National Performance Management Research Data Set (NPMRDS)
Descriptive Metadata Document
1.0

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1 Revision History

Table 1. Document Revision History

Revision	Date	Overview	Modified by
0.1	June 5, 2017	Initial draft	Rick Schuman, Shawn Turner, and Jonathan Corrales
1.0	July 6, 2017	Incorporates review comments	Rick Schuman, Shawn Turner, and Jonathan Corrales

2 NPMRDS Overview

The National Performance Management Research Data Set (NPMRDS) is a vehicle probe-based travel time data set acquired by the Federal Highway Administration (FHWA) for its use in various performance measurement programs, such as its Freight Performance Measures, Urban Congestion Report, and other programs. The NPMRDS is also provided to state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) for their performance management activities. This document includes a high-level description of the NPMRDS, how it is created and analyzed, and its intended users and uses.

2.1 What is the NPMRDS?

The NPMRDS is a FHWA procured and sponsored archived speed and travel time data set, and its associated location referencing data, covering the National Highway System (NHS) and roadways near 26 key border crossings with Canada (20 crossings) and Mexico (6 crossings) – defined in this document as the NPMRDS Road Network (see Figure 1). This document addresses the currently contracted NPMRDS dataset, which provides data from February 1, 2017 onward[1] and is supplied by the team consisting of the University of Maryland (UMD), INRIX, the Texas A&M Transportation Institute (TTI), and KMJ Consulting – collectively referred to as the UMD team.

2.2 Who can use the NPMRDS?

The NPMRDS can be used by individuals from federal agencies, DOTs, MPOs, and authorized organizations working under contract to these agencies. Each organization must execute a Data Sharing Agreement (DSA) to gain access to the NPMRDS data portal – "NPMRDS Analytics." An agency may grant a contractor the right to use the data for work performed for the agency as defined in the data sharing agreement.

2.3 How is the NPMRDS created?

INRIX, a member of the UMD team, is responsible for creating the NPMRDS dataset of calculated speeds and travel times for over 400,000 specific road segments across the NPMRDS Road Network for every 5-minutes of each day. INRIX leverages its existing source data that includes millions of connected vehicles, trucks, and mobile devices that anonymously supply location and movement data that is used by INRIX to generate real-time traffic speeds and travel times across the nation's key roadways. INRIX has implemented a special process to create the NPMRDS dataset: a path-processing algorithm described in detail in this document to meet NPMRDS requirements using its existing source data. The NPMRDS dataset is based on actual reported vehicle data, exclusively – no imputation is included. Path-processing is utilized because it allows for better use of the underlying source data to maximize road coverage and increases the accuracy of reported speeds and travel times on many of the non-interstate NHS facilities.

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[1] There is a legacy NPMRDS dataset that provided similar data prior to February 1, 2017, which is not the subject of this document.

2.4 How is the NPMRDS accessed?

Data will be made available to registered users in monthly increments within five business days of the end of each calendar month. Access will be available through the NPMRDS Massive Data Downloader (MDD), at https://npmrds.ritis.org. Individual users from eligible organizations will register for unique account credentials to access the NPMRDS MDD – eligible organizations must have a fully executed NPMRDS DSA. The NPMRDS MDD will provide several options for users to tailor data extraction to meet their needs and reduce the amount of superfluous data provided. Options include the ability to download data in 5-minute or 15-minute intervals. The 15-minute option provides data to State DOTs and MPOs that directly supports calculating the federally-required congestion and freight measures as defined in subparts E, F, and G of 23 CFR 490.

2.5 What is new in NPMRDS?

The following list highlights some of the new features available in NPMRDS:

- Uses path-processing which results in higher data quality and coverage
- Includes a sample size indicator for each vehicle type which specifies the number of reporting devices contributing to the speed and travel time record
- Includes epochs filled with nulls for better data management
- Is available within five business days after the end of each month
- Adheres to the following monthly data completeness commitments:
    - Interstate Truck Coverage – Total: 60%
    - Interstate Truck Coverage – Peak (M-F, 6a-8p): 70%
    - Interstate All-Vehicles – Total: 75%
    - Interstate All-Vehicles – Peak: 85%
    - Non-Interstate All Vehicles – Total: 25%
    - Non-Interstate All Vehicles – Peak: 35%
- Contains TMC Path and HPMS Segment Conflation which results in accurate location referencing
- Includes separate travel times on internal and external TMC paths
- Includes new fields including UTC timestamps and data density for all vehicle types

