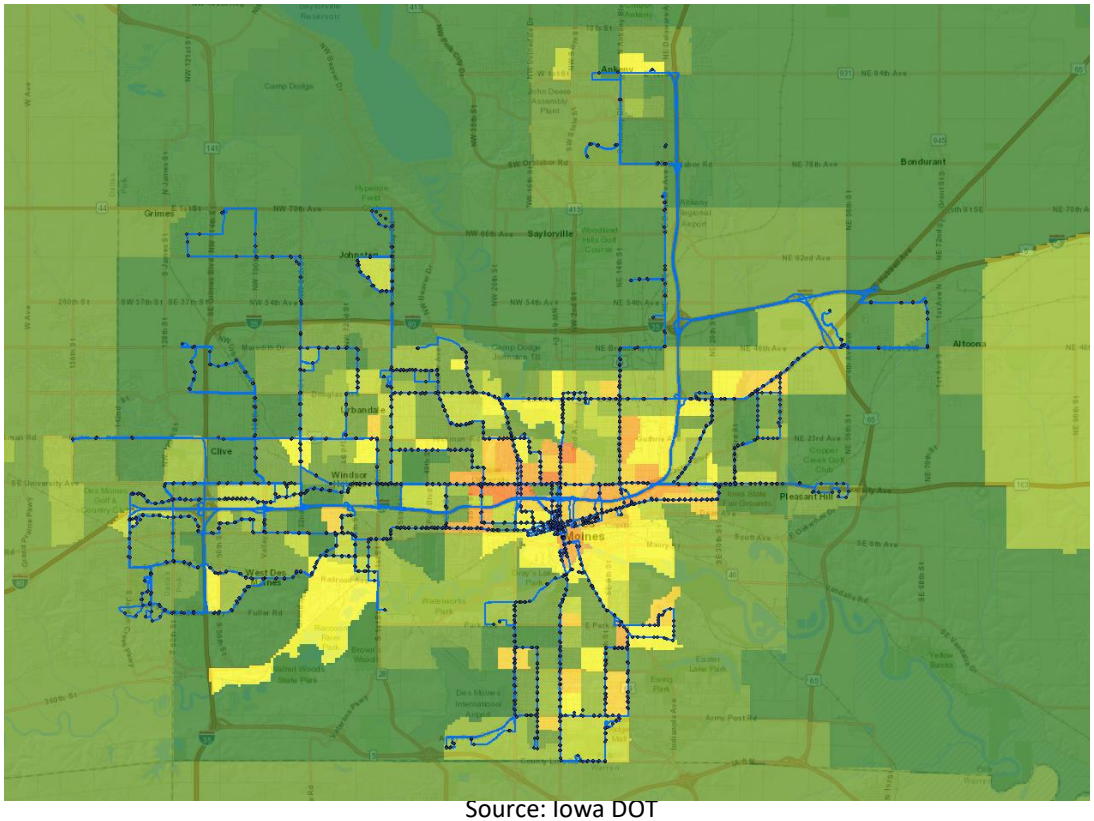
Source: Iowa DOT

6. Conclusions

The value of performing this analysis is in understanding the complex relationship between multiple factors in how they contribute to transit dependency. Regardless of whether a transit system is in an urban or rural community, a transit agency can review these results and see where there are predicted pockets of the population that are more likely to be dependent on that transit system for transportation. This allows for focused discussion on how to address those potential needs.

In the case of this analysis, one size does not fit all. Different strategies can be leveraged based on the combination of the individual factors in the region that are flagged as more transit dependent. Just because an area is "more transit dependent" does not necessarily mean that routes or schedules need to change, which could be quite costly for the transit agency. By examining the individual factors in transit dependent block groups, an agency can tailor a more appropriate response which may save resources and time, while potentially achieving the end goal of serving additional riders in those areas. Figure A2.24 illustrates this for the Des Moines area, with bus routes and stops overlaid on top of block groups identified as being more transit dependent based on the composite result. This helps visualize the relationship between existing transit service routes and the predicted transit dependent population block group areas.

Figure A2.24: Des Moines area with bus routes and stops

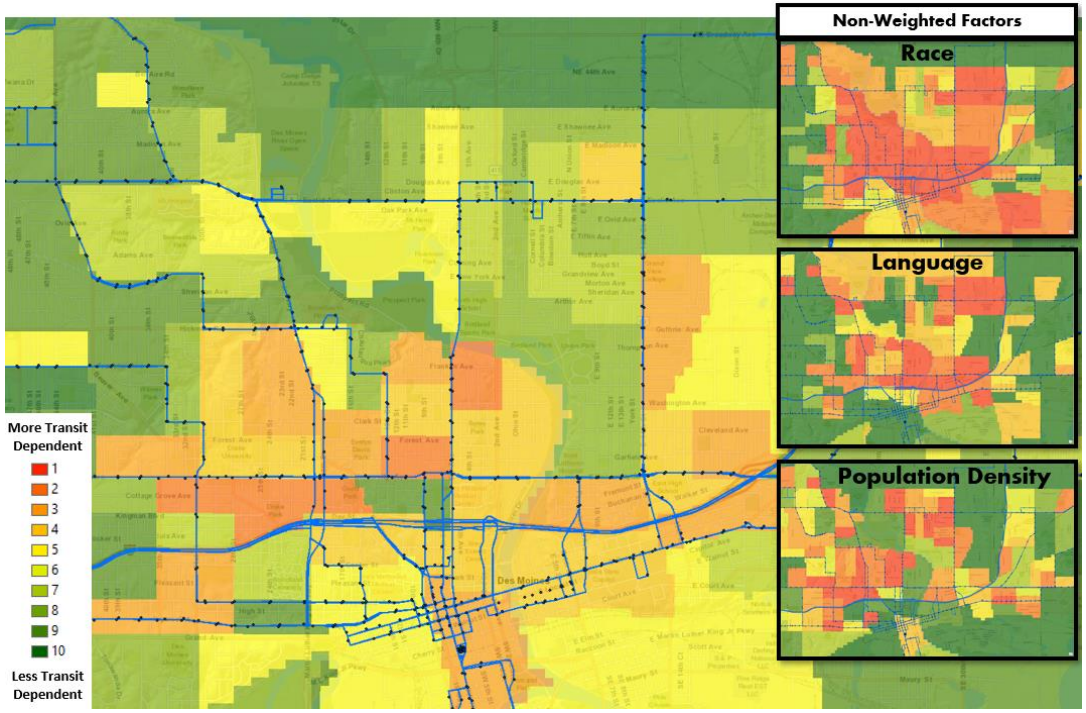


Source: Iowa DOT

While the overall composite score is useful for an initial impression of whether or not the existing service aligns with transit need, additional context is needed in order to positively impact transit ridership and market the service to certain demographics. The individual, non-weighted factors can be used as a reference to better understand a particular area's characteristics in order to tailor appropriate strategies.

Figure A2.25: Des Moines area with bus routes and stops

Figure A2.25 shows a zoomed-in view of the Des Moines area shown in Figure A2.24, but also depicts a few of the individual non-weighted factors for context. This example shows that some areas in downtown Des Moines may initially appear a light green color, indicating less overall transit dependency. However, when the non-weighted factors of race, language, and population density are considered, the narrative changes. With these other factors, one could conclude that a lower transit dependency score may have resulted from lower population density from the presence of single-family homes, but this residential area is occupied by a much higher than average non-White population who does not speak English very well. This perhaps indicates a significant cluster of immigrant or refugee populations that could benefit from increased outreach through translated marketing materials.



Source: Iowa DOT

As this analysis shows, not every region in Iowa necessarily needs fixed route transit service in order to increase ridership or serve transit dependent areas. A variety of strategies could be employed locally to meet the unique set of characteristics that impact transit dependency as a "one size fits all" approach may not be practical, feasible, or appropriate.

Expanding on the analysis by incorporating new factors and examining them at a local level will address some of the shortcomings of this analysis. Since this analysis was in support of a statewide transit plan, the focus was at a higher level and broader in scope, as compared to an analysis that studies a single transit service area. This is part of the reason why internal factors were not included in the

analysis as the transit agency-specific data was either not universally available or not consistent between the agencies. By incorporating internal factors and refining the other factors utilized in the analysis, this product can go from being a forecasting tool to an optimization tool.

One particular external factor, Gas Prices, was also one of the more difficult factors to obtain regular and reliable data on. The AAA gas prices website is updated every day; however, it was cumbersome to manually record this data every single day. Having an automated process that harvests this data would be much more ideal. Additionally, the AAA website did not report any gas price information for O'Brien County which meant another source of data was required to gather data for the entire state. The Gas Buddy website had much more granular data, rather than being constrained by county boundaries, and also covered the entire state including O'Brien County. This was preferable, but automation would still be required to make it a streamlined process.

Going forward, future plans for this project include the publication of the data itself to make it accessible to transit agencies, metropolitan planning organizations, and regional planning affiliations as well as the general public. The original intent was to conduct in-person one-on-one sessions with all stakeholders prior to the publication of the Transit Plan by means of the Passenger Transportation Summit in May and the IPTA Conference in June of 2020. Unfortunately, due to complications related to the COVID-19 pandemic response, these conferences were cancelled. However, the results of this analysis have already been presented and shared at multiple smaller meetings with specific stakeholders, not to mention that all the stakeholders and transit agencies that were involved in the development of the Transit Plan and aware of the Transit Dependency Analysis.

In order to facilitate the continued sharing of information, the data itself including the overlays will be posted online. A web mapping application using Esri's ArcGIS Online is also being planned to not only help public users visualize the data that was analyzed, but to also build upon the analysis that was conducted. Esri has made various resources and examples available that can serve as an example of an approach to take when conducting more detailed transit analysis. This example[15] utilizes general transit feed specification (GTFS) data to examine bus routes, bus stops, timetables, and schedules in combination with expected walking times or distances. This allows for a more robust analysis at a local level in order to optimize transit service or validate that existing services provide adequate coverage.

It is hoped that transit and planning agencies alike will find this analysis useful to help understand the unique interconnections between land uses and transit dependent demographics. These aspects are important for providing public transportation options to all Iowans.

[15] Esri, "Public Transit in ArcGIS", https://urbanobservatory.maps.arcgis.com/apps/MapSeries/index.html?appid=1c32233ab04241a08f6bbc80f668d022

www.iowadot.gov

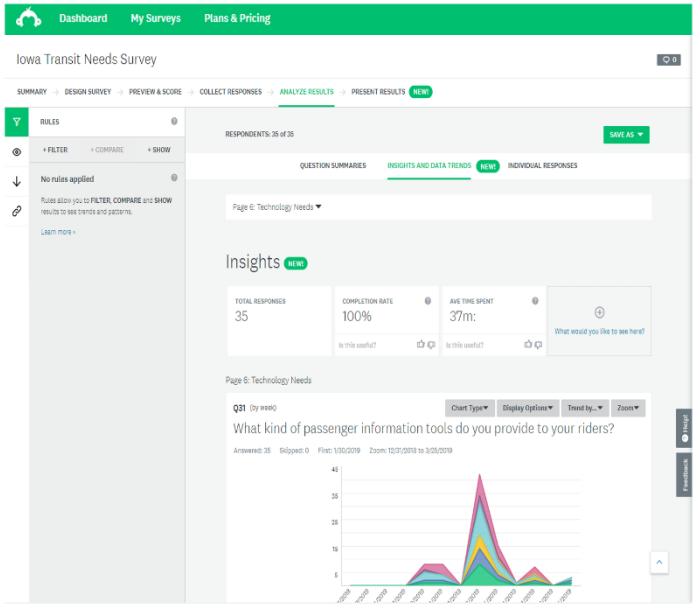
APPENDIX 3: **TRANSIT NEEDS SURVEY**

Appendix 3. Transit Needs Survey

This appendix documents results from the Transit Needs Survey discussed in Chapter 3 of the Iowa Public Transit Long Range Plan.

Background

Understanding the needs of the public transit system requires detailed knowledge of how it operates. For this reason, the first effort to assess these needs relied upon input from all transit agencies in Iowa.

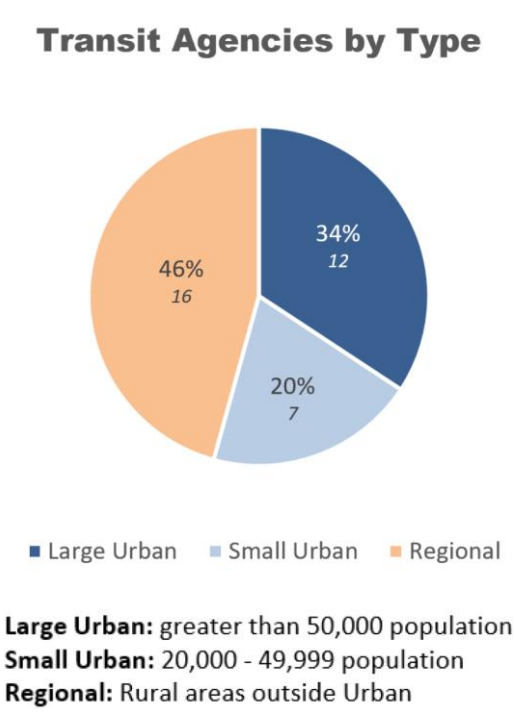


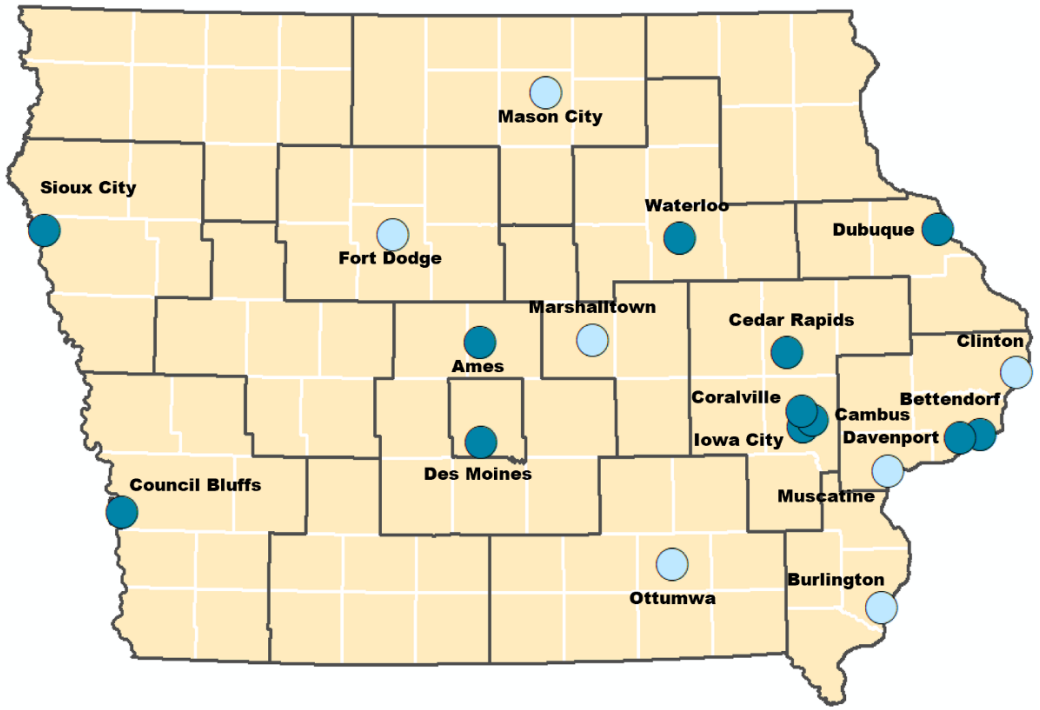
Immediately after the launch of the Iowa Public Transit Long Range Plan effort in December 2018, the working group began drafting a set of questions for the transit agencies to answer through a survey. The purpose of this survey was to identify gaps or needs in public transit services throughout the state. These needs were then analyzed and incorporated into the Plan.

An online platform was utilized to conduct the needs assessment and the survey was open from February 1 through March 29, 2019. All 35 Iowa transit agencies responded to the survey, with a median completion time of 37 minutes.

When possible, results were aggregated by transit agency type: large urban, small urban, or regional (see Figure A3.1).

Figure A3.1: Transit agencies by type





Source: Iowa DOT

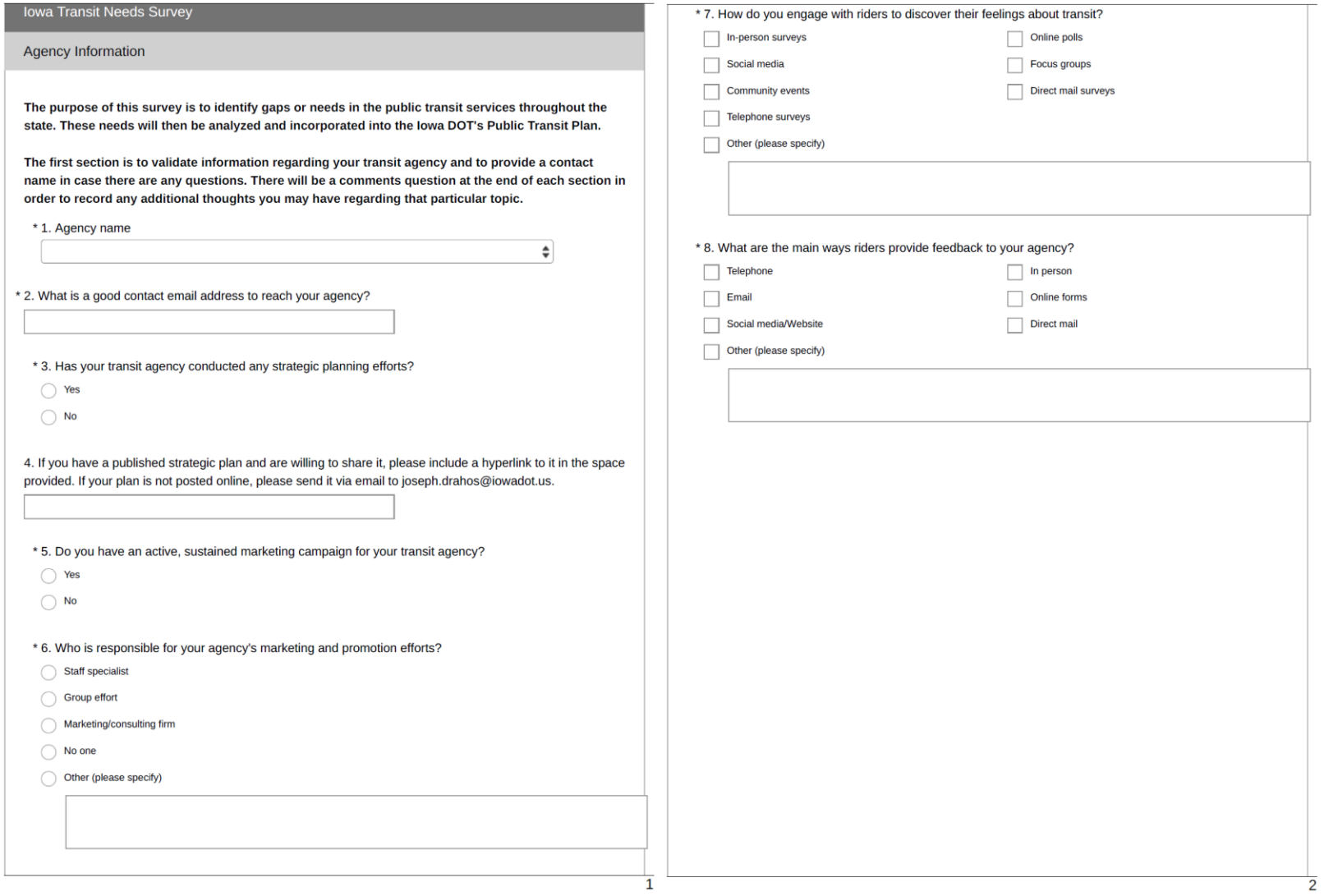
Survey Format

The survey was conveyed to the transit agencies in Survey Monkey using the 'One Question at a Time' survey format. The survey questions were organized into several different sections based on the type of need with the initial, leading section covering general agency-side questions such as marketing and outreach. At the end of each section, an open-ended comment box was provided for the respondent to write anything of note or elaborate on some of the supplied data. Figures A3.2 through A3.7 depict the questions and survey format of the Transit Needs Survey.

The sections of the survey include:

- **Section 1:** Agency Information
- **Section 2:** Service Needs
- **Section 3:** Fleet Needs
- **Section 4:** Facility Needs
- **Section 5:** Personnel Needs
- **Section 6:** Technology Needs

Figure A3.2: Transit Needs Survey pages 1 & 2



Iowa Transit Needs Survey

Agency Information

The purpose of this survey is to identify gaps or needs in the public transit services throughout the state. These needs will then be analyzed and incorporated into the Iowa DOT's Public Transit Plan.

The first section is to validate information regarding your transit agency and to provide a contact name in case there are any questions. There will be a comments question at the end of each section in order to record any additional thoughts you may have regarding that particular topic.

* 1. Agency name

* 2. What is a good contact email address to reach your agency?

* 3. Has your transit agency conducted any strategic planning efforts?

- Yes
- No

4. If you have a published strategic plan and are willing to share it, please include a hyperlink to it in the space provided. If your plan is not posted online, please send it via email to joseph.drahos@iowadot.us.

* 5. Do you have an active, sustained marketing campaign for your transit agency?

- Yes
- No

* 6. Who is responsible for your agency's marketing and promotion efforts?

- Staff specialist
- Group effort
- Marketing/consulting firm
- No one
- Other (please specify)

1

* 7. How do you engage with riders to discover their feelings about transit?

- In-person surveys
- Online polls
- Social media
- Focus groups
- Community events
- Direct mail surveys
- Telephone surveys
- Other (please specify)

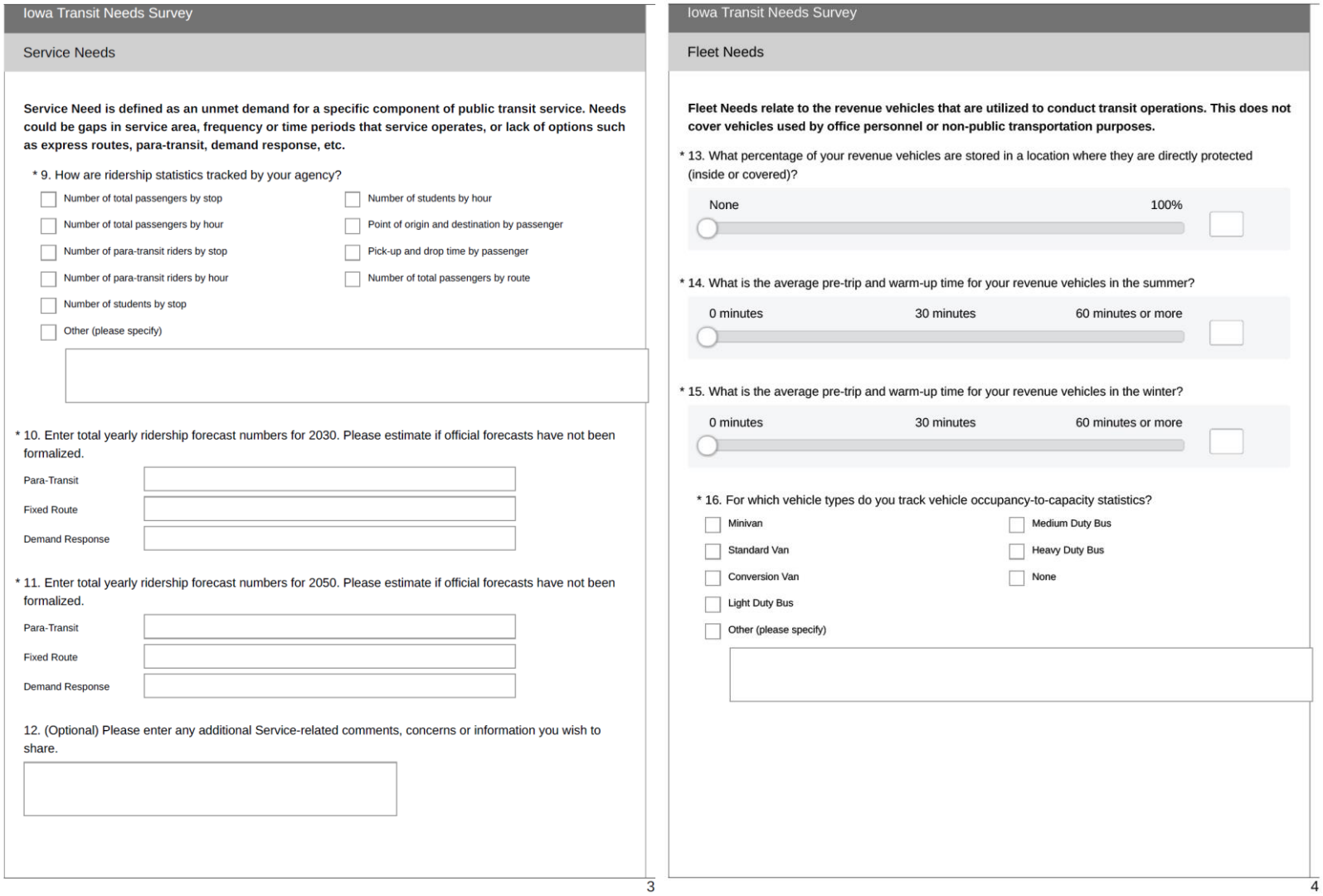
* 8. What are the main ways riders provide feedback to your agency?

- Telephone
- In person
- Email
- Online forms
- Social media/Website
- Direct mail
- Other (please specify)

2

Sources: Iowa DOT, Survey Monkey

Figure A3.3: Transit Needs Survey pages 3 & 4



Iowa Transit Needs Survey

Service Needs

Service Need is defined as an unmet demand for a specific component of public transit service. Needs could be gaps in service area, frequency or time periods that service operates, or lack of options such as express routes, para-transit, demand response, etc.

* 9. How are ridership statistics tracked by your agency?

- [ ] Number of total passengers by stop
- [ ] Number of total passengers by hour
- [ ] Number of para-transit riders by stop
- [ ] Number of para-transit riders by hour
- [ ] Number of students by stop
- [ ] Other (please specify)
- [ ] Number of students by hour
- [ ] Point of origin and destination by passenger
- [ ] Pick-up and drop time by passenger
- [ ] Number of total passengers by route

* 10. Enter total yearly ridership forecast numbers for 2030. Please estimate if official forecasts have not been formalized.

Para-Transit
Fixed Route
Demand Response

* 11. Enter total yearly ridership forecast numbers for 2050. Please estimate if official forecasts have not been formalized.

Para-Transit
Fixed Route
Demand Response

12. (Optional) Please enter any additional Service-related comments, concerns or information you wish to share.

3

Iowa Transit Needs Survey

Fleet Needs

Fleet Needs relate to the revenue vehicles that are utilized to conduct transit operations. This does not cover vehicles used by office personnel or non-public transportation purposes.

* 13. What percentage of your revenue vehicles are stored in a location where they are directly protected (inside or covered)?

None 100%

* 14. What is the average pre-trip and warm-up time for your revenue vehicles in the summer?

0 minutes 30 minutes 60 minutes or more

* 15. What is the average pre-trip and warm-up time for your revenue vehicles in the winter?

0 minutes 30 minutes 60 minutes or more

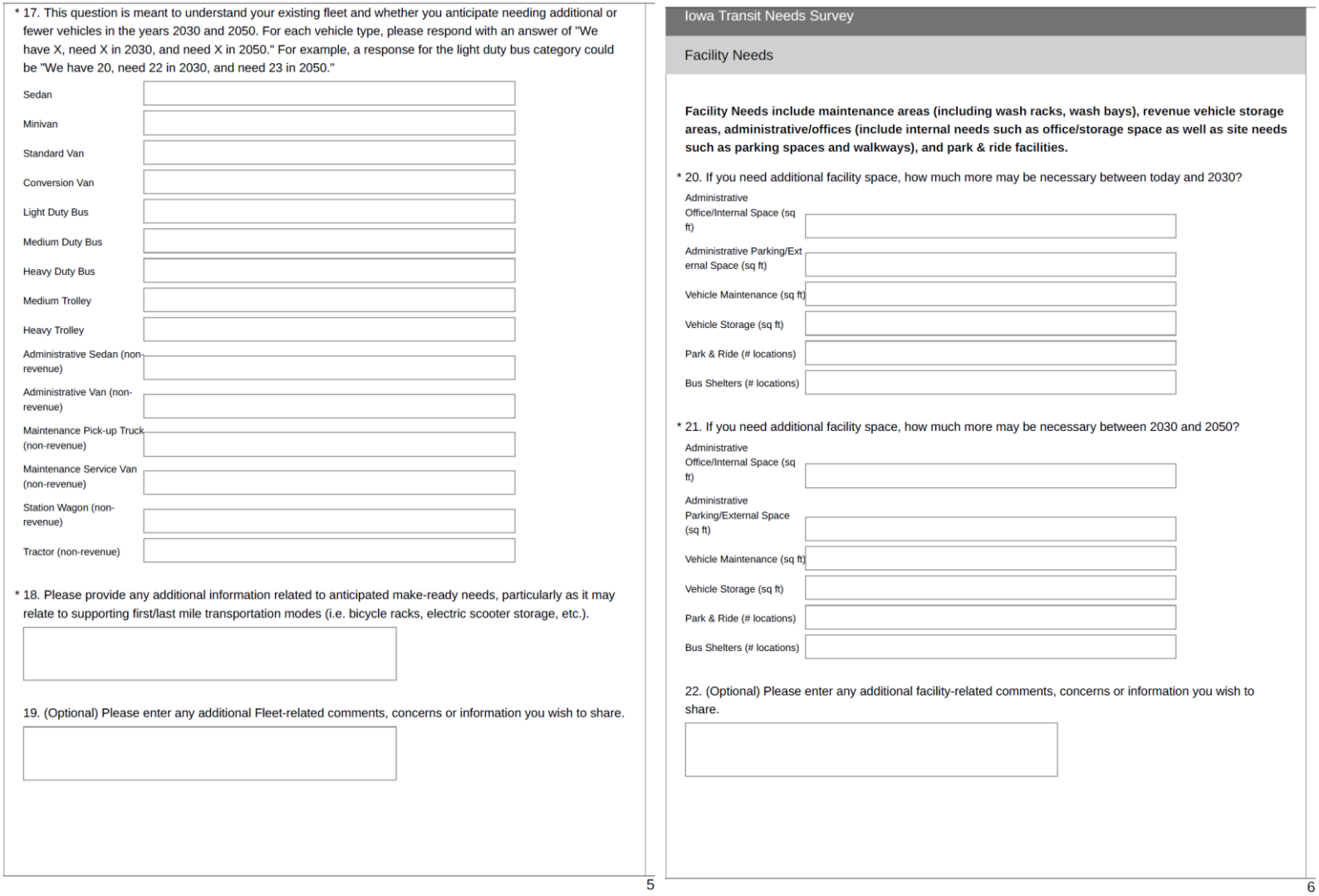
* 16. For which vehicle types do you track vehicle occupancy-to-capacity statistics?

- [ ] Minivan
- [ ] Standard Van
- [ ] Conversion Van
- [ ] Light Duty Bus
- [ ] Other (please specify)
- [ ] Medium Duty Bus
- [ ] Heavy Duty Bus
- [ ] None

4

Sources: Iowa DOT, Survey Monkey

Figure A3.4: Transit Needs Survey pages 5 & 6



* 17. This question is meant to understand your existing fleet and whether you anticipate needing additional or fewer vehicles in the years 2030 and 2050. For each vehicle type, please respond with an answer of "We have X, need X in 2030, and need X in 2050." For example, a response for the light duty bus category could be "We have 20, need 22 in 2030, and need 23 in 2050."

Sedan
Minivan
Standard Van
Conversion Van
Light Duty Bus
Medium Duty Bus
Heavy Duty Bus
Medium Trolley
Heavy Trolley
Administrative Sedan (non-revenue)
Administrative Van (non-revenue)
Maintenance Pick-up Truck (non-revenue)
Maintenance Service Van (non-revenue)
Station Wagon (non-revenue)
Tractor (non-revenue)

* 18. Please provide any additional information related to anticipated make-ready needs, particularly as it may relate to supporting first/last mile transportation modes (i.e. bicycle racks, electric scooter storage, etc.).

19. (Optional) Please enter any additional Fleet-related comments, concerns or information you wish to share.

5

Iowa Transit Needs Survey

Facility Needs

Facility Needs include maintenance areas (including wash racks, wash bays), revenue vehicle storage areas, administrative/offices (include internal needs such as office/storage space as well as site needs such as parking spaces and walkways), and park & ride facilities.

* 20. If you need additional facility space, how much more may be necessary between today and 2030?

Administrative Office/Internal Space (sq ft)
Administrative Parking/External Space (sq ft)
Vehicle Maintenance (sq ft)
Vehicle Storage (sq ft)
Park & Ride (# locations)
Bus Shelters (# locations)

* 21. If you need additional facility space, how much more may be necessary between 2030 and 2050?

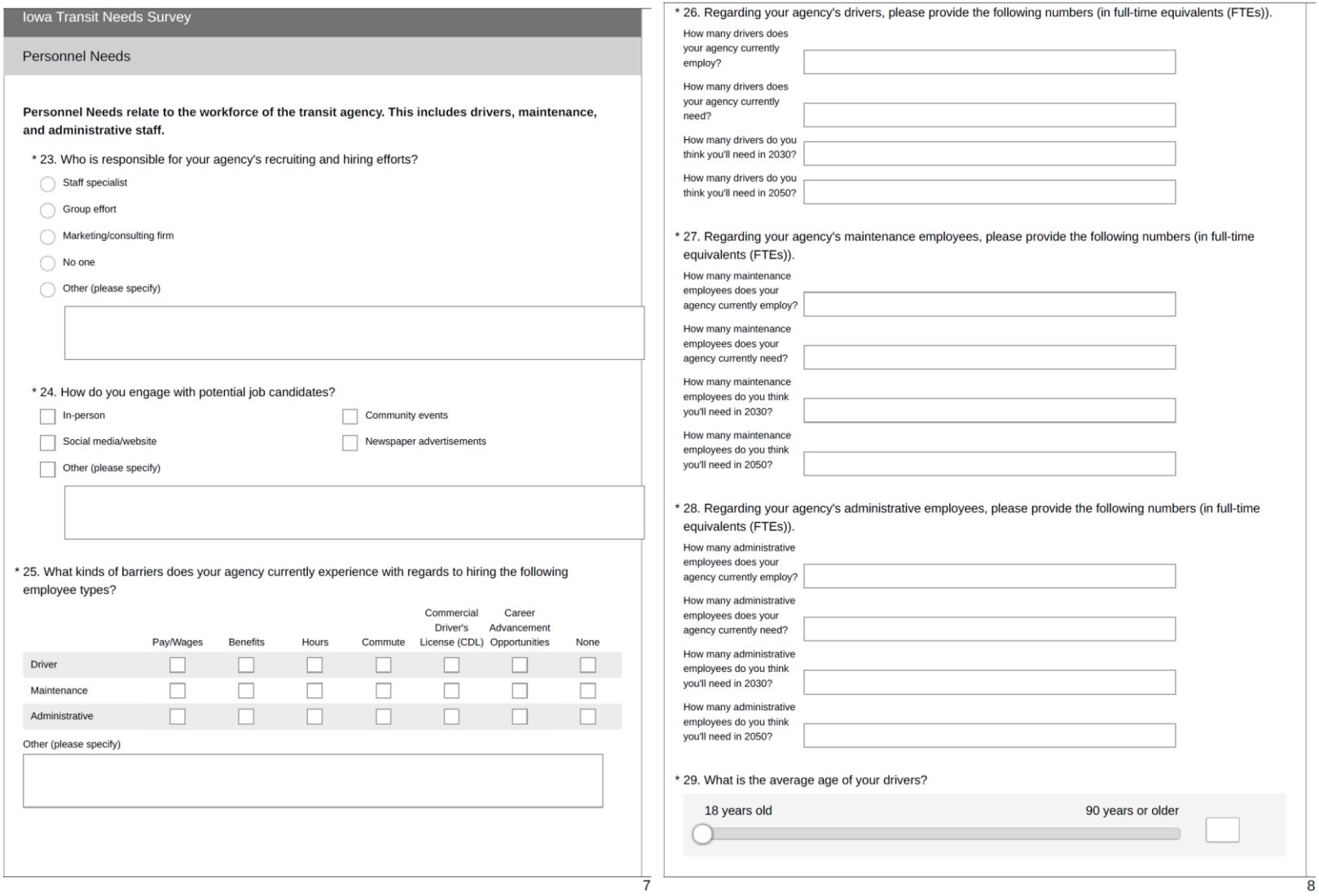
Administrative Office/Internal Space (sq ft)
Administrative Parking/External Space (sq ft)
Vehicle Maintenance (sq ft)
Vehicle Storage (sq ft)
Park & Ride (# locations)
Bus Shelters (# locations)

22. (Optional) Please enter any additional facility-related comments, concerns or information you wish to share.

6

Sources: Iowa DOT, Survey Monkey

Figure A3.5: Transit Needs Survey pages 7 & 8



Iowa Transit Needs Survey

Personnel Needs

Personnel Needs relate to the workforce of the transit agency. This includes drivers, maintenance, and administrative staff.

* 23. Who is responsible for your agency's recruiting and hiring efforts?

- Staff specialist
- Group effort
- Marketing/consulting firm
- No one
- Other (please specify)

* 24. How do you engage with potential job candidates?

- In-person
- Social media/website
- Other (please specify)
- Community events
- Newspaper advertisements

* 25. What kinds of barriers does your agency currently experience with regards to hiring the following employee types?

	Pay/Wages	Benefits	Hours	Commute	Commercial Driver's License (CDL)	Career Advancement Opportunities	None
Driver							
Maintenance							
Administrative							

Other (please specify)

7

* 26. Regarding your agency's drivers, please provide the following numbers (in full-time equivalents (FTEs)).

How many drivers does your agency currently employ?

How many drivers does your agency currently need?

How many drivers do you think you'll need in 2030?

How many drivers do you think you'll need in 2050?

* 27. Regarding your agency's maintenance employees, please provide the following numbers (in full-time equivalents (FTEs)).

How many maintenance employees does your agency currently employ?

How many maintenance employees does your agency currently need?

How many maintenance employees do you think you'll need in 2030?

How many maintenance employees do you think you'll need in 2050?

* 28. Regarding your agency's administrative employees, please provide the following numbers (in full-time equivalents (FTEs)).

How many administrative employees does your agency currently employ?

How many administrative employees does your agency currently need?

How many administrative employees do you think you'll need in 2030?

How many administrative employees do you think you'll need in 2050?

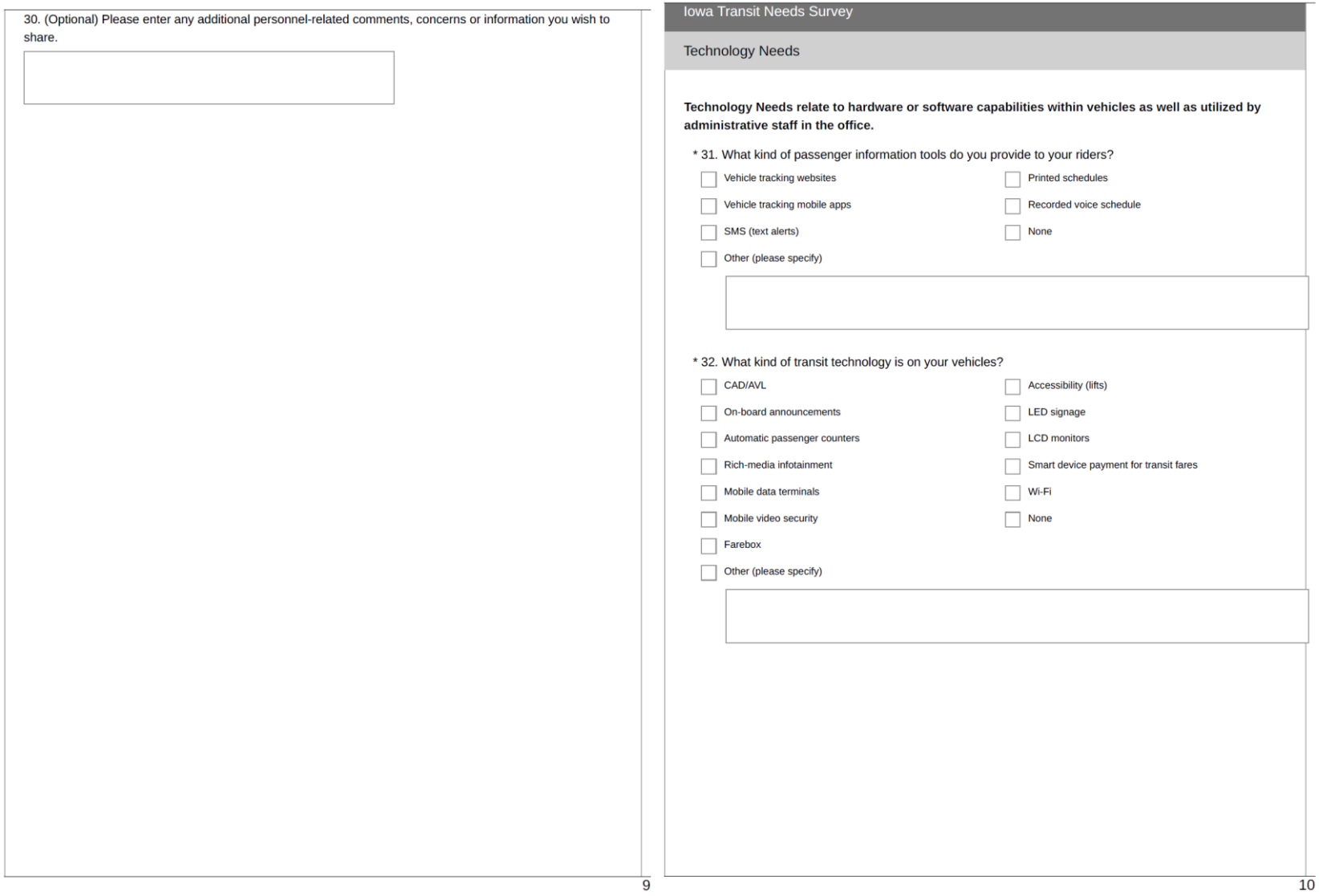
* 29. What is the average age of your drivers?

18 years old — 90 years or older

8

Sources: Iowa DOT, Survey Monkey

Figure A3.6: Transit Needs Survey pages 9 & 10



30. (Optional) Please enter any additional personnel-related comments, concerns or information you wish to share.

9

Iowa Transit Needs Survey

Technology Needs

Technology Needs relate to hardware or software capabilities within vehicles as well as utilized by administrative staff in the office.

* 31. What kind of passenger information tools do you provide to your riders?

- Vehicle tracking websites
- Vehicle tracking mobile apps
- SMS (text alerts)
- Other (please specify)
- Printed schedules
- Recorded voice schedule
- None

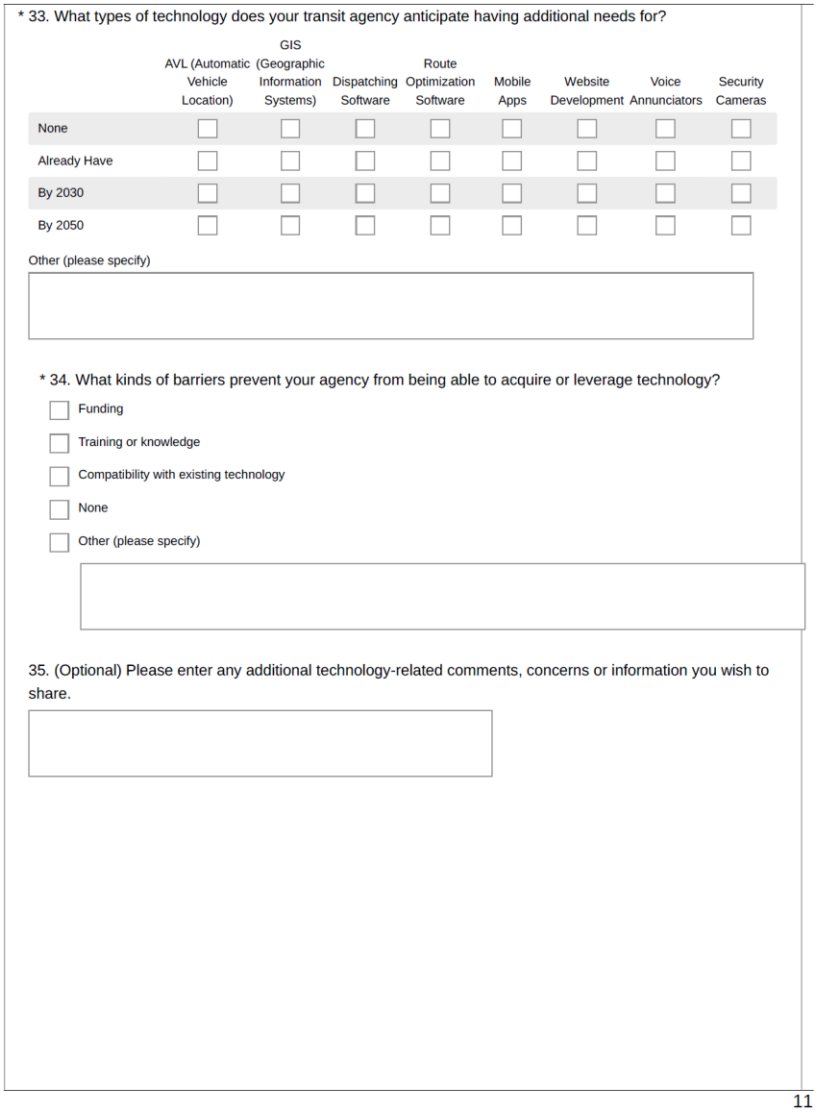
* 32. What kind of transit technology is on your vehicles?

- CAD/AVL
- On-board announcements
- Automatic passenger counters
- Rich-media infotainment
- Mobile data terminals
- Mobile video security
- Farebox
- Other (please specify)
- Accessibility (lifts)
- LED signage
- LCD monitors
- Smart device payment for transit fares
- Wi-Fi
- None

10

Sources: Iowa DOT, Survey Monkey

Figure A3.7: Transit Needs Survey page 11



* 33. What types of technology does your transit agency anticipate having additional needs for?

	AVL (Automatic Vehicle Location)	GIS (Geographic Information Systems)	Dispatching Software	Route Optimization Software	Mobile Apps	Website Development	Voice Annunciators	Security Cameras
None	☐	☐	☐	☐	☐	☐	☐	☐
Already Have	☐	☐	☐	☐	☐	☐	☐	☐
By 2030	☐	☐	☐	☐	☐	☐	☐	☐
By 2050	☐	☐	☐	☐	☐	☐	☐	☐

Other (please specify)

* 34. What kinds of barriers prevent your agency from being able to acquire or leverage technology?

- ☐ Funding
- ☐ Training or knowledge
- ☐ Compatibility with existing technology
- ☐ None
- ☐ Other (please specify)

35. (Optional) Please enter any additional technology-related comments, concerns or information you wish to share.

11

Sources: Iowa DOT, Survey Monkey

Survey Results

Results from Survey Monkey were downloaded and are summarized in the following sections. Some of the questions from the original survey were combined to form a more comprehensive picture and narrative in order to better describe the needs that the transit systems reported. Additionally, some data was added to the results for the purpose of providing context such as historic ridership numbers and existing vehicle fleet sizes.

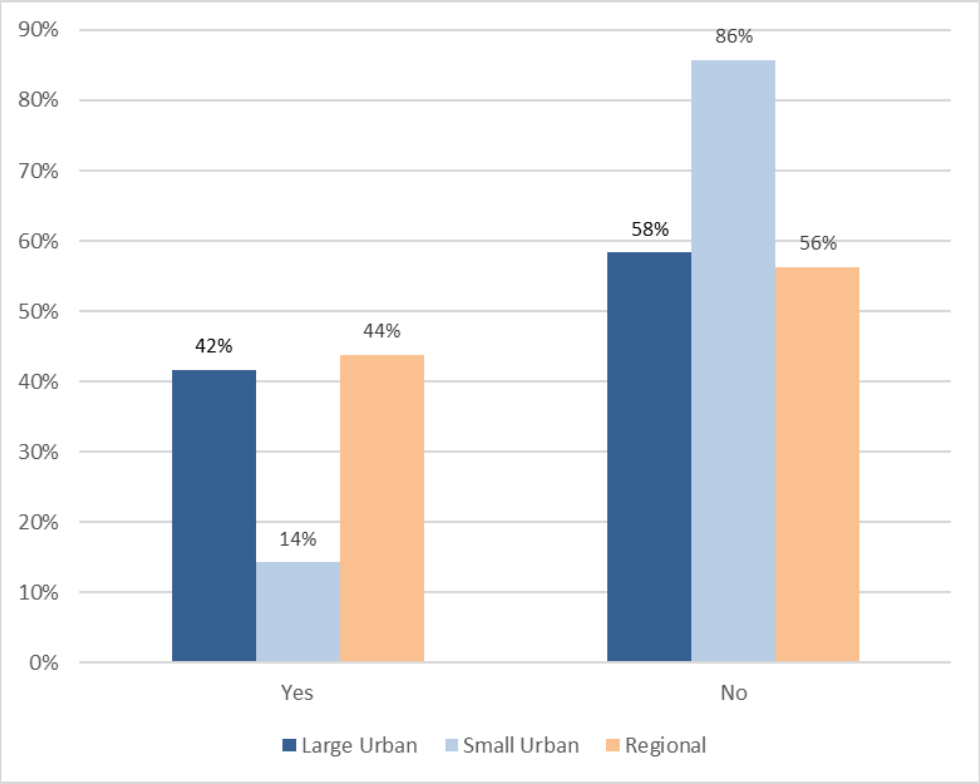
Section 1: Agency Information

The first section of the survey was intended to validate agency contact information, as well as to ask a series of general questions about the agency itself. These questions were useful information to gather as they provided additional context for understanding how the transit agencies operate and communicate.

One fact that quickly became clear was a general lack of long-range or strategic planning efforts. As seen in Figure A3.8, most agencies do not conduct planning to this extent. This was also evident through the difficulties that some agencies experienced when trying to forecast needs out to 2030 and 2050. Open-ended comments supplied in each survey section indicated this as well. The overall lack of long-range strategic planning serves as further evidence that this Public Transit Long Range Plan is needed.

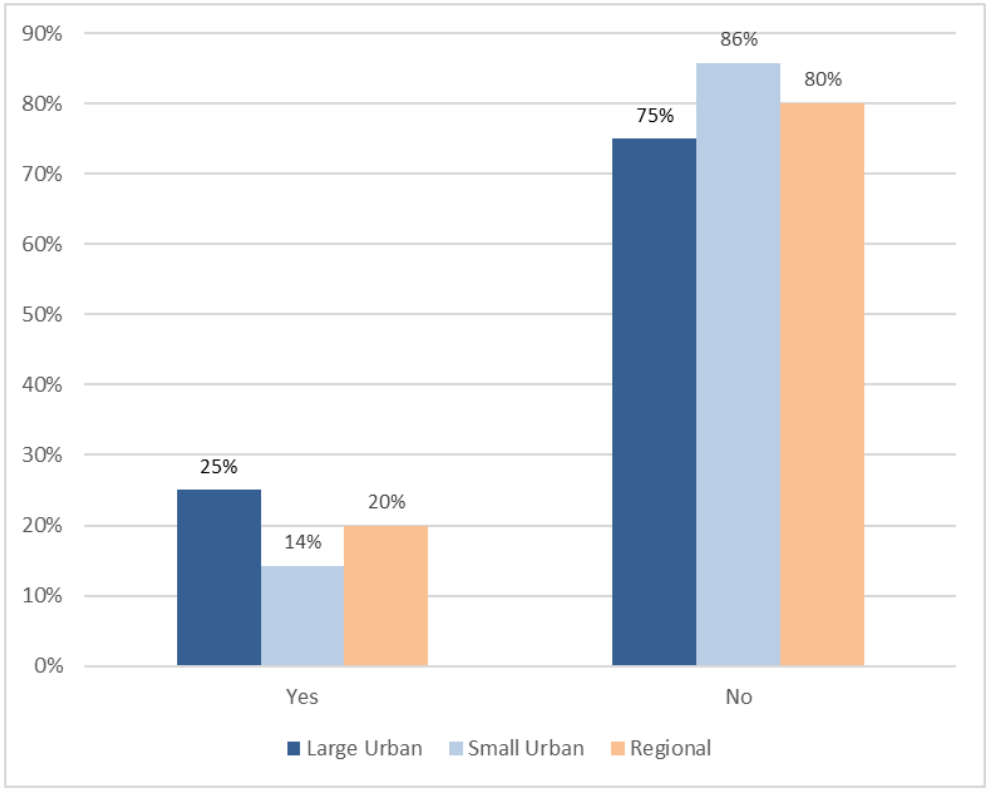
Figures 3.9 – 3.13 provide the remaining survey results from the agency information section.

Figure A3.8: Has your transit agency conducted any strategic planning efforts?



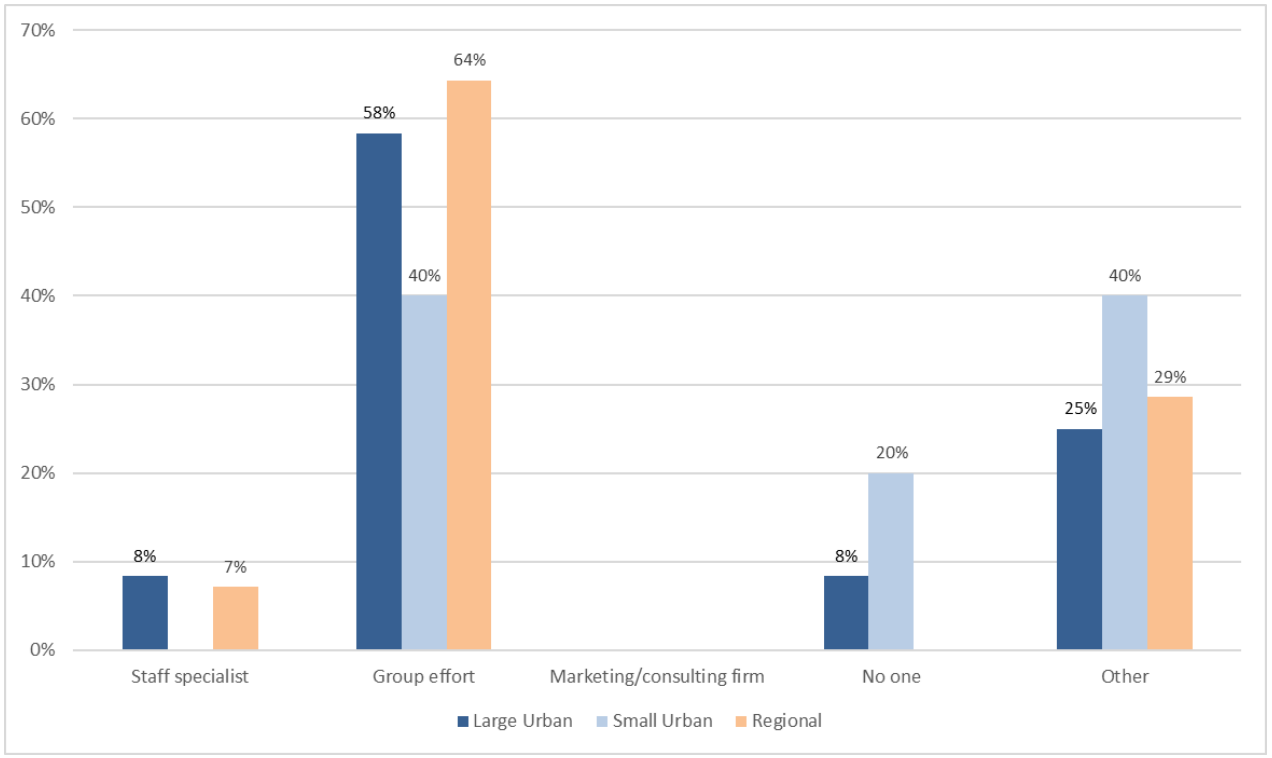
Source: Iowa DOT

Figure A3.9: Do you have an active, sustained marketing campaign for your transit agency?



Source: Iowa DOT

Figure A3.10: Who is responsible for your agency's marketing and promotion efforts?



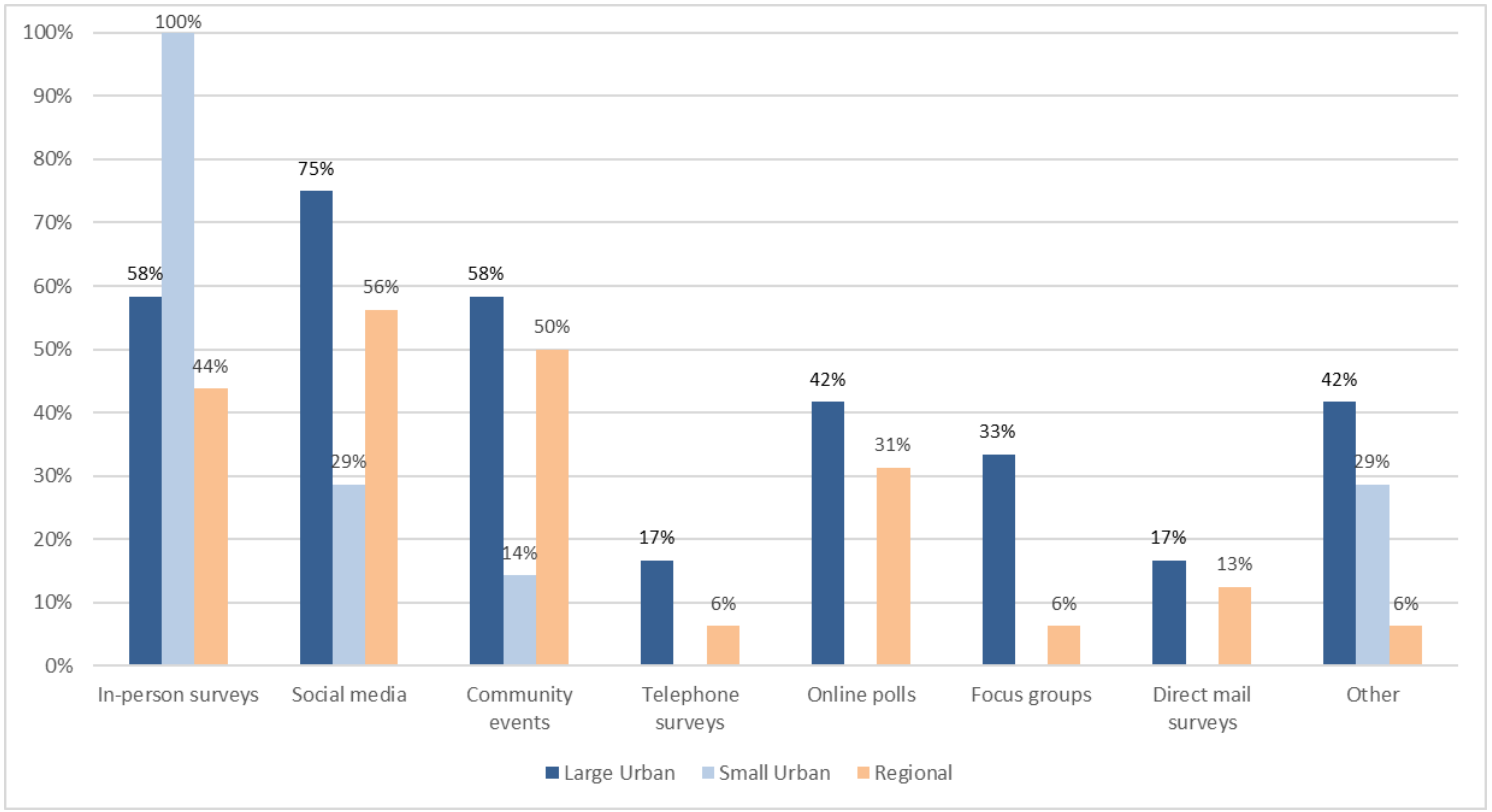
Source: Iowa DOT

(Other) responses:

- No one at this time, we are working towards building a sustained marketing campaign
- Transit Manager
- Transit Director
- Started with Mobility Coordinator. Once position was eliminated due to funding, the Executive Director has taken over the project.
- Transit Manager
- Transportation Director
- Transit Supervisor
- Transit Director
- The City contracts with [AGENCY 1] for fixed route service and with the [AGENCY 2] for paratransit service. [AGENCY 1] markets their service and the City has information on both the fixed route and paratransit services on the City's website.[1]
- Transit Director
- Transit Administrator
- Transit administrative staff
- Transit Administrators, City Communications Specialist, Transit Advisory Board

[1] Redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.11: How do you engage with riders to discover their feelings about transit?



Source: Iowa DOT

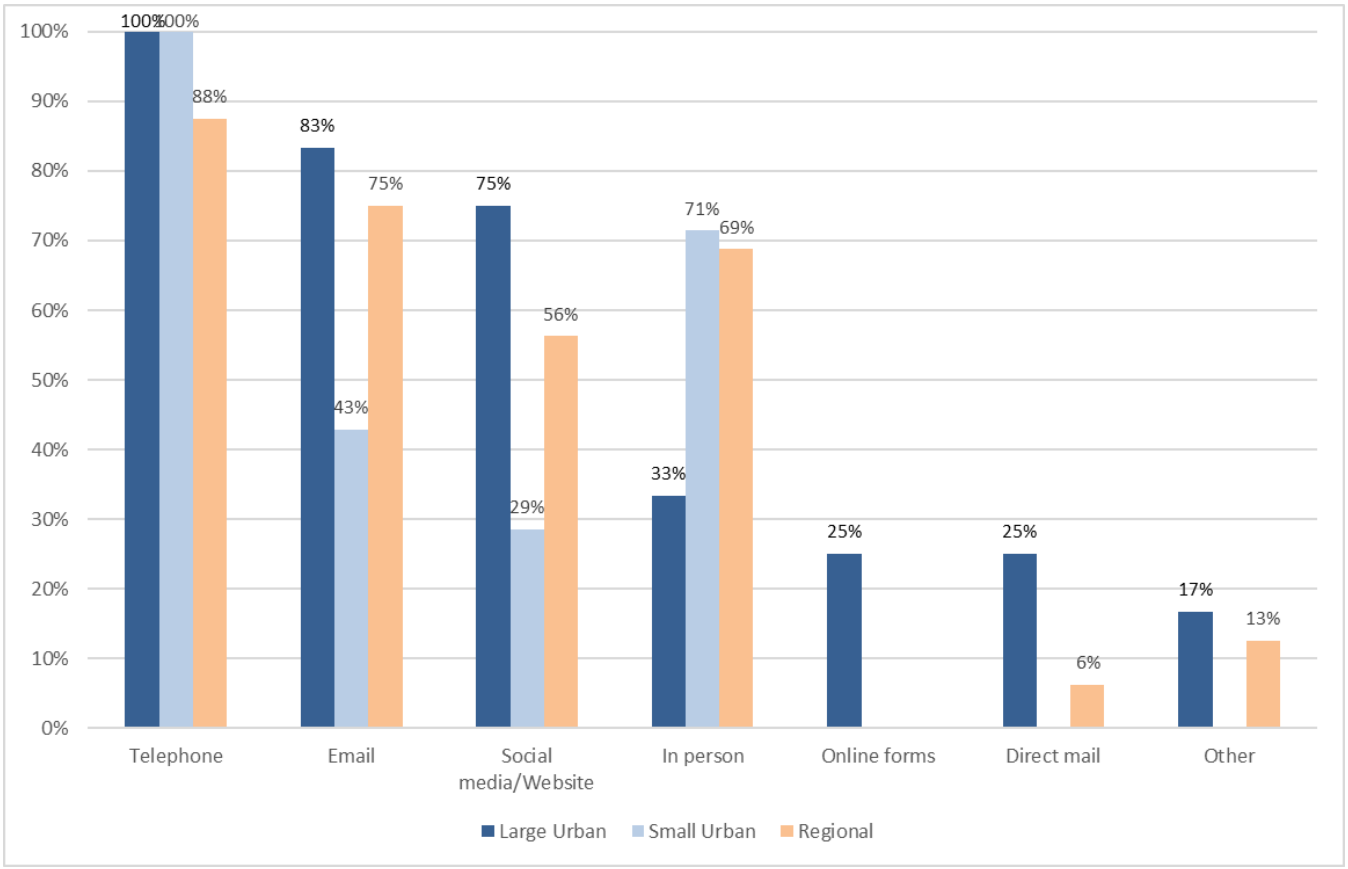
(Other) responses:

- Public meetings (in person and virtual)
- We have done surveys with riders while they are on the bus.
- Public engagement efforts from the [PLANNING AGENCY][2]
- Pop-Up meetings around town
- The in person surveys are limited.
- [AGENCY 1] does periodic surveys of fixed route riders. Paratransit riders contact [AGENCY 2] or [NAME], with comments and/or concerns.[3]
- Transportation advisory group meetings, part of the Passenger Transportation Plan process
- With our upcoming transit study we will be utilizing these strategies to understand our customers feelings about transit.
- Transit Advisory Board, an MPO Transportation Advisory Group (TAG)

[2] Response redacted with [PLANNING AGENCY] for privacy

[3] Response redacted with [AGENCY 1], [AGENCY 2], and [NAME] for privacy

Figure A3.12: What are the main ways riders provide feedback to your agency?



Source: Iowa DOT

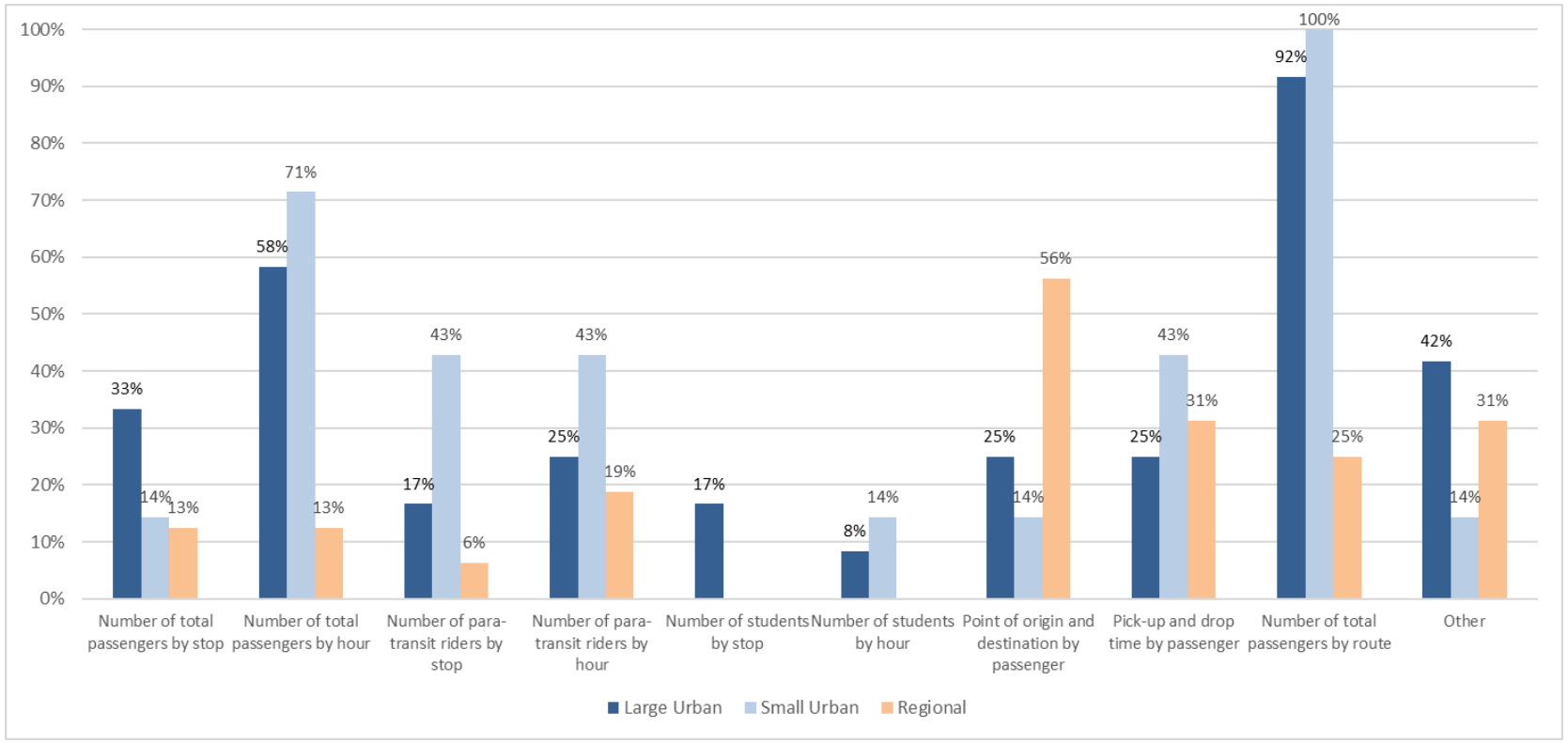
(Other) responses:

- [CITY] also uses an app called [APP] – riders can interact with staff through this application.[4]
- [AGENCY 1] does periodic rider surveys. Paratransit riders generally contact the City. Complains are referred to either [AGENCY 1] or [AGENCY 2], with follow-up call to the rider.[5]
- standard mail
- Contact Us option on the City's Transit website
- Ridership surveys. Public meetings. Policy Council. Transit Advisory Committee

[4] Response redacted with [CITY] and [APP] for privacy

[5] Response redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.13: How are ridership statistics tracked by your agency?



Source: Iowa DOT

(Other) responses:

- Clarification – Point of origin and destination by passenger for paratransit ONLY, Pick-up and drop-off time by passenger for paratransit ONLY
- We do not have stop level data unfortunately. Our current standard is to track passengers by route. That said, we have the potential to passengers by hour, and paratransit riders by stop/hour and by origin/destination should we request that information
- Dispatch Software
- Total number of passengers per day and per route
- Para-transit. Number of riders per day per bus
- Dispatch Software for Para-Transit and Demand Response
- Number of riders per day
- Driver's log each passenger on a county log.
- We use RouteMatch scheduling and dispatch software.
- Every 3 Years a Passenger Miles Traveled (PMT) Survey must be conducted. This sample provides detailed passenger counts (boarding & alighting) by stop, by hour, by day of the week on each route. Numbers are extrapolated to evaluate efficiency of routes, and locations for stops.

Section 2: Service Needs

Service needs are defined as unmet demand for specific components of public transit service. Needs could be gaps in service area, frequency, or time periods that service operates; or a lack of options such as express routes (routes with few stops or transfers), paratransit (service for individuals with disabilities), or demand response (pre-scheduled trips with no set stops).

