



Illinois Section  
Founded 1916

# News

ASCE Illinois Section

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## A New Twist on an Old Friend: Non-Planar Precast Concrete Pavement

*By Brian L. Pawula, P.E.*

The Illinois Tollway has been using its “old friend” precast concrete pavement (PCP) for the last six years. You can find it on the Reagan Memorial Tollway (I-88), at Illinois Route 83 and Highland Avenue interchanges, and on the Tri-State Tollway (I-294) near O’Hare International Airport, among many other locations where thousands of precast pavement slabs have been used for rapid, long-life pavement repair or reconstruction. Reconstruction of a multi-lane ramp along Tri-State Tollway (I-294) provided an opportunity to put a new twist on PCP.

PCP allows for long-term pavement improvements in areas where extended lane closures are not feasible because of high traffic volumes. It has many benefits, but perhaps its most important benefit is its reduced impacts on the motoring public. In the past six years, the majority of the Tollway applications of PCP were isolated placements at mainline roadway locations that needed repair using planar or flat panels.

In 2013, the Illinois Tollway put a new twist on PCP when it designed and reconstructed long sections of a multi-lane ramp along the Tri-State Tollway (I-294) under its systemwide capital program using PCP instead of cast-in-place concrete pavements. This ramp was one of several ramps that were reconstructed at the I-294/I-55 interchange in 2013. These ramps vary in terms

Precast concrete pavement allows for long-term pavement improvements in areas where extended lane closures are not feasible because of high traffic volumes.

of type (service versus system), number of lanes, existing pavement type, the presence of ramp toll plazas, truck-use percentages, traffic volumes, etc. One of these ramps has a combination of features that made it a perfect candidate for reconstruction with non-planar (warped) PCP rather than being reconstructed with cast-in-place concrete pavements as was used for the other ramps.

This particular ramp is located at the system interchange between I-294 and I-55 near Burr Ridge in Cook County, Illinois. This super-elevated, or curved, ramp (referred to as Ramp AB/A) carries vehicles from I-55 and westbound Joliet Road first through a ramp toll plaza, across an I-294 ramp bridge, and finally to northbound I-294. The traffic volume (average daily traffic of approximately 33,300 vehicles) and truck percentage

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# President's Notes

Patrick Lach, P.E.



Even though summer is winding down, the Illinois Section has certainly been busy over the past few months! We continued to have the media report on the 2014 Report Card for Illinois Infrastructure as well as other issues such as transportation funding and the Federal Highway Trust Fund. WTTW-PBS, NPR, Chicago Magazine, Crain's

Chicago Business, and NBC Chicago all have touched on the subject of our State's infrastructure and related issues. You can check out some of the highlights by visiting our Report Card webpage. Our goal this next year is to continue the momentum of our outreach efforts to make sure that infrastructure and its investment remain a priority for our government and infrastructure stakeholders.

and a potential adoption of a proposal for Sustainable Funding. There has been an ever increasing public dialogue and interest in sustainability and green infrastructure with a variety of national programs influencing design and construction. It has become clear that Civil Engineers need to step up and define what sustainable infrastructure means and how it should be approached via environmental, economic, and social well-being efforts. The Illinois Section Sustainability Committee just held its 4th annual Sustainability Workshop over the summer with over 50 attendees. The Workshop highlighted the latest approaches on sustainable design, ISI's training and certification program, and the Envision rating system. I would like to thank **John Lazzara**, **Gary Paradoski** and **Thera Baldauf** for their efforts over the past few years at developing these Workshops and demonstrating the importance of sustainability as we look towards the future of engineering.

We also continued our partnership with the American Council of Engineering Companies of Illinois (ACEC-IL) and have been able to provide our membership with important updates to legislation that could dramatically influence how we as civil engineers get licensed and win work as consultants as well as how projects can be awarded. At our August Board meeting, Dave Bender, the Executive Director of ACEC-IL, provided a detailed Legislative Report that delved into the various legislation that could impact our profession. More information can be found on their website and the Illinois Section is in the process of developing a Legislative Report webpage to keep its members informed. It is up to us as Professional Engineers to remain involved in the legislative process to make sure that our voice is heard and our legislators understand the importance of our profession and how it impacts the public good. The Illinois General Assembly Fall Veto session in November and the final days of the current sitting Assembly in early January following the election could bring significant issues to our profession. The Illinois Section will do its best to keep its members informed.

Looking ahead, we have our Annual Dinner coming up in a few months at U.S. Cellular Field on October 30, 2014. As accustomed, we will be presenting the annual awards, introducing new Life Members, and inducting the incoming officers for 2014-2015. The Illinois Section is also excited to announce that the evening's featured speaker will be Mike Huff, the former White Sox outfielder and Vice President of the Bulls/Sox Academy. If you have yet to register, please do so as space is limited!

As I am writing this, ASCE is holding their annual Region 3 Assembly in Chicago where attendees will debate on the Region 3 Infrastructure Initiative

Also coming up in 2016 is a great milestone for the Illinois Section – its 100th Anniversary! The Board has already established a working committee to start developing a variety of activities to celebrate this memorable occasion. Information will be provided as we near our anniversary kickoff in October 2015

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## ASCE Illinois Section News

### ILLINOIS SECTION NEWSLETTER

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Illinois Section – Region 3

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# MnDOT Conducts First Lateral Bridge Slide on I-35E MnPASS Design Build Project

By George Gorrill, P.E., S.E.

As part of the \$98M I-35E MnPASS Design Build Project just north of St. Paul, MN, nine bridges are being replaced between 2014 and 2015. Due to the moderate volume of traffic carried by the four lanes of the Larpenteur Avenue bridge over I-35E NB/SB and a desire to reduce the number of days the bridge would be closed to traffic, this bridge was selected to be constructed using lateral bridge slide construction, an Accelerated Bridge Construction (ABC) technique.

## The Larpenteur Avenue bridge is MnDOT's first lateral bridge slide.

The proposed Larpenteur Ave. bridge is a two-span prestressed concrete girder bridge that is 75'-10" wide, has 91'-9" spans and weighs approximately 3.5 million pounds. This bridge also features semi-integral abutments and a continuous deck over the pier. During the preliminary bridge plan development, several details were identified for modification in order to accommodate the planned lateral bridge slide. First, the tops of the beam seats would need to be constructed smooth and level, which required the use of a reinforced concrete slide shoe beneath each diaphragm. The bottom of the slide shoe was detailed parallel to the flat and smooth beam seats, and the top of the slide shoe was detailed similar to a conventional bridge seat, with discrete locations for the beams to sit that vary in elevation relative to the cross slope



Prior to slide

of the deck, and vertical reinforcement sticking up in between the beams to tie the slide shoe to the diaphragms after the beams were installed. Second, to achieve bearing fixity, steel plates were embedded in the bottom of the slide shoes at each bearing location at the pier. These plates were fabricated with slotted holes that would accept dowels after the slide was complete. The dowels would be placed in oversized holes in the pier cap and would be pulled up into the slots, and grouted into place after the slide operation. Third, the use of the lateral slide method required temporary bents to support the proposed superstructure in the temporary position prior to the slide operation. The temporary steel pile bents were designed per the AASHTO Guide Specification for Temporary Works, and the system was designed with bracing in the bridge

During the preliminary bridge plan development, several details were identified for modification in order to accommodate the planned lateral bridge slide.

longitudinal direction at the temporary abutments bents, and without bracing in the bridge lateral direction at any of the temporary steel pile bents.

