1. Visualization Case Studies Library

This library presents 11 real-world visualization case studies selected to illustrate a range of communication goals, data types, and visualization techniques used by transportation agencies. Each case study includes an evaluation of design characteristics, interactivity, and governance to guide practitioners in adapting best practices to their own needs.

1.1. Summary Table of Case studies

Agency	Medium	Communication Need	Audience	Data Type	Interactivity
VTrans	Printable brochure (PDF)	Inform/Persuade	Public and legislative audience	Qualitative, summary asset data	None
NVCOG	Online interactive charts (Datawrapper)	Inform and persuade	Practitioners, municipal leadership	Quantitative, Census/ACS	Low: Highlighting, tooltips, data download
RIDOT	ArcGIS Dashboard	Instruct and inform	General public, travelers	Live-feed, geospatial, travel time	Low: Basic filtering, tooltips
CalTrans	360° virtual tour	Inform in real-time	Environmental regulators, property owners, public	Geospatial, photographic, qualitative	High: Rotation, selection, and immersive navigation through project area

FDOT	Interactive web portal (Tableau + GIS)	Persuade and inform	Leadership, planners, MPOs, public	Quantitative, performance, geospatial	High: Navigation, informational pop-ups, filtering, tooltips, data download
MnDOT	Interactive web portal (Power BI)	Inform and monitor progress	General public, elected officials, internal staff	Quantitative, trend data	Low: Navigation and measure selection
ADOT	Social media image	Inform and foster accountability	General public	Geospatial, project impacts	None
WsDOT	Embedded Tableau dashboard	Inform and monitor	General public and local partners	Live-feed, travel time, freight, toll data	High: Navigation, filtering, highlighting, tooltips, data download
MAPA	GIS Tool	Inform	Transportation staff and community stakeholders	Quantitative, qualitative, and geospatial	High: Filtering, zoom, tooltips, scoring, data export
TxDOT	Online mapping guidelines	Inform	Internal staff, consultants, partners, public	Geospatial	Low: Navigation and scrolling
TxDOT	Online branding, and data visualization guidelines	Inform	Internal staff, consultants, partners, public	Quantitative, qualitative	Low: Navigation and scrolling

VTrans TAMP Brochure: Making Technical Topics Approachable

Summary

Agency:
Vermont Agency of Transportation (VTrans)

Communication Need:
Inform and persuade

Audience:
Public and legislative audience

Type of Data:
Qualitative and summary asset management information

Type of Analysis:
Narrative with limited visual data analysis

Visualization Medium:
Printable brochure (PDF), structured like a scrolling report

Access Link:
[is a current link available?]

Overview

To help non-technical audiences understand the value of asset management, VTrans developed a printable brochure that explains the purpose of the Transportation Asset Management Plan and its role in long-term stewardship and investment decisions. The brochure is designed to communicate core concepts without relying on technical performance tables or detailed condition metrics.

Rather than presenting detailed asset condition tables or performance measures, the brochure focuses on why asset management matters and how it supports better transportation decisions. Plain language, short sections, and approachable visuals guide readers through transportation challenges, investment tradeoffs, and long-term planning concepts. The format is intended to be easy to read and share.

"We needed to get beyond our normal graphs and charts and communicate with people on their terms."

- Asset Management Staff, VTrans

How it Works

The brochure was developed using a combination of in-house tools, staff expertise, and targeted contractor support for design and illustration within Microsoft Word. Content was organized around a clear narrative sequence, beginning with broad transportation needs and gradually introducing asset management concepts.

Key development elements included:

Translating technical TAMP content into plain-language summaries → Developing reusable illustrations and a consistent icon set → Iterating through multiple drafts with a cross-functional working group → Structuring the document to read smoothly in a vertical, scrolling format

By prioritizing narrative clarity and reusable visuals, VTrans delivered a polished communication product without advanced visualization software or a dedicated visualization unit.

Governance

Governance for the brochure was informal but intentional, with clear expectations for message consistency and review.

- Alignment with Vermont's statewide branding and communication priorities
- Led by communications-oriented staff, with technical review from planning and asset management teams
- Cross-functional coordination to confirm accuracy and maintain a consistent storyline
- No formal visualization style guide: consistency was achieved through shared templates and iterative review

Highlights

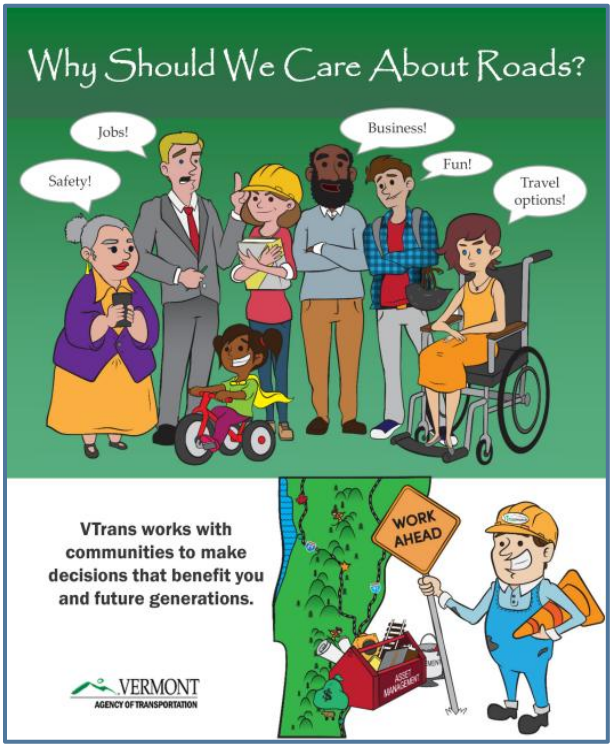
Audience-Led Framing
Content was shaped around how legislators and the public engage with information.

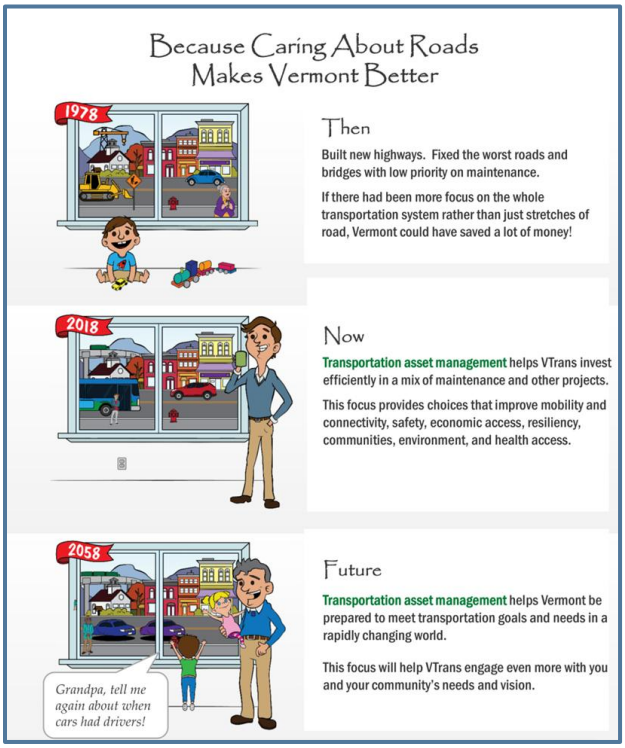
Simple Visuals
Icons and diagrams prioritize explanation and meaning over detailed performance measures.

Iteration Builds Buy-In
Multiple drafts balanced accessibility with technical credibility across divisions.

Cross-Disciplinary Collaboration
Planning, engineering, and communications staff worked together, with shared ownership of both the content and the message.

Samples





Key Takeaway

VTrans shows how agencies can make complex, technical planning topics accessible to public and legislative audiences by prioritizing narrative clarity, plain language, and simple visuals, without relying on advanced tools or large visualization teams.

NVCOG Data Download Page: Turning ACS Data into Accessible Visual Stories

Summary

Agency:
Naugatuck Valley Council of Governments (NVCOG)

Communication Need:
Instruct and inform

Audience:
Practitioners, planners, municipal leadership

Type of Data:
Quantitative, Census/American Community Survey (ACS) data

Type of Analysis:
Comparison, distribution, trends

Visualization Medium:
Online interactive charts

Access Link:
https://nvcogct.gov/maps-data/data-download/

Overview

NVCOG developed a collection of interactive charts to present commonly requested Census and American Community Survey data in a clear, accessible format. Topics such as population change, employment, and household income are organized in a scroll-based layout, with one chart per screen, allowing users to focus on individual trends without feeling overwhelmed.

Each visualization supports basic interaction, including hovering for values, tooltips, and direct data downloads. By housing these charts within its public Data Download page, NVCOG shifted from responding to repeated one-off data requests to offering a centralized, self-serve resource. This approach supports municipal staff, elected officials, and the public while reinforcing NVCOG's role as a regional data provider.

How it Works

ACS Data → Manual Processing → Datawrapper Charts → Embed on NVCOG Website

NVCOG starts with publicly available ACS datasets, then cleans and standardized the datasets for visualization. The processed data is then uploaded into Datawrapper, where the team designs interactive charts tailored for web display. These charts are embedded directly into NVCOG's website, creating a seamless experience where users can explore the data and access downloadable files within a single interface.

Governance

Lightweight but intentional governance characterized by:

- Encouraged experimentation and peer review
- Use of open, cloud-based tools
- Transparency through public-facing pages
- Limited formal policies for storage, security, or version control

Highlights

Designed for Progressive Reading

A scroll-based layout pairs focused visuals with interactivity, encouraging users to explore the data without cognitive overload.

