



**ASHE**

# Scanner

Fall 2015

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**ASHE Chesapeake Section  
Recaps 2015 National  
Conference**

*See page 12*

**Variable Speed Limits  
Drive More Safety and  
Efficiency on I-285,  
Georgia**

*See page 21*



**Public and Private Partnership  
Constructs New I-90/Nagel  
Road Interchange**

*See page 26*



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**Robert A. Hochevar, PE**

ASHE National President 2015-2016



## New Directions

I hope you enjoyed the summer, although it always seems to go by so quickly. I wish the cold and snowy winters in northeast Ohio would go by that fast!

The first digital edition of the *scanner* was completed with the summer edition in July—it looks and functions great! Many thanks to the *scanner* committee for all their hard work and time spent in making this technological tool a reality. Hopefully, you have received the email blasts with URL link that announces to the membership that the digital magazine is ready for viewing. The digital edition can also be accessed directly from the ASHE website.

On June 9, I had the honor, along with Sam Mody, Immediate Past National President, to be part of the Dallas-Fort Worth Section Chartering Ceremony and Installation of Officers. This was a historic event, since this is the first ASHE Section in Texas. Of course, things are always done big in Texas, so I guess it is no surprise that there were a total of 51 Charter Members! The Dallas-Fort Worth Section is now also the first Section in the South Central Region. Initially, the Dallas-Fort Worth Section will participate on the Southeast Region Board until additional Sections are chartered in the geographic area of the South Central Region. Prior to the evening ceremony, the day started off at noon with a five-hour Board Retreat/Strategic Planning Session with brainstorming and planning of events, meetings, membership initiatives, goals, etc., for the upcoming year. Jennifer Yoder, Dallas-Fort Worth Section President, and the other officers and Directors are well on their way in leading a successful and vibrant Section. Congratulations to the entire Dallas-Fort Worth Section!

ASHE provides many opportunities for individuals to become involved at the local, Region and National levels. The ASHE Organization Chart on page 14 shows the various Officer and Director positions on the Region and National levels. In addition, there are many committees at all levels of our organization that provide opportunities for involvement. Being involved with ASHE has been a rewarding experience for me both professionally and personally. I encourage and welcome you to become involved. If you are currently involved, thank you for your hard work and time in making ASHE the great organization that it is.

The National Board and committee members were off and running on accomplishing our many initiatives for this year soon after the board meeting at the National Conference in Baltimore. I have had the opportunity to participate in several of the committee meetings/teleconferences over the summer, so I can attest that they are working hard and things are moving forward.

Some of the accomplishments and initiatives worked on over the last few months include:

- The 2015-2018 Strategic Plan has been completed and posted to the website. This document is updated every three years. The Strategic Plan is our organization's guiding document that communicates our goals and the actions needed to achieve those goals. The actions serve to maintain and continually reaffirm the Vision, Mission and Values of ASHE. As we look to the future, we must continue to focus on those activities that have contributed to the continued success of the organization as we plan the future stability and growth of ASHE.

*(continued on page 15)*

# In This Issue



**6** Clearfield ASHE Tours Beaver Stadium



**18** Diverging Roadways, Emerging Solution



**26** Public and Private Partnership Constructs



**32** South Mountain Freeway Development

- 3- New Directions; President's Message
- 6- Clearfield ASHE Tours Penn State's Beaver Stadium
- 9- As The Wheel Turns
- 10- Virginia Tech Transportation Institute Researches How to Make Traveling Through Traffic Lights Safer, Smarter and Cheaper
- 12- Chesapeake Section Hosts ASHE 2015 National Conference
- 14- ASHE Organizational Chart
- 16- MileMarkers
- 18- Diverging Roadways Result in an Emerging Solution
- 21- Variable Speed Limits Drive More Safety and Efficiency on I-285
- 26- Public and Private Partnership Constructs New I-90/Nagel Road Interchange
- 32- Story of South Mountain Freeway Traces Development of Phoenix

**on the COVER**  
Variable Speed Limits Drive  
More Safety and  
Efficiency on I-285  
ASHE Georgia Section

See page 21

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As your new publisher and managing editor, I am inspired—and humbled—by your faith in me to carry on John’s wonderful work with the *scanner*. I have big shoes to fill!

My heart’s intent is to portray a cohesive, professional image for the *scanner* that is of the utmost quality—a polished magazine that will motivate many more to become a part of the outstanding ASHE organization. With your support, I will use my design experience and expertise to help convey the message that ASHE is, indeed, a forward-looking, progressive organization, committed to gaining additional credibility and recognition from both the public and government sectors.

This past May I had the privilege of attending the ASHE National Conference in Baltimore, and what a pleasure it was to finally meet many more ASHE members and “put faces with names” of those with whom I had previously communicated only by email. And certainly, one of the highlights of the Conference for me (and I hope for all of you) was the debut of the *scanner digital edition*, another excellent way to attract an expanded audience to ASHE!