Figure A3.14 represents historically reported ridership numbers and projected future ridership levels based on survey responses. This clearly shows a decrease of ridership from its peak around 2015 through the present. There are multiple factors that may help explain this decline. During that time period, Transportation Network Companies (TNCs) such as Uber and Lyft began expanding in Iowa's urban areas, which attracted some ridership from public transit. Additionally, changes in how Medicare medical transportation is contracted through Iowa's Managed Care Organization (MCO) providers resulted in a significant number of riders being diverted from public transportation to private or alternative means of transportation. Despite the recent decreases in public transit ridership, transit agencies are projecting long-term growth in ridership. Agencies were asked to estimate their ridership in 2030 and in 2050; as shown on Figure A3.14, agencies are projecting slightly higher growth in ridership from now to 2030 compared to 2030 to 2050. This may represent some of the long-term uncertainty regarding the relationship of public transit to TNCs and other possible transportation developments, such as autonomous vehicles.

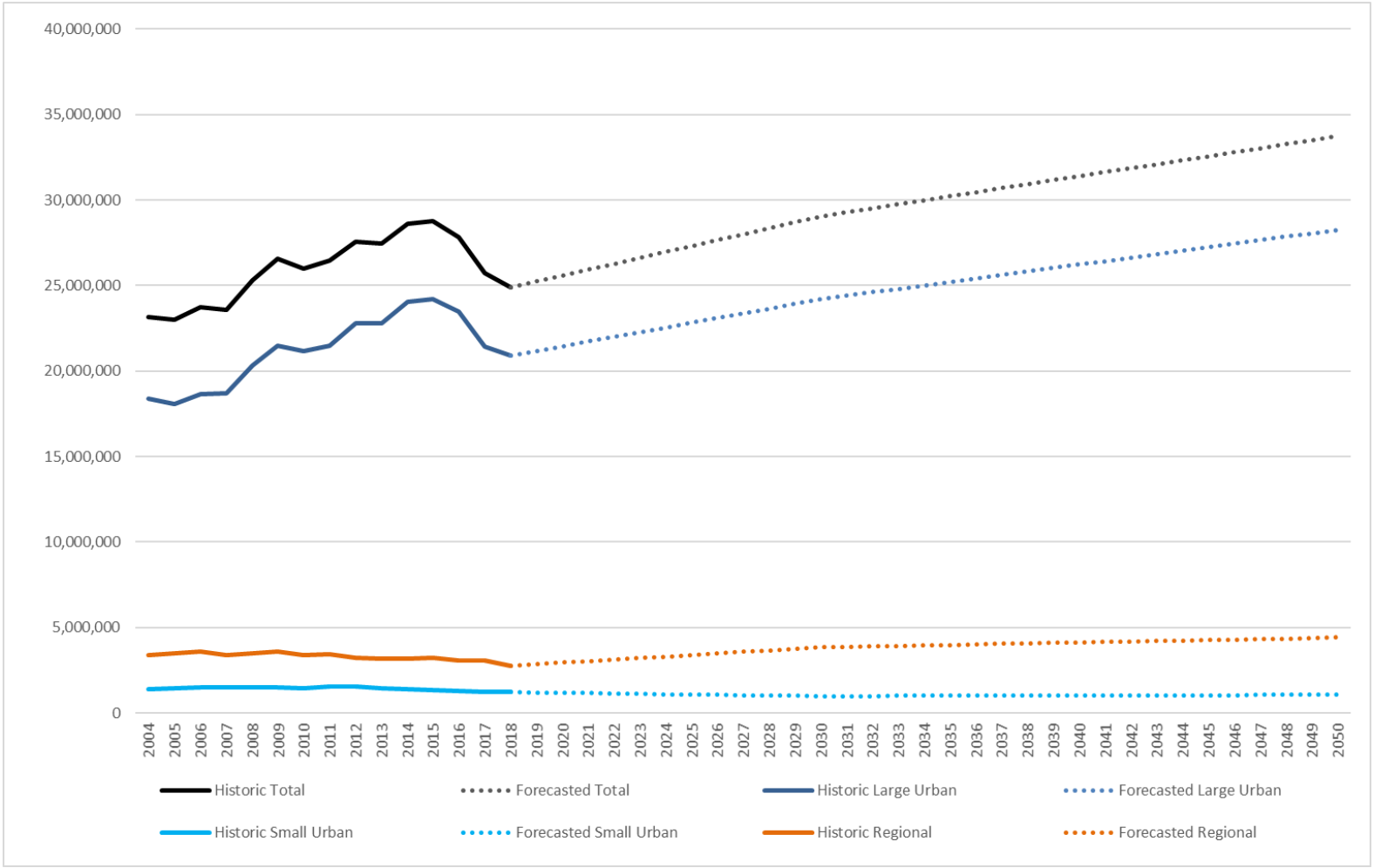
Open-ended comments regarding service needs:

- The demand response ridership numbers in questions 10 and 11 are for [AGENCY'S] vanpool program. Much of the growth will depend on the adoption of MaaS and how [AGENCY'S] role changes in providing service versus coordinating mobility in the metro.[6]
- Numbers are estimate, not official forecast
- Where [AGENCY] is situated in the state, we feel we move to more fixed route types of service in our area. Also feel changing needs will dictate less paratransit and demand response. These are complete estimates. We have not yet done any studies, but we do anticipate doing that within the next 2 years.[7]
- State needs to find a way to increase state assistance so that more service can be provided in its communities.
- Convenience is becoming more important to riders. How will current and future means of transportation effect the role and use of the bus.

[6] Response redacted with [AGENCY'S] for privacy
[7] Response redacted with [AGENCY] for privacy

- Estimating out 10 years is understandable, however the estimate for 30 years out seams unreasonable considering the number of influences that impact transit ridership and us having no understanding of their future.
- Forecasting ridership 30 years from now is very challenging with how fast technology and the transportation industry is changing. There is a likelihood public transit as we currently know it will no longer exist. Estimates for our region are based off of past trends.
- Forecasts assume very little total population change. Some demographic groups will shift. Service may be impacted by legislation that mandates universal basic mobility; or a significant shift in demographics that fosters electric scooter/bicycle use; or a major change that provides free rides. The latter change would only be feasible through service efficiencies such as fewer employees, some sort of additional transit tax levy, a congestion tax on cars, etc.
- Estimates based on 3% annual growth. Will change depending on what DHS changes occur with Medicaid programs and MCO contracts

Figure A3.14: Transit agency ridership forecast



Source: Iowa DOT

Section 3: Fleet Needs

Fleet needs relate to revenue vehicles, which are a transit agency's bus and van fleet that is utilized to transport riders. This does not include vehicles used by office personnel or for non-public transportation purposes such as maintenance trucks.

Vehicle fleet needs represent a constant challenge as this includes replacing existing vehicles that are beyond their useful lives, as well as projecting future needs for additional vehicles. In general, transit agencies are exploring the "rightsizing" of their fleet in order to have an appropriately-sized vehicle for the likely number of riders. In some situations, there may only be one or two riders, so it would not make as much practical sense to utilize a heavy-duty bus to transport them. Instead, a smaller van would be a more appropriate and comfortable fit. On the other hand, fixed-route services or contracted employee transportation services may require a bus that can hold 20 or more people at once. Figure A3.15 shows the varying vehicle needs between the different types of transit agencies. Note that Large Urban systems typically focus on fixed-route service which transports larger numbers of people for shorter distances, while Regional systems generally transport fewer numbers of people over longer distances. Additionally, many systems are exploring the use of vans to augment or replace larger buses.

Figures 3.16 – 3.18 provide the remaining survey results from the fleet needs section.

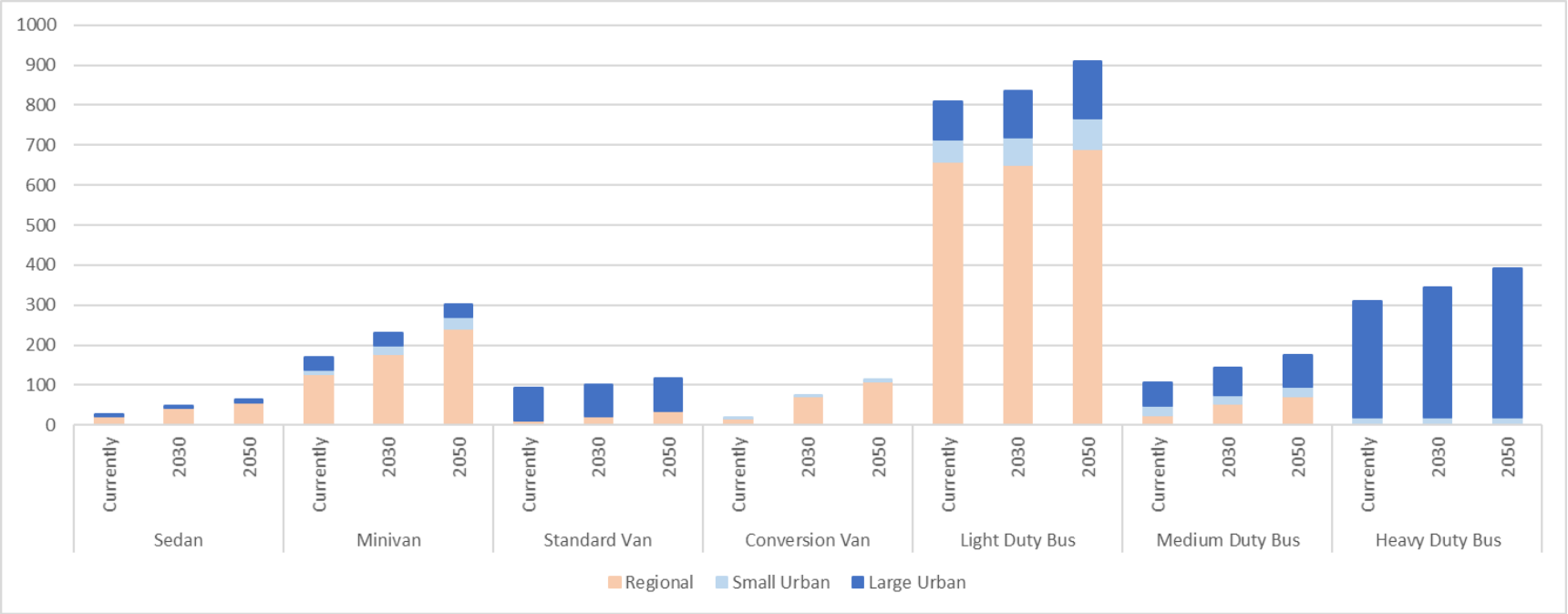
Open-ended comments regarding fleet needs:

- [AGENCY] is currently exploring a transition over time to electric buses. [AGENCY] currently has seven 40-ft electric buses on order.[8]
- [CITY'S] climate action plan indicates a need to significantly reduce greenhouse gas emissions, therefore pursing increasing transit mode share (which could result in increased rolling stock needs) and evaluating the purchase cleaner running technology such as electric buses.[9]
- n/a
- Iowa DOT needs to increase the funding per bus to accommodate all make-ready costs not just some. This includes travel costs for inspection at the plant as well, which are required by the federal government.

[8] Response redacted with [AGENCY] for privacy
[9] Response redacted with [CITY'S] for privacy

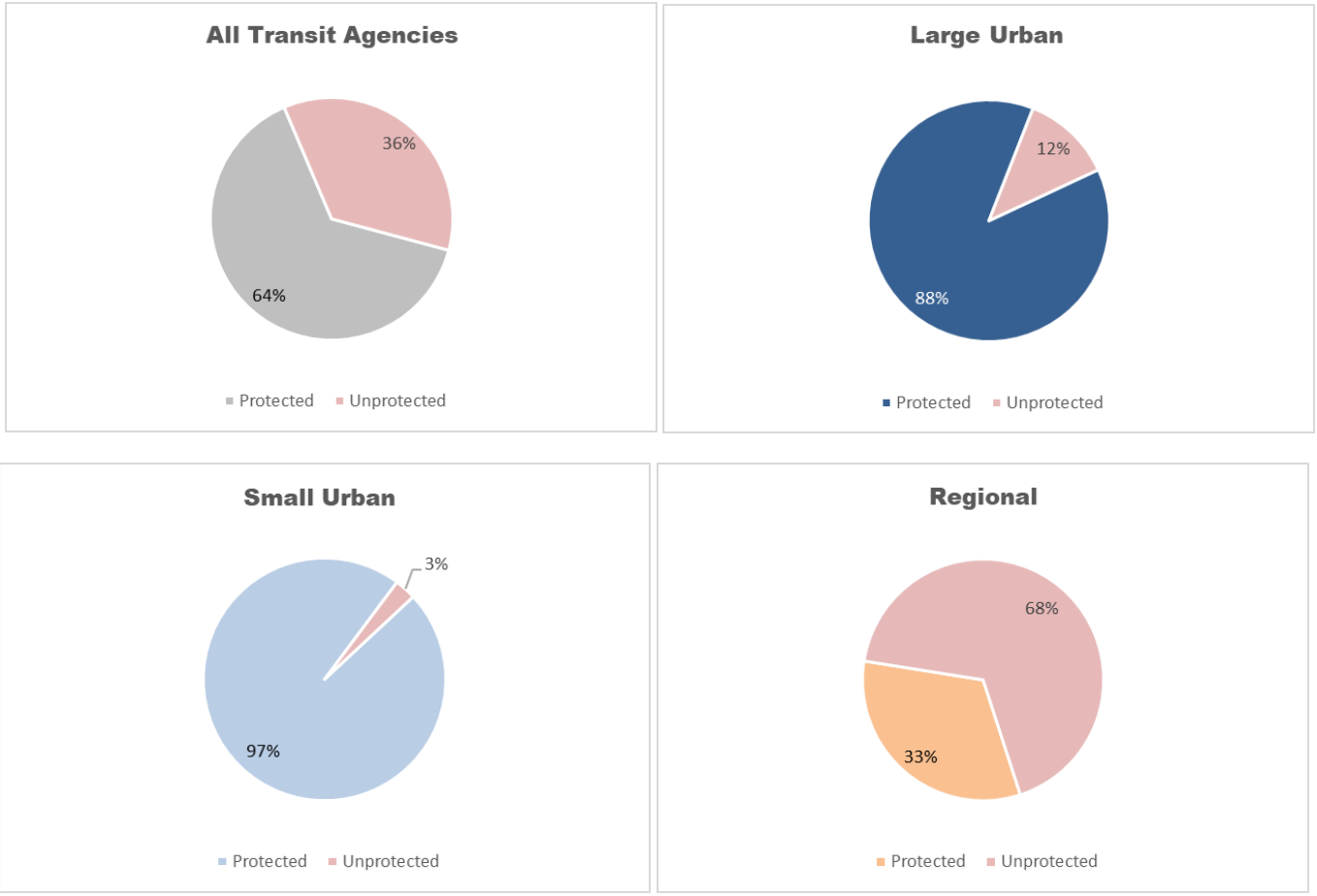
- Engine & transmission replacement costs have grown dramatically. Maintenance of emission control equipment is expensive. Use and maintenance of “smart bus” technologies has added to complexity and expense of maintaining vehicles. As the trend towards all electric buses continues, concerned with cost to replace fleet.
- We see our need for LD buses declining significantly in the next 10 years with the need for MD workroute buses and min-vans increasing significantly. We see this busing driven by the millennial generation who tends to have a greater desire to utilize public transit than previous generations.
- Fleet & vehicle capacities are projected upon the assumption that the service area will not grow much; that the demographic groups will remain close to the same; and that legislation will not mandate specific changes – i.e. battery electric buses due to air quality non-compliance.

Figure A3.15: Transit agency fleet needs



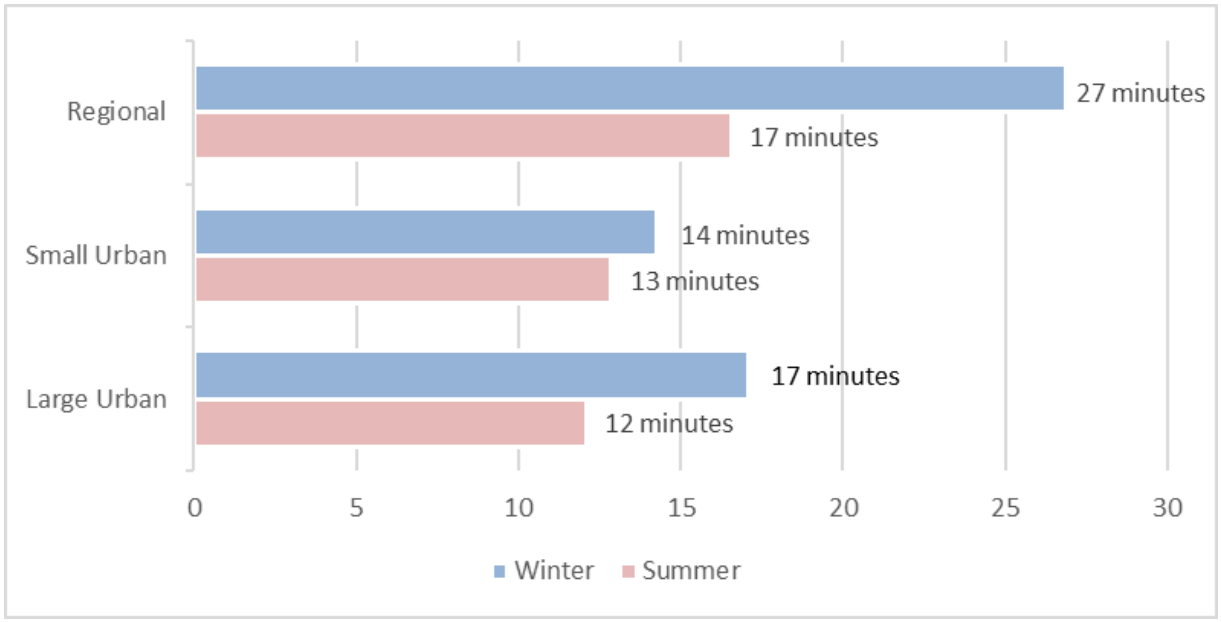
Source: Iowa DOT

Figure A3.16: What percentage of your revenue vehicles are stored in a location where they are directly protected (inside or covered)?



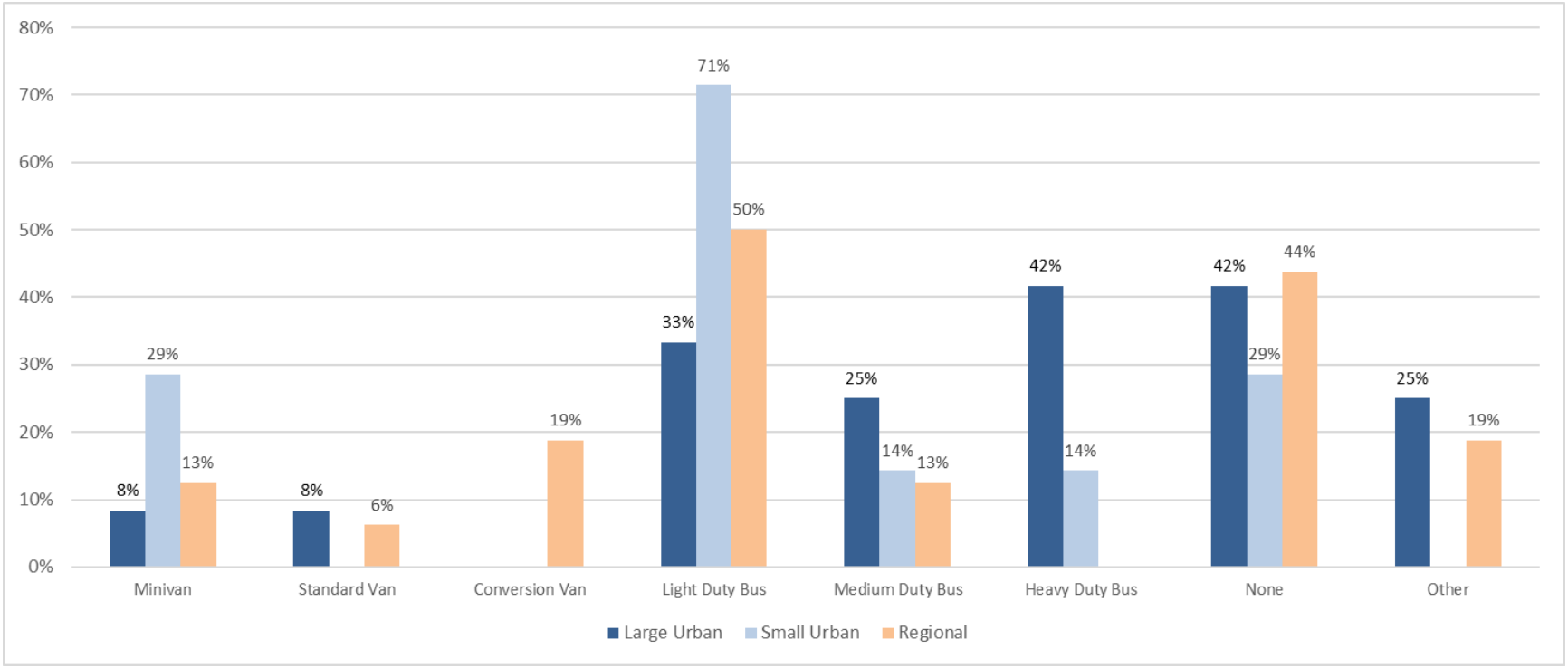
Source: Iowa DOT

Figure A3.17: What is the average pre-trip warm-up time for your revenue vehicles?



Source: Iowa DOT

Figure A3.18: For which vehicle types do you track vehicle occupancy-to-capacity statistics?



Source: Iowa DOT

(Other) responses:

- By vehicle assigned to route
- MV-1
- This is only done for vehicles that provide service for our work routes as ridership tends to fluctuate. We use LD/MD buses on these routes.
- We do not track this statistic
- Annual NTD report tracks and calculates a load factor for para transit service statistics. The passenger miles traveled (PMT) Survey provides figures that can be used to evaluate occupancy to capacity per vehicle.
- The City keeps statistics on passengers per hour and per mile on both the fixed route and the paratransit service

Section 4: Facility Needs

Facility needs include maintenance areas (including wash racks and wash bays), revenue vehicle storage areas, administrative/office (including internal needs such as office/storage space and site needs such as parking spaces and walkways), and park & ride facilities.

Typically, the larger the vehicle size, the more expensive it is to fix and replace. In order to extend the lives of these expensive vehicles, it is best to protect them to reduce maintenance costs and wear-and-tear of the buses. Extending the longevity of the bus fleet was reflected as one of the more significant needs for additional revenue vehicle storage. Maintenance facilities for the fleet was also identified as a need; however, it was significantly lower compared to storage needs. Administrative/office and parking facilities were also notably lower in need compared to other types of facilities.

Besides the need for particular types of facilities, the time period in which they are needed displayed another trend as shown in Figure A3.19. Nearly all facility needs were identified in the short-term planning horizon of 2030, with facility needs significantly lower in the long-term by 2050. This shows that new facilities, particularly for vehicle storage, is a higher priority and a more immediate need.

Open-ended comments regarding facility needs:

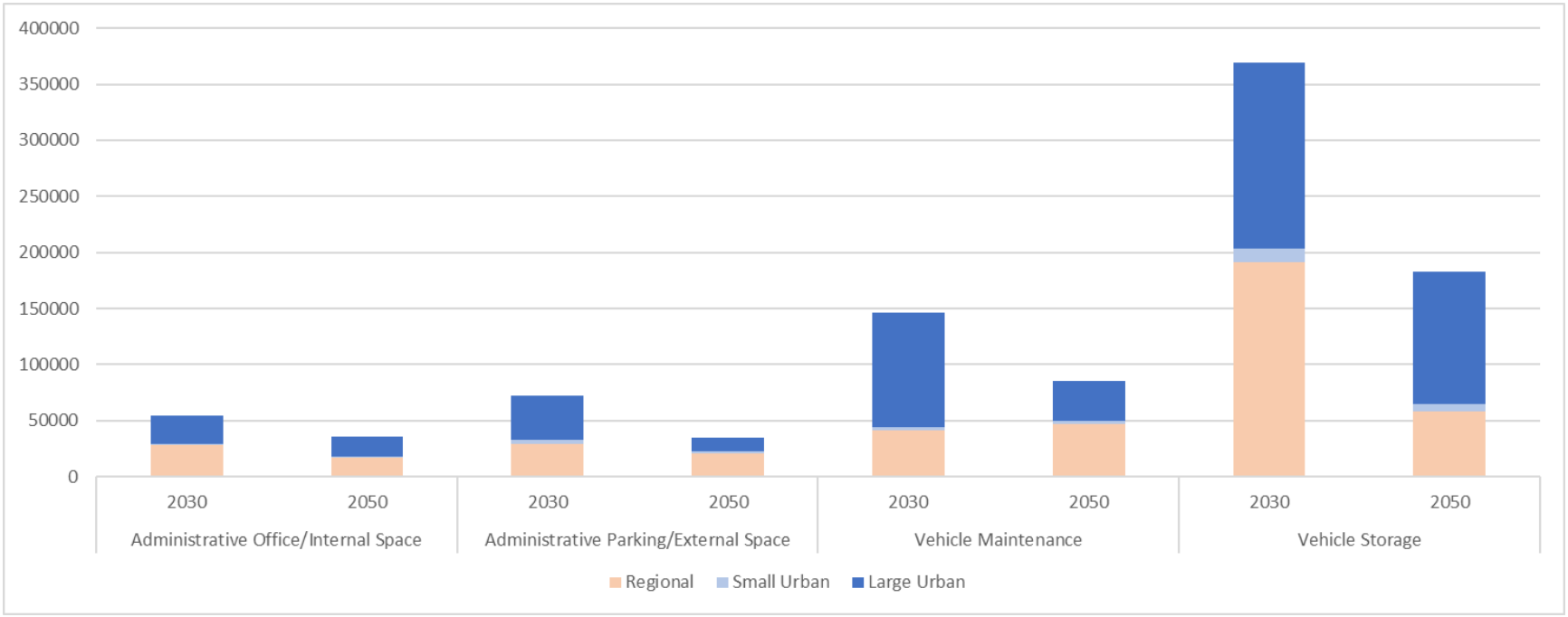
- [AGENCY] is in the process of completing a programming exercise for a facility to accommodate today's needs and future needs.
- Our facility is reaching the end of its useful life, and expansion is required as our community is growing. Unfortunately, due to site specific conditions (built on top of an old landfill) expanding at this location is not feasible and therefore a new transit facility at a new location is required. We have a site identified that is currently City owned. We are now in search of funds for the new facility.[10]
- In question 20 for vehicle storage; 2 buildings 3600 sq ft each
- When our Admin and Maintenance Facility was constructed in 2012 the City's direction was to plan for growth for the next 20 years. Do not anticipate additional park and ride sites but a possible addition to our current park and ride (Intermodal)
- This is difficult since we currently have no building for Administrative, bus storage or maintenance. And due to our service area it is not logical to have 1 facility so we need more than one and this isn't something we have thought through yet. Now that we will be providing all direct service as of FY20, we will be able to look at what the future could look like for our agency
- [AGENCY] will need to operate from two facilities as its current site is land-locked and adjacent land is not available for expansion. 25 buses parked outside and almost every areas of [AGENCY] facility is undersized after [AGENCY'S] growth period.[11]

[10] Response redacted with [AGENCY] for privacy
[11] Response redacted with [AGENCY] and [AGENCY'S] for privacy

- Parking provided by the [INSTITUTION]. In addition to space, maintenance facility needs modernized (dedicated maintenance bays' bus washer, hoists).[12]
- I see additional facility needs being a direct result of a greater need for public transit throughout the area as well as a drastic change in the way we will need to operate in the future to better serve the needs of aging generations as well as meeting the experience expectations of the younger generations.
- Leased building had leaking roof which has caused mold issue in ceiling tiles.
- [AGENCY] will strive to build a new stand-along facility by 2030, possibly a shared facility with City Field Services Department, School District, or the [AGENCY].[13]
- [AGENCY 1] stores their vehicles and [AGENCY 2] stores the City's paratransit vehicles.[14]
- We have been awarded a $7 million BUILD grant from USDOT for a new facility to be completed by 2025 which will match the needs listed in question 20

[12] Response redacted with [INSTITUTION] for privacy
[13] Response redacted with [AGENCY] for privacy
[14] Response redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.19: Transit agency facility needs (square feet)



Source: Iowa DOT

Each type of transit agency had different needs for bus shelters and park & ride lots. Regional systems had a slight need that increased very little between 2030 and 2050, as shown in Figure A3.20. Large urban systems showed the greatest change between 2030 and 2050, with much more need for both types of facilities. Small urban systems saw an increase for bus shelters in the short-term by 2030 with a similar need by 2050, but saw no need for additional park & ride facilities.

Figure A3.20: Bus shelter and park & ride needs (number of shelters/lots)

	Bus Shelters		Park & Ride	
	2030	2050	2030	2050
Regional	4	6	9	10
Small Urban	16	15	0	0
Large Urban	203	317	13	22

Source: Iowa DOT

Section 5: Personnel Needs

Personnel needs relate to the workforce of the transit agency. This includes drivers, maintenance, and administrative staff. All types of transit agencies expressed current personnel needs as well as ongoing needs for additional drivers, maintenance staff, and administrative or office staff (see Figure A3.21). However, the need for more bus drivers represents the single greatest personnel need across the state. In some situations, the need for drivers is so significant that dispatchers, maintenance personnel, and even agency directors attempt to fill the gap by driving a limited number of routes and picking up on-demand transit calls.

A lack of drivers will have the effect of limiting the level of transit service that is available in a given region. It does not matter how many buses or vans are available if there are not sufficient numbers of qualified and licensed drivers to operate them. Likewise, a lack of maintenance employees may impact the ability to service and sustain the fleet of vehicles available for transit service, while a lack of office staff will handicap the agency's ability to conduct public outreach, market its services, or perform strategic planning or analyses.

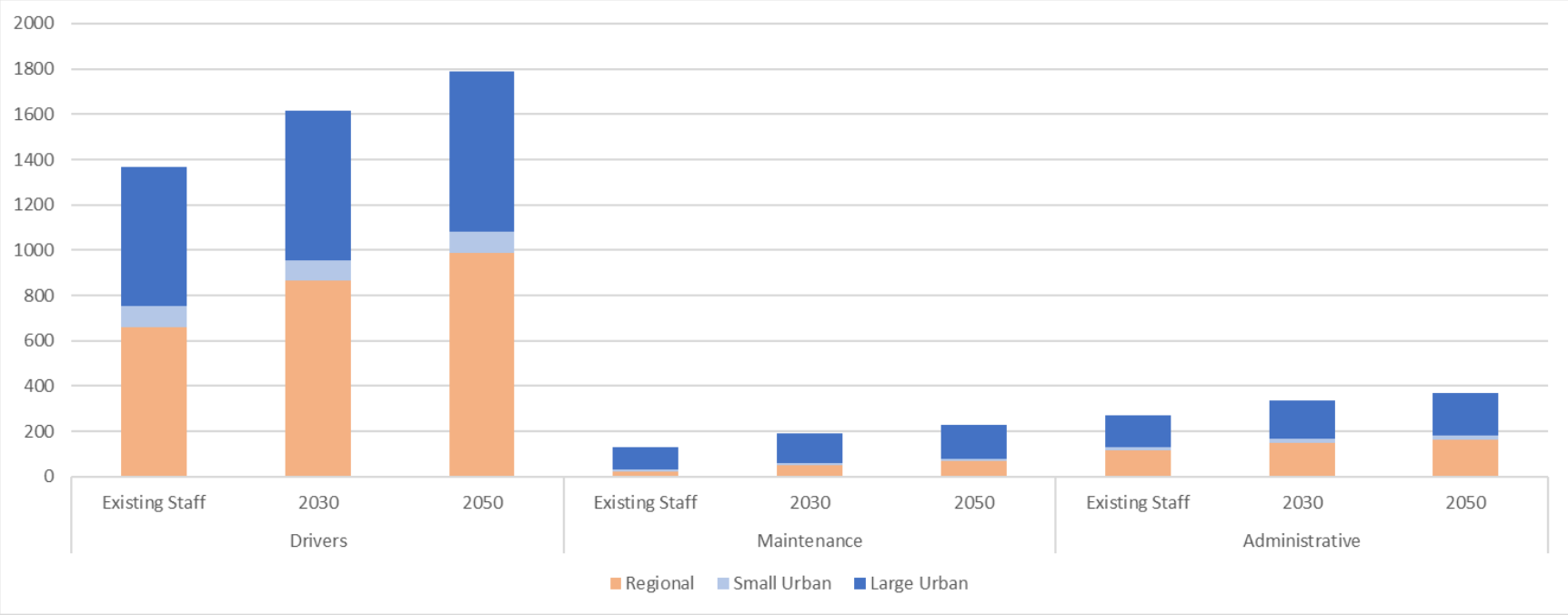
One of the most common personnel-related needs across all types of transit agencies is a shortage of qualified bus drivers. Low unemployment, decreasing population in rural areas, and difficulty in acquiring Commercial Driver's Licenses (CDLs) are some of the underlying circumstances contributing to this. Some of the manually inputted comments supplied by the responding transit agencies describe how the retiree demographic has traditionally been sought to fill the need for qualified drivers. This demographic is generally accepting of limited, part-time hours and may already have a CDL. However, in recent years, this demographic has been harder to recruit due to a variety of reasons from delayed retirement due to financial circumstances to different choices in how a retiree wishes to spend their time. Additionally, competition for CDL drivers is tight with the private sector trucking industry willing and able to pay wages that are nearly $10,000 - $12,000 a more per year than most transit drivers. Figures A3.22 – A3.28 provide the remaining survey results from the personnel needs section, including some of the personnel challenges noted by transit agencies.

Open-ended comments regarding personnel needs:

- [AGENCY'S] role in the future may change by not providing as much service but serving a coordination role to ensure seamless mobility for the region. The role of the maintenance technician will change drastically in the future based on new technology.[15]
- Finding drivers
- Most of our drivers are retired and now working a 2nd or 3rd career to earn extra spending money
- FTE's often end with decimals. I rounded a few answers up. For instance, 11.16 for drivers and .2 for administrative staff.
- I think there would be more people riding rural transit if we had more staff, such as outreach and marketing staff, but unlike our Urban counterparts, we don't have departments of people who can do everything that needs to be done – we are stretched thin, which is another issue with hiring. Our staff ix expected to much more for less pay than Urban areas that receive much more funding dollars.
- Drivers, mechanics and lane workers are difficult to to find and retain.
- Concerned with growing regulations related to CDL's and training requirements. Maintaining adequate staffing levels becoming more difficult over time.
- The number of Transit FTE's is dependent upon adoption of technology, operating performance, and continued, & unchanged revenue streams.
- [AGENCY 1] and [AGENCY 2] provide employees, so the only City employee is the Resource and Program Coordinator.[16]

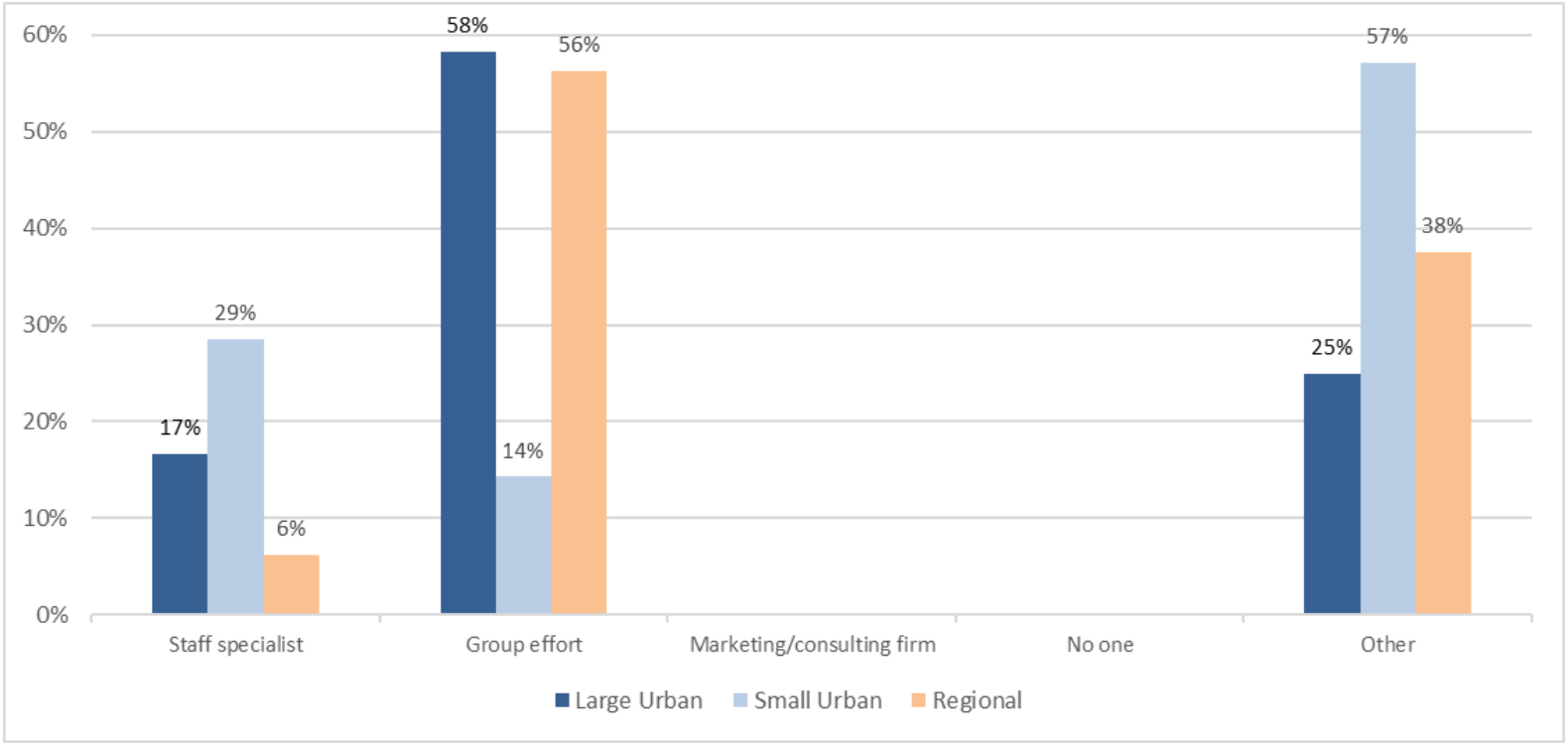
[15] Response redacted with [AGENCY's] for privacy
[16] Response redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.21: Transit agency personnel needs



Source: Iowa DOT

Figure A3.22: Who is responsible for your agency's recruiting and hiring efforts?



(Other) responses:

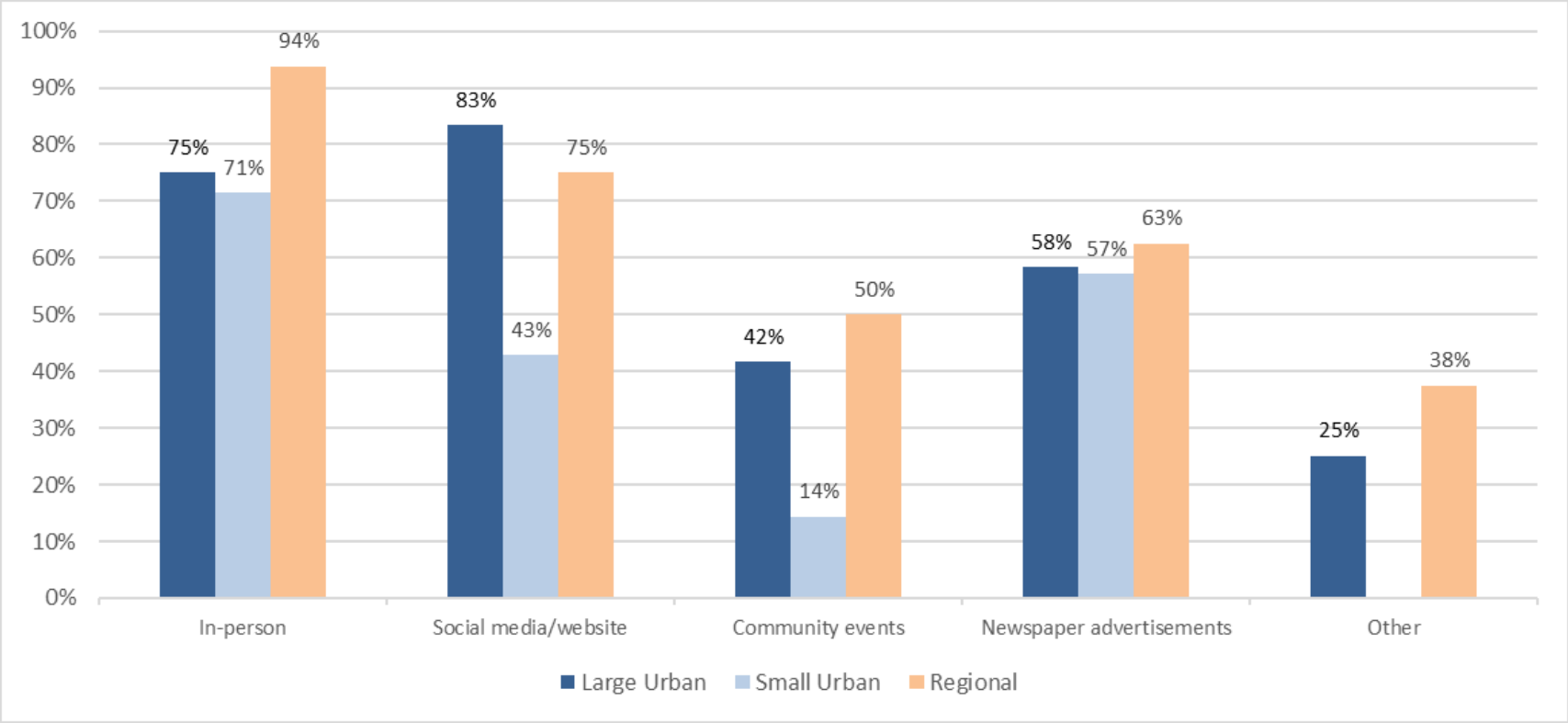
- Transit Manager
- Human Resources and Transit Director
- CEO and the COO
- HR for City
- Human Resources Dept.
- Transit Manager
- Transit Supervisor

Source: Iowa DOT

- Transit Director
- Director is responsible
- Multiple transit administrators, City Human Resource Department
- [AGENCY 1] and [AGENCY 2] provide the workforce as part of their agreements with the City.[17]
- Transit director, and operations supervisor
- Transit administrative staff

[17] Response redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.23: How do you engage with potential job candidates?



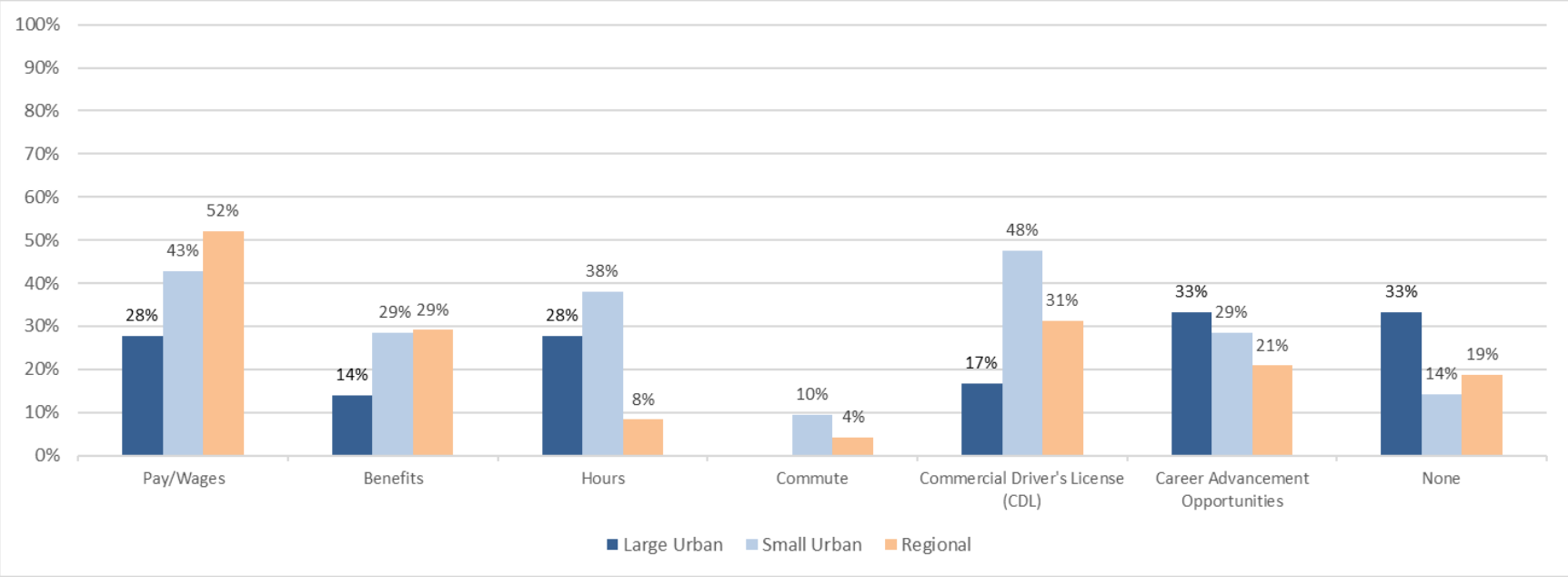
Source: Iowa DOT

(Other) responses:

- Direct placement recruiters
- Email lists for job availability/opportunities within the City
- Employment Application Software
- creatively designed posters promoting hiring – placed in the communities where we have services
- Buses parked with help wanted banners.
- advertise on buses, vans
- [AGENCY 1] and [AGENCY 2] engage with potential job candidates.[18]
- Use Indeed website as primary
- radio ad

[18] Response redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.24: What kinds of barriers does your agency currently experience?



Source: Iowa DOT

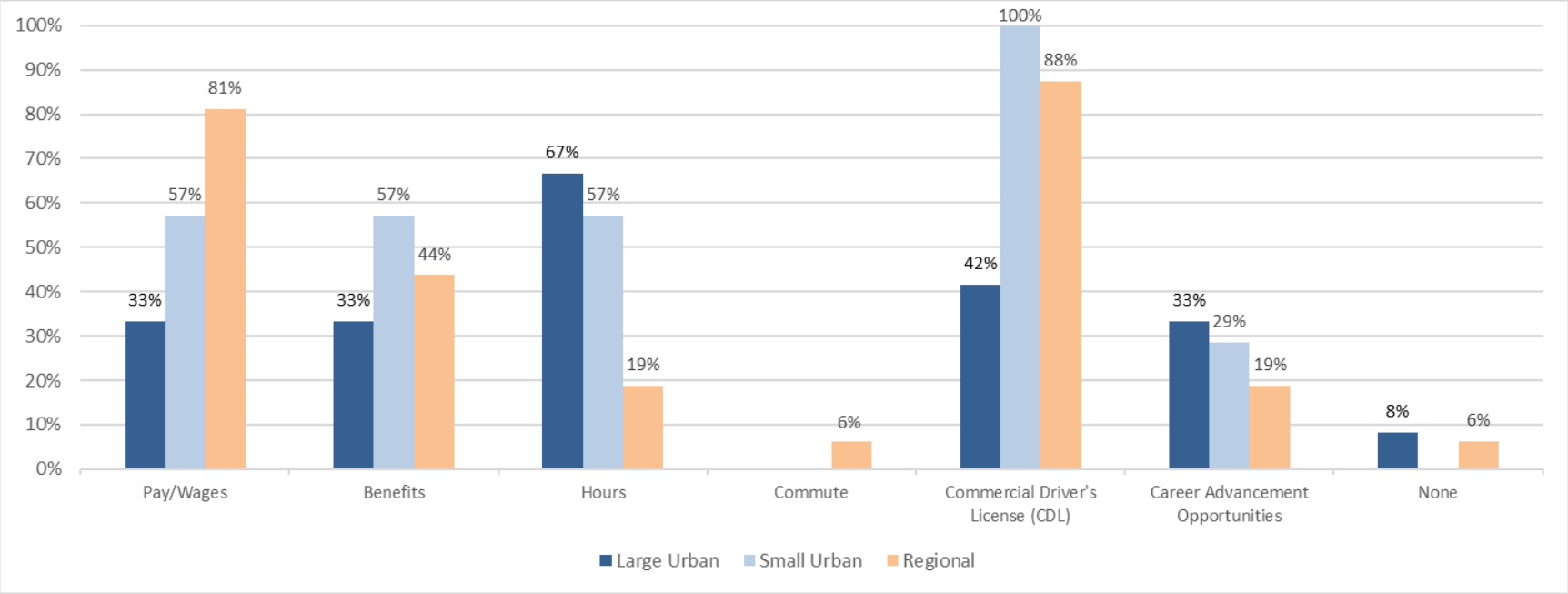
Note: this chart is an aggregation of the responses for barriers for all employee types. Individual breakouts specific to drivers, maintenance, and administrative staff are depicted in the following figures.

(Other) responses:

- Part-time operator benefits are a barrier as all drivers start in a part-time capacity.
- Low unemployment, people working at career longer before semi-retiring
- Part-time opportunities are not as appealing as Full-time especially in the more rural areas.
- [AGENCY 1] and [AGENCY 2] handle their employees, so the City doesn't experience any barriers.[19]
- Failure to pass pre-employment D&A test, failure to pass background checks, and past convictions for DUI.

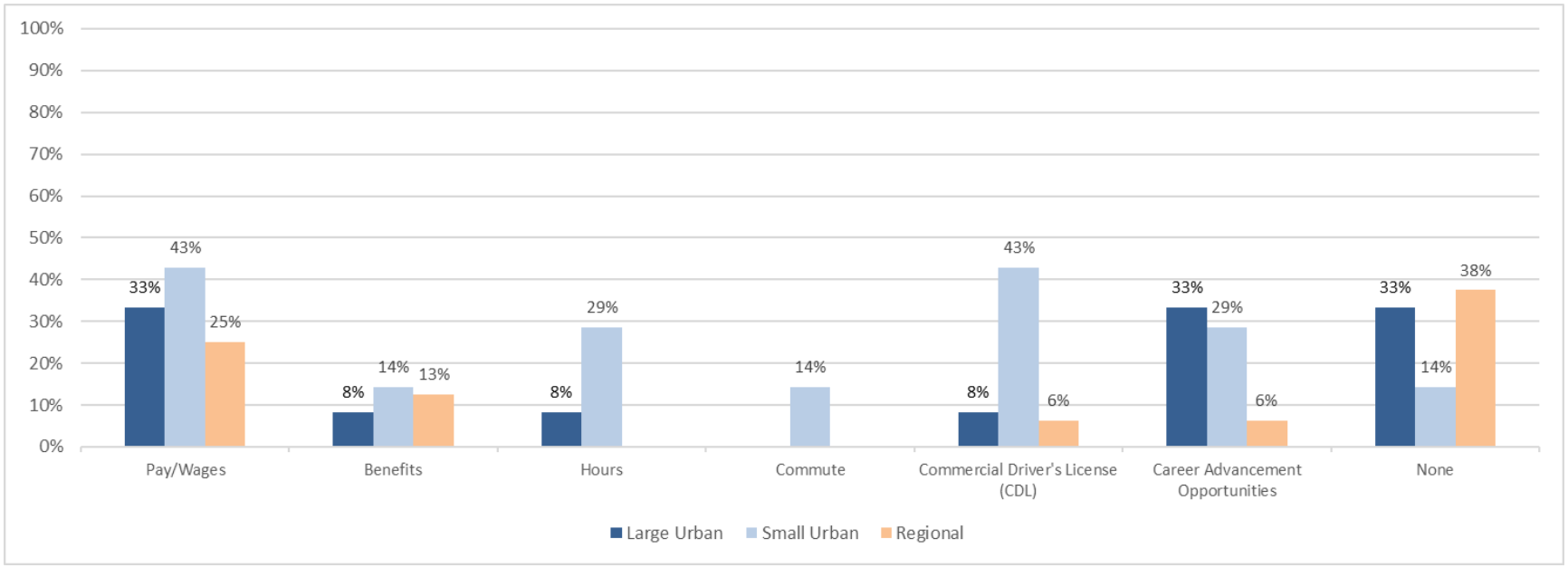
[19] Response redacted with [AGENCY 1] and [AGENCY 2] for privacy

Figure A3.25: What kinds of barriers does your agency currently experience? (Drivers)



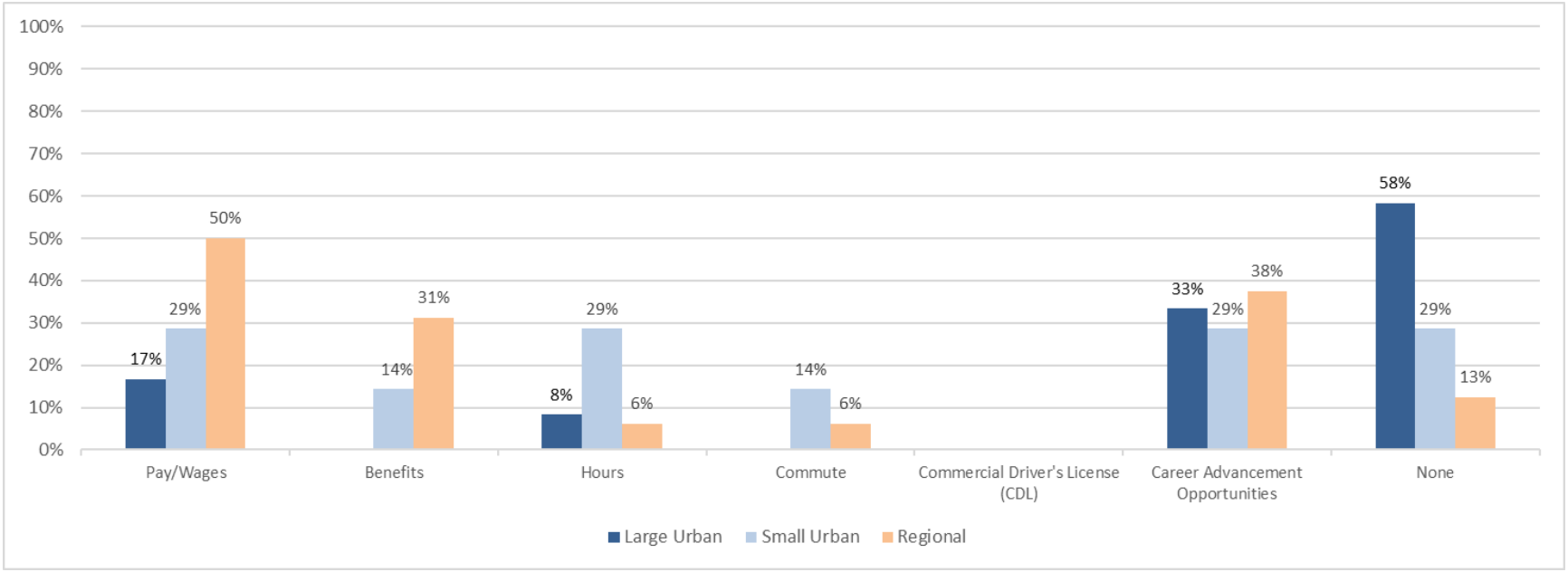
Source: Iowa DOT

Figure A3.26: What kinds of barriers does your agency currently experience? (Maintenance)



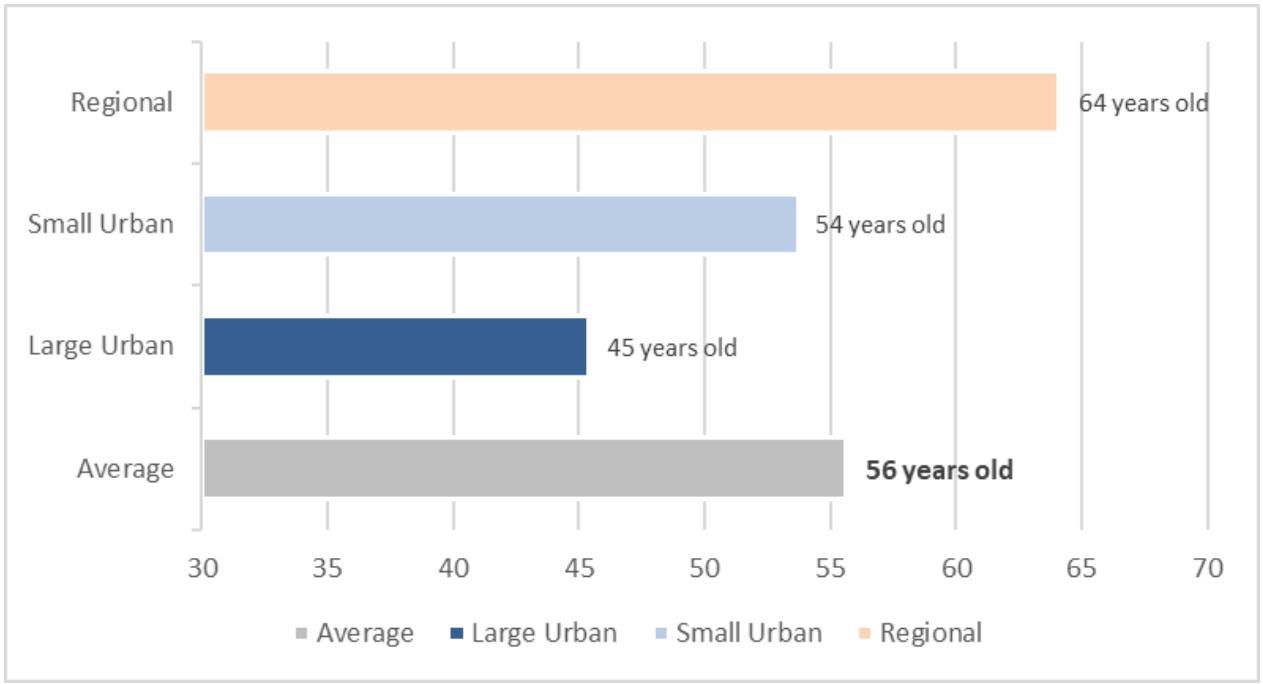
Source: Iowa DOT

Figure A3.27: What kind of barriers does your agency currently experience? (Administrative)



Source: Iowa DOT

Figure A3.28: What is the average age of your drivers?



Source: Iowa DOT

Section 6: Technology Needs

Technology needs relate to hardware or software capabilities within vehicles, as well as those utilized by administrative staff in the office. Transit agencies utilize a wide range of different tools and technologies in order to keep the transit system operating. From dispatching, to route optimization software, hybrid buses, and live geolocating services and apps, there are many different aspects of running transit operations that are impacted by the rapid pace of changing technology. Along with that, there are rapidly changing expectations of potential riders that make it difficult for transit agencies to simultaneously manage current operations while researching and implementing new technological approaches.

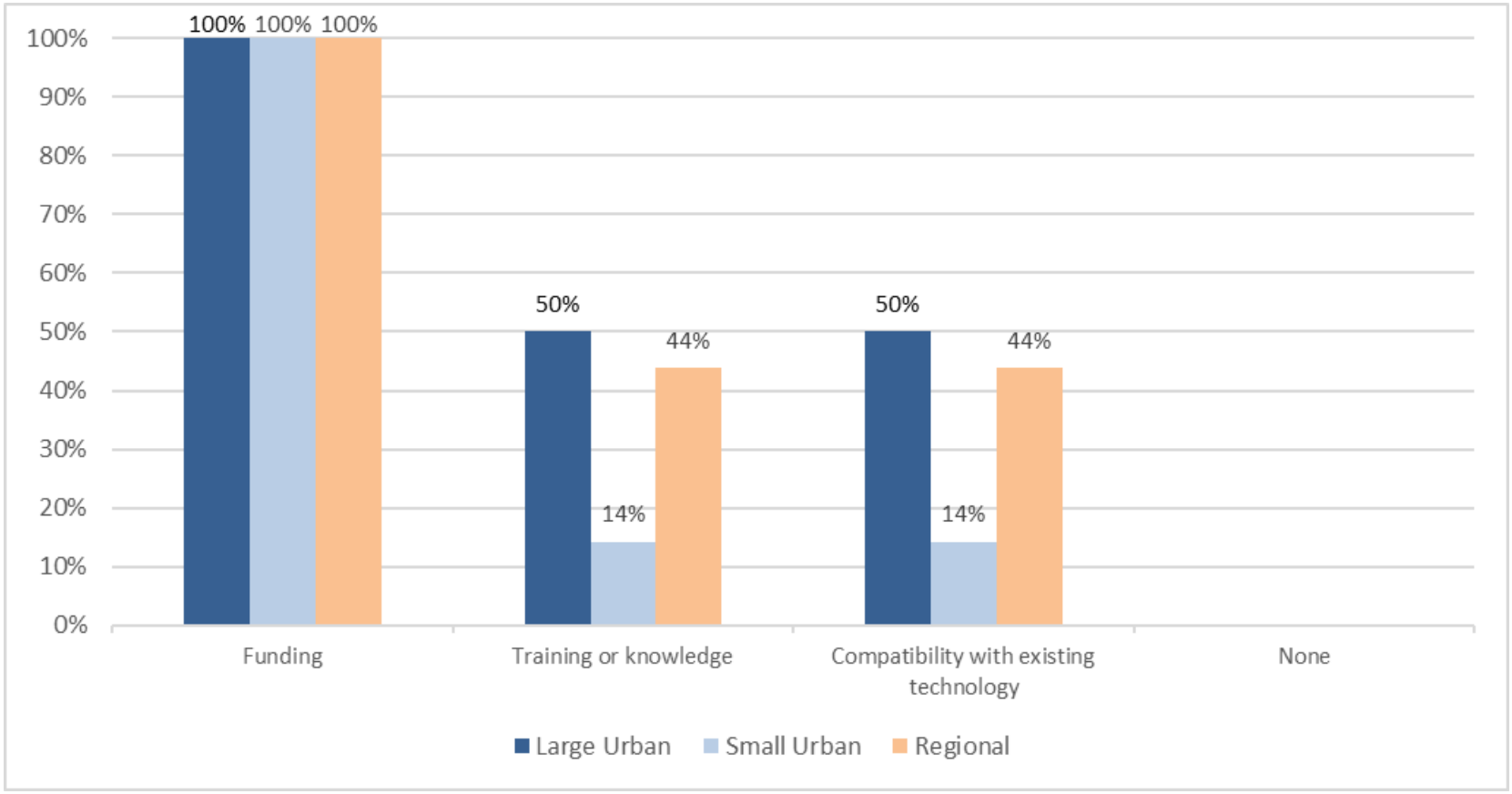
As shown in Figure A3.29, it is clear that the most significant barrier to implementing new technology is funding. Some of the comments from the agencies provided additional context to this. Several made mention of the difficulty in determining the overall cost of technology, such as predicting training costs, subscription services, and long-term licensing agreements. While most agencies expressed interest in adopting new technology, there was even more interest in understanding its return-on-investment. In other words, they would like to understand what the overall costs entail, including lost opportunity costs, in relation to cost savings or some other tangible benefit.

Figures A3.30 – A3.35 provide the remaining survey results from the technology needs section.

Open-ended comments regarding technology needs:

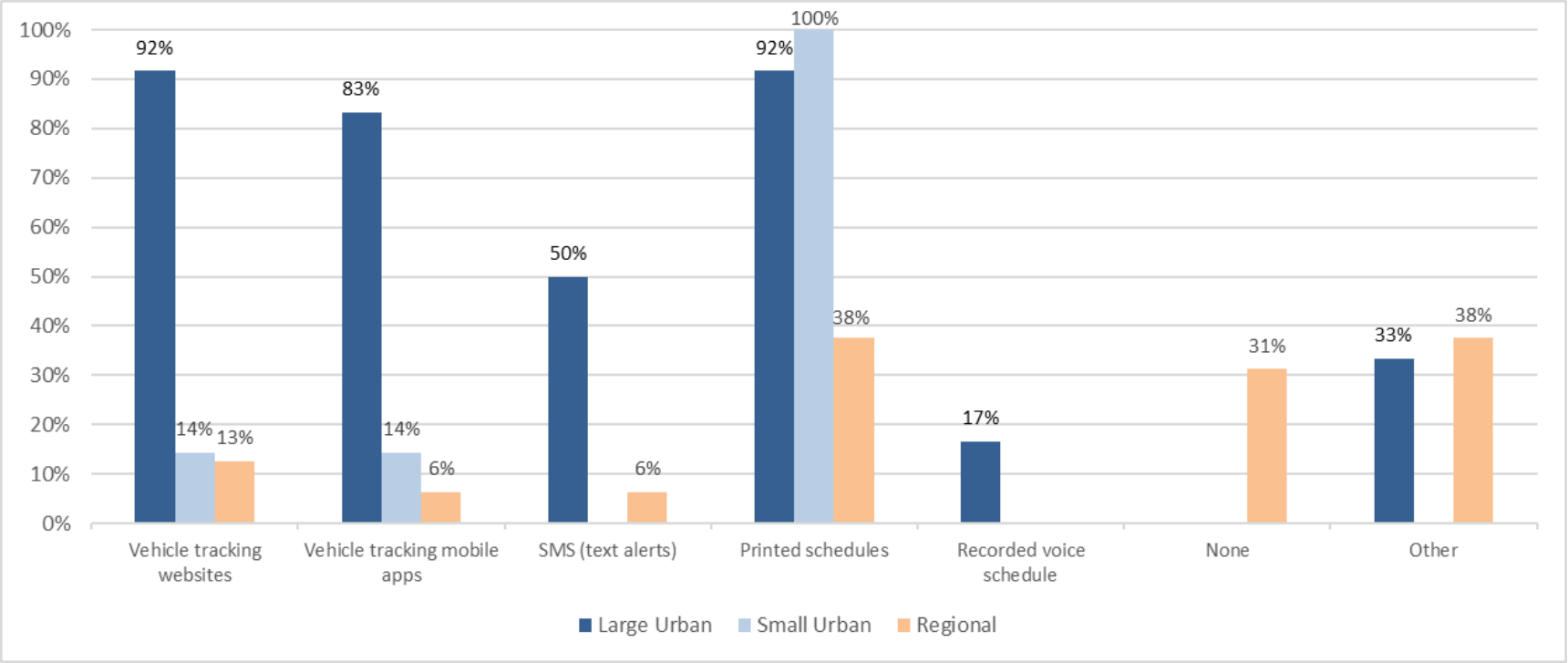
- We definitely are moving into the high-tech era of transit, figuring out how to provide *very* accurate predictions of arrival time is still a challenge. Leveraging our GIS technology for planning and operations is something we need to do more of. Providing accurate transit arrival information on a variety of app platforms (in tandem with say, bike share or scooter share availability) is something we need to be thinking about. Also, automated vehicle technologies are on the horizon and we need to begin thinking now about how to leverage the technology to improve transit service.
- Maintenance and replacement of technology consumes significant resources. Reliability is paramount as become dependent upon technologies. Difficult to evaluate and keep up on developing technologies.
- I think as an industry transit is behind the curve in technology. In the next year our system is going to start moving to really get on par as far as technology.
- Because of the preponderance of low-income passengers (85% +), eliminating fares would be highly desirable. Technology may assist with cost effective operations that make that goal feasible.
- Would like to add Cradlepoint modems on all buses but can't due to budget restraints.

Figure A3.29: What kinds of barriers prevent your agency from being able to acquire or leverage technology?



Source: Iowa DOT

Figure A3.30: What kind of passenger information tools do you provide to your riders?



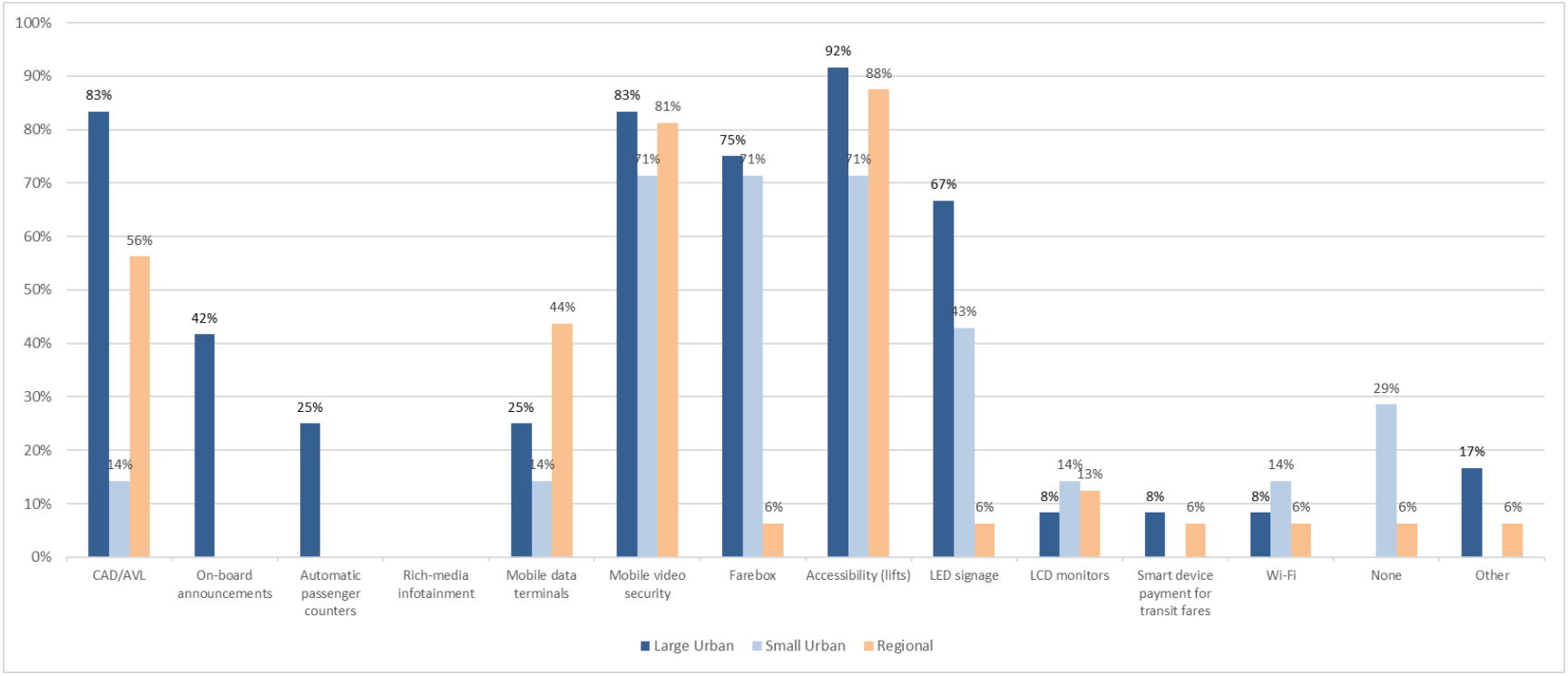
Source: Iowa DOT

(Other) responses:

- Mobile payment application
- Phone calls
- Broachers
- Notifications of trips, App to schedule/manage trips, online payment option
- Schedule information via telephone and email.
- AVAS
- Rider's Guide printed booklets
- [AGENCY] provides a vehicle tracking mobile app.[20]
- website information for schedules, reservations, and rates
- calling cards

[20] Response redacted with [AGENCY] for privacy

Figure A3.31: What kind of transit technology is on your vehicles?

