Monetizing the value of resiliency

See page 56

Also inside:

The 2016 Top Ten Public Works Leaders of the Year

It’s National Public Works Week!

May 15-21

See pages 30-31
Larue offers 10 different models to fit your requirements, from self-propelled Snowfighting trucks with up to 1,320 HP to detachable snowblowers 300 HP – 1150 HP, all manufactured for airports, municipal and industrial applications.

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The APWA Reporter, the official magazine of the American Public Works Association, covers all facets of public works for APWA members including industry news, legislative actions, management issues and emerging technologies.

SUSTAINABILITY & TOP TEN ISSUE

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On the cover: Mission Creek Park, San Francisco (photo by John C. Parker)
Much attention has been paid over the last decade to climate change, the changing demographics of our population, and the associated impacts both are having on our workforce and economy.

Extreme weather and resource insecurity are increasingly impacting our daily lives. Recent droughts illustrate the need to address the legal and historical frameworks for allocation and conservation of resources. Communities vulnerable to flooding and fire exemplify the need to better manage development and financial risk.

Last year’s 21st Conference of Parties (COP 21) meeting in Paris resulted in a landmark global greenhouse gas mitigation agreement in which developed and developing nations bridged their economic differences in committing to the goal of keeping global temperature change below 2 degrees Celsius from pre-industrial levels.

Meanwhile, developed nations like the U.S. and Canada are experiencing an aging population that is shifting out of work and into retirement, while developing nations like India are experiencing a “youth surge” and its associated employment challenges. But both developed and developing nations are struggling with labor and employment imbalances, as well as the burden on infrastructure from population growth, immigration and the migration of people from rural to urban areas.

What does all this mean for public works?

Confronting the challenges of a changing climate and demographic and geographic shifts in population using the framework of sustainability offers important lessons for public works. As public works professionals and agencies, we must be:

- prepared in the face of uncertainty and risk;
- adaptive in our approach to design and construction;
- prudent in our use of, and dependence on, finite natural resources; and
- diligent in preventing the loss of institutional knowledge from our workforce.

We can see how these lessons are being put into practice by our colleagues—at PWX, at chapter events and conferences, in Click, Listen & Learns, in publications, in resources gathered by the Center for Sustainability, and in the pages of the APWA Reporter.

Preparedness

Since 1990, the King County, Wash., floodplains have been declared a federal flood disaster area 12 times. In 2007, the Metropolitan King County Council created a new countywide...
Efficient Use of Resources
Since 2005, in the City of Guelph, Ontario, the Eastview Landfill Gas Energy Plant, in cooperation with the city, has been converting methane gas derived from Guelph’s Eastview Landfill into about 2.5 megawatts of electrical energy annually, approximately one percent of the city’s requirements.3

Succession Planning
The City of Springfield, Mo., launched a City Ambassadors Program (CAmP) in 2012 to give city employees a broader perspective of how the city operates, how all parts of city government fit together, and how they contribute toward the city’s mission. The program’s objectives include fostering increased communication across departments and providing professional development opportunities to employees. Graduates, after a curriculum of city department tours and skills enhancement training, become “ambassadors” for the city.4

This Sustainability issue of the APWA Reporter contains many more examples of how our communities and public works colleagues are developing similar solutions. I hope you’ll benefit from their stories and I look forward to hearing about your ideas in future issues.

Notes:
1 King County Flood Control District website http://www.kingcountyfloodcontrol.org/default.aspx?ID=6
2 Philadelphia Water Department website http://phillywatersheds.org/what_were_doing/documents_and_data/cso_long_term_control_plan
4 City of Springfield website http://www.springfieldmo.gov/1332/City-Ambassadors-Program-CAmp
In D.C., the Government Affairs Committee advocates for key priorities

Laura Bynum, M.A.
Media Relations/Communications Manager
American Public Works Association
Washington, D.C.

In early March, the APWA Government Affairs Committee (GAC) met in Washington, D.C., along with the APWA Government Affairs staff and representatives of the Emergency Management, Transportation, and Water Resources Technical Committees. The purpose of the GAC spring meeting is to advocate for APWA's key priority areas by meeting with representatives of partner federal agencies, and congressional members and their staff on Capitol Hill. This year's meeting included key congressional staff from the House Subcommittee on Tax Policy, the House Ways and Means Committee, the House Transportation and Infrastructure Committee's Subcommittee on Water Resources and the Environment, and Appropriations staff from both the House and Senate. High-level agency officials from the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, the Federal Emergency Management Agency (FEMA), the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE) took the time to discuss areas of common interest and to field questions from APWA participants. The policy priorities focused on in the various discussions included implementation of the recently enacted Fixing America’s Surface Transportation (FAST) Act, the need to invest in our nation’s water infrastructure, the anticipated passage later this year of the Water Reform Resources and Development (WRRDA) Act, and the role of public works in emergency management.

“This year, the GAC especially thanks and commends the congressional bipartisan leaders for the reauthorization of long-term surface transportation funding, which President Obama signed into law last December,” said GAC Committee Chair, Lisa Rapp, PWLF, Director of Public Works for the City of Lakewood, CA. “The FAST Act is the only long-term surface transportation funding bill enacted into law since 2005, and will help move critical transportation projects forward. Moreover, there is additional funding available for bridges off the National Highway System. States also have more funding available for first responders, and training for HazMat employees, as well as the acceleration of infrastructure projects.” APWA's representatives also met with congressional staff from the House Committee on Oversight and Government Reform, the Senate Appropriations Committee’s Subcommittee on Homeland Security, and the House Transportation and Infrastructure Committee’s Subcommittee on Economic Development, Public Buildings and Emergency Management. “In each of these important meetings, as well as those held with the Senate Environment and Public Works Committee, the Senate Appropriations Committee’s Subcommittee on Interior and the Environment, and House Speaker Paul Ryan’s (R-WI) office, the conversations were focused on shared issues facing APWA members each day in their agencies across the U.S.,” said Rapp.

“The FAST Act is the only long-term surface transportation funding bill enacted into law since 2005, and will help move critical transportation projects forward.”
FEMA Disaster Deductible Proposal

Another recent development the GAC reviewed is the proposed FEMA Disaster Deductible, which is aimed at reducing the costs of disaster response. In recent years in particular, these costs have skyrocketed. FEMA and the Obama Administration are seeking ways to both understand the reasons behind the cost increases, and decide how to create new efficiencies. APWA representatives met with the FEMA Director, Josh Batkin. He outlined the proposed rulemaking seeking to establish a “Disaster Deductible,” which would require a predetermined amount of financial or other commitment from a recipient state or tribal/local government before FEMA can provide assistance. FEMA believes the deductible model would incentivize recipients to make meaningful improvements in their disaster planning, fiscal capacity for disaster response and recovery and risk mitigation, while contributing to better stewardship of tax dollars. Several APWA members provided remarks, which were incorporated into APWA’s submission to FEMA regarding the proposed rulemaking on establishing a disaster deductible. APWA Government Affairs will continue to track the rulemaking process on this matter.

More voices are needed to weigh in on the various matters being considered by Congress impacting public works. To make your voice heard, please sign up to be an APWA Advocate by going to the following link: http://www.apwa.net/be_involved/APWA-Advocates/Sign-Up-For-APWA-Advocates. Also, stay on top of happenings in D.C. by signing up to receive the APWA Washington Report at: http://www.apwa.net/resources/WashingtonReport.

For any questions regarding APWA Government Affairs, please contact Andrea Eales at aeales@apwa.net or (202) 218-6730.
Meet the new Executive Director

As mentioned in the April issue, APWA’s Executive Committee along with the entire Board of Directors has announced that Scott Grayson has accepted the offer of Executive Director for the association. He will begin his new role on April 14 (about the time this May issue goes to press). On March 17, the APWA Reporter conducted a telephone interview with Grayson and this interview appears below.

First, some background on Grayson, who previously served as the Associate Managing Director for the Institute of Electrical and Electronics Engineers, Inc. (IEEE) located in Washington, D.C. He was responsible for programs related to employment, career and professional development, licensing and accreditation, and provided support for the IEEE-USA Board of Directors. Grayson worked in the areas of communications, public relations, chapter relations, membership development, conference management, fundraising, research, and most recently worked with student and young professional member engagement. He was with IEEE-USA since 1990 and had been responsible for grassroots, state and federal legislative programs including being a staff liaison to numerous scientific engineering and legal organizations to build coalitions.

Grayson holds a bachelor of arts degree in political science from the University of Wisconsin and a master’s in Latin American & Caribbean Studies from New York University, specializing in international relations and economic development. He is also active in the American Society of Association Executives (ASAE), Association for Talent Development (ATD) and the Council for Engineering and Scientific Society Executives (CESSE).

Describe your role with IEEE.

I started working at IEEE in August of 1990. I had been working for a large temporary and job placement firm as their corporate manager and head of human resources. IEEE had a need for a lobbyist on employment and career public policy issues. Since I already had a background in both human resources and policy it turned out to be a perfect fit. I lobbied on such issues as the older workers’ benefit protection act, EEO-related matters, pension reform and healthcare. I also lobbied on intellectual property focusing on copyright and patent law as they pertained to inventions and innovation. As the internet emerged, I provided the U.S. Congress with input on the appropriate balance between protection and necessary freedoms to allow for technological innovation.

From there, my role grew and I became a manager of the department I was working in, but also ended up managing three different departments/councils: Professional Activities, Career and Member Services, and Workforce Policy.

Eventually, I also took on the Communications department which included online publications, webpage development, media releases, press conferences and social media. In later years, I began to handle the Board of Directors administration, strategic planning, and membership development. Most recently I have been working in the areas of engaging our student and young professional members. Many organizations have been around for a long time and some of their processes, products and services have not changed. It is important to keep pace with the current times and provide benefits that resonate with different generations.

It sounds like you’ve had a pretty interesting career with them, Scott.

That is why I stayed as long as I stayed. I tell people when I hire them that the organization allows you to be entrepreneurial. Due to the entrepreneurial environment, we have been able to continue to create new and exciting products and services for our members. Through this entrepreneurial spirit we were able to take our printed salary survey report and turn the survey into one of the first online interactive salary calculators on the market. Our members use the calculator to help negotiate their salaries and human resources departments purchase use of the salary survey and calculator to set salaries for the technical workforce.

That sounds like a really interesting member benefit.

Oh, it’s great. In fact, I continually receive positive feedback from
members. Some members say, had it not been for the salary calculator, they might not have renewed their membership.

What excites you about your new position with APWA?
Having served on the city council in Golden Valley, Minnesota, I had the opportunity to become very involved in many public works projects including sidewalk and street construction, water treatment, sewer projects, snow removal, and watershed management. I am very passionate about the profession as a whole. The reason I am so passionate is because the public works profession is often overlooked by the public. Yet, it is the public works professionals who continuously enhance people’s quality of life on a daily basis. I am really passionate about the profession as a whole and feel that we must continue to do a good job at promoting the importance of public works to the public.

My intent is to help promote the amazing role that public works professionals play in every community throughout the U.S. and Canada. I also am very passionate about the importance of professional/technical associations. Associations are the lifeblood of a profession and serve as the voice of the members within the political arena as well as within the general public. Additionally, associations play an amazing role in the continuing education and career development of its members. I am also really excited to work with the Board of Directors, the staff and the members throughout the U.S. and Canada.

How can APWA help brand public works and change public perception so that public works is seen as a first responder like police and fire?
Having had the experience of being on the city council and approving public works budgets, I am aware of the lack of understanding of the importance of public works as a department by some council members and the public. From my perspective, public works is as important to communities as public safety departments (fire and police). In fact, most residents of communities are positively impacted by the great work of public works professionals on a daily basis. I plan to assist APWA in advocating on behalf of the profession in the U.S. Congress, Canadian Parliament, municipalities, and with city managers and councils as well as the public at large. During this current presidential election cycle, candidates have been discussing failing national infrastructure. I believe we have a large role to play, not only in the discussion but in the solutions. Likewise, the topic of Smart Cities is emerging. I think APWA can position itself to be part of these discussions as well.

How do you envision APWA’s credentialing and certification programs growing and how will that growth affect public works as a profession?
I have spent many years working with engineering licensing within the U.S. and know that the public has a desire to know that the professionals who work on infrastructure projects have licenses, credentials and/or certifications within the fields they are practicing. I think credentialing and certification not only put the public’s mind at ease, but is very important for professionals’ continuing education and career development.

Tell us about your family.
I met my wife Debra during our last year of college at the University of Wisconsin-Madison. Following graduation, we went to different graduate schools. Debra went to the University of Maryland-College Park in Marriage and Family Therapy and I went to New York University for a master’s in Latin American & Caribbean Studies, specializing in international policy and economic development. We were married in 1989 and lived in the Washington, D.C. area. In 1995, we moved to Minnesota. Debra currently is a marriage and family therapist and has a private practice, works in an alternative high school as their therapist and is on the faculty at the Adler Graduate School teaching ethics and Marriage and Family Therapy. She is also a clinical supervisor.

We have three kids. Our oldest is Shira. She graduated from the University of Wisconsin-Madison in biology and global health policy, and is currently living and working in Chicago at the International Society for Stem Cell Research. Our son, Mark, is a junior at the University of Wisconsin-Madison. He is majoring in biology and political science. Our younger son, Daniel, is a freshman at Indiana University and majoring in political science with a minor in business marketing.

What do you know about Kansas City? If you’ve visited Kansas City before, what is your favorite barbecue spot?
I was there about eight or nine years ago, and then most recently when I had my series of interviews for this job. I currently am creating a list of barbecue places and I will go through them methodically and report back as to which is my favorite (laughs). I also know that Kansas City is known for its music, restaurants, great microbreweries and easygoing people.

I am also impressed that Kansas City, Mo., was just named as one of the U.S. Department of Transportation’s Smart City finalists and Google established one of its Fiber Spaces for super-fast internet. Debra and I are very excited to experience all that Kansas City has to offer us.
Since it was created by the APWA Board of Directors in 2008, the APWA Center for Sustainability has been committed to serving APWA’s membership by providing tools and resources that encourage sustainable actions by our members within the communities we serve. The Center is continuously seeking ways to harness the expertise of APWA members and leaders to highlight how to address sustainability in public works. But not all APWA members know about the Center and the resources the Center has developed and gathered for the benefit of our members. To that end, the Center recently worked with APWA staff to redevelop its brand, starting with a new logo, and is highlighting some recent activities here.

C4S Brand
The Center for Sustainability launched its new brand and logo at the APWA Combined Committee Meeting in Kansas City. The Center is now known as C4S. The C4S Brand Essence is “Foundation of Sustainable Communities.” The C4S Brand Promise is “Only the APWA Center for Sustainability brings together all of the latest tools, resources, education, and knowledge public works professionals need to achieve sustainability in their communities.”

Chapter Outreach – Quarterly Calls with Chapter Sustainability Liaisons
C4S is thrilled to be engaging with chapters in 2016—to share our activities and hear about yours! C4S hosted a call for Chapter Sustainability Liaisons on February 29. The following thirteen chapters were represented: Arizona, Colorado, Georgia, Iowa, KC Metro, Maine, Mid-Atlantic, Minnesota, New York, North Carolina, Rocky Mountain, South Carolina, and Washington State. Future calls are scheduled for:

- Monday, June 27, 3:00 ET
- Monday, September 26, 3:00 ET
- Monday, December 12, 3:00 ET

If you are working to advance sustainability in your chapter, please join us! For more information, please contact Anne Jackson at ajackson@apwa.net.

APWA Connect – “Ask an Expert”
C4S is looking forward to using APWA Connect, APWA’s new member communications platform, to better engage with APWA members, especially when it comes to answering questions about sustainability.

APWA Connect builds on the former infoNOW Communities with expanded and enhanced technical and networking resources, including six different types of communications groups: infoNOW, APWA Technical Committees & Subcommittees, Professional Development, Chapters, Networking and User Groups.
The C4S Community can be found under “infoNOW” or “All Communities” and the C4S Leaders (the Experts) are eager to engage with you. Log in to APWA Connect now and join our community to connect with your public works peers; get information about sustainability issues, events and learning opportunities; and, if you have a question, “Ask an Expert”! Select “Join Now” after you’ve clicked on our community to begin following the conversation: http://infonow.apwa.net/welcome.htm.

In the Know
In order to push concise, timely examples of sustainability in public works out to our members, C4S continues to highlight sustainable practices in a monthly campaign called “In the Know” which can be found under “Inside APWA” on APWA’s home page. Each month, the Center is providing a short description of how citizens and/or public works professionals are working within their communities to bring about a more sustainable future. Tips and practices highlighted in recent months include:

• Aurora, Colorado Promotes Water Conservation by Design (January 2016). The city of Aurora’s water connection charges are a model for incentivizing water conservation.

• Chattanooga, Tennessee’s EPB Smart Grid Recognized for Electrical Excellence (February 2016).

• Washington, DC’s Curbside Parking Pilot to Reduce Traffic (March 2016). The District Department of Transportation (DDOT) launched a multimodal value pricing pilot for metered curbside parking to reduce congestion, make it easier for drivers to find parking, and improve traffic flow.

All past “In the Know” can be found in the C4S Toolkit and C4S welcomes your stories! Please send us your “tips and practices for a more sustainable future” so we can share with other members: http://www.apwa.net/centerforsustainability/tools-and-resources.

Sustainable Practices in Public Works Issue No. 2
At the 2015 APWA Congress (now called PWX) in Phoenix, C4S released its first issue of “Sustainable Practices in Public Works,” a resource developed in collaboration with APWA’s Technical Committees. C4S is grateful to the Technical Committees who contributed to this resource by identifying sustainable practice examples within their discipline (transportation, water, fleet, leadership and management, etc.) and providing information about where and how these practices are being implemented.

C4S is now working on the next issue of this resource, to be released at PWX 2016 in Minneapolis, illustrating how APWA members are achieving improved livability, resilience, and sustainability in their communities. If you would like to contribute to this resource, please contact Anne Jackson at ajackson@apwa.net or see the Sustainable Practices in Public Works Template online: www.apwa.net/centerforsustainability.

C4S Toolkit
C4S is undertaking a thorough review of case studies, guidelines and other tools it has gathered and created since its inception in order to better organize, add to, and promote these resources. Please visit us online for access to the Principles of Sustainability, Framework for Sustainable Communities, “In the Know” articles, and other resources.

C4S looks forward to furthering these efforts and will continue to seek out new and continuing opportunities to collaborate with our members. Visit the C4S website at www.apwa.net/centerforsustainability, and if you have suggestions for sustainability resources, ideas about how to promote sustainable practices in public works, or want to collaborate with C4S, contact Anne Jackson at ajackson@apwa.net.

“Lasting gains in quality of life cannot be achieved without effective integration of environmental, social and economic goals at the community and regional level.”

– Lamont C. Hempel, author, Environmental Governance: The Global Challenge
SUNDAY, MAY 22
4:30 – 6:30 p.m.
Exhibit Hours

8 a.m. – 4:30 p.m.
Winter Maintenance Supervisor Certificate Workshop

1 – 2 p.m.
Education Sessions
“Not all roads are paved …” Winter Maintenance of Gravel and Surface Treated Roads
Best Practices for the Storage of Salt, Sand and Liquid Deicing Agents
Winter Weather Operations Planning: Improving Your Snow and Ice Control Program

2:15 – 3:15 p.m.
Education Sessions
A Tale of Two Buildings
Web-based GIS for Municipal Snow Operations
Winter Maintenance Assessment Tool: An Innovative Way to Manage Salt Use

3:30 – 4:30 p.m.
Education Sessions
Innovative Approaches to Brine
Managing Change Alaska Style: Climate and Budget
New Technology Trends for Winter Maintenance

4:30 – 6:30 p.m.
Exhibit Opening and Welcome Reception on the Exhibit Floor

MONDAY, MAY 23
9 a.m. – 3:30 p.m.
Exhibit Hours

8 – 9:30 a.m.
General Session Talk Show: Changing the Conversation

9:30 – 11 a.m.
Non-compete Exhibit Time
Coffee Break on the Exhibit Floor

9:40 – 10:25 a.m.
Exhibitor Solutions Theater

10:30 – 11:15 a.m.
Exhibitor Solutions Theater

10:40 – 11:25 a.m.
Exhibitor Solutions Theater

11 a.m. – 12 noon
Education Sessions
“Change” — It Doesn’t Have To Be a Four-Letter Word!
AVL 101: Crash Course In Automated Vehicle Location Systems
Challenges of Winter Weather Forecasting Along the East Coast
How Two Towns Survived and Recovered from a Devastating Winter Storm
Snow & Ice Control Workshop — 15 Years and Counting

12 noon – 2 p.m.
Non-compete Exhibit Time
Lunch on the Exhibit Floor

12:50 – 1:35 p.m.
Exhibitor Solutions Theater

2 – 2:50 p.m.
Education Sessions
A Year in the Life of a Protected Bike Lane
Make Your Community a Member of Your Team
APWA and the APWA New England Chapter invite you to join us in the great Northeast for the 2016 North American Snow Conference in Hartford, CT, May 22-25, 2016. More than 2,000 snowfighters and other public works professionals are expected to attend what we are anticipating will be the biggest Snow Conference ever! This year’s Show for Snow has it all — from expert-led snow and ice education sessions to an exhibit floor full of excited vendors who can’t wait to show off the latest technologies and solutions your community’s been looking for! Don’t wait another minute, make plans today to join us in Hartford 2016 Snow Conference!

