Design Challenges for the 17th Street Bridge

SJTA’s Community Shuttles Expand Access
Expansion of RCBC Mt. Laurel Campus
The Future is Sooner Than You Think
Camden Continues to Rise
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President’s Message

The transportation sector is vital to our region’s overall economic vitality through its ability to move goods and services, provide access to education and employment, and investments in infrastructure and planning.

Now that the state’s much needed gas tax increase is in place, the next discussion will be about transforming the transportation sector and its infrastructure to support zero-emission vehicles. The Future is Sooner than You Think outlines the goal of having 1 million electric vehicles on the road in New Jersey while CNG Vehicles: Good for the Environment and Your Fleet’s Bottom Line makes the economic and environmental case for converting heavy duty diesel vehicles.

The Delaware Valley Regional Planning Commission released its Connections 2045, the long-range plan for Greater Philadelphia (which includes Burlington, Camden and Gloucester counties in South Jersey) that establishes a vision for growth and development for the region and serves as a blueprint for prioritizing transportation funding over the next 28 years. DVRPC’s Connections 2045 Plan Prepares for Integrated Transportation focuses on one of the five core principles of the plan.

From long range planning to our cover story, Design Challenges for the 17th Street Bridge, one of two articles that examine the design and engineering challenges behind constructing transportation infrastructure projects today. In our other transportation construction project, accommodating additional traffic was key to the Expansion of Rowan College at Burlington County Mount Laurel Campus.

The South Jersey Transportation Authority Community Shuttles continue to provide efficient and affordable shuttle bus service to expand access to South Jersey employers.

And finally, Camden County Freeholder Director Cappelli puts some perspective behind the encouraging crime and education statistics in Camden Continues to Rise.

We welcome your comments at marlene@snjdc.org. To learn more about the SNJDC, contact us (856) 228-7500 or visit our website snjd.org.

Sincerely,

Marlene Z. Asselta
President
Southern New Jersey Development Council
By: Jon Moren, PE
Manager, Bridge and Dams at French & Parrello Associates

The 17th Street Bridge in the City of Ocean City in the County of Cape May is the only means of access to the island located in the Venetian-Carnival Bayou, which is occupied by residents year-round. French & Parrello Associates (FPA) has been engaged in the design of the 17th Street Bridge with County Engineer Dale Foster at the helm since 2012, when the scope of work involved the rehabilitation and repair of an existing aluminum arch. A condition inspection of the culvert revealed significant oxidation and deterioration of the existing aluminum arch. A complete replacement of the culvert with a precast concrete arch bridge, precast concrete headwalls and wingwalls on a micro pile foundation, and cast-in-place concrete pile cap was selected as the replacement structure. The parapets will be cast-in-place concrete topped with a single railing and pedestrian lighting imbedded in the parapet.

Due to the bridge’s location, reconstruction work could only occur during the off-peak non-summer months of October through Memorial Day annually. The close proximity of residential homes to the bridge required that the existing structure be designed and replaced in two stages to maintain vehicular and pedestrian access at all times. The new structure was designed as two separate bridges that not only accommodate access to the island for vehicles and pedestrians, but also maintains all the utilities to the island, including gas, water, sanitary sewer, power, telephone and cable television. This

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POWERING BUSINESSES FOR COMMUNITY GROWTH.

We’re committed to providing safe, reliable and affordable energy that local businesses need to help our communities grow.
Over the past five years the public transportation network of South Jersey has quietly been expanding. South Jersey Transportation Authority (SJTA) began service on three shuttle bus routes – the English Creek-Tilton Road, Rt. 54/40 and Pureland East-West Community Shuttles. These routes have filled gaps in the public transit network, providing underserved communities with reliable transportation to work.

SJTA plans the service to be efficient and flexible, responding to the shifting needs of the community. The shuttles handle approximately 6,000 passenger trips each month. Fares are kept low, providing an economical means of transportation for lower income residents and others who may not have access to a car. Shuttle services connect to NJ TRANSIT bus or rail service, expanding employment access throughout the South Jersey region. Free transfers between the shuttles and NJ TRANSIT services are provided.

