

NEWS FROM NATIONAL

NEW PRESIDENT ELECT AND NATIONAL DIRECTORS/GOVERNORS

This year's election for National President Elect, Region Governors Elect, and several constitutional amendments was concluded on June 1. Our incoming President-Elect will be **Dr. Dennis Truax**, Civil Engineering Department Chair at Mississippi State University and longtime ASCE member and volunteer. He and Maria Lehman were the contenders for this position. Dr. Truax will be inducted at the Annual Business Meeting this fall at the ASCE 2020 Convention (more information on this is provided below). His biography and experience are provided on ASCE National's website.

In addition, several Regional Directors and Governors were elected in this process. For our Region (Region 2), Past Section President **Joe Platt** will be installed as our Governor-Elect.

The membership also approved by 75.4% the proposed Constitutional amendments intended to improve the organization's flexibility, nimbleness and responsiveness, as well as give voting equity to dues-paying Affiliate members. Amendments to the Constitution require the affirmative vote of two-thirds (2/3) of those members voting.

Thanks to all who participated in the election.



ASCE NATIONAL CONVENTION
Anaheim CA
OCTOBER 28-31, 2020
www.asceconvention.org

MEMBERSHIP STATUS

We often toss around facts and figures (mainly figures) about our Section membership. Our Membership Secretary, **Andrew Bechtel**, was able to provide these numbers for us for where we stand as of May.

- Total members** – 2,170
- Associate Members – 446
- Members – 1135
- Fellows – 55
- Affiliates – 81
- Life Members – 325
- Student Members – 451
- Other – 2

SPRING SOCIAL UPDATE

Because of the current virus situation we were unable to conduct our **Spring Social** on its originally-scheduled date (Thursday, May 14). We have rescheduled this to occur on **Thursday, September 24**, which we know is not "Spring" (and in reality will be two days after the start of autumn...). We will provide updates on this as the date gets closer.

The Social will be conducted at **Tendenza** in the Northern Liberties section of Philadelphia. We will salute another successful season for our Section as we enjoy drinks and dinner and honor and congratulate our 2020 Section Awards recipients as well as our newly-inducted Life Members. We will officially welcome and install our Officers and Board of Directors and thank those who have served in these positions over the past year. As always it will be an enjoyable and memorable event, and we hope you can join us to share in the festivities.

Cost and reservation information will be provided in upcoming e-mail blasts.

We appreciate your ongoing patience and cooperation during this ever-changing situation.

SECTION MEETING SCHEDULE 2020-21

The Section Meeting program for the upcoming season is in the very preliminary stages and our meeting program committee is busy lining up speakers and topics for what we hope will be an interesting and informative series of meetings. With the unusual situation we all face this year, locations and venues are still somewhat up in the air, but we are moving forward with planning for meetings and will react to the latest guidelines and suggestions as we get closer to each meetings date. Some "in-person" meetings may need to be changed to virtual events depending on conditions and restrictions that may be in place at that particular time. The information we have at this point is provided below for your planning purposes. We would suggest that you use this to mark your calendar at this time and hold the dates.

In coming issues of *THE NEWS*, this information will be "fine-tuned" to provide updates as they are available. We also suggest you visit the Section website for the latest changes in our meeting program. As we have done, each month's edition of *THE NEWS* will feature detailed information on that month's meeting along with as much information as is available for the following month's meeting, and the "look-ahead" schedule will show details that are available at that time for your advance awareness. E-mail blasts will be sent out on a regular basis to advise and remind of upcoming events and registration deadlines.

We also note the advantage of joint meetings with other societies and will schedule these as we can.

2020

October 8 – Maggiano's, Center City
November 12 – Maggiano's, Center City

December – to be determined, "multi-society" joint meeting with Engineers' Club of Philadelphia

2021

January 20 (Wednesday) – joint meeting with American Society of Highway Engineers, Radisson Hotel, Valley Forge
February – to be determined

March 11 – Maggiano's, Center City
April – to be determined
May – Spring Social, to be determined

ASCE VISION

Civil Engineers are global leaders building a better quality of life.

ASCE MISSION

Provide essential value to our members and partners, advance Civil Engineering, and serve the public good.

RETURNING FOR REAL IN SEPTEMBER...