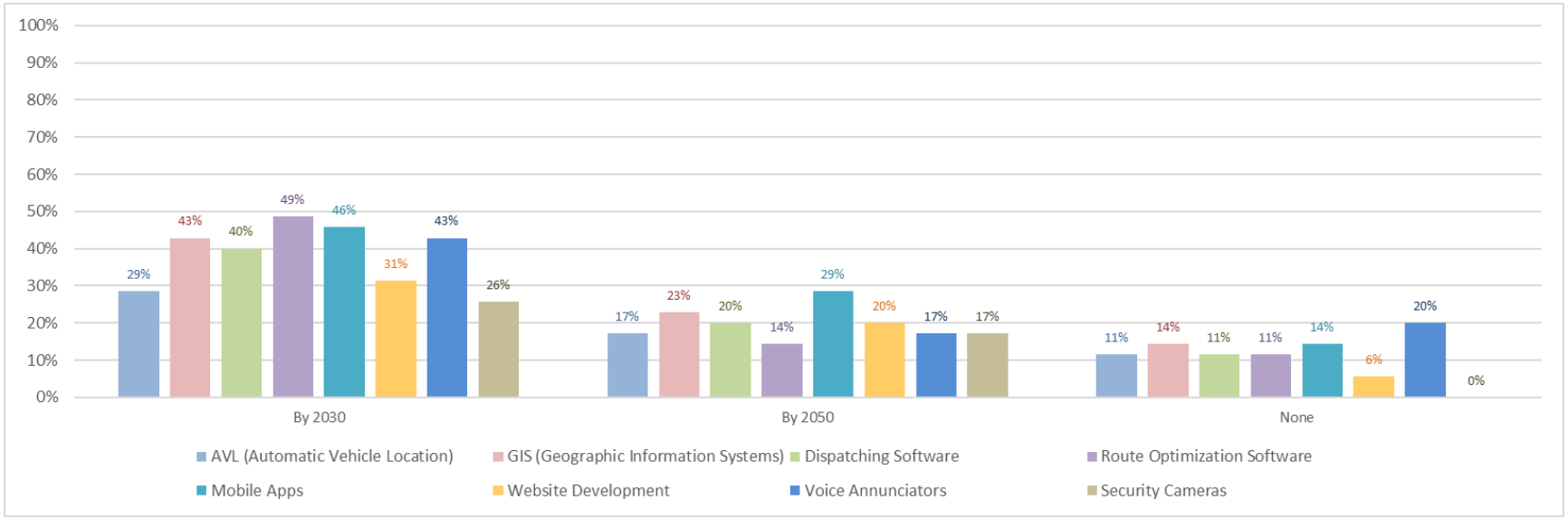


Source: Iowa DOT

(Other) responses:

- Within the next year will have automatic passenger counters and and on-board announcements.
- Routing software via tablet
- The City's paratransit vehicles are equipped with Excels cameras.

Figure A3.32: What types of technology does your transit agency anticipate having additional needs for? (All respondents)

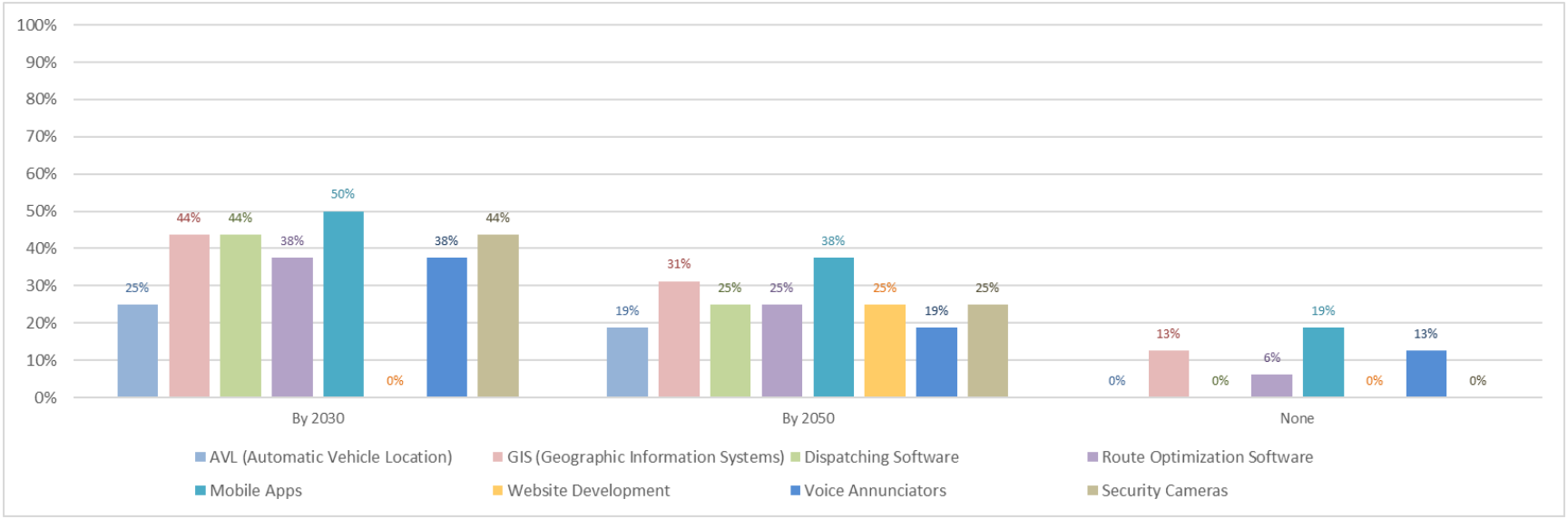


Source: Iowa DOT

(Other) responses:

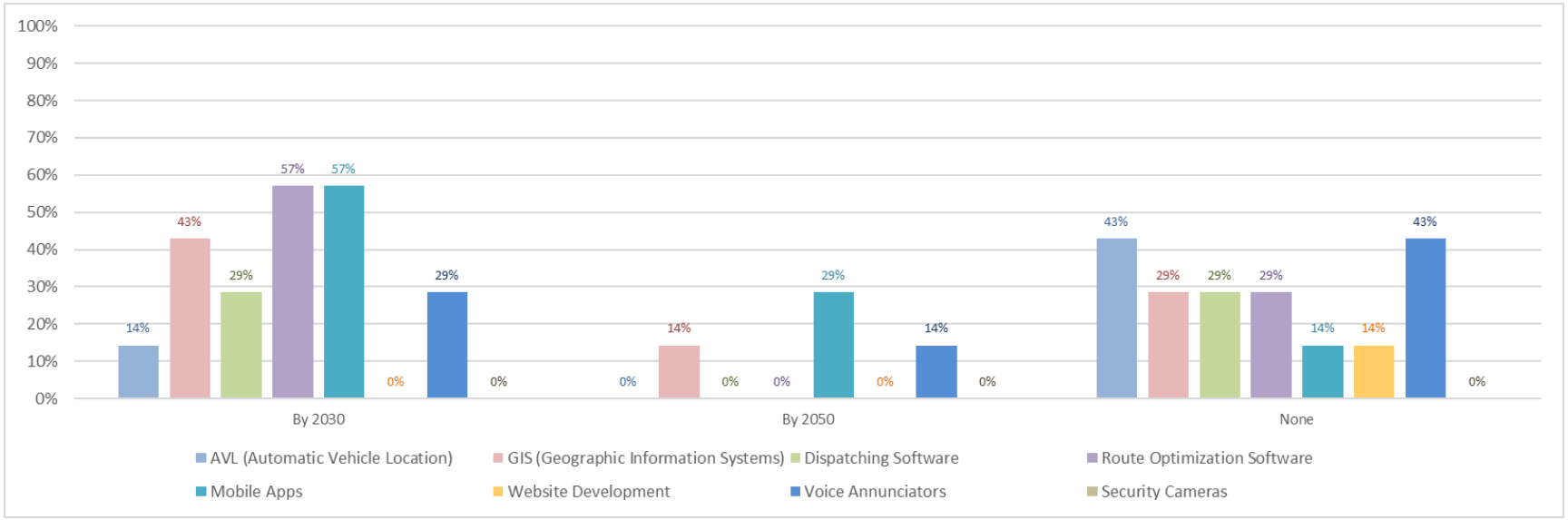
- Enhanced radio system to allow for interopperability, integrated mobile payment application, LCD monitors
- We have GIS, but need more technical staff training on how to use the software for planning and operations purposes.
- would like an immediate way to translate other languages for our English speaking drivers
- Electronic Fare
- Need to replace existing software, replace security cameras and add Route optimization by 2030

Figure A3.33: What types of technology does your transit agency anticipate having additional needs for? (Regional)



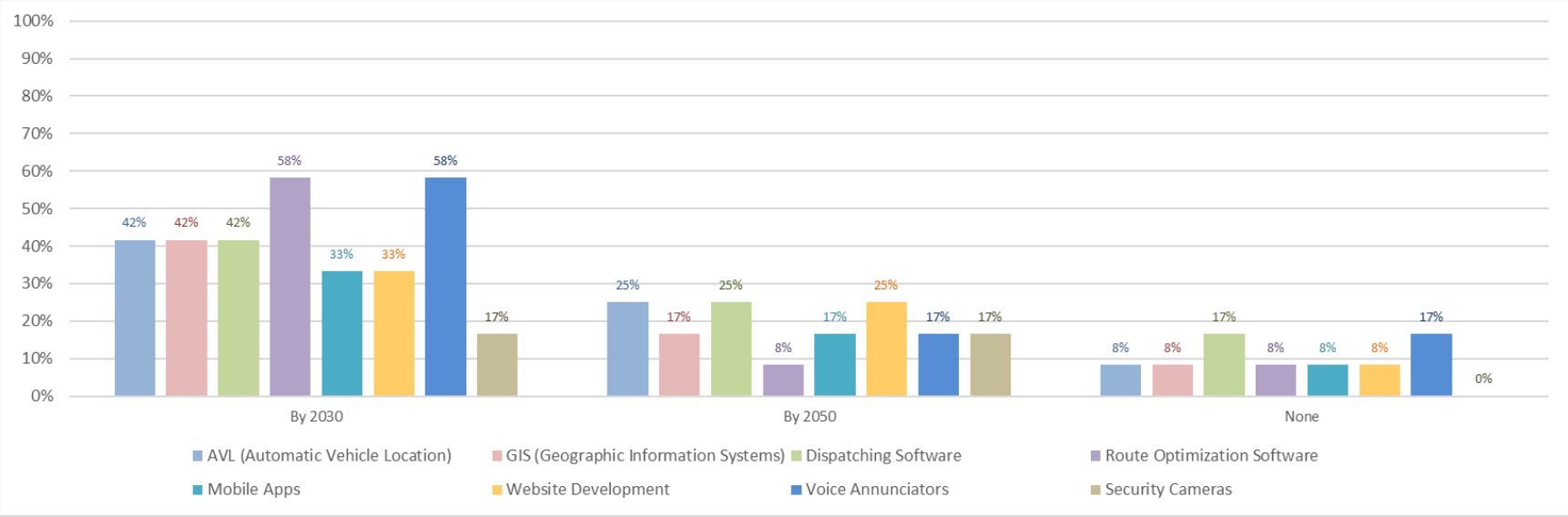
Source: Iowa DOT

Figure A3.34: What types of technology does your transit agency anticipate having additional needs for? (Small Urban)



Source: Iowa DOT

Figure A3.35: What types of technology does your transit agency anticipate having additional needs for? (Large Urban)



Source: Iowa DOT

www.iowadot.gov

APPENDIX 4: **PUBLIC SURVEY**

Appendix 4. Public Survey

Published in 2017, the State Public Participation Process for Transportation Planning[1], provides guidance for providing Iowans the opportunity to help identify transportation issues, needs, and priorities; plan how to meet those needs and priorities; and select transportation projects that turn the plans into reality. An example of how the Public Participation Process was utilized in this Plan includes the public survey.

Background

An online public survey was released for public input on October 18, 2019 and concluded November 1, 2019. While the survey was considered officially closed after that date, the survey itself was kept "live" for three additional weeks in order to allow opened surveys to be submitted. Mailed survey responses were also included in the results.

The intent of the survey was to provide the public an opportunity to weigh in on the refined strategies that utilized input from the Passenger Transportation Summit and external stakeholders. Responses were determined by a "Five-star" rating scale, with one star indicating the strategy was "Very Unimportant" and five stars indicating the strategy was "Very Important".

In addition to providing input on the strategies, survey respondents also provided useful demographic information, which helped determine which strategies resonated with various sociodemographic groups. Along with that, respondents were asked questions to gauge their usage of different transportation modes, such as how often public transit is utilized, or how far one is willing to commute to work. The result was a total of 583 responses from across Iowa that reflected a nearly equal distribution of public transit riders and nonriders, thus providing useful feedback that was not skewed toward any particular type of traveler.

[1] State Public Participation Process for Transportation Planning: https://iowadot.gov/program_management/StatePublicParticipationProcess.pdf

Survey Format

The survey was available to the public through SurveyMonkey with the goal of making it accessible for as many Iowans as feasible. In order to make the survey compliant with the American's with Disabilities Act (ADA), the 'Classic' survey format was utilized to enable the use of screen readers.[2] The survey was also translated into Spanish by an Iowa DOT staff member who is a native Spanish speaker. For Iowans who do not have access to a computer, tablet, or other digital device, PDF documents of both English and Spanish-translated surveys were provided so that they could be printed in hardcopy.

The survey questions were organized into several different sections. The leading section covered basic travel behavior and trip information, asking questions related to the modes of transportation that the survey respondent regularly uses and other modal preferences. The next four sections asked the survey respondent to evaluate different proposed strategies using a star ranking system, with the strategies organized into Service, Partnering, Facility, Fleet, and Personnel, and Funding strategies. The final section of the survey sought information on the respondent's social, economic, and demographic characteristics. While most of the survey questions were required, the entire final section was purposefully kept optional to allow respondents the option of submitting the survey without needing to answer those questions.

Figures A4.1 through A4.8 depict the questions and survey format of the Iowa Public Survey in English. Figures A4.9 through A4.16 depict the questions and survey format in Spanish.

The sections of the survey include:

- **Section 1:** Introduction and Trip Information
- **Section 2:** Service Strategies
- **Section 3:** Partnering Strategies
- **Section 4:** Facility, Fleet, and Personnel Strategies
- **Section 5:** Funding Strategies
- **Section 6:** Demographic Information

[2] SurveyMonkey, "Accessibility at SurveyMonkey", 2019, https://help.surveymonkey.com/articles/en_US/kb/Accessibility-at-SurveyMonkey

Figure A4.1: Public Survey pages 1 & 2

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Iowa Public Transit Survey

Introduction and Trip Information

Thank you for taking the time to complete our public survey on Iowa's public transit system. The input that you provide will directly impact the long-range planning efforts that the Iowa Department of Transportation undergoes in order to effectively manage resources across our state. We invite everyone who lives or works in Iowa to respond to this survey, regardless of whether you use public transit a little, a lot, or not at all.

We are asking for your input on public transit because the Iowa DOT administers federal and state transit grants, as well as providing technical assistance to Iowa's 19 urban public transit systems and 16 regional public transit systems. More than 24.9 million rides are provided annually by Iowa's transit systems. Go here to learn more...

The first part of our survey is to help us better understand how you utilize transportation in your daily life. We are going to ask you a few questions related to how you travel. Understanding the types of transportation you use for various trips will help us better understand how people travel.

1. Are you filling this survey out for someone else?

- ◯ Yes
- ◯ No

2. How often do you utilize the bus or public transit?

- ◯ I'm a regular transit rider *(riding transit 1-5 times per week)*
- ◯ I'm an occasional transit rider *(riding transit a few times per month or few times per year)*
- ◯ I never ride transit *(never riding transit)*

In the next several questions, we are going to ask you about your transportation connections. A transportation connection is any, mode, method, or conveyance that you utilize to get to your destination. This could be your personally owned vehicle, bike, bus, taxi, Uber/Lyft, or getting a ride from someone else.

3. How far are you willing to walk to get to your transportation connection? Leave blank if the question does not apply to you.

0 blocks — 4 blocks (1/4 mile) — 8 blocks (1/2 mile or more)

1

4. How far are you willing to bike to get to your transportation connection?

0 blocks — 8 blocks (1/2 mile) — 16 blocks (1 mile or more)

5. How far are you willing to drive to get to your transportation connection?

0 miles — 5 miles — 10 miles (or more)

6. How long are you willing to wait for your transportation connection to arrive?

0 minutes — 15 minutes — 30 minutes or more

7. How many minutes are you willing to commute (by any mode of transportation) to get to work?

0 minutes — 30 minutes — 60 minutes or more

8. In rural areas, how often should demand response public transit service be available?

Daily — Weekly — Monthly

9. How far in advance are you willing to schedule your transportation connection?

0 hours — 12 hours — 24 hours (or more)

10. Does weather affect your choice of transportation?

- ◯ Yes
- ◯ No

2

Sources: Iowa DOT, Survey Monkey

Figure A4.2: Public Survey pages 3 & 4

11. Do you use any of these types of transportation for these types of trip purposes? Leave selection blank if you never use a mode for a particular trip purpose.

	Bus	Walk	Bike	Personally owned-vehicle	Rideshare vehicle	Electric Scooter
To go to work	☐	☐	☐	☐	☐	☐
To go shopping	☐	☐	☐	☐	☐	☐
For entertainment or recreation	☐	☐	☐	☐	☐	☐
To get to school	☐	☐	☐	☐	☐	☐
For medical appointments	☐	☐	☐	☐	☐	☐

Other (please specify)

12. Are there any types of transportation you don't currently use, but would like to use for these types of trip purposes? Leave selection blank if you have no interest in a mode for a particular trip purpose.

	Bus	Walk	Bike	Personally owned-vehicle	Rideshare vehicle	Electric Scooter
To go to work	☐	☐	☐	☐	☐	☐
To go shopping	☐	☐	☐	☐	☐	☐
For entertainment or recreation	☐	☐	☐	☐	☐	☐
To get to school	☐	☐	☐	☐	☐	☐
For medical appointments	☐	☐	☐	☐	☐	☐

Other (please specify)

3

13. If you don't use a particular type of transportation at all, are any of these items part of the reason why? Leave selection blank if not.

	Bus	Walk	Bike	Personally owned-vehicle	Rideshare vehicle	Electric Scooter
Too expensive	☐	☐	☐	☐	☐	☐
Medical or health reasons	☐	☐	☐	☐	☐	☐
Not available in my area	☐	☐	☐	☐	☐	☐
Too inconvenient	☐	☐	☐	☐	☐	☐
Doesn't take me to where I need to go	☐	☐	☐	☐	☐	☐
Don't have time	☐	☐	☐	☐	☐	☐
Safety	☐	☐	☐	☐	☐	☐
Don't like this mode	☐	☐	☐	☐	☐	☐

Other (please specify)

4

Sources: Iowa DOT, Survey Monkey

Figure A4.3: Public Survey pages 5 & 6

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Iowa Public Transit Survey

Service Strategies

The second part of our survey is to find out what you value in the public transit system. We are going to ask you a series of questions related to different strategies and actions that could potentially be taken in order to improve transit service.

Some terms you will see in some of the strategies:

- **Large urban means the 12 transit systems located in areas greater than or equal to 50,000 in population.**
- **Small urban means the 7 transit systems located in small urban areas between 20,000 and 49,999 in population.**
- **Regional means the 16 transit systems that cover the remainder of the state.**

Full listings and maps of Iowa's public transit systems can be found at: https://iowadot.gov/transit/iowa-transit-services/transit-agency-maps-and-listings.

- **Fixed route public transit services are provided by the 19 urban transit agencies. No advance reservations are necessary. Service is available to the general public, including persons with disabilities.**
- **Demand response public transit services are provided by the 16 regional transit agencies. Ride reservations are made in advance, normally 24 hours. With demand response service, the bus picks the passenger up at their location and takes them to their desired destination. Service is available to the general public, including persons with disabilities.**
- **Paratransit is an Americans with Disabilities Act (ADA) complementary service provided by the 19 urban transit agencies in, at a minimum, 3/4-mile around a fixed route. Ride reservations are arranged by the rider at least one day prior to a desired trip. The bus picks the passenger up at their location, taking them to the desired destination. Fares for this origin-destination service may be no more than double the regular fixed route fare.**

Service

Our public transportation system is spread out across all of Iowa and offers a variety of types of transit service. This includes metropolitan areas that have fixed route service with bus stops, regional on-demand service that is scheduled, and para-transit that supports transportation to accommodate users with disabilities. The service-related questions that we will ask you will tell us what you think are the most important solutions we should focus on to improve service for our communities.

5

14. Examine the effects of offering free state-wide bus service.

Very Unimportant | Unimportant | Neutral | Important | Very Important

15. Expand bus service hours for people who work nights and weekends.

Very Unimportant | Unimportant | Neutral | Important | Very Important

16. Prioritize funding applications for communities that provide or improve transit service or access.

Very Unimportant | Unimportant | Neutral | Important | Very Important

17. Examine the effects of creating more urban transit services in areas that are currently covered by regional transit services.

Very Unimportant | Unimportant | Neutral | Important | Very Important

18. Continue existing services and establish new inter-regional services along commuter routes (such as Interstate 380 between Cedar Rapids and Iowa City, Interstate 35 between Ames and Des Moines, and Interstate 74 between Davenport and Illinois).

Very Unimportant | Unimportant | Neutral | Important | Very Important

19. Start a subscription price service that works across all bus services in Iowa and includes bikes, scooter sharing, and parking facilities.

Very Unimportant | Unimportant | Neutral | Important | Very Important

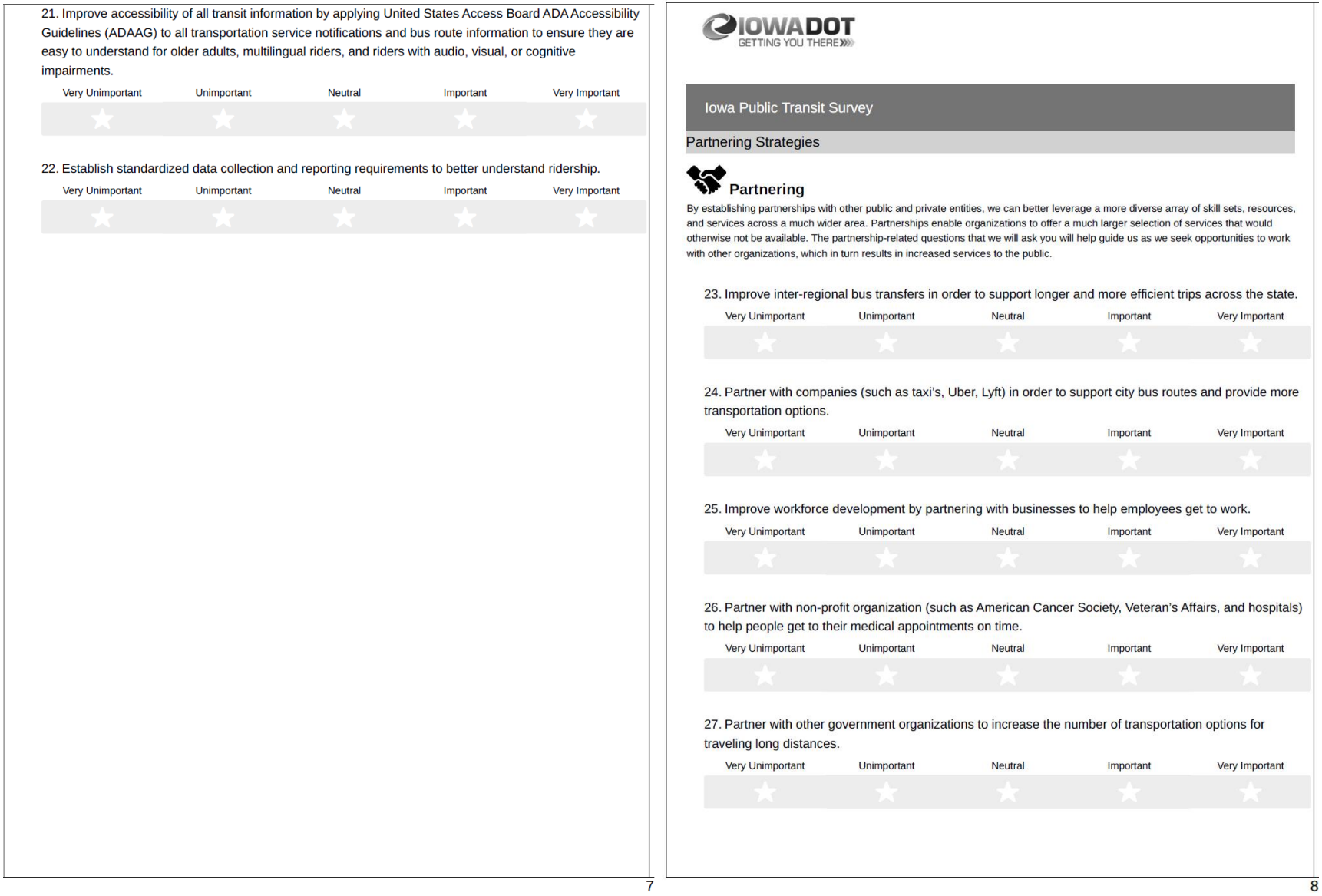
20. Enable all buses and transit agencies in the state to accept digital fares or electronic payment formats, while still allowing for cash payments.

Very Unimportant | Unimportant | Neutral | Important | Very Important

6

Sources: Iowa DOT, Survey Monkey

Figure A4.4: Public Survey pages 7 & 8



21. Improve accessibility of all transit information by applying United States Access Board ADA Accessibility Guidelines (ADAAG) to all transportation service notifications and bus route information to ensure they are easy to understand for older adults, multilingual riders, and riders with audio, visual, or cognitive impairments.

Very Unimportant | Unimportant | Neutral | Important | Very Important

22. Establish standardized data collection and reporting requirements to better understand ridership.

Very Unimportant | Unimportant | Neutral | Important | Very Important

7

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Iowa Public Transit Survey

Partnering Strategies

Partnering

By establishing partnerships with other public and private entities, we can better leverage a more diverse array of skill sets, resources, and services across a much wider area. Partnerships enable organizations to offer a much larger selection of services that would otherwise not be available. The partnership-related questions that we will ask you will help guide us as we seek opportunities to work with other organizations, which in turn results in increased services to the public.

23. Improve inter-regional bus transfers in order to support longer and more efficient trips across the state.

Very Unimportant | Unimportant | Neutral | Important | Very Important

24. Partner with companies (such as taxi's, Uber, Lyft) in order to support city bus routes and provide more transportation options.

Very Unimportant | Unimportant | Neutral | Important | Very Important

25. Improve workforce development by partnering with businesses to help employees get to work.

Very Unimportant | Unimportant | Neutral | Important | Very Important

26. Partner with non-profit organization (such as American Cancer Society, Veteran's Affairs, and hospitals) to help people get to their medical appointments on time.

Very Unimportant | Unimportant | Neutral | Important | Very Important

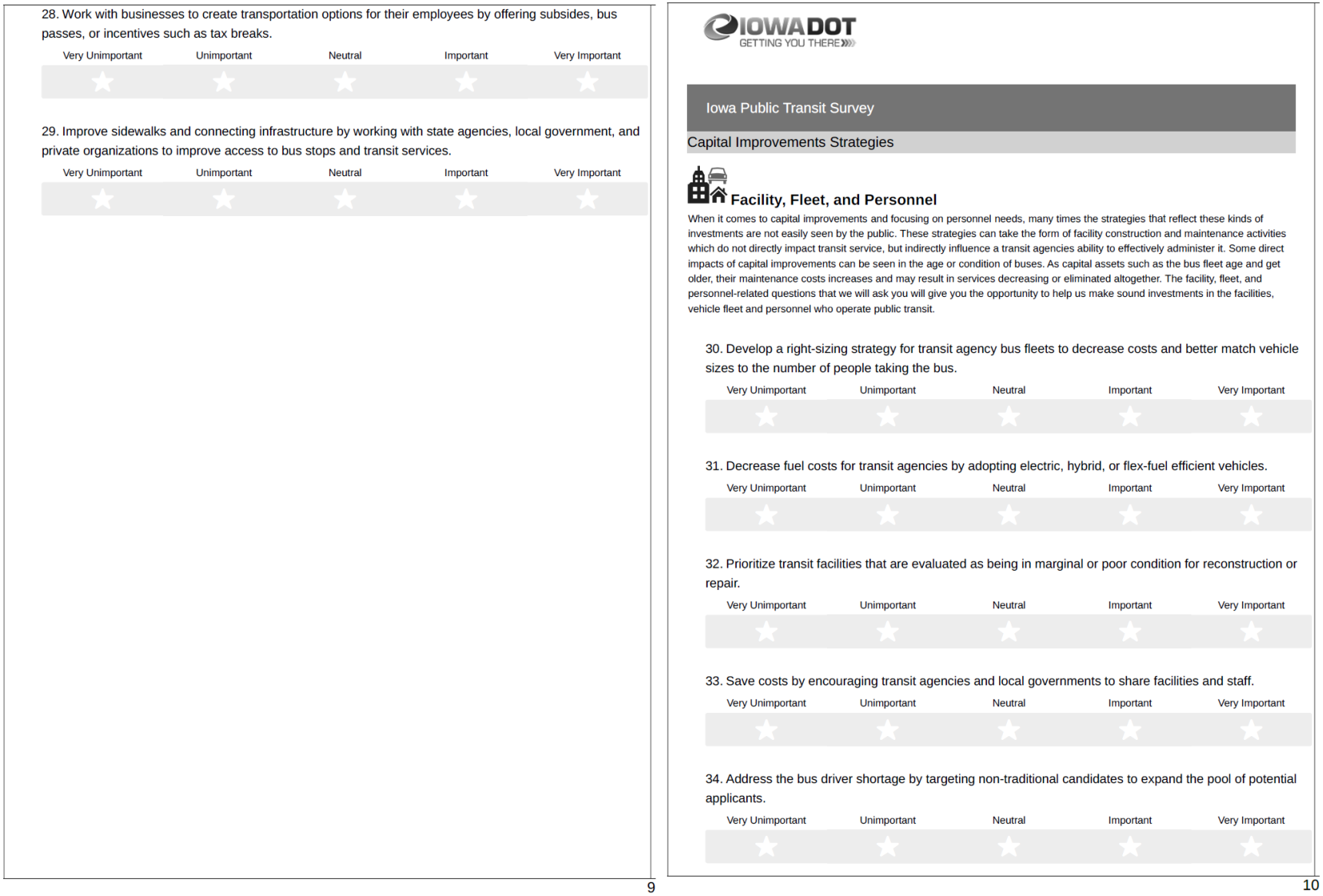
27. Partner with other government organizations to increase the number of transportation options for traveling long distances.

Very Unimportant | Unimportant | Neutral | Important | Very Important

8

Sources: Iowa DOT, Survey Monkey

Figure A4.5: Public Survey pages 9 & 10



28. Work with businesses to create transportation options for their employees by offering subsides, bus passes, or incentives such as tax breaks.

Very Unimportant | Unimportant | Neutral | Important | Very Important

29. Improve sidewalks and connecting infrastructure by working with state agencies, local government, and private organizations to improve access to bus stops and transit services.

Very Unimportant | Unimportant | Neutral | Important | Very Important

9

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Iowa Public Transit Survey

Capital Improvements Strategies

Facility, Fleet, and Personnel

When it comes to capital improvements and focusing on personnel needs, many times the strategies that reflect these kinds of investments are not easily seen by the public. These strategies can take the form of facility construction and maintenance activities which do not directly impact transit service, but indirectly influence a transit agencies ability to effectively administer it. Some direct impacts of capital improvements can be seen in the age or condition of buses. As capital assets such as the bus fleet age and get older, their maintenance costs increases and may result in services decreasing or eliminated altogether. The facility, fleet, and personnel-related questions that we will ask you will give you the opportunity to help us make sound investments in the facilities, vehicle fleet and personnel who operate public transit.

30. Develop a right-sizing strategy for transit agency bus fleets to decrease costs and better match vehicle sizes to the number of people taking the bus.

Very Unimportant | Unimportant | Neutral | Important | Very Important

31. Decrease fuel costs for transit agencies by adopting electric, hybrid, or flex-fuel efficient vehicles.

Very Unimportant | Unimportant | Neutral | Important | Very Important

32. Prioritize transit facilities that are evaluated as being in marginal or poor condition for reconstruction or repair.

Very Unimportant | Unimportant | Neutral | Important | Very Important

33. Save costs by encouraging transit agencies and local governments to share facilities and staff.

Very Unimportant | Unimportant | Neutral | Important | Very Important

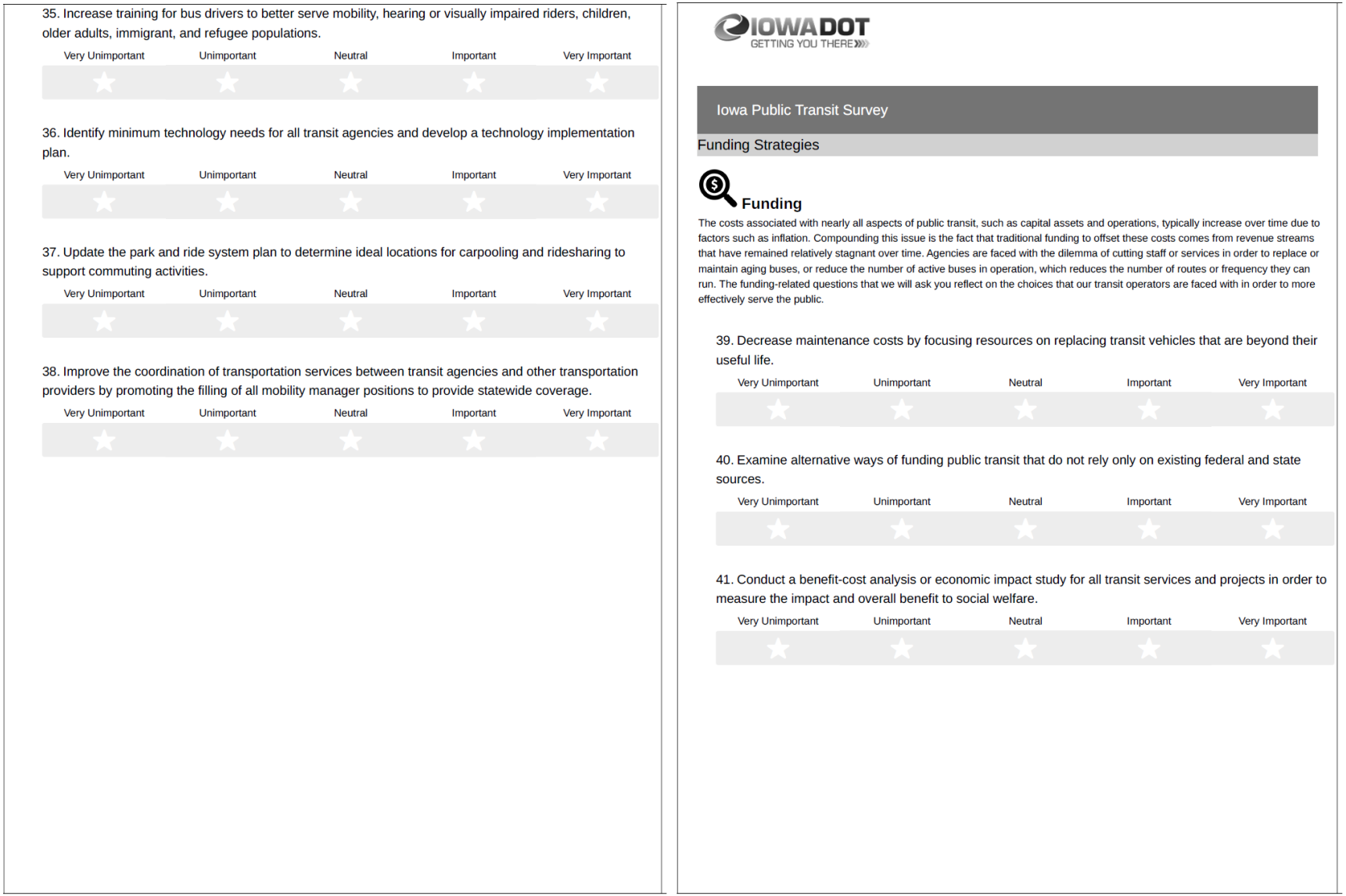
34. Address the bus driver shortage by targeting non-traditional candidates to expand the pool of potential applicants.

Very Unimportant | Unimportant | Neutral | Important | Very Important

10

Sources: Iowa DOT, Survey Monkey

Figure A4.6: Public Survey pages 11 & 12



35. Increase training for bus drivers to better serve mobility, hearing or visually impaired riders, children, older adults, immigrant, and refugee populations.

Very Unimportant | Unimportant | Neutral | Important | Very Important

36. Identify minimum technology needs for all transit agencies and develop a technology implementation plan.

Very Unimportant | Unimportant | Neutral | Important | Very Important

37. Update the park and ride system plan to determine ideal locations for carpooling and ridesharing to support commuting activities.

Very Unimportant | Unimportant | Neutral | Important | Very Important

38. Improve the coordination of transportation services between transit agencies and other transportation providers by promoting the filling of all mobility manager positions to provide statewide coverage.

Very Unimportant | Unimportant | Neutral | Important | Very Important

11

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Iowa Public Transit Survey

Funding Strategies

Funding

The costs associated with nearly all aspects of public transit, such as capital assets and operations, typically increase over time due to factors such as inflation. Compounding this issue is the fact that traditional funding to offset these costs comes from revenue streams that have remained relatively stagnant over time. Agencies are faced with the dilemma of cutting staff or services in order to replace or maintain aging buses, or reduce the number of active buses in operation, which reduces the number of routes or frequency they can run. The funding-related questions that we will ask you reflect on the choices that our transit operators are faced with in order to more effectively serve the public.

39. Decrease maintenance costs by focusing resources on replacing transit vehicles that are beyond their useful life.

Very Unimportant | Unimportant | Neutral | Important | Very Important

40. Examine alternative ways of funding public transit that do not rely only on existing federal and state sources.

Very Unimportant | Unimportant | Neutral | Important | Very Important

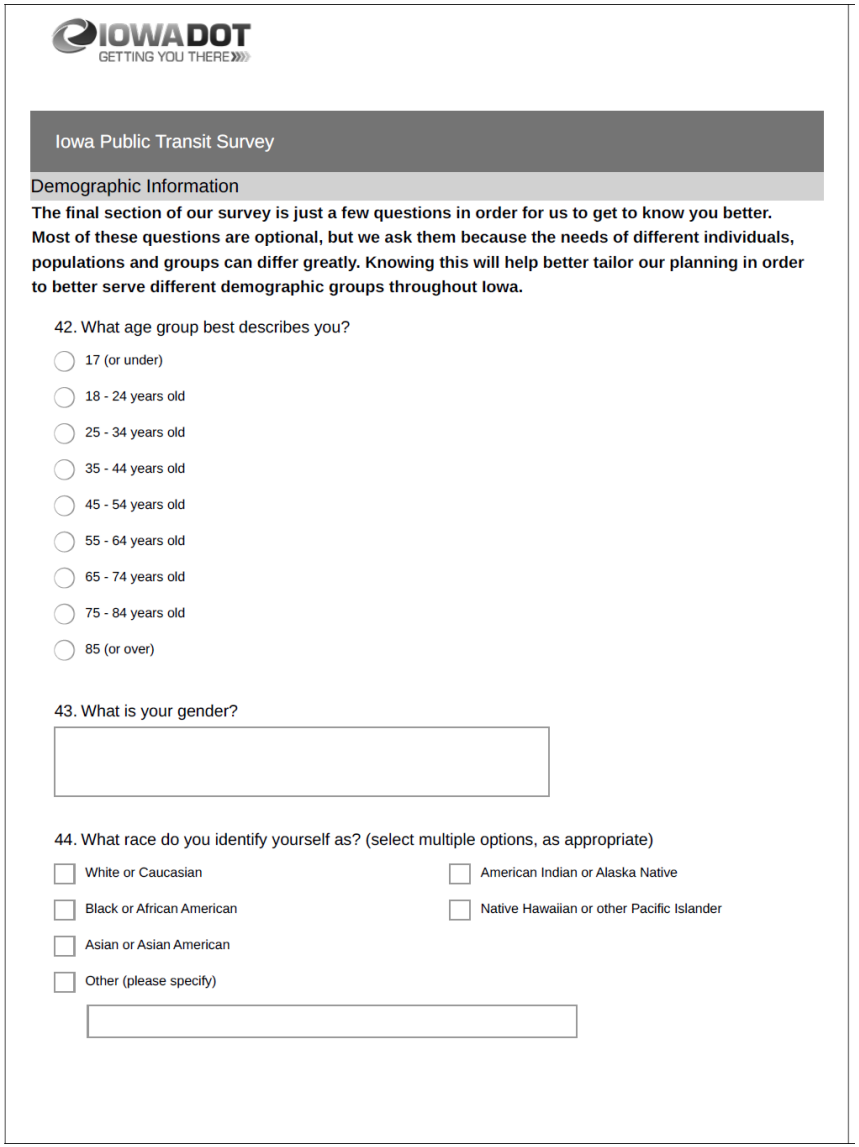
41. Conduct a benefit-cost analysis or economic impact study for all transit services and projects in order to measure the impact and overall benefit to social welfare.

Very Unimportant | Unimportant | Neutral | Important | Very Important

12

Sources: Iowa DOT, Survey Monkey

Figure A4.7: Public Survey pages 13 & 14



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Iowa Public Transit Survey

Demographic Information

The final section of our survey is just a few questions in order for us to get to know you better. Most of these questions are optional, but we ask them because the needs of different individuals, populations and groups can differ greatly. Knowing this will help better tailor our planning in order to better serve different demographic groups throughout Iowa.

42. What age group best describes you?

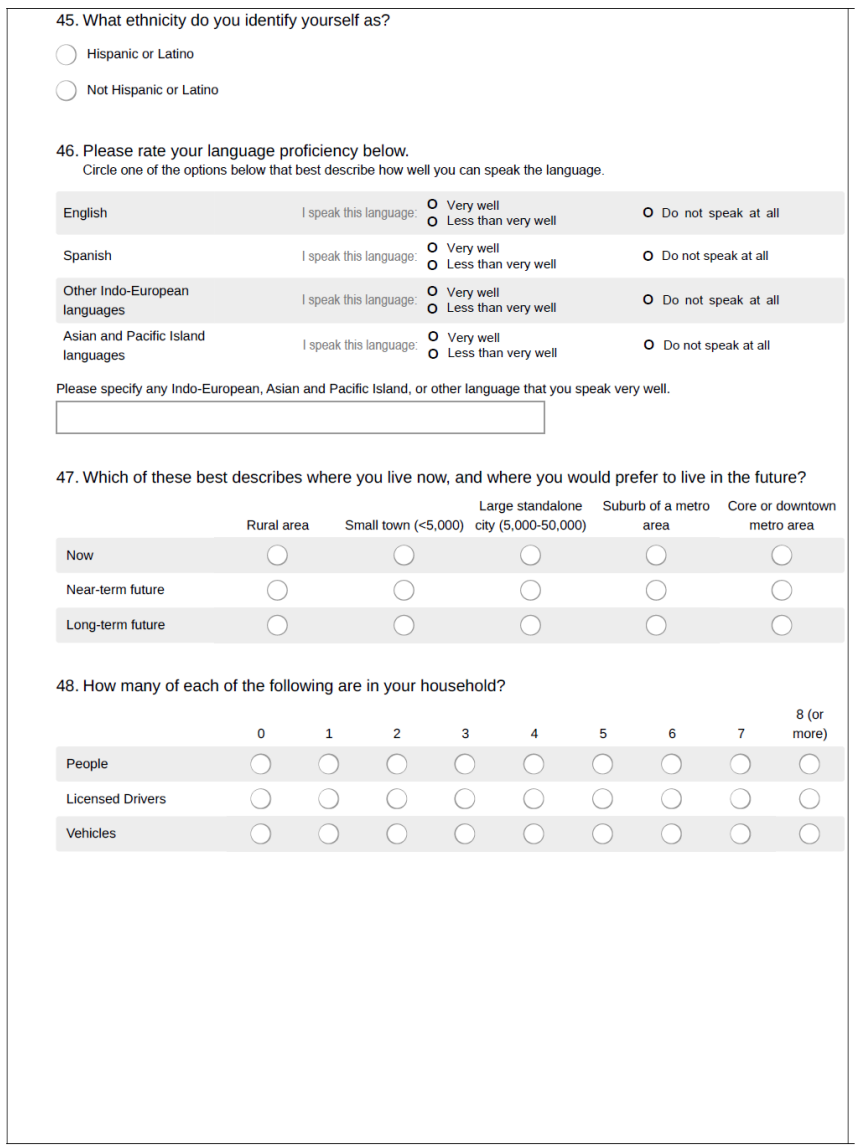
- ◯ 17 (or under)
- ◯ 18 - 24 years old
- ◯ 25 - 34 years old
- ◯ 35 - 44 years old
- ◯ 45 - 54 years old
- ◯ 55 - 64 years old
- ◯ 65 - 74 years old
- ◯ 75 - 84 years old
- ◯ 85 (or over)

43. What is your gender?

44. What race do you identify yourself as? (select multiple options, as appropriate)

- ☐ White or Caucasian
- ☐ Black or African American
- ☐ Asian or Asian American
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Other (please specify)

13



45. What ethnicity do you identify yourself as?

- ◯ Hispanic or Latino
- ◯ Not Hispanic or Latino

46. Please rate your language proficiency below.
Circle one of the options below that best describe how well you can speak the language.

English	I speak this language:	O Very well O Less than very well	O Do not speak at all
Spanish	I speak this language:	O Very well O Less than very well	O Do not speak at all
Other Indo-European languages	I speak this language:	O Very well O Less than very well	O Do not speak at all
Asian and Pacific Island languages	I speak this language:	O Very well O Less than very well	O Do not speak at all

Please specify any Indo-European, Asian and Pacific Island, or other language that you speak very well.

47. Which of these best describes where you live now, and where you would prefer to live in the future?

	Rural area	Small town (<5,000)	Large standalone city (5,000-50,000)	Suburb of a metro area	Core or downtown metro area
Now	◯	◯	◯	◯	◯
Near-term future	◯	◯	◯	◯	◯
Long-term future	◯	◯	◯	◯	◯

48. How many of each of the following are in your household?

	0	1	2	3	4	5	6	7	8 (or more)
People	◯	◯	◯	◯	◯	◯	◯	◯	◯
Licensed Drivers	◯	◯	◯	◯	◯	◯	◯	◯	◯
Vehicles	◯	◯	◯	◯	◯	◯	◯	◯	◯

14

Sources: Iowa DOT, Survey Monkey

Figure A4.8: Public Survey pages 15 & 16

49. What is your approximate annual household income?

- Less than $10,000
- $10,000 - $14,999
- $15,000 - $24,999
- $25,000 - $34,999
- $35,000 - $49,999
- $50,000 - $74,999
- $75,000 - $99,999
- $100,000 - $149,999
- $150,000 - $199,999
- $200,000 or more

50. Are you currently enrolled in college, undergraduate, graduate or professional school?

- Yes - attend mostly on-campus courses
- Yes - attend mostly online courses
- No

51. If you are employed or a student, what ZIP Code do you work or attend class in?

* 52. What is your home ZIP Code?

15

53. Please select any of the follow disability types if they apply to you or someone that is under your care.

For reference, the U.S. Census Bureau has defined disability types used in their American Community Survey as:

- Hearing difficulty: deaf or having serious difficulty hearing.
- Vision difficulty: blind or having serious difficulty seeing, even when wearing glasses.
- Cognitive difficulty: because of a physical, mental, or emotional problem, having difficulty remembering, concentrating, or making decisions.
- Ambulatory difficulty: having serious difficulty walking or climbing stairs.
- Self-care difficulty: having difficulty bathing or dressing.
- Independent living difficulty: because of a physical, mental, or emotional problem, having difficulty doing errands alone such as visiting a doctor's office or shopping.

- [ ] Hearing difficulty
- [ ] Vision difficulty
- [ ] Cognitive difficulty
- [ ] Ambulatory difficulty
- [ ] Self-care difficulty
- [ ] Independent living difficulty
- [ ] None of these options apply to me

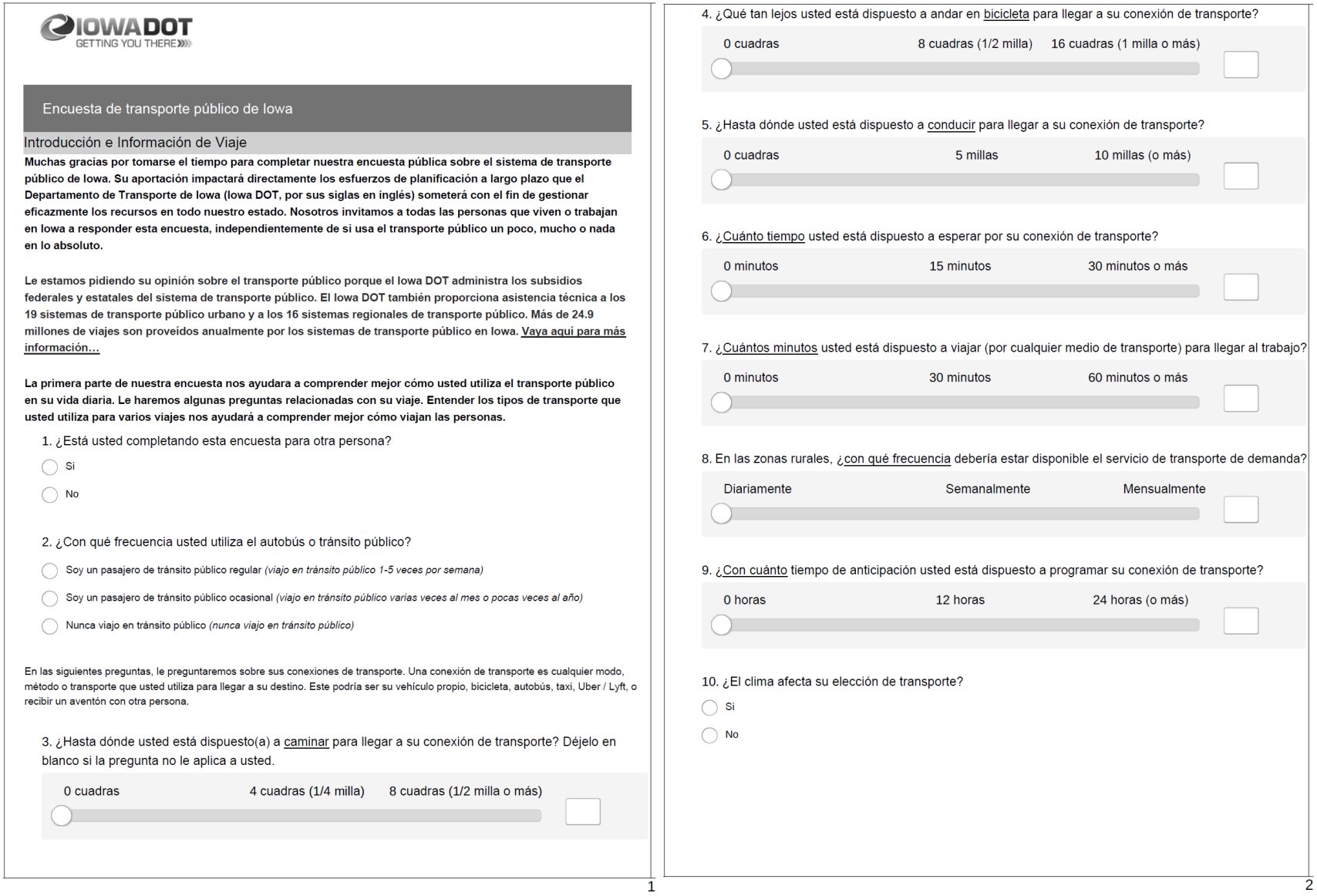
Please send completed surveys to joseph.drahos@iowadot.us or our physical mailing address at :

Joe Drahos
Systems Planning Bureau
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

16

Sources: Iowa DOT, Survey Monkey

Figure A4.9: Public Survey pages 1 & 2 (Spanish)



IOWADOT
GETTING YOU THERE

Encuesta de transporte público de Iowa

Introducción e Información de Viaje

Muchas gracias por tomarse el tiempo para completar nuestra encuesta pública sobre el sistema de transporte público de Iowa. Su aportación impactará directamente los esfuerzos de planificación a largo plazo que el Departamento de Transporte de Iowa (Iowa DOT, por sus siglas en inglés) someterá con el fin de gestionar eficazmente los recursos en todo nuestro estado. Nosotros invitamos a todas las personas que viven o trabajan en Iowa a responder esta encuesta, independientemente de si usa el transporte público un poco, mucho o nada en lo absoluto.

Le estamos pidiendo su opinión sobre el transporte público porque el Iowa DOT administra los subsidios federales y estatales del sistema de transporte público. El Iowa DOT también proporciona asistencia técnica a los 19 sistemas de transporte público urbano y a los 16 sistemas regionales de transporte público. Más de 24.9 millones de viajes son proveídos anualmente por los sistemas de transporte público en Iowa. Vaya aquí para más información…

La primera parte de nuestra encuesta nos ayudara a comprender mejor cómo usted utiliza el transporte público en su vida diaria. Le haremos algunas preguntas relacionadas con su viaje. Entender los tipos de transporte que usted utiliza para varios viajes nos ayudará a comprender mejor cómo viajan las personas.

1. ¿Está usted completando esta encuesta para otra persona?
   - Si
   - No

2. ¿Con qué frecuencia usted utiliza el autobús o tránsito público?
   - Soy un pasajero de tránsito público regular *(viajo en tránsito público 1-5 veces por semana)*
   - Soy un pasajero de tránsito público ocasional *(viajo en tránsito público varias veces al mes o pocas veces al año)*
   - Nunca viajo en tránsito público *(nunca viajo en tránsito público)*

En las siguientes preguntas, le preguntaremos sobre sus conexiones de transporte. Una conexión de transporte es cualquier modo, método o transporte que usted utiliza para llegar a su destino. Este podría ser su vehículo propio, bicicleta, autobús, taxi, Uber / Lyft, o recibir un aventón con otra persona.

3. ¿Hasta dónde usted está dispuesto(a) a caminar para llegar a su conexión de transporte? Déjelo en blanco si la pregunta no le aplica a usted.

0 cuadras | 4 cuadras (1/4 milla) | 8 cuadras (1/2 milla o más)

1

4. ¿Qué tan lejos usted está dispuesto a andar en bicicleta para llegar a su conexión de transporte?

0 cuadras | 8 cuadras (1/2 milla) | 16 cuadras (1 milla o más)

5. ¿Hasta dónde usted está dispuesto a conducir para llegar a su conexión de transporte?

0 cuadras | 5 millas | 10 millas (o más)

6. ¿Cuánto tiempo usted está dispuesto a esperar por su conexión de transporte?

0 minutos | 15 minutos | 30 minutos o más

7. ¿Cuántos minutos usted está dispuesto a viajar (por cualquier medio de transporte) para llegar al trabajo?

0 minutos | 30 minutos | 60 minutos o más

8. En las zonas rurales, ¿con qué frecuencia debería estar disponible el servicio de transporte de demanda?

Diariamente | Semanalmente | Mensualmente

9. ¿Con cuánto tiempo de anticipación usted está dispuesto a programar su conexión de transporte?

0 horas | 12 horas | 24 horas (o más)

10. ¿El clima afecta su elección de transporte?
    - Si
    - No

2

Sources: Iowa DOT, Survey Monkey

Figure A4.10: Public Survey pages 3 & 4 (Spanish)

11. ¿Utiliza usted alguno de los siguientes tipos de transporte para estos propósitos de viaje? Deje la selección en blanco si nunca usa un modo para un propósito de viaje en particular.

	Autobús	Caminar	Bicicleta	Vehículo propio	Vehículo compartido	Scooter eléctrico
Para ir al trabajo	☐	☐	☐	☐	☐	☐
Para ir de compras	☐	☐	☐	☐	☐	☐
Para ir de entretenimiento o recreación	☐	☐	☐	☐	☐	☐
Para ir a la escuela	☐	☐	☐	☐	☐	☐
Para ir a citas medicas	☐	☐	☐	☐	☐	☐

Otro (por favor especificar)

12. ¿Hay algún tipo de transporte que usted no usa actualmente, pero que le gustaría usar para estos propósitos de viaje?

	Autobús	Caminar	Bicicleta	Vehículo propio	Vehículo compartido	Scooter eléctrico
Para ir al trabajo	☐	☐	☐	☐	☐	☐
Para ir de compras	☐	☐	☐	☐	☐	☐
Para ir de entretenimiento o recreación	☐	☐	☐	☐	☐	☐
Para ir a la escuela	☐	☐	☐	☐	☐	☐
Para ir a citas medicas	☐	☐	☐	☐	☐	☐

Otro (por favor especificar)

3

13. Si usted no utiliza ningún tipo de transporte en particular, ¿Cuáles de los siguientes elementos es parte de la razón?

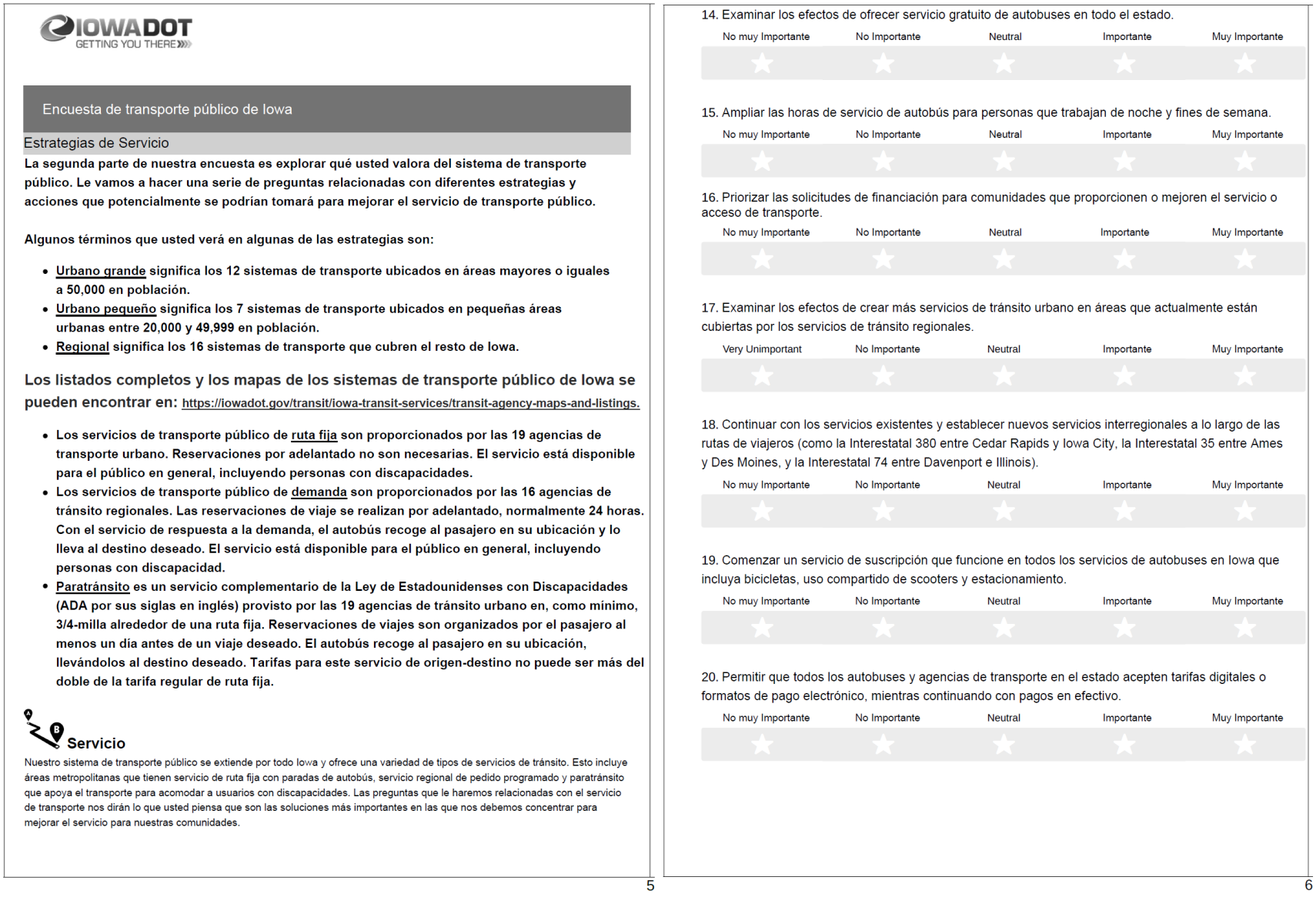
	Autobús	Caminar	Bicicleta	Vehículo propio	Vehículo compartido	Scooter eléctrico
Demasiado caro	☐	☐	☐	☐	☐	☐
Razón médica o de salud	☐	☐	☐	☐	☐	☐
No disponible en mi área	☐	☐	☐	☐	☐	☐
Demasiado inconveniente	☐	☐	☐	☐	☐	☐
No me lleva donde tengo que ir	☐	☐	☐	☐	☐	☐
No tengo tiempo	☐	☐	☐	☐	☐	☐
Falta de seguridad	☐	☐	☐	☐	☐	☐
No me gusta ese transporte	☐	☐	☐	☐	☐	☐

Otro (por favor especificar)

4

Sources: Iowa DOT, Survey Monkey

Figure A4.11: Public Survey pages 5 & 6 (Spanish)



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Encuesta de transporte público de Iowa

Estrategias de Servicio

La segunda parte de nuestra encuesta es explorar qué usted valora del sistema de transporte público. Le vamos a hacer una serie de preguntas relacionadas con diferentes estrategias y acciones que potencialmente se podrían tomará para mejorar el servicio de transporte público.

Algunos términos que usted verá en algunas de las estrategias son:

- **Urbano grande significa los 12 sistemas de transporte ubicados en áreas mayores o iguales a 50,000 en población.**
- **Urbano pequeño significa los 7 sistemas de transporte ubicados en pequeñas áreas urbanas entre 20,000 y 49,999 en población.**
- **Regional significa los 16 sistemas de transporte que cubren el resto de Iowa.**

Los listados completos y los mapas de los sistemas de transporte público de Iowa se pueden encontrar en: https://iowadot.gov/transit/iowa-transit-services/transit-agency-maps-and-listings.

- **Los servicios de transporte público de ruta fija son proporcionados por las 19 agencias de transporte urbano. Reservaciones por adelantado no son necesarias. El servicio está disponible para el público en general, incluyendo personas con discapacidades.**
- **Los servicios de transporte público de demanda son proporcionados por las 16 agencias de tránsito regionales. Las reservaciones de viaje se realizan por adelantado, normalmente 24 horas. Con el servicio de respuesta a la demanda, el autobús recoge al pasajero en su ubicación y lo lleva al destino deseado. El servicio está disponible para el público en general, incluyendo personas con discapacidad.**
- **Paratránsito es un servicio complementario de la Ley de Estadounidenses con Discapacidades (ADA por sus siglas en inglés) provisto por las 19 agencias de tránsito urbano en, como mínimo, 3/4-milla alrededor de una ruta fija. Reservaciones de viajes son organizados por el pasajero al menos un día antes de un viaje deseado. El autobús recoge al pasajero en su ubicación, llevándolos al destino deseado. Tarifas para este servicio de origen-destino no puede ser más del doble de la tarifa regular de ruta fija.**

Servicio

Nuestro sistema de transporte público se extiende por todo Iowa y ofrece una variedad de tipos de servicios de tránsito. Esto incluye áreas metropolitanas que tienen servicio de ruta fija con paradas de autobús, servicio regional de pedido programado y paratránsito que apoya el transporte para acomodar a usuarios con discapacidades. Las preguntas que le haremos relacionadas con el servicio de transporte nos dirán lo que usted piensa que son las soluciones más importantes en las que nos debemos concentrar para mejorar el servicio para nuestras comunidades.

5

14. Examinar los efectos de ofrecer servicio gratuito de autobuses en todo el estado.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

15. Ampliar las horas de servicio de autobús para personas que trabajan de noche y fines de semana.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

16. Priorizar las solicitudes de financiación para comunidades que proporcionen o mejoren el servicio o acceso de transporte.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

17. Examinar los efectos de crear más servicios de tránsito urbano en áreas que actualmente están cubiertas por los servicios de tránsito regionales.

Very Unimportant | No Importante | Neutral | Importante | Muy Importante

18. Continuar con los servicios existentes y establecer nuevos servicios interregionales a lo largo de las rutas de viajeros (como la Interestatal 380 entre Cedar Rapids y Iowa City, la Interestatal 35 entre Ames y Des Moines, y la Interestatal 74 entre Davenport e Illinois).

No muy Importante | No Importante | Neutral | Importante | Muy Importante

19. Comenzar un servicio de suscripción que funcione en todos los servicios de autobuses en Iowa que incluya bicicletas, uso compartido de scooters y estacionamiento.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

20. Permitir que todos los autobuses y agencias de transporte en el estado acepten tarifas digitales o formatos de pago electrónico, mientras continuando con pagos en efectivo.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

6

Sources: Iowa DOT, Survey Monkey

Figure A4.12: Public Survey pages 7 & 8 (Spanish)

21. Mejorar el acceso de toda la información de transporte aplicando las Directrices y Estándares de Accesibilidad del Consejo de Acceso de los Estados Unidos (ADAAG por sus siglas en inglés) a todas las notificaciones de servicio de transporte e información de ruta de autobús para garantizar que sean fáciles de entender para adultos mayores de edad, pasajeros multilingües y pasajeros con impedimentos de audio, visual o cognitivo.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

22. Establezca requisitos estandarizados de recopilación de datos e informes para entender mejor la cantidad de pasajeros.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

7

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Estrategias de Asociación

Asociación

Al establecer asociaciones con otras entidades públicas y privadas, podemos alcanzar una gama más diversa de habilidades, recursos, y servicios a través un área mucho más amplia. Las asociaciones les permiten a las organizaciones ofrecer una selección mucho más amplia de servicios que de lo contrario no estarían disponibles. Las preguntas que le haremos están relacionadas con las estrategias de asociación que le ayudarán a guiarnos mientras buscamos oportunidades para trabajar con otras organizaciones, lo que a su vez resulta en un aumento de los servicios al público.

23. Mejorar los traslados interregionales de autobuses para apoyar viajes más largos y más eficientes en todo el estado.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

24. Asociarse con compañías (como taxis, Uber, Lyft) para apoyar las rutas de autobuses urbanos y proporcionar más opciones de transporte.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

25. Mejorar el desarrollo de la fuerza laboral asociándose con empresas para ayudar a los empleados llegar al trabajo.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

26. Asociarse con organizaciones sin fines de lucro (como la Sociedad Estadounidense del Cáncer, Asuntos de Veteranos y Hospitales) para ayudar a las personas a llegar a sus citas médicas a tiempo.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

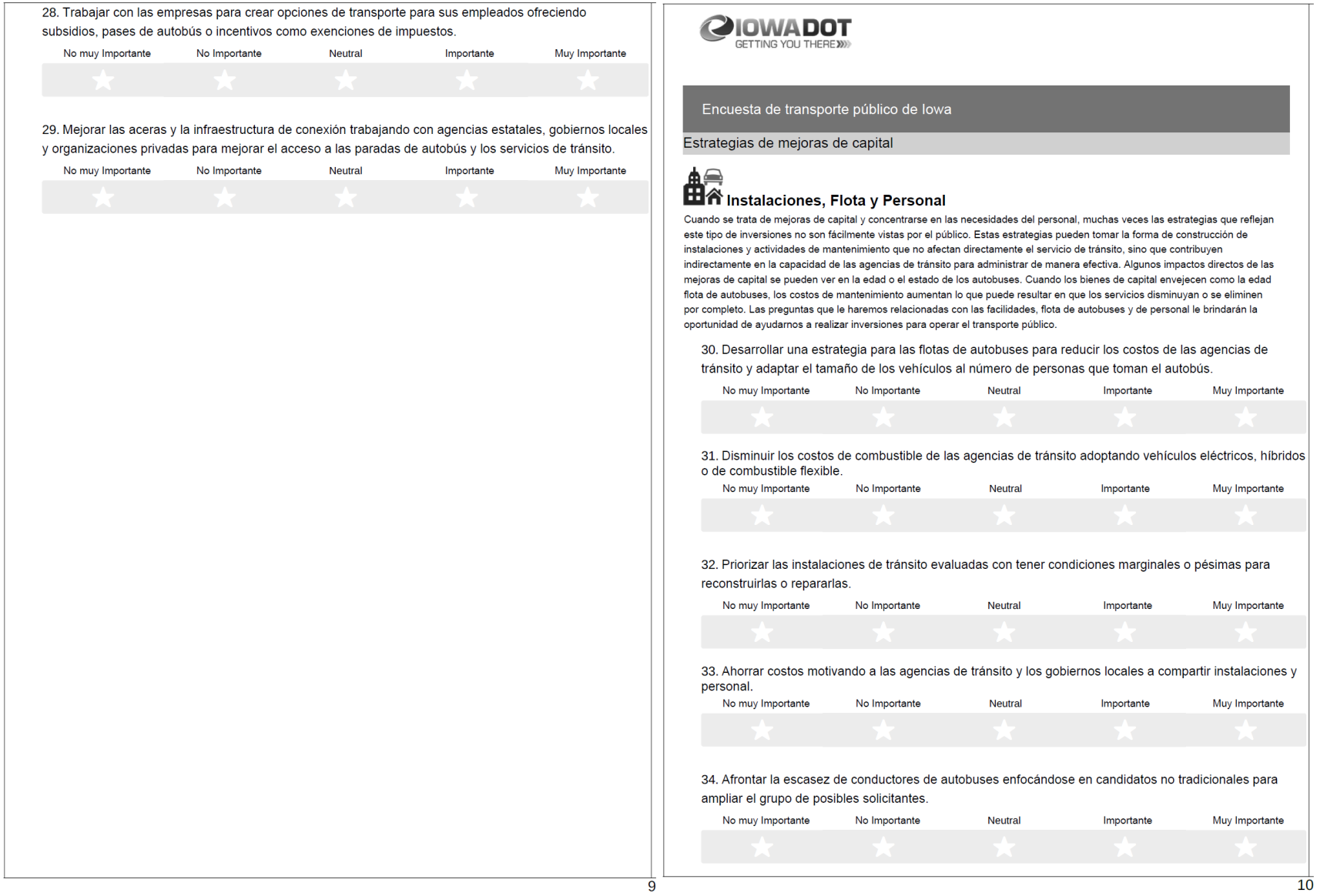
27. Asociarse con otras organizaciones gubernamentales para aumentar la cantidad de opciones de transporte para viajar largas distancias.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

8

Sources: Iowa DOT, Survey Monkey

Figure A4.13: Public Survey pages 9 & 10 (Spanish)



28. Trabajar con las empresas para crear opciones de transporte para sus empleados ofreciendo subsidios, pases de autobús o incentivos como exenciones de impuestos.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

29. Mejorar las aceras y la infraestructura de conexión trabajando con agencias estatales, gobiernos locales y organizaciones privadas para mejorar el acceso a las paradas de autobús y los servicios de tránsito.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

9

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Encuesta de transporte público de Iowa

Estrategias de mejoras de capital

Instalaciones, Flota y Personal

Cuando se trata de mejoras de capital y concentrarse en las necesidades del personal, muchas veces las estrategias que reflejan este tipo de inversiones no son fácilmente vistas por el público. Estas estrategias pueden tomar la forma de construcción de instalaciones y actividades de mantenimiento que no afectan directamente el servicio de tránsito, sino que contribuyen indirectamente en la capacidad de las agencias de tránsito para administrar de manera efectiva. Algunos impactos directos de las mejoras de capital se pueden ver en la edad o el estado de los autobuses. Cuando los bienes de capital envejecen como la edad flota de autobuses, los costos de mantenimiento aumentan lo que puede resultar en que los servicios disminuyan o se eliminen por completo. Las preguntas que le haremos relacionadas con las facilidades, flota de autobuses y de personal le brindarán la oportunidad de ayudarnos a realizar inversiones para operar el transporte público.