The English Creek-Tilton Road Community Shuttle began operation in October 2012. It serves over 5,000 households and 400 businesses in Northfield and Egg Harbor Township, including the AtlantiCare Health Park. The route recently expanded to include the newly constructed Oak Tree Plaza in Egg Harbor Township. This 35-acre retail center promises to bring over 400 jobs to the community and features a Walmart Supercenter. The shuttle also connects to NJ TRANSIT’s 502, 507, and 509 bus service, providing access to destinations throughout Atlantic County. Service is Monday through Saturday and costs $1 per ride.

The Pureland East-West Shuttle began operation in May 2015. In addition to the Pureland Industrial Complex, a 3,000-acre planned industrial park in Logan Township, the shuttle provides access to other sizable employers, such as Rowan University, Eastern Pro-Pak and Liscio’s Bakery in Glassboro. The Pureland Shuttle connects with 11 NJ TRANSIT buses spreading access to the wider region. Due to the size of Pureland, an “internal circulator” bus provides

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400: Sicklerville-Philadelphia
401: Salem-Philadelphia
402: Pennsville-Philadelphia
408: Millville-Philadelphia
410: Bridgeton-Philadelphia

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Camden Continues to Rise

By: Camden County Freeholder Director Louis Cappelli Jr.

Looking back on 2017, we can see our county seat turning a very sharp corner in its transformation into a stabilized municipality. This foundation is made of a new industrial and corporate base to drive Camden into the future, with companies such as Holtec International, Subaru of America and American Water.

A sense of hope and change is in the air and it is tangible to anyone who steps foot inside its borders. This alteration has been spawned in much the same way that manufacturing plants accelerated the industrial revolution more than a century ago.

It’s been said many times, but the number one way to stop a bullet is with a job, and in that respect, Camden was identified in April of 2017 by the U.S. Department of Labor Statistics as having the largest year over year job growth in the nation. By expanding employment opportunities and putting more people to work we are effectively diminishing the narcotics trade and expanding economic horizons.

Let’s look at some of the city’s crime statistics from last year, homicides are at a more than 30-year low, meaning that the 2017 homicide numbers are about 50 percent less than 2016 and a reduction of 67 percent from 2012. Overall, all Part 1 crimes, everything from aggravated assaults to arson, in 2017 were just over 4,100, and in order to find a comparable year you would have to go all the way back to the 1960s. At the end of the day we are talking about almost 3,000 less crime victims annually and more importantly significantly less funerals being held by families in Camden.

To put that in proper perspective, by contrast 33 percent of the city is under the age of 18 years old, meaning many city residents have never seen crime rates this low in their lifetime. Think about that for a second: a significant subsection of this city has never seen crime this low as long as they have been alive.

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DVRPC’s Connections 2045 Plan Prepares for Integrated Transportation:
Working toward a Physically and Digitally Connected Multimodal Network

By: Brett Fusco, Manager, Long-Range Planning

The Delaware Valley Regional Planning Commission (DVRPC) has just released a new long-range plan for Greater Philadelphia, Connections 2045, which focuses on how new technologies are impacting the way we live, work and travel. Throughout history, technology has shaped urban form and how we get around within and between developed areas. The First Industrial Revolution was powered by the steam engine and set off a wave of urban migration to towns and cities all over. The economies of scale generated by mass production and the assembly line during the Second Industrial Revolution began to concentrate growth in bigger cities, creating an urban network effect. The rise of the automobile, coupled with the environmental damage wreaked by the Industrial Age, made cities undesirable places and triggered explosive growth in the suburbs. However, cities have been growing again thanks to the network effects they create through agglomeration economies, which are seen as critical to competing in today’s digital, globalized world.

The initial phase of the Digital Revolution was slow to reach transportation but has recently had major impacts through real-time travel information and apps, transportation networking companies, car- and bike-sharing and others. These technologies aim to create a safer and more efficient transportation network, while improving the user experience. The Digital Revolution is now evolving around Artificial

The Four Industrial Revolutions

Source: DVRPC, 2017. Adapted from World Economic Forum.
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Executive Secretary-Treasurer: John Ballantyne President/New Jersey Regional Manager: William Sproule 91 Fieldcrest Avenue, Edison, NJ 08837

Photo: Stockton University Project in Atlantic City, NJ
THE FUTURE IS SOONER THAN YOU THINK –

When will there be 1 million electric vehicles registered in New Jersey?

