TOP PROJECTS IN NEW JERSEY

ASHE Southern New Jersey

Fall 2019

INSIDE THIS ISSUE

MEET THE SNJ OFFICERS

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A Message from Mike Frabizzio ASHE SNJ President

I would like to take this opportunity to thank each of you out there for the great attendance and participation we have enjoyed at our opening three meetings of 2019-2020. Continuing the momentum of last year, there has been tremendous turnout at all of our meetings so far. I think we all have been in the same boat at times, where we're at the office trying to get projects out and have to make the difficult decision whether to take time and leave early to go the ASHE meeting. So, thanks for the sacrifice and effort you all make. We hope that you find it's worth it. In my biased view, it is – I've been amazed at the level of engagement at the meetings, from the networking hour with lively discussions among colleagues to the presentations and follow-up Q&A. We've had some really good interaction between audience and speakers – let's keep that up!

Through our PDH forms, we receive valuable feedback each month. A common complaint is problems with hearing the speakers. Our venues have made improvements to their audio systems, so we should be able to get this resolved. On this front, I ask that you please raise a hand and give feedback right away to the speaker so that we don't waste your time! It may be as simple a solution as holding the mike closer.

A noteworthy achievement that I'd like to mention here is that our local student chapter at Mercer County Community College hosted the ASHE Student Chapter National Conference on October 12. The students organized a practical and comprehensive agenda covering topics such as drones in construction, resume building, an interview workshop, the importance of professional societies, and the steps to becoming a PE. Thanks to all who made this event a success, including several members of our section.

Speaking of students, one of our section's key initiatives is offering scholarships to worthy civil engineering undergrads who reside in one of our constituent ten (10) counties. If you know a student who qualifies (go to the "Scholarships" tab on the ASHE Southern NJ website for eligibility requirements), please encourage them to apply. The deadline is February 29, 2020.

Looking ahead, our December event will be a holiday social gathering intended to give us all more time to mingle and catch up with our colleagues in a festive, holiday-time setting. As has been our tradition the past couple years, we'll be collecting donations for Homefront NJ. The second half of our ASHE year will open with an ethics (read: PDH!!!) presentation in January, followed by the Route 206 White Horse Circle project presentation in February. We are hard at work rounding out the remaining few months of the schedule, which will include a field trip and the annual Project of the Year awards in April.

If you have any interest in becoming more involved in the ASHE Southern NJ section, please reach out to me at mfrabizzio@aidpe.com. I can tell you firsthand that it is a wonderful opportunity to give back to our profession while also receiving so much in return, not the least of which is working with a great group of volunteers.

On behalf of the Southern NJ ASHE Board, we wish you and your family a happy, healthy holiday season and new year!

Mike Frabizzio
ASHE SNJ Section President

Essay: New Jersey Infrastructure Funds Must be Spent Wisely

Now that Governor Murphy's administration has been in place for nearly two years, it is heartening to see that investment in New Jersey's infrastructure seems to be creating a potential point of unity among a broad range of political quarters. Most agree that New Jersey needs to focus on long-overdue mega-projects including the Gateway tunnels, Portal Bridge, Newark Airport Terminal A renovation, completion of the Pulaski Skyway, extension of the Hudson-Bergen light-rail line, extension of the River Line from Camden to Glassboro, and completion of the I-295 / 42 Interchange improvements.

In 2016, the NJ state legislature had the courage to revitalize the Transportation Trust Fund by increasing the motor fuels tax by 23 cents. This legislation provides approximately $400 million of additional funding annually which includes $200 million more for municipalities and $95 million more for NJ Transit. While this is a significant improvement, more is needed to adequately address the long list of important capital projects. What is certain is that the major challenge facing New Jersey will be to continue to support additional investment in infrastructure while spending the funds in the right ways.

We must make our infrastructure investments very strategically if we are to achieve the gains — in jobs, economic growth, global competitiveness and quality of life — that residents deserve. We must rethink our transportation priorities and approaches so that new spending lets us leapfrog to a new level of performance, rather than merely catching up to where we should have been for decades.

Here are a few ideas for ensuring that New Jersey can achieve the greatest benefit from our transportation spending in the coming years:

•***Innovate to reduce congestion:*** Congestion will continue to be a frustrating problem, particularly in and around urban areas. We should consider innovative techniques that can help move traffic more efficiently. Connected-vehicle technology will provide more accurate real-time data to traffic operations centers, improve traffic flow along signalized corridors, while improving safety for pedestrians and bicyclists. For example, connected vehicle technology can be installed at traffic signals to give NJ Transit buses priority. This technology can extend green lights to keep buses clear of intersections and help improve traffic flow overall. This can increase traffic capacity during times of greatest demand.

•***Advance user-centered mobility:*** Technology is revolutionizing virtually every aspect of travel, from digital maps for planning trips, to digital tickets for trains and subways, to ride sharing. Use of technology through roadway intelligent infrastructure will be able to communicate directly with vehicles and smartphones to provide real-time roadway conditions and warnings. This information can provide optimal routing to one's destination and provide advance warning of incidents and construction. We need to invest in technologies that erase the seams between modes, so travelers can assess and activate their mobility options easily, often from a smartphone app.

•***Index transportation user fees to inflation:*** The recent gas tax increase, which has been so helpful in revitalizing funding of transportation infrastructure, will diminish over time with the effect of inflation. We should index the gas tax along with other transportation user fees like tolls and Transit fares to the rate of inflation. Indexing will provide incremental annual increases that will help maintain the purchasing power of this important funding mechanism.

•***Consider Alternative Sources of Transportation Funding:*** As bold as it was to raise New Jersey's gas tax 23 cents, this revenue source will continue to fall short as we drive more fuel efficient and electric vehicles. New Jersey, in partnership with states from Florida to Maine, is part of the I-95 Corridor Coalition which is conducting a pilot to investigate the feasibility of replacing the gas tax with a Mileage Based User Fee (MBUF) in a multi-state environment. While this pilot is in the very preliminary stages, the MBUF could be a fair and equitable long-term funding solution, charging fees to cars and trucks based on actual miles traveled. (Check out: https://www.i95coalitionmbuf.org/)

These are just a few of many strategies that could help us improve our transportation system, while also ensuring that each dollar is spent effectively. I believe we are on the road to more predictable and sustainable funding for New Jersey.