This is our usual abbreviated summertime “teaser” edition of *THE NEWS*. While we are technically off for the summer, we know our loyal readers are always in search of information, and in our attempt to accommodate them, we take a break from our break and crank out this smaller-than-normal issue for your enjoyment and reading pleasure.

Anyhow, you’re welcome, and we’ll return to that lounge chair in our yard that we had to vacate to do this (darn wifi doesn’t extend outside...), with the promise (or warning...?) to be back with our usual full issues starting in mid-September or so. We hope you enjoy your summer, even in this very strange year we have experienced thus far!

2020 SECTION AWARD NOMINEES – CONGRATULATIONS!

As a reminder, our Section Awards will be presented at our **Annual Spring Social and Dinner Dance**, which is planned to be conducted on **September 24**. This year’s awardees are:

Darin Gatti, Philadelphia Department of Streets – *Philadelphia Civil Engineer of the Year*

Dennis Wilson, McCormick Taylor – *Philadelphia Young Civil Engineer of the Year*

Robert Lund, SEPTA – *Transportation Engineer of the Year*

Sarah McInnes, Pennsylvania Department of Transportation – *Geotechnical Engineer of the Year*

Gregory Dunn, Michael Baker International – *Structural Engineer of the Year*

Louis Belmonte, Pennsylvania Department of Transportation – *Government Service Award*

Lindsay Chateauvert, Amtrak, and **Danielle Schroeder**, Pennoni – *Community Outreach and Service Award*

We hope you will join us at the Social to honor our Awardees for this year.

More information on our awardees will be included in our October edition of *THE NEWS*.

MEMBERS IN THE NEWS

HASSAN NOW AT CDM SMITH

Section Immediate Past President **Kazi Hassan** has moved to a position of Senior Project Manager at CDM Smith at the firm’s office in Center City. He brings nearly 15 years of experience in various aspects of highway design and project management gained during his tenure at Pennoni Associates, where he was a Senior Highway Engineer in the firm’s Transportation Division at its Center City headquarters. He was with Pennoni since his graduation from Penn State.

Congratulations to Kazi on his new spot! We wish him good luck.

THANKS TO OUR SPONSORS !

We are happy to report that our Section Sponsorship Program has enjoyed another successful season. We are as always grateful for the 13 firms which made the financial commitment for last season, with many of them having done this consistently for several years.

Sponsor logos are displayed in a special Sponsors section of our website. Additionally, we provide direct links to sponsors’ own websites so prospective employees can review all available and up-to-date positions. We do not show the sponsors’ logos in the Summer edition of *THE NEWS* but will pick it up again in the fall. And speaking of this, we will be contacting current sponsors later this summer with more information on the program for the coming season. We hope the program will be as successful then as well.

If you have an interest in joining our sponsorship program, please contact **Bob Wright** at newseditor@asce-philly.org for more details.

SECTION COMMITTEES

If you have an interest in helping and/or would like to join a Committee, please reach out to us at an e-mail address we have set up for this, volunteer@asce-philly.org, or through our Section Secretary, **Jesse Gormley** (contact information is provided on page 2). Committee Chairs may be changing during the summer and we will include the chairperson information in our next report in October.

- ASCE Philadelphia Report Card Promotion
- Audit
- Awards (includes Engineers Week Hall of Fame Recognition)
- Budget and Finance
- Civil Engineers in Government
- College Scholarship
- Communications (includes E-mail Outreach, Newsletter, Sponsorship, Website)
- Continuing Education
- Humphrey Fund
- Membership
- Mural
- Nominating (for Board Positions)
- Program (includes Meeting Check-in/Name Tags and Venue Coordination)
- Society Relations (includes Legislative Affairs, PA Council and Region 2)
- Subsidiary Groups (includes Technical Groups/Institutes and Younger Member Forum)
- Spring Social

**Attack every problem with
enthusiasm, as if your
survival depended on it.**

– Unknown

ASCE, PHILADELPHIA SECTION OFFICERS AND BOARD OF DIRECTION — 2020-21 SEASON

The slate of Section officers and Board members was adopted by the Board at its April meeting and these individuals were sworn in at our May Board meeting. They are as follows:

PRESIDENT

Jennifer Reigle, Pennoni

PRESIDENT ELECT

Briana Earle, Langan Engineering & Environmental Services

VICE PRESIDENT

Mohamed Elghawy, Traffic Planning & Design, Inc.