The first step in the reconstruction of the Larpenteur Ave. bridge was to install the temporary steel pile bents just north of the existing bridge, and in line with the proposed substructures.

*(continued on page 4)*

## MnDOT Conducts First Lateral Bridge Slide on I-35E

(continued from page 3)

The team chose to utilize field welded temporary steel pile bents using new material. Since the temporary steel pile bents would be supporting the proposed superstructure over interstate traffic, non-destructive testing (NDT) was specified for critical welds to ensure weld quality. Each of the temporary steel pile bents consisted of several vertical H-piles with transverse subcap W-beams at each pile, and a slide table on top of the subcap beams that was constructed of H-piles stitch welded flange to flange, and constructed so the top of the slide table matched the elevation of the tops of the proposed substructures. Once the temporary steel pile bents were completed, reinforced concrete slide shoes were constructed and the prestressed concrete beams were erected. A few weeks later, the proposed deck was placed and wet cured. On June 7, 2014 the existing bridge was closed, demolished, and the construction of the proposed substructures began. In order to brace the temporary steel pile bents in the bridge lateral direction for the sliding

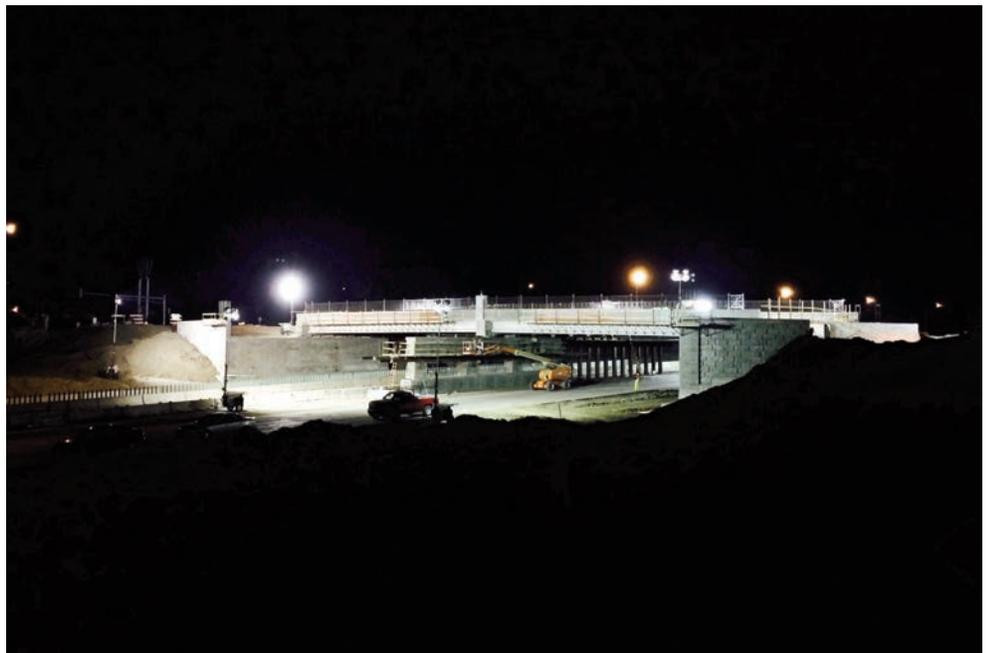
The project team elected to fabricate slide tracks on top of the slide tables, which were installed after the slide bearing components.

operation, the slide tables were attached to each of the substructures, and the contractor began preparing the bridge for the slide operation. The superstructure was jacked vertically and the slide bearing components were

(continued on page 5)



Abut during slide



During slide

## MnDOT Conducts First Lateral Bridge Slide on I-35E

(continued from page 4)

installed—thin stainless steel plates mated with PTFE sheets (with some liquid dish soap as a lubricant), which greatly reduced friction and demand on the hydraulic jacks used to push the bridge.

The project team elected to fabricate slide tracks on top of the slide tables, which were installed after the slide bearing components. The slide track consisted of two vertical plates stitch welded to the top of the slide table on either side of each diaphragm. One hydraulic jack was installed at each temporary pile bent to push the bridge.

The slide track plates had holes at regular spaces that allowed the hydraulic jacks

to be fixed to the slide table when pushing the bridge, and removed to advance the jack. In this way, the bridge was pushed approximately 19", the pins removed, the jack retracted, and pinned again to push once more. This process was repeated until the bridge was moved into position.

Lateral bridge slide  
construction reduced closure  
duration by 30 days  
over conventional  
bridge construction.

Then the superstructure was jacked vertically, the slide bearing components were removed, the permanent bearings were installed, and the dowels at the pier were pulled up and grouted.

The slide operation was completed July 11, 2014 and the bridge was opened to traffic on July 23, 2014, 46 days after the existing bridge was closed to traffic. The use of the lateral slide method reduced the bridge closure duration by more than 30 days over conventional construction. **ASCE**

*George Gorrill, PE, SE is the Bridge Department Manager in Michael Baker Jr., Inc.'s Chicago office.*

## President's Notes

(continued from page 2)

so be on the lookout in the newsletter and on the website for details. If you are interested in helping out, please feel free to contact Board officers **Jennifer Gora** and **Thera Baldauf**.

Finally, this will be my last chance as President of the Illinois Section to share my thoughts with you. I would like to graciously say thank you to the many ASCE members for all their hard work over the last year. We have accomplished a lot and I look forward to continuing to help the Section continue to provide valuable support to its members and the profession.

The Illinois Section is only as good as those who volunteer their time to help. I'm going to act like an Academy Award winner and pull out my thank you list now until the music plays me

off. Thanks to **Darren Olson** and the Report Card Committee members—the final product is an amazing example of the importance of our profession and infrastructure. Thanks to the current Board—it has been a pleasure working with you and I consider you all not just my colleagues, but my friends. Thanks to the Technical Groups, Institutes, and Committees—you are the lifeblood of the Section and it is amazing what you accomplish and the number of people you impact. Thanks to ASCE employees in the Reston and Washington DC offices including but not limited to **Nancy Berson, Brittney Kohler, Aaron Castelo, Leslie Nolan, Leslie Payne and Jennifer Lawrence**—your guidance and assistance truly helped me navigate over these past few years. Finally, thanks to Past-President **Lou Arrigoni** for being a

leader and a mentor. He has always been available to provide input and guidance when asked. There are many others that have been influential and for those I did not explicitly thank, please know that I am grateful for all your help.