30. Desarrollar una estrategia para las flotas de autobuses para reducir los costos de las agencias de tránsito y adaptar el tamaño de los vehículos al número de personas que toman el autobús.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

31. Disminuir los costos de combustible de las agencias de tránsito adoptando vehículos eléctricos, híbridos o de combustible flexible.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

32. Priorizar las instalaciones de tránsito evaluadas con tener condiciones marginales o pésimas para reconstruirlas o repararlas.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

33. Ahorrar costos motivando a las agencias de tránsito y los gobiernos locales a compartir instalaciones y personal.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

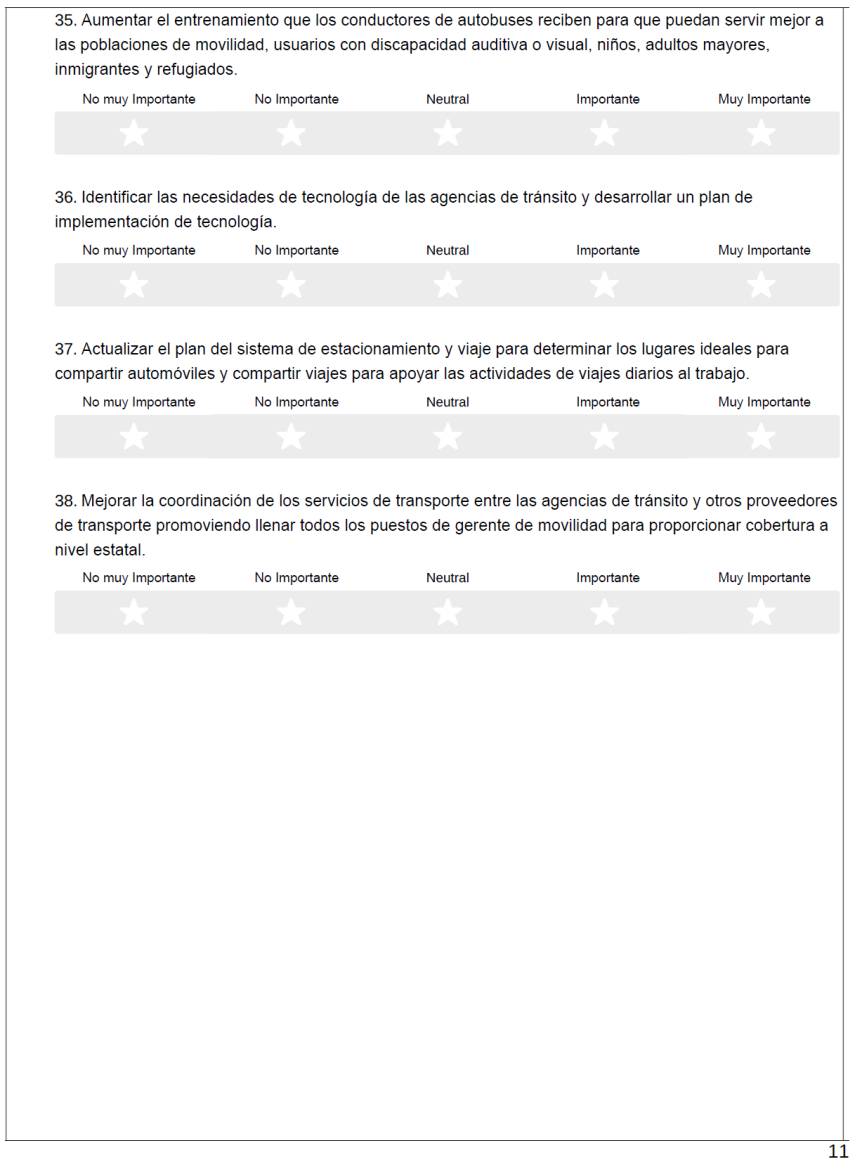
34. Afrontar la escasez de conductores de autobuses enfocándose en candidatos no tradicionales para ampliar el grupo de posibles solicitantes.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

10

Sources: Iowa DOT, Survey Monkey

Figure A4.14: Public Survey pages 11 & 12 (Spanish)



35. Aumentar el entrenamiento que los conductores de autobuses reciben para que puedan servir mejor a las poblaciones de movilidad, usuarios con discapacidad auditiva o visual, niños, adultos mayores, inmigrantes y refugiados.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

36. Identificar las necesidades de tecnología de las agencias de tránsito y desarrollar un plan de implementación de tecnología.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

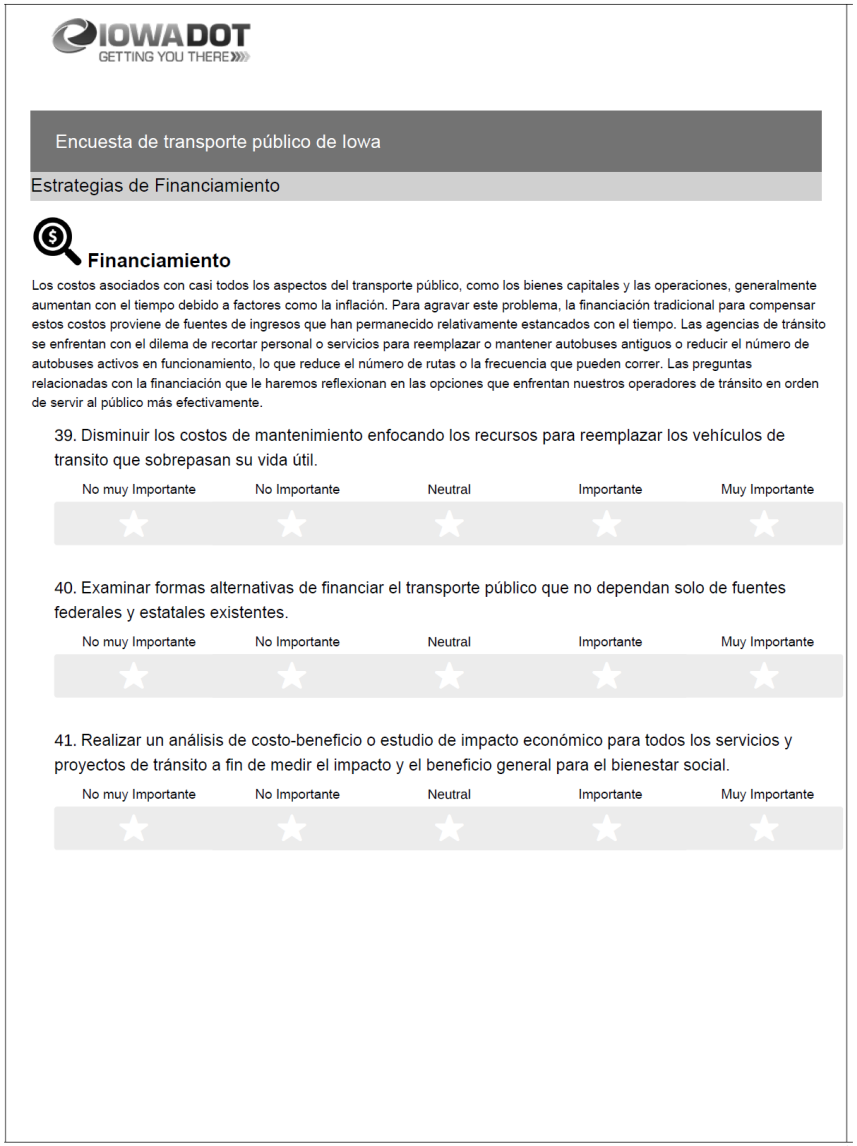
37. Actualizar el plan del sistema de estacionamiento y viaje para determinar los lugares ideales para compartir automóviles y compartir viajes para apoyar las actividades de viajes diarios al trabajo.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

38. Mejorar la coordinación de los servicios de transporte entre las agencias de tránsito y otros proveedores de transporte promoviendo llenar todos los puestos de gerente de movilidad para proporcionar cobertura a nivel estatal.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

11



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Encuesta de transporte público de Iowa

Estrategias de Financiamiento

Financiamiento

Los costos asociados con casi todos los aspectos del transporte público, como los bienes capitales y las operaciones, generalmente aumentan con el tiempo debido a factores como la inflación. Para agravar este problema, la financiación tradicional para compensar estos costos proviene de fuentes de ingresos que han permanecido relativamente estancados con el tiempo. Las agencias de tránsito se enfrentan con el dilema de recortar personal o servicios para reemplazar o mantener autobuses antiguos o reducir el número de autobuses activos en funcionamiento, lo que reduce el número de rutas o la frecuencia que pueden correr. Las preguntas relacionadas con la financiación que le haremos reflexionan en las opciones que enfrentan nuestros operadores de tránsito en orden de servir al público más efectivamente.

39. Disminuir los costos de mantenimiento enfocando los recursos para reemplazar los vehículos de transito que sobrepasan su vida útil.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

40. Examinar formas alternativas de financiar el transporte público que no dependan solo de fuentes federales y estatales existentes.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

41. Realizar un análisis de costo-beneficio o estudio de impacto económico para todos los servicios y proyectos de tránsito a fin de medir el impacto y el beneficio general para el bienestar social.

No muy Importante | No Importante | Neutral | Importante | Muy Importante

12

Sources: Iowa DOT, Survey Monkey

Figure A4.15: Public Survey pages 13 & 14 (Spanish)

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Encuesta de transporte público de Iowa

Información Demográfica

La sección final de nuestra encuesta son solo algunas preguntas para que podamos conocerte mejor. La mayoría de estas preguntas son opcionales, pero las hacemos porque las necesidades de diferentes personas, poblaciones y grupos pueden diferir mucho. Saber esto ayudará a adaptar mejor nuestra planificación para para servir mejor a diferentes grupos demográficos en todo Iowa.

42. ¿Qué grupo de edad le describe mejor?

- 17 años (o menor)
- 18 - 24 años de edad
- 25 - 34 años de edad
- 35 - 44 años de edad
- 45 - 54 años de edad
- 55 - 64 años de edad
- 65 - 74 años de edad
- 75 - 84 años de edad
- 85 años (o mayor)

43. ¿Cuál es tu género?

44. ¿Con qué raza usted se identifica? (seleccione varias opciones, según corresponda)

- Blanco o caucásico
- Negro o afroamericano
- Asiático o asiático americano
- Otro (Por favor especifique)
- Indio Americano o Nativo de Alaska
- Nativo de Hawaii u otra isla del Pacífico

13

45. ¿Con qué etnicidad usted se identifica?

- Hispano o Latino
- No Hispano o Latino

46. Por favor califique su habilidad de idiomas a continuación

Circule una de las opciones que mejor describan qué tan bien puede hablar ese idioma.

Inglés	Hablo este idioma:	Muy bien / No muy bien	No hablo este idioma en absoluto
Español	Hablo este idioma:	Muy bien / No muy bien	No hablo este idioma en absoluto
Otros idiomas indoeuropeos	Hablo este idioma:	Muy bien / No muy bien	No hablo este idioma en absoluto
Idiomas de Asia e islas del Pacífico	Hablo este idioma:	Muy bien / No muy bien	No hablo este idioma en absoluto

Por favor especifique que idiomas indoeuropeos, idiomas de Asia e islas del Pacífico, u otro idioma que usted hable bien.

47. ¿Cuál de estos describe mejor dónde usted vive ahora y dónde usted preferiría vivir en el futuro?

	Area rural	Pueblo pequeño (<5,000)	Cuidad grande independiente (5,000-50,000)	Suburbio de área metro	Centro urbano
Actualmente					
Corto plazo en el futuro					
Largo plazo en el futuro					

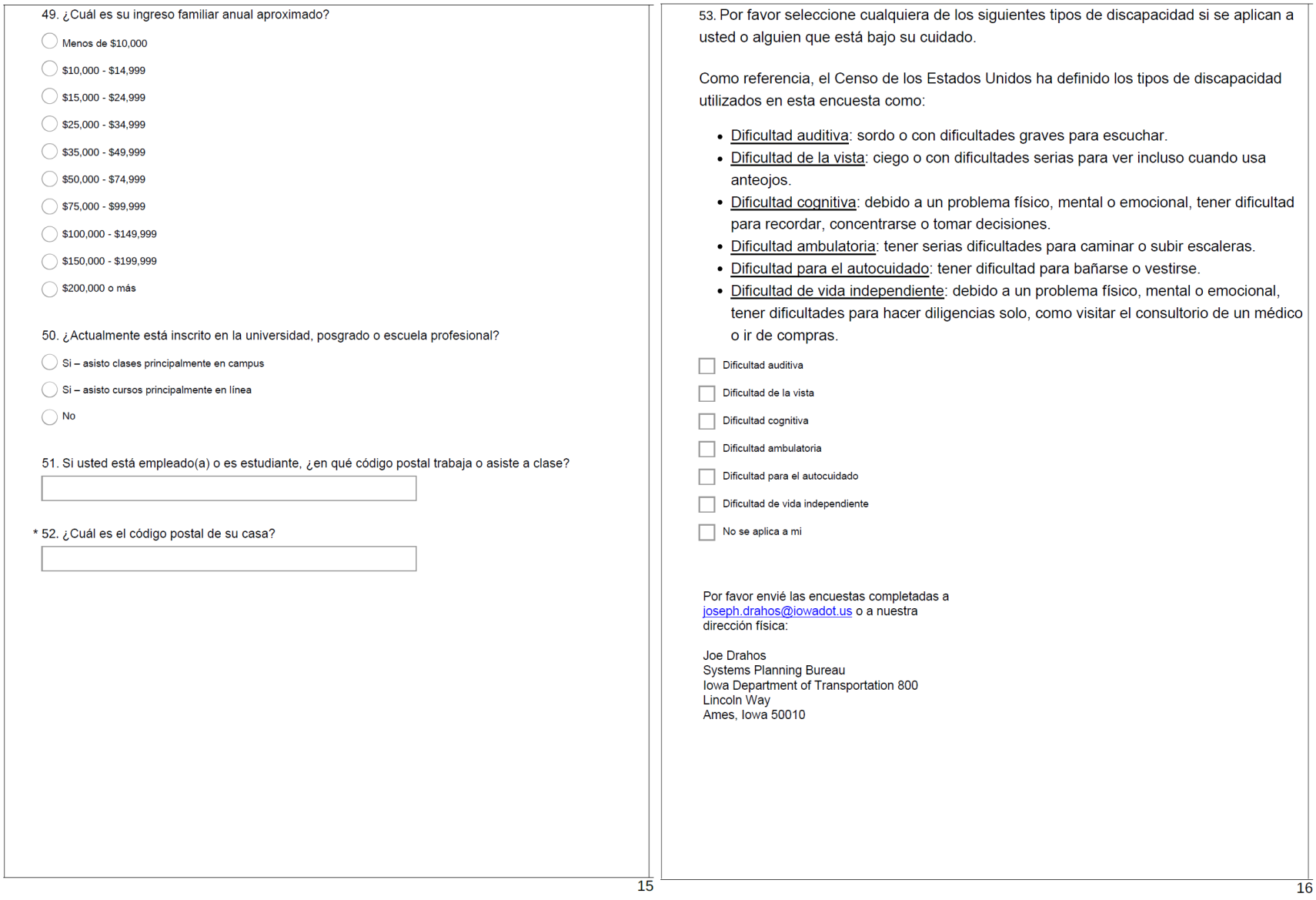
48. ¿Cuántos de cada uno de los siguientes están en su hogar?

	0	1	2	3	4	5	6	7	8 (o más)
Personas									
Conductores autorizados con licencia									
Vehículos									

14

Sources: Iowa DOT, Survey Monkey

Figure A4.16: Public Survey pages 15 & 16 (Spanish)



49. ¿Cuál es su ingreso familiar anual aproximado?

- Menos de $10,000
- $10,000 - $14,999
- $15,000 - $24,999
- $25,000 - $34,999
- $35,000 - $49,999
- $50,000 - $74,999
- $75,000 - $99,999
- $100,000 - $149,999
- $150,000 - $199,999
- $200,000 o más

50. ¿Actualmente está inscrito en la universidad, posgrado o escuela profesional?

- Si – asisto clases principalmente en campus
- Si – asisto cursos principalmente en línea
- No

51. Si usted está empleado(a) o es estudiante, ¿en qué código postal trabaja o asiste a clase?

* 52. ¿Cuál es el código postal de su casa?

15

53. Por favor seleccione cualquiera de los siguientes tipos de discapacidad si se aplican a usted o alguien que está bajo su cuidado.

Como referencia, el Censo de los Estados Unidos ha definido los tipos de discapacidad utilizados en esta encuesta como:

- Dificultad auditiva: sordo o con dificultades graves para escuchar.
- Dificultad de la vista: ciego o con dificultades serias para ver incluso cuando usa anteojos.
- Dificultad cognitiva: debido a un problema físico, mental o emocional, tener dificultad para recordar, concentrarse o tomar decisiones.
- Dificultad ambulatoria: tener serias dificultades para caminar o subir escaleras.
- Dificultad para el autocuidado: tener dificultad para bañarse o vestirse.
- Dificultad de vida independiente: debido a un problema físico, mental o emocional, tener dificultades para hacer diligencias solo, como visitar el consultorio de un médico o ir de compras.

- [ ] Dificultad auditiva
- [ ] Dificultad de la vista
- [ ] Dificultad cognitiva
- [ ] Dificultad ambulatoria
- [ ] Dificultad para el autocuidado
- [ ] Dificultad de vida independiente
- [ ] No se aplica a mi

Por favor envié las encuestas completadas a joseph.drahos@iowadot.us o a nuestra dirección física:

Joe Drahos
Systems Planning Bureau
Iowa Department of Transportation 800
Lincoln Way
Ames, Iowa 50010

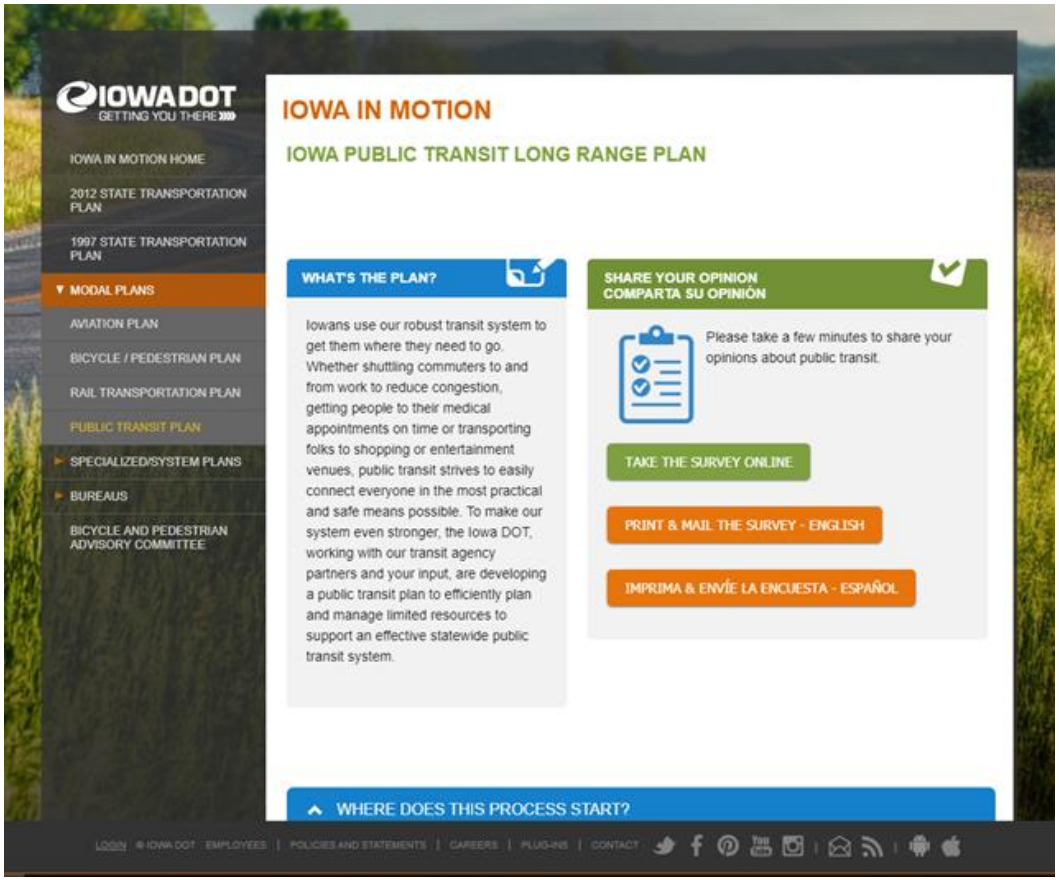
16

Sources: Iowa DOT, Survey Monkey

Marketing and Outreach

In order to maintain a consistent message across multiple stakeholder groups using a variety of communications channels, it was decided to host a link to the public survey on the transit plan development web page at https://iowadot.gov/iowainmotion/Modal-Plans/Public-Transit-Plan, which served as the centrally located one-stop location for this information. This also ensured that additional plan-related information was readily accessible to survey respondents who may wish to learn more about the planning effort.

Figure A4.17: Plan webpage with public survey links



Source: Iowa DOT

The transit plan working group coordinated with the DOT's Strategic Communications team to create graphics and products to support the outreach efforts of the public survey. Initially, a banner for the Public Transit Bureau webpage was developed, as shown in Figure A4.18.

Figure A4.18: Public Survey banner

Source: Iowa DOT

The biggest challenge of any public survey effort is making people aware of the survey in the first place. The working group utilized the DOT's public notice services such as digital press releases, which are distributed to anyone from the public that has signed up to automatically receive email notifications of transportation-related announcements. While this facilitated efficient communication with people that are actively following DOT events, it still does not come close to reaching the wide variety of transit riders and non-riders across Iowa. The DOT also leveraged its Instagram, Facebook, and Twitter accounts to share information on the public survey to an even wider audience with the hopes of encouraging participation.

The Iowa League of Cities and Iowa State Association of Counties also helped broaden the survey's distribution in order to reach those communities and constituents. The transit plan stakeholder members and organizations further helped by spreading word through their diverse range of channels and contacts. Those stakeholders included AARP, American Cancer Society, University Centers for Excellence in Developmental Disabilities (from University of Iowa), Veteran's Affairs, Iowa State University – Extension and Outreach, and Department

of Public Health. The Public Transit Bureau also reached out through the Mobility Manager Network and Iowa Transportation Coordination Council to extend the survey's reach even further. The latter organization (ITCC) has membership which includes the Iowa Department of Public Health, Metropolitan Planning Organizations, Regional Planning Affiliations, the Epilepsy Foundation, and the Iowa Department on Aging, among other non-transportation or transit related groups.

Public transit agencies from across the state were also mobilized to help spread the word of this survey effort to its riders. Iowa DOT created a double-sided hardcopy flyer in English/Spanish that could be posted on buses, bus stops, etc. to help make riders aware of the public survey effort which used a modified version of the banner in Figure A4.18 plus additional graphics generated by the Strategic Communications team to be utilized in a promotional flyer. This flyer, printed front and back with English and Spanish-translated content, was shared with the public transit agencies and transit stakeholder groups in order to encourage users and non-users of the transit system to provide feedback through the public survey. The format for the flyer began with online research, leveraging previous examples developed by organizations such as the Vermont Agency of Transportation.[3] Figure A4.19 shows the flyer with the front page depicting English and back page depicting Spanish.

[3] Vermont Agency of Transportation, "Public Transit Regional Forum", October 22, 2018, https://stagecoach-rides.org/public-transit-regional-forum/

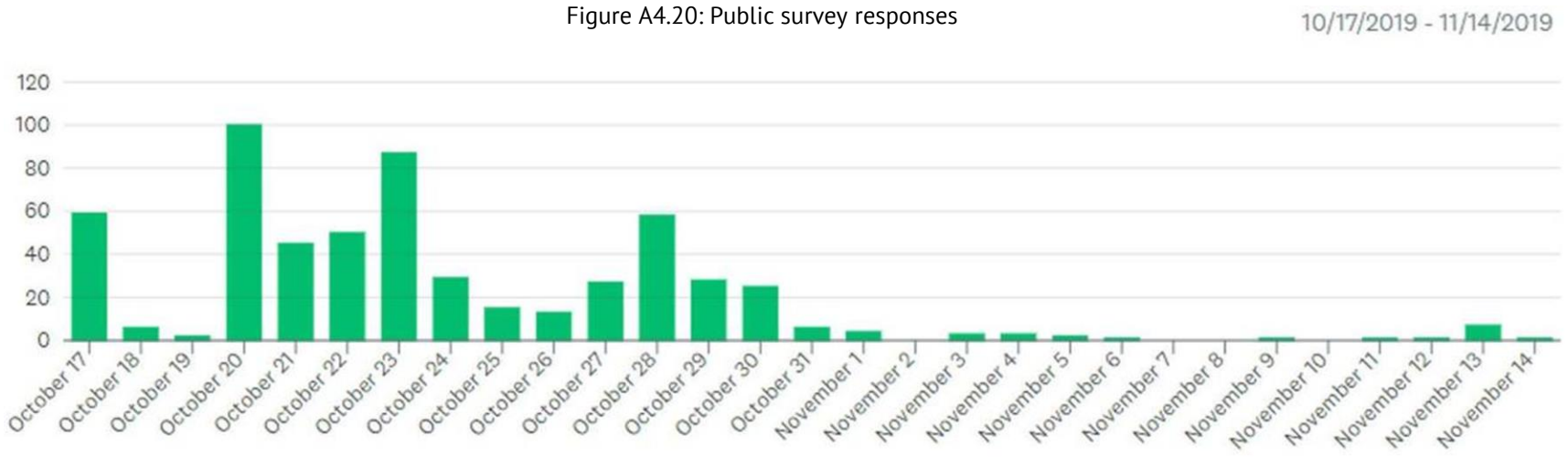
Figure A4.19: Public Survey Flyer pages 1 (English) & 2 (Spanish)

Source: Iowa DOT

Results

The survey was initially made available Thursday afternoon on October 17th. Throughout the 2-week duration, Iowa DOT communications staff sent out periodic reminders through social media channels which resulted in spikes in the number of responses; however those became less and less impactful over time, with fewer surges in responses after subsequent reminders. The official closing date of the survey was Friday, November 1st although the survey was kept open and the link on the transit plan webpage was live for another week. By November 7th, the survey link was removed from the webpage by the communications staff but the survey itself was kept live a little longer in case anyone still was in the process of submitting responses. The survey was completely closed on November 14th. Most of the results on November 13th were hardcopy responses manually entered into SurveyMonkey.

Figure A4.20: Public survey responses



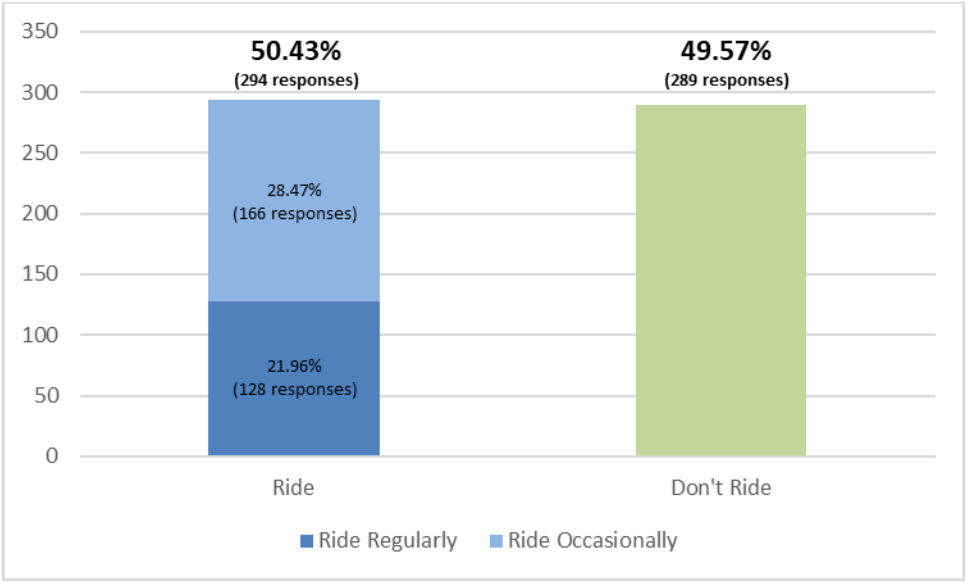
Sources: Iowa DOT, Survey Monkey

One of the very first actions of aggregating and evaluating the responses was to do a preliminary assessment on whether or not there were any irregularities and inconsistencies or patterns and trends that were immediately evident. Understanding who the respondents were was one of those first factors examined. The original intent of the survey was to gather feedback from as many points of view as possible, so those who normally ride buses or utilize public transportation were not the only demographic from which feedback was sought. While having the perspective of regular observers and riders of public transportation was very valuable in understanding how the

system works and does not work well, that perspective fails to account for everyone who cannot or will not ride the bus. Thus, the outreach and marketing of the public survey was purposefully advertised to non-riders of public transportation as well.

One of the earliest questions in the survey directly asked the respondent "How often do you utilize the bus or public transit?". The results shown in Figure A4.21 reflect almost an exact 50-50 break of those who ride public transit and those who do not. Additionally, the distribution between those who ride public transit regularly (defined as 1-5 times per week) versus occasionally (a few times per month or per year) was almost nearly evenly split as well. The working group and stakeholder groups were very pleased with these results as they capture a balance of different perspectives on public transportation in order to help improve the system from multiple points of view.

Figure A4.21: How often do you utilize the bus or public transit?



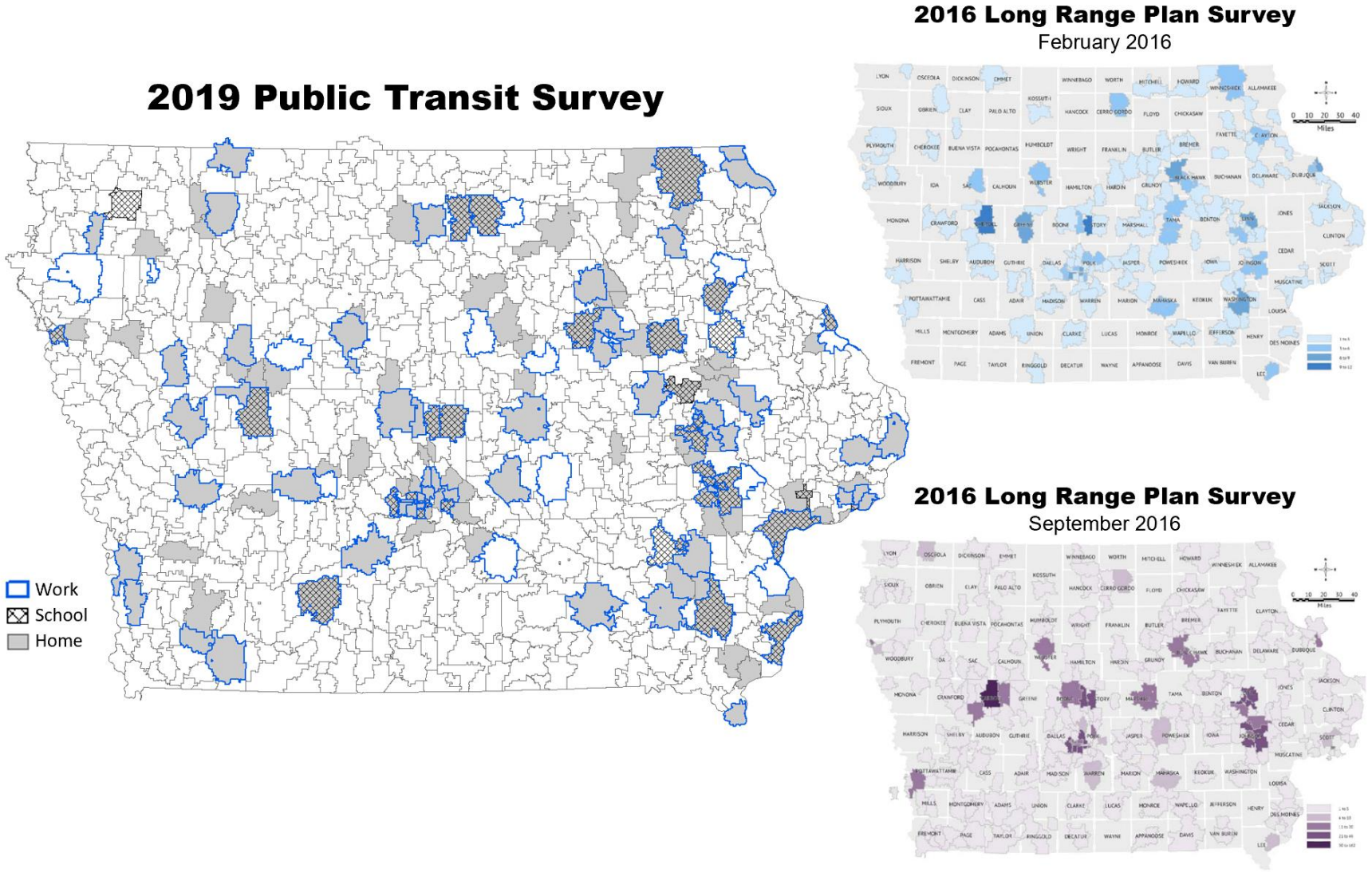
Sources: Iowa DOT, Survey Monkey

In addition to ensuring balanced perspectives of riders and non-riders, responses were also sought from a variety of regions across Iowa in order to represent thoughts from urban and rural residents. These results were then compared to the 2016 public survey results of the

Iowa in Motion 2045 State Long Range Transportation Plan. This Plan gathered public input on two separate occasions, February 2016 and September 2016, and asked respondents for zip code areas where they were from. The 2019 public survey for the Iowa Public Transportation Long Range Plan also asked for zip code areas but further asked for respondents to provide the zip codes for their place of residence or home, for where they go to school (if applicable), and for their place of employment or work (if applicable).

Figure A4.22 shows the comparison and distribution of locations that respondents indicated in the surveys. The zip code areas for the 2019 Public Transit Survey were symbolized on a map using gray shaded zip codes to represent home locations, black hatch lines to represent school locations, and blue outlines to represent work locations. The February and September 2016 survey results are shown on the right and the 2019 survey results are shown on the left. The 2016 surveys received an overall higher number of responses and a greater distribution of responses across more of the zip codes in Iowa. However, despite the 2019 survey showing fewer zip codes represented, the trend in the distribution of zip codes across Iowa reflects a similar pattern, with a fairly balanced representation of rural and urban zip code areas. Additionally, nearly every region in Iowa was represented with north, south, east, west, and central Iowa all having several different zip code areas with survey responses.

Figure A4.22: Comparison of public survey results to prior surveys



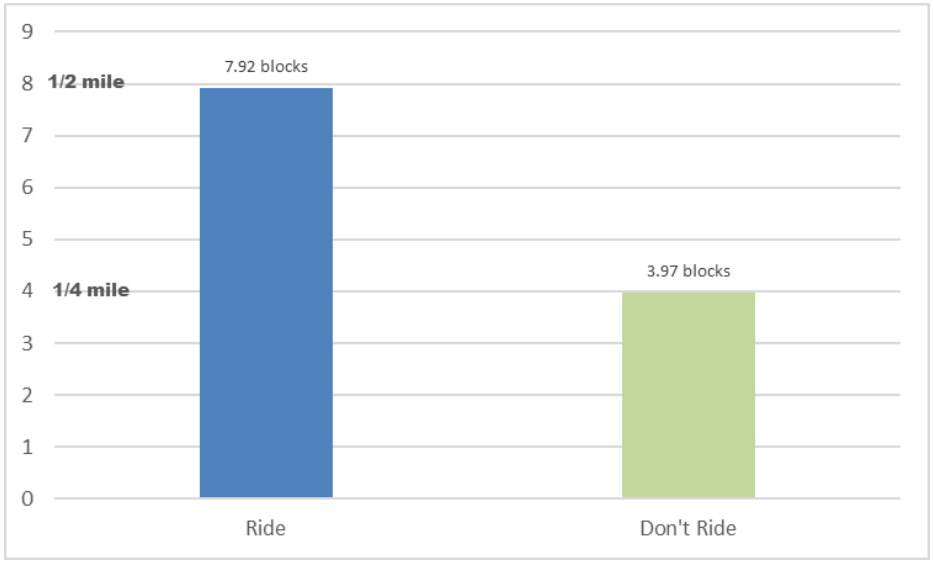
Source: Iowa DOT

Trip Information

In addition to asking whether the survey respondent was a user of public transportation or not, several additional questions were asked in order to determine transportation or trip preferences. Some of the questions were asked in terms of number of blocks the respondent was willing travel. For the purposes of this survey, four city blocks were assumed to be roughly equivalent to one quarter mile in distance. Most of the questions were also categorized by 'Ride' or 'Don't Ride' indicating whether the respondent uses public transportation regularly or occasionally as answered in the question above, or whether a respondent never rides public transportation. The term 'transportation connection' was also used in several questions, which was used to represent any type or mode of transportation, not just public transit.

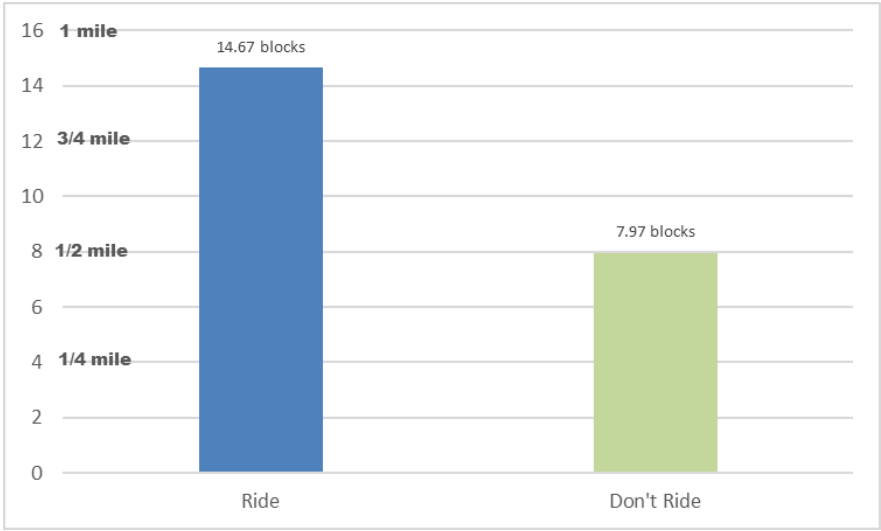
The data depicted in Figures A4.23 through A4.29 can be leveraged in situations in which certain strategies or transit services are targeted toward specific demographics in order to better align them with the expectations and needs of those demographics. This will increase the likelihood that the desired outcomes are achieved, particularly in resource constrained budgetary environments. General conclusions from these results show that regular or occasional transit riders typically wait longer for their rides and are more willing to walk or bike further to get to their transportation connection.

Figure A4.23: How far are you willing to walk to get to your transportation connection?



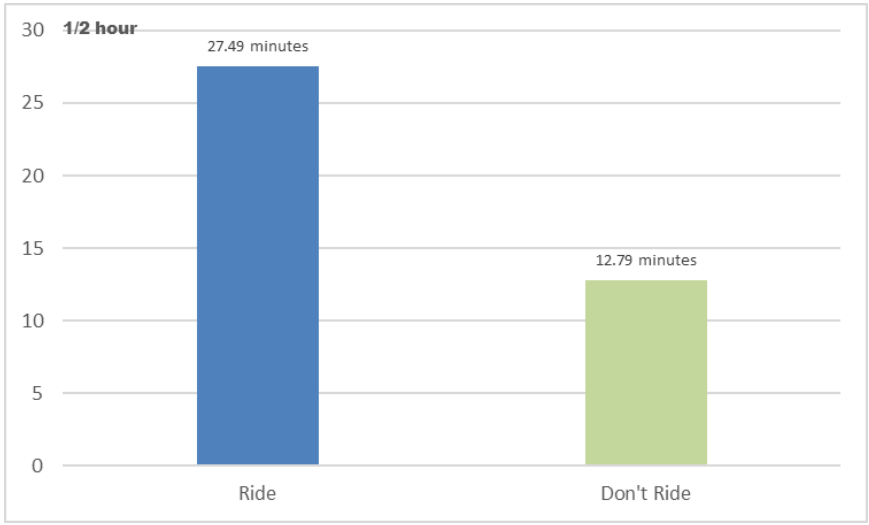
Sources: Iowa DOT, Survey Monkey

Figure A4.24: How far are you willing to bike to get to your transportation connection?



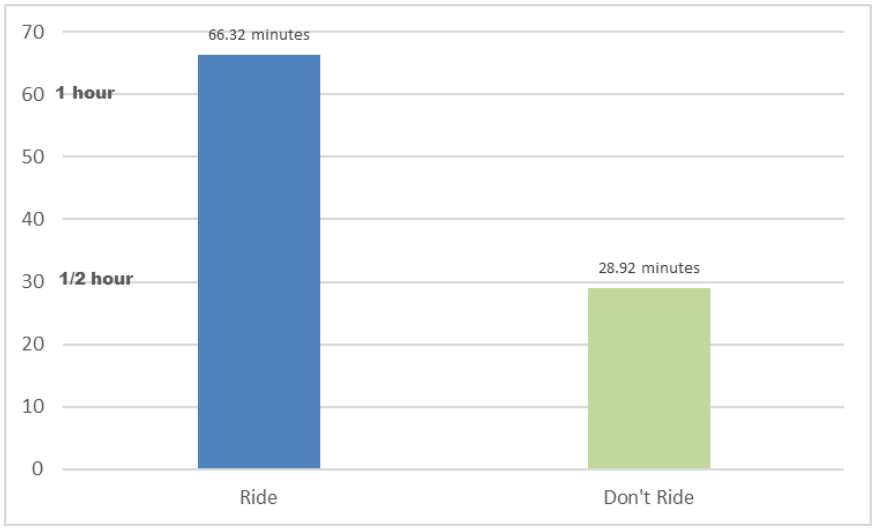
Sources: Iowa DOT, Survey Monkey

Figure A4.25: How long are you willing to wait for your transportation connection to arrive?



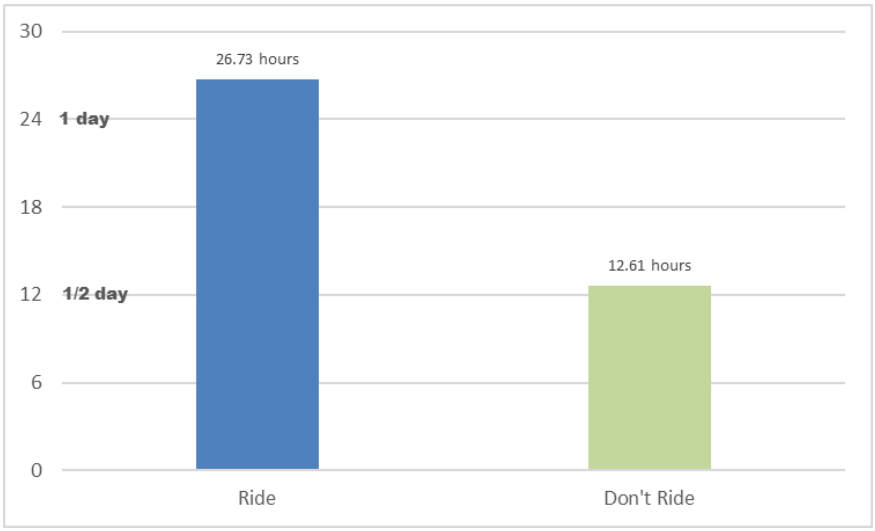
Sources: Iowa DOT, Survey Monkey

Figure A4.26: How many minutes are you willing to commute (by any mode of transportation) to get to work?



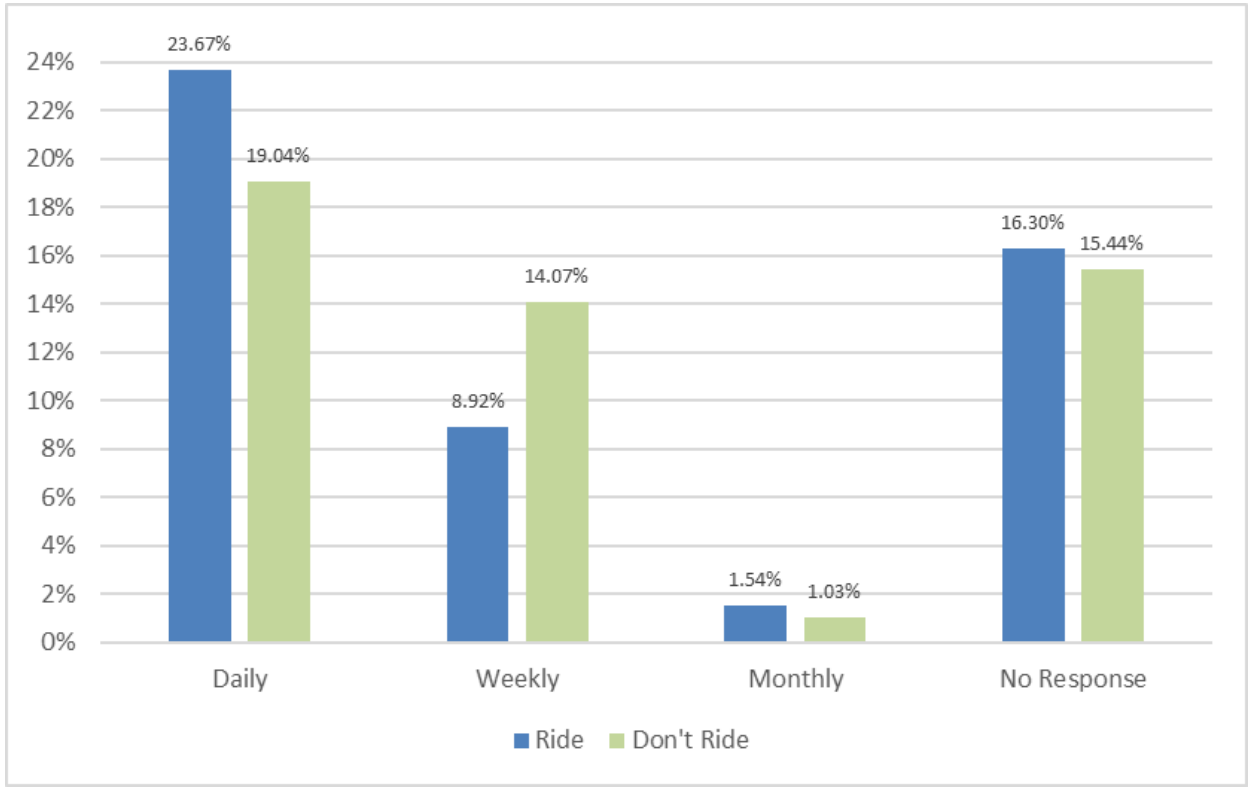
Sources: Iowa DOT, Survey Monkey

Figure A4.27: How far in advance are you willing to schedule your transportation connection?



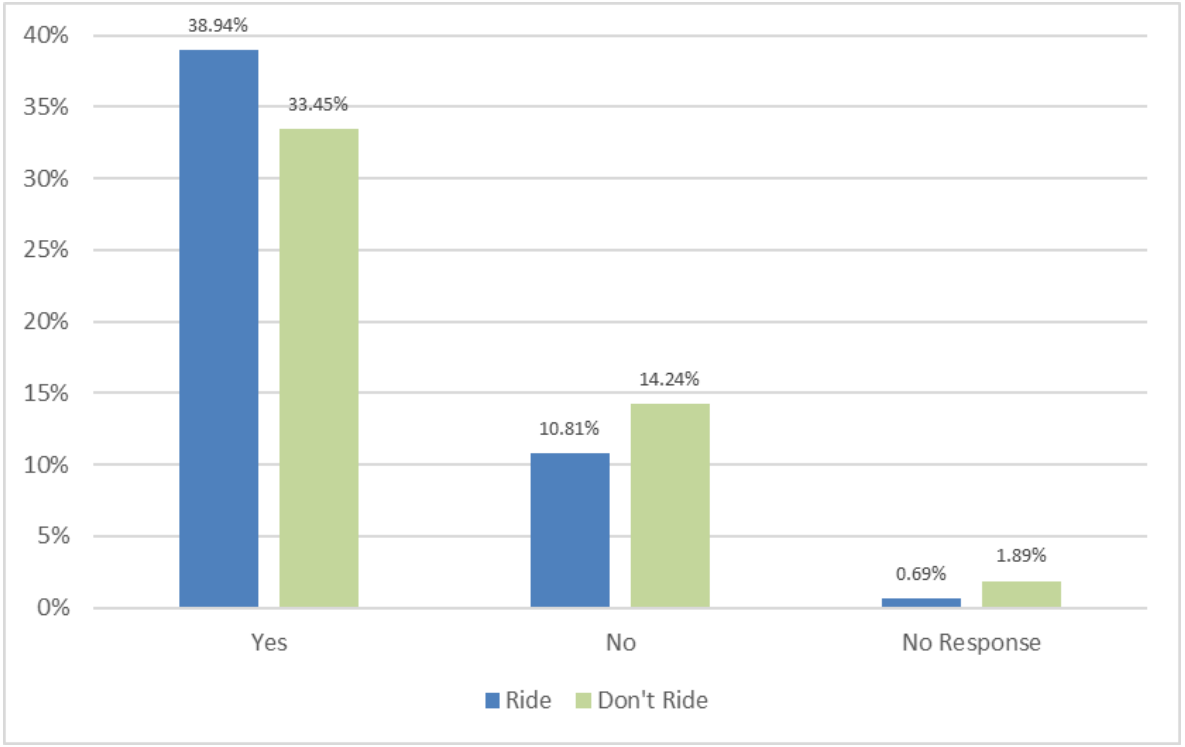
Sources: Iowa DOT, Survey Monkey

Figure A4.28: In rural areas, how often should demand response public transit service be available?



Sources: Iowa DOT, Survey Monkey

Figure A4.29: Does weather affect your choice of transportation?

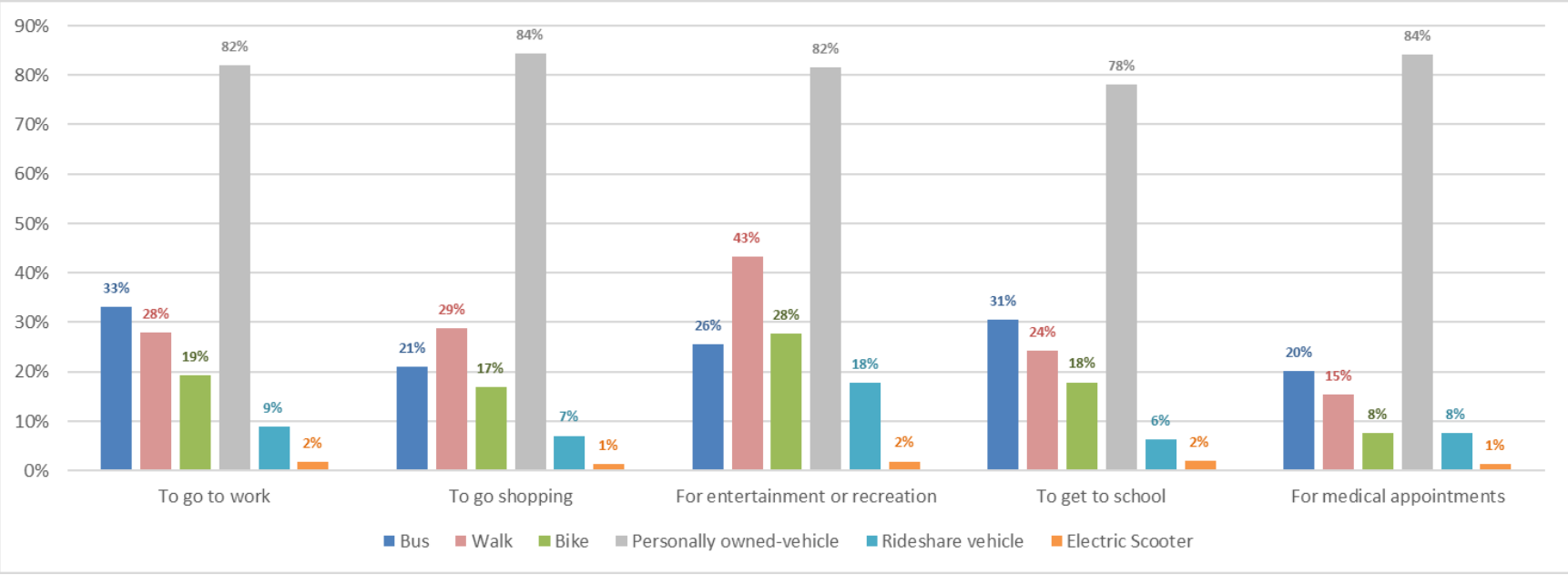


Sources: Iowa DOT, Survey Monkey

The following questions asked survey respondents to indicate what type or mode of transportation they utilize for several specific activities such as going to work, shopping, and attending medical appointments. Mode choice in these circumstances were used to compare and contrast current mode choice versus what they would ideally utilize if given the opportunity. The final question in this section of the survey was to ask the respondent why they did not choose that mode of transportation if they preferred to travel a different way. Respondents were asked to leave a selection blank if they never use a mode of transportation for one of the particular trip purposes.

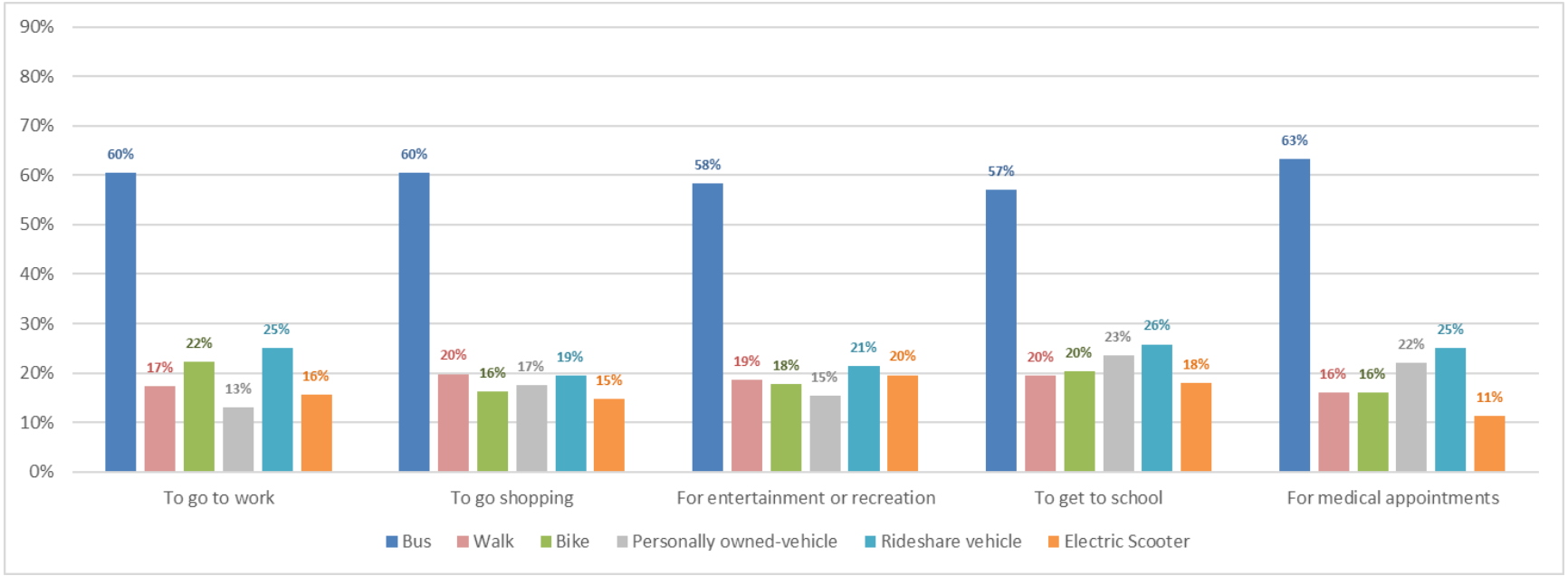
Figures A4.30 through A4.32 include regular and occasional transit riders as well as non-transit riders. General takeaways from these results confirm that a majority of the survey respondents utilize their personally owned vehicle as the primary mode of transportation. However, approximately 60 percent of respondents indicated that they would choose public transit if it was an option. Note that only 50 percent of respondents indicated that they were regular or occasional riders of public transit, showing that there are currently non-riders of public transit and/or occasionally riders of public transit who would prefer to start or increase their utilization of this mode of transportation. Unavailability of the service, inconvenience, and transit trip time duration were among the leading reasons why transit was not used.

Figure A4.30: Do you use any of these types of transportation for these types of trip purposes?



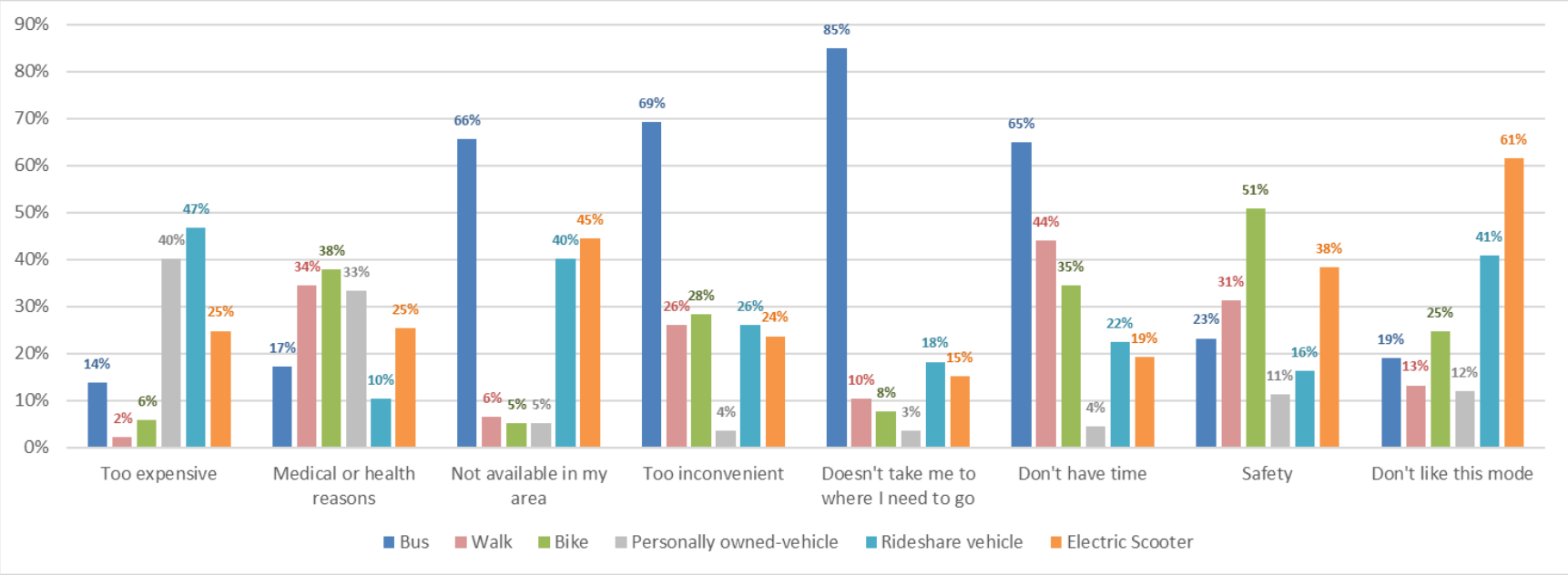
Sources: Iowa DOT, Survey Monkey

Figure A4.31: Are there any types of transportation you don't currently use, but would like to use for these types of trip purposes?



Sources: Iowa DOT, Survey Monkey

Figure A4.32: If you don't use a particular type of transportation at all, are any of these items part of the reason why?



Sources: Iowa DOT, Survey Monkey

Strategy evaluation considerations

The strategies were organized into different sections of the survey and grouped under the general categories of Services Strategies, Partnering Strategies, Facility, Fleet, & Personnel Strategies, and Funding Strategies. Feedback from the respondents was sought in order to understand which strategies resonated with the public, which would later help guide the prioritization and anticipated timeframe of the strategies in the execution matrix in Chapter 5 of the Plan.

It is important to note that some of the strategies listed below may not have been familiar to many of the public respondents, such as funding or vehicle maintenance-related strategies. Both the working and stakeholder groups acknowledged that this would likely be the case. However, members of the public weighing in on these strategies (no matter how unfamiliar they may be to them) was considered more of a benefit than keeping these strategies hidden until the final public input period at the end of the Plan development. Firstly,

sharing these strategies with the general public earlier on enabled greater transparency in the Plan development. This enabled more feedback to be gathered on all aspects related to the strategies rather than waiting until too late in the process.

Secondly, the 1 through 5 star ranking that respondents assigned to each strategy was not necessarily considered a vote for the winning strategy; rather, it allowed for comparisons between strategy rankings of various groups This helped ensure that strategy prioritization was consistent and aligned between the working group, stakeholder groups, and the public.

Lastly, it is worth noting that most of the strategies listed below, including those that may be funding and vehicle maintenance-related, were originally proposed at the 2019 Passenger Transportation Summit. The strategy brainstorming session at the summit included participation by non-profit organizations, local, state, and federal officials, transit agencies, and members of the public who were riders of public transportation. So, it would be disingenuous to say that all the strategies were presented in the survey for the first time to the public when, in fact, the public originally helped nominate earlier versions of these strategies.

In the strategy sections below, each individual strategy was originally evaluated by respondents using a 1 through 5 star ranking with a 1 indicating 'Not very important', 2 indicating 'Not important', 3 indicating 'Neutral', 4 indicating 'Important', and 5 indicating 'Very important.' After examination of the results it became apparent that there were certain types of strategies that more respondents tended to mark as 'Neutral.' The strategies tended to be focused on funding, vehicle maintenance, and other aspects of the public transit system that could be described as more operational in nature. It was assessed by the stakeholder group that 'Neutral' responses could be more accurately described as 'Not sure.' In order to represent the results in a way that would better serve as input into the prioritization of the strategies, 'Neutral' responses were not included in the final ranking results of the strategies. As a result, the charts below only show 4 of the 5 original options for ranking the strategies, and percentages have been recalculated with neutral responses removed.

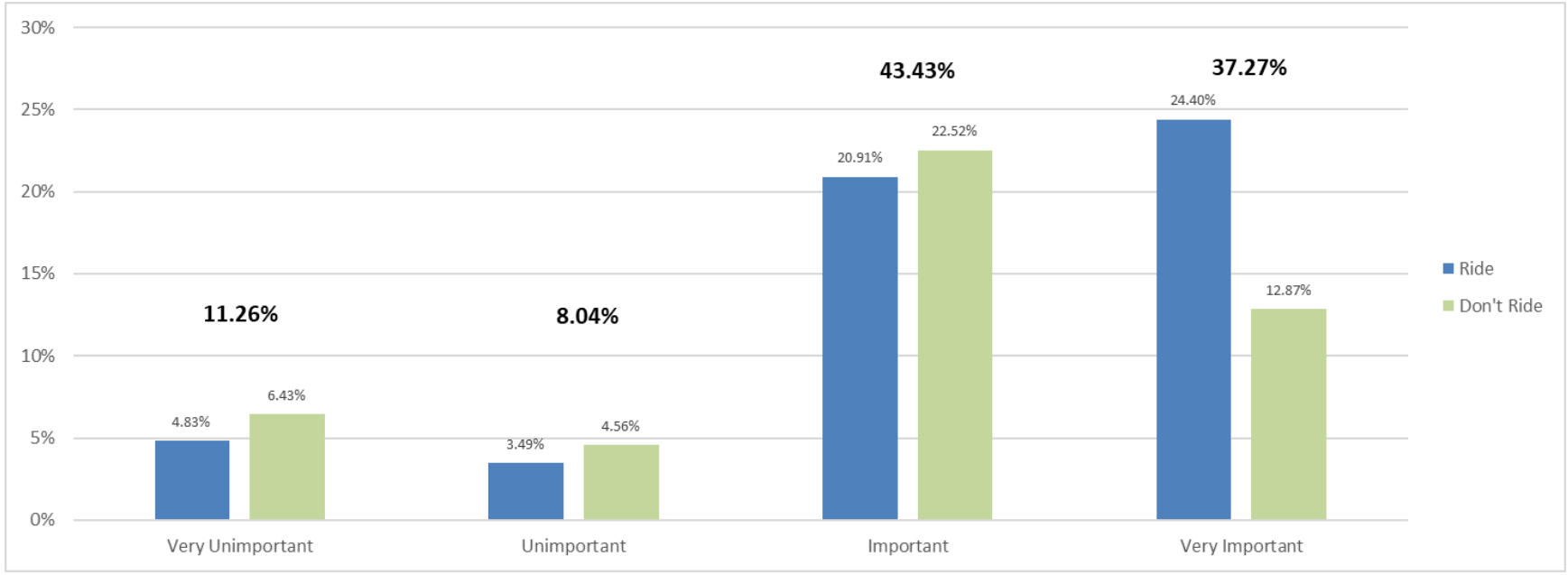
Service Strategies

Figures A4.33 through A4.41 represent strategies that were related to the service goal area and focus directly on the availability, frequency, and type of transit-oriented services utilized by riders. In order to alleviate any potential confusion on terminology, the survey provided definitions to describe the difference between different types of transit service such as fixed route, demand response, and paratransit. Additionally, large urban, small urban, and regional transit systems were defined based on the population sizes served.

Key takeaways from the service strategy results include the universal agreement between transit riders and non-riders that accessibility of the public transit system for older adults, riders with disabilities and riders with cognitive impairments is very important. Other strategies that resonated well, particularly with transit riders, were to sustain services such as the I-380 express shuttle, increase service during nights and weekends, and make more urban transit services available to regional transit riders.

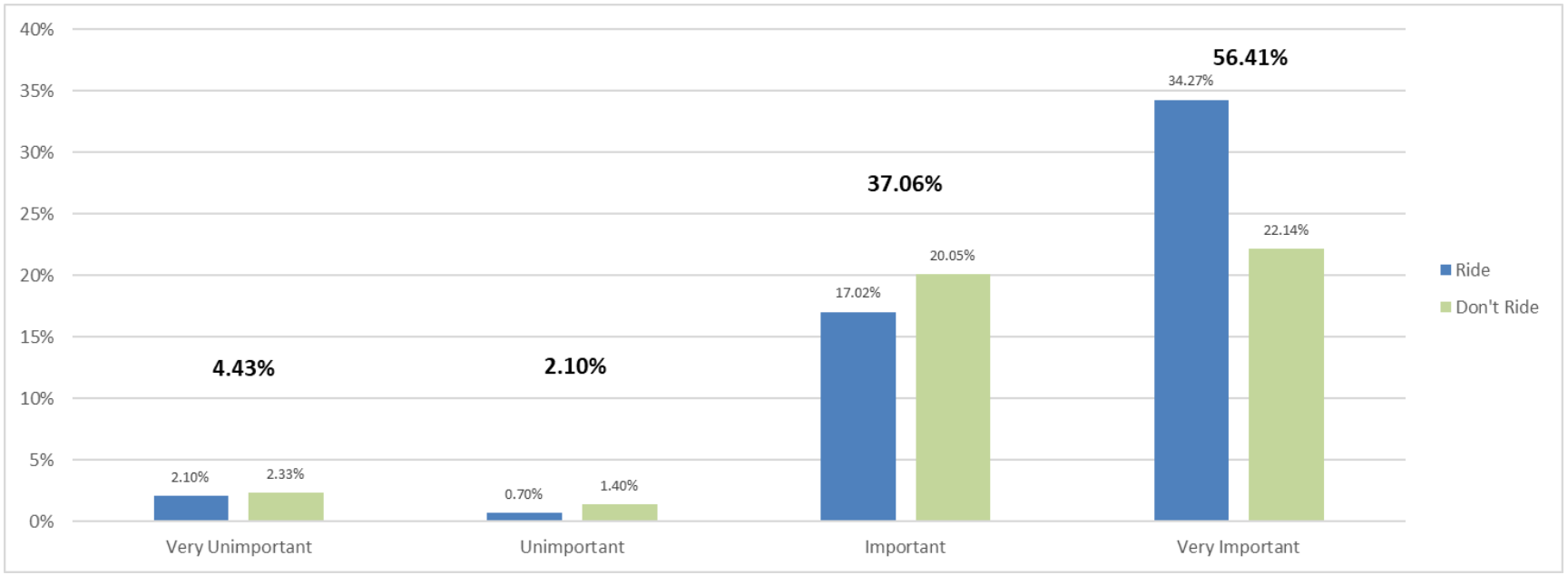
While all of the strategies were generally considered important, there were a few that received a more lukewarm reception from respondents. Strategies related to data collection practices were probably less understood by the public, while strategies related to aspects of mobility-as-a-service likewise received only slightly positive responses such as adding subscription services. Accepting digital fares and payments were more strongly supported; however, the continued acceptance of cash was likely an important component of that increased support. The addition of cash as an option in the language of this strategy was specifically recommended by the stakeholder group and it was assessed that without this inclusion, this strategy would have likely enjoyed far less support.

Figure A4.33: Examine the effects of offering free state-wide bus service.