SECRETARY

Jesse Gormley, Pennoni

TREASURER

Joseph Natale, DVRPC

MEMBERSHIP SECRETARY

Andrew Bechtel, College of New Jersey

DIRECTORS

Kevin Brown, Urban Engineers, 2020-22

Scott Cepietz, Michael Baker International, 2020-22

Michael DeVuono, Arcadis, 2020-21

Gregory Dunn, Michael Baker International, 2019-21

Thomas Kulesher, JMT, 2020-22

Tania O’Kane, HNTB, 2019-21

PAST PRESIDENTS

Kazi Hassan, CDM Smith

Angelo Waters, Urban Engineers, Inc

Cathy Farrell, HNTB

In accordance with our Constitution and Bylaws, only the immediate Past President will serve on the Board, and only for a one-year term. We show the most recent three Past Presidents as has become our tradition.

Also, these folks will serve in appointed positions:

ASSISTANT SECRETARY

Jeanien Wilson, Philadelphia Dept. of Streets

ASSISTANT TREASURER

Caroline “Cricket” Schreppler, Advantage Engineers

We wish these brave and generous folks our collective good luck for the coming season.

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Section Outreach Coordinator

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**COPY DEADLINE FOR
OCTOBER 2020 ISSUE
SEPTEMBER 18, 2020**

YOUNGER MEMBER FORUM NEWS

Assunta Daprano, Forum Editor
Jesse Gormley, Forum President 2019-20
 Pennoni Associates
 jgormley@pennoni.com

NEW OFFICERS

YMF held its election in late May and younger members of the Section were able to vote to elect the upcoming year's Executive Board (President, Vice President, Secretary, and Treasurer). With social distancing in effect, the usual happy hour that would be conducted for this had to be limited to a virtual meeting, but all seemed to work out.

Following the election, the incoming, current, and past Presidents met to appoint members to fill the other Board positions. These appointed individuals typically either held a Board position previously or reached out to express interest in serving on the Board this past April/May. All elected and appointed Board members serve a one-year term, which began on June 1. Please join us in welcoming the following members to the 2020-21 YMF Board:

President – Katrina Lawrence
Vice President – Dennis Wilson
Secretary – Tim Abel
Treasurer – Lindsay Chateauvert
Past President – Jesse Gormley

COMMITTEE/GROUP CHAIRS

Awards – Joe Natale
CivE Club – Tyler Farley, Sean McCreesh
College Contact – Cory Bogas, Paige Glassman
Community Service – Darren Black, Caroline Voigtsberger
Information Technology – Jake Nichols
K-12 Outreach – Christian Antisell, CJ Medora
Professional Development – Kirsten Brown
Public Relations – Assunta Daprano
Social Events – Ajin Fatima, Kevin Walsh
Student Member Transition – John Doyle
Technical Events – HuYoung Kim, Marty Williams

We thank these individuals for their willingness to serve and commit their time.

FROM THE NOT-MUCH-AT-ALL CLUTTERED DESK OF THE EDITOR...

One thing your Editor enjoys about the Summer edition of *THE NEWS* is, that with the reduced items needing coverage, I can take the soapbox for a change and pass along some of my views and observations. One more thing we really need with the way this year has been... And it feels like the year is dragging along sufficiently that it should really be November at this point, but it's not — your calendar is correct, assuming you've been flipping the pages correctly (and with the days seemingly running into each other, you may have forgotten to do that also).

We keep hearing that none of us has ever experienced something like this, and the word "unprecedented," even though accurate and appropriate, seems to be very much overused. Many of us have had to cancel or change vacation plans, and trying to guess when things can (or maybe even might) get rescheduled, when things will return to whatever qualifies for normal, etc., is a shot in the dark. Even something as mundane as when the kids will be returning to school remains an "if" more than a "when." I recall hearing Depression stories from my grandmother, when I was in my single digits, and I often found them hard to believe. I would ask my parents, who were themselves in single digits during the Depression, if they remembered things being as bleak and desperate as Grandmom was relating, and they agreed it was tough from what they could remember. As my dad told me, bleak and desperate was their "normal," so it was difficult to compare it to something better. It's hard to imagine, and I'm sure our grandchildren will wonder the same thing when we tell them about the dark days of 2020.

