



National Transportation Safety Board

Vehicle Collision with Student Pedestrians Crossing High-Speed Roadway to Board School Bus

Rochester, Indiana

October 30, 2018

Overview

- Webinar will be recorded
- Submit written questions in the GoToWebinar Question Box
- Individuals and organizations will not be associated with each question
- Webinar recording will be available on www.nts.gov
- Technology issues: rochesterhelp@nts.gov



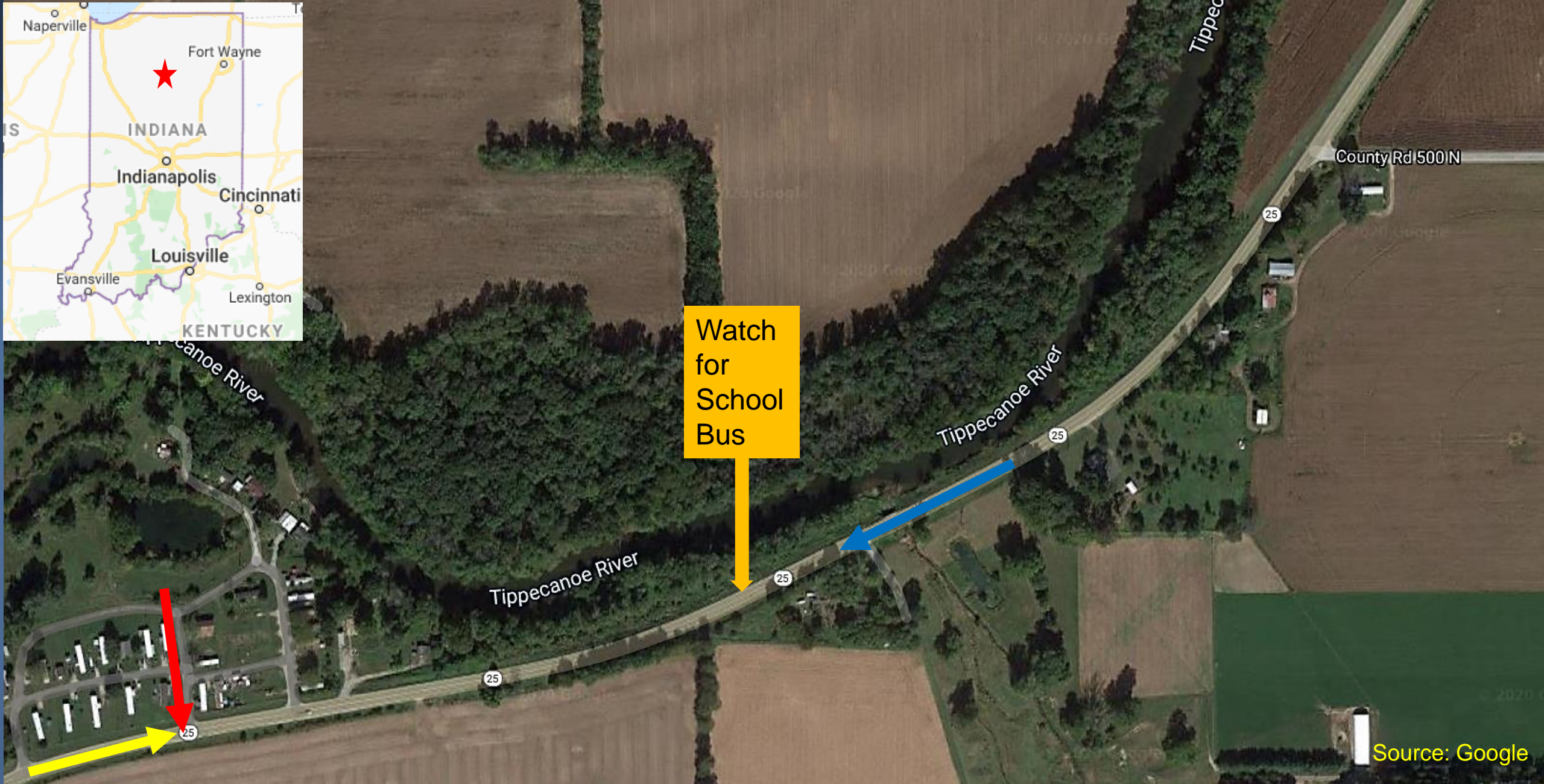
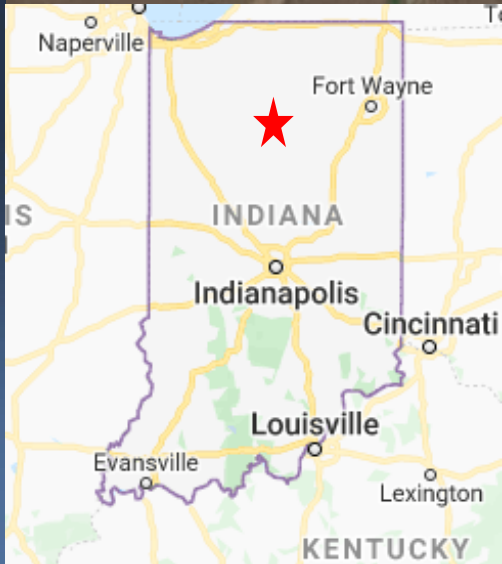
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Rochester, Indiana
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Sheryl Harley
Investigator-in-Charge