If you have any questions, comments or concerns, please feel free to let me know. The Section Board serves all of you, our members, and we want to make sure that we are doing what we can to improve your life and career as a civil engineer. I can be reached at [president@isasce.org](mailto:president@isasce.org) and we always have room for one more volunteer.

**ASCE**

# Taking On Waste Management in Candelaria, Honduras

By Ken Kastman, Lili Dumelle, and Liz Jensen



Communities across Central America were suddenly presented with a new challenge: plastics and other disposable goods were introduced into their markets, with no place to go post-consumption

Engineers Without Borders started working with the community of Candelaria in 2010 and from the beginning we recognized just how progressive, enthusiastic, and dedicated this community is to solving problems. The community not only has an 80+% literacy rate and a strong focus on

education, but they are also conscious of their role as environmental stewards. In the mid-90s, communities across Central America were suddenly presented with a new challenge: plastics and other disposable goods were introduced into their markets, with no place to go post-consumption. Lacking environmental policies and awareness of the effects on public health, many communities began either burning or dumping their waste locally. This led to an amassing of waste in water ways, streets, and vacant fields. Candelaria initially burned its garbage but upon realizing the hazards associated with this practice the community started an open-air garbage dump.

With the assistance of a local Non-Governmental Organization, the community later began working to improve the site, separating recyclable plastics, metal and tires; they arranged

for a driver to pick up the community's recyclables and encouraged community members to start composting. These efforts introduced the community to waste management techniques and transformed the site into a more controlled setting. But even with these advances the community had some lingering problems: leachate from the dump was damaging the surrounding environment and contaminating surface water, and the site was attracting disease-carrying rodents, insects, and wild dogs. That's where EWB came into the picture!

Since the launch of the collaboration, EWB and the community have constructed a sanitary landfill, implemented upgrades to the Recycling Center, and developed disposal techniques for medical waste. Building upon these early successes and the mutual trust

*(continued on page 7)*

## Taking On Waste Management in Candelaria, Honduras

(continued from page 6)

they helped to develop, the community has more recently asked EWB to venture outside the landfill: this past

EWB and the community have constructed a sanitary landfill, implemented upgrades to the Recycling Center, and developed disposal techniques for medical waste.



May the team constructed a river training structure to assist with sand collection, and will return in January to build an Aquaponics pilot system to provide a sustainable food source and valuable learning opportunity for students. With the help of donors like the ASCE IL Section, the EWB Candelaria project team has been able to continue advancing these efforts

while also identifying additional areas of need. After the implementation of the Aquaponics system the team will be turning its attention to protecting a natural spring on the waste management site, implementing an easier and safer medical waste disposal method, and finding a new use for recycled

goods as building materials.

EWB's motto is to *Change the World One Community at a Time*; with this community's dedication all they need is a helping hand. **ASCE**

### Call for a Volunteer (Traveling Mentor) - Napenkara, Burkino Faso Program

The Napenkara, Burkino Faso Program is looking for a volunteer to be their Traveling Professional Mentor for the team's upcoming Implementation Trip. The team has a Technical Lead, but he is unable to travel on the trip. The objective of the trip is to oversee the construction of a borehole well for the Village of Napenkara. The final trip dates are flexible, but most likely would be a 8-10 day trip in mid-to-late October or early November.

The qualifications for being a Traveling Professional Mentor for this project is 5 years of direct work experience in design and construction of infrastructure related to water. If you happen to have borehole well construction experience that would be fantastic, but a more broad experience with water supply, water resources, and/or water quality testing would work as well.

If interested please contact Eamon at [Eamon.Geary@gmail.com](mailto:Eamon.Geary@gmail.com) or 312-342-5611.

# American Society Of Civil Engineers Illinois Section

## 98TH ANNUAL DINNER



- Meet the featured speaker and the evening's host, Mike Huff, former White Sox outfielder, and VP of the Bulls/Sox academy
- ASCE Illinois Section awards will be presented
- New Life Members will be introduced
- Sponsorship opportunities will be available including having your company's logo presented on the main U.S. Cellular Field scoreboard
- Optional, limited numbers of ballpark tours will be available including dugouts, the warning track and other areas
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October 30, 2014  
U.S. Cellular Field

Cocktail Hour:  
5:30 pm

Dinner and Awards:  
6:30 pm



Register online at [www.isasce.org](http://www.isasce.org)

Illinois Section  
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# Sustainability from the ASCE Perspective – Envision™ Rating System

By John Lazzara, P.E.

ASCE defines Sustainability as: “A set of environmental, economic and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or the availability of natural, economic and social resources.” Civil engineers are responsible for developing and managing society’s physical infrastructure. In an ever-changing world there is a strong need to learn from the past and design sustainably for the future.

The Envision™ rating system consists of 60 credits organized into five categories including: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Risk.

The Institute for Sustainable Infrastructure (ISI) is a not-for-profit education and research organization, dedicated to developing and maintaining a civil infrastructure rating system. ISI was founded by the American Society of Civil Engineers (ASCE), the American Council of Engineering Companies (ACEC), and the American Public Works Association (APWA). Envision™ was developed in joint collaboration between ISI and the Zofnass Program for Sustainable Infrastructure at the Harvard Graduate School of Design as a tool to provide a

collection of sustainable infrastructure design considerations.

Envision™ is designed to keep pace with a changing concept of sustainability and is intended to be a guide to assist in the infrastructure planning and design process. Infrastructure rating systems must account for the new engineering design paradigm, one in which the engineering design constants and behavior of design variables of the past can no longer be taken for granted. At this juncture, there is no prescriptive solution for how to properly account for these changes. Instead, the Envision™ rating system incorporates a process by which the project owner, designer and contractors explicitly consider the possibility of new constants, new variable behaviors and new extreme values, and devise an effective approach for dealing with them.

During the development of the Envision™ rating system, over 900 rating systems from around the world were identified. However, many rating systems were sector specific and none covered all aspects of civil infrastructure, so the Envision™ rating system was designed as an holistic approach to fill that gap for the built environment. It is critical to consider infrastructure development on many levels from a local community perspective to a global view on resources in order to fully understand and address the needs of the stakeholders while still considering the triple bottom line (environmental, economic, and

ASCE is a founding member of the Institute for Sustainable Infrastructure.

The Envision™ rating system is a collaboration tool developed to address the triple bottom line of environmental, economic, and social conditions.

social conditions). The Envision™ rating system consists of 60 credits organized into five categories including: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Risk.