I have a feeling some folks will have one more reason to dislike me when I note this, but, for once, taking an early vacation (right at the first of the year) paid off, and I feel fortunate that I was able to do that, particularly

with the uncertainty around even thinking about time away or travel these days. A planned trip in the early summer has had to be cancelled, so when and where our next venture to elsewhere will happen is unknown at this point. We can very much hope and pray that things get better.

I have been involved in more than one conversation lately that has a positive result, however, and we need to look for those. Technology has made it relatively easy for many of us to work remotely and keep in contact with co-workers, family, friends, etc., shop for various items, even have medical visits (but of course, not everything — getting a haircut, no such luck). As recently as a dozen years ago, we would not be in this position and would really and literally be shut-ins. (And some of you have told me maybe we have been quarantined because we can be, with the availability of technology...) And, while too many of us have unfortunately lost our ability to make a living, technology has kept many of us gainfully employed and busy. While having been shut in and socially distant is no picnic, as we have learned the hard way, there remain ways we can communicate and stay in touch. For this, and for those of us who have remained safe and healthy, we have a lot for which we need to be thankful. And, of course, few of us will be sad to see the calendar flip a page to 2021 when the time comes. (Please remind me what month it is again... I know it's summer because it's warm and the days are long...)

Elsewhere in this edition, you will be able to read about another "experiment" our Section tried this spring. Faced with having to cancel our April meeting, and after conducting our March meeting on the eve of the big shutdowns, literally being one of the last technical society events to be held in our area, we debated on how we would be able to continue to serve our membership. We felt early on that we didn't want to be like many other groups that were merely cancelling events — we knew the "show" couldn't go on, but we also knew we would rather postpone and reschedule rather than merely cancel, and we set out to see how we could use technology to conduct meetings. And we knew our members were depending on us (no pressure...). While they would come without the usual networking/happy hour and meal that gave our meetings a nice social touch, we wandered into the "strange and different land" of virtual meetings. After finding a topic and speakers and working out the logistics, our Section leadership was able to trot out a May meeting that was one of our most popular events in recent memory, with over 150 participants. It showed us we could do this, and gave us an option in the event that we would need to use it again. We were not about to merely give up and blame it on the situation beyond our control — we were proactive and did what we could do.

Because that's what we do — our Section continues to be a strong group that accomplishes quite a bit, despite all of us being busy people, and at least part of this is attributable to good and dedicated leadership. Many of us know of other technical society sections/chapters that are not doing so well these days because people are unwilling or otherwise too busy to commit time to them, and as we know, that commitment is "key" to success. And we know time commitment is difficult given the stay-at-home situation, having to be the teachers for our children, keeping up with the demands of work, etc. Someone has to step up to steer the ship. Not easy to do.

We continue to do very well and are both admired and envied by other groups which can only wonder how we do it. Our good mix of seasoned leaders, the enthusiasm of our Younger Members Forum, and the active and strong Student Sections, makes it all work. We consistently have good meetings and topics and get good turnouts at our events, something other groups struggle to do. We manage to succeed, despite how busy we all are, because we make it work. Our "good thing," which you've heard me call this, is entering into its 108th year of existence this season. Our collective strength lies in the people who take advantage of what our Section has to offer. We have been successful lately in our outreach efforts to "spread the word" about what we do, particularly with students, and we will be continuing to do so.

An accountant I know has told me the same old joke for longer than either of us can remember, but it is starting to be not so accurate. The joke is the difference between accountants and engineers, professions for which social skills are not known to be priorities (so they say...). Engineers will look at their own shoes when talking to someone, but accountants will look at the shoes of the person to whom they're talking. There used to be some truth to this. It's good to know we're changing the paradigm and becoming more outgoing and letting people know who we are and what we do. It can only help.