3 NPMRDS Road Network

Figure 1 shows the nationwide road coverage of the NPMRDS Road Network. Over 400,000 road segments are uniquely defined across this network using TMC location codes. Spanning more than 220,000 centerline miles, the NPMRDS Road Network includes all roads with TMC location codes[2] for the NHS as defined by the states in their most recent annual Highway Performance Management System

[2] Definitions of roadway networks are constantly changing and evolving. Ideally, 100% of the NHS would be covered by TMC location codes. This is not and has never been the case. As of July 2017, roughly 96% of the NHS road mileage as currently defined in the 2015 HPMS network as NHS have TMC codes in version 4.7 of the TMC table, the initial table in use. INRIX has outlined a process to update and maintain the NPMRDS Road Network to improve and maximize coverage in the coming years.

(HPMS) submittal. The NPMRDS Road Network also includes all TMC-covered roadways within five miles of either side of the border crossings with Canada (20 crossings) and Mexico (six crossings).

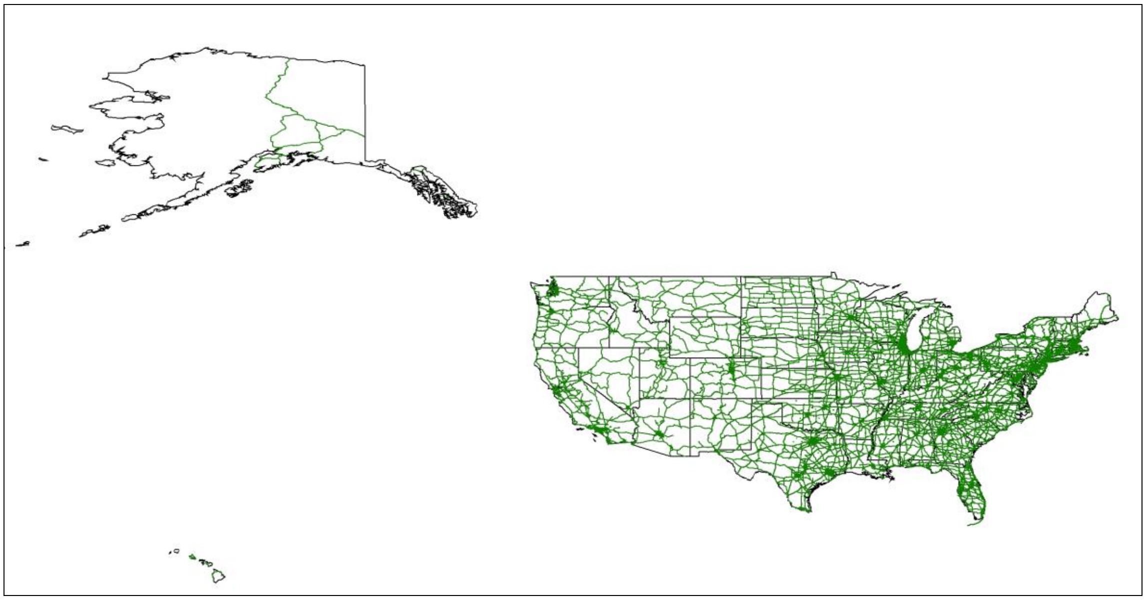

Figure 1.The nationwide road coverage of the NPMRDS road network.

3.1 Location Referencing Metadata and Shapefiles

Appendix A provides the label, name, and description of each attribute provided for every TMC location-referencing segment included in the NPMRDS Road Network. The metadata is a combination of attributes for each specific TMC segment and relevant HPMS data related to route, inventory, network type and traffic volume attributes. NPMRDS users should note that TMC segment attributes are for a particular travel direction, whereas the HPMS attributes assigned to that TMC segment (indicated in the Appendix A table) are for BOTH TRAVEL DIRECTIONS. Currently, the HPMS is based on roadway centerlines and therefore the reported HPMS attributes represent both travel directions. NPMRDS users will need to adjust some HPMS centerline-based attributes (such as AADT and number of through lanes) accordingly for certain applications.