The Illinois Section of ASCE, established a Sustainability Committee in the Spring of 2010 to promote ASCE Nationals’ Sustainability Program to the local membership and other key regional stakeholders. The Sustainability Committee’s activities this year include: conducting the 4th Annual Sustainability Workshop; giving a presentation on ISI and Envision™ to the Lake County Stormwater Commission Municipal Advisory Committee; participating in the ASCE National Committee on Sustainability summer meeting held in Chicago, and planning a training/credentialing workshop on Envision™. Sustainability will be a key focus area for ASCE on the national level in 2015 and the Illinois Section will continue to be very active in promoting sustainable design practices across the region. **ASCE**

*John Lazzara is the Transportation Manager in the Chicago office of HDR, Inc. and he is the Sustainability Committee Chair for the ASCE Illinois Section.*

# Hydrology and Hydraulic Modeling for Zion Beach-Ridge Plain Restoration

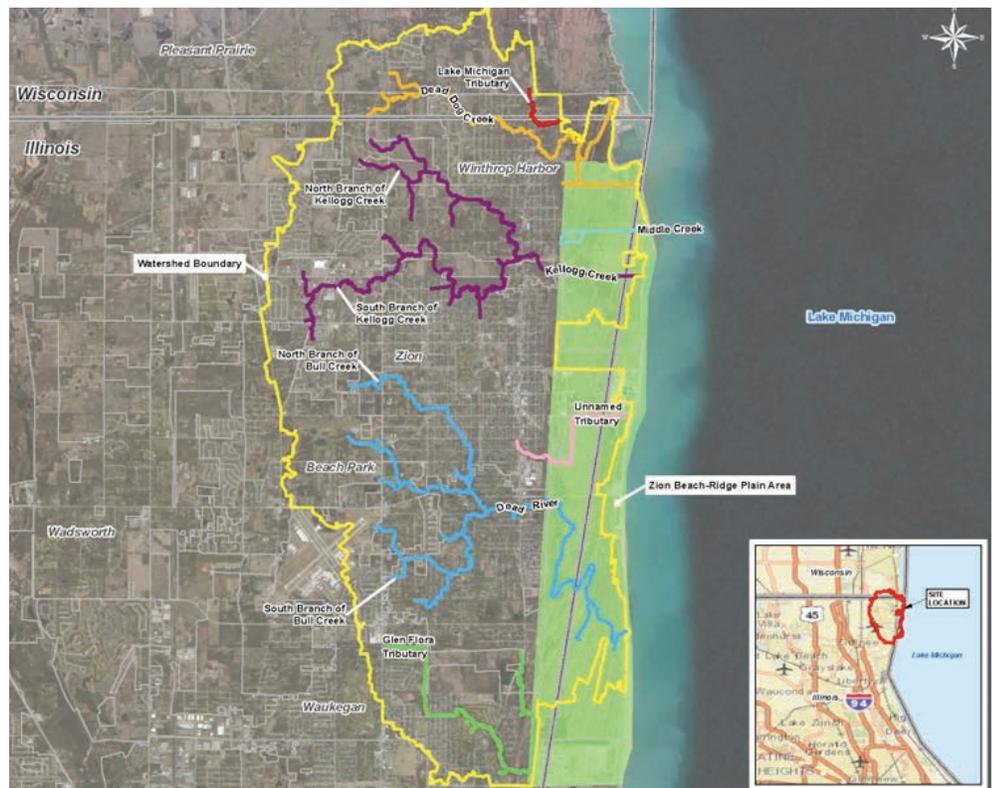
by Kristi Root and Tatiana Papakos, Tetra Tech

The U.S. Army Corps of Engineers (USACE)—Chicago District is preparing a feasibility study for the restoration of Zion Beach-Ridge Plain, located along Lake Michigan in northeast Lake County, Illinois. The watersheds that drain east to Zion Beach-Ridge Plain and Lake Michigan (approximately 24 square miles) were once historical marshes, ravines, and forests covering the region and have now been developed into the industrialized and urbanized environment present today.

This development and the resulting increase in impervious areas have changed the natural flow regime, making the watershed a “flashy” system that continues to deliver pollutants to the receiving waters. The restoration project seeks to reestablish and naturalize lake plain hydrology with the goal of restoring coastal zone native fish habitat and plant communities.

**Hydraulic and hydrologic models were developed for over 45 river miles and a watershed area over 24 square miles.**

To support USACE’s evaluation of restoration alternatives that would reduce impacts of the altered hydrology within the watershed, Tetra Tech conducted hydrologic and hydraulic (H&H) modeling of the entire watershed, which included Dog Creek,



Zion Beach -Ridge Plain and Contributing Areas

Lake Michigan Tributary, Kellogg Creek, Bull Creek, Dead River, Flora Tributary, Middle Creek, and an unnamed tributary to Lake Michigan. In order to complete the modeling project, data related to storm sewer networks were obtained and analyzed; manholes and outfalls were identified and surveyed to close data gaps in the storm sewer networks; channel, bridge, culvert, and weir field surveys were conducted in waterways within the watershed; geo-referenced storm sewer networks and H&H models were developed; and those tributary storm sewer networks that most contributed to the “flashiness” of the watershed were identified.

A large data collection and survey effort was conducted to incorporate the existing stormwater infrastructure into the H&H models, which required coordination with multiple cities and villages, Lake County Stormwater Management Commission (SMC), Lake County Forest Preserve, and the North Point Marina Harbor Master. A comprehensive database was developed utilizing ArcGIS to create storm sewer networks based on the data obtained in various formats including survey data, as-built drawings, and old city and village records. In addition, over 300 manholes and outfalls were surveyed to fill in data gaps in the

*(continued on page 11)*

# Hydrology and Hydraulic Modeling for Zion Beach-Ridge Plain Restoration

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storm sewer network and to check or “ground truth” the collected data. To reduce the survey efforts, survey data points focused on major trunk lines, feeder lines greater than 12 inches, major junctions, and areas upstream of major junctions.

Once the storm sewer network was completed, it was geo-referenced and incorporated into the hydrologic model. Over 400 cross-sections for channels, bridges, culverts, and weirs in the major streams were also surveyed and incorporated in the hydraulic model. The field surveys, done by Environmental Design International under subcontract to Tetra Tech, were conducted during the winter, and crews had to adapt and make adjustments for temperature to obtain complete and accurate data. The field surveys also helped identify past flooding and current erosion and bank stabilization problems along the streams.

The hydrologic analysis was conducted using the dynamic rainfall-runoff simulation model PCSWMM, a software developed by Computational Hydraulics International. The hydraulic analysis was conducted using Hydraulic Engineering Center River Analysis System (HEC-RAS). Model input data sets included the following:

- Digital elevation model (DEM) based on 1-foot Light Detection and Ranging (LIDAR) data for 2010 were used to supplement the survey data.
- Storm sewer network, merged with the DEM was used to delineate each sub-watershed, separating those portions serviced by storm sewer networks with outfalls to the streams from areas that drain naturally.
- ArcGIS and HEC-GeoHMS were used to perform the sub-watershed



Bank Erosion Area



Crew Surveying Outfall

delineations and develop hydrologic parameters for modeling.

