Michigan Department of Transportation

# Advancing Rural Mobility Program

## Stage 1 Implementation Report

SMART Grant FY 2023

Period of performance August 15, 2023 – February 15, 2025

**June 13, 2025**

HNTB
Prepared By HNTB Corporation.

# Table of Contents

# Table of Figures



# Table References

# 1. Executive Summary

The Advancing Rural Mobility Program (ARMP) Stage 1 pilot, led by the Michigan Department of Transportation (MDOT), aimed to improve access to rural transit services by developing and deploying General Transit Feed Specification for Flexible services (GTFS-Flex) data and a public-facing trip planner, MiTripPlanner. Initially proposed with four pilot agencies, the project successfully expanded to include 15 rural transit providers across 19 counties.

The pilot addressed a critical gap in rural mobility data by enabling demand-response services to be discoverable in trip-planning tools. Through four project phases—Discovery, Development, Initial Implementation, and Amendment—MDOT and its partners created GTFS-Flex feeds, launched MiTripPlanner, and developed a System Administration Portal to support long-term data maintenance and scalability.

Stage 1 demonstrated that GTFS-Flex can be effectively implemented across diverse rural transit systems, laying the groundwork for statewide expansion. The project improved data accessibility, enhanced agency technical capacity, and provided valuable insights for scaling. These efforts position ARMP to significantly improve transit visibility, access, and connectivity in Michigan's rural communities in Stage 2.

# 2. Introduction and Project Overview

**Project Title:** Advancing Rural Mobility Program (ARMP)

**Recipient Name:** Michigan Department of Transportation (MDOT)

**Fiscal Year of Award:** FY 2023

**Period of Performance:** August 15, 2023 – February 15, 2025

**Organization Preparing the Implementation Report:** HNTB Corporation

**Date of Report Submission:** June 13, 2025

The Advancing Rural Mobility Program (ARMP) supports the goals of the SMART Grant Program as outlined in the Infrastructure Investment and Jobs Act (IIJA), Public Law 117-58, Section 25005. Specifically, the project leverages advanced data and technology to deliver significant benefits to rural communities in Michigan. These benefits align with the statutory priorities of the SMART program, including:

- Enhancing access to jobs, education, and essential services, including health care
- Expanding access for underserved or disadvantaged populations and reducing transportation costs
- Contributing to economic competitiveness and system reliability
- Encouraging private sector partnerships and investments and
- Improving energy efficiency, reducing pollution, and increasing system resiliency

Through the development and deployment of GTFS-Flex data and the MiTripPlanner tool, the ARMP Stage 1 pilot directly supports these objectives by making demand-response transit services more discoverable, accessible, and integrated across 19 rural counties in Michigan.

The Michigan Department of Transportation (MDOT) developed open-standard General Transit Feed Specification (GTFS) data for demand-response services (GTFS-Flex) and a transit trip planner that ingests the data. The trip planner is available online to the general public, enabling people to find information about available transit services for planning trips and to connect with transit agencies to schedule trips. This effort will allow seamless systems integration with public and private trip-planning tools, ultimately improving accessibility and connectivity for rural passengers.

Stage 1 of the Advancing Rural Mobility Program (ARMP): Michigan Public Transit Open Data Standards pilot program increased awareness of and access to public transit services in rural Michigan. The initial phase included participation from four county-based transit providers. Following the successful implementation at these agencies, the pilot was expanded in November 2024 to incorporate 11 additional transit providers operating in rural Northern Michigan.

The initial four-county transit agencies participating in the Stage 1 pilot included Benzie Transportation Authority (Benzie Bus), Cadillac/Wexford Transit Authority (WexExpress), Charlevoix County Transit (CCT), and Roscommon County Transportation Authority (RCTA). In November of 2024, after the successful implementation at these four agencies, the pilot expanded to include an additional 11 transit providers: Arenac Public Transit Authority (APTA), Clare County Transit Corporation (CCTC), Crawford County Transportation Authority (CCTA), Gladwin City-County Transit (GCCT), Iosco Transit Corporation (ITC), Kalkaska Public Transit Authority (KPTA), Manistee County Transportation, Ogemaw County Public Transit (OCPT), Straits Regional Ride (SRR), Thunder Bay Transportation Authority (TBTA), and Yates Dial-a-Ride.

The Stage 1 ARMP pilot comprised four project phases: Discovery, Development, Initial Implementation, and Amendment. The Discovery phase, or Phase I, involved partner agency outreach, assessing services provided and understanding of GTFS-Flex, as well as the drafting of a State of the Practice Report. This report documented key findings gathered from agency outreach, as well as a review of the state of GTFS-Flex technology across the nation. The report outlined case studies of similar projects in Minnesota and Vermont. The Development phase, or Phase II, involved extensive engagement with early adopters of GTFS-Flex from around the nation (many of these were associated with the case studies in the State of the Practice Report) to document best practices and lessons learned. Phase II also included the preliminary development of GTFS-Flex data feeds at initial participating agencies and the trip planner web application. The Initial Implementation phase, or Phase III, included developing, deploying, and testing GTFS-Flex infrastructure and trip planner maintenance, as well

as site visits and information exchange sessions with initial project partners. The Amendment phase, or Phase IV, expanded the pilot area to include additional rural transit providers in the state of Michigan. This phase required engagement and implementation activities similar to those in the Development and Implementation phases to be undertaken again with all new participating rural transit providers.

Rural communities in Michigan are primarily served by demand-response transit services that take riders from their origin directly to their destination instead of operating on a fixed route (with scheduled, fixed times and stops). Unlike fixed-route services, demand-response transit services are not easily discoverable alongside fixed-route transit options in trip-planning applications (which rely on or consume open-standard data). Historically, this has created barriers that prevent access to available transit services for rural residents. As a result, people in these areas often rely on less affordable private transportation or on friends and family. The ARMP Stage 1 pilot addressed this mobility data gap by developing open-standard flexible data specifications that work with demand-response services to deliver transit information in rural Michigan communities with GTFS-Flex. The GTFS-Flex extension enables the discovery of static demand-response service information, providing a more comprehensive and equitable trip-planning experience in rural areas where demand-response transit is the primary or only option. Static information equips riders with information like established service areas and hours of operation but does not include dynamic updates like real-time estimated vehicle arrival times and vehicle location information.

GTFS data has been the open-standard data specification commonly available for discovering fixed-route services in urbanized areas. This data standard is utilized by common commercial trip planners like Google Maps and the Transit app. However, standard GTFS feeds are not designed to provide the information necessary for demand-response service that predominates rural areas, and commercial trip planners do not yet widely ingest GTFS-Flex data, leading to this project's creation of the MiTripPlanner tool. GTFS-Flex was officially adopted as a standard data specification during this project in April 2024, signaling that the transit industry would like to see further development and use of this data specification. The ARMP pilot has sought not only to pilot the development of GTFS-Flex and demonstrate its usefulness in trip-planning tools but also to take lessons learned from this implementation and to expand the availability of this data to the entire state. This will benefit riders by improving access to information about transit options and will help to educate transit agency staff on the latest industry practices and technologies.

## 2.1. Community Impact

Public transit is less visible in rural communities. Services are typically demand responsive, there are few to no bus stops, and vehicles can be smaller to meet demand. Additionally, open-standard transit data is lacking in rural communities, and people are not likely to discover public transit options when looking up directions in mapping tools like Google Maps or the Transit app. This makes public awareness and perception of

public transit options in rural areas inconsistent. The development of GTFS-Flex data feeds in rural areas can enable people to discover and plan trips using demand-response services. In addition, now that GTFS-Flex has been adopted by MobilityData[1], the non-profit organization that governs transit data specifications, it is anticipated that more trip-planning tools will begin to ingest GTFS-Flex data. The eventual expansion of ARMP to encompass agencies statewide can demonstrate the viability of widespread GTFS-Flex adoption, potentially further encouraging continued integration of the data format in trip planners.

In the ARMP Stage 1 pilot, GTFS-Flex data feeds were developed for 15 partner agencies offering demand-response and flexible transportation services in rural Michigan. Participating partner agencies provide service across 19 rural counties in Michigan, including Arenac, Benzie, Wexford, Charlevoix, Clare, Crawford, Gladwin, Iosco, Kalkaska, Manistee, Ogemaw, Roscommon, Cheboygan, Presque Isle, Emmet, Alpena, Montmorency, Alcona, and Lake counties. While many of these agencies provide a variety of services, many residents do not use their services due to limited awareness of schedules and service options. Partner agencies were selected based on an assessment of their technological readiness to adopt the data specification.

On-site and virtual meetings were held with participating agencies to get their feedback on the program and to provide training; agencies also participated in beta testing of the trip-planning tool. Ridership surveys were conducted to better understand passengers' use of transit and the challenges they face, and marketing kits were developed to help the agencies promote use of the trip-planning tool.

The initial four pilot agencies operate in counties that include five Census Tracts categorized as Areas of Persistent Poverty, four federally recognized tribal lands, four Opportunity Zones, and 11 Census Tracts that have been identified as disadvantaged through the Climate and Economic Justice Screening Tool (CEJST). In Phase IV of the pilot, the project expanded to an additional 11 agencies serving 15 primarily rural counties. These newly added counties contain 37 Census Tracts categorized as Areas of Persistent Poverty, 23 Opportunity Zones, and 91 Census Tracts that have been identified as disadvantaged through CEJST. These new counties also included one federally recognized tribal land, Little River Band of Ottawa Indians. The eventual expansion of ARMP to encompass agencies statewide can demonstrate the viability of widespread GTFS-Flex adoption, thereby potentially encouraging trip-planning platforms to integrate this data format.

## 2.2. Scale of Deployment

In the ARMP Stage 1 pilot, MDOT developed GTFS-Flex data feeds for all of the services provided by Benzie Bus, WexExpress, CCT, and RCTA in Phases I-III. In Phase IV of the pilot, MDOT developed feeds for all of the services provided by APTA, CCTC, CCTA, GCCT, ITC, KPTA, Manistee County Transportation, OCPT, SRR, TBTA,

[1] Data Standards | MobilityData. (n.d.-c). MobilityData. https://mobilitydata.org/data-standards/

and Yates Dial-a-Ride. MDOT also developed a free online and smartphone-accessible transit trip planner that ingests these feeds and provides information on services available to complete a trip. The first release of the trip planner, which included the initial four partner agencies, went live in September 2024. The second release included data feeds for the additional 11 agencies and went live in February 2025. The GTFS-Flex data feeds are published on the project website, making that data available to any other trip-planning tool that wants to incorporate it into their platform.