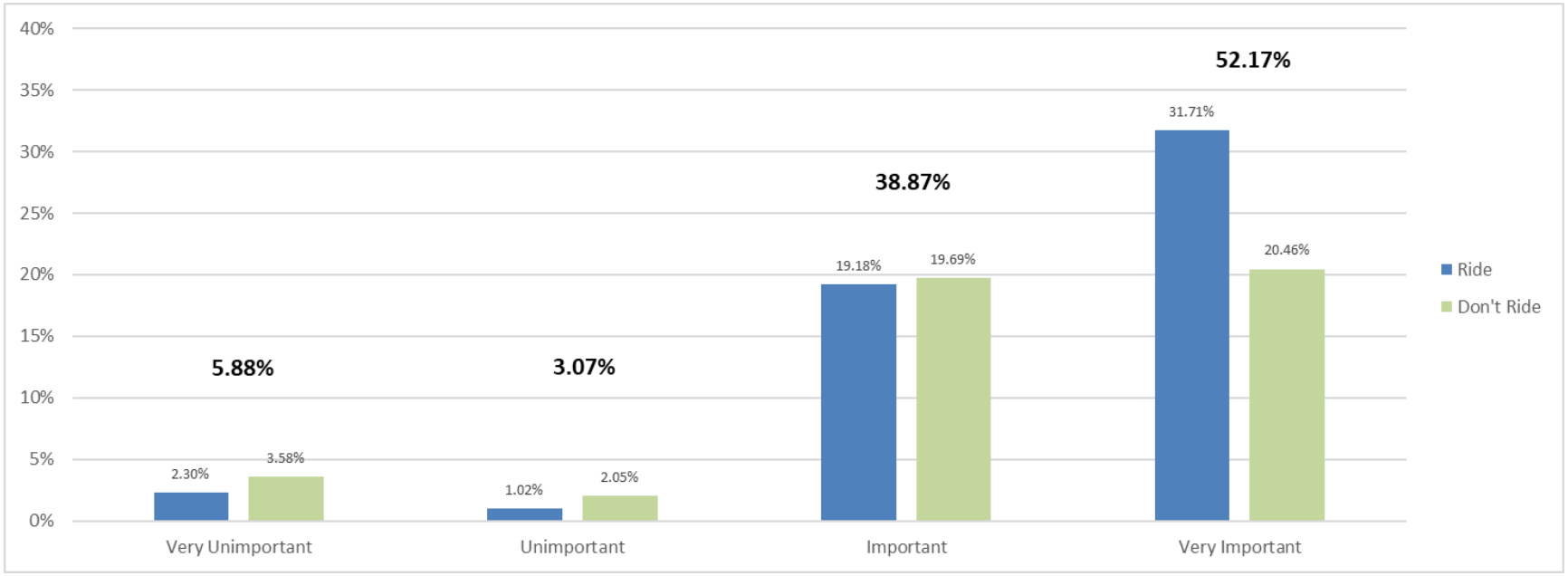
Sources: Iowa DOT, Survey Monkey

Figure A4.34: Expand bus service hours for people who work nights and weekends.



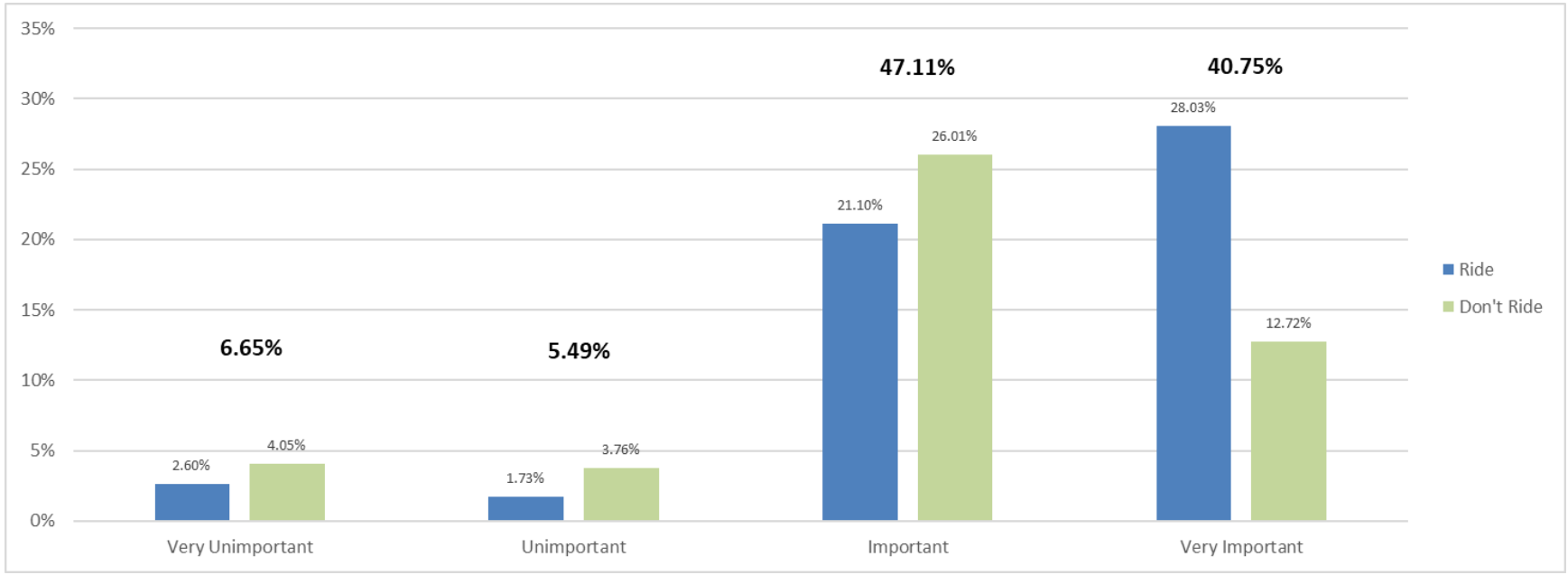
Sources: Iowa DOT, Survey Monkey

Figure A4.35: Prioritize funding applications for communities that provide or improve transit service or access.



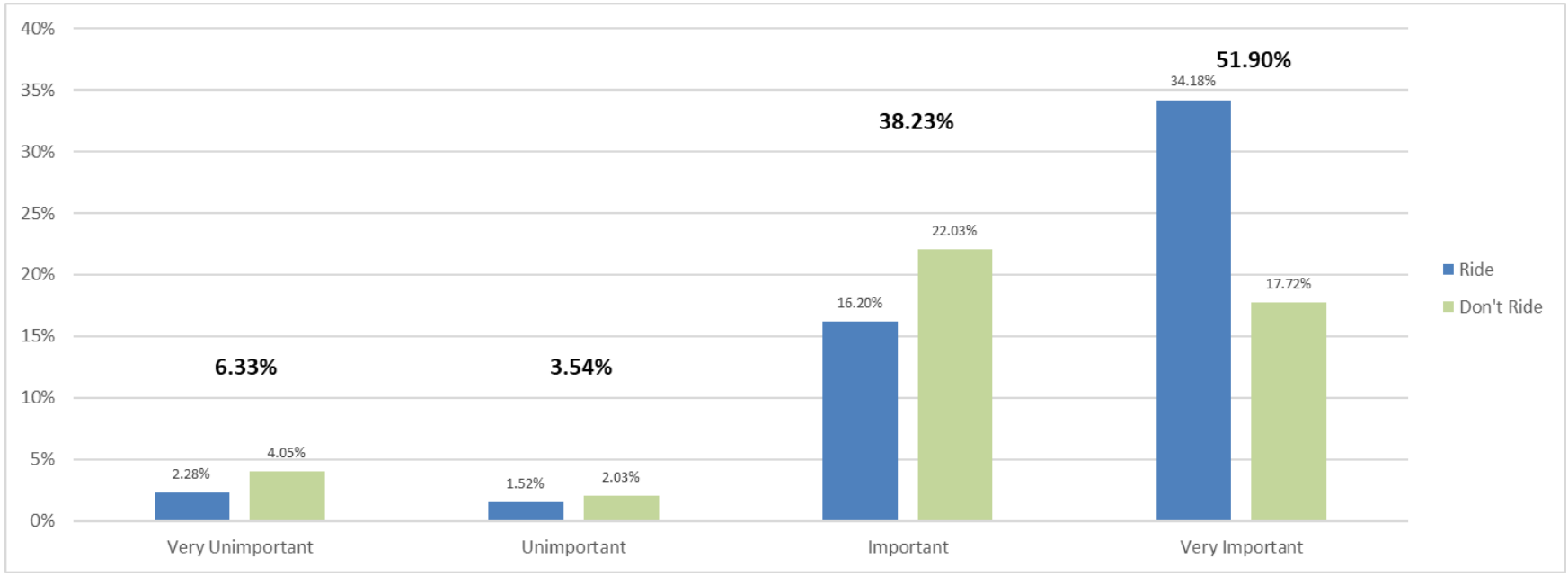
Sources: Iowa DOT, Survey Monkey

Figure A4.36: Examine the effects of creating more urban transit services in areas that are currently covered by regional transit service.



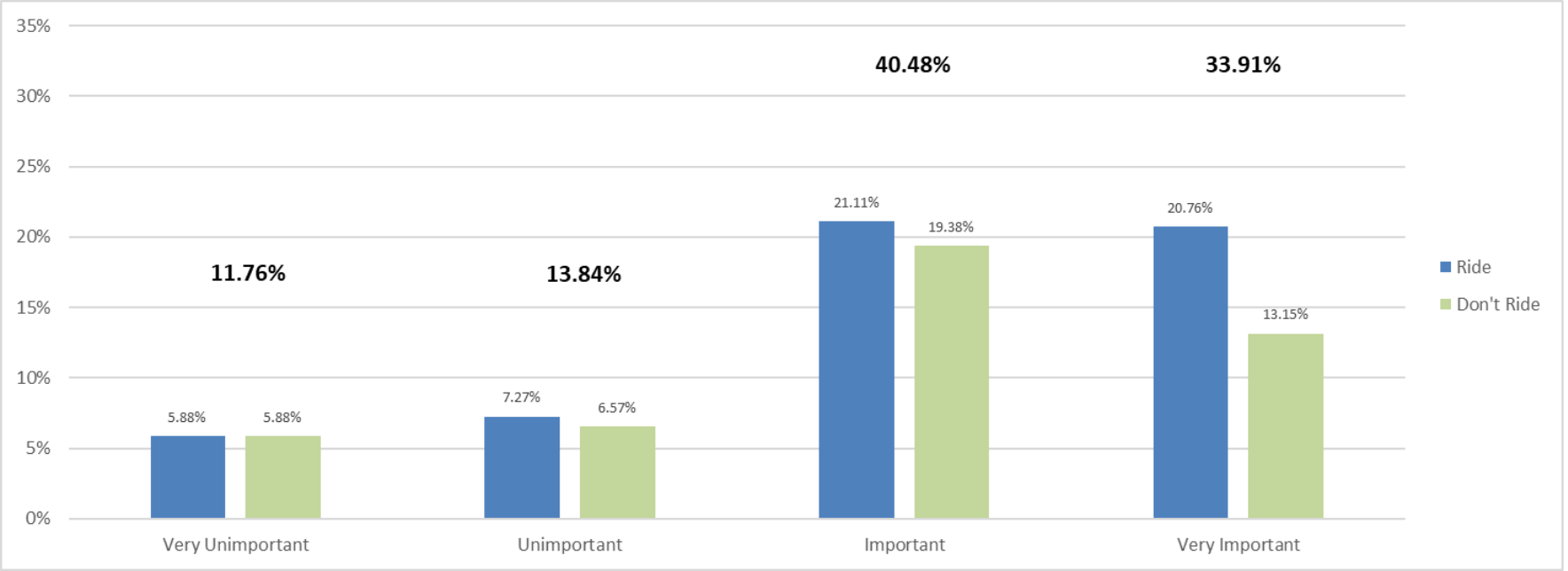
Sources: Iowa DOT, Survey Monkey

Figure A4.37: Continue existing services and establish new inter-regional services along commuter routes (such as Interstate 380 between Cedar Rapids and Iowa City, Interstate 35 between Ames and Des Moines, and Interstate 74 between Davenport and Illinois).



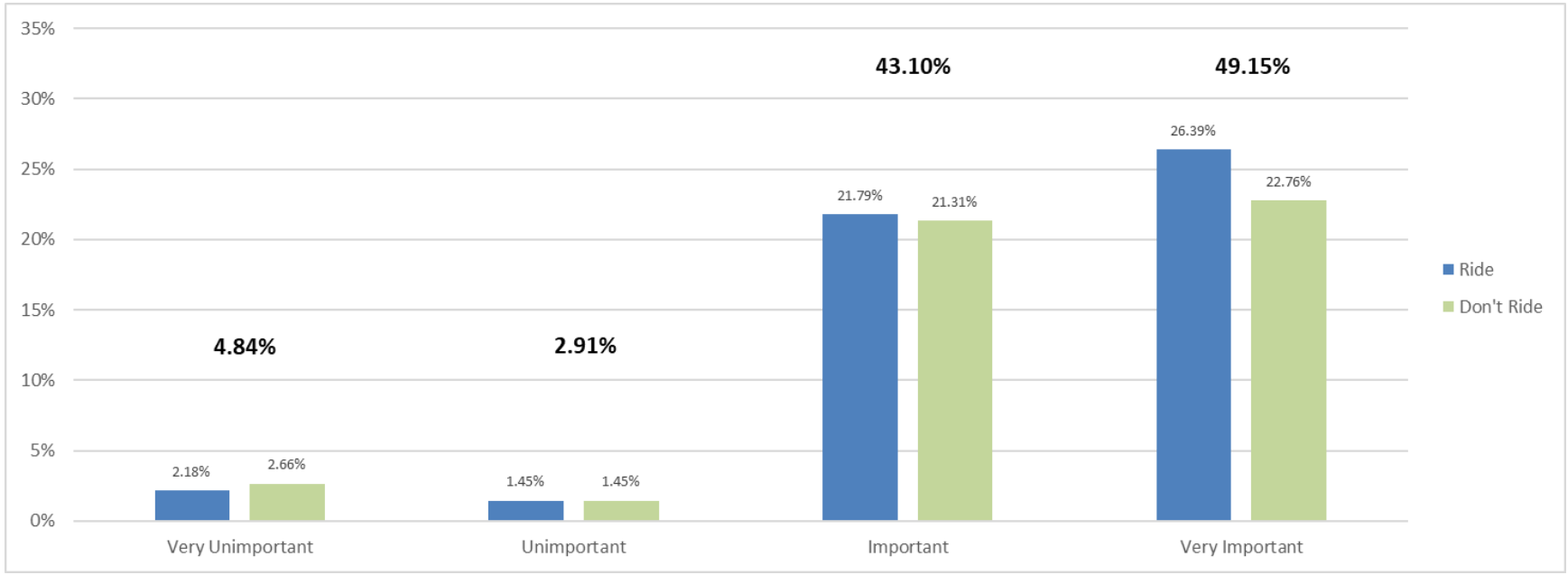
Sources: Iowa DOT, Survey Monkey

Figure A4.38: Start a subscription price service that works across all bus services in Iowa and includes bikes, scooter sharing, and parking facilities.



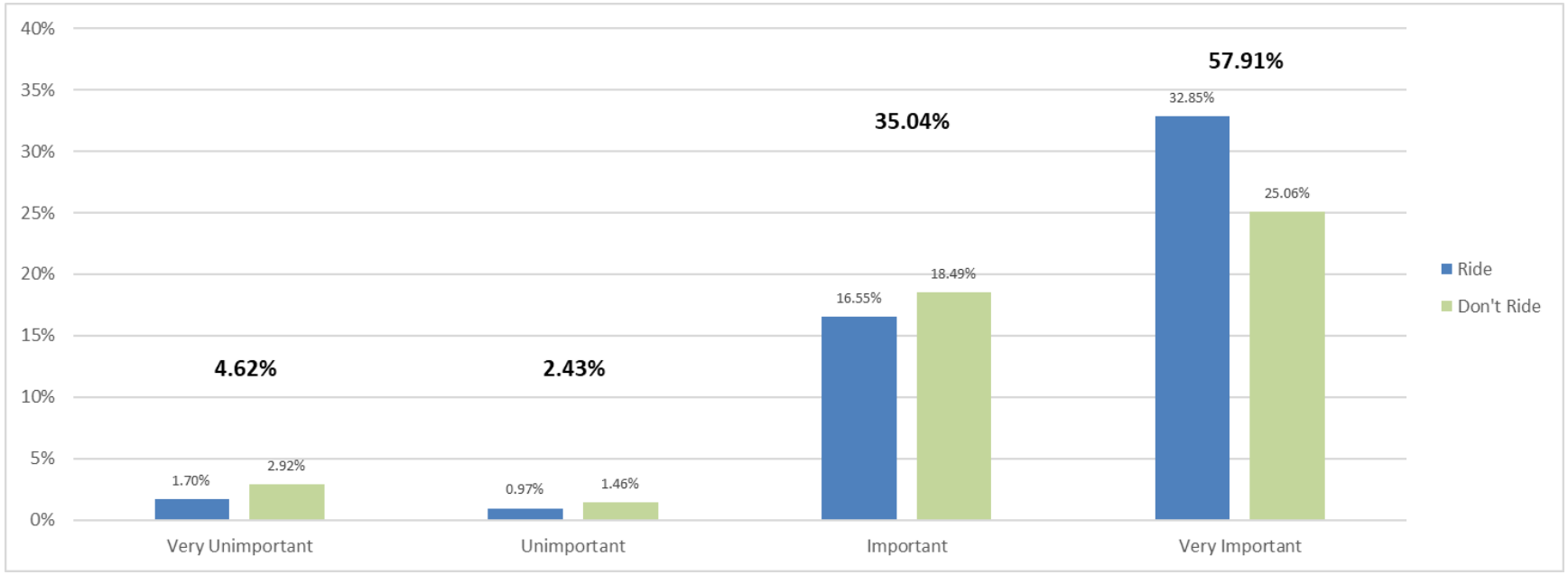
Sources: Iowa DOT, Survey Monkey

Figure A4.39: Enable all buses and transit agencies in the state to accept digital fares or electronic payment formats, while still allowing for cash payments.



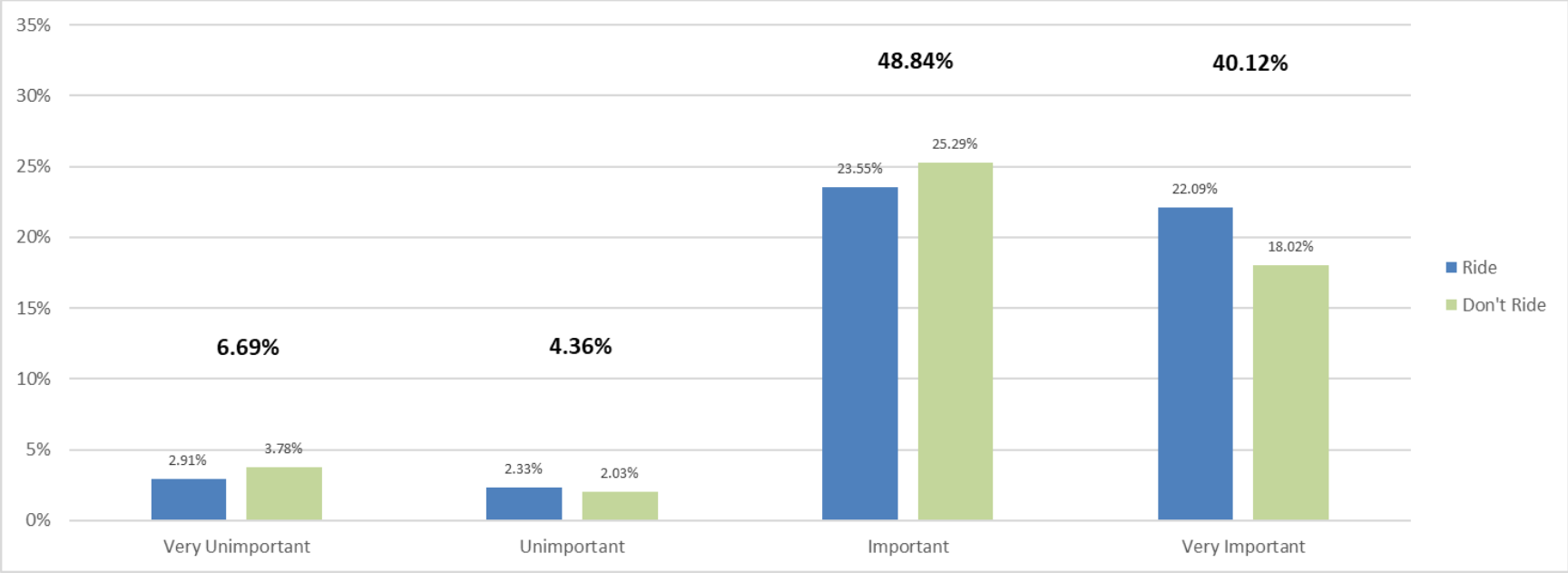
Sources: Iowa DOT, Survey Monkey

Figure A4.40: Improve accessibility of all transit information, service notifications, and bus route information to ensure they are easy to understand for older adults, multilingual riders, and riders with audio, visual, or cognitive impairments.



Sources: Iowa DOT, Survey Monkey

Figure A4.41: Establish standardized data collection and reporting requirements to better understand ridership.



Sources: Iowa DOT, Survey Monkey

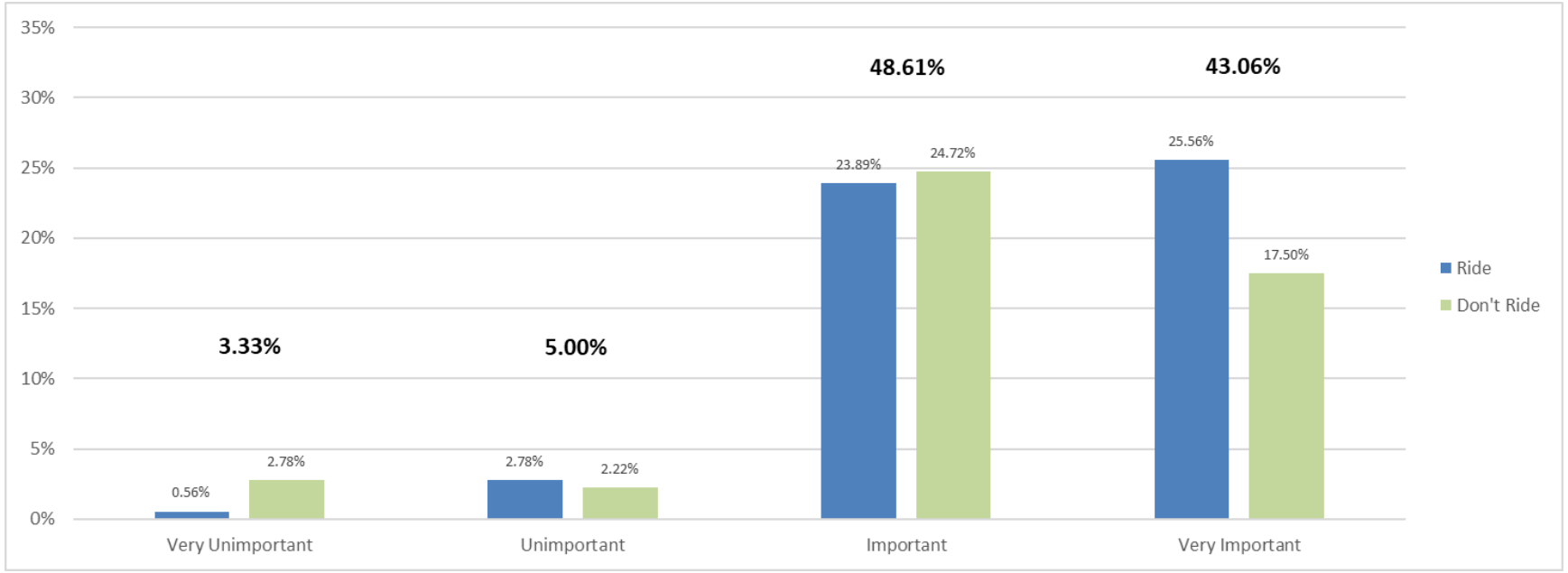
Partnering Strategies

Figures A4.42 through A4.48 represent strategies that were related to the partnering goal area and focus directly on establishing partnerships with other public and private entities. This includes opportunities for public-public partnerships such as two governmental entities working together and public-private partnerships such as the relationship between a business and a transit agency.

Key takeaways from the partnering strategy results include the universal agreement between transit riders and non-riders that workforce development and support of connecting employees and employers is very important. Likewise, partnering with non-profit organizations such as the American Cancer Society, Veteran's Affairs, and hospitals to help people get to medical appointments on time was also very important. Other strategies that resonated well, particularly with transit riders, are to work with other agencies in order to more efficiently support long distance travel, provide incentives for businesses to support transit options for their employees, and to improve connecting infrastructure such as sidewalks and bus stops to make them more accessible to transit users.

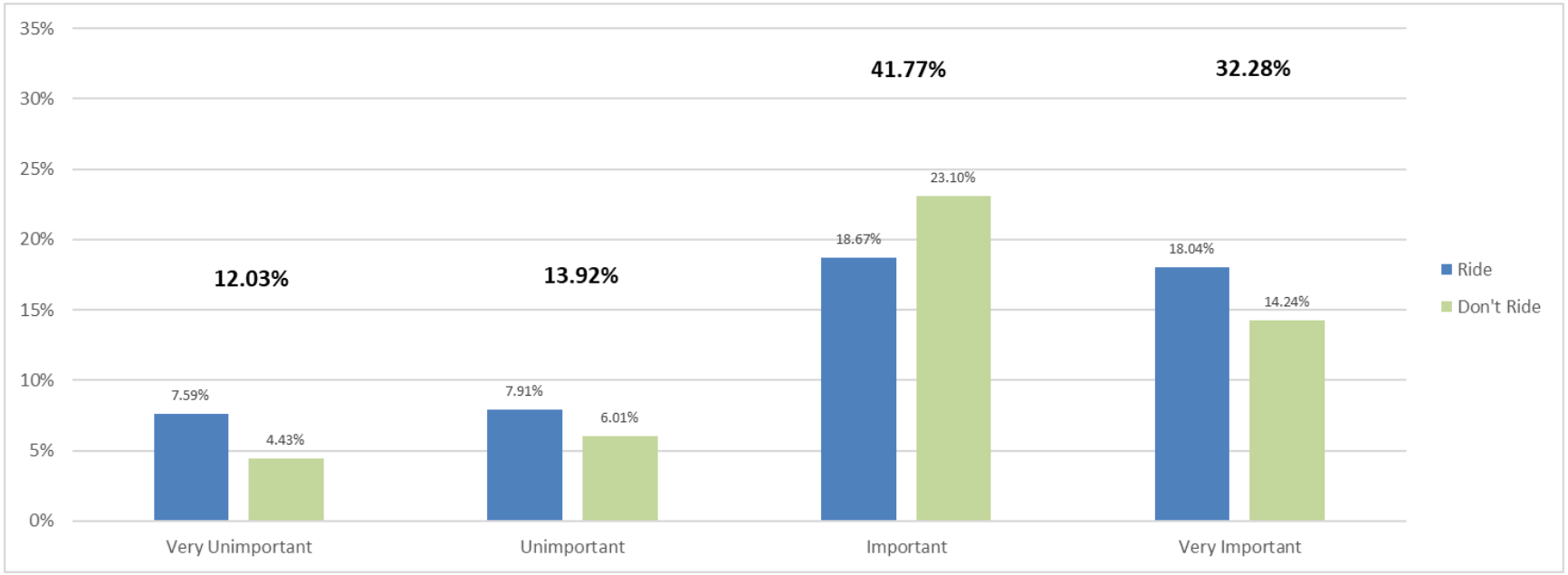
While all of the strategies were generally considered important, there was one that received a more lukewarm reception from respondents. The strategy related to partnering with transportation network companies (TNCs) such as Uber and Lyft received only slightly positive responses. This strategy, along with the service strategy related to subscription services, received the most negative responses of all the proposed strategies.

Figure A4.42: Improve bus transfers between regions and counties in order to support longer and more efficient trips across the state.



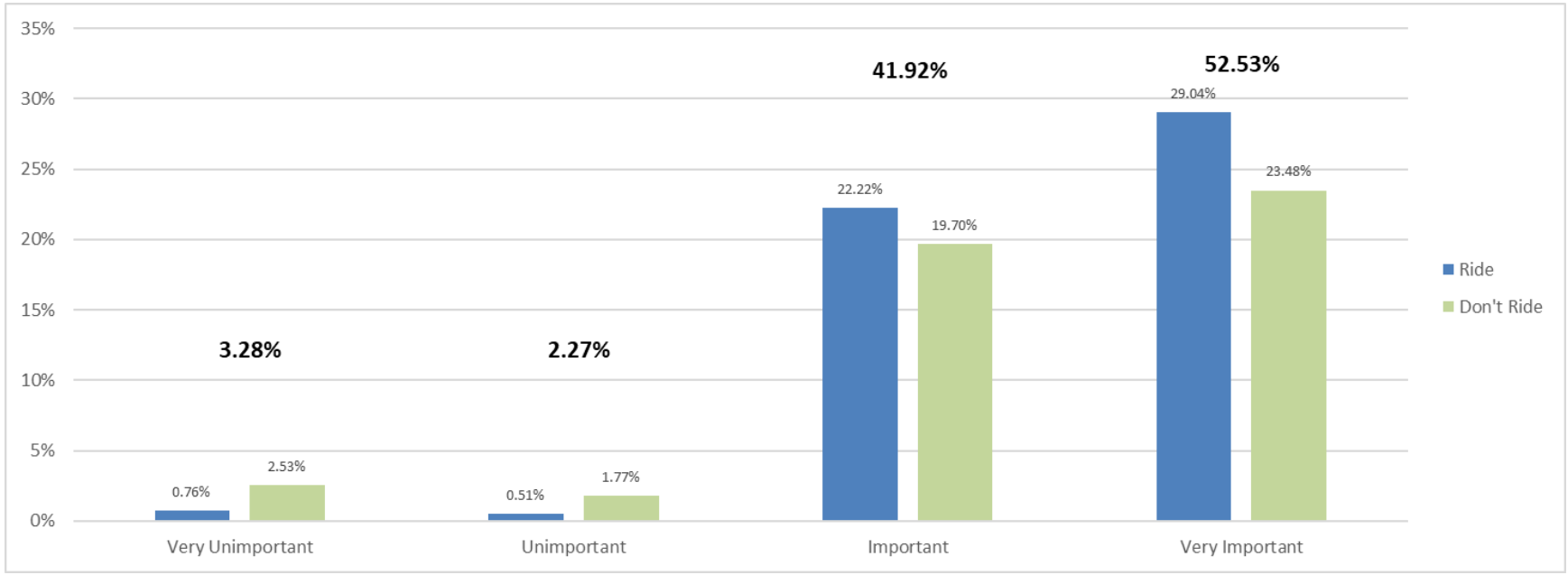
Sources: Iowa DOT, Survey Monkey

Figure A4.43: Partner with companies (such as taxis, Uber, Lyft) in order to support city bus routes and provide more transportation options.



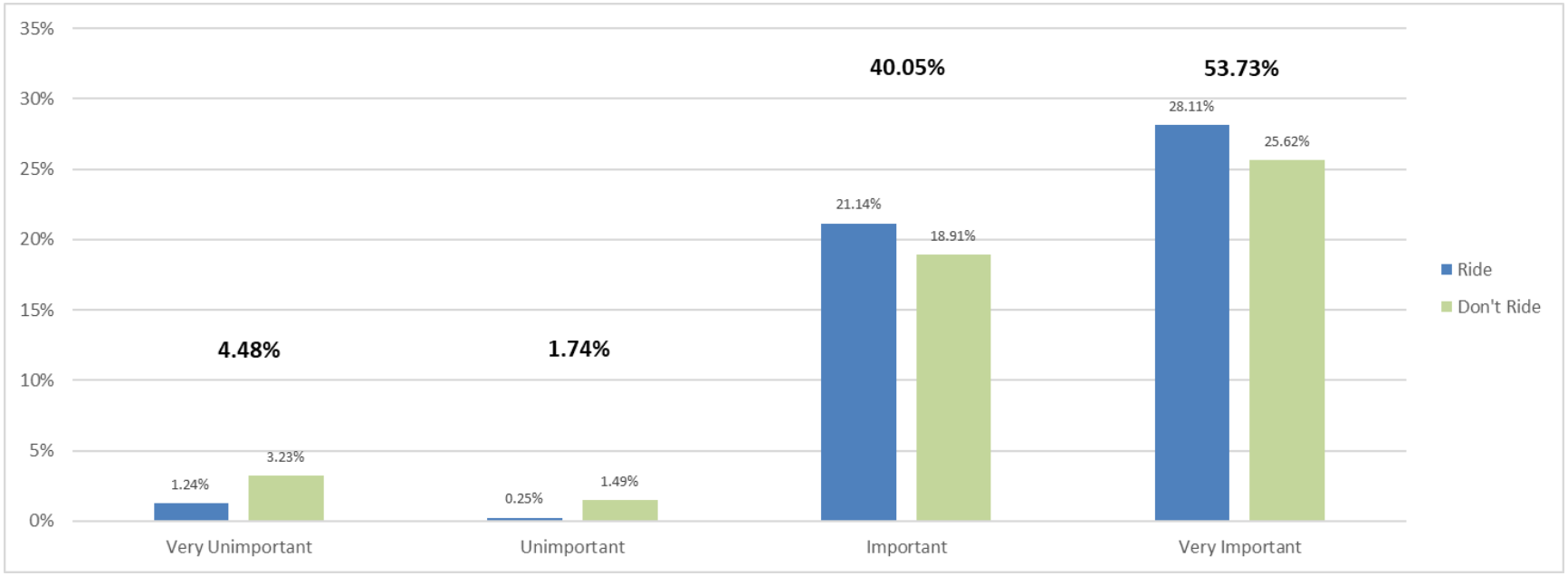
Sources: Iowa DOT, Survey Monkey

Figure A4.44: Improve workforce development by partnering with businesses to help employees get to work.



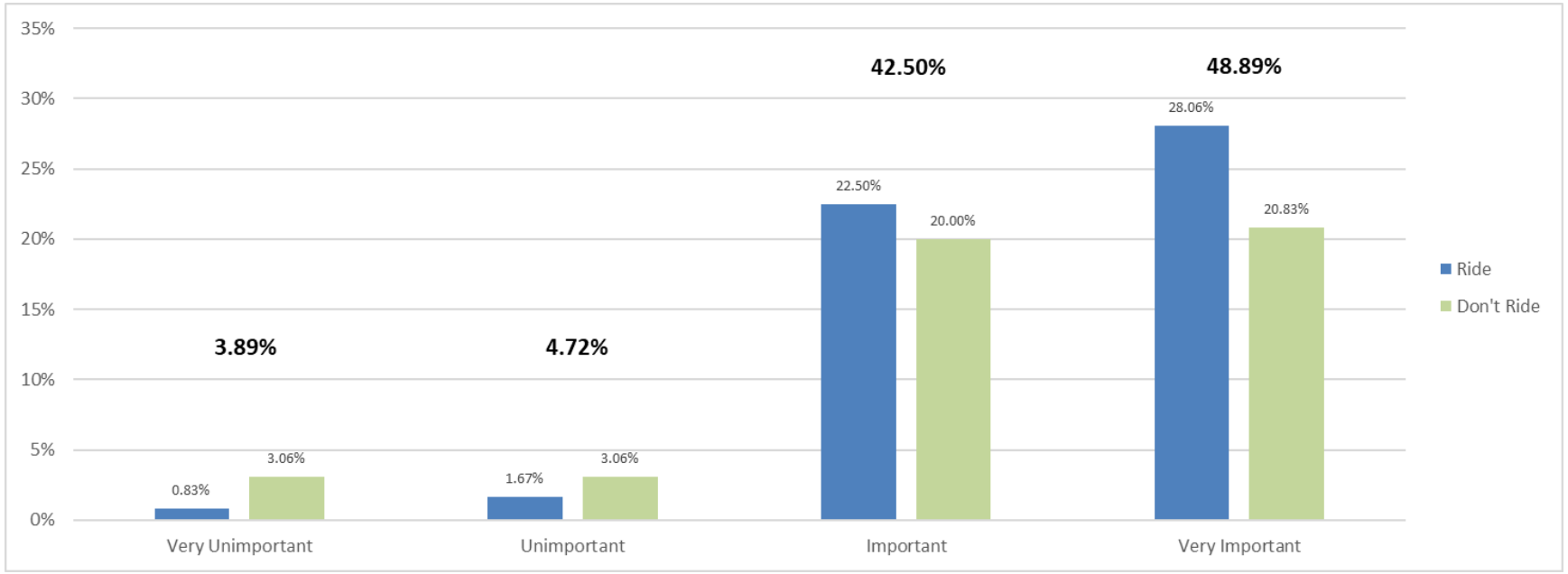
Sources: Iowa DOT, Survey Monkey

Figure A4.45: Partner with non-profit organizations (such as American Cancer Society, Veteran's Affairs, and hospitals) to help people get to their medical appointments on time.



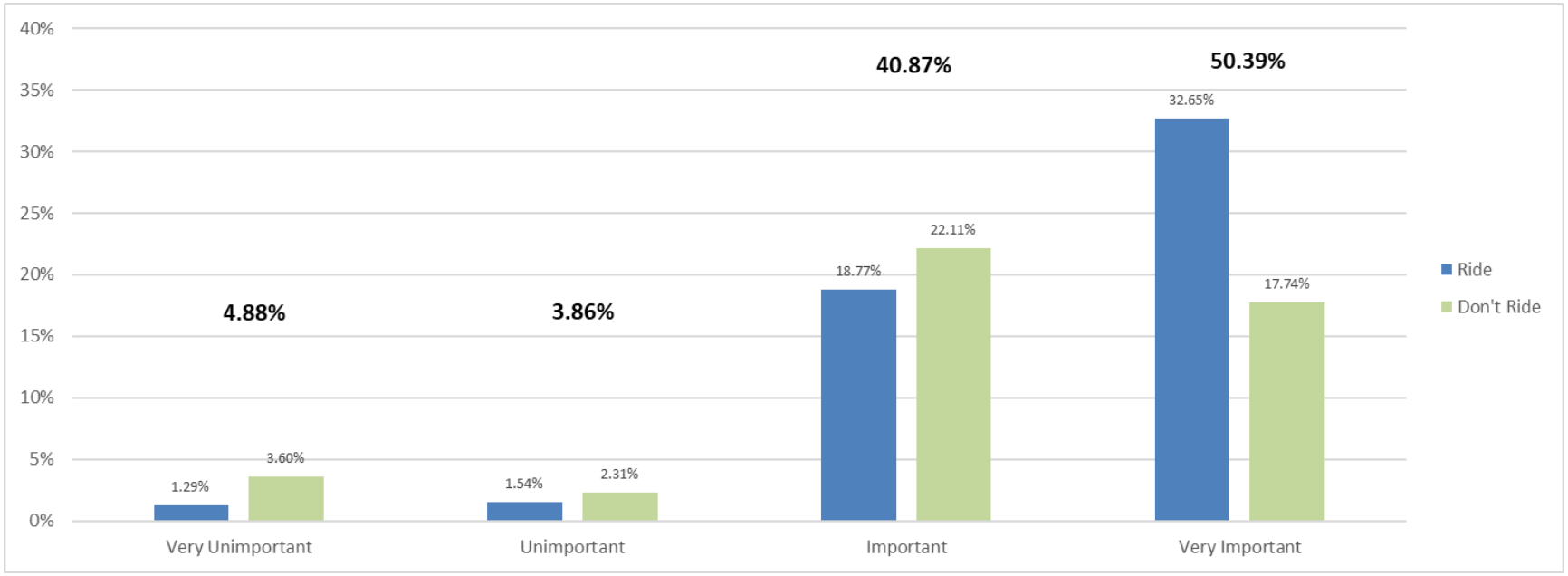
Sources: Iowa DOT, Survey Monkey

Figure A4.46: Partner with other government organizations to increase the number of transportation options for traveling long distances.



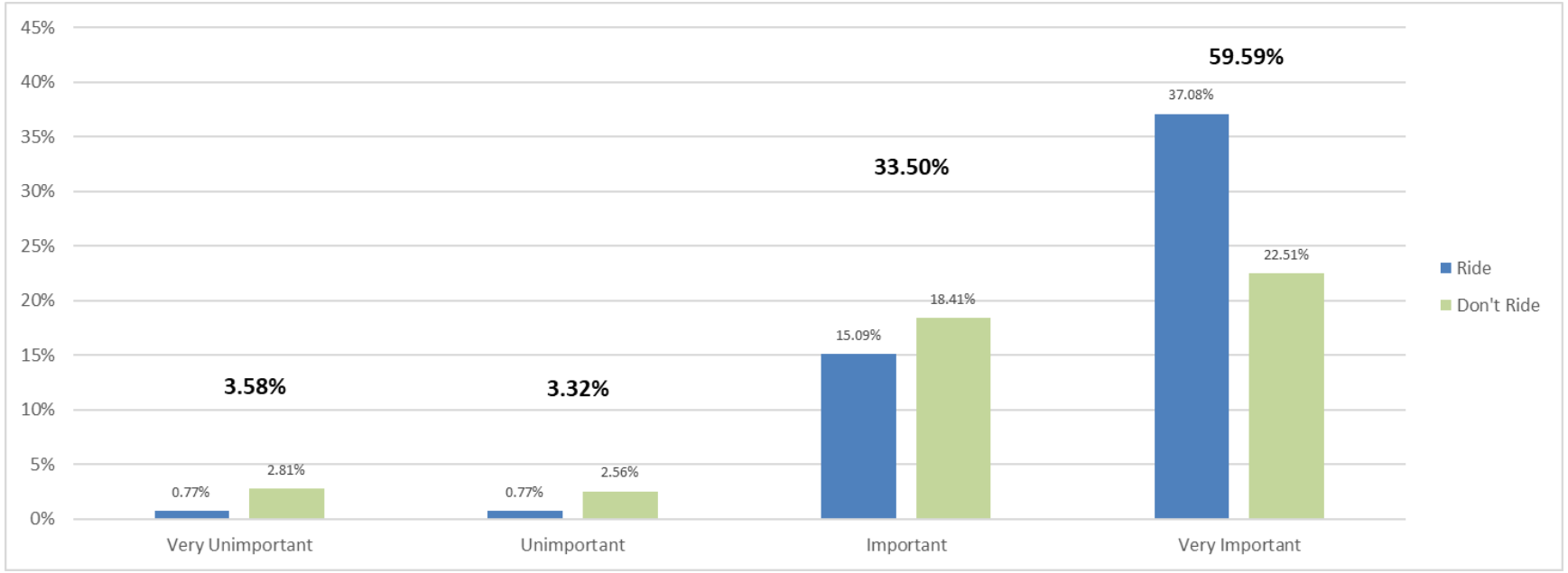
Sources: Iowa DOT, Survey Monkey

Figure A4.47: Work with businesses to create transportation options for their employees by offering subsides, bus passes, or incentives such as tax breaks.



Sources: Iowa DOT, Survey Monkey

Figure A4.48: Improve sidewalks and connecting infrastructure by working with state agencies, local government, and private organizations to improve access to bus stops and transit services.



Sources: Iowa DOT, Survey Monkey

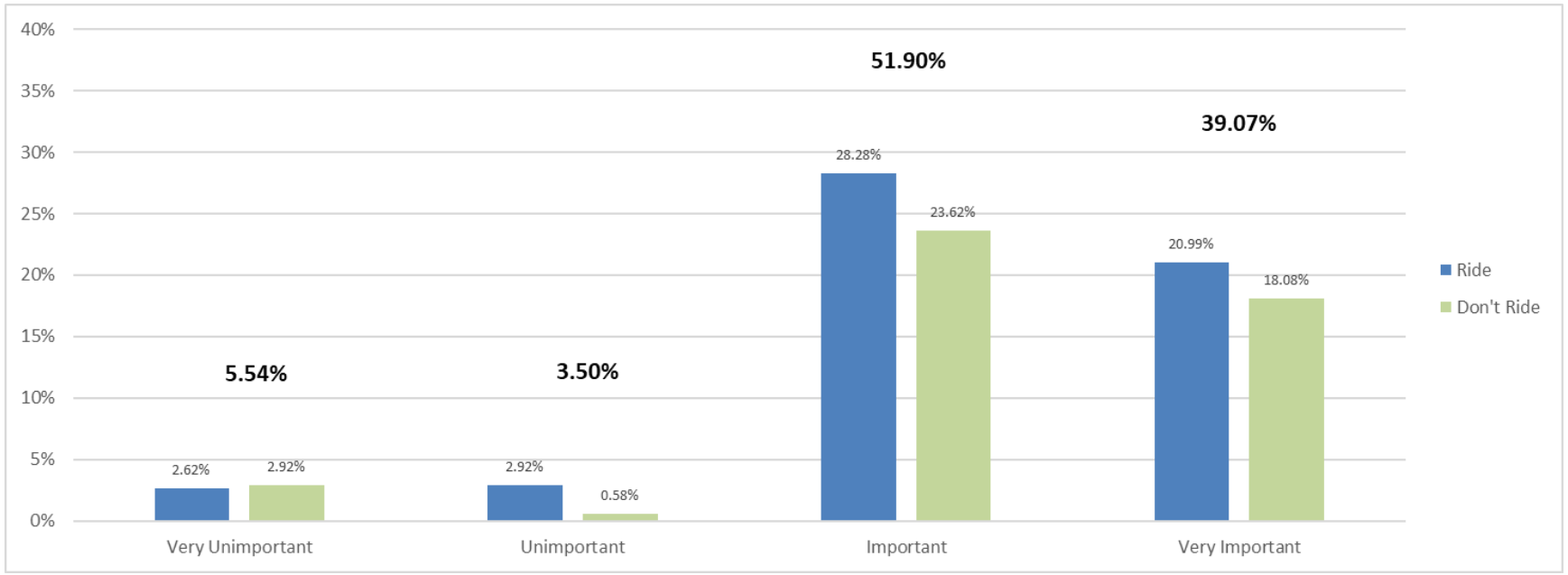
Facility, Fleet, and Personnel Strategies

Figures A4.49 through A4.57 represent strategies that were focused on transit personnel needs and capital improvements to the bus fleet and transit facilities. These strategies indirectly improve transit service through the improvement of asset condition, support for maintenance activities, and increases in operational efficiency.

Key takeaways from the facility, fleet, and personnel strategy results include the universal agreement between transit riders and non-riders that decreasing fuel costs through the adoption of electric, hybrid, and flex-fuel vehicles was very important. Another strategy that resonated well, particularly with transit riders, was to support better training for bus drivers to more effectively communicate with transit riders, especially riders who are older adults, experience any impairments or pre-existing medical conditions, or come from a refugee or immigrant background.

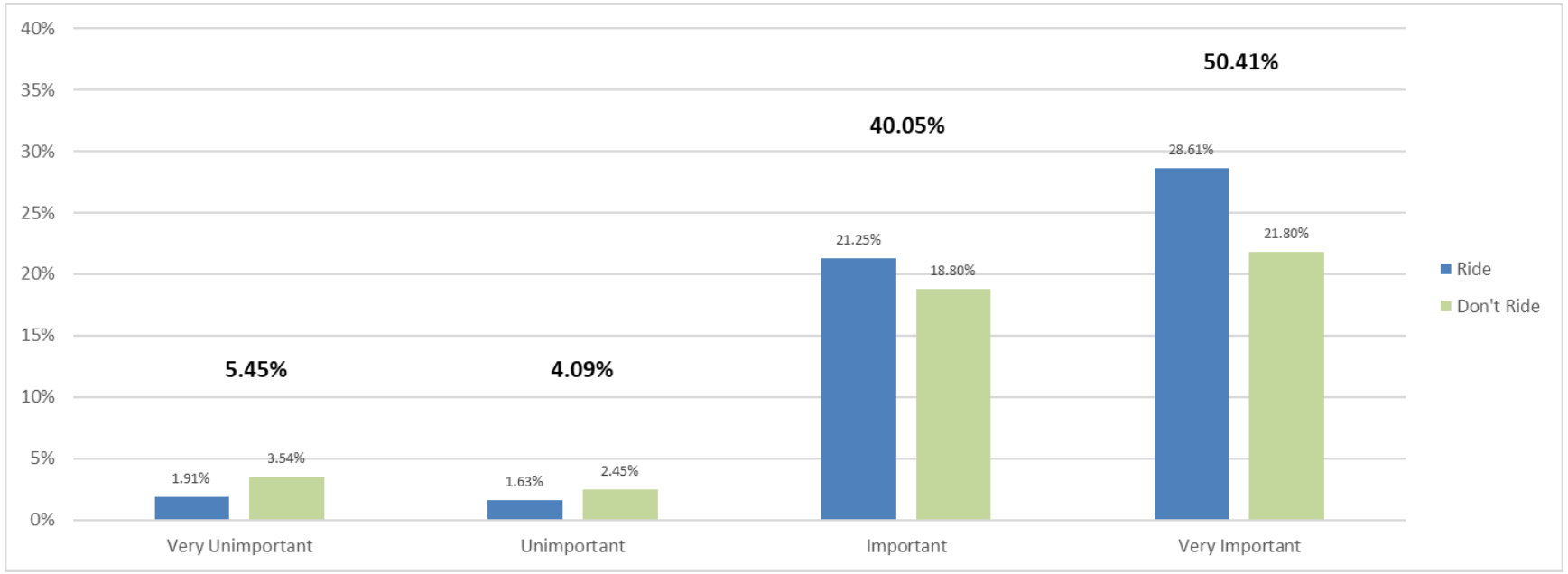
While all of the strategies were generally considered important, there were some that received a more lukewarm reception from respondents. Strategies related to rightsizing the bus fleet, addressing bus driver shortages, assessing technology needs, and supporting park & ride received slightly positive responses. It was assessed by the stakeholder group that these strategies, more than any others, were more frequently answered by respondents who were unsure or unfamiliar with transit operations. It is for this reason why most responses were generally supportive but not enthusiastically so.

Figure A4.49: Develop a rightsizing strategy for transit agency bus fleets to decrease costs and better match vehicle sizes to the number of people taking the bus.



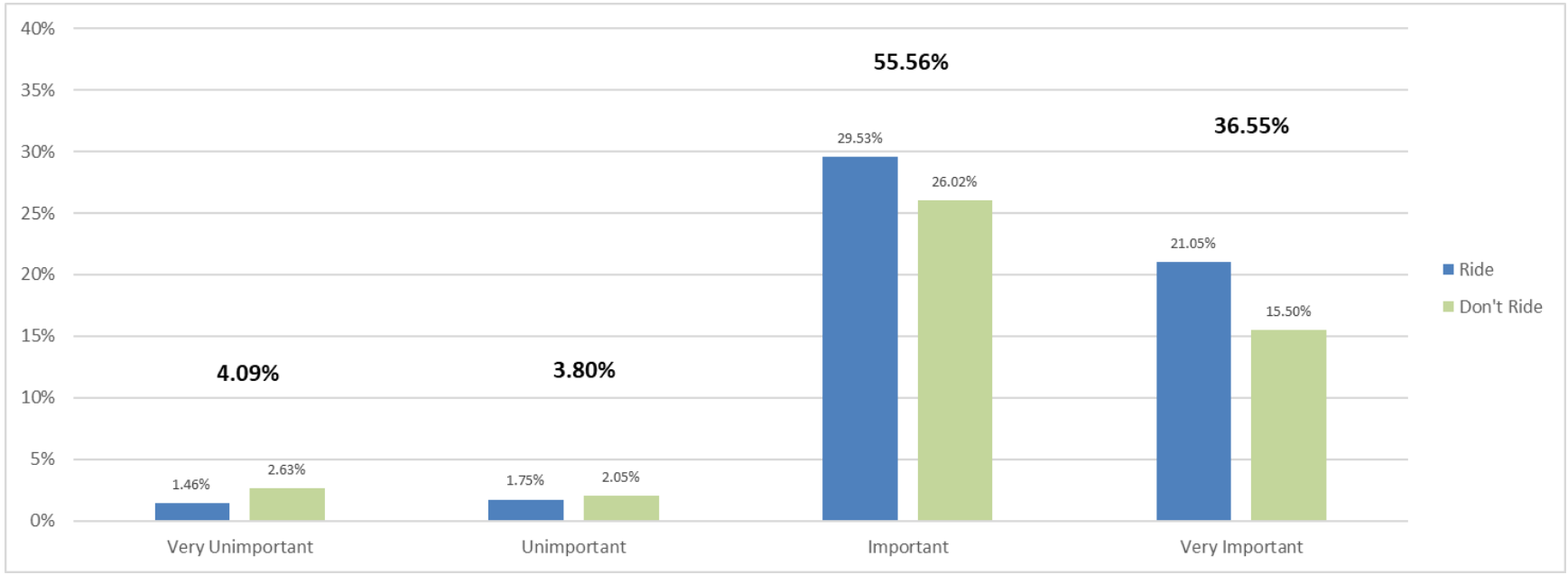
Sources: Iowa DOT, Survey Monkey

Figure A4.50: Decrease fuel costs for transit agencies by adopting electric, hybrid, or flex-fuel efficient vehicles.



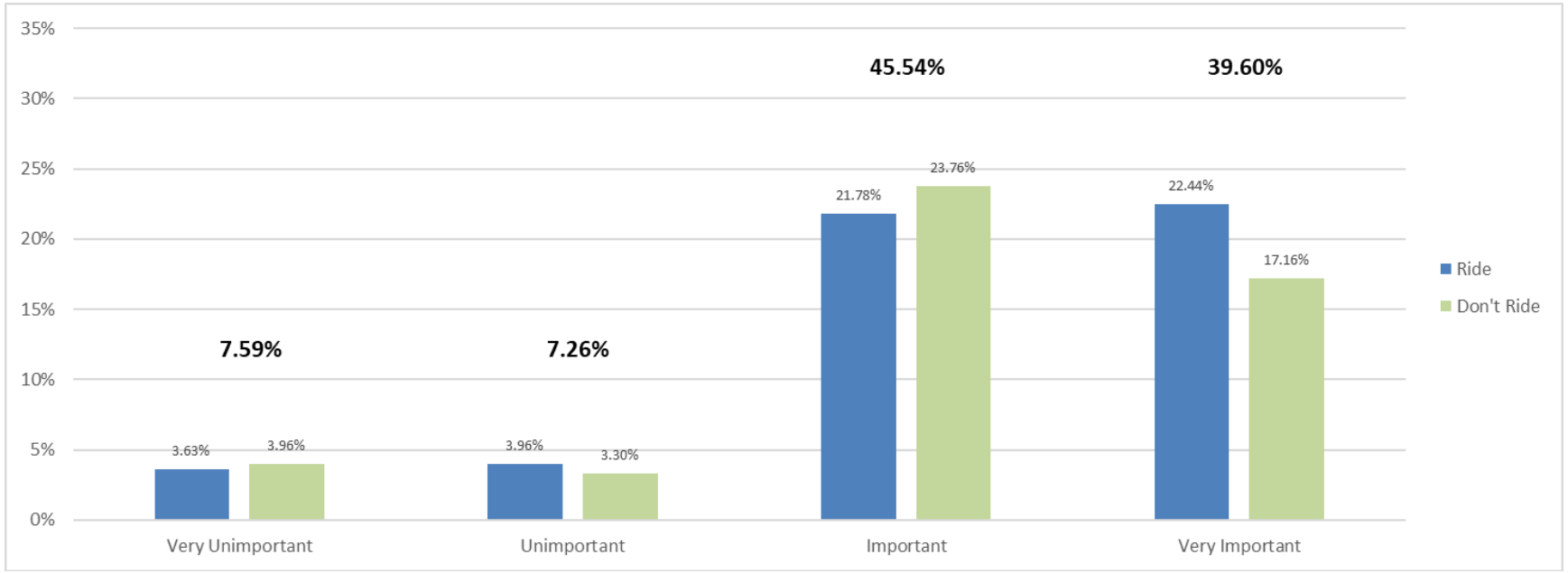
Sources: Iowa DOT, Survey Monkey

Figure A4.51: Prioritize transit facilities that are evaluated as being in marginal or poor condition for reconstruction or repair.



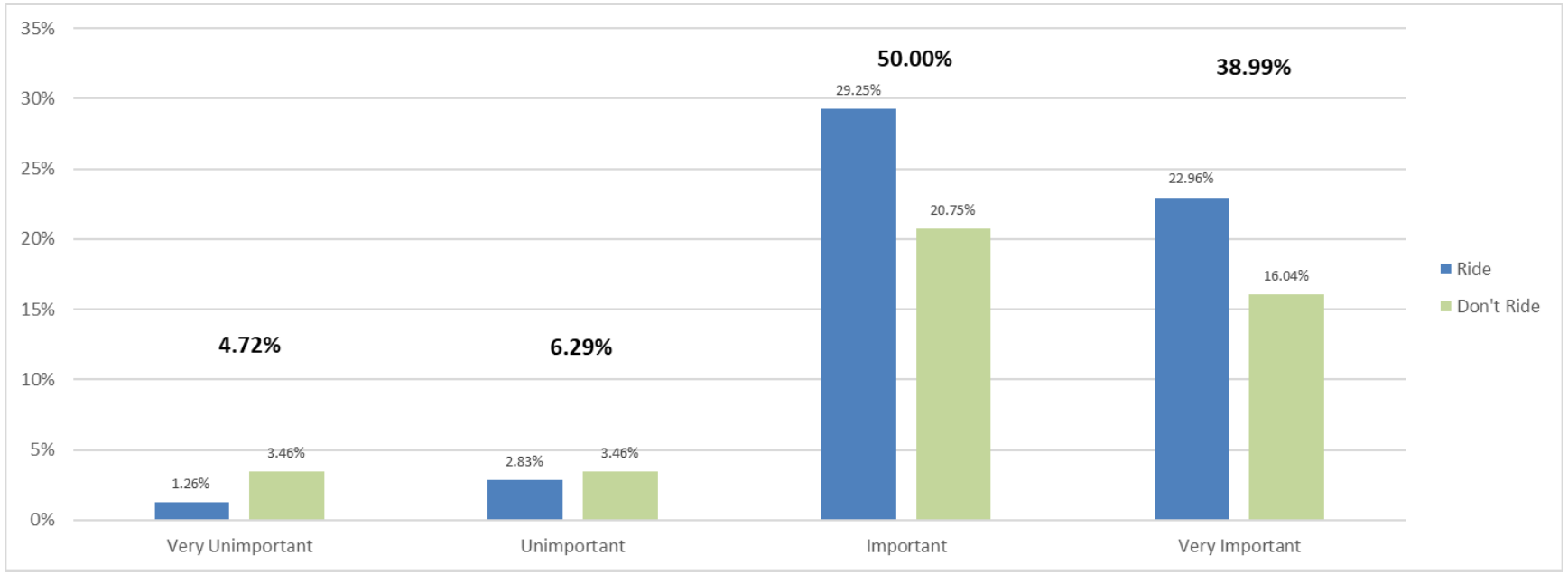
Sources: Iowa DOT, Survey Monkey

Figure A4.52: Save costs by encouraging transit agencies and local governments to share facilities and staff.



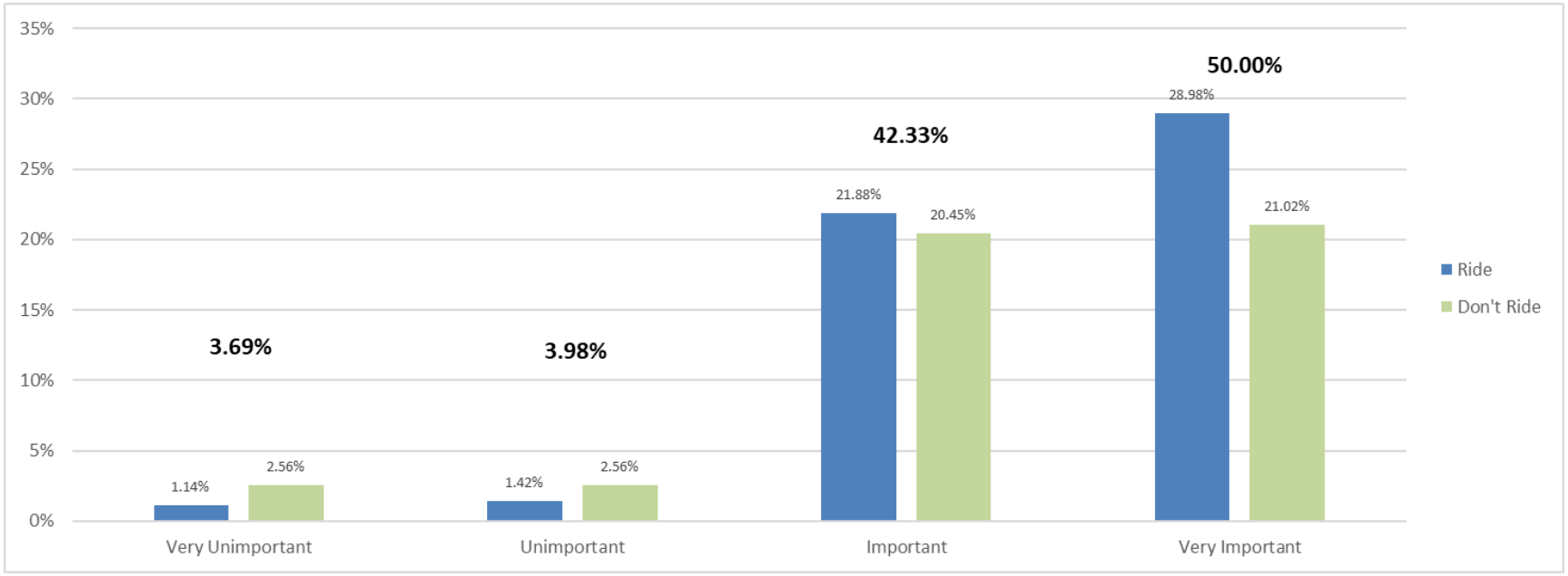
Sources: Iowa DOT, Survey Monkey

Figure A4.53: Address the bus driver shortage by targeting non-traditional candidates to expand the pool of potential applicants.



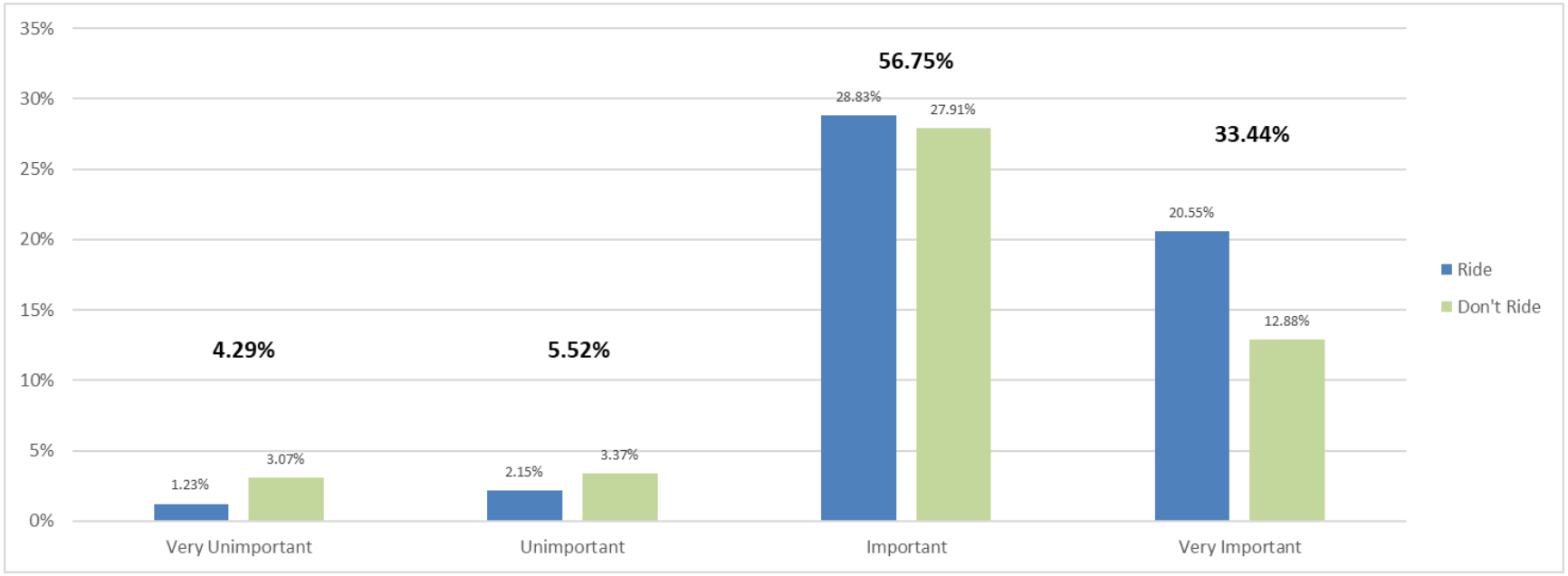
Sources: Iowa DOT, Survey Monkey

Figure A4.54: Increase training for bus drivers to better serve mobility, hearing or visually impaired riders, children, older adults, immigrant, and refugee populations.



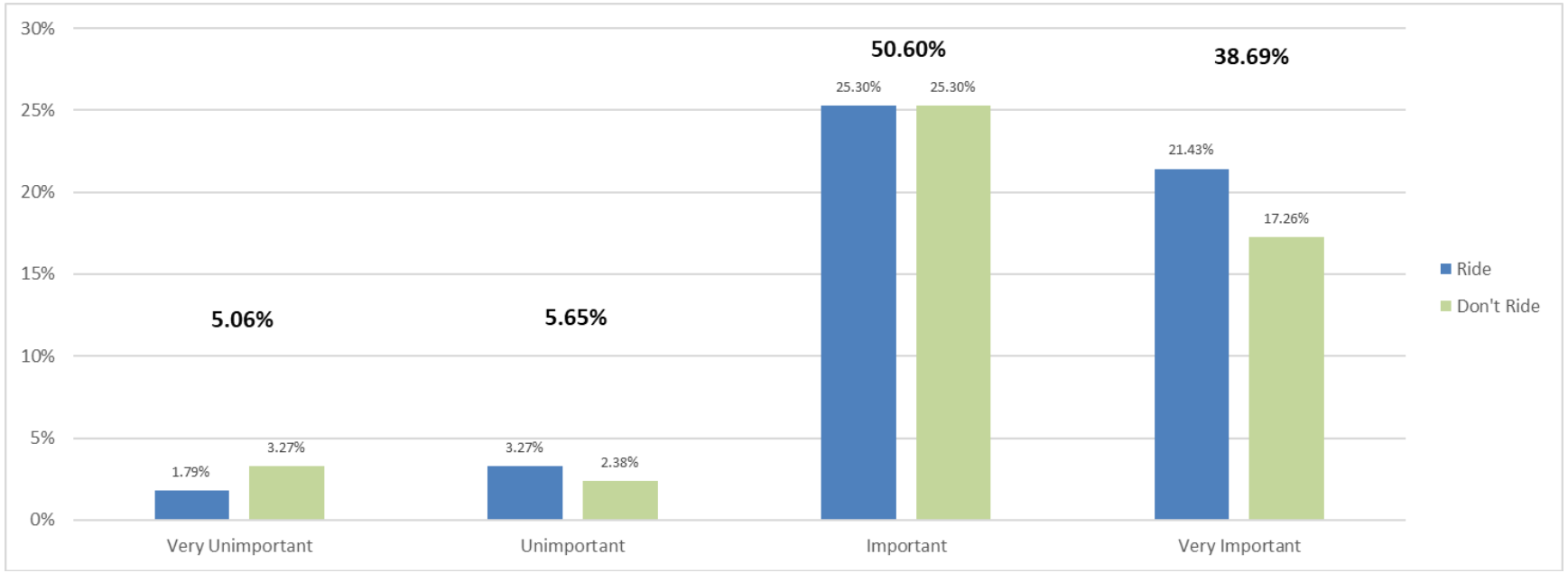
Sources: Iowa DOT, Survey Monkey

Figure A4.55: Identify minimum technology needs for all transit agencies and develop a technology implementation plan.



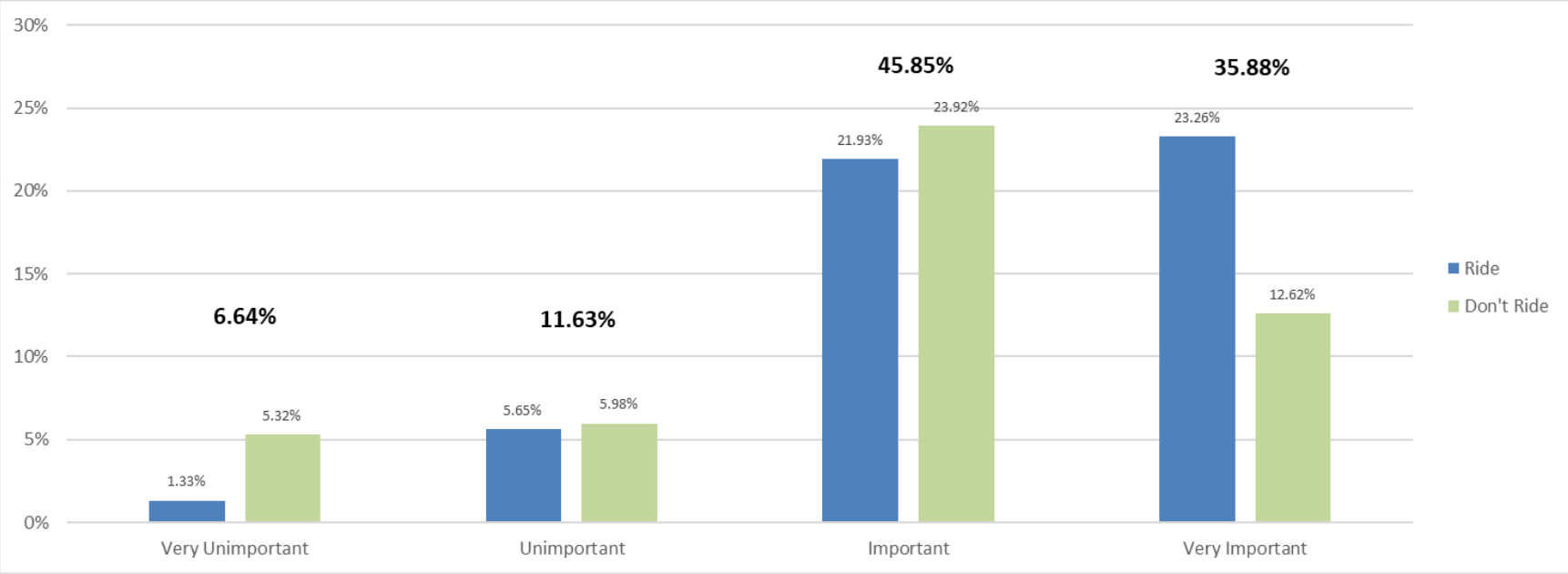
Sources: Iowa DOT, Survey Monkey

Figure A4.56: Update the park and ride system plan to determine ideal locations for carpooling and ridesharing to support commuting activities.



Sources: Iowa DOT, Survey Monkey

Figure A4.57: Improve the coordination of transportation services between transit agencies and other transportation providers by promoting and hiring mobility manager positions to provide statewide coverage.



