

**ENTERPRISE
AGENCIES
OPERATIONAL
RESPONSES TO
COVID-19**

FINAL REPORT

OCTOBER 2021

**ENTERPRISE TRANSPORTATION POOLED
FUND STUDY TPF-5(359)**

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16. Abstract In March 2020, due to the COVID-19 pandemic, many employees that could accomplish their jobs remotely at state department of transportation's (DOTs) were ordered to work from home at the direction of their governor. This occurred very quickly, and DOTs had to adjust to this change. Adjustments included decentralizing work activities, transitioning information technology (IT) support actions to accommodate the new work environments, and, in some states, relocating transportation operations center staff to their homes. The purpose of this research was to assist ENTERPRISE Pooled Fund Study members in documenting and sharing initial operational responses to COVID-19 to apply during future events or in daily operations as the pandemic continued. It is important to note that the information gathered for this project focuses on ENTERPRISE member agencies' experiences at beginning of the COVID-19 pandemic (March 2020 – April 2021). At the time of this publication, ENTERPRISE members continued to plan for and adjust as the pandemic prolonged. To gather information on ENTERPRISE members' initial responses to COVID, members provided input through phone interviews and during a peer exchange webinar.			
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Project Champion

David Gaffney, Pennsylvania Department of Transportation, was the ENTERPRISE Project Champion for this effort. The Project Champion serves as the overall lead for the project.

ENTERPRISE Members

The ENTERPRISE Board consists of a representative from each of the following member entities of the program:

- Illinois Department of Transportation (IDOT)
- Iowa Department of Transportation (Iowa DOT)
- Kansas Department of Transportation (KDOT)
- Michigan Department of Transportation (MDOT)
- Minnesota Department of Transportation (MnDOT)
- Ontario Ministry of Transportation (MTO)
- Pennsylvania Department of Transportation (PennDOT)
- Texas Department of Transportation (TxDOT)
- Wisconsin Department of Transportation (WisDOT)

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1.0 Introduction

In March 2020, due to the COVID-19 pandemic, many employees that could accomplish their jobs remotely at state department of transportation's (DOTs) were ordered to work from home at the direction of their governor. This occurred very quickly, and DOTs had to adjust to this change. Adjustments included decentralizing work activities, transitioning information technology (IT) support actions to accommodate the new work environments, additional precautions and sanitizing procedures for service patrols, participating in COVID-19 messaging, and in some states, relocating operations center staff to their homes.

The purpose of this research was to assist ENTERPRISE Pooled Fund Study members (also referred to as "members" in subsequent sections of this report) in documenting and sharing initial operational responses to COVID-19 to apply during future events or in daily operations as the pandemic continued.

It is important to note that the information gathered for this project focuses on ENTERPRISE members' experiences at beginning of the COVID-19 pandemic (March 2020 – April 2021). At the time of this publication, ENTERPRISE members continued to plan for and adjust as the pandemic prolonged.

To gather information on ENTERPRISE members initial responses to COVID, members provided input through phone interviews and during a peer exchange webinar. The sections of the report include:

- [2.0 Project Approach](#) – Describes the steps taken to complete this project.
- [3.0 ENTERPRISE DOT COVID-19 Operational Experiences](#) – Highlights information gathered from phone interviews with each ENTERPRISE member agency.
- [4.0 Key Highlights](#) – Summarizes key highlights of the initial ENTERPRISE member states operational responses to the COVID-19 pandemic.
- [Appendix A: Interview Questionnaire Guide](#) – Provides a list of the questions used to guide the phone interview discussions with ENTERPRISE member agencies.
- [Appendix B: Interview Notes](#) – Provides notes from the information gathered from each ENTERPRISE member phone interview.

Project Purpose

To document and share
ENTERPRISE members initial
operational responses to
COVID-19.

2.0 Project Approach

The project first gathered information through an online search, through ENTERPRISE Board meeting discussions, and phone interviews with the following ENTERPRISE members to document initial operational experiences from the COVID-19 pandemic.

- Illinois Department of Transportation (IDOT)
- Iowa Department of Transportation (Iowa DOT)
- Kansas Department of Transportation (KDOT)
- Michigan Department of Transportation (MDOT)
- Minnesota Department of Transportation (MnDOT)
- Ontario Ministry of Transportation (MTO)
- Pennsylvania Department of Transportation (PennDOT)
- Texas Department of Transportation (TxDOT)
- Wisconsin Department of Transportation (WisDOT)

Interviews were conducted between January 2021 and April 2021. Input from the agencies aimed to understand adjustments made with:

- Employees working off-site;
- Organizational adjustments and COVID-related job assignments;
- Traffic management center (TMC) operations;
- Managing traveler information;
- Maintenance;
- Service patrols/motorist assist;
- Funding implications;
- Debrief documents; and
- Lessons learned.



Figure 1: Project Approach

A questionnaire guide was developed and utilized with discussions with each member agency. See [Appendix A](#).

A peer exchange webinar was then held on May 25, 2021. The webinar provided highlights from the interviews, select member agencies presented on COVID experiences, and a round robin allowed ENTERPRISE members to note additional details on lessons learned to date and planning for transitioning back to physical facilities. During the webinar PennDOT discussed moving to a virtual TMC, MDOT presented on a hybrid approach for TMC operations, TxDOT shared adjustments made with remaining physically in their TMC operations building, and MnDOT discussed modifications made with winter maintenance planning due to COVID.

To help ENTERPRISE members document and share the ENTERPRISE states' operational responses to COVID-19, the last step of the project produced this document that summarizes the information gathered during phone interviews with ENTERPRISE members and the peer exchange webinar. See Figure 1 for the overall flow of the project approach.

3.0 ENTERPRISE DOT COVID-19 Operational Experiences

ENTERPRISE member agencies were interviewed for the impacts of COVID-19 on their agencies. In addition, a peer exchange webinar was conducted to share member impacts and experiences of COVID-19. This section identifies common themes as well as unique responses documented for the following topic areas. Notes gathered from each ENTERPRISE member are included in [Appendix B](#).

- Employees working off-site
- Organizational adjustments/COVID-19 related job assignments
- TMC operations
- Managing traveler information
- Maintenance
- Service patrols/motorist assist
- Funding implications
- Debrief documents
- Lessons learned

3.1 Employees Working Off-site

Due to the COVID-19 pandemic, all ENTERPRISE members quickly moved to remote work in March 2020 for all employees who could do their jobs remotely. Most agencies were not prepared for this transition but accomplished it because there was not another option. **Iowa DOT** had only a few employees working remotely prior to the pandemic. **MDOT** was well-equipped with the tools and resources to transition to telecommuting. They had a plan and followed their policy to transition to remote work without a decline in service and they have not had to revise their policies. **WisDOT** had a telework policy, but it was outdated and not set up for these circumstances. WisDOT updated their Contingency of Operations Plan and considered the potential for future off-site work. **MTO** started to develop new standards and policies for being in the office.

In March 2020 all ENTERPRISE members moved to remote work for work that could be done remotely and, although not all agencies were prepared for this quick transition, agencies did well because there was not another option.

As of May 2021, ENTERPRISE members continued to have employees working remotely, however, at least 3 agencies started transitioning back to on-site or hybrid work. **Iowa DOT** tried to transition back to the office during Summer 2020, but a second wave of infections prevented them from completing the transition back to on-site work. **TxDOT** underwent a building consolidation effort that will result in shared spaces and require fewer workspaces than staff. **MTO** almost reached the point where employees could go in one day per week at reduced capacity, but with another ramp up in COVID cases during 2020, the plan was shut down and has not been picked up again.

All ENTERPRISE members sent the laptops they had home with employees and **Iowa DOT**, **KDOT**, and **MDOT** stated that they allowed employees to take home desktops if a laptop was not available. **KDOT**

made the decision that they wanted all employees whose job could be done remotely to have laptops, but large quantities of laptops were difficult to acquire. As of February 2021, **KDOT** continued the process of procuring laptops. **MTO** planned to make a significant purchase of laptops but after some research realized the high cost, so they stopped pursuing purchasing agreements and changed to looking for corporate lease agreements.

In addition to computers, some members also allowed employees to take home monitors, keyboards, chairs, or printers on an as needed basis, however, **MTO** pointed out that employees would not be able to haul desktops back and forth, so returning to work on a part-time basis could be an issue. All members expressed some challenges with their virtual private network (VPN). **Iowa DOT**, **KDOT**, and **MTO** added additional VPN licenses to accommodate more employees, **MDOT** added a second VPN group to accommodate the increased VPN demand, and **PennDOT** created a separate VPN for TMC operations employees. **MnDOT** provided employees with MiFi, and, if it was deemed necessary, supplied employees with WiFi connections. **Iowa DOT** and **KDOT** provided hot spots to employees, when necessary, and **TxDOT** provided iPhones with mobile WiFi hot spots and upgraded software, as needed. **MTO** observed that with employees and family members all working from home, some employees had issues with their personal WiFi not being able to keep up with the demands, so **MTO** made an office by office decision to approve WiFi extenders for home WiFi.

3.2 Organizational Adjustments / COVID-related Job Assignments

ENTERPRISE members made many organizational adjustments to respond to the COVID-19 pandemic. These adjustments included temporary assignments to other departments, reassignments of responsibilities within their own department, a reduction in staff or hiring freeze, and altering existing practices. Examples of how agencies addressed these areas of adjustment are highlighted within this section.

ENTERPRISE members shifted employees or tasks as necessary, some agencies implemented a hiring freeze, and some agencies did not backfill positions such as from retirements.

3.2.1 Assignments to Other Departments

During the pandemic, some agencies shifted DOT employees to other agencies to ensure they minimized layoffs and filled the increased roles within other agencies. For example, **Iowa DOT** reassigned emergency personnel to address COVID issues within Homeland Security and **KDOT** loaned out employees temporarily to help other departments for things such as answering phones at the Department of Labor or delivering personal protective equipment (PPE). **MnDOT** reassigned a few employees to balance their workload. For example, MnDOT reassigned some Office of Communications and transportation systems management operations (TSMO) staff to the Department of Health on a full-time, temporary basis. **WisDOT** also reported that some employees were reassigned to work on the COVID effort with the Department of Health.

3.2.2 Changes in Task Assignments Within the Agency

In addition to loaning DOT staff out to other agencies, **Iowa DOT** reported that some employees within their organizations were assigned additional or different duties within the DOT. For example, analysts

within Iowa DOT were assigned to update laptops in the TMC to keep them up to date in case remote teleworking is needed again in the future.

Most other ENTERPRISE members reported that few or no employees were reassigned. **KDOT** reported that changes to work assignments were minimal, however, safety and human resources did shift the kind of work they completed. Similarly, **MDOT** and **PennDOT** did not reassign staff during the pandemic although additional tasks may have been added to existing staff assignments. All **MTO** staff were considered essential, so MTO tried to find work to keep employees full time with functions evolving over time. For approximately the first three months, traffic was down approximately 30% and MTO reduced onsite TMC staff by one employee per shift on a rotating basis. Other duties were developed to allow remote work, and when traffic volume came back up, the additional operator was brought back in.

MDOT assigned staff the responsibility of distributing masks to field staff or covering tasks for employees out with COVID. **PennDOT** assigned some staff new tasks such as determining the projected impact to revenue by evaluating traffic volumes and added assignments for temperature checks and sanitizing shared workstations. **TxDOT** established new tasks including taking temperatures and ensuring cleaning and disinfecting supplies were available and assigned these tasks to staff, and **WisDOT** assigned some employees an ongoing rotation on committees to review additional topics and policies.

3.2.3 Hiring freeze

DOT employees were frequently considered essential workers, so no ENTERPRISE member reported reducing staff.

- **Iowa DOT** did not implement a hiring freeze since all transportation staff were considered essential.
- Over the past 10 years, **KDOT** has been downsizing. Though there were no additional staff reductions or furloughs, KDOT observed a hiring freeze.
- **MDOT** did not reduce staffing because there was still an obligation to provide service, however a hiring freeze was implemented in 2020 but released January 2021.
- Though **MnDOT** did not reduce staff, they did not backfill as employees departed the agency. MnDOT implemented a state hiring freeze except for critical positions such as snowplow drivers.
- **PennDOT** implemented a hiring freeze for non-essential workers.
- Initially, **WisDOT** implemented a hiring freeze.