By: Lloyd C. Birnbaum, Esq. & Benjamin H. Birnbaum, Co-Founder, Repower Group

Approximately 9 million people live in New Jersey. And we drive over 6.6 million vehicles. Today, just about 10,000 of them are electric. Forecasts range in the estimates but some industry analysts predict that by the year 2025 there will be 1 million electric vehicles (or roughly 15%) on the road in New Jersey.

As a result of innovation in the automotive, energy, and transportation services sectors over the last decade, transportation companies are taking huge technological initiatives and making great strides. One of these technologies is the car battery. Between 2010 and 2016, technology innovation enabled suppliers to reduce the cost of a battery pack for an electric vehicle by close to 80% - and prices continue to decline.

A major impact of this cost reduction is the feasibility of electric vehicle (EV) production at a lower cost than the combustion engine vehicles that are the status quo – though New Jersey’s own Thomas Edison was building electric vehicles nearly 100 years ago. Global vehicle manufacturers are taking this trend very seriously (and taking note of Tesla’s soaring stock price). Over the past few months alone, over $90B of investments have been announced in electric vehicles coming to market in all shapes and sizes and across all eight vehicle classes by General Motors, Daimler, Ford and others.

While this new vehicle technology presents an opportunity for all of us to lower our transportation costs, industry experts are projecting fleet vehicles (delivery trucks, work vans, buses, taxis, etc.) to lead the charge (see Figure 1). Why? High utilization vehicles can reduce operating costs by up to 25% today by making the transition. In their transition to electric, they eliminate most of their fuel costs, drastically reduce maintenance costs, and in many cases, extend the expected useful life of their vehicles. These substantial savings are driving – no pun intended – fleets around the globe to assess when and how they can convert to electric.

Figure 1: Projected US fleet vs. overall market EV sales projection (% of annual sales)
In addition, groups like ChargeVC (www.chargevc.org) in New Jersey are creating coalitions in support of programs and policies to accelerate the adoption of electric vehicles and providing guidance on the infrastructure investments needed to support these vehicles. Elsewhere, startups like Repower Group (www.RepowerGroup.com) are bringing to market creative approaches to financing these infrastructure investments.

The short story, and this won’t surprise you, is that electric vehicles run on electricity. The bigger the vehicle, the more electricity needed to keep it charged. The more vehicles, the more chargers and other infrastructure needed to support those chargers. Other infrastructure includes things like energy storage (i.e. big on-site batteries), distributed energy resources (i.e. solar panels) and general upgrades to our electrical grid. To put things in perspective, an illustrative infrastructure suite for a fleet of vehicles looks like this:

While the investments required in infrastructure to support electric vehicles are not insignificant, even with those costs – the economic advantages of making this transition are clear. And that’s even without accounting for the positive environmental impact that this transition will have on our communities. While it will take our smartest minds in the public and private sector dedicated to identifying the opportunities, working through the challenges, providing strong regulatory support and overcoming some bumps along the way, I believe that we have what it takes to achieve this feat and lead the nation in this change.

If you still think 1 million electric vehicles registered in New Jersey by 2025 is not achievable, contact me at Lloyd C. Birnbaum, Esq., Lauletta Birnbaum LLC, 856-232-1600, lbirnbaum@lauletta.com to express your point of view.

Sources:
3. https://electrek.co/2017/01/30/electric-vehicle-battery-cost-dropped-80-6-years-227kwh-tesla-190kwh/
5. https://www.repowergroup.com/
SJTA’s Community Shuttles... (continued from page 4)

demand responsive service to get employees that last mile between work and the bus stop located just outside the complex. Riders simply tell the bus driver where they need to go and the driver develops an efficient route on the fly, rather than travelling along a circuitous pre-planned route. This flexibility is a must when serving a unique complex such as Pureland, where shift times are variable and job locations disperse. An estimated 40% of Pureland East-West ridership utilize the internal circulator as well. The service operates Monday through Friday and is $1 per ride.

The Route 54/40 Community Shuttle began service in January 2016. The shuttle serves the communities of Buena Vista, Collings Lakes, Folsom Borough, Hammonton, Landisville, Minotola, Newtonville, and Richland. Ridership has steadily grown, doubling between 2016 and 2017. The shuttle service connects to NJ TRANSIT’s 553 and 554 bus routes and AC Rail service. The Rt. 54/40 Community Shuttle operates Monday through Friday and is free, benefiting some of the county’s lower income communities that previously had limited or no public transit options.