Sources: Iowa DOT, Survey Monkey

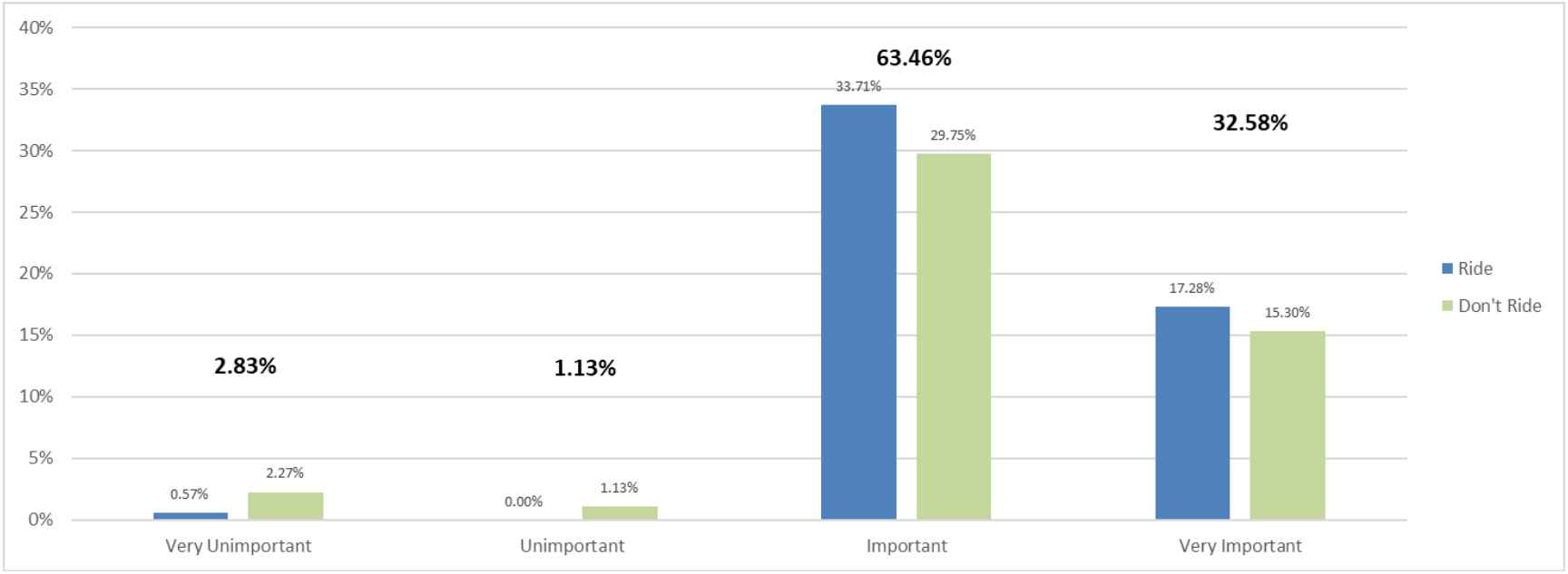
Funding Strategies

Figures A4.58 through A4.60 represent strategies that were focused on identification of cost savings opportunities and developing sustainable financial support for public transit operations. These strategies sometimes go hand-in-hand with some of the strategies mentioned previously by providing the funding streams necessary to sustain existing services, address service gaps, or enhancing the means in which transit serves the public.

Key takeaways from the funding strategy results include the universal agreement between transit riders and non-riders on the importance of analyzing the cost-benefit and return-on-investment that public transit provides for the communities it serves and businesses it helps support.

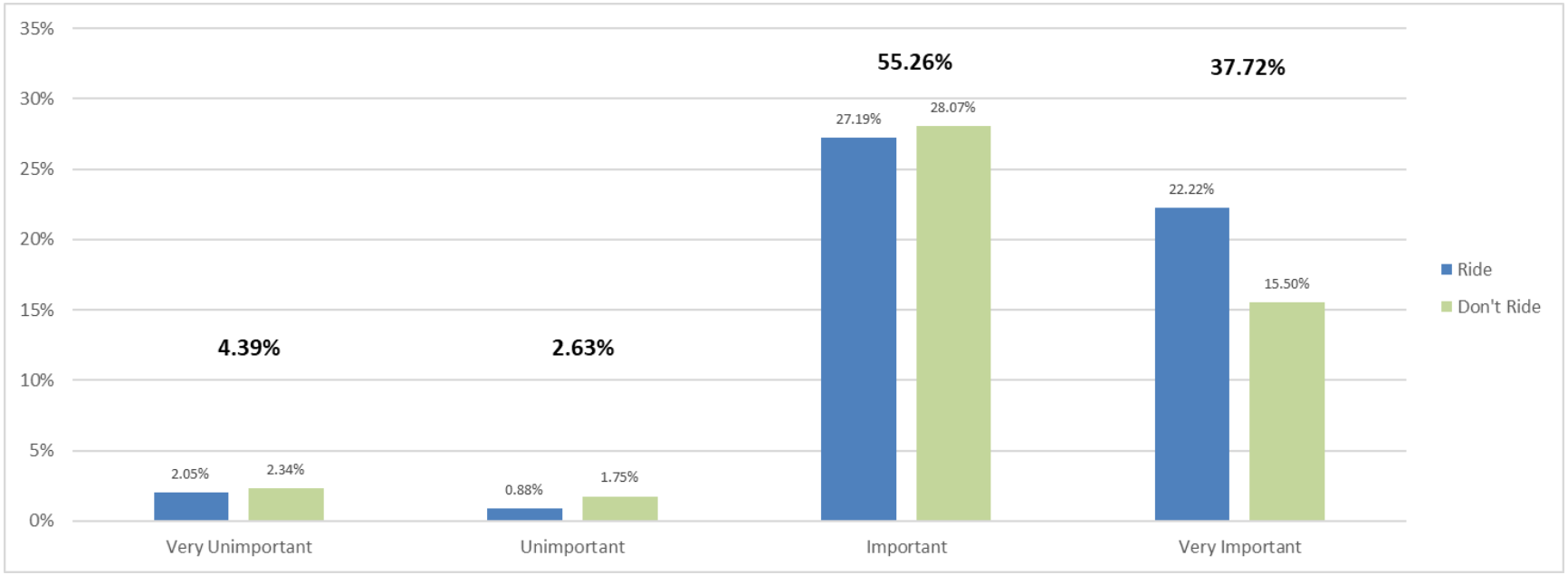
Similar to the facility, fleet, and personnel strategy results, there was generally slightly positive but lukewarm support for bus replacement strategies to address maintenance costs or identifying alternate sources of funding. Likewise, the stakeholder group assessed that these strategies also had respondents that seemed to be unsure or unfamiliar with these topics.

Figure A4.58: Decrease maintenance costs by focusing resources on replacing transit vehicles that are beyond their useful life.



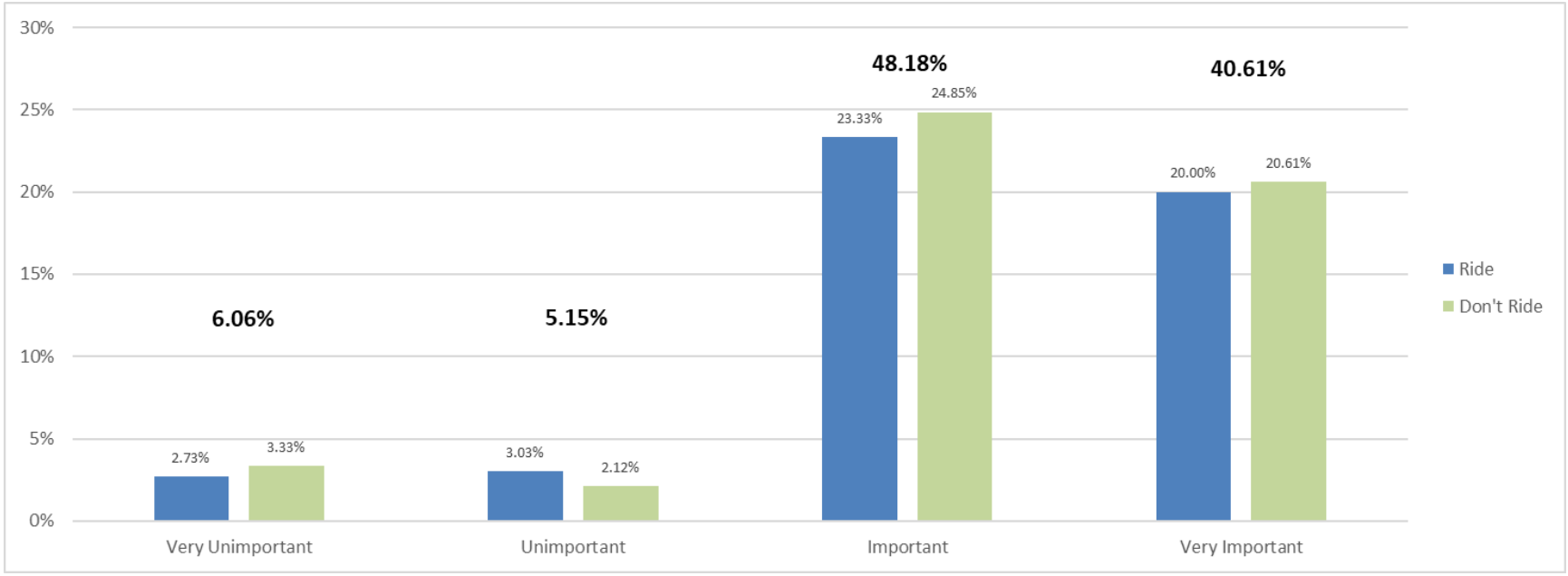
Sources: Iowa DOT, Survey Monkey

Figure A4.59: Examine alternative ways of funding public transit that do not rely only on existing federal and state sources.



Sources: Iowa DOT, Survey Monkey

Figure A4.60: Conduct a benefit-cost analysis or economic impact study for all transit services and projects in order to measure the impact and overall benefit to social welfare.



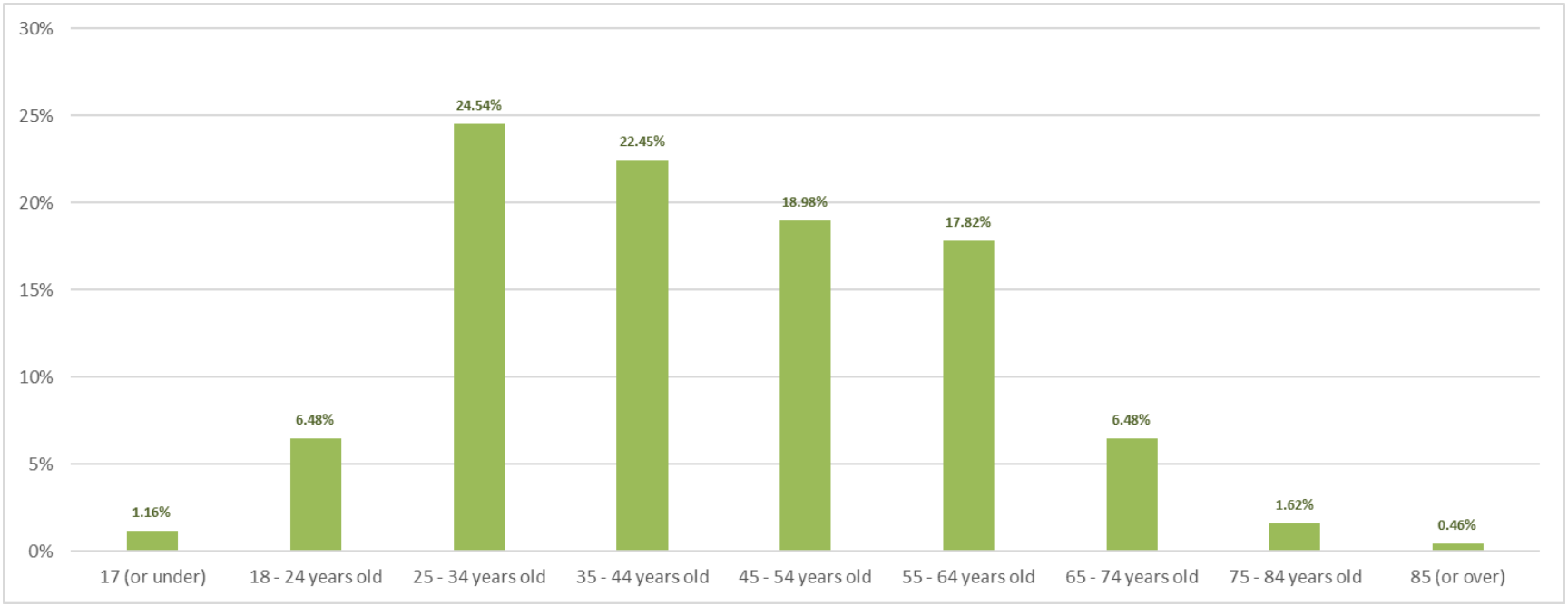
Sources: Iowa DOT, Survey Monkey

Demographic Information

Figures A4.61 through A4.70 depict the optional demographic information that respondents were asked to provide if willing. Three of the questions from this section but not shown below relate to ZIP codes indicating where the respondent lived, went to work, and went to school. This information was already depicted above on the map in Figure A4.22 comparing this public survey results to prior surveys.

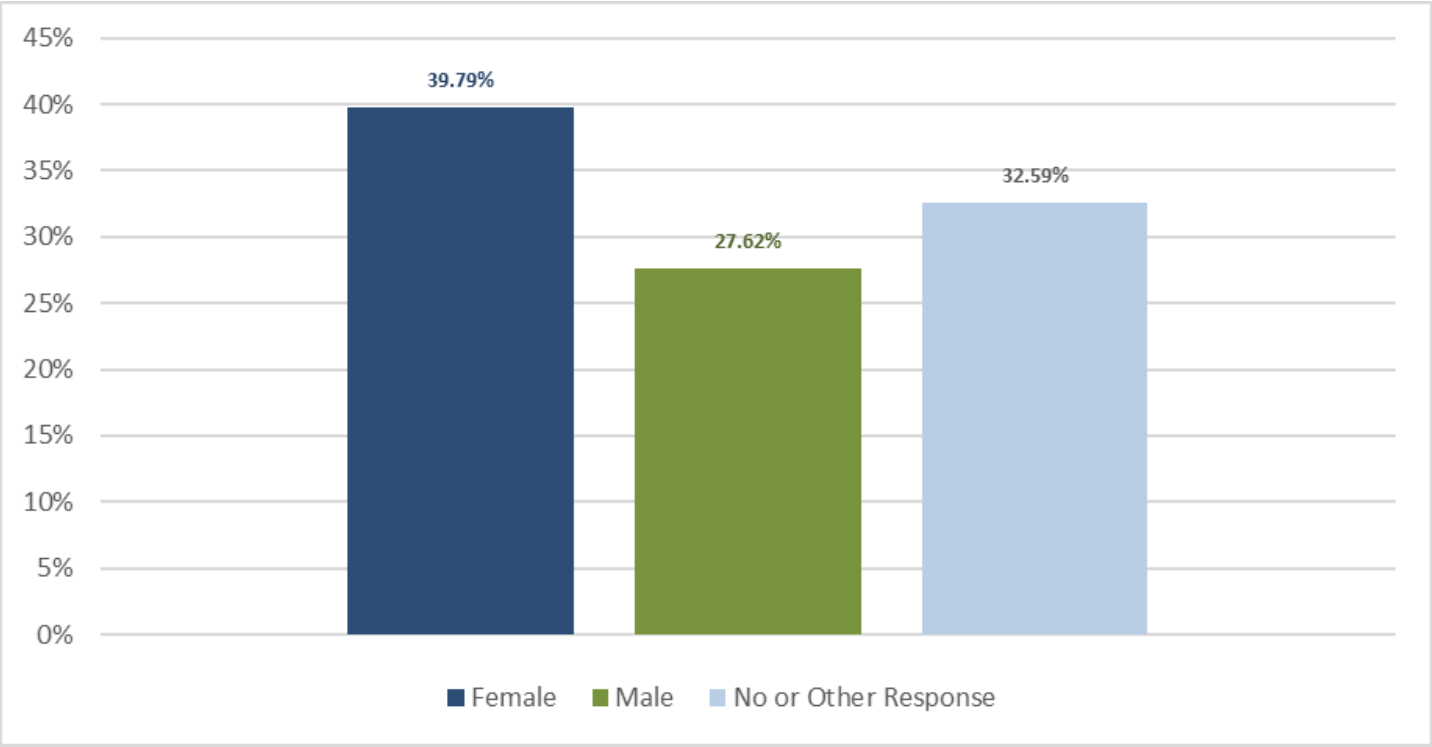
Demographic descriptions for each of these questions utilized terminology directly from the U.S. Census Bureau's statistics as much as possible, including for race, ethnicity, language, and disability categories. Questions regarding living area preferences and the number of licensed drivers or vehicles in a household were based on similar survey questions from the Iowa in Motion 2045 State Long Range Transportation Plan. The question regarding a respondent's gender was asked in an open-ended format to allow the respondent to type in whatever they felt comfortable answering. The majority of respondents utilized male or m, female or f, or chose not to respond.

Figure A4.61: What age group best describes you?



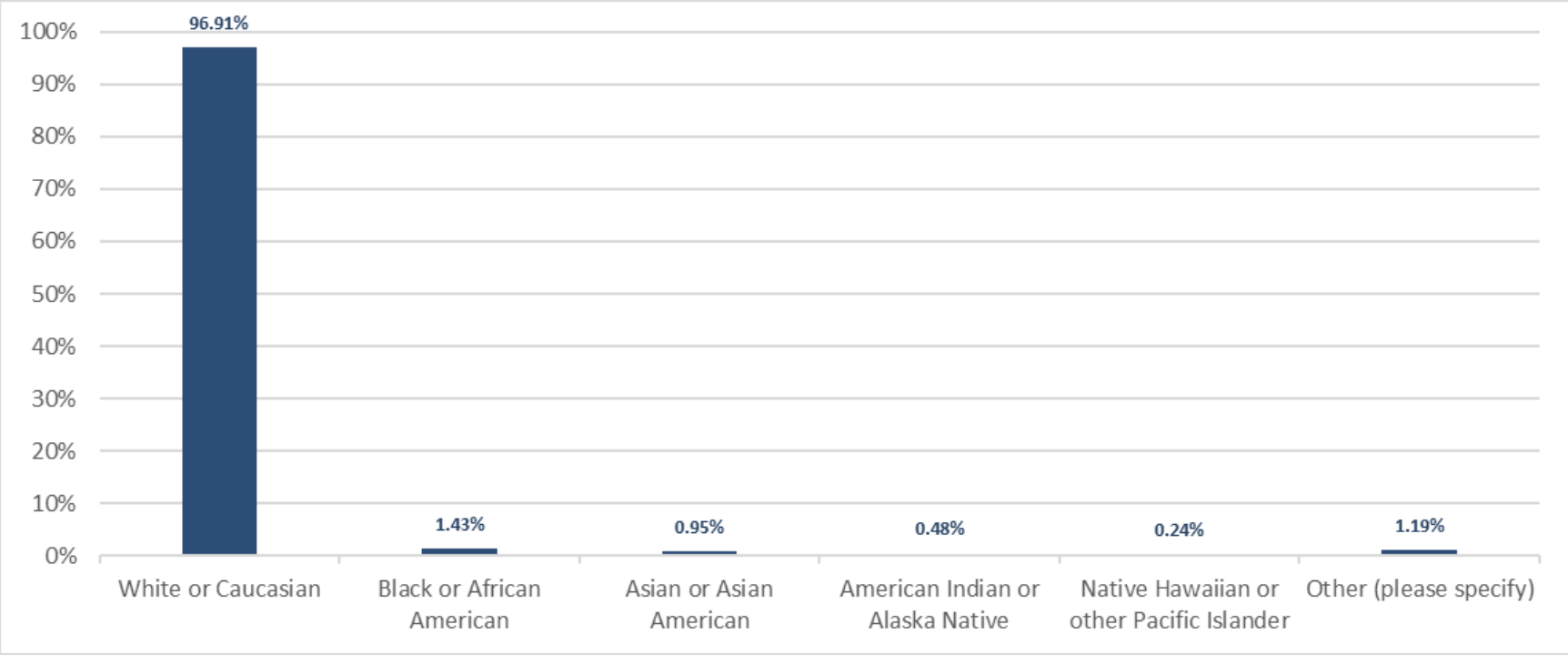
Sources: Iowa DOT, Survey Monkey

Figure A4.62: What is your gender?



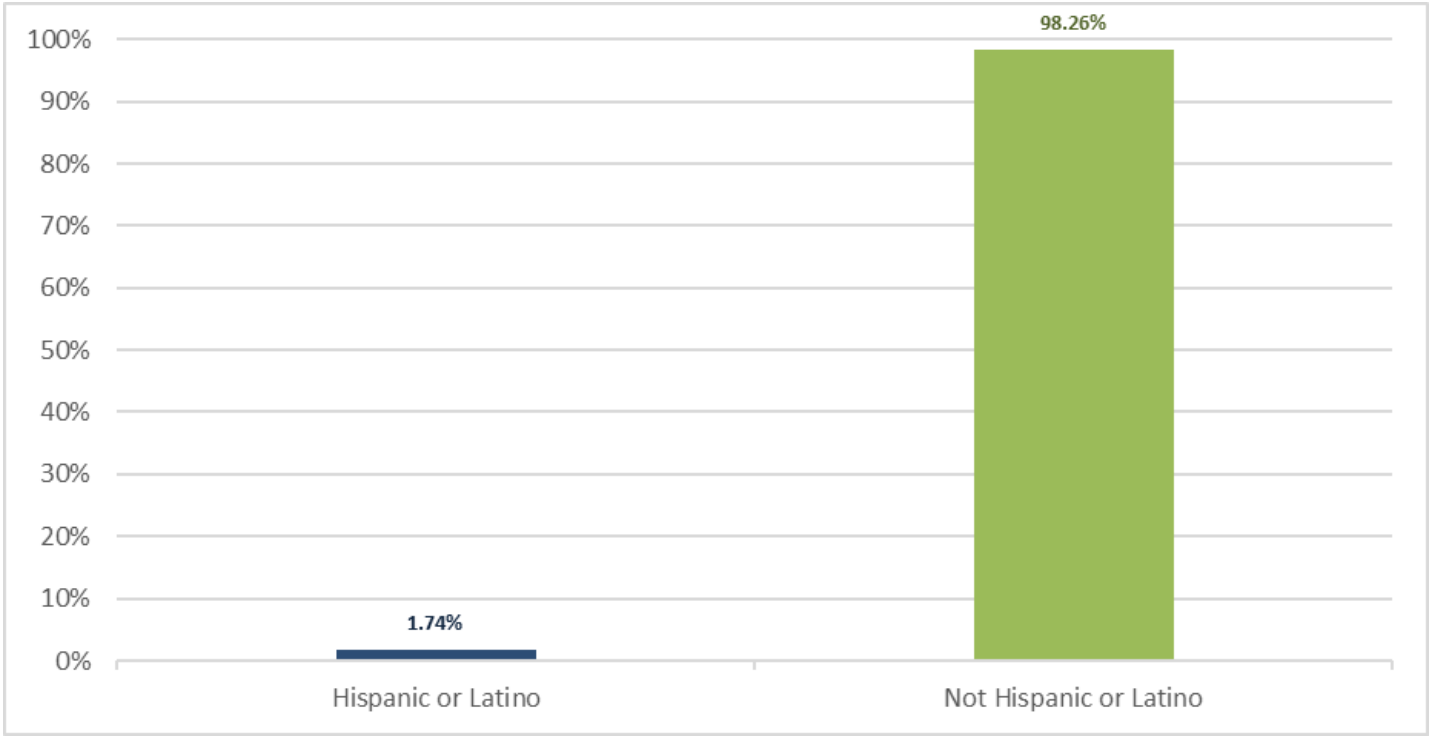
Sources: Iowa DOT, Survey Monkey

Figure A4.63: What race do you identify yourself as?



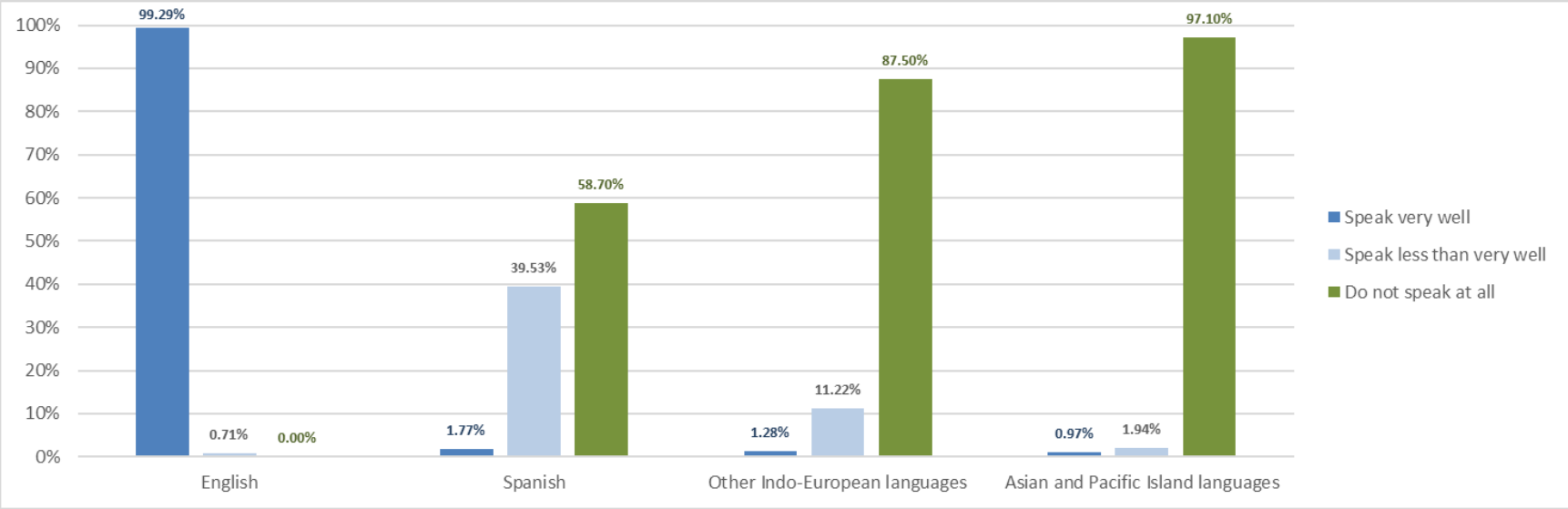
Sources: Iowa DOT, Survey Monkey

Figure A4.64: What ethnicity do you identify yourself as?



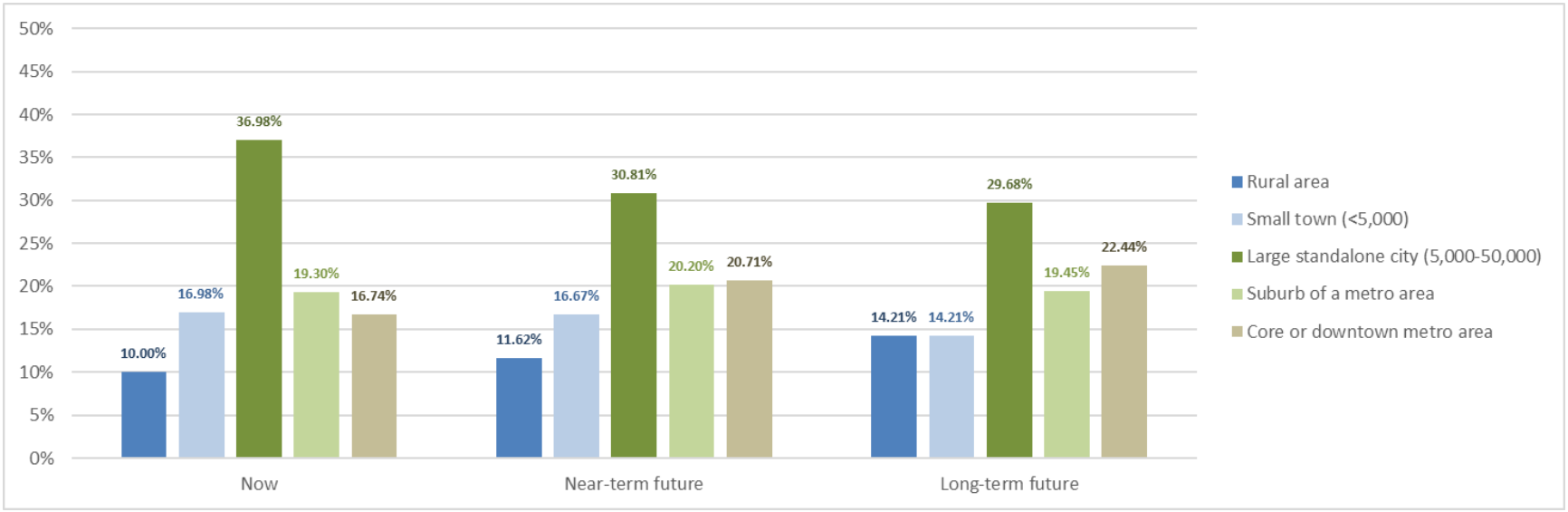
Sources: Iowa DOT, Survey Monkey

Figure A4.65: Please rate your language proficiency.



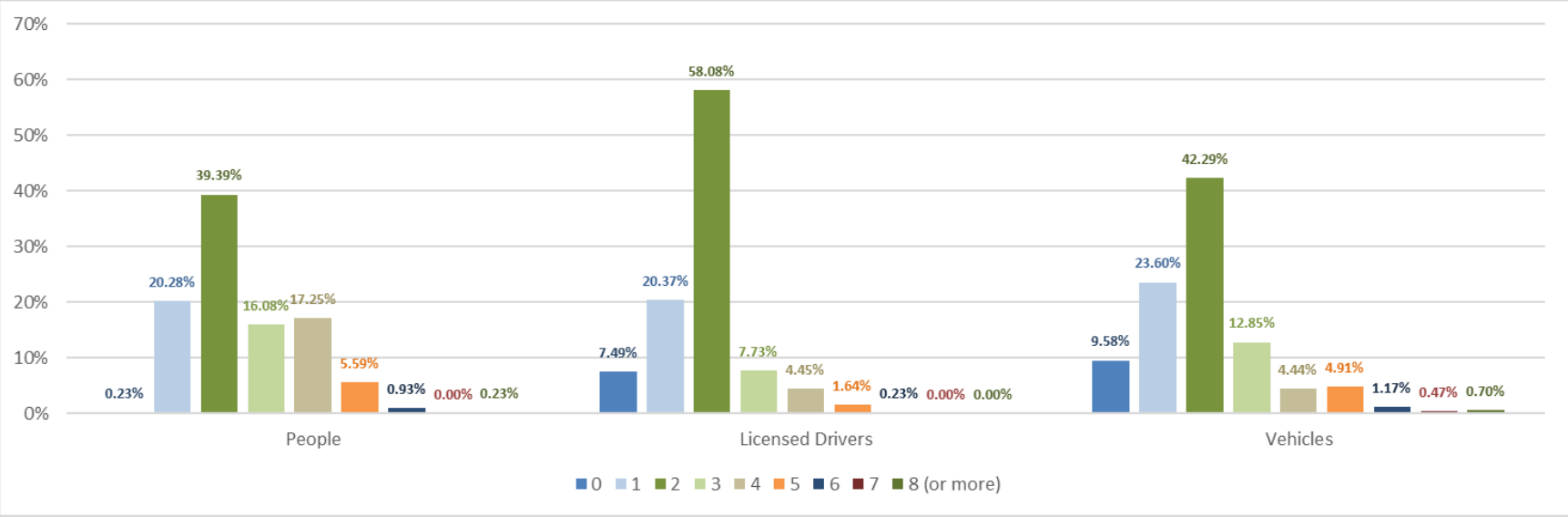
Sources: Iowa DOT, Survey Monkey

Figure A4.66: Which of these best describes where you live now, and where you would prefer to live in the future?



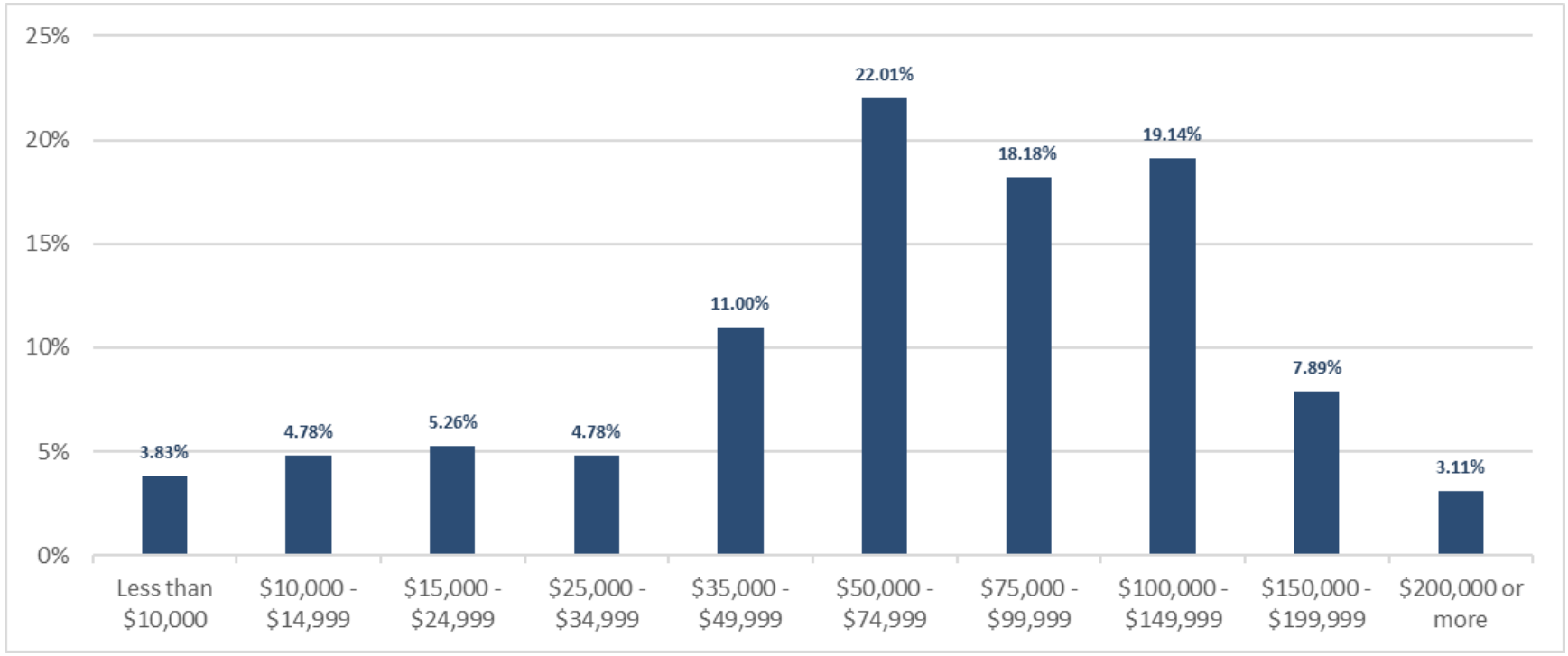
Sources: Iowa DOT, Survey Monkey

Figure A4.67: How many of each of the following are in your household?



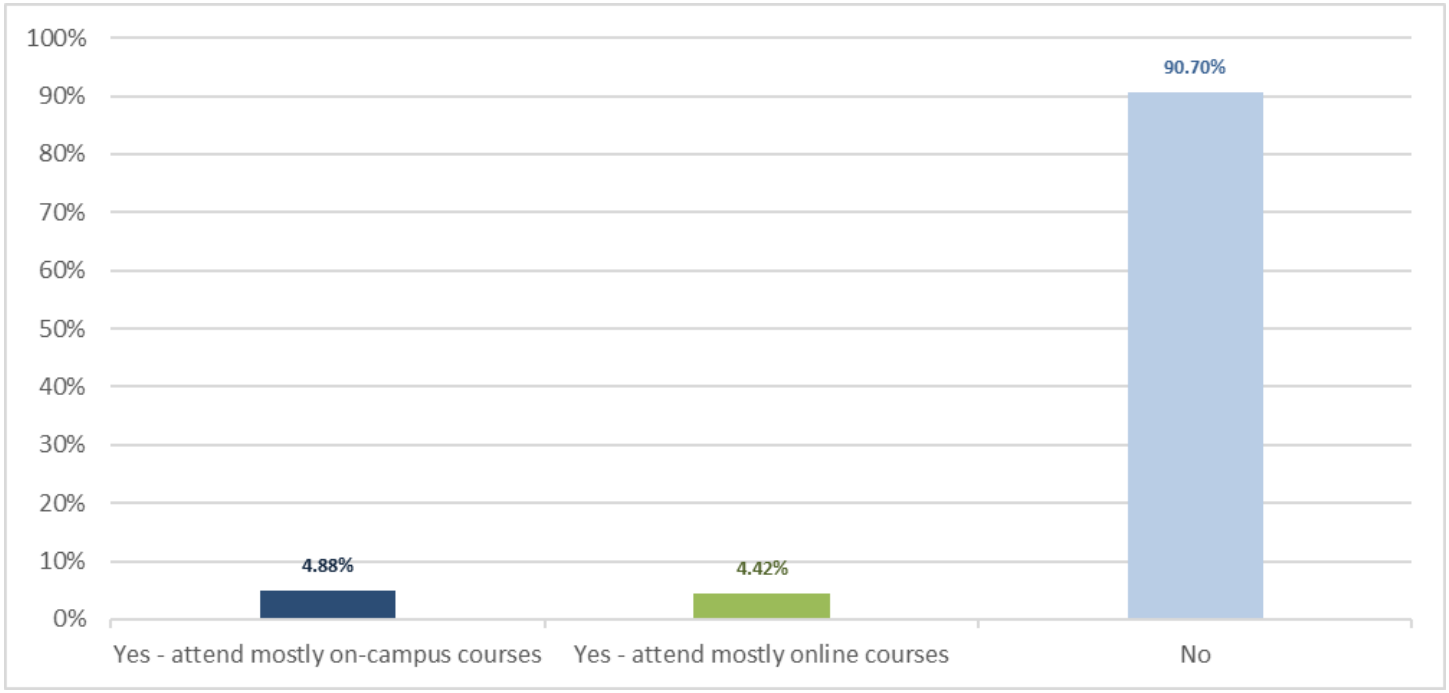
Sources: Iowa DOT, Survey Monkey

Figure A4.68: What is your approximate annual household income?



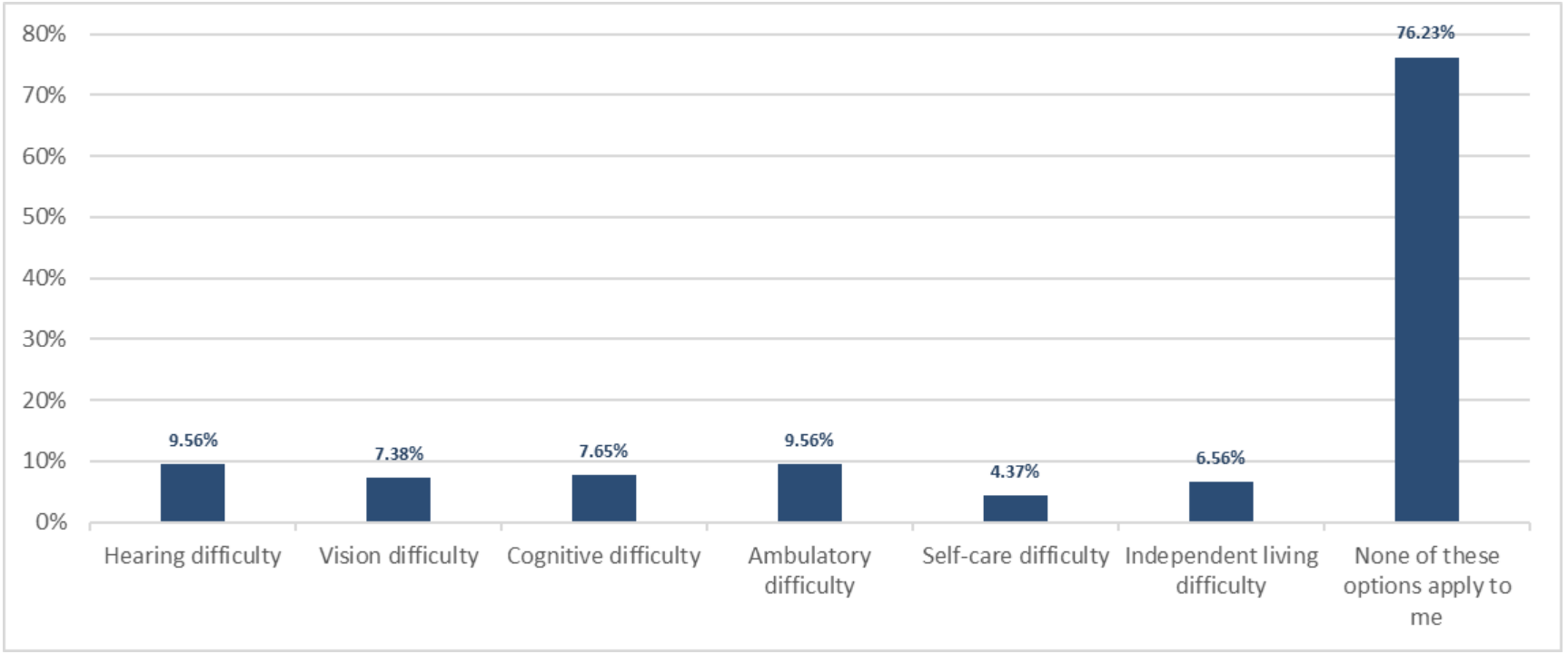
Sources: Iowa DOT, Survey Monkey

Figure A4.69: Are you currently enrolled in college, undergraduate, graduate or professional school?



Sources: Iowa DOT, Survey Monkey

Figure A4.70: Please select any of the follow disability types if they apply to you or someone that is under your care.



Sources: Iowa DOT, Survey Monkey

Prioritization of Iowa's Transit Solutions

The public survey allowed members of the public to provide input regarding the relative importance of strategies. Following that effort, the stakeholder groups guiding the development of this Plan also provided feedback, which largely mirrored the trends from the public. This also provided further validation that the strategies were sufficient to address the short-term and long-term objectives of this Plan. Strategy prioritization and resourcing is addressed in Chapter 5 of the Plan, which discusses the implementation of the strategies.

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APPENDIX 5: **FINANCIAL ANALYSIS**

Appendix 5. Financial Analysis

Background

The outputs of the finanacial analysis were highlighted in the Plan in order to describe the general state of public transit finances. However, the precise methodology that was utilized to calculate these values was not included. This appendix is intended to serve as documentation of those assumptions, efforts, and conclusions that led to the creation of the financial components in the Plan.

For this effort, the Transit Needs Survey conducted in March 2019 provided input from the State's 35 public transit agencies on the additional personnel, vehicles, and facilities needed to provide their desired level of service for the short-range horizon of 2030 and the long-range horizon of 2050. It is important to forecast what the costs to meet these needs may be and what amount of revenue is likely to be available. This appendix and Chapter 4 in the Plan address that by forecasting costs based on historical operating costs along with anticipated staff, facility, and vehicle needs, and forecasting revenues based on historical funding levels. The most critical piece of information presented in this appendix is the shortfall between anticipated future costs and revenues.

Methodology

Shortly after the Transit Needs Survey concluded in March 2019, initial planning began on a concept (Figure A5.1) to estimate the costs of accomplishing some of the stated goals of the plan, particularly being able to afford operating the transit services and maintaining or expanding capital assets such as facilities and vehicle fleets. The financial analysis consisted of several subcomponents. The first component needed was to establish a trend or baseline up to the present, reflected as historical costs and revenues. This data was fairly straightforward to acquire as it has been aggregated and reported to Iowa DOT by the transit agencies for the last few decades.
In addition to establishing a baseline for revenue and costs, the analysis also needed to be able to include anticipated or projected costs and revenue going forward into the future to the year 2050. These two components proved to be much more labor intensive as they required the validation of assumptions such as average costs per square foot for different types of facilities, as well as indexing to reflect the higher future costs due to inflation over time.

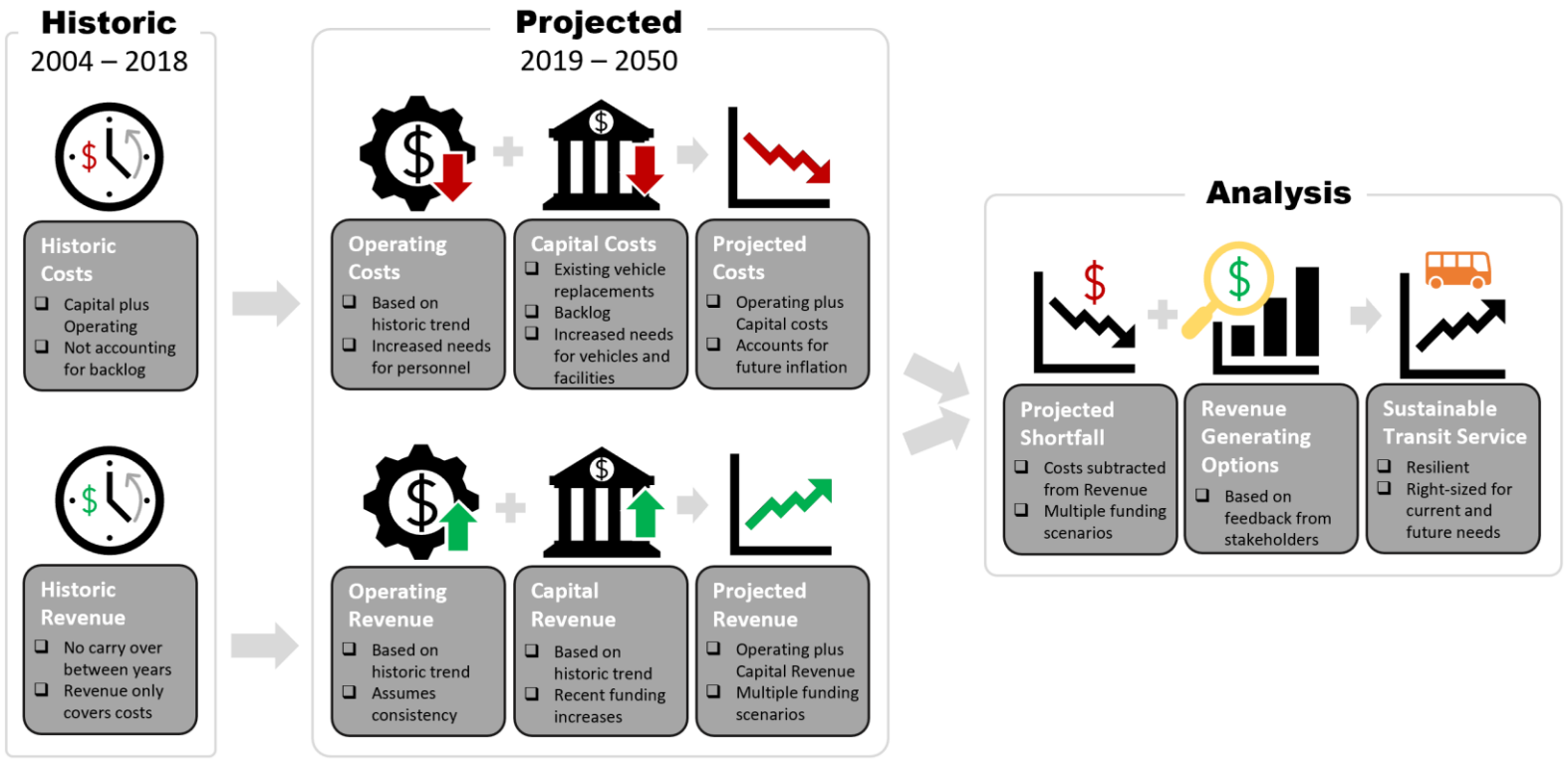
Lastly, the final component included a projection of the anticipated shortfall which was the net result after subtracting projected costs from the projected revenues. This shortfall will then become the focal point for which alternative or complementary funding mechanisms

could be adopted in order to mitigate, reduce, or eliminate any gap between cost and revenue, helping to ensure that the goals and strategies of this plan could be accomplished within the planning horizon of 2050.

Primary components of the transit financial analysis include:

- **Historical Costs and Revenues:** Capital and operating expenditures by year from 2004 to 2018
- **Projected Revenue:** Operating and capital revenue by funding scenario by year from 2019 to 2050
- **Projected Costs:** Operating and capital expenses by year from 2019 to 2050
- **Projected Shortfall:** Net difference between projected costs and revenue by funding scenario by year from 2019 to 2050

Figure A5.1: Financial analysis concept



Source: Iowa DOT

Historical Costs and Revenues

The financial analysis for this Public Transit Plan leveraged the revenue-cost forecasting approach used in previous modal and state transportation system analyses. The data gathered for Iowa in Motion 2045 served as the basis for understanding transit-related expenditures up to 2016 with only the data for years 2017 and 2018 needing to be populated for this Plan.

While the 5-Year Program served as the framework for presenting financial information in the Iowa in Motion 2045 plan, it was only included for context in the Public Transit plan. Another component, total operating costs, served as a key planning factor for estimating future operation costs which typically fluctuate depending on contemporary fuel prices, employee wages, and vehicle maintenance.

The components of the historical costs include the following. Figure A5.2 provides the historical costs from 2004 to 2018.

5-Year Program

- **Transit portion of 5-Year Program:** State Transit Assistance plus the Public Transit Infrastructure Grant Program.
- **Percent 5-Year Program:** Percentage of the value of the 5-Year Program that reflects transit projects and programs.

Total Capital

- **5309/5339 capital:** Capital projects for replacement, rehabilitation, and purchase of vehicles. Includes urban, non-urban, and metropolitan areas in Iowa. Includes federal Congestion Mitigation and Air Quality (CMAQ) monies that are taken off the top of Iowa's CMAQ apportionment by the Iowa Transportation Commission for bus replacement.
- **PTIG capital:** Public Transit Infrastructure Grant (PTIG) funding, which was established by the 2006 Iowa General Assembly. The purpose is to provide funding for improvement of the vertical infrastructure of Iowa's designated public transit systems. Funding amounts vary by fiscal year.

Total Operating

- **Federal Transit Assistance (FTA):** Formula allocation and competitive federal funding for metropolitan and non-metropolitan transportation planning, grant programs, senior and individuals with disabilities mobility programs, intercity bus assistance, and bus facilities grants.
- **State Transit Assistance (STA):** Primarily formula allocation and competitive State funding for transit assistance, fellowship programs, special projects, infrastructure grants, and capital match loan programs.
- **Local:** The bulk of transit funding in Iowa comes from local sources, especially on the operating side, typically generated from passenger revenues such as farebox revenue and ticket prices, and contract revenue by provide certain types of rides to

organizations and private businesses. Other sources of local funding can also derive from municipal or regional transit levies, student fees, or advertising revenue.[1]

Figure A5.2: Historical transit costs, 2004 – 2018

HISTORICAL COSTS	2004	2005	2006	2007	2008	2009	2010
Transit portion of 5 Yr Program	$8,123,000	$10,992,000	$10,780,000	$12,561,000	$12,457,000	$13,303,000	$12,341,000
Percent 5 Yr Program	$98,659	$128,922	$118,552	$137,931	$114,776	$118,739	$115,312
5309/5339 capital	$11,262,135	$10,389,561	$8,798,961	$4,171,920	$10,784,880	$9,208,690	$6,252,600
PTIG capital	$1,970,000	$1,970,000	$1,970,000	$2,200,000	$2,200,000	$2,200,000	$1,250,000
Total capital	$13,232,135	$12,359,561	$10,768,961	$6,371,920	$12,984,880	$11,408,690	$7,502,600
Total operating	$69,101,622	$72,901,317	$80,161,753	$84,695,200	$95,548,592	$100,626,759	$99,520,261
Total operating & capital	**$82,333,757**	**$85,260,878**	**$90,930,714**	**$91,067,120**	**$108,533,472**	**$112,035,449**	**$107,022,861**

HISTORICAL COSTS	2011	2012	2013	2014	2015	2016	2017	2018
Transit portion of 5 Yr Program	$12,239,000	$12,238,656	$11,738,656	$13,023,032	$13,654,125	$15,451,000	$0	$0
Percent 5 Yr Program	$113,380	$96,072	$97,344	$103,267	$105,269	$115,847	$0	$0
5309/5339 capital	$0	$15,101,560	$5,109,640	$7,079,828	$7,266,453	$7,252,086	$7,585,401	$10,334,991
PTIG capital	$2,000,000	$2,000,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Total capital	$2,000,000	$17,101,560	$6,609,640	$8,579,828	$8,766,453	$8,752,086	$9,085,401	$11,834,991
Total operating	$105,947,101	$110,289,501	$113,980,336	$117,530,563	$120,939,956	$124,621,775	$130,300,140	$134,969,649
Total operating & capital	**$107,947,101**	**$127,391,061**	**$120,589,976**	**$126,110,391**	**$129,706,409**	**$133,373,861**	**$139,385,541**	**$146,556,245**

Note: 5-Year Program data was not available for 2017 and 2018

Source: Iowa DOT

Projected Revenue

When forecasting or projecting the amount of revenue and funds for public transportation, an important consideration is that unlike private enterprises, public organizations do not typically generate a profit. Therefore, funding is either awarded or allocated based on anticipated needs or requests or applications for specific projects such as for capital assets; expected revenues are incorporated into a budget that the agency then operates out of to cover things such as salaries and fuel. Due to the variability of operational expenses, those tend to be the most difficult to project and as a result trends are utilized for that aspect of the forecast. Expected replacement costs and construction needs are based on physical capital assets that can be easier to anticipate which helps aid in those estimates.

[1] Iowa Department of Transportation, "Transit Manager's Handbook", 2020, https://iowadot.gov/transit/handbook/TMHandbookBinder.pdf

Regardless of the types and sources of revenue, it is important to project the availability of these resources into the future so that then can be used to compare and contrast against expected needs and expenses in order to determine any gaps or shortfalls in the funding.

Types of revenue include:

Operating Funding

- **Federal:** Formula allocation and competitive federal funding for metropolitan and non-metropolitan transportation planning, grant programs, senior and individuals with disabilities mobility programs, intercity bus assistance, and bus facilities grants.
- **State:** Primarily formula allocation and competitive State funding for transit assistance, fellowship programs, special projects, infrastructure grants, and capital match loan programs.
- **Local:** The bulk of transit funding in Iowa comes from local sources, especially on the operating side, typically generated from passenger revenues such as farebox revenue and ticket prices, and contract revenue by provide certain types of rides to organizations and private businesses. Other sources of local funding can also derive from municipal or regional transit levies, student fees, or advertising revenue.

Capital Funding

- **Scenario 1. Typical funding trend:** Capital funding trend in which recent increases (since 2018) to 5339 funds and federal competitive funds are not included. This trend reflects a conservative estimate of future funding in which recent increases to 5339 funds will not continue into the future and awarding of competitive grants will not be assumed.
  - **5339 Bus and Bus facilities (formula only):** Bus and Bus Facilities Grants program (section 5339) classified as a formula-based Federal transit assistance grant program. These funds can be utilized to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. For Scenario 1, assumes that this funding is represented by trends since before 2018.
  - **CMAQ:** The Congestion Mitigation and Air Quality (CMAQ) Program is a Federal Highway Administration (FHWA) program that is intended to fund transportation or transit projects to assist non-attainment areas for Clean Air Act standards. Since Iowa has no areas that are considered non-attainment, Iowa receives the minimum allocation of these funds that can be utilized anywhere in the state for projects with the potential to reduce transportation-related congestion and air pollution.
- **Scenario 2. Increased funding trend:** This funding trend includes the available programs, grants, and funding sources described in Scenario 1, but also includes recent increases (since 2018) to 5339 capital funds. Scenario 2 also includes sources that are not guaranteed to be funded such as federal competitive grants. This trend reflects an optimistic estimate of future funding in which recent increases to 5339 funds continue indefinitely and competitive grants continue to be allocated to Iowa.

- **5339 Bus and Bus facilities (formula only):** Same type of program as described above, but when used in Scenario 2 it also assumes that recent increases since 2018 represent the new long-term trend for its funding level.
- **Discretionary Competitive Funding:** In addition to the formula-based program, 5339 funds also can be awarded through a discretionary competitive funding process. Due to the nature of competitive funding, it is not a guaranteed source of funds.
- **CMAQ:** Same definition as above.
- **PTIG:** Public Transit Infrastructure Grant (PTIG) funding, which was established by the 2006 Iowa General Assembly. The purpose is to provide funding for improvement of the vertical infrastructure of Iowa's designated public transit systems. Funding amounts vary by fiscal year.

Operating Funding

In order to project future funding to be utilized to cover operating costs, it was necessary to determine what the average annual change in operating expenses is expected to be. To determine this, the reported federal and state funding amounts each transit agency needed to cover these expenses were aggregated. However, federal and state funding for transit operating expenses represents only a fraction of these total costs. Local funding makes up the greatest percentage of these revenues and is typically made up of fare box revenue collected through bus tickets and boarding passes as well as any local partner contributions from cities and counties, contracted revenue, performing transit services for businesses, or advertising revenue. While local funding makes up the largest share of transit operating revenue, it is not normally directly reported to Iowa DOT and as such certain assumptions needed to be made in order to approximate it. What was known is total operating expenses as well as known federal and state funding sources. For the purposes of this financial analysis, it was assumed that the difference between reported operating costs and the sum of federal and state funding could be used to represent local funding.

Figure A5.3 shows the percentage breakdown of federal, state, and assumed local funding that was utilized to cover operational expenses by transit agencies from 2004 to 2018. Starting with 2005, the percentage change from the previous year was calculated; these percentages were averaged over the course of the entire historical period, resulting in an average increase of 4.95 percent in operating costs per year.

Figure A5.3: Operating revenue by funding source from 2004 through 2018

	1	2	3	4	5	6	7	8
Funding Source	2004	2005	2006	2007	2008	2009	2010	2011
Federal	20.87%	20.26%	20.32%	23.26%	25.98%	25.43%	27.42%	25.80%
State	11.63%	13.63%	13.13%	12.43%	11.68%	10.43%	9.55%	9.93%
Local	67.50%	66.11%	66.56%	64.30%	62.34%	64.14%	63.03%	64.27%
Δ operating costs/previous year		5.50%	9.96%	5.66%	12.81%	5.31%	-1.10%	6.46%
	Notes:							
	Difference between total historic costs and Federal + State is assumed to be covered by local sources							

	9	10	11	12	13	14	15
Funding Source	2012	2013	2014	2015	2016	2017	2018
Federal	24.10%	24.76%	26.49%	24.74%	24.11%	22.62%	21.75%
State	10.23%	10.62%	10.62%	10.94%	11.11%	10.89%	10.54%
Local	65.66%	64.62%	62.89%	64.32%	64.78%	66.49%	67.71%
Δ operating costs/previous year	4.10%	3.35%	3.11%	2.90%	3.04%	4.56%	3.58%
	Notes:						
	Difference between total historic costs and Federal + State is assumed to be covered by local sources						

Average Funding (per year)	
23.86%	Federal
11.16%	State
64.98%	Local
4.95%	Δ change

Source: Iowa DOT

The federal, state, and local average annual increases were calculated and applied to the historical operation values in order to forecast total future operating revenue. As noted, operational revenue amounts equal the total operation expenditures. The results of this calculation are shown in Figure A5.4 in tabular format and as a stacked line chart in Figure A5.5. Just as with historical operating revenues, it is expected that local funding sources will make up the largest share of this which accounts for roughly 65 percent of funds. Federal funding comes in next at almost 24 percent with state funding at 11 percent.

Figure A5.4: Total forecasted operating revenue by funding source from 2019 through 2050

Transit operating funding forecast by year (2019 - 2030)

	1	2	3	4	5	6	7	8	9	10	11	12
Funding Source	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Federal	$33,798,677	$35,392,802	$36,986,927	$38,581,052	$40,175,178	$41,769,303	$43,363,428	$44,957,554	$46,551,679	$48,145,804	$49,739,929	$51,334,055
State	$15,804,945	$16,550,390	$17,295,836	$18,041,281	$18,786,726	$19,532,171	$20,277,616	$21,023,062	$21,768,507	$22,513,952	$23,259,397	$24,004,843
Local	$92,047,025	$96,388,452	$100,729,879	$105,071,306	$109,412,733	$113,754,160	$118,095,588	$122,437,015	$126,778,442	$131,119,869	$135,461,296	$139,802,723
Total	**$141,650,647**	**$148,331,644**	**$155,012,642**	**$161,693,640**	**$168,374,637**	**$175,055,635**	**$181,736,632**	**$188,417,630**	**$195,098,628**	**$201,779,625**	**$208,460,623**	**$215,141,621**

Notes:
Operating increases applied as simple interest (non-compounded); Principal*(1+(Rate*Year))

Transit operating funding forecast by year (2031 - 2040)

	13	14	15	16	17	18	19	20	21	22
Funding Source	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Federal	$52,928,180	$54,522,305	$56,116,431	$57,710,556	$59,304,681	$60,898,807	$62,492,932	$64,087,057	$65,681,182	$67,275,308
State	$24,750,288	$25,495,733	$26,241,178	$26,986,624	$27,732,069	$28,477,514	$29,222,959	$29,968,405	$30,713,850	$31,459,295
Local	$144,144,150	$148,485,577	$152,827,004	$157,168,431	$161,509,859	$165,851,286	$170,192,713	$174,534,140	$178,875,567	$183,216,994
Total	**$221,822,618**	**$228,503,616**	**$235,184,613**	**$241,865,611**	**$248,546,609**	**$255,227,606**	**$261,908,604**	**$268,589,602**	**$275,270,599**	**$281,951,597**

Notes:
Operating increases applied as simple interest (non-compounded); Principal*(1+(Rate*Year))

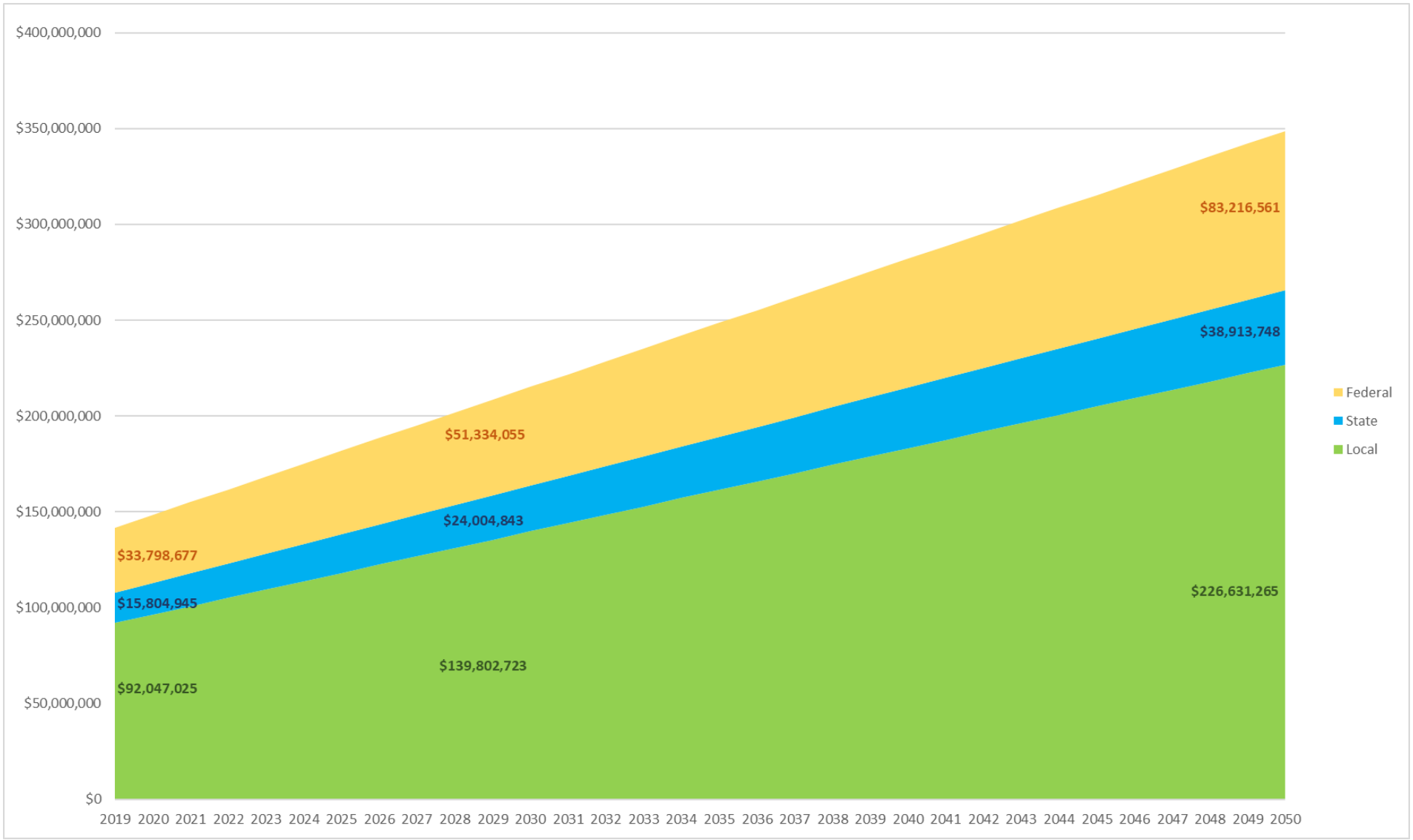
Transit operating funding forecast by year (2041 - 2050)

	23	24	25	26	27	28	29	30	31	32
Funding Source	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Federal	$68,869,433	$70,463,558	$72,057,684	$73,651,809	$75,245,934	$76,840,059	$78,434,185	$80,028,310	$81,622,435	$83,216,561
State	$32,204,740	$32,950,186	$33,695,631	$34,441,076	$35,186,521	$35,931,967	$36,677,412	$37,422,857	$38,168,302	$38,913,748
Local	$187,558,421	$191,899,848	$196,241,275	$200,582,702	$204,924,129	$209,265,557	$213,606,984	$217,948,411	$222,289,838	$226,631,265
Total	**$288,632,594**	**$295,313,592**	**$301,994,590**	**$308,675,587**	**$315,356,585**	**$322,037,583**	**$328,718,580**	**$335,399,578**	**$342,080,575**	**$348,761,573**

Notes:
Operating increases applied as simple interest (non-compounded); Principal*(1+(Rate*Year))

Source: Iowa DOT

Figure A5.5: Total forecasted operating revenue by funding source from 2019 through 2050



Source: Iowa DOT

Capital Funding

As described above, capital funding relates to revenue and funds that are intended to cover expenditures for physical assets such as vehicle procurement or transit facility construction. For those reasons, capital funding forecasts are a little more straightforward as their future costs, even when taking inflation into consideration, are easier to anticipate. The difficulty of forecasting these funds comes in the form of how they are awarded. These funds are sometimes competitive and discretionary funds or are based on temporary lines of funding such as the recent increases to 5339 Bus and Bus Facilities funds which may not persist into the future.

Due to the unpredictability of the availability of these funds, it was decided to divide these possibilities into two separate and distinct funding scenarios. Scenario 1 reflects typical funding levels in which discretionary or competitive funding such as PTIG is not available and 5339 funds reflect traditional levels which typically trended lower. Scenario 1 also assumes typical funding levels as appropriated before 2018. Scenario 2 reflects increased funding levels in which discretionary or competitive funding such as PTIG is available and 5339 funds reflect the recent increases to appropriations that were introduced in 2018. Both scenarios assumed CMAQ funding would continue to be available at the current level. Generally, funding is expected to be about 3% annual increases based on historical trends from years without major changes in transportation bills or apportionments. Figure A5.6 shows a comparison of these two funding scenarios by year from 2019 to 2050.

The funding scenario comparisons in Figure A5.6 are also represented as a stacked line chart in Figure A5.7. This graph represents a combination of layers some of which are reflected in the typical funding scenario with other layers only reflected in the increased funding scenario. In other words, the scenarios in the graph can be described as:

- **Scenario 1 (Typical Funding) =** Typical 5339 Bus and Bus facilities + CMAQ.
- **Scenario 2 (Increased Funding) =** Typical 5339 Bus and Bus facilities + Increased 5339 Bus and Bus facilities + CMAQ + PTIG + Discretionary Competitive funding.