The current trip planner displays demand response transit services in 19 rural counties, spanning approximately 20% of the state's total area. At-scale implementation of this project would introduce GTFS-Flex across all rural transit services in the state. At-scale implementation would also incorporate GTFS information for fixed-route services in urban areas, enabling riders to connect between rural and urban areas via public transit. In a separate but related initiative, MDOT is currently in the procurement process of contracting with a vendor to develop a statewide Mobility as a Service (MaaS) platform. When this becomes available, the GTFS-Flex data developed through this initiative will be integrated with the MaaS platform, enabling service discovery and trip planning that includes demand-response and flex-route services. By creating a statewide GTFS data clearinghouse, this data will also become available to commercial trip-planning companies to use after they begin to ingest GTFS-Flex data.

## 2.3. Project Activities

Project activities included the development of a data management plan, partner agency and provider surveys and interviews, the project website, a State of the Practice Report and System Requirements deliverable (documented “Concept of Operations” for the trip planner, use cases, and individualized requirements), newsletters, GTFS-Flex database and trip planner, System Administration Portal, agency site visits (in person and virtual), marketing kits, and reports.

***Table 2-1 Major Completed Milestones***

| Milestone | Phase | Completion Date |
|---|---|---|
| Data Management Plan | I | 12/15/2023 |
| Evaluation Report | I | 01/26/2024 |
| Partner Agency Surveys/Interviews | II | 03/01/2024 |
| Project Website | II | 04/02/2024 |
| System Requirements | II | 05/28/2024 |
| State of the Practice Report | II | 06/14/2024 |
| Agency Site Visits (In Person) | II | 06/28/2024 |
| Rider Surveys | II | 07/10/2024 |

| Milestone | Phase | Completion Date |
|---|---|---|
| Six Newsletters | II, III | 08/07/2024 |
| GTFS-Flex Feed Creation | II, III, IV | 04/15/2024 - 01/20/2025 |
| Trip Planner Beta Testing (1st Release) | III | 07/24/2024 - 08/16/2024 |
| Trip Planner Go-live Pilot Period | III | 9/1/2024 |
| Agency Site Visits (Virtual) | IV | 12/03/2024 -12/05/2024 |
| Trip Planner Beta Testing (2nd Release) | IV | 01/21/2025 - 01/29/2025 |
| Administration Portal Development | IV | 09/16/2024 – 01/17/2025 |
| Administration Portal Beta Testing | IV | Exp: 01/21/2025 - 01/31/2025 |
| Administration Portal Go-Live | IV | 02/14/2025 |
| Marketing Kits | IV | 02/03/2025 |
| System Administrator User Training | IV | 02/05/2025 |

## 2.4. Publicity

The Advancing Rural Mobility project was featured in a press release published in June 2024 on the United States Department of Transportation (USDOT) Strengthening Mobility and Revolutionizing Transportation (SMART) Grant Program News website.[2] The piece highlighted the visit of SMART Grant's Program Director Stan Caldwell and MDOT Office of Passenger Transportation Administrator Jean Ruestman to celebrate a milestone for the project at Charlevoix County Transit. The visit was also showcased in a USDOT Research and Technology LinkedIn post in the same month. The visit, project background, and milestones were described in detail in an MDOT press release,[3] published in July 2024. Also, in July of 2024, the project was featured in an article[4] in Mass Transit Magazine, a publication[5] by the USDOT Office of Assistant Secretary for Research and Technology Research Roundup, local news sites such as the Cadillac

[2] SMART News. (2024, June). U.S. Department of Transportation. https://www.transportation.gov/grants/smart/smart-news

[3] New innovations for rural public transit agencies highlighted in video news release. (2024, July 3). https://www.michigan.gov/mdot/news-outreach/pressreleases/2024/07/03/new-innovations-for-rural-public-transit-agencies-highlighted-in-video-news-release

[4] Michigan DOT's Advancing Rural Mobility pilot project provides new online tools for both rural public transit agencies. (2024, July 9). Mass Transit. https://www.masstransitmag.com/alt-mobility/press-release/55094371/michigan-department-of-transportation-mdot-michigan-dots-advancing-rural-mobility-pilot-project-provides-new-online-tools-for-both-rural-public-transit-agencies

[5] Research Roundup | Advancing Rural Mobility Project. (2024, July). Office of the Assistant Secretary for Research and Technology. https://www.transportation.gov/sites/dot.gov/files/2024-07/OST-R%20Roundup-July-Final%20_0.pdf

News, and other publications such as Contractor News. The project also was highlighted in presentations at the MDOT ACEC (American Council of Engineering Companies) Partnering Workshop on Feb. 7, 2025, and MDOT's Tech Talk virtual education series on March 13, 2025. MDOT staff also mentioned the project in numerous presentations to groups and events, including a webinar sponsored by FTA, AASHTO and SUMC on Jan. 15, 2025; the Transportation Bonanza, Feb. 15, 2024; the MDOT Development Conference, Nov. 7, 2023; and the Talking Michigan Transportation podcast, March 23, 2023. The project also will be part of a panel presentation that has been accepted for the ITS World Congress in Atlanta, Aug. 24-28, 2025.

In addition to this media attention, the ARMP team maintains a project website[6] which includes newsletters[7] that are regularly published to share project information with the public. Between May and July 2024, the project website had 2,000 visitors.

# 3. Proof-of-Concept Findings

The evaluation of the pilot is necessary to determine the resources, processes, and training needed for at-scale implementation, which would develop GTFS-Flex feeds for all rural transit services in the state of Michigan and expand access to information about these services. The Stage 1 pilot was initially carried out in four rural counties with above-average technological readiness for implementing GTFS-Flex, as determined by the MDOT *Statewide Technology Plan for Rural Public Transit Agencies*.[8] In the final phase of the pilot, Phase IV, the project was expanded to an additional 11 rural agencies. The objective of the Stage 1 pilot has been to enable residents and visitors in these communities to better understand transit options through the online trip planner, "MiTripPlanner," improving their access to mobility information and thereby improving access to jobs, education, and essential services.

Throughout the pilot, the project team provided technical expertise to agencies with varying technological readiness to determine functional needs and system requirements for an integrated system. At the onset of the work with participating agencies, a detailed assessment was conducted to understand individual agencies' existing services. Each agency provided information about the services they operate (i.e., fixed-route, flex-route, and demand-response services), the number of vehicles in operation, their scheduling/dispatching software, the nature of trip booking and fare payment (whether they use online vendors for online booking and payment), and their familiarity with and concerns about GTFS and GTFS-Flex data.

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[6] Home. (n.d.-c). Advancing Rural Mobility Michigan. https://miruralmobility.org/
[7] Newsletter Archives. (n.d.-c). Advancing Rural Mobility Michigan. https://miruralmobility.org/information-center/newsletter-archives/
[8] Statewide Technology Plan for Rural Public Agencies. (2022). MDOT Office of Passenger Transportation. https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Travel/Mobility/Public-Transportation/Publications/Statewide-Transit-Technology-Plan-Rural-RTAs.pdf

Among the four original participating agencies, only one — Benzie Bus — was using standard GTFS data before the pilot began. Benzie Bus created its own GTFS data in-house using the National Rural Transit Assistance Program's (RTAP) GTFS Builder. However, the data intended to describe Benzie Bus's flex and demand-response services did not accurately describe the agencies' services. Some of the initial questions posed by agencies around GTFS-Flex data and development included: who uses it, what does it do, who will take care of the development and maintenance of data feeds, and to what extent will "non-experts" be able to maintain the feeds.

All participating agencies completed the technology assessment successfully. Among the initial four agencies, none operated fixed-route services at the time of assessment, two operated flex-route services, and all provided demand-response services. In Phase IV of the pilot, all newly added agencies operated at least one demand-response service. Additionally, one agency offered flex-route services, and another operated a fixed-route service. The results of the technology assessments were crucial in shaping the project. They informed the software design and staff supplementation needed to build out GTFS-Flex models and guided the project team in developing an educational approach and strategy for expanding the pilot.

The development of GTFS-Flex feeds for each partner agency required extensive collaboration between the project team and transit providers to ensure an accurate display of transportation services in the trip planner. To validate the accuracy of service displays and the usability of the trip planner, the project team and agency staff conducted two distinct beta testing phases. Beta testing aimed to confirm that service information was modeled correctly and allowed agencies and stakeholders to test the functionality of the planner. Rather than following a rigid user acceptance testing format with scripted test cases, the project team elected to structure feedback as beta testing, during which selected stakeholders followed basic instructions to test, validate, and then provide feedback on the accuracy of services and general usability of the application through a widget called Marker.io. Testing tasks included entering origins and destinations throughout the region, modifying search parameters such as departure date/time and eligibility restrictions, and reviewing the resulting service descriptions for accuracy. Feedback from beta testers was documented within the application through a "Feedback" tab integrated into the application. When clicking the "Feedback" tab, a screenshot of the tester's current screen view is generated along with a dialog box to provide a description of the issue encountered within the application. The development team reviewed and prioritized feedback then addressed defects and bugs prior to going live. Overall, beta testing through Marker.io was a success. Stakeholders and transit agencies found the widget easy to use, and testers were able to provide detailed feedback and documentation in a straightforward manner that would have otherwise been difficult to collect manually.

A significant challenge during beta testing was gathering sufficient participation from agencies within the designated three-week testing period. In the future, the testing timeline could be extended, paired with clear and frequent communication emphasizing

the importance of testing and the deadlines. Securing commitments from agencies to complete testing within the planned timeframe would also help ensure better participation. An additional issue discovered by agency administrators during beta-testing was the limitations of search parameters, which at times were too restrictive. The project team addressed these concerns by modifying search parameters to be less restrictive so that more results are returned in the query (e.g. Frankfort Family Fare is returned in the query, whereas formerly it did not yield any result without entering the business address).

