SR 2006, Section 476
MacDade Boulevard Interchange

ITE Mid-Colonial District – 2026 Annual Meeting
April 16, 2026

SR 2006, MacDade Blvd - Project Team

Owner & Design Team

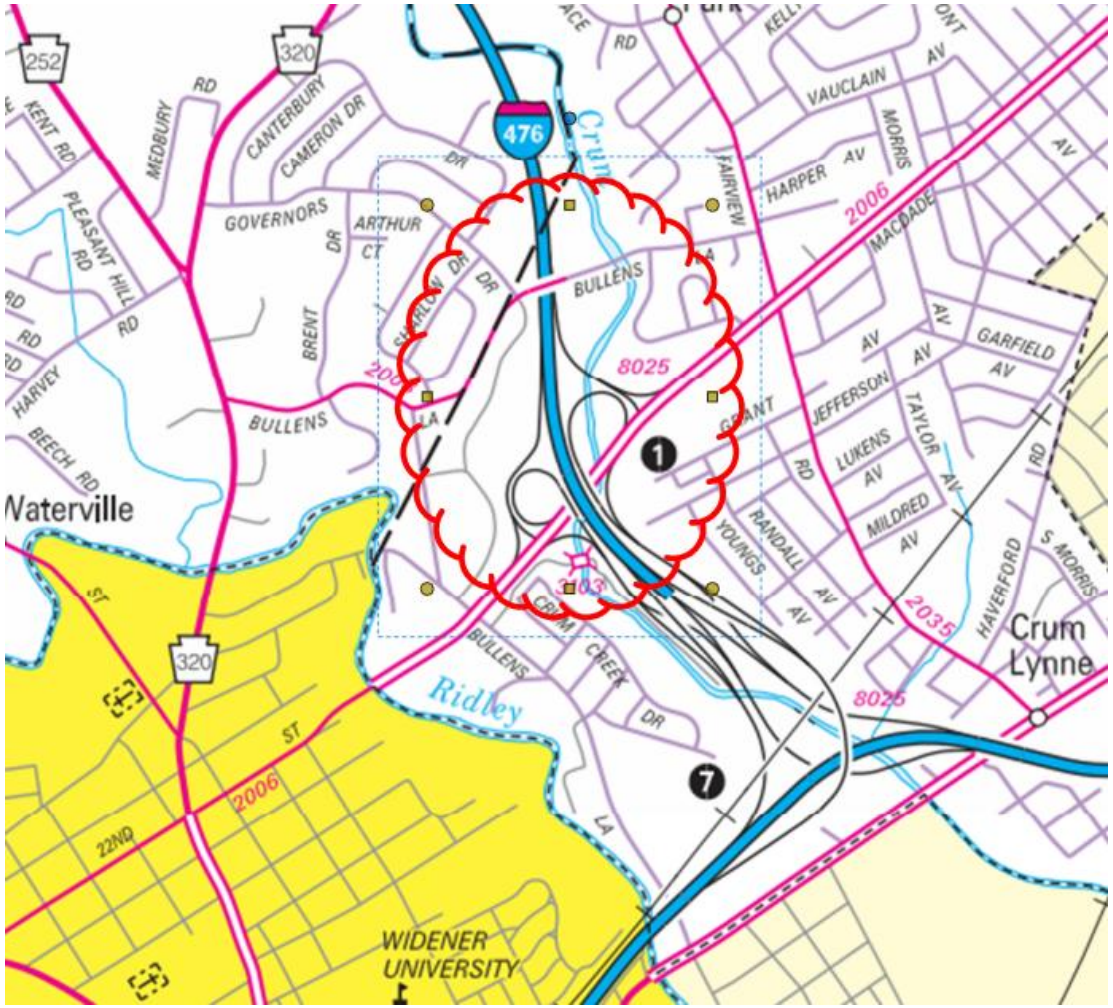
- **Owner** – PennDOT District 6-0
- **PennDOT Consultant PM** - *Kristin Caparra, AECOM*
- **HDR** – Lead Designer *(Bill Laird – Design PM)*
- **Drive Engineering**
- **Navarro & Wright**
- **A.D. Marble**

Construction Team

- **Allan Myers** – Contractor
- **Urban Engineers** – Construction Management
- **CMC Engineering** – Construction Inspection

Project Location

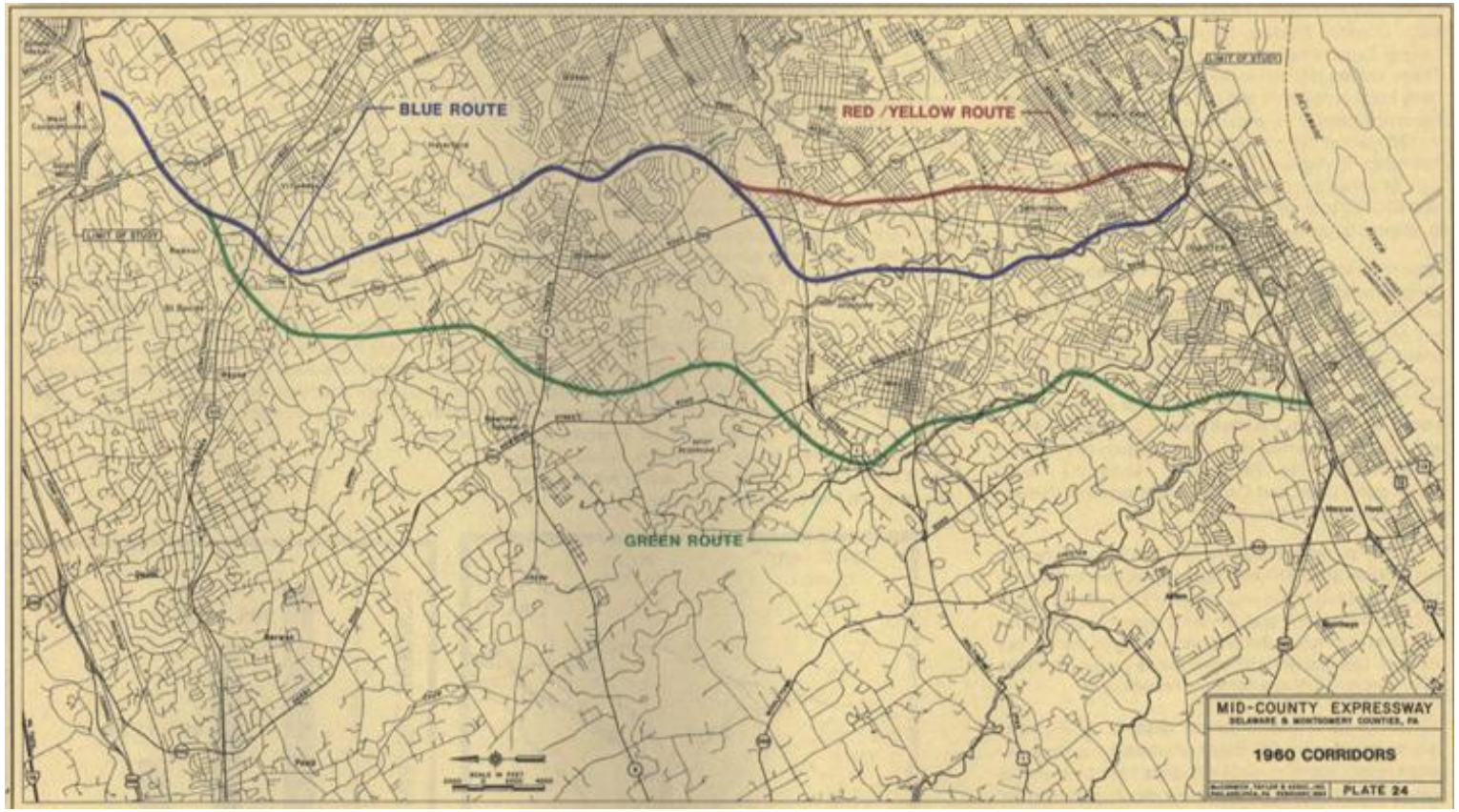
- SR 2006, MacDade Boulevard Interchange is Exit 1 on I-476.
- Just north of I-95
- Interchange carries over 30,000 vehicles per day.
- Vital connection from I-95/I-476 to local communities.
- MacDade Blvd serves as Gateway to Ridley Township



