Enhancing Road Safety Management: A Demonstration of the Safety Asset Management Tool

Improving Safety and Efficiency through Advanced Asset Tracking





What is Safety Asset Management?





* An organized system for managing critical safety assets

- signs, inlaid pavement markers, high friction surface treatments (HFST), and other safety related infrastructure
- Ensures safety assets are properly maintained, monitored, and updated to enhance public safety and operational efficiency



Why GIS for Safety Asset Management?

- * Allows for better prioritization of maintenance and replacement.
- * Enhances overall safety and operational decision-making.
- Proactive safety management can prevent accidents and reduce risks.
- Comprehensive Mapping & Visualization:
 - GIS provides a centralized, digital map for all safety-related assets in the St.
 Louis District, making it easier to identify and monitor asset locations.
- Data Integration:
 - Allows potential integration of various data types with asset information to make informed decisions (e.g., traffic, weather, crash history)







How the GIS Safety Asset Management System Works

Key Components

- * Asset Inventory:
 - > Collects and stores detailed information using ArcGIS platform
 - > Assets are geo-located, providing accurate placement information

Interactive Dashboard:

- > A user-friendly interface
 - Displays asset locations, installation year, and projected replacement year
- > Customizable views and filters
 - Allows for decision-makers to focus on the most critical assets or areas
- Data Updates and Integration:
 - Real-time updates
 - Field inspections and surveys can be incorporated into the system
 - > GIS-based data can integrate seamlessly with other datasets (eg. traffic and crash history)



Basics of Building the ArcGIS Safety Asset Management







- Data Sources:
 - As Built plans
 - Existing
 - spreadsheets
 - Field Verified
- System Requirements
- User Requirements
- Data Verification Process

Interactive Dashboard





Map Visualization Interactive GIS Map Layer Controls



Asset Inventory

Search and Filter Options



Data Analytics Performance Metrics





Data Exports



Live Demonstration

MoDOT Safety Asset Management System



Order of Operations: Overview of landing page Legend – layers **Charts**\graphs Tables – for each geometry type Select a record to view attribute table, photos, as-builts Legend

Options on top panel – Route, Replacement Year, MoDOT Project





Landing Page



Legend\Layers







Charts\Graphs















Asset Verified	Direction of Travelway	Asset Type	Route	TRAVELWAYID	Replacement Year	Sign Designation	Sign Designation Enhanced Visibility		Interactive	Power Source	
Yes	S	SIGN	RT W S	7315	2027	M2-1		J6S3147	No	NA	Relocate
Yes	S	SIGN	RT W S	7315	2027	M1-1		J6S3147	No	NA	Relocate
Yes	S	SIGN	RT W S	7315	2027	M1-4		J6S3147	No	NA	Relocate
Yes	S	SIGN	RT W S	7315	2027	M1-5a		J6S3147	No	NA	Relocate
Yes	S	SIGN	RT W S	7315	2027	R16-27		J6S3147	No	NA	relocate
Yes	S	SIGN	RT W S	7315	2027	R2-1		J6S3147	No	NA	relocate
Yes	N	SIGN	RT W N	7316	2027	R2-1		J6s3147	No	NA	Relocate
Yes	N	SIGN	RT W N	7316	2027	R1-1		J6S3147	No	NA	Relocate
Yes	N	SIGN	RT W N	7316	2027	Other		J6S3147	No	NA	Relocate
Yes	N	SIGN	RTWN 7316		2027	W1-6		J6S3147	No	NA	Relocate
Yes	S	SIGN	RT W S	7315	2027	R2-1		J6S3147	No	NA	Relocate
34	e	niew.	ner source	2010		14/4 D 14 D		1200117	N I	8.1 A	n.1
Points	Lines Polyg	jons									

Editing Data







,	,SIGN						
0	ी, Zoom to 👍 Pan						
	Asset Verified	Yes	*				
	Street View	View					
	Direction of Travelway	W					
	Asset Type	SIGN					
	County	St Charles					
	Route						
	TRAVELWAYID						
	Year Installed	2020					
	Expected Life	10					
	Replacement Year	2030					
	Number of Lanes						
	Number of Lifts						
	Location on Pavement	Inside Median (Left)					
	Sign Designation	R5-1a					
	Sign - Other	R5-1a					
	Sign Dimensions	42x30					
	Sign Description	Wrong way sign facing east					
	Mounting Type	Post					
	Enhanced Visibility						



