Modeling Autonomous Vehicles

Steve Ruegg, PE | WSP

Autonomous vehicles (AVs) have been a hot topic in the industry for at least the last 2-3 years. This interest has been driven by the potential for greater mobility, safety, and environmental benefits that may result from the widespread use of these vehicles. Both the automotive industry and large tech companies such as Google have been steadily pushing the technology toward self-driving cars by introducing adaptive cruise control, collision avoidance, lane following and environment-awareness into current and future vehicles. The fact that so many advances are being made in technology increases the likelihood of eventual implantation.

The figure shows the levels of automation currently established by SAE. Fully automated vehicles (stage 5 in the SAE categories) are those that are capable of all aspects of driving, including obeying all traffic regulations and controls, wayfinding, and crash avoidance without reliance on special infrastructure such as wireless communication for signals.

<table>
<thead>
<tr>
<th>Levels of Automation</th>
<th>Description</th>
<th>Automated System</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 NO AUTOMATION</td>
<td>Human driver monitors the road</td>
<td>N/A</td>
</tr>
<tr>
<td>1 DRIVER ASSISTANCE</td>
<td>Human driver assists the automated system</td>
<td>SOME DRIVING MDES</td>
</tr>
<tr>
<td>2 PARTIAL AUTOMATION</td>
<td>Human driver monitors the road</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>3 CONDITIONAL AUTOMATION</td>
<td>Human driver monitors the road</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>4 HIGH AUTOMATION</td>
<td>Human driver manages the vehicle</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>5 FULL AUTOMATION</td>
<td>Automated system is in control</td>
<td>SOME DRIVING MODES</td>
</tr>
</tbody>
</table>

Source: SAE International

Levels of Automation. Source SAE International via Vox

(Continued on page 15)
### EXECUTIVE COMMITTEE

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Affiliation/Email/Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
<td>Scott Poska</td>
<td>City of Minneapolis, 612.673.3738, <a href="mailto:scott.poska@minneapolismn.gov">scott.poska@minneapolismn.gov</a></td>
</tr>
<tr>
<td>Vice President</td>
<td>Jeff Preston</td>
<td>Stantec, 651.604.4816, <a href="mailto:Jeff.Preston@stantec.com">Jeff.Preston@stantec.com</a></td>
</tr>
<tr>
<td>Secretary</td>
<td>Jacob Folkeringa</td>
<td>SRF Consulting Group, 763.452.4730, <a href="mailto:jfolker@erfconsulting.com">jfolker@erfconsulting.com</a></td>
</tr>
<tr>
<td>Treasurer</td>
<td>Kevin Peterson</td>
<td>Washington County, 615.430.4330, <a href="mailto:Kevin.Petersen@co.washington.mn.us">Kevin.Petersen@co.washington.mn.us</a></td>
</tr>
<tr>
<td>Directors</td>
<td>Mike Fairbanks</td>
<td>MnDOT, 651.234.7819, <a href="mailto:mike.fairbanks@state.mn.us">mike.fairbanks@state.mn.us</a></td>
</tr>
<tr>
<td></td>
<td>Tyler Krage</td>
<td>Alliant Engineering, Inc., 612.450.9305, <a href="mailto:tkrage@alliant-inc.com">tkrage@alliant-inc.com</a></td>
</tr>
<tr>
<td></td>
<td>Natalie Lindsey</td>
<td>HDR, 763.591.5424, <a href="mailto:Natalie.Lindsey@hdrinc.com">Natalie.Lindsey@hdrinc.com</a></td>
</tr>
<tr>
<td>Past President</td>
<td>Mike Martinez</td>
<td>HDR, 763.591.5442, <a href="mailto:michael.martinez@hdrinc.com">michael.martinez@hdrinc.com</a></td>
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### STANDING COMMITTEES

<table>
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<tr>
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<tbody>
<tr>
<td>Young Member Committee</td>
<td>Jeremy Melquist, Bolton &amp; Menk, <a href="mailto:jeremyme@bolton-menk.com">jeremyme@bolton-menk.com</a></td>
</tr>
<tr>
<td>Professional Development</td>
<td>Ellie Lee, HDR, <a href="mailto:Meekyung.Lee@hdrinc.com">Meekyung.Lee@hdrinc.com</a></td>
</tr>
<tr>
<td>Student Activities and Career Guidance</td>
<td>Ann Fanger, Alliant Engineering, Inc. 612.767.9322, <a href="mailto:afanger@alliant-inc.com">afanger@alliant-inc.com</a></td>
</tr>
<tr>
<td>Communications</td>
<td>Jacob Folkeringa, SRF Consulting Group 763.452.4730, <a href="mailto:jfolker@erfconsulting.com">jfolker@erfconsulting.com</a></td>
</tr>
<tr>
<td>Website</td>
<td>Jonathon Finkelstein, Spack Consulting 888.233.1012, <a href="mailto:jfinkelstein@spackconsulting.com">jfinkelstein@spackconsulting.com</a></td>
</tr>
<tr>
<td>Newsletter</td>
<td>Cortney Falero, SRF Consulting Group 763.452.4806, <a href="mailto:cfalero@erfconsulting.com">cfalero@erfconsulting.com</a></td>
</tr>
<tr>
<td>Membership</td>
<td>Morgan Hoxsie, Kimley-Horn, 612.294.9726, <a href="mailto:Morgan.Hoxsie@kimleyhorn.com">Morgan.Hoxsie@kimleyhorn.com</a></td>
</tr>
<tr>
<td>Technology</td>
<td>Joe DeVore, KLJ Engineering, 651.222.2176 Ext. 6923, <a href="mailto:joseph.devore@kjeng.com">joseph.devore@kjeng.com</a></td>
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### TECHNICAL COMMITTEES