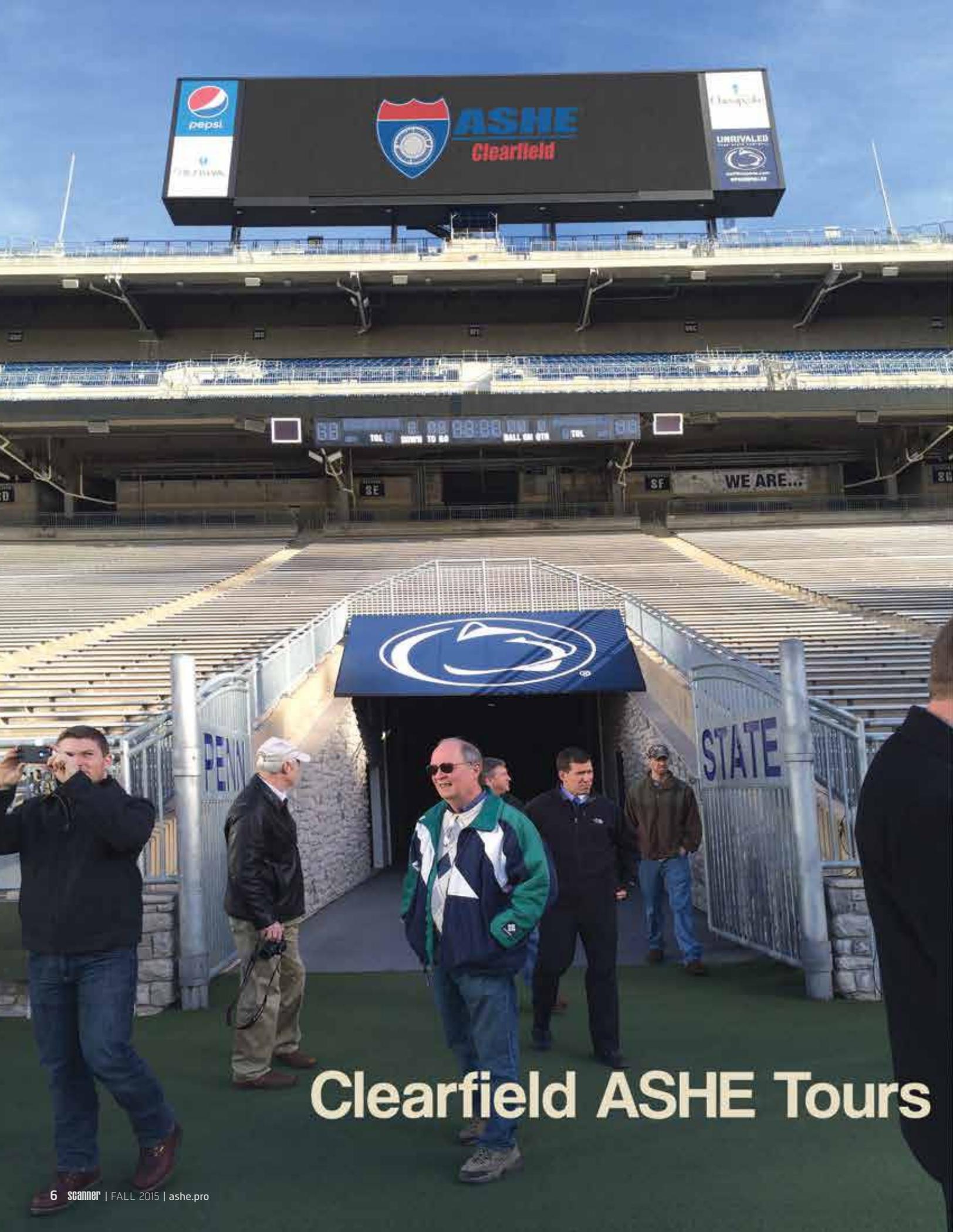
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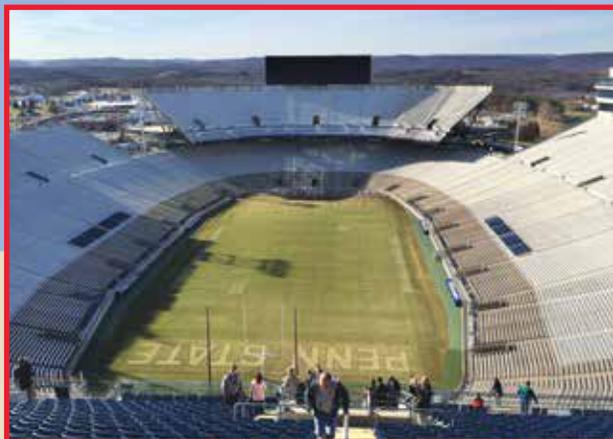
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STATE

# Clearfield ASHE Tours



**A**SHE Sections are always looking for interesting tours or subjects for their meeting programs. That search can often be challenging, since everyone wants to do something “cool,” while taking part in an activity that is also substantial. One afternoon this past March, the Clearfield Section met both of those goals with a comprehensive tour of Beaver Stadium—home of Penn State’s Nittany Lions.

More than 60 ASHE members and guests gathered in the lobby of the stadium’s Suites entrance to start their tour. They were welcomed by tour guide Terry Hansel, Penn State’s Facilities Project Coordinator at the Office of Physical Plant.

The tour officially began in one of the Private Suites and moved to the Presidential Suite. While in the Presidential Suite, Hansel explained the comforts that the 60 Private Suites offer—including windows that open to allow for better air circulation as well as access to the stadium crowd noise for an “inside but outside” football atmosphere. These Skybox suites sit above the East stands and were a part of an expansion completed before the start of the 2001 football season.

At an outer deck area, the group took in views of State College and the surrounding area before moving inside to a room being prepared for a wedding and reception—complete with guest chairs, bunting, and ceremony arch. It was easy

to picture the wedding couple reciting vows under the Blue & White.

Later, the tour gathered in the Letterman’s Lounge, where they met long-time Penn State employee Brad “Spider” Caldwell, who shared a few stories and discussed the mementos and memorabilia on display. Just outside the Letterman’s Lounge, the group saw the Press Conference area and then headed to the team’s locker room. Many of its cubicles displayed football jerseys, and mannequins placed around the room gave visitors a feel for the history of game days at Penn State.

From the locker room, it was a short walk underneath the stands to the field entrance and the field itself. Although the group could not step onto the playing field, they appreciated the grandeur of the stadium from the players’ perspective.

Throughout the tour, Hansel fielded questions about the stadium regarding security issues, challenges that come with stadium expansions and typical game day hours for him and his staff. Clearfield Section members left Beaver Stadium with a new appreciation not just for the facility, but for those who work there.

Beaver Stadium is the second largest sports stadium in the nation, holding 106,000 people. To learn more about the stadium, go to <http://www.gopsusports.com/facilities/beaver-stadium.html>. 

# Penn State’s Beaver Stadium

by Marla Fannin, PIO PennDOT District 2/**ASHE Clearfield Section**, ASHE President 2013-2015



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# AsTheWheelTurns

ASHE Members on the Move!



## Bywaletz Named Owner by Gresham, Smith and Partners

**Michael Bywaletz, PE**, President of the **ASHE Georgia Section** and senior engineer in the transportation market of Gresham, Smith and Partners (GS&P), has been named an owner. Bywaletz joined GS&P in 2007 and has 28 years of experience in the transportation and hydrological design industry, including projects related to roadway and drainage design, floodplain analysis and erosion control. He is also a market-wide leader in green infrastructure and natural system solutions. Bywaletz graduated from the University of Central Florida with a Bachelor of Science degree in Civil Engineering.



## Veydt to Serve on ACEC/PA Board of Directors

**D. Eric Veydt, PE, ENV SP**, a member of the **ASHE Pittsburgh Section**, has been named to the Board of Directors of the American Council of Engineering Companies of Pennsylvania (ACEC/PA). Veydt, a Vice President at Gannett Fleming's Pittsburgh office, where he is the National Highway Practice Manager and Office Transportation Manager, will serve as an ACEC/PA Director through 2017. He was President of the Western Chapter of ACEC/PA for the 2014-2015 term.

ACEC/PA is the largest statewide organization for consulting engineering. The organization's goal is to enable member firms to provide quality engineering services that best serve the interests of their clients and the public. "By joining the ACEC/PA Board of Directors, Eric is proving his commitment to both improving the statewide transportation industry and serving Gannett Fleming's clients," said John Kovacs, PE, PMP, D.GE, a Gannett Fleming Senior Vice President and Director of the Midwest Region.

With more than 32 years of experience with Gannett Fleming, Veydt directs and coordinates transportation projects, including the preparation of environmental documents, public and agency presentations and preliminary and final design plans. He is also responsible for the management of the Pittsburgh Transportation Group, overseeing project staffing and personnel development.