Order of Presentations

- Crash Investigation
- Crash Factors
- Education and Enforcement
- School Bus Route Planning and Training
- Vehicle Technologies
- Safety Recommendations



Crash Scene



Source: Indiana State Police

Probable Cause

- The pickup truck driver's failure to stop for the school bus for unknown reasons
- Contributing to the crash was the Tippecanoe Valley School Corporation's
 - Inadequate safety assessment of school bus routes that required student pedestrians to cross a 55-mph roadway, increasing the risk of injury during a collision
 - Failure to establish a clear policy for bus drivers to follow in determining when it is safe to signal students to cross the roadway

Similarities to Other Crash Investigations

Hartsfield, Georgia

- October 25, 2018
- 6:45 a.m. (darkness)
- 10- and 7-year-old males
- Crossing rural state roadway to board bus
- No supplemental lighting
- Speed limit 55 mph
- 1 fatality, 1 serious injury

Baldwyn, Mississippi

- October 31, 2018
- 6:36 a.m. (darkness)
- 9-year-old male
- Crossing rural state roadway to board bus
- No supplemental lighting
- Speed limit 55 mph
- 1 fatality

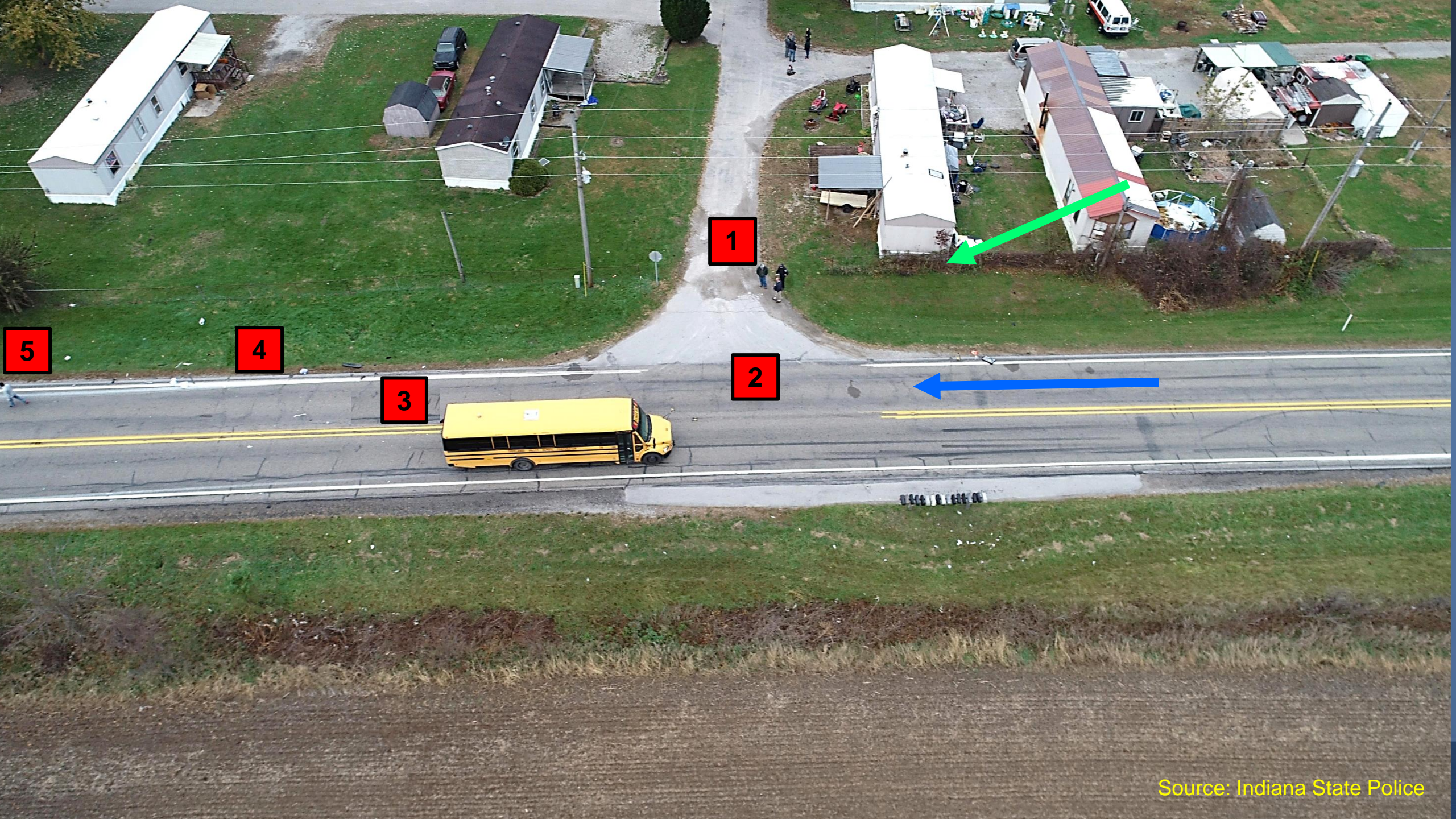


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Crash Factors

Bus Stop #5 – Mobile Home Park





2018–2019 Kansas Department of Education National Loading and Unloading Survey

- 50% involved students waiting for the bus
- 75% occurred during hours of darkness
- 50% occurred on state roadways
- 75% occurred on a rural roadway (mostly two-lanes) with the striking vehicle approaching from the front
- 73% involved students age 9 or younger (a third of these students were age 6)



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Education and Enforcement

Kenny Bragg

Senior Investigator

Human Performance Investigation

- Factors influencing driver behavior
- Physical condition of the pickup truck driver
- Information available to the driver



Excluded as Causal to Crash

- Licensing / experience issues
- Substance impairment
- Cell phone use
- Medical conditions

