Managing Big Data for Traffic Analysis

Derek Lehrke, PE & Justin Sebens, EIT | Kimley-Horn

In each issue, the INCITER features an article coordinated by one of NCITE’s technical committees. This article is a contribution from the Simulation & Capacity Analysis Committee.

Over the past decade there has been a lot of discussion about big data and how we manage all the data sources at an engineer’s disposal. As an engineering community we struggle with how best to utilize the data, without spending days trying to reduce it to something that is useful. There is a never-ending push and pull between deciding which data is useful and which is not. There are multiple challenges that face our industry as it relates to big data. Two that always seem to make it to the top of the list are storage and accessibility. As technology advances and storage techniques improve, agencies will not have to worry about where to store data, but how do they make it accessible to the engineering community and the public?

MnDOT has recently started investing in techniques to help solve our industry’s data accessibility issues. This process has evolved over the past year in a couple of ways:

Source: www.streets.mn

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### EXECUTIVE COMMITTEE

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[www.nc-ite.org](http://www.nc-ite.org)
Scott Poska, 2018 NCITE President

We are getting closer to hosting the 2018 MWITE/GLITE/ITE Annual Meeting! Our Section has been planning this event for over two years and I am excited to see all of our hard work by our Local Arrangements Committee as well as presenters and volunteers from our Section pay off! Let’s not forget to show our support for students participating in the Midwest District Traffic Bowl on August 17! These students are the beneficiaries of our Summer Social and Scholarship Fundraiser held in June at Fulton Brewing. Over $700 was raised for these scholarships!

I want to change gears and discuss some important changes within ITE that are currently taking place. The International Board of Direction (IBOD) adopted a new strategic plan, “OneITE”, designed to position ITE for the future. A significant element of this plan is a reexamination of the ITE District-Section-Chapter structure and operations to create a more consistent member experience, provide effective member support, and ensure the long-term viability of ITE. Currently, there are inconsistencies across ITE in terms of District size and geography, District Board structures, International Director representation, Section size and geography, Chapter operations, leadership opportunities, section affiliates, and dues. A portion of the new definitions for Districts/Sections/Chapters recently adopted by the IBOD states, “Districts should be similar in the number of members included and represent a geographic area where member interests are similar.” In addition, the suggestion has been made to examine District boundaries from the perspective of the emerging and growing “megaregions” in the United States and North America. This suggestion was founded from the idea that a central purpose of a District conference is to promote discussions and activities of common regional interest – population density, transportation issues and needs, climate, etc. The Midwest has one such megaregion that encompasses parts of several states including Minnesota, Wisconsin, Illinois, Michigan, Indiana, and Ohio. This region’s area includes Sections currently in the Great Lakes ITE District (Ohio, Michigan, Indiana) and portions of Sections currently in the Midwestern ITE District (Minnesota, Wisconsin, Illinois). Therefore, the idea to examine the Midwest and Great Lakes District boundaries based on this emerging megaregion was born.

Our current Midwestern District Director, John Davis, has communicated to our Section and the Board this year about impacts to our Section and District as a result of the proposed District realignment. The upcoming Midwestern District board meeting will include a discussion of the issues to realign the district boundaries. The end objective of this discussion will be to agree in principle to a District realignment and over the next several months to develop and implement a transition plan to commence the operation of a new “Great Lakes/Midwestern District” and MOVITE District on January 1, 2021.

I urge you to reach out to John Davis or any NCITE Board Member with questions or comments about this important District realignment. Additional information about OneITE can be found at https://goo.gl/xBf7xE and https://goo.gl/6QrFxu.

I look forward to seeing you at the MWITE/GLITE/ITE Annual Meeting!
2018 ITE Student Leadership Summit
August 17-19, 2018
University of Minnesota | Minneapolis, 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_Development_Meetings

Upcoming NCITE Events:
http://nc-ite.org/calendar.php
The April Section Meeting was held on April 24, 2018 at MnDOT Waters Edge in Roseville, MN.