Every dataset created by the NPMRDS MDD will include a TMC configuration table including all TMC segments for the roadways selected and the attributes for each listed in Appendix A. Additionally, the option will be provided to access a shapefile for the state, or states, included in the downloaded dataset.

3.2 Interpreting TMC Codes

A TMC Code consists of nine characters that define a unique segment and direction of roadway in North America. The TMC Code detailed here provides the following information:

- Example TMC code: 125+05272
- The first character (“1” in this example) refers to the Country Code. The United States has the Country Code “1”, Canada has “C”, and Mexico has “F”.

- The second and third characters ("25" in this example) refer to the Location Table Name. North America is covered with 35 distinct tables. This configuration allows for the final six digits of the TMC Code to be reused, as well as allowing the table coverage to grow in density while still maintaining the geographic integrity of the coding scheme.
- The fourth character ("+" in this example) refers to both the direction of travel and if the TMC segment type is "internal" or "external." The meanings of the possible values ("+," "-," "P," and "N") are described in the following section.
- The fifth through ninth characters ("05272" in this example) refer to the specific Location ID in the Location Table that is tied to a specific interchange, intersection, boundary, or decision point. In most cases there will be four distinct TMC segments near one another on the road network that share this same five-digit Location ID, each preceded by either "+," "-," "P," or "N."

3.3 Internal and External TMC segments

TMC location coding describes two segment types for nearly every Location ID—internal and external. The internal segment refers to the area just past the decision point, or intersection, at which the Location ID was placed (for example, a freeway off ramp), while the external segment refers to the section of the road leading up the decision point. In order to maximize possible data precision, speed and travel time data is computed and provided distinctly for both internal segment and external segment – i.e., data is reported separately for the two segments. Traffic congestion is often caused by traffic exiting at a decision point; thus, the external and internal segments corresponding to that Location ID might have substantially different speed profiles.

Figure 2 illustrates the difference between internal (labeled with 'P' or 'N') and external (labeled with a '+' or '-') TMC segments.

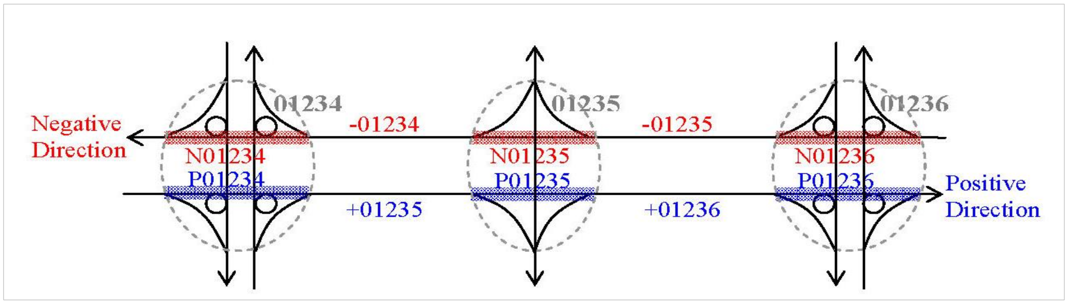

Figure 2. TMC segments with internal and external segments.

While there are several situations where this does not apply (for instance, inner and outer loop road geometry), the typical convention for identifying the travel direction for the segment and whether the segment is internal or external is:

- "P" = Northbound or Westbound, internal segments
- "N" = Southbound or Eastbound, internal segments
- "+" = Northbound or Westbound, external segments
- "-" = Southbound or Eastbound, external segments

While typical, not every five-digit Location ID has both an internal and an external TMC segment associated with it. Two external TMC segments can be adjacent to each other. For example, at county borders. Since a border is essentially zero length, there is no internal segment at the border, but rather a transition between two external segments in each direction. Other atypical TMC configurations include smaller roads will cross at a point and therefore have only “external” TMC segments, complex interchanges where “internal” TMC segments overlap, and where highways merge there may be two sets of TMC segments (one for each highway) over the same stretch of road.