Driver Response to Advance Warning Signs



1.8 miles prior to the stopped school bus



868 feet prior to the stopped school bus

Driver Response to Visual Information



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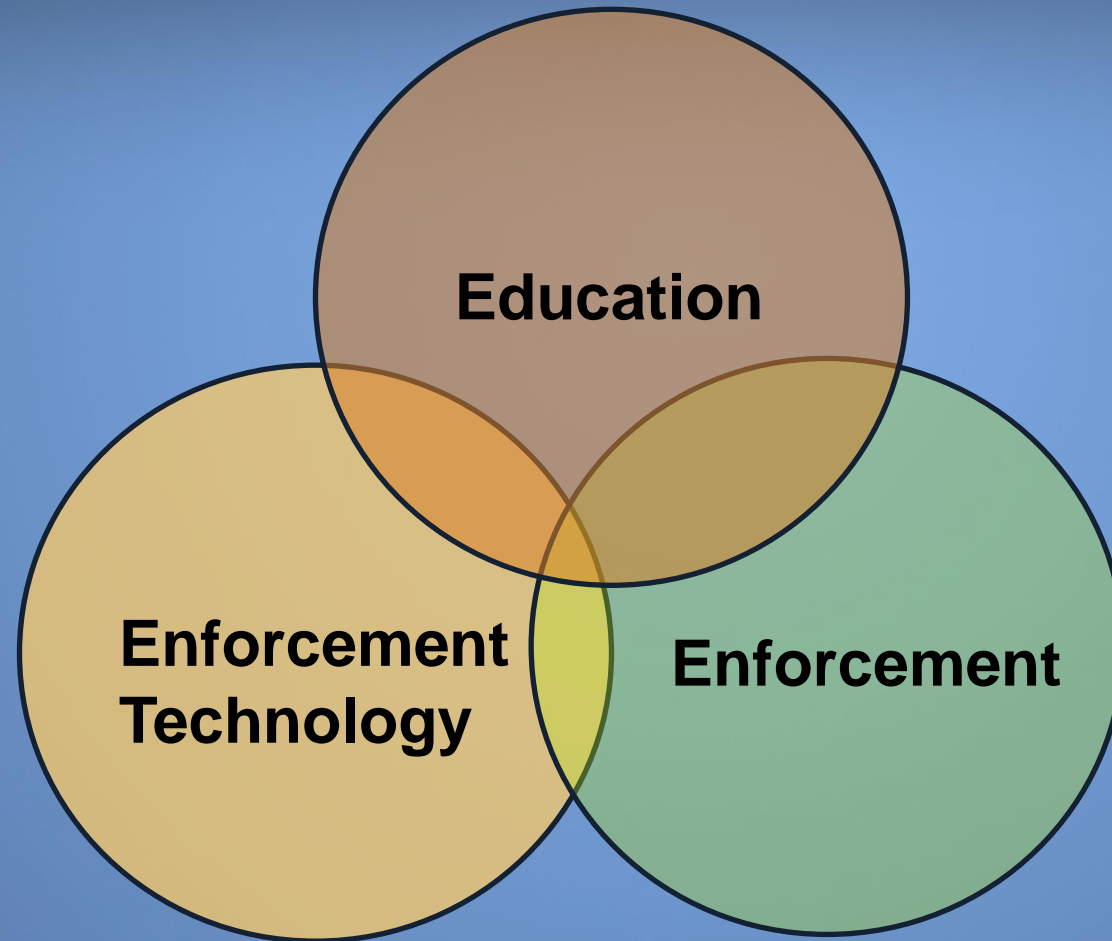
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Statistics Involving Illegal School Bus Passings

- Unlawful to pass a stopped school bus in all 50 states
- In 2018 83,944 incidents/day
- In 2019 95,319 incidents/day
- Illegal school bus passings occur about **17 million times a year**

Source: NASDPTS Annual Survey (2018/2019)

Modifying Driver Behavior



Modifying Driver Behavior

Education

- Service announcements (NHTSA)
- Back-to-school safety tips (NSC)
- School bus safety video (AAP)
- Public safety announcements
- State driving manuals

Modifying Driver Behavior

Enforcement

- Collaborative enforcement
- Enforcement campaigns
- Focused enforcement of school bus violations
- High-visibility enforcement

Enforcement Technology

Stop Arm Cameras



Source: buspatrol.com

Summary

- No medical issues, cell phone use, or impairment
- Visual information available to alert the pickup truck driver
- The pickup truck driver failed to immediately identify the stopped school bus
- Education and enforcement are effective strategies in reducing school bus stop-related crashes