The presenter was Ken Johnson of MnDOT, presenting on 2018 Temporary Traffic Control Field Manual Update. Highlights of the presentation included:

The Field Manual is Part 6 of the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD). This is the only engineering-related manual required by statute and provides traffic control requirements for all roads open to the public.

The Field Manual re-write started in April 2016 and included participants from MnDOT Central Office and Districts, State Aid, cities, counties, and the Northland Chapter of the American Traffic Safety Services Association (ATSSA).

Updates to the General Provisions (formally Standards and Specs) included:

- Using letters for page numbers instead of Roman numerals
- Clarification of individual and general responsibilities (page 6K-k)
- Clarification of compliance levels (shall, should, and may) (page 6K-a)
- New and modified definitions (pages 6K-b to 6K-j)
- Temporary traffic control enhancements (additional personnel, buffer or additional lane closures, sequential lighting, etc.) (page 6K-m)

New guidance:

- Inspecting and removing the temporary traffic control zone (page 6K-n)
- Crossing live lanes of traffic (page 6K-n)
- Roadside safety (page 6K-n to 6K-o)
- Reorganized temporary traffic control devices (page 6K-r)
- Clarification of high-visibility clothing (page 6K-r)
- Clarification of channelizers (Page 6K-t)
- Detectable edges for work zone signing (page 6K-u)
- Portable changeable message sign requirements (pages 6K-ab to 6K-ah)
- Mobile temporary traffic control distance charts (page 6K-ap)

Key changes to the layouts included:

- Specific versus general notes

New layouts:

- Road closure for special events
- Work vehicle parked on shoulder
- Mobile/short duration multi-lane closure
- Mobile/short duration road closure
- Closure at top of entrance ramp
- Closing one turn lane on dual turn lanes
- Controlled burn
- Bike lane closure

New sections for low volume roadways and two-way, continuous left turn lane roadways, & updated flagging layouts.

Additional information and training regarding the Field Manual can be found at the following locations:

- MN LTAP Circuit Training and Assistance Program (CTAP) Workshops
- MN State Aid for Local Transportation (SALT) Field Manual Resource
- Field Manual

www.nc-ite.org
The May Section Meeting was held on May 22, 2018 at Gasthof’s in Minneapolis, MN.

The presenter was Todd Clarkowski of MnDOT, presenting on the St. Croix Loop Trail Crossing Project. Highlights of the presentation included:

**Overview of St Croix Crossing Project**
- The project is unique as it is located between two states (Minnesota and Wisconsin).
- Issues in the area included: traffic congestion, mobility, safety, delays from the lift bridge (operations/flooding), pedestrian needs, bridge condition, environmental concerns, historic properties, endangered species, and protection of the St. Croix National Scenic Riverway.
- Twenty-eight stakeholders were involved in the process to reach consensus on project needs, new bridge location, bridge style, what to do with the existing bridge, etc.

**Mitigation Package**
- A package was developed to mitigate project impacts such as:
  - Development of a loop trail system to create a new use for the old lift bridge
  - Providing roadway lighting without spillover onto the surrounding environment
  - Building three miles on highway in Minnesota to improve TH 36
  - Adding a storm water pond system at the TH 36 and TH 95 Interchange to manage runoff and provide natural water treatment
  - Relocating endangered species
  - Preventing the spread of zebra mussels
  - The mitigation package cost approximately $44 million. The total project cost approximately $640 million.

**Schedule**
- The main project opened on August 2nd, 2017. Mitigation items are still in progress with a planned completion in of Fall 2019.
- Included in the upcoming work is the conversion of the old lift bridge. This will involve restoring the bridge to look like it did when it was originally built in 1931.
- Most of the five-mile loop trail will be completed this summer. Construction will include trail heads and parking areas. The Minnesota parking lot will be open for Memorial Day.

