I-70 & I-270/ I-255 SIGN INSPECTIONS

In the St. Louis District

Leading the Way with GIS

2023 TEAM Conference
Thursday, March 16, 2023

AGENDA

- Project Background
- Database & GIS Setup
- Field Assessment
- Reporting & Analysis
- Subsequent Phases
- Lessons Learned
- Questions & Answers

ASSET MANAGEMENT P.S.A.

INVENTORY

- Types
- Counts
- Location
- Status

ASSESS

- Conditions
- Defects
- Impacts
- Compliance

OPERATE

- Service Levels
- Maintenance
- Repairs
- Replacements

PLAN

- Costs
- Projects
- Programming
- Lifecycle

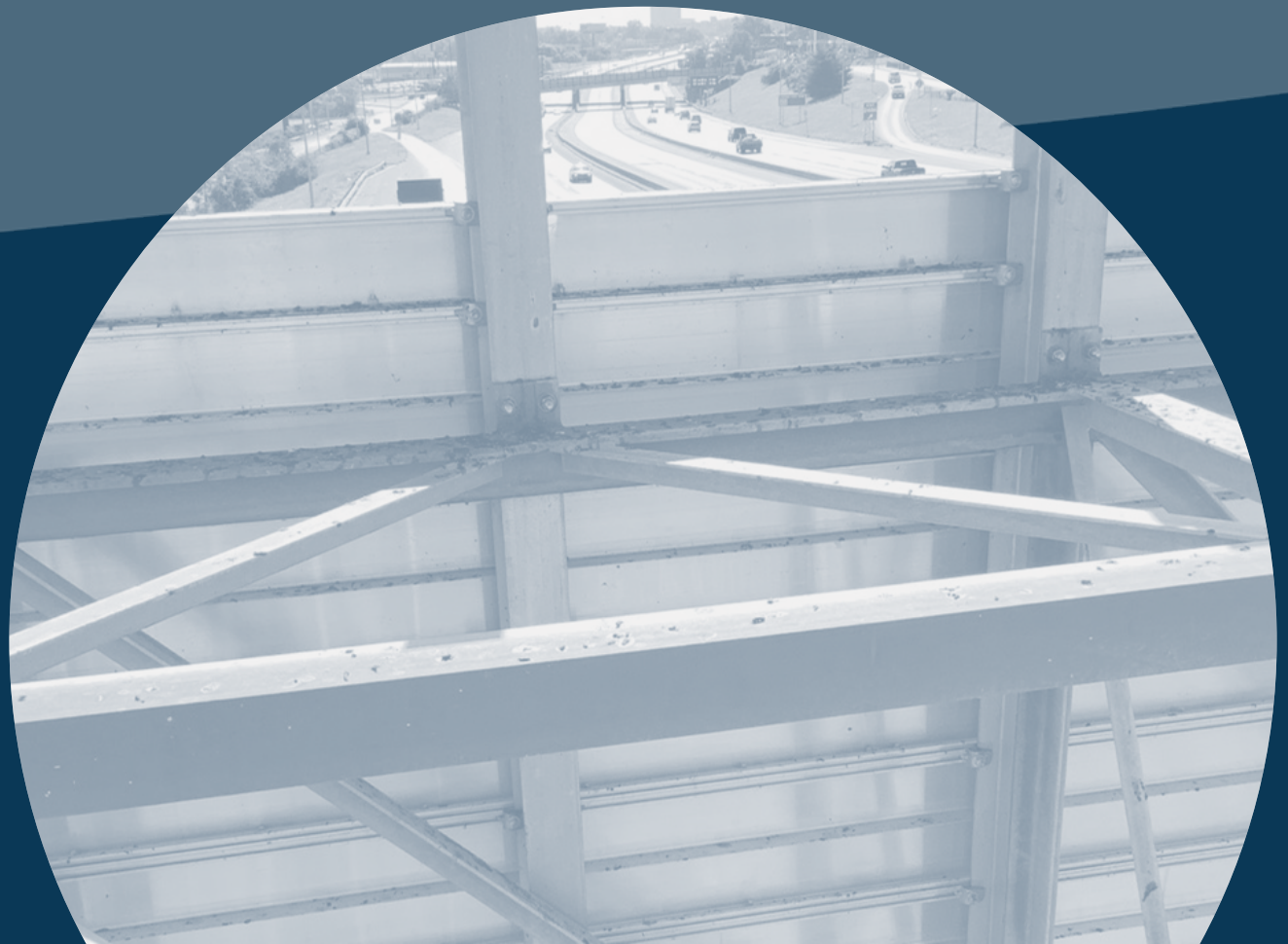
LOCATION MATTERS

“Everything is related to everything else, but near things are more related than distant things”

Waldo Tobler

The First Law of Geography

PROJECT BACKGROUND



PROJECT SCOPE

Perform visual inspections for MoDOT's St. Louis District of all structural signs and components along designated corridors of interstates I-70 & I-270, including delivery of report with recommendations for projects based on inspections. Conceptual, preliminary, and final sign design planned to follow inspections.

Included the following:

- Over 1,700 structural signs
- Almost 76 miles of interstate

TYPES OF SIGNS

GROUND MOUNT

Ground-mounted structural signs are defined as any sign composed of one or more extruded aluminum panels, regardless of the type or number of posts supporting the sign. (Dynamic message signs are also included.)

OVERHEAD

Overhead sign structures are defined as any cantilever, butterfly, simple truss, or tube structure, which holds a highway sign over a lane of a highway, including bridge mounted signs.

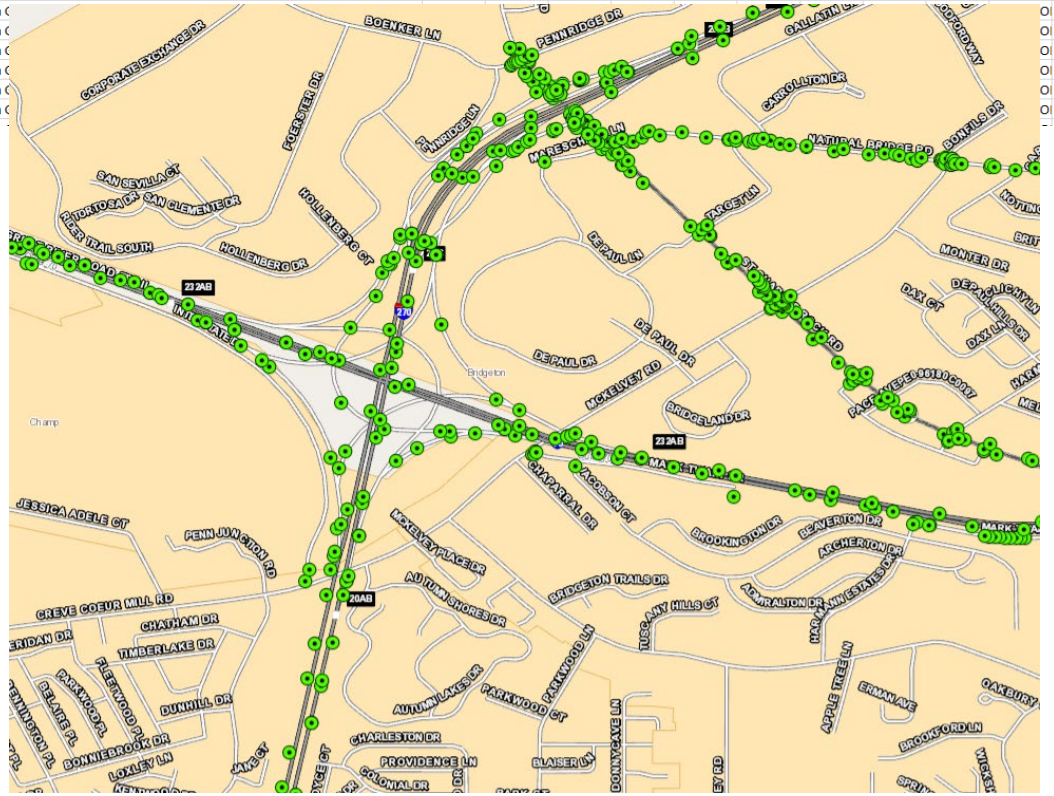
Focus was on MoDOT owned & maintained signs along corridors.

PREVIOUS PROJECTS

We have previously used existing sign information retrieved from MoDOT's Sign Management Database. Recent projects include the I-270 North Design-Build, I-270 Riverview Interchange, and Route EE ADA Improvements in Moberly.