Gary Hullfish, a professional engineer, is vice president and New Jersey office leader for HNTB Corp., an employee-owned infrastructure solutions firm serving public and private owners and contractors, with offices in Parsippany, Newark, Lawrenceville, and Cherry Hill.■

TOP PROJECTS IN NEW JERSEY

PART 2

ENTRIES

UNDER $5 MILLION

Replacement of Perrineville Road Bridge

The original simply-supported concrete superstructure bridge was built in 1934 and was in poor condition. Located along an environmentally sensitive stream corridor, the project area is under the jurisdiction of the NJDEP, so the design considered measures to minimize impacts and mitigate measures for wetland, state open water, or riparian buffer impacts.

T&M Associates selected a single span, simply-supported prestressed concrete box beam superstructure design supported on full height concrete abutments with pile foundations. This structure type provided a shallower superstructure depth, minimized future maintenance, and reduced construction time. Long retaining walls were constructed on three sides to minimize wetland disturbances.

The roadway profile was raised above the NJFHA floodplain. To adapt for a higher speed limit, the alignment was modified to meet standards for stopping sight distance and horizontal curvature. The reconstructed roadway and bridge were designed with superelevation to meet current

NJDOT and AASHTO design requirements. The innovative design and construction methodologies played a large role in the successful execution of this project. The design process explored many options based on the requirements of Middlesex County, NJDEP, NJDOT, AASHTO LRFD Bridge Design, and ADA Compliance.■

Route 130 Crystal Lake Dam

The Route 130 Crystal Lake Dam Project provided for the reconstruction of the Crystal Lake Dam, structural repairs, and roadway safety upgrades. Crystal Lake Dam is located at milepost 53.46 of US Route 130 in Bordentown and Mansfield Townships, Burlington County, NJ. The dam embankment carries US Route 130 over Springhill Brook (a tidally flowed tributary of the Delaware River), protects the downstream Conrail/NJ Transit rail viaduct and recently constructed Bordentown Waterfront Development, and provides for stable water depths in Crystal Lake. The dam has long been classified as a "significant hazard" dam and did not conform to current NJDEP Bureau of Dam Safety regulations and was recommended for overtopping protection. The dam exists over the Springhill Brook which flows under the dam via a large box culvert and is a tidally flowed tributary of the Delaware River, that reverses flow as the tide changes increasing construction complexity.

Greenman-Pedersen, Inc. designed a cutting-edge solution, which has not previously been used by the NJDOT on their dam projects. This milestone project introduced the first successful application of Articulated Concrete Block Matting (ACBM) armoring to an NJDOT dam. ACBMs provided a safe, inexpensive, low maintenance approach to strengthen and preserve the dam embankment from failure during an overtopping flood event. Repairs to the culvert and improvements to roadway safety atop the dam were also included in the project.■

Route 31 over Peters Brook Bridge Superstructure Replacement

The purpose of the Route 31 over Peters Brook Bridge project was to improve the service life of the bridge. The existing bridge was constructed in 1927 and currently carries more than 14,000 vehicles daily, including 7% truck traffic. The bridge was structurally deficient and needed deck/superstructure replacement and substructure repairs. The project included demolition of the existing deck/superstructure and replacement with a new modular galvanized steel stringer/precast concrete deck superstructure. Construction was in several stages using Accelerated Bridge Construction (ABC) techniques. New precast approach slabs, bridge parapets, and guiderails were installed at each approach. The existing abutment back walls were removed and replaced. The east corner of the south abutment exhibited severe spalling and required partial removal of the abutment stem to facilitate repairs. During the demolition of the existing substructure, the contractor reported excessive movement of the Southeast wingwall while working nearby. Additional severe damages were encountered after excavating behind the wingwall, which were obstructed from view during previous inspections,

including a large crack extending the entire height of the wall. The existing footing of Southeast wingwall was found to greatly differ from the footing depicted on the existing plan. Additionally, it was observed that a portion of the existing footing had spalled off where the abutment's footing began. Therefore, Hardesty & Hanover recommended full replacement of the southeast wingwall and that the contractor extended the proposed footing to where the existing footing was in good condition. ■

Emergency Culvert Replacement, Route 206 Over Stony Brook

Built around 1915, the existing box culvert spans a branch of the Stony Brook in Princeton, NJ. Route 206 is a heavily travelled route for motorists traveling through Princeton and the surrounding communities. The existing culvert exhibited severe deterioration including large spalls, cracks as deep as 10 inches, and missing sections of floor slab, requiring interim measures to stabilize the structure before it could be replaced. The project had numerous constraints including environmental sensitivities, utilities and high traffic volumes.

To meet the demanding project schedule, WSP designed the replacement culvert in about nine months. A total precast design was pursued including a precast culvert founded on precast footings, with attachments to precast wingwalls and headwalls. The rigid frame culvert design included a low flow passage for fish and aquatic species. Ultra High Performance Concrete (UHPC) was used to develop resilient connections between elements and rapidly gain strength to minimize construction duration.

Culvert replacement was accomplished with an aggressive construction timeline that centered on a five-day detour in which the existing culvert was demolished and new culvert was opened to traffic. The project is an example of how collaboration between the state, designer, manufacturers and contractor ends with total success, at a cost 10% below the engineer's estimate. ■

Mercer Co. Bridge No. 672.4, South Broad St. over Doctors Creek

Mercer County Bridge No. 6724, is a 62-foot long concrete bridge carrying South Broad Street over Doctors Creek in Hamilton Township. The bridge was classified as structurally deficient due to poor substructure condition, and IH Engineers, P.C., designed the replacement structure. Key constraints included the hydraulic opening, roadway geometrics, traffic control, and the accommodation of a high voltage aerial line over the west sidewalk.

The replacement design included 14 precast/prestressed adjacent concrete box beams on concrete abutments and wingwalls supported on 168 piles. Bridge replacement required a detour plan to accommodate vehicular traffic, however, the contactor was able to accomplish the project without deenergizing an important high voltage transmission line. ■

NEW JERSEY PROJECT OF THE YEAR WINNER UNDER $5 MILLION

Checkout the Summer 2019 Newsletter which showcased projects over $5 Million

U.S. Route 206 Bridge Replacement in 9 days

Engineers from AmerCom Corporation custom designed this bridge to be replaced utilizing Accelerated Bridge Construction techniques for the NJDOT. The project included demolition of the existing bridge superstructure and partial substructure, construction of a new superstructure, and reconstruction of the substructure in 9 days. The contractor was Konkus Corporation with a bid of $2.792M. AmerCom formed a strong partnership with the contractor, NJDOT, and local stakeholders to make this project happen.