- Land use data from Lake County for development through 2005 were used and updated using aerials for recent development changes.
- Soil data obtained from the U.S. Department of Agriculture (USDA) Natural Resource Conservation Center for Illinois were used to set the infiltration parameters.

Over 300 manholes  
and outfalls were  
surveyed, as well as,  
over 400 cross sections  
for channels, bridges,  
culverts, and weirs.

The H&H models developed for the watersheds draining to Zion Beach-Ridge Plain simulated both large storm events and low-flow events to present a complete picture of the watershed hydrology and hydraulics. Several storm durations and return periods were simulated and the analysis focused on the critical storm duration. The models were calibrated to available

flow data and water level measurements within each river.

At the conclusion of the project, over 45 river miles were successfully modeled in fourteen separate H&H models developed for the entire drainage area. The H&H models and survey efforts helped to identify “flashy” storm sewer networks and areas inundated by backwater effects within the watershed where restoration efforts should be concentrated. Should the local sponsors choose, the models could also be used to replace the existing effective regulatory models. USACE will utilize the models developed to evaluate restoration alternatives that will reduce the impacts of the altered hydrology, ultimately reestablishing native plant and fish communities within the watershed. **ASCE**

*Tatiana Papakos is a project manager and water resources engineer for Tetra Tech with 14 years of experience. She is registered as a Professional Engineer in the states of Illinois and Florida.*

*Kristi Root is a project manager and environmental and water resources engineer for Tetra Tech with 11 years of experience. She is registered as a Professional Engineer in the states of Illinois.*

# Permitting Subsurface Construction in the City of Chicago

The City of Chicago has specific permitting requirements for subsurface construction on public and private property. Detailed information may be found at the City of Chicago websites for the Chicago Department of Transportation (CDOT) for work in the public way and the Department of Buildings (DOB) for private property. Both departments utilize the Office of Underground Coordination.

The Office of Underground Coordination (OUC) is a distribution agency composed of private and public agencies that reviews proposed subsurface projects within the City of Chicago to prevent damage to existing infrastructure. The OUC is responsible for the protection of the City's surface and subsurface infrastructure from damage due to planned and programmed construction, installation and maintenance projects. The intent of OUC membership is to review proposed projects, in or adjacent to the right of way, prior to construction so that there is minimal damage to existing infrastructure.

## The OUC provides two types of reviews known as Information Retrieval and Existing Facility Protection.

The OUC provides two types of reviews known as Information Retrieval and Existing Facility Protection. In general, the projects are submitted for the information retrieval (IR) process when they are in the planning stages to obtain existing plans of other utilities in the public way in the vicinity of

their proposed work. Once the design drawings progress to at least 60 percent to 70 percent completion, the designer submits for existing facility protection (EFP); this is a narrower review of the new project with actual survey coordinates of the proposed work.

The OUC is made up of over twenty-five members from both City agencies and private entities who review IR and EFP documents to determine the effect specific requests will have on their existing facilities. Each member reviews individual IR and EFP requests, and then comments on them either by providing existing atlas information/record drawings, conflict notification and resolution requirements, or authorizing proposed construction/installation of new facilities.

## Existing Facility Protection (EFP)

The EFP process is required, as a minimum, for those projects listed below.

- New Installations
- Vault Work
- Adjacent To Freight Tunnel
- Geotechnical Review
- Harbor Permit

The EFP process is outlined in Figure 1 from the CDOT Rules and Regulations.<sup>1</sup>

The EFP is active for a one-year period from the Response Required Date; except in the area bounded by North Avenue, Halsted Street, Cermak Road and Lake Michigan where the EFP is active for a six-month period from the Response Required Date.

OUC permit issuance authorized is required from the EFP process prior to receiving a Right of Way permit or a Building Permit.

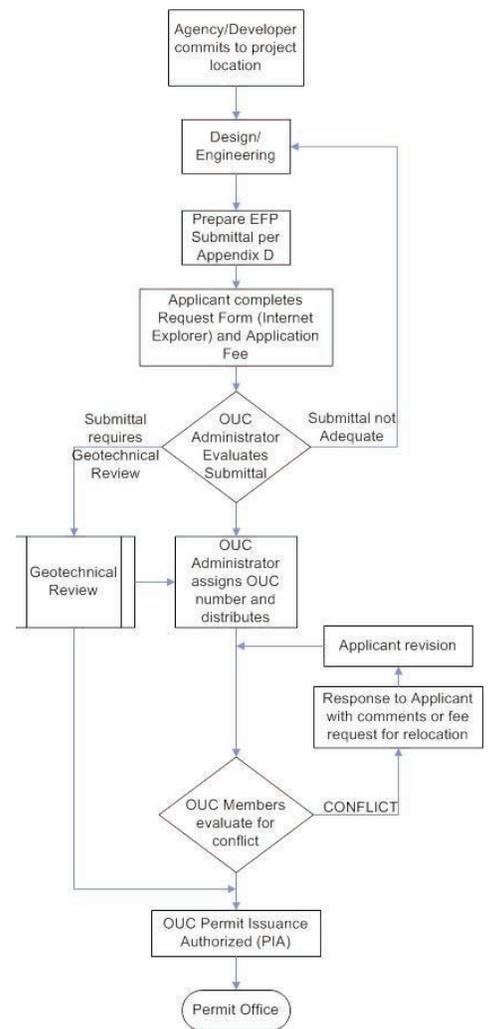


Figure 1: EFP Process<sup>1</sup>

## Geotechnical Reviews

Private and public developments that have excavations, foundations or earth retention systems that are equal to or greater than 12 feet below adjacent Public Way grade and/or excavations deeper than 4 feet that extend beyond the development's property lines and into the Public Way require a geotechnical review. Excavations that require shoring where the vertical element is less than 12-feet in depth may be

*(continued on page 13)*

# Permitting Subsurface Construction in the City of Chicago

(continued from page 12)