**REGISTER ONLINE TODAY**

www.apwa.net/snows

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**TUESDAY, MAY 24**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>8 a.m. – 1 p.m.</td>
<td>Exhibit Hours</td>
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<td>8 – 8:50 a.m.</td>
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<td>Dalton Highway Flood(s) Emergency Response</td>
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<td>How to Convince Stakeholders to Implement New Winter Maintenance Practices</td>
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<td>The Season of Zero Visibility — the Winter of 2014-2015</td>
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<td>Use of Equipment Lighting During Snow Plow Operations</td>
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<td>Coffee Break on the Exhibit Floor</td>
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<td>9 – 9:45 a.m.</td>
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<td><strong>Prize Drawings on the Exhibit Floor</strong></td>
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<td><strong>Exhibitor Solutions Theater</strong></td>
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<td>10:10 – 11 a.m.</td>
<td><strong>Education Sessions</strong></td>
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<td>Change — Challenges when Implementing New Ideas for Winter Maintenance</td>
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<td>Getting Your Message Out: Developing a Winter Maintenance Communication Plan</td>
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<td>Let’s Talk Road Weather!</td>
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<td>We May Be Small but We are Mighty!</td>
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<td>Winter Highway Maintenance: Balancing Concerns and Safety</td>
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<td>10:40 – 11:25 a.m.</td>
<td><strong>Exhibitor Solutions Theater</strong></td>
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<td>11 a.m. – 1 p.m.</td>
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<td>Lunch on the Exhibit Floor</td>
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<td>11:30 a.m. – 12:15 p.m.</td>
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<td>1 – 2 p.m.</td>
<td><strong>Education Sessions</strong></td>
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<td>Direct Liquid Application (DLA): During &amp; After the Storm</td>
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<td>Updating Operational Plans for New Technologies and Policies</td>
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<td>Use of a Winter Severity Index to Assess the Performance of Road Salt Efficiency</td>
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<td>Utilizing Technology to Achieve Results</td>
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**WEDNESDAY, MAY 25**

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<th>Time</th>
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<tbody>
<tr>
<td>8 a.m. – 12 noon</td>
<td>Technical Tour: State and Municipal Emergency Winter Operations</td>
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**REGISTER ONLINE TODAY**

www.apwa.net/snows
A
PWA's Excellence in Snow and Ice Control Award was established to promote excellence in the management and administration of public works snow and ice operations, and to promote the best practices in snow and ice removal while minimizing environmental impacts. The award will be presented at the 2016 APWA North American Snow Conference, May 22-25, in Hartford, Connecticut. Following are this year's recipients.

City of Longmont – Public Works & Natural Resources
Longmont, Colorado

The City of Longmont maintains about 350 lane miles of roadway within city limits. With a budget of $835,000 (2015/2016 budget) the City’s Public Works & Natural Resources Department is able to conduct snow and ice control operations on about 150-175 lane miles, including acceleration and deceleration lanes. To make the most effective use of resources, an annual Snow and Ice Control Plan for the City’s roadways is developed to guide operations. The plan outlines strategies to maintain a safe flow of traffic throughout the city and ensure that each residential area is in close proximity to a plowed street. Emphasis is also placed on ensuring that emergency services can be provided throughout the city. The roadway plan is supplemented by a parks snow and ice control plan that focuses more on pedestrian walkways and trails.

Longmont is continually evaluating the latest technology and more effective ways to deliver the best service possible to residents. To that effort, it is a practice to test the latest in blade technology in order find the best blade for the surface type being plowed. City trucks are also equipped with the most advanced ground speed controller available to the market. This gives the operator the ability to choose the exact rate at which the material is being applied, producing better results while controlling costs. By having plow blades that are highly effective at cutting though snow pack, the ability to select exactly how much deicing material is being applied, along with quick activation of the chemical by pre-wetting, the best possible results are achieved with each pass.

Town of Orangetown Highway Department
Orangeburg, New York
It is the Town of Orangetown Highway Department’s policy to provide a transportation system that is passable and reasonably safe as much of the time as possible within the limitations imposed by the natural environment and the availability of equipment, material and personnel resources. This aforementioned system contains 206 miles of roadway, which includes snow and ice control on 145 miles of Town roads, 45 miles of state roads and 16 miles of county roads. The Highway Department’s primary concern is keeping all roads open for emergency response and vehicular traffic. From November to April, when snow or icy conditions are likely, the Orangetown Highway Department, with its 25 snow and ice control routes, is geared up to meet this responsibility. The department’s snow and ice control plans take into account the possible need to get such vehicles into any area of Town.

In addition to the Highway Department’s process of deicing roads by applying granular sodium chloride (road salt) to a snow covered road surface, the Highway Department utilizes salt-brine to pre-treat Town roads. In 2003 the Highway Department purchased a Reed Systems Salt-brine Manufacturing Facility constructed and installed by the manufacturer. This facility mixes...
road salt and water to a 23% solution (salt-brine). This facility can produce up to 22,500 gallons at a time and is stored in six storage tanks. The Highway Department mixed its first batch of salt-brine on January 20, 2004 and is currently producing salt-brine at a cost of $0.09 per gallon. The Orangetown Highway Department is the first municipality in the New York Metropolitan Region to install this state-of-the-art facility and the department introduced the use of salt-brine to the region.

Village of Buffalo Grove Public Works Department

Buffalo Grove, Illinois

The Village of Buffalo Grove is responsible for the winter maintenance on 114 centerline miles of roads, requiring 522 plowing miles to effectively “curb” all streets. Buffalo Grove is primarily a residential community, the Public Works Department is also responsible to complete winter maintenance activities on 369 cul de sacs. Winter maintenance activities are also completed on six municipal parking lots, and parking lot maintenance that services the mass transportation systems within the Village limits that include Pace Bus and the Metra Commuter Rail Station.

The Village of Buffalo Grove Public Works Department utilizes ten primary plow units for snow removal on Village streets. Two of these units are new for 2015-2016 and are outfitted to maximize efficiency. These two units are single rear axle 5-ton dump trucks fitted with 12 ft. nose blades, 10 ft. wing blades and twin 150 gallon liquid tanks. These two units are responsible for winter maintenance on the 33 center line miles of Village streets that are 32 ft. in width. The combination of the nose plow and wing plow allows staff to curb these streets with a single pass in each direction. The remaining eight primary units are single rear axle 5-ton dump trucks fitted with single 100 gallon liquid tanks, 11 ft. nose blades & 10 ft. undercarriage scraper blades.
Hartford in pictures

On these pages you’ll see just a few of Hartford’s attractions that you can visit before, during and after APWA’s North American Snow Conference (May 22-25 at the Connecticut Convention Center). For more information on any of these attractions, go to the Greater Hartford Convention & Visitors Bureau website at www.enjoyhartford.com. For more information on the Snow Conference and to register online, go to http://www.apwa.net/snow. Why not combine business with pleasure and incorporate your Snow Conference trip into your vacation plans?

The Wadsworth Atheneum is noted for its collections of European Baroque art, French and American Impressionist paintings, Hudson River School landscapes, modernist masterpieces and contemporary works, as well as collections of early American furniture and decorative arts. Founded in 1842 and opened in 1844, it is the oldest continually operating public art museum in the United States. The museum is located at 600 Main Street in a distinctive castle-like building in downtown Hartford. With 75,000 square feet of exhibition space, the museum is the largest art museum in the state of Connecticut. It was listed on the National Register of Historic Places in 1970.

The Old State House (completed 1796) is generally believed to have been designed by noted American architect Charles Bulfinch as his first public building. The State House is currently managed by the Office of Legislative Management of the Connecticut General Assembly. The exterior building and the Senate have been restored to its original Federal style; the Representatives chamber is Victorian, and the halls and courtroom are Colonial Revival. (photo by John Groo)
The Mark Twain House and Museum was the home of Samuel Langhorne Clemens (a.k.a. Mark Twain) from 1874 to 1891 in Hartford. Before 1874, Clemens lived in many places, most notably Hannibal, Missouri, where he spent his childhood, which he immortalized in his writing. The architectural style of the 25-room house is Victorian Gothic. The house is also notable for the major works written during his residency, including The Gilded Age, The Adventures of Tom Sawyer, The Prince and the Pauper, Life on the Mississippi, Adventures of Huckleberry Finn, A Tramp Abroad, and A Connecticut Yankee in King Arthur’s Court. (photo by Frank Grace)

Bushnell Park is the oldest publicly funded park in the United States. It was conceived by the Reverend Horace Bushnell in the mid-1850s at a time when the need for open public spaces was just starting to be recognized. Today the park comprises 50 acres of green space, and is visited by over one million people each year. (photo by Frank Grace)
The Minnesota Department of Transportation is hosting the St. Croix Crossing Technical Tour as part of the 2016 PWX. The St. Croix Crossing is a new bridge spanning the St. Croix National Scenic Riverway connecting Oak Park Heights, Minnesota and St. Joseph, Wisconsin. With construction of this new bridge in full swing, this technical tour will include a project presentation by Kevin Western, MnDOT State Bridge Engineer, during the bus ride to the project site and once onsite, participants will walk and boat to four bridge construction project areas and learn about the precast process, pier construction, segmental construction and more.

The St. Croix Crossing has been decades in the making, partly because of the many historic, cultural and environmental features along the St. Croix National Scenic Riverway. There has been extensive community involvement on both sides of the river to determine whether a bridge should be built and to select the best location/alignment for the bridge.
This joint project between Minnesota and Wisconsin Transportation Departments will remove traffic from the 80-year-old Stillwater Lift Bridge with a new four-lane bridge to connect expressways on both sides of the St. Croix River. Crews will convert the Stillwater Lift Bridge to bicycle and pedestrian use only.

After months of project development and public engagement activities, an alignment was determined and a concrete extradosed bridge type was selected. This extradosed bridge is only the second of its kind in the United States and incorporates elements of cable-stayed and box girder bridges.

“The type of structure was selected during the stakeholder process, where visual quality and aesthetics were key points for selection,” said Kevin Western. “We also believed the cost would be comparable to that of a concrete box structure.” Likewise, this unique design minimizes environmental impacts in the St. Croix National Scenic Riverway while being an aesthetically pleasing river crossing.

“We were able to reduce the number of river piers by increasing span lengths to 600 feet,” Western said. “In final design we also minimized bridge width and piers as we approached shore to reduce our environmental footprint.”

We encourage you to participate in this informative and educational technical tour. Get a firsthand look at this mega project along this beautiful scenic river. By attending this technical tour, participants will: (1) Understand and appreciate the many stakeholders and goals of this project to span the St. Croix River between Minnesota and Wisconsin; (2) Learn about and gain insights into the project development challenges, accomplishments, and lessons learned; and (3) Visit project areas such as the casting yard and piers (viewing from a boat) and learn from knowledgeable project staff about the

creative and complex technical aspects of the project and how challenges have been overcome.

Attendees will be provided with personal protective equipment at the construction site and are required to wear closed-toed footwear in order to participate. To learn more about this incredible project, visit www.mndot.gov/stcroixcrossing.

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The American Public Works Association (APWA) Executive Committee was formally established on January 1, 1937, through the merger of the American Society of Municipal Engineers and the International Association of Public Works Officials. The records show that in 1924 the first individual from Minnesota to register in one of the predecessor organizations was George Shepard, Chief Engineer for the City of St. Paul, who would later become an APWA Director.

Interest and membership in national public works organizations grew, and in 1944 a small but extremely ambitious group of Minnesotans organized as the Public Works Section of the League of Municipalities. As this newly established group met during the League of Municipalities annual meetings, it became apparent that they could benefit as an organization through formal involvement in the relatively young APWA.

In 1946, at the League of Municipalities meeting in Brainerd, the Public Works Group submitted an application to the national office of APWA. In the fall of 1946, at the national APWA Congress in Ft. Worth, Texas, the APWA Executive Board approved the application and the Minnesota Chapter officially became a State Chapter of APWA. The first officers were: President Frank McKellip, Faribault; Vice President Phillip Smith, Edina; Secretary/Treasurer W. M. Somero, Ely. The total number of members in 1946 was 17.

Since that humble beginning, the Minnesota Chapter has grown to over 1,000 members and is the third largest in North America. We are proudly celebrating our 70-year anniversary.
this year and are excited about hosting the first-ever Public Works Expo or PWX in Minneapolis in August 2016. Some of the key highlights of our chapter’s history include the following:

- We have had four APWA National Presidents, three of which were Minnesota Chapter Members (1942 – Frederick Paul, City of Minneapolis; 1951 – Milton Rosen, City of St Paul; and 1967 – Hugo Erickson, Consulting Engineer); and one was a past Minnesota Chapter President who moved to Albuquerque, NM before becoming National President in 1973, Erwin Hensch.

- We have hosted five Congresses (1944, 1961, 1972, 1997 and 2005) and soon to host the first-ever PWX in 2016.

- We have hosted four North American Snow Conferences (1979, 1992, 1999, 2007)

- We have had 16 Top Ten Public Works Leader of the Year award recipients.

In 1965, the chapter expanded our annual conference to both a spring and fall conference. Our spring conference is held in a gorgeous setting “up north” amongst the lakes, pine trees and loons, rivaling any other chapter’s conference in the fun factor while engaging in top quality education topics and networking. Our annual Membership Drive and Golf Outing is going on 32 years strong.

We, the Minnesota Chapter of APWA, have a rich history of involvement in building public works traditions. On behalf of our president, Sue Mason, and our PWX Co-Chairs, Angela Popenhagen and Jeannine Clancy, we welcome you to Minnesota for the first-ever PWX and to celebrate our 70th anniversary.

Plan Your Attack

With unpredictable changes in winter weather conditions, snow and ice can wreak havoc on your roads in just a matter of hours. Whether the situation calls for pre-wetting, anti-icing, deicing, or making brine, GVM has a solution. Our systems are built to be tough, dependable, and affordable. GVM’s professional-grade snow and ice control equipment is custom built, to suit any operation and any budget, guaranteed for years of heavy-duty application. Let us help you attack next winter with confidence.

Learn more at gvminc.com/snow-division.
APWA announces 19 public works professionals earned Certified Public Infrastructure Inspector credential

APWA has announced that 19 public works professionals from across North America have recently earned the Certified Public Infrastructure Inspector (CPII) credential. Since its inception, the APWA certification in public infrastructure inspection program has credentialed a total of 258 U.S. and Canadian professionals with the CPII certification.

The purpose of the CPII certification is to promote quality infrastructure by advancing the knowledge and practice of construction inspection to benefit communities and public agencies. This APWA certification program is intended for individuals that inspect the construction of public infrastructure (e.g., roadways, highways, utilities, bridges, dams) and facilities (e.g., pump stations, treatment plants, water storage facilities) and other types of construction work and materials to ensure compliance with plans and specifications.

The most recent APWA Certified Public Infrastructure Inspectors include:

Drew T. Adams, CPII
Compton Engineering, Pascagoula, MS

Matt Blevins, CPII
Fairfax Water, Bristow, VA

Larry G. Brown, CPII
Fairfax Water, Fairfax, VA

Joaquin R. Campos, CPII
City of Buckeye, Chandler, AZ

Michael J. Carr, CPII
City of Wilsonville, OR

Steven O. Cox, CPII
KBA, Inc., Duvall, WA

Foster C. Ellison, Jr., CPII
Jacobs Engineering Group, Angleton, TX

Sean M. Felton, CPII
City of Houston, TX

Todd C. Foster, CPII
Compton Engineering, Pascagoula, MS

Travis W. Hart, CPII
City of Malibu, CA

Larry D. Holman, CPII
City of Houston, Highlands, TX

Marcus D. Marion, CPII
City of Coppell, TX

Larry D. Miller, CPII
City of Ocala, FL

Eric A. Proctor, CPII
City of SeaTac, WA

Patrick Riddell, P.E., CPII
Cannon Corporation, San Luis Obispo, CA

Stephen J. Rorai, CPII
KIT Professionals, Houston, TX

Christopher D. Thompson, CPII
Jacobs Engineering Group, Montgomery, TX

Travis S. Vickers, CPII
Provost and Pritchard Consulting Group, Fresno, CA

For more information on the CPII Certification program, the Certified Public Fleet Manager (CPFP) or the Certified Stormwater Manager (CSM) programs, please contact APWA Certification Manager, Becky Stein at (816) 595-5212, or bstein@apwa.net. For APWA media queries, contact APWA Media Relations/Communications Manager, Laura Bynum, M.A. at lbynum@apwa.net, or call (202) 218-6736.

Correction

In the April issue, the author of the article “The Energy Revolution” on page 42 was Theodore Atwood, Chief, Office of Sustainable Energy, City of Baltimore Department of Public Works.
APWA announces new Certified Public Fleet Professionals

APWA has announced the public works fleet professionals who have recently received the Certified Public Fleet Professional (CPFP) certification. The CPFP certification is for those professionals who actively supervise, manage, oversee or administer fleet services within a public or private fleet entity.

The program recently released a new policy for retired certified fleet professionals to be re-certified every five years with 20 units of professional development, including mentoring. Also, added in 2015 was a new eligibility requirement giving individuals with private fleet experience an opportunity to earn a CPFP certification.

The purpose of APWA’s Public Fleet Professional Certification is to promote excellence in fleet management by advancing the knowledge and practice of public fleet professionals to benefit their communities through quality fleet services. Since its inception, a total of 100 U.S. and Canadian fleet professionals have received the CPFP certification, and the program continues to have more fleet applicants who strive for excellent public works service in their communities.

The most recent APWA Certified Public Fleet Professionals include:

Jared L. Divett, CPFP
Bernalillo County Fleet, Albuquerque, NM

Gilbert A. English, CPFP
City of Raleigh, NC

Jeff A. Lawver, CPFP
San Bernardino County, San Bernardino, CA

Carlos Osterroth, CPFP
City of Medicine Hat, AB, Canada

The APWA Public Fleet Professional Certification program is designed to ensure individual competency and provide the public works industry with recognized hiring and promotion standards. For more information about APWA’s Certified Public Fleet Professional program, visit APWA’s website at www.apwa.net/certification, or contact Becky Stein at (816) 595-5212 or bstein@apwa.net. For APWA media queries, contact Laura Bynum, Media Relations/Communications Manager, at lbynum@apwa.net.
The APWA’s stormwater certification program promotes excellence and commitment to public service by advancing the knowledge and practice of stormwater management. Since its inception, the program has certified 91 stormwater managers in the U.S. and Canada. I would like to share a little about my background and experience with the Certified Stormwater Manager (CSM) program and its significant benefits to the profession and to our communities.

There are many different paths one could take to becoming a stormwater manager. Mine began as a youngster, always outside playing in the puddles after a storm. I have always had an affinity for water, plants, and math. In college, I initially majored in forestry, switched to land surveying (more math!), and ultimately landed in the civil engineering program. I received a B.S. in Civil Engineering from Michigan Technological University, then worked in a consulting engineering office and local building department. During that time I obtained my Professional Engineers license. My attraction to water led me toward managing public water and wastewater projects after which I returned to school for an M.S. in Water Resources Engineering. Following graduation I began working for the City of Eugene, my current employer, as Water Resources Manager.

I learned about the CSM program from a colleague in Eugene and enthusiastically participated in the development of the fledgling program as a member of the first CSM Council. It was apparent to me at that time that APWA was “on” to something with the CSM program. I was aware that there were many diverse paths to becoming a stormwater manager and that mine, an engineering path, was just one of them. I was aware of the growing need for stormwater managers especially in smaller cities and towns, potentially with fewer resources and staff expertise, where Clean Water Act requirements were being extended. I had also, by this time, personally worked with many other very competent stormwater managers whose education and work experience were in such diverse fields as public education, ecology, administration, and operations and maintenance. I appreciated APWA’s goal with the CSM certification of respecting the diversity of backgrounds and setting the bar for what it takes to be a competent stormwater manager.

In addition, in the last decade, certain factors have made the job of a stormwater manager more complex and that trend is likely to continue. These factors include changing environmental regulations, aging infrastructure, sustainability initiatives, financial stability goals, emerging...
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pollutants, and new treatment technologies.

CSM eligibility can be met with various combinations of education and work experience. Once eligibility is verified by APWA, candidates take a multiple choice test which is computer-based and can be administered at their place of employment. The test covers the following areas: overall stormwater management, program administration, communication/education, planning and design, regulatory programs, structural best management practices, hydrology and hydraulics, and operations and maintenance. A content outline is provided on the APWA website.

My advice to individuals applying to the program is to spend some time on the APWA website. Review the exam content outline and the recommended reading list. Reflect on what you think your strengths and weaknesses are and consider asking trusted coworkers for input. Focus your exam preparation in those content areas that need bolstering. For example, if your background is in planning and design, focus your preparation on the areas with which you are less familiar. For me, that would have been operations and maintenance. For candidates more familiar with operations and maintenance, focus your preparation in the areas you are less familiar with. Perhaps that would mean learning and applying the basics of hydrology. In any case, do not hesitate to ask for help from colleagues in your office or by reaching out to the other CSMs.

APWA’s CSM program enhances the credibility of our profession.

Communities in the U.S. and Canada benefit from having certified professionals with the breadth and depth of knowledge and expertise necessary to meet the demands of the job.

The exam questions were targeted at an individual having gained knowledge by working in the field. The APWA certification program is truly meaningful because it’s something you can’t obtain without real experience.

Being certified by APWA gives you respect, recognition and credibility because you have been tested in your area of expertise.

City regulators have acknowledged that having a CSM as part of a local government gives a more comprehensive approach with better understanding of what is required by the State/EPA regulators.

Therese Walch can be reached at (541) 682-5549 or therese.walch@ci.eugene.or.us.
Sunday, August 28, 2005
I met with the Mayor at 10:00 a.m. Reporters from the New York Post were present in our meeting. Weather Channel reporter Jim Cantore was in Gulfport. You know you are in harm’s way of a bad storm when he shows up. We always prepare equipment such as backhoes that help clear the streets throughout the city prior to these storms. We also allow all employees to take City vehicles home. This concept prevents the possibility of losing all of our fleet from a single hit such as a tornado. It also increases the response time and clearing in the different wards of the city. Crews passed out some 20,000 sand bags to citizens in a city the size of 75,000.

We stopped working around 3:00 p.m. I went home to my house north of Interstate 10 about five miles north of the coast. I worked to secure my own property and board windows. Tropical storm winds started coming in around 10:00 p.m. I was on the phone and e-mailing with several contractors getting them set up to come help clear the streets as soon as safe from weather.

