DRAFT
Standard Development Report
for
Recommended Standard
Next Generation Traffic Management Data Dictionary (ngTMDD) Implementation Guide and Standard v1.0

March 23, 2026

The following Standard Development Report (SDR) is made in accordance with the Institute of Transportation Engineers (ITE) procedures for standards development.

Contents

1 Latest Version of the Draft Proposed Standard

The Recommended Standard (RS) Next Generation Traffic Management Data Dictionary Standard v01 (henceforth, RS ngTMDD Standard). RS ngTMDD Standard, when Jointly Approved, will be a new ITE/AASHTO standard, and will be designated and cited as ngTMDD v01. Jointly Approved means that the standard was balloted and approved separately by the two cooperating standard development organizations (SDOs): the American Association of State Highway and Transportation Officials (AASHTO), and the Institute of Transportation Engineers (ITE).

2 Summary Status

RS ngTMDD Standard has been accepted as a Recommended Standard of the Next Generation Traffic Management Data Dictionary steering committee (ngTMDD SC). The ngTMDD Standard supports center-center (C2C) communications and interfaces between traditional Traffic management Centers (TMC) and is updated to support other data centers including: 3rd party data providers, connected vehicle data, and harmonization with traffic incident management metrics and work zone data. This ngTMDD standard is also updated to support efficient C2C communication using common data exchange methods.

RS ngTMDD Standard is distributed to the members of the Institute of Transportation Engineers (ITE), and American Association of State Highway and Transportation Officials (AASHTO) for balloting and approval. After both standards development organizations (SDOs) have individually approved RS ngTMDD Standard; it is a Jointly Approved Standard and published, with the designation (and to be cited as) ngTMDD v01.

3 Status Report

RS ngTMDD Standard was developed following a systems engineering process (SEP). The stages of development leading to a RS are identified below:

- Concept of Operations (ConOps)
- Functional Requirements (FR)
- System Design Details (SDD)
- User Comment Draft (UCD)
- Recommended Standard (RS)

Comments (written inputs) were submitted and addressed during each stage of development. Notably, approximately 91 comments were received and addressed during the public comment period known as the User Comment Draft (UCD) stage. Significant review of the comments and discussion by the ngTMDD SC during each phase of development led to a successful vote accepting the recommended standard during RS Stage.

The ngTMDD SC accepted draft RS ngTMDD Standard v1.0 as a Recommended Standard via a vote that closed on March 3, 2026 with a vote of 8 yeas, 0 nays, and 0 abstention out of 8 total members. Minor editorial comments provided during the March 3rd meeting (e.g., spelling, formatting) were subsequently addressed resulting in RS ngTMDD Standard v1.0 dated March 17, 2026 for Volume I; and dated March 20, 2026 for Volume II.

4 Comments Listing

The ngTMDD SC received and addressed comments during each of the SEP development stages. The result were 4 written reports as follows:

- ngTMDD Standard Concept of Operations (ConOps) Comment Resolution Report, June 15, 2023
- ngTMDD Standard System Requirements Specification (SRS) Comment Resolution Report, January 19, 2024
- ngTMDD Standard System Design Details (SDD) Comment Resolution Report, May 8, 2025
- ngTMDD Standard User Comment Draft (UCD) & Proposed Recommended Standard (pRS), March 17, 2026

5 Committee Objectives

The primary objective of this effort is to develop and publish a non-proprietary, industry-based consensus standard for a new Traffic Management Data Dictionary for traffic center-to-center communication.

This Next Generation Traffic Management Data Dictionary (ngTMDD) standard to supports center-center (C2C) communications and interfaces between traditional Traffic Management Centers (TMC) and is updated to support other data centers including: 3rd party data providers, connected vehicle data, and harmonization with traffic incident management metrics and work zone data. This ngTMDD standard is also updated to support efficient C2C communication using common data exchange methods.

6 Committee Members

The RS ngTMDD Standard has been developed by the ngTMDD SC, which is made up of 12 voting representatives composed of 5 voting members from AASHTO, 4 voting members from ITE, and 3 At-Large members.

Next Generation Traffic Management Data Dictionary Steering Committee (Voting Members Only are listed)

AASHTO Members:

- Neil Boudreau, Massachusetts DOT
- Joe Gorman, Michigan DOT
- Russell Holt, Rhode Island DOT
- Tony Leingang, Washington DOT
- Fausto Rodriquez, Connecticut DOT

ITE Affiliation:

- Alan Benson (Co-Chair), Caltrans
- Anthony Patire, UC Berkeley
- Robert Rausch, TransCore
- Glenn Massarano, Yunex Traffic

Members At-Large:

- Shane Zumpf (Co-Chair), TriHydro
- Israel Lopez, Skyline Technologies
- Kristin Virshbo, Castle Rock

Alternates:

- Zorica Cvijovic, TriHydro
- Walter Crear, Transcore
- Mary Crowe, Castle Rock

7 Other Material of Interest

Normative and Other references cited in RS ngTMDD Standard are excerpted and follow.