The initial release of the MiTripPlanner web application became available to the public in September 2024, following the completion of beta testing. This initial release incorporated GTFS-Flex data from the four original project partners, marking the integrated display of their service information for the first time online. This iteration included all 14 demand-response services provided by the initial four participating agencies. These services are detailed in **Table 3-1.**

***Table 3-1 MiTripPlanner First Release Services Included***

| **Provider** | **Services Included** |
|---|---|
| Benzie Bus | Dial-a-Ride, Airport Service, Flex Route, Health Rides |
| CCT | Dial-a-Ride, Medical Trips, Ironton Ferry, Dial-a-Ride - Beaver Island |
| RCTA | Dial-a-Ride, Non-Emergency Medical Transportation (NEMT) |
| WexExpress | Door-to-Door Service, New Freedom, Rides to Wellness, Regional Transportation |

Following successful implementation at the initial four agencies, the pilot incorporated an additional 11 transit agencies into the trip planner. These additional agencies operate a total of 38 demand-response, fixed-route, and flex-route services. The majority of transportation services provided by these agencies are demand-response; one service is fixed-route, and one is flex-route. These services are documented in **Table 3-2.**

***Table 3-2 MiTripPlanner Second Release Services Included***

| **Provider** | **Services Included** |
|---|---|
| APTA | Dial-a-Ride, Out-of-County Medical Transportation |
| CCT | Dial-a-Ride, NEMT |
| CCTA | Dial-a-Ride |
| Gladwin City-County Transit | Door-to-Door (Zone 1 and 2) |

| Provider | Services Included |
|---|---|
| Iosco Transit Corporation | Tawas Oscoda Service, Service to Whittemore and Hale, Iosco County Service |
| KPTA | Door-to-Door (village and county service), Flex Services to Manistee, Rapid City, Bear Lake, M-66, and Woodland School, Transportation to Traverse City (flex-route), Cowell Cancer Center, NEMT service, Service to Other Counties |
| Manistee County Transportation | Dial-a-Ride (city and county service), West Shore Community College Bus Service (fixed-route), Cowell Cancer Center Rides |
| OCPT | County-wide Service |
| SRR | Route 1, Route 2 (Cheboygan & Petoskey), Route 3 (Mackinaw City & Petoskey), Route 4, Route 5, Cheboygan Dial-a-Ride, Petoskey Dial-a-Ride |
| TBTA | Thunder Bay Dial-A-Ride Transportation (DART), Thunder Bay Out-of-County Transportation (TBTA), Thunder Bay NEMT |
| Yates Dial-a-Ride | Dial-a-Ride, Limited Sunday Service |

To measure the success of the pilot, the project team utilizes use-metrics of the MiTripPlanner via Google Analytics. These include the total and average daily website visitors and session engagement data. Website visitor numbers indicate the number of people who have accessed the website to discover participating agencies' transit information. From September 1, 2024, to January 7, 2025 (a span of 129 days), the MiTripPlanner portal received 1,947 views from 483 unique users, averaging 15 average daily users (ADU) per day. The average engagement time per session on the trip planner site was 50 seconds. According to Google Analytics, over 90% of users accessed the trip planner directly, either by typing the web address into their browser or by using links in newsletter emails. By contrast, only 6% of users arrived via referrals from the main project website. The trip planner site experienced its highest single-day spike in visits on September 12, 2024, with 189 users. This surge followed an email announcement to transit agencies and MDOT industry personnel about the launch of the tool.

In Phase IV of the Stage 1 pilot, an Administration Portal was developed for System Administrators. This tool is designed to provide agencies with additional capabilities to test and deploy GTFS-Flex feeds, as well as to monitor and collect session engagement data and usage metrics. The Administration Portal allows administrators to access user search location data, including the origin and destination of searches, even when no

results are returned (search locations are displayed on a map). This feature enables agencies to identify destinations that users have searched for, but which currently lack service, offering valuable insights for service planning by highlighting gaps between demand and available coverage. This data could prompt agencies to add or revise services to better meet public needs. Ultimately, the Administration Portal will help administrators and agencies assess the extent to which the MiTripPlanner is used and contribute to its long-term sustainability. The tool will be available with the February 2025 release of the website, with additional analytics to follow.

In addition to the technology assessment, GTFS-Flex development, and monitoring of use-metrics, the project team conducted transit agency site visits, interviews, and focus groups to gather additional information from agency staff and riders. In Phase II of the pilot, a survey was disseminated on paper and virtually to users of the four initial pilot agencies' services to gather their input on existing transit experiences (see **Appendix A**). A total of 86 riders participated in the survey. Key findings from the survey included insights on demographics, booking methods, frequency of use, and other challenges. Key findings are summarized in **Table 3-3** Rider Survey Key Takeaways

In addition to this engagement, the project team developed marketing kits to support pilot agencies in the promotion of the trip planner web application. The kits included a variety of resources such as social media content, newsletter content, graphics, and messaging, all designed to be easily shared across the agencies' preferred communication channels. To ensure the information reached a wide audience and enhanced the visibility and adoption of the tool, the project team worked closely with pilot agencies to identify the channels they currently use to communicate service information with riders. This collaborative effort allowed the team to tailor the marketing materials to fit the specific communication strategies and needs of each agency.

***Table 3-3 Rider Survey Key Takeaways***

| **Category** | **Key Findings** |
|---|---|
| Demographics | Nearly 50% of participants have a disability |
| Booking Methods | Nearly all riders book rides and get service information via phone calls to dispatch. |
| Frequency of Use | Most riders use public transportation on a weekly rather than daily or monthly basis. |
| Common Challenges | Lack of real-time arrival notifications; unclear booking requirements; complicated booking processes difficulty keeping track of scheduled trips |

With the information collected from the agency technology assessment, agency outreach, and rider surveys, the project team was able to guide implementation of the pilot with consideration of current conditions and limitations at each agency.

## 3.1. Michigan Trip Planner (MiTripPlanner)

The initial release of MiTripPlanner enables residents in pilot areas to quickly and easily discover available transit services that were formerly not discoverable online, effectively helping to bridge the rural mobility data gap in these areas. For instance, when searching for public transit from Charlevoix to nearby Boyne City using Google Maps, there appear to be no public transit options, as shown in **Figure 3-1**Error! Reference source not found.**.** Google Maps does not yet support ingestion of GTFS-Flex data, which would allow the discovery of existing demand-responsive services (in this case, Charlevoix County Dial-a-Ride). The initial deployment of MiTripPlanner effectively enables travelers to discover the 14 existing transit services that were formerly invisible in common trip planners and equips travelers with accurate information about these services. The planner visualizes available demand-response transit service information with custom origin and destination points as an arc with estimated arrival times, as shown in Error! Reference source not found., to reflect the fact that routes may vary as additional passengers are added to the trip. The next iteration of the trip planner will include numerous additional agencies and services.

The success of the trip planner can be measured by the criteria outlined in the Evaluation Report and the original grant proposal. This criteria includes the percentage of Michigan agencies using open-standard flexible data, the number of residents and jobs within counties served by agencies that have been incorporated into the trip planner with GTFS-Flex data, and the percent of agencies with app-based or online booking tools or that are participating in MDOT's MaaS platform. Long-term project impacts, such as increases in annual ridership in participating communities and statewide crash and vehicle emission reductions, will require multiple years of data for statistically significant quantitative evaluation.

***Figure 3-1 Example Trip from Charlevoix to Boyne City in Google Maps***

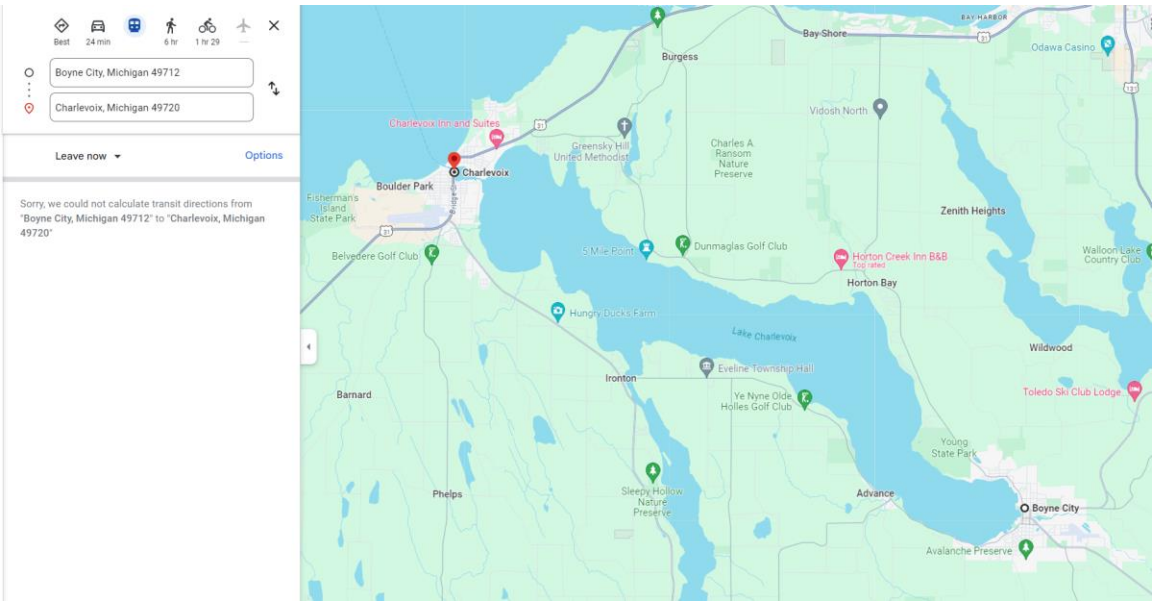
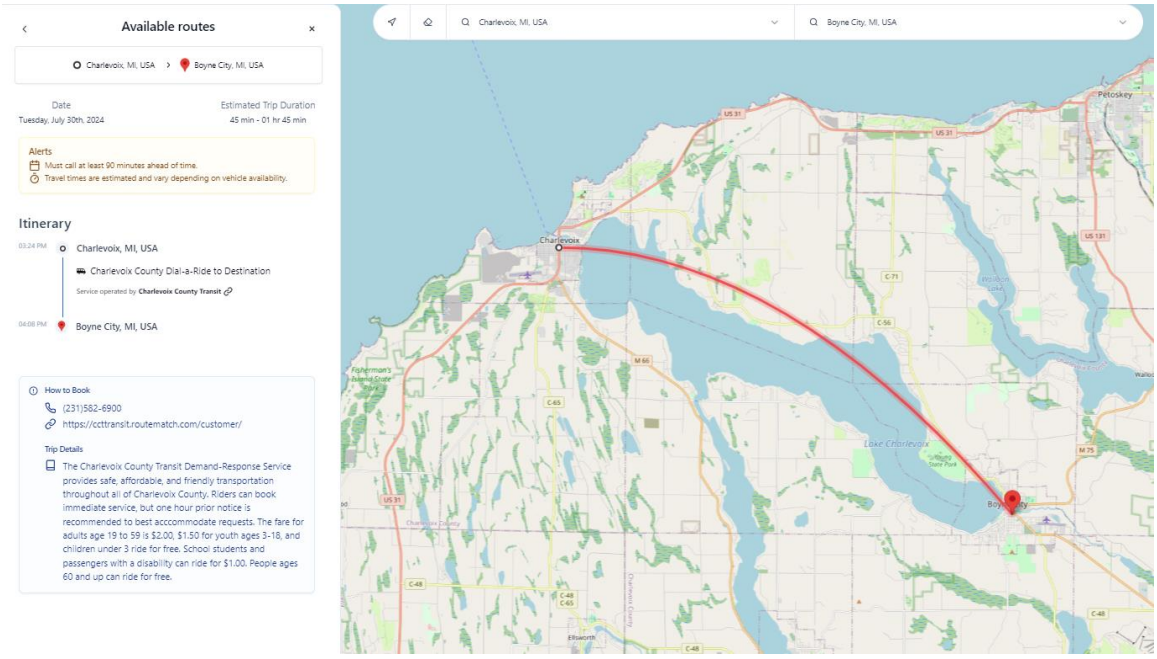