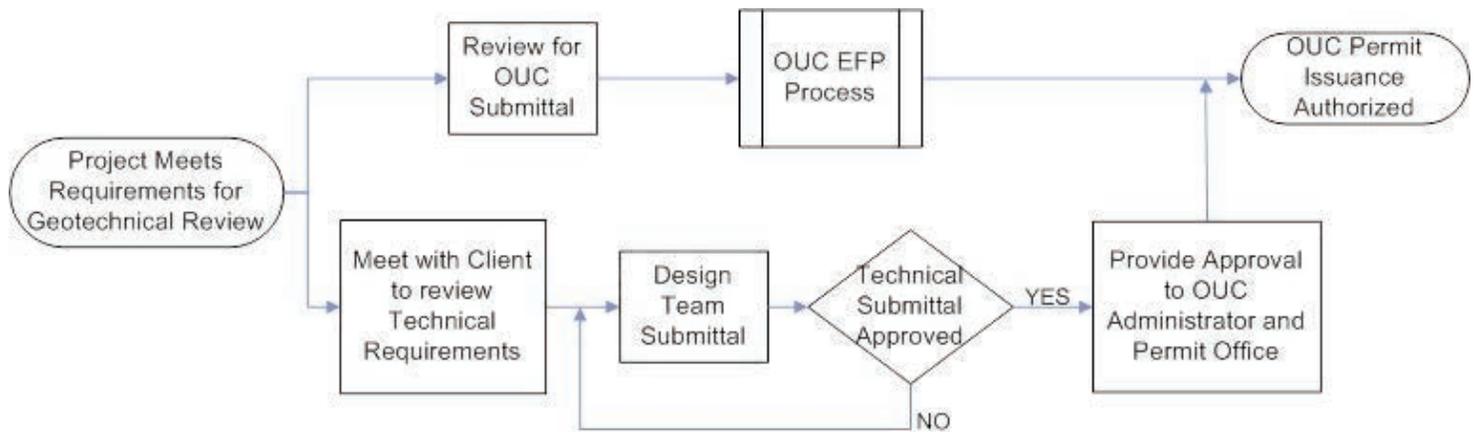


Figure 2: CDOT Geotechnical Review Process<sup>1</sup>

subject to a geotechnical review if there is a potential for damage to adjacent infrastructure, as determined by the OUC. The two departments who may perform the geotechnical review within the City are the Department of Buildings (DOB) and CDOT.

The geotechnical review includes a technical review and the EFP submittal to the OUC; these two paths are concurrent as shown in Figure 2. Both processes must be completed and approved prior to the OUC providing a permit issuance authorized to the Permit Office. Note, the geotechnical calculations are not required prior to the OUC EFP submittal.

For a building project, the owner must go through DOB to obtain a building permit, which includes a caisson-only or foundation permit (includes earth retention) for construction of all geotechnical elements on the project. This DOB foundation review is either performed in-house for general geotechnical elements or is given to an external peer reviewer for earth retention system design. Alternately, the owner of the project may go through Developer

Services (external technical review) for the DOB foundation review. If the project goes through Developer Services, the external review will be responsible for conformance of the drawing set for the (OUC) EFP submittal. For any infrastructure project, bridges, roadways, tunnels, etc., CDOT manages the project and is responsible for conformance of the drawing set for the (OUC) EFP submittal. CDOT typically works with an external reviewer for technical design calculation review.

In general, the geotechnical technical review includes a site specific geotechnical report with appropriate in situ and laboratory testing, settlement and bearing capacity calculations, slope stability analyses, installation and load testing procedures for deep foundations and design and drawings for earth retention systems. Computer generated calculations are not accepted. Specific guidelines for Department of Buildings and CDOT, including professional sealing requirements, can be located on the City of Chicago Websites for the two departments.<sup>2,3</sup> **ASCE**

## References

1. City of Chicago Department of Transportation Rules and Regulations for Construction in the Public Way. City of Chicago Department of Transportation, Chicago, January 2014.
2. [http://www.cityofchicago.org/city/en/depts/bldgs/supp\\_info/geotech-ouc\\_reviews.html](http://www.cityofchicago.org/city/en/depts/bldgs/supp_info/geotech-ouc_reviews.html)
3. [http://www.cityofchicago.org/city/en/depts/cdot/provdrs/construction\\_information/alerts/2013/dec/RulesandRegs.html](http://www.cityofchicago.org/city/en/depts/cdot/provdrs/construction_information/alerts/2013/dec/RulesandRegs.html)

## Acknowledgments

This article references and highlights the 2014 CDOT Rules and Regulations and was compiled by staff of the CDOT Project Coordination Office and the Department of Infrastructure Management.

Contributors include:

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Jai Kalayil, CDOT Office of Underground Coordination

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Dhooli Raj, P.E., CDOT Project Coordination Office

# A New Twist on an Old Friend: Non-Planar Precast Concrete Pavement

(continued from page 1)

(approximately 15 percent) at this interchange are high. Prior to the toll plaza, three feeder lanes converge. At the toll plaza, those three lanes widen to five lanes (three I-PASS lanes and two cash lanes). After the toll plaza, those five lanes narrow to two lanes before crossing the I-294 ramp bridge. After the ramp bridge, those two lanes merge on to I-294 northbound.

A ramp had to be reconstructed using PCP, due to its geometrics that necessitated the new twist of non-planar PCP. This ramp had a narrowing pavement width, reverse horizontal curves with associated superelevation and superelevation transitions, and a vertical sag curve.

The ramp included three sections of existing asphalt pavement with different compositions and ages, and two sections of existing concrete pavement. A pavement condition assessment yielded Condition Rating Survey scores ranging from five to six. Narrative results cited major impacts on the asphalt sections, including both frequent medium-severity transverse cracking and medium-severity centerline deterioration. Additionally, the concrete sections exhibited moderate to high levels of roughness and faulting, high levels

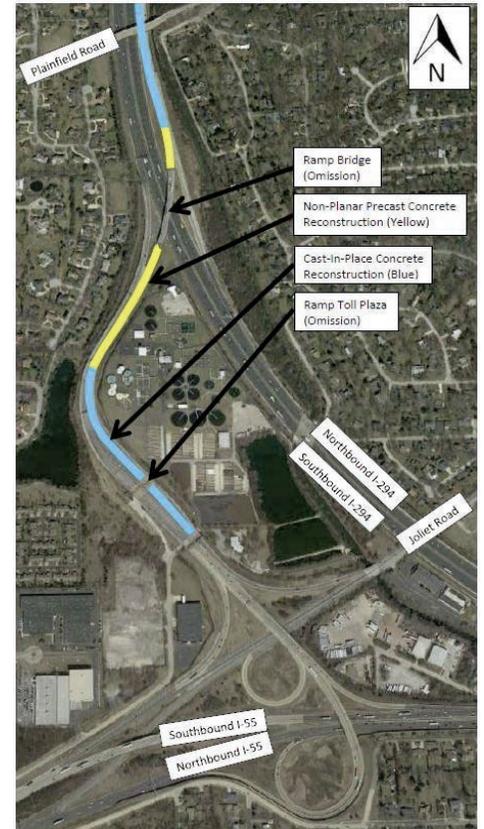
of frequent transverse cracking, and moderate levels of joint deterioration. It should be noted that the toll ramp plaza proper and the ramp bridge were omissions from this project.

Now, with a basic understanding of this ramp, let's focus on its cross-sectional constraints to understand why PCP was utilized for its reconstruction.