**Minnesota versus Wisconsin**
- The character is very different on each side of the river. Minnesota is more urban and developed whereas Wisconsin is more rural.
- Part of the Minnesota trail system is being built over an archeological site.
- Wisconsin is adding other trail systems that will connect into the Loop Trail

**Project Website and Webcams**
- St. Croix Crossing
- Highway 36 Stillwater Lift Bridge

The meeting concluded with the playing of The Lake Name Fake Name Promo Game for an opportunity to be entered into a drawing for a free ITE Annual Meeting Registration for the upcoming Annual Meeting In Minneapolis, Minnesota.
Clockwise from top left:

John Davis

Scott Poska, Todd Clarkowski, Natalie Lindsoe

Meeting Attendees at Gastof’s

Scott Poska, Mike Sanderson, Cortney Falero
Thank you to those who attended the NCITE bike tour around Minneapolis in June! The route included a variety of bicycle infrastructure along with stops in the Warehouse District, Downtown, and Dinkytown to enjoy some local brews.

Watch out for the 2nd Annual Gopher Football Tailgate that the YMC will host in Sept/Oct!

If you would like to be added to the YMC email list for future events, please email Jeremy Melquist (jeremy.melquist@kljeng.com).
In the past year, the Interdisciplinary Transportation Student Organization (ITSO) has maintained legacy events, while adding new content to our yearly line-up including the planning and hosting of the Midwestern/Great Lakes Districts Student Leadership Summit (SLS). Over the last decade, our student group had seen a drastic decline in outreach efforts and student membership. Two years ago, ITSO officers set out to improve undergraduate engagement, member retention, cross-departmental advertisement, cross-departmental partnerships, and renew relationships with our parent chapters. With these goals in mind, we have made and continue to make a variety of structural changes to our organization, including the introduction of a membership program later in the spring 2018 semester. By re-evaluating event times, consolidating our social media platforms, switching to Mailchimp for newsletter campaigns, and collaborating with the Center for Transportation Studies, we have seen our membership surge to nearly 143 student members.

Our success stems in part from our participation in a variety of career building and leadership events throughout the 2016-2017 and 2017-2018 academic years. ITSO officers attended the 2016 and 2017 Traffic Bowls at the Midwestern and International ITE conferences, ITE Midwest Student Leadership Summit, and Student Reception at the 2017 and 2018 Transportation Research Board Annual Meeting. We have greatly benefited from the opportunities that our donor organizations have provided to us.

In the coming years, we hope to strengthen our relationship with WTS MN and ITS MN to further our mission of bringing diverse transportation opportunities to our members.
UMN ITSO will be hosting the UMN 2018 ITE Student Leadership Summit. It is open to any students internationally and will be held immediately prior to the ITE Annual Meeting in Minneapolis from August 17th to 19th.
1) The first way utilizes an open source platform created by the Utah Department of Transportation. This platform allows users to view signal data at a number of MnDOT’s signals within the state. Currently the signal data includes coordination diagrams and cycle failures. The platform has other capabilities that can be utilized as detection improves at the intersections. This data allows MnDOT to utilize existing data coming from signals across the state and better diagnose issues in real-time and allows them to view the impact of timing changes without the need to go into the field. The figure below is a coordination diagram displaying the arrivals on green at an approach. This diagram helps determine what percentage of vehicles are arriving on green, enabling MnDOT to make offset adjustments and see the results without needing to go out into the field and complete travel time runs. Being able to utilize this data in more efficient ways is improving MnDOT’s efficiency and response time to changing traffic patterns and incidents.

2) The second way is a joint effort between MnDOT and the University of Minnesota Traffic Observatory (MTO) Lab. The MTO lab recently sent out questionnaires to agencies and consultants to determine what signal data they utilize when completing different types of traffic studies. The answers to these questionnaires will be used to put together a framework for developing an online database of signal information and signal timing that will be accessible for intersections within the state. In some cases, signal information may not be readily available within a jurisdiction. This database will then be updated when a project alters the existing timing or if the operating jurisdiction modifies the signal timing, ensuring that the most recent intersection information is always available.