4 NPMRDS Data

This section describes the speed and travel time datasets in detail, including the fields and format of the fields available in the dataset, how it is created, sources of the probe data that are used to create it, and specific commitments related to availability, completeness, and quality.

4.1 NPMRDS Dataset Format

While the NPMRDS MDD provides each user options to reduce the number of data fields for a given dataset download, the data fields are available for downloading are shown in Table 1.

Data records will be available for every TMC and every 5-minute epoch where one or more reporting vehicles has provided valid data. In cases where the only reporting vehicles are trucks, all vehicle and freight vehicle fields will have data and the passenger vehicle fields will contain null. In cases where the only reporting vehicles are non-trucks, all vehicle and passenger vehicle fields will have data and the freight vehicle fields will contain null.

Table 2. Data Fields Available for NPMRDS

Field Name	Type	Example	Data Field Description
Field Name	**Type**	**Example**	**Data Field Description**
datasource	Text	NPMRDS (Passenger vehicles)	The data set this record comes from. This field is only included when choosing to merge the data sets into a single CVS file.
tmc_code	Text	107-12541	The unique 9-digit value identifying the TMC segment.
measurement_tstamp	Date	5/1/2017 12:00:00 AM	Date of data record, in “MM/DD/YY HH:NN:SS A” format. The date is in the local time of TMC segment to which the record pertains.
speed	Number	40	Speed is recorded in mph as an integer. The harmonic average speed for all reporting vehicles on the segment.

Field Name	Type	Example	Data Field Description
average_speed	Number	45	The historical average speed for the roadway segment for that hour of the day and day of the week in miles per hour.
reference_speed	Number	50	The calculated "free flow" mean speed for the roadway segment in miles per hour. This attribute is calculated based upon the 95th-percentile point of the observed speeds between 10pm and 5am on that segment, which establishes a reliable proxy for the speed of traffic at free-flow for that segment.
travel_time_minutes	Number	3	Travel time recorded in minutes. It is the ratio between the segment length and the harmonic average speed for all reporting vehicles on the segment.
data_density	Text	C	Data density indicator, where: A = 1 to 4 reporting vehicles B = 5 to 9 reporting vehicles C = 10 or more reporting vehicles

NPMRDS users have the option to request data in 10-minute, 15-minute, 30-minute, and 1-hour increments in addition to the 5-minute default option. When a higher granularity option is selected, multiple 5-minute epochs will be aggregated. In these cases, the following happens:

- measurement_tstamp: will indicate the beginning of the interval
- speed, average_speed, reference_speed: will be the harmonic mean of the 5-minute values that fall within the granularity bin you choose.
- data_density: the minimum possible reporting vehicles in each 5-minute epoch is added together and the total data density Indicator over the interval is the appropriate indicator value. Examples include:
    - 5-minute increments with values of (A, A, A) rolled up to a 15-minute interval = A (3 reporting vehicles is the lowest possible total)]
    - 5-minute increments with values of (A, A, B) rolled up to a 15-minute interval = B (7 reporting vehicles is the lowest possible total)
    - 5-minute increments with values of (A, B, B) rolled up to a 15-minute interval = C (11 reporting vehicles is the lowest possible total)

4.2 NPMRDS Dataset Sources

INRIX uses a broad collection of commercial and consumer GPS probe data as the source data to deliver the highest quality NPMRDS compliant dataset possible across all vehicles, trucks, and passenger vehicles. INRIX GPS probe data has been in existence in the US since 2006 and has seen significant year-over-year growth each year since its inception. This growth has come, and continues to come, from both the organic growth of existing sources as well as the acquisition of new sources.

An example of organic growth is within the commercial fleet industry, where INRIX has numerous commercial telematics partners that provide GPS systems to all types of fleets across the country. The commercial fleet telematics industry has been growing at a rate of more than 20% each year for the last 10 years. As INRIX's partners outfit more vehicles with systems each day, the data network continues to grow. New US legislation related to mandating the use of Electronic Logging Devices (ELDs) to improve commercial driver safety will also drive growth in data sources.