Monday, August 29, 2005
I woke up around 4:00 a.m. to check the status of storm. We monitored the water and sewer systems by a SCADA system. Hurricane-force winds started coming in around 6:00 a.m. A large oak tree in my backyard shattered into toothpicks, as I watched through the window. At 8:00 a.m., the water pressure of the entire system south of Interstate 10 began to drop drastically. Within 30 minutes, there was no water pressure in this area of the city and along the coast. We knew that something terrible had happened to the coastline at this point but had no idea just how bad it really was. Hurricane-force winds continued for eight hours until about 2:00 p.m. Katrina produced a 28-foot storm surge.

From that moment forward, there have been many changes to Gulfport, Mississippi.

The Damage
- 9,500 Gulfport housing units affected
- 3,000 units destroyed

The Recovery
- One week to clear major roads
- One week to restore water to 90% of city (10% was destroyed)
- Three weeks to remove boil water notice
- Four weeks to restore sewer and traffic signals

The Debris
- Three million cubic yards removed (equivalent to size of the Empire State Building)
- 18 months for completion
- Total cost of $79.7 million
Funding
- $231.6 million in public assistance from FEMA
- All FEMA-related projects completed by August 2012
- $52.7 million in Community Development Block Grants
- $10.4 million in streetscape restoration
- Over $8.0 million in hazard mitigation grants

Facts about the Public Works Projects:
In addition to the repairs of infrastructure citywide, all of the infrastructure south of the railroad along the beachfront was replaced. This section was divided into six areas. The first project began in March 2008 in Area 3b which consisted of the area from the VA east to Debuys Road. Several months later, we began Area 3a from 20th Avenue to 30th Avenue which encompassed the downtown. In March 2009, we moved to Area 2 which included from 30th Avenue west to Broad Avenue, one of the heaviest hit areas of our city. Area 3d, the Jones Park area, followed and it was completed in March 2012. In December 2009, we began Area 1 which extended from Broad Avenue west to the city line at Lewis Avenue. And our final project, Area 3c, began in January 2011, which covered the VA west to 20th Avenue and was completed in 2012.

- Total $$$ for all six areas: $70,366,418
- Total area covered (in the street):
  - 40 miles – water
  - 18 miles – sewer
  - 8 miles – storm drain
  - 4 new sewer lift stations

Improved Quality of Life
More than $55 million in repairs and replacements in community facilities. Plus, new facilities including:
- Barksdale Pavilion & Leo Seal Plaza
- Jones Park
- Gulfport Marina and Harbormaster Office
- Parks and Community Centers

Celebrating 10 Years after Hurricane Katrina
After 10 years, 53 employees out of 200 still work for the Public Works and Engineering Departments for the City of Gulfport that were here during Katrina. We have a new Public Works Director since 2013. I have moved on to the Engineering Department as the Director. The city’s celebration was one of thanks. Former President Bush attended the celebration. Many good times were shared by all. Katrina brought us together in so many ways and I was fortunate to be in Gulfport during that time and thankful for the employees and volunteers that helped make our recovery a success.

Kris Riemann can be reached at (228) 868-5815 or kriemann@gulfport-ms.gov.

About Gulfport:
- 2nd Largest City in Mississippi
- 64 Square Miles
- Pre-Katrina Population – 73,299
- Current Population – 71,750
Plugging the Brain Drain in your workforce

Janet Leli, Associate Director for Technology Transfer, Rutgers’ Center for Advanced Infrastructure and Transportation, Piscataway, New Jersey; member, APWA Diversity Committee

Knowledge management, whether in the public sector or in private industry, presents a challenge to every organization. We’ve heard the term “brain drain” before—the concept of human capital flight that will inevitably leave our agencies with the loss of skilled personnel. It’s possible that without proper planning, that in a very short period of time, both our people power and institutional knowledge can vanish from our workplace.

They’re leaving

Our perception may be that this phenomenon, this loss of experience and skill, just sort of happened while we were busy working. However busy we were, the need for creating and executing a knowledge management plan has been there all along. The impending doom of the gigantic Baby Boomer retirement exodus has been within sight for some time now. We’re actually moving beyond the Boomers leaving and faced with the Generation X flux, who are coming and going with much higher frequency than previous generations. Furthermore, there is not only more transition in our workforce, but a broader disparity in the age of our employees. A recent article published on Forbes.com shines a spotlight on the fact that by the year 2020, five generations will be in the workplace. Five. That means we not only have to figure out what to do about knowledge management, but how to handle it with consideration to a slew of generational differences. The continuity of our work is reliant on being able to successfully transfer our agency processes, policies, practices, and history to new employees. Not just the younger employees, but those who are new to us for any variety of reasons. Focusing on only the “young” does not make sense—the trend for both Generation X and the Millennials is to be transient in their careers.

Recent surveys show a pattern in that both Generation X and the Millennials are likely to test the job market. Job satisfaction no longer guarantees employees stay put. Job stability appears to be less of an attraction to the younger generations, and they are more likely to make a move to find better benefits, promotional opportunities, or conditions perceived to lend themselves to a higher quality of life. One need not look any further than the Bureau of Labor Statistics to see why knowledge management should not be undervalued. The Silent Generation typically remained in an organization for more than a decade while Millennials are whittling down their length of tenure to about two years. A manager has to be savvy about training their employees, cross-training them when possible, and capturing that information knowledge of those that have retirement on the horizon in time.

Dr. Andrew M. Peña, Assistant Vice President for Human Resources at New Mexico State University, wrote an article titled “When Knowledge Left the Building” (www.workforce.com) where he discusses the need for having a succession plan not only for talent, but for the information that workers possess. He states that there are steps to be taken that can reduce the level of institutional knowledge lost when a skilled employee leaves. Specialized training, documentation of processes and job-sharing, combined with having a mentorship program in place, can help implement knowledge transfer. Retaining institutional knowledge is a critical factor in retaining and recruiting employees, and the greater the skill needed (such as technological skills), the greater the threat. Turnover of employees is less important than the level and capacity of the employees who are leaving—if an employee’s skill set is not able to be replaced rapidly, the organization suffers that much more.

When faced with a potential for employees spanning four or five generations, it would be foolish not to give some consideration to the typical attributes of each. For example, Millennials are the most tech-savvy, and are also likely to want to work more independently than as part of a team. Generation Y is enthusiastic toward their jobs, but motivated by promotion. Generation X is the generation of managers and they tend to be more adaptable. Baby Boomers are often referred to as highly productive, with an interest in mentoring. So there you have it: a mixed bag of characteristics that when put together in a collaborative environment, will require some finessing on the part of management.
Self-preservation: What do we do now?
As a manager, we have come to grasp that our people could very well have sights on leaving. We do have some who will remain long term, and we would like to retain them. Now we know we must look at our agency and decide not only what should be included in our knowledge management plan, but how to ensure that we can transfer those components across generations. That requires a working knowledge of the characteristics of those generations and a very healthy understanding of how to keep talent and preserve information that will ensure our organization’s success.

You should conduct a workforce assessment of your organization, taking into account and recording what critical knowledge is held by the current employees. This could include working alongside those who are close to retirement for their input on what is critical to be passed on to others. Put them into a mentorship situation with more recent hires or those that are already identified to be their successors. A mentoring program is an excellent way to pair up employees and boost internal communications in an agency. Set forth clear goals for both parties and what your expectations are.

Observe how groups of employees interact with one another—what are the communications shortfalls that will not support knowledge transfer? Are there work processes that can be modified or technology to be adopted to support transitioning responsibilities from one employee to another? Employees must be integrated with one another. What is transformative across all generations that could boost our organization’s chances of prospering instead of suffering at the hand of workforce and institutional knowledge shortages? Have you inadvertently stereotyped generations of workers? Has this caused a generational divide that is now a barrier between employees, thus restricting a mentorship or trainer type relationship among a seasoned employee and a less experienced one? Your mentoring program acts as active knowledge retention, and has some additional benefits. Participation often allows the new employee to develop skills and possibly acknowledgement of a career pathway, while simultaneously providing the veteran employee with a greater sense of value to the organization.

Does your organization use a knowledge hub to centrally convene digital information? Having an intranet or shared server is another means of ensuring that important information does not vanish when an employee leaves. Maybe you have an electronic document management system or software for writing process manuals. Once a manager determines what types of digital recordkeeping should occur in this system, ensuring that it is complied with is important—the records will only be as useful as the quality of information entered into it. This is a way to show that your organization is innovative. You have identified what knowledge exists, and are providing a way to share it. Technology can be used to complement person-to-person knowledge transfer. The knowledge hub is a means to encourage knowledge retention culture in the organization, and can even be common templates that all employees use.

In our current human resource environment, all organizations must deal with the fluid mobility of a modern workforce. As employees come and go, we will be tested by how the institutional knowledge of long-term employees is maintained, and how quickly new hires can be brought up to speed on internal processes. Workforce assessments, knowledge hubs, specialized training, and other methods can all be utilized to streamline your company’s response to employee turnover. The loss of institutional knowledge never has to be a reality for a well-prepared organization.

Janet Leli can be reached at (848) 445-2906 or jleli@rci.rutgers.edu.

Special Reminder: Please make sure you update your personal membership profile, including answering the optional questions 13-16 (see page 10, November 2013 Reporter). Please refer to APWA’s 2013 Diversity Resource Guide 2nd Edition and the Diversity Toolbox for more ideas in celebrating the diversity in your chapter.

“It were not best that we should all think alike; it is difference of opinion that makes horse races.”

– Mark Twain (1835-1910), American author and humorist
Recognize Your Leaders

Nominator’s Name: Jim Armstrong

Candidate’s Name: Richard Turner, P.E.

Candidate’s Title: Project and Preservation Program Manager

Candidate’s Agency/Organization: Charleston County Transportation Development

How long has the candidate been involved in the public works industry?

15 years

How long has the candidate worked in their current position?

5 years

Please describe the reason that the candidate is being considered for recognition.

Due to the leadership he has provided in modernizing the County’s pavement management program to make it a local agency leader in the Southeast.

How was the candidate’s leadership ideas/actions brought to the forefront?

He has researched new technologies and implemented numerous pilot programs to test pavement preservation techniques at no cost to the County.

Who did the candidate work with to help bring this idea/action forward?

He has worked with industry leaders and is a member of the SE Pavement Preservation Partnership. He has recently been asked to and will be serving on the FHWA Pavement Preservation Expert Task Group and the International Slurry Surfacing Association Committee.

Did the candidate experience any challenges when trying to implement this?

Yes, there was skepticism regarding the effectiveness of pavement preservation from elected officials, administration, inspection staff and the public.

Are there steps/processes that, when looking back, the candidate could have done differently to make this idea/action even more successful (lessons learned)?

No, in fact, due to his efforts the program received the 2014 FHWA James B. Sorenson Award for Excellence in Pavement Preservation.

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Visit our website at apwa.net/npww for great ideas on how to celebrate National Public Works Week in your community this year. Share your experiences on social media using the hashtag #NPWW.

If you have any questions about NPWW, contact Jared Shilhanek at jshilhanek@apwa.net or call 816-595-5257.

#NPWW
Web worldwide?

Andrew C. Lemer, Ph.D., Senior Program Officer, the National Academies of Sciences, Engineering, and Medicine, Washington, D.C.; Chair, APWA Engineering & Technology Committee

Dennis Gabor, awarded the 1971 Nobel Prize in Physics for his discoveries underpinning the development of holography, once wrote, “The future cannot be predicted, but futures can be invented.” Imagination to Innovation is a periodic look at new technology and scientific discovery that we could be using to invent the future of public works.

Spiders certainly are no competition for kittens as online video subjects and—except perhaps at Halloween—are not among most people’s favorite creatures. Nevertheless, even the most fearful are able to appreciate the beautiful and intricate webs some spiders weave to snare their supper.

More remarkable than their web patterns is the strength, elasticity, and toughness of the silk that spiders extrude. Scientific studies have shown that single strands can be stretched 25% to 40% beyond their original length before they break and the force needed to cause the break is comparable to that of high-strength steel, but with about one-sixth the weight and several times the toughness (ability to absorb energy and deform without fracturing). By some estimates, a spider web made of pencil-thick strands (possibly a challenge even for Spider-Man to produce) would be strong enough to stop a jumbo jet in flight.

Spider silk has reportedly been gathered and used for centuries as fishing line in the Polynesian islands and recently by a Japanese researcher to fabricate violin strings that performed very well on a 1720 Stradivarius instrument. In 2012, London’s Victoria and Albert Museum displayed several examples of spider-silk fabric, including a brocaded shawl made from the silk of more than one million female golden orb-weaver spiders collected in the highlands of Madagascar.

Capturing spiders and harvesting their silk has been too much of an obstacle for this remarkable material to be of widespread practical use—even farm-raised spiders are territorial and cannibalistic. The source of its properties is spider-silk’s molecular structure, a long complex and protein. The protein is insoluble in water and the fiber much finer than conventional spinning systems can manage. Special glands located in the spider’s abdomen secrete a fluid protein similar to that found in hair and horns. The silk hardens by polymerizing as it is extruded, but scientists are not sure what activates this process.

However, researchers on three continents are now finding methods that could simulate the spider’s methods and bring the silk into the mainstream. The first breakthrough involves the use of genetically-engineered Escherichia coli bacteria to produce silk proteins. (Most of the multiple strains of the E. coli bacterium are harmless, but some are pathogens responsible for food-borne illnesses famously affecting fresh-vegetable producers and fast-food restaurant chains.) Other researchers have used alfalfa and even goats to produce the proteins (extracted from the milk in the latter case). One company currently producing silk protein derived from the DNA of a European garden spider can generate about 20 different silk grades from four silk varieties. These products are being supplied for non-structural uses such as additives for shampoo and cosmetics.

The second breakthrough has been engineering of a capability for spinning the proteins into a polymerized fiber. One approach has been to modify silkworms to produce a hybrid fiber. (Traditional silk is strong, but not as strong as spider silk.) But approaches involve developing mechanical spinnerets to produce very fine fibers: A Japanese company uses one gram of the protein to produce about 5.6 miles of silk.

Developers imagine early applications of spider silk in surgical sutures, medical implants, tires cord, and textiles. If commercialization is successful and costs come down, it is not difficult to imagine artificial spider silk finding its way into safety netting and work clothing, perhaps even large public works applications like temporary shoring and permanent structures. Worldwide web could come to have a different meaning!

Andrew Lemer, Ph.D., is currently a Senior Program Officer with the National Academies of Sciences, Engineering, and Medicine. In addition to technical papers and occasional articles for the Reporter, he writes on civil infrastructure and human settlement at www.andrewlemer.com.
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As I write this, it is springtime, which means that, of course, there is a snowstorm moving across the U.S. dumping wet sloppy snow all over everything. That just underscores how difficult it is to forecast the weather. In fact, in most parts of North America it seems that when people discuss their local weather they will tell you that “if you don’t like the weather now, just wait half an hour, it will change.” That variability makes it tough to do winter maintenance proactively, because the proactive part of the operations means you are relying on the weather forecast.

There was a time some years ago when it was fairly standard across North America for public works agencies to wait until an inch or more of snow had accumulated on the roads before sending out the plows. For the most part, that approach is no longer acceptable. A variety of changes (higher traffic volumes, just-in-time delivery, and basically higher public expectations) have occurred so that
many agencies today have to start work on a winter storm long before the first flake has hit the ground. Techniques such as anti-icing (to be discussed in future months!) require that ice control materials be placed on the road prior to the start of a snowstorm, and that means public works agencies have a need for good weather forecasts. Put simply, the good old “weather rock” method of forecasting is no longer good enough (see Figure 1).

But what exactly is a good weather forecast in the context of conducting winter maintenance operations? It turns out that a standard weather forecast (for example, what you will get on the radio or the evening news) is not going to provide the critical information that you need. Those forecasts (and the free ones on the Internet and in apps) are derived from the National Weather Service forecast (along with some other global forecasting models). There is nothing fundamentally wrong with that forecast except for one thing—it does not forecast pavement temperature.

If you have dug around a bit in weather matters, you might beg to differ—after all, those forecast models all talk about surface temperature. But this is one of those occasions where technical language really can mislead. From the viewpoint of a meteorologist, the surface is in fact two meters above the ground (a tad more than six feet). If you are driving a truck or a car, and find yourself six feet above the ground, you have issues that a forecast is not going to solve...

The pavement temperature is a rather complicated beast. It is of course impacted by the air in contact with it, but also by the ground itself, what the temperatures have been doing over the previous months (that governs how much heat will flow out of the ground or into the ground), the degree of shade, the type of pavement, the cloud cover, and of course whether the pavement is on a bridge or not. There are a few other factors too. And from the winter maintenance point of view, the pavement temperature is critical. The snow falls onto the pavement, and as long as the pavement temperature is above the freezing point the snow will not freeze to the pavement. Which, by the way, is why we put salt on the pavement—to lower the freezing point of the snow on the pavement. If the snow does not freeze to the pavement, it is (relatively) easy to plow it off the road surface.
So the standard forecast does not include pavement temperature—and that means if we want that in our forecast, we will have to get some sort of Value Added Meteorological Service (or VAMS). As the Value Added bit of that implies, you will have to pay for it, so, we need to go shopping. A useful place to start when shopping is the APWA Buyer’s Guide website (http://publicworksbuyersguide.com/Listing/ Index/Winter_Maintenance/Weather_ Information_Services/4686/126). But before we start swiping the credit card, let’s think a bit about what else we might want in our forecast in addition to pavement temperature.

Depending on the area for which you have to provide winter maintenance, you may have a need to consider differences in weather across your area. Sometimes, especially in the mountain areas, weather can change dramatically over very short distances. In the Midwest this is less likely to be an issue, but it can still happen—those areas by lakes that get heavy snow, while two miles away there is almost no snow at all, for example. So, for your ideal forecast you may need to have greater location specificity than you would typically get from the local TV station (where the forecast area is their viewing area).

You are also going to want to know in as much detail as you can get when your storm is going to start (and end, although for most of us the start time is the really crucial one). If you listen to the radio forecast it will likely say something like “snow will start late tomorrow afternoon” which is better than “it will snow tomorrow” but not really as good as we would like it to be. You want to know, preferably to within about half an hour, when it is going to start to snow (or whatever the precipitation will be that you are concerned about) in your area of operations.

And in addition to knowing the pavement temperature, and the start and end times of the storm, you are also going to want to know what form the precipitation will take. A storm that begins as rain, changes to freezing rain and then becomes snow is a lot tougher to deal with than a storm that is snow throughout. It turns out that this is one of the hardest things for weather folk to get right in a forecast. We see these sort of storms most often in the spring and the fall, but they can happen in the middle of winter too (depending of course on where in North America you are located). Those nicely colored maps show different areas getting rain, sleet and freezing rain, and snow. And, wouldn’t you know it, you are in one of those places where you might (or might not) get all three in one storm.

There are a couple of things you can do to help you through the decisions you need to make for this sort of storm. First and foremost, you need to have a discussion with your weather forecast provider about the sort of storms that cause you significant operational problems. If you do not do this, he or she will not know that it matters whether a storm begins with rain and turns to snow, or is snow all the way through. From a weather point of view there is not much difference between those two storms, but from a winter maintenance stance, there is a significant difference (liquids will not be very effective if the storm begins with rain, in case you were wondering!).

The other thing you can do is get some good hard data on what is happening right now in your area of responsibility. The best way to do this is through some sort of road weather information system (also known as RWIS). The concept of RWIS has been around for more than 30 years, starting over in Europe and coming to North America as part of the Strategic Highway Research Program in the late 1980s. Back then it meant a few fixed locations with sensors to measure pavement temperature and various other meteorological parameters (like air temperature, relative humidity, wind speed and so forth). Nowadays it is rather more flexible and significantly more powerful than it was thirty years ago.

If you want to read up about what has changed in the realm of RWIS, one of your best sources would be the Aurora pooled fund study (www. aurora-program.org). It is an AASHTO Pooled Fund program with several states and provinces taking part and the program investigates and evaluates new technology in the area of RWIS, and also establishes needs for new technologies to serve winter maintenance operations.

RWIS these days includes a lot of mobile as well as static sensors. Many agencies now mount pavement thermometers on their trucks and use the data to decide how much material to apply. More sophisticated mobile sensors can also measure road surface grip (an analog for pavement friction) and thus provide real-time information to an agency as to whether or not their roads are slippery. Increasingly, agencies are tying this source of data in with GPS and AVL (automated vehicle location) systems to provide an up-to-the-minute picture of how their winter maintenance operations are proceeding during a storm.

All of which seems perhaps quite a long way from the weather rock. The good news is that there are much more sophisticated tools available to us now in winter maintenance than that good old rock, no matter how fond of it we may be!

Wilfrid Nixon can be reached at (703) 549-4648 or wilf@saltinstitute.org.
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Define leadership and management in your perspective as it relates to sustainability. An organization can only be as sustainable as its leaders. In order to become more sustainable, an organization has to be open to change. Leadership is critical in driving and motivating change. Good leaders provide motivation and inspiration for others. As it relates to sustainability, leaders must provide the motivation for change, which includes encouraging a sustainability mindset, being open to new ideas, and a willingness to give recognition to those who embrace it.

Where does an organization start? While sustainability is often considered an environmental term, many public works leaders define it as a priority that encompasses all aspects of investing in the long-term good of the community. That means making decisions that are simultaneously beneficial for the environment, residents, development, community character, overall quality of life and more. Executing a holistic approach requires involving everyone from the public works director to residents and from across divisions, cities and counties. Those concepts are not revolutionary, but they are driving how public works departments are being reshaped.

