

FULL-DEPTH RECLAMATION (FDR) FOR PREVENTIVE MAINTENANCE: SR 65 ANALYSIS

Kent Davis, INDOT PM

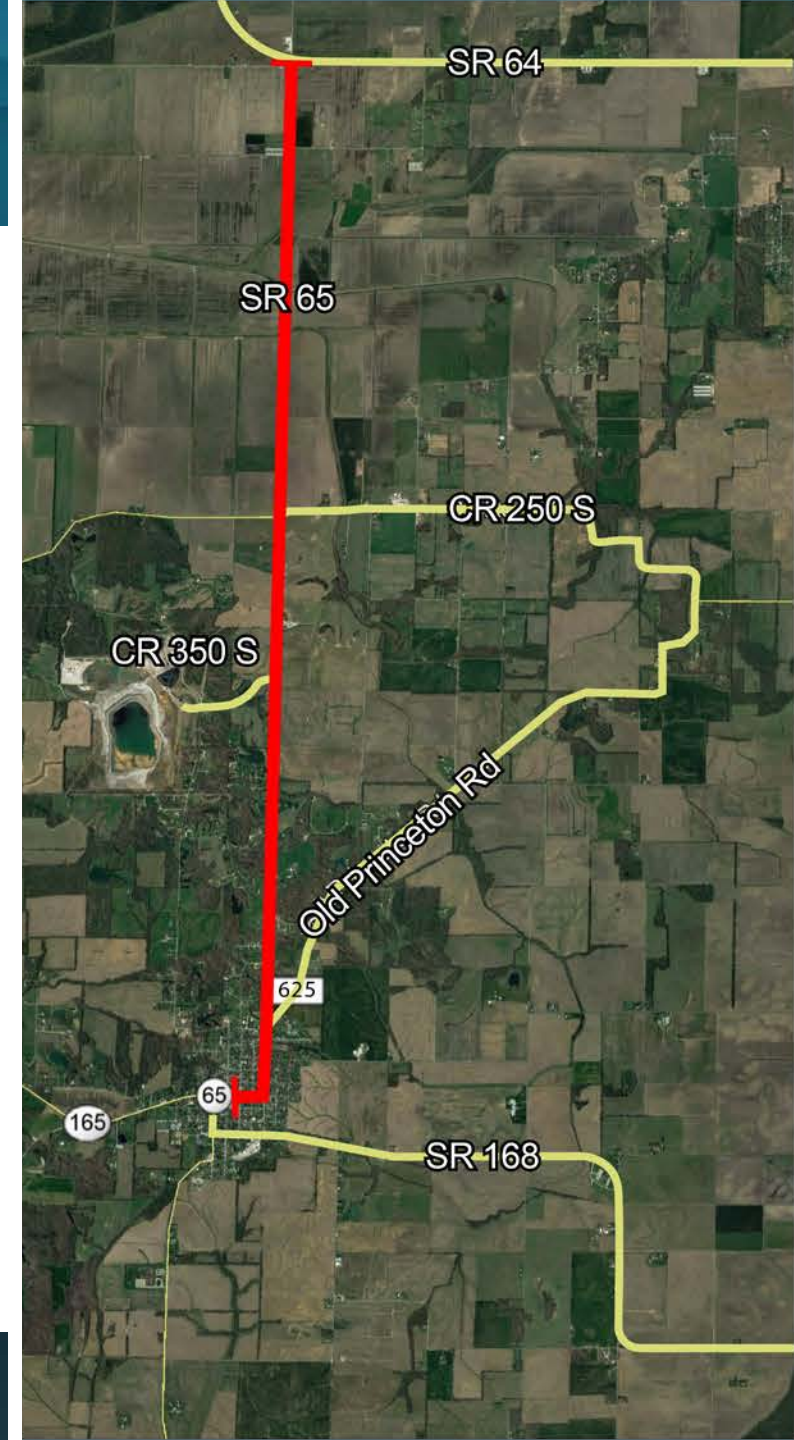
Jeff Whitaker, PE, Lochmueller Group

Joe Hile, PE, LS, Specialties Company

Todd Richardson, PE, American Structurepoint

MINI-SCOPE: 6/2015

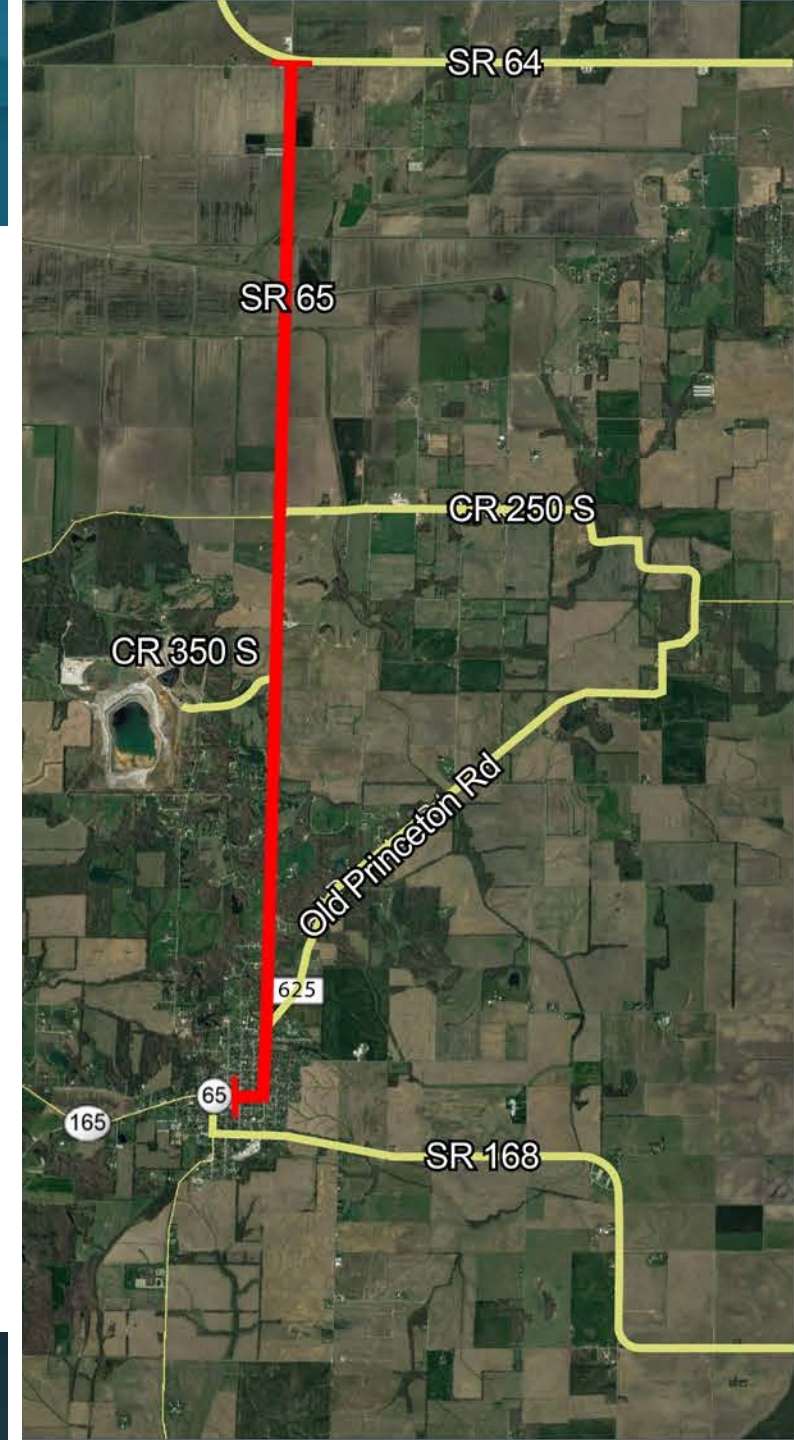
- SR 65 - SR 165 to SR 64 (6.04 miles)
- Restore the Surface Condition and Increase the Service Life
- Update Curb Ramps



TRAFFIC DATA

| | Year | Total | PA | BC |
|-------------|-------------|-------------|-------------|--------------|
| AADT | 2014 | 3700 | 2910 | 790 |
| | | | | Count |
| AADT | 2017 | 3800 | 3000 | 800 |
| | | | | Est. |