INRIX also has existing long-term contracts with many top connected-car manufacturers worldwide. The majority of these contracts are working in two directions – INRIX receives anonymous GPS data from connected cars deployed by these companies and distributes processed traffic (and other location services) data for use by the driver. INRIX's automotive partners continue to sell and deploy more connected-cars, which we use to collect data, which leads to a consistent growth of data each quarter.

GPS-enabled smartphones are also an important component of the GPS probe network and an area of high growth for new partnerships. In addition to INRIX's mobile applications that collect GPS probe data, INRIX has long-term agreements with a variety of smart phone manufacturers, mobile carriers, and mobile application developers. The collection and use of location data from smartphones continues to see very high growth as it allows for more targeted advertising and features for consumers. These uses continue to spawn new application companies with a core interest in the collection of location data for their own business, thus providing opportunities for INRIX to forge partnerships for accessing this data in an anonymized format.

4.3 NPMRDS Dataset Processing

The path-processing algorithm, created by INRIX, is used to meet NPMRDS requirements. There are three primary reasons that path-processing is the preferred approach for this project and for traffic data processing in general:

- Ensures all reporting probes contribute equally to the dataset:
    - INRIX receives data from vehicles and devices with variable reporting frequencies. Some data is provided to INRIX at 1-second update rates, while other sources can have as much as 3 minutes between data reports. Most data are provided to INRIX by sources with temporal granularity between 15 seconds and one minute.
    - With variable update rates, point processing weights reporting devices significantly differently – high reporting rate sources influence results more than lower reporting rate vehicles (e.g. in point processing, 1-second refresh rate data would provide 60 reports for every one report for 1-minute refresh rate data).
    - Further, slow vehicles provide more data points on a segment than faster moving vehicles as they simply spend more time on a segment, skewing results to the slow side in point processing.
    - Path Processing normalizes the incoming data by point-pairing across a consistent period for all reporting devices and treats each reporting device's path as equal to other reporting devices regardless of reporting rate or relative speed.

- Improves Data Accuracy: space mean speed avoids the inherent instability possible in instantaneous speed reports, especially on arterials.
- Increases Coverage: allows for reporting of data on short segments a reporting device traverses even if an instantaneous speed report is not created on that segment, increasing coverage while still maintaining accuracy.

The steps below summarize the key steps in INRIX's approach to applying path-processing specifically to generate NPMRDS datasets. Also included are descriptions of filtering processes applied to improve the quality of the data by identifying and filtering out "noisy" source data and results.

- Step 1: Determine Snapped Points on NPMRDS Roadway Coverage
    - Step 1a: For each reported point, "snap" to a segment, based on the latitude and longitude location of the point, adding a TMC ID to latitude and longitude, vehicle ID and timestamp ("Snapped Points"). Also, determine an offset distance from the end of the segment to be used in future calculations.
    - Filters: De-duplicate questionable Snapped Points and eliminate non-NPMRDS road coverage.
        - If there are duplicate points for the same location and time, eliminate all but one point.
        - If the same reporting device has multiple snapped points with the same timestamp but with different latitude and longitudes, eliminate all points.
        - If the TMC ID is not associated with the NPMRDS Road Network, eliminate all points.
- Step 2: Log Average Travel Speed to Each TMC segment for each reporting vehicle and device
    - Step 2a: For a snapped point, find the most recent previous snapped point from the reporting device.
    - Step 2b: Determine if the previous snapped point is within 5-minutes. If so, continue; if not, stop.
    - Step 2c: If the current and previous snapped points are on the same TMC segment, continue "walking" the snapped points from the vehicle until the last point from this vehicle on the TMC segment is found. Take the first and last snapped points from the vehicle on the TMC segment and compute the Average Travel Speed by determining the distance traveled between points and the time elapsed between reports. For the TMC ID, log the Average Travel Speed and the minute timestamp (the minute timestamp is logged as the minute when the reporting device would be at the midpoint of the TMC segment given the Average Travel Speed).
    - Step 2d: If the current and previous snapped points are not on the same TMC segment, determine if there are any TMC segments, which were traversed between the two TMCs. If so, compute the Average Travel Speed by determining the total distance traveled across all segments during the time elapsed between reports. For each TMC segment traversed, log the Average Travel Speed (same speed for each segment) and the minute timestamp (the minute timestamp is logged as the minute when the reporting device would be at the midpoint of the TMC segment given the Average Travel Speed).
    - Filters: Eliminate erroneous or questionable Average Travel Speeds.