Throughout his career, Veydt has served as the project manager for many transportation projects throughout Pennsylvania. Recently he was the project manager for the award-winning Pennsylvania Department of Transportation, District 11-0, Squirrel Hill Tunnel Rehabilitation project. The \$50 million project improved tunnel safety and reduced congestion along I-376, the main roadway serving Pittsburgh from the eastern suburbs and providing access to the Pennsylvania Turnpike.

Veydt holds a Bachelor of Science in Civil Engineering from Penn State. He is a registered Professional Engineer in Pennsylvania, West Virginia and Kentucky, as well as a licensed Professional Engineer in Manitoba, Canada. He also earned the Envision® Sustainability Professional (ENV SP) credential from the Institute for Sustainable Infrastructure.

In addition to his membership in ASHE and ACEC/PA, Veydt is active in the American Society of Civil Engineers and the Pennsylvania Highway Information Association.

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# Virginia Tech Transportation Institute Researches How to Make Traveling Through Traffic Lights Safer, Smarter and Cheaper

by Michael Dunn, **ASHE Blue Ridge Section**,  
in conjunction with Steven Mackay, Virginia Tech  
College of Engineering

**V**irginia Tech Transportation Institute researchers' new project could change the way motorists navigate through traffic lights, making the everyday action safer, smarter and cheaper—the latter by cutting fuel costs and, likewise, reducing pollution.

The effort is designed to keep vehicles as close to “fuel optimum speed” as possible, basically that sweet spot when a car’s speed is sufficiently high but fuel use is at a minimum with little slow-and-go maneuvering. Leading the study is Hesham Rakha, Director of the Transportation Institute’s Center for Sustainable Mobility (<http://www.vtti.vt.edu/research/csm/>) and the Samuel Reynolds Pritchard Professor of Engineering with the Charles E. Via, Jr., Department of Civil and Environmental Engineering (<http://www.cee.vt.edu/>).

Rakha and his team have been putting volunteer drivers through a series of real-world tests at the Virginia Smart Road (<http://www.vtti.vt.edu/facilities/virginia-smart-road.html>), located at the Institute’s Blacksburg campus, where the very idea of how participants enter an intersection will undergo a great change due to automated-vehicle technology. (The project for now involves cars only, not trucks or buses.)

Called Eco-Cooperative Adaptive Cruise Control, this in-development driver-assistance, connected-vehicle technology tool can assist the motorist in, or fully automate the action of, slowing or accelerating a vehicle according to the traffic light ahead, whether it is red, green or yellow.

Through connected infrastructure installed on the side of the road, a vehicle equipped with the Eco-Cooperative



Virginia Tech Transportation Institute's Hesham Rakha, at left, and Hao Chen conduct tests on the Virginia Smart Road to change how motorists could one day drive through traffic light intersections.



technology will “know” when the light ahead will change color. Removing the guesswork will improve the driving experience for driver and car, said Rakha. “This is important to drivers, because it will enhance safety, reduce their fuel consumption, delay or reduce idling and definitely reduce wear and tear of the vehicle,” he said, adding that the more drivers use the technology in a given area, the more they would boost overall savings of fuel. “The hook will be safer driving and fuel savings that they can achieve from this system.”

Every act of acceleration, braking and idling deviates the car from its fuel optimum speed, reducing fuel efficiency, said Rakha. The so-called “dilemma zone”—when the light is briefly yellow before turning red—will be considered. “From an environmental and traffic mobility standpoint, it is better that drivers run a yellow light if they can do so prior to the traffic signal turning to red. This basically reduces the queue length upstream of the traffic signal by one vehicle and also eliminates a full stop.”

Using either computerized assistance for the driver or automating all acceleration or deceleration actions, a driver can see fuel savings as high as 30 percent in more than two dozen top-sold vehicles in the United States, said Raj Kishore Kamalanathsharma, a senior consultant at Booz Allen Hamilton, who was Rakha’s research partner in Virginia Tech’s Civil Engineering program when the two wrote their study proposal.

“The average reduction in the total delay reaches 65 percent within the vicinity of traffic signalized intersections,” Rakha and Kamalanathsharma wrote in their research proposal for the test project. “The results also demonstrate that at levels of market penetration less than 50 percent, the system does not produce system-wide fuel and delay savings.”

In some cities, the Eco-Cooperative could become a reality within five years, added Rakha. Connected-vehicle technology already is a growing trend, led in part by the Institute, which has been conducting research in the field since 2001. In 2014, the U.S. Department of Transportation called for an eventual requirement for vehicle-to-vehicle communication technology in all cars and light trucks on the nation’s highways.

The Institute was tapped to design the integration framework that would allow vehicles to “talk” with drivers and with other automobiles on the roadway, in addition to highway wireless infrastructure and devices.

The Institute, in partnership with the Virginia Department of Transportation, previously launched a \$14 million connected-vehicle test bed near Fairfax, VA—one of the most congested corridors in the nation—that contains dozens of wireless infrastructure devices along roadways, all communicating with dozens of cars, trucks and motorcycles equipped with wireless technology. The system launched in 2013.

During the Eco-Cooperative study on the Smart Road—where wireless infrastructure devices are installed—test scenarios will include allowing the car to take full driving control as it enters an intersection, or assisting the driver, in part, when entering the section or merely making an oral suggestion to the driver on what action to take as he or she nears a signalized intersection. *(continued on page 20)*



# Chesapeake Section Hosts 2015 ASHE National Conference

Inner Harbor, Baltimore, MD

This year's National Conference in Baltimore, MD, was hosted by the Chesapeake Section and Mid-Atlantic Region at the Renaissance Baltimore Harborplace Hotel in Baltimore's Inner Harbor. More than 480 ASHE members, their families, speakers, sponsors and exhibitors joined the 2015 Conference Committee and volunteers for meetings, continuing education courses, special events in and around the Inner Harbor and the chance to enjoy the hospitality room with a view of the Inner Harbor.

The Conference began on Wednesday with early registration, and many participants attended a Baltimore Orioles baseball game. While not part of the itinerary, this and other tourist attractions, such as the National Aquarium, gave families and visitors ample options for fun and helped the Conference also serve as a destination trip.

On Thursday, 115 attendees started their day with a round of golf at the Woodland's Golf Course. The event included gifts, prizes and lunch following the golf round.

Guests could also take tours of the B&O Railroad Museum, sightsee on the Baltimore Trolley or just hang out in the Inner Harbor and follow their own sightseeing agenda. Thursday concluded with the Icebreaker/Welcome party in the Exhibit Hall, where more than 35 vendors, suppliers, companies and partners participated in games, including "Baltimore Bingo," with prize drawings.

Friday's Opening Session featured two keynote speakers: Dennis Schrader (Maryland Department of Transportation Deputy Secretary of Policy, Planning and Enterprise Services) and David Kim (FHWA Associate Administrator for Policy and Governmental Affairs), both supporters of ASHE's mission and values.

Friday's activities also included technical sessions, meetings and guest tours, including trips to historic Fells Point and Fort McHenry (birthplace of our country's national anthem). Concurrent with the morning technical sessions was a meeting with National, Region and Section representatives, where everyone had the opportunity to share experiences, techniques and initiatives underway at the various levels of the organization.

