inciter
NEWSLETTER OF THE NORTH CENTRAL SECTION
INSTITUTE OF TRANSPORTATION ENGINEERS
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INSIDE THIS EDITION

inciter
Cortney Falero
Newsletter Editor

Modeling the Impact of Increased Telecommuting

Brett Gunderson, Brian McLafferty, & Paul Morris, PE | SRF Consulting Group

In each issue, the INCITER features an article coordinated by one of NCITE's technical committees. This article is a contribution from the **Planning Methods and Applications Committee**.

Empty Minneapolis Streets. Source: Pexels

The onset of the COVID-19 pandemic forced a dramatic increase in workforce telecommuting and raised questions about if and how some industries would return to traditional peak-hour commute patterns. During the peak of the pandemic, approximately 30-35% of the workforce was telecommuting, dramatically impacting the highway system with near total elimination of recurring congestion. To respond to the uncertainty in future telecommuting trends, SRF Consulting Group developed a process to consider this change in travel behavior and applied the process to several sensitivity tests for various studies throughout the region.

The increased telecommute sensitivity test analysis used the Metropolitan Council's Regional Activity-Based Regional Travel Demand Model (RDTM). Activity-based models differ from traditional 4-step travel demand models in that they consider the activity of each individual and create "tour" records including information for an individual's entire day of travel. These trip tour records contain data fields that dictate the purpose of the individual's trip, a time stamp of when the trip is being made, and the mode of the trip. With this information, it was possible to identify individuals and trip tours that were potential candidates for telecommuting in future scenarios.

Increased telecommuting rates were modeled by eliminating a desired percent of "work tours" in the activity-based RTDM. A work tour consists of multiple trip records associated with a work commute. For example, a work tour could include a trip to the coffee shop on the way to work or a trip to the grocery store on the way home. Eligible work tours were subjected to a randomized selection process and were removed from the model assignment input until the desired reduction in commuting work tours was achieved, emulating an increase in telecommuting.

(Continued on page 11)

JOB OPENINGS

Visit the NCITE website for current job openings | nc-ite.org

EXECUTIVE COMITTEE

President	**Natalie Sager**, HDR 763.591.5424 Natalie.Sager@hdrinc.com
Vice President	**Jeremy Melquist,** City of Bloomington 952.563.4914 jmelquist@bloomingtonmn.gov
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Directors	**KC Atkins**, Hennepin County Kristin.c.atkins@gmail.com
	Justin Sebens, SRF Consulting Group 763.249.6743 jsebens@srfconsulting.com
Past President	**Kevin Peterson**, Washington County 651.430.4330 Kevin.Peterson@co.washington.mn.us

TECHNICAL COMMITTEES

Geometric Design	**Position Open**
Intersection Traffic Control	**Benjamin Brasser,** City of Minneapolis benjamin.brasser@minneapolismn.gov
Emerging Technologies	**Jake Eisinger,** Washington County jake.eisinger@co.washington.mn.us
Complete Streets and Safety	**Hannah Johnson,** Alliant Engineering 612.758.3080 hjohnson@nc-ite.org
Planning Methods and Applications	**Krista Palmer** SRF Consulting Group 763.452.4804 kpalmer@srfconsulting.com
Traffic Operation and Maintenance Discussion Group	**Greg Boche,** City of Woodbury greg.boche@woodburymn.gov
Simulation and Capacity Analysis	**Michael Kondziolka,** Alliant Engineering mkondziolka@alliant-inc.com

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	Michael Odell, Alliant Engineering, Inc. modell@alliant-inc.com
Professional Development	**Joe Devore, KLJ Engineering** joseph.devore@kljeng.com
Social Media	**Tyler Krage**, City of Chicago tyler.krage@cityofchicago.org
Student Activities and Career Guidance	**Ann Stewart,** Alliant Engineering, Inc. 612.767.9322 astewart@alliant-inc.com
	Chad Jorgenson, SEH 651.256.0427 cjorgenson@sehinc.com
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Membership	**Jack Olsson,** Kimley Horn 651.393.6158 Jack.Olsson@kimley-horn.com
Technology	**Jordan Schwarze**, Alliant Engineering, Inc. 612.767.9334 jschrarze@alliant-inc.com

STUDENT CHAPTERS

University of Minnesota— TC	**Mats Dale**, President dale0179@umn.edu
North Dakota State University	**Hizb Ullah Sajid**, President Ihizbullah.sajid@ndsu.edu
University of Minnesota— Duluth	**Jason Miller**, President dtsoduluth@gmail.com

GREAT LAKES ITE

Great Lakes ITE District Director	**Jeffrey Young**, HDR 651.604.4816 jeffrey.young@hdrinc.com
Great Lakes ITE District NCITE Officer	**Nick Erpelding**, SRF Consulting Group 763.475.0010 nerpelding@srfconsulting.com

PRESIDENT'S MESSAGE

Hello NCITE!

Natalie Sager
2022 NCITE President

I wanted to say thank you for the opportunity to serve you as the 2022 NCITE president. I am excited for the year ahead and to be working with our new board. On behalf of our section, I also wanted to thank our outgoing president, **Kevin Peterson**, for his leadership and contributions to NCITE. During his presidency, he navigated us through our first in-person/ hybrid year and held the first in-person event post-Covid, the 2021 Summer Social!

As we jump into 2022, I would like to share a reminder of the resources our organization can provide you. To name a few; we are more than happy to support you in applications for GLITE and ITE awards due March 1st, nominations for Leadership ITE (applications typically due in September), or finding involvement opportunities such as helping plan STEM events or becoming a chair or co-chair for one of our many committees. I would encourage you to get involved! If you have any ideas for future section meetings or would like to be a presenter, we welcome your input, particularly as we are planning the year.

On February 16th we held a joint Ethics Training with WTS. **James T. Johnson** led a presentation on: "Ethics - The Heart of the Engineering Profession". This is an opportunity that we offer on PE renewal years, and we hope you were able to join us for this virtual event.

Other events & meeting topics planned for this year include:

- March Section Meeting - Twin Ports Interchange
- April Section Meeting - NW Metro Mississippi River Crossing Study
- May Section Meeting - Membership Drive
- GLITE Annual Meeting - June 20th to 22nd in Duluth
- ITE Annual Meeting - July 31st to August 3rd in New Orleans
- Summer Social - TBD Fundraising for NCITE Student Scholarships
- September Section Meeting - Road Show
- October Section Meeting - Student Chapter
- NCITE Annual Meeting - TBD Fundraising for NCITE Student Scholarships & GLITE Endowment Fund

It has been difficult being physically apart from you all over the past few years and I look forward to reinvigorating our sense of community and engagement among our membership. One way of doing so is through in-person events. We are hoping to start meeting in-person with our March section meeting; please keep your eyes open for a save the date in the upcoming weeks. Also visit the NCITE webpage www.nc-ite.org, LinkedIn, and Twitter for current information on upcoming events.