Project Background & Description

MacDade Boulevard Interchange originally constructed in 1992 as part of the I-476 Mid-County Expressway (Blue Route Project.)

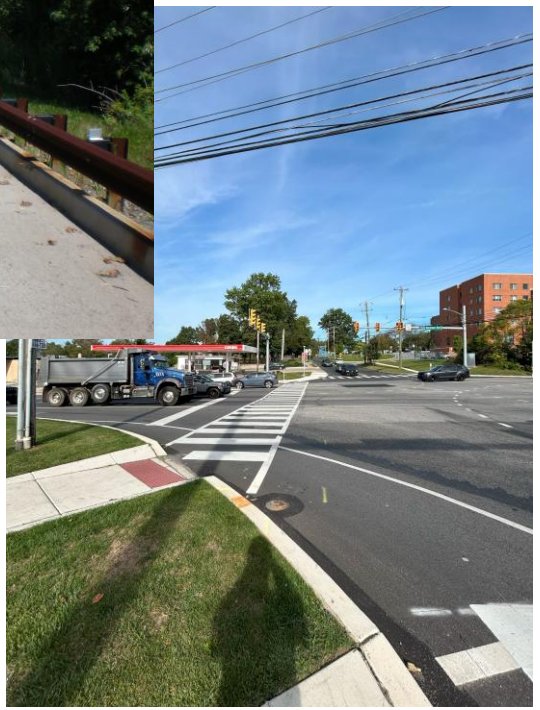
- Increased traffic volumes and development along I-476 and MacDade Boulevard overwhelmed capacity
- Interim fixes to improve safety were no longer effective



Purpose and Need

Project was warranted due to the following considerations:

- Address operational challenges and safety concerns related to existing I-476 NB ramp to MacDade Blvd East (Ramp 7).
- Deficient Sight Distance on Ramp 7 due to existing Pedestrian Structure that extended over ramp.
- Congestion improvement along I-476 during peak hours due to insufficient merging distances at the ramps.
- Improve safety and operation of the Bullens Lane and MacDade Blvd intersection.



Project Description & Complexity

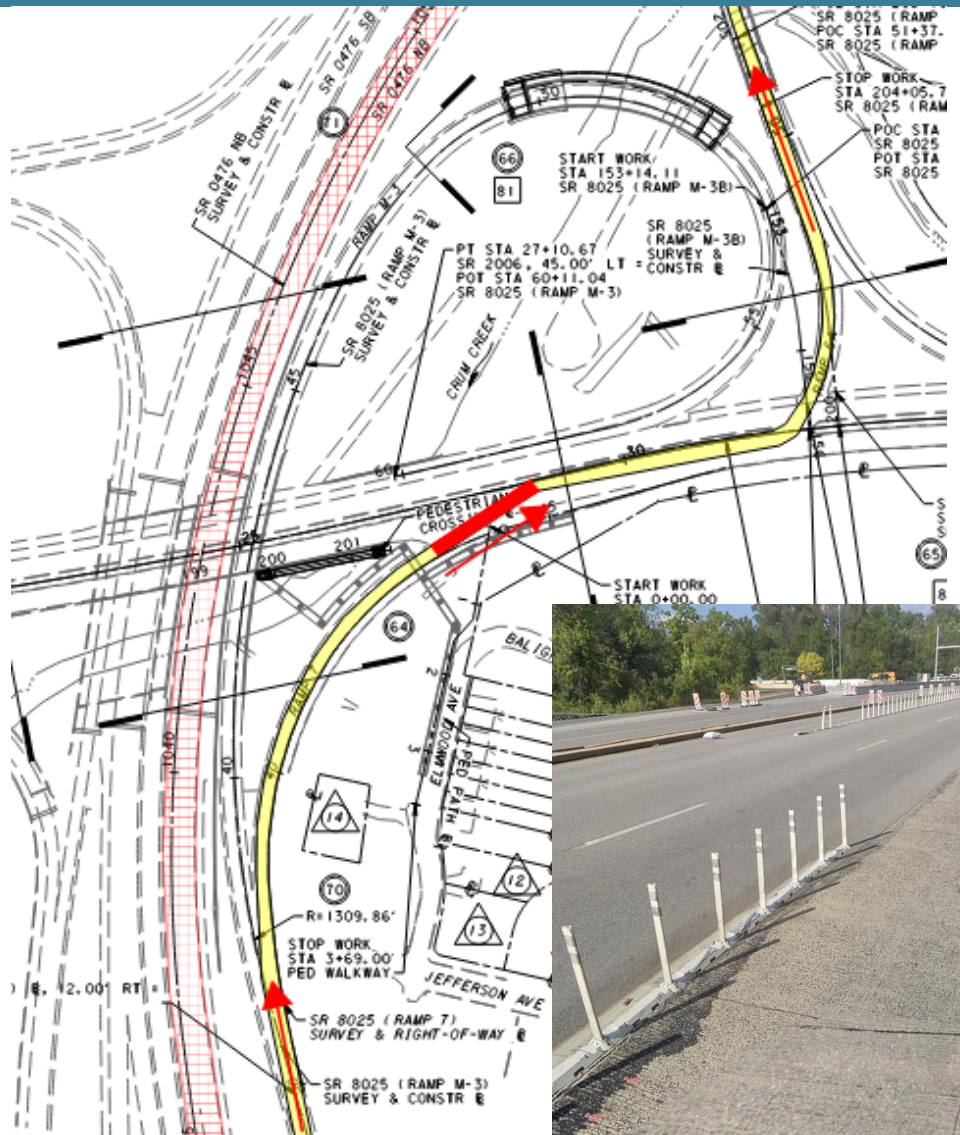
Complex project contained an expansive scope of work.