The existing 56-foot long multi-stringer bridge, built in 1928, was classified as structurally deficient and required replacement. This federally funded project required the NJDOT to remove this bridge from the structurally deficient category. The over 20,000 vehicles per day using the bridge, the proximity of businesses immediately adjacent to and near the bridge, and the extensive detour route would create an undue burden on the public. Therefore, Accelerated Bridge Construction became a viable option.

The project initially received resistance from the Township and users alike due to the full roadway closure needed for construction. Our extensive public outreach with an emphasis on AmerCom's innovative design to complete construction within a 9-day roadway closure utilizing around-the-clock construction enabled the project to gain support from the Township. All work was completed within the confines of the existing Route 206 R.O.W. avoiding impacts to the adjacent sensitive environmental areas.

The techniques developed used precast components designed specificallyfor this project by AmerCom and assembled by the contractor. Each superstructure unit was designed as prestressed concrete double T-beams in composite action with a reinforced deck. The superstructure rested on new precast substructure units that were placed atop the existing bridge substructure. Each substructure unit consisted of five sections that included the bridge seats and backwalls. The lower half of the abutments, existing footings, and adjacent wingwalls were left in place minimizing environmental impacts to this C-1 waterway. The bridge fascia utilized a "curtain" beam that maintained the dimensional waterway opening which streamlined the environmental permitting process. Prefabricated approach and sleeper slabs were also installed which moved the deck joint away from the bridge bearings. The new deck and approach joints were filled with Ultra High Performance Concrete and topped with a Polyester Polymer Concrete (PPC) overlayto extend the service life of the deck . The rapid setting characteristics of the PPC overlay allowed the project to meet the construction schedule. Utility work was completed prior to the full closure which included directional drilling under the existing footings to relocate an 8" gas main off of the bridge and out of the way of construction activities.

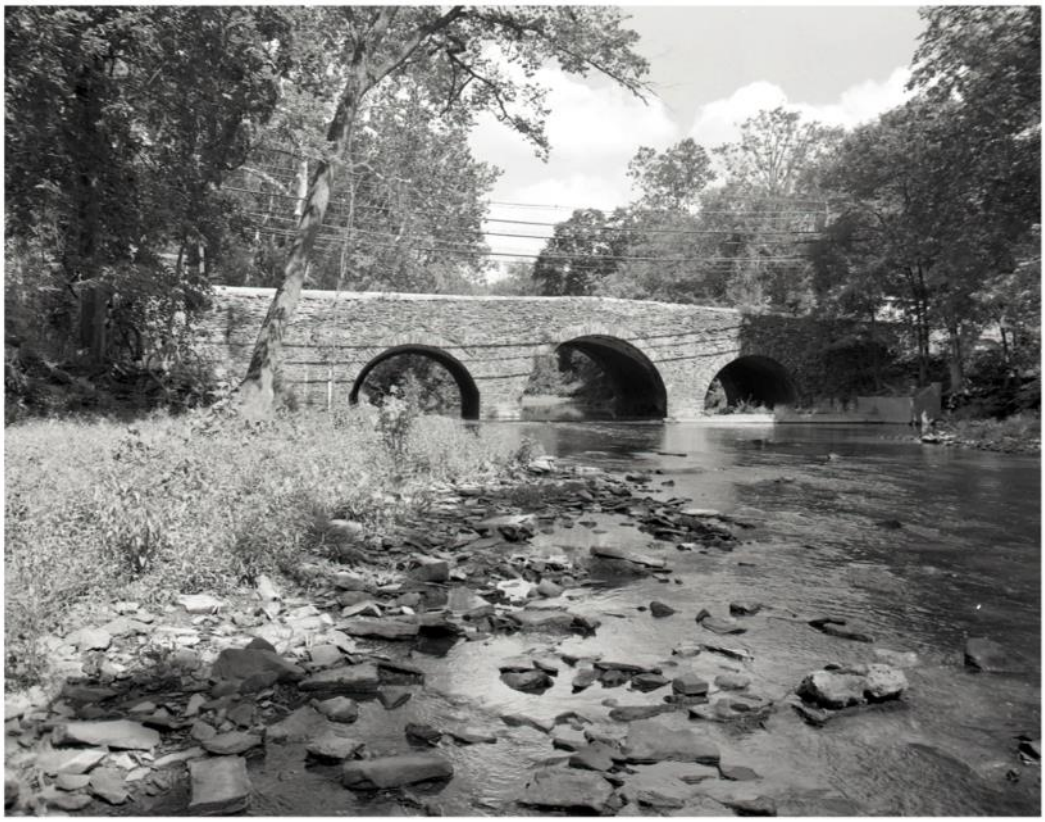
This project was covered extensively by the media and social media during construction. Once the bridge was opened, numerous positive responses poured in from New Jersey 101.5 Radio, Mendham NJ Patch, MT Olive Township NJ Alerts Facebook, page and others. ■

N.J. Route 206 Stone Arch Bridge

Spotlight on Richard Grubb &Associates

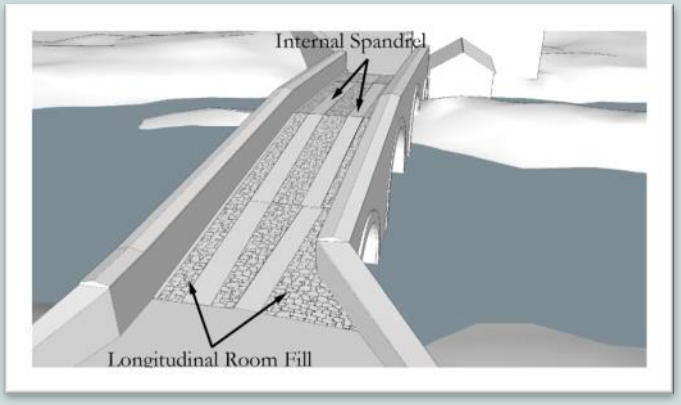
The New Jersey Route 206 Stone Arch Bridge (Structure #1129-155) over Stony Brook, commonly known as the Stony Brook Bridge, underwent emergency repair and rehabilitation in the wake of a 2016 partial collapse of one of its stone parapets. Erected in 1792 in Princeton, the Stony Brook Bridge is the oldest surviving, continuously used, stone arch bridge in the state. The historical and technological significance of the Stony Brook Bridge has been recognized on the state and national levels. The bridge is individually eligible for listing in the New Jersey Register of Historic Places (NJRHP) and the National Register of Historic Places (NRHP). Additionally, the bridge contributes to the significance of two NRHP-listed historic districts.