3.2.4 Changes in Existing Practices

The COVID-19 pandemic changed the way some agencies were operating. For example, new hires for **Iowa DOT** were allowed to telework, a change from before the shutdown. This allowed Iowa DOT to post positions statewide instead of only in a specific area with physical offices.

Since March 2020, when going into **KDOT** buildings, employees were required to pass through automatic screen stations for temperature readings similar to other ENTERPRISE members. In addition, building occupancy at KDOT was limited and masks required. Changes to office cleaning were also implemented and plexiglass was added around the front desk at the Kansas City office.

3.2.5 Additional Organizational Responses and Challenges Related to COVID-19

There were also several organizational adjustments that were COVID-related but unique to a particular state. Some of those adjustments are highlighted below.

- **Iowa DOT** supported the Test Iowa program by providing locations of COVID testing sites on their traveler information website. The Traffic Incident Management Coordinator became responsible for the rentals of dynamic message signs (DMS) needed for the Test Iowa program. Iowa DOT established a standard operating procedure for when a COVID test site was closing for weather-related reasons and implemented an automated system that sent Iowa DOT staff an alert if a DMS board was having issues.
- The State of Michigan established a virtual Statewide Emergency Operations Center (SEOC) due to the pandemic to facilitate information gathering, sharing, and reporting. As an essential service needed to address traffic issues from flooding and civil disturbances, **MDOT** utilized the SEOC onsite and virtually to address flooding and dam failures. MDOT implemented emergency contracting procedures, held virtual stakeholder meetings, and accepted electronic signatures for contracts and approvals. MDOT also held virtual site visits for damage assessment from flooding.
- **WisDOT** implemented their Incident Command Structure (ICS) for COVID that included subcommittees on planning, command, resources, documentation, regions, and bureaus. This was very involved for the first few months with daily briefings for upper management. The activity was put on hold in July 2020 but could be quickly started up again, if needed.
- Initially **KDOT** experienced some challenges finding work for some staff such as bridge inspectors who must travel for their jobs or employees hired to perform traffic counts during the weeks that traffic was reduced and atypical.
- **MnDOT's** current planning efforts specify transitioning employees to different buildings, if needed; however due to the quick nature of employees moving to teleworking for the COVID-19 pandemic, employees will likely telework instead of moving buildings in the future.
- At the onset of COVID-19 impacts in Pennsylvania, **PennDOT** enacted its Incident Command structure, adjusted Continuity of Operations (COOP) plans as necessary, and deployed components as circumstances warranted. In addition, PennDOT shut down high occupancy vehicle (HOV) lanes in the Pittsburgh area since the state went to remote operations.

3.3 TMC Operations

Each ENTERPRISE member agency has a different number of TMCs within their state and different requirements and situations that have affected TMC operations. A brief summary of each state is included in this section as an example of how each state handled their TMC operations during the COVID-19 pandemic.

3.3.1 Iowa DOT

In February 2020, even before the official pandemic shutdown, Iowa DOT's TMC implemented an upgraded cleaning schedule and

ENTERPRISE members transitioned TMC operations to remote operations, some utilized a hybrid approach, and some remained physically in their building.

anyone who was not a TMC employee was asked not to enter the TMC to minimize potential exposure for the TMC operators. The TMC added plexiglass dividers, provided hand sanitizer for employees, and increased their use of cleaning supplies. Starting in March 2020, Iowa DOT's TMC successfully went completely virtual, including phones and computers.

Iowa's TMC staff are consultants and returned to in-person activities in early July 2020. Since TMC workstations are shared spaces, employees are asked to clean their workstation before and after their shifts. Each TMC operator has their own handheld receiver and changes out the one used by the previous operator to avoid sharing a phone. Also, Iowa state requirements dictate that masks be worn at all times in state offices, even at personal desks.

3.3.2 Kansas DOT (KDOT)

KDOT has two TMCs, WICHway in Wichita (the statewide KDOT TMC) and KC Scout (the TMC for the Kansas City area). Initially and as of October 2020, both TMCs were primarily managing operations virtually. By February 2021, both TMCs were operating on a hybrid model with some in person staff and some staff with remote capabilities. Generally, however, both TMCs continued to operate virtually.

WICHway had some equipment challenges including laptop and cell phone availability and connectivity logistics. For employees who are back in the office, there have been some COVID cases requiring quarantining. However, KDOT's field offices have been hit the hardest by COVID quarantining protocol. Some areas needed a complete shutdown which was concerning, especially in the middle of winter. In at least one instance, employees from one region had to go to another region to clear snow. To handle emergencies, KDOT implemented a policy that if a field employee was quarantining without symptoms, they could be called in to work in isolation, if absolutely necessary.

3.3.3 Michigan DOT (MDOT)



Figure 2: Southeast Michigan DOT
Photo Courtesy of MDOT

MDOT deployed a hybrid model for their four traffic operations centers (TOCs). For some TOCs it made sense to continue in-person operations, but for other TOCs remote operations were necessary. MDOT transitioned their TOCs separately to ensure someone had control at all times.

The Blue Water Bridge TOC remained in the facility throughout. They have minimal staff and there were security concerns with the border crossing. Since not all their devices were on the ITS network, operating remotely was not an option.

The Southeast Michigan TOC (SEMTOC) in Detroit is the largest TOC. See Figure 2. They share space with Michigan's State Patrol and are staffed by up to 7 operators and 11 support staff at a time. Because of the large number of employees and close proximity, the TOC moved to remote operations while the

State Patrol remained onsite. Detroit was Michigan's hardest hit COVID area, so the TOC continues to operate remotely with all devices on the ITS network.

The Statewide TOC (STOC) is co-located in Lansing with MDOT ITS employees. STOC utilizes up to 6 operators with up to 14 support staff and moved to remote operations. See Figure 3.



Figure 3: MDOT Statewide STOC

Photo Courtesy of MDOT

Being farther west, the Western Michigan

TOC (WMTOC) in Grand Rapids had more time to prepare a COVID response. WMTOC has a small shift size in the TOC, so they remained in person.

MDOT learned that VPN access is important to their operations and having the proper equipment such as computers and phones available for remote use is essential. Employees and management learned to embrace new technology by using digital plan sets, Microsoft Teams, and ProjectWise for file sharing, and MDOT recognizes the importance of being adaptable and working together. A big take away for MDOT has been that telecommuting can work.

The biggest TOC-related challenge MDOT saw involved TOC staff phone lines. No one expected staff to be working from home for this extended time and only Lansing had phones that did not require plugging into a landline. MDOT had to reprogram phones to allow them to work outside the TOC. Lansing forwarded their main phone line to one cell phone and then forwarded that phone to individual operator cell phones. This worked for a while but there was too much call traffic to continue with this long term. To successfully work remotely, Detroit bought a third-party app to handle their high call volume by connecting individual operator cell phones to the app. Some areas, including the Detroit facility, also needed additional 800 MHz radios. In the future, MDOT will stockpile equipment for emergency preparedness.

3.3.4 Minnesota DOT (MnDOT)

MnDOT's regional transportation management center (RTMC) operations continued to be in-person. They did not move to remote operations; however, most supervisors did telework. MnDOT's TMC operations are located with the state patrol including maintenance dispatchers and operations. Buildings were locked down so that only employees who needed to access the building were allowed in.

Though MnDOT's RTMC equipment could be operated remotely, the phone service and 911 service operate at higher access security. Since the RTMC is a large space, MnDOT felt they could easily physically distance employees. See Figure 4. Curtains were added to PVC pipes around workstations. See Figure 5. The RTMC also took on the role of accepting and distributing deliveries and mail with additional precautions. Employees needed authorization and health screening to collect mail in bulk monthly.



Figure 4: MnDOT RTMC
Photo Courtesy of MnDOT



Figure 5: Curtains from PVC pipes around MnDOT RTMC Workstations
Photo Courtesy of MnDOT

3.3.5 Ministry of Transportation Ontario (MTO)

In spring 2020, the MTO TMC reduced to minimal staff, leaving four staff in the center 24 hours per day, 7 days per week. However, they were able to transition back to in person staffing because the TMC is a large space, and it is feasible to social distance. The TMC developed a customized process during the first few days. There was an increased cleaning protocol in common areas, and masks and social distancing are required. Plexiglass dividers were installed so operators could still communicate. Personal protective equipment (PPE) was required at all times, and only one staff person was allowed in the kitchen at a time. High touch points were being cleaned three times daily.

Early on, the TMC struggled to obtain equipment approval. They discussed switching to remote operations but since the TMC is on a separate network, employees did not have an easy way to work from home. MTO developed a “TMC in a bag” with laptops and made this available in case they needed to evacuate the TMC, but they would need a solid fiber connection. So far, they have not needed to use the “TMC in a bag” and can continue with face-to-face communication.

The main TMC was off limits to everyone except those who needed to work in the building and the building cleaners. To enter the TMC, employees had to do a self-assessment and the TMC supervisor was notified. MTO needed to regulate the number of people working in the TMC and track attendance for contact tracing. The main TMC in Toronto has not had a closure due to illness, however, one of the smaller TMCs was impacted due to illness and was able to transfer operations to another TMC.

3.3.6 Pennsylvania DOT (PennDOT)

PennDOT operates a statewide TMC, four regional TMCs, and three district TMCs. As the need to switch over to remote operations due to the COVID-19 pandemic progressed, PennDOT staged a shutdown of their TMCs so that while one TMC was relocating for employees to work remotely, another TMC could take over their operations. Challenges they had to address included equipment distribution, VPN access, and a change in their operational focus. Routine maintenance and restarts were a big consideration since they needed to ensure this would not impact operations. PennDOT determined that for work from home operators two monitors is optimal, but operators would prefer three. In the Statewide TMC there were seven monitors per operator and in the RTMCs there were four monitors.

PennDOT identified remote TMC best practices and incorporated them in their continuity and operations plan. They also addressed hybrid practices such as inviting field staff to help but want all services to be available remotely. PennDOT has continued with remote TMC operations, however, they have also prepared plans to transition back into the TMC.

PennDOT surveyed approximately 75 operators statewide for feedback on making adjustments. In general, the majority preferred to continue to work from home and appreciate the ability to work remotely, however, a few operators noted they would like to return to the office.

3.3.7 Texas DOT (TxDOT)

TxDOT has five TMC's that operate 24/7 – Austin, Houston, Dallas, Ft. Worth, and San Antonio. El Paso's TMS (TrasnVista) is anticipated to be 24/7 TMC by the end of the year. In addition, TxDOT has 25 Districts. The five TMC's help the remaining 20 Districts that have ITS equipment and on nights and weekends post messages on DMS.

By the time the COVID pandemic became a threat, the TxDOT San Antonio TMC was two months into remodeling the operations floor and did not feel there was an option to transition to remote operations. See Figure 6. They made the decision to continue onsite operations with added precautions and moved operators throughout the building into a large conference room and offices vacated by other TxDOT employees. See Figure 7. TxDOT had more than 150 people in and out of their building with contractors and sub-contractors. Everyone entering the building was required to go through a temperature check and masks were required at all times. Inside doors remained open and hand sanitizer was widely available for employees to use.

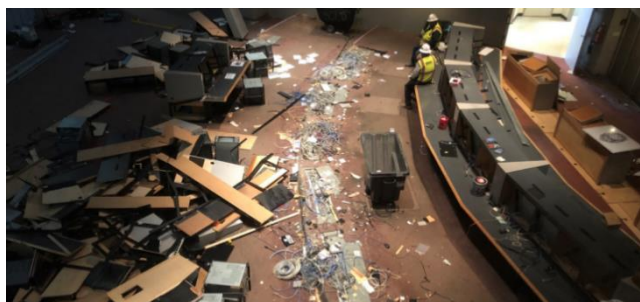


Figure 6: TxDOT San Antonio TMC Demolition April 20, 2020

Photo Courtesy of TxDOT

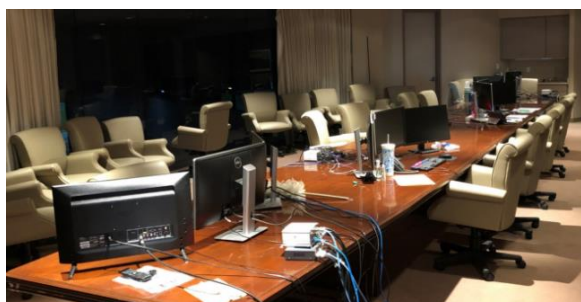


Figure 7: Temporary TxDOT San Antonio TMC Workstations

Photo Courtesy of TxDOT

When their new TMC was completed (Figure 8), TxDOT added COVID screens to the new desks. See Figure 9. They planned to house approximately 35 people up to 20 at a time but this still did not allow employees to be socially distanced. In December 2020, about half of the TMC employees who were relocated throughout the building moved back into the TMC. In March 2021, additional employees moved back in, and in May 2021 the remaining employees moved to the new TMC. The new space houses approximately 15 people at a time who do their best to be socially distanced, wear masks except when at their desk, and use hand sanitizer.



