



Montana Department of Transportation

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**VISION ZERO**

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zero serious injuries

**Memorandum**

To: e-distribution  
see listing below

From: James A. Combs, P.E.  
Highways Design Engineer

Date: November 30, 2018

Subject: Project Linear Referencing

Revised 3/9/23

MC

**Background and Objective**

Project development team members from various areas within MDT utilize different linear referencing methods to meet their business needs. Periodically, confusion, inefficiency and discrepancies occur as a result of using title sheet reference points as the true source of preconstruction linear referencing data. This memo establishes a process for Preconstruction to communicate construction project feature location information to other areas within MDT.

The purpose of this memo is to:

1. Provide guidance clarifying the project types and project features that need to be reconciled and documented in the SOW report.
2. Establish an efficient quality assurance process for providing consistent and accurate project location information.
3. Establish a process to reconcile spatial data for common project features using different linear referencing methods.
4. Provide implementation guidance for current projects.

Reference points on project title sheets are intended to provide construction and contractors a simple, low accuracy means to approximately locate a project. Title sheet reference points should not be used as a source for project linear referencing data because of the low level of accuracy. For example, reference markers may be offset by more than one mile. Another example is reference points are often reflected to one tenth of a mile precision on title sheets.

MDT Fiscal Programming Section currently performs Federally required reporting of permanent features to be constructed on a "roadway". For purposes of this memo, "Roadway" refers to "The portion of a highway including shoulders, for vehicular use. A divided highway has two or more roadways." ~~Route ID Corridor~~ and accumulated mileage is the linear referencing method required for the reporting performed by Fiscal Programming. Preconstruction applications use department route and reference point as the linear referencing method. Both methods can be used to identify the same spatial locations.

The MDT Intranet “~~ALTIS – Advanced Linear Transportation Information System~~” “~~TIS Transportation Information System~~” webpage and the “~~TIS~~ “~~ALTIS~~ Foundation” link under the “~~Transportation~~” heading found on the [MDT Internet Manuals & Guides](#) webpage [Foundation - Advanced Linear Transportation Information System \(ALTIS\) \(mt.gov\)](#) provide detailed definitions and explanations of the different linear referencing methods and the associated terminology.

### **Guidance**

**The SOW or combined PFR/SOW report is the sole reference for the true source of preconstruction linear referencing data. All changes to project feature locations that occur after SOW must be documented in a SOW addendum or amendment signed by the appropriate SOW signatory Engineer and distributed to the design team.** For example, if the project limits change after SOW and before project award, a SOW amendment or addendum should be completed, signed, forwarded to the design team and saved with the project files.

The SOW and combined PFR/SOW report templates have been modified to include a table in the “Project Location and Limits” Section will function as the true source of project linear referencing data. The table will reconcile linear referencing methods at critical locations. Column fields are provided to enter description, department route(s) and reference points, and ~~corridor~~ route ID(s) and accumulated mileage.

Description, department route and reference point, and ~~route ID~~ ~~corridor~~ and accumulated mileage must be entered in the table for all on and off-system project corridors where permanent features are planned on one or more roadways. Department route and reference post at the department route project limits should be included in the table on all projects, including those whose scope of work is off the roadway. Reference points and accumulated miles should be reported to the thousandth of a mile in the SOW report table.

**Most** Projects that include multiple discontinuous locations do not need to have the ~~route ID~~ ~~corridor~~ and accumulated mileage data reported. These projects are commonly safety or operational improvements at multiple sites (e.g. signing, rumble strips, signal optimization, signal timing, signal replacement, etc.).

Locations that need to be denoted in the table are project limits for on-system and off-system roadwork (including Interstate ramps) and, urban and reservation boundaries within the project limits. Permanent work off of the roadway and connections do not need to be denoted in the table. Connections are transition sections to tie a project with abutting existing roads. Connections are commonly used to transition the designed scope of work at the project limits to the existing road and/or to provide transitions at public side roads and ramps.

Structures are unique in their reporting requirements. Structures within project limits that have no work or pavement markings only, do not need to be provided for in the table. Bridge end sections are considered “roadway” work for purposes of providing linear referencing data. Structures that do not necessitate bridge rail modifications for connection to new bridge approach sections do not need to be provided for in the table. Consult with Bridge Bureau as needed for assistance determining if connection to a new bridge approach section constitutes a bridge rail modification or not. Structures should be accounted for in the table for all other structures work.

## **Procedure**

The Geospatial Information Section of the Data and Statistics Bureau will provide the Project Manager with linear referencing data for inclusion in the SOW report and any subsequent amendments or addenda.