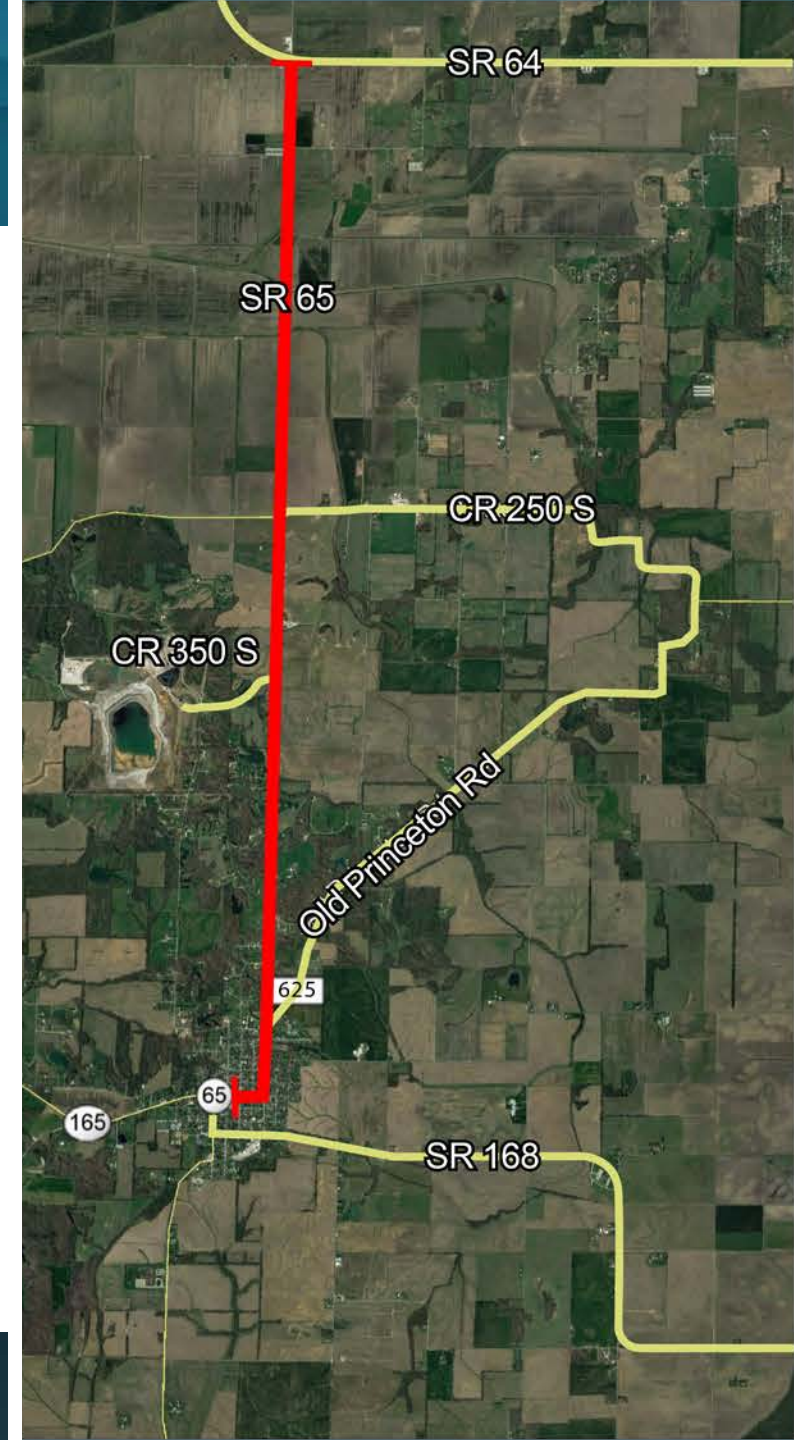
- 2014 – Coal Company Opened New Location
- CR 350 to SR64 – Coal Truck Dist. 90%/10%
- 2017 – 5.9 Million Tons/Year of Coal (Approx. 236,000 Trucks)



TRAFFIC DATA

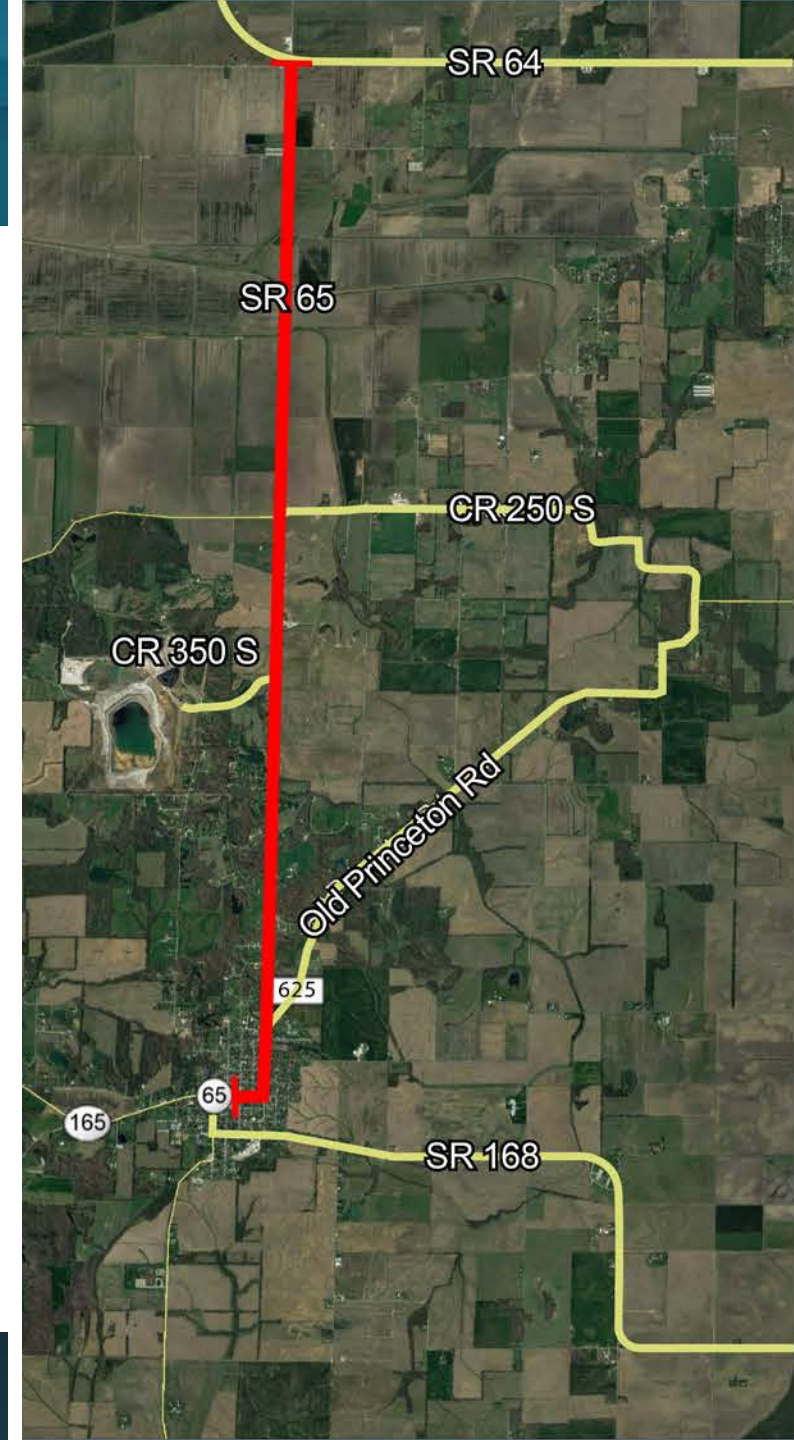
- 2018 & 2019 – Projected 7-8 Million Tons/Year (300,000 Trucks)

| | Year | Total | PA | BC |
|-------------|-------------|-------------|-------------|-------------------------------|
| AADT | 2017 | 4700 | 3000 | 1700 Est. Increase |
| AADT | 2017 | 4100 | 2500 | 1600 Count |



DESIGN DATA

- PM - Partial 3R (Non-Freeway)
- State Collector
- Urban & Rural
- Level Terrain
- R/W – Concerns



PAVEMENT HISTORY

- 1938 – Original Construction 18' Wide
- 1959 – Widened to 22' & Resurfaced
- 1963 – Resurfaced
- 1996 – Widened to 26' with Functional Overlay
- 2012 – Chip Sealed

