

# **WORK ZONE SAFETY**

---

Mark Buckalew, P.E.

Delaware Department of Transportation  
Chief of Construction and Materials

# WORK ZONE SAFETY



# The lower the digitization the more interesting to us

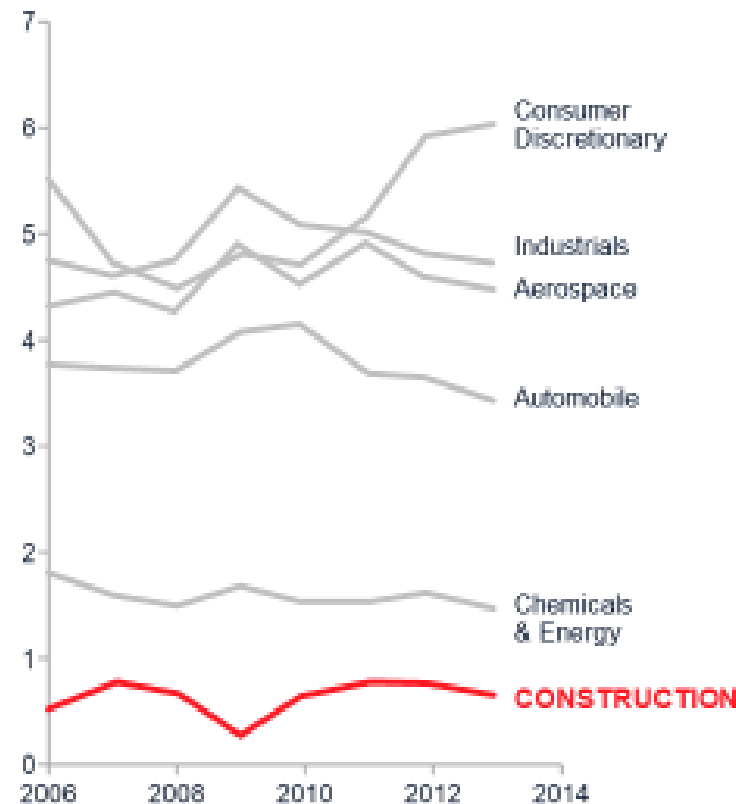
## Level of Digitization

MGI industry digitization index, 2015 or latest available data



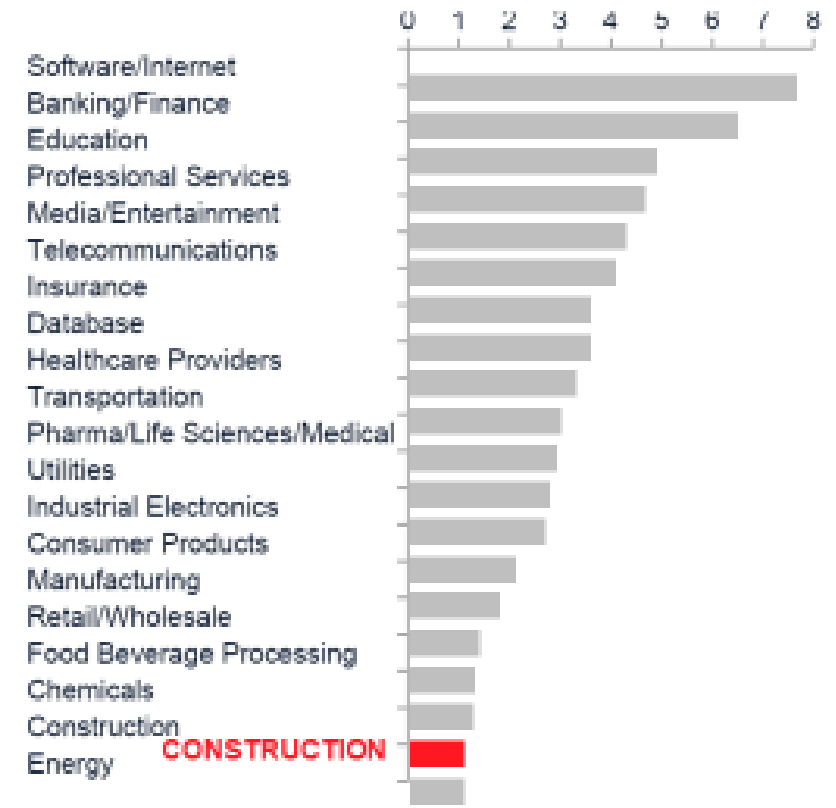
## R&D Investment

% of revenue spent on R&D



## IT Spending

% of revenue spent on IT



<sup>1</sup> Based on data of top 20 E&C companies by market value globally. <sup>2</sup> Top 20 companies by market value