- MacDade Blvd Interchange ramp reconfiguration.
- Complex structure widening/design.
- Evaluation and addressing I-476 NB traffic backups at Interchange ramps.
- Complex maintenance and protection of traffic.
- Traffic Signals/ITS/DMS facilities.
- Extensive Utility/SUE involvement.
- Comprehensive NPDES/Permitting Coordination.

MacDade Blvd/I-476 Interchange

Operational/Safety challenges

- Examination of inefficiencies and safety issues due to cut-through traffic.
- Improvements to ramp termini.
- Pedestrian safety/movements along MacDade Blvd.
- I-476 Operational Improvements.



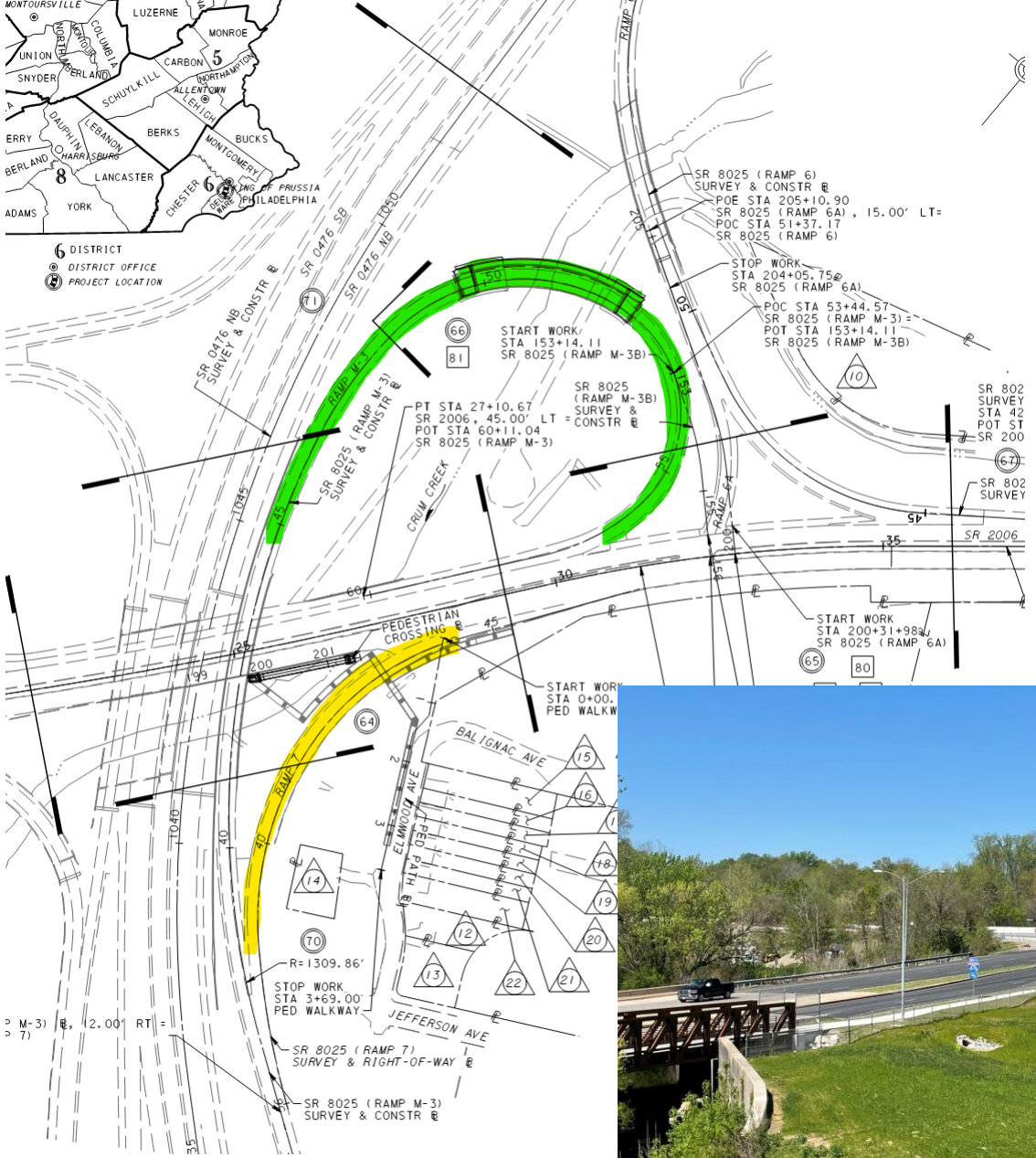
Ramp 7 Removal

Removal of Ramp 7 to eliminate I-476 NB cut-through traffic.

Eliminate safety/weaving issues for vehicles along MacDade Blvd

Ramp area regraded and used for SWM.