Later on Friday, attendees visited Baltimore's Top of the World observation facility for a view of the Inner Harbor and Baltimore from the 26th floor.

On Saturday, attendees could take a technical tour of the I-95 Express Toll Lanes project and attend two additional technical sessions at the hotel. Guests could visit the Sports Legend Museum at historic Camden Yards.

On Saturday night, participants attended the President's Reception and Annual Banquet and Gala. The awards ceremonies were held after dinner, along with the swearing in of the 2015-2016





National Board of Directors Officers and National Directors President Mody introduced the new National President, Robert Hochevar, who presented his vision on some of the initiatives and goals he hopes to accomplish during his term.



The ASHE 2016 National Conference Co-chair Pat Kane and Committee Member Kathryn Power invited all members to join them in Pittsburgh in late May 2016, with their "Connecting the Next 50 Years" presentation and video.

ASHE thanks the 2015 National Conference Committee and volunteers for their efforts in making this year's Conference an outstanding event.

The Chesapeake Section and Mid-Atlantic Region thank all ASHE members, colleagues, industry partners and highway industry advocates for attending the conference. The Section and Region folks look forward to the 2016 National Conference in Pittsburgh and wish everyone well in their final preparations for next year's gathering.

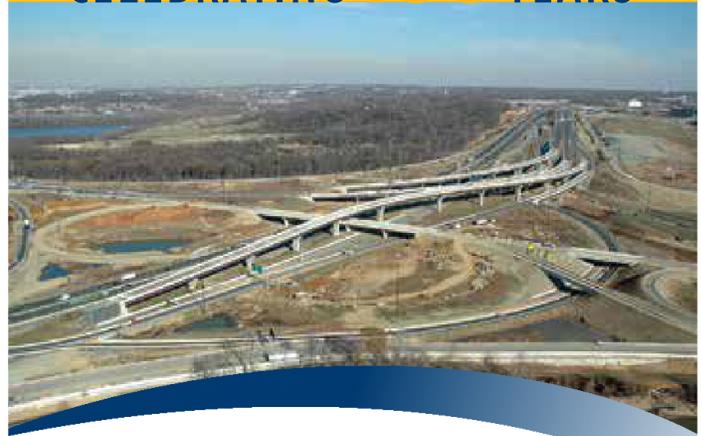
To see photos of our 2015 Conference, visit: <http://2015conference.ashe.pro/>. 🇺🇸

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*There are five other geographic areas including the North Central, Northwest, Pacific Northwest, Rocky Mountain, and South Central Regions which are inactive at this time due to the lack of Sections in the represented areas to make it viable.*

*\*Central Dacotah Section of the North Central Region, presently covered by the Great Lakes Region*

*\*\*Phoenix Sonoran Section of the Rocky Mountain Region, presently covered by the Southeast Region*

*\*\*\*Dallas-Fort Worth Section of the South Central Region, presently covered by the Southeast Region*



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| Doug Gilman, PE<br><i>Old Dominion</i>                |
| David Hieber<br><i>Potomac</i>                        |

**New Directions** (continued from page 3)

- Implementation of a new Governance Model at the National level, which will potentially include a part-time, paid professional staff. This initiative is one of the seven action items from the SWOT Analysis completed in January 2014. More details will be forthcoming over the next few months.
- Most of the documents in the Operations Manual have been updated and placed on the website for the membership's use. Additional updates will continue to be posted as they are completed.
- Updating of the National website is also in process and is anticipated to be completed by the end of December. The updated website will provide a more user-friendly and informational forum for our membership and others.
- The ASHE Cloud is up and running! This site is available for data storage, including photographs, and for information exchange by our local, Region and National Officers, Directors and committee members. Contact Dick Cochrane, Cloud Committee Chair, rcochrane@mctish.com, for a password to access the Cloud.

The National Executive Board met in Manhattan, New York, on August 14 to conduct business and meet with the 2017 National Conference Committee and the New York Metro Section officers and members. An update on the Conference plans was provided, along with a tour of the hotel/conference facility. The next National Board meeting will be in the Charlotte, NC, area October 16 and 17. The National Board is looking forward to meeting with the Carolina Piedmont Section members and others from the Mid-Atlantic Region.

Speaking of national Conferences, preparations for the 2016 National Conference in Pittsburgh, PA, on May 19-22 are underway. The Pittsburgh Section will be celebrating their 50th anniversary at the Conference, so it will be a special event and a great time.

I look forward to talking with you, the members of ASHE, at the upcoming Section and Region meetings and events over the next few months. At those events or anytime, I welcome your suggestions and feedback ... Let's Keep the Momentum Going! 🇺🇸



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News From Across ASHE-Miles



## ASHE Georgia Section Tees Off!

ASHE Georgia's most popular event was another success in 2015! With over 130 participants each year, the annual golf tournament raised \$5,000 for the Jim McGee Memorial Scholarship.



## Harrisburg ASHE Golf Outing Scores Another Success!

The 16th Annual Harrisburg ASHE Golf Outing was, once again, a success with approximately \$10,000 raised for their scholarship program. The winning team of Keith Goddard, Keith Lilley, John Yamashita and Lino Magnelli shot a score of 54 and won on a match of cards. On the Monday before the event, the weather called for a 100% chance of showers on Friday, but the tournament was rain-free. Thanks to all of the sponsors who again came through with generosity, allowing the group to keep pace with scholarships awarded in prior years!



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**T**he busy I-270 and Roberts Road area in Columbus, OH, was plagued with congestion and crashes due to the high volume of cars and trucks traveling the corridor daily. Originally designed in 1966, this interchange had exceeded its life expectancy as population growth increased traffic beyond its design capacity. Located in a heavily traveled commercial, industrial and residential area, the former traditional diamond interchange at I-270/Roberts Road had geometric design deficiencies and a high number of congestion-related crashes. The situation improved when the interchange was reshaped into Ohio's first Diverging Diamond Interchange (DDI).

Designed by Burgess & Niple, Inc., (B&N) for the Ohio Department of Transportation (ODOT), the I-270/Roberts Road DDI has reduced injury crashes by 56 percent, and motorists are moving smoothly, even during busy rush hour traffic. This DDI was the 23rd to open in the United States and the first in the country to include dedicated bike lanes. The DDI was proposed as a solution that could fix the geometric issues and handle the high demand volume of traffic.

### **Safety, Efficiency and Savings**

A DDI is designed to be safer, more efficient and more cost effective than traditional diamond interchanges. B&N's traffic modeling and analysis indicated that, at this location, a DDI could safely move the highest volume of traffic and be built for the lowest cost—about 25 percent less compared to other alternatives evaluated.

**Safety:** In a DDI, potential conflict points are significantly reduced, which reduces the frequency and severity of crashes. This is because left-turning traffic is no longer forced to cross opposing through traffic. The number of potential conflict points in a DDI is 42 percent less than a traditional diamond interchange; the number of crossing conflict points, typically resulting in the most severe crashes, is reduced by 80 percent.

