Data Governance for Asset Management & Safety: An Integrated Approach at CTDOT

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Spy Pond Partners, LLC
Data Governance Timeline

- **2016**
  - Transportation Enterprise Database Proof of Concept

- **2017**
  - Roadway Data Improvement Program
  - Safety Data Integration Workshop

- **2018**
  - Data Governance Workshop
Vision Statement For CTDOT’s Transportation Enterprise Database

“Create an accessible transportation safety and asset data enterprise system where authoritative data sets are managed by data stewards and formatted for consumption and analysis in a manner that allows stakeholders to use tools that are both effective and meet their business needs.”
Parallel Paths Coming Together

TAMP
Bridge & Pavement Targets
Asset Management

Safety Analysis
Safety Targets
MIRE (Model Inventory Of Roadway Elements)

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Prioritization of Asset Data

Asset Management (2018 TAMP)

Bridges:

Pavements:

Traffic Signals:

Signs:

Sign Supports:

Pavement Markings:

Safety Analysis

- Horizontal and vertical curves
- Intersections
- AADT
- Pavement Condition
- Signals
- Signs
- Passing Zones
- Speed Limits
- Illumination
- Guiderail

Future TAMPS

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Other Requirements Driving Asset Prioritization

- Curb Ramps ➔ ADA Transition Plan
  Americans with Disabilities Act (ADA)

- Guiderail ➔ MASH Implementation Plan
  Manual for Assessing Safety Hardware

- Drainage ➔ MS4 Implementation Plan
  Municipal Separate Storm Sewer System

- Illumination ➔ 811 Call Before You Dig

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Readiness Assessments

- Asset Definition & Identification
- Asset Data Requirements
- Data Ownership and Stewardship
- Data Collection, Storage and Updating
- Derivative Data Set Creation and Management
- Asset Work History Tracking
- Data Access Points
- Additional Notes

Completed for:
- Pavement
- Bridge
- Traffic Signals
- Guiderails
- Signs
- Sign Supports
- Pavement Markings
- Highway Lighting

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Readiness Assessment Process

- Coordinated/led by Asset Management Group
- Working session with asset steward to complete a draft (1-2 hour process)
- Asset steward reviews with asset work group and makes updates
- Form provided to Asset Management
- Updates can be made at any time but anticipate cycle aligned with TAMP
Readiness Assessment Elements

• Asset Definition & Identification
  – Definition of the Asset
  – Units of Measure
  – Asset Components (if applicable)
  – Unique ID
Readiness Assessment Elements

• Asset Data Requirements
  – Primary internal and external data users
  – Scope of asset data (e.g. state system)
  – Business decisions to be made based on data
  – What will more data enable CTDOT to do?
  – Data needed to meet state or federal requirement?
  – Type of data requirements: asset location, inventory, condition, condition history, work history (current and future)
  – Data dictionary status and location
Readiness Assessment Elements

• **Data Ownership & Stewardship** – Contacts for:
  – Answering questions about data meaning, derivation, quality
  – Approving changes to data structure or coding
  – Granting access to the data
Readiness Assessment Elements

• **Data Collection, Storage & Updating**
  – Who collects data and how?
  – Is there a Quality Management Plan?
  – Asset location management: feature type, location referencing method, LRS synchronization approach
  – Authoritative source system
  – Updating methods
  – Desired technology solutions
Readiness Assessment Elements

- **Derivative Data Sources**
  - Name/description
  - Refresh cycle
  - Update method
  - Update responsibility
  - Data dictionary
Readiness Assessment Elements

• Work History Tracking
  – Status *(is work history tracked?)*
  – Type of data currently tracked *(asset ID, work type, quantity, cost, other)*
  – Sources used *(capital projects, maintenance, developer work, etc.)*
  – Desired types of data to track in the future

• Data Access Points
  – Current/Intended access points for internal + external users
Readiness Assessment - Lessons Learned

• Provides:
  – Structured way to think through the data life cycle
  – Common yardstick for looking at asset data maturity across areas
  – Opportunity to move towards common solutions

• Important to define terms

• Useful to cover data flows/lineage

• Need for integrated approach with tactical data readiness assessment & metadata population for data warehouse
Data Governance

• **What It Is:**
  – A process for managing, improving, maintaining, and providing access to business information for a broad range of use purposes.
  – It is also a system of rights and responsibilities that describe the who, what, when and under what circumstances data can be managed and used as a collective asset within an agency.