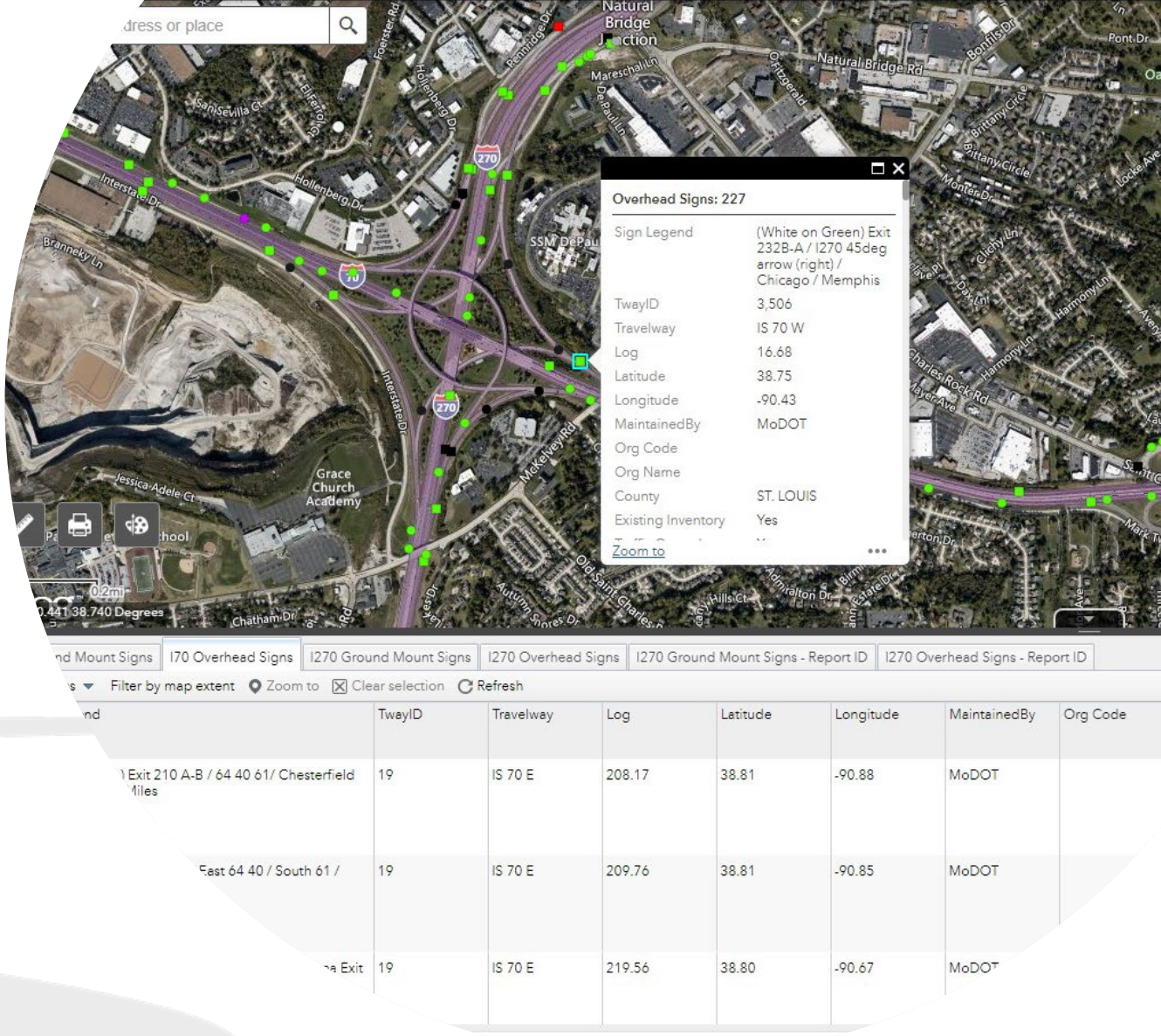
In the case of this project the spreadsheets contained structural sign information exported for multiple queries including by mainline direction, ramps, outer roads, and cities and counties.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Sign Legend	Tway Id	Travelway	Log	Latitude	Longitude	Structure	Structure	Maintaine	Org Code	Org Name	County	Support T	Position	Orientatic	Truss Type
2	(Green and White) Exit 203 T W Foristell 45deg arrow	19	IS 70 E	203.47	38.8173	-90.9588	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
3	White on Green) Exit 208 Wentzville Pkwy 1 1/2 Mile	19	IS 70 E	206.456	38.8048	-90.9059	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
4	White on Green) Exit 210 A-B / 64 40 61/ Chesterfield Hannibal / 1 3/4 Miles	19	IS 70 E	208.169	38.8099	-90.876	Truss	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Overhead	Traffic Fac	Cantilever
5	White on Green) Exit 209 / Z / Church St / 1/2 Mile	19	IS 70 E	208.651	38.8098	-90.8671	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
6	White on Green) Exit 209 / Z / Church St 45deg arrow	19	IS 70 E	209.02	38.8067	-90.8617	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
7	White on Green) Exits 210A-B / 64 40 61 / Chesterfield Hannibal / 3/4 Mile	19	IS 70 E	209.299	38.8055	-90.8568	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
8	White on Green) Troy Bowling Green Exit 210B	19	IS 70 E	209.466	38.8056	-90.8537	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
9	White on Green) Exit 210A / East 64 40 / South 61 / Chesterfield Exit Only	19	IS 70 E	209.764	38.8058	-90.8482	Truss	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Cantilever
10	White on Green) Lambert St Louis Airport Use 70 East	19	IS 70 E	209.845	38.8059	-90.8467	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
11	White on Green 3 signs) East 70 St Louis - Exit 210B/61 North Hannibal 1/4Mile	19	IS 70 E	210.061	38.8061	-90.8427	Truss	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Overhead	Traffic Fac	Box Truss
12	White on Green 2 signs) East 70 St Louis - Exit 210B North 61 45deg arrow Hann	19	IS 70 E	210.559	38.8064	-90.8335	Truss	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Overhead	Traffic Fac	Box Truss
13	White on Green) Exit 217 M K Ofallon 45deg arrow	19	IS 70 E	212.603	38.8048	-90.7957	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
14	White on Green) Exit 214 Lake Stl Blvd 45 deg arrow	19	IS 70 E	213.651	38.804	-90.7763	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
15	White onGreen) Exit 216 Bryan Road 45 deg arrow	19	IS 70 E	215.628	38.8031	-90.7397	Post	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
16	Exit 217/Rt K O'Fallon Main St 45 degree right arrow	19	IS 70 E	217.483	38.80208	-90.7054	Post	0	Unspecifie	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Unspecifie
17	White on Green) Exit 220 MO79 Elsberry Louisiana Exit Only down arrow	19	IS 70 E	219.559	38.8028	-90.6669	Truss	0	MoDOT	7F73	SIGN SHO	ST. CHARL	Post	Right	Traffic Fac	Cantilever
18	White on C														O	Cantilever
19	White on C														O	Butterfly T
20	White on C														O	Box Truss
21	White on C														O	Box Truss
22	White on C														O	Unspecifie
23	White on C														O	Butterfly T



PROPOSED APPROACH

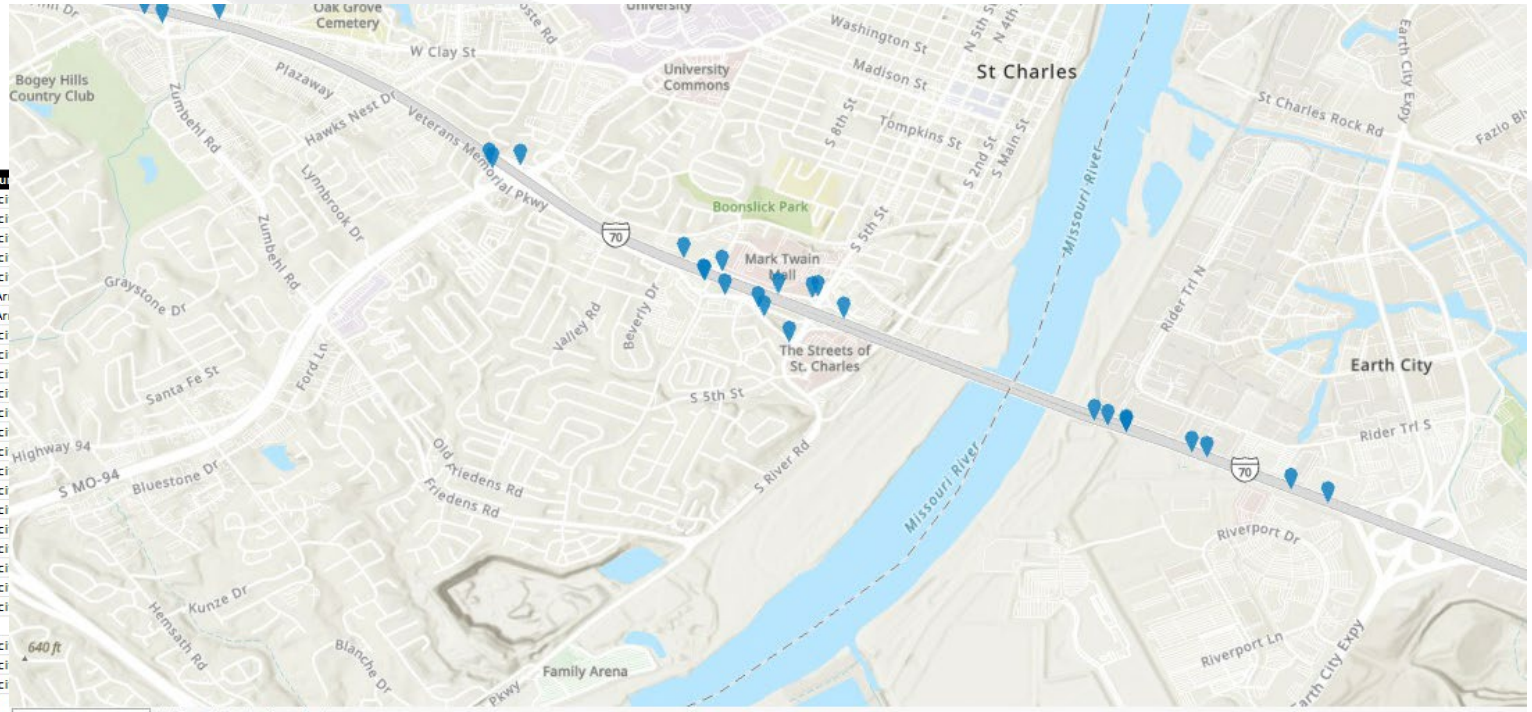
Inspect, track, report, and manage visual structural sign inspections using an interactive GIS database and online mapping, accessible to the project team via any web-browser and field tablets to provide efficiency to the project schedule and budget. The GIS database would also be part of the deliverables to incorporate into MoDOT's sign management systems.



DATABASE & GIS SETUP

EXISTING DATA

TwayId	SignLegend	Travelway	Log	Latitude	Longitude	Structu
104642	College (Left)	RP IS270W TO BIG BEND RD W	0.187	38.56789	-90.44073	Unspeci
104642	(Left) Kirkwood, Valley Park (Right)	RP IS270W TO BIG BEND RD W	0.213	38.56751	-90.44078	Unspeci
104242	Lodging	RP IS270W TO DORSETT RD W W	0.056	38.71678	-90.44732	Unspeci
104242	Food	RP IS270W TO DORSETT RD W W	0.069	38.71661	-90.44738	Unspeci
104242	Gas/Pharmacy	RP IS270W TO DORSETT RD W W	0.091	38.71629	-90.44752	Unspeci
104242	Lane Use Control Left Only/Shared Left T	RP IS270W TO DORSETT RD W W	0.167	38.71527	-90.44801	Mast Ar
104242	Lane Use Control Right Only/Right On R	RP IS270W TO DORSETT RD W W	0.197	38.71469	-90.44788	Mast Ar
105824	Museum (Right)	RP IS270W TO DOUGHERTY FERRY RD W	0.086	38.58329	-90.44876	Unspeci
105824	Growing Together	RP IS270W TO DOUGHERTY FERRY RD W	0.11	38.58295	-90.44876	Unspeci
105824	(Left) Kirkwood, Valley Park 3 (Right)	RP IS270W TO DOUGHERTY FERRY RD W	0.119	38.58282	-90.44877	Unspeci
105824	Food	RP IS270W TO DOUGHERTY FERRY RD W	0.142	38.58248	-90.44881	Unspeci
105824	Wrong Way / Hospital, St. Luke's Des P	RP IS270W TO DOUGHERTY FERRY RD W	0.162	38.5822	-90.44887	Unspeci
105824	Gas	RP IS270W TO DOUGHERTY FERRY RD W	0.18	38.58193	-90.4489	Unspeci
105824	Dougherty Ferry Rd	RP IS270W TO DOUGHERTY FERRY RD W	0.217	38.58117	-90.44883	Unspeci
228006	Gas/Food	RP IS270W TO DUNN RD W	0.027	38.77533	-90.33032	Unspeci
228006	Keep Right Sign (symbol)	RP IS270W TO DUNN RD W	0.07	38.7755	-90.33111	Unspeci
228009	Food	RP IS270W TO DUNN RD W	0.042	38.77262	-90.30438	Unspeci
228009	Keep Right Sign (symbol)	RP IS270W TO DUNN RD W	0.089	38.77277	-90.30513	Unspeci
228011	Keep Right Sign (symbol)	RP IS270W TO DUNN RD W	0.141	38.77164	-90.27858	Unspeci
228013	Food	RP IS270W TO DUNN RD W	0.05	38.77113	-90.25431	Unspeci
228013	Keep Right Sign (symbol)	RP IS270W TO DUNN RD W	0.083	38.77118	-90.25493	Unspeci
6292	South 270 to East 44	RP IS270W TO IS44E E	0.176	38.5462	-90.42744	Unspeci
6292	East 44 50 Left 45 arrow St Louis / MO 3	RP IS270W TO IS44E E	0.432	38.54923	-90.42565	Truss
6292	St Louis Community College (left)	RP IS270W TO IS44E E	0.572	38.5533	-90.41748	Unspeci
6293	Exit 50 mph	RP IS270W TO IS44W W	0.008	38.55117	-90.42974	Unspeci
6293	South 270 to West 44	RP IS270W TO IS44W W	0.269	38.54745	-90.42943	Unspeci
6502	US61 US67 Lemay Ferry Rd down arrow	RP IS270W TO IS55N N	0.589	38.5037	-90.34078	Truss
6502	Exit 40 mph / US61-67 Lemay Ferry Rd D	RP IS270W TO IS55N N	0.738	38.50305	-90.33817	Unspeci
6502	US61 US67 Ahead arrow / North 55 Righ	RP IS270W TO IS55N N	0.758	38.50297	-90.33782	Unspeci
6502	South 270 to North 55	RP IS270W TO IS55N N	0.815	38.5023	-90.3374	Unspeci
6502	West 255 To North 55	RP IS270W TO IS55N N	1.092	38.50429	-90.33624	Unspeci
6502	US50 US61 US67, Lindbergh Blvd Left 2 L	RP IS270W TO IS55N N	1.1	38.50444	-90.33637	Unspeci
6502	West 255 To North 55	RP IS270W TO IS55N N	1.164	38.50553	-90.33687	Unspeci
6501	I55 North St Louis / US61 US67 Lemay Fe	RP IS270W TO IS55S S	0.483	38.50426	-90.3426	Truss
6501	North I-55 ahead arrow / South I-55 45	RP IS270W TO IS55S S	0.519	38.50398	-90.34207	Unspeci
6501	West 255 To South 55	RP IS270W TO IS55S S	0.562	38.50503	-90.33948	Unspeci
6501	Exit 1A Right 45 Arrow	RP IS270W TO IS55S S	0.565	38.50429	-90.3403	Unspeci
6501	South 270 To South 55	RP IS270W TO IS55S S	0.636	38.50261	-90.34091	Unspeci
104402	East 64 40 South 61, Left 45 arrow, St Lo	RP IS270W TO IS64E E	0.092	38.64123	-90.4501	Unspeci
104402	East 64 Left 45 arrow, West 64 Right 45	RP IS270W TO IS64E E	0.136	38.64065	-90.45055	Unspeci
104402	South 270 to East 64	RP IS270W TO IS64E E	0.163	38.64026	-90.45059	Unspeci