Figure 8: Remodeled San Antonio TMC March 3, 2021
Photo Courtesy of TxDOT



Figure 9: San Antonio TMC COVID Screens
Photo Courtesy of TxDOT

3.3.8 Wisconsin DOT (WisDOT)

WisDOT TMC operators remained on site throughout the work from home order although a couple of TMC employees worked from home while quarantining. WisDOT's TMC is co-located with the dispatch center so there are a lot of employees in a small space. There have been some COVID cases which has been a challenge. WisDOT made a few changes to the TMC including installing plexiglass in the lobby. Workstations in the control room were already adequately spaced. The TMC set rules such as no sharing food and everyone must wear a mask. They also increased cleaning which will continue.

In March 2020, 130 ramp meters were put on green rest, and have slowly turned back on. WisDOT made very few signal timing changes. Lower traffic volumes were observed initially but have started to resume to typical volumes.

3.4 Managing Traveler Information

All ENTERPRISE members posted safety messages for COVID-19 (e.g., quarantining, washing hands, social distancing, wearing masks) on DMS. Though all states participated in COVID-19 messaging, each state handled how and when they used the messaging to fit the needs of their state. For example, **MDOT** did not change their policies for traveler information and retained their procedures for communicating information such as travel times, public safety, and weather. **Iowa DOT** worked with Iowa's Department of Public Health to write the messages to avoid posting messages that conflicted with the governor or the Department of Public Health. **PennDOT** DMS messages fluctuated frequently and as needed ranging from one day per week to every day. PennDOT also responded to a request to provide Spanish messages in specific areas to reach affected populations. See Figure 10. With both French and English on DMS, **MTO** often uses symbols, but this has been challenging for COVID messages.

ENTERPRISE members participated in COVID-19 messaging, each state handled how and when they used the messaging to fit the needs of their state.



Figure 10: Example PennDOT COVIDDMS messages
Courtesy of PennDOT

Many ENTERPRISE members, including **Iowa DOT**, **MDOT**, **MTO**, and **WisDOT**, received negative feedback from the public when using DMS boards to convey COVID-19 information. In **Iowa**, there was a public campaign against COVID-related messages on DMS boards with many complaints citing that the DMS is for traffic use only. **MTO** received similar feedback and worked to promote their 511 website, so motorists would understand that they still have access to traffic information. In **Michigan**, COVID messages on DMS were also met with some challenges from the public, and **WisDOT** incurred over \$40,000 in damages when a DMS with a mask message was shot out by a gun, presumably in dissent.

Advancements in traveler information were also observed during COVID-19. For example, in the midst of COVID, **KDOT** implemented a new traveler information website that allows staff to enter data from their cell phone instead of having to be in the office. **KDOT** also installed new ATMS software while employees were working remotely, making implementation somewhat more difficult. It has taken time to train everyone, but the new system is now functional and **KDOT** is adding a few optional modules.

KDOT and Iowa DOT implemented new ATMS despite the challenges of COVID.

In January 2021, **Iowa DOT** also implemented a new, web-based ATMS system that allows employees to access the system remotely. In addition, Iowa’s 511 website shows Test Iowa drive-through sites for COVID-19 testing. Though not a change due to COVID, **MnDOT** also pursued traveler information initiatives and completed a project in March 2021 to automate 511 entries from their maintenance decision support system (MDSS).

3.5 Maintenance

The COVID-19 pandemic affected maintenance in many ways including impacting when maintenance projects could be completed, how maintenance employees interacted and performed their jobs, and the effectiveness of snow removal and winter road maintenance. Maintenance offices had to find ways to

keep the traveling public safe while also working safely themselves. Some of the approaches ENTERPRISE agencies used to achieve this are discussed within this section.

3.5.1 Impacts to projects

Some ENTERPRISE agencies have reported a slight impact to maintenance projects. For example, **Iowa DOT** observed some project delays in Spring 2020. **KDOT** maintenance slowed down slightly initially, only addressing emergency needs. **PennDOT** scaled back maintenance to skeleton crews but did not make policy or formal procedure changes. Due to budget and health and safety issues, major impacts to maintenance at PennDOT initially focused on the essential systems. PennDOT maintenance performed some repairs, but these were limited. Maintenance received requests for necessity level maintenance,

There were benefits to decreased traffic for maintenance staff as they were able to complete additional activities without heavy traffic to work around.

and, if deemed critical, PennDOT sent staff or contractor staff to address the needs. **Michigan DOT** reported that longer lead times were required for parts and materials so service may have been delayed since MDOT could not get the materials they needed.

Due to lower traffic volumes, **Iowa DOT** maintenance was able to complete additional work safely during the day. **WisDOT** was also able to take advantage of the lower traffic volumes early on to complete additional maintenance.

3.5.2 COVID protocols

ENTERPRISE agencies observed many changes to accommodate the COVID protocols established by the center for disease control (CDC), member states, and their agencies. In the beginning, **MnDOT** committed to a professional cleaning service, but moved to routine cleaning internally. MnDOT facilities and equipment are disinfected if a positive COVID case is confirmed or presumed. **MnDOT** maintenance staff in the office use PPE and physical distancing. Some MnDOT districts have isolated truck stations while others have shared staff and work teams. **WisDOT** has had good coordination using tools such as Microsoft Teams and messaging.

Texas DOT maintenance employees in San Antonio and Dallas follow TxDOT protocol and adhere to mask rules and temperature scans. Dallas also discouraged more than three employees per vehicle. **WisDOT** implemented additional rules for maintenance staff, including only one person per vehicle.

KDOT found that maintenance work takes a few extra vehicles to separate staff since KDOT initially implemented a policy of only one person per vehicle. **MnDOT** expanded their fleet with rentals since initially only one person was allowed in a vehicle. Eventually, MnDOT guidelines allowed two people per vehicle (driver and back seat passenger with windows open) and more than two people for shorter durations. **MTO** also used additional vehicles for social distancing but otherwise operated with business as usual.

3.5.3 Winter maintenance and weather events

Weather events are of particular concern for DOT maintenance offices. **PennDOT** maintenance teams are engaged statewide to ensure roads are kept safe and passable, and crews remain available for responding to weather events. For winter maintenance, **WisDOT** contracts and coordinates with each of

Wisconsin's 72 counties. The counties supply 100% of the winter maintenance workforce but utilize WisDOT equipment.

When the pandemic shutdown occurred, Minnesota weather conditions were improving so **MnDOT** was nearly finished with winter maintenance. All 1,500 internal maintenance employees were deemed essential and required to report. Maintenance workers were asked to maintain social distance and wear face masks, and MnDOT developed a disinfecting protocol to ensure employees did not get sick at work. Summer work continued on schedule. As winter 2021 approached, a nine level staffing plan for snowplows was implemented to establish backup protocols and ensure Minnesota's roads were safe for motorists. The first 4 levels of staffing were all handled by internal DOT personnel. Levels 5-7 involved employees with snowplow training from other departments, counties, and local contractors. Levels 8 and 9 utilized the National Guard and closed roads. Minnesota did well with the precautions taken by employees and mainly operated their 800 snowplows within levels 1 and 2 (normal operations and normal backup). In a couple of instances, MnDOT moved to level 3 and used an adjacent district to help plow roads, but they did not need to go beyond that.

3.6 Service Patrols / Motorist Assist

Some ENTERPRISE members have service patrols while others do not. These motorist assistance programs are referred to under a variety of names, but all perform similar duties, assisting motorists along their state roads and highways.

ENTERPRISE agencies with service patrols increased cleaning precautions, however overall, there was little change in typical activity.

PennDOT saw no change in service patrols, and **WisDOT's** Freeway Service teams went forward as planned and did not change their activities. **MnDOT** service patrols continued to operate with extra cleaning precautions and wearing masks. **KDOT's** service patrol units are handled out of the TMC. Kansas City service patrols took a break at the start of COVID but were reinitiated later. In **Michigan**, freeway service patrols are operated courtesy of the Michigan State Patrol. Michigan's service patrols did not have staffing issues and were not reduced, however, cleaning supplies were added. In **Texas**, the Dallas County Sheriff handles service patrols and has their own protocols and San Antonio started the Highway Emergency Response Operator (HERO) program in September 2020 to provide free roadside assistance for motorists in the greater San Antonio area.

The radio system used by Iowa's Highway Helper could not be used while working remotely so **Iowa DOT** switched to push-to-chat phones for Highway Helper. Highway Helper did not change employee hours or the number of employees. Iowa DOT required masks for all Highway Helper staff, and motorists being assisted were required to remain in their vehicles. Iowa's Highway Helper reduced the number of transports they provided and required passengers to wear masks in the truck. When transporting motorists, Iowa DOT required that vehicle windows remain down and the individual motorist ride in the back seat. The truck is fully cleaned at the conclusion of the transport.

Though **MTO** does not have a motorist assistance program, they do have an internal emergency response unit that operates 24/7. Emergency response units follow COVID guidelines, and employees approach disabled vehicles wearing PPE.

3.7 Funding Implications

ENTERPRISE member agencies felt the uncertainty of the pandemic, and many adjusted their budgets and projects to ensure continued delivery of the type of service their agency expects. Some initially cut consultant budgets while others re-evaluated projects and deferred projects or maintenance that were not deemed essential. Many acknowledge that with reduced vehicle miles their funding may be impacted and started looking for additional sources of funding while others have adopted a wait and see approach.

ENTERPRISE member agencies felt the uncertainty of the pandemic, and many adjusted their budgets and projects to ensure continued delivery of the type of service their agency expects.

KDOT found the Coronavirus Aid, Relief, and Economic Security (CARES) funding helpful for equipment upgrades and procuring the necessary networking pieces needed for working remotely. Growth in the sales tax revenue from commercial trucks and Amazon deliveries made up for the decrease in the motor fuel revenue, however, KDOT is waiting to see the long-term financial impacts.

Prior to the pandemic **MDOT** established a fund for a large influx of money from bonds. With COVID-19, MDOT saw a shift in priorities. Michigan's TOCs saw no budget impacts for operations, but they may see long term impacts based on revenue changes. **TxDOT** has not experienced funding challenges, but they are waiting to see what happens next year.

MnDOT funding was impacted due to a reduction in traffic volumes, but it was less than anticipated, however, MnDOT expects some challenges related to the gas tax that will be permanent. **PennDOT's** funding could be an issue since revenue is tied to the gas tax. This presents many potential challenges. Volume analysis estimates a big drop for a couple of months, impacting revenue. PennDOT managed to shift funds by reducing consultant use and slowing down project letting. PennDOT expects these funding challenges may always be an issue due to an anticipated reduction in travel and continued remote work and believes the DOT needs to look for alternate funding.

The uncertainty of the COVID-19 pandemic has had some impact to **WisDOT**. Initially, WisDOT cut back on preventative maintenance, uncertain if the full maintenance budget would be approved, however, that was ramped back up to normal operation. During the summer of 2020, there was a lot of uncertainty and WisDOT had difficulty getting commitments, so many projects were deferred. There is still quite a bit of uncertainty and WisDOT is evaluating projects on a quarter by quarter basis.

3.8 Debrief Documents

Though still in the midst of pandemic operations, some agencies have begun documenting their processes and are creating or updating preparedness documents. For example, **Iowa DOT** updated their Pandemic Response Plan early on. A federal playbook for DOTs has since been made available and Iowa is continuing to review this document. **MnDOT** created a continuity of operations document and a document regarding preparedness and cleaning. Prior to COVID, **KDOT** had started updating their continuity of operations plan. KDOT documented their communication regarding PPE

ENTERPRISE member agencies are continuing to document their procedures in debrief documents.

guidance and will continue talking about lessons learned and make processes more user friendly for remote workers.