# ADVANCED DIGITAL CONSTRUCTION MANAGEMENT SYSTEM (ADCMS)

- FHWA awarded grants totaling \$34 million to several DOT applicants
- DelDOT led group of DOT's and industry partners in an application was awarded \$4 million
- Partnering states include Iowa DOT, Nebraska DOT, Louisiana DOT, Iowa State University, and HaulHUB Technologies
- Develop a Work Zone Safety Feed in partnership with Waze
- Gather data from equipment to develop automations to inspection
- Pilot started on the SR 72 paving project.

# CONNECTED EQUIPMENT



JOHN DEERE

**CAT**  
CATERPILLAR®



GREGGO  
AND  
FERRARA  
INC.

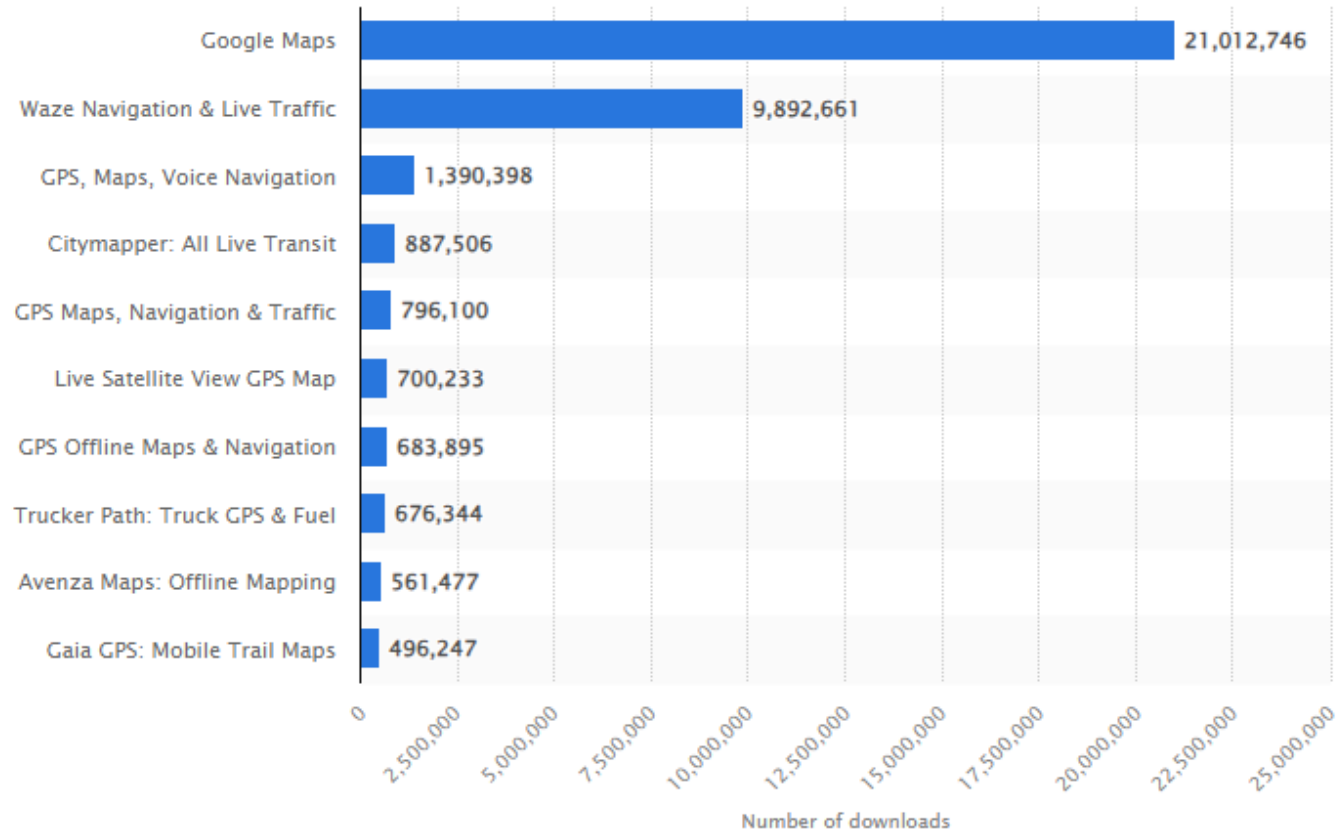


waze



# WORK ZONE SAFETY – MAPPING APPLICATIONS

Leading mapping apps in the United States in 2023, by downloads