Ramp M-3 Reconfigured to accommodate Ramp 7 removal



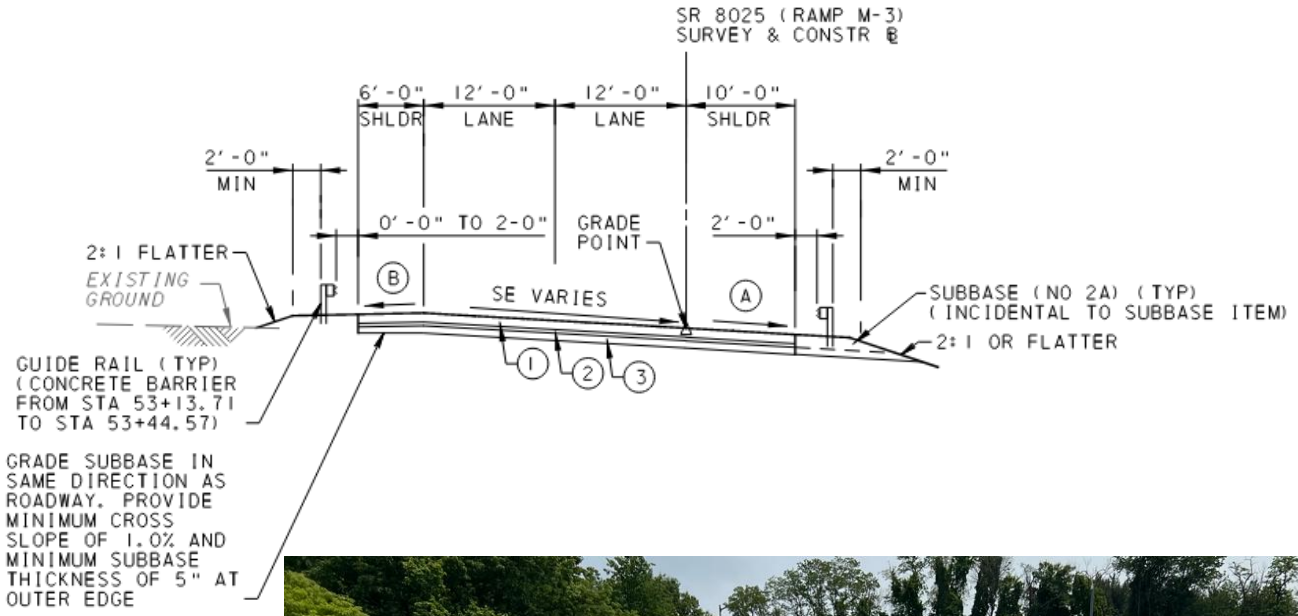
Ramp M-3 Reconfiguration

Ramp widening needed to accommodate additional Ramp 7 traffic once removed.

Existing Condition
- One 15’ travel lane

Proposed Condition
- Two 12’ min travel lanes

Shoulders reconstructed to handle traffic during staging.



I-476 Interim Operational Improvements

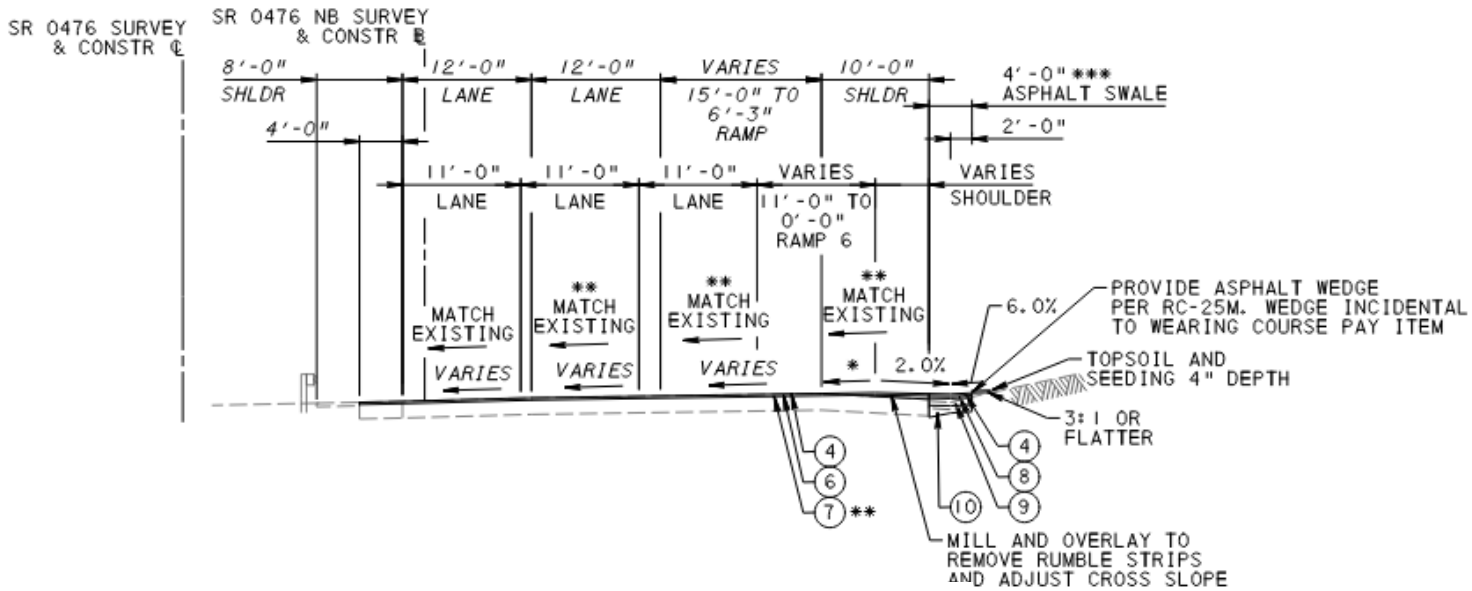
- HDR/PennDOT evaluated potential to improve traffic operations, travel time and safety along I-476 NB for traffic coming from I-95.
- VISSIM modeling conducted by the team showed reduced congestion and improved travel times along I-476 with the interim traffic improvements taken on by the project.
- To optimize effectiveness, improvements were needed at both heavy ramp merge areas of I-95 into I-476 and further north on I-476 at US 1.
- The project constructed interim improvements to alleviate peak hour congestion on I-476 prior to longer term improvements for flex lanes.

I-476 at MacDade

Existing northbound outside shoulders were converted to extend auxiliary lanes.

This allowed for up to four 11’ lanes on I-476 through the MacDade Blvd. interchange.

Included a 2’ shift in traffic towards the median due to bridge barriers and sight distance issues.