Minor updates were made to **Iowa DOT**'s telework rules and agreement to address the COVID-19 issues. Previously supervisors authorized telework for some employees, but COVID substantially increased the number of employees working remotely. **KDOT** revised their telework policy. Initially they did not address it as there was no option except to have employees work remotely. The revised policy gives employees more flexibility to work remotely.

Early on, **MnDOT** started a best practices document to address issues such as: how to make Microsoft Teams more effective, how to stay connected in a disconnected world, and what will the return to the workplace look like. **PennDOT** plans to document the timeline of events, including the information from the governor, and how to continue managing traffic remotely even in the shorter term such as assigning the RTMC to take over while the TMC sets up for remote operations. **PennDOT** is also writing a policy and procedures document for Traffic Operations to maintain devices and is working with information technology (IT) in case they need to transition to remote work again. **MTO** has found that there was too much daily work to complete large debrief documents during this time.

WisDOT created a detailed presentation on their changes for ramp meters, *Traffic Data in Ramp Metering: Impacts of Wisconsin's Shelter in Place Directive – January 19, 2021*. **Iowa DOT** identified a change in traffic trends during the COVID period since March 13, 2020 compared to same day of the week in 2019 and documents this comparison in [Iowa Department of Transportation Continuous Count Site Traffic Trend Change During the COVID-19 Period](#).

3.9 Lessons Learned

ENTERPRISE states reported some lessons learned but most agree that it was still early as the situation continues to change and evolve. Many lessons learned focused on remote operations; however, additional observations were also addressed, including communication, equipment resources, and planning. Some of the comments and lessons learned offered by ENTERPRISE members are shown below:

Lessons learned by ENTERPRISE agencies are continually evolving. Members have learned the importance of communication among employees, the need for portable equipment, and the importance of emergency planning.

Communication

- **MnDOT** learned not to let perfection lead to confusion as policies were refined. For example, early communication contained a lot of uncertainty as MnDOT wanted communications approved. Trying to make things perfect caused confusion.
- **KDOT** learned that connections between coworkers need to be reinforced. COVID highlighted any gaps in employee communication and emphasized the need to improve how employees communicate.

Equipment Resources

- **Iowa DOT** learned that their TMC did not have redundancy in place.

- In the future, **MnDOT** will likely buy laptops instead of desktops to allow employees to make a quick transition to teleworking, if needed.
- TOC consultant staff had desktops and landlines but needed laptops to work remotely. **MDOT** had to get the equipment together quickly. This identified shortcomings in their plan to move to remote operations. In the future, MDOT TOCs will move toward each employee having their own laptop and providing docking stations in the control room. Access to phones and transferring them over proved to be one of MDOT's biggest issues.

Planning

- **KDOT** acknowledges that managers will need to pay more attention to emergency planning and continuity of operations planning and respect the process and the need.
- **MDOT** feels they have learned a lot by having different TOCs operate remotely, hybrid, or physically in the building. The agency is looking at lessons learned on productivity and cost effectiveness and is working on a plan that is most fitting to both.
- **WisDOT** expects to do additional planning when the current conditions pass. Everyone must continue to be very flexible, learn to live in a COVID world, and adapt.

Remote Operations

- **TxDOT** learned that they have the ability to transition to virtual work if needed.
- **PennDOT** learned that they can do the job remotely without a decrease in production. They are expecting guidance on the future of work and are hopeful that they can stay remote and continue operations.
- **MnDOT** expects more employees working from home, at least partially, moving forward. This brings up a concern for the long-term impact of reduced "hallway business."
- **KDOT** discovered that most operations can be managed remotely. This may help with employee retention, especially for employees who would have long commutes. KDOT could not have established the current remote work policy without a major event like COVID because it forced employees to change their processes, required more or upgraded technology, and proved that employees can work remotely, resolving some recruiting difficulties.
- Though **MDOT** was prepared to transition to remote operations for a few days, they had not thought about long term preparedness of more than 12 months. However, MDOT employees and MDOT plans are very adaptable. MDOT was able to complete most of their work from home. Future discussions may revolve around the potential for either full or part time remote work although the TOC is unlikely to choose to work remotely due to the nature of the job.
- **MnDOT** finds that COVID brings up entirely new employee management challenges. Evaluating work performance is challenging, but managers have to trust and have faith the day-to-day business will get done.
- **MTO** found that pandemic operations were a good opportunity to try remote working. MTO learned that digital signatures are possible and that it is possible for employees to work from home efficiently. There is an expectation that the ability to work from home will change the culture of the organization to be more accepting of work from home as it is a benefit to employees to not have to commute.

4.0 Key Highlights

This section provides key highlights from each of the COVID-related topics information was gathered for this project.

- **Employees working off-site:** In March of 2020, all ENTERPRISE agencies moved to remote work for work that could be done remotely. Although not all agencies were prepared for this quick transition, agencies did well because there was not another option.
- **Organizational adjustments/COVID-related job assignments:** ENTERPRISE member agencies shifted employees or tasks as necessary, some agencies implemented a hiring freeze, and some agencies did not backfill positions such as from retirements.
- **TMC operations:** Each ENTERPRISE member has a different number of TMCs within their state and different requirements and situations that have affected TMC operations. Some agencies transitioned to remote operations, some utilized a hybrid approach, and some remained physically in their building.
- **Managing traveler information:** Though all ENTERPRISE agencies participated in COVID-19 messaging, each state handled how and when they used the messaging to fit the needs of their state. KDOT and Iowa DOT implemented new ATMS despite the challenges of COVID. Iowa DOT also provided locations of drive through testing site on their traveler information website.
- **Maintenance:** Initially, most agencies reported slight impacts to maintenance activities, including scaling back maintenance activities and observing a delay in the necessary materials required to do their jobs. There were benefits to decreased traffic for maintenance staff as they were able to complete additional activities without heavy traffic to work around.
- **Service patrols/motorist assist:** ENTERPRISE agencies with service patrols increased cleaning precautions, however overall, there was little change in their typical activity.
- **Funding implications:** ENTERPRISE member agencies felt the uncertainty of the pandemic, and many adjusted their budgets and projects to ensure continued delivery of the type of service their agency expects. Some initially cut consultant budgets while others re-evaluated projects and deferred projects or maintenance that were not deemed essential. Many acknowledge that with reduced vehicle miles their funding may be impacted and started looking for additional sources of funding while others have adopted a wait and see approach.
- **Debrief documents:** Because agencies continue to operate in the midst of the pandemic, ENTERPRISE members are continuing to document their procedures in various documents such as policies, operating procedures, and debrief documents.
- **Lessons learned:** Lessons learned by ENTERPRISE agencies are continually evolving. Members have learned the importance of communication among employees, the need for portable equipment, and the importance of emergency planning.

As the pandemic continues, ENTERPRISE member agencies will continue to review what has worked well since March 2020 and implement new processes and procedures to ensure a safe working environment for all staff working situations.

Appendix A: Interview Questionnaire Guide

Employees Working Off-Site

1. Have any new or revised policies been developed for employees working virtually?
2. What groups worked or are working virtually?
3. Did staff have equipment needed to perform their jobs at home?
4. What was the process for accessing the network? Issues? What went well?
5. Were there any adjustments to security (e.g., software, protocols)?
6. Have employees transitioned back to the office?

Organizational Adjustments/COVID-Related Job Assignments

7. Were any DOT employees reassigned to work on COVID efforts or assigned new tasks due to the pandemic?
8. Were there any organizational adjustments (e.g., staff reductions or other organizational changes)?
9. Were there changes to overall staffing (e.g., employees switching jobs)?

TMC Operations

10. Did your center(s) go to virtual operations or remain in a physical space?
 - Virtual
 - How long did your agency's TMC functions operate virtually?
 - What is/was the schedule to move back to the TMC physical space?
 - Were there any functions that couldn't be conducted virtually?
 - Physical Building/Space
 - What changes were implemented? (e.g., how do you social distance?)
 - What guidelines are in place for employees working in the physical TMC space?

Managing Traveler Information

11. Have there been changes to how traveler information is managed?
12. Have any procedures/policies changed, such as ability to post non-traffic messages? What COVID-related messages have been posted?

Maintenance

13. To what extent were maintenance activities impacted due to COVID?
14. Were there any policy/procedure changes for staff maintaining roadways, snow/ice operations?
15. Has the agency defined parameters that need to be met (or a preliminary timeline) before maintenance activities will return to pre-COVID status?
16. How did COVID impact your routine maintenance and repairs of ITS devices?

Service Patrols/Motorist Assist

17. What changes or modifications, if any, were made with service patrols/motorist assist?

Funding Implications

18. Were there any funding challenges with the pandemic that impacted operations or project prioritization?
19. Are the funding challenges expected to be temporary or permanent?

Debrief Documents

20. Did your agency document changes in agency operations or other responses to COVID?

Lessons Learned

21. How has the experience prepared your agency for future similar events?
22. Will any changes become standard after the pandemic ends?

Other

23. Anything additional to add regarding your state's response to the COVID Pandemic (e.g., freight operations, construction, rest areas)?

Appendix B: Note Summaries – ENTERPRISE Member Agencies

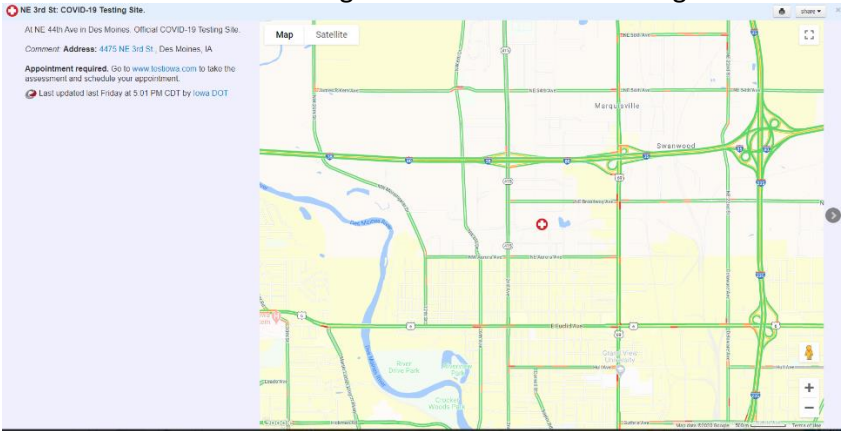
- Illinois DOT
- Iowa DOT
- Kansas DOT
- Michigan DOT
- Minnesota DOT
- Ontario Ministry of Transportation
- Pennsylvania DOT
- Texas DOT
- Wisconsin DOT

Illinois DOT: Notes

Information Gathered	<ul style="list-style-type: none"> 10.2.20 project kickoff meeting and an online search
Employees Working Off-site	<ul style="list-style-type: none"> Initially, one district office had remote staff emailing their supervisor twice a day as a way to check in. IT kept one or two people in the office at a time.
TMC Operations	<ul style="list-style-type: none"> TMC operations continued. Traffic operations staff and permits staff at the district initially went in one day per week. They were spaced out and coordinated who is in the office at a given time. Some traffic staff went into the office periodically (e.g., once per week), however, most staff initially worked remotely.
Managing Traveler Information	<ul style="list-style-type: none"> IDOT continued to maintain, support, and provide traveler information. IDOT contracts with the University to manage the traveler information website. All DOT staff worked remotely.
Maintenance	<ul style="list-style-type: none"> During emergencies IDOT maintenance tends to be used as a delivery resource (sandbags, swine/avian flu vaccines, etc.). In the first couple months, highway maintainers were doing double duty as delivery staff, picking up and delivering PPE and other resources around the state.
Other	<ul style="list-style-type: none"> Public meetings in a shared space were postponed and transitioned to online platforms. Rest areas remained open 24/7. IDOT asked motorists to dispose of trash properly to help keep rest areas as clean and safe as possible. All Illinois weigh stations were open, and trucks were required to stop. IDOT worked with groups and organizations to show appreciation to truck drivers by hosting events that provided free food to truckers at weigh stations.