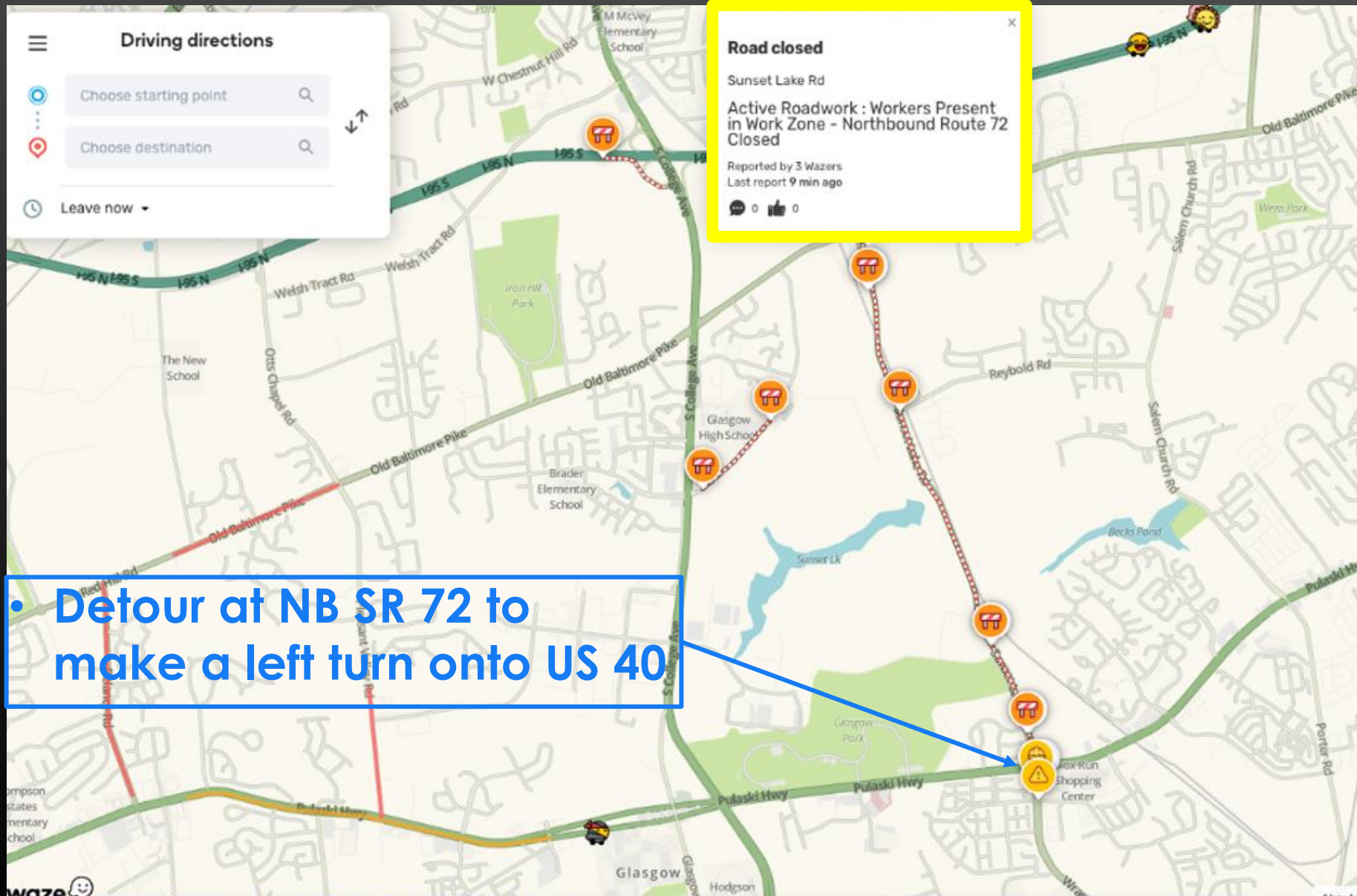
[Additional Information](#)

© Statista 2024

[Show source](#)



# WAZE ACTIVE WORK ZONE VIEW



# CONNECTING EQUIPMENT

The screenshot displays a mobile application interface. At the top, there is a 'Driving directions' panel with input fields for 'Choose starting point' and 'Choose destination', and a 'Leave now' dropdown. To the right, a 'Road closed' notification for Sunset Lake Rd is shown, indicating 'Active Roadwork : Workers Present in Work Zone - Northbound Route 72 Closed'. Below these elements is a list titled '17 Connected Equipment'. A search bar labeled 'Search by Model...' is positioned above a table with five rows of equipment data. The background shows a map with a red route and various location markers.