I'd like to close by introducing your 2022 NCITE Executive Board!

Vice-President: **Jeremy Melquist**, City of Bloomington
Secretary: **Philip Kulis**, SRF
Treasurer: **Nik Costello**, Washington County
Director: **KC Atkins**, Hennepin County
Director: **Justin Sebens**, SRF
Past President: **Kevin Peterson**, Washington County
Section Representative: **Nick Erpelding**, SRF

UPCOMING EVENTS

ite Calendar

ITE Calendar for District, Section, & Chapter Meetings

Stay Connected with Virtual Events
Online | Dates Vary

ncite

Attend an Upcoming NCITE Technical Committee Meeting! Check out upcoming topics here.

For more information on the committees and how you can get involved:
https://nc-ite.org/Committee_Listing

For professional development opportunities:
http://nc-ite.org/content.php?page=Professional_Development_Meetings

MEET THE 2022 EXECUTIVE BOARD

Get to know the 2022 board!!

Natalie Sager, *2022 NCITE President*

Natalie Sager
President

Job Title and Employer: Assistant Traffic Section Manager, HDR
Past Work: Student Internships at Alliant and Scott County
Education: BS in Civil Engineering from University of Minnesota, Twin Cities
Where You Live: Maple Grove, MN
Family: Tom (husband) and Evan (son, 6 months)
Pets: Maya, Siberian Cat
Hometown: Shoreview, MN
Hobbies: Hiking, Traveling, Camping, Cooking, Soccer
Interesting Facts:

- I was a surprise identical twin born on Friday the 13th (no, she is not an engineer). Side note: Our VP, Jeremy Melquist, is also an identical twin and we've both participated in the MN Twin Study for the U of M!
- I love cooking over the campfire; my favorite creation is tot-dish cooked in a cast iron skillet.
- I also have found a new love for making baby food.
- I have 6 step siblings (3 live in Israel and 3 live in Seattle) and two sisters (both in MN).
- Every blizzard my husband and I bundle up with our ski goggles on and walk a mile to Osseo.

Favorite TV Show: The Witcher
Favorite Music: Whatever is on the radio
Favorite Food: Whatever fruit is in season
Desired Superpower: Teleportation!
Instruments Played: Flute
Best Vacation: Any trip my husband plans! A few favorite have been Ireland/Scotland, Costa Rica and Grand Teton National Park.

Jeremy Melquist, *2022 NCITE Vice President*

Jeremy Melquist
Vice President

Job Title and Employer: Traffic Engineer (City of Bloomington)
Past Work: KLJ, Bolton & Menk
Education: Bachelor of Civil Engineering, University of Minnesota-Twin Cities
Where You Live: New Brighton, MN
Family: Wife (Jess)
Pets: Murphy (Golden Doodle)
Hometown: Woodbury, MN
Hobbies: Sports, Hiking/Camping, Exercising
Interesting Facts :

- I visited 30 national/state parks last year (in Minnesota, South Dakota, California, & Hawaii)
- If you see me outside of work it may not be me– I have an identical twin. He has been living in San Francisco for 8 years, but is moving back to MN this spring.
- I enjoy visiting new breweries and have tried almost 500 different beers.

Favorite TV Show: The Office
Favorite Podcast: KFAN The Power Trip Morning Show
Favorite Restaurant: Chipotle
Favorite Sports Team: MN Vikings & MN Gopher Football
Best Vacation: We took two trips last year- San Francisco/Yosemite (favorite part was hiking Half Dome) and Hawaii (visited 4 islands—Maui was my favorite).

MEET THE 2022 EXECUTIVE BOARD

Phillip Kulis, *2022 NCITE Secretary*

Phil Kulis
Secretary

Job Title and Employer: Project Manager at SRF Consulting Group
Past Work: Transportation Analyst at Kittelson and Associates
Education: MS Penn State University, BS Rochester Institute of Technology (Rochester, NY)
Where You Live: St Louis Park , MN
Pets: Cali the cat
Hometown: Ithaca, NY
Hobbies: Golfing, biking, hiking, skiing, photography, and home improvement projects.
Interesting Facts:

- I've had the joy of spending Christmas morning in the emergency room.
- Prior to moving to Minnesota, I lived in the hottest part of the country, Arizona.
- I've never broken a bone.
- I rewired my bathroom and wired my new home office and I'm still here to talk about it.

Favorite TV Show: Suits – thought about becoming a lawyer prior to engineering.
Favorite Food: Buffalo chicken pizza
Favorite Restaurant: Birch's on the Lake
Desired Superpower: Who doesn't want to be able to fly?

Nik Costello, *2022 NCITE Treasurer*

Nik Costello
Treasure

Job Title and Employer: Engineer III, Washington County Public Works Department (currently working full time at the Metro Transit Gold Line BRT Project Office)
Past Work: Assistant Traffic Engineer, Washington County Public Works Department
Education: University of Minnesota
Where You Live: St Paul, MN
Family: Wife, Kelly & daughter Ruth (almost 3)
Pets: dog Karl (14)
Hometown: Stillwater, MN
Hobbies: Golfing, fishing, camping, skiing, curling, traveling
Interesting Facts:

- My wife and I met in kindergarten, but didn't end up dating till after college.
- I was a varsity cheerleader in high school.
- I took a semester off of college and backpacked through western Europe, visiting 10 countries.
- I've never broken a bone.
- I joined a curling league five years ago and have been hooked ever since.

Favorite TV Show: Twin Peaks
Favorite Podcast: Tumblehome
Favorite Music: I like most genres. Some of my favorite artists are David Bowie, New Order, Pavement, and Modest Mouse
Favorite Food: Mexican
Favorite Restaurant: Mucci's
Favorite Book: Out Stealing Horses
Favorite Car: I owned a 1998 Honda Civic that made it to 301.000 miles before the body started falling apart. I'm convinced the engine would have made it another 300,000 miles.
Instruments Played: Alto Saxophone back in the day

MEET THE 2022 EXECUTIVE BOARD

KC Atkins, *2021 NCITE Director*

KC Atkins
Director

Job Title and Employer: Senior Professional Engineer, Hennepin County
Past Work: CH2M HILL (Prior to Jacobs), Toole Design Group, SEH
Education: Bachelor of Civil Engineering, U of M – Twin Cities
Where You Live: Eden Prairie, MN
Family: Husband, 2 daughters (5 and 2)
Pets: 1 dog (Marley – adopted Nov 2020)
Hometown: Brookfield/Menomonee Falls, WI
Hobbies: Strength Training, Wogging (walk/jog), biking, geocaching, learning to quilt, crocheting (I only know how to make infinity scarves), re-finding my hobbies after having 2 kids, looking for a softball or kickball team!
Interesting Facts About Yourself:

- I instituted #BoyBandWednesday for myself during the pandemic to know what day it is.
- I was a NASM Certified personal trainer.
- I performed in a group similar to Glee that traveled and performed in southeast WI.
- I'm now a proud NFL owner!
- I'm not the best gardener, but I love/hate projects around my house, especially outside

Favorite TV Show: Working Moms, The Jason Show
Favorite Podcast: Box Angeles
Favorite Music: Musicals
Favorite Food: I think, if forced to choose, my favorite food is coffee!
Favorite Book: Any crime/mystery
Favorite Car: RadWagon, anything that's trusty and runs a long time
Desired Superpower: Flying:
Instruments Played: Voice
Best Vacation: Anywhere I can turn off the real world and disconnect

Justin Sebens, *2022 NCITE Director*

Justin Sebens
Director

Job Title and Employer: Operations and Modeling Lead SRF Consulting Group
Education: Carthage College and University of Wisconsin Madison
Where You Live: Rogers, MN
Family: Wife Katie, Son (6) Carson, & Daughter (4) Kelsey
Pets: Lab mix Wyatt & Pit mix Emmy Lou
Hometown: Seymour, IL
Hobbies: Golf, smoking meat, and playing with my kids.
Interesting Facts :

- I ran Cross County and Track and Field at the NCAA D3 Level
- I jumped 6' 7" in High Jump in Highschool
- I am an avid Call of Duty fan and player
- I build a sledding hill on the side of our house for the kids each year
- I once swam with over 100 dolphins while snorkeling in Hawaii

Favorite TV Show: Game of Thrones
Favorite Movie: Happy Gilmore
Favorite Music: Anything Country
Favorite Book: Ready Player One
Desired Superpower: Time travel
Biggest Accomplishment: Surviving the terrible twos and threenager stage.
Best Vacation: Honeymoon (7 day cruise through the southern Caribbean Islands.

MEET THE 2022 EXECUTIVE BOARD

Kevin Peterson, *2022 Past President*
Job Title and Employer: Engineer III, Washington county Public Works
Past Work: SEH, Papa Charritos (busboy, cook, bartender)
Education: NDSU
Where You Live: Stillwater
Family: Wife, two kiddos
Pets: Dog and leopard gecko
Hometown: Hastings
Hobbies: coaching my son's sports teams
Interesting Facts About Yourself:

- I skipped a college chemistry test to road trip to the Salt Lake City Olympics!

Favorite TV Show: The Olympics!
Favorite Food: Sushi
Favorite Car: Anything with a heated steering wheel.
Best Vacation: Peru, Costa Rica, Spain, Ely

Kevin Peterson
Past President

Nick Erpelding , *2022 ITE District Director*
Job Title and Employer: Traffic Operations, SRF Consulting Group
Past Work: Westwood (2007-2011), RLK (2001-2007)
Education: University of Notre Dame
Where You Live: Minnetonka
Family: wife Lara, sons Nolan (11; 6th grade) and Everett (8; 2nd grade)
Hometown: Minnetonka
Hobbies: bridge, curling
Interesting Facts About Yourself:

- Joined curling league in Blaine after learning to play at NCITE Annual Meeting
- Love to spend time waterskiing at family cabin in Park Rapids (Bad Axe Lake)
- Run one foot race (a 5k) every year on the 4th of July
- Enjoy reading a hard copy newspaper every day
- Worked as a golf caddie at Oak Ridge CC in junior high

Favorite TV Show: Ozark
Favorite Podcast: ESPN College Football Podcast
Favorite Food: Sausage and Pepperoni Pizza
Favorite Restaurant: Chick-Fil-A
Favorite Book: Into the Wild
Desired Superpower: Ability to be in two places at once
Biggest Accomplishment: Achieved Life Master ranking in bridge in 2017
Most Embarrassing Moment: Rear-ended a parked car in the school parking lot in high school
Instruments Played: Trumpet
Best Vacation: Grand Canyon backpacking

Nick Erpelding
ITE District Rep

SECTION MEETING UPDATES

The January Section Meeting featured a presentation on Roundabout Capacity and Design Guidance by **Jamal Love** and **Douglas Carter** from **MnDOT**. Watch the presentation on YouTube!

Highlights included:

Roundabout Capacity:

- Less multi-lane roundabouts now because switched from 20-year design to shorter term (10-year design). Have reduced capacity at some multi-lane roundabouts due to operational and safety issues
- Multi-lane roundabouts handled different due to the drastic increase in crashes at multilane. Trying to reduce the number of lanes in roundabout as much as possible.
- Threshold used to be 1,000 conflicting vehicles to consider a multi-lane roundabout, but now is 1,400. Discussed in the Facility Design Guide (FDG), with updated gap acceptance and headways.
- Issue with LOS table of signalized and unsignalized – what's the right amount of delay?
    - Rolling queue vs standing queue
    - No national research, but ~70 seconds of delay at roundabout seems tolerable

Mini-roundabouts:

- Focus less on the name of mini vs single-lane roundabout.
- Apply features of roundabout that fit the context of each approach.

We continue to iterate the way we complete these meetings, and this time has been a perfect opportunity to try out some new things. However, if you have anything that may make these meetings work better or enhance the value for the section, we'd love to hear your thoughts! Please let any of your thoughts be known to a member of the board.

YMC UPDATE

We had our first planning meeting of the year on February 3rd at BlackStack Brewing in St. Paul. The YMC wrapped up 2021 and discussed our upcoming February event, which we decided on Snow Tubing at Buck Hill in Burnsville on March 3rd. The event is up on the NCITE website and open for registration. Private sector employees and guests are $17 while public sector and student tickets are $10. We ask anyone interested in coming to register early as tickets are limited at Buck Hill. Anyone is welcome, not just YMC members!

Some future agenda items include:

- April event ideas and planning session
- June event – normally our Bike/Brewery event, but we think we may want to do an event with the GLITE meeting in Duluth. We will discuss further at our next planning meeting!
- Student outreach – We want to determine the active ITE student chapters in the NCITE section so we know who we can reach out to. We also want to look into setting up a ITE/NCITE booth at career fairs in the future.

Source: Buckhill.com

If you would like to be added to the YMC email list, or know of any new hires/coworkers that would enjoy our events, please send email addresses to
Cameron Valuch (cvaluch@alliant-inc.com) or Michael Odell (modell@alliant-inc.com)

Modeling the Impact of Increased Telecommuting (continued from page 1)

One study that utilized this telecommute analysis is the "Twin Cities Highway Mobility Needs Analysis", a joint effort of the Metropolitan Council and the Minnesota Department of Transportation. The sensitivity of highway mobility investment scenarios to increased telecommuting was tested by designating an additional 10, 20, and 30 percent of work trips as telecommute trips. As shown in Figure1 and Figure 2, this analysis resulted in time-of-day profiles that tracked vehicle miles traveled (VMT) and vehicle hours traveled (VHT) under different telecommuting assumptions. These profiles illustrated how telecommuting rates have a dramatic impact on VMT and VHT during the AM and PM peak hours, but a very small impact on VMT and VHT during non-peak hours – a pattern reflected in real-world observations during the pandemic. Furthermore, differences between telecommuting levels are proportionally higher for VHT compared to VMT, showing that as traffic volumes decrease the reduction in congestion accelerates.