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<tbody>
<tr>
<td>Geometric Design</td>
<td>Thomas Jantscher, HRGreen, 651.659.7769, <a href="mailto:tjantscher@hrgreen.com">tjantscher@hrgreen.com</a></td>
</tr>
<tr>
<td>Intersection Traffic Control</td>
<td>Tyler Krage, Alliant Engineering, <a href="mailto:tkrage@alliant-inc.com">tkrage@alliant-inc.com</a></td>
</tr>
<tr>
<td>ITS</td>
<td>Todd Olsen, Alliant Engineering, 612.720.0811, <a href="mailto:tolson@alliant-inc.com">tolson@alliant-inc.com</a></td>
</tr>
<tr>
<td>Pedestrian and Traffic Safety</td>
<td>Caitlin Wotruba, Kimley-Horn, <a href="mailto:caitlin.wotruba@kimleyhorn.com">caitlin.wotruba@kimleyhorn.com</a></td>
</tr>
<tr>
<td>Planning Methods and Applications</td>
<td>Steven Ruegg, WSP Parsons Brinckerhoff, <a href="mailto:ruegg@pbworld.com">ruegg@pbworld.com</a></td>
</tr>
<tr>
<td>Traffic Operation and Maintenance Discussion Group</td>
<td>Adam Bruening, Washington County, 651.430.4398, <a href="mailto:adam.bruening@co.washington.mn.us">adam.bruening@co.washington.mn.us</a></td>
</tr>
<tr>
<td>Simulation and Capacity Analysis</td>
<td>Joe DeVore, KLJ Engineering, 651.222.2176 Ext. 6923, <a href="mailto:joseph.devore@kjeng.com">joseph.devore@kjeng.com</a></td>
</tr>
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</table>

### STUDENT CHAPTERS

<table>
<thead>
<tr>
<th>University/State</th>
<th>President/Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Minnesota</td>
<td>Josh Tarr, <a href="mailto:tarrx026@umn.edu">tarrx026@umn.edu</a></td>
</tr>
<tr>
<td>North Dakota State University</td>
<td>Niloy Saha, <a href="mailto:niloy.saha@ndsu.edu">niloy.saha@ndsu.edu</a></td>
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</table>

### MIDWESTERN ITE

<table>
<thead>
<tr>
<th>Position</th>
<th>Chair/Email/Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwestern ITE District Director</td>
<td>John A. Davis, Ayers Associates, 262.522.4905, <a href="mailto:davisj@ayersassociates.com">davisj@ayersassociates.com</a></td>
</tr>
<tr>
<td>Midwestern ITE District NCITE Officer</td>
<td>Mike Bittner, KLJ, 701.271.4879, <a href="mailto:mike.bittner@kljeng.com">mike.bittner@kljeng.com</a></td>
</tr>
</tbody>
</table>
Scott Poska, 2018 NCITE President

I am excited to begin my term as 2018 NCITE President and lead the organization which has been such a big influence in my career! This is an enormous year for our region with the spotlight on hosting Super Bowl LII as well as the MWITE/GLITE/ITE Annual Meeting and Student Leadership Summit at the University of Minnesota! Our transportation system will be put to the test as we welcome many visitors to our region this year.

On top of these large events, our region is serving as a winter weather testbed for a level 4 autonomous bus! NCITE members were invited to experience MnDOT’s EasyMile autonomous bus in late 2017 at MnROAD in Monticello. Public rides on the bus were available on Nicollet Mall during Super Bowl Live. In addition to testing operations in winter weather, the pilot project intends to identify challenges and strategies for safe operation, prepare mobility services, identify the infrastructure needed for autonomous vehicles, enhance partnerships between the state government and the autonomous-vehicle industry, and to increase Minnesota’s influence in the industry. What an exciting time to be a transportation professional in our Section!

The 2018 Executive Board has met once and has identified a number of initiatives to pursue for the year. Last year’s Section Meeting in Fargo, North Dakota was such a success that we are working on arrangements for another non-Twin Cities metro Section Meeting. This is a wonderful way to connect with our members outside of the Twin Cities region. We are also planning to host an Engineering Ethics training event in advance of this year’s PE licensure renewal deadline. Stay tuned on announcements for both of these events. In addition to Board activity, several technical committees have had brainstorming meetings for upcoming meeting topics. Finally, the January section meeting was a success with over 50 in attendance to hear about MnDOT’s Transportation Systems Management and Operations Plan.

I invite each of you to help make 2018 a memorable year in NCITE by attending Section meetings, participating in committees, volunteering at the Student Leadership Summit, and networking at the MWITE/GLITE/ITE Annual Meeting!

I’d like to close by introducing the 2018 Executive Board and welcome all of you to contribute ideas that can make our section stronger.

Vice-President: Jeff Preston, Stantec
Secretary: Jake Folkeringa, SRF Consulting Group
Treasurer: Kevin Peterson, Washington County
Director: Michael Fairbanks, MnDOT
Director: Tyler Krage, Alliant
Director: Natalie Lindsey, HDR
Past President: Mike Martinez, HDR

Scott Poska
2018 NCITE President
2018 Minnesota Transportation Conference
February 27-March 1, 2018
Verizon Wireless Center | Mankato, MN

Minneapolis 18
Annual Meeting and Exhibit
August 20 – 23

2018 ITE Annual & Midwestern District Meeting
August 20-23, 2018
Hilton | Minneapolis, MN

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

NCITE Calendar:
http://nc-ite.org/calendar.php
January 1, 2018

Dear Voting Member:

The future of the Institute of Transportation Engineers (ITE) and the direction and course of its programs and activities are greatly influenced by the leaders you elect to represent you. The ITE Nominating Committee has nominated the following candidates for the offices of International President and International Vice President for 2018:

For International President: **BRUCE BELMORE, P.Eng., PTOE, AVS (F)**

For International Vice President: **JASON CRAWFORD, P.E. (F)**
**RANDY MCCOURT, P.E., PTOE (F)**

The Election Ballot will open on February 14, 2018 at 12:01 a.m. ET and will close at noon ET on Thursday, March 15, 2018. Written consent to hold office, if elected, has been received from each candidate. The publication of this notice complies with Article V of the ITE Constitution.

I encourage you to become familiar with the qualifications and visions of the candidates and exercise your right to shape ITE’s future by casting your vote to select the 2018 ITE International President and International Vice President. The enclosed flyer has a brief resume and statement from each of the candidates. You can learn more by visiting the candidate websites at www.ite.org/candidates and by attending either the virtual Town Hall on January 30, 2018 at 12:00 p.m. or the Facebook Live event at 2:00 p.m. ET.