Focusing on leadership, what is the vision as it relates to improving sustainability within public works? The vision as it relates to improving sustainability within public works is to implement more environmentally friendly, economically sound, and socially responsible long-term solutions. To do this, we must continually analyze our projects and processes to find new and better ways to build and maintain the infrastructure of our communities. Often, in both the public and private sectors, the most sustainable organizations are also considered some of the most innovative. These organizations embrace change and are open to new ideas as well as failure. As leaders of these organizations we must support these new ideas and also accept that they may not always work, at least not at first. We have the ability to create a culture of continuous improvement, where we operate under almost constant change to implement the solutions that work best for our organizations and communities.

Transitioning from leadership to management, what are the goals of building a sustainability mindset within public works? Public works has an impact on everyone. We make decisions that affect people’s lives, and building a sustainability mindset helps guide those decisions. We are not just making decisions that impact people today; we are making decisions that will affect generations to come. A sustainability mindset means that we are doing the right project, and have considered the social, economic, and environmental impacts of that project. Good management helps support this through proper planning, budgeting, along with goal setting and tracking.

Why does it matter? If the global population attained the quality of life we have as Americans, we would need five planets to support these natural resource demands. Currently, global consumption is outpacing natural systems’ regenerative capacities by 150%.

Human development coupled with climate change is on pace to cause 50% of all species to go extinct by 2100. The fuel we use to power our lives and comforts are destroying ecosystems that took thousands of years to become what they are.

Locally, we use energy which has local and global air, water, and land implications. Our transportation systems use energy, impact community cohesion, and dictate health. If we wish to have clean water, clean air,
and healthy soil to grow food and enjoy nature into perpetuity, it is our responsibility to face these challenges head-on, determine low impact, thoughtful scenarios, and make decisions that prioritize our health and abilities to live long, prosperous lives.

**What leadership and management skills are especially important?** Excelling in a sustainability role requires an extensive science and/or engineering background, right? Not quite. The going notion may be that technical skills will help you tackle environmental impact at work—but that’s only part of the picture. For the majority of really effective sustainability leaders, soft skills are far more critical to getting the job done. So how do you know if you’ve got what it takes? Whether you’re looking to initiate conversation inside your company or spearhead a new program, here are three soft skills every sustainability leader should develop: big picture thinking, strong communications skills, and keen “peripheral vision.”

**Where can someone start? What happens when it does not work?**

Pursuing sustainability begins with self-educating and exploring efforts and frameworks that already exist, and it persists with strong social capital, organizational integration, and management skills.

Use available tools and resources. The APWA Center for Sustainability (C4S) is a great resource for public works agencies. C4S provides tools and resources to APWA members and community leaders that allow decision makers to implement more sustainable, economically sound, and socially responsible long-term solutions. New information is continually being added to the C4S webpage (https://www.apwa.net/centerforsustainability) to assist members and communities.

APWA is also a founding member of the Institute for Sustainable Infrastructure and Envision. Envision is a tool that can be used for infrastructure projects of all types, sizes, and complexities. It can help you achieve higher levels of sustainability at each step of the process—from assessing costs and benefits over the project life cycle to evaluating environmental benefits and using outcome-based objectives. By going through the credentialing program employees will broaden their understanding of sustainability as it relates to public works, and they will gain access to additional tools such as the Envision checklist and the online rating system.

Find trusted science, advocacy, and news sources—broadly speaking—like the EPA, National Resources Defense Council, National Geographic, Governing.com, or Planetizen.com. Sustainability is beginning to take root as a core competency in many institutes of higher education. And because many cities have cared about sustainability—whether calling it that or not—enough have hired sustainability coordinators and created sustainability plans that there is no need to reinvent the wheel. As in many industries, professional groups and standardization are important, and cities now have comprehensive and broad sustainability benchmarking standards—such as STAR Communities—to refer to for taking the next steps to improve.

New ideas aren’t always easy for institutions, and sustainability advocates’ ideas matter no more than they are embraced by others. To spread interest and traction building social capital, pointing to success stories from other cities and speaking to an audience’s interests are critical in gaining buy-in. Arguments can be framed from different angles; when resistance is met, seek constructive feedback so the person’s interests can be understood better and approached again with a more thoughtful case. And if the case cannot be made, it can be good to build a pocket of success rather than seeking a paradigm shift for an organization, or there are always other areas that can be addressed. Sustainability is big and can include anything under the umbrella of environmental, social, and economic health, so look for more opportunities and willing partners.

**What our agency is doing now currently works, why change?** It’s easy to rush change. Applaud success and a smooth operation where due. Focus on relationship building and understanding of an operation, and then build an argument by identifying peer operations that look at things differently and promote success. Is there a cost or health argument that can be made? Is there a publicity argument to be made? Should the case for change be coming from a different person in the organization? It’s easy for a sustainability-focused professional to become predictable and too ambitious before learning the nuances of an operation. Offer appreciation and time to a prospective partner, learn what will be most appealing, and keep in mind the importance of humility when seeking to understand—and possibly change—a person’s fine-tuned operation.

Jen Winter can be reached at (319) 286-5803 or j.winter@cedar-rapids.org; Mary Pat Baldauf can be reached at (803) 545-2722 or mpbaldauf@columbiasc.net.
Crews working to repair Christchurch’s extensive system of earthquake-damaged underground infrastructure have received a helping—albeit robotic—hand.

The city’s vital horizontal infrastructure—including roads, freshwater systems, wastewater systems, and stormwater systems—was devastated in the 2010 and 2011 earthquakes. The Stronger Christchurch Infrastructure Rebuild Team (SCIRT) is working to repair the damage to publicly-owned infrastructure by the end of 2016.

To help get the job done safely, SCIRT contractors McConnell Dowell and subcontractor Concrete Treatments NZ (CTNZ) have brought in an ultra-high pressure hydro-demolition robot, affectionately known as “Geo,” that can be used in confined spaces to remove unwanted concrete or prepare damaged concrete for repair. The Aqua Cutter 410A Evolution is the only one currently available in the Southern Hemisphere.

Geo is currently working on the Southern Relief, a wastewater trunk main that was significantly damaged in the earthquakes. The trunk main is a 1.2m by 1.4m box culvert that takes wastewater from more than 200,000 households around Christchurch and moves it to the Bromley wastewater treatment plant.

Damage to the Southern Relief sewer varies from small holes or short cracks through to full circumferential cracks and widths from 0.2mm up to over 20mm wide in both the culvert and manholes. The current phase of work is in Worcester Street, where CTNZ is repairing 110 defects. Parts of the essential pipe repairs require Geo to complete crack injections to individual defects along almost 2 km of the culvert.

Project Engineer Stuart Anderson says ultra-high pressure hydro demolition is a significant safety risk for operators, particularly when undertaken by hand. High-pressure water-jets can exceed 3,300 km/h, which is powerful enough to slice through solid materials or to damage any part of the human body. Even injuries that appear to be relatively minor can be fatal, as micro-organisms can be injected into the

The Aqua Cutter 410A Evolution, affectionately known as “Geo”
body through an abrasion, along with air, water and debris.

“Using the water pressure at the flow rate required to carry out the repairs combined with the length of lance would pose a serious risk to the operator’s safety,” Anderson says.

“The solution was CTNZ’s purchase of the automated robotic hydro excavation tool. Geo has the ability to use the tool remotely, replacing hand-held lancing. The robot’s compact nature allows it to enter and repair the box culvert safely and efficiently.

“Geo’s hydraulic and articulated arm can reach as far as three metres into horizontal, vertical and overhead areas and its use has enabled a safer working environment for the crew. It means that crew members aren’t placed in an unsafe position to deal with flying concrete debris in a restricted space.”

CTNZ worked with the supplier to design new attachments for the robot and develop power-pack control and remote emergency-stop systems that could be initiated from both above and below the ground, which avoid an unexpected or uncontrolled energy source in the confined space while still providing emergency control of the above-ground power-pack.

CTNZ is in negotiations with clients to use Geo on bridge, wharf and culvert repairs with the robot being capable of working on any concrete structure, including tanks, buildings, floors, carparks and roads.

In 2015, McConnell Dowell won the Bill Perry Safety Award for their use of “Geo” in the Southern Relief project. The award recognizes SCIRT teams that continually raise the bar of safety and safety awareness.

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The Mexico City Habitat III meeting on financing urban development is underway.

The meeting is meant to provide input to the consultations on the New Urban Agenda concept, to be adopted at the third UN Conference on Housing and Sustainable Urban Development (Habitat III) in Quito later this year.

Local governments have an enormous potential for global transformation towards sustainability. The vision, experience, technologies and commitments are all there. What is still missing are effective governance and financing models.

In order to ensure a rapid global transformation, discussions around financing urban development should focus on two primary areas: Innovation and Scale-up.

Innovation
Global financing models should serve urban development with a holistic approach, respecting the demand-driven priorities of local and subnational governments. The necessary background and framework is now available through (a) the adoption of SDG Goal 11 on making cities and human settlements inclusive, safe, resilient and sustainable; (b) the Paris Agreement recognizing engagement of all levels of government in global climate efforts; (c) paragraph 34 of Addis Ababa Action Agenda on financing development; and (d) paragraphs 19.e and 19.f of Sendai Framework and the vision to develop local disaster plans in additional to national ones.

From climate mitigation to procurement, from renewable energy to ecosystem-based adaptation, from mobility to land use planning, the commitments and innovative experiences of local and subnational governments for transformative actions must be considered as priority areas for investments at all levels.

Local and subnational governments should be capacitated to develop and deliver transparent and inclusive high quality investments for sustainable development that are attractive for public and private investors at all levels.

Scale-Up
Resources for sustainable development must increase rapidly. The ICLEI Declaration to Ministers at COP21 underlines the need to develop a global framework to mobilize additional financial resources for climate change mitigation, adaptation and loss-and-damage through public as well as private finance. Financial tools can include carbon pricing, the phasing out of fossil-fuel subsidies, divestment from carbon intensive infrastructure and other assets, and revenues to be generated from regulations on international finance markets or transactions.

Access of local and subnational governments to these resources must be enhanced significantly. The launch of the GEF Integrated Action Program on Sustainable Cities and subnational implementing entities at the Green Climate Fund are good practices that must be scaled up and rendered operational. Commitments under the Compact of Mayors or proposals developed under the Transformative Actions Program (TAP) should be considered as priority actions for cities and regions to help them access these global climate funds. The growing contributions of local and subnational governments such as Brussels, Paris, and Quebec should be praised and acknowledged, and other cities and regions in a position to do so should be encouraged to increase such contributions. The Global Environment Facility and the Green Climate Fund should be invited to match these contributions with other resources, and these should be earmarked to finance ambitious and transformative actions presented by local and subnational governments in developing countries.

Habitat III: What needs to be done on financing urban development

Yunus Arikan
Head of Global Policy and Advocacy
ICLEI
Bonn, Germany

T
Direct investment to local and subnational governments, through laws, incentives, taxes, procurement or commitments, as well as growing contributions to global climate funds, should be considered as a significant source of investment in sustainability.

ICLEI promotes or is involved in several initiatives on financing urban development.

At the 2015 UN Climate Conference (COP21), we launched the Transformative Actions Program (TAP), a global partnership that mobilized 125 applications from 80-plus local and subnational governments and partners worth $9 billion of investments, aiming for ambitious, crosscutting and inclusive climate action.

ICLEI is also engaged in partnerships with CCFLA, Climate KIC and LoCal, CDIA, and GIB. ICLEI also supports GEF and is an observer to the Green Climate Fund.

We facilitate the Global Lead City Network on Sustainable Public Procurement and city-business collaborations.

Several ICLEI members are global leaders in innovative financing models: Johannesburg on green bonds, Seoul on investments in renewable energy and energy efficiency, Helsinki on public procurement, and Tokyo on Cap and Trade, as well as Brussels and Paris on mobilizing financial resources to the Green Climate Fund.

Finance has been one of the core topics of the Resilient Cities congress series that has been held in Bonn, Germany since 2010, including discussions around ICLEI’s White Paper released in 2011.

Yunus Arikan coordinates ICLEI’s global policy and advocacy. In this capacity, he acts as the focal point of the Local Governments and Municipal Authorities (LGMA) Constituency to the UNFCCC, as well as Organizing Partner of Local Authorities Major Group at the UNEP, Rio+20 and WCDRR processes. He can be reached at yunus.ariank@iclei.org.
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Sustainability was key for new rental car facility at Logan Airport

Camille Bechara, P.E., Project Manager, and Teresa C. Vangeli, P.E., Lead Structural Engineer, WSP/Parsons Brinckerhoff, Boston, Massachusetts

Incorporating the principles of sustainability into the design of a new rental car facility at Boston Logan International Airport resulted in recognition from three organizations—the U.S. Green Building Council, the Institute for Sustainable Infrastructure, and American Council of Engineering Companies (ACEC) of Massachusetts.

The $310 million ConRAC (Consolidated Rent-A-Car) building opened for service in September 2013 and was finally completed in the summer of 2014, with the addition of a taxi and bus/limo pool. The facility consolidates the operations of nine rental-car companies at a 49-acre site in the airport’s southwest service area.

A project of the Massachusetts Port Authority (Massport) in collaboration with the rental car companies, ConRAC includes a 112,000-square-foot, four-level customer service center and a 1.2-million-square-foot parking structure with spaces for over 4,000 vehicles. The facility includes areas for maintenance, storage, fueling and car washing.

WSP/Parsons Brinckerhoff served as Massport’s prime consultant for the ConRAC project, with responsibility for project management, planning, design and construction-phase services, as well as oversight of subconsultants.

The customer experience at ConRAC is enhanced by the facility’s open design, with glass curtain-wall façades allowing expansive views. The parking structure features large open bays with exterior H-frames, interior moment-frames eliminating shear-walls and cross-bracing, maximizing openness, visibility and security.

Passengers arriving by bus are dropped off at the upper-level roadway to the rental-car transaction counters and then to the parking structure. Passengers returning their cars to the garage are directed to level one via elevators/escalators, and then take buses to terminals.

Camille Bechara, P.E., Project Manager, and Teresa C. Vangeli, P.E., Lead Structural Engineer, WSP/Parsons Brinckerhoff, Boston, Massachusetts

The new rental car facility at Boston Logan International Airport
For the ConRAC project, Massport instituted a sustainability program based on environmental stewardship, economic growth and social responsibility, and produced sustainable design standards and guidelines to be followed by consultants. For the buildings of the project, the initial goal was LEED Silver, but ultimately LEED Gold was achieved for the customer service center, and the QTA (quick-turn-around) buildings, which service the vehicles. For the infrastructure as a whole and in combination with its residential neighbors, WSP/Parsons Brinckerhoff used the Envision rating system of the Institute for Sustainable Infrastructure in assessing the project’s performance with respect to the “environmental, social and economic impacts to sustainability.” The Envision self-assessment projected score was 53%, equivalent to a Platinum award in the third-party review and award program. The project also received the Grand Conceptor Award at the 2014 Engineering Excellence Awards competition sponsored by ACEC/Massachusetts.

With the opening of ConRAC, diesel-powered buses serving rental car customers with as many as 100 trips per hour were eliminated from the airport, replaced by 28 fuel-efficient hybrid Massport buses. Consolidating fuel-efficient shuttles reduced congestion and emissions by 50 percent.

On all of its projects, Massport emphasizes energy efficiency, water management, and the use of regional, renewable and recycled materials whenever possible.

The ConRAC project used 38 percent recycled materials and 43 percent regional materials. More than 90 percent of waste was diverted from landfills, and more than 51 percent of excavated material was reused onsite, including demolished pavement that was recycled as gravel borrow.

More than 150 kW of electricity is generated through 616 photovoltaic panels on 22 solar canopies on the upper level of the parking structure that can produce 151 kW. Water-conserving fixtures reduce potable water use by 34 percent, and the car wash systems recycle more than 95 percent of all wash water used.

The project was located in a well-used industrial site with areas of brownfield-classified contamination, and incorporated abatement and remediation as necessary. New infrastructure included direct access roads through the site, pedestrian paths to connect nearby residents to an adjacent park, and an increase of 3.7 acres of landscaped area. All the plantings in the landscape are native to the area and require little or no watering.

Aggressive measures were taken to protect groundwater from the new fueling areas by using double-wall piping and tanks. Improvements to the outfall water were handled by the stormwater management measures. Site runoff was treated in oil water separators and Massport’s required “stormceptors.” Runoff at the rental car parking structure was diverted from the stormwater system to the sewer system.

All above-ground tanks, such as for motor oil and windshield wiper fluid, are double-walled, and all underground tanks and piping are double-walled with leak detection. The fueling areas of the new QTAs contain robust life safety and fire suppression systems, as well as positive limiting barriers for containing small spills and containment for pool fires. The emergency stop system shuts down operation of the windshield wiper fluids and vacuum as well as the fuel system. The fueling areas have ample operational space to reduce the likelihood of accidents.

One of Massport’s top priorities was being a good neighbor to communities adjoining the project, and the agency welcomed stakeholder involvement.
from the beginning. Landscaping and an architectural wall were added to provide a buffer for nearby residential neighborhoods. A pedestrian/bike path and park space connect the neighborhood south of the site to a park and ball fields north of the site. A neighborhood center, the Noddle Island Community Room, was added to the customer service center, and is used for community functions and displays of work by local artists. The site is easily accessible by public transportation and walking/bicycle paths, providing transportation options for community members employed by the rental car companies. During construction, extensive noise-control monitoring was performed to ensure that construction impacts were within acceptable limits.

Despite numerous challenges, obstacles and changes, the ConRAC project was completed ahead of schedule and under budget, achieved an outstanding record with respect to sustainability, and serves as a welcome addition to the local community.

Camille H. Bechara is a senior supervising engineer at WSP/Parsons Brinckerhoff. A 30-year employee of the firm, he is a registered professional engineer in Massachusetts and Rhode Island and has extensive experience in the design of airside and landside airport facilities, parking garages, passenger terminals, transit stations, commercial and residential buildings, bridges, marine facilities and tunnels. He can be reached at (617) 960-4854 or bechara@pbworld.com.

Teresa Vangeli offers more than 27 years of diversified structural engineering and sustainable design and management experience throughout the United States. She has been a LEED™ Accredited Professional BD+C since 2004. Since obtaining her Envision™ Sustainability Professional Credential in 2014, Teresa has used Envision on three infrastructure projects. She is a licensed professional engineer in Commonwealth of Massachusetts and the State of Connecticut. She can be reached at (617) 960-4941 or vangeli@pbworld.com.
The STAR Community Rating System (STAR) is the nation’s leading sustainability framework and certification program created by and for local governments to assess their achievement toward sustainability. STAR was introduced in October 2012 and represents a pivotal moment in the national movement to create more livable communities by defining community-scale sustainability and presenting a vision for how communities can become healthier, inclusive and prosperous across seven goal areas:

- **Built Environment** – Achieve livability, choice, and access for all where people live, work, and play.
- **Climate & Energy** – Reduce climate impacts through adaptation and mitigation efforts and increase resource efficiency.
- **Economy & Jobs** – Create equitably shared prosperity and access to quality jobs.
- **Education, Arts & Community** – Empower vibrant, educated, connected, and diverse communities.
- **Equity & Empowerment** – Ensure equity, inclusion, and access to opportunity for all citizens.
- **Health & Safety** – Strengthen communities to be healthy, resilient and safe places for residents and businesses.
- **Natural Systems** – Protect and restore the natural resource base upon which life depends.

Within the rating system’s seven goal areas, there are 44 sustainability objectives and a total of 526 measurable indicators. Each objective includes two types of evaluation measures: Community Level Outcomes and Local Actions. Community Level Outcomes are quantitative, condition-level indicators that show community progress on a STAR Community Rating System Objective. Local Actions are the decisions, programs, plans and codes that a community puts in place to move towards the Community Level Outcomes. The criteria for these evaluation measures are based on relevance, feasibility, timeliness, usefulness, reliability and validity.

STAR can be used as a standalone framework for local sustainability or as a management tool and certification program. The rating system’s goals and objectives allow for local governments and their communities to better strategize and define their sustainability planning efforts. It also helps users identify, validate and support implementation of best practices to improve sustainable performance. Local leaders use the STAR framework to demonstrate accountability and leadership, identify gaps and prioritize investment, and as a measuring stick to determine whether their investments are achieving outcomes.

STAR certification provides a clear, data-driven approach to assessing communities’ sustainability efforts and allows communities to credibly and transparently track progress toward overall sustainability objectives. Local governments are responsible for providing data on evaluation measures and submitting their applications for verification. The flexibility of the program gives local governments the ability to select measures that have more significance and relevance to their communities. STAR Communities’ technical team verifies the data submitted for accuracy and determines the rating based upon the points achieved.

There are three leadership levels of certification. A 3-STAR Community is recognized for sustainability leadership and a point range of 200-399. A 4-STAR Community is recognized for national excellence and a point range of 400-599. A 5-STAR Community is recognized as a top tier achiever in national sustainability and a point range of 600 or more. The data collection process for certification can typically take from six months to a year. The rating lasts for three years after the award date and communities are encouraged to continue their progress and recertify.

Tacoma, Washington was the first U.S. city to become a certified STAR Community in November 2013. Since then, 45 U.S. communities nationwide have become STAR-
Certified, including large cities such as Austin, Texas; Baltimore, Maryland; and Broward County, Florida, as well as smaller communities like Evanston, Illinois and Dubuque, Iowa. Marilyn Strickland, Mayor, City of Tacoma said, “The STAR Community Rating System has been a powerful and valuable tool for our city to assess the progress of our sustainability efforts. It will also help us identify gaps and hold us accountable for improving the quality of life for our residents.” Tacoma received high scores in the Education, Arts & Community and Built Environment goals. As a result, they have created opportunities for improvement in areas with lower scores such as Economy & Jobs, Equity & Empowerment, and Health & Safety.