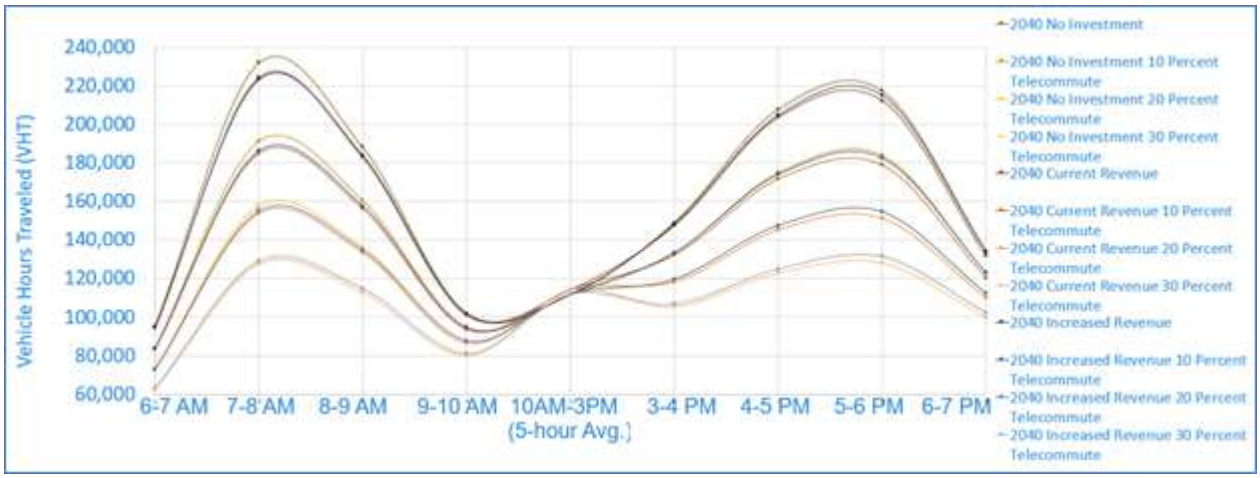


Figure 1: Modeled Results VMT by Telecommute Scenario

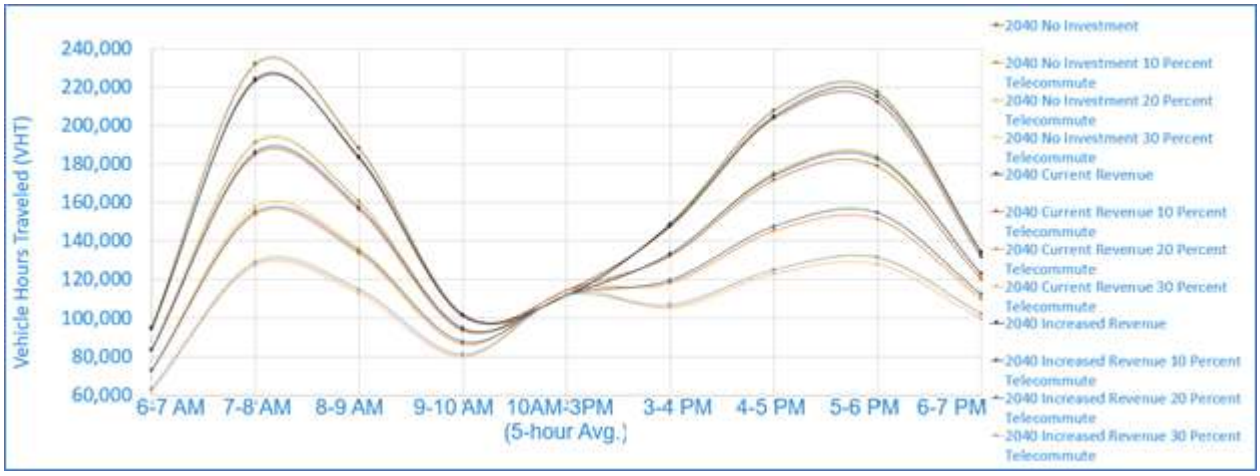


Figure 2: Modeled Results VHT by Telecommute Scenario

The sensitivity analysis performed for the Twin Cities Highway Mobility Needs Analysis study culminated in the chart depicted in Figure 3. This chart shows the impact of telecommuting assumptions on annual hours of delay per capita under the Implement Planned Investment, Extend Current Investment, and Manage Decline in Regional Mobility Investment Scenarios. These impacts suggest that if telecommuting rates were to increase by 10 percentage points, both the Extend Current Investment and Manage Decline in Regional Mobility Scenarios would achieve a target of 40 annual hours of delay per capita. If telecommuting rates increase by 20 percentage points or more, all the highway investment scenarios developed in the analysis would limit annual hours of delay per capita to less than 40 hours.

(Continued on page 12)

Modeling the Impact of Increased Telecommuting (continued from page 11)

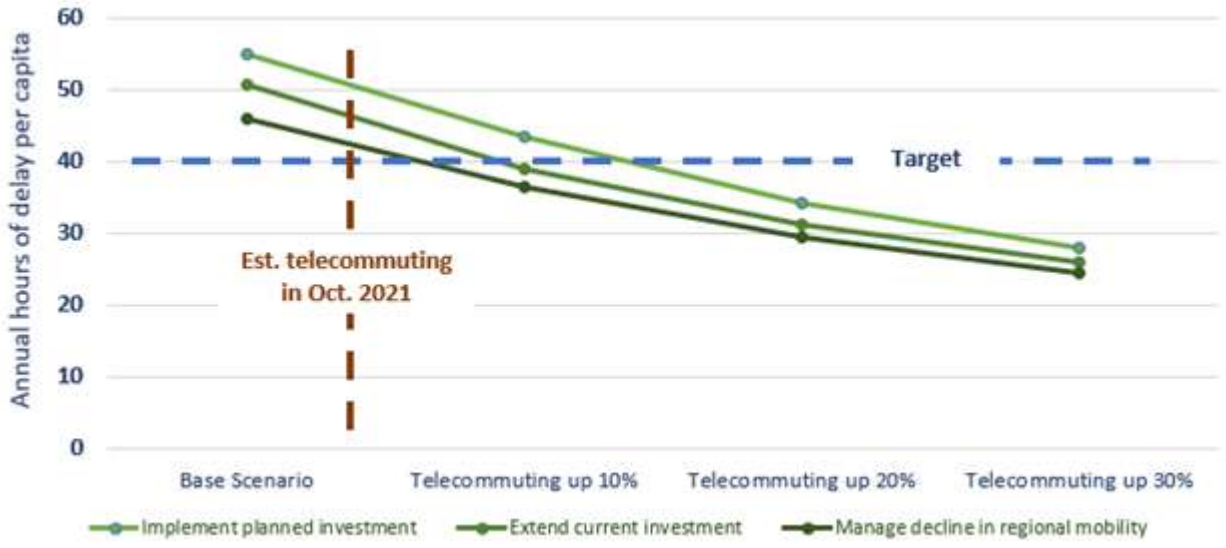
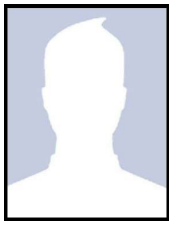