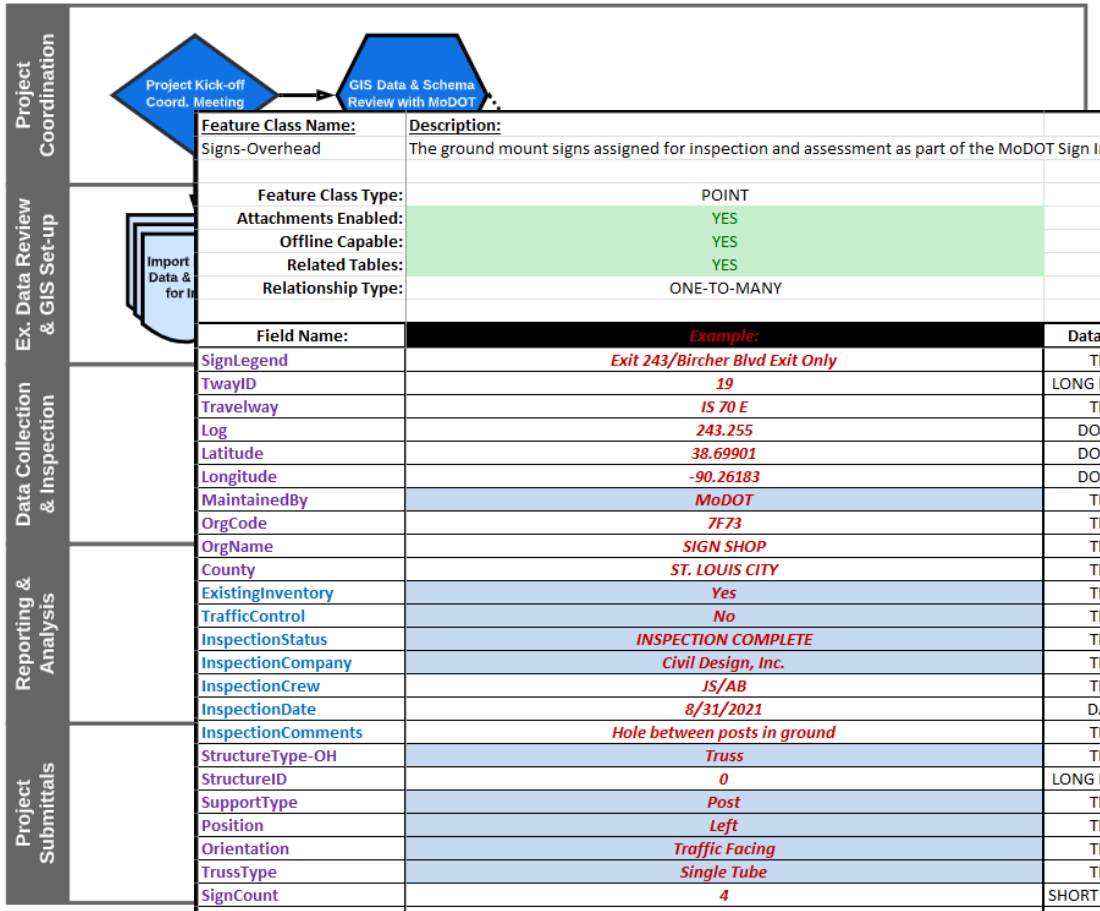


GroundMountSignsEXPORT-20210907

Field: Add Calculate | Selection: Select By Attributes Zoom To Switch Clear Delete Copy | Rows: Insert

	OID	AssemblyID	SignLegend	TwayID	Travelway	Log	Latitude	Longitude	Maintained	OrgCode	OrgName
1	0	{00000000-0000-0000...		1056173	RP FAIRGROUNDS RD...	0.112	38.76977	-90.49968	MoDOT		
2	1	{00000000-0000-0000...		1056179	RP IS70E TO FAIRGRO...	0.181	38.77061	-90.50089	MoDOT		
3	2	{00000000-0000-0000...	48inch size	1056183	RP IS70E TO LP70W W	0.158	38.76902	-90.4977	MoDOT		
4	3	{00000000-0000-0000...	Left Lane No Trucks...	19	IS 70 E	238.052	38.7332	-90.3442	MoDOT		
5	4	{00000000-0000-0000...	(White on Green butt...	3506	IS 70 W	7.759	38.7077	-90.2762	MoDOT		
6	5	{00000000-0000-0000...	(White on Green butt...	3506	IS 70 W	8.683	38.7143	-90.2909	MoDOT		
7	6	{00000000-0000-0000...	(White on Green butt...	3506	IS 70 W	9.764	38.7209	-90.3084	MoDOT		

DATABASE DEVELOPMENT



Feature Class Name:	Description:
Signs-Overhead	The ground mount signs assigned for inspection and assessment as part of the MoDOT Sign Inventory project for I-70 and I-270.

		NOTES:	Related Tables: (If any)	Related Keys/Fields:
Feature Class Type:	POINT	MoDOT Req'd Fields	Signs	
Attachments Enabled:	YES	GIS Required Fields		
Offline Capable:	YES	CDI Recommended Tracking Fields		
Related Tables:	YES	Other Recommended Inspection Fields		
Relationship Type:	ONE-TO-MANY	Items to discuss further		

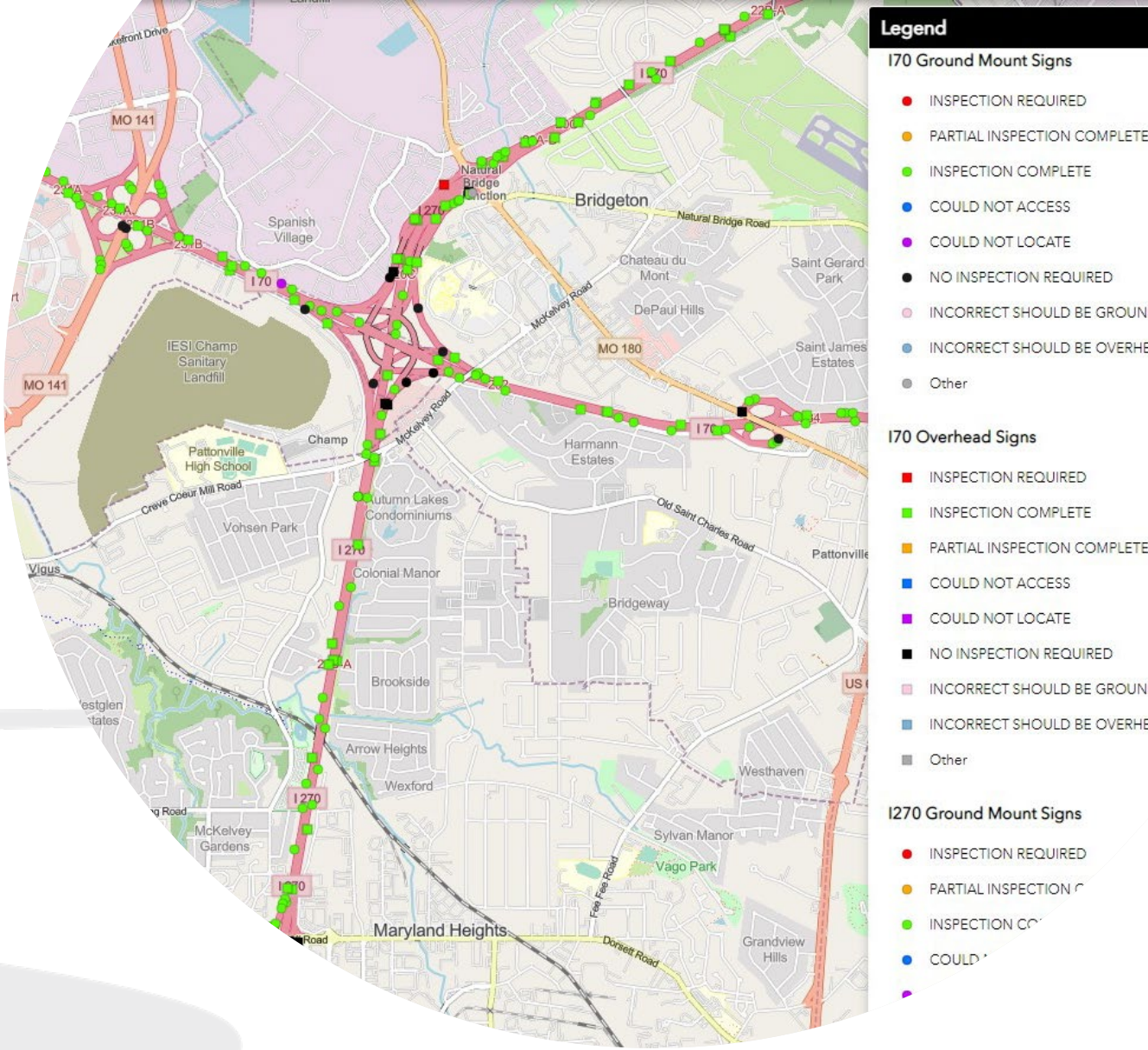
Field Name:	Example:	Data Type:	Alias:	Allow NULL Values:	Geometry Type:	Default Value:	Domain:	Length:
SignLegend	Exit 243/Bircher Blvd Exit Only	TEXT	Sign Legend					
TwayID	19	LONG INTEGER	Tway ID					
Travelway	IS 70 E	TEXT	Travelway					
Log	243.255	DOUBLE	Log					
Latitude	38.69901	DOUBLE	Latitude					
Longitude	-90.26183	DOUBLE	Longitude					
MaintainedBy	MoDOT	TEXT	Maintained By				MaintainedBy	10
OrgCode	7F73	TEXT	Org Code					10
OrgName	SIGN SHOP	TEXT	Org Name					20
County	ST. LOUIS CITY	TEXT	County					20
ExistingInventory	Yes	TEXT	Existing Inventory				YesNo	10
TrafficControl	No	TEXT	Traffic Control				YesNo	10
InspectionStatus	INSPECTION COMPLETE	TEXT	Inspection Status				InspectionStatus	50
InspectionCompany	Civil Design, Inc.	TEXT	Inspection Company				InspectionCompany	50
InspectionCrew	JS/AB	TEXT	Inspection Crew					10
InspectionDate	8/31/2021	DATE	Inspection Date					
InspectionComments	Hole between posts in ground	TEXT	Inspection Comments					
StructureType-OH	Truss	TEXT	Structure Type				StructureType-OH	50
StructureID	0	LONG INTEGER	Structure ID					
SupportType	Post	TEXT	Support Type				SupportType	20
Position	Left	TEXT	Position				Position	20
Orientation	Traffic Facing	TEXT	Orientation				Orientation	20
TrussType	Single Tube	TEXT	Truss Type				TrussType	20
SignCount	4	SHORT INTEGER	Sign Count					
PostCount	2	SHORT INTEGER	Column Count					
SupportType	Structure	TEXT	Post Type				SupportType	