### Table of STAR Goals and Objectives

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Other communities that have demonstrated sustainability progress using STAR:

**Evanston, Illinois.** This community earned its 4-STAR Community Rating through noteworthy achievements such as exceeding its Climate Action Plan Goal by reducing electricity usage by 22 percent; providing $477,000 in scholarships for programs and services to 7,200 residents; and increasing “green” transportation options by providing eight publicly available electric vehicle charging stations throughout the city, seven miles of bike lanes, eight miles of off-street bike paths, and 32 miles of designated bike routes. Since their certification, the City has used their results as the basis of a Livability Academy, a half-day interactive workshop and training on livability and sustainability that has been attended by all Evanston city staff.

**Reading, Pennsylvania.** The STAR Rating System framework helped Reading demonstrate its achievement in meeting standards for drinking water quality, safe wastewater and stormwater management; reduction in the total solid waste generated within the jurisdiction since 2010; and success with youth development programs such as the Reading Youth Violence Prevention Program, the “ImmaBe” Mentoring Program, and the YouthBuild Life Skills Readiness Program. Pursuing STAR certification helped to spur conversations about what more the City could be doing; while in STAR’s Leadership Program, the City passed a zero waste policy and created its first food policy council.

The STAR Community Rating System has become the leading framework for local community sustainability and progress, with over a hundred cities and counties participating in a STAR program and over seventy in the process of pursuing certification. STAR Communities is furthering its programs and services in 2016 by expanding technical assistance offerings such as implementation workshops and launching the Leading STAR Community Indicators dashboard, a subset of 21 indicators from across the Rating System to be used for annual reporting, developed in partnership with the Urban Sustainability Directors Network. The organization is also currently in the process of performing a comprehensive evaluation of the framework and performance measures ahead of the release of Version 2.0 of the STAR Community Rating System later this year.

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Plaques and road signs can be created to formally acknowledge a community’s STAR rating.

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Planning to be prepared: climate change and natural hazards mitigation

Missy Stults
Doctoral Candidate, University of Michigan
Program Officer, The Climate Resilience Fund

Our global climate is changing. The weather we experience today is not like the weather we experienced as children. And the weather our children experience as adults will very likely not be similar to today’s weather. Perhaps you welcome a warmer winter or a longer spring. Perhaps the idea of a hot summer excites you. Or maybe, you worry about these changes. Regardless of whether or not you worry about global climate change, one thing is nearly certain: the impacts of climate change are and will continue to affect you and the work you do.

One of the most direct ways we experience climate change is through extreme events. Over the last several decades, the number and severity of extreme events has been on the rise. According to the Federal Emergency Management Agency (FEMA), the number of presidentially declared disasters has been rising over the last several years, with a peak of 242 presidentially declared disasters in 2011.¹ What this data doesn’t show, however, is that the cost of disasters is also on the rise. In fact, of the ten most costly disasters (in terms of dollars) in the United States, five have occurred in the last 11 years.²

This increase in the number and cost of natural disasters necessitates that communities plan for and appropriately prepare for natural disasters. This increase in the number and cost of natural disasters necessitates that communities plan for and appropriately prepare for natural disasters. The most common way this has historically happened in the U.S. is through hazard mitigation planning. Hazard mitigation planning is a process strongly encouraged by FEMA that aims to “reduce loss of life and property by lessening the impact of disasters.”³ States, tribes, and local governments wanting to be eligible for certain types of non-emergency disaster funding (e.g., non-emergency public assistance, hazard mitigation assistance grants) must have a FEMA-approved hazard mitigation plan. To help communities prepare these plans, FEMA provides guidance on what it expects to be included and tools to help stakeholders prepare the hazard mitigation plan.

To date, over 22,000 states, tribes, and/or local communities have created hazard mitigation plans. While laudable, one of the largest missed opportunities associated with hazard mitigation planning is that most communities project their future risk to natural disasters based on the occurrence of historic hazards. This means that communities are literally using the past in order to prepare for the future. In a world plagued by climate change, past is no longer prologue to the future, meaning that planning based on historical occurrences of disasters will very likely make us ill-prepared for the future.

Recognizing this, a number of communities such as Austin, TX; Baltimore, MD; Lewes, DE; Waveland, MS; and Santa Cruz, CA have found ways of integrating projections of future climate change into their hazard

“...This increase in the number and cost of natural disasters necessitates that communities plan for and appropriately prepare for natural disasters.”
mitigation planning, thereby helping to ensure they are preparing for both historic as well as future natural hazards. For example, Baltimore used projections of future climate as a baseline to determine how the intensity, frequency, and return rate of natural hazards may change in the future. This information was then used to determine which hazard mitigation actions would prepare the city for historic as well as future climate-related hazards. In Austin, a decision was made to include stakeholders from the Austin Climate Partnership on the hazard mitigation steering committee, thereby ensuring that climate change was constantly considered throughout all phases of the planning process. The engagement of the Austin Climate Partnership also led to alignment between the City’s climate action plan and hazard mitigation plan.

These are just two ways that communities have successfully integrated climate change considerations into their hazard mitigation planning. Research underway at the University of Michigan is seeking to understand the myriad of ways that stakeholders can do this going forward. More information based on this research is forthcoming (feel free to contact the author), but some initial steps include:

- Invite representatives from the climate change community, or individuals knowledgeable about climate change to join your hazard mitigation planning committee.
- Integrate projections of future climate change into your vulnerability and risk assessments, thereby ensuring you are thinking about how climate change could affect the intensity, frequency, and severity of natural disasters.
- If you can’t do the above, consider adding climate change as a single, stand-alone hazard that you evaluate in addition to the more traditional hazards already in your hazard mitigation plan.
- When analyzing your flooding potential, include structures in the 500-year (0.5% annual chance) floodplain as opposed to just structures in the 100-year (1% annual chance) floodplain.
- Include criteria related to climate change in the evaluation of potential actions, thereby ensuring that most strategies selected for implementation are climate-smart.

Embedding climate change into hazard mitigation planning isn’t the only way to ensure that your community is preparing for climate change. Another approach is to ensure that all planning processes undertaken in your community consider climate change. For example, when preparing a water management plan, think about how changes in climate could affect future water supply, water quality, and water demand. Or, if working on a plan to redevelop the waterfront, consider how future sea level rise or inland flooding could alter the physical environment and overall character of the waterfront. Or, if working on a public health initiative, think about how changes in temperature, precipitation, or disease vectors could affect the elderly, poor, youth, outdoor workers, or other vulnerable populations.

And don’t worry if you don’t know the answer. The future has always been uncertain, yet that uncertainty has not stopped us from planning in a variety of other domains. Instead, consider using approaches such as adaptive management, whereby you continually revisit your plan and the strategies prioritized in that plan as new information is acquired, as a technique for planning in the face of uncertainty. Other uncertainty reducing techniques include:

- Using scenario planning to get a sense for the range of possible futures and selecting strategies for implementation that perform well under many possible futures (this is called robust planning);
- Selecting no-regret and low-regret strategies that make sense regardless of whether or not the climate is changing; and
- Selecting incremental or flexible strategies that allow you to adjust or make changes to the strategy as more information is acquired.

These are only three of the possible techniques one can use to help reduce the uncertainty associated with climate change. Regardless of what you do in your professional life, it is nearly certain that climate change and extreme weather will have some effect on you. That said, it is imperative that we find ways of planning for and implementing strategies that reduce our vulnerabilities to climate change. If we don’t, we risk placing people and property in grave danger. However, if we plan for a climate-altered future, we have the possibility of creating a more resilient and sustainable future for all.

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Notes:

1 https://www.fema.gov/disasters/grid/year
2 https://www.trustedchoice.com/insurance-articles/weather-nature/most-expensive-disasters/
3 https://www.fema.gov/hazard-mitigation-planning
When it comes to disaster preparedness and emergency management, sustainability is a key component for a community’s ability to respond to and recover from a disaster. In recent years, sustainability has generally been associated with hot topics such as climate change, global warming, organic food, and commerce. But while these terms can stir up a lot of emotions and political rhetoric, it is important that the core meaning of sustainability, “the ability to last or continue for a long time” (Merriam-Webster), and its importance toward disaster preparedness not be lost.

Integration of Planning Efforts
APWA’s Center for Sustainability’s first edition of Sustainable Practices in Public Works talks about hazard mitigation planning being an important tool for community resilience. The first action item under the “Getting It Done” section of the article highlights the best practice of integrating multiple planning efforts, including hazard mitigation. Taking this approach will not only help improve coordination and communication between the plans, but may also lead toward better ideas for mitigating and recovering from a disaster.

The Federal Emergency Management Agency (FEMA) is a strong supporter of hazard mitigation efforts. As of this writing, FEMA oversees three different financial assistance programs related to hazard mitigation. These programs are the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and Pre-Disaster Mitigation. For more information on these programs, please visit FEMA’s website (see sidebar). The Stafford Act, which outlines the process for federal assistance with disasters, has an entire section on hazard mitigation. Just like offices and organizations need to avoid the silo mentality, the way we approach sustainability and disaster mitigation/recovery should be done without silos (mental or otherwise).

FEMA is not the only federal agency involved with disaster mitigation and recovery. The U.S. Department of Housing and Urban Development (HUD) also has the Community Development Block Grant Recovery Program and National Disaster Resilience Competition. As with all planning efforts, it will take a conscious and sustained commitment to coordinate and communicate with all the potential stakeholders, but in the disaster response context, the benefits of coordinated planning can be saving lives, protecting property and the environment.

Challenge Mental Silos
In trying to break down the mental silos around sustainability, the best place to start is the current work environment. Agencies should look at their current operations and facilities and consider the impact that any of the multitudes of threats (extended power outage, extreme weather, normal weather, etc.) could have, but before looking for areas to improve, start by looking for successes already in place, whether by design or not. Agencies may be surprised at how their current facilities or operations have had sustainable components integrated in already. For example, if lift stations already have permanent backup power systems or quick connections for generators, this helps make the stations sustainable during power outages. From a staffing perspective, extended snow events can lead to split shifts or other staffing adjustments. This same approach could be used during a disaster response where crews were needed to monitor floodwaters, remove storm debris from streets, or other extended operation.

Sustainability and resiliency concepts may also help reduce the amount of demands on public works staff during an emergency. In the area of stormwater management, efforts such as tree trenches, infiltration basins, and porous pavers have not only water quality improvement benefits, but also can help with rate control. Reducing the rate at which water discharges from an area can help reduce downstream localized flooding. In turn, this may be one less street staff has to barricade or take some other reactive measure during a flood situation.

Or, take a roundabout for example. Roundabouts can reduce traffic delay, correspondingly reduce pollution from vehicle idling, reduce the severity

Mark Ray, P.E.
Director of Public Works
City of Crystal, Minnesota
Member, APWA Emergency Management Committee

Sustainability, it’s about mitigating for and recovering from a disaster
of crashes, and can use less power than signalized intersections. When looking through the emergency management lens, a roundabout can properly function even during a power outage, regardless of the power outage length; and since a roundabout can be sometimes a unique intersection in a community, it can also serve as a known landmark for outside responders.

Public works departments are committed to the communities they serve. Creative solutions that provide a wide range of benefits to society, the environment, and mitigating potential disasters need to be explored and applied where appropriate. When removed from the silos they sometimes fall into, sustainability and disaster mitigation and recovery go hand-in-hand.

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Resources:


U.S. Department of Housing and Urban Development https://www.hudexchange.info/programs/cdbg-dr/
Monetizing the value of resiliency

John C. Parker, Chief Economist, Impact Infrastructure Canada, Inc., Toronto, Ontario; Steph Larocque, Senior Vice President, Impact Infrastructure Canada, Inc., Toronto, Ontario, and member, APWA Center for Sustainability

Infrastructure. Everyone says it is crumbling. North American infrastructure has suffered from years of neglect and under-investment. While the U.S. economy is very slowly recovering, the Canadian economy is in an economic slump. Half of North America is calling for federal governments to spend big on infrastructure while the other half is worried about the deficits this will cause. And in this fiscally constrained environment cities want to build resiliency.

Three things are being overlooked in the current infrastructure investment debate. The first is that we build infrastructure for the public good and the public benefits that it brings. That is why these projects are called public works. These benefits include resiliency and insurance against climate change. The benefits of public works last as long as the infrastructure itself and can easily outlast cyclical deficits. Second, the benefits of infrastructure to the environment and quality of life are not captured in the traditional economic

Green (under grey) infrastructure improving water quality and quality of life at Mission Creek, San Francisco. (Photo Credit: John C. Parker)
rationales—job creation and growth. And finally, the type of infrastructure matters. Non-traditional green infrastructure can obviate or mitigate the need for grey infrastructure and because this benefit is being forgotten people are advocating building the wrong type of infrastructure.

Resilient infrastructure is, from an economist’s point of view, an insurance policy. It involves building redundant infrastructure, infrastructure that is able to withstand extreme events—just in case. But the word “redundant” immediately raises red flags in our austere budget-constrained times. Do we really want superfluous infrastructure? And with a huge infrastructure deficit already, are people willing to pay more for more, stronger, and less-used infrastructure?

When disaster strikes, people—mainly politicians—talk about spending more on infrastructure but the reality is that they would prefer to be seen helping during a disaster rather than spending to prevent one. A harsh political reality is that spending on things that will rarely be used is a tough sell.

This short-term thinking and focus on immediate costs is a barrier to resiliency. Also impeding resiliency is that people forget. People have short memories and discount risk too much. Just as a lack of long-term planning stops our politicians from spending on resilient infrastructure, so too a lack of long-term memory creates an inefficient level of adaptation and hence a less than optimal amount of investment in infrastructure.

We can’t rely on natural disasters to jog people’s memories and get them to open up their wallets to spend on resiliency. Instead we have to look at the full value that infrastructure brings, in fair weather and foul. This amounts to building a case for the insurance that resiliency brings.

Much of the infrastructure debate is on whether infrastructure spending will work to boost the economy. This is the wrong question. We should instead be asking the question, why do we build infrastructure in the first place?

When the build/no build argument is posed, economists are marshaled to justify the growth and jobs that come from infrastructure spending. The right infrastructure investment may generate jobs and growth, but the main reason is that we build infrastructure to make our lives, where we live, and our environment better. With this mindset in place we are forced to think more broadly. What is cleaner air and water worth? How do we value time spent getting around? These things are trickier to pin down but they are real and have value. While we tend to forget about public works when they work, the value comes to the fore when things go wrong. Economists, those skilled in cost-benefit analysis, ecosystem valuation and micro-economics, can help. But we should stop listening to the (macro) economists blathering on about growth and jobs and give our attention to the micro-economists who can tease out the intrinsic value of public works even if the benefits are less tangible than the dollars spent to build these projects.

The current debate on how much to invest has this macro-economic focus. More infrastructure spending would produce more growth. The downside is that it will also lead to larger public deficits and debt. Lawrence H. Summers (Globe and Mail, Friday, March 20, 2015) puts the rebuttal succinctly: “There are many ways of burdening...
the future. One is to borrow money—though, given how low interest rates are, those burdens aren’t that great. Another is to defer maintenance. Those costs accumulate at a much greater rate, and that’s why I think infrastructure investment is so very important. …a more rational set of policies that raise the growth rate and leave them 20 percent richer than they would otherwise be is by far the most important thing we can do for future generations.”

Summers makes the point that as long as the infrastructure remains, so do the public benefits. If we have cleaner air, and water, that continues to give us health and happiness year after year. So let’s be fair and put the cost of deficits up against the benefits of infrastructure and make an informed choice before being scared by the deficits bogeyman.

Finally, despite the ink given to this debate, no one is talking about green infrastructure. Using nature rather than paving it over has gained favor in the engineering profession. Stormwater management is a case in point. Using wetlands, trees, and natural processes results in less flooding which has a real financial gain. But we also get cooler cities in the summer, cleaner air and water, and more recreational areas. We also get more carbon sequestration. So in addition to the financial benefits there are the less tangible benefits that scientists can quantify and ecological economists can put a dollar value on. Green infrastructure brings multiple benefits. Green stormwater infrastructure also means less need for grey infrastructure—less pipe and reduced investment in water treatment.

Civil engineers are using nature to adapt to climate change. Witness the growth of sustainability rating systems—LEED for buildings, Envision for infrastructure. Engineers are using green infrastructure in designing buildings, sites, and infrastructure to be more resilient. Ecological economists are helping engineers make the business case by valuing green. Small and green should be not be overlooked as a sensible and cost-effective alternative to the traditional solution of pouring concrete that only exacerbates our flooding and climate change challenges.

There is solid evidence that if we build infrastructure and maintain it we will be healthier, wealthier and better off. We should justify our investments more broadly than with just job creation and growth. More people are now arguing that infrastructure is the best use of our money and that now is the right time to spend. We should not be distracted by arguments against deficit funding if they ignore the benefits side of the equation. Finally, we should think about infrastructure as including green solutions because working against nature is always a bad idea.

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Coastal city solutions to protect infrastructure from sea level rise

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A study published in March estimates that with projected population growth in the U.S., up to 13 million Americans along the coast are at risk of flooding from sea level rise by 2100. Sea level rise is expected to pose a threat to an estimated $75 billion in public and private assets over the next hundred years. However, according to the U.S. Government Accountability Office, many municipalities have not yet considered the impacts of climate change on infrastructure in their decision-making processes for a variety of reasons, from limited budgets to public perception. Whether your city is currently proactively addressing impacts from sea level rise or interested in starting to think about how you might address flooding from sea level rise, below are some examples of long-term solutions municipalities have implemented to protect their critical infrastructure.

In 2014, the City of San Francisco adopted “Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco.” This guidance document includes a vulnerability zone map that shows inundation that could result from extreme sea level rise in the year 2100 plus a 100-year storm. It also includes a checklist to help assess the vulnerability of planned capital projects and the cost to replace or repair the project if it floods. The checklist is completed for projects that are at risk of flooding and submitted to a Capital Planning Committee, made up of representatives from 12 City departments. The Committee then determines the risk and whether

This Sea Level Rise Vulnerability Zone Map published by the City of San Francisco shows potential inundation that could result from extreme sea level rise (SLR) in the year 2100 plus a 100-year storm.
adaptation planning is sufficient for that particular project. The City is currently working on a citywide plan that is expected to be released by 2018 that will include resources and solutions to protect the city’s critical infrastructure.

The City of Olympia enacted a policy in 2010 to use the best available science to protect downtown from 50 inches of sea level rise. To adapt to sea level rise, the City plans to implement measures such as installing tide gates on the most vulnerable outfalls. Eventually, the City plans to elevate roadways and install pump stations to prevent flooding in the downtown area and protect their wastewater treatment plant, which is susceptible to flooding.

On the east coast, the City of Boston developed a climate adaptation questionnaire similar to San Francisco, which is required to be completed for all new large development projects. Boston has also incorporated sea level rise into its 25-year capital asset plan for stormwater and sewer infrastructure. In Boston in particular, creative solutions have been proposed by researchers and the private sector to address sea level rise. For example, scientists at Harvard have proposed creating urban retention areas on abandoned or underutilized roads in Boston and a massive storm surge barrier with pontoons to protect the channel near Logan Airport.

Following Superstorm Sandy, New York implemented aggressive programs and policies to combat flooding from sea level rise. In 2013, the City released a comprehensive plan to increase the resiliency of infrastructure in the city. The $19.5 billion plan specified improvements such as permanent levees and portable storm barriers. The City also created a branch of the Mayor’s Office for Recovery and Resiliency and the New York City Climate Change Adaptation Task Force to publish sea level rise projections and find solutions to protect infrastructure and communities from flooding.

In 2013, the City of Portsmouth, New Hampshire adopted a Coastal Resiliency Study and embarked on a pilot program to address sea level rise with assistance from a NOAA grant. The study identifies potential flooding from climate change and proposes adaptation measures to protect infrastructure and private property. For example, the study includes infrastructure and critical facilities maps detailing all wastewater pump stations, wastewater treatment plants, combined sewer overflows, culverts, storm drain outfalls, bridges, and roads. The study depicts coastal flooding scenarios to show the extent of coastal flooding and then proposes adaptation actions with associated costs to protect those assets under each flood scenario.

South Florida is one of the areas of the country most at risk from flooding. It is estimated that $69 billion worth of property is at risk of flooding in less than 15 years. Because of projections by the U.S. Army Corps of Engineers that the sea level will affect Miami more quickly than other coastal cities, elected officials have recently supported plans by public works to retrofit infrastructure, roads, and treatment plants.

The City of Miami Beach has adopted the Unified Sea Level Rise Projection for Southeast Florida, which was developed by the Southeast Florida Regional Compact on Climate Change. This projection estimates a 3-7 inch rise in sea level by 2030 and a 9-24 inch rise by 2060.

To combat this anticipated sea level rise, the City has adopted a multi-faceted effort that includes installation...
of sea walls (5.7 NAVD), over 80 new storm sewer pumping stations, new large diameter storm sewer system and raising all rebuilt neighborhood roads to a nominal 3.7 NAVD elevation. In addition, the City is engaging the planning and zoning departments to upgrade their ordinances for private development to meet the new road elevations. Please visit http://www.miamibeachfl.gov/risingabove/ for more information on the City of Miami Beach’s efforts.

The methods and costs of protecting infrastructure from flooding has long been a challenging effort for public works departments. The added component of sea level rise will continue to complicate the issue for public works in the coastal cities mentioned above and other coastal cities. As in solving many problems that cities face, the common thread among those making the most progress to address sea level rise seems to be that public works departments take the lead to quantify the problem. This effort includes:

- Identify those facilities (above and below ground) that will likely be impacted by the changes in sea level.
- Prepare a risk analysis to determine the impact to maintenance operations and services.
- Inform the public and decision-makers of potential issues.
- Develop a long-term strategy to mitigate impacts.
- Identify a budget and funding source for implementation.

What’s happening in your city and what are you doing to protect your infrastructure?

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Notes:

1 The study was published in March 2016 in the peer-reviewed British journal Nature Climate Change led by Mathew Hauer, a doctoral candidate at the University of Georgia.
Sustainability is an often-mentioned objective of most businesses and governments today. Consequently, justifying increased sustainability and measuring the degree to which an organization is sustainable, or is becoming sustainable, can be a daunting task.