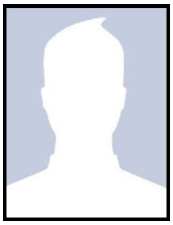
Figure 2: Sensitivity of Travel Delay to Telecommuting Rates

The results of this sensitivity analysis should be taken with caution, however, as the methods used in this analysis assume complete elimination of work-related trips at the 10, 20, or 30 percent telecommuting level. This can be misleading for two important reasons. First, many surveys of workers and employers conducted during the pandemic defined telecommuting as working from home “some of the time”, and not “all of the time” as was assumed in this analysis. Second, the work tour reduction method described in this section removes all trips associated with the journey to work, many of which may still occur when working from home, such as shopping or driving children to childcare. In summary, these results likely represent far higher levels of travel reduction than would occur at the specified levels of telecommuting.

TECHNICAL COMMITTEE UPDATE



Geometric Design Technical Committee
The Geometric Design Committee is in need of a new Committee Chair. Any interested parties should contact Natalie Sager at Natalie.Sager@hdrinc.com

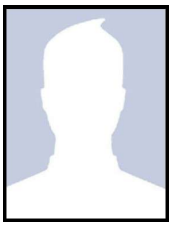


Intersection Traffic Control Technical Committee
Committee Chair: **Benjamin Brasser -** benjamin.brasser@minneapolismn.gov
Recent Agenda Items: No recent meetings.
Future Agenda Items: TBD
Next Meeting: TBD

Emerging Technologies in Transportation Technical Committee
Co-Chairs: **Jake Eisinger** jake.eisinger@co.washington.mn.us **Zach Parsons** Zach.Parsons@bolton-menk.com
Recent Agenda Items: Smart work zones with Street Smart Rentals.
Future Agenda Items: Pending finalization: VDI Labs demonstration
Next Meeting: TBD in April

Complete Streets and Safety Committee
Committee Chair: **Hannah Johnson -** HJohnson@alliant-inc.com
Recent Agenda Items: Brainstorming session,
Future Agenda Items: Pedestrian/Bike Project review, D line visit, MnDOT Pedestrian Toolkit, MnDOT document updates, Statewide pedestrian crash study, work zone navigation, LRRB, Vendor Panel, Ped crossing warrants, ped facilities LOS, SRTS, sidewalk delivery vehicles and more!
Next Meeting: TBD in March/April

Planning Methods and Applications Technical Committee
Committee Chair: **Krista Palmer** - kpalmer@srfconsulting.com
Recent Agendas Items: member updates, upcoming conferences, regional travel demand updates—Met Council, & INCITER article.
Future Agendas Items: Updates to regional network, Transit model updates, MnDOT model output check for reasonableness and post processing adjustments.
Next Meeting: TBD



Traffic Operation and Maintenance Discussion Group
Committee Chair: **Greg Boche** - greg.boche@woodburymn.gov
Recent Agenda Items: Portable signals and sign design program discussions.
Future Agenda Items: Round Table
Next Meeting: 11:30am Wednesday March 2nd , Location TBD. (First Wednesday of each month)

Simulation and Capacity Analysis Technical Committee
Committee Chair: **Michael Kondziolka** - mkondziolka@alliant-inc.com
Recent Agenda Items: No recent meetings
Future Agenda Items: Future meeting initiatives and resource planning
Next Meeting: 1pm-2pm virtual meeting Wednesday February 23rd

Hennepin County ATMS Fiber-Optic Cable Installations

Daniel Nelson, AICP | AECOM

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **AECOM.**

AECOM has been working with the Hennepin County Transportation Operations Department since 2020 to develop fiber optic cable design plans as well as to provide construction inspection and contract administration services during fiber-optic cable installation. Hennepin County has been building a county-wide fiber-based communications network to connect all county owned traffic signals and network-enabled traffic and ITS components to its Advanced Traffic Management System (ATMS). The ATMS allows county traffic operational professionals to better monitor traffic signal performance and proactively address any traffic delay, communication, and maintenance issues in a timely manner.

AECOM developed fiber-optic cable design plans and created bid packages in 2020 that Hennepin County used to solicit bids from Contractors. Design plans were prepared in Microstation and quantities of fiber-optic cable infrastructure were prepared for developing cost estimates for the County prior to soliciting for bids.

Construction on the corridors began April 2021 and was completed by end of December 2021. AECOM provided construction inspection and contract administration services for the County throughout the year. This included applying for construction permits at locations where fiber routes cross MnDOT roadways or railroads. AECOM also documented quantities of equipment installed by the contractors and reviewed Contractor-submitted invoices for payment.

Below is a listing of corridors and estimated mileage of fiber that was installed by County contractors in 2021.

- CSAH 5 – from Williston Rd. to CSAH 61 (Plymouth Rd.) in Minnetonka (1.4 miles) (pictured right)
- CSAH 103 / CSAH 130 – from 84th Ave. to 71st. Ave. in Brooklyn Park (1.6 miles) (pictured below)
- CSAH 103 / CSAH 30 – from 109th Ave. N. to Highway 169 in Brooklyn Park (2.3 miles)
- CSAH 52 – from 65th St. to 77th St. in Richfield (1.5 miles)
- CSAH 31 – from CSAH 53 / 69th St. to 76th St. in Richfield (1.3 miles)
- CSAH 34 – from 94th St. to CSAH 1 in Bloomington (1.8 miles)
- CSAH 28 / 84th Street – from 78th St. to 84th St. and from Highwood Drive to Normandale Blvd. in Edina and Bloomington (2.2 miles)

Fiber conduit installation in Minnetonka, Minnesota

(Continued on page 15)

Hennepin County FO Installations (continued from page 14)

AECOM developed additional fiber-optic cable design plans in 2020 that the County plans to use in future solicitations in the coming years. In 2022, Hennepin County has already solicited bids from Contractors to connect their ATMS with County owned signal controllers on the following corridors:

- CSAH 158 (Vernon Ave. / Gleason Rd.) – Interlachen Blvd. to McCauley Trail in Edina (2.6 miles)
- CSAH 40 (Glenwood Ave.) – Winnetka Ave. to Xenia Ave. in Golden Valley (1.7 miles)
- CSAH 62 – County Road 101 to Baker Road in Minnetonka / Eden Prairie (3.4 miles)
- County Road 101 – Minnetonka Blvd. to Excelsior Blvd. in Minnetonka (2.4 miles)
- Eden Prairie Road – CSAH 62 to Glen Lake Blvd. (0.2 miles)

Construction on these corridors is anticipated to begin in the spring of 2022 and be completed by the fall season. AECOM will continue to provide construction inspection and contract administration services during fiber-optic cable installation in 2022.