Accessible Design

Consistent colors, clear titles, tooltips, keyboard navigation, and data download options ensure the visualizations are usable and accessible from the start.

Demand-Driven, Self-Serve Open Data

NVCOG translated recurring data requests into self-serve visualizations housed on a public data page, strengthening its role as a regional data hub and reducing staff burden.

Low-Lift, High-Impact Tools

Datawrapper enables interactive charts without the need for developers, coders, or GIS specialists.

Sample

Change in Employment Annual Averages, 2018-2023

Labor force measures are based on the civilian noninstitutional population 16 years old and over.

Geography	2018 Unemployment Rate	2023 Unemployment Rate	Percent Change in Unemployment Rate	Percent Change in Labor Force
Ansonia	5.7	5.1	-10.5%	-1.6%
Beacon Falls	3.8	3.6	-5.3%	-0.6%
Bethlehem	3.8	3.8	0.0%	-2.2%
Bristol	4.6	4.2	-8.7%	-1.5%
Cheshire	3.0	2.8	-6.7%	1.9%
Derby	5.2	4.6	-11.5%	-2.7%
Middlebury	3.4	3.4	0.0%	0.8%
Naugatuck	4.7	4.4	-6.4%	-2.6%
Oxford	3.4	3.2	-5.9%	2.0%
Plymouth	4.6	4.1	-10.9%	-2.0%
Prospect	3.6	3.3	-8.3%	-1.3%
Seymour	4.3	4.1	-4.7%	-1.2%
Shelton	4.1	4.0	-2.4%	-0.7%
Southbury	3.9	3.7	-5.1%	-0.1%
Thomaston	3.8	3.5	-7.9%	-1.8%
Waterbury	6.6	5.9	-10.6%	-2.9%
Watertown	3.6	3.6	-2.7%	-1.7%
Wolcott	3.7	3.7	0.0%	-1.2%
Woodbury	3.4	3.2	-5.9%	-1.9%

Key Takeaway

By building a public, self-serve pathway for common ACS requests, NVCOG reduced repetitive staff time spent responding to one-off inquiries while expanding access to consistent, interpretable regional data.

RIDOT Travel-Time Dashboard: Real-Time Travel Information for Emergency

Snapshot View

Agency:
Rhode Island Department of Transportation (RIDOT)

Communication Need:
Inform in real-time

Audience:
General public and travelers

Type of Data:
Live-feed, geospatial, and travel time data

Type of Analysis:
Live status monitoring with some trends

Visualization Medium:
Online dashboard

Access Link:
https://www.dot.ri.gov/projects/WashingtonBridgeRebuild/index.php#TravelDashboard

Overview

RIDOT developed an interactive travel-time dashboard to provide the public with clear, real-time information during an emergency bridge closure. The dashboard was designed to help travelers understand current delays and conditions on alternate routes, supporting quick and informed travel decisions during a rapidly evolving situation.

The visualization emphasizes immediacy and clarity. Rather than presenting historical performance or detailed analytics, the dashboard focuses on current travel conditions, using simple visual cues to communicate delay severity and route impacts at a glance. This approach allows users to quickly interpret conditions without navigating complex controls or filters.

How it Works

The dashboard is built using the ArcGIS Dashboard application and is powered by a custom backend connected to live traffic and operational data feeds. Information refreshes approximately every five minutes, ensuring that displayed conditions remain closely aligned with real-world conditions throughout the emergency response period.

Key development elements include:

Integration of live traffic, geospatial, and camera-based data sources → Automated refresh cycles to support near real-time updates → A streamlined interface designed for rapid interpretation under time pressure → Minimal user interaction to reduce friction during emergency use

This architecture allows the dashboard to function reliably as both a communication and situational awareness tool during high-impact events.

Governance

Governance for the dashboard emphasizes reliability, security, and operational continuity:

- Live data feeds supported by active monitoring and maintenance protocols
- Periodic quality checks to ensure accuracy and consistency
- Firewall protections and access controls to safeguard systems
- Clear operational ownership during the emergency response period

These practices help ensure that the dashboard remains stable and trustworthy when public reliance is highest.

Highlights

Visualization as Emergency Infrastructure

Visualization is treated as operational infrastructure that supports incident management and public communication simultaneously.

Fresh Data Is the Message

Near real-time updates align with immediate traveler needs.

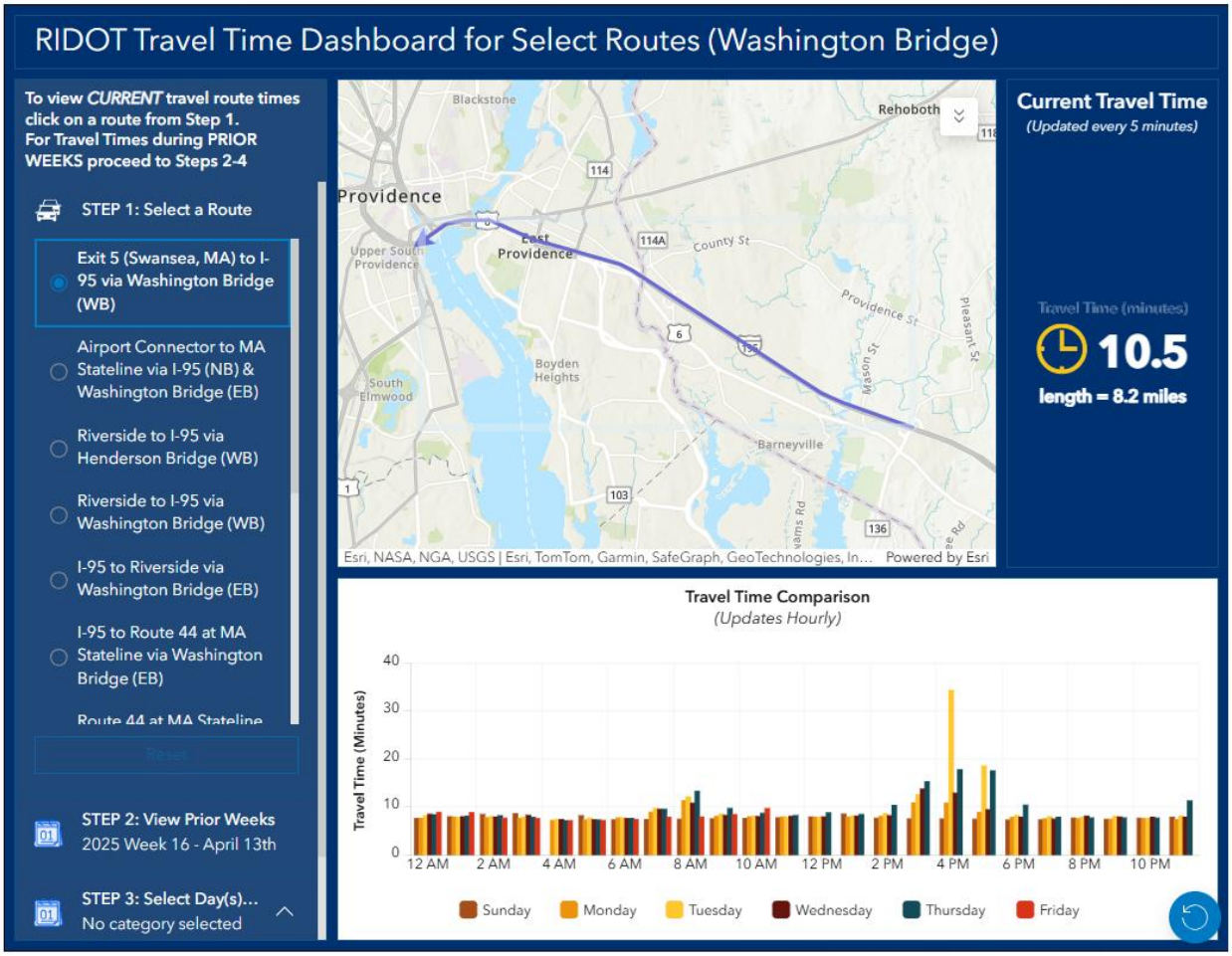
Designed for Speed, Not Exploration

The interface is intentionally constrained. Visual hierarchy, color-coding, directional indicators, and limited filtering prioritize fast comprehension.

Context Builds Confidence

Combining travel times with live camera feeds helps users interpret conditions more confidently.

Samples



Key Takeaway

RIDOT demonstrates how real-time dashboards can support public mobility and trust during emergencies by translating live operational data into clear, intuitive visuals that enable fast, informed decision-making for a general audience.

Caltrans 360 Tours: Immersive Stakeholder Engagement

Summary

Agency:
California Department of Transportation (Caltrans)

Communication Need:
Inform

Audience:
Public and stakeholders, contractors, engineers

Type of Data:
Geospatial, photographic, and qualitative

Type of Analysis:
Spatial relationship, project impact visualization

Visualization Medium:
Online 360-degree virtual tour

Access Link:
https://www.youtube.com/@CaltransD4Visualizations

Overview

Caltrans District 4 created 360-degree virtual tours to help stakeholders visualize project alternatives and understand tradeoffs earlier in the project development process. These immersive visuals provide context that is difficult to convey through traditional plans or static renderings alone.

Instead of treating visualization as a late-stage deliverable tied only to environmental documentation, the team uses these materials as a practical engagement tool for public meetings, agency coordination, and right-of-way conversations. The immersive format allows viewers to explore proposed changes from multiple perspectives and see how alternatives interact with existing conditions. This early, shared understanding has proven especially valuable for environmental engagement, where clearer context can reduce miscommunication and support more productive permitting conversations.