Each of the on-going efforts above are helping to bridge the gap between data reduction and accessibility. By combining all the information available into one or two locations, consultants and agencies alike can be more efficient and avoid common hurdles involved with accessing the most recent data. In addition to accessing the most recent data, MnDOT and other agencies will be able to better actively manage their traffic systems by utilizing the real-time data that is already being collected by signal controllers and summarize it into something easily referenced and readily available without significant post processing.
**Geometric Design Technical Committee**
Committee Chair: **Thomas Jantscher** - tjantscher@hrgreen.com
Recent Agenda Items: SRF – MnDOT’s Congestion Management Safety Plan
Future Agenda Items: Jim Rosenow – AASHTO Green Book 7th Edition Updates
Next Meeting: August 30, from 8:30 am – 10:00 am at Stantec, Roseville, MN.

**Intersection Traffic Control Technical Committee**
Committee Chair: **Nik Costello** - nik.costello@co.washington.mn.us
Recent Agenda Items: Super Bowl LII Traffic Operations
Future Agenda Items: TBD
Next Meeting: Wednesday September 5th, 8:00am - 10:00am, location TBD

**ITS Technical Committee**
Committee Chair: **Todd Olson** - tols@alliant-inc.com
Recent Agenda Items: Nick Erpelding, SRF - Variable Pedestrian Clearance Interval
Future Agenda Items: TBD
Next Meeting: TBD

**Pedestrian and Traffic Safety Technical Committee**
Committee Chair: **Tyler Krage** - tkrage@alliant-inc.com
Recent Agenda Items: Bde Maka Ska/Harriet Trail improvements & E-scooter Safety Forum.
Future Agenda Items: TBD
Next Meeting: TBD

**Planning Methods and Applications Technical Committee**
Committee Chair: **Steven Ruegg** - ruegg@pbworld.com
Recent Agendas Items: Review of ABM user’s guide drafts
Future Agendas Items: Discussion on the committee’s project of creating an ABM user’s guide
Next Meeting: TBD

**Traffic Operation and Maintenance Discussion Group**
Committee Chair: **Adam Bruening** - adam.bruening@co.washington.mn.us
Recent Agenda Items: New pole base mouse proofing. Countdown Pedestrian LED failures. Thermo-Marking, how to make sure contractors are installing properly (specs, standards, etc,) who inspects?
Future Agenda Items: TBD
Next Meeting: Wednesday September 5th, Location TBD (First Wednesday of each month).

**Simulation and Capacity Analysis Technical Committee**
Committee Chair: **Derek Lehrke** - derek.lehrke@state.mn.us
Recent Agenda Items: Sheyenne Street Corridor/MSPUI – KLJ Engineering
Future Agenda Items: TBD
Next Meeting: Wednesday September 26th, 1:00pm – 3:30pm, MnDOT’s Waters Edge room 403
Emergency vehicles must get to locations as quickly and as effectively as possible. When sight lines are impacted, a nearby traffic signal or emergency beacon may be activated to notify approaching vehicles to be on the lookout for emergency vehicles. The Minnesota Manual on Uniform Traffic Control Devices (MNMUTCD) includes another option; the Emergency Vehicle Hybrid Beacon (EVHB).