Figure A5.6: Capital funding scenarios from 2019 through 2050

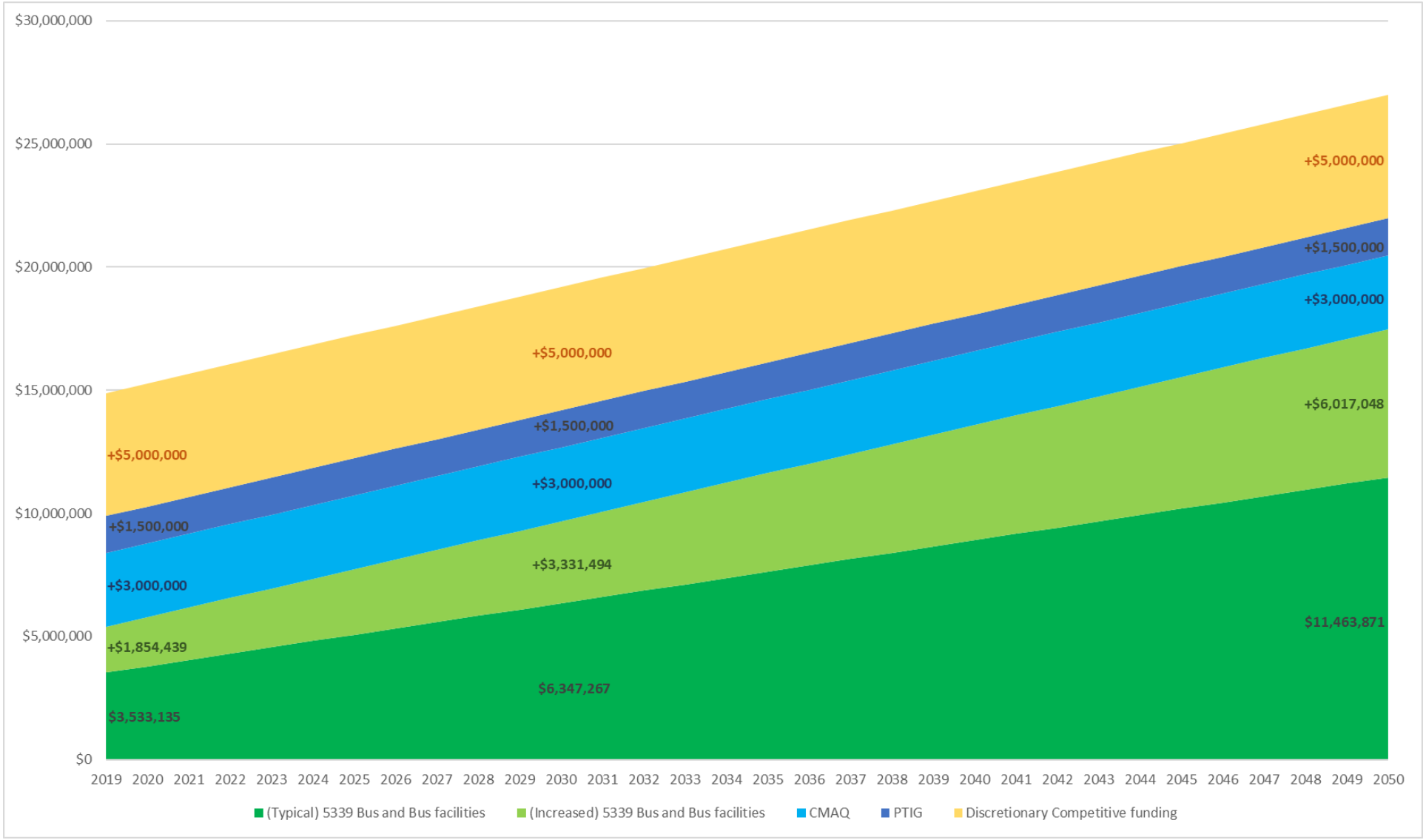
	1	2	3	4	5	6	7	8	9	10	11	12
Scenario 1. Typical Funding	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
5339 Bus and Bus facilities	$3,533,135	$3,788,965	$4,044,795	$4,300,625	$4,556,456	$4,812,286	$5,068,116	$5,323,946	$5,579,776	$5,835,607	$6,091,437	$6,347,267
CMAQ	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
PTIG												
Total	**$6,533,135**	**$6,788,965**	**$7,044,795**	**$7,300,625**	**$7,556,456**	**$7,812,286**	**$8,068,116**	**$8,323,946**	**$8,579,776**	**$8,835,607**	**$9,091,437**	**$9,347,267**
Scenario 2. Increased Funding												
5339 Bus and Bus facilities	$5,387,574	$5,777,682	$6,167,790	$6,557,898	$6,948,006	$7,338,114	$7,728,222	$8,118,329	$8,508,437	$8,898,545	$9,288,653	$9,678,761
Increase in 5339 over typical	*$1,854,439*	*$1,988,717*	*$2,122,995*	*$2,257,272*	*$2,391,550*	*$2,525,828*	*$2,660,106*	*$2,794,383*	*$2,928,661*	*$3,062,939*	*$3,197,216*	*$3,331,494*
CMAQ	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
PTIG	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Discretionary Competitive funding	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000
Total	**$14,887,574**	**$15,277,682**	**$15,667,790**	**$16,057,898**	**$16,448,006**	**$16,838,114**	**$17,228,222**	**$17,618,329**	**$18,008,437**	**$18,398,545**	**$18,788,653**	**$19,178,761**

	13	14	15	16	17	18	19	20	21	22
Scenario 1. Typical Funding	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
5339 Bus and Bus facilities	$6,603,097	$6,858,927	$7,114,758	$7,370,588	$7,626,418	$7,882,248	$8,138,078	$8,393,909	$8,649,739	$8,905,569
CMAQ	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
PTIG										
Total	**$9,603,097**	**$9,858,927**	**$10,114,758**	**$10,370,588**	**$10,626,418**	**$10,882,248**	**$11,138,078**	**$11,393,909**	**$11,649,739**	**$11,905,569**
Scenario 2. Increased Funding										
5339 Bus and Bus facilities	$10,068,869	$10,458,977	$10,849,085	$11,239,193	$11,629,301	$12,019,408	$12,409,516	$12,799,624	$13,189,732	$13,579,840
Increase in 5339 over typical	*$3,465,772*	*$3,600,049*	*$3,734,327*	*$3,868,605*	*$4,002,883*	*$4,137,160*	*$4,271,438*	*$4,405,716*	*$4,539,993*	*$4,674,271*
CMAQ	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
PTIG	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Discretionary Competitive funding	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000
Total	**$19,568,869**	**$19,958,977**	**$20,349,085**	**$20,739,193**	**$21,129,301**	**$21,519,408**	**$21,909,516**	**$22,299,624**	**$22,689,732**	**$23,079,840**

	23	24	25	26	27	28	29	30	31	32
Scenario 1. Typical Funding	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
5339 Bus and Bus facilities	$9,161,399	$9,417,229	$9,673,060	$9,928,890	$10,184,720	$10,440,550	$10,696,380	$10,952,211	$11,208,041	$11,463,871
CMAQ	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
PTIG										
Total	**$12,161,399**	**$12,417,229**	**$12,673,060**	**$12,928,890**	**$13,184,720**	**$13,440,550**	**$13,696,380**	**$13,952,211**	**$14,208,041**	**$14,463,871**
Scenario 2. Increased Funding										
5339 Bus and Bus facilities	$13,969,948	$14,360,056	$14,750,164	$15,140,272	$15,530,380	$15,920,487	$16,310,595	$16,700,703	$17,090,811	$17,480,919
Increase in 5339 over typical	*$4,808,549*	*$4,942,826*	*$5,077,104*	*$5,211,382*	*$5,345,660*	*$5,479,937*	*$5,614,215*	*$5,748,493*	*$5,882,770*	*$6,017,048*
CMAQ	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
PTIG	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Discretionary Competitive funding	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000
Total	**$23,469,948**	**$23,860,056**	**$24,250,164**	**$24,640,272**	**$25,030,380**	**$25,420,487**	**$25,810,595**	**$26,200,703**	**$26,590,811**	**$26,980,919**

Source: Iowa DOT

Figure A5.7: Capital funding scenarios from 2019 through 2050



Source: Iowa DOT

Projected Costs

The projected or forecasted costs between 2019 and 2050 relied heavily on the results of the 2019 Transit Needs Survey, which described the gaps, needs, and issues that affected the public transit system as reported by the transit agencies. These costs or expenses were categorized by operating expenses which represent the daily cost of providing transit services and include everything from fuel and maintenance costs to employee salaries. The other category is capital expenses which represent the physical assets that are owned by the transit agencies such as buildings, bus stops, and buses.

Types of expenses include:

Operating Expenses

- **Operating trend:** The average annual change in historical operating costs between 2004 and 2018 was extrapolated through 2050. This served as a baseline for operating expenses given the wide variety and fluctuating nature of these types of costs which makes these values difficult to precisely forecast. Operating trend consists of fuel prices, vehicle and facility maintenance costs, employee salaries, and generally the cost of doing business and providing transit services.
- **Additional personnel:** The additional personnel costs were based on the results of the 2019 Transit Needs Survey provided by transit agencies. Existing personnel are assumed to be covered by the operating trend.

Capital Expenses

- **Facility:** Costs of purchasing or construction new transit facilities including bus stops, bus shelters, park & ride lots, vehicle maintenance buildings, vehicle storage buildings, and administrative office buildings. These needs are primarily based on results from the 2019 Transit Needs Survey provided by transit agencies.
- **Vehicle:** Cost of purchasing new transit vehicles or replacing existing vehicles that have aged beyond their expected useful life. These needs are primarily based on results from the 2019 Transit Needs Survey provided by transit agencies.

Operating Expenses

The operating expenses were primarily focused on a combination of operational cost trends to reflect daily costs of maintaining and providing transit services, and personnel costs for hiring additional needed employees between 2019 and 2050 as provided through the Transit Needs Survey completed by public transit agencies in Iowa.

Using the same assumptions as operating revenues, specifically that operating revenues equal operating costs and that average annual historical operating cost increases between 2004 and 2018 are 4.95 percent, the future or anticipated operating expenses were then calculated between 2019 and 2050 (shown in Figure A5.8). Furthermore, it is also assumed that the calculated forecasted operating costs

will also reflect changes in economic conditions, personnel costs, vehicle maintenance activities, and changes in transit services and routes. This enabled a straight trend to forecast these costs using the 4.95 percent yearly change to project that trend to the year 2050.

Figure A5.8: Average annual operating costs

	2004 - 2018 average annual costs	2019 - 2030 average annual costs	2031 - 2050 average annual costs	2019 - 2050 average annual costs
Operating	$104.076	$192.068	$318.358	$270.999

4.95%	avg Δ in operating costs per year

Source: Iowa DOT

The changing annual operational costs is also expressed per year in Figure A5.9 showing 2019 operating costs of over $141 million dollars that gradually increase at the annual rate of 4.95 percent and reaches nearly $349 million by the year 2050.

Figure A5.9: Forecasted operating costs from 2019 through 2050

# years	1	2	3	4	5	6	7	8	9	10	11	12
Operating trend	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PROJECTED COSTS	$141,650,647	$148,331,644	$155,012,642	$161,693,640	$168,374,637	$175,055,635	$181,736,632	$188,417,630	$195,098,628	$201,779,625	$208,460,623	$215,141,621

# years	13	14	15	16	17	18	19	20	21	22
Operating trend	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
PROJECTED COSTS	$221,822,618	$228,503,616	$235,184,613	$241,865,611	$248,546,609	$255,227,606	$261,908,604	$268,589,602	$275,270,599	$281,951,597

# years	23	24	25	26	27	28	29	30	31	32
Operating trend	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
PROJECTED COSTS	$288,632,594	$295,313,592	$301,994,590	$308,675,587	$315,356,585	$322,037,583	$328,718,580	$335,399,578	$342,080,575	$348,761,573

Source: Iowa DOT

In addition to typical operating expense trends, personnel needs identified by the transit agencies were also included. For the purposes of this financial analysis, personnel were categorized into three unique employee types. These employee types represent the primary and most abundant personnel within the public transit systems throughout the state. Rarer types of positions or employees that represent only a small fraction of all transit employees were typically combined with the closest related employee type such as marketing specialists being included with administrative staff.

The three primary employee categories were utilized in the Iowa Transit Needs Survey conducted in March 2019 in the Personnel Needs section of the survey form. Personnel Needs include the number and type of employees that were needed right now (indicating existing vacancies or shortages) as well as the number and types of employees expected to be needed by the year 2030 and by the year 2050.

Types of public transit employees:

- **Administrative:** employees responsible for conducting payroll, dispatching vehicles, marketing and outreach, planning, and analysis-related activities.
- **Maintenance:** employees performing basic repairs and maintenance actions on the vehicle or facilities, such as a mechanic.
- **Drivers:** employees responsible for operating revenue vehicles to pick up and drop off passengers.

Transit agencies responded to the survey by inputting how many additional employees are needed between the current date and 2030, and then between 2030 and 2050. Administrative, Maintenance, and Driver needs were asked in terms of numbers of total full-time equivalents, which could also include part-time employees as shown in Figure A5.10.

Figure A5.10: Forecasted additional transit personnel needs from 2019 through 2050

	Large Urban			Small Urban			Regional			Total			
Employee Type	Now	2030	2050	Now	2030	2050	Now	2030	2050	Now	2030	2050	Total
Administrative	12	19	15	2	1	2	14	19	16	28	39	33	100
Maintenance	12	27	17	0	2	2	5	20	18	17	49	37	103
Driver	47	101	55	8	8	7	77	132	122	132	241	184	557

Notes:
Transit Agency Needs Survey, Survey Monkey, March 2019
Questions 26, 27, and 28
Personnel needs represented as FTEs (full time equivalent) and do not include volunteers

Source: Iowa DOT

After the aggregated totals for each employee type were determined, they were divided by the number of years in the short-term planning horizon of 2019 through 2030 consisting of 12 yearly periods and the long-term planning horizon of 2031 through 2050 consisting of 20 yearly periods. The intent is to multiply the total number of each employee type by an average inflation-adjusted salary for each year, totaling that number before adding it to the final forecasted operational costs (which already includes the operational trend estimate described in the previous section).

Cost estimates for personnel salaries were gathered through the combination of a few different sources. The Iowa Public Transit Association (IPTA) conducted a salary survey in 2017 by asking each transit agency to voluntarily provide numbers of employees, the

types of positions that they were, and how much those positions were compensated or paid, as shown in Figure A5.11. Not all transit agencies responded with 40 percent of agencies electing not to participate in the survey. Another 6 percent participated but did not share their agency name or indicate whether they were a large urban, small urban, or regional transit system. Those responses are categorized as 'Unknown' for the purposes of this analysis. Otherwise, approximately 14 percent of responses were from small urban systems, another 9 percent by large urbans, and over 31 percent of responses were provided by regional systems.

When examined individually (Figure A5.12 – Figure A5.14), both small urban and regional systems had similar response rates of roughly 70 percent (5 of 7 small urbans and 11 of 16 regionals), while large urbans saw only 25 percent responding (3 out of 12 large urban transit agencies). There were several Unknown agencies that responded and could have been among the different sized systems as well.

Besides the transit system response rates, there were a few additional considerations that needed to be accounted for in order for the results to be utilized in this financial analysis. Firstly, the employee types were slightly different from the three categories used in the 2019 Transit Needs Survey (Administrative, Maintenance, and Driver). The 2017 IPTA Salary Survey classified employees as Admin/Clerical, Driver, Maintenance, Support/Operations, and Director/Manager.

While Admin/Clerical and Driver were fairly straightforward comparisons with Administrative and Driver, the other categories required a bit more thought in order to determine how to handle them. The Director/Manager employee type used in the IPTA Salary Survey was not considered as part of this financial analysis. The number of employees in this classification, when compared to all of the other types combined, represented a very small fraction. As such, this category was disregarded.

Maintenance and Support/Operations were examined, and due to their small numbers but similar salaries, it was decided to combine these and average their wages. This was decided due to the fact that the 2019 Transit Needs Survey had various comments indicating that maintenance personnel would cover other responsibilities plus their vehicle mechanic or maintenance activities. Operational duties such as dispatch and communications were also assumed to sometimes fall within the additional duties of maintenance employees.

The salary information that was reported in the transit agency responses were also somewhat inconsistent. Some agencies reported this information in terms of annual salary while other agencies reported approximate hourly wages. An hourly-to-salary calculator[2] was utilized in order to standardize this information for consistency and used to populate the table in Figure A5.15 using an assumption of 40-hour work weeks and 52 work weeks in a year.

[2] "Convert my hourly wage to an equivalent annual salary", CalcXML, https://www.calcxml.com/calculators/convert-hourly-to-salary

Figure A5.11: 2017 IPTA salary survey responses

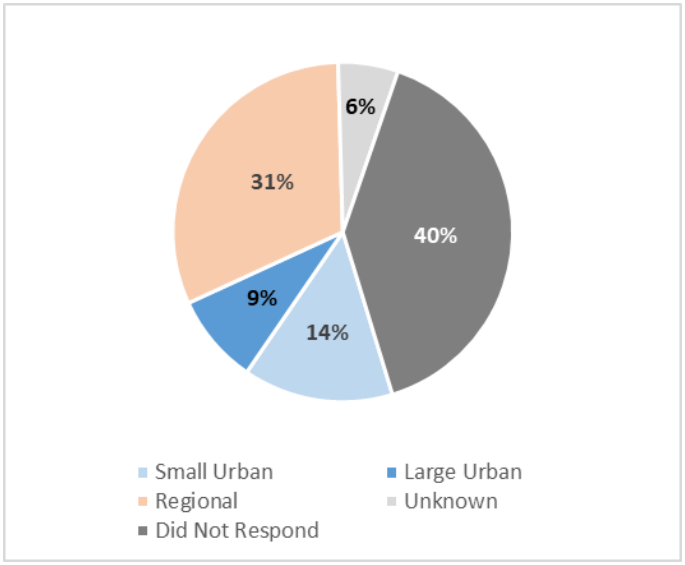


Figure A5.12: 2017 IPTA salary survey responses (Small Urban)

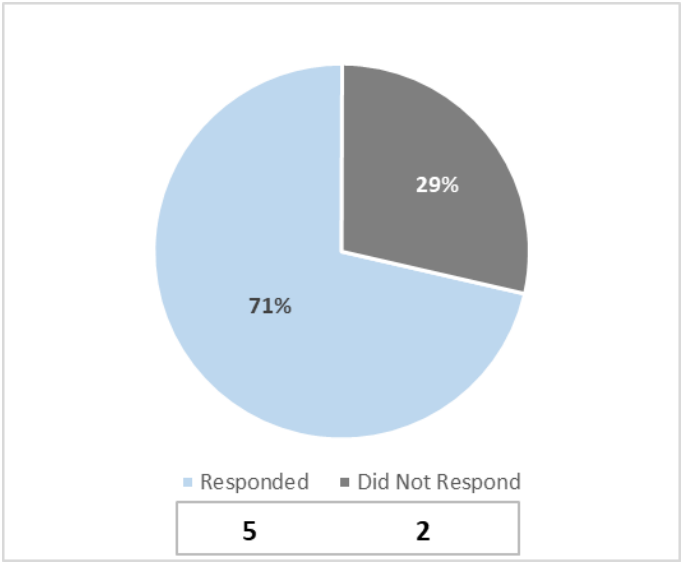
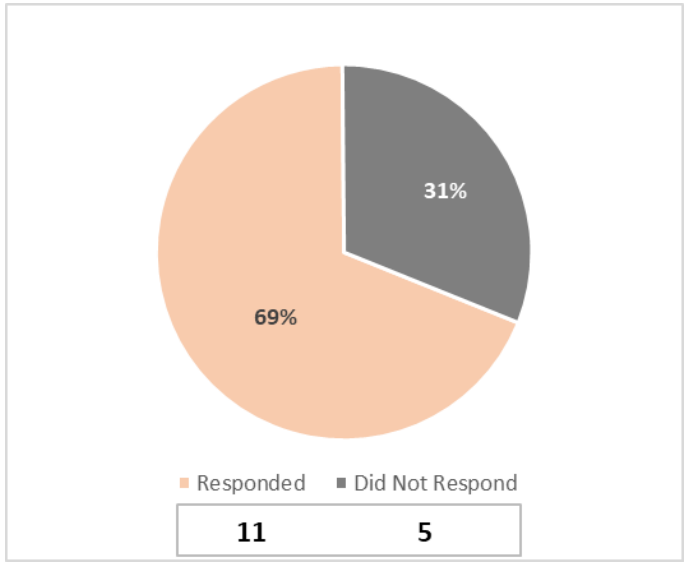
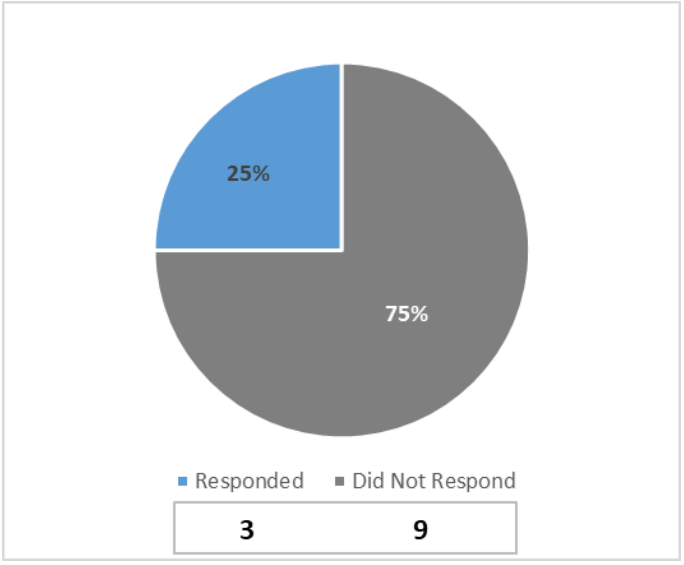


Figure A5.13: 2017 IPTA salary survey responses (Regional)



Source: Iowa Public Transit Association

Figure A5.14: 2017 IPTA salary survey responses (Large Urban)



Source: Iowa Public Transit Association

Figure A5.15: Average hourly and annual wages for transit personnel by employee

	Admin/Clerical		Driver		Maintenance		Maintenance		Support/Operations		Director/Manager	
	Renamed		*No Change*		*Averaged with Support*		*Combined*		*Combined*		*Removed*	
Transit Agency	Mean hourly wage	Annual mean wage	Mean hourly wage	Annual mean wage	Mean hourly wage	Annual mean wage	Mean hourly wage	Annual mean wage	Mean hourly wage	Annual mean wage	Mean hourly wage	Annual mean wage
Small Urban	$17.13	$35,634	$14.52	$30,199	$21.03	$41,924	$19.93	$41,343	$22.13	$42,505	$29.75	$59,503
Large Urban	$14.99	$31,170	$14.00	$29,120	$14.75	$30,680	$14.75	$30,680	$14.75	$30,680	$32.46	$67,511
Regional	$16.39	$34,100	$13.20	$27,457	$19.38	$40,464	$20.92	$43,514	$17.85	$37,413	$31.64	$65,818
Unknown	$15.50	$32,240	$14.42	$29,984	$15.78	$32,812	-	-	$15.78	$32,812	$34.13	$70,988

Source: Iowa Public Transit Association

For context, an average salary was calculated across all Iowa transit agencies and used to compare against the United States Department of Labor's Bureau of Labor Statistics (BLS) data from 2017[3] of similar positions in Iowa. A variety of BLS occupations were selected, particularly as comparisons to the Driver position in order to better understand the challenges of hiring these types of employees. 'Office and Administrative Support Occupations', 'Bus and Truck Mechanics and Diesel Engine Specialists', and 'Bus Drivers, Transit and Intercity' were selected as direct comparisons against Administrative, Maintenance, and Driver transit employee types. Additional occupations of 'Bus Drivers, School or Special Client', 'Heavy and Tractor-Trailer Truck Drivers', 'Light Truck or Delivery Services Drivers', 'Industrial Truck and Tractor Operators', and 'Taxi Drivers and Chauffeurs' were also selected to compare to the Driver category of transit employees.

As shown in Figure A5.16, transit employees were almost universally at a disadvantage when compared to their peers in similar industries across Iowa with annual mean wages being 10 percent lower or greater in terms of pay and compensation. This was especially pronounced for Drivers who are paid nearly 30 percent less than a heavy truck or semi driver. The only positions that were paid less than a transit employee are taxi drivers and chauffeurs who are paid substantially less than transit bus drivers.

After seeing these results, it puts into greater focus the difficult situation most transit agency directors find themselves in when trying to hire new or retain existing employees. In the case of drivers, the need for a CDL (Commercial Driver's License) becomes a kind of double-edged sword at times. Transit agency directors may use the promise of help obtaining a CDL for a prospective new driver, only to find that the driver leaves the transit agency for a truck driving position which can make upwards of an additional $10,000 or more a year as

[3] United States Department of Labor - Bureau of Labor Statistics, "May 2017 State Occupational Employment and Wage Estimates", https://www.bls.gov/oes/2017/may/oes_ia.htm

an annual salary. This situation assuredly becomes more complicated when unemployment numbers across Iowa are low, making competition for hiring employees, especially drivers, much more difficult.

Figure A5.16: Average hourly and annual wages for transit personnel by employee type

May 2017 State Occupational Employment and Wage Estimates
Iowa https://www.bls.gov/oes/2017/may/oes_ia.htm

BLS Occupational Data							Comparison to IPTA Data				
Occupation code	Occupation title	Employment	Employment per 1,000 jobs	Median hourly wage	Mean hourly wage	Annual mean wage	Similar Transit Occupations	Mean hourly wage	Annual mean wage	Δ Annual mean ($)	Δ Annual mean (%)
43-0000	Office and Administrative Support Occupations	220,090	143.341	$16.44	$17.46	$36,310	Administrative	$16.00	$33,286	-$3,024	-8.33%
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	4,160	2.711	$19.87	$20.44	$42,500	Maintenance	$18.01	$36,992	-$5,508	-12.96%
53-3021	Bus Drivers, Transit and Intercity	1,750	1.14	$15.92	$17.21	$35,800	Driver	$14.03	$29,190	-$6,610	-18.46%
53-3022	Bus Drivers, School or Special Client	5,360	3.491	$16.92	$17.08	$35,520	Driver	$14.03	$29,190	-$6,330	-17.82%
53-3032	Heavy and Tractor-Trailer Truck Drivers	38,110	24.819	$19.36	$20.46	$42,570	Driver	$14.03	$29,190	-$13,380	-31.43%
53-3033	Light Truck or Delivery Services Drivers	8,540	5.561	$14.74	$16.30	$33,910	Driver	$14.03	$29,190	-$4,720	-13.92%
53-7051	Industrial Truck and Tractor Operators	6,580	4.284	$16.91	$17.11	$35,580	Driver	$14.03	$29,190	-$6,390	-17.96%
53-3041	Taxi Drivers and Chauffeurs	1,500	0.975	$11.08	$11.76	$24,460	Driver	$14.03	$29,190	$4,730	19.34%

Sources: Bureau of Labor Statistics, Iowa Public Transit Association

Figures A5.17 – A5.20 show comparisons between the BLS occupations that closely matched with the three transit agency employee types, and examined transit agency types with small urban, large urban, regional, and unknown agencies separated. This allowed for a more in-depth examination on the differences between transit agencies and compensation of employees. The findings all somewhat mirror the overall results shown above in Figure A5.16, however, there are some variations between transit agencies to note.

Interestingly, small urban transit agencies exhibited the smallest differences in salaries compared with similar BLS occupations for Administrative and Maintenance employees. There is nothing within the data that makes it apparent as far as an explanation, however, population size and availability of alternative or similar employment opportunities may have encouraged the small urban transit systems to pay its employees differently. There may be similarities with regional transit systems as well, who are also noted as compensating its employees within a few percentage points of the BLS equivalent occupations. All transit agencies, regardless of size and type, appear to compensate drivers much lower than the equivalent BLS occupations though, and this is likely a significant contributor to the shortages of qualified bus drivers with CDL certifications that transit agencies experience.

Figure A5.17: Small urban transit personnel wage comparison to U.S. Department of Labor – Bureau of Labor Statistics

US Dept Labor BLS			Small Urban				
Occupation title	Mean hourly wage	Annual mean wage	Similar transit occupations	Mean hourly wage	Annual mean wage	Δ Annual mean ($)	Δ Annual mean (%)
Office and Administrative Support Occupations	$17.46	$36,310	Administrative	$17.13	$35,634	-$676	-1.86%
Bus and Truck Mechanics and Diesel Engine Specialists	$20.44	$42,500	Maintenance	$21.03	$41,924	-$576	-1.36%
Bus Drivers, Transit and Intercity	$17.21	$35,800	Driver	$14.52	$30,199	-$5,601	-15.65%

Figure A5.18: Large urban transit personnel wage comparison to U.S. Department of Labor – Bureau of Labor Statistics

US Dept Labor BLS			Large Urban				
Occupation title	Mean hourly wage	Annual mean wage	Similar transit occupations	Mean hourly wage	Annual mean wage	Δ Annual mean ($)	Δ Annual mean (%)
Office and Administrative Support Occupations	$17.46	$36,310	Administrative	$14.99	$31,170	-$5,140	-14.16%
Bus and Truck Mechanics and Diesel Engine Specialists	$20.44	$42,500	Maintenance	$14.75	$30,680	-$11,820	-27.81%
Bus Drivers, Transit and Intercity	$17.21	$35,800	Driver	$14.00	$29,120	-$6,680	-18.66%

Figure A5.19: Regional transit personnel wage comparison to U.S. Department of Labor – Bureau of Labor Statistics

US Dept Labor BLS			Regional				
Occupation title	Mean hourly wage	Annual mean wage	Similar transit occupations	Mean hourly wage	Annual mean wage	Δ Annual mean ($)	Δ Annual mean (%)
Office and Administrative Support Occupations	$17.46	$36,310	Administrative	$16.39	$34,100	-$2,210	-6.09%
Bus and Truck Mechanics and Diesel Engine Specialists	$20.44	$42,500	Maintenance	$19.38	$40,464	-$2,036	-4.79%
Bus Drivers, Transit and Intercity	$17.21	$35,800	Driver	$13.20	$27,457	-$8,343	-23.30%

Figure A5.20: Unknown transit personnel wage comparison to U.S. Department of Labor – Bureau of Labor Statistics

US Dept Labor BLS			Unknown				
Occupation title	Mean hourly wage	Annual mean wage	Similar transit occupations	Mean hourly wage	Annual mean wage	Δ Annual mean ($)	Δ Annual mean (%)
Office and Administrative Support Occupations	$17.46	$36,310	Administrative	$15.50	$32,240	-$4,070	-11.21%
Bus and Truck Mechanics and Diesel Engine Specialists	$20.44	$42,500	Maintenance	$15.78	$32,812	-$9,688	-22.80%
Bus Drivers, Transit and Intercity	$17.21	$35,800	Driver	$14.42	$29,984	-$5,817	-16.25%

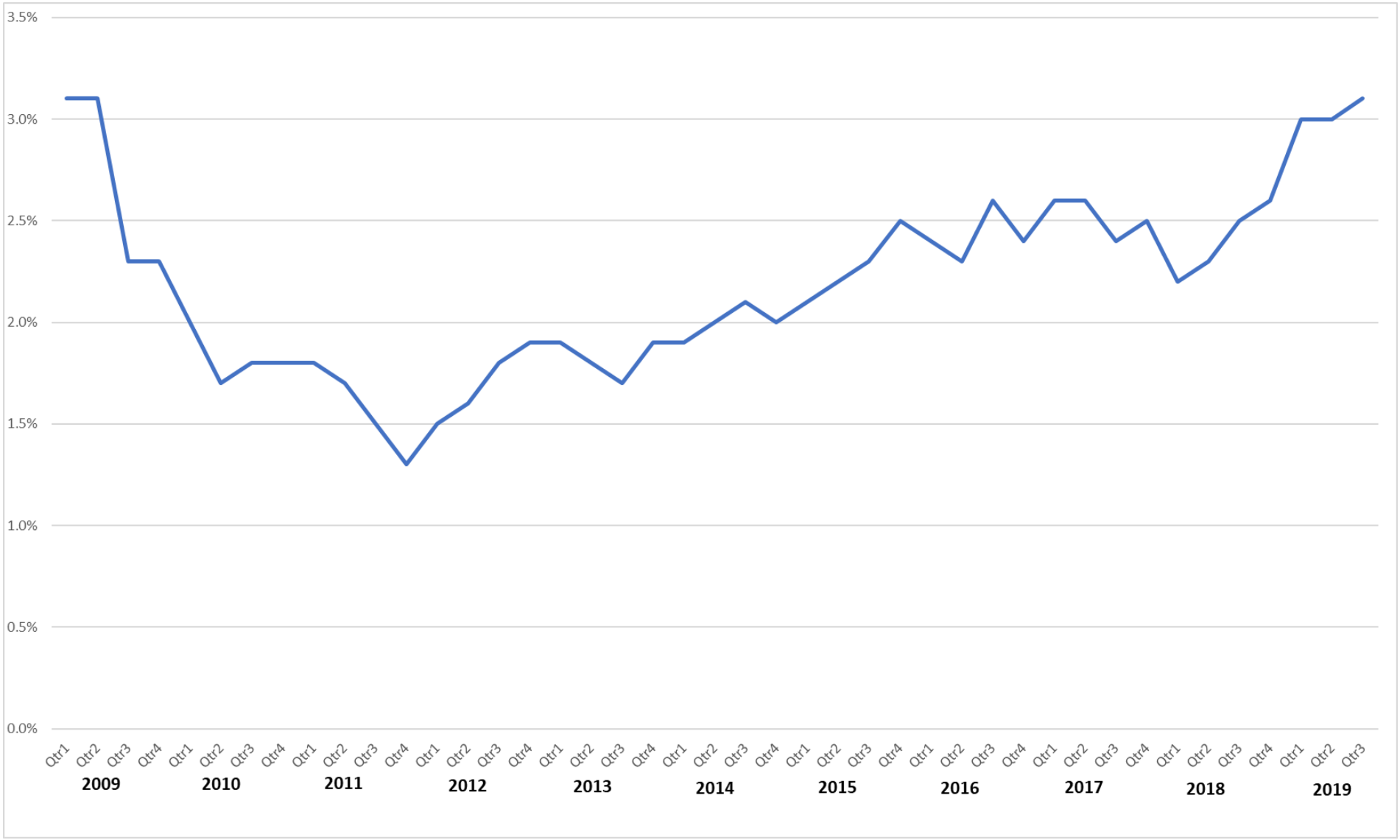
Sources: Bureau of Labor Statistics, Iowa Public Transit Association

The primary output from the BLS and IPTA salary analysis was to help inform the assumptions regarding annual wages for new personnel. This was then used to calculate projected personnel costs to the year 2050. Having the 2017 IPTA Salary Survey results as well as the 2017 BLS occupational data allowed for those two sets of information to be averaged together to account for any missing feedback from the transit agencies in addition to helping account for any possible salary increases that the transit agencies may decide to institute in the future, bringing wages more in line with statewide mean wages for those occupations.

It was necessary to apply inflation to the wages for the transit occupation types. The Employment Cost Index[4] is a factor that measures the change in value of labor costs over time in order to reflect this inflationary effect on forecasted personnel cost estimates. For this analysis, total compensation for State and local government workers in all industries was considered. The Employment Cost Index was gathered by quarter from 2009 to 2019, shown in Figure A5.21. Averaging these values resulted in a final inflation value of 2.2 percent.

[4] "Employment Cost Index (ECI) 2009 – 2019", United States Department of Labor - Bureau of Labor Statistics, https://www.bls.gov/ppi/#tables

Figure A5.21: Quarterly Employment Cost Index (ECI) from 2009 – 2019



Source: Bureau of Labor Statistics

Combining the employee salary estimate values plus the average yearly inflation rate resulted in the future projection of personnel costs, shown in Figure A5.22. The upper salary amounts were based on the BLS salary data while the lower salary amounts were based on the IPTA salary survey results. For the purposes of this financial analysis, an average of those two salary levels were taken and utilized for the forecasted additional personnel costs from 2019 through 2050.

Figure A5.22: Personnel annual salary estimates by employee type

Employee Type	Lower Cost	Average Cost	Upper Cost	Data Year	Inflation Rate
Administrative	$33,286	$34,798	$36,310	2017	2.20%
Maintenance	$36,992	$39,746	$42,500	2017	2.20%
Driver	$29,190	$32,495	$35,800	2017	2.20%

Notes:

Upper cost values are from US Department of Labor - Bureau of Labor Statistics, May 2017 State Occupational Employment and Wage Estimates, Iowa; https://www.bls.gov/oes/2017/may/oes_ia.htm#43-0000

Lower cost values are from Iowa Public Transit Association (IPTA) Salary Survey as of 7.31.17

Average cost values calculated as an average between the lower and upper cost values, and utilized for the projected personnel costs between 2019 - 2050

2.2% inflation costs derived from 10 year average (2009-2019) of ECI employment data for state and federal government employees

Inflation rate applied to average cost as simple interest (non-compounded); Principal*(1+(Rate*Year))

Source: Iowa DOT

Multiplying the inflation-adjusted salary for each employee type in Figure A5.22 with the total personnel needs in Figure A5.10 yields the yearly totals per year in Figure A5.23. Since personnel needs in the 2019 Transit Needs Survey were reported only as an aggregate by 2030 and 2050, the staffing numbers were evenly distributed in the years in between, from 2019 through 2030, and 2031 through 2050.

The results in Figure A5.23 were then depicted graphically as a stacked line chart in Figure A5.24 depicting short-term (2019 – 2030) and long-term (2031 – 2050) totals for each employee type. The takeaway from these graphs show a much higher need for drivers throughout the entire planning horizon, which indicates an existing and continuing need for the foreseeable future. With the large discrepancies between the 2017 IPTA Salary Survey reported wages when compared to the reported wages by BLS for similar types of jobs throughout Iowa, one could reasonably conclude that employment challenges are due in no small part to lagging wages and this will continue to be a challenge for all transit agencies.

Figure A5.23: Additional personnel annual salary estimates by employee type

Transit personnel costs by year (2019 - 2030)

Employee Type	1 2019	2 2020	3 2021	4 2022	5 2023	6 2024	7 2025	8 2026	9 2027	10 2028	11 2029	12 2030
Administrative	$1,017,215	$1,170,168	$1,328,550	$1,492,360	$1,661,598	$1,836,265	$2,016,361	$2,201,885	$2,392,837	$2,589,218	$2,791,027	$2,998,265
Maintenance	$705,412	$909,013	$1,120,404	$1,339,585	$1,566,556	$1,801,318	$2,043,869	$2,294,211	$2,552,344	$2,818,266	$3,091,979	$3,373,481
Driver	$4,478,071	$5,331,360	$6,215,974	$7,131,914	$8,079,179	$9,057,769	$10,067,684	$11,108,924	$12,181,489	$13,285,380	$14,420,596	$15,587,137
Total	**$6,200,698**	**$7,410,541**	**$8,664,928**	**$9,963,858**	**$11,307,333**	**$12,695,351**	**$14,127,914**	**$15,605,020**	**$17,126,670**	**$18,692,864**	**$20,303,602**	**$21,958,883**

Notes:
Personnel staffing evenly distributed between 2019 - 2030
No feasible or equitable means available to distribute personnel hiring out by priority or by agency type (large urban, small urban, regional)

Transit personnel costs by year (2031 - 2040)

Employee Type	13 2031	14 2032	15 2033	16 2034	17 2035	18 2036	19 2037	20 2038	21 2039	22 2040
Administrative	$3,124,659	$3,253,578	$3,385,024	$3,518,996	$3,655,495	$3,794,520	$3,936,071	$4,080,149	$4,226,753	$4,375,883
Maintenance	$3,527,370	$3,684,494	$3,844,853	$4,008,448	$4,175,278	$4,345,343	$4,518,643	$4,695,179	$4,874,950	$5,057,957
Driver	$16,244,822	$16,915,662	$17,599,656	$18,296,804	$19,007,105	$19,730,561	$20,467,171	$21,216,934	$21,979,852	$22,755,924
Total	**$22,896,851**	**$23,853,734**	**$24,829,533**	**$25,824,248**	**$26,837,878**	**$27,870,424**	**$28,921,885**	**$29,992,262**	**$31,081,555**	**$32,189,764**

Notes:
Personnel staffing evenly distributed between 2031 - 2040.
No feasible or equitable means available to distribute personnel hiring out by priority or by agency type (large urban, small urban, regional)

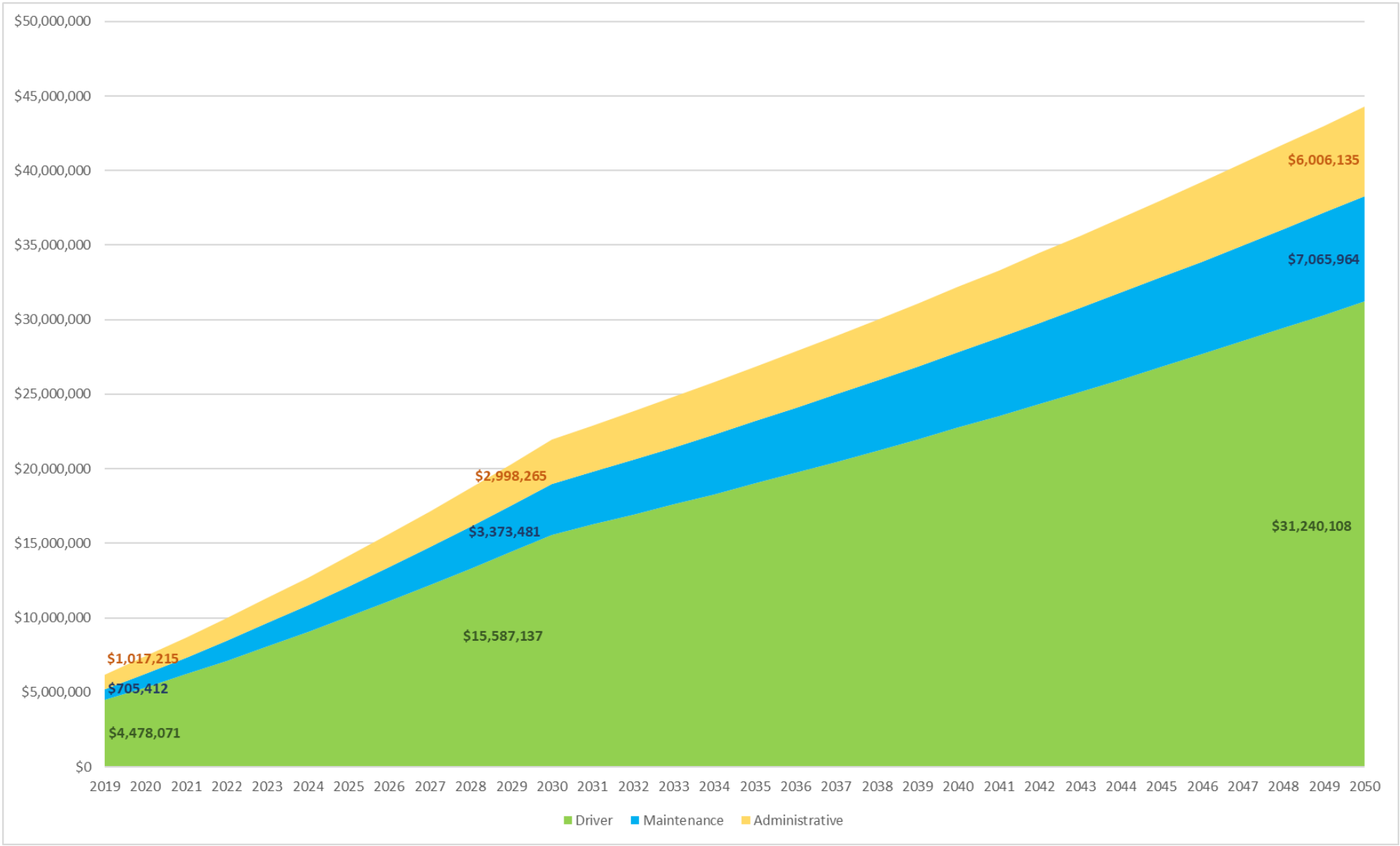
Transit personnel costs by year (2041 - 2050)

Employee Type	23 2041	24 2042	25 2043	26 2044	27 2045	28 2046	29 2047	30 2048	31 2049	32 2050
Administrative	$4,527,540	$4,681,723	$4,838,432	$4,997,668	$5,159,430	$5,323,718	$5,490,533	$5,659,874	$5,831,741	$6,006,135
Maintenance	$5,244,199	$5,433,676	$5,626,388	$5,822,336	$6,021,519	$6,223,937	$6,429,591	$6,638,480	$6,850,605	$7,065,964
Driver	$23,545,149	$24,347,529	$25,163,062	$25,991,750	$26,833,591	$27,688,587	$28,556,736	$29,438,039	$30,332,497	$31,240,108
Total	**$33,316,888**	**$34,462,927**	**$35,627,883**	**$36,811,753**	**$38,014,540**	**$39,236,242**	**$40,476,860**	**$41,736,393**	**$43,014,843**	**$44,312,207**

Notes:
Personnel staffing evenly distributed between 2041 - 2050
No feasible or equitable means available to distribute personnel hiring out by priority or by agency type (large urban, small urban, regional)

Source: Iowa DOT

Figure A5.24: Forecasted additional transit personnel costs



Source: Iowa DOT

Capital Expenses

The capital expenses calculated in this product were primarily focused on facility and vehicle needs forecasted between 2019 and 2050 through the Transit Needs Survey completed by public transit agencies in Iowa.

Facilities for the purposes of this financial analysis were categorized into five unique facility types. These facility types represent nearly all passenger transportation or transit-related infrastructure throughout the state and represent generalized structures that might include several different and distinct functions, such as wash racks and maintenance repair bays. These categories were utilized in the Iowa Transit Needs Survey conducted in March 2019 in the Facility Needs section of the survey form. Facility Needs include maintenance areas (including wash racks, wash bays), revenue vehicle storage areas, administrative/offices (including internal needs such as office/storage space as well as site needs such as parking spaces and walkways), bus shelters, and park and ride facilities.

Types of public transit facilities:

- **Vehicle storage:** areas and buildings that serve as storage and protection for transit vehicles such as buses.
- **Vehicle maintenance:** areas where basic repairs and maintenance activities take place. These can also include wash racks and wash bays.
- **Administrative office:** areas that support the internal staff operations of the transit agency, such as office activities.
- **Bus shelter:** enclosures to protect passengers as they wait at transit stops along established bus routes.
- **Park and ride:** parking lots where passengers can leave their vehicles while they take the bus. Park and ride lots can be constructed in a variety of configurations with surface types consisting of gravel (mainly in rural settings) or pavement.

Transit agencies responded by inputting how much additional facility space is needed between the current date and 2030, and then between 2030 and 2050. Administrative offices and internal space, administrative parking and external space, vehicle maintenance, and vehicle storage facilities were asked in terms of total square footage. Park and ride lots and bus shelters were asked in terms of total number of locations. Note that for facilities asked in terms of total square footage, this value represents all facilities classified in a particular category and does not reflect the total number of buildings that consist of the aggregated total square footage as shown in Figure A5.25. Additionally, administrative parking and external space was not utilized in the final cost estimates. This was due partly to lack of a cost per square footage value for these areas as well as the assumption by staff that the administrative building estimates by the National Cooperative Highway Research Program already include those areas into the overall cost.

Figure A5.25: Transit facility needs for large urban, small urban, and regional systems by facility type and years 2030 and 2050

	Large Urban		Small Urban		Regional		Total	
Facility Type	2030	2050	2030	2050	2030	2050	2030	2050
Administrative Office (sq ft)	25,055	17,200	1,144	1,000	28,200	17,000	54,399	35,200
Vehicle Maintenance (sq ft)	102,402	34,860	3,000	3,000	41,000	47,100	146,402	84,960
Vehicle Storage (sq ft)	166,312	118,160	11,440	6,880	191,500	58,000	369,252	183,040
Bus Shelter (#)	203	317	16	15	4	6	223	338
Park & Ride (#)	13	22	0	0	9	10	22	32

Notes:
Transit Agency Needs Survey, Survey Monkey, March 2019
Questions 20 and 21

Sources: Iowa DOT, Survey Monkey

After the aggregated totals for each facility type were determined, they were divided by the number of years in the short-term planning horizon of 2019 through 2030 consisting of 12 yearly periods and the long-term planning horizon of 2031 through 2050 consisting of 20 yearly periods. Additionally, park and ride facilities were assumed to be paved if counted within a large or small urban system and as granular if counted with a regional system as shown in Figure A5.26. The intent is to then multiply the total square footage and total number of each facility for each year by an inflation-adjusted cost for each type of facility.

Figure A5.26: Transit facility construction needs by year, evenly distributed (2019 – 2030, 2031 – 2050)

Facility Type	2019 - 2030	2031 - 2050
Administrative Office (sq ft)	4,533	1,760
Vehicle Maintenance (sq ft)	12,200	4,248
Vehicle Storage (sq ft)	30,771	9,152
Bus Shelter (#)	18.58	16.90
Park & Ride (granular) (#)	0.75	0.50
Park & Ride (paved) (#)	1.08	1.10

Source: Iowa DOT

Cost estimates per square foot or per unit were gathered from several different sources. Estimates for administrative office, vehicle maintenance, and vehicle storage facilities were derived from a 2015 study by the National Cooperative Highway Research Program (NCHRP).[5] The NCHRP report referenced in Figure A5.27 is a product of the Transportation Research Board of The National Academies of Sciences, Engineering, and Medicine. This study centered on estimating design and construction costs of rural and small urban transit facilities which broke down costs by the same facility categories that were used in the Iowa Transit Needs survey. Maintenance facilities were given a flat $300 per square foot average, however administrative and bus storage facilities had ranges of $150 - $200 and $125 - $250 per square foot averages, respectively. Mid-points between those ranges of $175 and $188 were utilized in the final cost estimates.

Bus shelter cost estimates shown in Figure A5.28 were gathered by LT Leon Associates Inc. as part of Iowa DOT's Americans with Disabilities Act (ADA) compliance assessments in 2018.[6] Part of the information gathering included cost estimates for replacing an entire bus shelter with a range between $10,000 - $15,000. LT Leon used past bid information from Des Moines Area Regional Transit Authority (DART), Sioux City Transit System, and the City of Council Bluffs. A mid-point average of $12,500 was used in the final cost estimate.

Cost estimates for park and ride facilities were referenced from the 2014 Iowa Park and Ride System Plan[7] in Figure A5.29. The plan includes estimates for gravel and paved lots with an average size of 12,000 square feet, enough for approximately 26 vehicles. For the purposes of this cost estimate, urban park and rides were

Figure A5.27: Transit facility cost estimates for admin, vehicle maintenance, and storage

Table 2 Unit costs of transit facilities.

Facility Type	Unit Cost
Administration	$150–$200/ft²
Maintenance	$300/ft² (The cost depends on what kind of maintenance service is performed.)
Open bus storage	$125–$250/ft²

Source: TRB

Figure A5.28: Transit facility cost estimates for bus shelters

Improvements and Costs

For planning and budgeting purposes, improving non-compliant transit facilities to become compliant can be broken down into four typical project groups. A typical cost will be assigned to each project group. The four groups include:

- Major Project with Shelter
  - Estimated $25,000-$40,000 ($10,000-$15,000 for the shelter)
  - Includes complete replacement of the existing noncompliant facility
  - Associated costs could include removal of existing shelter and concrete, installation of new concrete, installation of new shelter, minor excavation and seeding, utility improvements, new signage, permitting, and traffic control

Source: LT Leon Associates Inc.

Figure A5.29: Transit facility cost estimates for park and ride

Table 6.2: Surface construction cost estimates (per square foot)

	Paved	Granular
Earthwork	$1.10	$1.10
Special backfill	$1.10	N/A
7-inch Portland cement concrete pavement	$3.70	N/A
Granular surface	N/A	$0.70
Unquantified items*	$2.90	$2.90
TOTAL	**$8.80**	**$4.70**

*Unquantified items include drainage structures, erosion control, traffic control, lighting, and signage.
Source: Iowa DOT, Office of Design (2014)

Source: Iowa DOT

[5] National Academies of Sciences, Engineering, and Medicine. 2015. Independent Cost Estimates for Design and Construction of Transit Facilities in Rural and Small Urban Areas. Washington, DC: The National Academies Press. https://doi.org/10.17226/22086

[6] LT Leon Associates Inc. Technical Memorandum "ADA Requirements for Transit Facilities", April 4, 2018

[7] Iowa Department of Transportation, "Iowa Park and Ride System Plan", 2014, https://iowadot.gov/iowainmotion/files/StatewideParkandRideSystemPlanFINAL.pdf

assumed to be paved and rural park and rides were assumed to be gravel or granular for $8.80 and $4.70 per square foot on average.

After gathering cost estimates for all the types of transit facilities, it was necessary to apply inflation to each since the data for each of them was gathered in different time periods. The Producer Price Index (PPI)[8] is a factor that can be applied to the cost estimates that can account for the change in value for costs over time and reflect this inflationary effect on the estimates. For new facility construction, PPI was gathered specific to non-residential (commercial) construction in the Midwest for the prior five-year period from 2014 to 2018, shown in Figure A5.30. Averaging these values resulted in a final PPI inflation value of 2.14 percent.

Figure A5.30: PPI industry data for new nonresidential building construction for Midwest region, not seasonally adjusted

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014		100.0	100.0	100.3	100.4	100.5	100.4	100.5	100.5	100.9	100.9	101.0
2015	101.3	101.4	101.3	101.0	101.1	101.1	101.5	101.7	101.8	102.4	102.2	102.3
2016	102.0	102.0	101.9	103.0	102.6	102.6	101.8	101.7	101.7	102.7	102.6	102.4
2017	102.8	102.9	102.8	103.3	103.5	103.6	105.1	105.2	105.1	105.9	105.6	105.4
2018	106.2	106.3	106.4	107.3	107.4	107.7	108.1	108.4	108.5	110.3	110.5	110.7
											Avg PPI/facility inflation	2.14%

Source: United States Department of Labor - Bureau of Labor Statistics

Combining the facility cost estimate values, the year the costs were originally calculated, plus the average yearly inflation rate resulted in the values in Figure A5.31. These costs were then used in the future projection of facility costs in combination with the transit facility needs identified from the Transit Needs Survey (shown in Figure A5.26). In order to bring these cost estimates up to date for the beginning year of 2019, the inflation rate needed to be applied to the years between the original data year and 2019 first.

Figure A5.31: Transit facility costs per square foot by year (2019 – 2050) with inflation

Facility Type	Lower Cost	Average Cost	Upper Cost	Data Year	Inflation Rate
Administration (per sq ft)	$150	$175	$200	2015	2.14%
Maintenance (per sq ft)		$300		2015	2.14%
Open bus storage (per sq ft)	$125	$188	$250	2015	2.14%
Bus shelter (per unit)	$10,000	$12,500	$15,000	2018	2.14%
Park & Ride granular (per sq ft)		$4.70		2014	2.14%
Park & Ride paved (per sq ft)		$8.80		2014	2.14%

Source: Iowa DOT

[8] "The Producer Price Index (PPI)", United States Department of Labor - Bureau of Labor Statistics, https://www.bls.gov/ppi/#tables

Multiplying the inflation-adjusted costs for each facility type in Figure A5.31 with the total facility needs in Figure A5.26 yields the yearly totals per year in Figure A5.32.

Figure A5.32: Transit facility costs per year (2019 – 2050) with inflation

Transit facility costs by year (2019 - 2030)

	1	2	3	4	5	6	7	8	9	10	11	12
Facility Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Administrative Office	$861,227	$878,204	$895,181	$912,158	$929,135	$946,112	$963,089	$980,066	$997,043	$1,014,020	$1,030,997	$1,047,974
Vehicle Maintenance	$3,973,350	$4,051,675	$4,130,000	$4,208,325	$4,286,651	$4,364,976	$4,443,301	$4,521,626	$4,599,951	$4,678,276	$4,756,601	$4,834,926
Vehicle Storage	$6,280,140	$6,403,937	$6,527,735	$6,651,533	$6,775,331	$6,899,129	$7,022,927	$7,146,725	$7,270,523	$7,394,321	$7,518,118	$7,641,916
Bus Shelter	$237,263	$242,234	$247,205	$252,176	$257,147	$262,118	$267,089	$272,060	$277,031	$282,002	$286,973	$291,944
Park & Ride (granular)	$46,826	$47,731	$48,637	$49,542	$50,447	$51,352	$52,257	$53,163	$54,068	$54,973	$55,878	$56,784
Park & Ride (paved)	$126,641	$129,089	$131,537	$133,985	$136,433	$138,882	$141,330	$143,778	$146,226	$148,674	$151,122	$153,571
Total	**$11,525,446**	**$11,752,871**	**$11,980,295**	**$12,207,719**	**$12,435,144**	**$12,662,568**	**$12,889,993**	**$13,117,417**	**$13,344,841**	**$13,572,266**	**$13,799,690**	**$14,027,115**

Transit facility costs by year (2031 - 2040)

	13	14	15	16	17	18	19	20	21	22
Facility Type	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Administrative Office	$413,459	$420,050	$426,642	$433,233	$439,824	$446,415	$453,006	$459,598	$466,189	$472,780
Vehicle Maintenance	$1,710,755	$1,738,027	$1,765,299	$1,792,571	$1,819,843	$1,847,115	$1,874,388	$1,901,660	$1,928,932	$1,956,204
Vehicle Storage	$2,309,701	$2,346,522	$2,383,342	$2,420,162	$2,456,983	$2,493,803	$2,530,623	$2,567,444	$2,604,264	$2,641,084
Bus Shelter	$270,020	$274,541	$279,061	$283,582	$288,103	$292,624	$297,144	$301,665	$306,186	$310,707
Park & Ride (granular)	$38,459	$39,063	$39,666	$40,270	$40,873	$41,477	$42,080	$42,684	$43,287	$43,890
Park & Ride (paved)	$158,419	$160,905	$163,391	$165,876	$168,362	$170,848	$173,334	$175,820	$178,306	$180,791
Total	**$4,900,813**	**$4,979,107**	**$5,057,400**	**$5,135,694**	**$5,213,988**	**$5,292,282**	**$5,370,575**	**$5,448,869**	**$5,527,163**	**$5,605,457**

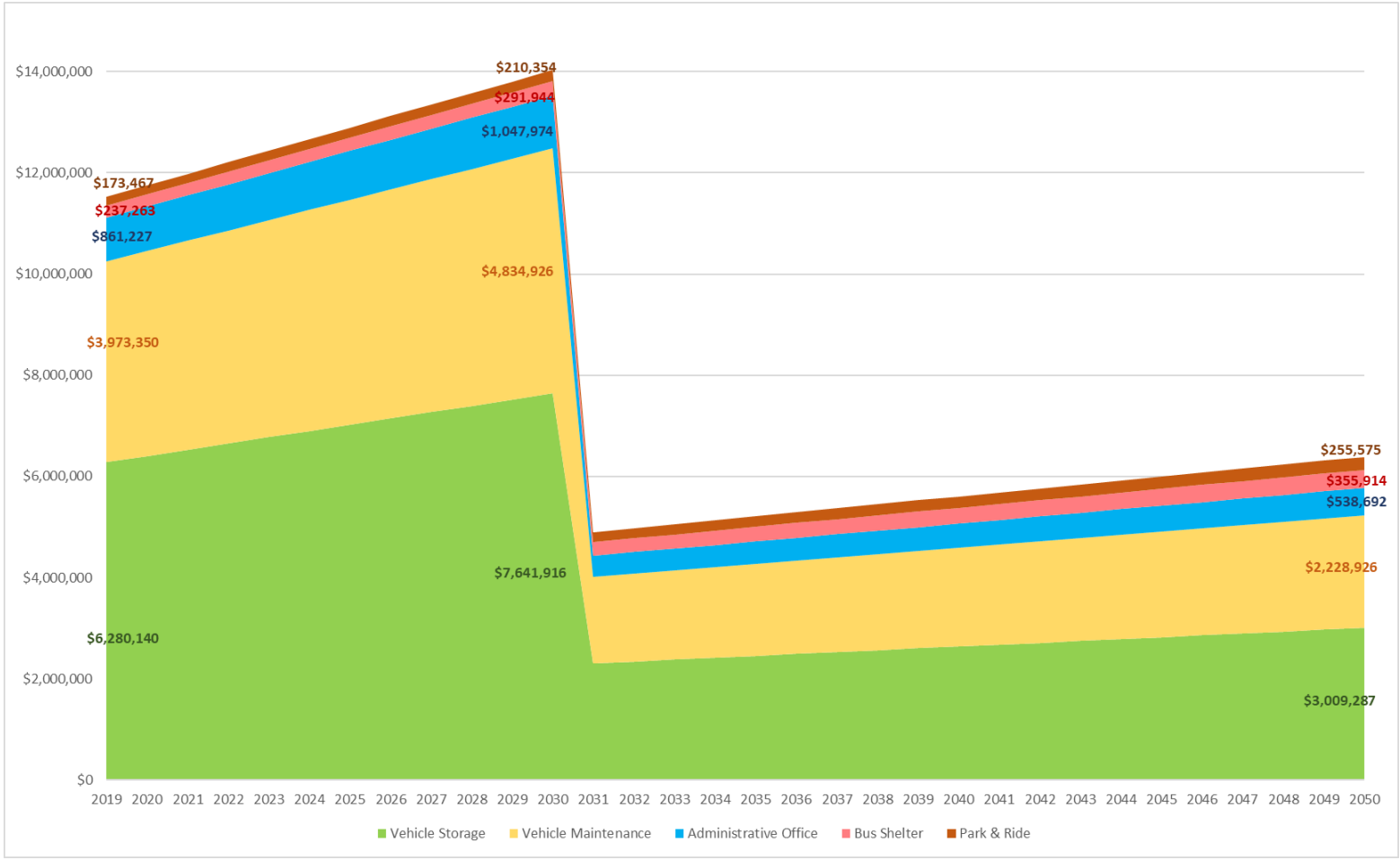
Transit facility costs by year (2041 - 2050)

	23	24	25	26	27	28	29	30	31	32
Facility Type	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Administrative Office	$479,371	$485,962	$492,554	$499,145	$505,736	$512,327	$518,918	$525,510	$532,101	$538,692
Vehicle Maintenance	$1,983,476	$2,010,748	$2,038,020	$2,065,293	$2,092,565	$2,119,837	$2,147,109	$2,174,381	$2,201,653	$2,228,926
Vehicle Storage	$2,677,904	$2,714,725	$2,751,545	$2,788,365	$2,825,186	$2,862,006	$2,898,826	$2,935,647	$2,972,467	$3,009,287
Bus Shelter	$315,227	$319,748	$324,269	$328,790	$333,310	$337,831	$342,352	$346,873	$351,393	$355,914
Park & Ride (granular)	$44,494	$45,097	$45,701	$46,304	$46,908	$47,511	$48,115	$48,718	$49,322	$49,925
Park & Ride (paved)	$183,277	$185,763	$188,249	$190,735	$193,221	$195,706	$198,192	$200,678	$203,164	$205,650
Total	**$5,683,750**	**$5,762,044**	**$5,840,338**	**$5,918,632**	**$5,996,925**	**$6,075,219**	**$6,153,513**	**$6,231,806**	**$6,310,100**	**$6,388,394**

Source: Iowa DOT

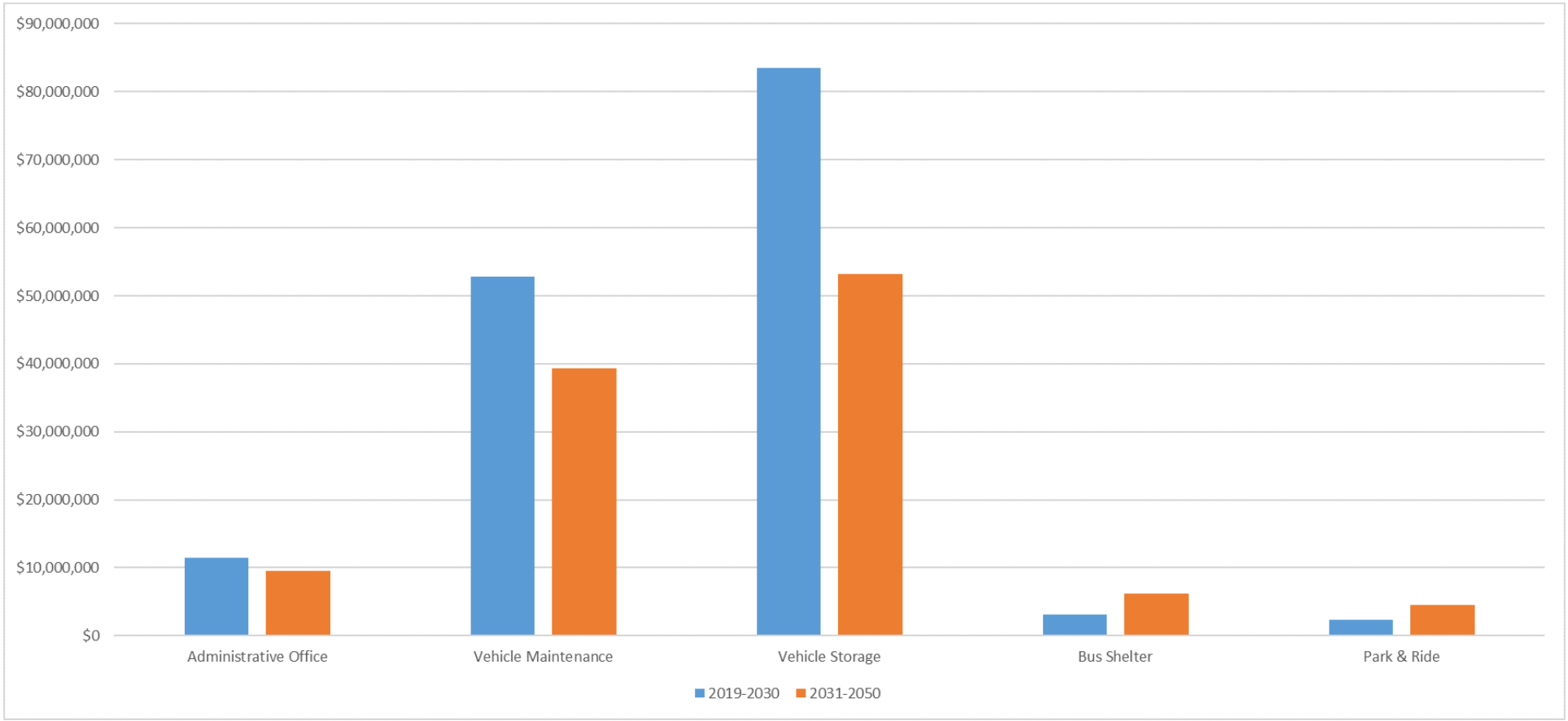
The results in Figure A5.32 were then depicted graphically as a stacked line chart in Figure A5.33 and as a bar chart in Figure A5.34 depicting short-term (2019 – 2030) and long-term (2031 – 2050) totals for each facility type. A noticeable drop in facility costs and needs can be seen between 2030 and 2031. This is a result of the way that the questions were asked in the Transit Needs Survey rather than an actual drop in facility needs between those years. The takeaway from these graphs show a much higher need for administrative offices, vehicle storage, and vehicle maintenance facilities early on but with much less need in the long term. Bus shelters and park and ride lots were seen as a slightly growing need over the planning horizon to 2050.

Figure A5.33: Forecasted transit facility costs (2019 – 2050)



Source: Iowa DOT

Figure A5.34: Forecasted transit facility costs (2019 – 2050)



Source: Iowa DOT

Like the transit facilities, vehicle needs were also obtained from the Transit Needs Survey in March 2019. The survey asked how many of each type of vehicle agencies currently need, and how many additional vehicles of each type they will need by the years 2030 and 2050.

Transit vehicles for the purposes of this financial analysis were categories into several unique types. These vehicle types represent nearly all revenue vehicle or passenger transportation-related vehicle fleets throughout the state. These categories were utilized in the Iowa Transit Needs Survey conducted in March 2019 in the Vehicle Needs section of the survey form. In the survey, needs for non-revenue vehicles were asked for of the transit agencies, however, given the low number of these vehicle needs and lower cost compared to revenue vehicles, these numbers were not utilized in the final cost estimates. These non-revenue vehicles include administrative sedans, administrative vans, maintenance pick-up trucks, maintenance service vans, station wagons, and tractors.

Types of public transit vehicles:

- **Sedan, Standard Van, Minivan, Conversion Van:** 7- to 15-passenger vehicles, which may or may not be wheelchair lift equipped, with useful life up to 100,000 miles and 4 years.
- **Light Duty Bus:** up to 25-passenger vehicles with useful life of 120,000 miles and 4 years.
- **Medium Duty Bus:** up to 30-passenger vehicles with useful life of 200,000 miles and 7 years.
- **Heavy Duty Bus:** up to 40-passenger vehicles with useful life of 300,000 to 350,000 miles and between 10 and 12 years.
- **Medium, Heavy Trolley:** up to 40-passenger vehicles like buses but exterior (and usually interior) designed to look like a streetcar from the early 1900s, and useful life of 13 years.

Transit agencies responded by inputting how many additional revenue vehicles are needed between the current date and 2030, and then between 2030 and 2050. As mentioned in Appendix 3 on the Transit Needs Survey, transit agencies are generally exploring the "rightsizing" of their fleet in order to have an appropriately sized vehicle for the likely number of riders. Urban systems typically focus on fixed-route service which transports larger numbers of people for shorter distances, while Regional systems generally transport fewer numbers of people over longer distances resulting in many systems transitioning toward the use of smaller vans that are more practical for maintenance and more suited for transporting fewer passenger in order to augment or replace larger buses. Figure A5.35 shows projected vehicle needs, and Figure A5.36 provides current replacement costs for each type of vehicle.

Figure A5.35: Transit vehicle existing fleet and needs for Large Urban, Small Urban, and Regional systems by vehicle type by years 2030 and 2050

	Large Urban			Small Urban			Regional			Total			
Vehicle Type	Existing	2030	2050	Existing	2030	2050	Existing	2030	2050	Existing	2030	2050	Total Add'l
Sedan	4	1	1	0	0	0	23	21	13	27	22	14	36
Minivan	32	0	0	10	11	8	127	51	64	169	62	72	134
Standard Van	81	0	0	0	0	0	11	10	15	92	10	15	25
Conversion Van	0	0	0	1	3	1	16	55	37	17	58	38	96
Light Duty Bus	93	24	27	56	12	7	659	-8	40	808	28	74	102
Medium Duty Bus	57	11	10	24	-3	4	25	29	17	106	37	31	68
Heavy Duty Bus	290	35	49	19	-1	-2	0	2	1	309	36	48	84
Medium Trolley	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trolley	0	0	0	1	0	0	0	0	0	1	0	0	0

Notes:
Transit Agency Needs Survey, Survey Monkey, March 2019, Question 17

Source: Iowa DOT

Figure A5.36: Transit vehicle replacement costs

Program Guidance
Vehicle Replacement Costs

			Exceeds Federal Threshold		Entire Fleet	
Type	**Size**	**ADA**	**Count**	**Cost**	**Count**	**Cost**
Minivan	Standard Size Vehicle	N	52	$2,015,000	82	$3,177,500
Minivan	Standard Size Vehicle	Y	90	$4,725,000	130	$6,825,000
Standard Van	Standard Size Vehicle	N	38	$1,476,300	103	$4,001,550
Conversion	138" Wheel Base	Y	0	$0	2	$109,200
Conversion	Standard Size Vehicle	N	1	$54,600	1	$54,600
Conversion	Standard Size Vehicle	Y	13	$709,800	16	$873,600
Light Duty	138" Wheel Base	Y	49	$4,136,000	74	$6,211,000
Light Duty	138" Wheel Base		0	$0	1	$69,500
Light Duty	158" Wheel Base	Y	107	$9,416,700	158	$13,793,800
Light Duty	158" Wheel Base,	Y	5	$455,500	13	$1,143,300
Light Duty	176" Wheel Base	N	2	$153,500	4	$307,000
Light Duty	176" Wheel Base	Y	378	$35,541,000	587	$54,709,500
Medium Duty	28' or Shorter	N	2	$354,900	2	$354,900
Medium Duty	28' or Shorter	Y	16	$2,916,200	43	$7,798,350
Medium Duty	32' Medium Duty	N	2	$365,600	6	$1,096,800
Medium Duty	32' Medium Duty	Y	20	$3,747,000	45	$8,359,000
Medium Duty	36' Medium Duty	N	2	$418,200	3	$627,300
Medium Duty	36' Medium Duty	Y	12	$2,572,200	16	$3,408,600
Medium Duty	40' Medium Duty	N	1	$232,200	1	$232,200
Medium Duty	40' Medium Duty	Y	1	$232,200	3	$696,600
Heavy Duty	27' Heavy Duty	Y	4	$1,597,200	4	$1,597,200
Heavy Duty	30' Heavy Duty	N	1	$451,800	1	$451,800
Heavy Duty	30' Heavy Duty	Y	15	$6,777,000	39	$17,620,200
Heavy Duty	35' Heavy Duty	N	0	$0	1	$459,200
Heavy Duty	35' Heavy Duty	Y	17	$7,806,400	85	$39,032,000
Heavy Duty	40' Heavy Duty	N	0	$0	3	$1,449,900
Heavy Duty	40' Heavy Duty	Y	115	$55,579,500	290	$140,157,000
Heavy Duty	A - Articulated	Y	6	$2,899,800	12	$5,799,600
Trolley Medium	40' Medium Duty	Y	1	$232,200	1	$232,200
Trolley Heavy	40' Heavy Duty	Y	2	$966,600	2	$966,600
Total			**952**	**$145,832,400**	**1,728**	**$321,615,000**

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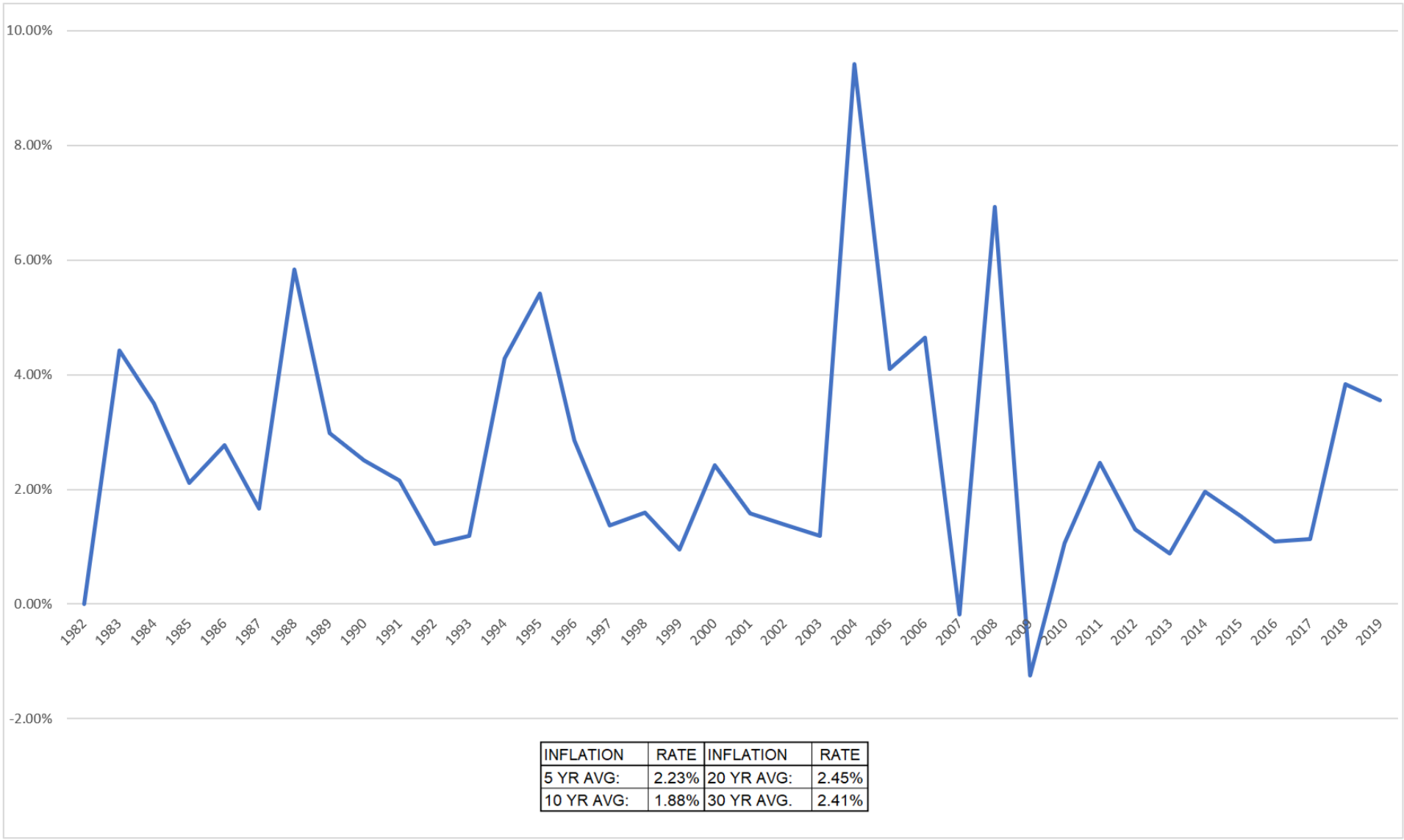
Source: Iowa DOT

After gathering cost estimates for all the transit vehicles, it was necessary to apply inflation to each vehicle type for forecasting costs into the future. The Producer Price Index (PPI)[9] is a factor that can be applied to the cost estimates that can account for the change in value for costs over time and reflect this inflationary effect on the estimates. For new vehicles, PPI was gathered to reflect pricing trends for transportation equipment, specifically trucks and bus bodies between the time period of 1982 to 2019, shown in Figure A5.37. Averaging these values across a 30-year period resulted in a final PPI inflation value of 2.41 percent.