"... I was working the 360 viewer the entire meeting and was quite popular. I think folks really gravitate to the format and the interactive content. In my mind it has become essential to the public meeting format for my projects moving forward."

- Zachary Gifford, Senior Environmental Scientist
Caltrans District 4 Environmental Planning and Engineering

"The immersive environment of the 360 Tour really helped not only myself but all the stakeholders quickly understand the constraints and the opportunities of the project. It's a great way to accelerate the permitting process by quickly bringing everyone up to speed."

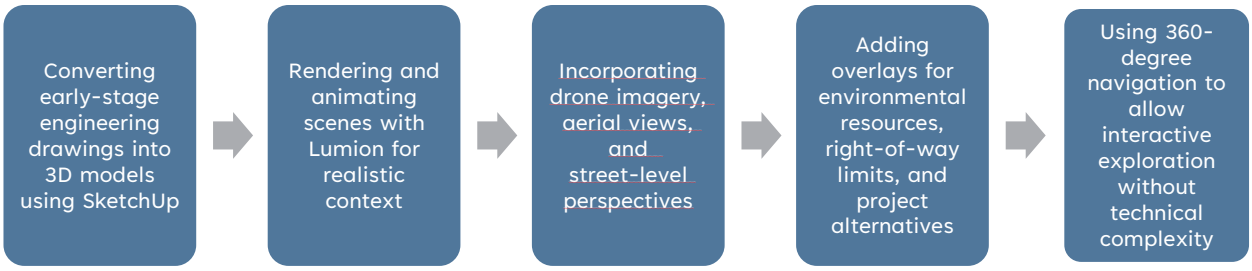
- Eileen M. White, P.E., Executive Officer
San Francisco Bay Regional Water Quality Control Board

How it Works

The 360-degree tours are produced in-house by a dedicated visualization team embedded within Caltrans District 4. The team works directly with project development teams during scoping and early planning to identify where immersive visualization will add value.

The visualization team joins Project Development Team (PDT) meetings, scopes visualization needs based on stakeholders and project phase, and then builds products ranging from quick sketches to immersive 360 tours. CAD information is translated into 3D models and rendered in tools selected for speed and scalability.

Key development elements include:



By engaging early and tailoring visuals to specific stakeholder concerns, the team ensures visualizations support discussion rather than react to conflict.

Governance

Caltrans embeds visualization staff directly within project development teams, ensuring early, consistent involvement in planning and engagement decisions. This structure is supported by district leadership and integrated into project initiation and scoping processes. Their governance emphasizes:

- Early inclusion of visualization in project budgets and work plans
- Close coordination with environmental planners, engineers, and public information staff
- Flexibility to adapt visuals based on audience and project context rather than rigid templates

This embedded model helps ensure visualizations remain relevant, timely, and aligned with project needs.

Highlights

Immersive Context for a Shared Understanding
The 360-degree conveys scale, proximity, and impact without requiring interpretation of engineering plans, supporting shared understanding among stakeholders.

Visualization Used Upstream
Visualization is introduced early to frame problems, compare alternatives, and guide discussion before decisions begin to solidify.

Visualization as a Team Function
Embedding visualization staff within project teams enables proactive use, reduces rework, and strengthens coordination and communication.

From Explanation to Exploration
Interactive navigation lets stakeholders move through the project environment themselves, shifting engagement from passive explanation to active understanding.

Samples

Key Takeaway

Caltrans shows how immersive visualization, when embedded early and supported by dedicated expertise, can replace abstract technical materials with shared, intuitive understanding and lead to more productive stakeholder engagement.

FDOT Source Book: Building Trust Through Transparent Performance Reporting

Snapshot View

Agency:
Florida Department of Transportation (FDOT)

Communication Need:
Inform and monitor progress

Audience:
Leadership, planners, MPOs, public

Type of Data:
Quantitative, performance, geospatial

Type of Analysis:
Trends, comparisons, performance targets

Visualization Medium:
Interactive web portal with embedded dashboard and maps

Access Link:
https://fdotsourcebook.com/

Overview

The FDOT Source Book is an interactive web portal that provides centralized access to multimodal transportation performance data across Florida. What began as a collection of spreadsheets and static reports has evolved into a comprehensive, publicly accessible platform that supports performance monitoring, planning coordination, and transparency.

Designed to serve a broad audience, including MPOs, internal staff, and the public, the portal allows users to explore historical trends, track key metrics, and visualize performance across Florida's transportation system in a transparent and consistent format. The Source Book integrates interactive charts, dashboards, and maps that enable comparison across districts, transportation modes, and time periods. Consistent layouts, explanatory text, and uniform color schemes support repeated use and help users navigate complex performance information with confidence. By making performance data easy to explore and download, the platform reinforces FDOT's role as a trusted source of statewide transportation information.

How it Works

The Source Book is supported by a robust technical and data infrastructure. A SQL Server database stores more than 70 multimodal performance measures spanning safety, mobility, reliability, transit, aviation, and other areas. Scripts process raw datasets and feed calculated

metrics directly into Tableau, which powers the interactive dashboards and charts. Geospatial components are integrated through ESRI tools, including interactive maps and downloadable shapefiles hosted via ArcGIS Hub and Open Data. The platform operates on a rolling update schedule, publishing data as soon as it becomes available following rigorous quality assurance and quality control processes, and clearly displaying the most recent update date on each page. This approach ensures that users are working with current, reliable information while maintaining consistency across measures and modules.

Governance

The Source Book reflects a mature and intentional data governance model:

- Data storage, transformation, and visualization are intentionally separated to support accuracy, scalability, and trust, with a centralized SQL database, version-controlled scripts, and Tableau-based dashboards
- Version-controlled scripts support consistent metric calculation and reliable updates
- Regular coordination with safety, modal, and analytics teams ensures alignment across programs
- Documented processes and data dictionaries support transparency and continuity
- Training resources and recorded webinars help onboard and support users

Over time, this governance approach has helped position the platform as FDOT's authoritative performance reporting tool.

Highlights

Consistency Enables Comparability

Standardized layouts, scales, and color schemes make it easier to compare performance across time, geography, and modes.

Transparency Builds Credibility

Pairing each visualization with definitions, calculation methodology, reporting frequency, update dates, and downloadable data supports informed and confident use of performance measures.

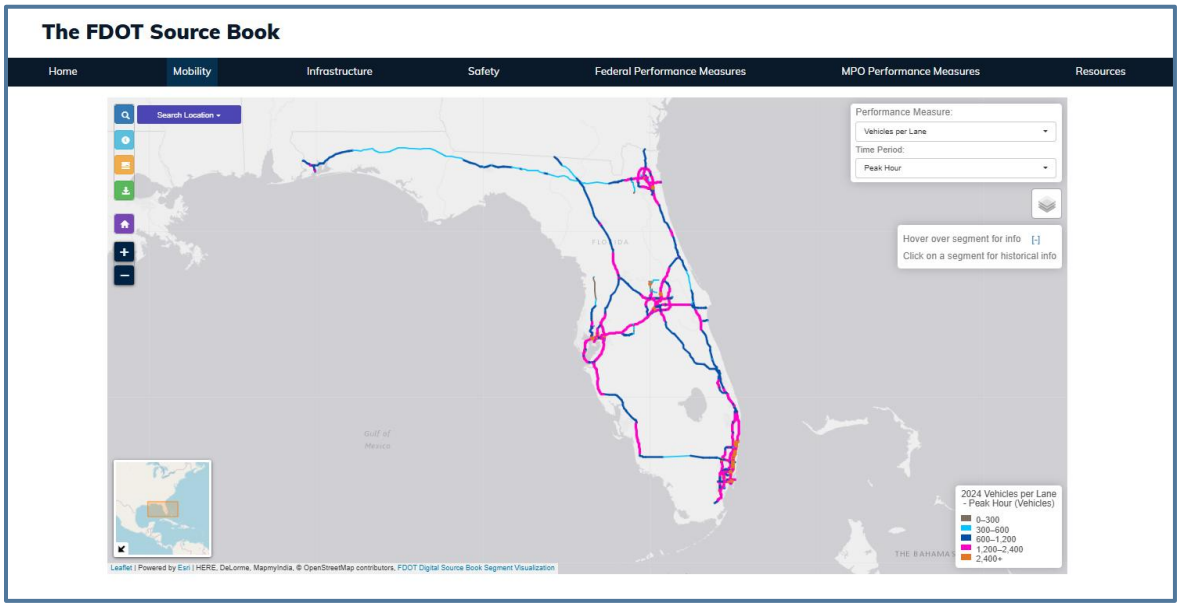
Governance Sustains Scale

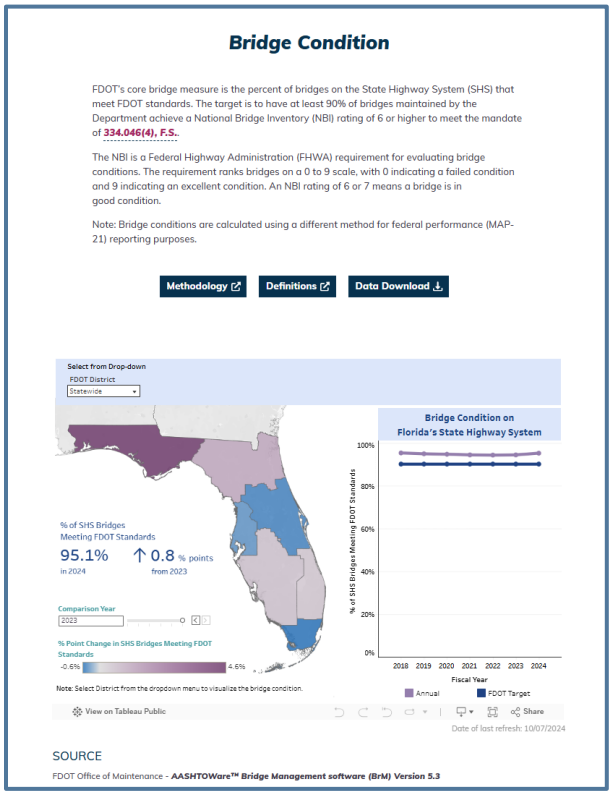
Strong coordination, documentation, and database infrastructure enable the platform to grow while remaining reliable and maintainable.