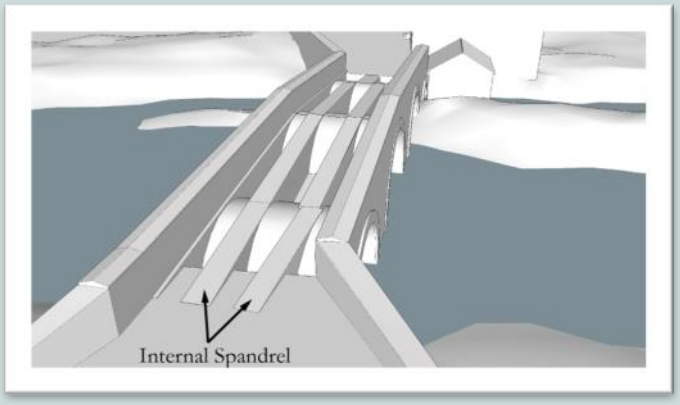
The New Jersey Department of Transportation (NJDOT) determined that a $7.4 million state-funded project was required to rehabilitate the Stony Brook Bridge, reconstruct the abutting Floodplain Bridge, and stabilize the adjacent Worth's Mill ruins in a manner that mitigated project-related effects and complied with the New Jersey Register of Historic Places Act and resolutions passed by the New Jersey Historic Sites Council (NJHSC). The rehabilitation of the Stony Brook Bridge involved the removal of the interior fill and structural elements above the bridge arches, the rebuilding of out-of-plumb walls, and the construction of interior concrete saddles and walls within the fill area of the structure. This technique allowed the preservation of visible features of the stone arches, spandrels, and arch barrels beneath the bridge. Cultural resource mitigation measures included: Historic American Engineering Record (HAER) documentation on both bridges and the mill prior to construction, development of a Historic Interpretive Plan for the Stony Brook crossing, and archaeological monitoring during construction activities. The project required extensive planning and consultation with the Princeton Historic Preservation Committee, the NJHSC, and the New Jersey Historic Preservation Office. Richard Grubb & Associates worked closely with the NJDOT project team to fulfill the mitigation measures, resulting in the receipt of a 2018 Historic Preservation Award. The project was completed ahead of schedule and under budget in the Fall of 2017.



As part of the HAER documentation,

RGA completed a detailed historic context for the bridges and mill. Detailed recordation of the structures and architectural elements was facilitated through the use of large format black and white photography. HAER documentation and archaeological monitoring revealed that the Stony Brook Bridge changed significantly since its initial construction. Erected askew to Stony Brook as a joint effort between Somerset and





Middlesex counties, Freeholder minutes describe the intended 1790s dimensions for a bridge with three barrel-shaped arches, a span of 70 feet, and an 18-foot wide cartway. Repairs to the Stony Brook Bridge took place throughout the nineteenth century, and in an effort to reduce its steep slope, a stone-pier-and-deck bridge was built over the low-lying area to the southwest of the Stony Brook Bridge in 1896. Known as the Floodplain Bridge, this 60-foot bridge, with a 25-foot width, was constructed with three 20-foot spans. The Stony Brook Bridge was dramatically altered in 1916 when the bridge was widened and straightened with red shale-faced, concrete additions that encapsulated the original bridge within its spandrels. The new roadway was more than 32 feet wide. Subsequent repairs to the Stony Brook Bridge and the adjacent Floodplain Bridge were minimal.

Archaeological monitoring in 2017 identified structural elements associated with the original 1792 bridge despite the 1916 modifications. Removal of the bridge surface revealed that the 1792 bridge was virtually intact and encapsulated within the 1916 bridge expansion elements. Archaeology revealed that between the original 1792 exterior spandrels, the bridge was constructed with a set of internal stone spandrels that tied directly into the stone barrel arches. The 2.5-foot wide internal spandrels extended from the spring to the tops of each arch, creating longitudinal rooms between aches that ran parallel to the exterior spandrels. Each longitudinal room was filled with loose stone rubble and dirt. The engineering techniques identified in the 1792 bridge is the first archaeologically documented in New Jersey, though it has antecedents in Europe. In 1740, London's Westminster Bridge, designed by Labelye, was constructed with a gridded pattern of internal spandrels, creating square chambers or rooms that were filled with material. A recent study by Brencich and Colla (2019) of 19th-century masonry railway bridges in Italy revealed similar construction techniques, especially in bridges built askew to water crossings. The study argues that internal spandrel walls contribute to a bridge's structural performance and stiffening, help to avoid relative movement between skewed arches, and relieve load stresses on piers and arches. The Stony Brook Bridge represents the first and earliest documented use of internal spandrels in masonry bridge construction in the United States, recordation of which was made possible through mitigation measures. This bridge building technique had lesser known antecedents in Europe. Use of internal spandrels likely contributed significantly to the Stony Brook Bridge's survival since 1792 and may account for an unrecognized, hidden and integral structural design in other 18th-century stone arch bridges.■

I-280/Route 21 Interchange Improvements

Spotlight on Michael Baker

The biggest city in New Jersey had a big problem. A major interchange – built to standards now lapsed, positioned in a crowded urban location, sitting atop a long-used brick-lined sewage system, and funneling tens of thousands of motorists through a dangerous ramp and merging configuration – needed to be rethought, redesigned and rebuilt. This critical freeway between the Garden State Parkway and the NJ Turnpike connects Morris County in the west with New York City in the east and traverses downtown Newark just north of the City's Central Business District.

The New Jersey Department of Transportation (NJDOT) also needed to ensure that construction on the interchange would have limited impacts on the area's historic neighborhood. Enter Michael Baker International, a leading provider of engineering and consulting services, to lead the design of the I-280/Route 21 Interchange project. Working within a very tight geographic footprint, Michael Baker and the lead contractor on the project, George Harms, needed to alleviate the poor conditions and geometric concerns associated with the six existing ramps. The project consisted of the rehabilitation and/or replacement of the existing bridges as well as the construction of new bridges and ramps to improve the functionality of the interchange. This was accomplished with the construction of 6 new bridge structures, 11 retaining walls, 4 sign structures, new bulkhead system, and utility upgrades.

For decades, the original I-280 ramps poorly served motorists and neighboring communities. But Michael Baker was able to maximize the traffic-serving capabilities of the freeway, improve safety, and minimize community impact.