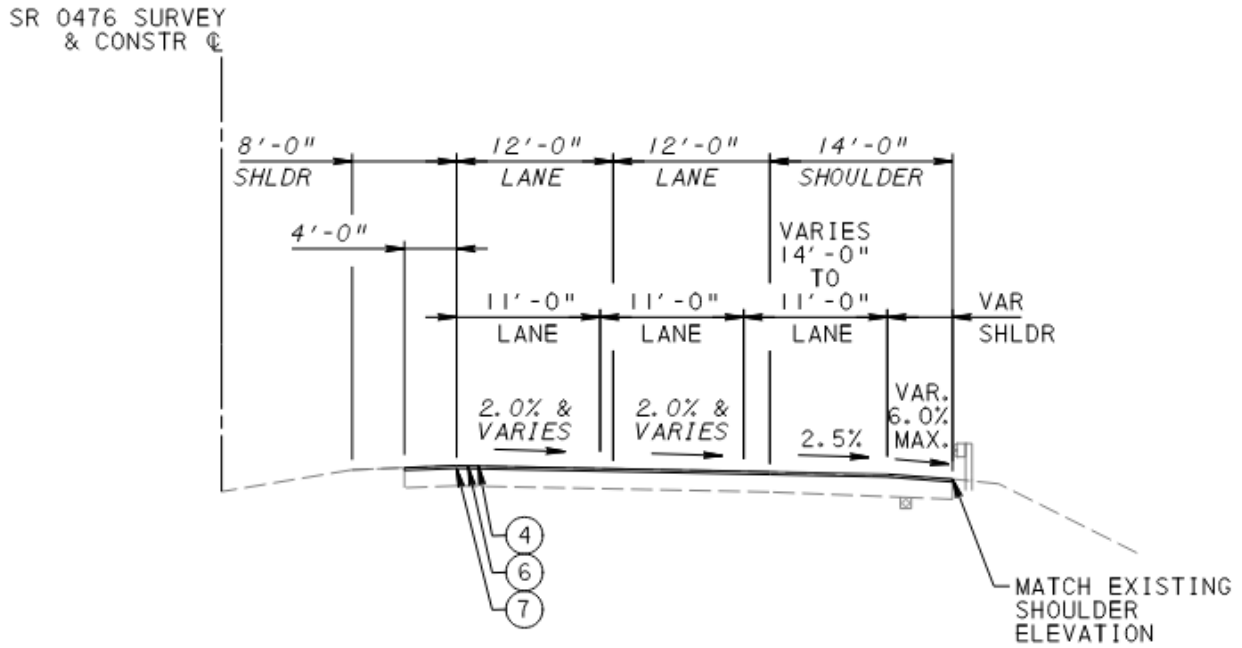


SR 0476 NORTHBOUND
AT MACDADE BLVD INTERCHANGE

I-476 at US 1

Converted shoulder to auxiliary lane just north of the I-476 & US 1 interchange on-ramp at Media Bypass (US 1).

These improvements added enough increased capacity to allow for a decrease of peak travel times along the corridor of ~ 17 minutes.



SR 0476 NORTHBOUND
AT SR 0001 INTERCHANGE

MacDade Blvd/Bullens Lane Intersection

Lack of a separate EB left turn lane presented operational and safety issues.

- Left turning vehicles needed to occupy the inner through lane leading to rear-end crashes.

Existing ADA ramps did not meet requirements.

No signal interconnection with corridor signals.

MacDade Blvd Signals

New traffic signals installed at the Bullens Lane and I-476 Northbound Ramp intersections.

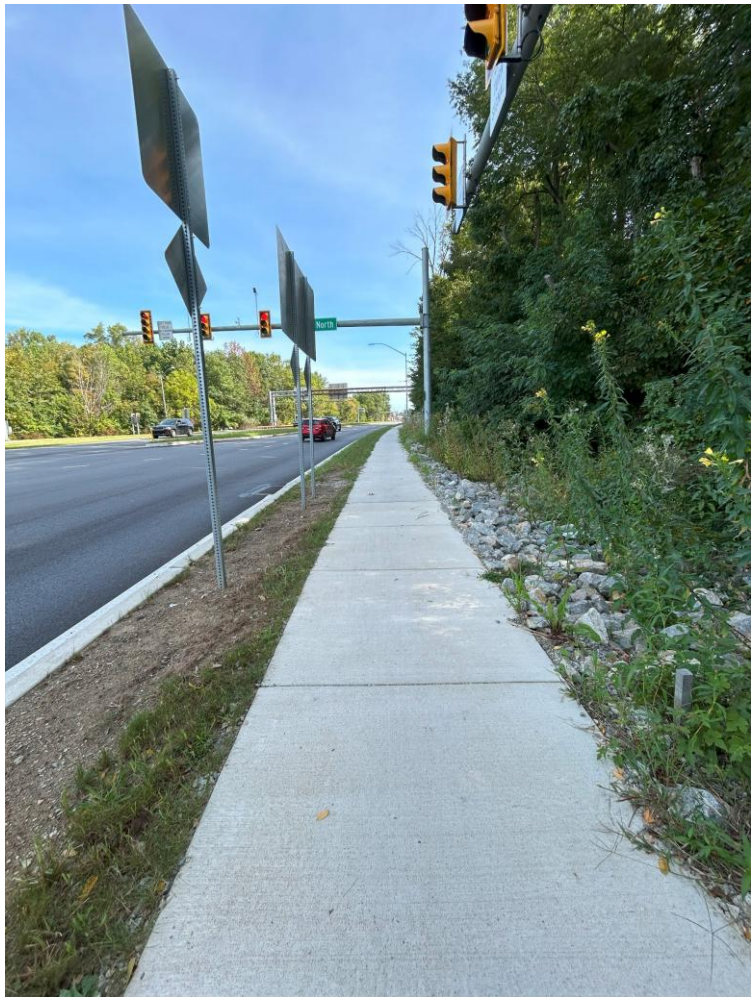
MacDade Blvd Signals

- Improvements to the existing MacDade Blvd traffic signals at the intersections at Fairview Road and the I-476 Southbound Ramps included the installation of upgraded traffic signal equipment in the controller cabinets to accept the fiber optic cable interconnection and well as emergency vehicle pre-emption.

- Improved traffic signal timings to optimize the progression of traffic along MacDade Blvd.

MacDade Blvd Pedestrian Improvements

- Pedestrian design focused on connectivity – long term & during construction.
- Residential community on SW quadrant of MacDade Blvd and Bullens Lane utilized existing, unsafe pedestrian routes to access commercial area of MacDade Blvd.
- ADA Ramp improvements.



ITS/DMS Facilities

Project added CCTV and DMS facilities along the corridor.