        - If the Average Travel Speed is negative, eliminate it as bad data.
        - If the Average Travel Speed is less than 3 MPH, eliminate it as stopped or non-motorized data.[3]
        - If the Average Travel Speed is greater than 100 MPH, eliminated it as bad data.
- Step 3: Establish an Average Travel Time for an Epoch by Vehicle Type
    - Step 3a: To determine an Average Travel Time for all Vehicles, calculate the Epoch harmonic Average Travel Speed for all logged Average Travel Speed values for all 5-minutes of the Epoch, then compute the Epoch Average Travel Time based on the segment length.
    - Step 3b: To determine an Average Travel Time for Trucks, repeat Step 3a, but only for logged Average Travel Speeds from reporting devices associated with trucks.
    - Step 3c: To determine an Average Travel Time for Passenger Vehicles, repeat Step 3a, but only for logged Average Travel Speeds from reporting devices associated with passenger vehicles.

4.4 NPMRDS Data Availability and Completeness

Speed and Travel Time datasets will become available in monthly increments to all users no later than five business days after the end of each month via the NPMRDS MDD. Each monthly dataset will have a distinct TMC and HPMS version spanning the entire NPMRDS Road Network for the entire month. In months where the speed and travel time dataset are based upon a new version of TMCs or HPMS attributes, the updated location reference data will be made available at the same time the speed and travel time dataset becomes available.

In an effort to provide the maximum amount to high-quality data, INRIX has committed to meet data completeness targets as follows (defined as cumulative miles with travel time data over the entire month, measured nationwide):

- Interstate Truck Coverage – Total: 60%
- Interstate Truck Coverage – Peak (M-F, 6a-8p): 70%
- Interstate All-Vehicles – Total: 75%
- Interstate All-Vehicles – Peak: 85%
- Non-Interstate All Vehicles – Total: 25%
- Non-Interstate All Vehicles – Peak: 35%

4.5 NPMRDS Data Quality and Validation

The UMD team commits to meet the following data accuracy specifications during the project:

For truck and all vehicle datasets:

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[3] Applying this filter eliminates artificially low speeds from being generated erroneously; this filter could also in some cases cause severe congestion to be underreported, but experience suggests that erroneous slow speed reports would occur far more often without this filter than severe congestion would be underreported applying this filter.

- In each of the speed ranges of 0-30, 30-45, 45-60, and over 60 MPH (as determined by ground truth data)
- Interstate data accurate to within 7 MPH Average Absolute Speed Error (AASE) and 5 MPH Speed Error Bias (SEB)
- Non-Interstate and Border data accurate to within 10 MPH AASE and 5 MPH SEB

In 2008, UMD defined and has since been executing the nation's first and largest probe vehicle data validation program as part of the I-95 Corridor Coalition's Vehicle Probe Project (VPP), leveraging portable Bluetooth and Wi-Fi readers for ground truth data collection and creating purpose-built software for analysis and reporting. VPP is a multi-state traffic monitoring system based on "infrastructureless" vehicle probe technology. The first of its kind in terms of geographic scope, procurement methodology, and technology, this multi-year project has influenced a major industry shift from sensor-based detection to outsourced traffic data. UMD has published over 50 validation reports, primarily focused on determining speed error and speed bias of the licensed real-time speed and travel time data, the same metrics to be measured in NPMRDS.

UMD will leverage the same staff, approach, and software to provide a robust NPMRDS data validation program that exceeds the Solicitation's basic requirements. This approach has several advantages that will improve the results, minimize associated costs, and reduce overall risk in establishing a first-class validation.

5 More Information

For additional information or technical assistance regarding the NPMRDS, please contact us at npmrds@ritis.org.

6 Appendix A – NPMRDS Road Network Configuration Attributes

CAUTION: NPMRDS users should note that TMC segment attributes are for a particular travel direction, whereas the HPMS attributes assigned to that TMC segment (indicated in the Appendix A table) are for BOTH TRAVEL DIRECTIONS.