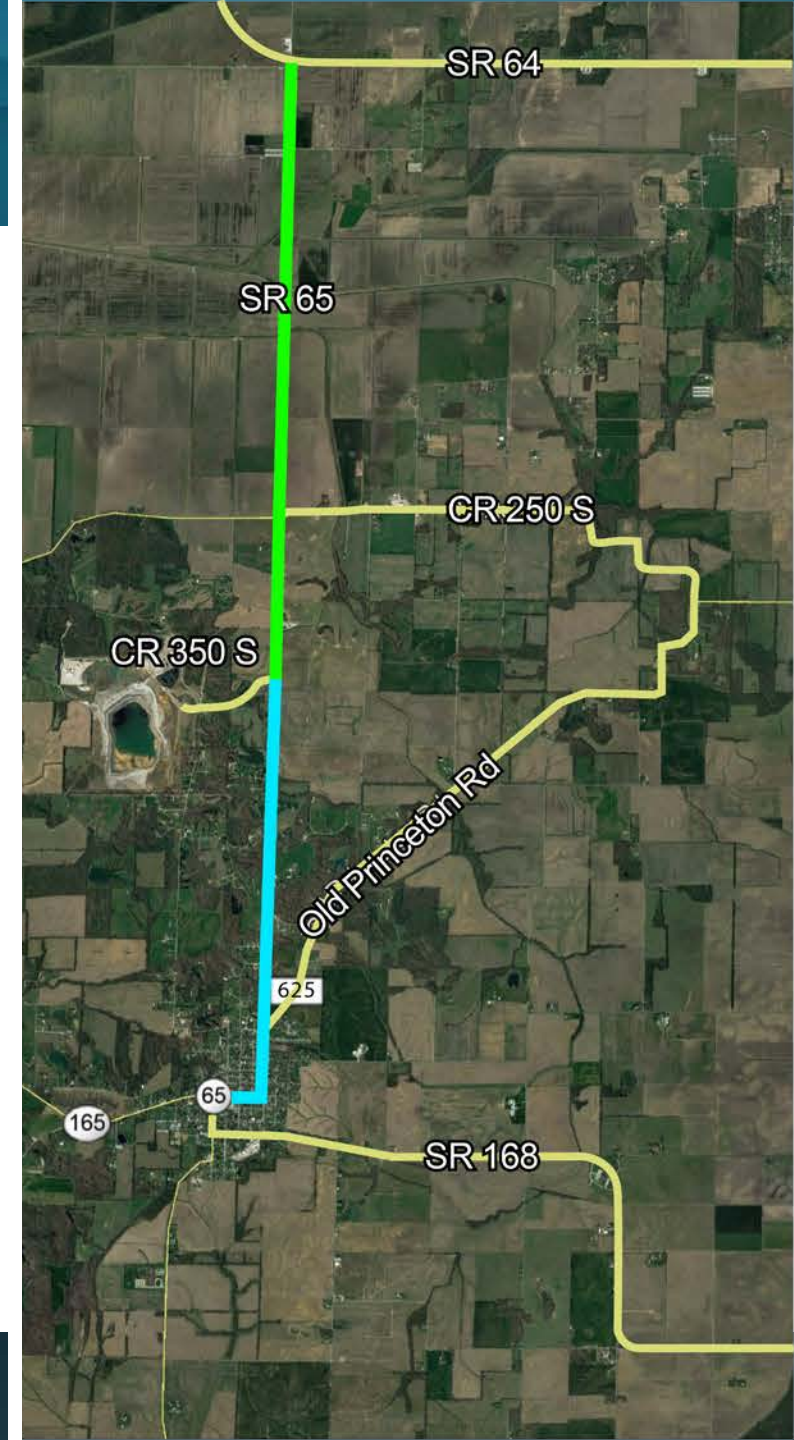
PAVEMENT CONDITION

Severe Pavement Failures

- NBL from CR 350S to SR 64

Surface Stripping

- SR 165 to CR 350S



PAVEMENT CONDITION – CR 350S TO SR64



PAVEMENT CONDITION – CR 350S TO SR64



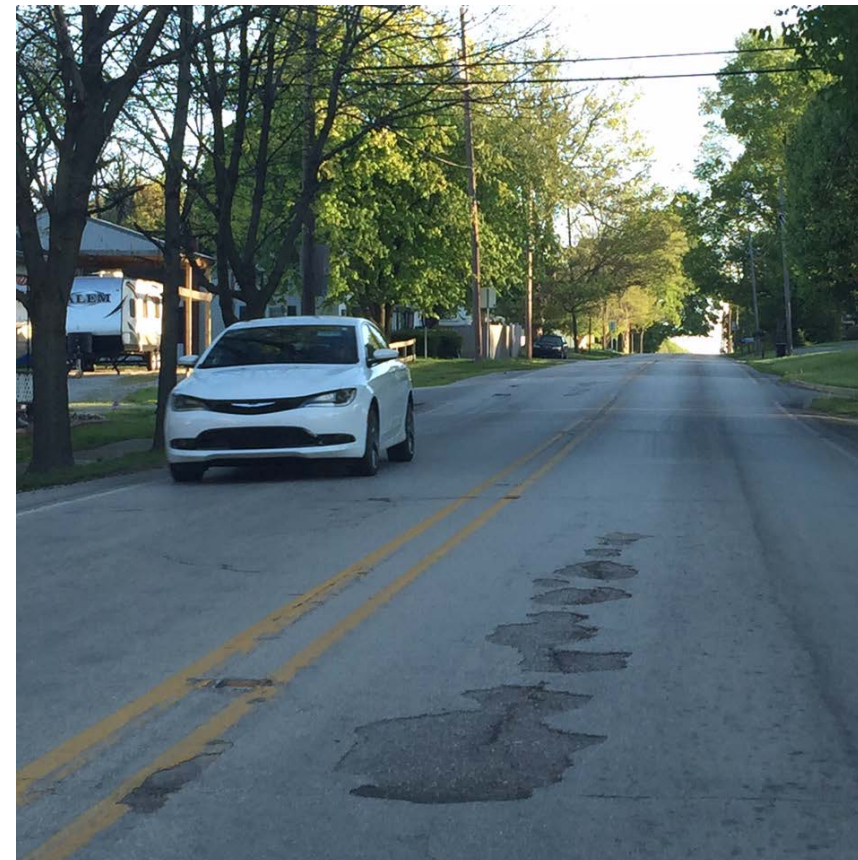
PAVEMENT CONDITION – CR 350S TO SR64



PAVEMENT CONDITION – CR 350S TO SR64



PAVEMENT CONDITION – SR 165 TO CR 350S



PAVEMENT CONDITION – SR 165 TO CR 350S



INDOT PAVEMENT CORES/FWD



Existing HMA Pavement – 12” Average Thickness

INDOT PAVEMENT CORES/FWD



INDOT PAVEMENT CORES/FWD



MINI-SCOPE PAVEMENT OPTIONS

Severe Surface Stripping & Failures in Base from the Pavement Cores

- **Option 1:** Full Depth Patching w/Surface Overlay
- **Option 2:** Functional Mill/Overlay
- **Option 3:** FDR with HMA Overlay

PROJECT DESIGN

Lochmueller Group,

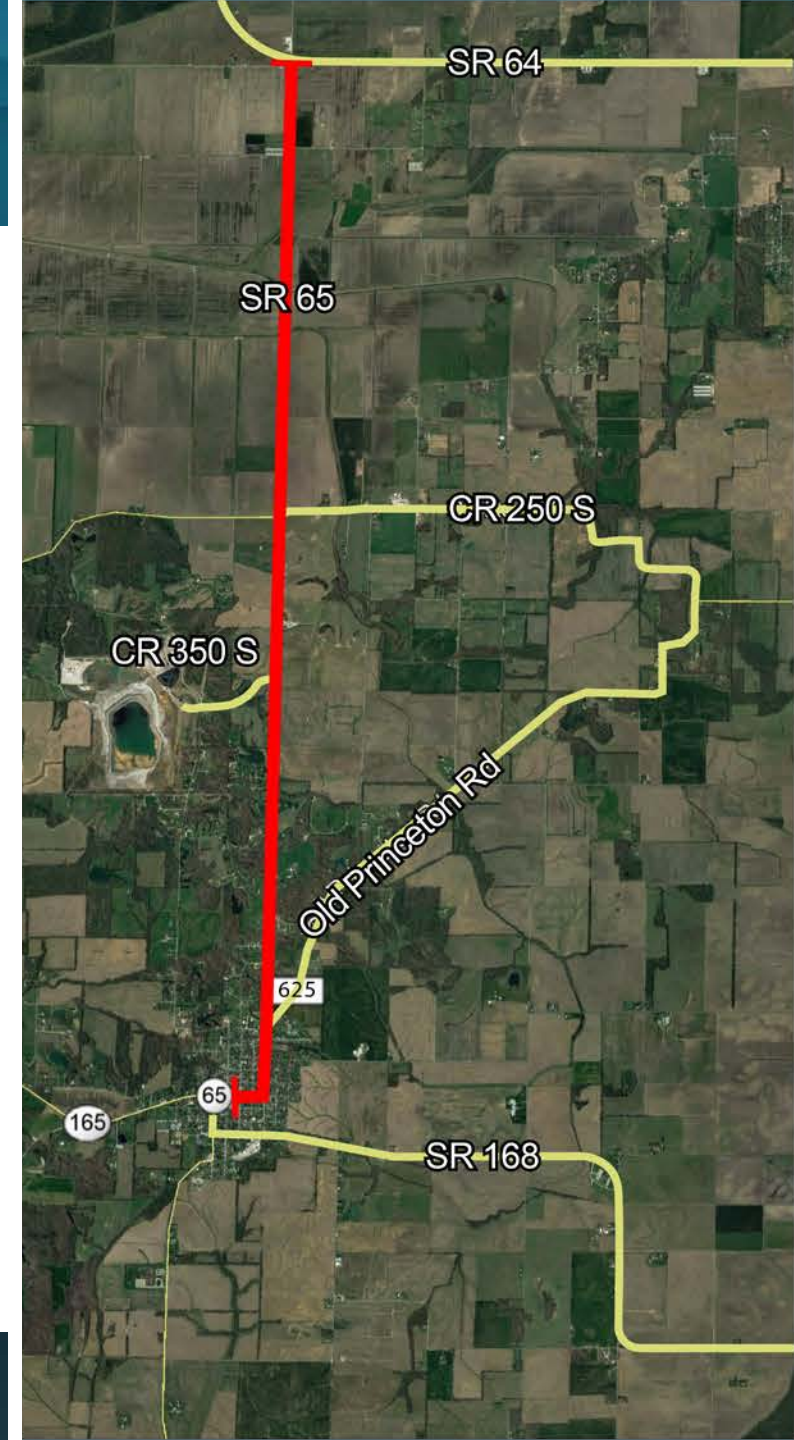
Jeff Whitaker, PE

PROJECT DESIGN

- Design Process
- NTP - May 2016
- Stage 3 – Nov. 4, 2016
- Final Tracings – Dec. 26, 2016
- Letting – April 5, 2017

PROJECT DESIGN

- Scoping Meeting
- Preventive Maintenance
- Partial 3R (Non-Freeway)
- Pavement Design (Urban & Rural)