MAY SECTION “VIRTUAL” MEETING

May 14, 2020

Schuylkill Crossing at Grays Ferry (Swing Bridge)

by Robert Wright, Editor

The weather outside was nice, sunny and warm, after a few weeks of cool and wet, possibly giving us the winter we dodged a couple of months back. With all of us locked into our locations, many of us working from home as a result of the quarantine, an ASCE meeting appeared to be a welcome break in the shutdown. Thus, our Section decided to try a virtual meeting, in the absence of being able to offer any sort of in-person get-together that we're accustomed to, and on the day which we had planned to celebrate our Spring Social, which was itself rescheduled until the fall. The coordination of four speakers, each with their portions of the presentation, and the technology of the virtual platform was able to be accomplished, and getting the necessary sign-in information and passwords to the over-150 (!) registrants proved to be a task unto itself, but it all came together nicely, and may prove to be the prototype for more such sessions to come if the lockdown continues.

President **Kazi Hassan** got things started with a few items of housekeeping and thanks to our Section Sponsors as well as our **Construction Technical Group**, which had assisted with the arrangements with the topic and speakers. President-Elect **Jen Reigle** introduced the speakers and got the presentation underway.

First up was **Darin Gatti**, Section Past President and Chief Engineer and Surveyor of the Philadelphia Department of Streets, who gave a brief introduction and overview of the Schuylkill Crossing, commonly known as the Swing Bridge. He noted that there were several owners and project sponsors, including the Federal Highway Administration, which provided the grant funding, PennDOT, the Schuylkill River Development Corporation (SRDC), and the City's Department of Parks and Recreation as well as Streets. Streets was able to offer particular input on structural review and issues as well as maintainability. The effort required a good deal of close communication and coordination, and this was able to be established early on. He cited the good working relationship with SRDC, with this being the fourth successful project on which SRDC and Streets have collaborated, with a fifth effort in the works. He emphasized the great benefit this project would offer to trail users and how this served as a model for how other municipalities can partner with agencies to allow implementation of such efforts.

Joseph Syrnick, Section Past President and President/CEO of SRDC, gave some historical background on Schuylkill Banks, the trail network focused on the tidal portion of the river, and the transformation from the industrial nature of the river in years past into what it has become today. The main section of the trail was completed in 2000 and has proven to be a popular addition to the City's parks and trails network. Two segments to the south of Center City, the Grays Ferry Crescent, completed in 2012, and

Bartram's Mile, opened in 2017, are basically "disconnected" from each other and other portions of the trail at present. Because the trail additionally is planned to be on the west side of the river south of Bartram's Mile, a river crossing would be needed to link the east-side and west-side segments.

From a location standpoint, the existing former Penn Central Railroad swing bridge adjacent to the Grays Ferry Avenue bridge seemed to be ideal for this purpose. Mr. Syrnick explained that the bridge had been out of service and the rail line had been out of service since the early 1980's, thus the bridge appeared to be able to be repurposed for use for the continuity of the trail. The swing span was left locked in the open position to allow river navigation to operate. SRDC staff began to review options on how this could be implemented, and later engaged Ammann & Whitney to conduct feasibility studies for alternatives that would reuse the truss portion of the bridge in particular, which was the moveable span. This was considered to best reflect the river's historic industrial past as there was some historic value to the bridge, which dates to the early 20th century and is one of the very few swing bridges in Pennsylvania.

Mr. Syrnick noted that the alternates considered were all for fixed, non-moveable spans with unique "signature" characteristics. To clear river traffic, this meant that the new structure would need to have sufficient underclearance, possibly as much as 50', thus it would have longer and steeper approaches. A request for a 35' clearance was proposed with the Coast Guard, which would match the South Street Bridge upstream, but river operators objected. The issue went to then-Mayor Nutter, who decided that the bridge would be openable. While this gave the opportunity for a lower bridge, it introduced the complication of who would operate the bridge and the more complex construction that would be required.

William Gural, Construction Manager for Streets, came into the presentation to present on the construction project currently underway to rehabilitate the bridge for future use. He gave a short history of the structure, which has a 266' metal truss swing span with a 100' approach span on either side. The steam mechanism was originally steam powered. He added that the existing fender system and truss span would need to be replaced, the approach spans would require rehabilitation, and the navigation guidance light system would need to be changed. He handed off to **Tyler Barile**, Construction Engineer for Streets and on-site project director, for more details.