Support Turns Tools into Practice

Training resources and webinars help translate the platform from a reporting tool into a routinely used planning resource.

Samples





Key Takeaway

FDOT Source Book shows how strong governance, consistent design, and integrated data infrastructure can transform performance reporting into sustained internal coordination, external communication, and public accountability.

MnDOT Performance Dashboard: Simplicity for Shared Ownership

Summary

Agency:
Minnesota Department of Transportation (MnDOT)

Communication Need:
Inform

Audience:
General public, elected officials, internal staff

Type of Data:
Quantitative and narrative trend context

Type of Analysis:
Trends, benchmarks, target achievement, projections

Visualization Medium:
Interactive web portal with embedded Power BI dashboards across multiple pages

Access Link:
https://www.dot.state.mn.us/measures/index.html

Overview

MnDOT's Performance Dashboard is a public-facing website that presents transportation performance data in a clear, approachable, and consistent way. It consolidates key metrics from across the agency into a single platform that is easy to navigate and useful for both internal and external audiences, beginning with a "Snapshot" landing page that provides a high-level view of system performance.

The site is organized by performance area, allowing users to explore individual measures. Each page pairs interactive visuals with straightforward explanations about what is being measured, why it matters, and the strategies MnDOT and its partners are using to meet performance goals. This approach helps make data more understandable and policy-relevant. The dashboard supports leadership briefings, internal discussions, and public communication.

How It Works

MnDOT's performance dashboard is supported by a practical, human-centered production workflow that reflects both the structure of the agency's data systems and available staff capacity.

Data Export → Central Assembly & Standardization → Measure-Specific Preparation → Update & Publishing

Most measures originate from specific program areas such as pavement, safety, and traffic engineering are exported by subject matter experts on a regular schedule. These handoffs follow a structured and repeatable process that ensures consistency in definitions, timeframes, and reporting assumptions.

The performance team uses spreadsheets as a staging environment to standardize the datasets. This includes aligning definitions, confirming units and time periods, checking for outliers, and formatting tables for Power BI. For spatial or network-related measures, such as congestion, additional steps are taken to associate data with roadway segments or geographic areas.

Once visuals are prepared in Power BI, they are embedded into MnDOT's public dashboard site. Updates follow an annual or periodic schedule aligned with performance reporting cycles. This process allows MnDOT to maintain a stable, transparent platform without relying on automated data pipelines or complex integrations.

Governance

MnDOT's dashboard reflects a centralized but practical governance approach focused on consistency and sustainability:

- Performance reporting is centrally coordinated, with standardized dashboard templates and page layouts
- Visual design and organization align with agency planning documents and strategic objectives
- Coordination across divisions supports consistent definitions, messaging, and update timing
- Performance staff with guidance from Communications staff, ensure metrics are framed in plain language and are accessible to non-technical audiences

Highlights

Measures Are Framed Around Agency Intent
Each page clearly states what the measure represents and how MnDOT uses it, anchoring the visualization to agency goals rather than leaving users to infer purpose from charts alone.

Long-Term Trends Are Prioritized Over Point-in-Time Results
Visuals emphasize multi-year trends and condition trajectories, helping users focus on system performance over time instead of reacting to short-term variation or single-year changes.

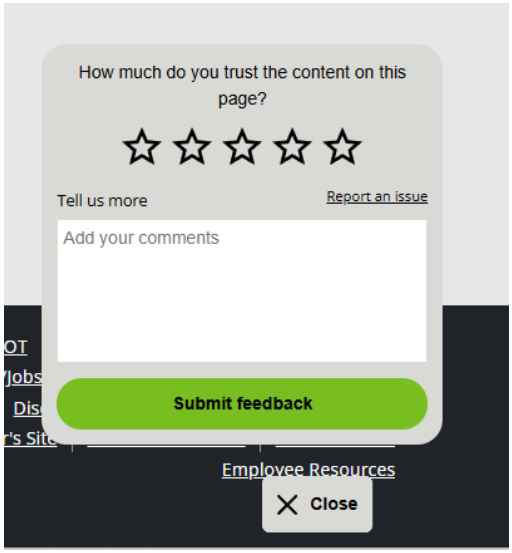
Disaggregation Adds Meaning
When beneficial for understanding, measures are broken into subcategories and supported by simple filters, allowing users to explore key dimensions of performance while preserving a clear, readable layout.

Persistent Navigation Supports Orientation and Discovery
A consistent right-hand navigation menu shows users where they are within the performance website while making it easy to move between related measures, encouraging exploration without losing context.

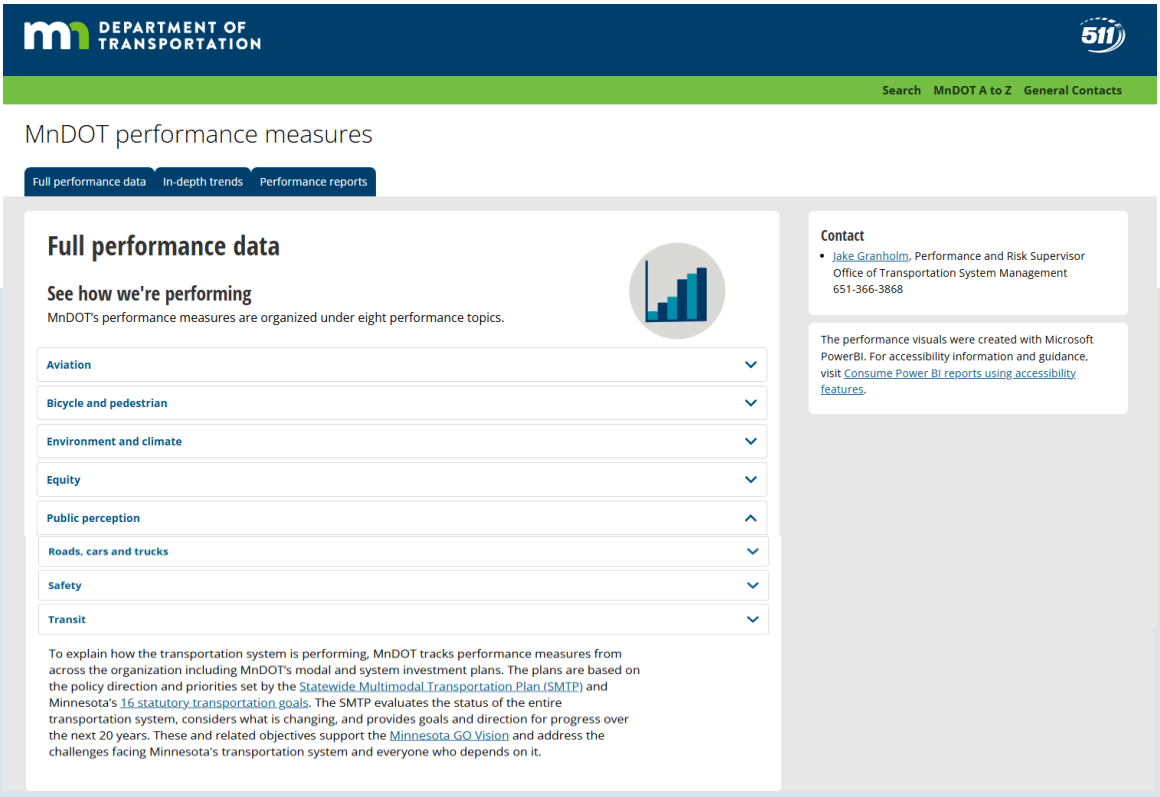
Feedback Loop

MnDOT's Performance Measures Dashboard includes two notable features that support user engagement and trust: (1) direct contact information for the staff member responsible for each dashboard, and (2) an embedded feedback tool. Each measure page lists the name, phone number, and hyperlinked email address of the supervising staff member, encouraging open lines of communication.

A pop-out interface allows users to rate their level of trust in the dashboard content on a scale of 1 to 5, provide written comments, and report issues. Feedback is routed to MnDOT's communications team. Together, these features support a two-way feedback loop and give users an easy way to ask questions, report concerns, or suggest improvements, while demonstrating how agencies can integrate feedback tools directly into digital platforms.