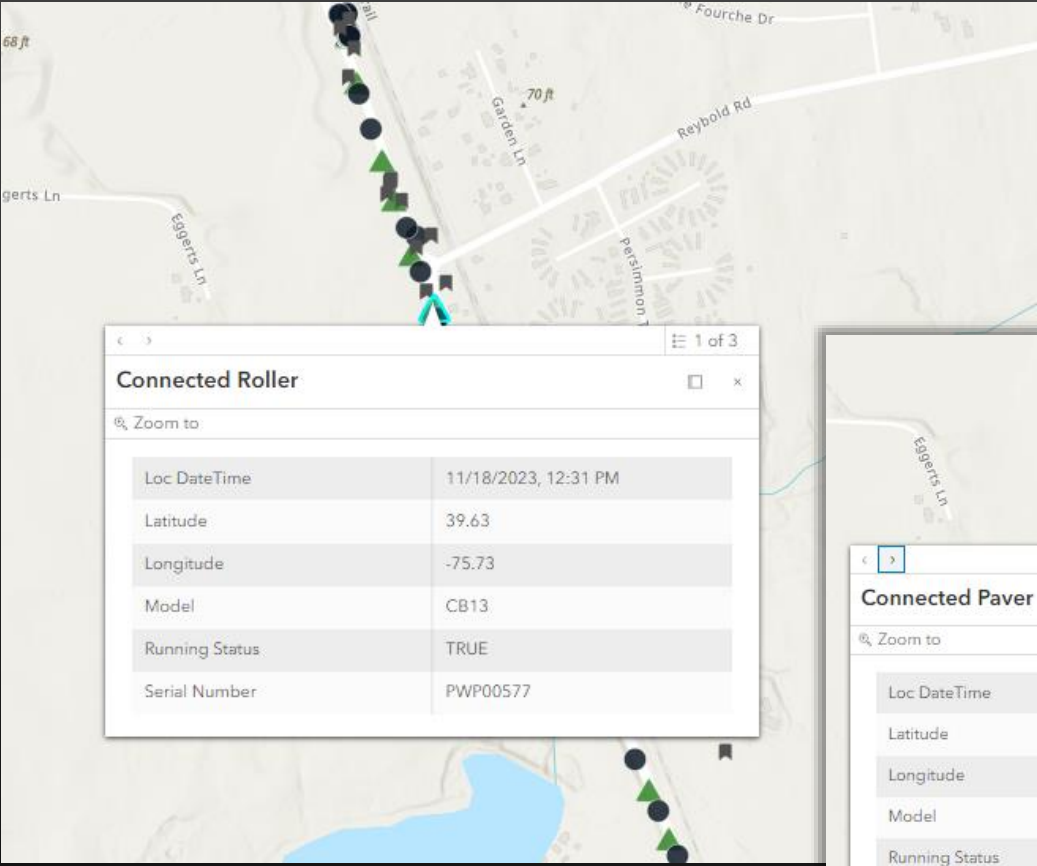
### 17 Connected Equipment

Search by Model...

Status	OEM	Model	Equipment ID
● Off	CATERPILLAR	AP655F	MH600319
● Off	CATERPILLAR	CB10	L9R00330
● Off	CATERPILLAR	950 GC	M5T06353
● Off	CATERPILLAR	242D	DZT04128
● Off	CATERPILLAR	CB7	M5R00129