Iowa DOT: Notes

Interview Date	<ul style="list-style-type: none"> 01.21.21 with Andy Lewis, Bonnie Castillo, and Sinclair Stolle
Employees Working Off-site	<ul style="list-style-type: none"> Iowa DOT as a whole received the direction that all who were able to telework should do so, and employees went to remote work the second week in March 2020. Iowa DOT had employees already teleworking occasionally, however, those who had not been teleworking needed IT assistance. Iowa DOT worked with IT to allow employees to work off-site including sending home laptops and establishing hot spots, when needed, to facilitate remote access from a laptop at home. Some employees took desktops home. No chairs were allowed to go home, but some staff were able to take monitors home. Not all systems can function fully from home due to issues such as bandwidth. Iowa DOT had some VPN issues and upgraded their VPN usage to accommodate up to 900 people. Travel was limited in March 2020 and quarantine issues were documented. Iowa DOT prepared guidelines for those traveling out of state. In July 2020, Iowa DOT began to transition some staff back to the office due to phone technical difficulties. Calls were being missed due to only being able to forward calls to one number. Iowa DOT tried to return to on-site offices in the Fall of 2020 with approximately 75% of staff back in the office, but with the increase in COVID cases they moved back to remote operations. In January 2021, Iowa DOT implemented a new ATMS system. This new system is web-based and has the capability for staff to access the system remotely.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> Iowa DOT employees accepted many added duties. Emergency personnel were reassigned to address COVID issues with Homeland Security. The Test Iowa program, Iowa's response to COVID testing, was added to the workload including updating sites, scheduling, and authorizing DMS messages. The Traffic Incident Management Coordinator became responsible for the rentals needed for the Test Iowa program. Iowa DOT established a standard operating procedure for when a test site was closing for weather-related reasons. An automated system sent Iowa DOT an alert if a DMS board was having issues. Iowa DOT had no staff reductions and did not implement a hiring freeze. All transportation staff were considered essential. One change for new hires was that they were also allowed to telework. This allowed Iowa DOT to post positions statewide instead of only in a specific area with physical offices such as Ames. Analysts were assigned to update laptops in the TMC to keep them up to date in case remote teleworking is needed again in the future.

<p>TMC Operations</p>	<ul style="list-style-type: none"> • In February 2020, the TMC implemented an upgraded cleaning schedule and anyone who was not a TMC employee was asked not to enter the TMC to minimize potential exposure for the TMC operators. Plexiglass was added, hand sanitizer was provided, and cleaning supplies were available. • Starting in March 2020, Iowa DOT's TMC successfully went completely virtual (including phones, computers, etc.). • TMC staff are consultants. They returned to in-person activities in early July 2020, as needed. All TMC staff are back in the office now. • Since TMC workstations are shared spaces, employees are asked to clean their workstation before and after their shifts. TMC operators do not have headsets so each operator has their own handheld receiver and changes out the one used by the previous operator, so they don't have to share a phone. • Iowa state requirements dictate that masks be worn at all times in state offices, even at personal desks. • The Iowa DOT Call Center is still off-site. Calls being made are filling up the system. As a result, the TMC is still having issues with phones ringing busy because the lines are full. • Iowa's TMC would consider going back to doing some work remotely if they can work around a few more issues, however, the TMC has only had one individual express concern over working in the office and that employee was offered a workstation in the back of the TMC which seems to have been an acceptable solution.
<p>Managing Traveler Information</p>	<ul style="list-style-type: none"> • Test Iowa provides drive through COVID testing. Iowa's 511 website shows Test Iowa drive-through sites for COVID-19 testing.  • Iowa DOT has been posting safety messages (washing hands, etc.) for COVID-19 on DMS. Iowa DOT worked with Iowa's Department of Public Health to write the messages to avoid posting messages that conflicted with the governor or the Department of Public Health. Management reviewed and approved messages then sent them to FHWA, although there was no delay in implementing the messages. This step was mostly to keep FHWA in the loop. • Iowa DOT did receive some negative feedback about DMS boards used to convey COVID-19 information. There was a public campaign against these

	boards asking the DOT to remove them, which they eventually did. When some people identified a DOT email, they inundated that email with complaints. The TMC received many complaints citing that the DMS is for traffic use only.
Maintenance	<ul style="list-style-type: none"> • In the beginning, there were some projects that saw delays. Maintenance needed some additional laptops from IT. Riding in vehicles together was eliminated and continues to be the practice. • Maintenance has been able to complete additional work safely during the day with lower traffic volumes.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • Highway Helper did not change employee hours or the number of employees, however they did change to patrolling continuously through the commute. They can make approximately one round per hour. • The Highway Helper COVID plan has been updated. Masks are required for all Highway Helper staff and those who are being assisted must remain in their vehicles. • Highway Helper reduced the number of transports they provided and requires passengers to wear masks in the truck. If motorists do not have a mask of their own, Highway Helper provides one for them. When transporting motorists, vehicle windows must remain down, and the individual must ride in the back seat. The truck is fully cleaned at the conclusion of the transport. • Since Highway Helper is staffed by consultants, the vendor also had COVID requirements, including that operators could only use rest rooms at the contractor or DOT office. • The radio system used by Highway Helper could not be used while working remotely so Iowa DOT switched to push-to-chat phones for Highway Helper.
Funding Implications	<ul style="list-style-type: none"> • It is anticipated that some federal money is coming in to help with added COVID expenses.
Debrief Documents	<ul style="list-style-type: none"> • Iowa updated their Pandemic Response Plan early on. A federal playbook for DOTs has since been made available. Iowa is continuing to review this document. • Minor updates were made to Iowa's telework rules and agreement to address COVID issues. Previously supervisors authorized telework for employees, but COVID substantially increased the number of employees working remotely. • Iowa DOT identified a change in traffic trends during the COVID period since March 13, 2020 compared to same day of the week in 2019. https://iowadot.gov/maps/reports(atr)/traffic_Trend_Report.pdf
Lessons Learned	<ul style="list-style-type: none"> • No lessons learned yet. Things are still evolving and keep changing and moving. • The TMC did not have a redundancy.
Other	<ul style="list-style-type: none"> • Iowa DOT has a panic button system that could not be tested while working remotely. • Some construction projects changed from nighttime hours to prime time hours due to reduced traffic. • There was a COVID positive case in Construction which stopped activity

due to interruptions from exposure.

- Driver's license stations made a lot of accommodations including implementing appointment only for all driver's license renewals, new licenses, etc. They limited hours and moved to an all online scheduling system to limit the number of people in a driver's license station. This practice will continue and become permanent. Iowa DOT has received positive feedback from the public regarding reduced waiting lines.
- The governor issued several proclamations, the last of which expired in December 2021, that allowed motorists to drive on an expired license due to the inability to keep up with renewals during COVID. Iowa DOT is now back to normal and playing catch up to renew driver's licenses.
- Iowa would like to explore the Cisco web-based application phone system used in Kansas to address future events that may remove power from the TMC.

Kansas DOT: Notes

Interview Date	<ul style="list-style-type: none"> • 02.09.21 with Gary Olson and Maggie Doll
Employees Working Off-site	<ul style="list-style-type: none"> • From mid-March 2020, the majority of KDOT’s staff worked remotely. • As of February 2021, some staff were back in the office periodically, but many were still working remotely. However, KDOT is seeing a hybrid where employees go in a couple of days each week and work remotely the other days. • One big change due to telework is transitioning to laptops rather than desktop computers. Some employees did have laptops, but many did not. Prior to COVID, less than 20 people worked remotely as it was not widely accepted by the department. • In March 2020, the Kansas governor shut down state government for 2 weeks. Core functions that needed to continue through those 2 weeks were identified and they were given priority for laptops. • KDOT wanted all employees whose job could be done remotely to have laptops. As of February 2021, they are still in the process of procuring laptops. • It was difficult to find and get laptops, so KDOT initially sent a lot of desktops home. To minimize the number of people in the building, IT staff boxed up desktops and moved them out for employee pickup. • Most desktops were hard wired and didn’t have wireless cards, so they also needed to get access to the network. • Most employees had internet access at home. Some had issues due to living in a rural area or not having internet at their home. These employees were provided with hot spots and prioritized to be back in the building. • KDOT also had to buy some cell phones to allow employees to answer calls from their homes. • IT support in the buildings continued to be maintained. • With the increased need for VPN access, KDOT had to add some licenses. • KDOT had no issues with security once they got the pieces in place for things like software. • Initially KDOT’s policy was restrictive about taking home printers, chairs, and monitors. Over time, KDOT has chosen to make accommodations where it makes sense.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> • Since March 2020, when going into the buildings, employees pass through automatic screen stations for temperature. Building numbers are limited. • Masks are required in common areas and when there are visitors. In cubicles without visitors, masks are not required. • Changes to office cleaning have also been implemented and plexiglass was added around the front desk at the Kansas City office. • Changes to work assignments were minimal, however, Safety and HR did shift the kind of work they completed and loaned out employees temporarily to help other departments for things such as answering phones at the Department of Labor or delivering PPE. • Initially there were some challenges finding work for some staff such as

	<p>bridge inspectors who must travel (travel was shut down) or employees hired to perform traffic counts (traffic was reduced and atypical).</p> <ul style="list-style-type: none"> Over the past 10 years KDOT has been downsizing so they already had fewer administrative staff. There were no additional staff reductions or furloughs, but KDOT continued to have a hiring freeze.
TMC Operations	<ul style="list-style-type: none"> Kansas has 2 TMCs: WICHway in Wichita (statewide KDOT TMC) and KC Scout (TMC for Kansas City). Initially and as of October 2020, both TMCs were managing operations mostly virtually. Some staff go in for maintenance or other specific tasks. By February 2021, both TMCs were operating on a hybrid model with some in person staff and some staff with remote capabilities but generally still virtual. WICHway: <ul style="list-style-type: none"> Had equipment challenges (laptop availability, cell phones, connectivity logistics). Hope to return to onsite operations by mid-summer 2021. For employees who are back in the office there have been some COVID cases requiring quarantining, especially in the southwest area of the state. It is unknown whether or not the transmission occurred at work. Field offices: <ul style="list-style-type: none"> Hit the hardest by COVID quarantining protocol. Some areas needed a complete shutdown which was concerning, especially in the middle of winter. In at least one instance, employees from the northwest region had to go to the southwest region to clear snow. KDOT implemented a policy that if a field employee was quarantining without symptoms, they could be called in to work in isolation if absolutely necessary. This has been used a little bit for winter weather. KDOT uses contract labor for snowplows.
Managing Traveler Information	<ul style="list-style-type: none"> Initially KDOT posted COVID-related messages (required by the governor) on DMS. They have now stopped this practice. In the midst of COVID, KDOT implemented a new traveler information website. Staff can now enter data from their cell phone instead of having to be in the office. KDOT also installed new ATMS software while employees were working remotely, making implementation a little more difficult. It has taken a while to train everyone, but the new system is now functional and KDOT is adding a few optional modules.
Maintenance	<ul style="list-style-type: none"> Maintenance slowed down slightly initially, only addressing emergency needs, but continued to function and is now near normal. Maintenance work takes a few extra vehicles to separate staff. KDOT implemented a policy of only one person per vehicle which was not popular. They have relaxed this requirement in the last 3-4 months if employees travel with the windows open and masks on.
Service Patrols/	<ul style="list-style-type: none"> Service patrol units are handled out of the TMC.