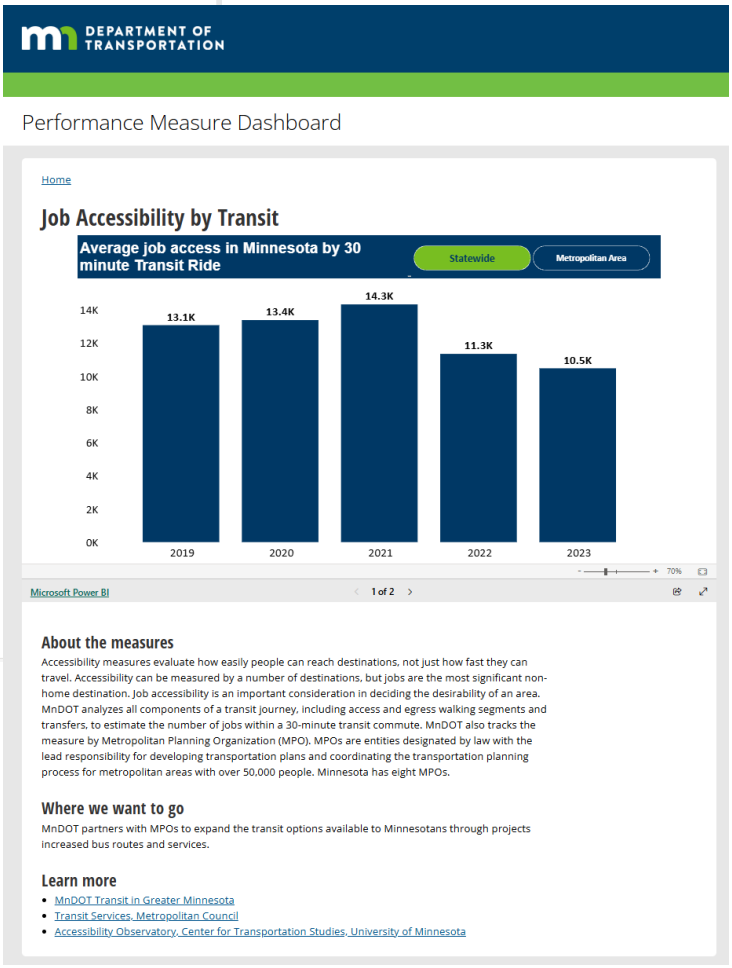


Samples



Samples

MnDOT performance measures



Key Takeaway

MnDOT Performance Dashboard demonstrates how intentional simplicity, strong narrative framing, and disciplined interactivity can make performance information usable for both internal decision-making and public transparency. By pairing clear explanations with consistent layouts, limited filters, and intuitive navigation, MnDOT enables users to understand agency performance without requiring advanced analytical skills or complex data infrastructure.

Arizona DOT: Social Media Graphics for Public Information

Summary

Agency:
Arizona Department of Transportation (ADOT)

Communication Need:
Inform

Audience:
General public

Type of Data:
Geospatial visualization and project impacts

Type of Analysis:
Basic location and impact illustration

Visualization Medium:
Social media image (Instagram)

Access Link:
https://www.instagram.com/p/DIRuoLJJAmb

Overview

ADOT creates graphics optimized for mobile screens that deliver timely transportation updates to the public via social media. The visuals focus on urgent roadway changes such as closures and detours and are designed to be understood quickly while scrolling on a phone.

A bird's-eye perspective, clear titles, and concise labels help users grasp key information at a glance. Rather than presenting detailed data or technical analysis, the graphics emphasize immediate situational awareness by showing affected areas, closures, and available alternate routes. By using a widely adopted social media platform, ADOT is able to distribute critical information efficiently, making the graphics especially effective during short-lived, time-sensitive events.

How It Works

ADOT uses its Instagram platform to communicate time-sensitive roadway information directly to the public. When closures or detours arise, operations or project staff quickly share location and impact details that are translated into clear, map-based graphics for public use.

That information is translated into a single, simplified visual that emphasizes spatial understanding. The image is published through ADOT's official Instagram account, enabling rapid distribution and resharing during active disruptions. The product is designed for immediacy and clarity, rather than long-term reference or analytical exploration.

Governance

Content is governed through ADOT's communications and public information functions:

- Decision-making emphasizes message clarity, accuracy, and timing, reflecting the graphic's role as a rapid public awareness tool
- Coordination with operations or project teams supports validation of closures and detours prior to publishing
- Visuals follow agency branding and readability standards appropriate for public-facing communications
- Products are not treated as long-term or archival data assets, aligning governance effort with the graphic's short lifecycle

Highlights

Spatial Orientation Supports Immediate Wayfinding

An overhead view allows users to quickly identify where an impact is occurring and how it relates to surrounding roadways, supporting rapid situational awareness without technical map reading skills.

Platform-Specific Design Improves Comprehension

The graphic is designed specifically for Instagram's mobile feed, using scale, orientation, and spacing that support quick understanding without requiring zooming or interaction.

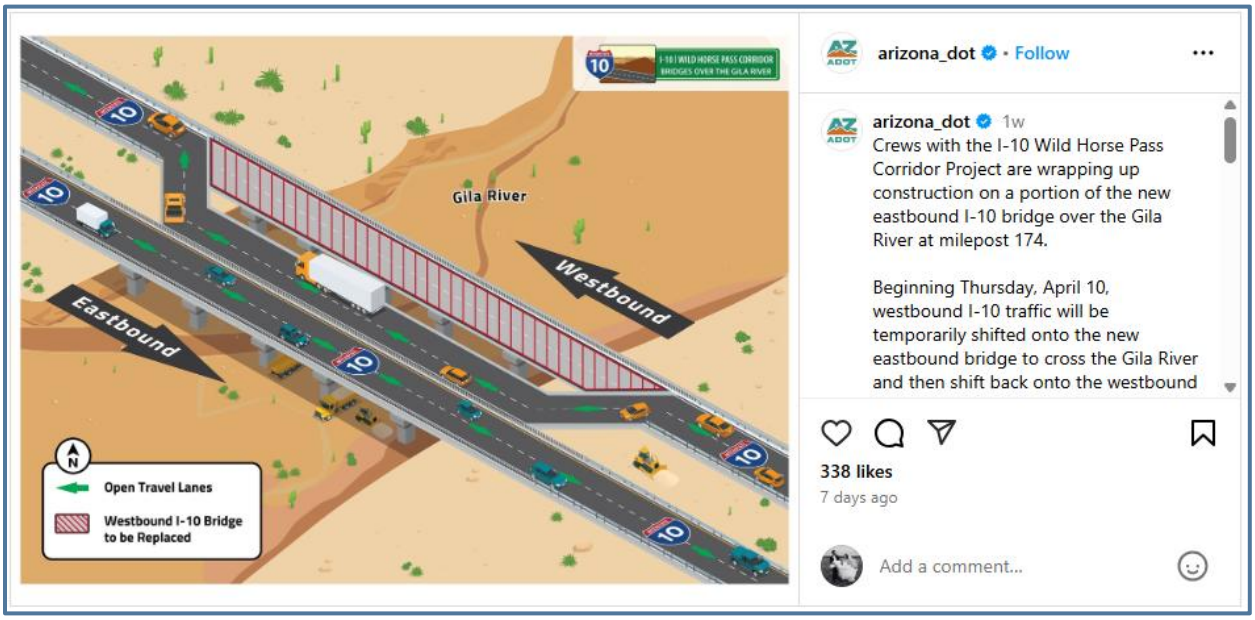
Single-Frame Visuals Reduce Cognitive Load

By communicating the full message within one static image, the graphic avoids reliance on captions, links, or multi-slide carousels, ensuring essential information is conveyed even when users only glance at the post.

Short-Lived Media Supports Timely Updates

Instagram enables ADOT to share temporary but essential roadway updates with the public, prioritizing speed and accessibility over long-term archival value.

Samples



Key Takeaway

Arizona DOT's social media graphic show how public agencies can use platform-aware visuals to communicate with the public. By focusing on spatial clarity, mobile accessibility, and a single-image format, ADOT helps viewers quickly understand road closures and detours.

WSDOT Travel Trends Dashboard: Communicating Traffic Conditions with Near Real-Time Data

Summary

Agency:
Washington State Department of Transportation (WSDOT)

Communication Need:
Inform and monitor evolving travel conditions

Audience:
Public and industry stakeholders

Type of Data:
Near real-time travel volumes, speeds, freight activity, toll data

Type of Analysis:
Trends, comparisons

Visualization Medium:
Tableau dashboard embedded in website

Access Link:
https://wsdot.wa.gov/about/data/travel-trends-dashboard/default.htm

Overview

The Travel Volume and Speed Trends Dashboard provides near real-time insight into highway, toll, and freight travel along Washington's most heavily traveled corridors. The dashboard builds on data pipelines and workflows originally developed for WSDOT's COVID-19 Travel Trends effort and is updated daily as new data become available.

Information is organized into four primary categories: highway traffic volumes, toll facility volumes, highway speeds, and freight traffic volumes. By pairing recent conditions with historical baselines, the dashboard helps users understand how travel patterns are evolving over time. On-page guidance supports consistent interpretation of charts and filters, making the dashboard a practical resource for public transparency, partner coordination, and ongoing monitoring of statewide travel trends.

"The goal was never to react to one day of data. It's about understanding patterns and context."

- Performance Management Staff, WSDOT

How It Works

The Travel Trends Dashboard is supported by an automated daily workflow developed and maintained internally by WSDOT staff, allowing the site to refresh quickly when new data become available.

Raw traffic data is managed through an internal web-based environment built with Python and Django. Each morning, Python scripts retrieve travel data, including volumes, speeds, freight indicators, and toll information, and process it through scheduled jobs. These scripts perform data quality checks, clean and aggregate records, and prepare standardized datasets for visualization. The workflow also identifies missing or faulty sensor data and uses historical information to fill gaps when necessary, helping ensure reliable daily updates.

Once processing is complete, the datasets are loaded into Tableau, where dashboards are refreshed and published through Tableau Public and embedded on WSDOT's website. This approach enables consistent daily updates while allowing staff to review the data before publication. Users can explore near real-time conditions alongside historical trends, supporting both immediate situational awareness and longer-term analysis of travel patterns.