All three community shuttles were planned and developed through a private/public partnership that included SJTA, NJ TRANSIT, Cross County Connection Transportation Management Association, United Way of Gloucester County, local social service providers and community groups, as well as Atlantic County and Gloucester County governments. They were brought together by the Pascale Sykes Foundation, a private foundation that supports initiatives that assist lower income working families. The Pascale Sykes Foundation recognized that access to reliable transportation is often a significant barrier to stable employment and economic opportunity for working families in a car-dependent environment like South Jersey. The shuttle services are funded through grants from the Pascale Sykes Foundation and NJ TRANSIT. More information regarding the shuttles can be found at Cross County Connection’s website www.driveless.com. You can also contact Cross County Connection TMA at 856-596-8228 to inquire as to how these shuttles, public transit or options such as carpooling and vanpooling can help your company reliably get your employees to work. Cross County Connection can also provide trip planning assistance for employees on any shuttle or public transit service in the region. They are eager to help!
An ambitious project that combined Rowan College at Burlington County’s (RCBC) two campuses into one required engineering solutions in many areas, including transportation. Before relocating thousands of students, as well as hundreds of faculty and staff, the college needed to be certain that the expanded Mount Laurel Campus could accommodate the additional traffic. In partnership with the college and the Burlington County Engineer’s Office, Taylor Wiseman & Taylor performed a traffic study as part of the overall site improvements. The Mount Laurel Campus opened about 20 years ago as a supplement to the Pemberton Campus. Now serving as the college’s primary campus, it is located on the north side of Route 38, east of the NJ Turnpike and I-295.

First, turning movement counts were conducted at six intersections providing connections between campus roadways (College Circle, Technology Way, Penmark Drive and Votta Drive) and surrounding highways (Marne Highway [CR 537], Hartford Road [CR 686], and Briggs Road). Six more automatic traffic recorder (ATR or machine) counts were subsequently performed at other affected roadway segments. Background traffic was then projected to Design Year 2026, as requested by the Burlington County Engineer’s Office. Utilizing information provided by the college on the anticipated size of site expansion, the number of added new site trips was determined based upon the 9th Edition of ITE Trip Generation and were assigned to existing roadways.

Synchro traffic analyses were performed for both existing roadway configurations and proposed improvements. These improvements included the completion of College Circle and the relocation of Technology Way. Based on the results of these analyses, signal warrants were investigated at two...

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Design Challenges for the 17th Street Bridge... (continued from page 2)

required an extensive design effort and a reiterative process that refined the various requirements and demands of the project to provide the adequate maintenance and protection, staging and utility accommodation plans, which ensured that the project could be constructed in the time frame provided.

Additional constraints came in the form of the NJDEP regulatory permit restrictions that were secured for the project, which required stream flow to be maintained under the bridge at all times. The initial design assumed that the contractor would be able to construct the cofferdam in two stages by cutting off the flow through the arch, providing the contractor with additional work area in which to stage his construction operations. This development required FPA to further break the two stages of cofferdam construction into four independent cofferdams, which had to be laid out to accommodate the requirements of maintenance of utilities and island access. Due to this loss of staging area within the cofferdam design, changes to the maintenance and protection of traffic plan were required to create additional staging at the island area between 17th Street and Bay Avenue.

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April 14, 2017 – Placement of cast-in-place concrete for the bridge footing.
intersections currently under stop control (Hartford Road/Penmark Drive and Briggs Road/Technology Way), which are anticipated to require signalization after site expansion due to delays.

Roundabouts were also subsequently investigated at these and three other internal campus intersections. Synchro analyses were performed for each of these scenarios, with figures prepared to summarize and document results. Additionally, crash records were also reviewed. All information was included in a report summarizing our findings.

In addition to the traffic study, TWT performed a title survey and aerial topography of the entire campus using LiDAR mapping which was used in the preparation of design plans for the expansion.