In future years, Hennepin County plans to complete the development of the ATMS system by continually installing fiber and conduit to connect county traffic signals and other network enabled field devices to their ATMS along the following corridors:

- CSAH 4 (Eden Prairie Rd.) – Pioneer Trail to Edenwood Dr. in Eden Prairie (2.4 miles)
- CSAH 1 (Pioneer Trail) – Dell Rd. to Franlo Rd. in Eden Prairie (4.9 miles)
- CSAH 73 (Hopkins Crossroads) – Sunset Trail to Minnetonka Mills Rd. in Minnetonka (3.6 miles)

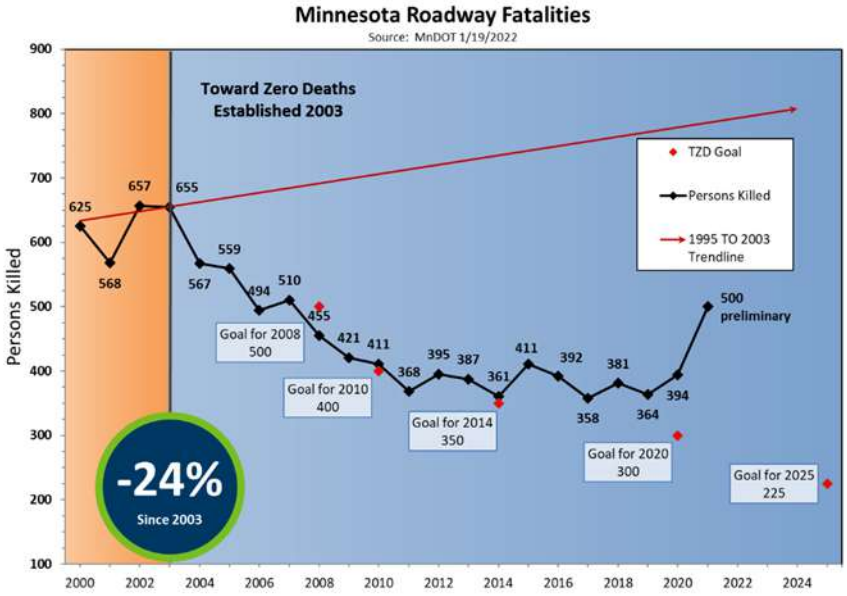
Handhole and Fiber Marker Installation in Brooklyn Park, Minnesota

TZD 2.0 : The Next Generation of Minnesota's Zero Deaths Program

Katie Caskey, AICP & Richard Storm, PE, PTOE | HDR

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **HDR.**

Now is the time for traffic safety action. In 2021, 500 people died on Minnesota's roadways based on preliminary data. This is the highest number of traffic deaths since 2007. The TZD 2.0 project aims to revamp Minnesota's Toward Zero Deaths program and reignite progress toward the ultimate goal of zero deaths on Minnesota roadways.



Driven by the desire to save lives on our state's roads, in 2003 the Minnesota Departments of Health, Public Safety and Transportation came together and formed the Minnesota Toward Zero Deaths program. Minnesota made great progress to reduce deaths and serious injuries in the early years of TZD. However, over the past decade, there was limited success in advancing the TZD goal on Minnesota roadways. Program leadership recognized that they must act now to re-establish progress toward zero deaths**.** Over the last year, HDR and Pinnacle Performance Group supported Minnesota TZD leadership to assess and update the program's organizational structure and operations, provide a fresh framework that will allow TZD to be flexible to local needs, produce new and innovative strategies to improve traffic safety, and reenergize stakeholders.

To assess current program structure and operations, the project team reviewed best practices from successful zero-fatality programs in other states and countries through a literature review and peer agency interviews. The team also drew insights from organizational design models commonly used across for-profit, not-or-profit and public entities. Additionally, the team engaged hundreds of existing and potential traffic safety stakeholders to learn directly from practitioners the strengths and challenges of the current TZD program. The team incorporated equity throughout the assessment, including analyzing historic crash data to identify inequities in traffic deaths and serious injuries.

The project team identified six core opportunity areas based on the results of the assessment and stakeholder engagement. The opportunities focus on enhancing TZD's program structure and operations to increase its overall effectiveness. They include:

- **Program focus:** Increase TZD's focus on building a culture of traffic safety in Minnesota.
- **Internal communication**: Better coordinate and streamline communication among TZD staff and partners.
- **External communication:** Better coordinate and streamline public facing traffic safety communication and shift the focus to building a culture of traffic safety.
- **Data:** Better coordinate and streamline sharing of traffic safety and research, and proactively identify data and research needs.

(Continued on page 17)

TZD 2.0 (continued from page 16)

- **Resources:** Address gaps in funding and staff resources.
- **Role clarity and decision-making:** Clarify roles and formalize the program's decision-making process.

To be effective moving forward, TZD needs to focus on building a culture of traffic safety in Minnesota AND designing and operating a safe transportation system. Traffic safety partners can build a culture of traffic safety through Positive Community Norming, which is a social ecological approach to create lasting changes to individual and organizational beliefs and behavior. At the same time, we can use a Safe System approach to design and operate our transportation system to protect against human error and injury tolerances to minimize death and serious injuries. A Safe System approach highlights that we, as engineers and planners, share the responsibility for traffic safety. In our roles, we can implement changes such as separating traffic (e.g., travel modes and vehicles traveling in opposite directions) where possible and managing speeds, especially when separation is not possible, through design.

To help TZD focus on what matters, the project team recommended eight actions for program leaders to consider, including:

- Adding additional partners, especially to help build a culture of traffic safety.
- Creating new statewide TZD positions to support program operations and coordination.
- Adopting a new program structure, re-aligning staff and hiring to fill gaps.
- Securing additional, flexible funding to support program staff and activities.
- Developing and implementing coordinated internal and external communication strategies.
- Creating a go-to resource for traffic safety data and research.
- Revising program decision-making processes to clarify responsibilities and improve timeliness of direction.
- Empowering TZD regions with decision-making authority and funding to allow for more localized and tailored approaches to traffic safety.