An EVHB is a traffic control signal that gives the right-of-way to an emergency vehicle. An EVHB provides an additional layer of safety when factors such as sight distance, lack of gaps in traffic, and other signal warrants have not been met. Operation of EVHBs are similar to Pedestrian Hybrid Beacon (PHB) signals. An EVHB signal consists of a three section head with two red balls on top and one yellow ball below. The signal remains dark when not in use. An emergency vehicle can activate the system through Emergency Vehicle Preemption (EVP) or remote activation, such as within a fire station. When activated, a flashing yellow light is displayed, alerting approaching drivers that an emergency vehicle will soon enter the roadway. Shortly after, the system shows a solid yellow followed by a solid red, instructing drivers to stop and allow the emergency vehicle to enter into the roadway. As emergency vehicles enter and exit the intersection, the system will show a flashing red, allowing drivers to proceed through the intersection when it is clear to proceed. The system will then go dark and traffic shall proceed as normal when deactivated.

In Cottage Grove, Minnesota, the city was constructing a new fire station on 80th Street. The new station is set back from the street to provide more space for trucks and other equipment. Currently an urban, four-lane, undivided roadway with a posted speed limit of 35 mph, the 2015 AADT on 80th Street was 9,000 vehicles per day. Traffic speeds were collected and it was found the majority of traffic exceeds the speed limit. The fire station is located on a vertical curve of 80th Street, where the top of the hill is just west of the Central Fire Department site. Additionally, there are trees that hinder sight lines along the roadway. These create vertical and horizontal constraints that do not meet the minimum sight lines set by the AASHTO Geometric Design of Highways and Streets for cars approaching an intersection.

Due to the constraints, the City of Cottage Grove ultimately requested to have a system to notify drivers that emergency vehicles are approaching the roadway. An EVHB system was installed to assist emergency vehicles looking to gain safe entry onto the street while responding to calls. This was a unique request, as this is the first known EVHB in Minnesota. Through testing, timings for the system were set depending on the speed of traffic on 80th Street as well as the time for an emergency vehicle to exit the fire station and clear the intersection.
The system was made operational in April 2018 and is being used by the fire department on a daily basis when responding to calls. The City of Cottage Grove has posted a video to their website to help inform drivers of how to use the system correctly. Currently, emergency vehicle drivers are instructed to continue to enter the intersection with caution until most drivers are compliant with the new system. View the City of Cottage Grove Central Fire Station Emergency Beacon video at: https://www.youtube.com/watch?v=A5l2P3fZurU

Consider EVHB to enhance safety for emergency vehicles and all public roadway users.
Kimley-Horn worked with the Minnesota Department of Transportation (MnDOT) on the research, analysis, and design of a signalized reduced conflict intersection (RCI) at the intersection of TH 65 and Viking Blvd in East Bethel, MN. This was a unique project as it will be the first signalized RCI in Minnesota.

The TH 65 corridor between Spring Lake Park and East Bethel has been studied for several years due to increasing congestion and safety concerns. Seven of Minnesota’s “Top 200” crash intersections from 2012 through 2014 are within the study corridor, and the intersection at Viking Blvd is number 163 of 200. The intersection is approaching and is expected to exceed capacity in the future. This study evaluated intersection modifications that would improve traffic operations including a conventional intersection with additional through and turn lanes and a signalized RCI. Kimley-Horn completed the following components of the project:

- Researched and documented best practices for the design and operation of signalized RCIs
- Created an educational video about signalized RCIs (https://youtu.be/3yM_lXIVWCU)
- Traffic operations analysis
- Traffic signal design

The existing intersection has an unusually wide 100-foot median, which negatively impacts intersection operations and capacity because of long clearance intervals and the inability to run concurrent eastbound and westbound left-turn movements due to overlapping vehicle paths. Although this wide median provided room to complete the U-turns required by the RCI.
A literature review of the available published information on signalized RCIs was completed. Then conference calls were held where MnDOT and Kimley-Horn discussed past signalized RCI experiences individually with Texas DOT and North Carolina DOT staff. Following the literature review, practices and standards for the design and operation of signalized RCIs were documented.

The results of the traffic analysis showed that the RCI would be expected to outperform the improved conventional intersection options. The RCI also provides improved traffic safety by reducing the number of conflict points at the intersection and reducing the potential for more severe crash types. Finally, the cost of an RCI was less than the cost of an improved conventional intersection resulting in a benefit/cost ratio of 13.4 as compared to 4.4 for the improved conventional intersection alternative.