FINAL PAVEMENT DESIGN

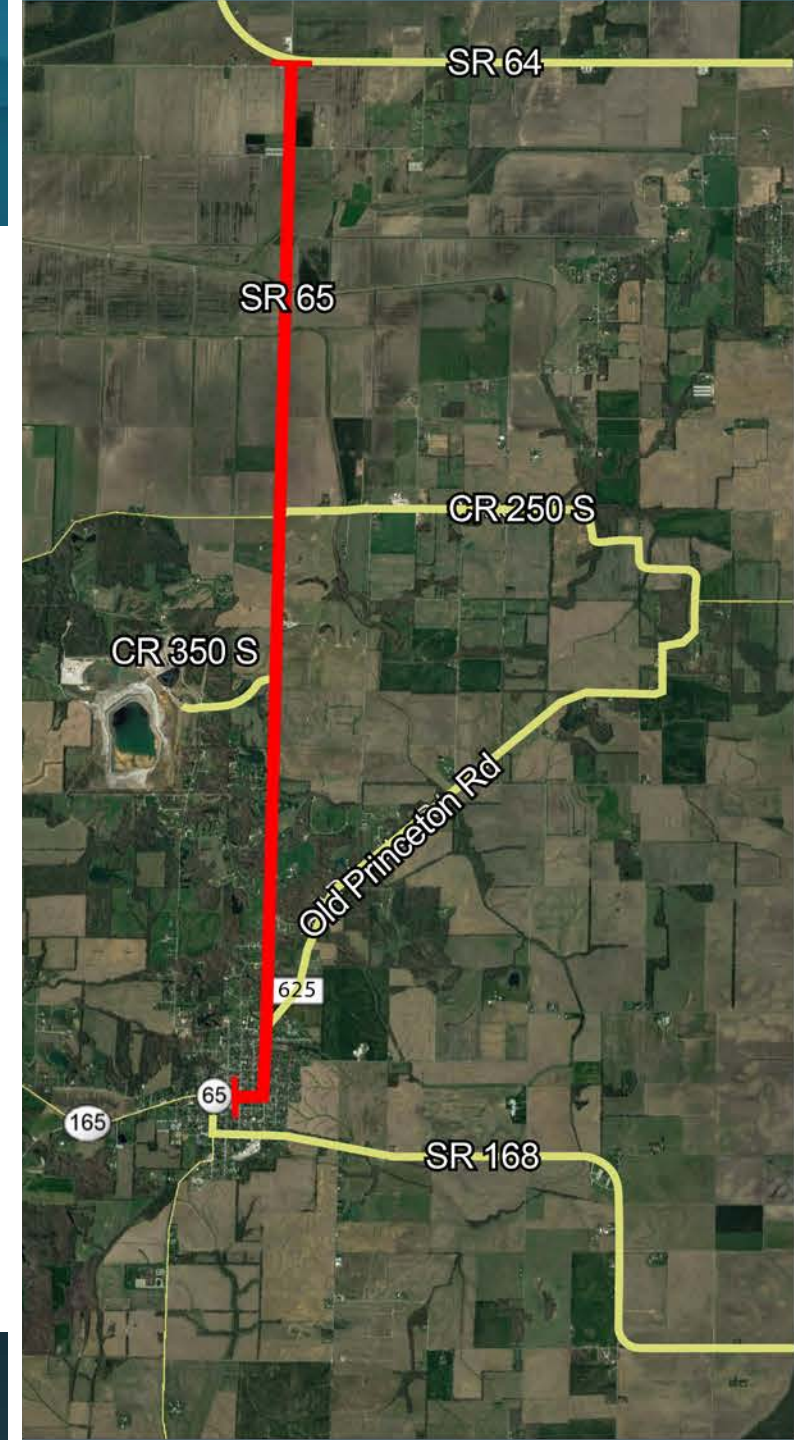
| Pavement Alternative Rural Section | Initial Const. Cost | Service Life | Cost/Lane Mile/Year of Service Life |
|-----------------------------------------------------------------|---------------------|--------------|----------------------------------------|
| FDR with HMA Overlay (4" Mill, 10" FDR, 7" HMA) | \$2,779,524 | 20 | \$11,543 |
| Functional HMA Mill/Overlay (4" HMA Mill/Overlay w/Patching) | \$3,428,859 | 15 | \$18,986 |
| Full Depth HMA Reconstruction (10" HMA on SGT) | \$3,239,031 | 20 | \$13,451 |

Approved October 14, 2016

PROJECT DESIGN

Other Pavement Alternatives

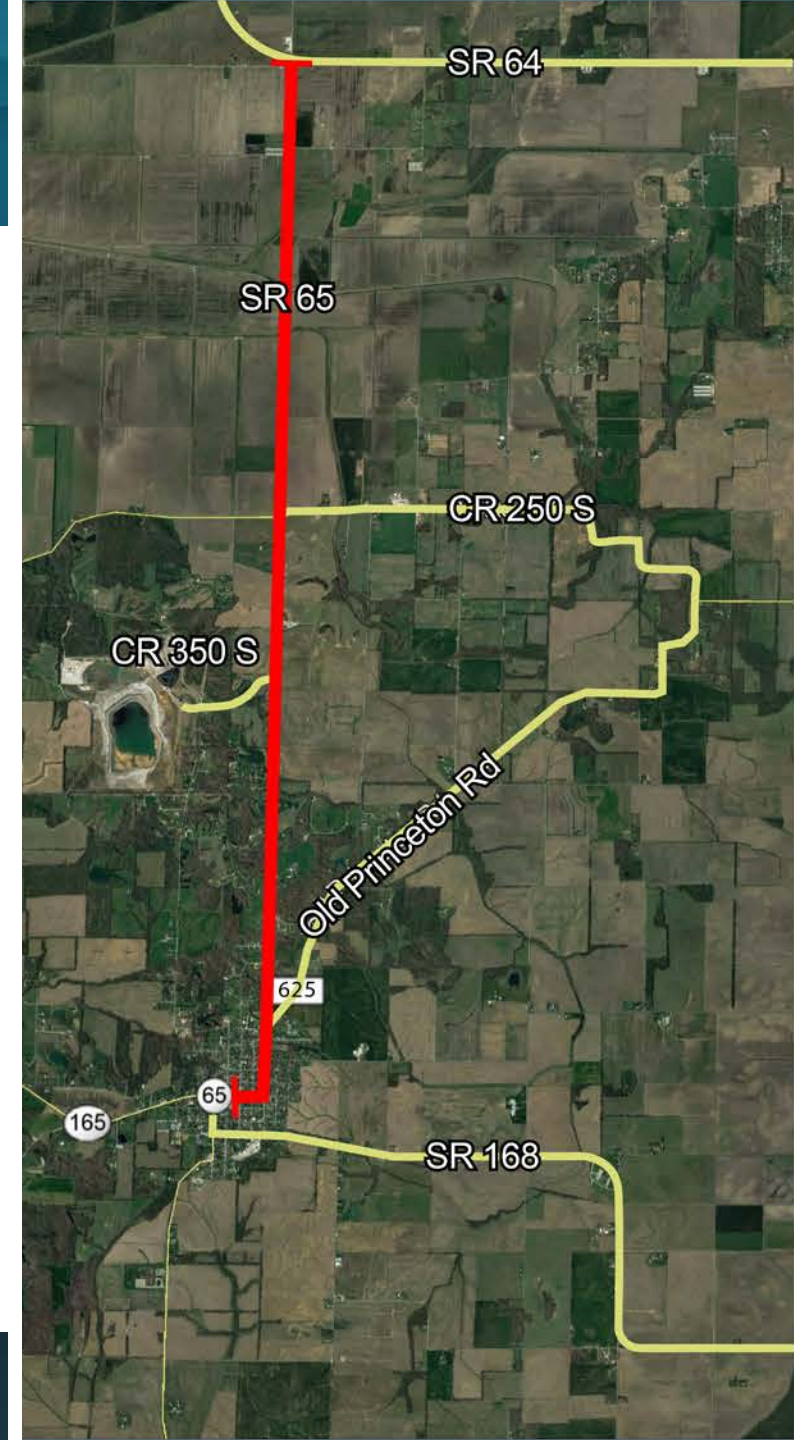
- FDR with 4" – 5" Thin Concrete Overlay
- 8" – 9" Concrete Pavement



PROJECT DESIGN

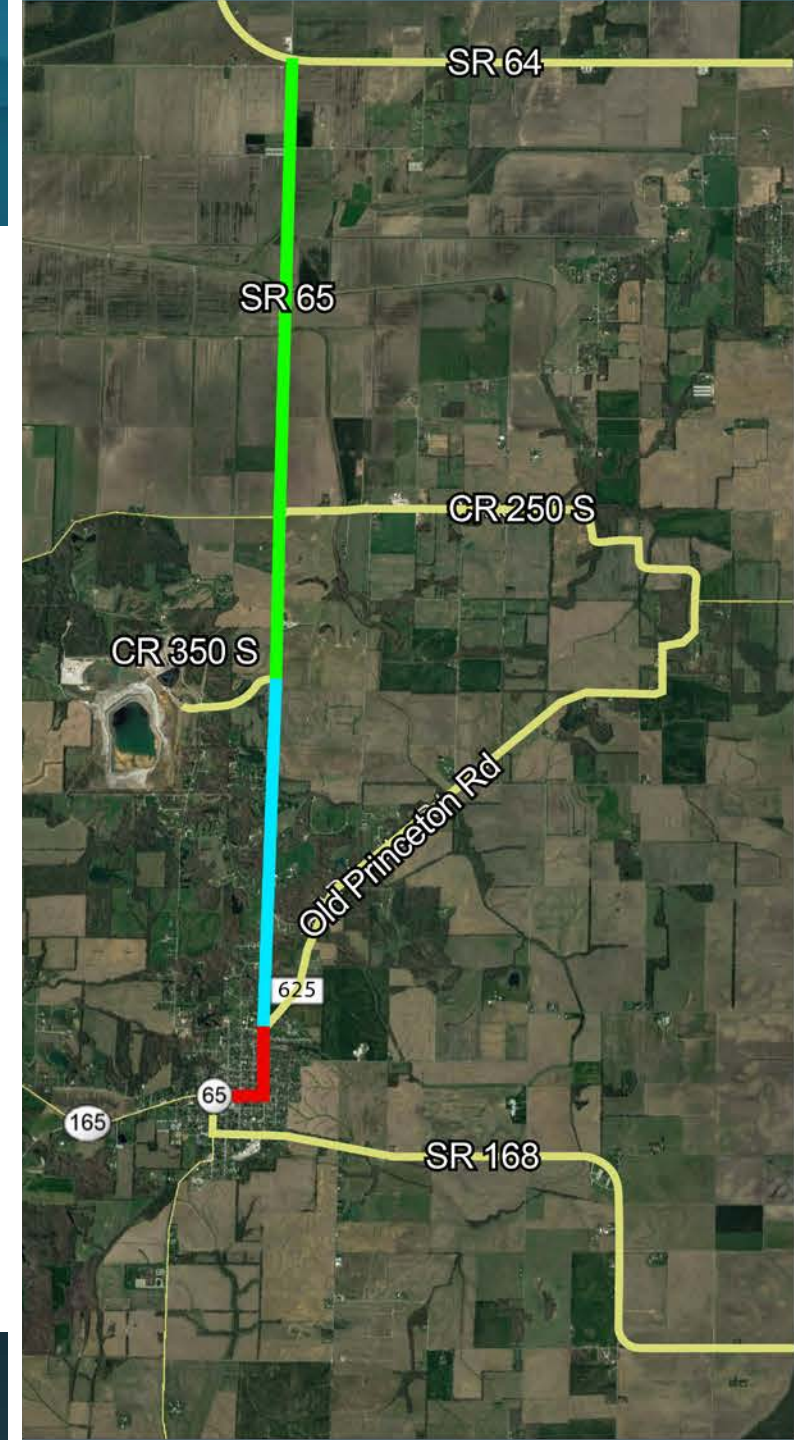
How Does the Pavement Section Affect?