Mr. Barile noted that the first stages of the work were the removal of the truss span and swing rotation mechanism. The span had to be carefully balanced as top members were removed to allow access to the deck. The fender system was demolished and piles were removed. It was believed that the piles would break given their

age, but most were able to be extracted in one piece and appeared to be in fair condition. The approach spans were cleared of track and ties to allow the support beams to be stripped, primed and repainted, with repairs made to the steel as necessary. It was found that the steel was in good condition despite its age. For historic considerations, rivets that needed replacement had round-head bolts substituted to mimic the appearance of rivets, with roughly 3000 being replaced in this fashion.

There was considerable off-site work that had to be coordinated. Mr. Barile outlined how tolerances less than 1/32" had to be met in certain areas and the truss spans, turning machinery and components, and gearboxes were being worked on at several different sites on coordinated schedules.

A new navigation light system had been designed for the structure. During construction, Mr. Barile explained that a conflict was found that could potentially confuse river pilots coming upstream. Navigation lighting on the Grays Ferry Avenue bridge, which marked the channel clearance beneath the structure with green lights, conflicted with the red lights that indicated that the swing bridge was in the closed position. The issue was raised with the Coast Guard and found to be a situation not encountered anywhere previously. A redesign was completed to have the roadway bridge lights only on and green when the swing bridge was open. The power for the roadway lights was also separated from its connection to street lighting wires to ensure that the navigation lights would work if there were any interruption to the street light service. The wiring for the swing bridge system is carried across the river on the roadway bridge as well, to avoid costly tunneling beneath the river to place lighting conduits.

The approach spans had new bearings and floor beams installed and new paving was provided both on the spans as well as the trail segments leading to them. Mr. Barile added that a trench drain and bioswale system were installed on the east trail segment. The new fender system was a design-build element which will protect the full length of the swing truss in its open position. It was designed to withstand the impact of a barge colliding with it. The ring-track pivot in the center pier, which will permit rotation of the truss, has been fabricated and installed at this point. The swing truss and full center pier fender system remain to be completed.

Mr. Barile indicated that the shutdown of construction activity related to COVID-19 restrictions in late March has recently been lifted and new protocols are in place to protect workers and provide a safe environment. This has resulted in a setback of anticipated completion, possibly until the end of 2020. The effort has a construction value of \$15 million.

A number of questions were submitted by the participants and ably responded to by the panelists.

President Hassan thanked the presenters for a job well done with this new meeting format.

N-ASCE*

THE US IS GETTING SHORTER (OR WHAT EXACTLY IS NAVD ANYWAY?)

Height is height, right? Look at a Manhattan skyscraper, or the Washington Monument, or a mountain peak in California, and you imagine that it will be the same height tomorrow as it is today. But across the United States, the heights of structures, landmarks, valleys, hills and just about everything else are about to change, at least with regard to average sea level. Most will get shorter. Parts of the Pacific Northwest will shrink by as much as five feet, and parts of Alaska by six-and-a-half, according to Juliana P. Blackwell, director of the National Geodetic Survey. Seattle will be 4.3 feet lower than it is now.

That's because height is only height compared to a reference point — and geodesists, who calculate the Earth's shape, size, gravitational field and orientation in space over time, are redefining the reference point, or vertical datum, from which height is derived. It is a fiendishly difficult math and physics task that, once completed, will have taken a decade and a half to accomplish. The grand recalibration, called "height modernization," is part of a broader effort within the National Oceanic and Atmospheric Administration (NOAA) to establish more accurately where and how the United States physically sits on the planet. This new National Spatial Reference System, encompassing height, latitude, longitude and time, is expected to be rolled out in late 2022 or 2023. It will replace reference systems from the 1980s that are slightly askew, having been derived from calculations that were done before the advent of supercomputers or global navigation satellite systems such as GPS.

The errors in height are magnified as one moves diagonally across the country from the southeast to the northwest. One of the few areas of the United States expected to either stay the same height or rise fractionally will be the toe of Florida. But height has long been tethered to ego. Some Coloradans worry that a few of their mountain peaks will fall below a bragging-rights threshold under the new height system. And near Beaumont, TX, citizens are grappling with the unwelcome news that certain areas have subsided so much since previous height calculations that these regions now sit in the floodplain. As a result, some landowners may now need to insure themselves against losses from floods.