The signal design was a very collaborative process with MnDOT staff. Areas of focus included determining the number of controllers and cabinets, EVP (Emergency Vehicle Preemption) system configuration, the sources of power (SOP), and other unique design parameters. One particularly unique design element was determining signal pole positioning, mast arm rotation, and signal head placement to eliminate conflicts and confusion. A review of the MnMUTCD was completed to determine applicable design requirements. MnDOT was very involved in the design, and found that the 3-D modeling they created to review how signal placement, signing, and pavement markings worked together assisted greatly in effective decision making. It was decided that the preferred system configuration was four cabinets and controllers with fiber interconnect. The fiber interconnect including connecting the east signal cabinet to the fiber optic trunk line, and the north/west/south signal cabinets were connected to the east signal cabinet via fiber pigtail interconnect. Extensive coordination occurred MnDOT experts in roadway, signing, lighting, and the Regional Traffic Management Center (RTMC) design to ensure the signal design including all necessary input.

The project was let for bid on 5/18/2018 and has been awarded. Construction began on 7/23/2018 and will be completed in October 2019.
What Difference Does a Sign Make?

Bryant J. Ficek, PE, PTOE | Spack Consulting Inc.

How much impact does the speed limit have on a local, residential road? That basic question has increasingly become a hot-button issue in Minnesota where these roads are usually 30 mph by state statute. Several cities and bicycle/pedestrian advocates are pushing to change the statute and lower the local speed limit to 25 mph. At 25 mph, the roads should be safer for bicyclists and pedestrians. If anyone is unfortunately struck by a car, the chances of survival greatly increase if the car is traveling at a slower speed. This increase in safety is a good reason to advocate for slower speeds. However, getting back to our initial question, we wondered whether simply changing the rule in the book or a posted sign will really impact speeds.

As we often do, we created a research project to attempt to answer this question. Luckily, our neighbor to the east, Wisconsin, has 25 mph as their base for local residential roads. With the similarities between our two states, it seemed natural that we could compare vehicle speeds on local roads with the two different speed limits.

To help us in the effort, we worked with the Cities of Woodbury Minnesota and River Falls Wisconsin to obtain speed data. Thanks to Tony Kutzke (Woodbury) and Reid Wronski (River Falls) for their help in providing the speed data and working with us on this research.

The goal for this quick review was simple – compare the speeds on the local roads for each city by roadway width. Our initial thinking and past experience suggested the width of the local road mattered more than the actual speed limit. In other words, drivers will travel to the condition and characteristics of the road more than what a posted sign tells them.

As shown, the average 85th percentile speeds are relatively close between the two cities. In general, the speeds for both corridors increase as the road width increases. Although, the 25-mph roads have a slower rate of increase. Also, most local roads are typically narrower, roughly 32-feet wide or less, where the results between the two sets of data are similar.

<table>
<thead>
<tr>
<th>Local Road Width</th>
<th>Average 85\textsuperscript{th} Percentile Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 MPH Roads</td>
</tr>
<tr>
<td></td>
<td>(Wisconsin)</td>
</tr>
<tr>
<td>28-foot Road Width</td>
<td>N/A</td>
</tr>
<tr>
<td>30-foot Road Width</td>
<td>31.8</td>
</tr>
<tr>
<td>32-foot Road Width</td>
<td>33.4</td>
</tr>
<tr>
<td>36-foot Road Width</td>
<td>30.8</td>
</tr>
<tr>
<td>40-foot Road Width</td>
<td>33.7</td>
</tr>
<tr>
<td>42-foot Road Width</td>
<td>33.9</td>
</tr>
</tbody>
</table>

Average 85th Percentile Speeds
So to rephrase our question - does the speed limit of the road matter? At this point, our answer is a decisive “maybe” due primarily to an admittedly small sample of data from only two cities. The small size could also mean the data is susceptible to factors like enforcement, surrounding geometry (horizontal or vertical curves), landscaping, and parking to name a few potential concerns.