# **Diverging Roadways Result**

## **I-270 and Roberts Road Diverging Diamond Interchange in Columbus, Ohio** by Burgess & Niple, ASHE Central Ohio Section

**Efficiency:** The DDI increases capacity with improved signal operations that eliminate left-turn signal phases. Traffic flows through the interchange more quickly, and congestion is reduced. The I-270/Roberts Road DDI moves significantly more traffic than a traditional diamond interchange. As part of this project, B&N conducted a sensitivity analysis to ensure this alternative could accommodate future traffic growth. The results indicated that a DDI could accommodate traffic volumes that exceed design year estimates by 25 percent.

**Savings:** Fewer lanes are required to handle the same traffic capacity, which reduces the construction costs for a DDI. At I-270/Roberts Road, a DDI was the only design option evaluated that could handle the design year traffic and did not require widening the bridges over the interstate. It also eliminated the need for Right-Of-Way (ROW) acquisition.

### **Designing an Interchange That's the Right Fit**

The I-270/Roberts Road interchange is the entry to a major rail and truck intermodal yard, and a gateway to the City of Hilliard. To help ensure the new interchange could handle the increasing demand of motorists and truck traffic critical to area commerce, the design accommodates dual interstate truck turns. This is an unusual feature in any type of interchange due to the large footprint required. The dual turn lanes allow a high volume of trucks to travel from I-270 to Roberts Road, which is important for businesses on the west side of the interchange.

ODOT also asked B&N to fit the DDI within the existing ROW. This allowed the project to progress quickly, because the timely and costly ROW acquisition process was avoided.

The design team also changed the construction implementation plan from part-width construction of the interchange—including necessary bridge improvements—to a full bridge closure, reducing the construction duration from 12 months to four. The full closure was less expensive and a safer option for construction crews and motorists. A portion of the cost savings was used to add the dedicated bike lanes through the project limits, which serve as an extension of neighboring bike facilities.



*I-270 and Roberts Road Diverging Diamond Interchange—end of construction*

# in an Emerging Solution

## Partnering for Improvements

Extensive community education and outreach were important factors in the project's success. The community selected this as the preferred alternative during public meetings that also served as vehicles for educating users on how to navigate a DDI.

Because of the large number of adjacent businesses, stakeholder input also was imperative, especially when considering the proposed change from part-width construction of the interchange improvements to a full bridge closure. Several meetings were held with key stakeholders to provide education on the proposed improvements. As a result, stakeholders were in favor of the full closure construction plan and supported the overall proposed improvement plan.

## Paving the Way

ODOT and B&N developed this innovative interchange reconfiguration as a way to improve safety and ease congestion. With a construction cost of \$10.5 million, the DDI was the lowest cost option from the onset that met all of the necessary project goals.

The DDI opened in October 2013 as the first in the state of Ohio. B&N provided traffic forecasting, preliminary engineering, assistance with stakeholder and public involvement and final design of the interchange reconfiguration.

Whether the driver is a working parent with a faster commute home at the end of the day, or a truck driver bringing goods more efficiently to market, the improved traffic flow through the I-270/Roberts Road DDI benefits central Ohio.

During comments at the project's ribbon-cutting ceremony, ODOT District 6 Deputy Director Ferzan M. Ahmed, PE, stated, "This is not only an innovative solution in terms of engineering, but it's also an innovative solution in terms of traffic management." Ahmed noted that the more efficient interchange is good for commuters, commerce and local businesses. "Traffic is going to move so much better with this Diverging Diamond Interchange in place." 🇺🇸

## Virginia Tech Transportation Institute Researches How to Make Traveling Through Traffic Lights Safer, Smarter and Cheaper

(continued from page 11)

Live road tests of the technology will move from the Smart Road test bed to the highways of Qatar as the project is perfected, said Rakha.

Joining Rakha and Kamalanathsharma in the study are Hao Chen, a research associate; Hao Yang, a post-doctorate researcher; and Ihab El-Shawarby, a senior research associate, all with the institute; and Mani Venkat Ala of Hyderabad, India, and Mohommed Almannaa of Riyadh, Saudi Arabia, both Master's students in Civil and Environmental Engineering.

The Virginia Tech Transportation Institute conducts research to save lives, time and money and protect the environment. One of the seven university-level research institutes (<http://www.research.vt.edu/institutes/index.php>) created by Virginia Tech to answer national challenges, the Virginia Tech Transportation Institute continually advances transportation through innovation and has impacted public policy on the national and international level.

### Related Links

Transportation Institute works on study that could display traffic signs inside vehicles (<http://www.vtnews.vt.edu/articles/2014/08/080414-vtti-roadsignsincarstudy.html>)

Researchers to design vehicle-to-vehicle communication integration framework (<http://www.vtnews.vt.edu/articles/2014/02/021414-vtti-connectedvehciletechnology.html>)

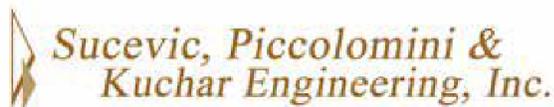
Yellow-light tweaks could make intersections safer (<http://www.vtnews.vt.edu/articles/2012/09/092712-vtti-yellowlights.html>)

Gov. Bob McDonnell helps Virginia Tech Transportation Institute launch Virginia connected vehicle test bed (<http://www.vtnews.vt.edu/articles/2013/06/061213-vtti-testbed.html>)

The Research Institutes of Virginia Tech (<http://www.research.vt.edu/institutes/index.php>)

This story can be found on the Virginia Tech News website:

<http://www.vtnews.vt.edu/articles/2015/05/052015-vtti-trafficlighttests.html> 



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# Variable Speed Limits Drive More Safety and Efficiency on I-285

by Andrew Hoenig, PE, GDOT Project Manager, and  
Dustin O'Quinn, PE, HNTB Project Manager,  
ASHE Georgia Section

**F**or years, the northern “Top End” of Interstate 285 was one of the most congested roads in metro Atlanta. The 36-mile segment runs north of the Interstate 20 interchanges through Fulton, DeKalb and Cobb counties. Countless traffic bottlenecks on the roadway have posed an ongoing threat to motorist safety.

To make this crucial roadway section safer and more efficient, the Georgia Department of Transportation launched a Variable Speed Limit (VSL) system.

While Georgia has long used variable speed limits to slow down traffic ahead of work crews, the I-285 project represents the first permanent VSL system in the state. Georgia chose to implement VSL on the top end of I-285, rather than the southside segment, because the top end carries an average of 50,000 more vehicles—100,000 more in some segments. Top end I-285 also has nearly twice as many interchanges as the southside segment, which leads to more congestion and a greater likelihood of crashes.

Various studies have shown that VSL will decrease congestion, help motorists save on gasoline, reduce accidents and cut travel time. In addition, VSL systems improve air quality by reducing the time that cars are idling.