*Figure 3-2 Example Trip from Charlevoix to Boyne City in MiTripPlanner*

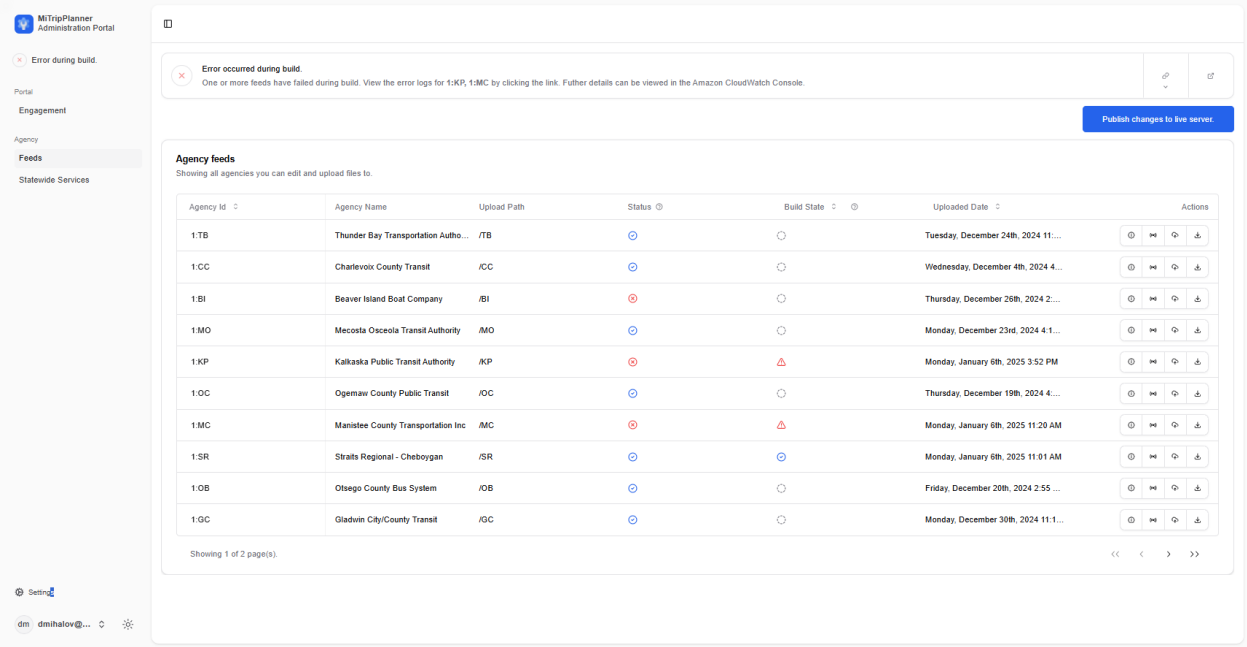



## 3.2. System Administration Portal Development

The System Administration Portal was developed during Phase IV of the Stage 1 pilot to enhance the long-term resilience of MiTripPlanner, ensure stronger support to agencies in maintaining their GTFS-Flex data feeds, and enable monitoring of public usage of MiTripPlanner. The user-based platform provides an intuitive interface for System Administrators to efficiently manage, update, test, and deploy GTFS-Flex feeds as well as view summarized information about public usage of the trip planner.

Within the portal, there are four core areas: feed management, user management, statewide services, and engagement dashboard. The feed management area enables administrators to view, upload, and download GTFS-Flex data feeds on behalf of agencies. Administrators have a global view of feeds in the Feed Management View, shown in **Figure 3-3**, and can view individual feed status in the Feed Status View, shown in **Figure 3-4.** System Administrators upload finalized feeds to the Preview site for review and confirmation by approved Agency Viewers before publishing them to the live site.

## *Figure 3-3 Feed Management View*




## *Figure 3-4 Feed Status View*

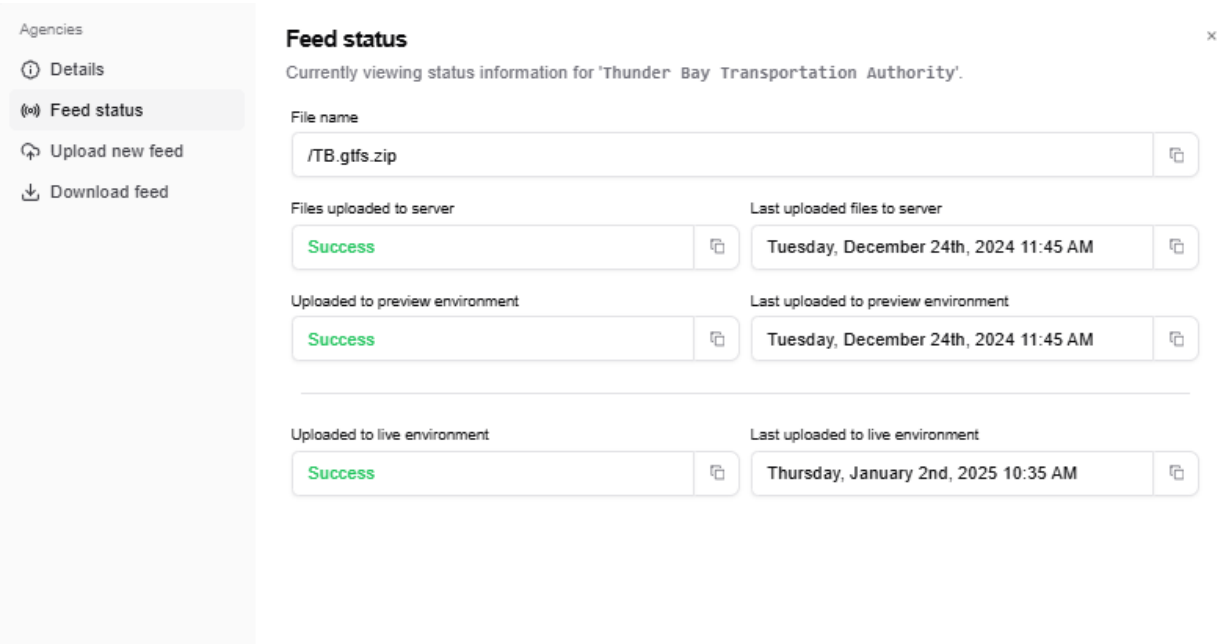
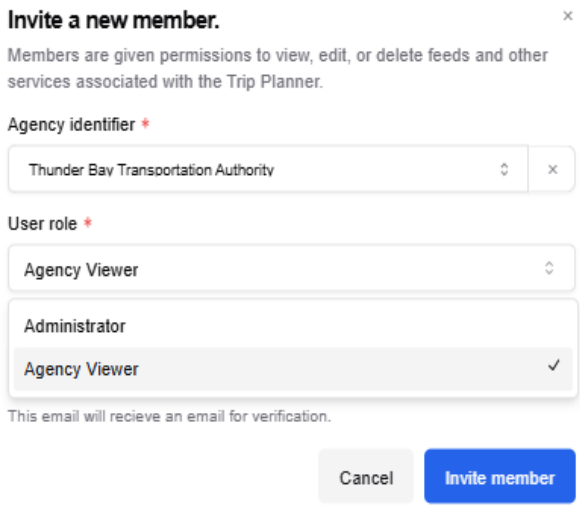


*Figure 3-5 Invite New Member View*




The User Management area allows administrators to invite or remove other System Administrators or assign Agency Viewers, shown in **Figure 3-5.** Agency Viewers are granted access to the Preview site to validate potential feed changes prior to their publication to the live site. The Statewide Services view, shown in Error! Reference source not found., provides tools to configure services that span the entire state. The functionality of this area operates similarly to the Feed Management view shown in **Figure 3-3**. Finally, the Engagement Dashboard, shown in Error! Reference source not found., offers statistical insights about how the public is using the site, providing valuable data for monitoring and improvement.