We are continuing to review the data and will be providing a white paper on the results soon.
TKDA completed a feasibility study, complete preliminary and final designs, and saw the replacement of the Godfrey Bridge project through construction. The structure, also known as the 46th Street Bridge on County Road 46, was well past its intended design life and Hennepin County identified it as structurally deficient. Moreover, its structural capacity was insufficient to meet current design standards to accommodate potential light rail transit loading requirements.

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This article is a contribution from TKDA.

Godfrey Bridge is located within Minnehaha Park, one of the city’s oldest and most popular recreation areas. It has served for more than nine decades as an arched gateway between West River Parkway and the historic park that annually draws thousands of visitors to its famous Minnehaha Falls, picnic areas, trails, gardens and other first-class amenities.

The structure, also known as the 46th Street Bridge on County Road 46, was well past its intended design life and Hennepin County identified it as structurally deficient. Moreover, its structural capacity was insufficient to meet current design standards to accommodate potential light rail transit loading requirements.
Hennepin County earmarked the Godfrey Bridge for replacement and, in partnership with the City of Minneapolis and the Minneapolis Park and Recreation Board, hired TKDA to undertake a feasibility study, complete preliminary and final designs, and see the project through construction.

Replacement of the Godfrey Bridge posed some unique challenges for TKDA project engineers. Not only does 46th Street span the popular 55-mile Grand Rounds Scenic Byway System, one of the country's longest continuous systems of public urban parkways, but it also serves as the initial approach to the Intercity Bridge (Ford Bridge) over the Mississippi River that connects Minneapolis with Saint Paul.

Closing the Godfrey Bridge for reconstruction would have required a lengthy detour route and was not a feasible option. Also, the popularity of the Grand Rounds in a city that has been called the “Bike Capital of America” made it essential to limit the inconvenience to pedestrians and bike traffic throughout construction.

TKDA recommended the design of a single-span, prestressed concrete beam superstructure with semi-integral abutments, to be supported on micropiles. The use of micropiles, small-diameter drilled and grouted deep foundation elements, would eliminate the need for sheet pile and large, open-cut excavations and would minimize impacts to pedestrians and bicyclists as well as existing trees. The single-span design would also avoid the complication of intermediate bridge piers.

The new bridge’s smooth gray finish, slightly arched superstructure fascia and rusticated abutment details invoke the original 1925 design. Ornamental metal railings and lighting fixtures incorporate aesthetic characteristics from surrounding parkway infrastructure, and Grand Rounds users now enjoy a new trail and roadway for a smoother ride.
The new bridge was to be 10 feet wider to accommodate cyclists, wider travel lanes, and sidewalks. The increase in deck width would avoid the need for additional right-of-way, but just barely: the deck would be located one inch from the property line.

After reviewing the study, Hennepin County decided to proceed with TKDA’s recommendations.

Construction of the new $3.5 million bridge began in January 2017 and was completed in November 2017. Use of the Grand Rounds Scenic Byway by cyclists and pedestrians—including the running of the Twin Cities Marathon—continued for the duration of the project. A carefully sequenced construction staging plan for traffic, bicyclists, and pedestrians was the key to the project’s success.

Travel on the upper roadway, 46th Street, was reduced to single lanes on one-half of the bridge while the other half was under construction. Pedestrians and cyclists were locally channelized outside of the work zone during construction to ensure their safety.