## How It Works

A VSL system implements speed limits that change according to road, traffic and weather conditions. Through careful monitoring of the roadway, electronic variable





speed limit signs slow down traffic ahead of congestion or bad weather to smooth out traffic flow and reduce the need for stop-and-go driving.

In addition to decreasing traffic congestion, variable speed limits decrease the speed disparity between the fastest and slowest cars, which in turn reduce the likelihood of crashes.

A good way to envision how a VSL system works is to think about rice flowing through a funnel, with rice as the cars and the funnel as the roadway. If the rice is poured into the funnel all at once, it gets congested at the bottom of the funnel and takes a long time to work its way through. But if the rice is poured slowly and steadily into the funnel, it moves through evenly and doesn't get congested. Though the rice enters the funnel more slowly, it gets through the funnel faster.

### **Project Details**

The I-285 VSL system went live in October 2014, with two signs on either side of the road at 88 locations—a total of 176 electronic signs. The total cost of the program was \$6 million, including about \$4.5 million for the VSL technology and the balance for updated static signs that display the new 65mph speed limit.

Depending on road conditions, the system varies the speed limit from 35 to 65mph in 10mph increments. The expected speed limit remains at 65mph most of the time. If there is an accident or congested area, the speed limit along that segment of roadway can be set as low as 35mph, with the speed limit being reduced in 10mph increments leading up to the affected area.

Focus group sessions revealed that travelers were interested in receiving real-time updates related to the decreases in speed when driving on I-285. To meet this need, the system includes overhead electronic signs that display explanatory messages, such as “Speed Limit Reduced Ahead,” that are added to existing accident or travel time messages.

Additional public support was gained by raising the overall speed limit along the top end of I-285 from 55 to 65mph. Even prior to the adjustment, drivers typically reached speeds above 60mph throughout uncongested segments of I-285, so raising the limit to 65mph was met with minor opposition.

### **Lessons Learned as Concept Spreads**

VSL is an evolving technology with the capability of offering a variety of features. For example, the VSL project in Washington allows the state DOT to post varying speeds in different lanes. If there's an accident in a single lane, the system notifies motorists in advance.

Some variable speed limit systems have been more successful than others. In the St. Louis area, a VSL system along Interstates 270 and 255 was changed to an advisory-only system in 2011 after a study by researchers from the Missouri University of Science and Technology found that nearly two-thirds of drivers wanted the signs removed.

Though the Missouri Department of Transportation said the variable speeds made the highways safer, the study concluded that police did not think the system was successful in getting motorists to comply.

*(continued on page 24)*



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## Variable Speed Limits Drive More Safety and Efficiency on I-285

(continued from page 22)

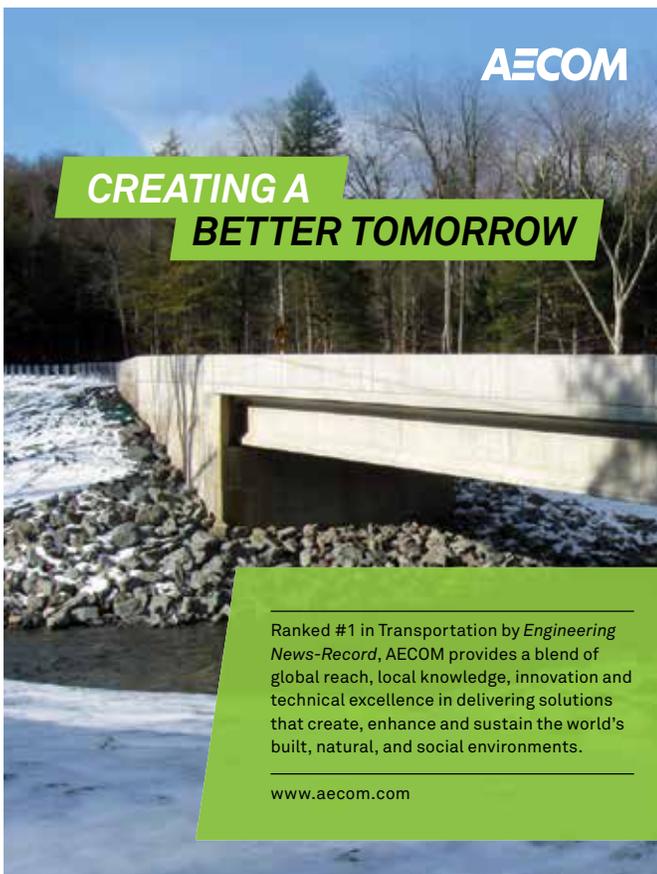
In 2013, growing unpopularity ultimately led to removal of the advisory speed limit signs from the two St. Louis highways altogether.

After a review of other variable speed systems across the nation, including the St. Louis program, it was determined that, among the systems that did not operate properly, there was an issue with the spacing of signs. The Georgia VSL team took note and implemented half-mile spacing between the signs on I-285, which appears to be having a positive impact. Currently, the system is operating at the level intended; however, GDOT continues to analyze incoming data to determine and optimize effectiveness.

## Coordination Is Crucial

The I-285 VSL system spans three counties and multiple cities. Coordination with these counties and cities, multiple police jurisdictions and the highway patrol was crucial. There were many moving parts involved in the unveiling of 176 VSL signs, and in replacing the 55mph signs with 65mph signs. Numerous meetings took place to prepare for active use of the system.

The importance of reaching out to all impacted parties early in the process to work through potential problems is one considerable advisement from GDOT to any entity seeking to establish a VSL system in the future. The extensive communication and coordination that took place with the I-285 VSL installment helped create a consistent, uniform understanding of the overall plan and was a major factor in the successful implementation of this project. ♥



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# Public and Private Partnership Constructs New I-90/Nagel Road Interchange

by David J. Weglicki, PE, Highway Team Leader/Project Manager, TransSystems,  
ASHE Central Ohio Section

The city of Avon, Oh, initiated the efforts to fund and construct a new interchange on existing I-90 at Nagel Road in Lorain County. The project was planned, designed and constructed with the cooperation of the Ohio Department of Transportation (ODOT) and with full oversight by the Federal Highway Administration (FHWA). This \$22 million improvement project was unique in that it was fully funded by the city and private sources, including nearby property owners Richard E. Jacobs Group, Suretech Brands, Jenny Manufacturing and approximately eight other owners, without Federal or state dollars. The interchange project planning and design was led by TranSystems, using ODOT's Project Development Process (PDP). The planning provided a Major Investment Study (MIS), an Interchange Justification Study (IJS), preliminary alternate designs, stakeholder involvement and public information efforts. This work ultimately led to approval of the project by the Northeast Ohio Areawide Coordinating Agency (NOACA), which is the local Municipal Planning Organization

(MPO), and FHWA for implementation of the preferred interchange alternate location and configuration. The final design provided roadway, drainage, traffic control, maintenance of traffic, utility relocation, bridge structure and retaining wall design; environmental and permitting services; right-of-way plans; and right-of-way acquisition services. Bramhall Engineering provided waterline and sanitary sewer design as separate projects within the footprint of the interchange project area. Mosser Construction was the general contractor for the project. Avon and ODOT worked as a team to manage the project construction.