*Figure 3-6 Statewide Services View*

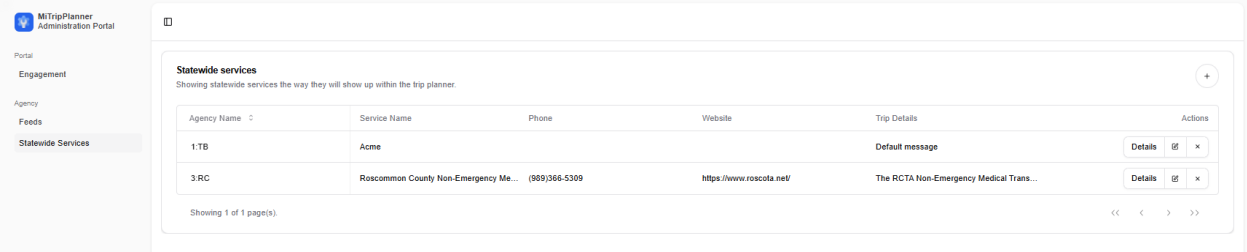
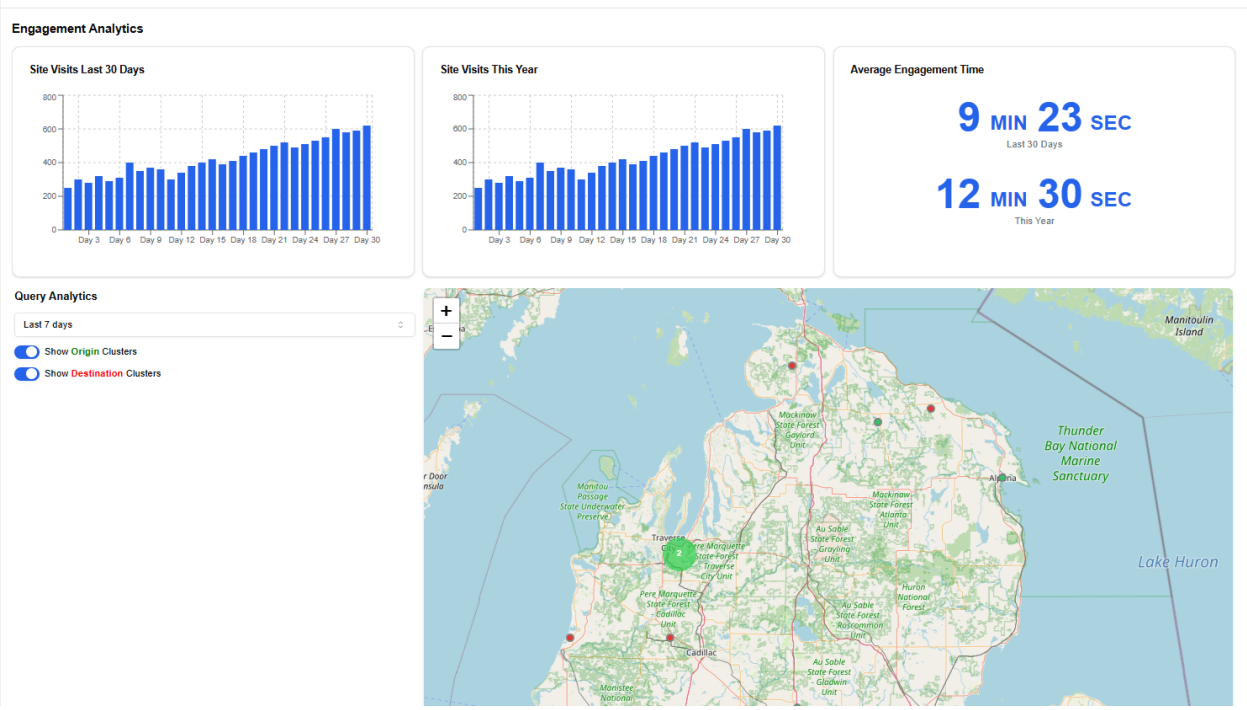


*Figure 33-7 Engagement Dashboard*




During Phase IV of the pilot, an Administrative Training Plan was developed to prepare selected stakeholders as System Administrators and Agency Viewers. System Administrators will gain the ability to upload GTFS feeds to GTFS Preview, manage Statewide Services, and publish updates to the Live Server. Agency Viewers, on the other hand, will be able to access service feeds and visualizations within GTFS Preview to validate data before going live. Initially, System Administrators will be drawn from the HNTB and MDOT project teams. In future project stages and during at-scale implementation, staff from participating agencies will be trained to take on System Administrator and Agency Viewer roles, providing them with access to the Administrator Portal.

### 3.3. Proof-of-Concept Summary

The Stage 1 pilot is enabling the traveling public in 19 rural Michigan counties to make more informed choices to reach their destinations, ensuring consistent data across agencies and creating a foundation for demand-response public transit that improves mobility and efficiency. In addition, trip planner user data is being collected to help agencies better analyze travel patterns and routes to improve efficiency and performance in the future. Finally, the pilot has developed a replicable process that can be adopted by other agencies in the future.

The initial process for agency engagement, processing service descriptions, and representing them with GTFS-Flex was developed during Phases I-III of the pilot. In Phase IV, the project team refined and enhanced this process, introducing several key updates to improve efficiency and replicability. First, instead of sending blank surveys to agencies for them to complete with their transit service information (as was done in Phases I-III), the team conducted online research to pre-fill the surveys with all available service details that could be found online. Agencies were then provided with pre-filled surveys, known as a Service Validation Sheet, and asked to review the accuracy of service information and requested to supply corrections or missing details. An example Service Validation Sheet can be found in **Appendix B.** Second, the team prioritized "findability" over "specificity" in modeling demand-response services. While these services are often tailored to meet specific community needs, such as serving particular regions or times based on demand, this level of specificity made the services harder to find in trip planners. To address this, services were modeled more simply to ensure they appeared as potential trip itineraries. However, the specific context of the service was included as explanatory text to provide clarity.

# 4. Anticipated Costs and Benefits of At-Scale Implementation

### 4.1. Expected Impacts

At-scale implementation would pave the way for more accessible and safer transportation in the state of Michigan by increasing visibility of transit options, thereby reducing reliance on private automobiles over the course of time. Beyond reducing reliance on private automobiles, the project also expands transportation options for individuals who do not drive due to health or disability, financial constraints, or legal reasons. Increasing the availability of and fluency in transportation data management and sharing across the state will ultimately improve transit services and, therefore, access to jobs, education, and essential services. Measurable impacts from the pilot, as well as anticipated long-term impacts of at-scale implementation, address each of the following SMART goal areas (see **Table 4-1**).

At-scale implementation will create a centralized repository where all GTFS service information can be stored and readily accessible (data from the agencies in the Stage 1

project is now publicly available). This will streamline the process of finding accurate and up-to-date transit information, reducing the time and effort required to plan trips. Automated tools will be implemented to gather data from websites, surveys, and interviews, saving time and reducing the burden on staff. These tools would also ensure the accuracy and consistency of the data collected.

***Table 4-1 Addressing Goals of SMART Program***

| Goal | Issue/Status Quo | Improvement |
|---|---|---|
| **Safety & Reliability** | While crashes decreased in the last decade, crashes are rising again in Michigan. | Public transit is 10 times safer than driving and increased ridership can reduce crashes. Adding on-demand trips along pre-scheduled routes can increase the number of rides agencies can provide. Real-time data can improve efficiency by decreasing curb wait times for drivers and reducing calls to customer service. |
| **Resiliency** | Cybersecurity, climate change and responding to disruptions from manmade or natural threats. Staff turnover and an aging workforce pose risks to efficient service. | Agencies have been taught about risks and best practices at Tech Talks and presentations at state transit conferences. Adding rural service through ARMP will provide information when disruptions occur. Training current and future staff to use technology to schedule, dispatch, and track services will increase the resiliency of the transit network. |
| **Equity & Access** | Demand-response transit and accessible (ADA complementary paratransit) services are not currently discoverable in trip-planning tools, which can limit access to opportunity. | The trip planner has made demand-response transit information more easily discoverable as indicated by over 450 trip planner visitors between September 2024 and January 2025. In addition to this, the pilot grew the percentage of the Michigan population that now lives in an area covered by GTFS-Flex transit data. The percentage of Michigan residents living in areas with access to transit described by GTFS-Flex data has increased from 0% to 1% during Phases I-III (four counties) and now exceeds 4% in Phase IV (19 counties). There are over 175,000 jobs located in the counties served by the trip planner. |

| Goal | Issue/Status Quo | Improvement |
|---|---|---|
| **Climate** | Transportation, particularly from light-duty vehicles, is the largest source of greenhouse gas emissions in Michigan. | Shifting single-occupant vehicle trips to public transit trips is one of the most impactful ways to reduce greenhouse gas emissions. |
| **Partnerships** | Public transit service data is provided agency-by-agency, with most agencies lacking the technical and staff capacity to develop and maintain data feeds. | The pilot increased engagement between MDOT and rural transit providers by deploying new technology and enhancing the technical skills of rural transit agency staff. During the pilot, the number of partnerships grew from four to fifteen agencies. This growth represents a 25% increase in partnerships based on sharing of open-standard data out of the total 60 rural transit agencies operating in Michigan. |
| **Integration** | While some transit agencies create static GTFS data for fixed-route services, static and real-time information is largely unavailable in rural communities. This barrier to information hinders mobility. | Publicly available GTFS and GTFS-Flex data supports integration with public and private trip-planning tools, including MDOT's MaaS platform. GTFS data will also help agencies with fixed routes to comply with recent changes to Federal Transit Administration (FTA) National Transit Database (NTD) reporting requirements and improve national transit data. |

## 4.2. Scaling Data Collection and Trip Planner

At-scale implementation will require engagement with additional transit agencies across the entire state of Michigan and technical updates to the trip planner released during Stage 1. Engagements will include education on the purpose of the project and GTFS data, data collection on and verification of transit agency services and policies, gathering existing agency-maintained GTFS feeds, and coordination with the implementation team for the statewide GTFS data management platform.

To further roll out the application and gather additional feedback, engagement will involve follow-up ridership surveys and additional online metric tracking to understand user needs, preferences, and habits better. Ongoing project education sessions will be conducted virtually and in-person to ensure all stakeholders are well-informed about the project's goals and benefits. Additionally, feedback from these engagements will be carefully integrated back into the trip planner tool to ensure continuous improvement and alignment with user expectations.

By maintaining open communications with new partner transit agencies and riders, the project team will continue to collect valuable insights that will help refine the application. This iterative process will involve regular updates and enhancements based on this feedback, ensuring the trip planner remains a useful and user-friendly tool. The ultimate goal is to leverage the collective input of both providers and riders to drive the project's success.

The list below outlines additional high-level technical tasks required to successfully scale the program.

- **GTFS Collection and Modeling:** Scaling the program to the entire state will require the development of GTFS-Flex data feeds for 65 new participating agencies (60 rural and 5 urban). GTFS-Flex development costs will primarily be attributed to the time and labor required to coordinate with multiple agencies to understand how their flexible service should be modeled in GTFS-Flex.
- **Integration with agency-maintained GTFS feeds:** All large and most small urban agencies in Michigan maintain GTFS data and make it available to the public.[9] Including urban agencies' feeds into a unified trip planner requires that the trip planner can successfully retrieve GTFS data from these sources, instead of requiring agencies to manually upload the GTFS feed again.
- **Integrating Services**: Scaling to 65 agencies requires that trips can be planned connecting the services across all agencies. While the Stage I implementation allows for this with the four participating agencies, a full-state deployment requires flex services to be able to integrate with the more traditional services seen in urban areas. The trip planner must be developed to ensure that trips involving traditional scheduled services are displayed correctly.
- **Combined Search Data:** An at-scale implementation will require that detailed data be collected about the types of trips that are most searched. The Stage I implementation collects data about the web-traffic to the application, but robust data about the location, services, and agencies appearing in searches is also required.
- **Statewide GTFS Feed Management Platform:** At-scale implementation will require that agencies can modify their GTFS-Flex feeds themselves to ensure that they remain up to date. This is facilitated through the System Administration model employed in Phase IV of the pilot and is critical to successfully scaling the program to over 65 agencies.