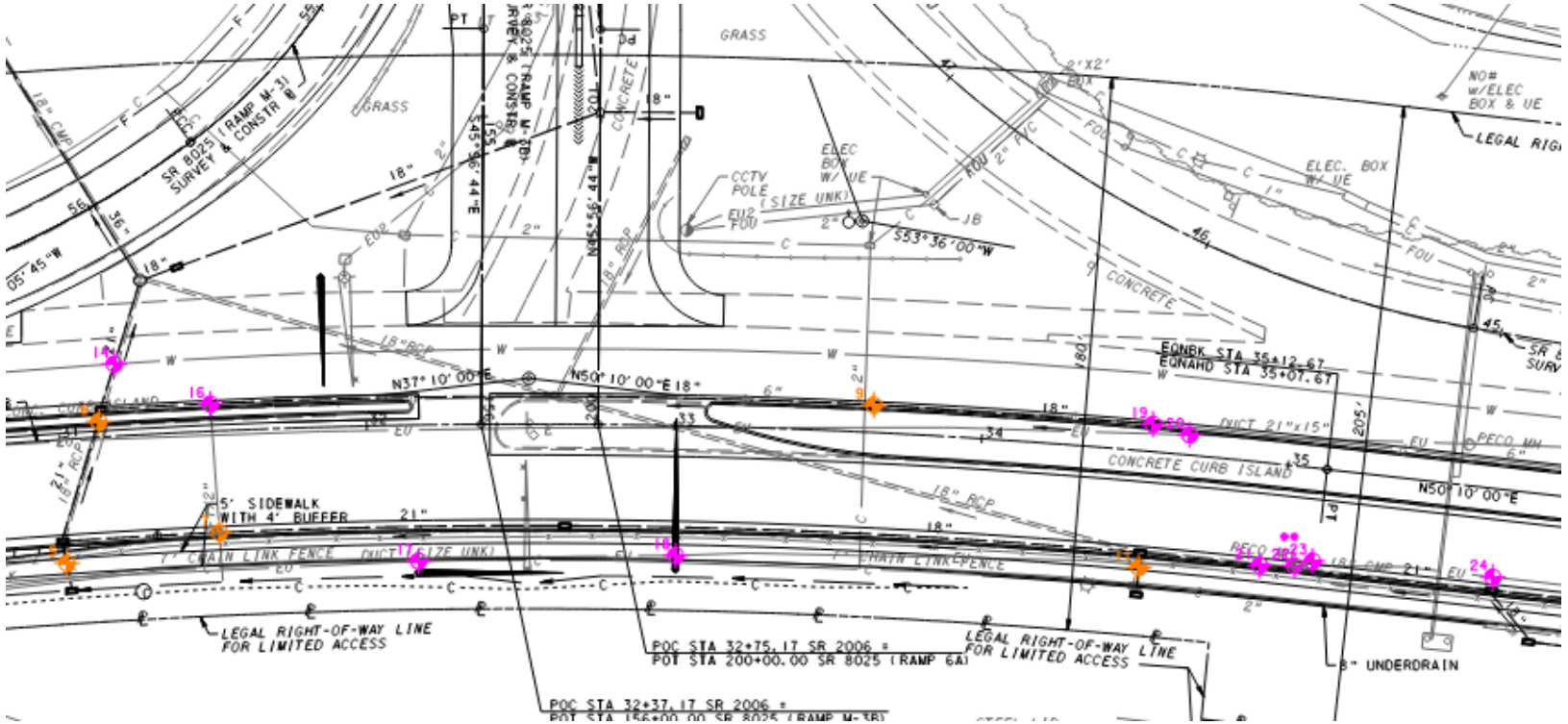
Substantial coordination with PennDOT, Blair Park and external contractors.

Utility Coordination

Substantial utility coordination and SUE investigations.

- 10 Utility Companies
- 70+ Potential Conflicts
- 32 SUE test holes

Commonwealth-wide utility coordination pilot project whose conflict avoidance activities served as a precursor to and development of URMS.



MacDade Utility Conflict Test Hole Locations — 2/13/2019

Test Holes Highlighted Yellow were previously drilled in September 2018

Alignment		Station	Offset	Approximate Test Hole Depth	Utility	Location relative to traffic	Applicable PATA Figures
MacDade Blvd	1	24+54	33' RT	10	Underground Petroleum line	Outside curb of EB MacDade	PATA 124 (Work Space in the Left or Right lane of Two-Lane approach) PATA 405 (Lane Closure Near a Freeway or Expressway Entrance Ramp)
MacDade Blvd	2	27+72	33' RT	10	Underground Petroleum line	Outside curb of EB MacDade	PATA 124 (Work Space in the Left or Right lane of Two-Lane approach) PATA 405 (Lane Closure Near a Freeway or Expressway Entrance Ramp)
MacDade Blvd	3	30+00.00	8.98' LT		Underground Electric	Median	
MacDade Blvd	4	28+40	33' RT	10	Underground Petroleum line	Outside curb of EB MacDade	PATA 124 (Work Space in the Left or Right lane of Two-Lane approach) PATA 405 (Lane Closure Near a Freeway or Expressway Entrance Ramp)
MacDade Blvd	5	30+99.77	40.19' RT		Underground Electric	4' outside of Ramp 7(to be obliterated).	
MacDade Blvd	6	31+13.15	5.09' LT		Underground Electric	Median	
MacDade Blvd	7	31+50.64	33.00' RT		Underground Gas line	3' inside existing curb line of outside lane	
MacDade Blvd	8	29+00	9' LT	9	Underground Electric	Inside median of WB MacDade	PATA 124 (Work Space in the Left or Right lane of Two-Lane approach)
MacDade Blvd	9	33+64.38	8.87' LT		Underground Gas line	Median	
Ramp 7 Existing	10	43+42	29' RT	6	Underground Electric	20' right of outside edge of Ramp 7	N/A
MacDade Blvd	11	34+54.48	37.87' RT		Underground Electric	Behind existing guiderail and fence along MacDade	
Ramp M-3	12 *	41+03	11' RT	2	Underground Fiberoptic	Outside edge of guiderail Ramp M-3 at begin bridge over MacDade	PATA 406 (Work Space on a Ramp)
MacDade Blvd	13	41+32.50 (AHEAD)	33.00' RT		Underground Electric	1' inside existing curb line of outside lane	
MacDade Blvd	14	31+19	23' LT	4	Underground Water line	Within right lane WB MacDade	PATA 124 (Work Space in the Left or Right lane of Two-Lane approach)
MacDade Blvd	15	41+99.01 (AHEAD)	37.60' RT		Underground electric and gas	Behind existing guiderail along shopping center.	
MacDade Blvd	16	31+50	9' LT	8	Underground Gas line	Inside median of WB MacDade	PATA 124 (Work Space in the Left or Right lane of Two-Lane approach)

Stormwater/Drainage/NPDES Permitting

Drainage pipes/inlets and swales added along MacDade Blvd.

NPDES Permit – to incorporate PADEP changes in regulations, permits were required to be updated multiple times during design, the last during the COVID shutdown.