Governance

WSDOT's Travel Trends Dashboard reflects a hybrid governance model that combines automation with deliberate oversight:

- Daily data processing and updates are handled through automated scripts to ensure timeliness
- Internal quality control checks are embedded in the data preparation process
- Dashboard maintenance and refinement are supported by a small, specialized internal team
- Strong executive sponsorship helped institutionalize the dashboard beyond its initial COVID-19 use case
- Ongoing use by leadership, partners, and the public reinforces accountability and continuity

Together, automation and oversight have helped the dashboard remain both responsive and trustworthy over time.

Highlights

Real-Time Data Is Framed for Interpretation, Not Reaction

Although the dashboard updates daily, visuals emphasize trends and context rather than momentary spikes, helping users interpret variability without overreacting to short-term changes.

Automation Is Paired with Human Oversight

Automated scripts handle daily processing, but quality checks and staff review remain integral, reinforcing trust in near real-time public reporting.

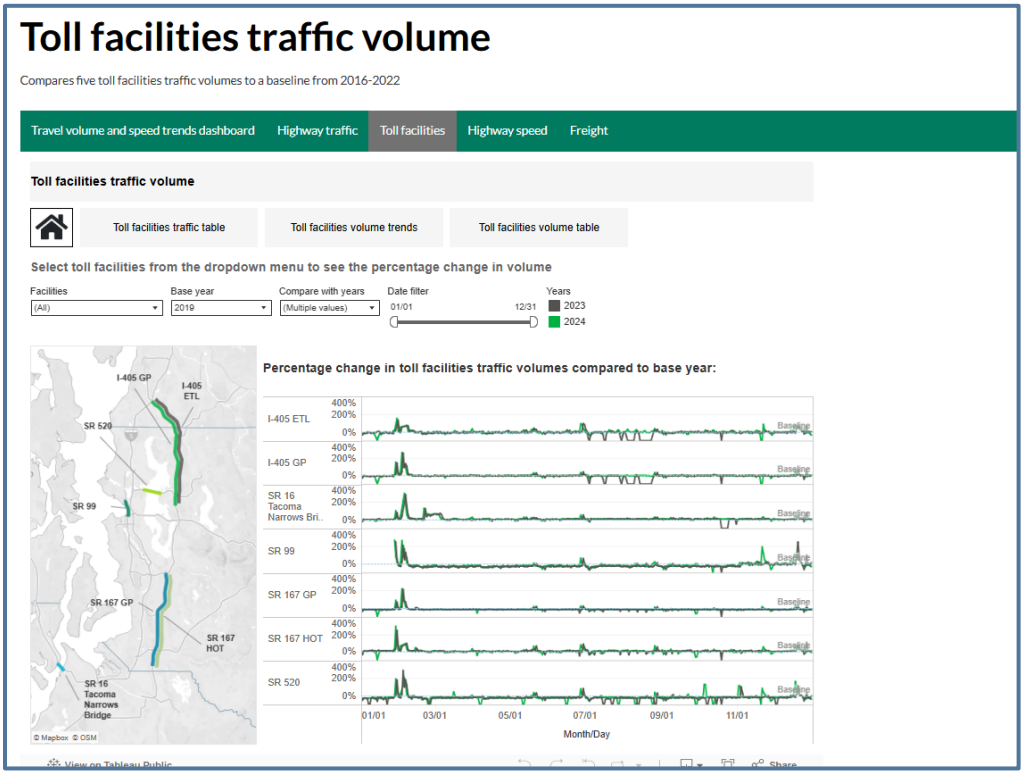
Multiple Time Scales Support Different Decisions

The dashboard allows users to view recent conditions alongside longer historical baselines, enabling the same tool to support executive briefings, partner coordination, and public understanding.

Operational Data Is Translated for Public Use

Complex operational inputs, such as toll transactions and system performance data, are aggregated and summarized into clear metrics that allow non-technical users to understand system use without exposing raw or sensitive data.

Samples



Key Takeaway

WSDOT's Travel Trends Dashboard shows how automation, internal quality control, and sustained leadership support can transform near real-time data into a trusted public resource. By combining daily updates with clear visual standards, WSDOT enables timely situational awareness while preserving analytical credibility.

TxDOT Visualization Guidelines and Tableau Community of Practice

Summary

Agency:
Texas Department of Transportation (TxDOT)

Communication Need:
Inform about visualization guidelines and resources

Audience:
TxDOT employees and contractors

Type of Data:
Quantitative, qualitative

Type of Analysis:
Not applicable (standards and guidance)

Visualization Medium:
Website

Access Link:
https://www.txdot.gov/about/brand-guidelines.html

Overview

TxDOT has agency-wide standards that govern how data are presented across platforms and audiences. Through its publicly accessible Brand Guidelines and Data Visualization Guidelines, the agency provides consistent direction on design elements like color, typography, symbology, chart selection, and accessibility.

These resources promote visual consistency and credibility across a large organization, while still allowing flexibility for different programs and use cases. Because the same online resource is used by both internal staff and external consultants, the guidelines help ensure that all visual materials, regardless of who creates them, adhere to a common set of expectations.

To reinforce these standards and encourage continuous learning, TxDOT also maintains a Tableau-focused Community of Practice, where staff from across the agency share knowledge, showcase their dashboards, and discuss evolving best practices.

How It Works

The Data Visualization Guidelines extend this consistency to charts and dashboards, offering guidance on chart selection, color use, hierarchy, accessibility, and common pitfalls in data presentation.

In addition to standardized guidance, TxDOT fosters internal consistency and peer learning by offering regular collaboration opportunities through a Tableau Community of Practice (CoP).

The CoP meets at least quarterly and draws an average of 75 Tableau developers and enthusiasts from across the agency. Sessions typically include project walkthroughs, peer feedback, open discussions, and tutorials on various Tableau features or design techniques.

By creating a space where staff can share works in progress, offer suggestions, and learn from each other, the CoP functions as an ongoing support structure that helps embed good visualization practices across the organization. TxDOT also hosts Tableau Office Hours within the CoP, providing their Data Analysts collaborative support, team-based solutions, and expert guidance from Tableau Doctors for development challenges. The CoP aspires to be a feedback loop, helping refine guidance over time while supporting staff adoption through peer learning rather than enforcement alone.

Governance

TxDOT's approach reflects a centralized but enabling governance model:

- Visualization and branding standards are centrally defined and publicly documented
- Guidelines apply to internal staff, consultants, and external partners
- A Community of Practice supports implementation through training, shared templates, and peer support
- Standards emphasize accessibility, clarity, and consistency rather than prescribing specific tools
- Feedback from users informs iterative updates to guidance and examples

This structure allows TxDOT to scale visualization efforts across a large organization while maintaining quality and coherence.

Highlights

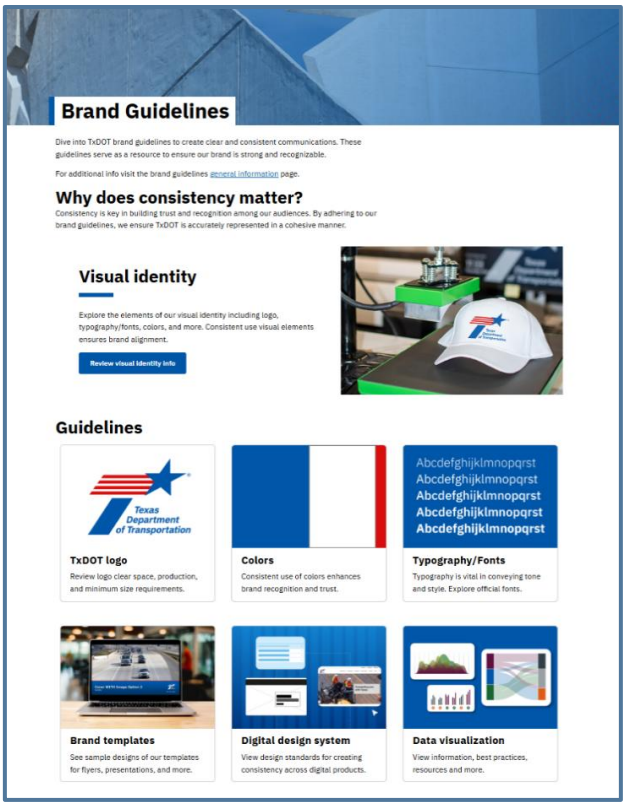
Standards as Shared Infrastructure
Clear, public guidelines function as foundational infrastructure, reducing rework and improving consistency across projects, districts, and teams.

Centralized Standards for Decentralized Creation
By centralizing standards and resources, TxDOT enables staff across the agency to produces visualizations confidently without relying on a single production team.

Communities of Practice Reinforce Adoption
The Tableau Community of Practice complements formal guidance by providing training, examples, and peer support, helping standards translate into everyday practice.

Operational Data Is Translated for Public Use
Clear guidance on charts, colors, and accessibility removes low-level design decisions, allowing staff and consultants to focus on analysis rather than visual debates while improving consistency and delivery speed.

Samples



Key Takeaway

TxDOT demonstrates how clear, centralized visualization standards can set a strong foundation for consistent, accessible design across tools and formats, from presentations and reports to Tableau dashboards. These standards help ensure visualizations meet internal quality expectations and align with agency branding and accessibility goals. That foundation is reinforced and sustained through an active Tableau Community of Practice that meets quarterly and provides a space for ongoing learning, collaboration, and knowledge sharing. Together, TxDOT's guidelines and CoP offer a dual approach that supports both technical consistency and professional growth, making it easier for staff at all levels to create impactful, user-friendly visuals.