[9] "Producer Price Index (PCI) by Commodity for Transportation Equipment: Truck and Bus Bodies", Federal Reserve Economic Data (FRED) Graph Observations - Economic Research Division, Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org

Figure A5.37: Producer Price Index trend for transportation equipment: truck and bus bodies (1982 - 2019)



INFLATION	RATE	INFLATION	RATE
5 YR AVG:	2.23%	20 YR AVG:	2.45%
10 YR AVG:	1.88%	30 YR AVG.	2.41%

Source: Federal Reserve Bank of St. Louis - Economic Research Division

Once the quantity and types of vehicle needs were known and distributed evenly across the short-range planning horizon of 2019 through 2030 and the long-range planning horizon of 2031 through 2050, this information was entered into an analysis tool designed to optimize future investment in transit vehicles. This software, called TERM-Lite, was developed by the Federal Transit Administration (FTA) Office of Budget and Policy[10] and is designed to account for typical rehabilitation, refurbishment, or replacement timelines for vehicles, while also factoring in vehicle condition and mileage of the existing vehicle fleet.

Figure A5.38: TERM-Lite software

Sources: Federal Transit Administration, Iowa DOT

There are multiple ways of inputting the forecasted vehicle needs into TERM-Lite. The method used for this analysis used a separate spreadsheet that was supplied with the software and formatted such that when the needs were completed in the sheet, a 'Publish

[10] Federal Transit Administration, "TERM-Lite" software, https://www.transit.dot.gov/TAM/TERMLite

Inventory' button was available to automatically import the vehicle data into the TERM-Lite tool. Inputting the vehicle need data into the sheet was partially controlled through drop-down picklists for the Mode in which 'MB – Motor Bus' and 'DR – Demand Response' was utilized for all of the vehicles. The Description field was also populated using existing descriptions in the sheet. The Quantity Unit field was populated with the yearly need for that vehicle and allowed for decimal points. This allowed for the sheet to reflect the evenly divided vehicle needs that was calculated in the previous step to be directly copied into this import tool. The last piece of required information is the Year Built field which indicated the year that a new vehicle is anticipated to be purchased.

Figure A5.39: Projected transit vehicle inventory from 2019 – 2050

Publish Inventory

TERM-Lite Inventory Publisher
for the Transit Economic Requirements Model

Delete Records with no Description | Delete Selected Records | Add

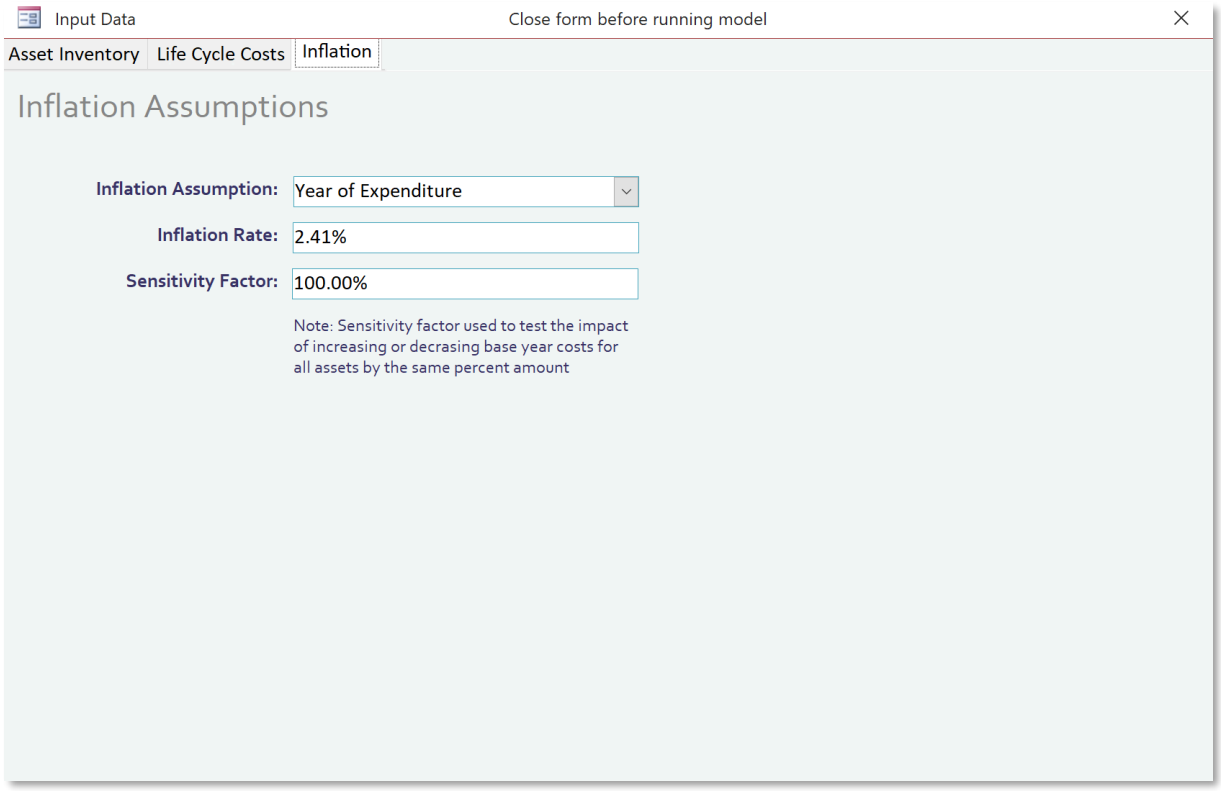
Currently, there are 2,004 records
+10 record(s)

	Record	★ (mandatory) Mode	★ Description	★ Asset Classification	★ Quantity	Unit	Expansion?	★ Year Built
✓	1976	MB - Motor Bus	Heavy Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2047
✓	1977	DR - Demand Response	Standard Van	51000 - Vehicles, Revenue Vehicles	0.83	Each	Yes	2047
✓	1978	DR - Demand Response	Sedan	51000 - Vehicles, Revenue Vehicles	1.83	Each	Yes	2048
✓	1979	DR - Demand Response	Minivan	51000 - Vehicles, Revenue Vehicles	5.17	Each	Yes	2048
✓	1980	DR - Demand Response	Conversion Van	51000 - Vehicles, Revenue Vehicles	4.83	Each	Yes	2048
✓	1981	DR - Demand Response	Light Duty Bus 176	51000 - Vehicles, Revenue Vehicles	2.33	Each	Yes	2048
✓	1982	MB - Motor Bus	Medium Duty Bus 32	51000 - Vehicles, Revenue Vehicles	3.08	Each	Yes	2048
✓	1983	MB - Motor Bus	Heavy Duty Bus 40	51000 - Vehicles, Revenue Vehicles	3.	Each	Yes	2048
✓	1984	MB - Motor Bus	Medium Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2048
✓	1985	MB - Motor Bus	Heavy Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2048
✓	1986	DR - Demand Response	Standard Van	51000 - Vehicles, Revenue Vehicles	0.83	Each	Yes	2048
✓	1987	DR - Demand Response	Sedan	51000 - Vehicles, Revenue Vehicles	1.83	Each	Yes	2049
✓	1988	DR - Demand Response	Minivan	51000 - Vehicles, Revenue Vehicles	5.17	Each	Yes	2049
✓	1989	DR - Demand Response	Conversion Van	51000 - Vehicles, Revenue Vehicles	4.83	Each	Yes	2049
✓	1990	DR - Demand Response	Light Duty Bus 176	51000 - Vehicles, Revenue Vehicles	2.33	Each	Yes	2049
✓	1991	MB - Motor Bus	Medium Duty Bus 32	51000 - Vehicles, Revenue Vehicles	3.08	Each	Yes	2049
✓	1992	MB - Motor Bus	Heavy Duty Bus 40	51000 - Vehicles, Revenue Vehicles	3.	Each	Yes	2049
✓	1993	MB - Motor Bus	Medium Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2049
✓	1994	MB - Motor Bus	Heavy Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2049
✓	1995	DR - Demand Response	Standard Van	51000 - Vehicles, Revenue Vehicles	0.83	Each	Yes	2049
✓	1996	DR - Demand Response	Sedan	51000 - Vehicles, Revenue Vehicles	1.83	Each	Yes	2050
✓	1997	DR - Demand Response	Minivan	51000 - Vehicles, Revenue Vehicles	5.17	Each	Yes	2050
✓	1998	DR - Demand Response	Conversion Van	51000 - Vehicles, Revenue Vehicles	4.83	Each	Yes	2050
✓	1999	DR - Demand Response	Light Duty Bus 176	51000 - Vehicles, Revenue Vehicles	2.33	Each	Yes	2050
✓	2000	MB - Motor Bus	Medium Duty Bus 32	51000 - Vehicles, Revenue Vehicles	3.08	Each	Yes	2050
✓	2001	MB - Motor Bus	Heavy Duty Bus 40	51000 - Vehicles, Revenue Vehicles	3.	Each	Yes	2050
✓	2002	MB - Motor Bus	Medium Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2050
✓	2003	MB - Motor Bus	Heavy Trolley	51000 - Vehicles, Revenue Vehicles	0.	Each	Yes	2050
✓	2004	DR - Demand Response	Standard Van	51000 - Vehicles, Revenue Vehicles	0.83	Each	Yes	2050

Sources: Federal Transit Administration, Iowa DOT

Once the vehicle data sheet has been imported into the TERM-Lite tool, the information can be modified by selecting the Modify Input Data button and making the appropriate changes in the Asset Inventory tab. This menu also allowed for the input of an inflation rate in the Inflation tab which adjusts the future vehicle costs for each year that is included within the analysis out to 2050. All other options were left at the default setting.

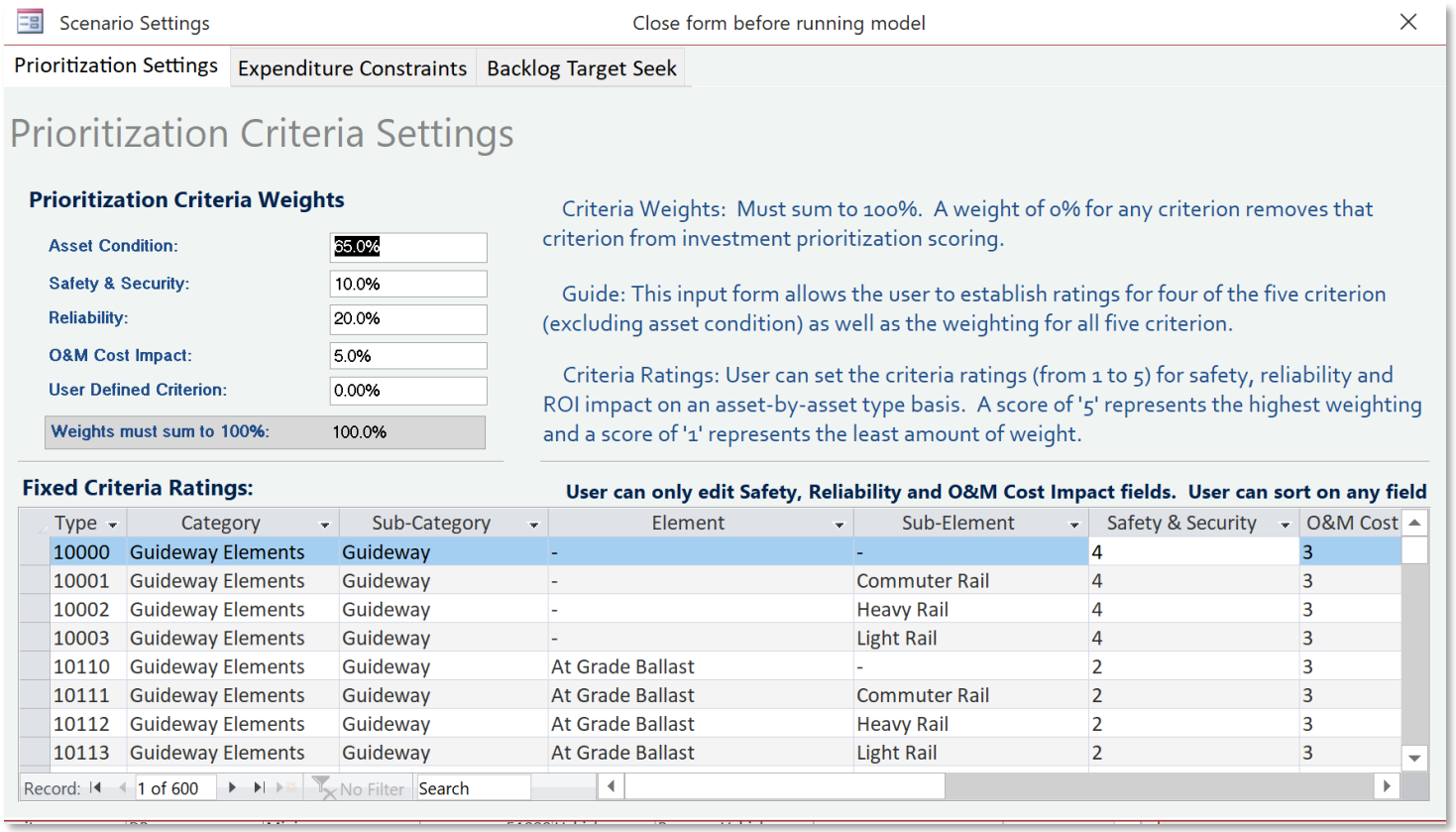
Figure A5.40: Inflation assumptions



Sources: Federal Transit Administration, Iowa DOT

The Scenario Settings button activates a menu of three tabs to further configure the TERM-Lite analysis. The first tab of Prioritization Settings affects the weighting of different characteristics of the vehicle fleet. For the purposes of this analysis, the pre-existing settings as shown in Figure A5.41 were used.

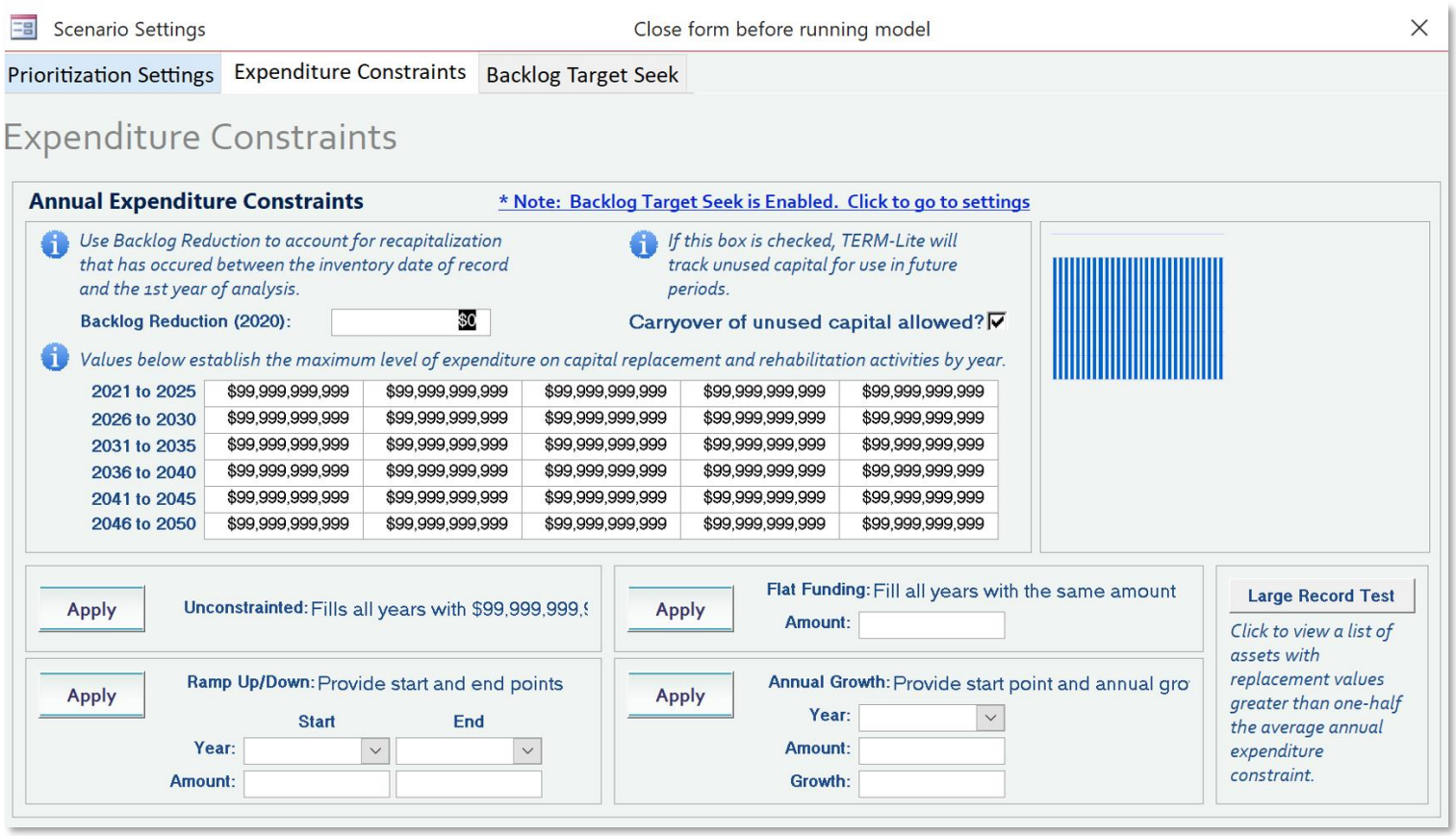
Figure A5.41: Inflation assumptions



Sources: Federal Transit Administration, Iowa DOT

The second tab under Scenario Settings allows one to adjust annual expenditures. In cases where a constrained budget for vehicle expenses is expected, a user can set what those expected budget limits will be. For the purposes of this analysis, an Unconstrained option was utilized, resulting in the year range (set in the first menu from being between 2020 and 2050 as depicted in Figure A5.42) automatically being set to $99,999,999,999. The plan development team wanted to prioritize the replacement of the vehicle fleet in order to keep the fleet in a state of good repair, essentially reducing all poor condition vehicles to 0 by no later than 2050. This allowed the group to calculate a projected budget that is required to achieve its fleet goals.

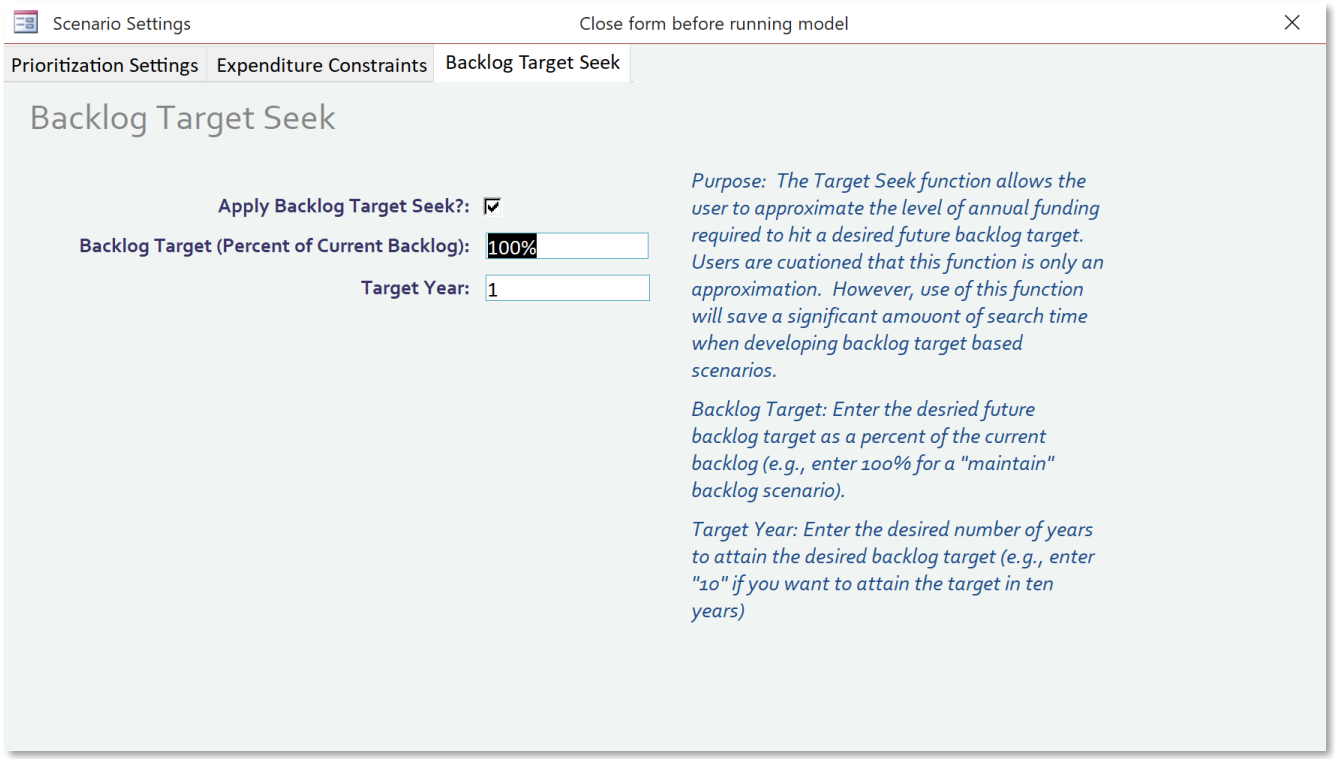
Figure A5.42: Expenditure constraints



Sources: Federal Transit Administration, Iowa DOT

The last tab of the Scenario Settings adjusts the Backlog Target Seek configurations. This affects how the current backlog of vehicle replacements will be handled in the analysis. For the purposes of this analysis, 100 percent of the backlog was considered and a target year of 1 was set in order to understand what it would take for the state to "catch up" on the backlog while being able to visualize the effects of the expansion vehicles (additional revenue vehicle needs identified in the 2019 Transit Needs Survey) on the future budget to include refurbishment and eventual replacement of those additional vehicles.

Figure A5.43: Backlog settings



Sources: Federal Transit Administration, Iowa DOT

Selecting 'Run Model' will perform the analysis and provide results in an Excel spreadsheet that contains several tabs of information. Primarily, the annual forecasted expenditures to cover the backlog of vehicles in need of replacement, in addition to acquisition, rehab, and replacement of the existing fleet was sought in order to refine the future anticipated costs for the transit plan financial analysis. These results can be seen below in Figure A5.44 and graphically depicted in Figure A5.45.

Note that additional vehicle needs identified by transit agencies in the 2019 Transit Needs Survey are represented as expansion vehicles. Since these are considered new vehicles, it will take several years before some of them begin to reach their end of expected life and require replacement.

Figure A5.44: Forecasted transit vehicle costs (2019 – 2050)

Transit vehicle costs by year (2019 - 2030)

	1	2	3	4	5	6	7	8	9	10	11	12
Asset Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing Rehab & Replace	$6,533,135	$128,060,000	$24,660,000	$53,750,000	$46,420,000	$42,530,000	$22,860,000	$48,300,000	$31,760,000	$42,540,000	$60,080,000	$14,210,000
Expansion Acquisition	$0	$0	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000
Expansion Rehab & Replace	$0	$0	$0	$0	$0	$0	$720,000	$990,000	$990,000	$1,700,000	$2,420,000	$0
Total	**$6,533,135**	**$128,060,000**	**$28,200,000**	**$57,290,000**	**$49,960,000**	**$46,070,000**	**$27,120,000**	**$52,830,000**	**$36,290,000**	**$47,780,000**	**$66,040,000**	**$17,750,000**

Transit vehicle costs by year (2031 - 2040)

	13	14	15	16	17	18	19	20	21	22
Asset Type	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Existing Rehab & Replace	$48,870,000	$33,460,000	$16,440,000	$56,560,000	$46,010,000	$30,750,000	$28,210,000	$55,470,000	$19,910,000	$47,990,000
Expansion Acquisition	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000
Expansion Rehab & Replace	$4,390,000	$720,000	$1,980,000	$4,170,000	$5,610,000	$10,830,000	$5,360,000	$3,430,000	$5,270,000	$11,020,000
Total	**$56,800,000**	**$37,720,000**	**$21,960,000**	**$64,270,000**	**$55,160,000**	**$45,120,000**	**$37,110,000**	**$62,440,000**	**$28,720,000**	**$62,550,000**

Transit vehicle costs by year (2041 - 2050)

	23	24	25	26	27	28	29	30	31	32
Asset Type	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Existing Rehab & Replace	$42,730,000	$35,870,000	$48,550,000	$39,910,000	$30,720,000	$37,580,000	$53,180,000	$37,950,000	$41,760,000	$55,180,000
Expansion Acquisition	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000	$3,540,000
Expansion Rehab & Replace	$8,900,000	$7,150,000	$8,230,000	$7,570,000	$3,340,000	$14,950,000	$17,210,000	$12,700,000	$7,570,000	$27,460,000
Total	**$55,170,000**	**$46,560,000**	**$60,320,000**	**$51,020,000**	**$37,600,000**	**$56,070,000**	**$73,930,000**	**$54,190,000**	**$52,870,000**	**$86,180,000**

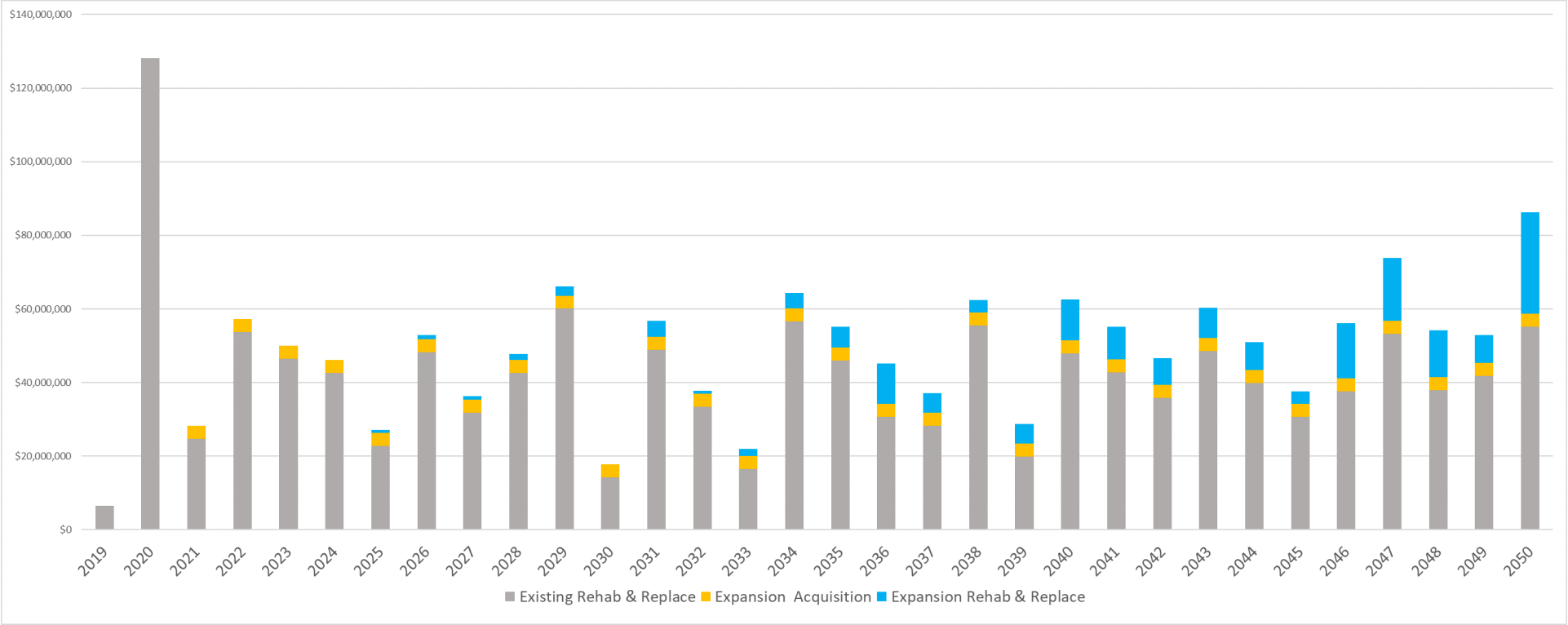
Source: Iowa DOT

As mentioned above, the chart in Figure A5.45 graphically depicts the tabular vehicles costs depicted in Figure A5.44. Gray shaded bars represent the existing vehicle fleet for all transit agencies as of 2019. Orange shaded bars represent the acquisition or purchase of new transit vehicles that were identified as needs in the 2019 Transit Needs Survey. Blue shaded bars represent the refurbishment and replacement of those new acquisition transit vehicles represented in the orange bars. The expected lifespans for the different types of transit vehicles differ from each other based on the number of miles that is expected of that type of vehicle or the expected durability of the vehicle itself, resulting in more or less rehab and replacements in the future.

In addition to the projected costs of maintaining or acquiring transit vehicles in the future, TERM-Lite is also able to depict the relative condition of the vehicle fleet based on the expected lifespan and mileage of those vehicles. The existing vehicle fleet with (constrained) baseline funding levels was run initially to establish a baseline understanding of what the transit fleet will look like if nothing was changed as far as new vehicles acquired or funding levels adjusted. Figure A5.46 shows that the red shaded 'Poor' condition vehicles will encompass approximately 80 percent of the entire transit fleet by around the year 2035, plateauing at that level/ for the foreseeable future and leaving only 10 percent of the fleet in 'Marginal' condition as amber and 10 percent as 'Good' condition in green.

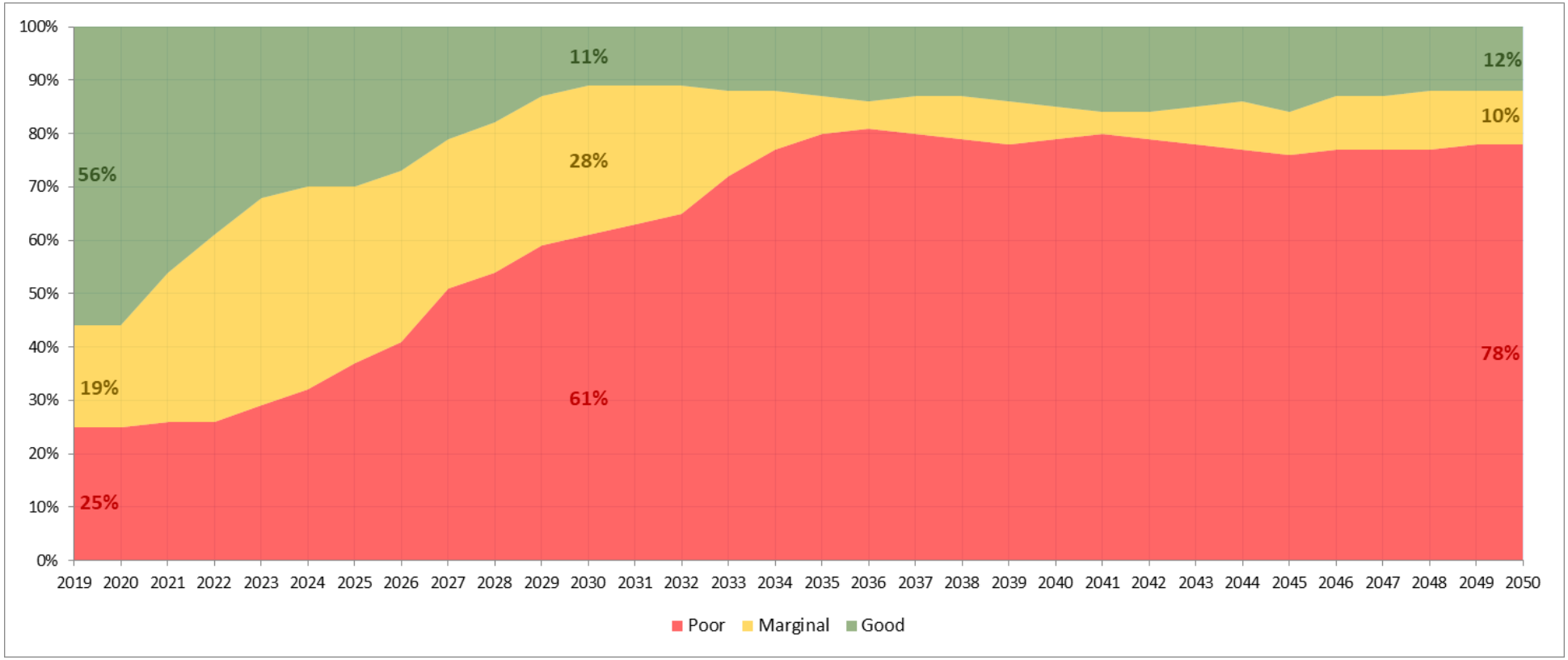
After running the analysis as part of this planning effort, unconstrained funding was included as described in the Scenario Settings above which included backlog and expansion vehicles. The results shown in Figure A5.47 reflect the overall goal of reducing the vehicle fleet 'Poor' condition vehicles to 0 percent by the end of the long-term planning horizon of 2050 resulting in roughly two-thirds of fleet in 'Good' condition and one-third in 'Marginal' condition. These graphical products can also be utilized to gauge the impact of the transit fleet budget during the implementation of this plan in order to determine the effect that fleet-related strategies have on their conditions.

Figure A5.45: Forecasted transit vehicle costs (2019 – 2050)



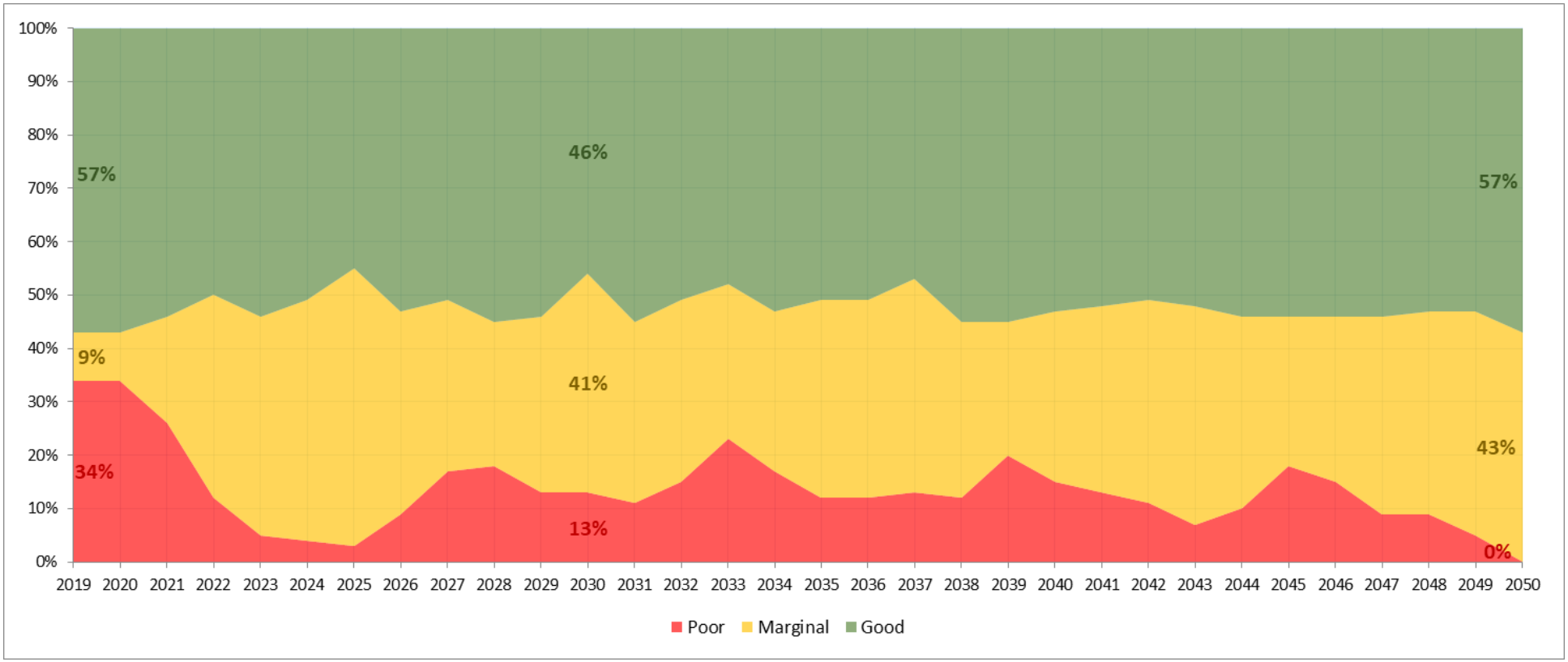
Source: Iowa DOT

Figure A5.46: Transit vehicle fleet condition forecast by year with constrained funding (2019 - 2050)



Source: Iowa DOT

Figure A5.47: Transit vehicle fleet condition forecast by year with unconstrained funding (2019 - 2050)



Source: Iowa DOT

Projected Shortfall

Having determined future costs in terms of operating and capital expenses as well as anticipating possible revenues allows for these to be combined in order to identify financial gaps were costs will exceed expected revenue. These gaps represent shortfalls in transit funding that will need to be addressed in order to support the operating and capital investments that have been identified as priorities.

As described earlier, there were two separate and distinct capital funding scenarios, one representing typical funding levels and a second representing higher than normal funding levels reflecting recent increases as well as including competitive and discretionary funding. For determining shortfalls, these two funding scenarios were carried through, resulting in shortfalls being calculated for both scenarios.

Figure A5.48 depicts the table of operating and capital costs with anticipating funding from 2019 through 2050 with shortfalls for each funding scenario. The orange 'Projected Costs' summarize the operating and capital expenditures described earlier in this document and aggregated as 'Total Expenses.' The green 'Projected Revenue' was likewise summarized from the earlier section in this document by capturing the anticipated operating funding in addition to the two capital funding scenarios, resulting in two separate total revenue values. Finally, the 'Total Expenses' were subtracted from the 'Total Revenue' in both scenarios, resulting in the total shortfalls or gaps in revenue as depicted under the red 'Projected Shortfall.' All values depicted in Figure A5.48 are in millions of dollars, for example, the total shortfall for scenario one in the year 2030 is 44.388731 which is approximately $44,388,731,000.

As shown in Figure A5.48, total future costs exceed available revenues in both funding scenarios.

Figure A5.48: Forecasted costs and funding scenarios (2019 - 2050)

# years	1	2	3	4	5	6	7	8	9	10	11	12
PROJECTED COSTS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total operating	$147,851,345	$155,742,185	$163,677,570	$171,657,498	$179,681,970	$187,750,986	$195,864,546	$204,022,650	$212,225,298	$220,472,489	$228,764,225	$237,100,504
Total capital	$18,058,581	$139,812,871	$40,180,295	$69,497,719	$62,395,144	$58,732,568	$40,009,993	$65,947,417	$49,634,841	$61,352,266	$79,839,690	$31,777,115
TOTAL COSTS	**$165,909,926**	**$295,555,056**	**$203,857,865**	**$241,155,217**	**$242,077,114**	**$246,483,554**	**$235,874,539**	**$269,970,067**	**$261,860,139**	**$281,824,755**	**$308,603,915**	**$268,877,619**
PROJECTED REVENUE												
Total operating	$141,650,647	$148,331,644	$155,012,642	$161,693,640	$168,374,637	$175,055,635	$181,736,632	$188,417,630	$195,098,628	$201,779,625	$208,460,623	$215,141,621
Scenario 1. Typical capital funding	$6,533,135	$6,788,965	$7,044,795	$7,300,625	$7,556,456	$7,812,286	$8,068,116	$8,323,946	$8,579,776	$8,835,607	$9,091,437	$9,347,267
Scenario 2. Increased capital funding	$14,887,574	$15,277,682	$15,667,790	$16,057,898	$16,448,006	$16,838,114	$17,228,222	$17,618,329	$18,008,437	$18,398,545	$18,788,653	$19,178,761
Scenario 1. TOTAL REVENUE	**$148,183,781**	**$155,120,609**	**$162,057,437**	**$168,994,265**	**$175,931,093**	**$182,867,921**	**$189,804,748**	**$196,741,576**	**$203,678,404**	**$210,615,232**	**$217,552,060**	**$224,488,888**
Scenario 2. TOTAL REVENUE	**$156,538,221**	**$163,609,326**	**$170,680,432**	**$177,751,537**	**$184,822,643**	**$191,893,748**	**$198,964,854**	**$206,035,959**	**$213,107,065**	**$220,178,170**	**$227,249,276**	**$234,320,382**
PROJECTED SHORTFALL												
Scenario 1. TOTAL SHORTFALL	**$17,726,145**	**$140,434,447**	**$41,800,428**	**$72,160,952**	**$66,146,021**	**$63,615,634**	**$46,069,790**	**$73,228,491**	**$58,181,735**	**$71,209,523**	**$91,051,855**	**$44,388,731**
Scenario 2. TOTAL SHORTFALL	**$9,371,705**	**$131,945,730**	**$33,177,433**	**$63,403,680**	**$57,254,471**	**$54,589,806**	**$36,909,685**	**$63,934,107**	**$48,753,074**	**$61,646,585**	**$81,354,639**	**$34,557,237**

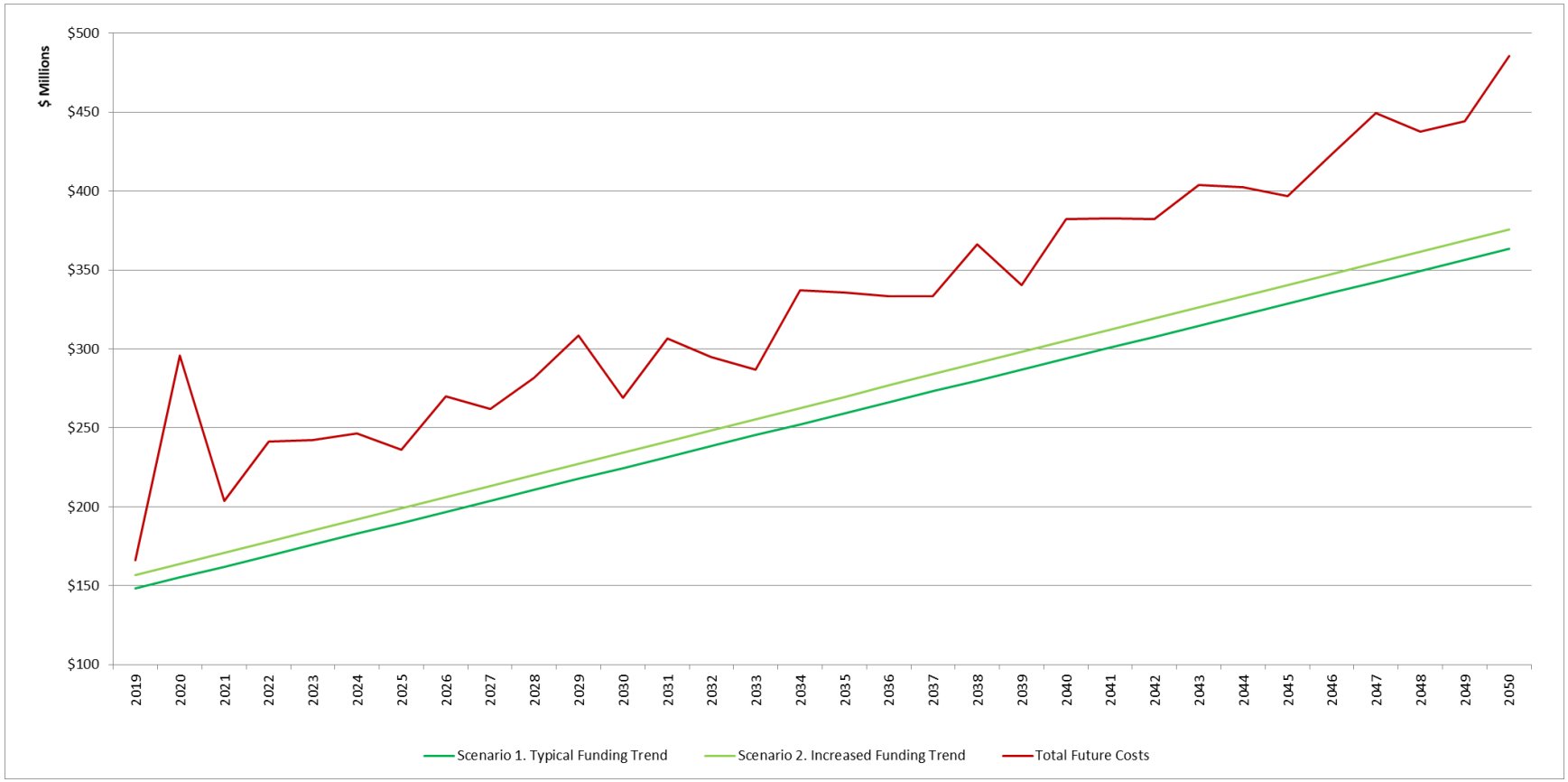
# years	13	14	15	16	17	18	19	20	21	22
PROJECTED COSTS	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Total operating	$244,719,469	$252,357,350	$260,014,147	$267,689,859	$275,384,487	$283,098,030	$290,830,489	$298,581,864	$306,352,154	$314,141,360
Total capital	$61,700,813	$42,699,107	$27,017,400	$69,405,694	$60,373,988	$50,412,282	$42,480,575	$67,888,869	$34,247,163	$68,155,457
TOTAL COSTS	**$306,420,282**	**$295,056,457**	**$287,031,547**	**$337,095,553**	**$335,758,475**	**$333,510,312**	**$333,311,065**	**$366,470,733**	**$340,599,317**	**$382,296,817**
PROJECTED REVENUE										
Total operating	$221,822,618	$228,503,616	$235,184,613	$241,865,611	$248,546,609	$255,227,606	$261,908,604	$268,589,602	$275,270,599	$281,951,597
Scenario 1. Typical capital funding	$9,603,097	$9,858,927	$10,114,758	$10,370,588	$10,626,418	$10,882,248	$11,138,078	$11,393,909	$11,649,739	$11,905,569
Scenario 2. Increased capital funding	$19,568,869	$19,958,977	$20,349,085	$20,739,193	$21,129,301	$21,519,408	$21,909,516	$22,299,624	$22,689,732	$23,079,840
Scenario 1. TOTAL REVENUE	**$231,425,715**	**$238,362,543**	**$245,299,371**	**$252,236,199**	**$259,173,027**	**$266,109,854**	**$273,046,682**	**$279,983,510**	**$286,920,338**	**$293,857,166**
Scenario 2. TOTAL REVENUE	**$241,391,487**	**$248,462,593**	**$255,533,698**	**$262,604,804**	**$269,675,909**	**$276,747,015**	**$283,818,120**	**$290,889,226**	**$297,960,331**	**$305,031,437**
PROJECTED SHORTFALL										
Scenario 1. TOTAL SHORTFALL	**$74,994,567**	**$56,693,914**	**$41,732,176**	**$84,859,354**	**$76,585,448**	**$67,400,457**	**$60,264,382**	**$86,487,223**	**$53,678,979**	**$88,439,651**
Scenario 2. TOTAL SHORTFALL	**$65,028,795**	**$46,593,864**	**$31,497,849**	**$74,490,749**	**$66,082,565**	**$56,763,297**	**$49,492,944**	**$75,581,507**	**$42,638,986**	**$77,265,380**

# years	23	24	25	26	27	28	29	30	31	32
PROJECTED COSTS	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Total operating	$321,949,482	$329,776,519	$337,622,472	$345,487,341	$353,371,125	$361,273,825	$369,195,440	$377,135,971	$385,095,418	$393,073,780
Total capital	$60,853,750	$52,322,044	$66,160,338	$56,938,632	$43,596,925	$62,145,219	$80,083,513	$60,421,806	$59,180,100	$92,568,394
TOTAL COSTS	**$382,803,232**	**$382,098,563**	**$403,782,810**	**$402,425,972**	**$396,968,050**	**$423,419,044**	**$449,278,953**	**$437,557,778**	**$444,275,518**	**$485,642,174**
PROJECTED REVENUE										
Total operating	$288,632,594	$295,313,592	$301,994,590	$308,675,587	$315,356,585	$322,037,583	$328,718,580	$335,399,578	$342,080,575	$348,761,573
Scenario 1. Typical capital funding	$12,161,399	$12,417,229	$12,673,060	$12,928,890	$13,184,720	$13,440,550	$13,696,380	$13,952,211	$14,208,041	$14,463,871
Scenario 2. Increased capital funding	$23,469,948	$23,860,056	$24,250,164	$24,640,272	$25,030,380	$25,420,487	$25,810,595	$26,200,703	$26,590,811	$26,980,919
Scenario 1. TOTAL REVENUE	**$300,793,994**	**$307,730,821**	**$314,667,649**	**$321,604,477**	**$328,541,305**	**$335,478,133**	**$342,414,961**	**$349,351,788**	**$356,288,616**	**$363,225,444**
Scenario 2. TOTAL REVENUE	**$312,102,542**	**$319,173,648**	**$326,244,753**	**$333,315,859**	**$340,386,964**	**$347,458,070**	**$354,529,175**	**$361,600,281**	**$368,671,386**	**$375,742,492**
PROJECTED SHORTFALL										
Scenario 1. TOTAL SHORTFALL	**$82,009,239**	**$74,367,742**	**$89,115,161**	**$80,821,495**	**$68,426,745**	**$87,940,911**	**$106,863,992**	**$88,205,989**	**$87,986,902**	**$122,416,730**
Scenario 2. TOTAL SHORTFALL	**$70,700,690**	**$62,924,915**	**$77,538,057**	**$69,110,113**	**$56,581,086**	**$75,960,974**	**$94,749,777**	**$75,957,497**	**$75,604,132**	**$109,899,682**

Source: Iowa DOT

The values in Figure A5.48 were also depicted as a stacked line chart in Figure A5.49. The two green lines indicate the two funding scenarios with the red line indicating total future costs. As noted above, total future costs exceed available revenues in both funding scenarios. The spike in costs near year 2020 reflects the backlog of vehicles while the ups and downs throughout most of the remainder of the period through 2050 represent a combination of differing vehicle replacement rates since vans and buses age differently, as well as differing personnel and facility expansion needs each year.

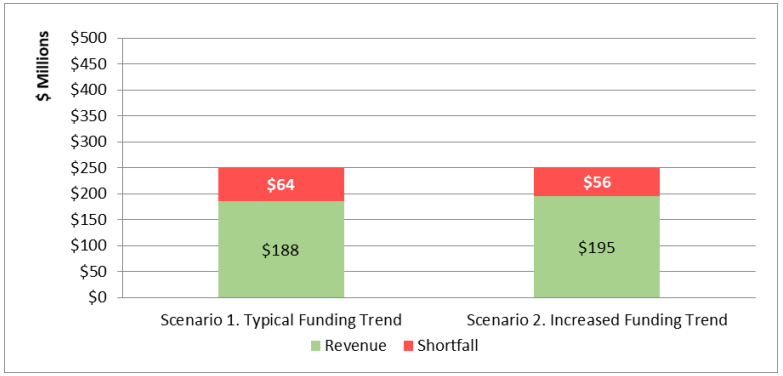
Figure A5.49: Forecasted costs and funding scenarios (2019 - 2050)



Source: Iowa DOT

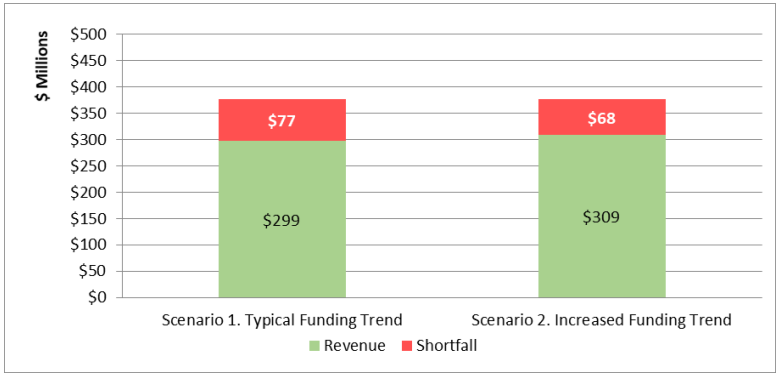
Figures A5.50 and A5.51 represent the average annual funding shortfalls expected to occur by the short-range and long-range planning horizons. Regardless of the funding scenario, these shortfalls are expected to increase as time goes on. Between 2019 and 2030, the optimistic increased funding estimate leaves an average shortfall of $56 million, while the conservative estimate of typical funding leaves a shortfall of $64 million. By 2050, these annual shortfalls will increase to $68 million and $77 million, respectively.

Figure A5.50: Forecasted average annual funding shortfall (2019 - 2030)



Source: Iowa DOT

Figure A5.51: Forecasted average annual funding shortfall (2031 - 2050)



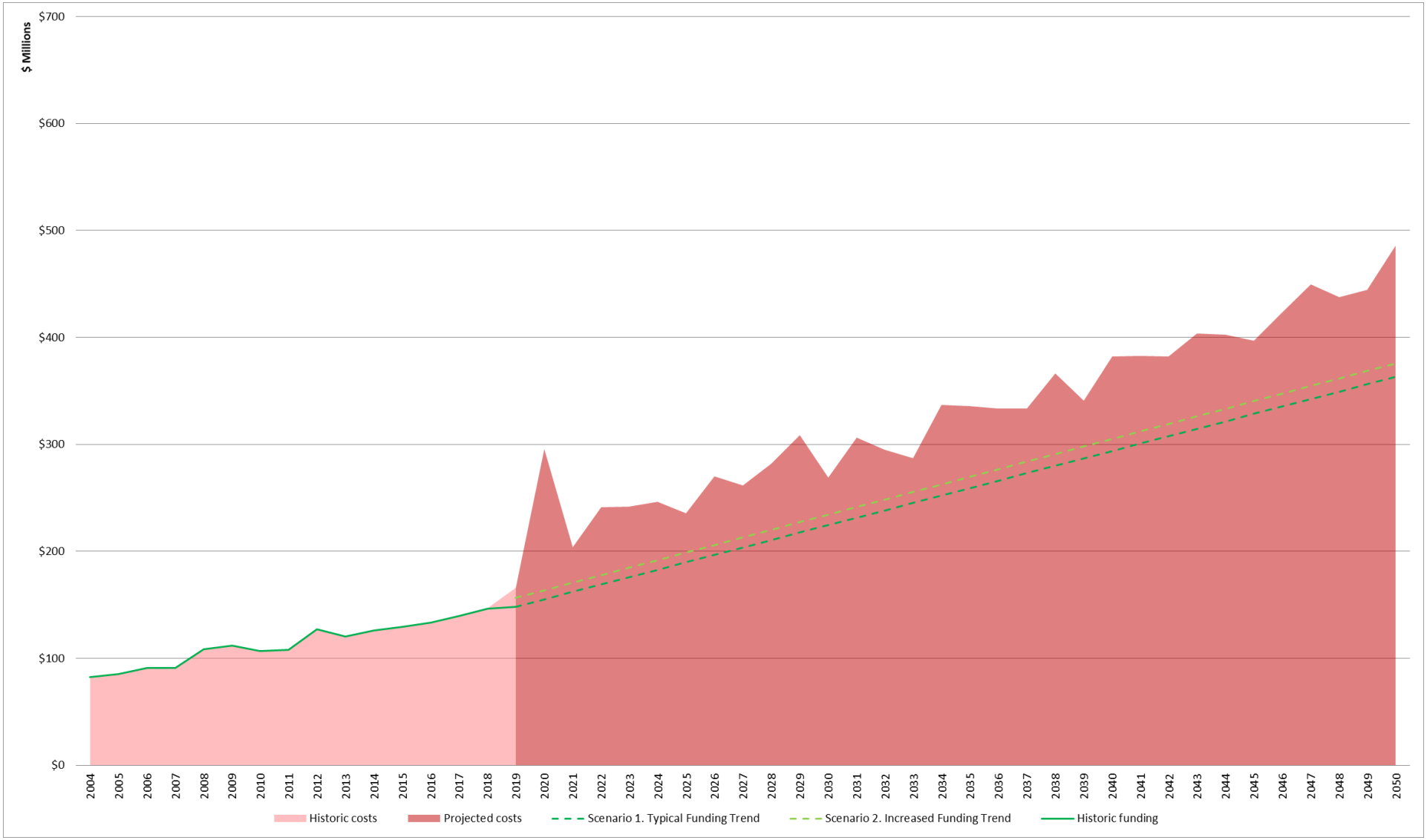
Source: Iowa DOT

Figure A5.52 reflects the same forecasted costs and funding scenarios but also adds historical values as well, in order to graphically depict the overall trend that this financial analysis attempted to convey. The overall takeaway from this analysis was more than simply understanding previous, current, and anticipated financial challenges. By understanding what the needs are for the public transit system to maintain a sustainable public transportation system, we can identify and mitigate these shortfalls. The funding mechanisms described in the Plan and in further detail in Appendix 6 outline some possible ways in which the gaps in funding can be addressed.

Implications of the shortfall:

- **Deprioritized facilities:** Expanding storage facilities will decrease overall operational costs of maintaining vehicles over time. However, the number of vehicles beyond useful life right now may result in vehicles being prioritized over facilities.
- **Deferred maintenance:** Impacts to operational funding may affect facilities or vehicles in terms of deferred maintenance and the hiring or retention of personnel.
- **Decreased staff:** Decreasing staff levels as a cost saving measure, particularly drivers, will result in a decrease to overall transit service, further limiting farebox revenue and additional sources of funding.
- **Unsustainable investment:** If shortfalls in transit funding are not addressed, priority operating and capital investments cannot be supported.

Figure A5.52: Historical and forecasted costs with funding scenarios (2004 - 2050)



Source: Iowa DOT

www.iowadot.gov

APPENDIX 6: **POTENTIAL REVENUE SOURCES**

Appendix 6. Potential Revenue Sources

With the funding shortfall and its impacts noted in Chapter 4 of the Iowa Public Transit Long Range Plan, it becomes imperative to examine other potential sources of revenue. Additionally, it is prudent to continuously evaluate alternative funding sources for public transit and passenger transportation services for their advantages, disadvantages, and overall viability. This is particularly important as circumstances change, or, as in the case of this Plan, agencies work to rightsize transit service and reduce the number of capital assets that are beyond their useful lives.

Input was gathered from a variety of stakeholders on potential mechanisms or enhancements that could be made to more efficiently support Iowa's public transit system and to rightsize transit service. This feedback resulted in the list shown in Figure 4.17 starting on page 93 of the plan,[1] which indicates the type of mechanism proposed, as well as potential advantages and disadvantages of implementing it. Figure 4.17 provided a short summary of these potential revenue sources; this appendix expands on several of them to provide additional detail.

Population Threshold for Regional Transit Districts

Consider lowering the Regional Transit District (RTD) population threshold[2] for counties from 175,000 to 90,000 in order to provide an additional funding mechanism for urban transit systems serving those counties. The current RTD population threshold restricts regional districts to Polk County and contiguous counties in central Iowa and Linn County and contiguous counties in eastern Iowa. Reducing the population threshold would allow an additional seven counties with the desire to collaborate on transit funding through formulation of a multi-city/county RTD to do so. The benefit of allowing counties/communities to form a transit district is that economies of scale exist by bringing together the management of service over a larger area. [3] This threshold change would increase the number of counties able to form RTDs to include the counties containing the nine Metropolitan Planning Organizations in Iowa and twenty public transit agencies (see Figure A6.1). Proceeds of the tax levy are used for the operation and maintenance of a regional transit district, for payment of debt obligations of the district, and for the creation of a reserve fund.

[1] https://iowadot.gov/iowainmotion/Modal-Plans/Public-Transit-Plan

[2] Iowa Code Chapter 28M.2

[3] Iowa Passenger Transportation Funding Study, Dec. 2009.

Figure A6.1: Annual estimates of the resident population: April 1, 2010 to July 1, 2017 population estimates [4]

County	2010 Census	2017 Estimate	Public Transit Agency
Black Hawk	131,090	132,648	Metropolitan Transit Authority of Black Hawk County; Iowa Northland Regional Transit Commission
Dubuque	93,653	97,041	City of Dubuque, The Jule Region 8 Regional Transit Authority
Johnson	130,882	149,210	Coralville Transit System, Iowa City Transit University of Iowa, Cambus East Central Iowa Council of Governments/CorridorRides
Linn	211,226	224,115	Cedar Rapids Transit East Central Iowa Council of Governments
Polk	430,640	481,830	Des Moines Area Regional Transit Authority
Pottawattamie	93,158	93,386	City of Council Bluffs Southwest Iowa Transit Agency
Scott	165,224	172,509	City of Bettendorf, Davenport Public Transit River Bend Transit
Story	89,542	97,502	Ames Transit Agency/CyRide Heart of Iowa Regional Transit Agency
Woodbury	102,172	102,429	Sioux City Transit System Siouxland Regional Transit System

Source: U.S. Census Bureau, Population Division; release date for county data: March 2018

Property Tax

Increase the property tax cap from $0.95 to $1.45 per 1,000 of taxable valuation for RTDs and municipal transit levies. Two cities are currently capped (Iowa City and Windsor Heights), and more will reach the cap in the future. This change would allow local agencies to increase local resources for public transit services. [5]

Local Option Sales Tax

One of the most common and successful approaches to coordinating regional transit interests utilized around the country is to create RTDs. These public organizations can establish a coordinated effort among municipalities and counties within a single region to create

[4] Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017

[5] Iowa Passenger Transportation Funding Study, Dec. 2009.

transportation solutions. Often established under statutory authority or via legislative approval, RTDs enhance a region's ability to work with state DOTs and lawmakers. In many states, RTDs are eligible for funding directly from the state, and some are also supported by localities.

In some cases, RTDs are granted taxing authority in order to provide funding to meet the public transportation needs of those who work and live in their district. A similar approach is a local options sales tax. This taxing authority can be used in conjunction with a number of infrastructure projects, but often is associated with transportation. Iowa RTDs, currently only available to counties with at least 175,000 residents, have the power to implement a property tax of up to 95 cents per $1,000 of assessed value; municipalities also have this authority, but it cannot be used in conjunction with an RTD levy.

There are numerous examples of utilizing this type of levy.

- Denver's RTD levies a 1 percent sales/use tax, which provides nearly 70 percent of its revenue.
- The Chicago RTA and the Metro-East Mass Transit District in Illinois are permitted to levy sales taxes in various counties.
- In Arizona, Maricopa and Pima Counties are permitted to levy a one-half cent sales tax to support public transportation projects.
- Five metro-region counties surrounding Minneapolis/St. Paul have implemented a one-half cent sales tax intended to support transit.
- Utahans in the Salt Lake City region provide nearly 65 percent of the funding for the Utah Transit Authority via a one-half to two-thirds cent sales tax.
- In 2014, the Indiana legislature passed SB 176, allowing counties to vote on an increase to the income tax rate of between .10 percent and .25 percent to fund approved public transportation projects.
- In 2013, the Colorado legislature, with SB 48, allowed municipalities and counties to spend 15 percent of the portion of revenues they receive from the highway users tax fund on transit projects. [6]

Rebuild Iowa Infrastructure Fund (RIIF)

The typical annual appropriation for public transportation is small but impactful. The $1.5 million Rebuild Iowa Infrastructure Fund (RIIF) has helped with a variety of projects including maintenance facility improvements, construction of bus storage buildings, and repair of bus shelters. In the past, RIIF expenditures have been reduced or eliminated for some programs; sustaining this amount of funding would help ensure continued transit infrastructure improvements. [7]

[6] On Track: How States Fund and Support Public Transportation, National Conference of State Legislatures (NCSL), Jun. 2015.
[7] 2019 Legislative Priorities, Iowa Public Transit Association

State Transit Assistance (STA)

Increase the current State Transit Assistance (STA) standing appropriation[8] from 4 percent to 5 percent (equivalent to the state sales tax) of the fees for new registration collected on sales of motor vehicle and accessory equipment to support public transportation. Most of this funding is distributed by the STA formula that is based on each transit system's performance during the previous year in terms of rides, miles, and local funding support. These formula funds are usable for support of any operating, capital, or planning expenses related to the provision of public passenger transportation.

Public transit agency operating costs continue to increase at a rate surpassing annual STA allocations. This has reduced the buying power of the STA allocation. At the same time, legislative proposals seeking to allocate portions of existing STA funds for narrowly defined initiatives have been introduced previously in 2017 and 2018, which would reduce the amount of STA available for formula distribution.

Vehicle Rental/Leased Car Sales Tax

Iowa currently devotes a portion of new vehicle registrations to fund public transit. Another source of revenue could be taxes on rental and leased vehicles. An example of such a tax is found in neighboring Minnesota, which institutes lease and rental sales taxes.

The Motor Vehicle Lease Sales Tax (MVLST) is a 6.5 percent tax on leased motor vehicles. The MVLST revenue is allocated in the following percentages beginning in FY 2018[9]: 38 percent to the County State Aid Highway Fund, 38 percent to the Transit Assistance Fund (Greater Minnesota Transit account), 13 percent to the Minnesota State Transportation Fund (for local bridges) and 11 percent to the Highway User Tax Distribution Fund (HUTD). Additionally, as of FY 2018, revenue collected through a 9.2 percent short-term motor vehicle rental tax and a 6.5 percent general sales tax on short-term motor vehicle rentals is deposited in the HUTD fund. Previously, this revenue remained in the General Fund. [10]

TNC Tax

Research[11] of the impacts of Transportation Network Companies (TNCs), such as Uber or Lyft, show that they tend to have a negative impact on congestion. Rather than decrease the number of vehicles on the road, TNCs have the opposite effect and end up increasing the

[8] Iowa Code Chapter 321.145(2)(a)(1)

[9] Minn. Stat. 297A.815

[10] Transportation Funds Forecast November 2018, Minnesota Department of Transportation (MnDOT), Dec. 2018.

[11] Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States, Oct. 2017.

number of vehicle trips by users. These additional vehicle trips draw users away from alternate transit and mobility options, thus decreasing the operating revenue of bus systems. The same research has found that the primary users of TNCs are younger and have higher incomes than those who use public transit and do not have their own vehicles.

An additional obstacle to planning for the use of TNCs is the lack of usage data. Public agencies and academic institutions request user data but rarely, if ever, receive full cooperation from the TNCs. Adequate planning becomes a challenge when vital transportation data is obscured or denied outright.

Different states and cities have applied varying mechanisms to institute a tax on these companies in order to mitigate some of the negative impacts they have. New York State[12] has a robust system for registering and paying these trip taxes. Their TNC tax is a 4 percent assessment on the gross trip fare of every prearranged TNC trip that originates anywhere in New York State outside of New York City and terminates anywhere in New York State. In addition to this tax, each TNC must file returns that document specific trip or ride data that can be analyzed by transportation planners.

The City of Chicago[13] city council approved a 15-cent increase to the 52-cent fee that is already added to every ridesharing trip. The original per-trip fee was initiated in 2015 and directed to the city's general fund, but the new ride-hailing increase is the first time that it will directly fund public transit. The city expected to raise $16 million for the Chicago Transit Authority (CTA) in 2018 and $30 million in 2019 with an additional 5-cent increase to the fee.

The City of San Francisco[14] is also in the process of seeking approval for a tax that will be applied to a percentage of the TNC's net ride revenues with the money allocated toward the city's transportation infrastructure and operations improvements. With the increased funds, lawmakers hope to tackle San Francisco's traffic congestion, which Uber and Lyft drivers contribute to significantly. Combined, these two ridesharing companies average about 82 million trips in the city annually, with at least 80 percent of their drivers coming into San Francisco from elsewhere. The proposed tax would place a 3.25 percent tax on "single-use" rides and a 1.5 percent tax on "carpool share" rides. The measure would also apply to autonomous vehicles once companies are allowed to charge passengers for rides.

[12] New York State Transportation Network Company assessment

[13] https://www.citylab.com/transportation/2017/11/how-should-chicago-spend-its-uber-tax/546233/

[14] https://www.bizjournals.com/sanfrancisco/news/2018/08/01/uber-lyft-agree-proposed-ridehail-tax-sf.html

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