The team also integrated sustainability into the design process. With improved traffic flow, vehicles no longer idle for long stretches, greatly reducing carbon emissions. Special efforts were also made to use locally-sourced materials and recycled materials from demolished bridges, helping to reduce waste and emissions. Elements such as roadway and structural design elements, parapets and railings, median barriers, drainage, signage, and lighting were updated to comply with current American Association of State Highway and Transportation Officials and NJDOT design standards. The project also included extensive utility relocations, pavement design, intricate staging, and creative maintenance of traffic solutions, as well as accelerated bridge construction techniques.

Once completed, the I-280/Route 21 Interchange project successfully addressed the safety and efficiency of the interchange, including correcting the geometric deficiencies, providing missing interchange movements between an interstate highway and a principal arterial, optimizing I-280 throughput without adding through lane capacity, and improving the condition and reliability of this vital link in the region's transportation network. Since the impact to the historical structures in the area was also a major concern, Michael Baker employed a specialized use of vibration monitoring and control procedures to help safeguard the historic structures.

The team, working in tandem with NJDOT, the Contractor, and the general public, completed this incredibly intricate project on time, on budget, and with seamless execution during construction. ■

Pulaski Skyway

Spotlight on HNTB

The Pulaski Skyway is one of the most recognizable and iconic structures in Northern New Jersey. Constructed in 1932 as one of the first "controlled-access" or super highways, the Pulaski Skyway serves as a vital transportation link in the New York Metropolitan area, providing direct access to the Holland Tunnel. The 3.5-mile long structure carries four lanes of traffic through Jersey City, Kearny, and Newark, crossing critical infrastructure, including the Port Authority Trans-Hudson Line (PATH), Conrail and the New Jersey Turnpike, as well as the Hackensack and Passaic Rivers. The Pulaski Skyway consists of a Pratt Truss

Figure 1 - Pulaski Skyway (Passaic River Crossing)

cantilever bridge superstructure, with 118 spans (the longest of which are the two 550-foot river spans). Due to the Skyway's age, architecture, first access-controlled super highway in the state, it is classified as a historic place and is listed on the State and National Historic Register.

Since 2012, the Pulaski Skyway has been the subject of several construction projects led by the New Jersey Department of Transportation (NJDOT), to rehabilitate the entire bridge and restore it to its as-built condition, at a minimum. These projects, along with several future contracts, comprise the overall Pulaski Skyway Rehabilitation Program. Work currently ongoing includes replacement of the Skyway's entrance/exit ramps and east and west non-truss approach spans. The removal and replacement of concrete encased girders from the Hoboken Viaduct, and the replacement of the entire concrete deck has been completed.

Currently, NJDOT is in the design phase for the full rehabilitation of the Truss Spans. These rehabilitation projects will include repair/replacement of primary and secondary truss members, rehabilitation of rocker-bents,

Figure 2 - Pulaski Skyway over the NJ Turnpike Easterly Alignment

replacement of structural bearings, and rehabilitation of the supporting piers and foundations. Additionally, ancillary work such as relocation of various utilities, installation of a new fender system, and other upgrades will be performed where necessary.

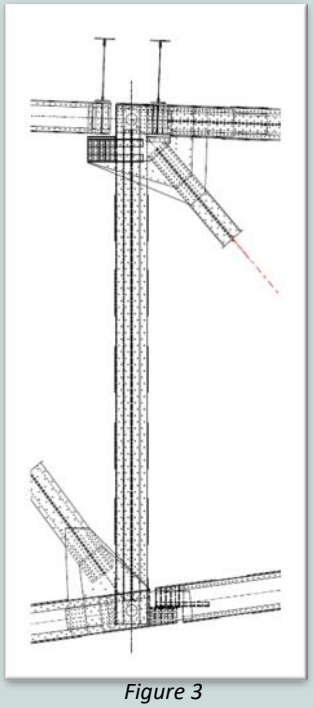


Figure 3
Typical Rocker Bent

HNTB is the responsible Engineer-of-Record for the rehabilitation of truss spans from pier 78 to 97. These spans include the Passaic River Crossing, a crossing over the Route 1 Bypass, and most notably, a crossing directly over the westerly and easterly alignments of the New Jersey Turnpike. Not impacting the traffic below was a significant consideration. HNTB's design is separated into three main categories as described below:

<u>Rocker Bent Rehabilitation:</u>

To account for the thermal movement within the Steel Truss, the original design of the Pulaski Skyway called for the construction of Rocker Bents. Located at the connection between the cantilever and suspended trusses, these traditional railroad-style truss expansion devices provide for thermal movement and are similar in function to the

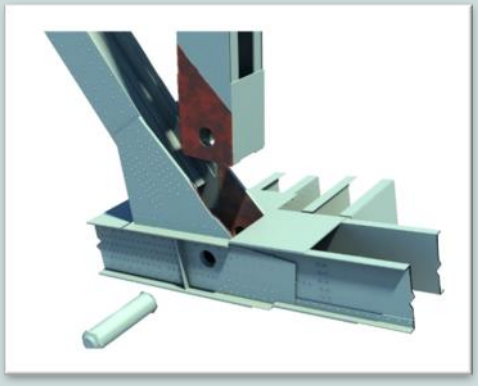


Figure 4 — Typical Rocker Bent

more commonly known pin and hanger mechanism. However, a key difference is that these members act in compression as opposed to tension. The original detail allowed for a nominal 1/16" of clearance between the rocker bent pins and adjacent steel surfaces. Over time, this detail resulted in the accumulation of pack-rust, which has caused the pin to not fully function as designed. This, in turn, has the potential to cause overstressing of these members as they are forced to bend in response to thermal deformations rather than pivot on their pins.

Structural Steel Repairs:

In addition to the Rocker Bent Rehabilitation, the steel truss requires rehabilitation. Currently, the condition of steel varies from span-to-span with some of the worst levels of steel deterioration observed on the lower truss chord. To understand the varying conditions of the steel Truss, SJH Engineering was brought onto the team to perform a detailed, hands-on inspection of the Skyway.

This inspection found defects that ranged from minor section loss/pack rust infiltration to significant section loss of some built-up members. This level of deterioration could be attributed to the highly corrosive environment in which the Skyway exists and former open-trough deck drainage. An example of a defect is shown in Figure 5.

With the results of the hands-on inspection, and in conjunction with utilizing the desired design criteria for repair, HNTB categorized each defect to determine whether a repair was needed, and what the appropriate repair type should be.