The campus expansion plans included design for completing the southwest quadrant of College Circle loop drive along with new parking lots and the quadrangle, extending Votta Drive access to this area from Route 38 westbound, redirecting Technology Drive and providing a new access drive between Briggs Road and College Drive (subsequently named 3plus1 Drive). This work was completed with the team of USA Architects, Sikora Wells Appel and LR Kimball Architects.

TWT performed the necessary plans to acquire Wetlands and Flood Hazard Area permitting, which included the need for archeological services as well as approval from the Burlington County Soil District. A new stormwater management basin and collection system was designed to receive the additional runoff created by the improvements at the Student Center, as well as a portion of the new Health Sciences Center at 1000 College Circle. A new water supply well was also designed by TWT for irrigation of the new expanded quadrangle, as well as new potable water system connections to improve overall water supply and pressure.

TWT’s Subsurface Utility Engineering (SUE) department assisted in designating existing underground utilities, while TWT’s Survey department located many existing features in addition to staking out the new Student Center building and other areas of the uniquely designed quadrangle.

The entire project was done in a fast-track design and construction mode, requiring close coordination among the team members of RCBC, the Burlington County Engineer’s Office, USAA Architects, LR Kimball Architects, Sikora Wells Appel, Taylor Wiseman & Taylor, Maser, Terminal Construction and Newport Construction.
In the trucking business, whether you’re collecting garbage, hauling freight or moving raw materials, the cost of fuel is one of your biggest expenses. Any fleet manager can tell you that unexpected or wild swings in fuel pricing can wreak havoc on your budgets and profit margins. They’ll also tell you that diesel pricing is very inconsistent. In January of 2018, the average price of diesel in South Jersey exceeded $3 a gallon. 

**That’s a 20% increase in just one year.** Currently the price of CNG at a South Jersey CNG station is $1.87/gas gallon equivalent with the average price over the last 12 months of $1.80/GGE. CNG fuel pricing is more stable. Why? Because 60% of the price of diesel is driven by the price of oil. The natural gas commodity only represents about 23% of the total cost of CNG.

Maintenance costs are also more favorable with CNG engines. With diesel, fleet operators need to account for maintenance of the EPA required diesel filtering systems and the expense of DEF. CNG trucks don’t require DEF or any complicated filters. With CNG at about $1 less per Gallon Gas Equivalent, it’s easy to make up the additional cost of the vehicle and see added profits over the life of the truck.

While the bottom line in dollars is easy to see, another advantage to CNG vs. diesel is reduced emissions. The largest contributor to greenhouse gases and NOx, comes from medium and heavy duty diesel trucks. These vehicles, while only 7% of the total on America’s roadways, emit 50% of all smog precursor emissions and 20% of all transportation greenhouse gases. In New Jersey, these vehicles account for 53% of the state’s NOx emissions. In a recent UC Riverside study, 2010 diesel engines with SCR operating at reduced duty cycles (slower speeds, idling, stop-and-go traffic) emitted up to 5 times higher NOx emissions than its EPA certification. That means in New Jersey, where slow speeds and traffic are the norm, we’re experiencing up to 5 times the allowable emissions from those trucks!

Today’s CNG trucks, with the Cummins Westport engines, emit 90% less smog forming gases, including NOx, than the current EPA compliant diesel engines. Although electric vehicles are the hot topic, there currently is no commercially viable electric heavy duty vehicles in these vehicle classes. If an electric truck were available, comparisons show that a CNG truck would emit 5 times less emissions based on the emissions profile of New Jersey’s electric supply.

Switching to CNG can save your business money and make the air our kids breathe cleaner.

CNG is growing. Currently there are eight public fast fill stations located in southern New Jersey and more on the way. There are close to 500 locally based fleet vehicles operating on CNG today. At South Jersey Gas, we can help answer your questions and help you determine if CNG is right for your fleet.
Due to the close proximity of the residential homes, some within 25 feet of the proposed construction, FPA needed to evaluate means and methods that would reduce construction vibrations to the greatest extent possible. Based upon the results of the soil borings and the fact the existing structure was pile supported, some type of deep foundation system had to be designed. Conventional pile driving operations had the potential of causing extensive damage to the adjacent residential structures, and the need for cranes and other support equipment would have prevented the residents’ access to the island. FPA evaluated different foundation systems, including helical piles, grout inclusion columns, auger cast-in-place piles and drilled shafts. FPA finally settled on a micro-pile design, which addressed the project requirements of low vibrations and limited access for construction to support the new structure. Once again, this was a iterative process, which was refined numerous times, to ensure that all of the constraints and requirements of the project were met.