MoDOT-ExportFields | DB Field Ideas | Signs-GroundMount | Signs-Overhead | ReviewStatus | InspectionStatus | WeatherType | MeasureSource | InspectionCompany | ConditionStatus | Stru ...

BUILDING STRONGER CDI COMMUNITIES

GIS MAPPING SETUP

The GIS mapping was setup to allow the project team to easily identify the various types of signs to be inspected, as well as the inspection status of the signs. This helped provide the project team and management oversight on project statuses, in addition to allocating resources to stay aligned with the project schedule.



GIS ACCESSIBILITY

OFFICE DESKTOP

Sign inspection GIS mapping needed to be accessible to the project team and management to track inspection progress and review data.

FIELD TABLET

Sign inspection GIS mapping needed to be accessible to field crews to perform inventory updates, condition assessment, and take photos.

FIELD ASSESSMENT

TRAINING

Both field crews and office team members were trained on using the GIS mapping applications to perform the various project activities.

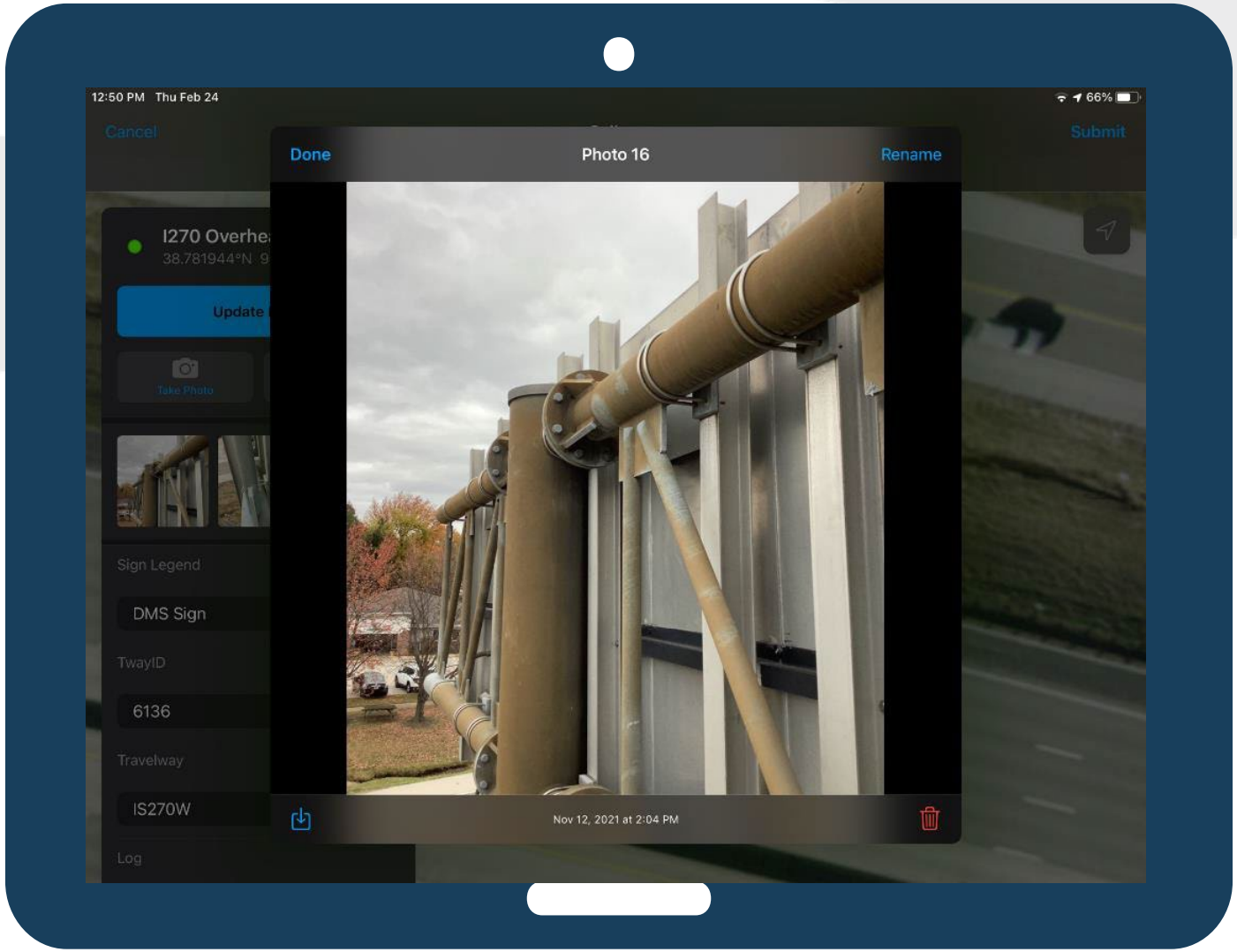
Training was completed for desktop applications both in-person and remotely, while mobile inspection training was completed in the field.

Procedure documents were also shared with the project team, including data dictionaries of the GIS database fields.

Assessment training included checking sign retroreflectivity with new equipment.

FIELD TABLET SOFTWARE

ArcGIS® Field Maps



SIGN INSPECTION APPROACH

GROUND MOUNT

Dedicated crews assigned to ground inspections. Typically, did not require any lane closures or impacts. Performed from the shoulder using ladders and other inspection equipment.

OVERHEAD

Dedicated crews assigned to overhead inspections. Required traffic control measures and lane closures for most inspections. Performed using bucket truck, lift, or climbing (where approved) and other inspection equipment.

Inspected nearly 1,100 Ground Mount signs and 600 Overhead signs.

GROUND MOUNT INSPECTION FIELDS

AssemblyID
SignLegend
TwayID
Travelway
Log
Latitude
Longitude
MaintainedBy
OrgCode
OrgName
County
ExistingInventory
TrafficControl
InspectionStatus
InspectionCompany
InspectionCrew
InspectionDate
InspectionComments
StructureType_GM
StructureID
SupportType
Position
Orientation
TrussType
SignCount
PostCount
PostType
PostSize
PostMaterial
PostCoating
FootingType
BreakawayStubs
FusePlate
HingePlate
Sign1Width
Sign1Height
Sign2Width
Sign2Height
Sign3Width
Sign3Height
Sign4Width
Sign4Height
SignOffset_Ft
SignVertHeight_Ft
PostLength_Ft
StubHeight_In
PostSpacing_Ft
PostLevel__
S1_SignColor
S1_BackgroundRetro
S1_LegendRetro
S2_SignColor
S2_BackgroundRetro
S2_LegendRetro
S3_SignColor
S3_BackgroundRetro
S3_LegendRetro
S4_SignColor
S4_BackgroundRetro
S4_LegendRetro
FootingCondition
BreakawayCondition
PostCondition
FusePlateCondition
CoatingCondition
SignAttachCondition
OverallCondition
Northing
Easting
Status
StatusDate
AdditionalInfo
EmergencyAction
RepairAction
ActionComments
ReviewStatus_CDI
ReviewDate_CDI
ReviewBy_CDI
ReviewComments_CDI
ReviewStatus_MoDOT
ReviewDate_MoDOT
ReviewBy_MoDOT
ReviewComments_MoDOT
AssemblyID_String
GlobalID
created_user
created_date
last_edited_user
last_edited_date
FusePlateDistance_In
StubFootingFlushWGrade
InsufficientReasons
SignLateralShoulder
ReportID
POINT_X
POINT_Y

OVERHEAD INSPECTION FIELDS

AssemblyID
SignLegend
TwayID
Travelway
Log
Latitude
Longitude
MaintainedBy
OrgCode
OrgName
County
ExistingInventory
TrafficControl
InspectionStatus
InspectionCompany
InspectionCrew
InspectionDate
InspectionComments
StructureType_OH
StructureID
SupportType
Position
Orientation
TrussType
SignCount
PostCount
StructureMaterial

PostCoating
FootingType
LightingSystem
Catwalk
Guardrail
PostOffsetEOS
PostOffsetGR
Sign1Width
Sign1Height
S1_SignColor
S1_BackgroundRetro
S1_LegendRetro
S1_VertClearance
S1_AttachCondition
Sign2Width
Sign2Height
S2_SignColor
S2_BackgroundRetro
S2_LegendRetro
S2_VertClearance
S2_AttachCondition
Sign3Width
Sign3Height
S3_SignColor
S3_BackgroundRetro
S3_LegendRetro
S3_VertClearance
S3_AttachCondition

Sign4Width
Sign4Height
S4_SignColor
S4_BackgroundRetro
S4_LegendRetro
S4_VertClearance
S4_AttachCondition
InnerFootingCondition
InnerPostCondition
OuterFootingCondition
OuterPostCondition
UFTrussChordCondition
UBTrussChordCondition
LFTrussChordCondition
LBTrussChordCondition
InternalTrussCondition
PosttoFootingCondition
TrusstoPostCondition
ChordSpliceCondition
CoatingCondition
OverallCondition
Northing
Easting
StatusDate
AdditionalInfo
EmergencyAction
RepairAction
ActionComments