TxDOT GIS Governance and Map Guidelines

Summary

Agency:
Texas Department of Transportation (TxDOT)

Communication Need:
Inform about visualization guidelines and resources

Audience:
TxDOT employees and contractors

Type of Data:
Geospatial

Type of Analysis:
Not applicable (standards and guidance)

Visualization Medium:
Website

Access Links:
https://www.txdot.gov/about/brand-guidelines/map-guidelines.html

Overview

TxDOT's Map Guidelines emerged from the formation of the TxDOT GIS Work Group (GISWG), which operated within a broader Enterprise Governance framework. This framework includes tactical and executive steering committees composed of senior leadership, along with work groups focused on specialized topics such as GIS.

In its early stages, the GISWG prioritized the development and publication of GIS standards, including metadata requirements and mapping guidelines. These standards were communicated agency-wide to create consistency in how maps were produced and shared. Over time, the work of the GISWG helped build the case for a permanent statewide GIS function.

Today, TxDOT's Statewide GIS section, also known as Geographic Information Management, provides dedicated staff to support GIS efforts across the agency. The Map Guidelines are part of a broader ecosystem that includes internal websites, Teams channels, annual conferences, GISP certification support, training sessions, office hours, and ongoing knowledge-sharing

How It Works

The Mapping Guidelines establish consistent approaches for basemaps, symbology, labeling, scale, and context, ensuring that maps produced across districts and divisions are interpretable and aligned with TxDOT's visual identity.

The GIS Community of Practice reinforces these standards through structured and informal engagement opportunities. Staff participate in trainings, conferences, and regular collaboration channels where mapping practices are discussed and refined. Rather than functioning as a static rulebook, the guidelines are supported by an active professional network that promotes shared understanding and continual improvement.

Governance

Governance for TxDOT's GIS program reflects an enterprise-level approach to spatial data and mapping standards.

- Developed within an Enterprise Governance framework that includes executive and tactical oversight
- Initially led by the GIS Work Group, which established early GIS standards and documentation
- Resulted in the creation of a permanent Statewide GIS section with dedicated staff
- Supported by an ongoing GIS Community of Practice offering training, conferences, and collaboration tools
- Designed to sustain long-term consistency in GIS practices across a large and decentralized agency

Highlights

Institutionalization Transforms Initiative into Program

The transition from a work group to a permanent Statewide GIS section demonstrates how mapping standards can evolve into sustained organizational capacity.

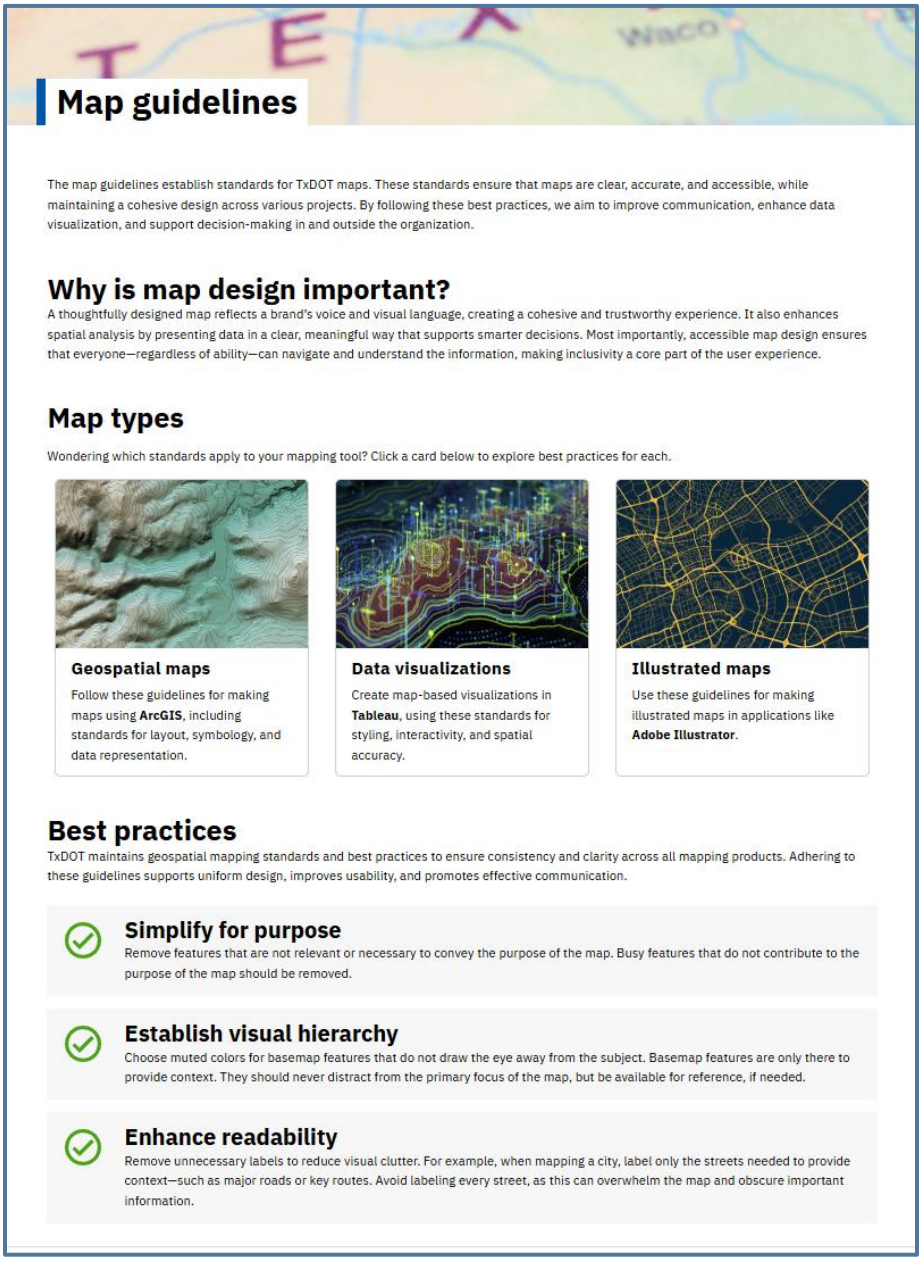
Standardized Spatial Rules Improve Analytical Consistency

Common guidance on metadata, projection, symbology, and network definitions ensures maps and spatial analyses are comparable across divisions and projects.

Internal Ecosystems Support Ongoing Practice

Dedicated internal sites, Teams channels, conferences, and certification support create a structured environment where GIS knowledge is continuously shared and maintained.

Samples



Map guidelines

The map guidelines establish standards for TxDOT maps. These standards ensure that maps are clear, accurate, and accessible, while maintaining a cohesive design across various projects. By following these best practices, we aim to improve communication, enhance data visualization, and support decision-making in and outside the organization.

Why is map design important?

A thoughtfully designed map reflects a brand's voice and visual language, creating a cohesive and trustworthy experience. It also enhances spatial analysis by presenting data in a clear, meaningful way that supports smarter decisions. Most importantly, accessible map design ensures that everyone—regardless of ability—can navigate and understand the information, making inclusivity a core part of the user experience.

Map types

Wondering which standards apply to your mapping tool? Click a card below to explore best practices for each.

Geospatial maps

Follow these guidelines for making maps using **ArcGIS**, including standards for layout, symbology, and data representation.

Data visualizations

Create map-based visualizations in **Tableau**, using these standards for styling, interactivity, and spatial accuracy.

Illustrated maps

Use these guidelines for making illustrated maps in applications like **Adobe Illustrator**.

Best practices

TxDOT maintains geospatial mapping standards and best practices to ensure consistency and clarity across all mapping products. Adhering to these guidelines supports uniform design, improves usability, and promotes effective communication.

Simplify for purpose

Remove features that are not relevant or necessary to convey the purpose of the map. Busy features that do not contribute to the purpose of the map should be removed.

Establish visual hierarchy

Choose muted colors for basemap features that do not draw the eye away from the subject. Basemap features are only there to provide context. They should never distract from the primary focus of the map, but be available for reference, if needed.

Enhance readability

Remove unnecessary labels to reduce visual clutter. For example, when mapping a city, label only the streets needed to provide context—such as major roads or key routes. Avoid labeling every street, as this can overwhelm the map and obscure important information.

Key Takeaway

TxDOT demonstrates how formal enterprise governance combined with a strong GIS Community of Practice can institutionalize mapping standards across a large organization. The Map Guidelines function not as isolated design rules, but as part of a broader ecosystem that supports consistency, training, and long-term GIS capacity.

MAPA High Priority Network Tool: Integrating Data, Risk, and Community Voice for Safety

Summary

Agency:
Metropolitan Area Planning Agency (MAPA)

Communication Need:
Inform

Audience:
Transportation and community stakeholders

Type of Data:
Quantitative, qualitative, and geospatial

Type of Analysis:
Network screening, comparison

Visualization Medium:
GIS Tool

Access Link:
https://mapacog.github.io/hpn-tool/

Overview

MAPA developed the High Priority Network (HPN) Tool as part of its Safe Streets and Roads for All Action Plan to support proactive, system-level safety planning across the Omaha–Council Bluffs region. Rather than relying solely on historical crash data, the tool integrates three complementary signals: where serious crashes have occurred, where future risk is likely, and where community members report feeling unsafe.

This approach reframes safety analysis from a purely reactive exercise to one that balances historical need, predicted risk, and lived experience. By combining these perspectives into a single decision space, MAPA created a tool that helps agencies identify both known problem locations and emerging safety risks, including areas where crashes may be underreported but community concern is high.