Some business leaders are still convinced that in order to become more environmentally friendly, their costs will increase and their competitive edge or financial efficiency will decrease. These leaders sometimes believe that sustainability becomes a socio-economic conundrum, where they must choose between the social benefits of sustainable processes and practices and the financial costs of action. This is typically incorrect.

The drive for increased sustainability challenges this apparent socio-economic conundrum by forcing business and governments to revisit the business models, processes and technologies currently in use. Through challenge combined with economic pressure comes innovation. Innovation done through a sustainability lens means making intentional changes to organizational processes and deliverables that produce environmental and social benefits, in addition to economic value. These areas are often referred to as the three pillars of sustainability.

Numerous models exist for sustainability implementation and management. An example of a model that is used for fleet or business operations is included below. This model is comprised of three key focus areas as seen in the graphic shown above.

**Operational Optimization** is typically inward-focused in both approach and outcome. In essence, the organization typically reduces its environmental and social impacts without fundamentally changing its current mode of business. The City of Toronto’s fleet, similar to many fleets, has incorporated operational optimization by using energy-efficient lighting, reducing paper consumption, waste diversion, reduced use/elimination of hazardous materials, facility consolidation, flexible work hours/telecommuting and the increased use of alternative fuel vehicles and renewable energy. The triple bottom line of environment, economic and social (e2s) benefits can be recognized in all of these initiatives.

**Organizational Transformation** is typically inward-focused, this approach usually works up and down the value chain while collaborating closely with stakeholders. For the City of Toronto’s fleet this meant further reducing paper consumption through electronic billing, invoicing and communication, implementing ISO 14001 and 9001 standards, and developing and implementing a green fleet plan. The Toronto Green Fleet Plan includes initiatives which reduce costs and pollution through the introduction and advancement of car and bike sharing services. Once again, in moving from Optimization to Transformation the e2s benefits are still recognized.

**Systems Building** is a dynamic process through which individuals, and occasionally disparate organizations, work together symbiotically to create positive lasting impacts for people, organizations and the planet. An example of this is energy provision and distribution companies, infrastructure developers, manufacturers and City Waste Management and Fleet Divisions working together to develop a
transformation approach to waste diversion and vehicle fueling at a municipal level. This full-circle approach, which involves the capture, generation, transmission, distribution and consumption, can be facilitated through the use of biogas, sometimes known as Renewable Natural Gas (RNG), produced from curbside organic material. Through a full-circle Systems Building approach, this means that the vehicle picking up the curbside organics can be powered by those very same organics. The profound shift in moving from Organizational Transformation to Systems Building may require some outside-the-box thinking, but when a symbiotic relationship can be developed, such as the example mentioned, e2s benefits are an easily embraced derivative.

So how do you innovate for sustainability in a fleet or business? At a macro level, start by measuring and then set goals.

- Define efficiency targets and policies, and set challenging sustainability goals.
- Build sustainability goals into technical specifications.
- Articulate your organization’s sustainability goals and why they are important.
- Reframe the business model, structure processes and metrics to transparently reflect the triple bottom line or e2s goals and objectives.
- Promote internal and external collaboration.
- Supply Chain Management – Improve your supply chain through enhancing green and social procurement practices, while incorporating methods to hold suppliers accountable.
- Enhance knowledge capture and management – employ mechanisms and platforms such as Environmental Management Systems (EMS) and Lifecycle Cost Analysis (LCA) tools to enhance sustainability, while embedding it into business practices and processes.

In the City of Toronto Fleet Services Division, varying degrees of sustainability advancement exist beyond those already mentioned. At the highest level these are currently defined by performance indicators that reflect the needs of the business, combined with sustainable innovation. Some of the indicators used in Toronto’s fleet include:

1. **Fleet Utilization** – A measure to assess utilization and opportunities for fleet reduction and/or increased car-sharing.
2. **Supplier performance** – A measure to assess procurement practices and supply chain members’ performance.
3. **Shared Services** – A measure to define the socio-economic and environmental benefits derived from various collaborative efforts.
4. **Productivity rate** – A measure that identifies productivity in key areas such as maintenance operations, while helping to streamline operations and drive efficiencies.
5. **Capital reserve adequacy** – This measure defines the ability of the vehicle and equipment capital reserve to meet fleet replacement requirements. The calculation is based on anticipated future requirements and lowest total cost of ownership, based on the economic theory of replacement. The reserve and the associated vehicle and equipment replacement is forecasted for 10 years and adjusted each year, as required, to reflect changing operational requirements.
6. **Optimization rate** – This measure works in conjunction with capital reserve adequacy and provides an indicator of the fleet’s actual age, as compared to the optimum age by class/category that provides the lowest total cost of ownership, based on Lifecycle Cost Analysis (LCA).

7. **Sustainability level** – This is a more complex measure that assesses the health of the division as a whole. It incorporates the above two measures as well as the following:
   a. Facility Condition Index – Based on a facility condition assessment this provides an indicator of the health and LCA of each facility respective to operation.

Achieving a balance between the environment, society and the economy is an essential requirement that allows today’s needs to be met without negatively impacting future generations’ ability to meet their needs. Achieving this balance requires innovation, and advancement through innovation changes existing paradigms. To stimulate such innovation, business leaders must first question the inherent assumptions behind current practices. The choice for companies and government alike is not if, but how, they should achieve and enhance sustainability. Business leaders can continue to choose to see this as a socio-economic conundrum, a necessary evil, a matter of compliance and risk, or, they can look at it as an opportunity to develop organizational processes and deliverables that produce environmental and social benefits, as well as economic value.

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Climate adaptation is just one piece in the complicated resilience puzzle that cities face, and it’s directly and indirectly related to a host of challenges from flooding to infrastructure to public health. Resilience touches many city departments and budgets and outside stakeholders.

So how is a city to address resilience in a proactive and comprehensive manner?

The Rockefeller Foundation is seeking to address that question with a nonprofit they seeded called 100 Resilient Cities, the crux of which is an application-based selection of the 100 cities that they will support directly to “build resilience to the economic, social and physical challenges we face in the 21st century.”

The 60+ cities selected (link to http://www.100resilientcities.org/cities#/-_/) to participate so far (the final group will be announced in 2016) include the big names you would expect like Boston, London, San Francisco and Sydney. But the list also includes Belgrade, Serbia; El Paso, Texas; Durban, South Africa; Norfolk, Virginia; Quito, Ecuador; and Toyama, Japan.

In other words, a very diverse—in geography, demographics, and resilience challenges—group. Still, it’s a small group. And many of us aren’t in it.

But the beauty of 100 Resilient Cities is that you don’t have to be a participating city to benefit from the vast resources being poured into this effort.

Here are five of the top resources from 100 Resilient Cities that all other cities can use:

1. **Search by City and their Common Challenges.** Choose one of the 100 cities on their website and you’ll see the specific resilient challenges they face, an overview of what they are doing, links to recent stories about the city, and a snapshot of that city. Plus, once you’re in a city’s profile you can hone in on a particular resilience challenge and find all the cities dealing with the same thing.

   Click on Boston (http://www.100resilientcities.org/cities/entry/boston#/-_) and you’ll see that their resiliency challenges include flooding, infrastructure failure, lack of affordable housing, rising sea level and coastal erosion, social inequity and terrorism. (That list also serves as a good reminder to us that “resilience” extends far beyond climate change impacts.) You can “Meet the Chief Resilience Officer” and find cities from Texas to India facing similar resilience challenges.

2. **Deep Dives on Important Issues from Experts and Leading Cities.**

   Maybe you don’t have the budget to travel to global meetings, but that doesn’t mean you can’t learn from those who attend and present through their participation in 100 Resilient Cities.

   Take, for example, the “Rotterdam Exchange: Water Management and Multi-Benefit Solutions Handbook” (http://www.100resilientcities.org/blog/entry/rotterdam-exchange) First,
it’s not a random or obscure topic. They note that “of the more than 1,000 applications received for membership in the 100 Resilient Cities network to date, 60% identified flooding as one of the top shocks they face, while 20% identified water shortage as their top stress.” Second, it’s far more than an agenda from the event with a bunch of out-of-context PowerPoints. Here’s how they describe it:

In October 2015, the Chief Resilience Officers (CROs) and resilience team members of Bangkok (Thailand), Berkeley (USA), Mexico City (Mexico), New Orleans (USA), Norfolk (USA), Rome (Italy), Rotterdam (Netherlands), Surat (India), and Vejle (Denmark) convened in Rotterdam to share lessons learned and innovative approaches to water management, identify opportunities for collaboration, and learn from the living laboratory that is Rotterdam. The “Rotterdam Exchange: Water Management & Multi-Benefit Solutions Handbook” highlights the learnings from this three-day Exchange and features tactical solutions and tools from both participating 100RC member cities and 100RC Platform partners. The collective hope of Exchange participants is that Chief Resilience Officers from around the world, their team members, and other resilience practitioners will look to these lessons and tactics when confronting water management challenges in their cities.

So you didn’t need an invitation, budget or passport to download the handbook and start learning and doing.

3. City Resilience Framework. Perhaps what is most appealing about 100 Resilient Cities to participating and nonparticipating cities alike is the brainpower dedicated to the endeavor. A lot of us simply don’t have the time (and maybe not the expertise) to do the research, create the tools, and tap the network that would help us get up to speed—or bring decision makers and stakeholders up to speed. But they’ve got top experts churning out resources that are specifically designed to be shared far and wide.

The City Resilience Framework is a perfect example (see graphic on p. 64).

They describe it as providing “a lens to understand the complexity of cities and the drivers that contribute to their resilience, and a common language that enables cities to share knowledge and experiences.

It is built on four dimensions of urban resilience:

- Health and Well-being
- Economy and Society
- Infrastructure and Environment
- Leadership and Strategy

And each dimension includes three “drivers” that are actions cities can take to improve their resilience. For example, the “Infrastructure and Environment” dimension includes these drivers:

- Provide and Enhance Protective Nature and Man-Made Assets
- Ensure Continuity of Critical Services
- Provide Reliable Communication Mobility

Don’t roll your eyes and think this is a wonky 30-page white paper. They provide it in an interactive online version as well as any easy-to-print pdf.

- [http://www.100resilientcities.org/resilience/](http://www.100resilientcities.org/resilience/)
- [http://www.100resilientcities.org/page/-/100rc/Blue%20City%20Resilience%20Framework%20Full%20Context%20v1_2.pdf](http://www.100resilientcities.org/page/-/100rc/Blue%20City%20Resilience%20Framework%20Full%20Context%20v1_2.pdf)

4. Learn about Chief Resilience Officers. If your city is considering hiring—or seeking a funding source to hire—a Chief Resilience Officer or similar position, this blog post [http://www.100resilientcities.org/blog/entry/what-is-a-chief-resilience-officer/](http://www.100resilientcities.org/blog/entry/what-is-a-chief-resilience-officer/) is a great overview of what this person can accomplish for a city’s resiliency goals. They describe the position as “instrumental to how 100 Resilient Cities is helping cities address the challenges of complexity and scalability, and thus how they will contribute to the evolution of a long-lasting global community of practice around urban resilience.”

So maybe if this hadn’t been top of mind or budget priorities, it should be?

5. Access Policy Tools. 100 Resilient Cities is a nascent organization in many ways, and resilient cities aren’t created overnight or even over a decade. So we expect more and more template resources like the 10% Resilience Pledge in the coming years.

The Pledge—announced at COP21 in Paris and signed by 22 cities and counting—“urges mayors of 100 Resilient Cities to make the most ambitious commitment to city resilience in history, promising 10% of their cities’ annual budgets toward resilience-building goals and projects, without raising additional funds or taxes.” [http://www.100resilientcities.org/blog/entry/10percent-resilience-pledge/](http://www.100resilientcities.org/blog/entry/10percent-resilience-pledge/)

Bottom line: Sure, 100 Resilient Cities directly serves—with financial assistance, technical support and access to the network and events—just 100 cities.

It’s an elite group. But it’s not exclusive.

The lessons they learn, the resources they are developing, and the tools they are creating are designed to share with cities around the world.

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Sustainability Plans in public works agencies

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One of the most challenging aspects of the public works field is articulating the role our profession plays in the ever-increasing dialogue on sustainability. Specifically, many public works professionals believe the field to be on the cutting edge of sustainable practices. To that end, they note that even before the term was popular, public works promoted recycling, alternative transportation, low impact development, pervious pavements, water reuse, and other measures. On the other hand, some believe that public works is a reluctant participant in the sustainability discussion, resisting change and innovation. Some maintain this is an unfair criticism, perhaps created because public works as a profession has sometimes not effectively communicated its legacy in this field.

In any event, it is clear that a potential asset to the public works profession is a Sustainability Plan. This plan would serve as a tool and clear method for both identifying what they have accomplished in the past, and even more important, what they intend to accomplish in the future. This document would serve as a long-term vision which guides the Capital Improvement Program as well as the ongoing services and programs.

Therefore, a clearly articulated Sustainability Plan for public works agencies would clarify the key role public works plays in creating a sustainable future. The benefit of a plan is two-fold: first, for the organization, it clearly outlines where you intend to go and how to get there; secondly, the plan enables you to monitor, measure, and report clear outcomes to the policy makers and residents.

There are many existing examples of public works agencies that have adopted and implemented a Sustainability Plan. Olympia, the capital of the state of Washington, has for years assessed, analyzed, and measured their projects and services utilizing metrics on how their work enhances the economy, the environment and the community. The City of Tracy, Calif., adopted a detailed Sustainability Action Plan establishing goals and measures in several different areas of local government. Many of these areas are within the purview of public works, including tree plantings, conversion of the municipal fleet, solid waste and water use.

The above agencies and many others serve as excellent examples of how a plan establishes a vision, articulates it as city policy, provides employees with goals to attain, and communicates to the public sustainability as city priority. The City of Chula Vista, Calif., was selected for further discussion as their plan was specific to city operations.

The City of Chula Vista began their formal sustainability efforts following their participation in San Diego Gas and Electric’s REV Sustainability program. REV Sustainability is a six-month program designed for businesses which provides the private sector tools on how to increase operational sustainability. Chula Vista was the first municipality to enroll in REV Sustainability, and lessons learned from the program served as the basis for their City Operations Sustainability by annexations and large development projects. The current estimated population is 260,000 and the city covers 52 square miles between San Diego Bay and the coastal mountain foothills.

Concurrent with the population growth, Chula Vista city government also experienced significant layoffs both before and during the recession. Some local government watchers noted that Chula Vista, with its pre-recession increase in housing stock, was one of the first cities to experience the fiscal trauma of the housing crisis that precipitated the recession.

As Chula Vista climbed back out of the recession, city leaders believed the community’s future would be enhanced by a commitment to sustainable policies and practices. They also believed that city operations would be an excellent place to begin—for progress in those very visible areas could serve as a catalyst and inspiration for local citizens to embark on their own initiatives in sustainable practice.

The City of Chula Vista began their formal sustainability efforts following their participation in San Diego Gas and Electric’s REV Sustainability program. REV Sustainability is a six-month program designed for businesses which provides the private sector tools on how to increase operational sustainability. Chula Vista was the first municipality to enroll in REV Sustainability, and lessons learned from the program served as the basis for their City Operations Sustainability
Plan. In addition, Sustainability Coordinator Lynn France noted, “Chula Vista believed they had already implemented sustainability projects, and sought both to highlight those as well as set additional goals.”

Following their participation in REV Sustainability, Chula Vista created a cross-sectional team of city staff to write up the City’s first City Operational Sustainability Plan. This plan is a concise and readable document that outlines what the organization wants to achieve between 2014 and 2020. Specifically, the document outlines goals, strategies, and performance matrices in seven different areas. These areas are Energy Use, Water Use, Green Purchasing, Recycling and Waste Management, Pollution Prevention, Transportation, and Green Buildings & Infrastructure. The Sustainability Plan was formally adopted by the City Council, thus enabling the City to their goal to “lead by example.” In addition, the plan both represents City policy and allows the public to see the City’s sustainability goals and measures.

The format of the Sustainability Plan is clear and concise, articulating specific goals, strategies and measures. For example, each of the seven areas noted above includes a goal, a list of strategies to meet that goal, and a description of the metrics used to measure progress. The Plan also lists existing policies and potential funding sources that City staff could use as implementation tools. For example, one Transportation Goal is to “Transition 40% of the fleet to hybrid or other alternative fuel vehicle technology by 2020.” Also included in that section are the five strategies to achieve that goal and the two performance metrics used to measure progress.

To implement the Plan the City established a Green Team made up representatives in various operational areas of City government. In bringing together experts from the various areas, the Green Team ensures that programs and solutions are both practical and effective.

Lynn France indicates the Green Team has made a tremendous difference, noting, “The process is going really well, everyone has ownership over the entire program.” She also mentioned that “the goals are made up of some programs which are required, some which are programs the City has wanted to do for a while, and some significant ‘stretch’ goals.” She added, “Staff was energized from the beginning, for when we accomplished some of the easier early tasks, people felt empowered to tackle increasingly larger and more challenging areas.” When asked about the cost to implement the program, Lynn France stated their efforts thus far clearly demonstrate that “while everybody thinks sustainability costs money, our work has shown that it saves money.”

Two initiatives currently underway include staff training in Envision and in the U.S. Green Building Council’s LEED for Existing Buildings: Operations and Maintenance. Envision is an internationally recognized rating system to assess and quantify the sustainable benefits of a particular project. Staffs credentialed in Envision are able to qualify costs and benefits over the project’s life cycle, and evaluate environmental benefits using outcome-based objectives. LEED for Existing Buildings will enable the City to manage ongoing O&M with measureable sustainable benefits.

Employee involvement extends beyond the Green Team; the City enhances engagement through an annual CLEAN employee award program, quarterly employee lunch and learns, annual employee surveys, orientations for new hires, and annual Operations Plan Progress Reports.

Through the City Operations Sustainability Plan, Chula Vista is able to measure the results of the work they were already doing, establish clear objectives to move the organization forward, and provide a model for public and private imitation.

As noted, many public works agencies have adopted a Sustainability Plan. Almost every public works organization implements service or constructs a project with long-term benefits to the environment, the public, and the economy. The challenge for public works agencies, then, is to better communicate what we have done thus far. In addition, departments must establish goals which continually move our profession and our municipalities to the vanguard of a movement to preserve and enhance the environment. A Sustainability Plan for public works departments is an excellent way to accomplish that important mission.

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Integrated “One Water” approach for managing water resources

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The concept of One Water sustainable management is to integrate planning and management of water supply, wastewater and stormwater systems in a way that minimizes the impact on the environment and maximizes the contribution to social and economic vitality. It also seeks to optimize planning, development and management of water with land and other resources. These are the drivers for transitioning to a “One Water” concept for managing resources:

- Population increase
- Climate change effects
- Aging infrastructure
- Water scarcity
- Need for sustainability

Using a “One Water” strategy will change the next generation of water management as shown in the table below.

As a member of the APWA Center of Sustainability, I participated as an exploratory team member on the Water Environmental Research Foundation (WERF) Sustainable Integrated Water Management Research Challenge. WERF undertook this resource study to define and examine how communities have or have not worked around barriers to achieve integrated water management programs. The research strategy included the following:

- Case studies to evaluate integrated water systems
- A road map and action plan to guide future “step change” sustainable water practices
- Identify global stakeholders to form a partnership to create a road map detailing next steps that support “step changes” towards future sustainable urban water systems

Institutional challenges to One Water management exist at the strategic, tactical and operational levels, limiting the ability for organizations to collaborate with each other, both vertically and horizontally; to integrate activities within their own organizations; and to move forward with new systems that optimize green-grey infrastructure and resource recovery. This lack of a unifying culture encourages continued reliance on existing institutional silos and inertia in the water industry. WERF’s research was grouped into five institutional barriers to achieving integrated water management and five underlying causes that must be addressed to overcome them. The five categories of institutional barriers and the underlying causes that block integrated water management are shown at right.

Fundamental to the success of any initiative is strong leadership that can devote the time and influence to developing and implementing partnerships with other organizations. It is evident from the case studies WERF examined that strong leadership and vision from senior level personnel is key to driving an integrated water management approach. Creating a picture of success is critical to changing the current culture and improving the capacity of staff in partner organizations to buy into, and align with, the transition. Before an integrated water approach becomes a part of everyday practice, a dedicated transition team may be necessary to implement the strategy and manage related projects. Local government can provide critical support by creating a streamlined permitting process with environmental, health and planning departments to support integrated water programs, including onsite water systems. Owners and operators...
Institutional Barriers | Underlying Causes
---|---
Planning that is uncoordinated and non-collaborative | Lack of an agreed upon and unifying vision
Economic and financial systems that are restrictive and traditional | Lack of leadership and political will
Legislation and regulations that are prescriptive, overlapping, and inconsistent | No clear drivers or sense of urgency
Citizen engagement that is uncoordinated, technical, and uninspiring | Lack of capacity for systems thinking/integration across water and other utilities or urban planning
Organizational and professional cultures that are siloed and inflexible. | Uncoordinated methods and processes for data collection, information sharing, and messaging

are more likely to participate if there is an easing, and incentivizing, of the compliance process for design, construction, and operation of these innovative systems. Overall, improving coordination between departments, organizations, and/or agencies, together with transparent processes and sharing of data, are key to integrated planning. Building partnerships and long-term, mutually beneficial relationships with a broad range of agencies, including the private sector, will create the collaboration needed for development projects to be aligned with the strategy and implemented in a coordinated fashion.

**Transitioning to a One Water approach**

In order to arrive at the desired One Water state, the challenges need be inverted. In other words, the converse of the challenges will need to be in place. Twenty-eight case studies from the U.S., Australia, and the UK, detailing innovative methods of overcoming institutional challenges, were documented. Of these, 25 were snapshots around a specific institutional challenge and three were detailed case studies of progress to One Water at the regional level (Pittsburgh), city level (Sydney), and utility level (Clean Water Services). The case study work produced a number of common themes:

**Strong leadership** and vision from senior positions was shown in case studies to be crucial to driving a One Water approach to service delivery.