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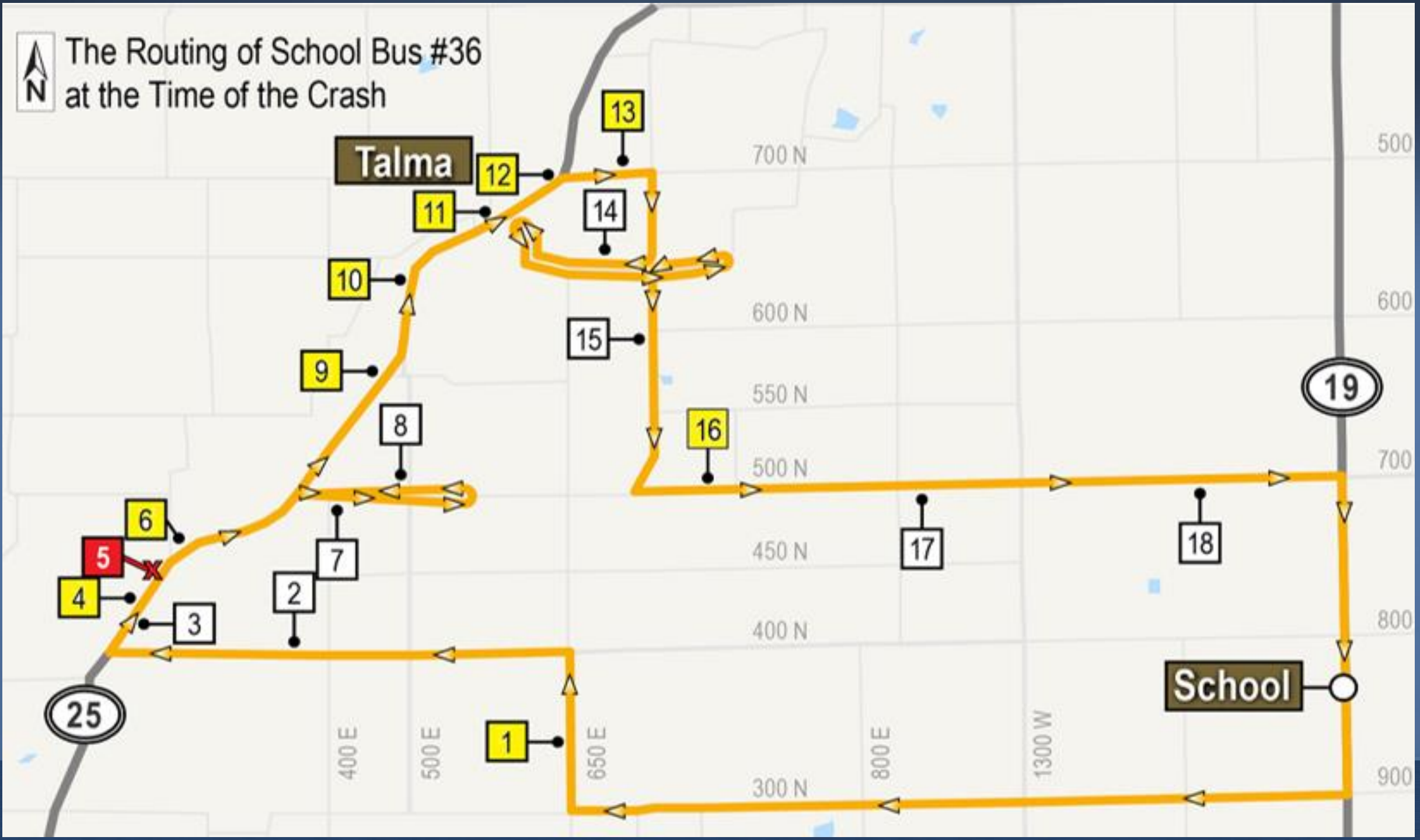
School Bus Route Planning and Training

Shawn Currie
Senior Investigator

Tippecanoe Valley School Corporation

- 5 schools
- 1,788 students
- 44 buses
- 26 drivers
- 24 bus routes

 The Routing of School Bus #36
at the Time of the Crash



Route Planning

- Planned by bus drivers
- Handed down from previous driver
- Routes based on transportation needs
- Safety issues not tracked

Bus Driver Training

- Basic certification course
- Annual recertification
- No training for route risk assessment

Transportation Director Training

- Responsible for student safety and route planning
- Transportation 101
 - Not mandatory
 - Less than 2% of all directors have attended

Student Training

- Conduct
- Emergency evacuation
- Universal crossing signal
 - Horn used as warning signal

Summary

- Students were required to cross high-speed roadway
- Safety of the route
 - Not evaluated
 - No tracking
- Training deficiencies
 - Drivers
 - Transportation director
 - Students



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Vehicle Technologies

Jerome Cantrell
Senior Investigator

Vehicle Factors Investigation



Vehicle Factors Investigation



Source: Indiana State Police

Excluded as Causal to Crash

- Mechanical / operational condition of the pickup truck and school bus
- Lighting and stop arm operation on the school bus