Figure 5
Deteriorated Horizontal Connection Plate

HNTB is currently developing design plans to address these structural steel defects. Repairs range anywhere from replacement of members such as batten plates, lacing bars and secondary connection plates; to overall strengthening to members such as gusset pates and primary truss chord members.

Pier Rehabilitation:

The third portion of this rehabilitation effort pertains to the rehabilitation of all piers. As a first step to developing these rehabilitation plans; HNTB hired SIMCO Technologies of Quebec, Canada to perform a concrete durability and condition assessment of the piers. As a result of this assessment, SIMCO determined that the existing pier concrete was not suitable to achieve the required Program service life goal and required an extensive rehabilitation effort. SIMCO concluded that all pier caps needed to be repaired based on their current condition. Additionally, they determined that many of the larger piers had deep sub-parallel cracking, as the Pulaski Skyway was built just prior to the onset of incorporating air-entrainment measures into concrete mix designs. These defects were attributed to a combination of poor freeze-thaw resistance, leading to salt infiltration, concrete degradation due to the surrounding environment and lack of suitable internal reinforcement required by present-day design codes.

To rehabilitate the Piers, HNTB is proposing to build a new concrete shell which is to encompass the existing piers entirely. Construction of these shells will take place over the course of a four-staged approach.

Stage 1 shown below, will include the installation of a new foundation system, as well as, the installation a concrete pier shell to go around the existing pier.

Stage 2 will involve the installation of a jacking frame as shown below.

Stage 3 will include the jacking of the bridge and replacement of the existing bearing with a new one that meets the program's design criteria.

Finally, Stage 4 will involve the construction of a cast-in-place pier cap and the installation of a new Pier Strut.■

Written by: Jay Jeyamohan, NJDOT Project Manager, and Joseph Strafaci, PE, HNTB

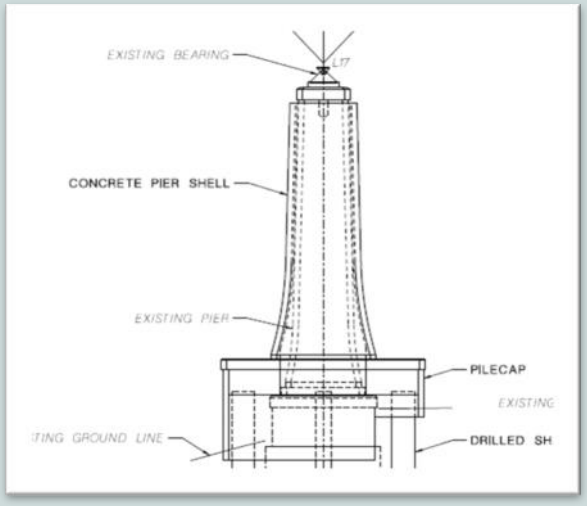


Figure 6

Stage 1: Proposed Pier Shell & Foundation

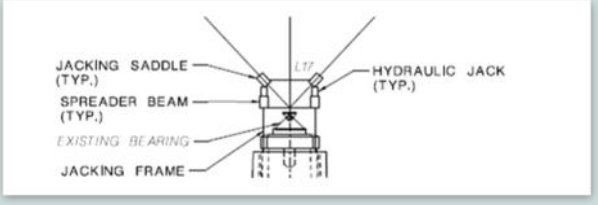


Figure 7

Proposed Jacking Frame

Sea Isle Boulevard

Spotlight on McCormick Taylor

The main entryway into Sea Isle City, Sea Isle Boulevard runs for about 1.7 miles through an expansive estuarine wetland complex, proceeding from the Garden State Parkway Interchange 17 to the western approach of the Ludlam Thoroughfare Bridge that connects to Sea Isle City.

Sea Isle Boulevard is a designated Coastal Emergency Evacuation Route that has experienced tidal flooding during storm events of less than 100-year magnitude. This project addressed the roadway's resiliency by raising it to accommodate flooding events.

McCormick Taylor completed the final design of this multiyear roadway reconstruction. The roadway was elevated on fill by approximately four to five feet to be above the 100-year flood elevation while maintaining the existing toe-of-slope and right-of-way. Three existing tidal equalizer pipes crossing beneath the roadway were replaced at their same locations with larger pipes to improve tidal rushing and wildlife passage. A small connector roadway between Old Sea Isle Boulevard and Sea Isle Boulevard underwent minor reconstruction to improve access to the Sunks Creek Bulkhead Public Access Area and an offsite marina.

Sea Isle Boulevard reconstruction will improve the resiliency of this critical emergency evacuation route.

The estuarine wetland complex adjacent to Sea Isle Boulevard is considered critical habitat for a large population of Northern Diamondback Terrapins. In response to the concerns of the US Fish and Wildlife Service, approximately four miles of turtle exclusion fence was installed along all proposed guiderail upon the roadway's top-of-slope, which effectively eliminates terrapin mortality caused by motor vehicle encounters on the roadway. The tidal equalizer pipe replacements also provide enhanced opportunities for terrapins to cross Sea Isle Boulevard without entering the roadway. A protected turtle nesting area was also provided as part of the Sunks Creek Bulkhead recreational site improvements.■

Section Meetings & Events

September Meeting
FY 2020
NJDOT Capital Program

The September meeting was a blow-out, with about 200 registered attendees. The attendance plus the energy in the room combined to make it a great way to kick off the 2019-2020 season. The program started with J.P. Magron introducing himself as the returning ASHE NC-NJ President and Michael Frabizzio as the new ASHE SNJ President. Introductions were followed by an exciting announcement about the new Joint Education Committee. The Committee is a cooperative venture between ASHE SNJ and ASHE NC-NJ to create and sustain new ASHE student chapters throughout New Jersey. The committee is seeking volunteers to assist at all levels. Anyone who is interested should contact Richard Grubb at rgrubb@rgaincorporated.com.

Snehal Patel, NJDOT Assistant Commissioner and State Transportation Engineer headlined the meeting with presentation of the FY 2020 NJDOT Capital Program, subtitled "Our Commitment to New Jersey Communities". From the beginning, Mr. Patel made clear his passion for creating a climate of public service at NJDOT by outlining the key objectives of the Commitment to Communities initiative at NJDOT. Embodied in this initiative are the core values which define NJDOT as an organization which are:

- Inform
- Innovate
- Collaborate
- Empower
- Evolve

He explained that NJDOT can best serve the state by responsibly managing and continually improving New Jersey's highway and bridge infrastructure. He spoke with pride about the Department's recent successes delivering shovel-ready projects and getting them under contract.

