US 301 MIDDLETOWN BYPASS

THE PROJECT

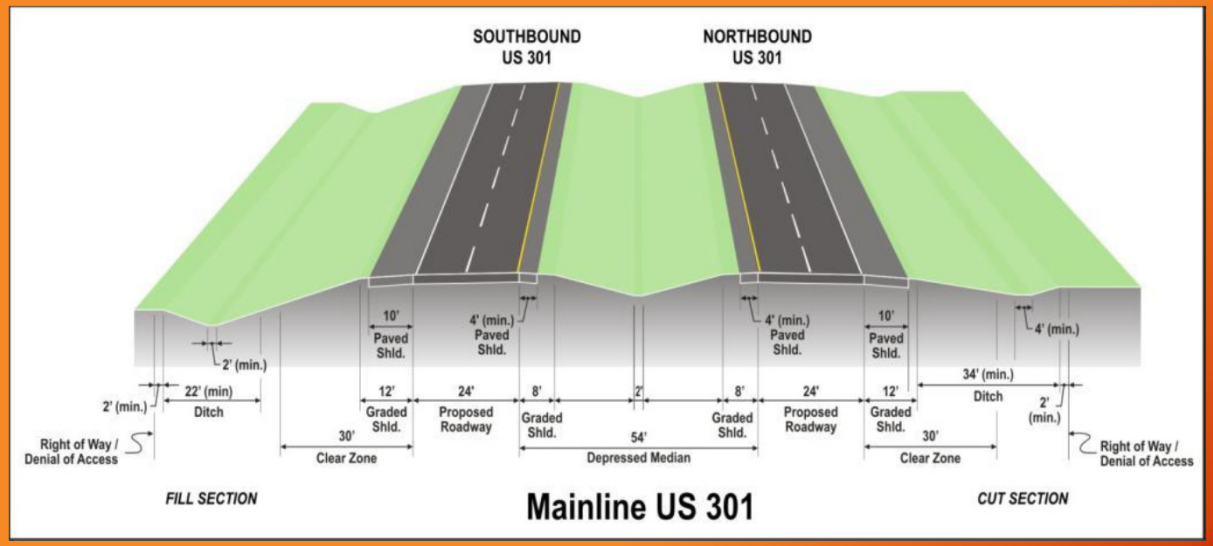
- 13+ Mile realignment and widening of US 301 in Middeltown DE
- DELDOT spent years planning this work and decided that concrete best suited their needs

- 7 Mainline Construction Contracts
- 3 New Full Access Interchanges
- North Serving Connections to SR 1
- 5+ Million Cubic Yards of Earthwork
- Bridges at 24 Locations

- 12” Portland Cement Concrete Pavement on Mainline & Ramps; Bituminous Concrete Pavement on Side Roads
- Steel Girder and Concrete Girder Bridges
- Mechanically Stabilized Earth Walls
- P.C.C. Box Culverts; P.C.C. Arch Culverts
- Emergency-Only Access Ramps & Median Crossovers
- All Electronic Toll (AET) Facilities
- Mainline and North Serving Ramps at 3 Full Access Interchanges
- Roadway Lighting, Signing, Markings, ITMS and Signals
- Utility Relocations, NSRR Coordination
- Drainage, StormwaterManagement, E&S Measures
- Environmental Mitigation, Stream Restoration