“Despite a number of significant challenges that we faced in the design of this project - especially considering the tight site constraints - this bridge will provide the residents of this Ocean City community with a safe and efficient crossing to access the island from the mainland, with an expected lifespan of seventy-five years,” stated Michael West, PE, a design engineer for this project at FPA.

Additional project team members include Churchill Consulting Engineers, Marbro General Contractors, Inc., and Contech Engineered Solutions LLC. Also involved in the coordination of this project was the City of Ocean City, Atlantic City Electric, Comcast Communications, Inc., South Jersey Gas, Cape May Division, and Verizon, NJ, Inc. The project is scheduled to be completed prior to Memorial Day weekend in 2018.

Jon Moren, PE is the Engineer of Record for the 17th Street Bridge reconstruction project. He is the Manager of Bridges and Dams at French & Parrello Associates (FPA), a multi-discipline engineering and environmental consulting firm headquartered in Wall Township, New Jersey. For more information on Jon and FPA, please visit www.FPAengineers.com.
DVRPC’s Connections 2045 Plan ... (continued from page 8)

Intelligence and robotics. This suggests a future where sensors connected to the Internet of Things will act as a central nervous system in our communities; and transportation may be refashioned around highly automated and connected vehicles, and drones. These innovations create a unique opportunity to reimagine transportation by physically and digitally linking various modes together to operate as an integrated network through data and information, and connecting vehicles and infrastructure to each other and the Internet.

Even knowing this, the future is still full of uncertainty: the timing and implications of each new wave of technology, the impacts from climate change, and the ever-shifting global economy. We shouldn’t expect any single technology, even automated vehicles, to be a silver bullet that solves all problems. Supporting the network effects of the Digital Revolution requires density and mixed use in both urban and suburban communities, with a space efficient transportation system to match. As a result, we’ve built Greater Philadelphia’s new long-range plan around a vision of transportation as an ecosystem, where the more modes and options we have in getting around, the more flexible and adaptable the region will be for whatever the future ultimately brings.

Crafting a future vision is one thing, but implementing a plan is a whole different challenge. We have plenty of obstacles to overcome, not the least of which is that we only forecast to have about half the funding needed to maintain and improve the existing transportation infrastructure over the next 25 years. That provides an opportunity for the private market to play a bigger role in transportation infrastructure and service delivery. It also suggests the need for more locally generated funding, which has the greatest degree of flexibility and will allow for more experimentation with partnerships and technologies. You can find more information about technology and preparing for it in the Connections 2045 Plan at www.dvrpc.org/connections2045.
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When a group of people comes along who have the courage and vision to turn dreams into reality, they make the future bright for everyone.

We proudly celebrate the achievements of Southern New Jersey Development Council.

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That said, police officers cannot revive a city unilaterally. In fact, they are but one branch on a large tree. The other branches are made up of education, economic opportunity and a strong social safety net that doesn’t allow the most vulnerable to slip through the cracks. This tree needs a well-fed root system fed by community engagement, job training programs and strong leadership. Right now, all facets of this network are working in a coordinated effort to create a better city and county, and are pulling in the same direction.

Moving forward, continuing to raise the high school graduation rate, keep kids from dropping out of school and investing in educational infrastructure will consistently aid public safety in the city.

For instance, high school drop-outs are nearly four times more likely to commit crimes than high school graduates. Since Superintendent Paymon Rouhanifard was appointed, Camden’s graduation rate has risen 17 points and the dropout rate has been cut in half.

We have seen the poverty rate, according to the U.S. Census Bureau, drop 25 percent in the most updated statistics released in 2017. The economic rebirth is starting to take hold putting more residents back to work and providing access to jobs that did not exist in past years.

The bottom line here is progress has been made on a variety of different fronts. That said, we have promises to keep and miles to go before we can say mission accomplished.

Freeholder Director Louis Cappelli Jr. serves on the Camden County Freeholder Board and was at the forefront of implementing the Camden County Police Department in 2012. He can be reached at @LouisCappelliJr or through email at louc@camdencounty.com
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