Please note, the length and time frame of the 2018 International President and Vice President campaign and balloting period has changed from previous years as a result of the Constitutional Amendments passed in 2017. New campaign conduct rules, for the candidates and ITE members, have been established by the Nominations Committee and are available on the ITE website at www.ite.org/candidates. I encourage all members to take a few minutes to become familiar with these new time frames and rules. With the early election of candidates, members will be provided with increased electronic and virtual candidate information. In lieu of campaigning at District and Section meetings, the election will conclude in time for the successful candidates to attend these meetings as International President-elect and Vice President-elect.

Once you have decided for whom you wish to vote, you may vote either by e-ballot or by mail. To vote by e-ballot starting February 14, 2018, 12:01 a.m. ET, eligible voters will be sent an e-mail with a personalized URL enabling them to vote. You must cast your e-ballot no later than noon ET on March 15, 2018. You will receive an e-mail confirmation of your vote. If you wish to vote using a mail ballot, you must request a ballot, in writing, no later than February 18, 2018 by e-mailing Marianne Saglam at msaglam@ite.org. Your ballot must be received at ITE no later than noon ET on March 15, 2018.

Your vote will remain confidential. The election results will be announced on the ITE website on March 20, 2018 and in the April 2018 issue of ITE journal.

Sincerely,

Jeffrey F. Pantall, PE.
ITE Executive Director and CEO
Like you, I am passionate about transportation and ITE. My passion has guided me for 26 years to develop a strong, proven leadership record through ITE Student Chapter, Section, District, and most recently, my International Board of Direction service completed in 2017. I am also a proud, inaugural Leadership/ITE graduate.

My service to ITE has been through listening, collaborating, promoting fairness, and mentoring, focused towards serving both the needs of our members today and the next generation of transportation professionals. I was fortunate to serve on the ITE International Board of Direction at a transformational and transitional time that included hiring a new Executive Director, improving member communication, developing and passing constitutional amendments, releasing major publications, and developing partnerships with other associations.

I wish to continue my service to you, our membership, by working to complete the many initiatives under way and building on those successes into the future. To accomplish my vision, I am embracing four themes to LEAD our association.

**Leadership** – I will build on the success of Leadership/ITE and Student Leadership Summits by delivering leadership training locally through Districts and Sections. I will advance efforts to educate and encourage our District and Section leaders on how to be an active voice for local transportation issues. Lastly, I will work to establish a strategic vision panel to advise the International Board on issues expected to impact our profession over the next 10 to 15 years.

**Engagement** – I will seek ways to engage our members at all organizational levels to both realize and seize the value of ITE membership. Being a volunteer-driven association, we need to improve the way we match passionate and energetic members with volunteer opportunities. Finally, we should work to expand our global membership by re-engaging our former student chapter members now back home in countries outside North America.

**Alignment** – I value the strength and connections that our vibrant sections and chapters offer. At the same time, we must ensure that our association’s overall strategic direction is reflected in District/Section/Chapter initiatives and activities. I intend to increase our efforts to introduce and persuade all professionals that influence and impact transportation to join and be active in our association and to proudly represent their profession. We can improve information sharing between headquarters and its districts and sections to facilitate member recruitment and follow-up.

**Diversity** – I welcome ideas that challenge the norm and offer different perspectives. I believe we must attract and include in our leadership ranks greater professional, ethnic, and gender diversity that better reflects our general membership. I actively sought to remove barriers impeding membership growth through constitutional amendments and I will continue building on these efforts to grow the ITE membership and help ensure it represents the diversity of our strong, passionate community of transportation professionals.

I greatly value my ITE membership experience and network. I thank my mentors for their encouragement and support that ignited my desire to serve.

Please join me as we work together to serve, to LEAD, and to move our profession forward.
My journey with ITE has been a road traveled for more than 40 years. The people I have met have inspired me personally and professionally to serve others and share industry knowledge both nationally and internationally. My commitment is that I will serve as an ambassador to ITE—an active listener to our members’ needs, seek feedback, and hold the dignity of our profession to the highest standard.

Vision: To advance our volunteer members’ careers through meaningful ITE experiences in leadership, partnerships, and technical expertise.

Our members are why we exist and the nucleus in which we serve. We are dawning a new era in the transportation profession. Our industry has radically evolved in ITE’s 90 years. Each transformation has been exciting, allowing us to implement our expertise while playing a pivotal role in making a difference in our communities. My quest to serve as ITE International Vice President is focused serving the needs of students, public agencies, active and retired members, and international partners through:

1. MEMBER DEVELOPMENT: Deliver high value learning and networking experiences through engagement, action, and implementation. My primary goal is to facilitate a balance of listening to our membership with the need for action and implementation to advance the 21st century transportation experience. This includes such topics as advances in trip/parking generation, greater access to MUTCD best practices, before/after studies, and understanding of transportation equity.

2. INDUSTRY OUTREACH: Today, we are challenged as a profession to work collaboratively to help identify the future of transportation. This requires us to go further in developing partnerships with partner organizations. As smarter mobility evolves, we must work together as a unified transportation profession between public, private, industry, vendors, and academic experts.

3. LEADERSHIP ADVANCEMENT: With emerging voices and disruptive technology, it’s critical for ITE leadership to manage change affecting our members and their careers. This means an ITE that serves as a meaningful resource to our members by staying at the forefront of emerging technology; providing mentorship and guidance to our members; active involvement with students studying transportation engineering; and fostering career advancement. We are the ITE that is invested and committed to giving back to each member and our industry.

You will find more on each of these topics on my website www.Randy4ITE.com with platforms to share your thoughts, ideas, and opinions on how we can deliver high value to our membership and their employers.

There is nothing I, and our members, love more than waking up to new challenges, such as vision zero, autonomous vehicles, or complete streets. These are the opportunities that the transportation industry creates for us daily. As mobility experts, we can affect this change. As ITE International Vice President, I will seek active engagement from our members to ensure we are delivering on the future that transportation innovation has for our communities.

This is an exciting time in our industry as it is changing at a record-setting pace. Join me in the dream of a new transportation future that involves you.
Who am I? I am a devoted transportation professional with more than 25 years of experience and I am passionate about ITE. Every day through my work, I strive to make our communities a better place to live, work, and play. I am in a great position to positively impact the future of ITE. I have served ITE at the Section, District, and International levels. My involvement includes recently completing a three-year term on the International Board of Direction. From this experience, I have become familiar with the issues, challenges, and opportunities facing ITE. Further, I believe in giving back to the engineering community as an adjunct professor at the University of Regina. I intend to build upon the hard work and initiatives already started, and continue to develop ITE as a leading organization in operating and delivering services to members.