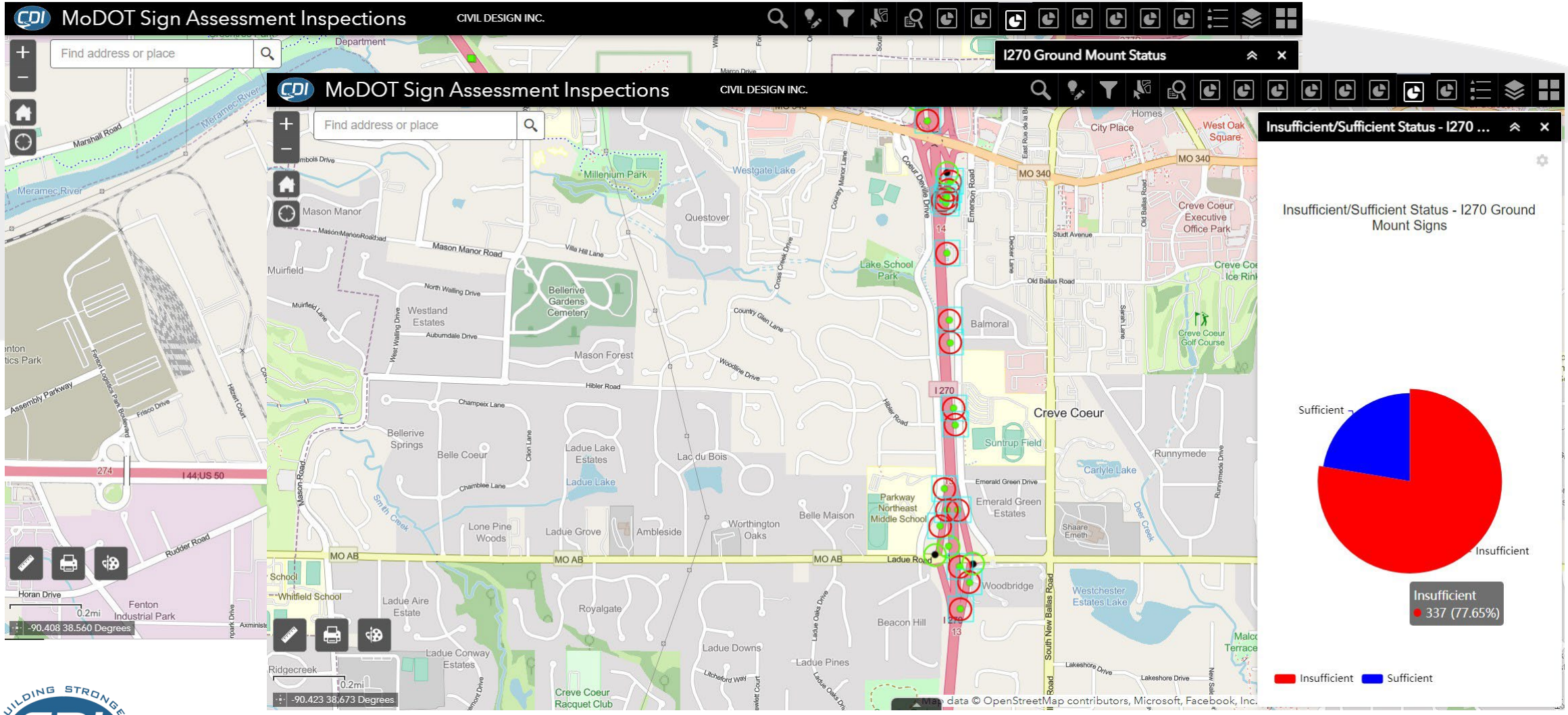
Sign5Width
Sign5Height
S5_SignColor
S5_BackgroundRetro
S5_LegendRetro
S5_VertClearance
S5_AttachCondition
Sign6Width
Sign6Height
S6_SignColor
S6_BackgroundRetro
S6_LegendRetro
S6_VertClearance
S6_AttachCondition
Sign7Width
Sign7Height
S7_SignColor
S7_BackgroundRetro
S7_LegendRetro
S7_VertClearance
S7_AttachCondition
Sign8Width
Sign8Height
S8_SignColor
S8_BackgroundRetro
S8_LegendRetro
S8_VertClearance
S8_AttachCondition

Sign9Width
Sign9Height
S9_SignColor
S9_BackgroundRetro
S9_LegendRetro
S9_VertClearance
S9_AttachCondition
Sign10Width
Sign10Height
S10_SignColor
S10_BackgroundRetro
S10_LegendRetro
S10_VertClearance
S10_AttachCondition
Sign11Width
Sign11Height
S11_SignColor
S11_BackgroundRetro
S11_LegendRetro
S11_VertClearance
S11_AttachCondition
Sign12Width
Sign12Height
S12_SignColor
S12_BackgroundRetro
S12_LegendRetro
S12_VertClearance
S12_AttachCondition

ReviewStatus_CDI
ReviewDate_CDI
ReviewBy_CDI
ReviewComments_CDI
ReviewStatus_MoDOT
ReviewDate_MoDOT
ReviewBy_MoDOT
ReviewComments_MoDOT
created_user
created_date
last_edited_user
last_edited_date
GlobalID
Post_Material
Truss_Material
Truss_Coating
InsufficientReasons
Status
ReportID
POINT_X
POINT_Y
I_BeamSpacing
DistanceEdge_I_BeamSign
I_BeamPosition
I_BeamPositionComments
F6in3inVerticalSprtFlushTopSign
ThreeInBackerBarLengthAdequate
H1SignHatHeight

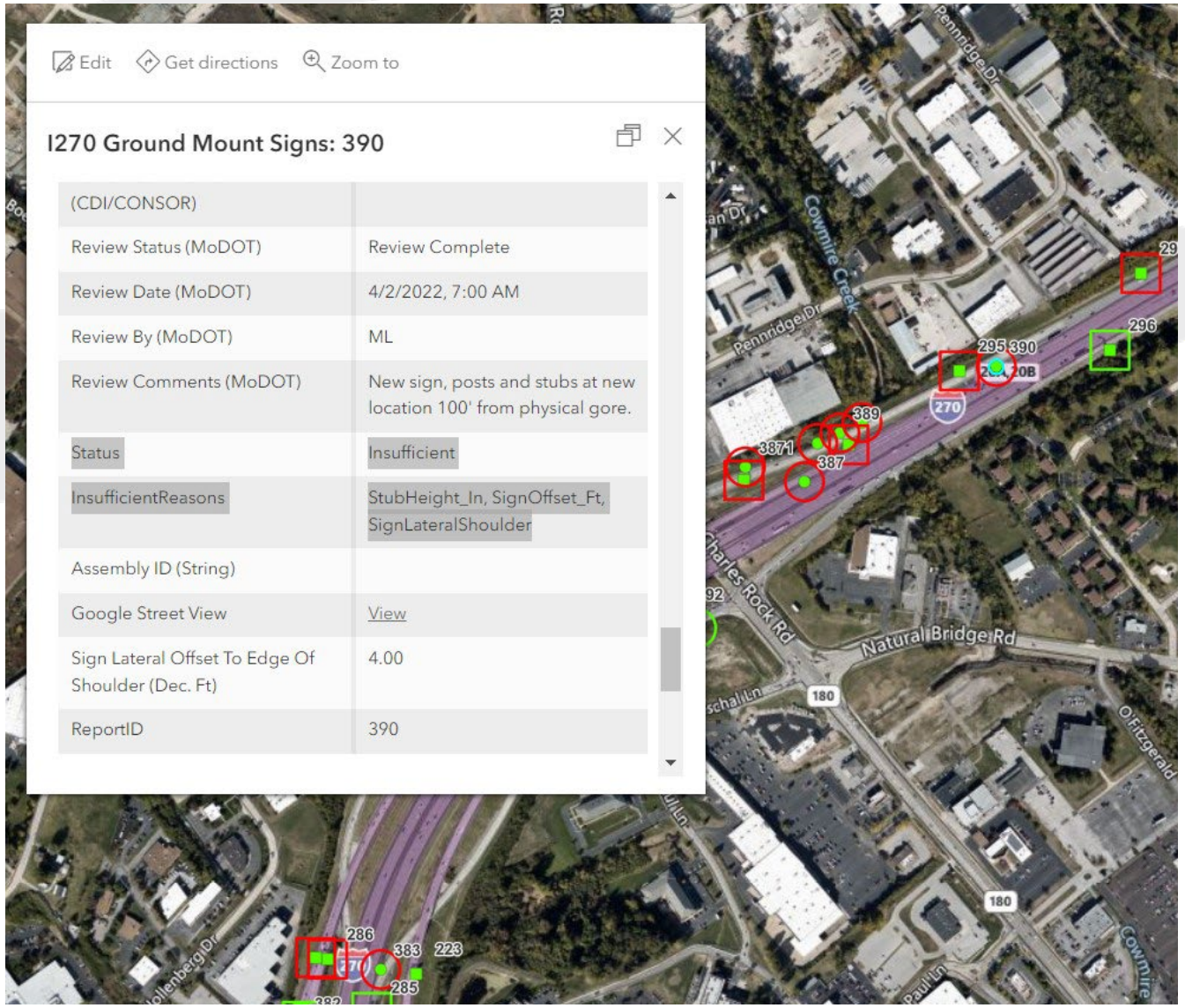
REPORTING & ANALYSIS

DATA DASHBOARDS

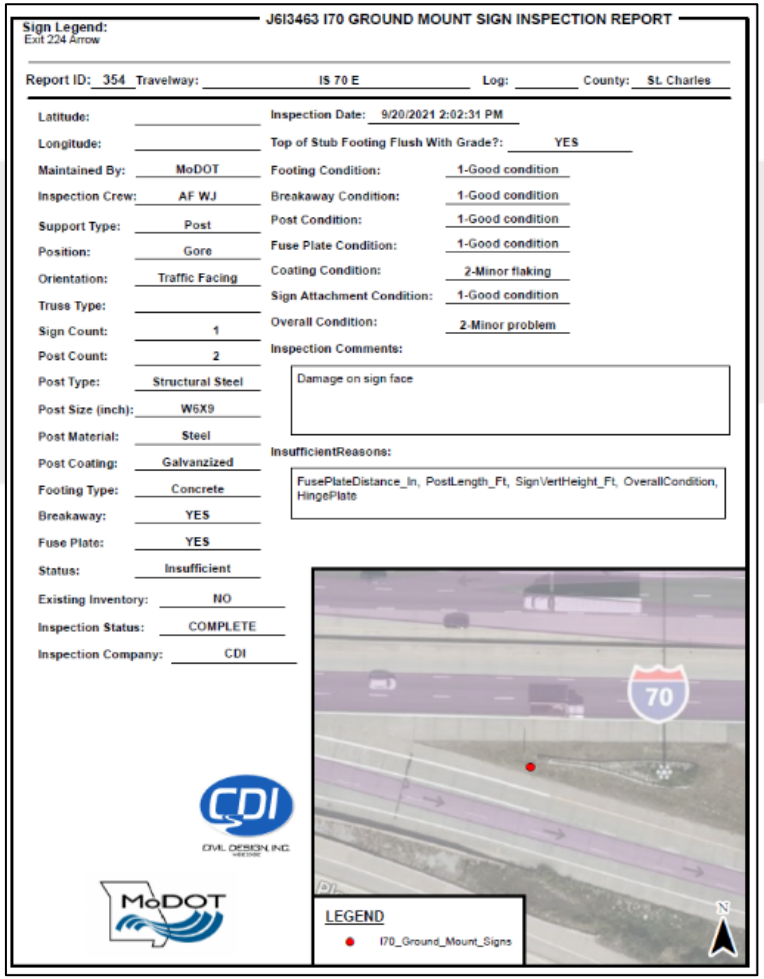


SCRIPTED ANALYSIS

To efficiently and consistently identify sign structures deemed "insufficient" (*requiring recommendations*), a Python / C# script was developed to analyze designated criteria and automatically populate the GIS database with the correct Status and reasons for being flagged.