[9] National Transit Map Routes. (n.d.). https://geodata.bts.gov/datasets/usdot::national-transit-map-routes/about

## 4.3. Anticipated Costs

The total projected expenditure for the ARMP proof-of-concept through Stage 1 is estimated at $1,310,447. Of this amount, $838,735 is allocated to the contractual budget, encompassing project management, public engagement, planning, implementation support, and the in-house development of GTFS-Flex data. The development of GTFS-Flex data for the initial four pilot agencies, along with the creation of the trip planner, incurred a total cost of $119,116. Additional expenditures amounting to $6,007 were primarily directed toward travel and the maintenance of the project website. The implementation of more efficient processes for GTFS-Flex data development has enhanced cost-effectiveness and operational efficiency, leading to reduced expenses as these processes continue to be refined.

The anticipated costs of at-scale implementation would be similar to that of Stage 1 for project management, planning, and implementation. The level of effort estimated for GTFS-Flex and General On-Demand Feed Specification (GOFS) feed creation, trip planner enhancements (such as urban service trip planning itineraries, user search data collection tracking, use feed editing capabilities), deployment for 65 agencies, and initial MaaS implementation is estimated at over 15,000 hours. The total estimated cost of at-scale implementation is $7,464,500. Budget activities for at-scale implementation are outlined below in **Table 4-2**.

***Table 4-2 At Scale Implementation Estimated Costs***

| **Activity** | **Cost** |
|---|---|
| Total Contractual | $4,247,000 |
| Project Management | $423,000 |
| Technology Development | $1,072,000 |
| Implementation | $1,998,000 |
| Planning | $83,000 |
| Education and Outreach | $671,000 |
| Membership Fees | $60,000 |
| Travel/Expenses | $7,500 |
| Automatic Vehicle Location (AVL) Equipment | $3,150,000 |
| **At-Scale Implementation Total Estimated Cost** | **$7,464,500** |

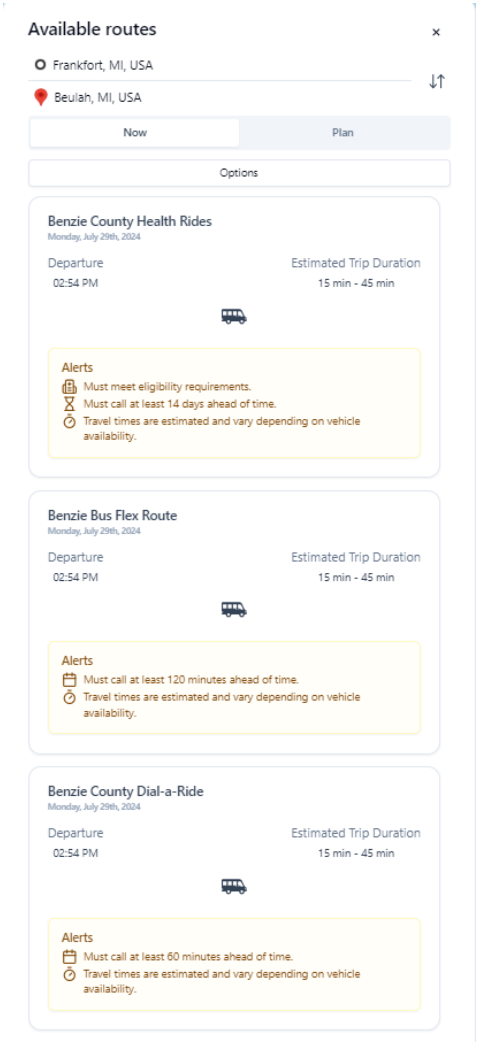
MDOT will continue to contract with HNTB, which supported the Statewide Technology Plan for Rural Transit Agencies, was project manager for Stage 1, and is currently assisting MDOT with procuring and deploying the statewide MaaS platform. HNTB will also support development of the data feeds using open standards and train agency staff. MDOT is exploring a partnership with MobilityData to oversee data quality and

help maintain high standards and reliability. They will also support educational efforts through implementation workshops and outreach. MobilityData may also establish a technical assistance center to offer training, tools, and support, empowering agencies with the knowledge and resources needed to implement mobility solutions successfully. MDOT may elect to join MobilityData as a Public Sector Development Partner for a two-year term. Membership would provide MDOT with exclusive access to resources, valuable collaboration opportunities, and a meaningful role in shaping the evolution of data standards. Expenses include potential hardware and software upgrades to test GOFS.

## Cost-Benefit Comparison

As the trip planner service area expands to additional rural agencies and administrative enhancements are about to be released, it is challenging to quantify the full range of benefits. However, the initial public deployment of MiTripPlanner has already impacted communities positively. Residents and visitors in participating counties have an increased ability to discover public transit services in their area and thereby have new options for reaching their destinations. In addition to revealing new transit options (as shown in **Figure 3-2**), the trip planner also offers a more comprehensive display of all available services and instructions for use. For example, trip searches populate all available services in a given geography coupled with comprehensive information about each service, including agency booking contacts and rules, as shown in Error! Reference source not found.. This comprehensive view can be expected to help reduce agency staff time spent on explaining services over the phone.

*Figure 4-1 Example Trip Results Showing Multiple Trip Options*




On January 15, 2025, participating agencies received a questionnaire to assess how dispatch staff and transportation coordinators allocate their time. Respondents estimated spending an average of 7.5 hours per day answering calls, with 7 hours of this time dedicated to providing service information. This indicates that the majority of phone time is spent sharing service details.

If the trip planner has an average of 15 daily users, and half (7 users) are genuine inquiries about available services, those users accessing

the information online instead of calling would save staff significant time. Assuming each service inquiry phone call takes 10 minutes, this would result in over an hour (70 minutes) of daily time savings for dispatch staff and coordinators.

At-scale implementation would translate to large-scale time and cost savings for agency staff across dozens of participating transit agencies. The trip planner's comprehensive view of services instantly resolves frequent sources of confusion found among riders, as detailed in the ridership survey. For instance, the estimated trip duration estimates provided in trip search results clear up common questions about wait times and booking rules.

Preliminary baseline data that has been collected in Stage 1 could be used for evaluation at-scale. The metrics listed in **Table 4-3** have been evaluated for data availability and can be realistically measured in a short timeframe. Values with N/A indicate that data for the metric has not yet been collected.

***Table 4-3 Preliminary Baseline Data***

| **Metric Name** | **Phase I-III value** | **Phase IV value** |
|---|---|---|
| Number of demand-response services publicly displayed in MiTripPlanner. | 14 services | 52 services |
| Number of agencies participating in the project and statewide GTFS repository. | 4 agencies | 15 agencies |
| Number of agencies that have participated in GTFS-Flex education. | 4 agencies | 15 agencies |
| Number of urban agency services publicly displayed in MiTripPlanner. | 0 agencies | 0 agencies |
| Number of agencies updating and maintaining their own GTFS-flex feeds. | 0 agencies | 0 agencies |
| Public awareness of public transit (site visits via Google Analytics) | 15 ADU | N/A ADU |
| Satisfaction with the trip planner via survey pop-up after using the trip planner. | N/A | N/A |
| Changes to existing service and route optimizations based on trip planner search data and statistics. | N/A | N/A |

In the current collection of preliminary baseline data, several metrics are still at zero or marked as not applicable. These include the number of urban agencies participating in MiTripPlanner, the number of agencies maintaining their own feeds, public awareness of public transit options in Phase IV (measured by Average Daily Users, or ADU), satisfaction with the trip planner (collected via a survey pop-up after using the trip

planner), and changes to existing services and route optimizations (based on trip planner search data and statistics). Currently, there are no agencies updating or maintaining their own GTFS-Flex feeds. However, the Administration Portal is designed to streamline this process for agencies in the future, and the number of agencies managing their GTFS-Flex feeds is expected to increase over time. Although no urban agencies are currently participating in the project, some are expected to join in later phases of development and during at-scale implementation.

Public awareness of public transit, measured by Average Daily Users (ADU), was not yet available for Phase IV because the second release of MiTripPlanner, which integrated feed data from 11 newly added agencies, was still forthcoming. To maintain consistency with the time frame used to calculate ADU for Phases I–III (approximately 130 days), it is recommended to calculate Phase IV ADU values in June 2025.

Another valuable baseline metric that is easily measured in a short time frame is an end-user satisfaction survey. The second release of the website included this type of simple survey to measure end-user satisfaction with the trip planner portal. The survey asks users to rate their experience with MiTripPlanner and provide feedback to help improve the planner. Tally BV, a form builder tool for creating custom feedback forms, was used to collect, host, and manage survey data. The results from this survey are expected to be available in the months following the release, which is scheduled for February 2025. An eventual feature enhancement will allow the survey data to be written locally to the System Administration portal, where System Administrators and Agency Viewers can access and interpret end-user satisfaction data.

Data on changes to existing services and route optimization based on trip planner searches is expected to become available once System Administrators and agency staff gain access to the Administration Portal, specifically the Engagement Dashboard. This Dashboard will provide transit agency staff with key metrics, including specific website visitor information and geographic data on search locations that will be displayed on a map. These tools can help agencies identify trends and underserved areas more effectively.

# 5. Challenges and Lessons Learned

## 5.1. Project Challenges

Several challenges arose during the course of Stage 1 and the project team developed effective workarounds. For instance, although the data specification became a part of the official GTFS standard during the course of the project (in April 2024), it was still new, which limited the teams' ability to rely on commercial trip-planning applications for the project. While initially the project team anticipated potentially incorporating GTFS-Flex feeds into a commercial trip planner, most commercial trip planners did not yet ingest GTFS-Flex. This obstacle necessitated the creation of an independent trip planner that consumes GTFS-Flex data to be displayed to the public. Creating the

independent trip planner also enabled the team to bypass a lengthy procurement process and keep the project on schedule. The project team leveraged the open-source code from Open Trip Planner (OTP)[10], a family of open-source software products for multimodal trip planning, to create the independent trip planner.

**Table 5-1** illustrates the technical challenges experienced by the GTFS-Flex development team in the pilot phase. Many of the technical issues that arose during GTFS-Flex development were related to the inability of OTP to read flex-route service activity. The project team created workarounds for OTP issues with flex routes, which can be further utilized in future trip-planning projects.