Filter Options – No Filters





Filter Options – Route Filter





Filter Options – Year Filter



	And the second second second second	and the second s	Contraction of the	A CONTRACTOR OF CONTRACTOR		Carlos and the second	AND A CONTRACT OF A CONTRACT	OF PARTY PARTY I				
	S	SIGN	RT FT S	658	2030 R6-1		J163498	No	NA	Asset cannot be verified in street view imagery, appears to have been added to stop sign; R6-1 One Way; As builts do not include Log Mile or Stationing; Mount to existing 4* pipe post.		https://www.google.com/maps/@?api=1↦_ac
5	N	SIGN			2030 RS-1a		J6P3584	No	NA	R5-1a Wrong Way, As builts do not include Log Mile or Stationing. New 2.5° pipe post and FTG.		https://www.google.com/maps/@?api=1↦_ac
s	E	SIGN	MO 364 E	279557	2030 R5-1a		J6P3584	No	NA	R5-1a Wroeg Way; As-builts do not include Log Mile or Stationing. New 2.5* pipe post and FTG.		https://www.google.com/maps/@?api=1↦_ac
E.	E	SIGN			2030 RS-1	1	J6P3584	No	NA	Cannot verify safety asset in street view imagery; RS-1 Do Not Enter; As-builts do not include Log Mile or Stationing. New 2.5° pipe post and FTG. Jul 2022 imagery has both signs on one post differing from plans with the street view imagery; RS-1 Do Not Enter; As-builts do not include Log Mile or Stationing. New 2.5° pipe post and FTG. Jul 2022 imagery has both signs on one post differing from plans with the street view imagery; RS-1 Do Not Enter; As-builts do not include Log Mile or Stationing. New 2.5° pipe post and FTG. Jul 2022 imagery has both signs on one post differing from plans with the street view imagery; RS-1 Do Not Enter; As-builts do not include Log Mile or Stationing. New 2.5° pipe post and FTG. Jul 2022 imagery has both signs on one post differing from plans with the street view imagery in the street view imagery.		https://www.google.com/maps/@?api=1↦_ac
	E	SIGN	RTNE	6331	2030 R6-1		J6P3584	No	NA	New 2.5° pipe post and FIG.		https://www.google.com/maps/@?api=1↦_ad
E.	E	SIGN	RTNE	6331	2030 R5-1		J6P3584	No	NA	New 2.5" pipe post and FTG.		https://www.google.com/maps/@?api=1↦_ac
	E	SIGN	RTNE	6331	2030 R5-1		J6P3584	No	NA	New 2.5" pipe post and FTG.		https://www.google.com/maps/@?api=1↦_ac
5	w	SIGN	MO 364 W	279556	2030 R6-1R	1	J6P3584	No	NA	R6 1R One Way; As builts do not include Log Mile or Stationing. New 2.5* pipe post w/ FTG. https://www.google.com/		https://www.google.com/maps/@?api=1↦_ac
š.	W	SIGN	MO 364 W	279556	2030 R5-1		J6P3584	No	NA	R5-1 Do Not Enter; As-builts do not include Log Mile or Stationing: New 4* pipe post w/FTG.		https://www.google.com/maps/@?api=1↦_ac
5	W	SIGN	MO 364 W	279556	2030 RS-1		J6P3584	No	NA	R5-1 Do Not Enter; As-builts do not include Log Mile or Stationing; New 4* pipe post w/ FTG.		https://www.google.com/maps/@?api=1↦_ac
8	E	SIGN	MO 364 E	279557	2030 R6-1	1	J6P3584	No	NA	Cannot verify safety asset in street view imagery; R6-1 One Way; As builts do not include Log Mile or Stationing. New 2.5* pipe post w/ FTG. Differs from PDF design, installed on DNE	ž	https://www.google.com/maps/@?api=1↦_ac
	e	CIPAI	NICOLEE.	030553			Innora4	1	***	The second	2	4. ₁₁ 27 F. 1 1.200 + 4.0.
Points	Lines Poly	/gons										



Filter Options – Year Filter

Route MoDOT Project MoDOT Safety Asset Inventory Replacement Year No category selected No category selected J613384 MODOT SAFETY ASSETS MoDOT Safety Asset - Point PAVEMENT MARKING ♦ REFLECTORIZED BACKPLATE SIGN Modot Safety Asset - Line Barriers • • Bridge Approach Transition - Chevron Guard Cable Guardrails Inlaid Pavement Markers Permanent Striping Rumbles 25 MoDOT Safety Asset - Polygon 20 High Friction Surface Treatment Intersection Geometrics Improvement Pedestrian Hybrid Beacon 10 MO MoDOT Roads Routes MUTCD Designation MO County Boundaries Replacement Year Enhanced Visibility 5102 MUTCD Designation 1 -Asset Verified Direction of Travelway Asset Type Route TRAVELWAYID Replacement Year Sign Designation Enhanced Visibility MoDOT Project Interactive Power Source Number of Lanes Number of Lifts