# CONNECTING EQUIPMENT

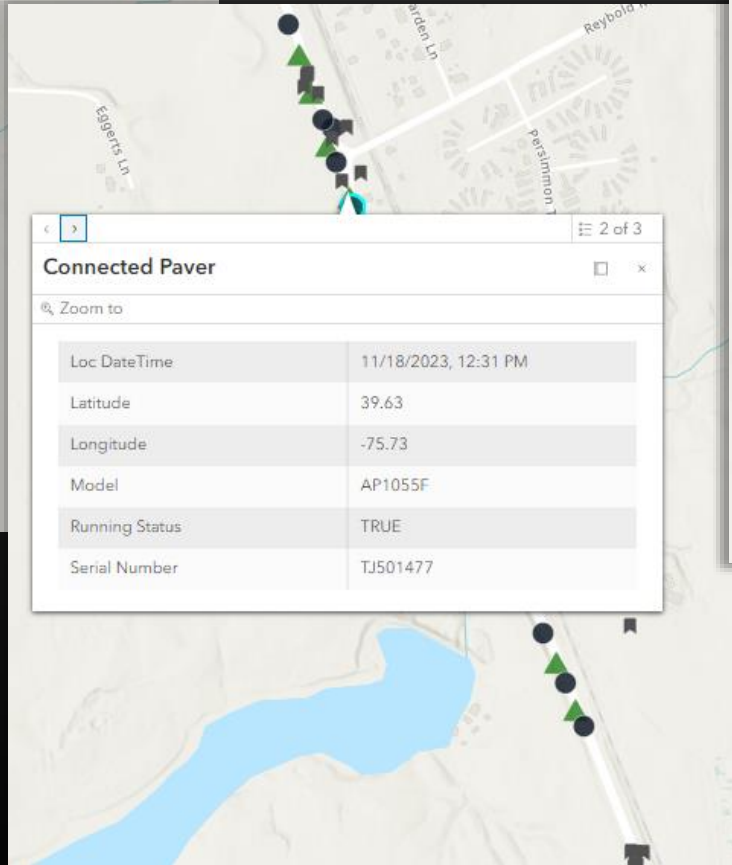


1 of 3

### Connected Roller

Zoom to

Loc DateTime	11/18/2023, 12:31 PM
Latitude	39.63
Longitude	-75.73
Model	CB13
Running Status	TRUE
Serial Number	PWP00577

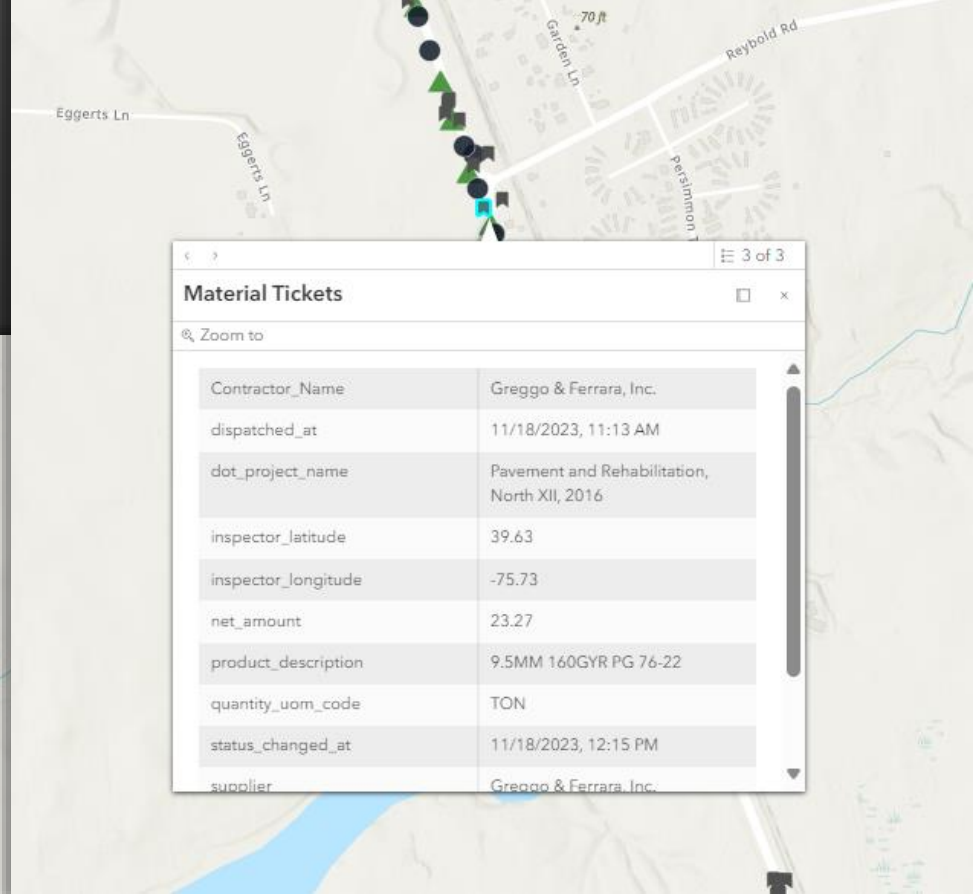


2 of 3

### Connected Paver

Zoom to

Loc DateTime	11/18/2023, 12:31 PM
Latitude	39.63
Longitude	-75.73
Model	AP1055F
Running Status	TRUE
Serial Number	TJ501477