Traffic Control

MacDade Blvd Interchange

Access maintained at all times.

9 total stages – mix of short and long-term operations.

Tight work zones required to keep traffic moving efficiently

No interruptions of pedestrian usage

Stage 1

- MacDade Blvd median removal

Stage 2

- Ramp M-3 pavement widening
- Partial width construction of Ramp M-3 structure

Stage 3 & 4

- Staged pavement/barrier construction of the MacDade Blvd/Ramp Intersection

Stage 5

- Completion of Ramp M-3 pavement/structure.
- New signal construction at MacDade Blvd/Ramp Intersection

Stage 6 & 7

- Pedestrian Bridge/Sidewalk construction
- Removal of Ramp 7 & drainage work

Stage 8 & 9

- Reconstruction of MacDade median and final paving.

Traffic Control

I-476 NB Construction

Work Zone Analysis memo and Work Zone Impact Delay Analysis completed

Lane closures allowed for short-term operations on weekends and overnights

Lane closures must avoid Philadelphia events:

May, 2023 – Taylor Swift Eras Tour

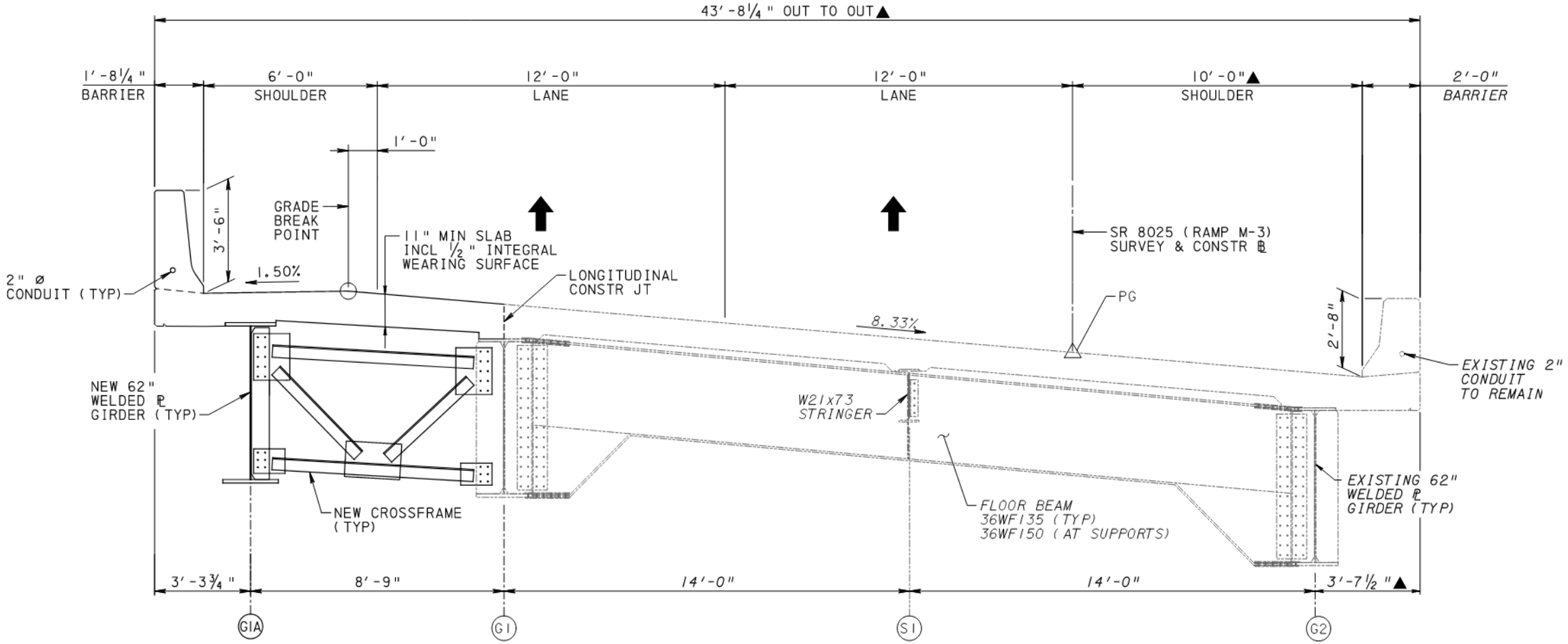
Stage 1

- I-476 NB Inner/Outer shoulder reconstruction
- Minor drainage work on outside shoulder

Stage 2

- I-476 Mill & overlay of entire roadway
- Installation of new pavement markings and roadside signs
- Installation of sign overlay panels on overhead signs
- Ramp 6 mill & overlay

Ramp M-3 Bridge – Proposed Typical Section



TYPICAL SECTION
(LOOKING AHEAD STATION)