**Improved coordination and data sharing** between departments and organizations were identified as key to integrated planning. Building partnerships and long-term, mutually beneficial relationships with a broad range of agencies, including the private sector, will create the collaboration needed for development projects to be strategically aligned and implemented in a coordinated fashion. This should be driven at both the state and city levels.

**Changing the current culture and improving the knowledge and capacity of staff** and organizations is necessary to start the transition journey. To do this, it is useful to identify what a One Water success would look like in an organization and then work backward to identify the steps necessary to build professional capacity. Getting buy-in from senior level executives is important. Before One Water is mainstreamed into everyday practices and thinking, it may be necessary to set up a dedicated team to implement the strategy and manage related projects.

**Transparent consultation with the community and stakeholders** (both public and private) is essential for confirming the vision and supporting the implementation of the strategy. This could include: dedicated public involvement and education staff; biennial customer awareness, satisfaction and values surveys; and online public engagement tools.

**The development and application of a common economic evaluation framework** in water and related urban planning decision making and investment is essential for incorporating the broader benefits of integrated water cycle management approaches. Consider using a Triple Bottom Line approach that includes economic, environmental and social costs and benefits in the analysis.

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The Urban Water Transition Framework, showing the transition from the current state to a One-Water city
Before there were cars and paved roads, there were streets that served a wide range of users including pedestrians, bicycles, horses and horse-drawn vehicles. As automobiles and trucks came into use in the early twentieth century, agencies responsible for building and maintaining roads began to make room for these “horseless carriages” by encouraging traditional roadway users to utilize the sides of streets and roads. As a result, most new streets began to be built with the primary purpose of serving the needs of growing numbers of cars and trucks with an equal decrease in consideration of mobility and safety for the non-motorized users who must use those same facilities.

Growing challenges for non-motorized users
This new approach to designing and operating vehicle-focused roadways continued to expand as urban sprawl created more and more local roads, and states began to improve regional and inter-regional routes, including the access-controlled interstate defense highway system. What were once
“complete” streets that accommodated all users became streets almost wholly focused on motorized travel which led to increasingly “incomplete” streets for the traditional travel modes of walking and bicycling. And as walking and bicycling became more difficult and dangerous in urban and suburban areas, neighborhoods became divided and access to transit routes suffered.

What are Complete Streets?
Complete Streets are designed and operated to safely serve everyone that uses them, including pedestrians, bicyclists, motorists and transit users. Complete Streets make it easy to cross the street, walk to jobs and shops, and bicycle to work. They allow buses and integrated rail vehicles to run on time and make it safe for people to walk to and from stops and stations.

According to the National Complete Streets Coalition, typical elements that make up a complete street include sidewalks, bicycle lanes (or wide, paved shoulders), shared-use paths, designated bus lanes, safe and accessible transit stops, and frequent and safe crossings for pedestrians, including median islands, accessible pedestrian signals, and curb extensions.

The bottom line: Complete Streets balance safety, mobility and convenience for everyone using the roadway whatever the surrounding context.

What are the benefits of Complete Streets?
Complete Streets can provide many benefits to all communities irrespective of size or location including the following identified by the National Complete Streets Coalition:

- Improve safety and mobility – Streets designed for multiple modes of transportation are safer for all users and increase mobility by allowing everyone including children, the elderly, and residents with disabilities to travel with the same level of safety and convenience.
- Ease congestion and increasing road capacity – Complete Streets help reduce short-distance car trips thereby increasing the street’s overall capacity to accommodate more travelers.
- Improve health – Complete Streets promote physical activity and decrease the number of cars on the road thereby improving air quality.
- Grow economy and enhance tax base – Transportation options increase access to shops, restaurants, and jobs and raise property values by creating more inviting communities.
- Lower transportation costs – Transportation options allow families to spend less of their income on gasoline thereby increasing household savings and/or disposable income.
- Decrease overall operating budget – Complete Streets can incorporate green infrastructure features that reduce stormwater runoff and lower overall transit costs by reducing usage of short-distance curb-to-curb transit service.

Do Complete Streets help achieve green streets and community sustainability?
Transportation and public works professionals face an increasingly complex set of competing demands in the delivery of roadway projects in public rights-of-way, such as providing transportation alternatives, protecting public spaces, preserving landscapes and natural elements, meeting climate change goals and regulations, and using natural resources responsibly and efficiently. Many elements of street design, construction, and operation can work in favor of achieving both Complete Streets that work for all travelers and “green” streets that serve environmental and community sustainability.
Optimal stormwater management looks beyond simply removing rainfall as quickly as possible, which risks negative environmental impacts associated with both stormwater quality and quantity, like polluted runoff, sedimentation, and bank erosion. Instead it focuses on efforts to retain and treat—or even eliminate—runoff at the source through cost-effective green infrastructure, improving water quality and complementing Complete Streets efforts. Landscaping elements that help curb stormwater runoff—bioswales, planters, rain gardens, and street trees—are mutually beneficial for mobility and ecology. Such green elements are increasingly found to be important deterrents of crashes and injuries, and contribute to a more comfortable and visually interesting environment for all users.

Pavement width is also an important component of creating greener, more Complete Streets. As streets have grown wider to accommodate increasing vehicle demand, they have become unpleasant or unsafe for anyone traveling via foot or bicycle, and the resultant increases in impervious pavement necessitate more extensive and expensive drainage and treatment systems. Some cities are addressing this concern by investing in pervious surfaces, such as pervious asphalt and concrete, pervious pavers, and reinforced gravel paving when it has been determined the surfaces will not compromise pedestrian and bicyclist access and safety.

Many communities are narrowing travel lanes, swapping one automobile lane for two bike lanes (e.g., a “road diet”), or taking other measures to provide safe space for bicyclists, pedestrians, and public transportation—without additional road widening. Furthermore, communities can look to maximize pavement “albedo” (reflectivity) to reduce the urban heat island effect, improve air quality, increase pavement durability, and improve nighttime illumination.

Complete Streets make their most basic contribution to green streets by providing space along the right-of-way for low-emission travel. In the United States, transportation is a significant source of greenhouse gas (GHG) emissions and the largest source of transportation GHG emissions is personal cars and trucks. Walking and bicycling for the shortest trips (less than one mile), rather than taking a car, could reduce CO₂ emissions by 12 to 22 million tons per year in the U.S. Replace the car with walking and biking for longer trips (1-3 miles), and the CO₂ savings come to 9 to 23 million tons annually. Add in the benefits of access to public transportation ridership—which is already cutting CO₂ by 37 million metric tons every year—and the environmental benefits of Complete Streets are very significant.

Are Complete Streets effective in rural areas and small towns?
Complete Streets can provide a more effective and balanced transportation system for the nearly 49 million Americans who live in rural areas and small towns. More than 1.6 million rural households do not have access to a car. Public transportation, social service van pools, carpooling, and ridesharing services to reach healthcare, employment, and other resources can be a lifeline in rural areas. And, just as in urban areas, public transportation trips usually begin and end as walking trips.

Complete Streets concepts are also important in helping build strong town centers and Main Streets by improving street connectivity and allowing everyone, whether on foot, bike, or public transportation, to reach community focal points. Many smaller communities do not control their Main Streets, which are often state highways. Complete Streets policies at the local level help communicate the community’s vision, and policies at the state level ensure safe, accessible, and attractive streets.

Are Complete Streets supported at the federal level?
The Moving Ahead for Progress in the 21st Century (MAP-21) Act, passed in 2012, authorized the Transportation Alternatives Program (TAP) to provide funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle

A Complete Streets project serving all users on a suburban collector roadway in Roswell, Georgia
facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways.

In addition, the Fixing America’s Surface Transportation (FAST) Act, passed in 2015, is the first U.S. federal transportation bill to ever address Complete Streets. Specifically, the bill includes these provisions:

- Requires the Secretary of Transportation to encourage states and metropolitan planning organizations to adopt road design standards that take into account pedestrians and other vulnerable road users, as well as motor vehicles, through all phases of planning, development, and operation.
- Directs the Secretary to report on state progress toward implementation and to identify best practices in the states.
- Requires state transportation departments to take into account access for all users and modes of transportation when designing and building National Highway System roadway projects.
- Adds the National Association of City Transportation Officials (NACTO)’s Urban Street Design Guide as one of the manuals that U.S. Department of Transportation (USDOT) should consider when developing design standards, and it permits local governments to use their own adopted design guides if they are the lead project sponsor and the direct recipient of the federal funds for the project—even if it differs from state standards.

Summary
Transportation agencies and their partners already have the ability—through local legislation, federal programs, policy statements, design guidelines, and planning—to provide more Complete Streets to all travelers.

All travelers using our public rights-of-way have a need and desire for safe and convenient accommodation. As the USDOT Secretary said in a posting on “Fast Lane,” the Secretary’s official blog, “We need roadways designed to account for the needs of everyone who uses them, whether driving, walking, or riding in a wheelchair or on a bicycle.”

All transportation and public works professionals share the responsibility to create a transportation network that meets the diverse mobility requirements of the twenty-first century. Getting there requires a shift in mindset from designing an auto-focused transportation system to creating a truly integrated multimodal transportation network that accommodates all users and modes safely and conveniently.

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Sustainable solutions for locally-controlled water supply in Southern California

Morgan Wazlaw, Attorney, San Diego Land Lawyers, Inc., San Diego, California, and member, APWA Center for Sustainability; Ryan Gallagher, Principal, KEH & Associates, Oxnard, California

In the Los Angeles region alone, nearly 60% of the water supply is currently imported from either the Bay-Delta or the Colorado River. California’s multi-year drought and other factors have dramatically reduced the availability of imported water and as a result, agencies and municipalities in Southern California are designing innovative solutions to provide their increasing customer base with more reliable water supplies.

One of the agencies in Southern California that is combining water independence, sustainability, and public education is the Water Replenishment District of Southern California (WRD). WRD has historically relied in part on imported water but is currently working on the Groundwater Reliability Improvement Project (GRIP), which will greatly diminish their need for imported water by 2018. GRIP includes an Advanced Water Purification Facility that will recycle tertiary treated wastewater from an upstream wastewater treatment plant and will produce 10,000 acre-feet of highly purified water per year. The treatment system will utilize an ultrafiltration pre-treatment followed by a three-stage reverse osmosis system, advanced oxidation, and backwash treatment to reach a projected 92% recovery. This local water source will help to drought-proof the WRD service area, providing increased self-sufficiency and water independence to more than 10 percent of the state’s population.

In addition to the benefits of water independence, WRD is creating a state-of-the-art facility that will incorporate sustainable design features and feedback from local residents. To best meet the needs of the community, WRD held a design charrette where residents, businesses, elected leaders and other interested parties were invited to discuss plans and share ideas about how best to design the facility. Several architectural design inspirations, which were the product of a WRD design contest, were presented to spark ideas and encourage dialogue. Based on this feedback, the project was designed to include outdoor educational and community space, access to the adjacent trails along the river, and a pedestrian crossing. Other sustainable features include a living roof, native plant demonstration gardens and trails, stormwater capture features, a photovoltaic system, low-impact development landscaping and permeable paving. The facility is expected to be LEED Gold certified.

The City of San Diego is working toward water independence through their Pure Water program, a large-scale water recycling project. Like other Southern California cities, San Diego has become particularly interested in exploring local water sources because the cost of imported has tripled over the past 15 years and because currently, 85% of the City’s water is imported. For the past 20 years, the Regional Water Quality Control Board and U.S. Environmental Protection Agency have allowed the City to operate an advanced primary treatment facility under modified permits. About 92% of the City’s wastewater is treated at this facility and discharged to the ocean. If the modified permit is not extended, the City will need to spend $1.8 billion to upgrade that facility to a secondary treatment facility with no increase in water reuse.

Instead of upgrading the existing facility, the City launched the Pure Water program, which will involve diverting the flow currently going to the primary treatment facility to advanced water purification facilities and then to reservoirs to distribute to customers. The City will also construct a 30-million-gallon-per-day water purification facility that is expected to be operational by 2021. The long-term goal for the City is to provide 83 million gallons of purified water per day, which would supply one-third

Rendering of WRD’s planned Advanced Water Purification Facility
of San Diego’s future drinking water supply in 2035.

The Pure Water program will reduce ocean discharges in half compared to the existing advanced primary treatment facility (a reduction of about 100 million gallons per day). It will also provide a high-quality water supply for San Diego that is drought-proof, locally-controlled, and protects the city from impacts of climate change and natural disasters. Specifically, new infrastructure and a local water source will help mitigate impacts from natural disasters. The City is proud that through their outreach efforts, nearly 75% of San Diegans support adding purified water to the water supply in the region. The Pure Water program is also supported by San Diego’s environmental community, business community, and elected officials.

In addition to the Pure Program, San Diego has diversified their water supply through desalination. In December 2015, the Poseidon Desalination Project in Carlsbad was completed, which will provide about 8% of the water supply to the county’s three million residents. Poseidon is a 54-million-gallon-per-day facility and is the largest desalination facility in the nation. The project was made possible in part because of a 30-year Water Purchase Agreement between the San Diego County Water Authority and Poseidon for the purchase of $6,000 acre-feet of water per year. The project was constructed adjacent to a power station and uses the same water intake and return system as the power plant, which reduces energy and makes the project more sustainable than a stand-alone facility. In addition, the Carlsbad Desalination Plant was the first major infrastructure project in the state to voluntarily eliminate its net carbon footprint. While the price of desalinated water from Poseidon is currently double the cost of imported water per acre-foot, the gap in cost is diminishing due to the increasing cost and unreliability of imported water. The San Diego Water Authority believes the cost gap will close in the next decade.

Another Poseidon desalination plant is planned in Orange County, where the Municipal Water District of Orange County (OCWD) recently projected that in 2040, county water demand will be 17 percent lower than previously estimated. The desalination plant is proposed adjacent to a power plant with an existing intake system like the Poseidon plant in Carlsbad and is expected to produce 50 million gallons per day. Like the Carlsbad Project, this plant would increase the cost of water in the short term but would create a more drought-proof, locally-controlled water supply for a growing area of Southern California. OCWD already has one of the largest wastewater purification systems in the world, currently generating about 70 million gallons a day of recycled water with plans to expand in the coming years. With the expansion, OCWD projects that about 60 percent of the county’s water will be recycled.

These are a few examples of the innovative water solutions that are underway in Southern California. To learn more about these projects and others that may pave the road toward a sustainable water supply for Southern California, I encourage you to visit the following websites or stop by and enjoy taking a tour of these facilities: http://wrd.org/, https://www.sandiego.gov/water/purewater/, http://carlsbaddesal.com/, http://poseidonwater.com/. To schedule a tour of the Carlsbad Desalination Project, visit http://carlsbaddesal.com/visit.

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2016 Top Ten Public Works Leaders named

One of the most coveted and prestigious public works awards is sponsored each year by APWA and is presented to ten individual leaders whose excellence in public works earns them the distinction of the Top Ten Public Works Leaders of the Year. The honorees are awarded this recognition for their professionalism, expertise and personal dedication to improving the quality of life in their communities through the advancement of public works services and technology.

This year, the Top Ten Review Committee consists of Committee Chair Kurt Corey, P.E., PWLF, Director of Public Works, City of Eugene, Oregon; Tom Collins, PWLF, Deputy Director, Town of Natick, Massachusetts; Howard Lazarus, P.E., PWLF, Director of Public Works, City of Austin, Texas; Paul Smeltzer, P.Eng., Director, Water and Wastewater Services, Niagara Region, Thorold, Ontario; and Tom Talsma, Vice President, Engineering Enterprises, Inc., Sugar Grove, Illinois.

For 2016, the selected recipients of the Top Ten Public Works Leaders of the Year Award are:

Kenneth Eyre, P.E.
Senior Associate
Greeley and Hansen, LLC
Alexandria, Virginia

Kenneth Eyre's professional career is quite diverse and vast in scope and application. Early exposure to land surveying and sewer infrastructure mapping suited future roles and responsibilities, including planning and executing field investigations, studies, design, construction monitoring and equipment commissioning for municipal water, wastewater, stormwater and solid waste facilities and systems. He has engineering experience for industrial clients, but the majority of his entire career has been providing engineering solutions in the municipal sector. Eyre is a municipal civil engineer specializing in water/wastewater, stormwater and solid waste issues, for many east coast communities.

Eyre leads the Greeley and Hansen team providing specific storm conveyance infrastructure maintenance enhancements to Fairfax County’s Stormwater Maintenance Division practices (including developing customized databases used for storm structure inspections; streamlining a backlog of CCTV inspections so that condition recommendations can be made; conducting and reporting on private system inspections which connect to the county’s MS4). Presently, as part of the ongoing MSMD infrastructure reinvestment program, Eyre led the effort using MS Access to process a backlog of pipe inspection databases from multiple inspection contractors, where the team has applied the NASSCO PACP “QuickScore” defect coding methodology in providing preliminary screening of those pipe segments exhibiting the greatest need of rehabilitation, or replacement in some cases.

Eyre worked over a period of eleven years under three Engineering Program Management Consultant (EPMC) authorizations, leading many field and design efforts. He provided program management services for the development of the District’s System Facilities Plan for the systems which consist of approximately 1,200 miles of sanitary and combined sewers and 600 miles of stormwater system that range in diameters from six inches to brick-arch sewers with spans in excess of 26 feet. The EPMC-IIIB team, co-located onsite with DC Water, also included 10 other specialty services firms to provide functionality as well as staff augmentation. Under this program, Eyre provided critical sewer system asset condition assessment and prioritization, especially for sewers under buildings and for sewers at risk in stream valley locations.
John W. Herzke serves as Vice President of Municipal Services for Clark Nexsen, in Virginia Beach, Virginia. He is a civil engineer with over 44 years of experience in the design and management of public, private and commercial projects. He has performed in the role of Special Projects Engineer, City Traffic Engineer and City Engineer for the City of Virginia Beach; plus he was branch manager for an A/E design firm for four years. Herzke has designed, managed, and supervised a myriad of projects including transportation projects, drainage projects, waterfront construction, building projects and a variety of other governmental infrastructure projects.

Herzke has developed relationships and contacts with other key A/E firms for teaming purposes on major design and design-build projects/programs. Such projects include the Virginia Beach Light Rail Extension Project and Military Highway CFI, where teaming efforts with major specialty firms offered the opportunity for Clark Nexsen to become a key part of some of these major project endeavors, especially for design-build projects. He has also coordinated and developed many of the overall marketing and client development activities for the Transportation and Bridge Groups for Clark Nexsen, and provided guidance with key transportation staff for quality control input and comments for targeted clients and projects.

Herzke implemented the first use of a thermoplastic pavement marking program on all roadways in Virginia Beach. When he was first hired as the City Traffic Engineer, all markings were installed using a City-owned and -operated paint striper. With the advent of thermoplastic pavement markings in the early 1980s, Herzke programmed the gradual replacement to that new method and material, thereby replacing the old paint stripper, which also was an environmental problem with the disposal of the toxic chemicals needed to clean the machine after each use. While it was initially more expensive per foot to use the new thermoplastic markings, the longer durability proved to be the most economically feasible for acceptance and adoption by upper management.

Dena Mezger, P.E., PWLF
Director of Public Works
City of Lee’s Summit, Missouri

As Director of Public Works for the City of Lee’s Summit, Mo., Dena Mezger oversees a total staff of 110 employees, an annual operating budget of approximately $15.34 million, and a five-year capital budget of $170 million. The Public Works Department is comprised of four divisions under her responsibility and guidance: Administration and Engineering; Operations; Solid Waste; and Airport. Mezger’s overall responsibility for the department’s performance includes level of service, customer service, budget development and management, personnel management, and organized labor contract negotiations and administration. She is an active member of the City’s senior management team, and serves as the staff liaison with the City Council Public Works Committee.

Mezger is currently working with the City Council Public Works Committee to develop a comprehensive stormwater management program. She is responsible for developing the recommended scope of the program, staffing and equipment needs, annual and capital costs, policies for prioritizing and funding projects and tasks, and the analysis of potential funding sources and amounts. Once a program is developed, she will play a lead role in educating the public in anticipation of a public vote to approve the funding mechanism.

Mezger has served as an active steering committee member and chapter leader for the department’s APWA accreditation/reaccreditation efforts for 2004, 2008, 2012 and 2016. She serves as the Lee’s Summit representative on the Missouri STP Priorities and Highway Committee of the Kansas City regional metropolitan planning organization, the Mid America Regional Council. She served as the City’s staff liaison for the Citizen’s Stormwater Task Force (2003-2004), an 18-month effort focused on the identification and recommendation of improved stormwater management.
policy. Mezger presented a final report of recommendations to the City Council, and coordinated efforts to revise ordinances that included stormwater management provisions in development, planning, and property maintenance codes.

Diane Nakano, P.E.
Assistant General Manager
Sacramento Regional Transit District
Sacramento, California

As Assistant General Manager of the Sacramento Regional Transit District (RT), Diane Nakano oversees the Engineering and Construction Division and was recently given the responsibility to also manage the Facilities and Planning Divisions. She currently has a total staff of 59 and a number of consultants and contractors who serve RT. She is responsible for developing and monitoring the division’s fiscal budget and expenditure plan, oversight of major capital improvement projects through environmental studies, design, right-of-way acquisition and construction. Nakano’s work includes presentations to the Board of Directors, and interface with the Federal Transit Administration, local and state agencies, and the California Public Utilities Commission.