• **Why We Need It**
  – Ensures enterprise data consistency, reliability, and repeatability.
  – Provides standards for data capture, storage, maintenance, security and accessibility.
  – Provides clarity and confidence in the quality of data being published.

• **How Is It Organized Within CTDOT**
  – Periodic briefings of Executive Team by the Data Governance Council that meets monthly.
  – Data Governance Guidance issued as needed.
Data Governance Structure

• Data Governance Council
• Executive Oversight
• Data Owners
• Data Stewards
Data Governance Council Members

- Policy and Planning (Chairperson)
- Engineering & Construction
- Asset Management
- Office of State Traffic Administration
- Information Technology
- Safety Management
- Finance & Administration
- Maintenance
- Public Transportation
- Consultants (Facilitators)
Function of Data Governance Council

“Prioritize safety and asset data governance solutions to provide the foundational tools necessary to expand enterprise data participation across all disciplines within the agency.”

- Identify data being collected and maintained agency wide.
- Document data standards and coordinate development of new standards.
- Develop guidance for data dictionaries, user manuals, and training programs.
- Establish quality control/quality assurance (QC/QA) processes.
- Facilitate the integration and interoperability of information between authoritative roadway inventory databases and the Department’s enterprise wide data system.
- Identify and inform the Executive Committee of emerging data priorities and how they best might be addressed.
- Report to the Executive Committee as needed to make recommendations regarding data governance challenges or technology opportunities.
Data Governance Executive Oversight Committee

- Bureau Chiefs from each Agency Bureau
- Chaired by the Chief of Staff
- Manager of Technology and Business Systems Participates
Function of Data Governance

Executive Oversight Committee

“Provide guidance and help secure resources to support all strategic transportation data enterprise planning activities including regular review of data management practices and tools, and development of policies and procedures.”
Data Owners

- Has supervisory, administrative, and technical control over an information asset dataset.
- Responsible for the oversight of the collection, storage, maintenance, and implementation of business rules / managing its use including rules for how data will be exposed for general public consumption.
- Ensures access to the data asset is authorized and controlled
Data Stewards

• responsible for the management of data assets on a day to day basis in terms of content, update and data extract processes, data migration to TED and for the development of metadata.

• ensures that:
  – there are documents highlighting the origin and sources of authoritative data and completes each metadata element;
  – data has a collection and a maintenance cycle defined;
  – data quality processes are in place
  – data is protected against unauthorized access or change.
Data Stewards

A Data Steward role differs than that of an Asset Steward who:

- Is a “Champion” for the Asset;
- Develops, implements, and regularly updates an Asset Program Plan;
- Serve as the Asset’s Point of Contact to the Asset Management Group;
- Compiles and submits Performance Measure Data on the Asset;
# Data Catalog for TED

## TED Data Catalog

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<th>Category</th>
<th>SubCategory</th>
<th>Asset Name</th>
<th>Metadata Steward</th>
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Meta Data for TED

Meta Data Contact

- **Steward**: Paul D'Attilio
- **Role**: pointOfContact
- **Business Unit**: Engineering
- **User Name**: paul.dattilio@ct.gov
- **First Name**: Paul
- **Last Name**: D'Attilio
- **Title**: Transportation Engineer 3
- **Email**: paul.dattilio@ct.gov
- **Phone**: 860-594-3541
- **Fax**: 
- **Street Address 1**: 2800 Berlin Turnpike
- **Street Address 2**: 
- **City**: Newington
- **State**: CT
- **Zip Code**: 06111
- **Website**: 
- **Hours**: 7-3:30

Contact Instructions:

Connecticut Department of Transportation
Data Governance Guidance Memoranda

1.0 Definition of Data Assets; Assignment of Asset Data Owners and Stewards

2.0 Roles and Responsibilities of Asset Data Owners and Asset Data Stewards in the TED System

3.0 Metadata Requirements for Asset Data Owner and Asset Data Stewards

4.0 Asset Data Requirements for Transportation Enterprise Data (TED) Warehouse
Data Governance Challenges

- Determining the data that will be Public-Facing
- Addressing Data Quality
- Keeping meta data updated, maintaining TED and removing obsolete data
Data Governance Successes

• Decision making together as a group.
• Established authoritative data sources.
• Meta data standards.