Goals. I will focus on the following five areas:

1. **Communication** – we need to reflect how members like to communicate and receive information today. Whether it’s through ITE Community, social media platforms, or cloud-based document sharing, we need to ensure that information is timely, relevant, and readily accessible by our members in a broad range of formats.

2. **Collaboration** – we need to work more closely with other transportation organizations to cooperatively develop technical resource material. These other organizations bring different perspectives and skills. By sharing knowledge and resources, we can produce technical reference documents faster, at a shared cost, and with full recognition of our members’ contributions.

3. **Knowledge** – we need to look at new funding mechanisms for producing technical documents and better ways to recognize the contribution of our many outstanding volunteers. We also need to streamline the approval and release of technical documents so that valuable resource materials are in our members’ hands quicker.

4. **Growth** – we need to grow our membership to remain a healthy, vibrant organization. Key to this growth and our long-term stability is developing new student chapters and encouraging highly active sections. We also need to start new sections outside of North America where there is growing interest in ITE membership. This allows us to share more ideas and experiences from around the world.

5. **Member development** – we need to develop the skills of members, including technical skills, soft skills, and leadership skills. We need well-rounded transportation professionals in our industry; ITE can lead through both online training and face-to-face opportunities for skills growth.

Here’s an Idea. I would like to see members who are unable to attend the Annual Meeting and Exhibit in person be able to access technical presentations online through a video-on-demand system. We have the ability to broadcast the presentations—potentially reaching nearly 15,000 members with meeting content rather than just the 1,000 or so who currently attend. More members would gain needed continuing education credits and ITE would reach a broader audience with conference content.

I have the desire to see ITE grow and succeed. Simply, I have something to contribute and am in a position to serve.
Get to know the 2018 board!!

Scott Poska, 2018 NCITE President
Job Title and Employer: Senior Professional Engineer, City of Minneapolis Traffic and Parking Services
Past Work: SRF Consulting Group Inc.
Education: BS Civil Engineering, Iowa State, 2004
Where You Live: Plymouth, MN
Family: Wife, Christy, Daughters, Kaitlyn (6) and Rebecca (3)
Hometown: Portage, MI. I moved to suburban Chicago when I was 13.
Hobbies: Avid hockey fan and player; I enjoy outdoor adventures/trips including hiking, backpacking, canoeing, fishing, camping, mountain biking; homebrewing; grilling; photography; and being a dad to my two girls
Interesting Facts:
  • I’ve never lived in a city at the same time the local team has won the Stanley Cup. I hope this changes soon!
  • In the 30 years I’ve been a hockey player, I’ve scored a goal six different ways: even strength, power play, shorthanded, penalty shot, empty net, and own goal.
  • I’ve traveled to 9 countries.
TV Show: Top Gear (UK) and Gold Rush
Favorite Food: Smoked ribs or pulled pork
Favorite Car: Any red Ferrari
Desired Superpower: Time travel
Best Vacation: They are all the best: the more planning that goes in, the better they are!
2017 trips included Washington DC, Teton and Yellowstone NP, BWCA MN, Toronto Canada, Glacier NP, and Duluth MN.
Top 5 Minnesota Taprooms: Fulton, Utepils, Big Wood, 56, and Surly.

Jeff Preston, 2017 NCITE Vice President
Job Title and Employer: Senior Engineer, Stantec
Past Work: City of Woodbury – Engineering Dept.
Education: BS Civil Engineering – Iowa State University
Where You Live: Blaine, MN
Family: Dina, Claire (10), Noah (8), Lilly (4)
Hometown: North St. Paul, MN
Hobbies: Coaching kids soccer/football/basketball, Golf, Vikings and Timberwolves games
Favorite TV Show: Game of Thrones, too much Discovery/History Channel.....
Favorite Food: Grilled with cold beer
Favorite Book: Vince Flynn books
Best Vacation: Hawaii / Italy / Disney with the Kids
Get to know the 2018 board!!

**Jake Folkeringa, 2018 NCITE Secretary**

**Job Title & Employer:** Senior Associate, SRF Consulting Group  
**Past Work:** SEH (intern), WSN (intern), Subway Sandwich Artist!  
**Education:** Bachelor of Civil Engineer, University of Minnesota, 2008  
**Where You Live:** Elk River, MN  
**Family:** Rachel (Wife)  
**Pets:** Two Dogs (Dyno and Nala)  
**Hometown:** Brainerd, MN  
**Hobbies:** Hunting, fishing, and anything with my dogs  
**Interesting Facts:**
- I spend a lot of time with my dogs, two Nova Scotia Duck Tolling Retrievers. We are active in hunting, agility, obedience, and conformation (show).  
- I am a lover of all things Google.  
- I was a trumpet player in the University of Minnesota Marching Band.  
- I’ve sung as a tenor in multiple barbershop quartets.  
**Favorite Food:** Anything as long as I don’t have to make it  
**Favorite Restaurant:** Raising Cane’s – best chicken fingers meal hands down!  
**Instruments Played:** Trumpet, piano, guitar, drums, (does recorder count?)

**Kevin Peterson, 2018 NCITE Treasurer**

**Job Title & Employer:** Engineer II, Washington County Public Works  
**Past Work:** SEH  
**Education:** NDSU  
**Where You Live:** Stillwater, MN  
**Family:** Wife (Meghan), Son (Felix, 4), Daughter (Lucy, 2)  
**Pets:** Dog (Mollie, 12), Herb (Robotic Vacuum)  
**Hometown:** Hastings, MN  
**Hobbies:** Travel, Family Time, Getting Outside  
**Interesting Facts:**
- I skipped a Chemistry test in college to road trip to the Salt Lake City Olympics  
- I honeymooned in Peru (everyone should see Machu Pichu)  
- My family and I are going to Costa Rica this winter  
- I’ve never seen the movie Titanic  
**Favorite Music:** ABC (Anything but Country)  
**Favorite Food:** Pizza Rolls  
**Favorite Restaurant:** Fogo de Chao  
**Favorite Book:** Hillbilly Elegy  
**Favorite Car:** Tesla  
**Desired Superpower:** Ability to function on very little sleep  
**Biggest Accomplishment:** Hopefully I top this at some point, but I won a Paper, Rock, Scissors tournament at a bar in college  
**Best Vacation:** Honeymoon in Peru
Get to know the 2018 board!!