Prior to initiation of the project, historically rural Avon began to develop and was listed by *Forbes Magazine* as the 67th fastest-growing city in the United States. As the population growth led to an increase in traffic congestion, the city government decided to look into possible solutions to improve efficiencies for the traveling public and provide infrastructure required to meet future traffic and development demands. In 2006, the



Nagel Road over I-90 was two lanes prior to interchange construction.



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city approached ODOT regarding their support of potential projects. They were told that due to limited funding, future projects would not be considered until 2014. With limited funding sources available for major new highway projects, the city determined that it was in their best interest to fund potential improvement projects themselves.

Avon's initial study and planning efforts documented operational deficiencies of the existing roadway network, including the existing interchanges on I-90. Based on existing and future-year traffic projections, improvements to the roadway network were investigated. These improvements included modifications to existing interchanges and a new point of access to I-90.



Eastbound Interstate 90 at New Nagel Road Interchange

All alternates were developed and evaluated based on appropriate city, state and Federal access and geometric design criteria, project cost, property impacts, community and environmental resources, continuity with existing transportation and land use plans and other planned improvements in the area. The study identified a new full-access, three-quadrant interchange at I-90 as the preferred alternate. Improvements were also suggested for the existing interchange at I-90 and SR 83 approximately one mile to the west and for the existing intersection of Nagel Road and Detroit Road approximately one mile to the south.

*(continued on page 31)*

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**New I-90/  
Nagel Road  
Interchange**

An aerial photograph of a multi-lane highway interchange with several overpasses. The road is surrounded by green fields and some residential buildings in the distance. A semi-transparent blue box with white text is overlaid on the right side of the image.

Following approvals by NOACA and FHWA, the interchange project final design began with the understanding that the additional improvements at SR 83 and Detroit Road would come at a later date as future traffic volumes demanded. As the design progressed, the city simultaneously planned and designed waterline and sanitary sewer improvements to meet future development needs for the area surrounding the interchange. The Cleveland Clinic planned to construct a hospital facility north of I-90 that would be accessed by the new interchange and require the utility improvements. In early 2010, the interchange project was selected as one of four in Ohio for ODOT's Fast Track Review Scheduling that could stimulate economic growth. Final interchange design, right-of-way plan preparation and right-of-way acquisition proceeded to completion, with a targeted sale date in late summer 2011, with simultaneous sale of the city's utility improvement projects.

Construction of the interchange and utility improvement projects began in late 2011. The general contractor used Value Engineering for maintenance of traffic operations to build an access road on private property, to avoid multi-phase, part-width construction on a major project intersection. The results of the Value Engineering, combined with a mild 2011-2102 winter and dry 2012 summer, allowed the I-90/Nagel Road interchange to open to traffic in November 2012, nearly one year ahead of schedule.

The development of the area surrounding the interchange is expected to accelerate. The new interchange is expected to alleviate traffic congestion in Avon as originally planned, and stimulate economic development in the city, as witnessed by the nearby construction of a Cleveland Clinic facility. ❤️

*(Postscript: In the immediate vicinity of the interchange, a Cleveland Clinic Outpatient/Emergency Room facility has now been completed, and a Cleveland Clinic Hospital is under construction, along with several retail establishments.)*



# Story of South Mountain Freeway Traces Development of Phoenix

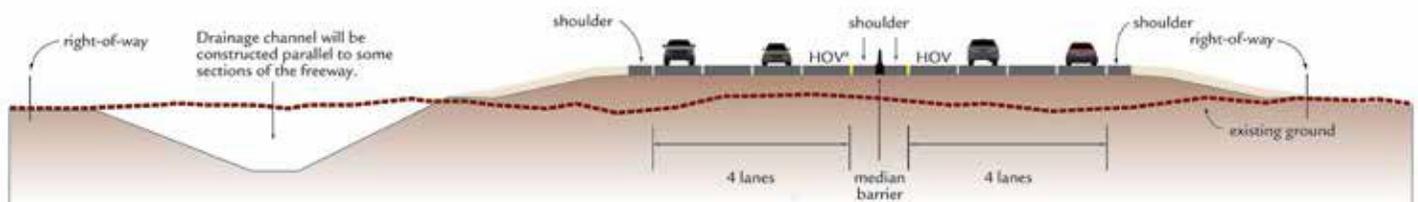
**T**y Timothy Tait, Ed.D., Arizona Department of Transportation, ASHE Phoenix Sonoran Section

The history of the South Mountain Freeway follows a growing city through the challenges, the up-and-down cycles and the hopes of its residents. For the Arizona Department of Transportation (ADOT) and the regional planners at the Maricopa Association of Governments, the South Mountain Freeway (Loop 202), located in central Arizona, represents the final element of a long-promised regional freeway system.

First proposed in the early 1980s, the South Mountain Freeway was approved by voters in the 1985 Proposition 300 vote, which provided, for the first time in the Phoenix metro region, a 20-year dedicated source of transportation funding based on a one-half-cent sales tax. After decades of contentious battles over transportation in the Valley of the Sun, 72 percent of voters supported Proposition 300, and a regional freeway system was born.

Since then, the South Mountain Freeway has been on the books as a planned corridor, designed to serve the fast-growing southwest and southeast portions of the Phoenix metro region. Funding shortfalls from the 1985 plan delayed implementation of the South Mountain Freeway as regional planners and ADOT focused funding and effort on other core freeway corridors. ADOT constructed hundreds of lane-miles of new freeways to serve the Phoenix area—completing the last segment of Interstate 10 (I-10) in the country, and building a se-

Typical Eight-lane Freeway Section with Potential Drainage Basin



\* high-occupancy vehicle

Note: The drainage channel will be located north or east of the freeway.

ries of loops around the city to facilitate the movement of people and commerce throughout the region. But South Mountain had to wait its turn. In 2004, voters were asked to reauthorize the one-half-cent sales tax increase for transportation, this time adding funding for transit and light rail, in addition to local streets and freeways. South Mountain was identified as one of the remaining “legacy projects” to be funded through this new initiative, which was approved with strong voter support. After nearly a decade of detailed study and analysis, the South Mountain Freeway moved closer to implementation.

Consistent with ADOT’s Legacy Vision of creating a transportation system for Arizona that improves quality of life and supports economic development, in March 2015 the Federal Highway Administration (FHWA) issued a Record Of Decision (ROD) selecting a build alternative for the State Route 202 Loop—the long-planned South Mountain Freeway. ADOT, FHWA and the study team reviewed more than 8,000 comments submitted by the public, stakeholders and agencies during the Draft Environment Impact Statement



South Mountain Freeway community forum

(EIS) comment period, to come to a final “build” recommendation that was consistent with voter-approved plans and met the transportation demands for the future.