The United States has been measuring its own height since 1807, when President Thomas Jefferson established the Survey of the Coast, forerunner to the National Geodetic Survey, to chart the waters and coasts on the Eastern Seaboard. The survey was the nation's first civilian scientific agency, and had the aim of making shipping safer. As the country expanded westward through the 19th century, so did the measuring, using the coast, a proxy for sea level, as the reference point for zero elevation. Surveyors planted metal benchmarks in the land as they traveled, describing each point's height above



PA REPORT CARD CATEGORY OF THE MONTH: SOLID WASTE

Pennsylvania's solid waste consists of household trash as well as waste generated by construction, commerce and industry. The solid waste infrastructure including haulers, landfills, and transfer stations remains in fair condition. Landfill capacity is sufficient and counties are required by law to plan for a minimum of 10 years' worth of disposal. To counteract the increase, funding is needed to strengthen and grow municipal recycling universally across the Commonwealth. Safety issues and illegal dumping incidents serve as reminders that funding for the Pennsylvania Department of Environmental Protection is necessary to protect the public and support safe handling, transport, disposal, and recycling practices.

Compelling Statistic: Although Pennsylvania's daily per person solid waste disposal is over half a pound of trash less than our nation's average, the rate of disposal is on the rise.

sea level, often mile by mile. Anyone who wanted to measure the height of a building or hill measured it relative to the benchmark and, indirectly, to sea level.

Geodetic leveling, as the process was called, was painstaking and expensive. The rationale was to make sure heights were measured in the same way across the country over time, rather than each county or state having its own system. By 1900, geodesy had become even more sophisticated. Instead of using a coastline as the standard for sea level, geodesists developed a mathematical model representing sea level based on readings from tides. They have adjusted the height reference, the North America Vertical Datum (NAVD), five times since then, in 1903, 1907, 1912, 1929 and 1988. The 1988 model remains the standard in both the United States and Mexico, but was short on accurate information for California and parts of Texas and North Carolina, because the crust there has moved up or down considerably, as a result of tectonic plate activity and the removal of oil, gas and water from beneath the ground.

The solution might be to use the global navigational satellite system technologies, such as GPS, that were then beginning to proliferate. It had the advantage of being inexpensive and easy. Satellites, and therefore global positioning systems, measure height relative to a smoothed out mathematical approximation of the Earth's shape called an ellipsoid. But there was a big catch — gravity.

Gravity matters to a geodesist. Height is distance measured along the direction that gravity



PA REPORT CARD CATEGORY OF THE MONTH: PORTS

With substantial completion of the Delaware River Channel Deepening in 2019, and \$300 million in major infrastructure capacity investments committed in 2016, the Commonwealth has demonstrated its commitment to be competitive in the global and regional economy. This momentum will need to continue to address condition as numerous facilities have aged past their useful life and are in need of significant infrastructure improvements in order to prevent Pennsylvania facilities from becoming obsolete, which will result in cargo finding another route into the country.

Compelling Statistic: With over 100 million tons of goods moving through Pennsylvania's ports, Pennsylvania ranks 9th in the country for volume of goods that move through ports, providing an annual economic benefit of nearly \$50 billion to the Commonwealth.

points, and the strength and direction of gravity's pull vary according to the density of what is beneath the terrain and near it. Height is not merely distance or elevation above the ground, since it is tied to gravity. Gravity, in turn, is related to the distribution of mass. Geodesists therefore use the term "height" rather than "elevation." As a result, a height measured only by GPS could be badly inaccurate.

Making highly detailed measurements of the gravitational field, in order to factor them into heights captured by GPS, is no small task. In 2007, the National Geodetic Survey launched an ambitious mission — GRAV-D, for Gravity for the Redefinition of the American Vertical Datum — to accomplish just that. Geodesists will use these gravity readings to make a model that best represents average sea level everywhere in the world, even on land. Because the pull of gravity varies everywhere, this model, called the geoid, resembles a lumpy potato. All heights will subsequently be measured taking it into account.

Once the new height system is in place, people will find unexpected uses for it. With the proliferation of drones, self-driving cars and remotely operated aerial systems, the ability to navigate accurately in three dimensions is becoming paramount.

Thanks to the *New York Times* for this information.

*N-ASCE – Not always something concerning Engineering

The only limit to our realization of tomorrow will be our doubts of today.

– Franklin D. Roosevelt