Michael Fairbanks, 2018 NCITE Director
Job Title & Employer: Metro Signal Operations Engineer (MnDOT)
Past Work: Subterranean Engineering, MnDOT
Education: Bachelors of Civil Engineering, University of Minnesota
Where You Live: Coon Rapids, MN
Family: Wife Colleen, Daughter Jen, Son Jason and Son-in-law Dylan
Pets: (2 Dogs) Erin and Zoey
Hometown: Saginaw, MN
Hobbies: Walking (My goal is to get 20,000 steps a day), Fishing, most anything outside
Interesting Facts:
• I walked every street in Coon Rapids during the Month of October in 2011.
• I still play fantasy football.
• I like taking cruises and have one planned for the end of February.
• I have a Minnesota Beer Passport and have visited over 90 breweries in the State.
• When eating out I like to try something different every time.
Favorite TV Show: Big Bang Theory
Favorite Music: Eagles
Favorite Food: Mom’s homemade Lasagna – with Cole Slaw
Favorite Restaurant: Mr. Steak, The Anchor Fish and Chips, and La Casita
Favorite Book: Harry Potter
Favorite Car: 1969 Chevrolet Camaro
Biggest Accomplishment: Getting my Civil Engineering Degree (Albeit @ the age of 37).

Tyler Krage, 2018 NCITE Director
Job Title & Employer: Traffic Engineer at Alliant Engineering
Past Work: Intern at U of M Parking and Transportation Services, then Alliant Intern
Education: BS in Civil Engineering from University of Minnesota, 2014
Where You Live: Whittier, Minneapolis
Family: Wife, Meredith
Pets: Rab-Dad to 2 Netherland Dwarf Rabbits, Pepper and George
Hometown: Houston, MN
Hobbies: Live Music, Rock Climbing, Camping, Biking, Homebrewing
Interesting Facts:
• I grew up on an elk farm.
• I dated a foreign exchange student in High school and got to stay in Germany with her family for 2 weeks after graduation. We broke up on day 8.
• I once hit 2 deer with my car in 24 hours.
Favorite TV Show: Modern Family and Chopped
Favorite Music: All over, but more Alternative. Currently trying to kick a bad Steely Dan habit.
Favorite Car: 1992 Geo Prizm
Instruments Played: Trombone in High School and dabble in drums
Best Vacation: Road trip to Austin. Texas, not MN.
MEET THE 2018 EXECUTIVE BOARD

Get to know the 2018 board!!

**Natalie Lindsoe, 2018 NCITE Director**

**Job Title & Employer:** Traffic EIT at HDR since June 2014  
**Past Work:** Intern/student worker at: Alliant Engineering (2013/2014) and Scott County Public Works (summer 2013)  
**Education:** Bachelors of Civil Engineering from University of MN – Twin Cities, May 2014  
**Where You Live:** Maple Grove, MN  
**Family:** Engaged to be married in fall of 2018 to my fiancé Tom and no kids yet. I have two sisters who live nearby; my identical twin and a younger sister. My dad and his wife’s family recently moved to Seattle and my mom and her husband’s family travel between MN and Israel.  
**Pets:** Our only pet is a 1-year old Siberian cat, Maya, who is extremely spoiled.  
**Hometown:** Shoreview, MN  
**Hobbies:** Playing soccer, going camping, visiting breweries, going on long walks, and making home-made cards.  
**Interesting Facts:**  
- I was born a surprise identical twin on Friday the 13th, and consider that day to be lucky.  
- I wanted to go to the U of M ever since I joined the Twin Study when I was 11 years old.  
- I didn’t know what civil engineering was when I first started college.  
- Despite running into everything, I have never broken a bone or had a bloody nose.  
**Favorite Food:** Bananas – need that potassium!  
**Desired Superpower:** Being able to teleport  
**Most Embarrassing Moment:** Falling through a window during the high school band trip to Italy due to clumsiness – in all fairness, the window was extremely thin!  
**Instruments Played:** Flute  
**Best Vacation:** Any trip planned by my personal trip planner/travel partner, Tom.

ITE LOL

![Comic Strip](image-url)
The Younger Member Committee has some exciting events lined up for 2018.

Tentative 2018 YMC Schedule:

**Feb 28**th **-** Lunch & Learn for students on U of M Campus  
**March** - Poker Night  
**April** - NCITE & ITSO joint event  
**June** - Bike Tour  
**July** - NCITE Summer Social  
**August** - Student Summit after hour activities (Light rail bar crawl & Coffman bowling night)  
**September** - Service Event (Second Harvest or FMSC)  
  Lunch & Learn for students on U of M Campus.  
**October** - Gopher Tailgate & PTS Tour  
**November** - NCITE Annual Meeting

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 Jeremy Melquist (jeremyme@bolton-menk.com).

New Chair (formerly co-chair) & New co-chair of the YMC:

Jeremy Melquist – Chair  
Bolton & Menk  
jeremyme@bolton-menk.com  

Ellie Lee – Co-Chair  
HDR  
Meekyung.Lee@hdrinc.com
ITSO is excited to announce a new group of officers for 2018:

President - Josh Tarr
Vice President - Jack Olsson
Secretary - Jhenyffer Oliveira
Treasurer - Sarah Dillon
Webmaster - Cameron Valuch
Officers at Large - Nina Myszkowski and Alisha Radstake

We have expanded our officer base in preparation to plan the upcoming Student Leadership Summit at the University of Minnesota. Planning is already underway and more information will be available soon via our Facebook page (@2018SLS). We are in need of sponsors and volunteers to make the event a success. Please contact planning committee chair Jackie Nowak (nowak123@umn.edu) if you are interested in getting involved.