The new bridge’s smooth gray finish, slightly arched superstructure fascia and rusticated abutment details invoke the original 1925 design. Ornamental metal railings and lighting fixtures incorporate aesthetic characteristics from surrounding parkway infrastructure and Grand Rounds users now enjoy a new trail and roadway for a smoother ride.
In 2016, Econolite began working with Miami-Dade County to update its aging traffic management network with a new Intelligent Transportation Systems (ITS) technology to operate traffic lights according to changing flows of vehicles. The first phase of the project is part of a planned 300 intersection upgrade along 10 corridors. The new ITS installations that have yielded preliminary results were on the NW 36th Street corridor (between 71st and 84th avenues) and the South Dade TransitWay (Previously known as U.S. 1 Busway). The upgrades along these corridors included the new traffic signal controllers, video detection sensors, a Bluetooth® based travel time solution, and a Centracs centralized ATMS (advanced transportation management system) software system that included Adaptive Signal Control, and Transit Signal Priority (TSP) for the TransitWay.

The NW 36th Street corridor is identified as one of the congestion-management corridors within the County. It serves heavy commuter and tourist traffic to and from Miami International Airport. Coined the “Smart Signal” traffic system by Miami-Dade, the Adaptive Signal Control program enables signal optimization through rapid adjustments to signal timing according to detected traffic volumes and speeds. The objective of the new traffic signal infrastructure upgrade and ITS system is to help alleviate congestion and keep traffic moving.

The South Dade TransitWay serves commuters traveling between Florida City and Dadeland. The approximately 20-mile bus route north from Florida City to Dadeland would often take one hour and seven minutes, or more. The Traffic Signal Modernization Project along the South Dade TransitWay included controller and detection upgrades, as well as, the ATMS integration with the County’s existing transit software system to deploy a state-of-the-art TSP program for the dedicated bus lanes along TransitWay.

In 2017, the traffic signal upgrade along with Adaptive Signal Control was completed along the NW 36th Street corridor and the After-results from the Bluetooth travel time system showed significant improvements. The Adaptive Signal Control demonstrated a 10-minute reduction in travel time along the NW 36th street corridor. Multiplied by the number of drivers traveling the corridor, the travel time improvement represents hours saved in commute times.
In 2018, the infrastructure and signal light improvements along the South Dade TransitWay were completed, as well as ATMS integration with the existing transit software. As a result of the upgrades and the Transit Signal Priority, there has already been a 17-minute improvement in the bus route north from Florida City to Dadeland, enabling completion of the route in under an hour. As more traffic data is collected for optimization, the expectation is that TSP will provide more travel time improvements in the future.

**Project Scope**

**Infrastructure improvements:** The project provides upgrades to Miami-Dade County’s 30-year-old traffic signal equipment, with installation of new, state-of-the-art technology:
- Controller hardware and software upgrades
- Video detection upgrades for vehicle detection data and monitoring
- Bluetooth readers for travel time data

**Technology enhancements:** Working in concert with the infrastructure improvements, the new ITS technology will significantly expand the transportation management capabilities:
- ATMS deployment
- Adaptive Signal Timing
- Center-to-Center Route Priority
- Travel time measurement

**Software enhancements:** Complete integration for interactive driver information application and County monitoring:
- Navigation App Data Portal for Waze Integration

**What’s Next?**

As mentioned before, Miami-Dade County’s traffic signal modernization includes updating 300 intersections along 10 corridors. The project will include installing 700 video detection sensors at each of the intersections, as well as strategically placed Bluetooth readers for the travel time system.

- These systems will detect and feed traffic data to the ATMS
- This data powers the Adaptive Signal Control timing system to automatically coordinate and optimize signal timing changes 24 hours/day

As Adaptive Signal Control comes online at more corridors, travel time results will be published.
ITE LOL

**Would you guess this weighs as much as a small adult?**

**WHAT?**

**Uh, probably.**

**Great!**

**Thump**

Please fasten your seat belt.

**Click**

Take me to Anchorage, Alaska.

**Navigating.**

*Slam*

**I love self-driving cars.**

...whose car was that? DUNNO, but they shouldn't have left it running.
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