***Table 5-1 GTFS-Flex Development Technical Challenges and Resolutions***

| **Technical Challenge/Issue** | **Resolution** |
|---|---|
| Unable to embed trip eligibility information about the type of route, such as for medical trips only. | Encoded medical-only trips into the ID of the trip “MED_01.” |
| OTP does not respect minimum booking notice for GTFS-Flex (prior notice fields). | Created a JSON serialized snapshot of the prior notice fields and added it to the pickup booking information field. |
| OTP’s banned routes query parameter are ignored for trip planning, specifically for flex-route service. | Filtered the front-end based on ID after receiving the trip planning query. |
| OTP’s query search window was ignored for flex routes. | Filtered out trips returned to match the desired search window on the front-end. |
| When only searching for flex routes, walk-only trips are returned. | Filtered out trips on the front-end. |
| Trip time multiplier does not correctly influence OTP’s returned trip duration for flex routes. | Added logic to the front-end to increase the calculated duration. |
| OTP’s documentation and examples referenced the Rest API which is planned for deprecation. | Switched to the GraphQL API. |
| Transfers could not be shown due to the way trips were modeled. | Used “_tran” in the ID to delineate those to the front-end. |

[10] OpenTripPlanner. (n.d.). https://www.opentripplanner.org/

During the Stage 1 pilot, a major challenge for the project team and transit agencies was the accurate translation and representation of services in the GTFS-Flex feed model. For example, the modeling of GCCT's zones proved to be difficult because Zone 1 is a subset of Zone 2, which resulted in a geography that is not compatible with OTP rules. Through collaboration with GCCT, the project team determined that services in Zone 2 and the rest of Gladwin County are essentially the same. To model services accurately, the project team simplified geographies by indicating that Zone 1 has greater service hours and shorter call-ahead times compared to the rest of the county.

A similar challenge arose with SRR, which operates deviated flex-routes on a complex schedule. While SRR provides estimated pick-up and drop-off times at various locations and posts these times on its online schedule, it was found that SRR often picks up passengers up to 1.75 miles from the route. Additionally, the routes and schedules frequently change based on passenger bookings. Consequently, the project team decided to classify SRR's services as demand-response rather than deviated-route.

In addition to these specific cases, many agencies do not advertise service outside of their official service area; however, in practice, they do facilitate transfers in bordering areas. Ultimately, this service was modeled and text information accompanying the trip plan indicates that the traveler is responsible for contacting both agencies to arrange their transfer. In addition, while many transit agencies prefer travelers to book ahead, many can accommodate same-day service, so this was indicated in the trip plan text. There may be challenges at-scale related to this type of conditional service and booking requirement as a greater number of agencies are incorporated into the trip planner.

The project team encountered challenges with deploying real-time data during the pilot. Through research and collaboration with peer projects, it was determined that GOFS is the ideal specification for sharing real-time information with demand-response services. GOFS allows the transmission of live updates such as vehicle location, availability, capacity, and estimated arrival times. While these real-time updates could be shared with riders using GOFS data, the current trip planner based on GTFS-Flex only supports discovery. All location, availability, and scheduling information must be manually coordinated by the dispatch team. Although GOFS would support real-time updates, the project team decided not to include it at this time because GOFS uses an entirely different coding language (JSON format) than GTFS and GTFS-Flex (CSV format). This format is not easily transferrable to GTFS format, and the current trip planner cannot easily support it.

In addition, the team learned that GOFS is designed to work for demand-response transportation only and cannot describe anything operating according to a schedule or route, such as flex-routes, which two of the initial participating four pilot agencies operated. For the pilot, it was necessary to develop an application code that could work for all agencies, including those with flex-route service.

The incorporation of real-time information via GOFS into the trip planner is a challenge that still needs to be resolved. During at-scale implementation, the project team would

aim to pilot GOFS at agencies that offer exclusively demand-response services, possibly through the development of a new trip planning product. Utilizing GOFS would further bridge the urban-rural mobility data gap and increase community acceptance by including real-time trip updates for demand-response services, a feature which travelers are accustomed to with fixed routes and transportation network companies.

## 5.2. Recommendations

At the onset of the pilot, the project team assumed that to fully take advantage of GTFS-Flex data capabilities, agencies would be required to operate computer-aided dispatch (CAD) or Automatic Vehicle Location (AVL) equipment to move forward with the project. Through discovery and development, the project team learned that GTFS-Flex does not need to be integrated with CAD/AVL because it requires no real-time information and only needs to be populated with static service information. The removal of the CAD/AVL requirement lowered barriers to entry for participating agencies because it eliminated the need to procure equipment or integrate it with software.

One challenge encountered during beta testing of the initial iteration of the MiTripPlanner was getting agencies to participate in the beta testing during the designated testing period. A lesson learned from this experience has been to plan for longer periods of testing time accompanied by clear communication with and commitments from the agencies to complete testing in the time planned for it.

Another lesson learned during the course of the project was information on rural transit agencies' services may not all be available online. For example, Charlevoix County Transit operates on Beaver Island. However, Beaver Island service was not documented on the website during the time of data collection. Additionally, multiple agencies provided limited online information about the service areas of their NEMT services. Similarly, the Benzie Bus service, which can operate 6 miles into Manistee County, was also not discoverable online. Frequently, online service information was found to be unclear because it was located in different parts of the agency website (fares, service times, how to schedule/register). Transfers between services were also not well documented online. Similar challenges arose from miscommunication or a lack of consistent training among staff, leading to agencies providing inconsistent information—for example, initially describing a service one way and later describing it differently. Close collaboration between the project team and agency staff is necessary and recommended to gain a clear understanding of services being provided. Agency staff were responsive when working with the project team to resolve these inconsistencies, however this type of service description issue could be compounded by at-scale implementation.

The initial process to build data around agency services evolved throughout the project. Initially, the project team performed preliminary research on services using transit agency websites and created a survey for each agency to complete to describe their service model. The original four participating agencies were generally responsive in completing the survey, however sometimes the information they provided was

contradictory or inconsistent. The project team followed up on the surveys with each individual agency via interview. After these interviews, the GTFS-Flex development team-built Excel files summarizing service information and had transit agencies validate the information. Through beta testing of the trip planner, service areas were validated to arrive at the final desired configuration. This process was used to translate agency services during Phases I-III of the Stage 1 pilot.

In Phase IV, this process was refined based on lessons learned. Changes were made to address challenges such as inconsistent and conditional service information, enabling quicker and more accurate collection and representation of agency services for the additional incoming transit providers. The experience from earlier phases allowed the project team to optimize data collection efforts for greater efficiency. One change to the initial approach was to create initial service descriptions based on information found online rather than asking agencies to fill out a blank survey. These descriptions were then shared with the agencies for them to edit and confirm. In order to streamline the process and better understand and communicate the services offered, the project team recommends documenting service information prior to conducting agency interviews. This provides the opportunity for the project team to review collected information with the agencies during the interview. This would enable a more streamlined and efficient use of time at scale and ensure a more direct, accurate, and concise communication of service information. Additionally, the project team improved their ability to effectively model and map edge and exceptional cases (such as GCCT and SRR services described above) in GTFS-Flex.

Through experiences gained in the pilot, the team found that most agencies prefer to make conditional services, such as out-of-service boundaries and same-day reservations, as discoverable as possible. However, while increasing the discoverability of these services is important, it is equally important to recognize that trip planner information is publicly available and should not set unrealistic expectations. To address this, the project team and agencies included a disclaimer advising riders to coordinate with dispatchers to finalize the specifics of these types of rides. There may be additional challenges at scale in translating service information from an increasing number of agencies with limited time and staff. To account for this risk, the project team developed both the Administration Portal and the Service Validation Sheet workflow to enable a more seamless documentation of provider service information.

# 6. Deployment Readiness

## 6.1. Requirements for Implementation

Collecting and validating data through agency outreach and interviews, ridership surveys, and site visits can be time-consuming and resource intensive. Additionally, scaling the program to cover more areas and services may be a challenge due to limited time and staff, and managing information across multiple platforms adds to the complexity. Nevertheless, equipped with the workarounds and lessons learned, and

with the trip planner development nearing completion, the project team is well prepared for at-scale deployment.

Refinements made to the feed development processes during the pilot phase are expected to facilitate a more efficient scaling of the project compared to the initial implementation. The integration of data feeds from the four pilot agencies into the trip planner took 140 days, spanning from April 15 to September 1, 2024. In contrast, the integration of the second batch of 11 agencies in Phase IV was completed in just 93 days, from November 14, 2024, to February 14, 2025. These improvements suggest that the process of incorporating additional agencies during the scaling phase will proceed with greater efficiency than during the pilot phase.

Future challenges are expected to arise from the need to educate and coordinate with a more diverse set of transit agencies across the state with varied services. To meet this challenge, the project team will group transit agencies based on their experience, services offered, and technical abilities, as identified in the *Statewide Technology Plan for Rural Public Transit Agencies*.[11] This strategic grouping will allow for the development of targeted program education tailored to each agency's level of technical readiness. Agencies with more advanced technical capabilities will receive education on General Transit Feed Specification (GTFS), GTFS-Flex and General On-Demand Feed Specification (GOFS). Meanwhile, agencies with less experience will be provided with foundational training to build technical skills. This approach ensures that all agencies, regardless of their starting point, receive the appropriate support and resources to enhance their operational efficiency and service delivery. A requirement for implementation at scale will be the eventual training of technologically adept agencies to update GTFS-Flex data feeds themselves.

## 6.2. Maintenance and Operating Requirements

There are 82 public transit agencies in Michigan, 60 of which serve rural areas. Michigan's rural agencies primarily offer demand-response service, though some agencies also provide fixed-route and flex-route service, NEMT, and marine ferry services. ARMP's focus is to collaborate with rural agencies, creating data and building technology capacity and expertise across all of Michigan's public transit agencies.

Data support and maintenance activities for GTFS-Flex data feeds for pilot agencies are estimated to be between two and 12 hours of labor per month. However, since feed updates are infrequent, the additional time needed for in-house updates is expected to be minimal, averaging no more than 10 hours per agency per year. This includes troubleshooting, feed updates, and system monitoring. Support and maintenance for the additional participating rural and potential new urban agencies will require a new level of effort depending on the number of agencies participating in At-Scale Implementation.