In addition to putting together our successful proposal to host the Student Leadership Summit, ITSO hosted Graduate Engineers from MnDOT's Autonomous Bus Pilot Project for a Transpo Talk seminar and sponsored a tour of Metro Transit's Light Rail Maintenance Facility. The photo shows ITSO members in the Light Rail Maintenance Facility.
Connected vehicles are those that have 1 or 2-way communications capabilities with surrounding roadway infrastructure and/or other vehicles. Ultimately, autonomous vehicles will probably incorporate both connected and automated features.

From a planning standpoint, autonomous vehicles represent a fundamental change in the way we all travel. This includes:

- **Vehicle Availability:** A fleet of AVs could serve as ubiquitous taxis, like current Transportation Network Companies such as UBER or Lyft, but without drivers. “Mobility on Demand” as it is called, could remove the need for private auto ownership for many. With more vehicle availability, will trip-making increase?

- **Travel Cost:** The ultimate cost of using AVs is unclear at this time. Many factors contribute to the cost, including the evolution of electric vehicle technology, durability of AVs, marginal costs for transport, the price of electricity and the cost of building a vehicle heavily dependent on solid state electronics – will the cost of these elements drop as we have seen the cost of memory chips decline? Currently, cutting edge automated vehicles such as the Tesla models are outside the price range of most consumers.

- **Transit use:** AVs could enhance the use of some transit services by providing more convenient and broader access to transit stations, without dependence on feeder-bus routes or the need for park and ride lots. Alternatively, AVs could compete with transit services by providing better service for those who otherwise do not own a car. Again, the price of travel will have a pivotal role in determining how attractive AV use will be.

- **Roadway capacity and congestion:** AVs are capable of more efficient driving behavior on roadways, and this could lead to increasing operational capacity. Shorter headway tolerance, and better queue anticipation would improve the level of service, primarily on our freeways. Connected vehicles offer the potential for signalized intersections to operate more efficiently as well.

- **Zero-passenger vehicles:** Without the need for a driver, users can send AVs home after their arrival at work or shopping, which would greatly reduce the need for parking. It is estimated that there are currently three non-residential parking spaces for each vehicle in the US. Freeing this land use from parking would provide the opportunity to increase densities, especially in center cities. On the downside, driverless vehicle trips will add significantly to the traffic load in our system, and may overcome any capacity improvements realized because of AV technology.

- **Accessibility:** Autonomous vehicles would increase the mobility of persons otherwise unable to use a conventional car. This includes disabled, elderly, or even children. This increased mobility might increase independence and employment opportunities for these populations.

- **Value of time:** Using an AV will reduce the stress of driving for passengers. This may translate to longer trips to work, as the time spent in the vehicle is not as onerous and could be used more productively. Longer work trips may translate into more sprawl as household locate further from their workplaces.

Many of these effects on traveler behavior can be modeled using current travel demand models. In the Twin Cities, the new Activity-Based model (ABM) has been used to test changes in travel cost, value of time, vehicle availability, capacity enhancement and the effect of driverless vehicles. The ABM is particularly suited to this kind of analysis since it treats each household and each person as a discrete unit, with specific trip choices and constraints on time and distance throughout the day. This was recently applied to assist the Metropolitan Council in developing its first policy on automated vehicles.
By adjusting key variables (value of time, cost, auto availability, roadway capacity, and vehicle behavior) the model can estimate the effect on daily travel patterns for the entire region. These travel patterns, in turn can be used to estimate movements and timings of driverless vehicles. Other research has focused on specific driving behavior of AVs using simulation models that estimate how automated vehicles might behave compared with conventional driver-controlled vehicles.

There are many remaining uncertainties regarding how AVs and AV use will evolve. However, it will be a gradual process, as the industry advances the technology from research to testing to broad implementation. In this time of transition, estimated to be between 20 to 30 years, our society will have time to adapt to this new transportation paradigm, and planners will gain valuable insight into how travelers respond to new transportation opportunities. These insights should be used to improve our forecasting models, allowing planning for AVs to be more accurate and useful to decision-makers.
Geometric Design Technical Committee
Committee Chair: Thomas Jantscher - tjantscher@hrgreen.com
Recent Agenda Items: Viewing “We Are the Champions: Roundabouts of the Future” presentation from the Joint ITE/CITE 2017 Annual Meeting.
Future Agenda Items: Presentation of RCUTs (Restricted Crossing U-Turn Intersection) with discussion.
Next Meeting: TBD

Intersection Traffic Control Technical Committee
Committee Chair: Tyler Krage - tkrage@alliant-inc.com
Recent Agenda Items: Diverging Diamond (DDI) Forum (December 2017), Annual Brainstorming Session for 2018 Meeting Topics and Locations (January 2018)
Future Agenda Items: Pedestrian Beacon & Signal Forum, with an update on the latest RRFB developments (Joint Meeting with Ped Safety Committee)
Next Meeting: Wednesday, February 14th, 8:00-9:30 a.m., MnDOT Water’s Edge Conference Room C

ITS Technical Committee
Committee Chair: Todd Olson - tolson@alliant-inc.com
Recent Agenda Items: Autonomous Bus Tour at MnROAD
Future Agenda Items: MnPASS EASy project hosted by Erik Minge, Discussion about the implications of Connected and Autonomous Vehicles
Next Meeting: Tuesday April 3rd, 1:00pm – 3:00pm, MnDOT Water’s Edge, Conference Room A

Pedestrian and Traffic Safety Technical Committee
Committee Chair: Caitlin Wotruba - caitlin.wotruba@kimley-horn.com
Recent Agenda Items: Topic brainstorming session
Future Agenda Items: Joint meeting with ITCC on RRFB developments
Next Meeting: Wednesday February 14th, MnDOT Water’s Edge.

Planning Methods and Applications Technical Committee
Committee Chair: Steven Ruegg - ruegg@pbworld.com
Recent Agendas Items: Developed an outline for a report on ABM Best Practices
Future Agendas Items: Sub Committee writing responsibilities for the ABM Best Practices document.
Next Meeting: Tuesday, February 13th, 12:00-1:00 a.m., Location TBD

Traffic Operation and Maintenance Discussion Group
Committee Chair: Adam Bruening - adam.bruening@co.washington.mn.us
Recent Agenda Items: State purchasing contracts – cabinets and controllers, Truck crane operator’s certification New CDL requirements, Maxview software, ACT signal cabinets
Future Agenda Items: TBD
Next Meeting: Location TBD (First Wednesday of each month)

Simulation and Capacity Analysis Technical Committee
Committee Chair: Joe DeVore - joseph.devore@kljeng.com
Recent Agenda Items: Paul Czech presented on MnDOT’s Experience with new Streetlight Data contract in September.
Future Agenda Items: TBD
Next Meeting: Tuesday February 20th, 1:00pm – 3:30pm, Waters Edge room 403.
Twin Ports Interchange (TPI)
Thomas Jensen, PE | Alliant Engineering Inc.