7.1 Normative References

Normative references contain provisions that, through references in this text, constitute provisions of this ngTMDD standard. Other references in this document provide additional information. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to

agreements based on this ngTMDD standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed.

Standard Identifier	Title	Status	Publication Date	Major / Minor Draft #
IETF RFC 3339	Date and Time on the Internet: Timestamps	Published Standard	July 2002	
IETF RFC 4122	A Universally Unique Identifier (UUID) URN Namespace	Published Standard	July 2005	
IETF RFC 8259	The JavaScript Object Notation (JSON) Data Interchange Format	Published Standard	December 2017	
IETF RFC 9110	HTTP Semantics	Published Standard	June 2022	
IETF RFC 3986	Uniform Resource Identifier (URI): Generic Syntax	Published Standard	January 2005	
IETF RFC 7946	The GeoJSON Format	Published Standard	August 2016	
ISO 14817	Transport information and control systems — Requirements for an ITS/TICS central data registry and ITS/TICS data dictionaries, First Edition	Balloted Standard	December 2002	
NTCIP 1201 v03	Global Object (GO) Definitions – Version 03	Published Standard	March 2011	v03.15
NTCIP 1202 v04	Object Definitions for Actuated Traffic Signal Controller (ASC) – Version 04	Balloted Standard	May 2025	v04.11
NTCIP 1203 v03	Object Definitions for Dynamic Message Signs (DMS)	Published Standard	September 2014	v03.05
NTCIP 1204 v03	Environmental Sensor Station (ESS) Interface Protocol	Published Standard	October 2009	v02.24r
NTCIP 1205:2001	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Published Standard	December 2001	v01.08
NTCIP 1207:2001	Object Definitions for Ramp Meter Control (RMC) Units	Published Standard	November 2001	v01.17
NTCIP 1209 v02	Object Definitions for Transportation Sensor Systems (TSS)	Published Standard	May 2014	v02.18
NTCIP 8004 v02	Structure and Identification of Management Information (SMI)	Published Standard	June 2010	v02.17
SAE-J2266	Location Referencing Message Specification (LRMS)	Balloted Standard	October 2004	
SAE-J2353	Data Dictionary for Advanced Traveler Information Systems (ATIS)	Published Standard	October 1999	
SAE-J2540-2	(R) ITIS Phrase List (International Traveler Information)	Balloted Standard	December 2020	

7.2 Other References

The following documents and standards may provide the reader with a more complete understanding of traffic management C2C environment; however, these documents do not contain direct provisions that are required by the ngTMDD standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on the ngTMDD standard are encouraged to investigate the possibility of applying the most recent editions of the standard listed.

Identifier	Title
U.S. Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT)	Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT), USDOT, https://arc-it.net
IEEE Std 610.12-1990	IEEE Standard Glossary of Software Engineering Terminology, IEEE, 1990.
IEEE Std 829-2008	IEEE Std 829 IEEE Standard for Software and System Test Documentation, IEEE, 2008.
IEEE Std 1362-1998	IEEE Guide for Information Technology System Definition - Concept of Operations (ConOps) Document, IEEE, 1998.
The NTCIP Guide (NTCIP 9001, v04)	The NTCIP 9001, The NTCIP Guide, v04, AASHTO / ITE / NEMA, published July 2009.

7.3 Contact Information

7.3.1.1 Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT)

The Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) may be viewed online at:

https://arc-it.net

ARC-IT is the US ITS reference architecture.

7.3.1.2 Federal Highway Administration (FHWA) Documents

U.S. Department of Transportation FHWA documents (with designations FHWA-JPO-…) are available at the U.S. Department of Transportation National Transportation Library, Repository & Open Science Access Portal (ROSA P):

https://rosap.ntl.bts.gov/

7.3.1.3 IEEE Standards

IEEE standards can be purchased online in electronic format or printed copy from the following:

Techstreet
6300 Interfirst Dr.
Ann Arbor, MI 48108
(800) 699-9277
www.techstreet.com/ieee

7.3.1.4 Internet Documents

Obtain Request for Comment (RFC) electronic documents from several repositories on the World Wide Web, or by “anonymous” File Transfer Protocol (FTP) with several hosts. Browse or FTP to the following:

www.rfc-editor.org
https://www.rfc-editor.org/retrieve/

7.3.1.5 ITE Standards

Copies of ITE standards may be obtained from:

Institute of Transportation Engineers
1627 Eye Street, NW, Suite 550
Washington, DC 20006
(202) 785-0060
www.ite.org/technical-resources/

7.3.1.6 NTCIP Standards

Copies of NTCIP standards may be obtained from the following:

NTCIP Coordinator
National Electrical Manufacturers Association
1300 N.17th Street, Suite 900
Rosslyn, Virginia 22209-3801
www.ntcip.org
email: ntcip@nema.org

8 Abstract of the Standard

This section is excerpted from the Executive Summary of the RS ngTMDD Standard.

8.1 Project Objectives and Scope

The primary objective of this effort is to develop and publish a non-proprietary, industry-based consensus standard for a new Traffic Management Data Dictionary for traffic center-to-center communication.

This Next Generation Traffic Management Data Dictionary (ngTMDD) standard to supports center-center (C2C) communications and interfaces between traditional Traffic management Centers (TMC) and is updated to support other data centers including: 3rd party data providers, connected vehicle data, and harmonization with traffic incident management metrics and work zone data. This ngTMDD standard is also updated to support efficient C2C communication using common data exchange methods.

8.2 Background

The original scope of the Traffic Management Data Dictionary (TMDD) standard outlined more than 20 years ago focused on support for coordinated TMC operations. The standard included a common set of Information Layer messages and dialogs to enable TMCs to share information about roadway events and device status and coordinate with National Transportation Communications for Intelligent transportation systems Protocol (NTCIP) standards to define how the information could be carried at the Application, Transport, and Subnetwork Level Layers.

The current TMDD (TMDD v3.1) is a mature standard, but needs to evolve to address new and emerging operational needs and industry trends. The most notable of these trends is the emergence and role of private non-infrastructure owner/operators that collect and manage real-time transportation data. There is a need to share more granular data using a systems to systems approach to support multiple entities to achieve common operational goals. One key missing ingredient, however, is locational accuracy where lane-specific details about an event or device are required in addition to having a map (sometimes provided by a 3rd party) that provides high precision position information about the transportation infrastructure. Early electronic maps were rudimentary at the onset compared to today's maps, and operations staff had to know the road network well to compensate for limited resolution and data gaps. TMDD messages and data elements were originally designed to share general information on roadway

event types (e.g., incidents, construction) rather than share information on the specific details of an event, such as identifying the specific lane where an incident occurred on a map.

Other industry and agency concerns with the current TMDD include:

- TMDD does not align with the Traffic Incident Management model;
- TMDD is unable to define the complexity of work zone data (such as temporal details and geographic accuracy);
- TMDD is unable to exchange discrete microscopic data at the unit vehicle level as the TMDD is designed to exchange aggregate (macroscopic) data;

New encoding and protocol technologies are available to help address these concerns. JSON (JavaScript Object Notation) for example, is a relatively new encoding technology that is text based similar to eXtensible Markup Language (XML), but simpler to implement and use with Java and JavaScript objects. JSON is frequently used in conjunction with REST (Representational State Transfer) as a protocol technology that uses Hypertext Transfer Protocol (HTTP). New initiatives, such as the Work Zone Data Exchange (WZDx) and Connected Vehicle Pooled Fund Study (CVPFS) have started using these technologies. Recently, JSON and REST (JSON/REST) have largely replaced XML/Web Services, while GeoJSON can be used to describe roadway geometry impacted by impediments such as incidents, construction, and work zones. These new protocols for information sharing have evolved to address exchanging large quantities of data in real-time.

Enhancements to the ngTMDD Standard

The ngTMDD standard addresses industry and agency concerns with the following new features:

- Use of JSON encoding, superseding XML
- Use of GeoJSON for sharing locations
- Support for response plans for event management
- Use of SAE J2540 ITIS codes for events consistent with other standards
- Support for data from mobile sources (such as roadway weather data from snowplows), probe data, mobile/portable dynamic message signs, and connected vehicles
- Support for command of external center ITS devices when permitted
- Support for sharing CCTV Image Links
- Support for viewing ITS Device Data consistent with the latest NTCIP standards
- Support for RSU monitoring based on NTCIP 1218
- Streamlined ability to restrict dissemination of information to the public

8.3 Purpose of this Document

This document identifies the ngTMDD deployer needs, sets the requirements, and provides guidance for nationally interoperable ngTMDD across the United States. The focus of this document is on system-to-system interfaces to enable interoperable ngTMDD applications. This document is envisioned to be a living document.