SIGN INSPECTION REPORTS



J6I3463 I70 GROUND MOUNT SIGN INSPECTION REPORT

Sign Legend: Exit 224 Arrow

Report ID: 354 Travelway: IS 70 E Log: County: St. Charles

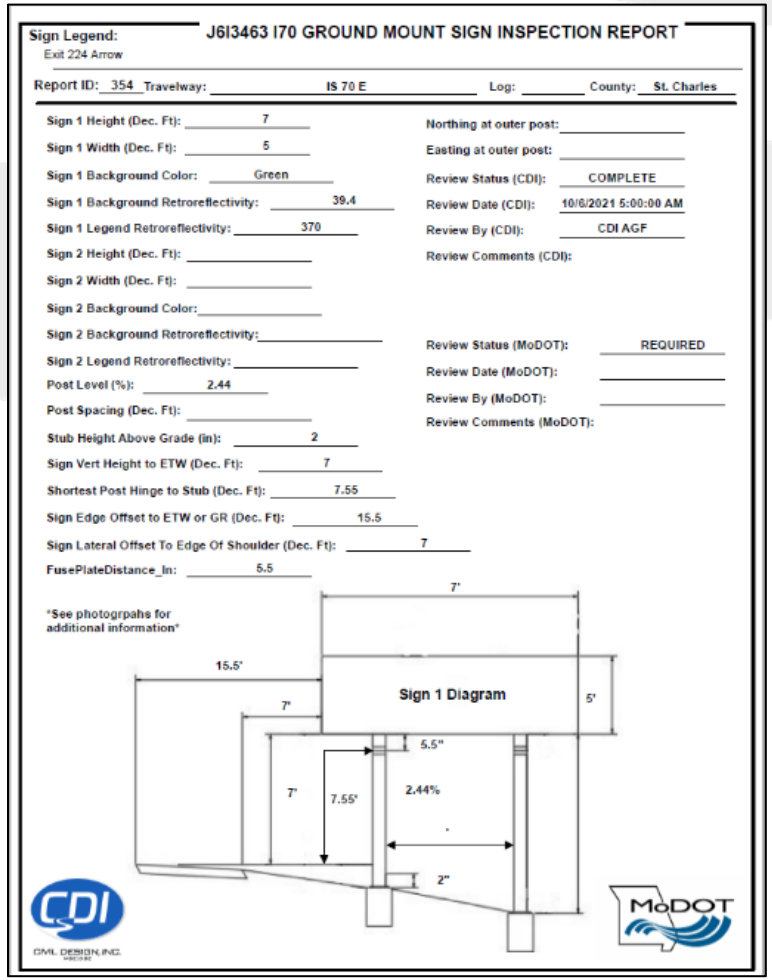
Latitude:		Inspection Date:	9/20/2021 2:02:31 PM
Longitude:		Top of Stub Footing Flush With Grade?:	YES
Maintained By:	MoDOT	Footing Condition:	1-Good condition
Inspection Crew:	AF WJ	Breakaway Condition:	1-Good condition
Support Type:	Post	Post Condition:	1-Good condition
Position:	Gore	Fuse Plate Condition:	1-Good condition
Orientation:	Traffic Facing	Coating Condition:	2-Minor flaking
Truss Type:		Sign Attachment Condition:	1-Good condition
Sign Count:	1	Overall Condition:	2-Minor problem
Post Count:	2		
Post Type:	Structural Steel		
Post Size (inch):	W6X9		
Post Material:	Steel		
Post Coating:	Galvanized		
Footing Type:	Concrete		
Breakaway:	YES		
Fuse Plate:	YES		
Status:	Insufficient		
Existing Inventory:	NO		
Inspection Status:	COMPLETE		
Inspection Company:	CDI		

Inspection Comments:

Damage on sign face

InsufficientReasons:

FusePlateDistance_In, PostLength_Ft, SignVertHeight_Ft, OverallCondition, HingePlate



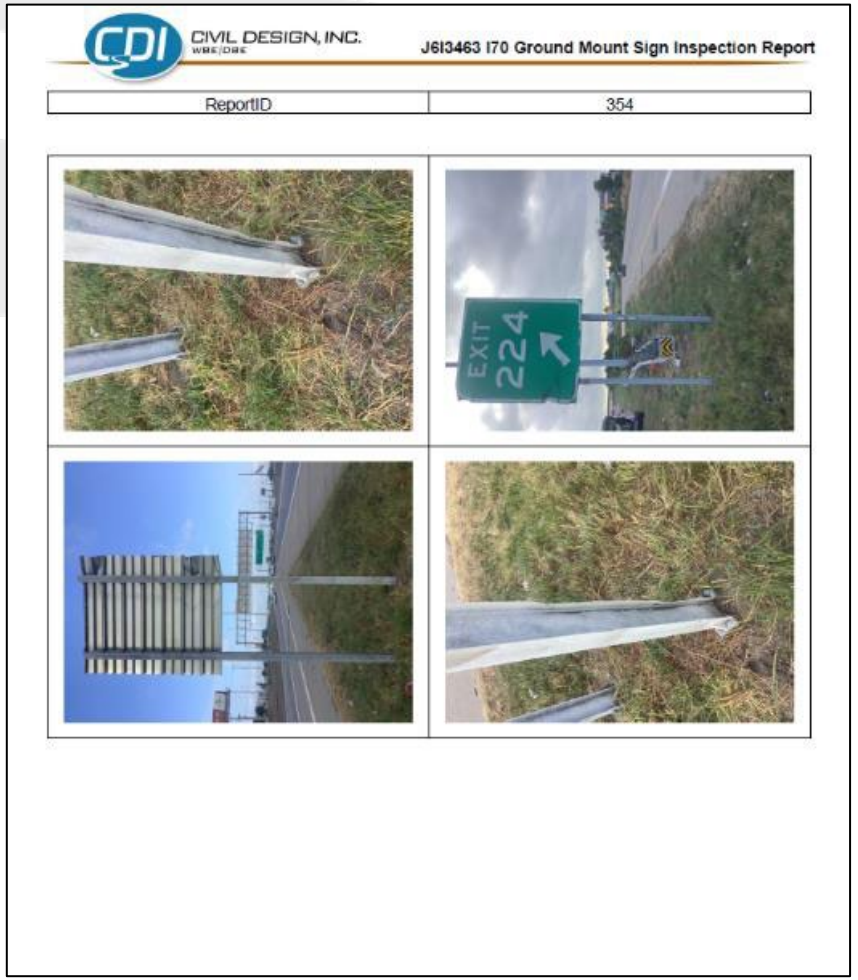
J6I3463 I70 GROUND MOUNT SIGN INSPECTION REPORT

Sign Legend: Exit 224 Arrow

Report ID: 354 Travelway: IS 70 E Log: County: St. Charles

Sign 1 Height (Dec. Ft):	7	Northing at outer post:	
Sign 1 Width (Dec. Ft):	5	Easting at outer post:	
Sign 1 Background Color:	Green	Review Status (CDI):	COMPLETE
Sign 1 Background Retroreflectivity:	39.4	Review Date (CDI):	10/6/2021 5:00:00 AM
Sign 1 Legend Retroreflectivity:	370	Review By (CDI):	CDI AGF
Sign 2 Height (Dec. Ft):		Review Comments (CDI):	
Sign 2 Width (Dec. Ft):			
Sign 2 Background Color:			
Sign 2 Background Retroreflectivity:		Review Status (MoDOT):	REQUIRED
Sign 2 Legend Retroreflectivity:		Review Date (MoDOT):	
Post Level (%):	2.44	Review By (MoDOT):	
Post Spacing (Dec. Ft):		Review Comments (MoDOT):	
Stub Height Above Grade (in):	2		
Sign Vert Height to ETW (Dec. Ft):	7		
Shortest Post Hinge to Stub (Dec. Ft):	7.55		
Sign Edge Offset to ETW or GR (Dec. Ft):	15.5		
Sign Lateral Offset To Edge Of Shoulder (Dec. Ft):	7		
FusePlateDistance_In:	5.5		

See photogrpahs for additional information



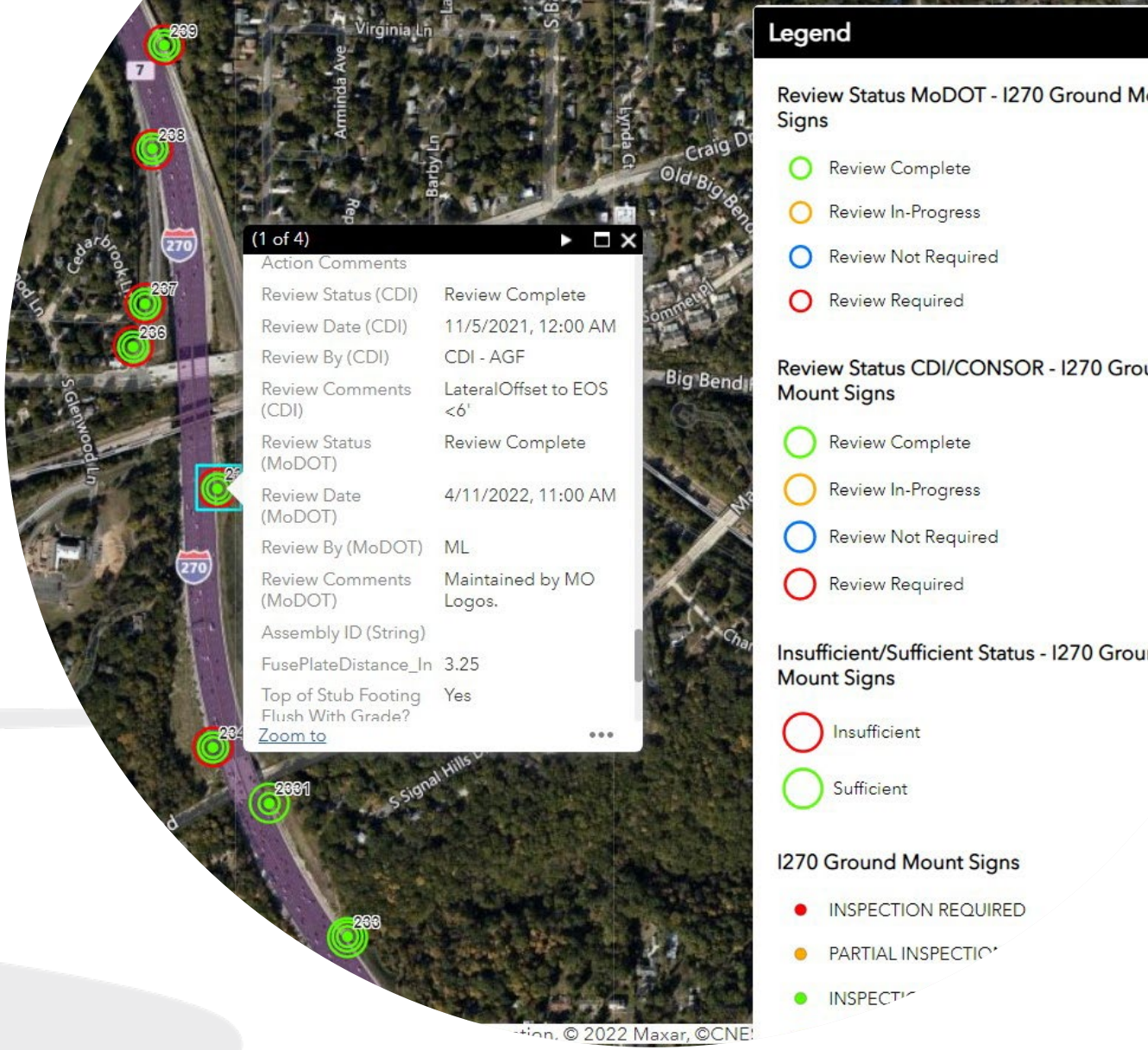
CIVIL DESIGN, INC.