The Alliant Team, including Isthmus Engineering, was selected by MnDOT District 1 through the General Engineering Consultant (GEC) pre-construction contract to provide preliminary engineering services for the Twin Ports Interchange (TPI), previously known as the “Can of Worms.” TPI primarily consists of the system interchange between Interstates 35 and 535, and provides service level access to US Highway 53. The interchanges of I-35 and 27th Avenue West, and I-535 and Garfield Avenue, are near TPI. The three interchanges together form the project study area for the TPI project.

Located immediately adjacent to the harbor, TPI needs to accommodate freight traffic to and from the ports of Duluth and Superior. The Highway 53 connection is important to the local community and provides potential shipping routes to the west out of the ports.

There are a total of 33 bridges within the existing project area, many of which were constructed in the late 1960’s and early 1970’s and nearing the end of their design life cycle. MnDOT has had to invest significant funds in recent years for emergency bridge repairs which require closures, greatly impacting traffic in the region. Of those 33 bridges, 16 are weight restricted and seven are non-redundant. As a result, many of the oversize and overweight loads to and from the ports cannot travel through the existing interchange and must use local roads. Additionally, the existing interchange suffers from many geometric deficiencies including left exits, blind merges, and inadequate acceleration lengths which pose safety issues.
Alliant’s involvement started with brainstorming conceptual alternatives for a new interchange that would address many of the shortcomings of the existing interchange. The kick off meeting for the project was November 9th, 2016 which happened to be the day after the Presidential election. Within days of the project kick off meeting, a solicitation of FASTLANE grant applications was announced. Alliant assisted in the development of MnDOT’s application which received positive feedback during the review process. However, with a new President came a new administration and a new grant program: INFRA. All previous FASTLANE grant applications were returned, and another INFRA grant application had to be prepared. MnDOT is currently waiting to see if TPI will be awarded funding through the program.

Meanwhile, Alliant assisted MnDOT in refining and evaluating additional concepts. Two Geometric Workshops were held, attended by MnDOT District 1, MnDOT Central Office, MnDOT Bridge, FHWA, and the City of Duluth. A total of 15 concepts were identified and after a high-level review, four were selected for further refinement and evaluation. Alliant is currently preparing Staff Approved Layouts for two concepts which are expected to be completed Spring of 2018.

As the preliminary design process progressed two additional concepts were advanced. The replacement of the Highway 53 bridges would now occur as part of the TPI project to address degradation issues. In addition, the construction of Courtland Street on the east side of I-35 was included to provide an alternate route during construction, while also providing a local road connection to Canal Park from the 27th Avenue interchange. Significant traffic modeling has been completed to support the development and evaluation of the layouts. VISSIM models were prepared for the no-build and two build concepts. The traffic analysis was used to refine the concepts and provide data for evaluation.

MnDOT recently requested Letters of Interest (LOI) from the contractor and engineering communities for the final design and construction of the TPI project. With a tentative begin construction date in 2019, MnDOT has decided to utilize the Construction Manager/General Contractor (CMGC) alternative delivery method for the project. MnDOT is currently planning on a four-year construction duration and an estimated cost of $204 million.
I have been there and so have you.

Waiting on the side street in a long queue when the traffic signal cycles for just a few vehicles is frustrating.

Unwarranted traffic signals can present challenges to drivers in the form of decreased safety and/or poor operations. Unfortunately, agencies often unexpectedly determine a signal no longer meets warrants during the planning phase of a roadway project, laying the foundation for a potentially long and difficult path of public engagement ahead.

We wrote about the challenges of removing traffic signals in the Summer 2015 INCITER (Volume 32, Number 3) edition based on a project in South St. Paul, and have since put that approach to the test on a recent project in collaboration with MnDOT. (http://nc-ite.org/news.php)

The Project
Trunk Highway (TH) 12 is the main thoroughfare through the City of Litchfield, serving local and regional trips (think Willmar to Minneapolis). With storm sewer capacity an issue along with aging infrastructure; a portion of this roadway will be reconstructed in 2020, including two existing traffic signals. One signalized intersection in particular has been the focus of months of debate, analysis, and planning between the state and many local groups.

As part of the standard MnDOT Intersection Control Evaluation process, traffic engineers concluded the existing signal was no longer justified. Presumably, traffic volumes have declined since installation in the 1970s due to changes in land use and traffic circulation through town.

In this downtown environment, pedestrian accessibility crossing TH 12 (carrying approximately 10,000 vehicles per day) is important, therefore simply replacing the unwarranted traffic signal with side street stop control alone was not an option. The project team developed alternatives for improving the pedestrian crossing with variations of enhanced treatment flasher systems and pedestrian hybrid beacons. Based on anticipated operations, site conditions, and cost factors, the team’s recommendation was to proceed with the installation of a staged crossing with pedestrian flashers, allowing pedestrians to cross the highway one direction of traffic at a time.
However, before the city granted municipal approval of the project and before plans were set in stone, the city and other community groups were in need of further evidence confirming the analysis presented. It is one thing to explain, from an engineering perspective, how the removal of the unwarranted signal would improve safety and delay, but it is completely different to show this in action. Even with an intense public involvement effort—which followed our approach of managing the message, arming ourselves with the facts, accepting and responding to public concerns, and looking for additional opportunities—the public needed more. They needed a test.

The Test
The project team developed plans for a three-month test, which would mimic the proposed design and give local drivers and pedestrians a flavor of how the treatment would function. The test was two-pronged: one goal was to provide an experience for concerned local residents where they could more tangibly understand the recommended alternative; the second goal was to gather data to validate the traffic analysis and further inform the project team and local stakeholders. Both goals focused on the pedestrian crossing, the proposed side street stop control, driver behavior, and other traffic measures of effectiveness.