Snehal Patel PE, PMP
NJDOT Assistant Commissioner & State Transportation Engineer

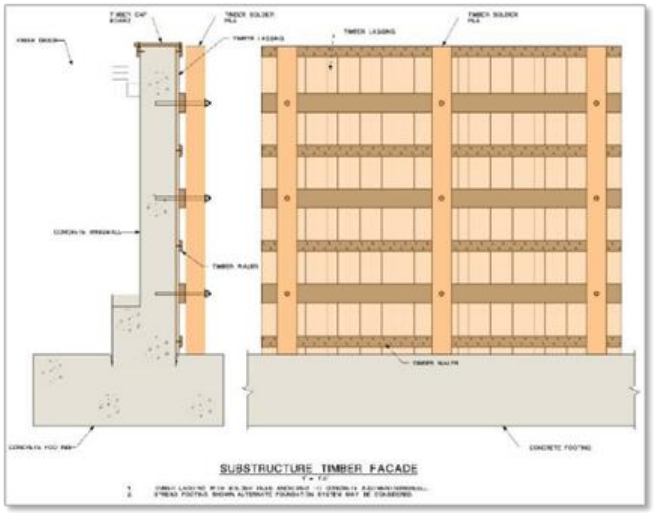
Mr. Patel asked the professionals in the room to help implement NJDOT's new customercentric vision and continually improve the roads and bridges in New Jersey. ■

October Meeting
Alexander Rd & D&R Canal

John S. Campi, Jr., NJDOT Project Manager kicked off the presentation for the replacement of the Alexander Road Bridge over the D&R Canal. While the 2-span timber bridge is small, just 48 feet long, the project team needed to tackle some big issues. For starters, Alexander Road carries about 20,000 vehicles per day and provides a key connection between Princeton University, Princeton Borough, and points east. The Department chose to pursue an aggressive 6-month construction schedule to minimize traffic impacts to the community, avoid environmental timing restrictions and have the

Amy Sokalski (ASHE SNJ VP), Denice daCunha (NV5), John Campi (NJDOT), and Mike Frabizzio (ASHE SNJ President)

bridge open in time for Princeton's commencement. Throughout the outreach process, the team hammered out several key



commitments to mitigate the impacts of the 6-month detour including a temporary travel time system that informed drivers of potential delays along detour routes. Other traffic mitigation measures included signal timing adjustments and preemption for emergency vehicles.

The historic setting required the team to consult with multiple parties to design the replacement structure that fit with the historical context of the site. Through the consultation process, with a consensus of stakeholders/regulators, the bridge replacement design utilized structural materials with the composition, look and feel of the existing bridge. For instance, the team proposed a 4-bar steel "New Hampshire" railing system that meets TL4 standards, and, when painted white, "feels" like a timber railing. The team also specified a timber bulkhead façade to cover the concrete abutments and timber sidewalks. However, after bidding, the contractor submitted a VE proposal that changed the proposed materials and supported his submission with a limited amount of feedback from some, but not all, stakeholders. NJDOT eventually rejected the contractor's VE proposal because it did meet the many commitments made by the Department. Mr. Campi noted that it would have been better if NJDOT had prohibited VE proposals but also explained that it can be difficult to modify NJDOT standard contract language. ■

Social Event
Third State Brewing

The Fall social event was held at Third State, a brew pub in Burlington, NJ, with a well crafted selection of beer and ale. Despite the weather, the event was a very well attended outing where we all enjoyed a supper of local eats. The highlight of the evening was the informative tour of the brewery where we got a feel of the excitement and pride that our brew master hosts have in their craft. The best part was when they popped-open wooden "aging" barrels so we could sample what's going to be on-tap next. ■

November Meeting Adaptive Signal Systems

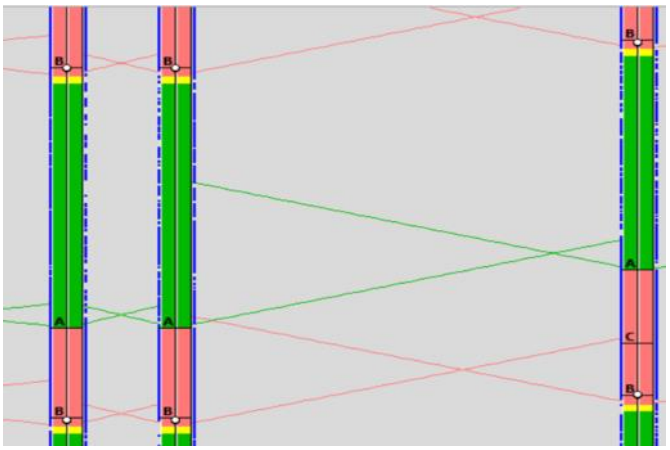
In November, ASHE SNJ and the Mid-Atlantic Section of ITE (MASITE) held a joint meeting with a focus on the implementation of adaptive signal systems in New Jersey. Kelly McVeigh, a Principal Traffic Engineer with over 6 years of experience working for the New Jersey Department of Transportation in the Transportation Mobility (TSM&O), lead the presentation. Kelly is one of the Department's lead engineers for adaptive traffic signal system design, construction, testing, and operations. During the presentation, Kelly helped us obtain a better understanding of adaptive signal systems and how they work through the lens of projects along US Route 1, US Route 130, NJ Route 18, and NJ Route 73.

Radar vs. Video Detection

An adaptive signal system makes real-time adjustments to the traffic signal timing components (Cycle, Split, Offset) to reduce congestion and delay. The two elements of adaptive systems are input in the form of vehicle detection data and output in the form of optimized signal timings.

According to the FHWA Center for Accelerating Innovation, the main benefits of adaptive signal control technology over conventional signal systems are that an adaptive system can:

- Continuously distribute green light time equitably for all traffic movements.



Adaptive Systems improve travel time reliability by progressively moving vehicles through green lights.

- Improve travel time reliability by progressively moving vehicles through green lights.
- Reduce congestion by creating smoother flow.
- Prolong the effectiveness of traffic signal timing.
- Reduce congestion by creating smoother flow.