Implementation of these recommendations is being led by TZD leadership. Starting in 2022, program leaders are reviewing the recommendations, engaging stakeholders, and defining and refining their next steps for the TZD program. For more information about the project and to learn how you can be part of the future of TZD, visit www.minnesotatzd.org.

Improving the I-94 Corridor Northwest of the Twin Cities

Stephen j. Manhart, PE, PTOE, PTP, RSP1 | Michael Baker International

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This article is a contribution from **Michael Baker International.**

Concrete conveyor used on the I-94 Design-Build Project, Rogers to Maple Grove, MN
Source: C.S. McCrossan)

Drivers in the northwest metro of the Twin Cities have long struggled with congestion. This has been especially true along the stretch of I-94 between Rogers and Maple Grove. Due to recent growth along the corridor, this segment of I-94 has seen volumes at or over 75,000 vehicles per day. Drivers familiar with that segment know that traffic congestion can be overwhelming especially on long holiday weekends.

To better manage these traffic concerns, MnDOT established a design-build project to overlay and widen the segment. To that end, C.S. McCrossan was selected as the construction prime contractor and Michael Baker International was selected as the lead design engineer for the project. This project included the design of an unbonded concrete overlay from the I-494/I-694/I-94 interchange in Maple Grove to the TH 101 interchange in Rogers. In addition, a new lane in each direction was added from TH 610 to TH 101.

The project also included the design of new noise walls and the replacement of the traffic management system. Traffic signals were upgraded at Maple Grove Parkway and at Weaver Lake Road. In addition, all C and D signs were replaced within the project limits. Michael Baker International designed the renovation and expansion of the Elm Creek Rest Area, the busiest rest area in Minnesota, to accommodate additional truck parking.

(Continued on page 19)

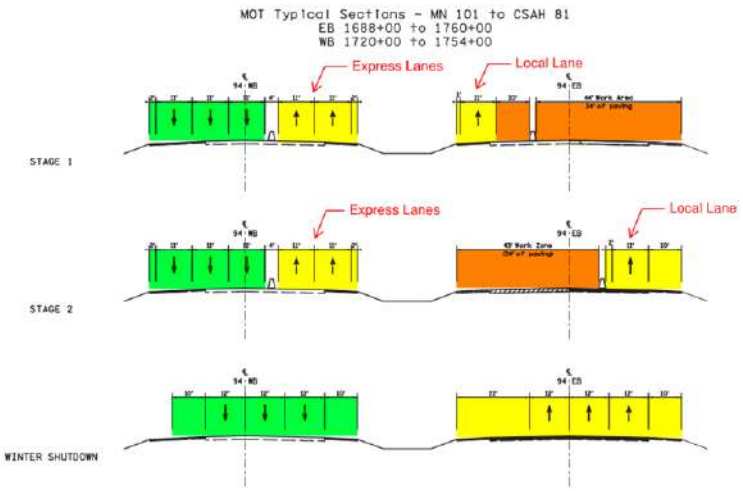
Improving the I-94 Corridor Northwest of the Twin Cities (continued from page 18)

The project included a several innovative features in its design and construction:

- The maintenance of traffic plan employed using five lanes on one side of the median and a sixth "local" lane on the opposite side to accommodate traffic entering and exiting the interstate. This method served to separate through traffic from the traffic that may be slowing to exit the interstate or may be merging with traffic. (See lead photo of article and diagram below.) This express/local lane system was then flipped when reconstructing lanes in the opposite direction.

- During construction, McCrossan utilized an innovative concrete conveyor system that allowed the concrete to be transported over the traffic lanes from the shoulder and onto the median work zone, where the mixed concrete could be transported to the paving area. This prevented the need for concrete trucks from weaving into and out of the through traffic lanes, thus improving safety. (See lead photo of article.)

- In designing the large overhead guide signs, the upward pull-through arrows were used, replacing the older down or diagonal arrows previously required. These newer arrows provide drivers with more distinctive visual clues on applicable lane use and direction of travel. The use of the upward pull-through arrows makes the sign panels quite large. The replacement sign panel shown below is 48 feet wide and 13.5 feet high, however some sign panels on the project are as large as 15 feet high.



MOT Lane Arrangement showing Express Lanes and "local" lade during construction (showing EB construction phase). Source: Michael Baker International

The I-94 Design-Build project from Rogers to Maple Grove was completed December 2021. The Design-Build team utilized several innovative processes in the design, maintenance of traffic and construction of the project. The result has provided several lessons learned in ways to deliver transportation projects while maintaining traffic through congested corridors. Further, the project provided improved drainage, resurfaced deteriorating pavement, improved safety, increased access for freight and business travel, and resulted in a smoother road surface for the traveling public.

Replacement D-Sign with Over-lane pull-through Arrow. Source Michael Baker International

LED Signals and Winter Weather Solutions

Brent Katauskas, PE | MoboTrex

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This article is a contribution from **MoboTrex.**

Snow Covered LED Signals. Source:
https://www.keloland.com/keloland-com-original/why-did-the-snow-stick-to-the-traffic-lights-in-sioux-falls/

Safety is a word that is at the forefront for every traffic engineer in the United States. Winter weather is one of the most dangerous situations that exists for motorists. For decades, traffic signals stayed clear and visible during snow and ice storms, because the incandescent bulbs inside wasted so much energy as heat that they melted anything that came into contact with the signal. With the advent of LED traffic signals in the mid-2000s, an unintended consequence came with the many advantages of LEDs – the loss of this "melting element". As a result, agencies around the country have been searching for a solution to keep their signals clear during winter weather.

In 2010, ITE and USDOT commissioned a study to determine the issues related to snow and ice buildup on traffic signal indications and document the findings and next steps to address the issues. The results were published by USDOT and FHWA in 2014. This study found that several countermeasures were available, both reactive and proactive. The reactive measures included manual brush cleaning, compressed air spraying, and anti-freeze or de-icing spraying. The proactive measures included special visors with a "wind scoop", a cover for the LED lens, and applying chemical de-icing before a storm. The ultimate conclusion of the report was that although these countermeasures provided some improvement, none of the existing countermeasures were completely effective at preventing snow or ice buildup that could inhibit visibility of the LED lens. One of the recommendations was to evaluate heating technologies that effectively melted the snow and ice, but did not degrade the signal lens.

(Continued on page 21)

LED Signals and Winter Weather Solutions (continued from page 20)

MoboTrex recently completed a project in Schaumburg, IL to test a heated visor solution at one of the busiest intersections in the area. This solution, called the Eagle Defender, included a positive temperature coefficient (PTC) heater attached to the inside of the signal visor. The Eagle Defender heats the visor and the area along the edges of the LED lens enough to prevent snow and ice buildup, with the PTC heater reaching temperatures of 65°C. This heater is powered through a separate 120VAC line from the traffic cabinet, and is controlled by a control module in the signal that can run up to five heaters in a signal head. The module uses an externally-mounted temperature and humidity probe that is calibrated to turn the heater on when typical snow and ice conditions are present – the temperature is under 38°F, and the relative humidity is above 50%.