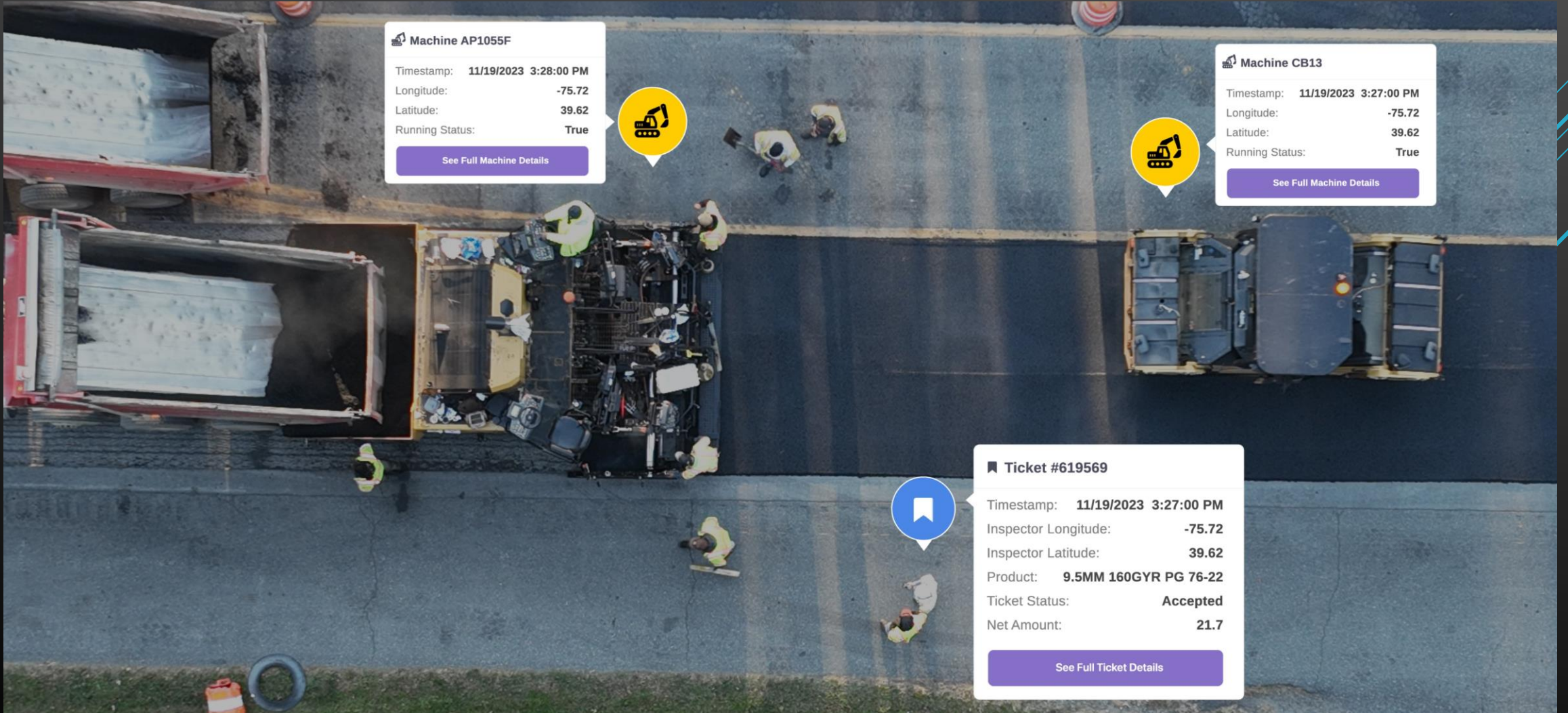
3 of 3

### Material Tickets

Zoom to

Contractor_Name	Greggo & Ferrara, Inc.
dispatched_at	11/18/2023, 11:13 AM
dot_project_name	Pavement and Rehabilitation, North XII, 2016
inspector_latitude	39.63
inspector_longitude	-75.73
net_amount	23.27
product_description	9.5MM 160GYR PG 76-22
quantity_uom_code	TON
status_changed_at	11/18/2023, 12:15 PM
supplier	Greggo & Ferrara, Inc.