To date, data derived from the test has been used at public meetings to further provide basis for the project team’s recommendations.

Results
The test also included a concurrent survey promoted through numerous sources including social media, local media, and direct email distribution lists of people using this corridor. Results from the survey are mixed; however, the majority of respondents voiced concern with the removal of the traffic signal during the test. The local council has not taken action to date by formal resolution. Formal action is expected by spring.

In summary, determining a signal no longer meets warrants is by far the easiest step in the signal removal process. When encountering this situation on a project, plan for an arduous public involvement process and go in with an open mind. Don’t be afraid to use testing and data collection as tools at your disposal. The saying goes a picture is worth a thousand words; I would argue the ability to experience something is worth that tenfold.
Minnesota’s Design-Build Contracting Method Invites Innovation
Spotlight on Use of Tunnels in Place of Steel Bridges

Joe Weaver, PE | TKDA

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

Low-maintenance concrete tunnels, substituted for superelevated curved steel bridges, were constructed in place. This eliminated the need for intermediate bridge supports within county and railroad right-of-way. Source: Lunda Construction

The final 3-mile segment of Trunk Highway 610, a vital link in the Minnesota Department of Transportation’s highway network in the Twin Cities northern suburbs, was completed in 2017 using the department’s innovative design-build best value procurement process. TKDA, a major participant on the Lunda Construction Company’s design-build team, led the design.

Design-build, authorized by the Minnesota Legislature in 2001, has been used over 30 times since then. It helps the State maximize the value received per dollar on complicated projects. The TH 610 project was no exception.

The $81.5 million project connected the former westerly terminus of TH 610 to I-94 in Maple Grove, Minnesota. In addition to approximately 3 miles of new four-lane freeway, the project was to include a full-access interchange at Maple Grove Parkway, nine bridges, the extension of 105th Avenue, more than 3,000 feet of new frontage road, and two steel bridges to carry TH 610 over the BNSF railroad and eastbound (EB) Hennepin County CSAH 81.
Major team players—Lunda Construction Company, TKDA, Shafer Contracting Company, and Hardrives on the TH 610 project—worked together early on to explore cost-effective alternative technical concepts that likely would not have been considered under a standard design-bid-build process. One of those concepts involved the replacement of the two superelevated curved steel bridges with concrete tunnels. This proposal required extensive conversations and numerous meetings with MnDOT staff and BNSF to explore design alternatives and coordinate the proposed change.

The tunnels were constructed with vertical cast-in-place concrete walls at the abutments. A membrane system was included to protect the prestressed concrete beam superstructure from water and anti-icing chemicals—the bane of steel bridges in a cold atmosphere. There were significant benefits to this approach:

- “First and foremost, because the tunnels essentially involved building both EB and WB TH 610 on embankments where a barrier between them was no longer necessary, bridge railings were not required. This eliminated stopping sight distance design exceptions caused by the proposed bridge barriers noted in the preliminary designs, thus significantly improving safety on TH 610.
- Clear spans offered by the tunnel design did not require intermediate supports within county and railroad right-of-ways. Not only did this eliminate the reconstruction of EB CSAH 81 and impacts to the railroad and existing utility systems, it significantly reduced prolonged delays for the 40,000 motorists who travel CSAH 81 each day. It also eliminated any structures located within the CSAH 81 clear zone.
- Replacing standard bridge abutments in favor of vertical tunnel walls made it possible to eliminate permanent impacts within BNSF’s 100-foot right-of-way corridor.
- The tunnels eliminated the need for two long-span steel bridges and their associated expansion devices and bearing assemblies. Because they are buried, concrete tunnels experience less thermal wear than steel bridges; moreover, since the structural components of the tunnels are protected from snow, ice, and salt damage required maintenance is significantly reduced.
- The design life of the tunnels is estimated to be about 70 years. Steel bridges have a design life of about 50 years.

The use of tunnels on TH 610 not only maximized safety of the project’s geometric design, but minimized disruption to surrounding transportation corridors. Source: Lunda Construction
• The construction of tunnels eliminated the separation between the proposed bridges that would have allowed snow to accumulate on CSAH 81 below.
• The vertical tunnel walls also made it possible to provide 10 feet of snow storage beyond the right shoulder, a desirable design element in Minnesota’s snowy winter weather.

In summary, the design team’s proposal to replace two steel bridges with tunnels met a number of the client’s stated goals: it maximized the safety of the geometric design; minimized disruption to surrounding roadways and the public; avoided impacts to BNSF, utilities, and other existing infrastructure; and provided a high-quality project that minimized future maintenance.

MnDOT’s innovative design-build best value procurement process on the TH 610 Completion project made it possible for TKDA, Lunda, and the design-build team to add significant value to a complex project without sacrificing time and money.

The Minnesota Department of Transportation used its innovative design-build best value procurement process to add significant value to its complex TH 610 Completion project. Source: Lunda Construction
MEMBERSHIP UPDATE

New Members

Steven Frooman - Rapid City Dept. of Public Works

Josephine Tayse - Minnesota Department of Transportation

Joseph Talago - Minnesota Department of Transportation

Anna Corman – Student at Iowa State University

Gennadiy B. Begelman - Minnesota Department of Transportation

Sara M. Pflaum - Minnesota Department of Transportation

Timothy R. Brackett – Student at Minneapolis Community & Technical College

Daniel Haake - SRF Consulting

Moves

David Tsang - Minnesota Department of Transportation, formerly with Transportation Halff Associates

Lisa Klein – Alliant Engineering, formerly with the University of Minnesota

Paul Zager - Minnesota Department of Transportation, formerly with Transportation HZ United

Almin Ramic - Minnesota Department of Transportation, formerly with the University of Minnesota

Kate Miner – Stonebrooke Engineering, formerly with Scott County

If you or a friend has changed jobs or moved, we would like to stay in touch. Members, please update your information by visiting http://www.ite.org/membership/index.asp. To access this area, you will need to know your membership number. Your “username” is your membership number, and your “password” is the first 6 letters of your last name (e.g. Johnson=Johnso). Non-members please contact Morgan Hoxsie via phone (612.294.9726) or email (Morgan.Hoxsie@kimley-horn.com) for assistance. Please provide you name, title, employer, complete street address (including mailstop, if applicable), telephone number, fax number, and email address.

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