J6I3463 I70 Ground Mount Sign Inspection Report

ReportID	354

REVIEW PROCESS

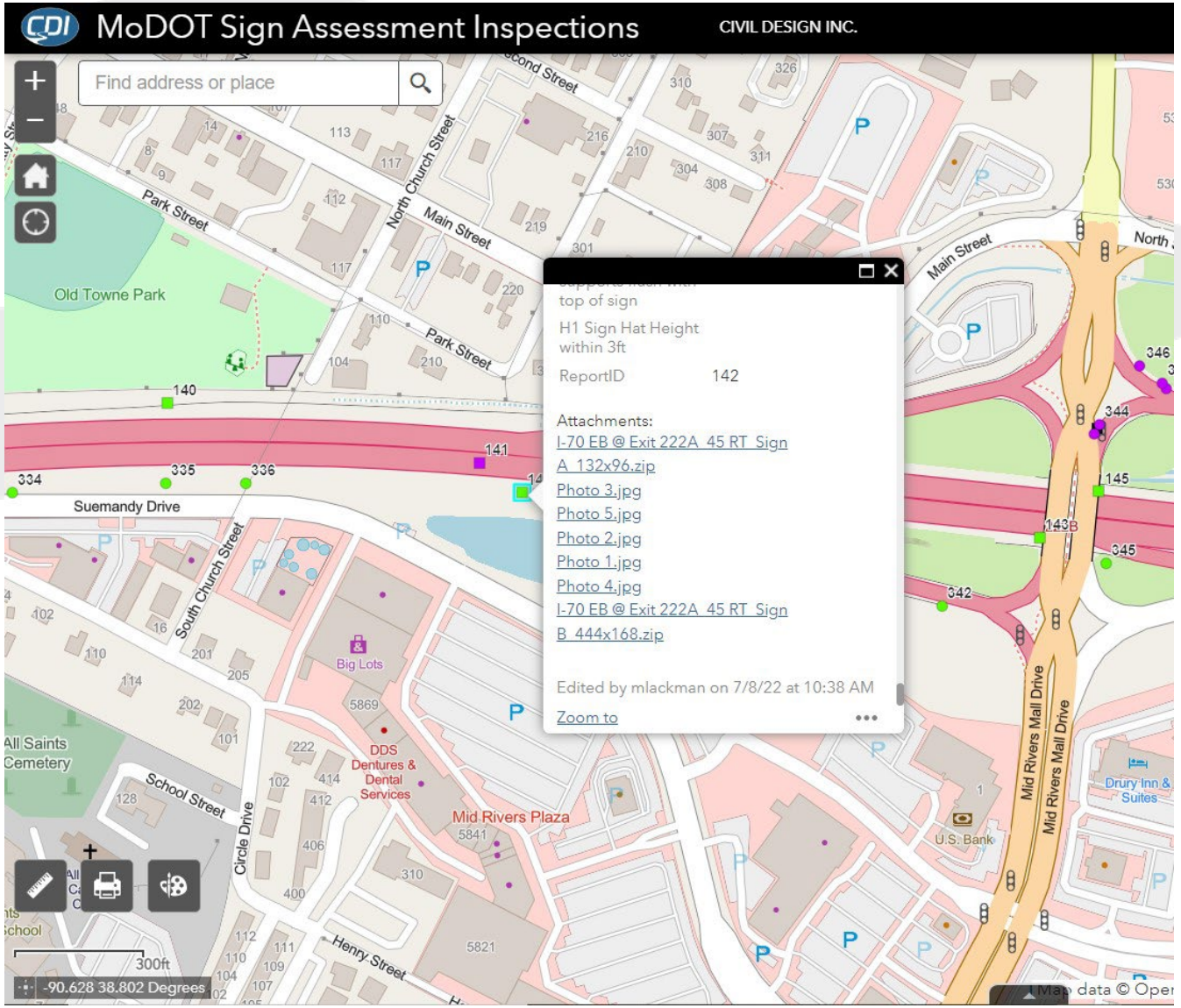
Coordinating with the project team and MoDOT, the inspection data and recommendations QA/QC review process was incorporated into the GIS database and mapping. This allowed for simple data filters to identify the signs that were ready for review, which was also visualized on the GIS mapping. This approach significantly helped streamline project communication and reduced the amount of back & forth data submittals.



DATA & FILE SHARING

The GIS mapping was configured to allow data exports (*CSV / Excel*) at anytime during the project for custom review and analysis.

The GIS database was also enabled with feature related attachments, which included photos of signs, but also allowed sign design files and specifications to be linked directly to each specific sign.



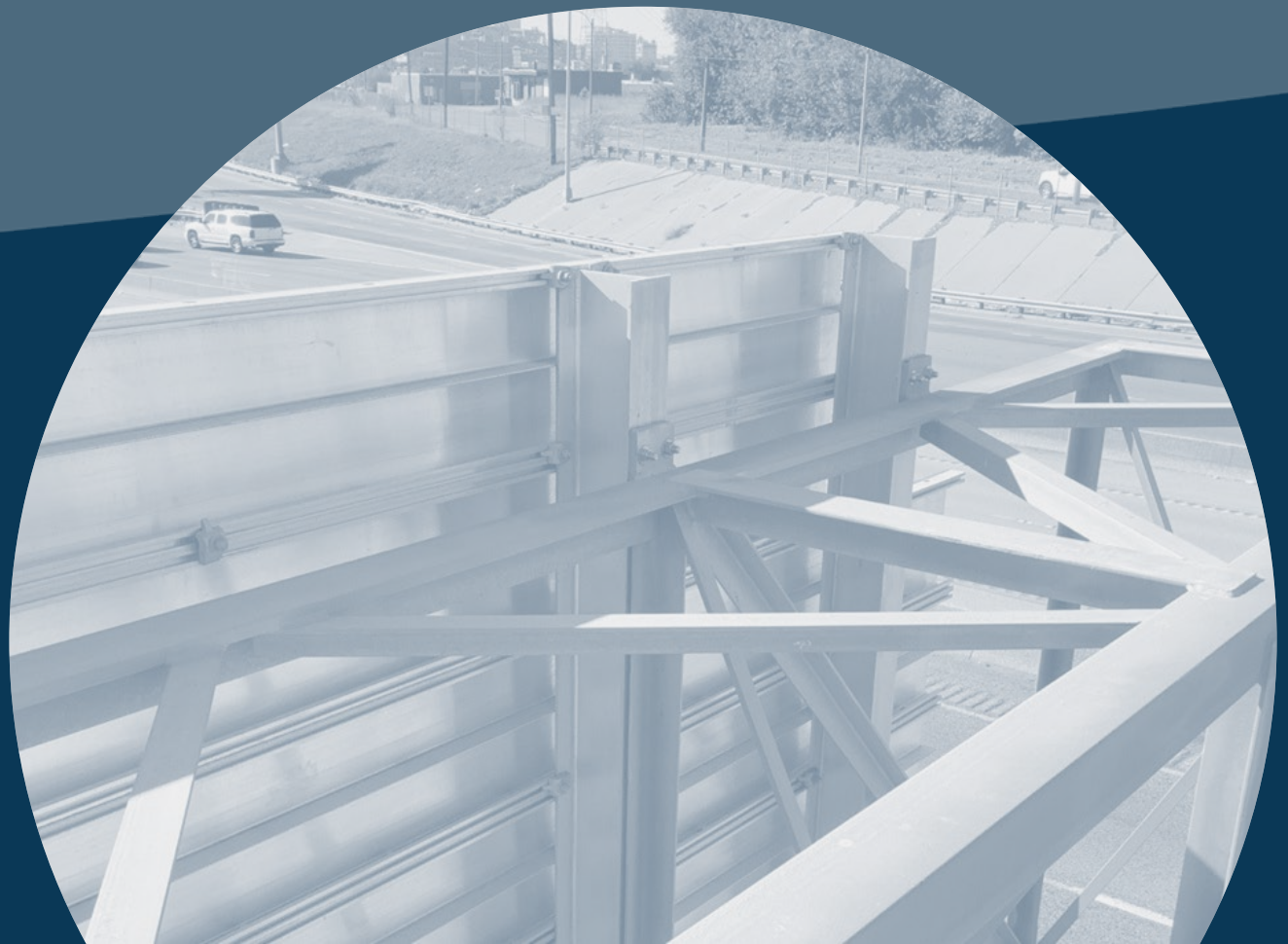
DATA DRIVEN

“The goal is to turn data into information, and information into insight”