The two-lane section before, across, and after the I-294 ramp bridge is the critical cross section because the ramp is at its narrowest. In this section, the left shoulder is 1 foot wide to a median barrier wall, and the right shoulder is a standard 10 feet wide. Additionally, the right side foreslope steepens to beyond 1:3 vertical-to-horizontal ratio as the ramp approaches the I-294 ramp bridge making the construction of temporary pavement impractical. Therefore, while approximately three lane widths are available in the northbound direction, two of those lanes were required for construction activities, leaving just one lane for temporary traffic.

Due to the ramp's high traffic volume, extended lane closures were not allowed, meaning a minimum of two lanes of traffic had to remain open in the daytime during peak traffic hours throughout construction. This requirement, in combination with the critical cross section, yielded insufficient horizontal width for the maintenance of two traffic lanes in the daytime during construction.

Accordingly, the plans were revised to include a combination of cast-in-place construction methods during the daytime, where horizontal width was sufficient to maintain two lanes, and PCP construction methods during the nighttime and on the weekends, when a reduction to one traffic lane was allowable.



Location Map: I-294 ramp at I-55

Now that it was established that a portion of this ramp had to be reconstructed using PCP, let's focus on its geometrics that necessitated the new twist of non-planar PCP.

PCP was required in two sections: a 1,130-foot section south of the I-294 ramp bridge omission and a 325-foot section north of the I-294 ramp bridge omission. In the more complicated southern section, this ramp had a narrowing pavement width from three lanes to two lanes, reverse horizontal curves with associated superelevation and superelevation transitions, and further complicated by a vertical sag curve. In the northern section, the ramp had a horizontal curve and a vertical curve. As a result of these geometrics,

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# A New Twist on an Old Friend: Non-Planar Precast Concrete Pavement

(continued from page 14)

non-planar PCP panels were necessary. This was the first use of continuously placed multi-lane non-planar PCP in the state of Illinois.

Geometrics like this ramp require more attention during design, fabrication and installation than a typical application of PCP. Here are a few considerations:

- **Survey** – An accurate three-dimensional survey with total station of the existing roadway surface is essential. The survey should include, but not limited to, pavement elevations, vertical profiles (i.e., crest and sag curves), cross slopes (i.e., crowns) and breaklines. Aerial mapping and GPS cannot currently achieve the necessary level of accuracy. Additionally, the precast contractor should be made ultimately responsible for ensuring that the precast slabs meet the existing pavement/approach slabs on each end of the new installation.
- **Connections to Existing Pavement/ Approach Slabs** – PCP should be connected to existing pavement with a dowel bar retrofit application, and the PCP should be connected to approach slabs with pressure-relief joints. Both of these connections should be included in the cost of the PCP.
- **Features Adjacent to PCP Construction** – When considering the use of PCP, the adjacent features must be considered. For instance, PCP should not be installed adjacent to a median barrier wall or curb and gutter section that is substandard, deteriorating, etc. Ideally, PCP should be installed next to a solid clean edge.
- **Underdrains** – No underdrains should be proposed beneath the PCP.
- **Two- to Three-Month Design Window for Contractor** – The precast

contractor should be given a two- to three-month design window following contract award. This window consists of survey, design, fabrication and curing.

- **Full-depth Non-compressive Shims** – Prior to opening PCP to traffic for the morning peak hours, full-depth non-compressive shims must be installed to better hold panels in place temporarily.
- **Diamond Grinding** – Post-installation diamond grinding is an absolute must and an industry standard for PCP. It is necessary to smooth out elevation differences from one panel to the next. However, diamond-grinded pavement is preliminarily white in color, making white pavement markings difficult to see. One countermeasure is to contrast white-on-black pavement markings over the grinded surfaces.

In summary, the placement of continuous non-planar PCP panels for a long section of roadway, the first of its kind in the state of Illinois, was a success for the Tollway for many reasons, with the most important one being reduced impacts on the motoring public. This project proved that PCP can be applied to situations other than pavement patching with planar or flat panels. It was made possible by prime contractor R. W. Dunteman Co. and precast contractor The Fort Miller Co. Inc. **ASCE**

*Brian L. Pawula, P.E. is a Project Manager for Thomas Engineering Group, LLC, a director through 2015 for the Illinois Section of ASCE, and the advertising director for the Illinois Section of ASCE. This article was written on behalf of the Transportation & Development Institute, of which Brian was a former chair.*



Non-Planar PCP installation during the nighttime

In an effort to inform Illinois Section members of the discussions at the monthly Board meetings, the Section Secretary contributes this monthly article to the newsletter. Any questions or comments on the Board activities are welcome by contacting Thera Baldauf, at [thera.a.baldauf@mwhglobal.com](mailto:thera.a.baldauf@mwhglobal.com)

### ■ *Treasurer's Report*

▲ A treasurer's report was presented at the June and August Meetings. There was no July meeting. All reports were approved with no changes.

### ■ *Group Reports*

▲ Groups presented a written report outlining previous and current month's activities.

▲ **ACEC-IL Update** – Dave Bender of ACEC provided a report at the August meeting on some of the legislation his organization has been recently tracking. He wanted to thank the Illinois Section for providing support and its financial contribution that helped issue a temporary stay on issues being sought after by organized labor, the Capital Development Board and the Illinois Department of Labor that could have an impact to the professional design industry.

▲ **Illinois Report Card Public Relations** – Big thank you to Andrew Keaschall who provided an interview on the Report Card to ABC 5 Chicago on the behalf of the Structural Institute Group and the Illinois Section. WTTW PBS emailed the Section and will be doing an article on the Report Card as well. National has

recommended that the Section hire a PR firm for further promotion of the Report Card which is eligible for a SPAG grant. Governor Olson will pursue the SPAG grant. Please contact Governor Olson for additional copies.

▲ **Annual Dinner/Awards Update** – This year's Annual Awards Dinner will be held on October 30, 2014 at Cellular field. Mark your calendars! The link is up, but pricing needs to be finalized. About 20 nominations were received this year.

▲ **Region 3 Assembly and Attendance** – The Region 3 Assembly was held in Chicago on August 15 and 16. Four Section Board members and three additional Section Members were in attendance. A motion was presented and approved at the June meeting to cover the application fees for up to 10 Board and Committee members to attend the assembly with Board Members to receive priority.

▲ **Website and Communications** – Legislative outreach pages are in the process of being added to the Section website as well as a "click to connect" through the help of National to obtain form letters to send to congressman and legislatures.

▲ **Presidents and Governors Forum** – The Presidents and Governors Forum will be held in Reston, Virginia on September 21 and 22. Treasurer Gora will attend on the behalf of the Section.