Motorist Assist	<ul style="list-style-type: none"> • Kansas City service patrols took a break at the start of COVID but have reinitiated service in the last few months.
Funding Implications	<ul style="list-style-type: none"> • CARES funding has been helpful for equipment upgrades and procuring the necessary networking pieces needed for working remotely. • Growth in the sales tax revenue from commercial trucks and Amazon deliveries made up for the decrease in the motor fuel revenue. • KDOT is waiting to see the long term financial impacts.
Debrief Documents	<ul style="list-style-type: none"> • KDOT is currently revising their telework policy. Initially they did not address it as there was no option except to have employees work remotely. The revised policy will give employees more flexibility to work remotely later. • KDOT is documenting their communication regarding PPE guidance. • Prior to COVID, KDOT had started updating their COOP. They will continue talking about lessons learned and make processes more user friendly for remote workers. Documentation is often one of the last steps.
Lessons Learned	<ul style="list-style-type: none"> • Most operations can be managed remotely. This may help with employee retention, especially for employees who would have long commutes. • People will pay more attention to emergency planning/COOP planning and respect the process and the need. • KDOT could not have gotten to the current remote work policy without a major event like COVID. <ul style="list-style-type: none"> ○ People are naturally resistant to changing processes. COVID forced people to change and required more automation. ○ KDOT was forced to upgrade technology. ○ KDOT learned employees can work remotely. Resolved some recruiting difficulties. • Managers manage products and results not employee time. • Connections between coworkers need to be reinforced. COVID highlighted any gaps in employee communication and emphasized the need to improve how to communicate.
Other	<ul style="list-style-type: none"> • Field staff continued to work in the field during COVID and KDOT maintained their scheduled construction projects.

Michigan DOT: Notes

Interview Date	<ul style="list-style-type: none"> 01.7.21 with Jason Bodell, Elise Feldpausch, and Marlon Spinks
Employees Working Off-site	<ul style="list-style-type: none"> Though the majority of MDOT prior to COVID did not telecommute, MDOT overall was well equipped and had the tools and resources needed to transition to telecommuting, and service did not decline. MDOT has not had to revise its policies due to COVID-19. They had a plan and followed their policy to transition to remote work. Employees transitioned to teleworking and were given authorization to take all the necessary equipment home (e.g., computers, monitors, chairs). The majority of MDOT employees have laptops, some of those that had desktop computers were provided with laptops. In the beginning, network access was a challenge but for the most part VPN access has been worked out. The Department of Technology, Management and Budget (DTMB) added a second VPD group to accommodate the increased VPN demand. There is a lot of diversity in how schools are operating which is impacting some employees' ability to work remotely or go back into the office. Employees work with their management on specific arrangements. A survey of staff has been conducted. The agency is looking at remote working as a potential way to engage new employees with a flexible work environment. MDOT is planning a statewide transition back to the office in March 2021. However, the date will likely be extended.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> The State of Michigan established a Virtual Statewide Emergency Operations Center (SEOC) due to the pandemic to facilitate information gathering, sharing, and reporting. As an essential service needed to address traffic issues from flooding and civil disturbances, MDOT utilized the SEOC onsite and virtual to address flooding and dam failures. They implemented emergency contracting procedures, held virtual stakeholder meetings, and accepted electronic signatures for contracts and approvals. MDOT also held virtual site visits for damage assessment from flooding. No staff has been reassigned during the pandemic although additional tasks such as getting masks to field staff or covering tasks for employees out with COVID were added to some existing staff assignments. MDOT has not reduced staffing because there is still an obligation to provide service. A hiring freeze was implemented during the pandemic and released January 2021.
TMC Operations	<ul style="list-style-type: none"> MDOT has 3 separate Transportation Operations Centers (TOCs) at Lansing, Detroit, and Grand Rapids and 1 international crossing TOC at Blue Water Bridge. TOCs are staffed by consultants so operators are not officially MDOT employees. Lansing, Detroit, and Blue Water Bridge are all staffed by the same contractor. While Grand Rapids has a different contractor. TOCs follow both MDOT and the managing consultant guidelines for personnel and workplace safety, requiring cooperation between the

	<p>public and private sectors.</p> <ul style="list-style-type: none"> • The decision about whether to go to remote operations or remain onsite was made by the managing consultant, balancing the risk of remaining onsite vs the potential for completing work remotely. <ul style="list-style-type: none"> ○ Lansing and Detroit are 100% remote, Grand Rapids and Blue Water Bridge are not. Blue Water Bridge could not go remote due to camera limitations but there are only 1-2 operators at this location. Grand Rapids is working with operators and the shift supervisor onsite but without support staff. • Phone Lines for remote TOC staff was the biggest challenge. <ul style="list-style-type: none"> ○ The first couple of months were challenging as no one expected to be home this long. Phones were the biggest challenge since only Lansing had phones that did not require plugging into a landline. MDOT had to reprogram phones to allow them to work outside the TOC. ○ To successfully work remotely, Detroit bought a third-party app to handle their high call volume by connecting individual operator cell phones to the app. ○ Lansing forwarded their main phone line to one cell phone and then forwarded that phone to individual operator cell phones. This worked ok for a while but there was too much call traffic to continue with this long term. • Additional 800 MHz radios were needed which was a challenge in some areas. For example, the Detroit facility needed additional radios. In the future, MDOT will stockpile equipment for emergency preparedness. • Transportation Service Centers (TSCs) are field offices that handle day to day operations and house engineers and regional offices. Employees in the office must wear masks and limit their time in the office. Cleaning supplies are available and provided for frequent disinfecting. • The return to onsite operations will be an all or nothing event for practicality. For example, MDOT TOC's will select a day to transition back into the office, assign first shift employees, if needed authorize overtime to eliminate a mass transition, and complete a 24 hour transition to ensure phone, video, etc. are working properly so that the transition offers no lapse in coverage. • MDOT is following the general Health Department guidelines. No one is going into the office except to get equipment. No cases have been reported from exposure within the TOC itself. • TOCs have had confirmed cases, but all were while employees were working remotely. No one was out for an excessive period of time. • MDOT's transition to get all employees working remotely went fairly smoothly once the decision was made. Employees all knew what to do and take with them. MDOT planned to transition TOC staff over a 48-hour period but completed the transition within 24 hours.
Managing Traveler Information	<ul style="list-style-type: none"> • MDOT did not change their policies for traveler information and retained their procedures for communicating information such as travel times, public safety, and weather.

	<ul style="list-style-type: none"> • MDOT did follow FHWA’s advice on mask messaging and participated in public education for the pandemic per the governor’s order. They will continue these practices until March 15, 2021. Currently 25% of the DMS across the state include mask-type messages. At one time it was up to 50%. COVID messages on DMS were met with some challenges from the public.
Maintenance	<ul style="list-style-type: none"> • Maintenance did not observe any decline in work for either direct MDOT employees or contract employees from counties and cities although counties and cities did experience some reduction in staffing. • No maintenance policy changes were made, and the pandemic did not affect snow and ice operations. • ITS project managers reported that contractors developed their own COVID response plan. Since most maintenance staff are involved in solo work there was minimal impact but longer lead times were required for parts and materials so service may have been delayed at times. • Supply chains for random items were delayed. This impacted some projects in the field because MDOT could not get the materials they needed.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • Service patrols on the freeway are operated courtesy of the patrol. Service patrols did not have staffing issues and have not been reduced. Cleaning supplies were added.
Funding Implications	<ul style="list-style-type: none"> • MDOT has been doing a good job following TSMO guidelines. Prior to the pandemic MDOT established for a large influx of money from bonds. With COVID-19, MDOT has seen a shift in priorities. • TOCs saw no budget impacts for operations, but they may see long term impacts based on revenue changes. MDOT anticipated reductions, but so far issues have been dealt with elsewhere.
Debrief Documents	<ul style="list-style-type: none"> • MDOT is not aware of any debrief documents but will reach out to see if some are available within their department.
Lessons Learned	<ul style="list-style-type: none"> • MDOT feels they have learned a lot by having different TOCs. The agency is looking at lessons learned on productivity and cost effectiveness and is working on a plan that is most fitting to both. • Though MDOT was prepared to transition to remote operations for a few days, they had not thought about long term preparedness of more than 12 months. • MDOT employees and MDOT plans are very adaptable. MDOT was able to complete most of their work from home. Future discussions may revolve around the potential for either full time or part time remote work although the TOC is unlikely to choose to work remotely due to the nature of the job. • Access to phones and transferring them over proved to be one of MDOT’s biggest issues. • TOC consultant staff had desktops and landlines but needed laptops to work remotely. MDOT had to get the equipment together quickly. This identified the shortcomings in their plan to move to remote operations. In the future, MDOT TOCs will move toward each employee having their own laptop and providing docking stations in the control room.

Other

- MDOT has observed an 8-10% annual average traffic reduction. In some areas, traffic reductions of 50-60% were observed for a time.
- MDOT exempted trucks hauling food and vital supplies for relief efforts from seasonal weight restrictions and expedited the permitting process for non-seasonal load restrictions.
- The agency suspended restrictions on noise and the timing of deliveries that met immediate needs related to relief efforts.
- MDOT is looking at this as an opportunity to evaluate opportunities for future remote operations.
- Construction
 - There have been some instances of COVID infections with construction staff and employees needing to quarantine.
 - Construction workers and contractors are conducting checks to ensure employees do not have symptoms. Wash stations have been added, employees are asked to maintain 6 ft distancing, and employees must wear masks.
 - MDOT has had some challenges for construction in the field regarding exposure. MDOT policies require that employees in close contact with someone diagnosed with COVID must quarantine. This has caused some complications for construction that slowed down projects. For example, a bridge crew works in close contact. Exposure from one team member required quarantine for the rest of the team.
 - Construction policies established in July/August 2020 included daily health screen assessments regarding how each employee felt at 9am and if they had any COVID symptoms. If employees entered offices, they were required to sign a sheet saying they were feeling well and symptom free.

Minnesota DOT: Notes

Interview Date	<ul style="list-style-type: none"> 04.02.21 with Cory Johnson, Steve Lund, and Jed Falgren
Employees Working Off-site	<ul style="list-style-type: none"> MnDOT since March 2020 is teleworking as much as possible for employees that can do their jobs from home. Field staff needed to report as did mechanics. Construction inspectors reported as needed. MnDOT transformed to a teleworking agency within a week. Most meetings are being held virtually. MnDOT's IT staff found multiple ways for teleworking employees to connect to the network including VPN, providing MiFi, or supplying WiFi, if necessary. MnDOT is not transitioning back to the office yet. As MnDOT considered moving back to physical offices in fall 2020 and prepared for winter activities, wave 2 of COVID hit, delaying their return to the office. Consequently, very few who were sent home have returned to the office, however, there is a process in place when the time comes. MnDOT's return to offices will begin sometime after July 1, 2021 (the start of the next fiscal year) and will likely be a hybrid model where some time is in person and other time will be virtual.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> A few employees were reassigned to a different assignment to facilitate work balancing. For example, the Office of Communications and TSMO director and other MnDOT staff were re-assigned to the Department of Health on a full-time, temporary basis. Current MnDOT's planning efforts would transition employees to different buildings if needed; however due to the quick nature of employees moving to teleworking for the COVID-19 pandemic, employees will telework instead of moving buildings. MnDOT had no staff reductions but did not backfill as employees moved on. Minnesota implemented a state hiring freeze except for critical positions such as for snowplow drivers who retired.
TMC Operations	<ul style="list-style-type: none"> TMC operations is still in-person, onsite and did not move to remote operations, however, most supervisors are teleworking. Though the RTMC's equipment could be operated remotely, the phone service and 911 service operate at higher access security. Since the RTMC is a large space, MnDOT felt they could easily physically distance employees. TMC operations are located with the state patrol including maintenance dispatchers and operations. Buildings were locked down so that only employees who needed to access the building were allowed in. The RTMC accepted and distributed deliveries and mail with additional precautions. Employees needed authorization and health screening to collect mail in bulk monthly.
Managing Traveler Information	<ul style="list-style-type: none"> Though not a change due to COVID, MnDOT pursued traveler information initiatives and completed a project in March 2021 to automate 511 entries from MDSS.
Maintenance	<ul style="list-style-type: none"> Daily interactions for cleaning, etc. changed. Maintenance is in the office with PPE and physical distancing. Some districts isolated truck stations.