Vehicle Technologies

- NTSB history advocating collision mitigation technologies
- Technology that could prevent or mitigate crashes
- Other available safety options

Technologies Available for the Pickup Truck

2017

- Star Safety System
 - Anti-lock Brake System (ABS)
 - Electronic Brake Force Distribution (EBD)
 - Traction Control (TRAC)
 - Brake Assist (BA)
 - Smart Stop Technology (SST)
 - Vehicle Stability Control (VSC)

2020

- Star Safety System
- **Toyota Safety Sense (TSS-P)**
 - Lane Departure Alert (LDA)
 - Automatic High Beams (AHB)
 - Pre-Collision System with Pedestrian Detection (PCSw/PD)
 - Dynamic Radar Cruise Control (DRCC)

Advanced Vehicle Technology

- Connected Vehicle Technology
- Automated Vehicles
- Pedestrian Automatic Emergency Braking

Technology Available For School Buses



Source: Guardian Angel LLC

- Supplemental lighting
 - Student visibility
 - Bus driver
 - Approaching motorist
 - Provide a pathway
- Predictive stop arm
 - Monitors approaching traffic
 - Audible warning

Technology Available for School Buses

Extended Stop Arms



Summary

- No mechanical or operational issues with the pickup truck or school bus
- Technology can prevent or mitigate crash severity
- No requirement for implementing technology



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Safety Recommendations

Meg Sweeney, Ph.D.
Project Manager

Education and Enforcement

To NASDPTS, NAPT and NSTA:

- Coordinate with local law enforcement agencies to conduct educational and enforcement activities aimed at reducing illegal school bus passings (H-20-18)

To IACP, NSA, and NASRO:

- Work with local school districts to conduct educational and enforcement activities to reduce illegal school bus passings (H-20-19)

Education and Enforcement

To 28 States and the District of Columbia:

- Enact legislation to permit stop arm cameras and allow citations to be issued based on the camera-obtained information (H-20-12)

School Bus Routes

To NASDPTS, NAAPT and NSTA:

- Minimize the use of school bus stops that require students to cross a roadway (especially a high-speed roadway)
- To, at least annually, and whenever a route hazard is identified, evaluate the safety of their school bus routes and stops (H-20-15)

Tracking of School Bus Route Safety Concerns

To TVSC:

- Implement a process to track school bus driver and parent (caregiver) complaints regarding the safety of school bus routes, as well as other safety concerns about bus operations, from initial submission of an issue to its resolution (H-20-20)

Training – School Bus Route and Stop Safety Assessment

To IDOE:

- Supplement training program with a module on how to assess the safety and risks of school bus routes and stops (H-20-13)
- Require local school transportation directors and others to complete the training (H-20-14)

To NASDPTS, NAPT, and NSTA:

- Remind members to ensure those involved in evaluating school bus routes and stops complete training (H-20-16)

Training – Crossing Procedures

To TVSC:

- Train school bus drivers and students on crossing procedures (H-20-21)

To NASDPTS, NAAPT, and NSTA:

- Advise members to train their school bus drivers and students on crossing procedures (H-20-17)

Technology – Reduce Illegal School Bus Passings

To NHTSA:

- Evaluate the effectiveness of technologies designed to reduce the incidence of illegal school bus passings
- Publish and disseminate the evaluation results (H-20-11)

Technology – Pedestrian Automatic Emergency Braking

To NHTSA:

- Incorporate pedestrian safety systems, including pedestrian collision avoidance systems and other more-passive safety systems, into the New Car Assessment Program (H-18-43)

Technology – Connected and Automated Vehicles

To NHTSA:

- Develop minimum performance standards for connected vehicle technology for all highway vehicles (H-13-30)
- Require this technology to be installed on all newly manufactured highway vehicles (H-13-31)
- Evaluate how effectively entities include school bus operations in their self-assessment reports (H-20-10)

Summary

- 12 new safety recommendations
- 3 reiterated safety recommendations
- Issue areas:
 - Education and enforcement
 - School bus route planning and training
 - Technology



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Rochester report, safety recommendations, and webinar recording
available at:

www.nts.gov