The Eagle Defender has been running at this test intersection for two winter seasons, with excellent results. The picture below shows the heated visor on the left, and a normal traffic signal on the right. The heated visor has proven to prevent dangerous snow and ice buildup on the LED lens, and keep the signals clear and visible during winter storms.

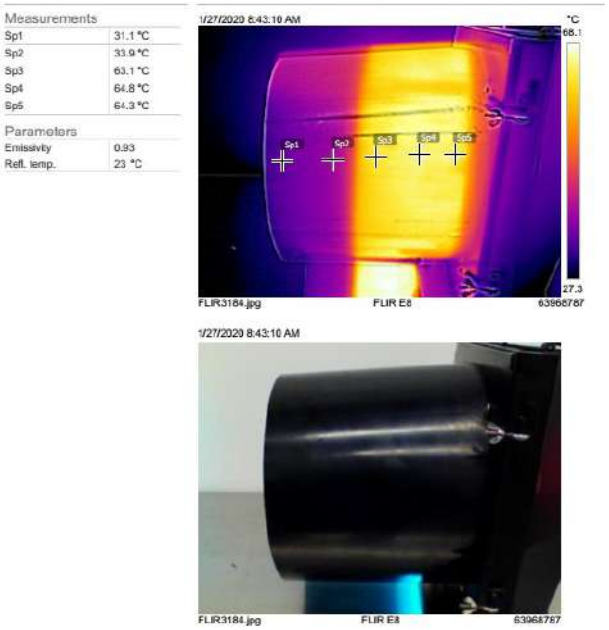

Photo by Mike Cubon

There are several other new solutions available as proactive countermeasures to keep the signals clear. The "Snow Cone" from Snow Proof Signals uses aerodynamics to allow the snow to flow through the visor and blow the snow out of the lens area. The McCain "Snow Scoop" visor has a similar idea to a car's hood scoop to direct the airflow through the visor and keep snow from building up. The Fortran "Snow Sentry" has a unique shape to cover the LED lens and inhibit snow sticking to the lens.

Keeping motorists and pedestrians safe is a primary concern for traffic engineers. The unfortunate unintended consequence of moving to LED signals was to impair safety by reducing signal visibility during winter weather. These new solutions for keeping the signals clear are important new tools for the traffic engineer's toolbox.

Photo by Mike Cubon

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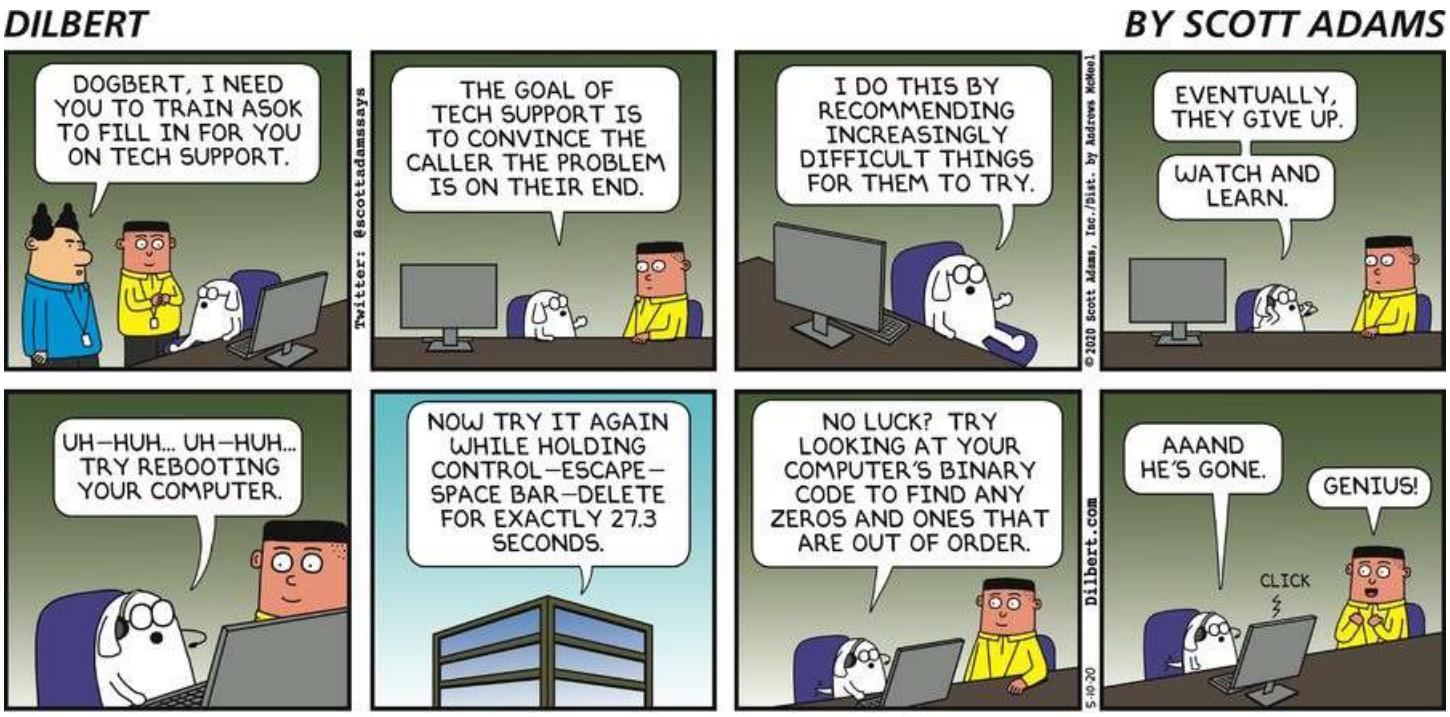

Source: Dilbert

MEMBERSHIP UPDATE

New Members

Abdi A. Abdulle - City of Bloomington

Jim Byerly - Minnesota Department of Transportation

Victor Kenneth Lund - St. Louis County

Kathleen Mayell - City of Minneapolis

Hunter Williamette - South Dakota State University

Ashley Sherry - University of Minnesota

Moves

KC Atkins - Hennepin County, formerly Short Elliott Hendrickson Inc.

Caitlin J. Johnson - TKDA, formerly Minnesota Department of Transportation

Dr. Amiy Varma - AAAJ LLC, formerly Independent Consulting

New TPCB Certification Holders

Peter Lemke - PTOE

Derek Nieveen - PTOE

Jacob Rojer - PTOE

Steven Strack - PTOE

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