The presentation concluded with a comparison between an InSync Operation and a SCATS Operation.■

Lindsey Klein (MASITE), Kelly McVeigh (NJDOT), and Mike Frabizzio (ASHE SNJ President)

Section News & Reminders

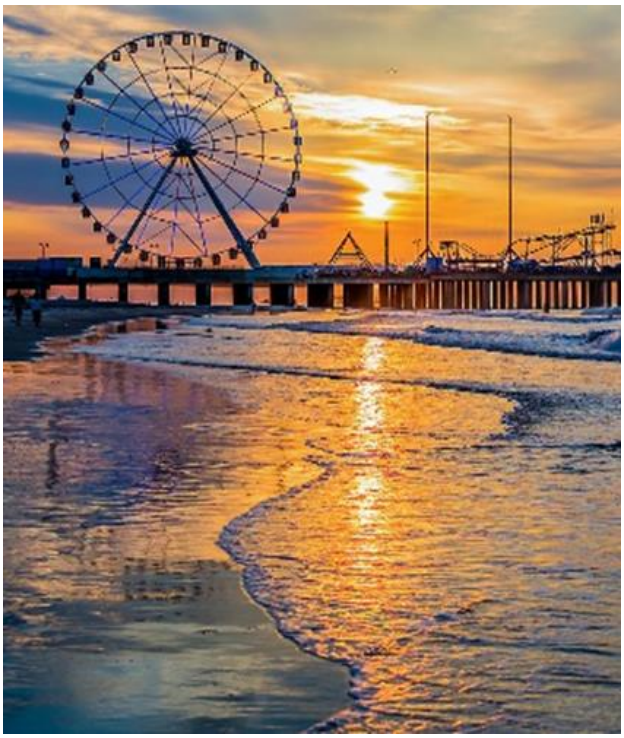
2023 ASHE National Conference

ASHE SNJ and ASHE NC-NJ have formed a Joint Committee to prepare a bid to host the 2023 ASHE National Conference in Atlantic City, New Jersey. The 2023 ASHE New Jersey National Conference Committee is currently preparing a "Request to Host" which will be submitted in December and reviewed at the January ASHE National Board Meeting. Both sections have a long history of hosting well-attended monthly programs. With this experience, combined with the draw of Atlantic City and the name recognition of ASHE, we expect the 2023 National Conference to be a 'must attend' event for the transportation industry. Furthermore, SNJ and NC-NJ have long history of working together on successful events like the NJ Project of Year Competition and the new Joint Education Committee. By combining the leadership of the two sections, we have great team to pursue the National Conference.

Co-Chairs: Leading the 2023 National Conference charge are Lori Wade of ASHE Southern NJ and Scott Cortese of ASHE North/Central NJ, who will serve as conference co-chairs.

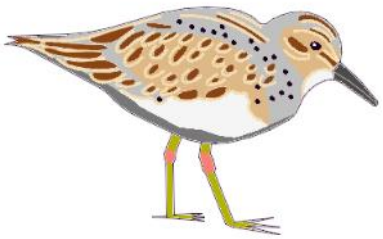
The Subcommittees: The Committee includes a dozen subcommittees to manage all aspects of the National Conference including Registration, the Technical Program, Entertainment, and the Golf Outing. All committee chair positions have been filled, however there are plenty of opportunities to get involved in this historic event just contact anyone listed in the bulletin.

Technical Program: New Jersey is in the Mid-Atlantic region and is bordered by New York, Pennsylvania, and Delaware – a region with significant planned future infrastructure investment with over $100 billion in the next 5 years! With a wealth of transportation agencies, authorities, and commissions, New Jersey is the ideal location to collaborate, resolve transportation issues,



and explore opportunities to improve mobility.

Entertainment: Of course, the National Conference will not be all work. There will be plenty of opportunities to have fun and Atlantic City is all about fun! Golf, gambling, amusement rides, or strolls through the sand, AC has it all.■



Section News & Reminders

ASHE National Student Chapter Conference

The 3rd Annual ASHE National Student Chapter Conference was held on Saturday, October 12th. This year's conference was hosted by the ASHE Mercer County Community College Student Chapter. We would like to extend a special thank you to MCCC student Javuan Linton and his conference committee for organizing such an informative and interactive conference.

The Student Conference was organized by the ASHE National Student Chapter Committee as a way for student chapter members to network with their peers from other colleges/universities as well as industry professionals. The host chapter for each conference is chosen through an RFP process.

The October event was well attended by over 25 students from local colleges/universities including MCCC, Rowan University, The College of NJ, Rutgers University, NJIT, University of Delaware, and University of Maryland College Park.

In addition to the student attendees, the event drew professionals from several ASHE Sections including Southern NJ, North Central NJ, First State, and Chesapeake.

The conference kicked off with a drone demonstration by Greg Assis, Chief UAV Pilot/Remote Sensor Technologist from KS Engineers. The students were fully engaged as Mr. Assis flew the drone over campus explaining the drone specifications, software, flight path, weather and environmental restrictions, etc.

The conference continued with presentations on Interview Skills by Matt Carter of UDel Delaware T2 Center; Resume Building by Ronald Rotunno of BANC3, Importance of Professional Societies and LinkedIn 101 by Carrie Streahle of Promatech, and Steps to Becoming a Licensed PE by Jim Purcell of NCEES.

Thank you again to the MCCC Student Chapter and all the student and professional attendees. We look forward to the continued success of this student conference.■

ASHE SNJ Scholarships

The 2020 ASHE SNJ Scholarship Application is now available on our website. Deadline is February 29, 2020. Don't be late! ■

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Upcoming Events

LOOKING AHEAD

Ethics
Maggiano's
Cherry Hill, NJ
January 15, 2020

Route 206 &
White Horse Circle
Hamilton Manor
Hamilton, NJ
February 12, 2020

Scudder Falls Update
March 2020

NJ Project of the Year
April 2020

December Holiday Toy Drive & Lego Construction Contest

5:00pm - December 11, 2018
Hamilton Manor, Yardville, NJ

This year, our holiday drive will benefit HomeFront NJ. HomeFront's mission is to end homelessness in Central New Jersey by harnessing the caring, resources, and expertise of the community. They lessen the immediate pain of homelessness and help families become self-sufficient. They work to give their clients the skills and opportunities to ensure adequate incomes, and they work to increase the availability of adequate, affordable housing. They help homeless families advocate for themselves individually and collectively. Find out more on their website! https://www.homefrontnj.org/

HomeFront NJ suggests the following donations to make the holiday season a little brighter for local children and teens!

- Children's clothes (baby, toddler, and teen including hats, gloves, etc.)
- Unwrapped toys
- Books
- Gift Cards (for teens)