	<p>Others shared staff and work teams.</p> <ul style="list-style-type: none"> • MnDOT expanded their fleet with rentals since initially only one person was allowed in a vehicle. Eventually, guidelines allowed 2 people per vehicle (driver and back seat passenger with windows open) and more than 2 for shorter durations. • In the beginning, MnDOT committed to a professional cleaning service, but now routine cleaning is done internally. Now, maintenance is self-sanitizing. Facilities and equipment are disinfected if a positive COVID case is confirmed or presumed. • MnDOT established levels on how to keep roads plowed. The first 4 levels were handled internally (1: normal, 2: backup (normally used for training, leaves, etc.), 3: adjacent districts, 4: mobile volunteers). Levels 5-7 were external and included a shared response from snow fighters, other agencies, and private contracts, if needed. Level 8 involved the national guard and level 9 closed roads. These levels required union discussions and acceptance. MnDOT did not have to move beyond levels 1 and 2 with one known exception that involved deploying level 3.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • Service patrols continued to operate with extra cleaning precautions and wearing masks.
Funding Implications	<ul style="list-style-type: none"> • Funding has been impacted due to a reduction in VMT but, so far, it has been less than anticipated. • MnDOT expects some challenges related to the gas tax that will be permanent.
Debrief Documents	<ul style="list-style-type: none"> • This is an ongoing process. MnDOT created a continuity of operations document and a document regarding preparedness and cleaning. • MnDOT started a best practices document early on to address issues such as: <ul style="list-style-type: none"> ○ How to make Microsoft Teams more effective. ○ How to stay connected in a disconnected world. ○ What will the return to the workplace look like.
Lessons Learned	<ul style="list-style-type: none"> • In the future, MnDOT will likely buy laptops instead of desktops to allow employees to make a quick transition to teleworking, if needed. • MnDOT expects more employees working from home, at least partially, moving forward (ex. 2 days telework/3 days in the office). This brings up a concern for the long-term impact of reduced “hallway business.” • MnDOT learned not to let perfection lead to confusion as policies were refined. For example, early communication contained a lot of uncertainty as MnDOT wanted communications approved. Trying to make things perfect caused confusion.
Other	<ul style="list-style-type: none"> • In the beginning, MnDOT put food trucks in rest areas. Rest area custodial staff are largely retirees 70-75 years old. With COVID, some self-selected out while others used PPE and sanitized. • There is some tension between those required to work in the office every day and those teleworking. This may be an issue when the department transitions back to primarily working in the office. • MnDOT also had to work out union issues for at-home employees. • Construction used mixed protocols. Virtual interactions were used

between work groups, for contractor meetings, and for pre-construction meetings. Mobile apps and weekly updates were also used. Construction managers benefitted as it became easier to be in more places and provide better support.

- COVID brings up entirely new employee management challenges. Evaluating work performance is challenging, but managers have to trust and have faith the day-to-day business will get done.

Ontario Ministry of Transportation (MTO): Notes

Interview Date	<ul style="list-style-type: none"> • 03.30.21 with Susan Boot and Pete Armoogam
Employees Working Off-site	<ul style="list-style-type: none"> • MTO worked to establish processes and equipment for virtual flexibility. Buildings were closed so employees could not enter. Equipment was an issue as all TMCs were built around equipment in the office. Staff could take desktop computers home, but they could not haul it back and forth, so returning to work on a part time basis could be an issue. • Where employees work is customized by the job, but generally, all offices and engineering continue to work from home. Construction varies their work location from the field to the car to their home. Frontline ITS maintenance staff are working on site with a new policy not to share vehicles or desks. • There were no written policies for employees working from home since it was a response to an emergency. The beginning was rocky and MTO did not anticipate the duration of the shutdown. <ul style="list-style-type: none"> ○ MTO was able to repurpose a couple of existing laptops, but most employees had desktops, so they were looking into a big purchase. Once some laptops came in, MTO realized the high cost, so they stopped purchasing and changed to corporate lease agreements. They also made arrangements for staff to take their desktops home, scheduling times to allow for social distancing. ○ VPNs were limited at first. Generally, now all employees have a laptop or desktop and VPN access. ○ No chairs were taken home. • A few employees did not have internet, so MTO purchased some sticks to provide internet. In the beginning, internet providers waived fees. • With employees and family members all working from home, some employees had issues with their personal WiFi not being able to keep up with the demands. MTO made an office by office decision to approve WiFi extenders for home WiFi. • Initially employees kept video on, however, this required a lot of bandwidth so at some point employees were allowed to turn off video. • One year in, technology is working better. Offices are open but staff is discouraged from working in the office due to health concerns. New standards and policies are being put in place for being in the office. • MTO almost reached the point where employees could go in 1 day per week at reduced capacity, but with another ramp up in COVID cases, the plan was shut down and has not been picked up again. • While working from home, employees had to jump through hoops to overcome issues such as not being able to print from home without going through their personal accounts. • It has been an adjustment working with external services. • MTO is crafting return to work policies, however, the culture of MTO has changed with the proof that work can be done remotely. It will be a challenge to get staff back to the office. • It is unlikely MTO will move fully to telecommuting due to the political

	<p>perspective with public service working from home. Bringing public service back into the office is seen politically as a way to show that the economy is picking up and that going back to work is feasible, although the plan to return to offices has not been finalized.</p> <ul style="list-style-type: none"> • Generally, staff like to work from home but continue to visit the office on a schedule of approximately once a month to pick up supplies or files and receive software updates and security patches.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> • All MTO staff were considered essential. MTO tried to find work to keep employees full time. They operated at 100% - not necessarily effectively, but employees were working. Functions evolved over time.
TMC Operations	<ul style="list-style-type: none"> • In spring 2020, MTO went down to a minimal staff. From the start, 4 staff remained in the center 24/7 to access the system. Now MTO is back in person. At the TMC there is a large enough space that this is feasible to social distance. PPE is required at all times, and only 1 staff is allowed in the kitchen at a time. High touch points are being cleaned 3 times daily. • The main TMC is off limits to everyone except those who have to work in the building and cleaners. To enter the TMC, employees must do a self-assessment and the TMC supervisor is notified. MTO needs to try to regulate the number of people working in the TMC. Attendance is tracked for contact tracing. • The main TMC in Toronto has not had a closure due to illness, however, one of the smaller TMCs was impacted operations due to illness. They transferred operations to another TMC. • The TMC developed a customized process during the first few days using collective common sense. • There is an increased cleaning protocol in common areas and masks and social distancing are required. Plexiglass dividers were installed so operators could still communicate. • For approximately the first 3 months, traffic was down approximately 30% and TMC staff was reduced by 1 employee per shift which was rotated. Other duties were developed to allow remote work. When the volume came back up, the additional operator was brought back in. • Early on, the TMC struggled for equipment approval. The TMC discussed going remote but since they are on a separate network, they did not have an easy way to work from home. MTO developed a TMC in a bag with laptops and made this available in case they needed to evacuate the TMC. They would need a solid fiber connection. Thankfully, they have not needed to use the TMC in a bag and can continue with face-to-face communication.
Managing Traveler Information	<ul style="list-style-type: none"> • MTO maintained normal procedures until a decision to post COVID messages to replace general off-peak safety messages was made. The Ministry of Health helped select the COVID messages such as Stay Apart and Stay Home. Messages continue to be posted. COVID messages are replaced when the system responds to a higher priority message. • With both French and English on DMS, MTO often use symbols. This has been challenging with COVID messages. They have had public complaints

	<p>on posting COVID messages. The public only wants traffic messages.</p> <ul style="list-style-type: none"> • MTO has received some negative feedback from motorists who believe the signs should only be used for traffic safety. MTO tries to promote their 511 website for trip planning etc. so motorists still have access to traffic information.
Maintenance	<ul style="list-style-type: none"> • Maintenance and construction operated as business as usual except Maintenance used additional vehicles to allow for social distancing.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • MTO does not have a motorist assistance program. Highway contractors have some patrols, but their protocols have changed. • MTO has internal emergency response units that operate 24/7. Emergency Response units operated following COVID guidelines and employees approach disabled vehicles wearing PPE.
Funding Implications	<ul style="list-style-type: none"> • So far there have been only small scale funding implications. • MTO made a corporate purchase of PPE as a strategic decision but has not made capital budget changes. • MTO has not yet learned of future funding changes, but rumor suggests there will be no change. Next year is an election year so there may be a change after that.
Debrief Documents	<ul style="list-style-type: none"> • Operations procedures for the TMC and ITS maintenance have been made on a small scale. • There is too much daily work to complete larger debrief documents.
Lessons Learned	<ul style="list-style-type: none"> • It is still early and MTO is still learning. • MTO learned that digital signatures are possible. • Pandemic operations were a good opportunity to test employees working from home. It proved that employees can work at home efficiently. There is an expectation that the ability to work from home will change the culture of the organization to be more accepting of work from home. It is a huge benefit to employees not having to commute. • MTO is not actively downsizing property or staffing, however, bringing on new staff while working remotely does not offer the same relationship as when working side by side. • Changes up to the executive level are possible.
Other	<ul style="list-style-type: none"> • In a survey of staff, 70% responded they would like to work from home while 30% would rather go back to the office. Many like not commuting for the significant time and cost savings although there has been some frustration about not having access to things like copy machines and supplies. • MTO would like to learn what the financial impact/considerations of working from home vs. working in the office are (e.g., space considerations). • Initially, construction stopped, but construction was considered essential work so full construction activities went on. Construction developed their own internal guidelines. No construction employees were laid off or had their hours reduced. • Until construction was deemed an essential service, MTO closed construction activities during the first few weeks. Luckily, not much construction was scheduled for March. Most construction activities begin

mid-April, and these occurred pretty much on time.

- MTO's Continuity of Operations had to ensure vendors could provide time critical service.
- Contractors had delays caused by struggling to get equipment across the border, staff health and safety protocols, U.S. materials took a lot of time with border closures.
- Multiple contractors had to use new health and safety protocols such as wearing PPE, taking more cars, and breaking tasks down to more individual work and less teamwork.
- A lot of construction delays altered MTO's 5-year plan. This year there is more carryover work from last year. Construction costs will be the same, but they will put out less work because of carryover.

Pennsylvania DOT: Notes

Interview Date	<ul style="list-style-type: none"> 01.07.21 with David Gaffney
Employees Working Off-site	<ul style="list-style-type: none"> State officials first shut down the Philadelphia office. Within a matter of days, PennDOT closed buildings and offices across the state and successfully transferred essential functions, including traffic management and executive leadership, to remote operations. PennDOT went fully remote except for a skeleton maintenance crew for winter weather and emergencies. Some districts had IT equipment, but others needed support for DOT equipment. Except for TMC employees, the majority of employees had new laptops within 6 months prior to going remote. Some employees also had monitors and keyboards while others did not have this equipment available. Early on VPN bandwidth was an issue. IT created a separate VPN for TMC operations employees. So far, there have not been a lot of secondary adjustments. Operations went back at an “as-needed” basis early on. As of October 2020, most staff were still working remotely. Exceptions included mail and IT employees. In early January PennDOT received permission to go into the office at 50% capacity 5 days/week for morning and evening peak but left it up to the districts when to return to the office. Two districts are going back soon while 2 districts are waiting to evaluate the return.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> At the onset of COVID-19 impacts in Pennsylvania, PennDOT enacted its Incident Command structure centrally, adjusted Continuity of Operations (COOP) plans as necessary, and deployed components as circumstances warranted. No DOT employees were reassigned, however, new tasks were assigned such as determining the project impact to revenue by evaluating traffic volumes. Assignments for temperature checks and sanitizing shared workstations were also added. PennDOT implemented a hiring freeze for non-essential workers. HOV lanes in the Pittsburgh area have been shut down since PennDOT went to remote operations.
TMC Operations	<ul style="list-style-type: none"> PennDOT went fully remote in March 2020, including all TMCs (statewide TMC, four regional 24/7 operations, and two peak hour facilities). All TMCs have been remote since then, with a couple of exceptions (e.g., weather event). PennDOT migrated initial impact area operations to other TMCs to develop a broader approach; now all are functioning remotely. PennDOT experienced a challenge with getting IT equipment to operators but worked with IT to supply the equipment. There is some discussion about going back 50% with TMCs. During winter weather, PennDOT plans to have some operators in the building to have redundancy with power during inclement weather events. TMCs had all their equipment shipped out from central IT to different