DESIGN

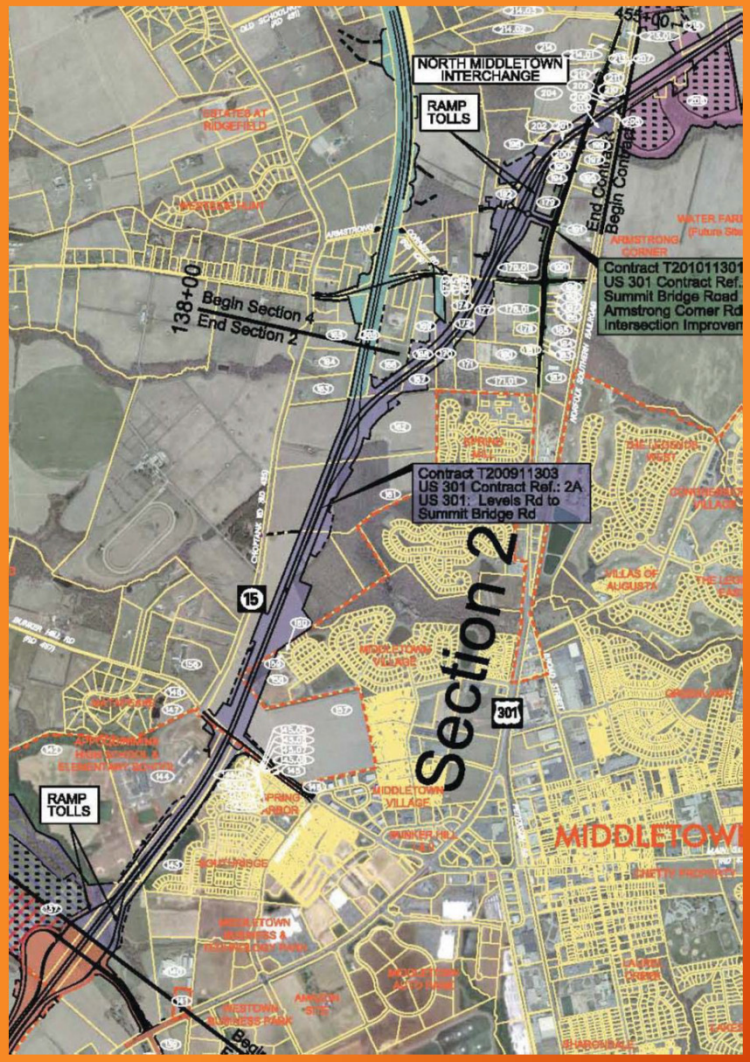
- Old 301 consisted of two lanes
- New design incorporates two 12’ lanes both north and south bound.
- 10’ outside and 4’ inside shoulder
- 12” PCCP
- 4” Asphalt drainage layer
- 6” plant mixed soil cement
- Toll facilities



LEVELS ROAD TO SUMMIT RD BRIDGE

Allan Myers/ Atlantic Contracting

- Approximately 4 ½ miles long
- Six ramps and nine bridges
- 184,000 SY of 12” PCCP
- 61,350 CY of Concrete
- 30,700 CY of soil cement
- 36,000 Tons of asphalt drainage layer
- Bulk of the paving work was to be completed in one season!



APPROACH

A successful project requires planning. Concrete projects present unique challenges. Planning began prior to the bid to determine the best approach. Embed placement, curing periods, material production and access would all be taken into consideration.

General Plan

- It was determined that Soil Cement would be produced by Grego & Ferrara
  - The result of sequencing and availability
- Allan Myers would produce & place permeable asphalt layer
- ACM would produce and place concrete pavement

CONCRETE PRODUCTION

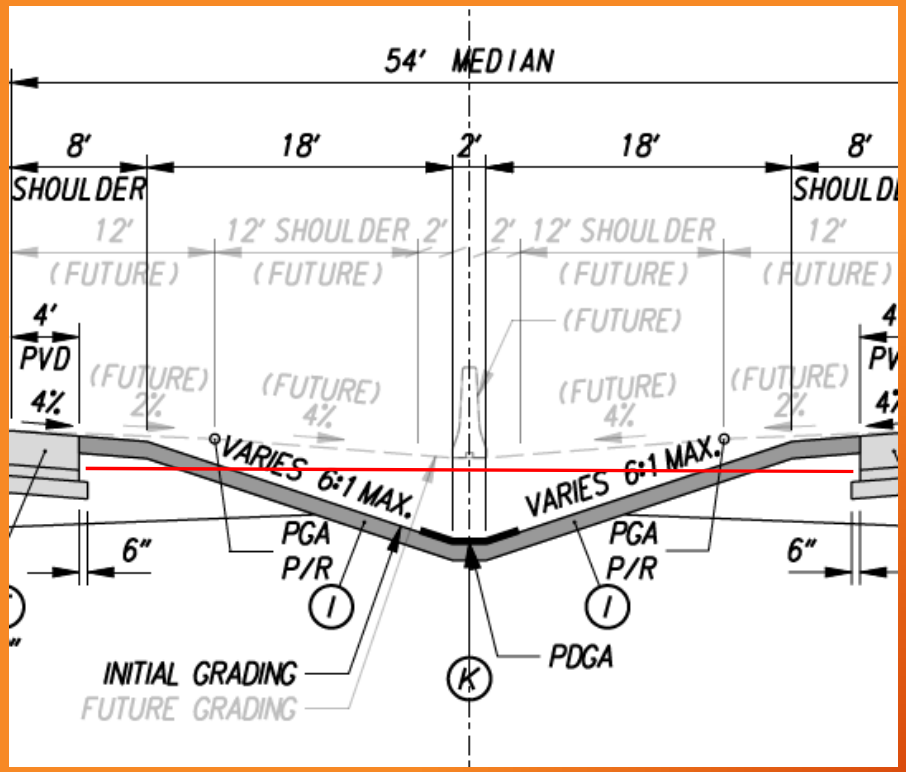
- Ready Mix Vs Onsite Plant
- Why an onsite plant?
  - Control of the materials & mix
  - Slipform paving requires high volumes (2000-3000 CY/ Shift)
  - Slipform mixes are low slump (1” +/-)
  - Loading and discharging mixers difficult
  - Hauling in non agitated trucks requires a central mix plant