# CONNECTED WORK ZONE



 **Machine AP1055F**


Timestamp: **11/19/2023 3:28:00 PM**  
Longitude: **-75.72**  
Latitude: **39.62**  
Running Status: **True**

[See Full Machine Details](#)

 **Machine CB13**

Timestamp: **11/19/2023 3:27:00 PM**  
Longitude: **-75.72**  
Latitude: **39.62**  
Running Status: **True**

[See Full Machine Details](#)

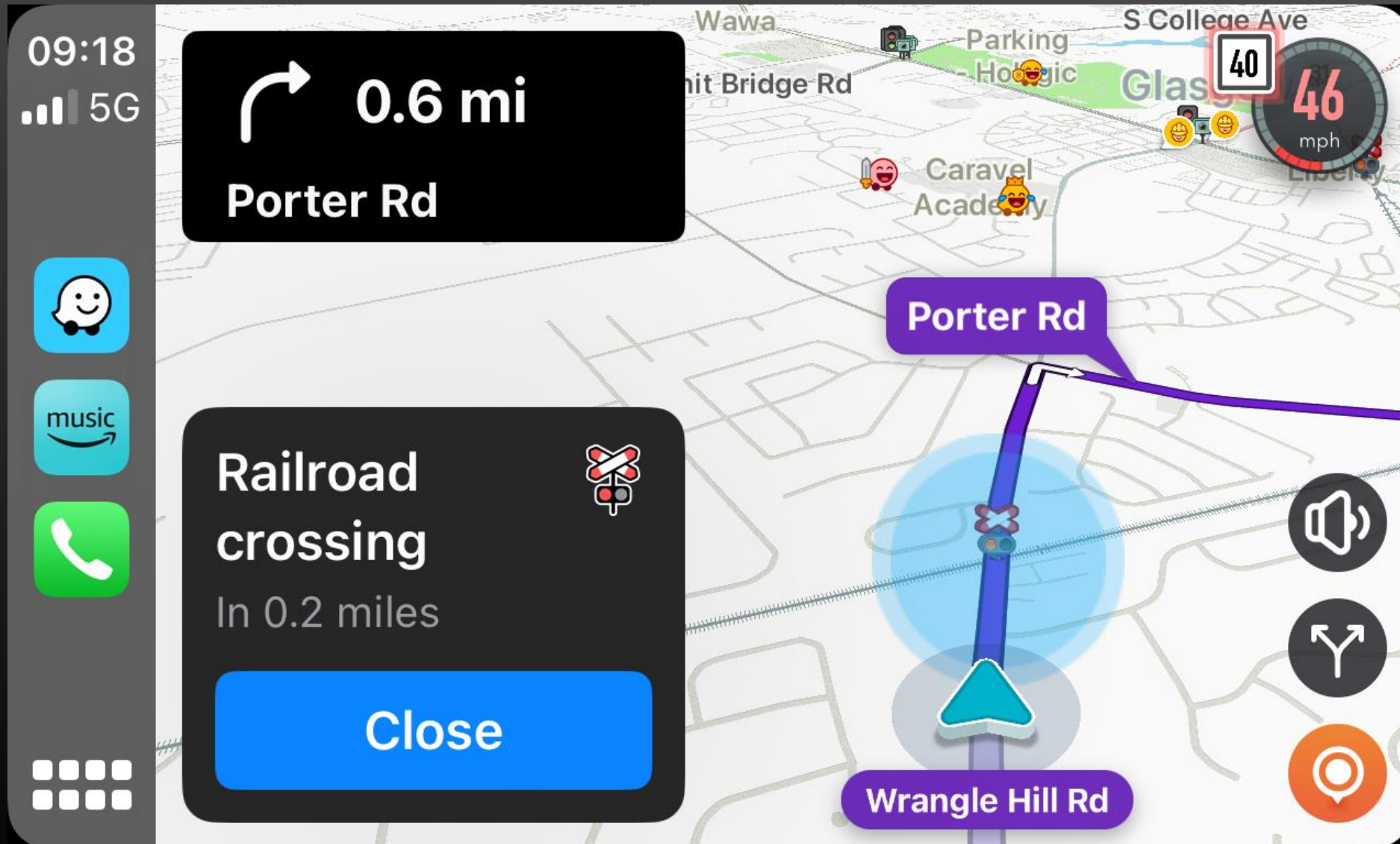
 **Ticket #619569**

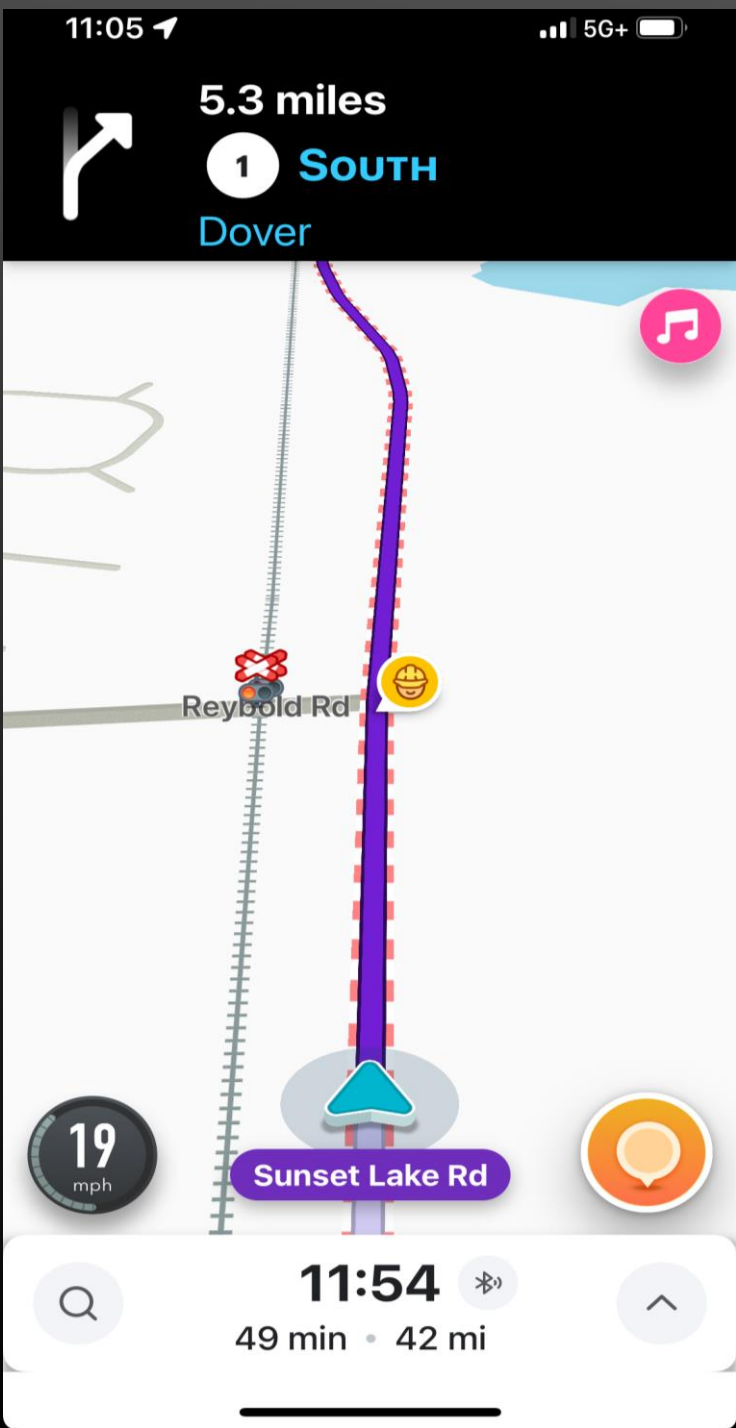
Timestamp: **11/19/2023 3:27:00 PM**  
Inspector Longitude: **-75.72**  
Inspector Latitude: **39.62**  
Product: **9.5MM 160GYR PG 76-22**  
Ticket Status: **Accepted**  
Net Amount: **21.7**

[See Full Ticket Details](#)



# WAZE PROMPTED DETOUR





# CONNECTED WORK ZONE DRIVER VIEW

# FINAL THOUGHTS.../QUESTIONS?

- **Data from pavers:** Location, mix through the machine, temperature of the mix, cross-slope, elevations, rideability improvement, etc. What can we automate in our processes?
- **Data from rollers:** Smart compaction, pavement mat temperature, roller speeds, amplitude and vibration frequencies of the roller drum. Can we replace destructive testing?
- **What other equipment can we connect? Message boards, arrow panels, truck-mounted attenuators, etc.**
- **Can we expand the safety feed?**
- **Questions?**