Ramp M-3 Bridge Widening

Two 12' Wide Lanes

Curved Girder Widening, One Girder Line Added

Cross-Frames at Floorbeam Locations

3D Superstructure Analysis performed by BSDI

Stand-alone Pier Columns, Widened Abutments

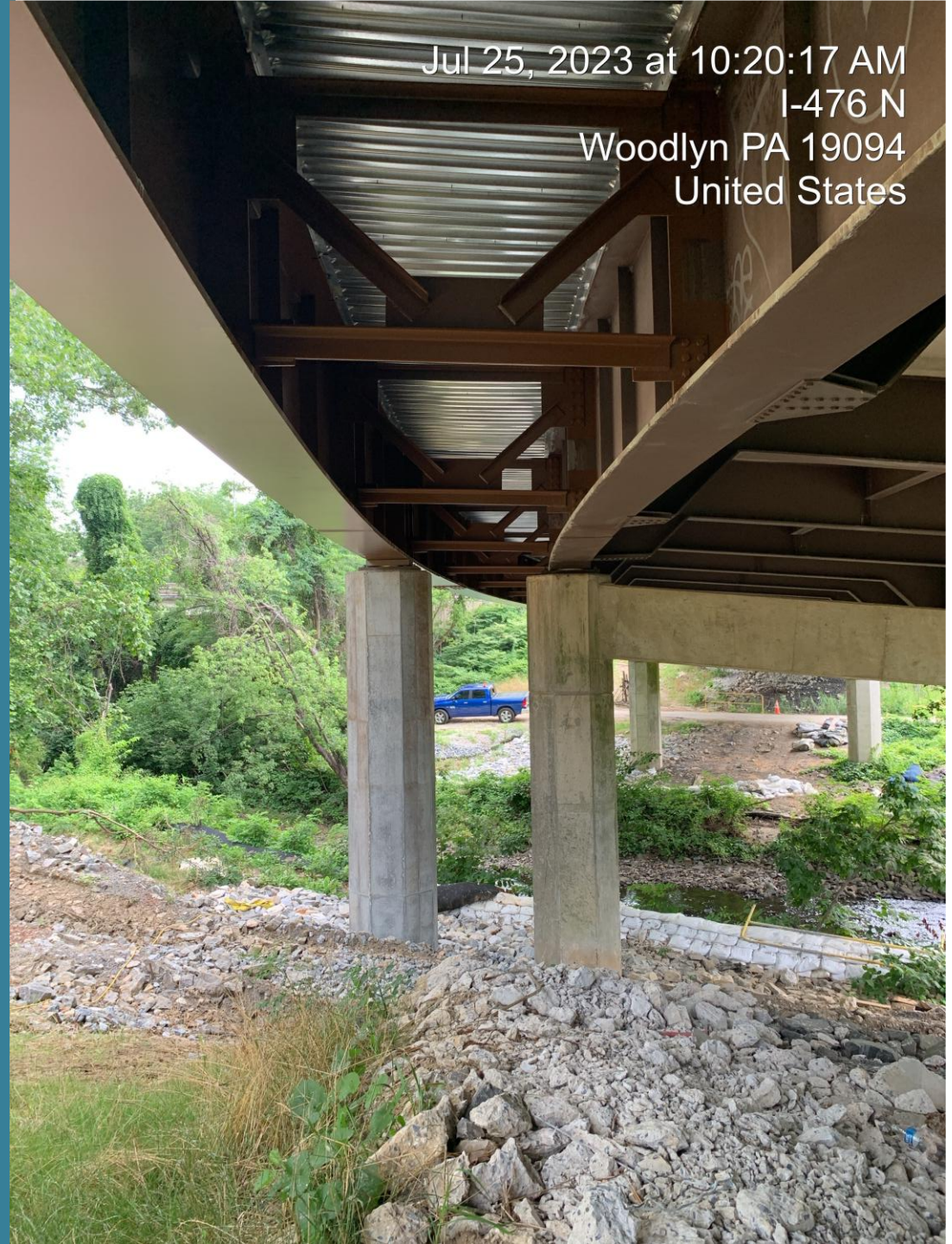


Photo: Urban Engineers

Existing Pedestrian Structure

Network of two-girder bridge spans and concrete ramps

- Crum Creek Crossing
- Ramp 7 Crossing
- Residential Neighborhood Connection

Total **540'** of steel bridge length, **8** spans, and **300'** of concrete ramp structures

Source: Google Earth

Existing Pedestrian Structure

Replacement Pedestrian Structure

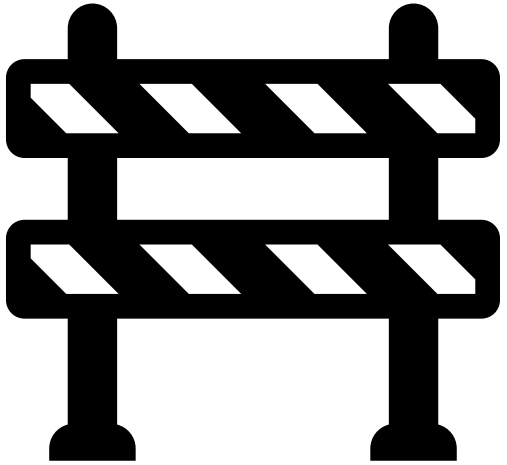
- Removed 8 spans and 2 concrete ramp structures
- Single span bridge over Crum Creek and at-grade sidewalk

Replacement Pedestrian Structure

Notable Construction Challenges

Traffic Control During I-476 Operations

- Managing I-95 NB/SB ramps to I-476 during resurfacing
- Needed additional traffic control, crash trucks and State Police Support



Intricate Construction Staging

- 9 Stages created smaller work areas, resource fluctuations and extended duration of work
- Minimized durations by working in multiple stages concurrently

Notable Construction Challenges

Diversity of Scope of Work

- Multiple crews needed – Structures, Excavation, Paving, Pipe, Electrical, Signals & DMS to name a few
- Coordination was the key to success

Underground Utilities

- Detailed coordination with 3 major pipelines
- Modifications needed in drainage to avoid undetected/unknown PECO High Voltage Underground Electric line

Project Construction Schedule

	PreBid	Actual
Project Let	March-22	March-22
Notice to Proceed	May-22	May-22
Physical Construction Begins	Jun-22	Sept-22
MacDade Blvd/Ramp Intersection Open	May-25	Dec-23
Pedestrian Bridge Complete	Aug-25	May-24
Ramp 7 Removal Complete	Apr-25	Sept-25
Project Final Walk Through	Aug-26	Dec-24

615 Days Early

Project Construction Schedule

How did they save so much time??

- Pre-Bid Schedule was sequential by stages with Winter shutdowns
- Allan Myers was able to adjust resources
    - Concurrent work with Stages 2, 3 & 4
    - Concurrent work with Stages 5 & 6
    - Concurrent work with Stages 8 & 9
- Work proceeded through Winter with no shutdowns

Construction Costs

Design Estimate - $14.5 M

Bid Estimate - $16.2 M

Final Cost - $18.1 M

Top 3 Impacts to project cost:

- Change to SMA paving on SR-476 with the added void reducing asphalt membrane (VRAM) - **$800K**
- Final mill/overlay added to MacDade Blvd. - **$550K**
- MacDade Crossing Shopping Center Intersection added via HOP to contract - **$400K**

Ramp M-3 Intersection Construction

Photo: Allan Myers

Ramp M-3 Intersection Construction

Photo: Allan Myers

Ramp M-3 Bridge Widening Construction

Deck Cut

Photo: Allan Myers

Ramp M-3 Bridge Widening Construction

Photo: Urban Engineers

Ramp M-3 Bridge Curved Girder Erection

Photo: Allan Myers

Ramp M-3 Bridge Widening Construction

Photo: Allan Myers

Ramp M-3 Bridge Widening Deck Construction

Photo: Allan Myers

Replacement Pedestrian Structure Erected

Photo: Allan Myers

Replacement Pedestrian Structure Deck Construction

Photo: Allan Myers

Ramp Intersection at MacDade Blvd

Ramp Intersection at MacDade Blvd

Widened Ramp
M-3 Structure

Replacement Pedestrian Structure

Photo: Urban Engineers

Replacement
Pedestrian Structure

Ramp 7 Removed

Photo: Urban Engineers

Thank you!

Questions?