- MOT
- Coal Truck Traffic
- Environmental Document & Permits
- R/W



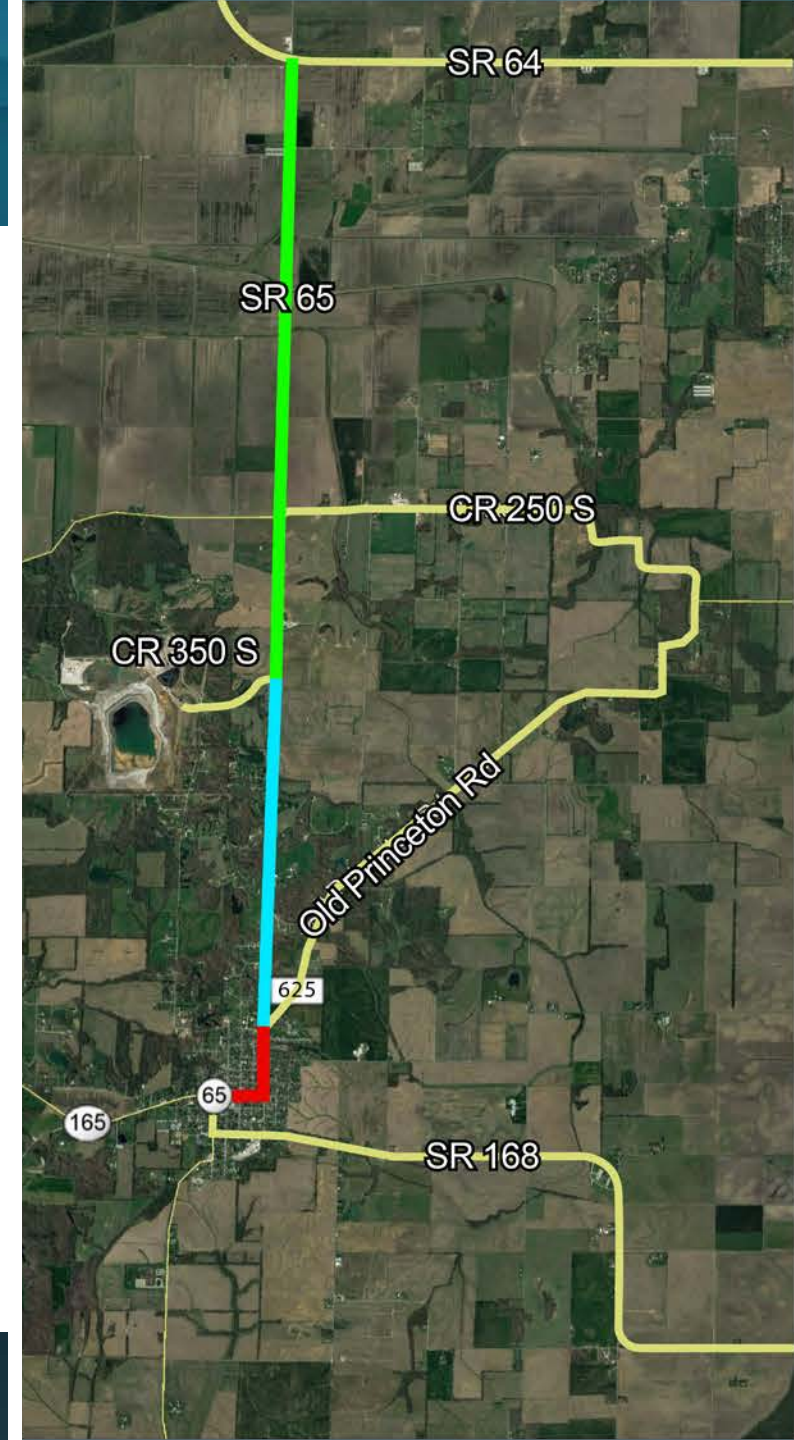
FDR/HMA RURAL TYPICAL

- 4" Mill
- 10" FDR
- 7" HMA (1.5" Surface, 2.5" Intermediate, 3" Base)
- 3" Increase in Elevation
- Transition Street/Drive Approaches
- Transition Aggregate Shoulders



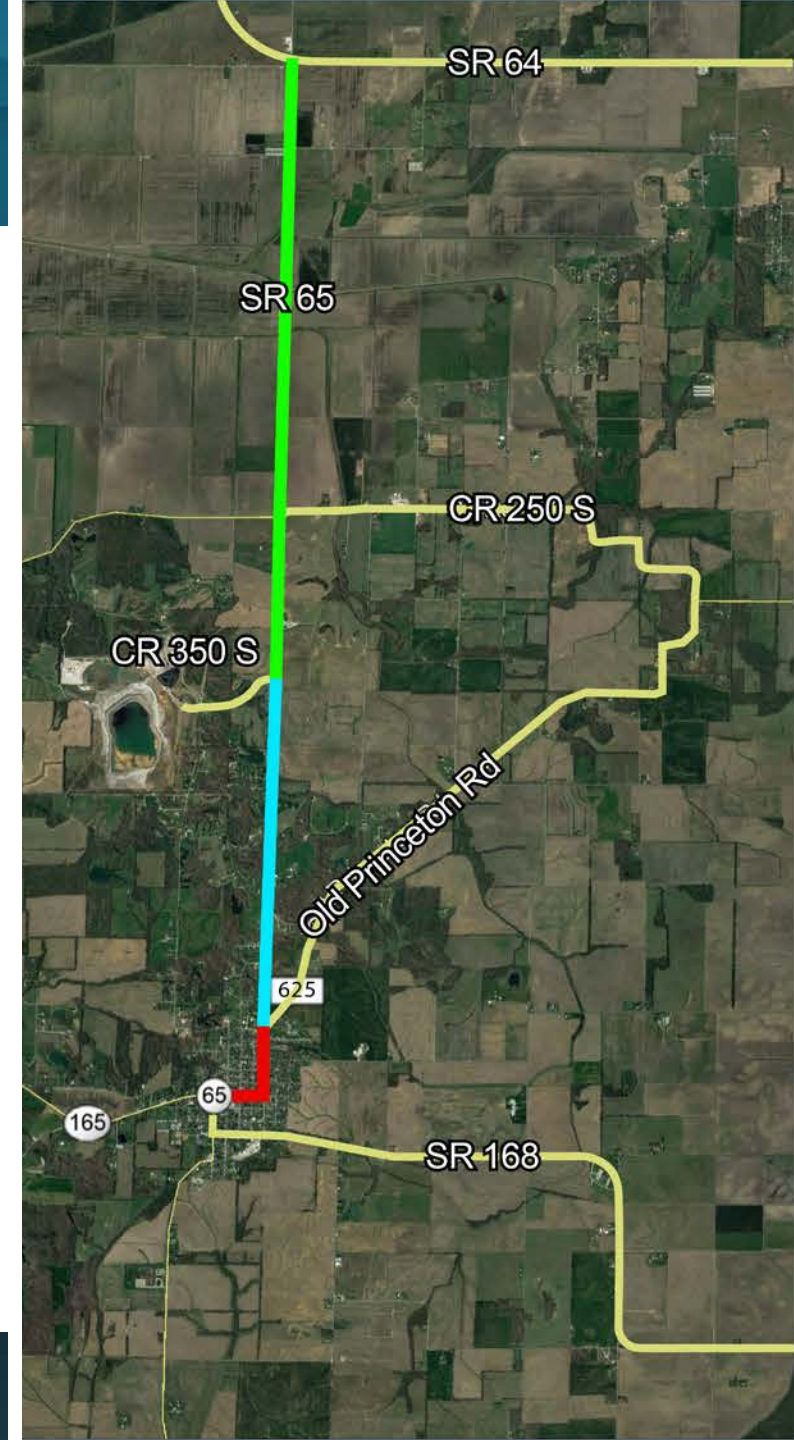
HMA FULL DEPTH TYPICAL

- 10" HMA (1.5" Surface, 2.5" Intermediate, 6" Base, SGT)
- Transition - Bridge Approaches
- Transition – Approach to SR 64