Carly Fiorina

Ex-CEO, Hewlett Packard

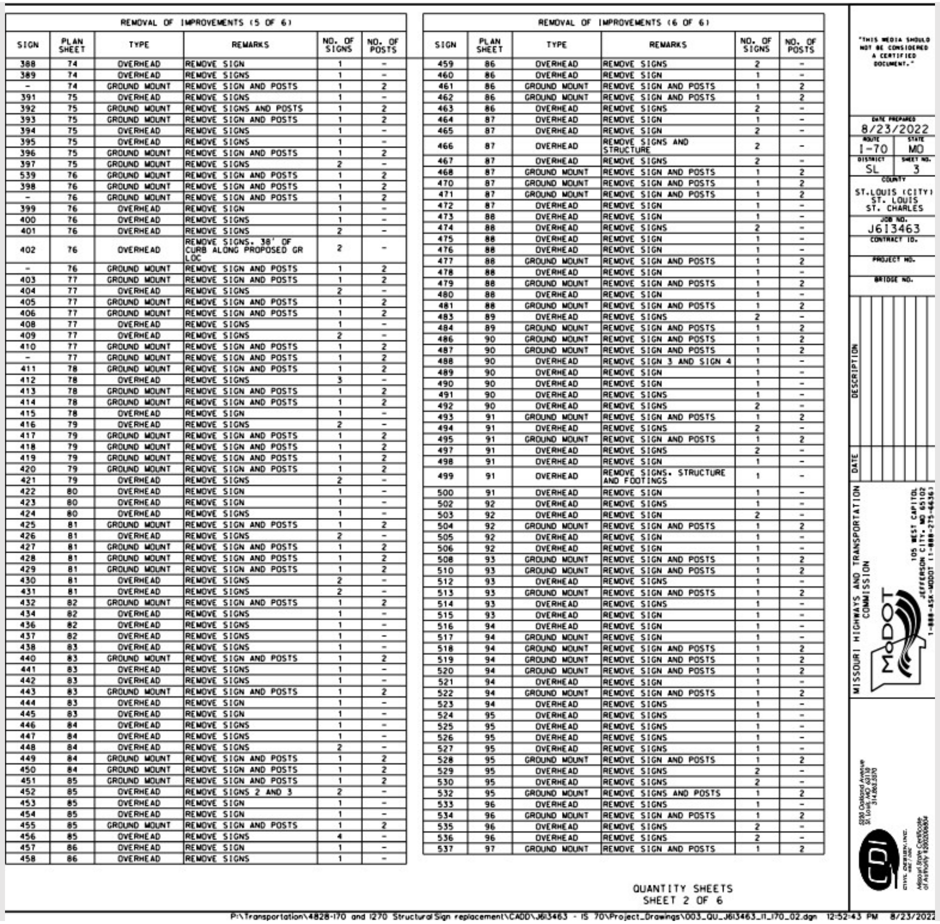
SUBSEQUENT PHASES



POST-ASSESSMENT SCOPE OF WORK

CONCEPTUAL STUDY

Provide a conceptual study report summarizing the project groupings of signs for repair or replacement based on location and severity, including estimated costs for each sign and project.



REMOVAL OF IMPROVEMENTS (5 OF 6)

SIGN	PLAN SHEET	TYPE	REMARKS	NO. OF SIGNS	NO. OF POSTS
388	74	OVERHEAD	REMOVE SIGN	1	-
389	74	OVERHEAD	REMOVE SIGNS	1	-
-	74	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
391	75	OVERHEAD	REMOVE SIGNS	1	-
392	75	GROUND MOUNT	REMOVE SIGNS AND POSTS	1	2
393	75	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
394	75	OVERHEAD	REMOVE SIGNS	1	-
395	75	OVERHEAD	REMOVE SIGNS	1	-
396	75	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
397	75	GROUND MOUNT	REMOVE SIGNS	2	-
539	76	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
398	76	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
-	76	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
399	76	OVERHEAD	REMOVE SIGN	1	-
400	76	OVERHEAD	REMOVE SIGNS	1	-
401	76	OVERHEAD	REMOVE SIGNS	2	-
402	76	OVERHEAD	REMOVE SIGNS. 38' OF CURB ALONG PROPOSED GR LOC	2	-
-	76	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
403	77	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
404	77	OVERHEAD	REMOVE SIGNS	2	-
405	77	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
406	77	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
408	77	OVERHEAD	REMOVE SIGNS	1	-
409	77	OVERHEAD	REMOVE SIGNS	2	-
410	77	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
-	77	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
411	78	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
412	78	OVERHEAD	REMOVE SIGNS	3	-
413	78	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
414	78	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
415	78	OVERHEAD	REMOVE SIGN	1	-
416	79	OVERHEAD	REMOVE SIGNS	2	-
417	79	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
418	79	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
419	79	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
420	79	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
421	79	OVERHEAD	REMOVE SIGNS	2	-
422	80	OVERHEAD	REMOVE SIGN	1	-
423	80	OVERHEAD	REMOVE SIGN	1	-
424	80	OVERHEAD	REMOVE SIGNS	1	-
425	81	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
426	81	OVERHEAD	REMOVE SIGNS	2	-
427	81	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
428	81	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
429	81	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
430	81	OVERHEAD	REMOVE SIGNS	2	-
431	81	OVERHEAD	REMOVE SIGNS	2	-
432	82	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
434	82	OVERHEAD	REMOVE SIGNS	1	-
436	82	OVERHEAD	REMOVE SIGNS	1	-
437	82	OVERHEAD	REMOVE SIGNS	1	-
438	83	OVERHEAD	REMOVE SIGNS	1	-
440	83	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
441	83	OVERHEAD	REMOVE SIGNS	1	-
442	83	OVERHEAD	REMOVE SIGNS	1	-
443	83	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
444	83	OVERHEAD	REMOVE SIGN	1	-
445	83	OVERHEAD	REMOVE SIGN	1	-
446	84	OVERHEAD	REMOVE SIGNS	1	-
447	84	OVERHEAD	REMOVE SIGNS	1	-
448	84	OVERHEAD	REMOVE SIGNS	2	-
449	84	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
450	84	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
451	85	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
452	85	OVERHEAD	REMOVE SIGNS 2 AND 3	2	-
453	85	OVERHEAD	REMOVE SIGN	1	-
454	85	OVERHEAD	REMOVE SIGN	1	-
455	85	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
456	85	OVERHEAD	REMOVE SIGNS	4	-
457	86	OVERHEAD	REMOVE SIGN	1	-
458	86	OVERHEAD	REMOVE SIGNS	1	-

REMOVAL OF IMPROVEMENTS (6 OF 6)

SIGN	PLAN SHEET	TYPE	REMARKS	NO. OF SIGNS	NO. OF POSTS
459	86	OVERHEAD	REMOVE SIGNS	2	-
460	86	OVERHEAD	REMOVE SIGN	1	-
461	86	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
462	86	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
463	86	OVERHEAD	REMOVE SIGNS	2	-
464	87	OVERHEAD	REMOVE SIGN	1	-
465	87	OVERHEAD	REMOVE SIGN	2	-
466	87	OVERHEAD	REMOVE SIGNS AND STRUCTURE	2	-
467	87	OVERHEAD	REMOVE SIGNS	2	-
468	87	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
470	87	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
471	87	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
472	87	OVERHEAD	REMOVE SIGN	1	-
473	88	OVERHEAD	REMOVE SIGN	1	-
474	88	OVERHEAD	REMOVE SIGNS	2	-
475	88	OVERHEAD	REMOVE SIGN	1	-
476	88	OVERHEAD	REMOVE SIGN	1	-
477	88	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
478	88	OVERHEAD	REMOVE SIGN	1	-
479	88	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
480	88	OVERHEAD	REMOVE SIGN	1	-
481	88	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
483	89	OVERHEAD	REMOVE SIGNS	2	-
484	89	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
486	90	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
487	90	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
488	90	OVERHEAD	REMOVE SIGN 3 AND SIGN 4	1	-
489	90	OVERHEAD	REMOVE SIGN	1	-
490	90	OVERHEAD	REMOVE SIGN	1	-
491	90	OVERHEAD	REMOVE SIGNS	1	-
492	90	OVERHEAD	REMOVE SIGNS	2	-
493	91	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
494	91	OVERHEAD	REMOVE SIGNS	2	-
495	91	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
497	91	OVERHEAD	REMOVE SIGNS	2	-
498	91	OVERHEAD	REMOVE SIGN	1	-
499	91	OVERHEAD	REMOVE SIGNS. STRUCTURE AND FOOTINGS	1	-
500	91	OVERHEAD	REMOVE SIGN	1	-
502	92	OVERHEAD	REMOVE SIGNS	1	-
503	92	OVERHEAD	REMOVE SIGN	2	-
504	92	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
505	92	OVERHEAD	REMOVE SIGN	1	-
506	92	OVERHEAD	REMOVE SIGN	1	-
508	93	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
510	93	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
512	93	OVERHEAD	REMOVE SIGNS	1	-
513	93	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
514	93	OVERHEAD	REMOVE SIGNS	1	-
515	93	OVERHEAD	REMOVE SIGN	1	-
516	94	OVERHEAD	REMOVE SIGN	1	-
517	94	GROUND MOUNT	REMOVE SIGN	1	-
518	94	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
519	94	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
520	94	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
521	94	OVERHEAD	REMOVE SIGN	1	-
522	94	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
523	94	OVERHEAD	REMOVE SIGNS	1	-
524	95	OVERHEAD	REMOVE SIGNS	1	-
525	95	OVERHEAD	REMOVE SIGNS	1	-
526	95	OVERHEAD	REMOVE SIGNS	1	-
527	95	OVERHEAD	REMOVE SIGNS	1	-
528	95	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
529	95	OVERHEAD	REMOVE SIGNS	2	-
530	95	OVERHEAD	REMOVE SIGNS	2	-
532	95	GROUND MOUNT	REMOVE SIGNS AND POSTS	1	2
533	96	OVERHEAD	REMOVE SIGNS	1	-
534	96	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2
535	96	OVERHEAD	REMOVE SIGNS	2	-
536	96	OVERHEAD	REMOVE SIGNS	2	-
537	97	GROUND MOUNT	REMOVE SIGN AND POSTS	1	2

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED 8/23/2022
ROUTE I-70 | STATE MO
DISTRICT SL | SHEET NO. 3
COUNTY ST.LOUIS (CITY) ST. LOUIS ST. CHARLES
JOB NO. J613463
CONTRACT ID.
PROJECT NO.
BRIDGE NO.

DESCRIPTION | DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

QUANTITY SHEETS
SHEET 2 OF 6

P:\Transportation\4828-I70 and I270 Structural Sign replacement\CADD\J613463 - IS 70\Project_Drawings\003_QU_J613463_I1_I70_02.dgn 12:52:43 PM 8/23/2022

FINAL PSE'S

Provide Final Plans, Specifications, and Estimates for each project based on the approved scope from the Conceptual Study aligned with current construction scheduling and budgets.

LESSONS LEARNED

LESSONS LEARNED

GIS DATABASE CONSISTENCY

GIS database schema provided a consistent data structure and process for all team members collecting and reporting data for the project. Also allowed for easier field crew training across project teams.

"REAL-TIME" COORDINATION

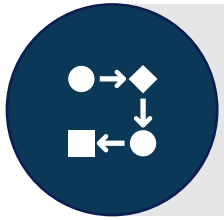
Using "real-time" GIS mapping improved field crew communication & coordination, as well as allowed the office team to view and share issues directly following inspection.

LESSONS LEARNED

EFFECTIVE COMMUNICATION

Leveraging the GIS mapping and data dashboards helped effectively communicate the project status with project management and team, as well as allowed for critical (*emergency or insufficient*) locations to be more easily identified.

GIS-DRIVEN WORKFLOW



The GIS mapping and database provided an efficient workflow to help manage the QA/QC and review processes, in addition to sign file management capabilities.

LESSONS LEARNED

STREAMLINED REPORTING

Custom, data-driven scripts and templates were created to streamline sign analysis and reporting, allowing more time to focus on more critical aspects of the project scope, such as data review and recommendations.

SUSTAINABLE APPROACH

Once the GIS database, processes, and workflows are established, this approach can easily be implemented and applied to other similar structural sign inspection projects at various other locations and/or districts.

QUESTIONS & ANSWERS

THANK YOU!

Jeremy Linley, PE, CFM

Infrastructure + Analytics Service Leader

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