▲ **Golf Outing** – There were nearly 80 attendees who attended this year's golf outing. Seven Bridges is becoming too expensive for the Section to continue to host golf outings. The golf committee will be looking at alternative golf courses after the 2-year contract expires with Seven Bridges.

▲ YMG provided a presentation on their participation in the CANstruction at the Merchandise Mart August 13 and 14 and will be open to the public for the following 2 weeks. YMG's theme this year is Chi-beria and their fundraising goal is \$5,000. A motion was presented and approved at the June meeting for a \$1,000 sponsorship on condition that YMG fill out a funding request and provide a report to the Section Board after the event.

The Illinois Section Board Meetings are held every first Monday of every month with the exception to holidays. The next board meeting is scheduled for September 8, 2014 at 5:30 pm at MWH Americas, Inc., 175 West Jackson Blvd, 19th Floor. Meetings for the remainder of 2014 will be held on October 6, November 3, and December 1.

By Thera A. Baldauf  
[thera.a.baldauf@mwhglobal.com](mailto:thera.a.baldauf@mwhglobal.com)

## Section Activities

### EWRI

#### Monthly Committee Meeting

**Date:** Tuesday, September 9  
**Time:** 5:30 pm  
**Place:** Baxter & Woodman  
8430 W. Bryn Mawr Ave, Suite 400  
Chicago, IL 60563  
**RSVP:** [ewr.ilasce@gmail.com](mailto:ewr.ilasce@gmail.com)

### SEI

#### Dinner Meeting—Design and Construction of the Chicago Riverwalk

**Date:** September 10  
**Time:** 5:30 pm  
**Speakers:** Kurt Naus P.E., S.E.  
Project Manager with  
Alfred Benesch and Company  
Andrew Keaschall P.E., S.E.  
Project Manager with  
Alfred Benesch and Company  
**Place:** Elephant and Castle  
111 W. Adams Street  
Chicago, IL  
**Cost:** \$45 with reservation  
\$30 government/education with  
reservation  
\$20 full time students with reservation  
\$50 at the door or after RSVP date  
*Make checks payable to "ASCE  
Structural Group"*  
**PDH:** 1.0  
**RSVP:** Marcin Krok at  
[asce.il.struct@gmail.com](mailto:asce.il.struct@gmail.com)  
by September 5th

### Geo-Institute

#### Dinner Meeting—Solutions for Geotechnical Problems with CRANES, TRAINS and AUTOMOBILES: Successes and Things Not to Do

**Date:** September 17  
**Time:** 5:30 pm Cocktails,  
6:15 pm Dinner  
Presentation following dinner  
**Place:** Pazzo's at 311  
311 S Wacker Dr.  
Chicago, IL 60606  
*Parking is located south of the  
building - \$9.00 after 5:00 pm*  
**Cost:** \$45 with reservation  
\$35 Education/Government  
\$25 for students (with reservations)  
\$50 at the door OR if you call after  
RSVP date  
*Make checks payable to "ASCE  
Geotechnical Group"*  
**Contact:** Dhooli Raj at  
[asceilgeotech@gmail.com](mailto:asceilgeotech@gmail.com)

### T&DI in Conjunction with ITE

#### Illiana Corridor Study, P3 Process, and Next Steps Moving Forward

**Date:** September 18  
**Time:** 11:30 am  
**Presenter:** Steve Schilke  
District One Bureau of  
Programming Major Projects Unit  
Head at the Illinois Department  
of Transportation (IDOT)  
**Place:** Maggiano's Schaumburg  
1901 E Woodfield Rd  
Schaumburg, IL 60173

For more information or questions,  
contact: Jessie Slaton at 312.294.5682  
or [slatonjl@pbworld.com](mailto:slatonjl@pbworld.com)

### EWB Chicagoland Professional Chapter

#### Fall Book Club

**Date:** Thursday, September 18  
**Time:** 6:00 pm  
**Place:** Demera Ethiopian Restarurant  
4801 N. Broadway  
Chicago, IL 60640  
**RSVP:** Gil Cabrera, Membership Chair, to  
be placed on mailing list for contin-  
ued information about book club  
activities at [membership@ewb-usa-  
chicago.org](mailto:membership@ewb-usa-chicago.org).

### EWB Chicagoland Professional Chapter

#### 5th Annual 9-Hole Golf Outing

**Date:** Thursday, September 25  
**Time:** 2:30 pm—Shot Gun Start  
**Place:** Maple Meadows Golf Course  
272 South Addison Road  
Wood Dale, IL 60191  
**Cost:** \$75.00/Person  
\$300.00/Foursome  
Price includes golf cart, green fee,  
hot dog or bratwurst with chips.  
For more information or questions, contact:  
Rod Beadle, [rbeadle@eraconsultants.com](mailto:rbeadle@eraconsultants.com),  
(630) 918-7716

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## Section Activities

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### Geo-Institute

*Case Studies: Unique Aspects of Earth Retention and Underpinning*

**Date:** October 8

**Time:** 5:30 pm Cocktails,  
6:15 pm Dinner  
Presentation following dinner

**Speakers:** Allen Hughes and  
Michael Wysocky  
Thatcher Foundations

**Place:** TBD

**Cost:** \$45 with reservation  
\$35 Education/Government  
\$25 for students (with reservations)  
\$50 at the door OR if you call after  
RSVP date

*Make checks payable to "ASCE  
Geotechnical Group"*

**Contact:** Dhooli Raj at  
[asceilgeotech@gmail.com](mailto:asceilgeotech@gmail.com)

### Illinois Section - ASCE

*2014 Annual Dinner*

**Date:** Thursday, October 30

**Time:** 5:30 pm—Cocktails and Appetizers  
6:30 pm—Dinner & Awards  
Presentation

**Place:** U.S. Cellular Field, the home  
of the Chicago White Sox

**Register:** [www.123signup.com/register?id=byzgn](http://www.123signup.com/register?id=byzgn)

### Geo-Institute

*ASCE Illinois Report Card – Impact on the  
Practicing Civil Engineer*

**Date:** Wednesday, November 12

**Speaker:** Darren Olson

**Place:** Parthenon Restaurant  
314 S Halsted St  
Chicago

**Contact:** Dhooli Raj at  
[asceilgeotech@gmail.com](mailto:asceilgeotech@gmail.com)

### Other Activities

#### Illinois State Toll Highway Authority

*Highway Beautification Act and Control  
of Outdoor Advertising Workshop*

**Date:** November 5-6 (2-Day seminar)

**Time:** 9:00 am-4:30 pm

**Presenter:** Clyde Johnson

**Host:** Illinois Tollway

**RSVP:** Mary Gerut at  
[mary.gerut@ch2m.com](mailto:mary.gerut@ch2m.com) before  
September 30 to reserve a space

**For all Section, Group  
and Committee events,  
check out the Section  
website at:  
[www.isasce.org/calendar](http://www.isasce.org/calendar)**