[11] Statewide Technology Plan for Rural Public Agencies. (2022). MDOT Office of Passenger Transportation. https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Travel/Mobility/Public-Transportation/Publications/Statewide-Transit-Technology-Plan-Rural-RTAs.pdf

Maintenance of data at scale will also include maintenance by some agencies who can update their GTFS-Flex data in-house. In addition to the projected labor costs, there are additional local maintenance and operation costs. These include the annual fee to maintain the MiTripPlanner.org domain name, which is $25 per year, and the cost to maintain the Amazon Web Services (AWS) environment hosting the trip planner. From July 2024 to December 2024, the average monthly cost to maintain the AWS environment was approximately $200.

### 6.3. Impact on Workforce

At-scale implementation of the project would accelerate the training of transit agency staff across the state, equipping them with new skills and fluency in GTFS-Flex and GOFS technologies. This technology is designed to improve rural mobility, facilitating better access to jobs, education, and training opportunities. By doing so, it not only empowers individuals with new skills but also opens doors to new job prospects. As transit staff become adept at using GTFS and related technologies, they can contribute to more efficient and effective transit services, further enhancing the quality of life for rural communities and supporting their economic growth. Transit agencies play a key role in building a strong, diverse local workforce by creating good-paying jobs, and investing in public transit supports job growth. In addition, better access to transit information will allow community residents to more easily discover transportation options to job opportunities, reducing barriers to employment.

# 7. Wrap-up

Rural transit agencies often face significant challenges in providing accurate and easily accessible service information. Their websites frequently have information that is hard to find, making it difficult for users to get updates, such as service cancellations. In Stage 1, the ARM Program has made rural transit options more visible to the public by creating the capacity for agencies to maintain the data used in trip-planning applications. The project successfully leverages contemporary technologies and data formats that are well-suited for transit services in rural communities and can benefit transit connections to services in urban and suburban areas as well.

At-scale implementation of the project will develop scalable solutions that can be easily adapted from Stage 1 to cover more areas and services. Additionally, at-scale implementation will pave the way for continued trip planner enhancements such as agencies' ability to include real-time travel updates to riders, enhanced ability to update their own data feeds, and inclusion of urban trip itineraries. The workarounds developed to address the challenges encountered and lessons learned during Stage 1 will enable the project team to circumvent similar challenges and leverage efficiencies in developing GTFS-Flex and GOFS at scale.

Stage 2 will expand the trip planner to include additional transit agencies beyond the 15 pilot agencies, ensuring greater accessibility for rural communities. Reliable transit

access across the state helps residents reach employment opportunities, healthcare, and essential services, strengthening community resilience. To support this growth, agencies with more advanced technical capabilities will receive education on data standards such as GTFS-Flex and GOFS, allowing them to provide riders with real-time arrival estimates and the ability to edit their data. Meanwhile, agencies with less experience will be provided with foundational training to build their technical capacity. This approach ensures that all agencies, regardless of their starting point, receive the appropriate support and resources to enhance their operational efficiency and service delivery. Regular follow-ups and meetings will ensure continuous improvement and adaptation to challenges.

MiTripPlanner is improving access to reliable service information for travelers, ensuring they can plan trips with greater accuracy and confidence. The integration of GTFS-Flex and, eventually, GOFS across the state strengthens data standards and addresses the rural mobility gap, making transit services more accessible. As Stage 2 moves forward, funding is helping improve how transportation data is managed and shared, making Michigan’s transit system more connected and reliable.

# Appendix A

## Rider Survey

Advancing Rural Mobility
Michigan

## Rider Survey: Booking and Transit Usage

*Please complete this brief voluntary survey to help us understand current public transit usage and current booking processes for the Advancing Rural Mobility Program.*

1. **Name of the transit agencies you regularly use:**

| |
|---|
| |

2. **How do you currently book trips?** ***Please check all that apply.***
    - Phone call
    - Email
    - Text
    - Mobile app
    - Agency website (accessed via phone or computer)
    - Third-party or caretaker books for me
    - Other (please specify): _____
3. **How would you prefer to book trips?** ***Please select up to two.***
    - Phone call
    - Email
    - Text
    - Mobile app
    - Agency website (accessed via phone or computer)
    - Third-party or caretaker books for me
    - Other (please specify): _____

4. **What pain points do you experience with booking trips?** ***Please check all that apply.***
    - Difficulty understanding where I can travel.
    - Unclear what services are available.
    - Complicated booking process.
    - Unclear wait times.
    - Lack of real-time arrival notifications.
    - Hard to keep track of scheduled trips.
    - Unclear fare amount.
    - Accepted fare payment methods don't work for me.
    - Unclear if the agency can accommodate my special needs.
    - Required to book too far in advance.
    - Booking center hours are not convenient for me.
    - Other (please describe): _____
5. **How often do you use public transportation?**
    - Daily
    - Weekly
    - Monthly
    - Bi-Monthly
    - Quarterly
    - Other (please describe): _____
6. **How often do you use transit for out-of-county trips?**
    - Daily
    - Weekly
    - Monthly
    - Bi-Monthly
    - Quarterly
    - Other (please describe): _____

7. **What are your three most common destinations?** ***Please select up to three.***
    - Employment
    - Grocery, Pharmacy, Essential Services
    - Personal Errands
    - Medical appointments
    - Social Engagements
    - School/Classes
    - Worship
    - Other (please describe): _____
8. **Where are you most often unable to go because of not having a way there?** ***Please select up to three.***
    - Employment
    - Grocery, Pharmacy, Essential Services
    - Personal Errands
    - Medical appointments
    - Social Engagements
    - School/Classes
    - Worship
    - Other (please describe): _____
9. **Without transit, how would you make this trip?**
    - Personal vehicle
    - Taxi or ride-share (Uber, Lyft)
    - Ride with someone else
    - I wouldn't take this trip at all
    - Other (please describe): _____

10. **Do you have regular access to the internet, either at home or on a mobile device?**
    - Yes, high speed
    - Yes, but not high speed
    - No

**Demographic questions are optional to respond to. Demographic information is solely used for informational purposes of rider demographics and will not be used for any other purpose.*

11. **How do you identify? (Select all races/ethnicities that apply) ***
    - White or Caucasian
    - Black or African American
    - Indigenous American, American Indian, or Alaska Native
    - Asian or Asian American
    - Native Hawaiian or Pacific Islander
    - Hispanic or Latino
    - Other race (Please Specify):
      _____

12. **Do you have a disability? ***
    - Yes
    - No

13. **How old are you? ***
    - Under 18
    - 18-24
    - 25-34
    - 35-44
    - 45-45
    - 55-64
    - 65-74
    - 75+

14. **Share anything else you'd like us to know about your experience booking and using public transit:**

# Appendix B

## Service Validation Sheet

# Transit Agency Name

| Agency Information | |
|---|---|
| What is the agency's name?<br><br>*Relevance: agency.txt - agency_name* | Transit Agency Name |
| What is the agency's contact information (email and phone)<br><br>*Relevance: agency.txt - agency_email, agency_phone* | Phone: ###-###-####<br>Email: example.email@example.com |

| | Service #1 | Service #2 | Service #3 | Service #4 | Service #5 |
|---|---|---|---|---|---|
| **Service Operation Models** | | | | | |
| What is the name of the demand responsive service? | **Example Door-to-Door Service** | - | - | - | - |
| What type of service models do you operate (select all that apply)<br><br>- Fixed Route<br>- Deviated Fixed Route<br>- Demand Responsive/On-Demand<br>- Other (please specify)<br><br>*Relevance: routes.txt - route_type; extensions for deviated or on-demand services.* | Type of service. | | | | |
| For services that deviate from a fixed route, by how much can they deviate? (e.g., within 2 miles of the route)<br><br>*Relevance: GTFS-Flex extension - Deviated Fixed Route specifics.* | A | | | | |
| For services that deviate from a fixed route, please describe how riders can request deviations or on-demand trips (e.g., call a number, use an app).<br><br>Relevance: GTFS-Flex extension - Booking rules. | Contact method(s). | | | | |
| **Booking Requirements** | | | | | |
| What is the minimum notice time required for booking a trip?<br><br>*Relevance: GTFS-Flex extension - minimum booking notice.* | # of hours or days | | | | |
| Can riders book a trip for immediate service, or is there a cut-off time before which they must book?<br><br>*Relevance: GTFS-Flex extension - booking cut-off time.* | # of hours or days | | | | |
| Is there a limit to how far in advance riders can book a trip?<br><br>*Relevance: GTFS-Flex extension - maximum booking horizon.* | # of hours or days | | | | |
| **Service Area and Hours** | | | | | |
| Please describe the geographic area your service covers (e.g., specific towns, distance from a central point).<br><br>*Relevance: stops.txt and extensions for service area descriptions.* | Geographic service area(s). | | | | |
| What are your service hours? Do these hours vary by day of the week?<br><br>*Relevance: calendar.txt - service_id and associated times.* | Service hours. May be separate service hours for transit service and call center for booking. | | | | |
| Is your service still available on special holidays? If so, are the service hours the same?<br><br>*Relevance: calendar.txt - service_id and associated times.* | List of holidays on which agency is closed. | | | | |
| **Fares and Payment** | | | | | |
| How are fares structured for deviated or on-demand services? (e.g., flat rate, distance-based)<br><br>*Relevance: fare_attributes.txt and fare_rules.txt for fare information.* | Fare structure for service, including different fare rates for different traveler status' (e.g., student, senior), as applicable. | | | | |
| What payment methods are accepted? (Select all that apply)<br>- Cash<br>- Credit/Debit Card<br>- Mobile Payment<br>- Prepaid Transit Card<br>- Other (please specify)<br><br>*Relevance: fare_attributes.txt - payment_method.* | Payment method including if exact change is required. | | | | |
| **Accessibility** | | | | | |
| *Are there eligibility requirements for the service?*<br><br>Relevance: GTFS-Flex extension - accessibility accommodations. | Requirements such as disability, senior, or student status, residency within the county, etc. | | | | |
| **Feedback and Updates** | | | | | |
| How often is the service updated?<br><br>*Relevance: feed_info.txt - feed_start_date, feed_end_date.* | Frequency | | | | |
| Who can we contact for further details or clarifications about your service?<br><br>*Relevance: agency.txt - agency_contact.* | Staff Name or Role<br>###-###-#### | | | | |
| **Service Summary** | | | | | |
| Summarize the service information. | Service summary text displayed to users when searching the trip planner. Typically describes hours, service area, eligibility, and other information a traveler needs to use the service. | | | | |