and the second second		7.1 1999 20 - 20 - 20	and a state of the state	Construction of the second sec	of the second strain a second states	2.5 Comparison of the second secon	12 Canada Salaka Cara		
Yes	E	SIGN	1S 70 E	19 20	29 R5-1a	J613384	No	R5-1a Wrong Way; As-builts do not include Log Mile or Stationing	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.70039915157029;90.2648317073254
No	E	SIGN	15 70 E	19 .20	29 R5-1a	J613384	No	NA R5-1a Wrong Way; Asset cannot be verified in street view imagery; As-builts do not include Log Mile or St	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.70029681440297, 90.26490084885619
Yes	E	SIGN	1S 70 E	19 20	29 R5-1	J613384	No	NA R5-1 Do Not Enter; As-builts do not include Log Mile or Stationing	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.70026518283428,90.26450030534237
Yes	E	SIGN	IS 70 E	19 20	29 R3-2	J613384	No	NA R3-2 No Left Turn; As builts do not include Log Mile or Stationing	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.7003005356806, 90.26420228206035
Yes	E	SIGN	1S 70 E	19 20	29 R3-1	J613384	No	NA R3-1 No Right Turn; As-builts do not include Log Mile or Stationing	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.700128422181464, 90.26453487610777
Yes	E	SIGN	15 70 E	19 20	29 R5-1	J613384	No	NA RS-1 Do Not Enter; As-builts do not include Log Mile or Stationing	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.700158193168186;90.2645932881608
No	E	SIGN	IS 70 E	19 20	29 R5-1	3613384	No	NA Asset cannot be verified in street view imagery; As-builts do not include Log Mile or Stationing RS-1 Stop	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.700518525233996; 90.26541396924142
No	E	SIGN	IS 70 E	19 20	29 Other	.1613384	No	NA Parts of asset cannot be verified in street view imagery; As-builts do not include Log Mile or StationingSto	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.70060932533314, 90.26533806249823
No	E	SIGN	1S 70 E	19 20	29 R5-1a	J613384	No	NA Asset cannot be confirmed in street view imagery; RS-1a Wrong Way; As-builts do not include Log Mile or	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.70068866850047,90.26545060433534
No	E	SIGN	IS 70 E	19 .20	29 RS-1a	J613384	No	NA Asset could not be verified in street view; R5-1a Wrong Way; As-builts do not include Log Mile or Stationing	https://www.google.com/maps/@?api=1↦_action=pano&viewpoint=38.70075951326889,90.26537128309576
Yes	E	SIGN	1S 70 E	19 20	28 R5-1	J613384	No	NA R5-1 Do Not Enter with two One Ways stacked on top; As builts do not include Log Mile or Stationing	https://www.google.com/mapa/@?api=1↦_action=pano&viewpoint=38.69388302666393,90.26064356294316
140	1.0	Cursu.	10.20.0	1.0	an lor a	1/1000.4		THE DECKNOPS SALES AT A STATE AT A STATE AND A SALES	
Points	Lines Poly	gons							

The Benefits of GIS Safety Asset Management

Key Benefits

> Improved Decision Making:

By centralizing asset data in an interactive dashboard, decision-makers can make informed, datadriven choices about where to allocate resources for maintenance and improvements.

> Cost Efficiency:

Identifying aging assets early and planning replacements or improvements helps optimize budgets and reduce emergency repairs.

> Increased Collaboration:

With a shared platform, different departments (e.g., traffic, maintenance, design) can work together more efficiently on asset management.





DESIGN GROUP, LLC



How It Benefits MoDOT

Benefits to Date

- * Real-time Data Access:
 - Immediate access to asset location details
 - Faster response times to maintenance requests
- * Improved Reporting:
 - Easier generation of reports for regulatory compliance, budgeting, and stakeholder communications
- * Enhanced Road Safety:
 - Ensures the timely inspection and maintenance of safety-critical assets like traffic signals, guardrails, and bridges, reducing the risk of accidents caused by infrastructure failure.

Case Study

MoDOT SL needed a comprehensive program to **manage and maintain roadway safety assets** to improve overall road safety, reduce accidents, and lower maintenance costs while ensuring compliance with federal safety regulations.

Goals

- . Enhance safety
- . Increase efficiency
- . Ensure sustainability
- . Cost reduction

Lessons Learned

- . Data-Driven Decisions
- . Proactive Maintenance
- . Technology Integration





Potential Future Enhancements & Opportunities



- Additional Features:
 - Enhanced reporting tools for long-term strategic planning and asset lifecycle management
 - Crash data layer on the map to identify hotspots and analyze correlations with safety feature locations
 - Aging asset notifications
 - Asset status for preventative maintenance or repairs
 - Wider Integration:

•

•

- Expanding integration with other traffic management systems for even greater insight into overall infrastructure health
- Mobile Integration:
 - Asset data updates directly from mobile devices, improving efficiency and accuracy





Questions & Discussion





Teresa Krenning

TREKK

tkrenning@trekkdesigngroup.com 314.471.4554

Eddie Watkins Missouri Department of Transportation Eddie.Watkins@modot.mo.gov

314.650.5461

Kristen Wenzel TREKK kwenzel@trekkdesigngroup.com

314.920.5352