PLANT SITE

- Batch plant site located between ROW and local roads
- Power & Water readily available
- Raw material deliveries never enter worksite
- Wetbatch deliveries never enter public roadways

TRANSPORT

- Transport of wetbatch using 30 ton offroad trucks
- New medians to be used as haul routes
- Medians graded flat for hauling and finished after paving is complete.



PAVING

- G&Z PS1200 Belt Placer
- G&Z S850 Paver
- G&Z PS1500 Tine & Cure
- 25 Terex 30 Ton Articulated Trucks

CHALLENGES

If you want to be successful, you must identify your challenges and plan for them. We had already addressed the typical logistical challenges. We had identified a good plant site, laydown areas for embeds and intended haul routes.

Prior to the bid we identified a major challenge ……..engineering!

Concrete paving requires precise layout to ensure proper joint location & alignment.

Paving spreads require accurate control. This is typically done with string lines ……they also require a certain amount of room.

- In order to accommodate track and string lines we typically require 4-6 feet off the edge of the pavement.
- The median becomes very crowded with string lines, inlets and two way traffic.
- Crowded work areas become safety issues, especially in a high production operation.

- So how do we accommodate the needs for engineering and a safe work space?

ATLANTIC GOES STRINGLESS

ACM selects the Leica machine control system

- PROS
- Converting to a stringless operation opens up another 8-12 feet in the median.
- We now have easier access to the paving lane.
- Faster setups and ability to relocate with less trouble
- CONS
- Cost – More than $500k in retrofits and new equipment
- A steep Learning Curve
- Models would have to be developed
- More difficult to identify engineering problems ahead of time. No string to “eyeball”.

STOCKING UP

In order to ensure high production, made sure that we were prepared for the potential delays in delivery of raw materials.

We stockpiled 21,000 tons of sand and 33,000 tons of gravel well in advance.

In order to minimize the potential impacts of cement/ slag delays, we installed six “pigs” (bulk cement containers). This would give us a storage capacity of 460 Tons of cement and 450 tons of slag.

READY TO GO!

- So ….we have identified and addressed our logistical and engineering challenges.
- We have planned haul routes and prepared laydown areas for embeds.
- We have stockpiled as much raw material as our yard would allow.
- What could possibly go wrong?

RAIN ……..RAIN ……RAIN ……..

Rather than starting in August/ September ……paving starts in November!

New Challenges

- Muddy Conditions
- Cold weather

Added Power For Heat

The Plant Gets A Boiler

And still, despite setbacks ……..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HIGH POINT!

November 20, 2017:ACM Hits a Mile!

- We pave 5,388 LF – 24 Feet Wide
- 14,368 SY
- In one long ….long day

NOT SO HIGH POINTS

LOW POINTS

Layout problems

Cracked Panels resulting from design flaw

New Machine Breakdown

LESSONS LEARNED

- It is very important that the owner understand what they want when they prepare a design
- They must understand the strengths and limitations of the design
- You cannot over plan. That goes for contractors and owners.
- Check your engineering again and again …….and again
- Be prepared for the unexpected
- Know that a good surface starts down low. Consistency counts.
- Don’t let speed blind you to quality.