	<p>regions. PennDOT has determined 2 monitors for work from home operators is optimal, but operators would prefer 3. In the TMC there were 7 monitors per operator.</p> <ul style="list-style-type: none"> • PennDOT is starting to transition back to the office including preparing to maintain social distance, wear masks, and sanitize equipment. Employees going back into the office will be required to wear a mask except at their workstation. PennDOT is developing guidelines for temperature checks, creating quarantine plans, and defining close contact. • There have been few changes to the space for TMCs going back, but some may have added plexiglass. In most situations the spacing was already sufficient. • PennDOT used virtual 24-hour TMC meeting rooms for operators to talk as if they were in person. • PennDOT used a SKYPE phone that rang simultaneously to multiple operators. • PennDOT surveyed approximately 75 operators statewide. This feedback has allowed them to make adjustments. PennDOT is looking at another survey in the near future to get additional feedback. • In general, the majority (including those with children) prefer to continue to work from home and appreciate the ability to work remotely, however, a few operators would like to return to the office. • Benefits of COVID-19 include the opportunity to look at the impacts to TMCs. For example, during peak periods, the number of calls to the TMC when construction and maintenance are working can be a big burden but there is better situational awareness during COVID operations.
Managing Traveler Information	<ul style="list-style-type: none"> • Little has changed for traveler information although PennDOT has posted some COVID messages at the request of leadership. Examples of messages added during the pandemic include information on quarantine, masks, social distancing, and hand washing. Messages fluctuate frequently and as needed ranging from one day per week to every day.
Maintenance	<ul style="list-style-type: none"> • PennDOT scaled back maintenance to skeleton crews at the beginning but did not make policy or formal procedure changes. • Due to budget and health and safety issues, major impacts to maintenance initially were cancelling the previous maintenance cycle and focusing on the essential systems (using a large number of devices or at critical locations). Maintenance performed some repairs, but these were limited. • Maintenance has received requests for necessity level maintenance. If deemed critical, PennDOT sent staff or contractor staff to address the needs. • Maintenance teams are engaged statewide to ensure roads are kept safe and passable, and crews remain available for responding to weather events.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • There was no change to service patrols.
Funding Implications	<ul style="list-style-type: none"> • Funding could be a significant issue since revenue is tied to the gas tax. This offers many potential challenges. Volume analysis estimates a big

	<p>drop for a couple of months, impacting revenue. So far PennDOT has managed to shift funds by reducing consultant use and slowing down project letting. PennDOT expects these funding challenges will always be an issue due to an anticipated reduction in travel and continued remote work. PennDOT needs to look for alternate funding.</p>
Debrief Documents	<ul style="list-style-type: none"> • PennDOT is currently writing a policy and procedures document for Traffic Operations to maintain devices. They are working with IT in case they need to transition to remote work again. • PennDOT plans to document the timeline of events, including the information from the governor, and how to continue managing traffic remotely even in the shorter term. For example, the RTMC can take over while the TMC sets up for remote operations.
Lessons Learned	<ul style="list-style-type: none"> • PennDOT learned that they can do the job remotely without a drop in production. They are expecting guidance on the future of work and are hopeful that they can stay remote and continue operations.
Other	<ul style="list-style-type: none"> • PennDOT is interested in learning how agencies are justifying going back to the office/physical space now that it is understood that nearly all functions can be done remotely. • PennDOT shut down construction for 1 ½ months. • Rest areas were shut down for a time but are being opened on a phased approach with new sanitizing protocols.

Texas DOT: Notes

Interview Date	<ul style="list-style-type: none"> 01.06.21 with Craig Burgan, John Gianotti, and Charles Tapp
Employees Working Off-site	<ul style="list-style-type: none"> Essential workers (including TMC Operations) since the beginning of the pandemic have worked onsite, the rest of the employees transitioned to teleworking. <ul style="list-style-type: none"> As of October 2020, 10% of staff were allowed back in the office. As of January 2021, 25% or less were allowed in the office (returning to the office is strictly voluntary for both the Dallas and San Antonio offices). TxDOT is undergoing a building consolidation effort and visiting different districts to plan. As part of the consolidation there will not be the same number of chairs as staff. Issues encountered for employees teleworking depended on what the employee had at home for WiFi. To address connectivity issues, TxDOT provided iPhones with mobile WiFi hot spots. TxDOT also upgraded software, as needed.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> Some new tasks were established and assigned to staff (e.g., taking temperatures and ensuring cleaning and disinfecting supplies were available). Division employees use a facial scanner for temperature checks.
TMC Operations	<ul style="list-style-type: none"> TxDOT has five TMC's that operate 24/7 – Austin, Houston, Dallas, Ft. Worth, and San Antonio. El Paso's TMS (TrasnVista) is anticipated to be 24/7 TMC by the end of the year. In addition, TxDOT has 25 Districts. The five TMC's help the remaining 20 Districts that have ITS equipment and on nights and weekends post messages on DMS. TxDOT standard protocol is that if an employee is in contact with a confirmed COVID case they will quarantine at home. Dallas TMC <ul style="list-style-type: none"> Dallas TMC remained in at their physical building. However, the TMC could quickly move to working virtually, if necessary. Masks are required unless an employee is alone in their office space. The Dallas TMC has only had one employee early on who tested positive. They have had 3-4 employees who self-quarantined due to close contact with an individual who tested positive, but they ultimately did not test positive. If Dallas experiences an outbreak, they are prepared to go virtual. San Antonio TMC <ul style="list-style-type: none"> San Antonio TMC was in the middle of a remodel and opted to continue to work physically in the office. Masks are required unless an employee is alone in their office space. Plexiglass dividers were added between desks. San Antonio is aware of 4 employees who tested positive but no one else was infected by them. So far, positive tests have been due to a personal activity, not from attending work.

Managing Traveler Information	<ul style="list-style-type: none"> • Tx DOT has posted COVID messages on DMS messages (e.g., social distancing, wearing masks).
Maintenance	<ul style="list-style-type: none"> • Maintenance employees in San Antonio and Dallas are asked to follow TxDOT protocol and adhere to mask rules and temperature scans. Dallas also discourages more than 3 employees per vehicle.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • The Dallas County Sherriff handles service patrols and has their own protocols that are similar to TxDOT's. • San Antonio started the Highway Emergency Response Operator (HERO) program in September 2020 to provide free roadside assistance for motorists in the greater San Antonio area.
Funding Implications	<ul style="list-style-type: none"> • TxDOT's fiscal year runs from September 1 to August 31. • Neither San Antonio nor Dallas has experienced funding challenges yet, but they are waiting to see what happens next year. For now, they have kept the staff numbers and job assignments the same, but financial implications could trickle down next year. • Funding has been reduced some across divisions, but that has been mostly applied to consultant projects.
Debrief Documents	<ul style="list-style-type: none"> • There are traffic studies on patterns and crashes due to COVID.
Lessons Learned	<ul style="list-style-type: none"> • TxDOT learned that they have the ability to transition to virtual work if needed. • Since going virtual, Dallas productivity has not decreased. They are unsure if permanent changes will be made in the future.
Other	<ul style="list-style-type: none"> • TxDOT is interested in learning from other states: <ul style="list-style-type: none"> ○ Crash rates changes since the pandemic started ○ Risk factors experienced ○ Is there a better understanding of the IT/ITS relationship • TxDOT is interested in seeing changes as staff moves back into offices. • Employees are experiencing commuting savings, but will employees get more reimbursement (e.g., higher internet speeds have been required over what would be needed for personal activities)? • TxDOT experienced a ransomware attack that led to an awareness of the free software located on TxDOT's network. Ransomware has had a bigger effect than the pandemic. The ransomware attack made the IT support work get done very quickly, and stereotypes about working remotely were diminished.

Wisconsin DOT: Notes

Interview Date	<ul style="list-style-type: none"> 01.21.21 with David Karnes and Stacey Pierce
Employees Working Off-site	<ul style="list-style-type: none"> Since March 2020, any employee able to telework was asked to do so. 80-90% of staff, including consultants, moved to working from home. Most WisDOT staff had laptops and could work remotely and access the system through VPN or internet so they could transition almost immediately. When employees transitioned to remote work, they were also allowed to take home monitors and chairs so most had what they needed right away. Standing desks were not approved home for taking home for liability reasons. Initially, the network had hiccups from an overwhelmed VPN which IT then ramped up. Employees discovered that they didn't necessarily need VPN connections for everything. Wisconsin has used a phased approach for opening government buildings. Since summer 2020, things have not progressed significantly. Public facing employees (ex. DMV) are working at the facility and field employees are working in the field, however, most employees continue to work remotely. WisDOT had a telework policy, but it was outdated and not set up for these circumstances. WisDOT is updating their Contingency of Operations Plan and considering the potential for future off-site work.
Organizational Adjustments/ COVID-related Job Assignments	<ul style="list-style-type: none"> Some employees were reassigned to work on the COVID effort with the Department of Health. Some employees were assigned a rotation on committees to review additional topics and policies. This is ongoing. WisDOT had a hiring freeze, but it is starting to open back up. WisDOT implemented the Incident Command Structure (ICS) for COVID. There were subcommittees on planning command, resources, documentation, regions, and bureaus. This was very involved for the first few months with daily briefings for upper management, but it was put on hold in July 2020. It could be quickly started up again if needed.
TMC Operations	<ul style="list-style-type: none"> TMC operators remained on site throughout the work from home order although a couple of TMC employees worked from home while quarantining. Wisconsin's TMC is co-located with the dispatch center so there are a lot of employees in a small space. There have been some COVID cases which has been a challenge. WisDOT made a few changes to the TMC including installing plexiglass in the lobby. Workstations in the control room were already adequately spaced. A conference room with windows viewing the TMC temporarily served as additional space for 2-3 operators but has now been turned back into a conference room. The TMC set rules such as no sharing food and everyone must wear a mask. They also increased cleaning which will continue. TMC operators are consultant staff. WisDOT experienced a shift in who was in charge of the TMC. On September 20, 2020, Traffic Operations took back over control. WisDOT made very few signal timing changes. Traffic Operations has seen

	<p>lower traffic volumes, but numbers are starting to creep back up. 130 ramp meters were put on green rest in March 2020, but now half of the ramp metering is back on.</p>
Managing Traveler Information	<ul style="list-style-type: none"> • For a time, WisDOT had a web link to the Department of Health and Health Services. This has now been removed. • WisDOT posted COVID-related messages on DMS, 511, and PCMS. Messages included reminders for distancing, phrases like “Hands on wheel, not on face” and reminders to wash hands and wear masks. In April 2020 WisDOT included thank you messages to first responders and front line workers such as truckers and grocery workers. • Both permanent and portable DMS signs had messages for testing sites. • FHWA did not provide a specific waiver for COVID messages but there is language that allows messages under emergency conditions. • Wisconsin has had very divided opinions on the COVID messages. For example, a DMS that had a mask message was shot out by a gun, resulting in WisDOT incurring over \$40,000 in damages.
Maintenance	<ul style="list-style-type: none"> • WisDOT did not stop maintenance activities. Early on, WisDOT took advantage of the lower traffic volumes to do additional maintenance. • Additional rules for maintenance staff, including only one person per vehicle, were implemented. • Maintenance employees have also been working from home. They have good coordination using tools (MS Teams, messaging), and it is going well. • For winter maintenance, WisDOT contracts and coordinates with each of Wisconsin’s 72 counties. The counties supply 100% of the winter maintenance workforce but utilize WisDOT equipment.
Service Patrols/ Motorist Assist	<ul style="list-style-type: none"> • Freeway Service teams went forward as planned and did not change their activities.
Funding Implications	<ul style="list-style-type: none"> • Wisconsin’s fiscal year begins July 1. The uncertainty of the COVID-19 pandemic has had a minor impact to ITS. WisDOT cut back on preventative maintenance, uncertain if the full maintenance budget would be approved. They have since ramped back up to normal operation. • During the summer months there was a lot of uncertainty and WisDOT had difficulty getting commitments, so a lot of projects were deferred. There is still a lot of uncertainty and WisDOT is evaluating projects on a quarter by quarter basis.
Debrief Documents	<ul style="list-style-type: none"> • WisDOT provided a detailed presentation on their changes for ramp meters (Traffic Data in Ramp Metering: Impacts of Wisconsin’s Shelter in Place Directive – January 19, 2021).
Lessons Learned	<ul style="list-style-type: none"> • It feels a little early for overall lessons learned since the pandemic is ongoing. We are on a journey with changing information and different policies. WisDOT expects to do additional planning when the current conditions pass. • Everyone must continue to be very flexible. We must learn to live with COVID and its precautions instead of waiting for it to be over. We must all adapt.
Other	<ul style="list-style-type: none"> • Nothing additional.