To complement the technical tool, MAPA also developed Safety Snapshots: concise, one-page visuals that translate complex safety analysis into clear, audience-specific narratives for leaders, stakeholders, and the public.

How It Works

The High Priority Network (HPN) Tool is a GIS-based analysis and visualization tool developed using an ArcGIS environment. It evaluates every roadway segment and intersection in the Omaha–Council Bluffs region using a single, regionwide dataset that integrates information from both Iowa and Nebraska.

To support consistent analysis across state lines, MAPA first standardized crash and roadway data from both states. Crash records were aligned across formats and coding schemes, consolidated into one record per crash, and spatially assigned to a unified roadway network. This created a common foundation for network-level safety screening.

The tool integrates three complementary data inputs. Historical fatal and serious injury crashes represent safety need. Roadway characteristics, such as lane count and speed limits, are used to estimate systemic risk at locations where severe crashes may occur. Community-reported safety concerns are incorporated through a spatial survey, with responses geocoded and linked to the same roadway network.

Within the GIS tool, users can explore these inputs individually or in combination and apply filters based on crash types and roadway characteristics. To support non-technical audiences, MAPA also developed Safety Snapshots, which translate the underlying GIS analysis into concise, one-page visuals for briefings, public communication, and early coordination.

Governance

Governance for the High Priority Network Tool emphasized transparency, shared understanding, and long-term usability in a multi-jurisdictional region.

- Developed by a consultant in close coordination with MAPA, with iterative review to confirm data assumptions, methods, and usability
- MAPA maintains ownership of the underlying datasets, analytical framework, and outputs as a regional planning resource
- Scoring logic, network rules, and data inputs are documented and visible to support partner understanding and trust
- The GIS-based framework is structured to support future updates as new crash data, roadway information, or community input become available

Highlights

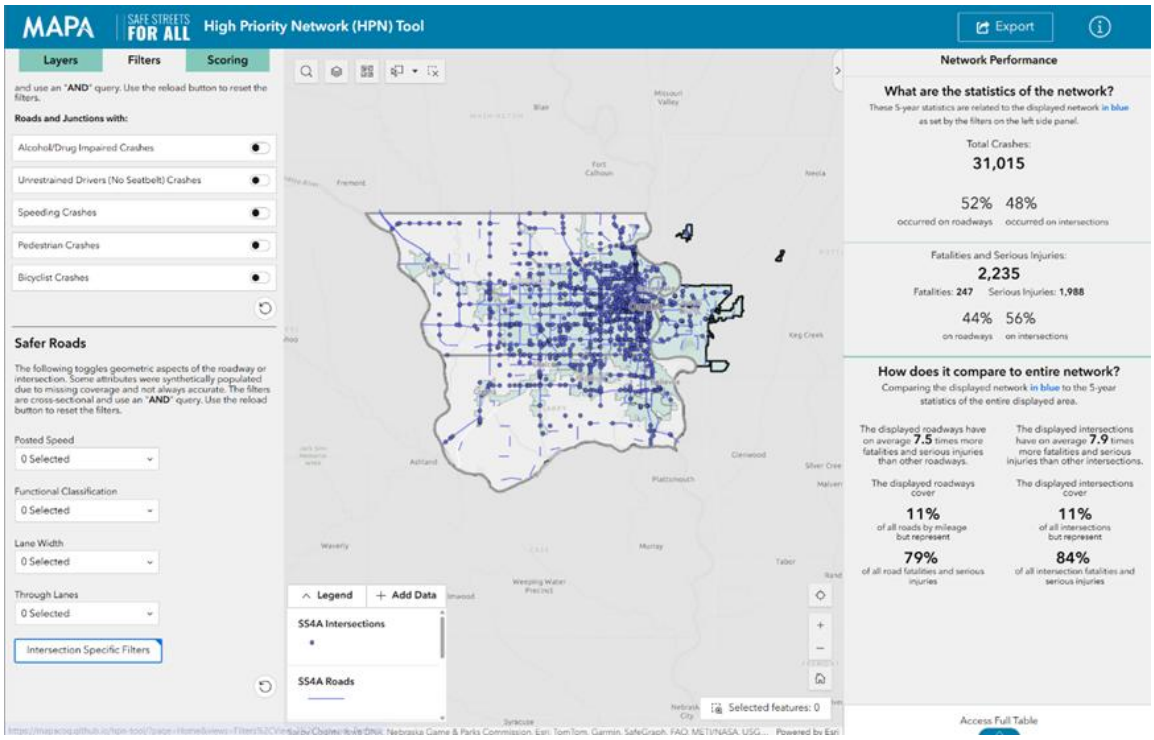
Crashes, Risk, and Lived Experience for a Complete Safety View
Combining historical crash data, modeled risk, and community-reported concerns creates a more complete picture of safety need than any single dataset

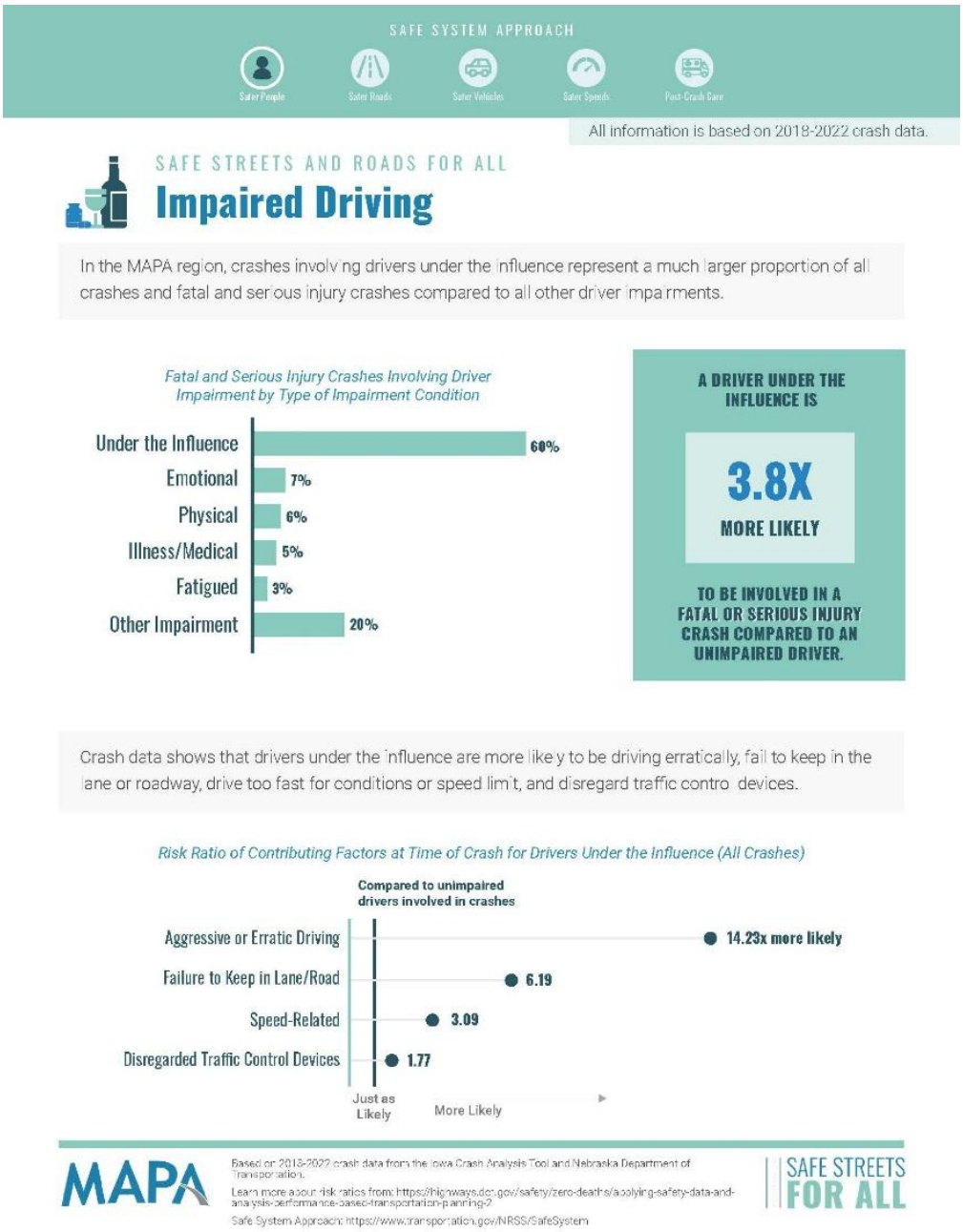
Different Outputs for Different Audiences
Pairing a flexible GIS-based tool with concise one-pagers helped translate complex analysis into accessible formats for leaders, stakeholders, and the public.

GIS-Based Visualization Preserves Location Context
Mapping safety outcomes directly to roadway segments and intersections allows users to see where safety issues occur within the network, rather than relying on aggregated summaries that can obscure local conditions.

Using Comparison to Understand Safety Outcomes
The Network Performance panel compares the filtered network to the rest of the roadway system, providing immediate context for interpreting safety outcomes. This built-in comparison is unique and helps users quickly assess whether outcomes are typical or disproportionately severe.

Samples





Key Takeaway

MAPA's High Priority Network Tool illustrates how regional planning agencies can integrate multiple sources of safety data, like historical crash records, modeled roadway risk, and community-reported concerns, into a single, actionable framework. This approach moves beyond traditional, reactive safety planning and helps agencies identify both known and emerging risk areas.