FUNCTIONAL HMA MILL/OVERLAY

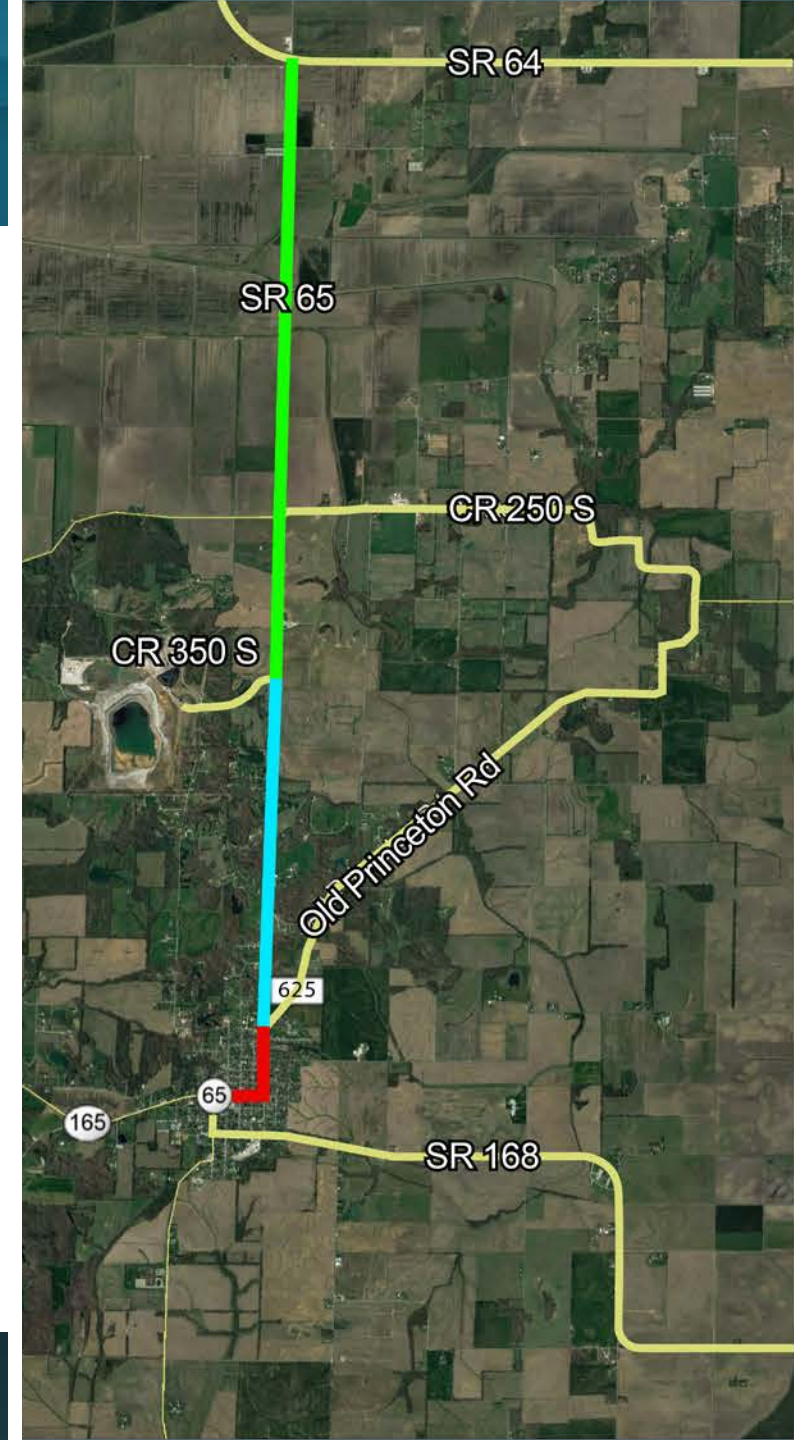
- Initially Proposed 4" Mill/Overlay
- 2.5" Mill
- 4" HMA (1.5" Surface, 2.5" Intermediate)
- 1.5" Increase in Elevation
- HMA Full Depth Patching



PROJECT DESIGN

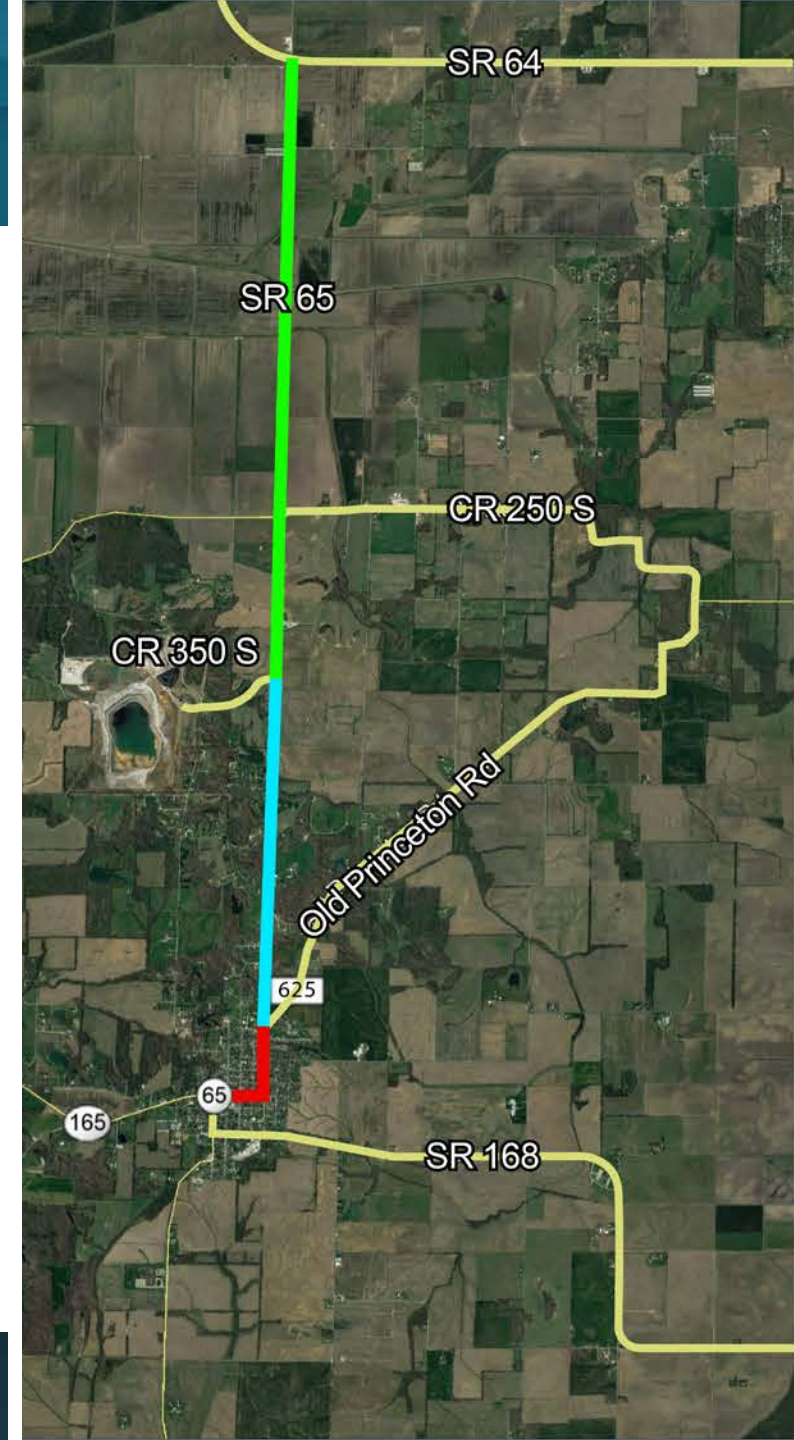
Project Divide into 2-Sections

- Functional PM – 0.59 miles
- Structural PM – 5.45 miles



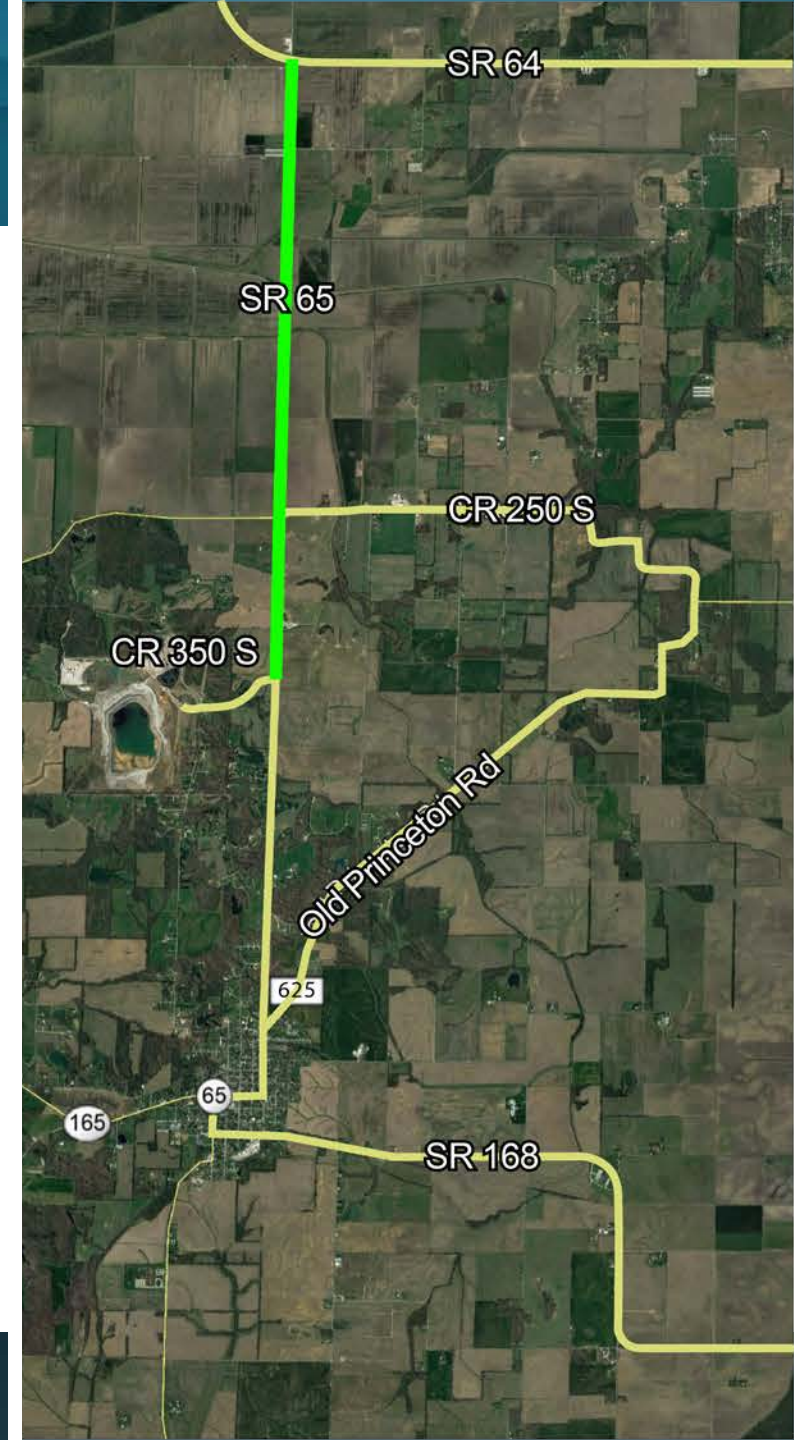
MOT/SCHEDULE

- Meeting w/Coal Mine
- Meeting w/Town of Owensville
- Letting April 5, 2017
- Completion Date November 10, 2017