Table 3. NPMRDS Road Network Configuration Attributes Table

Attribute Label	Attribute Name	Attribute Description
Tmc	TMC Path Identifier	The unique 9-digit value identifying the TMC Segment.
TmcType	Type of TMC Code	“P1” is the typical TMC Code. “P3” indicates national, state, and county boundaries, rest areas, toll plazas, major bridges, etc. “P4” is for ramps.
RoadNumber	Common name or route number	The roadway number, for TMC Segments on numbered roadways.
RoadName	Associated Road Name	Name of Roadway according to source data.
FirstName	Associated Street	The cross street and/or interchange associated with the internal segment of 5-digit Location ID.
TmcLinear	Associated Linear TMC	A reference to the “Linear TMC” that includes the TMC Segment. Typically, several TMC Segments are part of a Linear TMC, which usually represents a road corridor through a single county. The purpose of this column is to provide assistance for filtering and locating TMC Segments and simplifying the process of linking consecutive TMC Segments. Note that care must be taken when linking consecutive TMC Segments in the exception cases where multiple TMC Codes refer to the same stretch of road.
Country	Country	The country in which the TMC Segment is located.
State	State	The postal abbreviation of the state to which the TMC Segment is assigned.
County	County	The county to which the TMC Segment is assigned.
Zip	Postal Code	The 5-digit zip code to which the TMC Segment is assigned.
Direction	Direction	The overall direction of the roadway.
StartLat	Beginning Latitude	The latitude of the beginning of the TMC Segment.
StartLong	Beginning Longitude	The longitude of the beginning of the TMC Segment.
EndLat	Ending Latitude	The latitude of the end of the TMC Segment.
EndLong	Ending Longitude	The longitude of the end of the TMC Segment.
Miles	Length of Segment	The length of the TMC Segment along the road in miles.
FRC	Road class (TMC FRC)	The class or group of roads to which the road belongs (assigned by TMC Consortium).
Border_Set	Border Set	A code to indicate whether the TMC path is within a 5-mile radius of the FHWA-designated US-Canada and US-Mexico border crossings. (Y=Yes, N=No)

Attribute Label	Attribute Name	Attribute Description
The following attributes in this table are being integrated from FHWA's Highway Performance Monitoring System (HPMS). The HPMS is currently based on roadway centerlines and therefore the integrated HPMS attributes represent **BOTH TRAVEL DIRECTIONS**, whereas each TMC segment represents a particular direction of travel. NPMRDS users may need to adjust some HPMS centerline-based attributes (such as AADT and number of through lanes) accordingly for certain applications. HPMS attributes and codes are defined in detail in Chapter 4 of the December 2016 HPMS Field Manual, https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/.		
F_System	Functional System (HPMS Attribute 1)	The FHWA approved Functional Classification System code. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the value for the highest functional class (minimum code value) is assigned. <u>Attribute Value: Description</u> 1: Interstate 2: Principal Arterial – Other Freeways and Expressways 3: Principal Arterial – Other 4: Minor Arterial 5: Major Collector 6: Minor Collector 7: Local
Urban_Code	Urban Code (HPMS Attribute 2)	The U.S. Census Urban Area Code. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. <u>Attribute Value: Description</u> <99998: Refer to U.S. Census Urban Area Code 99998: Small Urban Sections 99999: Rural Area Sections
FacilType	Facility Type (HPMS Attribute 3)	The operational characteristic of the roadway. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. <u>Attribute Value: Description</u> 1: One-Way Roadway 2: Two-Way Roadway 4: Ramp 5: Non Mainlane 6: Non Inventory Direction 7: Planned/Unbuilt
StrucType	Structure Type (HPMS Attribute 4)	Code for roadway section that is a bridge, tunnel or causeway. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. <u>Attribute Value: Description</u> 1: Bridge 2: Tunnel 3: Causeway