Under Nakano’s direction, Sacramento RT initiated an Owner Controlled Insurance Program (OCIP) in lieu of the typical contractor-provided insurance for the Blue Line light rail project. Costs savings and numerous benefits resulted from the implementation of an OCIP. One such benefit was that smaller construction firms were able to bid on the contract, where if the typical insurance requirement was in place, such small firms might not be able to reasonably secure insurance at the levels required on this contract. Another benefit was reduced claims as a result of the vigorous safety program associated with the OCIP. Finally, by providing insurance for all levels of contractors, Sacramento RT eliminated redundant coverage, resulting in cost savings to the construction contract.

In an effort to minimize the additional years that could be added to the project schedule, Nakano partnered with Los Rios Community College District (Los Rios), which owns and operates Cosumnes River College, to build a new parking structure on campus. Los Rios agreed to allow the construction of a parking structure on campus and offered to design and construct the parking structure through a design-build process granted to educational institutions in California. This partnership allowed students and transit riders to share any available parking spaces on the campus; and granted easements to Sacramento RT for the light rail tracks, station, a bridge structure, and bus transfer area. Through Nakano’s outstanding negotiations skills, she was able to obtain Los Rios’ agreement to manage the ongoing operations and pay maintenance costs for the parking structure.

As Public Works Director for Charleston County, S.C., James “Jim” Neal supervises a department of 200 employees and is responsible for a General Fund budget of over $10 million and project budgets in excess of $15 million, annually. His job requires him to coordinate with elected officials, local government agencies, and citizens throughout the 822 square miles of the coastal South Carolina county to ensure that the needs of its citizenry and visitors are met. He is responsible for the unincorporated infrastructure and improvements that include over 150 miles of roadways, 280 miles of drainage ways, 17 bridges, and almost 1,000 acres of drainage easements.

Under Neal’s guidance, Charleston County established its Stormwater NPDES II program as an MS4, creating one of the most successful stormwater programs in South Carolina. The Stormwater Program permits and monitors any land disturbance within unincorporated Charleston County and, due to an intergovernmental agreement, five outer municipalities. This program is also responsible for post-construction monitoring of sites and the investigation of illicit
discharges within its jurisdiction. The Stormwater Program has headed many drainage studies and, in keeping with Neal’s dedication to training and education, it provides an educational program purposed with teaching the public how to keep our local waterways clean.

Neal led an initiative designed to address health issues that were causing his equipment operators to lose their CDL licenses and, consequently, their positions with the county. From 2008 to 2012, Jim lost 14 equipment operators, primarily due to health conditions that could have been prevented through proper diet and exercise. To retain and support his workers, Neal created the “Step it Up, Charleston” program, which encouraged participants to walk 70,000 monitored steps a week using evidence-based motivators. Team competitions inspired the participants to cheer each other on and account for one another’s progress, while individuals and teams were awarded with meaningful incentives, including hours off, gift certificates, and small prizes. The program’s success within Neal’s department led to its expansion among all Charleston County employees.

Since 2003, Bob Patterson has worked as the City of Pendleton’s Director of Public Works. His responsibilities include administrative and leadership roles by overseeing work assignments, construction and maintenance efforts and the completion of projects. He manages four divisions—the Public Works Administration & Fleet Division, Sewer Division, Streets Division, and Water Division—within Pendleton’s Public Works Department, while overseeing an annual budget for each division. Prior to his role as Director of Public Works, Patterson served as Pendleton’s Special Projects Engineer during which time he oversaw permitting, development, and construction of a new river intake structure and pump station; a new water filtration plant using membrane filtration technology; and an Aquifer Storage and Recovery (ASR) Program.

From 2013 and 2015, Patterson led a $1,200,000 master planning effort for water, sewer, and storm systems, along with team building and leadership development within his department. The master planning effort incorporated modeling of the systems, updating mapping, developing a new stormwater utility, developing system development charges (SDC) methodologies, and developing a Geographic Information System (GIS) specific to public works. Patterson invested a great deal of time with council workshops and community outreach presentations related to the master planning effort and also for other city infrastructure needs.

Patterson works with his staff and management team to serve in various public works-related organizations to keep informed on issues affecting the City of Pendleton and the Public Works Department. He has ongoing staff involvement with the Eastern Oregon Regional Subsection of the Pacific Northwest Section – American Water Works Association and Eastern Oregon Region Pacific Northwest Clean Water Association. He has management staff members involved in the Oregon Emergency Management Association, Southeast Washington/Northeast Oregon GIS Users Group, and local Utility Locate group. Patterson believes their participation is valuable for the individual’s learning and for the organization.

James “Jim” Proce, MBA, PWLF
Assistant City Manager
City of Rowlett, Texas

Throughout his career, James “Jim” Proce has managed many successful engineering and construction projects including roadway, stormwater, and utility projects, handling all aspects including management, engineering, planning, design, maintenance, and construction. He is currently employed by the City of Rowlett, Texas, where he was originally hired as the Public Works Director, but as of December 2013 was promoted to Assistant City Manager, where he now oversees Engineering, Utilities, Public Works, Planning & Zoning, Building Permitting, Drainage, Parks & Recreation, Facilities, and Information Technology, as well as managing the City’s Capital Improvement program for all departments.

Bob Patterson, P.E.
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City of Pendleton, Oregon

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Proce initiated and implemented the first strategic plan in the Public Works Department in Rowlett. The process engaged the entire department, focusing on developing a new and improved culture. The process provided for a mission statement, vision statement, departmental values, established core services, customer service processes, identified an annual work plan, goals on the horizon, and long-term outlook for the department. The effort resulted in better teamwork, resource allocation and a focus on continuous improvement.

Prior to Proce’s arrival in Rowlett, all training, certifications, and licensing had fallen by the wayside. Proce reinitiated the internal training and licensing programs ensuring the staff worked towards their licensing requirements. This is inclusive of water, sewer, ASE, the Public Works Institute (PWITX), APWA’s Emerging Leaders Program (yielding graduates Jacob Gilliland and Erin Jones) and participation in the APWA Donald C. Stone Center program. Staff has been enabled and encouraged to actively participate in APWA programs, training and seminars.

Walter “Walt” Veselka provides leadership and oversight for the management, maintenance, and operations of all facets of public works service delivery for the City of Bristol, Connecticut. He collaborates with federal and state agencies related to road and bridge maintenance, solid waste and recycling, wastewater collection and treatment, health and safety, and stormwater management. Maintaining aging infrastructure and ongoing capital improvements is a daily challenge for Veselka, and he meets and exceeds this challenge with achievement in public service and commitment to sustainability and innovation. Additionally, he served as the Mayor’s alternate to the Bristol Resource Recovery Facility Operating Committee and the Tunxis Recycling Operating Committee.

Veselka recognizes the challenge in communicating with the 20,000-plus households in the City of Bristol. Residents often become frustrated when there are service schedule changes due to holidays and storms, etc. Always open to advances in technology, Veselka was instrumental in getting administration approval to create the Bristol Public Works Facebook page. With over 2,000 likes, this page is the first of the City departments to have a Facebook presence, and it is used to post important information regarding weather, emergency parking bans, upcoming events, and other preparedness tips. The Public Works Department also uses Twitter to engage citizens and share information.

The APWA DCS Center Leadership and Management credentialing program provides the most comprehensive, affordable leadership training for public works professionals in North America. Veselka’s contributions and accomplishments with the DCS Center include: credentialed as a DCS Public Works Fellow in August 2012; New England Chapter representative at Chapter Institutes and APWA Donald C. Stone Center August 6, 2012 meeting in Kansas City highlighting work done by New England Chapter; assisted in the program development and justification process for the New England Chapter Level II Institute program through Norwich University 2011-1012; partnered with Connecticut T2 Center in 2012 to develop a program for a Level I Institute program.

Clark Wantoch manages the Wisconsin Concrete Pipe Association with a ten-member Board of Directors who have reinforced concrete pipe manufacturing plants within Wisconsin and Illinois. The membership also includes twenty Associate Members who provide products and services to the pipe manufacturers. The primary function of the Association is to provide certification of the plants so they can produce and sell concrete pipe used on federal- and state-funded projects.

Walter “Walt” Veselka, P.E., PWLF
Public Works Director
City of Bristol, Connecticut

Clark Wantoch, P.E., MS, MBA, PWLF
Executive Director
Wisconsin Concrete Pipe Association
Milwaukee, Wisconsin
Prior to this role Wantoch served the City of Milwaukee’s Department of Public Works for over 34 years, most recently serving as the Administration & Transportation Design Manager.

Over the years with the City of Milwaukee, Wantoch developed a comprehensive computerized system to monitor and control capital improvement projects from concept through construction. The main system, called the ODB, shares data entered by various staff within many different departments as a project is developed. This links over 200 employees within the areas of planning, surveying, design, drafting, sewer, water, streetlighting, traffic control, contracting, and inspection. Salaries and hours by project are downloaded from the City’s Financial Management Information System into the ODB. This is used for project estimating and tracking the costs for a project.

Wantoch was instrumental in getting projects designed and built in the City of Milwaukee as a part of the American Resource Recovery Act (ARRA) grant program that provided federal funding for street paving projects. The City’s paving program was tripled as a result of the work done under the grant. In addition, Wantoch noted that Milwaukee County would be left with an unimproved two-block stretch of County Trunk Highway (CTH) that was in poor condition between a recent county bridge project and a City-designed ARRA street project to the east. Although the ARRA provided 100% construction funding, the County did not have design funds. Wantoch convinced the County to have City staff fast-track the design of the roadway with the County reimbursing the City in a future year’s budget. As a result, the design was completed in four months, at half the estimated cost.

Paul D. Wiegand, P.E.
SUDAS Program Director
Iowa State University
Ames, Iowa

Paul D. Wiegand is responsible for directing the activities of the Iowa Statewide Urban Design and Specifications (SUDAS) program, where he provides direction and sets the standard for the development and dissemination of technical and operational standards for urban public improvement design and specifications. Earlier in his career he served as the Public Works Director for the City of Ames, Iowa for 17 years, where he was responsible for the departmental activities of 75 employees involved with engineering, utility construction and maintenance, street construction and maintenance, traffic engineering, signs and traffic signals, municipal airport management, solid waste disposal through resource recovery, review of site developments and subdivisions, budgeting, and administration.

Over the past 11 years, Wiegand has developed and fostered a great partnership with the Iowa Department of Transportation (DOT). The Iowa DOT’s Standard Specifications were originally developed with highway construction in rural areas in mind. As the state grew and developed, there became a greater need for urban specifications that can be used on primary highways and federal-aid projects within urbanized areas. When Wiegand joined the SUDAS staff, a multi-year, multi-phase research project was started to identify and then reconcile the differences between the Iowa DOT and SUDAS Specifications. Wiegand’s experience and guidance were key to the success of this project. Under his leadership, the Iowa DOT and the SUDAS program have continued their collaboration to create common, uniform specifications, figures, and design sections.

In 1987-88 while at the City of Ames, Wiegand completed the design and obtained Iowa Department of Natural Resources permit approval for a 5.5-mile, $5,000,000 sanitary sewer project to connect an old sewage treatment facility to a new one. The pipe varied in diameter from 60 to 66 inches, and included construction adjacent to the South Skunk River permitted through the Army Corps of Engineers and an Interstate 35 crossing permitted from the Federal Highway Administration. Due to Wiegand’s personal contact with the property owners, he was able to obtain all easements and all road crossing permits along the 5.5-mile project voluntarily and without litigation.

Editor’s Note: For a list of the Top Ten recipients from 1960 to 2016, go to APWA’s National Awards Program web page at www.apwa.net/About/awards.asp?Display=top10list.
New San Francisco 49ers stadium goes green with BioMod® Modular Bioretention System

Santa Clara, California

Project Overview
Water is one of nature’s most powerful forces. Land development can turn that force destructive, both in terms of erosion and pollution.

A large construction project such as Levi’s Stadium, the home of the San Francisco 49ers in Santa Clara, Calif., can include significant expanses of runoff-generating hardscape. Draining that area effectively and treating the runoff can present challenges, but it can also be an opportunity to incorporate unique green infrastructure design strategies to minimize the impact of development on the site and handle the stormwater effectively.

The project required a low impact development (LID) solution that could tackle the tough stormwater pollutants coming off the expansive parking lots and slow down the release of stormwater into the storm drain system. The new stadium is adjacent to San Tomas Aquino Creek, which flows directly into the Guadalupe Slough and San Francisco Bay, sensitive ecologies less than six miles away.

To handle stormwater in the parking lots, access roads, and other hardscape surrounding the stadium, project engineer GHD Engineering in San Francisco selected the BioMod® Bioretention System, a stormwater collection and natural treatment system made by Oldcastle Precast. The stadium site has six bioretention systems in parking lots and in the grounds immediately adjoining the stadium itself. The project required an accelerated construction schedule, so the speed of installation added to the overall challenge.

The BioMod Method
Bioretention is one of the simplest, most natural, and most cost-effective ways to collect runoff and treat it onsite, and it is considered a best management practice (BMP) under U.S. Environmental Protection Agency (EPA) guidelines for low impact development (LID).

BioMod is a modular system of precast concrete bioretention units. The fully installed system looks to the casual observer like nothing but a flower bed or tree-planter, but beneath the surface, it is a series of concrete cells filled with layers of mulch, bioretention media, and drainage rock, with pipe in the bottom to carry treated water out of the system.

During a storm, water runs into the modules, ponds, and percolates into the media, where it is naturally filtered along the way. Filtered pollutants are naturally broken down by microbes and provide nutrients for the plantings in the module. The filtered water is collected in a perforated pipe that runs through the bottom of the bioretention system and carries water into a storm drain system. This BioMod system incorporates bioretention media in accordance with Contra Costa County requirements which allowed GHD to specify a non-proprietary system in a structural container.

Various BioMod module types, such as planter units, tree modules, light pole modules, pre-filtration units, and overflow drains were used in the design to incorporate standard site design and drainage features. The pre-filtration
modules capture trash and debris in one location, making maintenance easy, and the overflow drains allow the system to handle a 10-year rain event without flooding the site. Having an integrated overflow bypass built into the system eliminated the need for a separate peak conveyance system, as is often necessary with other bioretention setups.

**Installing the System**

Installing the BioMod system was simple. During the first phase of construction, the system on the north side of the stadium was installed, totaling just over 600 lineal feet of bioretention cells. The second, main phase of the project included four more systems: two in a large parking lot south of the stadium, and two lining the walkway area surrounding the main entrance to the stadium. A total of over 2,500 lineal feet of BioMod cells, approximately 15,000 square feet of bioretention area, will drain the overall stadium site, including its 10,000-space parking lot.

Due to the tight construction schedule, installation had to be rapid and simple. By using precast concrete modules, the system arrived onsite ready to be set in place, making the contractor’s job easy. The contractor noted there was a learning curve, but it was a fast one. During the second phase, they installed 120 feet of the system on the first day. By the fourth day, they set 480 feet in a day with a single crew.

**The Long Term**

One of the great advantages of a bioretention system is that it is easy to maintain and essentially self-sustaining. It harnesses the method by which nature breaks down petrochemical pollutants, a process that needs little help from us. Debris must be removed from the system, and plants must be maintained like any other landscaping, but little more is necessary. The bioretention system at Levi's Stadium will largely maintain itself, keeping the grounds looking good and safe from flooding and protecting the San Francisco Bay and sensitive areas surrounding it from harmful contamination.

*For more information about Oldcastle Precast and our stormwater management solutions, see the ad on pages 44-45 or visit www.oldcastlemo.stormwater.com.*

**Project Quick Facts**

**Design & Construction Team**

- **Engineer:** GHD Engineering, San Francisco, CA
- **Contractors:** Ghilotti Construction (1st Phase), Santa Rosa, CA; Devcon Construction (2nd Phase), Milpitas, CA
- **System Manufacturer:** Oldcastle Precast, Santa Rosa, CA

**Project Facts**

- **Hardscape area drained:** 5+/- acres
- **Total lineal feet of bioretention cells:** 2,500 ft
- **Total bioretention surface area:** 15,000 sf
- **Completion:** August 2014
Products in the News

STRIPE-OFF™ makes cleanup of striping paint overspray a breeze

STRIPE-OFF™ makes cleanup of striping paint overspray a breeze. Just apply STRIPE-OFF™ before you begin striping and it will prevent quick-drying, water or solvent-borne thermoplastic and epoxy-based paints from bonding to your striping machines, gun packs, tires, and stencils. Now all you have to do is simply flush or wipe off any striping paint overspray accumulations. It’s that easy! For more information, call RHOMAR Industries, Inc. at 1-800-688-6221.

Henke Manufacturing introduces the first 20 ft. Folding V-Plow

What does it take to keep over 300 acres of parking in East Windsor, Connecticut clear of snow at all times? The world’s first 20 ft. Folding V-Plow and 16 cubic yard snowbasket! When Southern Auto Auction contacted Henke Manufacturing asking if they could provide some big, heavy-duty snowplows, Henke said “yes.” Sixty days later, Henke unveiled the world’s very first 16 cubic yard Snowbasket (SB-16, 12 ft. wide, 6 ft. tall, and 6 ft. deep) and a 20 ft. Folding V-Plow. The FV-20 is two 10 ft. plows, connected with a 3” solid steel center pivot pin. Henke Manufacturing is a recognized industry leader in the design and manufacture of specialty snow removal attachments that are mounted on both heavy industrial equipment and medium- to heavy-duty trucks utilized in both the public and private sectors. For more information, visit www.henkemfg.com.

Solar or electric, AC or DC power for powerful above-ground-drive pump

Blackhawk Technology’s powerful new-generation Anchor Piston Pump™ for landfill, sump, remediation and dewatering applications now offers solar power in addition to both AC and DC electric power. The above-ground Anchor drive motor pumps virtually any fluid to 8 gpm at depths to 800 feet. The solar option is ideal for remote sites. Blackhawk solar pumps are a popular choice for aging, closed landfills not served by pneumatic power. They are employed across the country at inactive sites experiencing ecological and regulatory issues and landfills wishing to increase methane flows. Contact Mark Bertane, mbertane@blackhawkco.com; 800-469-4887.

Dude Solutions unveils IT Asset Management Suite: TechnologyEssentials
With enterprises facing an increasingly complex array of devices to manage, policies to enforce and problems to solve, Dude Solutions, Inc., the leading cloud-based provider of operations management solutions, has unveiled Technology Essentials, a cloud-based IT asset and workflow management suite for IT professionals. Offering a robust and fully scalable family of applications, Technology Essentials enables IT teams to automatically discover all IT assets connected to a network, as well as maintain access, oversight and control across their entire organizational technology infrastructure. For more information, please visit www.dudesolutions.com.

WorkplaceAware puts safety and operations reporting in the hands of every employee with a cell phone or a tablet

WorkplaceAware enables companies to transform safety and maintenance reporting from a paper-based document system to a mobile app and web database. With the WorkplaceAware mobile app, employees can instantly submit photos and report details to management saving valuable time between reporting and response. From restocking supplies to responding to an accident, WorkplaceAware eliminates the extra step of a manager or business owner trying to contact the employee for more information. All the specifics including visuals and location details are contained in one easy-to-consume, digital report. Contact: www.workplaceaware.com or (816) 268-2585.

Burns & McDonnell expands industrial wastewater practice to Minneapolis

Burns & McDonnell has expanded its industrial wastewater practice to Minneapolis, bolstering support for environmental and utility managers in the area. The new group will provide engineering services to a number of industries but will immediately focus on needs of the oil, natural gas and chemical industry, including biogas and other renewable sources of natural gas. The Minneapolis group will be led by Dr. Patrick Hirl, who has worked extensively with clients in designing and developing innovative new chemical and biological treatment processes for water and wastewater treatment, biofuels and other forms of renewable energy. Contact info: Dr. Patrick Hirl, (952) 656-6003.

Check out the ACDelco Technician Training Recognition Program!

Want to recognize your top technicians? Look no further than ACDelco: ten training paths, nine of which align with core automotive ASE skill categories; training reward system that rewards individual medallions and a plaque for technicians and shop owners to display them; customized status communications that keep participants on track and up-to-date on completing their training paths; a variety of courses that feature the latest web-based, instructor-led and technical seminar training; and various proficiency areas that technicians can learn within each training path. To access training, log into the ACDelco training website at acdelcotraining.com.

Grundfos SL submersible wastewater pumps offer unmatched durability, efficiency and serviceability

The Grundfos line of SL submersible wastewater pumps are designed to handle raw, unscreened sewage, effluent, large volumes of surface water and process water in municipal, utility and industrial applications. The solids-handling pump series, in motor ranges from 1.5 to 15 horsepower (HP), is available in two types of impellers: SLV/SuperVortex Impeller provides the free passage of solids up to four inches in diameter, making it ideal for liquids with a content of solids, fibers or gassy sludge; SL1/S Tube Impeller also accommodates solids up to 4 inches, but is designed particularly for large flows of raw sewage. For more information, please visit www.grundfos.com.
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### UPCOMING APWA EVENTS

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<tr>
<td>PWX</td>
<td>Aug. 28-31</td>
<td>Minneapolis, MN</td>
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<td>2017</td>
<td>Aug. 27-30</td>
<td>Orlando, FL</td>
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<tr>
<td>2018</td>
<td>Aug. 26-29</td>
<td>Kansas City, MO</td>
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For more information, contact David Dancy at (800) 848-APWA or send e-mail to ddancy@apwa.net.

### MAY 2016

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<td>9-12</td>
<td>APWA: CSM, CPII and CPFP Certification Exams (computer-based testing), (800) 848-APWA, <a href="http://www.apwa.net">www.apwa.net</a></td>
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### JUNE 2016

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<td>14-17</td>
<td>Institute of Transportation Engineers, Annual Meeting &amp; Exhibit, Anaheim, CA, <a href="http://www.ite.org">www.ite.org</a></td>
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“It doesn’t matter if you’re driving in a race, or taking your daughter to school; smoother roads are safer for you and your family. That’s why almost all NASCAR tracks are asphalt, and why I prefer it, no matter my speed.”

-Brian Scott | Richard Petty Motorsports #44 | Father

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