8.4 Who Should Read this Document?

Stakeholders from multiple industries may benefit from this ngTMDD Implementation Guide and Standard. These industries include IOOs, third party traffic data providers, multimodal partners, and end users of data and services.

8.5 Document Overview

The ngTMDD standard consists of two volumes.

In addition to this Executive Summary, this document is divided into five (5) main sections. Following a Systems Engineering process, these sections are the following:

- **Executive Summary.** This section provides a high-level overview of the entire document.
- **Section 1, General Information**. This section discusses the scope of the ngTMDD, references to other documentation, and terms used in this document along with terms and definitions.
- **Section 2, Concept of Operations.** This section includes the content of the Concept of Operations, including the User Needs for the ngTMDD as well as Operational Scenarios describing what needs apply. A tutorial is also included.
- **Section 3, Functional Requirements.** This section includes the Functional Requirements that satisfy the User Needs for the ngTMDD. A Needs to Requirements Traceability Matrix (NRTM) is provided.
- **Section 4, Needs To Requirements Matrix.** This section identifies which Functional Requirements in Section 3 are mandatory or optional to support the User needs defined in Section 2.
- **Annex A, Future User Needs.** This informative annex identifies user needs, requirements, and design details that were identified and considered by the ngTMDD Steering Committee but were ultimately not included in this version of the ngTMDD standard. The rationale on why these needs, requirements, and design details were not included is also provided.

Volume Two:

Volume Two contains four (4) main sections as follows:

- **Section 1: Document Introduction.** introduces the ngTMDD standard and describes its organization
- **Section 2: ngTMDD Interface Dialogs.** This section identifies and describes the sequence of message exchanges needed for communications between a TMC and an EC.
- **Section 3: ngTMDD JSON Data Concept Definitions.** This section rovides a highly structured definition of the ngTMDD data concepts that fulfill the ngTMDD requirements.
- **Section 4: Requirements Traceability Matrix.** This section maps the requirements defined in Section 3 of the ngTMDD Data Dictionary Volume I: Concept of Operations & Requirements
- **Currently in a separate document for Volume Two:**
  - **Annex A: Dialogs.** This section includes detailed description of the published and subscribed dialog files
  - **Annex B: Migration from XML to JSON Schema.** This section describes the strategic transition from the XML-based TMDD v3.1 standard to the JSON-based ngTMDD (Next Generation Traffic Management Data Dictionary) v.1.0

9 Tracking ngTMDD v1.0 by the SDO Process

Step No.	SDO Process Step	Deliverables	Status	Start Date	Completion Date
14	SDOs maintain the Standard				
13	SDOs approve the Recommended Standard and thereby create the Standard				
12	SC forwards Recommended Standard to SDOs	• Next Generation Traffic Management Data Dictionary Volume I - ConOps and Requirements – Proposed Recommended Standard, dated March 2026 • Next Generation Traffic Management Data Dictionary Volume II – Design Document – Proposed Recommended Standard, dated March 2026 • Text file containing the JSON Schema in JSON Format, dated March 20, 2026	Current	3/3/2026	3/20/2026
11	SC votes on submission of Recommended Standard to SDOs	• Next Generation Traffic Management Data Dictionary Volume I - ConOps and Requirements, dated February 12, 2026	Complete	3/3/2026	3/3/2026
10	SC prepares a Draft Recommended Standard		Complete	1/12/2026	2/24/2026
9	SC decides to submit a "resolved" version as a Recommended Standard		Complete	1/12/2026	2/24/2026
8	SC resolves user comments		Complete	1/12/2026	2/24/2026
7	SC distributes UCD through SDOs and receives comments	• Next Generation Traffic Management Data Dictionary Volume I - ConOps and Requirements – User Comment Draft, dated June 16, 2025	Complete	6/20/2025	07/19/2025

		• Next Generation Traffic Management Data Dictionary Volume II – Design Document – User Comment Draft, dated June 16, 2025 • Text file containing the JSON Schema in JSON Format			
6	SC votes on distribution of UCD		Complete	6/6/2025	6/6/2025
5	SC prepares User Comment Draft (UCD)	• Next Generation Traffic Management Data Dictionary Volume I - ConOps and Requirements – Proposed User Comment Draft, dated May 2025 • Next Generation Traffic Management Data Dictionary Volume II – Design Document – Proposed User Comment Draft, dated May 2025 • Text file containing the JSON Schema in JSON Format	Complete	5/8/2025	6/6/2025
4	SC develops WG Draft for informal review		Complete		
3	SC forms a WG		n/a		
2	SC (Steering Committee) votes to form WG (Working Group)		n/a		
1	Submit request and initiate standards activity				