The environmental review process, which included preparing the draft and final EIS and the ROD, was conducted in accordance with the National Environmental Policy Act and identified the preferred route for this freeway corridor—running east and west along Pecos Road and then north and south between 55th and 63rd Avenues, connecting with I-10 on each end, a distance of 22 miles all located within the city of Phoenix.

The South Mountain Freeway design will be coordinated with the light rail corridor planned for I-10 and the planned future State Route 30, a new corridor that, if approved, will parallel I-10 through the southwest suburbs.

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ADOT will fund the project capital costs with a combination of available public funds (Federal, state and local highway funding) and tax-exempt bonds. “Voters recognized the necessity and the benefits of this project to provide connectivity, travel reliability and route options for a growing region,” said ADOT Director John Halikowski. “Both ADOT and the Maricopa Association of Governments agree this is a critically needed project, and ADOT is breaking new ground by moving it forward under a public-private partnership agreement to more closely involve the private sector, helping to save money and speed construction.” Upon the FHWA issuing the ROD, Michael LeVault, mayor of Youngtown and then-chair of the Maricopa Association of Governments’ Regional Council, said, “This is a great day and an important milestone in the history of the Valley’s transportation system. It has been a long time coming, and we look forward to the improved mobility and economic opportunities that this freeway facility will bring to our region.”

Arizona public-private partnership agreements became possible when the state legislature passed HB 2396. Soon thereafter, in 2013, ADOT received an unsolicited proposal to build, fund and maintain the South Mountain Freeway. As required by state law, the proposal was reviewed, resulting in ADOT shortlisting three developer teams; the department viewed the P3 as a way to save project funds and deliver the project on a faster track. The winning developer will be chosen using a best-value selection and will be required to maintain the freeway under a 30-year agreement. This project is ADOT’s first freeway design-build-maintain project.

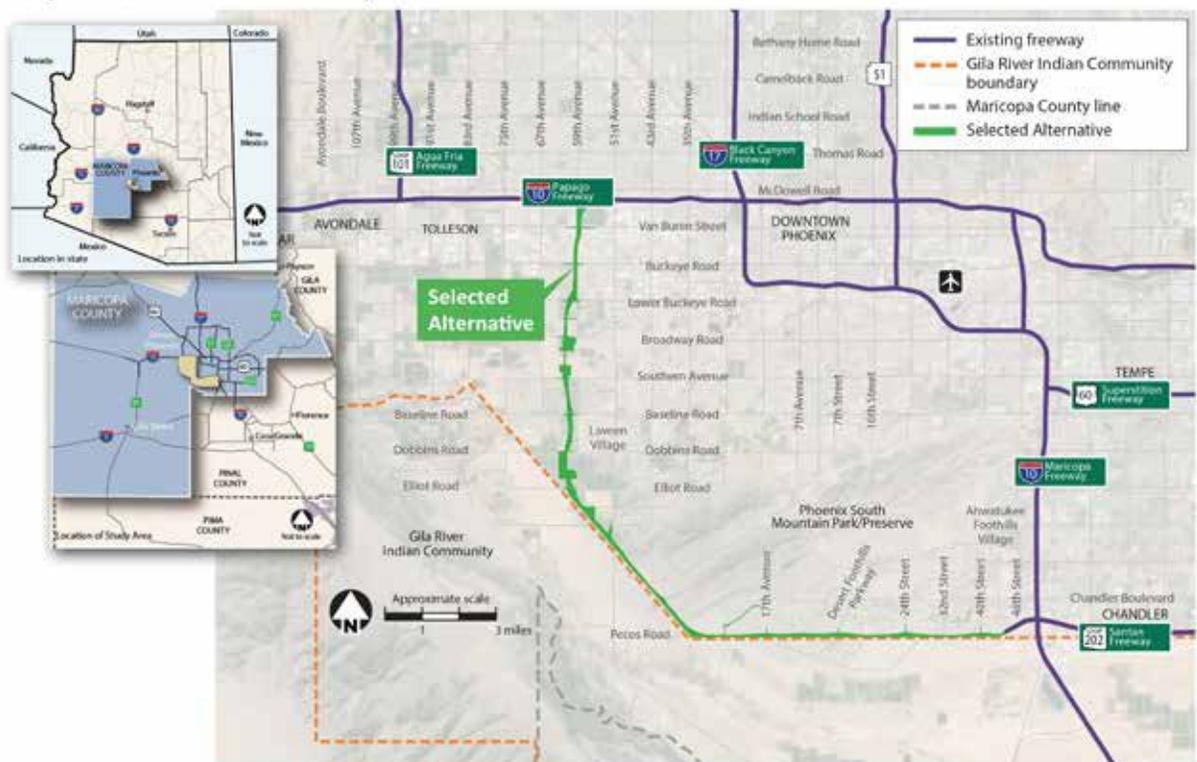
ADOT is now proceeding with right-of-way acquisition and the selection of the developer. The developer will be selected at the end of 2015, and freeway construction is expected to begin in summer 2016.

The freeway will be constructed with four lanes in each direction—three general-use lanes and one High Occupancy Lane (HOV) lane—and will implement modern features, such as rubberized asphalt and aesthetics designed in partnership with the community. The \$1.9 billion project is expected to take about four years to construct and will encompass 1,700 acres, requiring 8 million cubic yards of roadway excavation, 3 million cubic yards of rock excavation, 8 million cubic yards of borrow, construction of 78 bridges including a 3,000-foot-long bridge over the Salt River, a three-level system-to-system interchange and 13 traffic interchanges.

The final chapter in the South Mountain Freeway tale has yet to be written, but it will no doubt involve deep community partnerships striving toward implementation, strong collaboration among the developer team and, once completed, a sense of community enhancement by residents across the region. 🇺🇸

For more information, or to view a video simulation of the freeway, visit: [azdot.gov/SouthMountainFreeway](http://azdot.gov/SouthMountainFreeway).

### Loop 202 South Mountain Freeway Route



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Franklin	145
Harrisburg	363
Long Island	44
Mid-Allegheny	119
New York Metro	86
North Central New Jersey	178
North East Penn	135
Pittsburgh	590
Southern New Jersey	200
Southwest Penn	297
Williamsport	127

**Subtotal 3,418**

### Mid-Atlantic Region

Blue Ridge	79
Carolina Piedmont	59
Carolina Triangle	233
Chesapeake	237
Greater Hampton Roads	136
North Central West Virginia	36
Old Dominion	103
Potomac	283
<b>Subtotal</b>	<b>1,166</b>

### Southeast Region

Central Florida	47
Georgia	403
Gold Coast	10
Middle Tennessee	185
Northeast Florida	198
Tampa Bay	92
<b>Subtotal</b>	<b>935</b>

### Great Lakes Region

Central Ohio	201
Circle City	50
Cuyahoga Valley	128
Derby City	82
Lake Erie	142
Northwest Ohio	40
Triko Valley	175
<b>Subtotal</b>	<b>818</b>

### North Central Region

Central Dacotah	123
<b>Subtotal</b>	<b>123</b>

### Rocky Mountain Region

Phoenix Sonoran	141
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### South Central Region

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