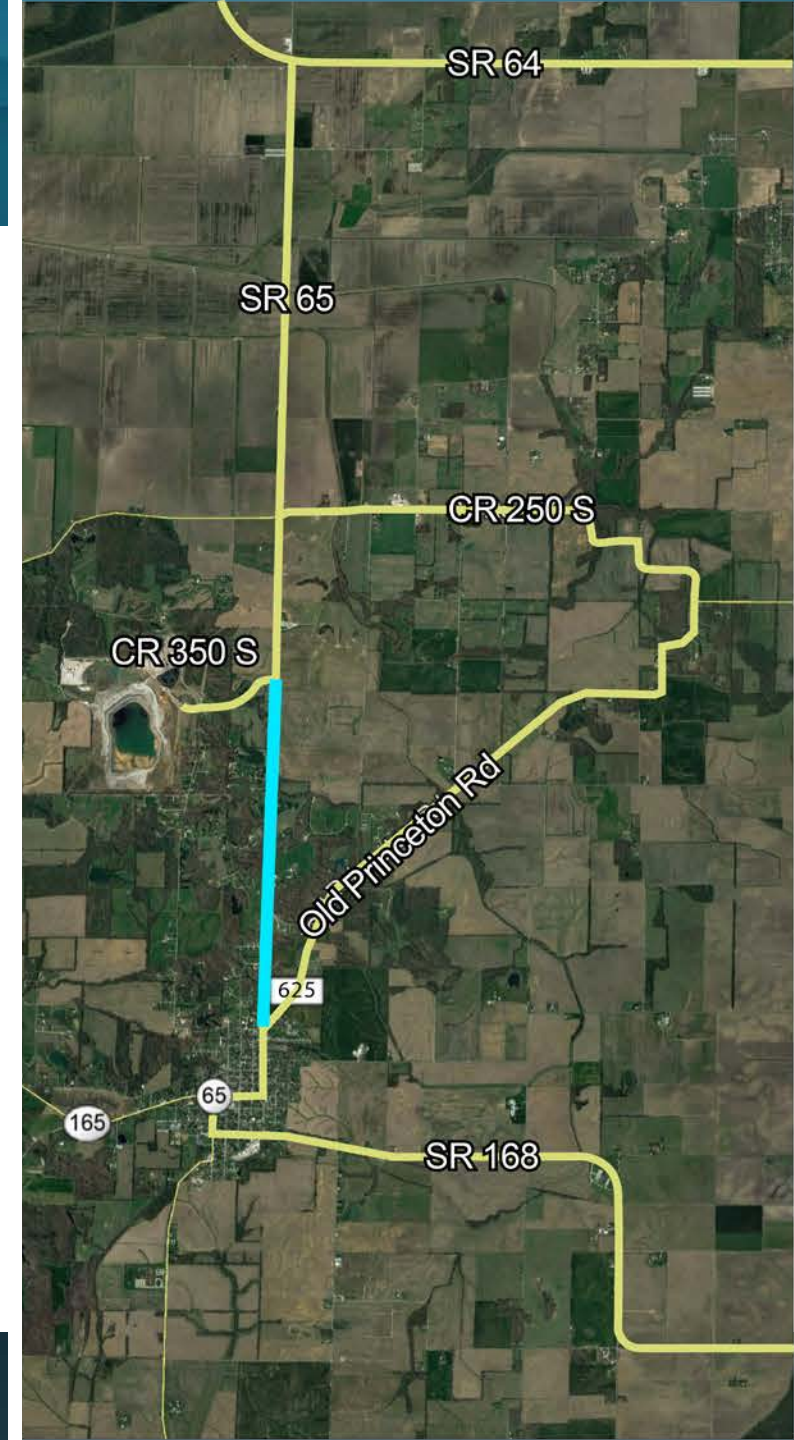
PHASE 1 - MOT

- CR 350S to SR 64 (3.49 miles)
- FDR/FD HMA Section
- Road Closure w/Detour
- Coal Truck Traffic



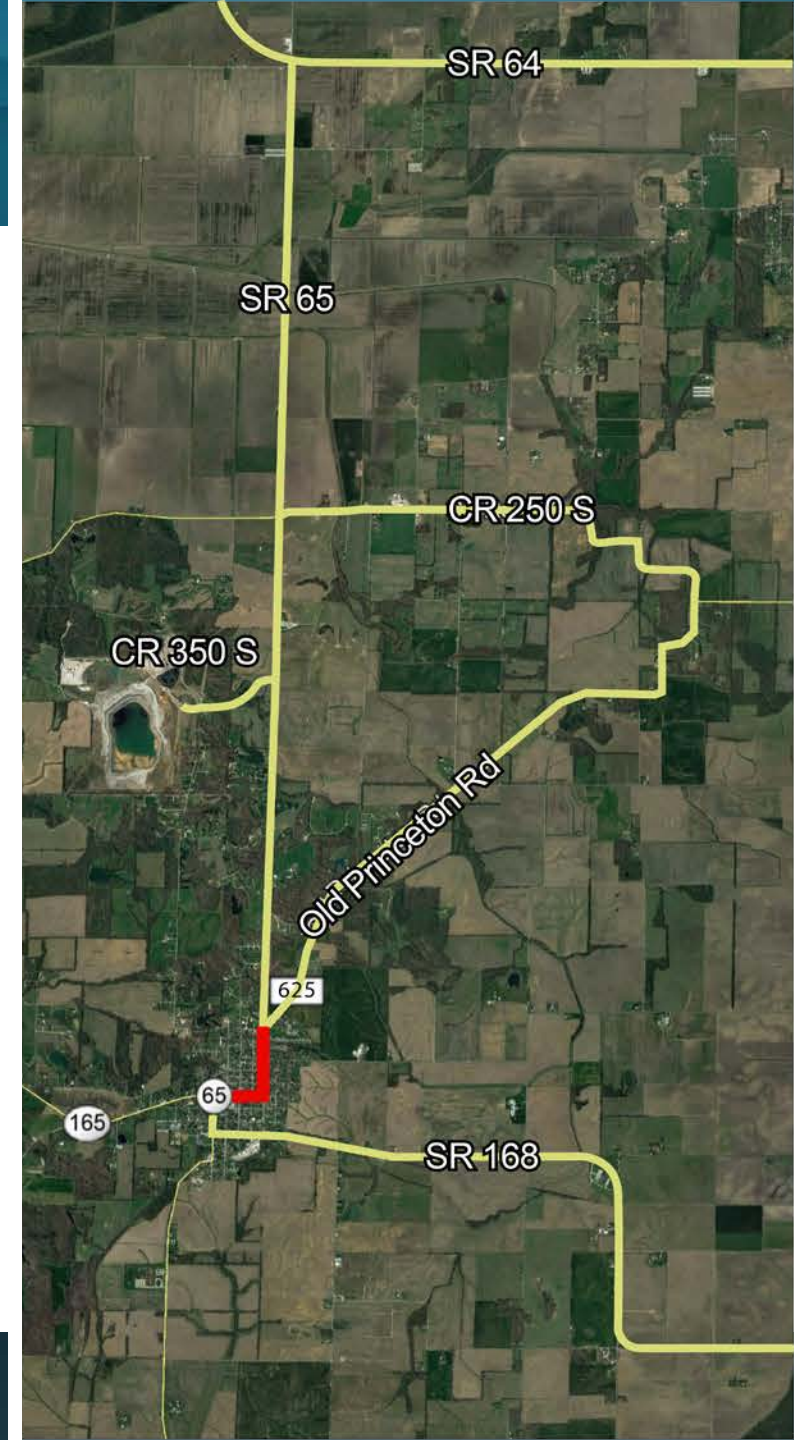
PHASE 2 - MOT

- Old Princeton Rd to CR 350S (1.98 miles)
- FDR/HMA Overlay Section
- Road Closure w/Detour
- Coal Truck Traffic