Attribute Label	Attribute Name	Attribute Description
ThruLanes	Through Lanes (HPMS Attribute 7)	The number of lanes designated for through-traffic in BOTH TRAVEL DIRECTIONS. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned.
Route_Numb	Route Number (HPMS Attribute 17)	The signed route number. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned.
Route_Sign	Route Signing (HPMS Attribute 18)	Code for the type of route signing. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. <u>Attribute Value: Description</u> 1: Not Signed 2: Interstate 3: U.S. 4: State 5: Off-Interstate Business Marker 6: County 7: Township 8: Municipal 9: Parkway Marker or Forest Route Marker 10: None of the Above
Route_Qual	Route Qualifier (HPMS Attribute 19)	Code for the route signing descriptive qualifier. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. <u>Attribute Value: Description</u> 1: No qualifier or Not Signed 2: Alternate 3: Business Route 4: Bypass Business 5: Spur 6: Loop 7: Proposed 8: Temporary 9: Truck Route 10: None of the Above
AltRteName	Alternative Route Name (HPMS Attribute 20)	A familiar, non-numeric designation for a route. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned.
AADT	Annual Average Daily Traffic (HPMS Attribute 21)	Annual Average Daily Traffic. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the length-weighted average is assigned.

Attribute Label	Attribute Name	Attribute Description
AADT_Singl	Single-Unit Truck & Bus AADT (HPMS Attribute 22)	Annual Average Daily Traffic for single-unit trucks and buses. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the length-weighted average is assigned.
AADT_Combi	Combination Truck AADT (HPMS Attribute 24)	Annual Average Daily Traffic for Combination Trucks. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the length-weighted average is assigned.
NHS	National Highway System (HPMS Attribute 64)	Code for a roadway that is a component of the National Highway System (NHS). If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant "on-NHS" value (i.e., 1 through 9) by length is assigned. Attribute Value: Description 1: Non Connector NHS 2: Major Airport 3: Major Port Facility 4: Major Amtrak Station 5: Major Rail/Truck Terminal 6: Major Inter City Bus Terminal 7: Major Public Transportation or Multi-Modal Passenger Terminal 8: Major Pipeline Terminal 9: Major Ferry Terminal
NHS_Pct	Percent of TMC Path on NHS	The percentage of the TMC path length that is designated as NHS by HPMS (applicable when multiple HPMS segments assigned to a single TMC path). This attribute value is calculated by the NPMRDS Development Team and is not an HPMS attribute.
Strhnt_Typ	Strategic Highway Network (HPMS Attribute 65)	Code for a roadway section that is a component of the Strategic Highway Network (STRAHNET). If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. Attribute Value: Description 1: Regular STRAHNET 2: Connector
Strhnt_Pct	Percent of TMC Path on STRAHNET	The percentage of the TMC path length that is designated as STRAHNET by HPMS (applicable when multiple HPMS segments assigned to a single TMC path). This attribute value is calculated by the NPMRDS Development Team and is not an HPMS attribute.

Attribute Label	Attribute Name	Attribute Description
Truck	National Truck Network (HPMS Attribute 66)	Code for a roadway section that is a component of the National Truck Network (NTN) as defined by 23 CFR 658. If multiple HPMS segments with different attribute values are assigned to a single TMC path, the predominant value by length is assigned. Attribute Value: Description 1: Section is on the National Network (NN) 2: Other State-designated truck route (optional)

7 Appendix B – Holiday Types

Table 4. Holiday Types

HolidayTypeId	Holiday
1	New Year's Day
1	Christmas Day
1	Christmas Eve
1	Independence Day
1	Labor Day
1	Memorial Day
1	Thanksgiving Day
1	Thanksgiving Friday
2	Last Week of December, Weekday
2	Dr. Martin Luther King, Jr. Day
2	Friday before Independence Day
2	President's Day
2	Veteran's Day
3	Friday before Labor Day
3	Friday before Memorial Day
3	Friday before MLK
3	Friday before President's Day
3	Special Friday before Christmas Eve
3	Special Friday before Monday 7 and 4
3	Special Friday before Sunday 7 and 4
3	Special Friday before Xmas Eve Saturday
3	Special Friday before Xmas Weekend
3	Special Thursday before Friday 7 and 4
3	Special weekday before Christmas Eve
3	Special weekday before Independence Day
3	Thanksgiving Wednesday