The Project Manager will determine what linear referencing data and what features need to be included in the SOW table based on the guidance provided above. Consult with the Fiscal Programming Section and Bridge Bureau for assistance as needed.

The Project Manager should ~~submit complete~~ a request ~~form~~ noting all features needing reconciled linear referencing methods. The completed request ~~form~~ should be forwarded to the Geospatial Information Section Supervisor. ~~A hyperlink to a Linear Referencing Data Request Memo can be found on the MDT Intranet "Forms and Templates" webpage under the "Highway Design Request Memo Templates" heading.~~

The ~~request form~~ should include information for all roadway features that need to reflect both linear referencing methods in the SOW table. Provide the information below in the request:

- Project limits: State plane coordinates of roadway(s) are preferred. State plane coordinates should be available in the plans or they can be found using the "MDT Route Location Finder App" in most instances. Reference point is the next alternative if state plane coordinates are unavailable. As-built stationing is not recommended but can be provided if state plane coordinates and a reference point are not available.
- Structures: Provide NBI numbers for structures that are required to be included in the table. Structures data, including National Bridge Index (NBI) numbers, can be found in the MDT Spatial Data or the Montana Bridge interactive GIS maps. MDT interactive GIS maps can be accessed from the MDT Internet at <https://www.mdt.mt.gov/publications/map-gallery.shtml>.
- Interchange ramps: Each ramp at an Interstate interchange ~~has is~~ a unique ~~route ID corridor-route~~ and should be treated as an individual roadway. Provide interchange exit numbers, mainline direction and identify if the ramp is an entrance or an exit ramp.
- Urban and reservation boundaries: Identify the known presence of urban and reservation boundaries that are within the project limits.

The Geospatial Information Section will return the completed form to the Project Manager with the data to be included in the SOW table. Note structures in the "Description" column by the structure NBI number. Reference post and accumulated mileage data provided for structures will be at the structure beginning.

## **Implementation**

This memo is effective as of December 1, 2018. Complete the table on the most current combined PFR/SOW or SOW report on all projects at or before SOW as of December 1, 2018.

## **Final Remarks**

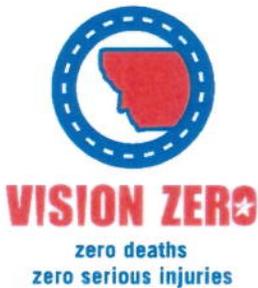
Plans title sheets production remains unaffected by this memo.

The attached September 2, 2018 letter provides additional background supporting this memo.

The "Reference Posts on Title Sheets" design memo dated January 13, 2011 is rescinded and replaced with this memo.

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September 2, 2018

Kevin McLaury, Division Administrator  
FHWA Montana Division  
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Subject: HPMS Data in FMIS

The purpose of this letter is to share MDT's Standard Operating Procedures regarding inclusion of HPMS data for projects in the Federal Management Information System (FMIS).

In recent discussions, MDT determined our practice for reporting HPMS data into FMIS could be improved to realize better efficiency. As a result of these discussions, MDT will be requesting accumulated mileage data for inclusion in FMIS when the Scope of Work report is issued for a project. If location changes occur after the issuance of the Scope of Work report, MDT will issue a revised scope of work report to capture additional and/or changed data. This data will be provided to Fiscal Programming for input when authorizing the Construction phase of a project.

MDT will not include location information for Other Phases, Preliminary Engineering, Utilities, Right-of-Way or Construction Engineering programming as this is defined as "off-roadway" work in the FMIS modernization guide.

MDT will not include location information for "Statewide" projects as allowed in the FMIS modernization guide. MDT defines statewide as meeting one of the following criteria:

- The project is within one of the state's five construction districts, but includes more than one city, town and/or county;
- The project spans multiple construction districts;
- There are various locations within a single construction district;
- The project is a job order contract where the sites are determined as needed.

Projects that fit these criteria are general preservation maintenance contracts, safety improvement at multiple sites (for example: signing, rumble strip projects, etc.), and operations projects (for example: signal optimization, replacement or timing). Bridge projects would be the only exception to the above mentioned due to the reporting requirements.

In addition, items that are incidental to construction, transition work (i.e. project connections to match existing conditions) or features and projects that are considered "off-roadway" work will not have accumulated mileage data (i.e. rockfall mitigation, rest areas, pedestrian paths, ADA improvements, landscaping, scale sites, slides, etc.).

Please contact me if you have any comments or questions.



Dwane Kailey  
Highways & Engineering Division Administrator

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