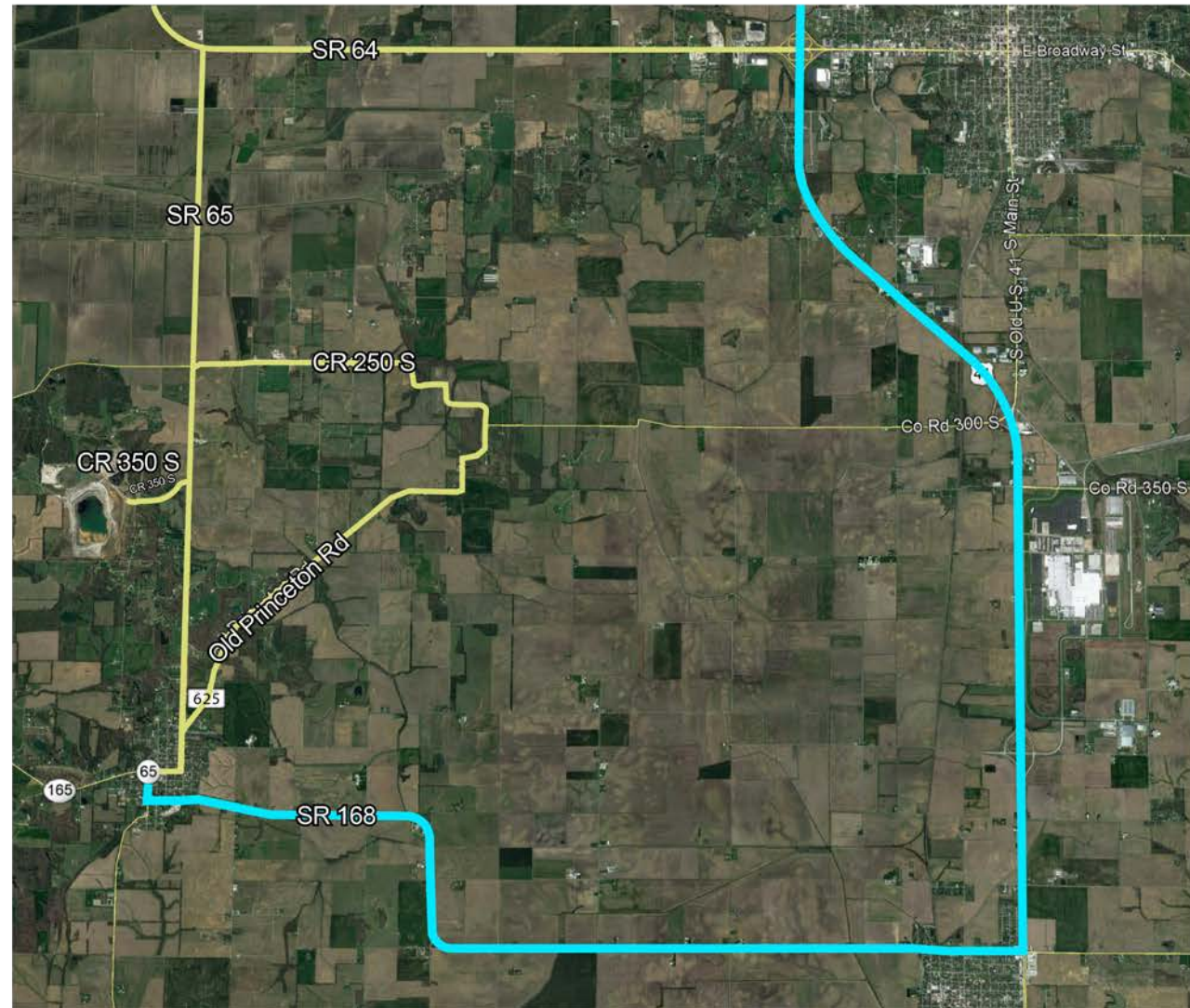
PHASE 3 - MOT

- SR 165 to Old Princeton Rd (0.59 miles)
- HMA Mill/Overlay & Patching
- Flagging Operations



DETOUR - MOT

- Phase 1 & 2
- SR 168 to US 41 to SR 64/65



PLANS

- Horizontal Alignment (Entire Project)
- Vertical Alignment (Full Depth & FDR Sections)
- HMA Wedge for Street/Driveway/Mailbox Approaches
- Shoulder Aggregate Wedge
- Guardrail - End Treatments/Length of Need
- Signal Detection SR64/65

PLANS

- Curb Ramps (ADA Technical Review Committee)
- Curb Work
- Storm Sewer Work
- Level 1 Design Exception for Travel Lane Cross Slope (Functional Overlay)
- Bundled Project w/SR 64 Project

FDR PROCESS

Specialties Company,

Joe Hile, PE, LS

MIX DESIGN



INITIAL MILLING



PRE- PULVERIZATION



CORRECTIVE AGGREGATE



SPREADING OF CEMENT



FINAL MIXING



COMPACTION



GRADING



CURING



ACCEPTANCE TESTING



PROFILE MILLING



**FINAL
PAVEMENT**



CONSTRUCTION INSPECTION

American Structurepoint,

Todd Richardson, PE

CONSTRUCTION INSPECTION

- Testing Requirements
- Mix Design
- General Notes
- MOT

TESTING REQUIREMENTS

| <i>QC TESTING</i> | |
|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <i>Test</i> | <i>Frequency*</i> |
| <i>Depth of Pulverization</i> | <i>1 per 500 ft</i> |
| <i>Pulverized Material Gradation</i> | <i>1 per 0.5 day of production</i> |
| <i>Asphalt Emulsion Content or Cement Application Rate</i> | <i>1 per 500 ft</i> |
| <i>Optimum Moisture and Maximum Dry Density</i> | <i>1 per 0.5 day of production</i> |
| <i>Compacted In-Place Field Density</i> | <i>1 per 1000 ft</i> |
| <p><i>* The Contractor shall perform all QC tests within the first 500 ft after startup or after any change in the mix design.</i></p> | |

MIX DESIGN

- The contractor is responsible for obtaining all samples required to develop the mix design
- One sample per lane mile of planned RBC shall be the minimum sampling frequency for mix design preparation
- The contractor shall provide a mix design or designs for approval at least 15 calendar days prior to beginning the pulverization operation
- The mix design shall include all test results performed
- If new materials are added, a new mix design, including the revised test results, shall be submitted at least one day prior to implementation

GENERAL NOTES

- Specialties was able to complete approximately 1 mile at 26 feet wide per day.
- Phase 1 had 2 residences and 1 hog farm that needed access daily.
- Phase 2 had 40 residences.
- Specialties was able to coordinate their stabilization areas so that residents would have access from either the north or south at all times.

GENERAL NOTES

- The FDR process is similar to Subgrade Treatment but has the additional pulverization step.
- The same equipment was used for the FDR as Subgrade Treatment.
- HMA Paving took place 10-14 days after stabilization.
- 7 Day Cure period, Proofroll, 2 Days for profile milling.

MAINTENANCE OF TRAFFIC

- **Phase 1**
 - Closed SR 65 from CR 350 S to SR 64
 - Coal trucks were detoured through Owensville
- SR 65 was closed June 5 and opened on July 31
- Phase 1 was 3.49 miles in length and included 49,916 sys of FDR and 23,887 tons of HMA

MAINTENANCE OF TRAFFIC



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MAINTENANCE OF TRAFFIC

- **Phase 2**
 - Closed SR 65 from Owensville to CR 350 S
 - Coal trucks were allowed to use the paved FDR section
- Phase 2 was closed August 2 and opened September 28
- Phase 2 was 1.98 miles in length and included 32,291 sys of FDR and 12,023 tons of HMA

MAINTENANCE OF TRAFFIC

- **Phase 3 Patching**
 - Quantities
 - 538.7 tons of HMA Patching – Plan
 - 1149.2 tons of HMA Patching – Used
 - 1216 sys of SGT Type IC - Plan
 - 2311 sys of SGT Type IC - Used

MAINTENANCE OF TRAFFIC

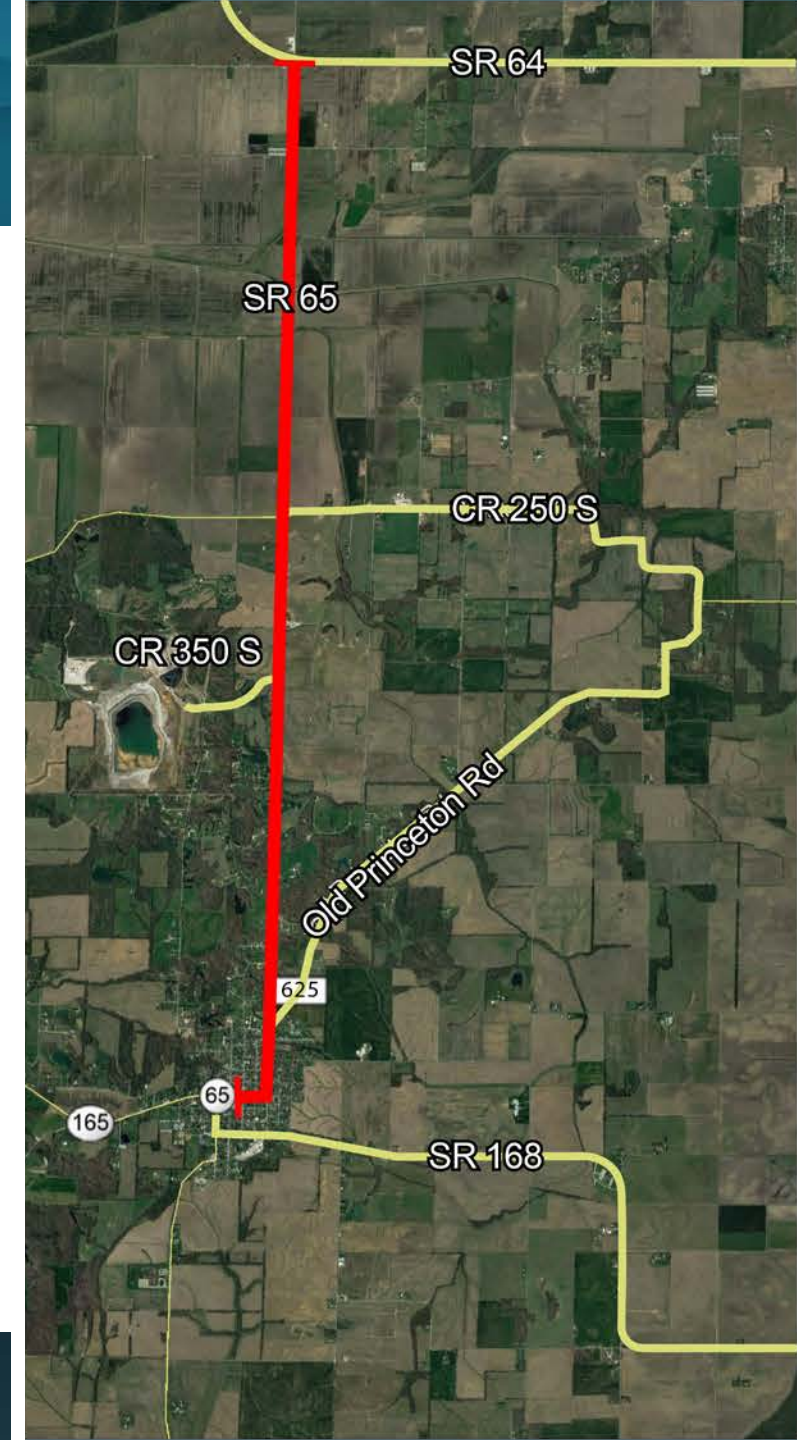


MAINTENANCE OF TRAFFIC



SR 65 – FDR CONTRACTORS

- E&B Paving, Inc.- Prime/Paving Contractor
- Javelina Construction, Inc. - 4" Mill
- Specialties Company, LLC - 10" FDR
- Weddle Bros. Highway Group, LLC - Fine Grading of FDR



QUESTIONS?

Kent Davis, INDOT PM

Andy Pinkstaff, INDOT AE

Dave Dallas, INDOT Pavement

Lochmueller Group, Jeff Whitaker

American Structurepoint, Ken Olsen

American Structurepoint, Todd Richardson

E&B Paving, Nick Chapman

Specialties Company, Joe Hile

