

2024

Highway Performance Monitoring System Quality Review



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Cover Photo: PA-51, Allegheny County.

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INTRODUCTION

The Highway Performance Monitoring System (HPMS) is an annual data reporting program created by the Federal Highway Administration (FHWA) to meet their need to provide information to the Congress for development and analysis of national policy and programs relating to highways.

In Pennsylvania, HPMS serves as the primary source of highway information utilized in the allocation of highway maintenance funds, revenue enhancement initiatives and PennDOT's annual report of mileage and travel statistics. HPMS data is used to access the state's minimum pavement condition level for the interstate system on an annual basis and for determining significant progress towards pavement condition targets. HPMS data are also used to fulfill requests for information received from consulting firms, PennDOT District Offices, Metropolitan Planning Organizations (MPOs), and national organizations as well as the general public.

Each year, an annual quality review of Pennsylvania's HPMS is conducted. The review is performed by the Bureau of Planning and Research's (BPR) HPMS staff and consists of HPMS field views of randomly selected sample sections in several counties. The purpose of this review is:

1. To ascertain the current state of HPMS data quality and ensure that any errors found are corrected.
2. To determine if any common problem areas exist and identify subsequent training needs.
3. To determine if any organizational or procedural changes to the HPMS program are warranted.
4. To ensure that communications regarding HPMS are maintained between PennDOT, MPOs and PennDOT District Offices.

The HPMS program continues to deliver a high level of timely and accurate data for the purpose of allocating national and state highway funds, project planning and programming, assessing air quality conformity, and travel monitoring.

The following pages contain the results of this year's review.

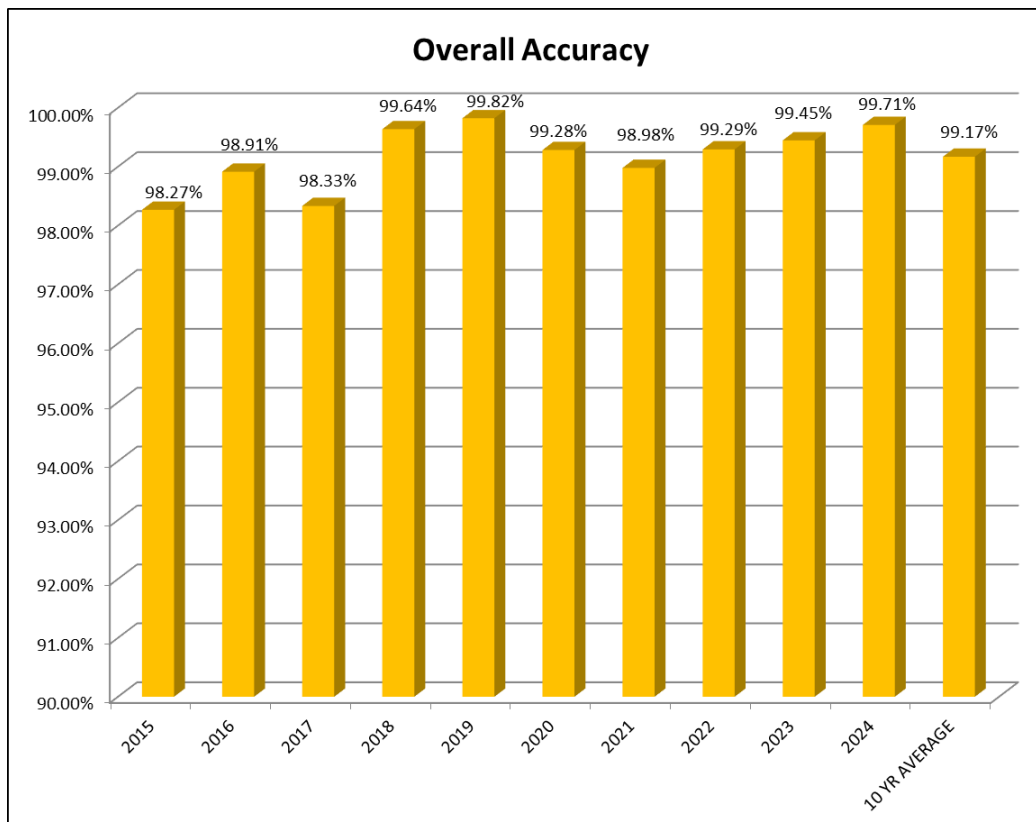
EXECUTIVE SUMMARY

In August, September, and October 2024, BPR's HPMS staff conducted its annual quality review of Pennsylvania's HPMS. The quality reviews were conducted with the appropriate MPO or PennDOT District Office HPMS representative present with both HPMS Coordinators from Central Office, resulting in improved communication between our HPMS staff and our data providers. The review included HPMS field views of sample sections on which HPMS data are provided by:

- Centre Regional Planning Agency
- Lackawanna County Department of Planning and Economic Development
- Lancaster County Planning Commission
- Lebanon County Planning Department
- Lehigh Valley Planning Commission
- Mercer County Regional Planning Commission
- Southwest Pennsylvania Commission
- Tri-County Regional Planning Commission
- York County Planning Commission
- PennDOT District Office 1-0
- PennDOT District Office 2-0
- PennDOT District Office 5-0
- PennDOT District Office 11-0

Additionally, the HPMS staff provided HPMS data collection training to the Luzerne County Planning Commission.

All thirteen (13) of the data providers reviewed this year recorded an accuracy rate of 98% or greater. The average overall accuracy rates of the data providers reviewed for the last ten years appear in the chart below.



2024 HPMS DATA REVIEWS

Organization	Participants	Counties Reviewed	Date
PennDOT District Office 11-0	Brandy Miller John Moloney Mike Ballinger	Lawrence	August 12
Southwest Pennsylvania Commission	Cort McCombs Andrew Clevenger John Moloney Mike Ballinger	Butler	August 13
Mercer County Regional Planning Commission	Brian Barnhizer Peter Messina John Moloney Mike Ballinger	Mercer	August 14
PennDOT District Office 1-0	Jacki Deeter John Moloney Mike Ballinger	Mercer	August 15
Lackawanna County Department of Planning and Economic Development	Eric Middleton Jessica Edwards John Moloney Mike Ballinger	Lackawanna	August 26
Luzerne County Planning Commission	Robert Manzella Dan Reese John Moloney Mike Ballinger	Luzerne	August 26
PennDOT District Office 5-0	Mary Arner Jeff Williams John Moloney Mike Ballinger	Monroe	August 27
Lehigh Valley Planning Commission	Brian Hite John Moloney Mike Ballinger	Lehigh	August 27
York County Planning Commission	Heather Bitner John Moloney Mike Ballinger	York	September 5
Lancaster County Planning Commission	Trevor West Mary Siu John Moloney Mike Ballinger	Lancaster	September 17
Lebanon County Planning Department	Jon Fitzkee John Moloney Mike Ballinger	Lebanon	September 17

Centre Regional
Planning Agency

Anne Messner
Megan Lee
Sean Summers
John Moloney
Mike Ballinger

Centre

October 3

Tri-County Regional
Planning Commission

Ben Warner
Tanner Stroup
John Moloney
Mike Ballinger

Cumberland

October 8

PennDOT District
Office 2-0

Wendy Wells
John Moloney
Mike Ballinger

Centre

October 9

DATA ITEMS

Each review consisted of field verifying data that could be measured through field observations in accordance with the Federal Highway Administration's HPMS Field Manual. The field verifiable data items included in this assessment are listed below. Those items shown in **bold type** are data items collected by the MPOs and PennDOT District Offices exclusively for the HPMS program. All other items reside in the Roadway Management System (RMS) and are controlled by the PennDOT Central Office staff and District Offices' RMS staff. MPOs must notify the PennDOT Central Office staff of inaccuracies found in the RMS data items. The PennDOT Central Office and District Office staff are responsible for correcting the errors.

Data Item	Description
3	Facility Type
4	Structure ID
5	Access Control
7	Through Lanes
8	HOV Type
9	HOV Lanes
10	Peak Lanes
11	Counter Peak Lanes
12	Right Turn Lanes
13	Left Turn Lanes
14	Speed Limit
17	Route Number
18	Route Signing
19	Route Qualifier
20	Road Name
29	Signal Type
30	Percent Green Time
31	Signalized Intersections
32	Stop Sign Controlled Intersections
33	At-Grade Other Intersections
34	Lane Width
35	Median Type
36	Median Width
37	Shoulder Type
38	Right Shoulder Width
39	Left Shoulder Width
40	Peak Parking
42	Widening Potential
44	Terrain Type
46	Percent Passing Sight Distance

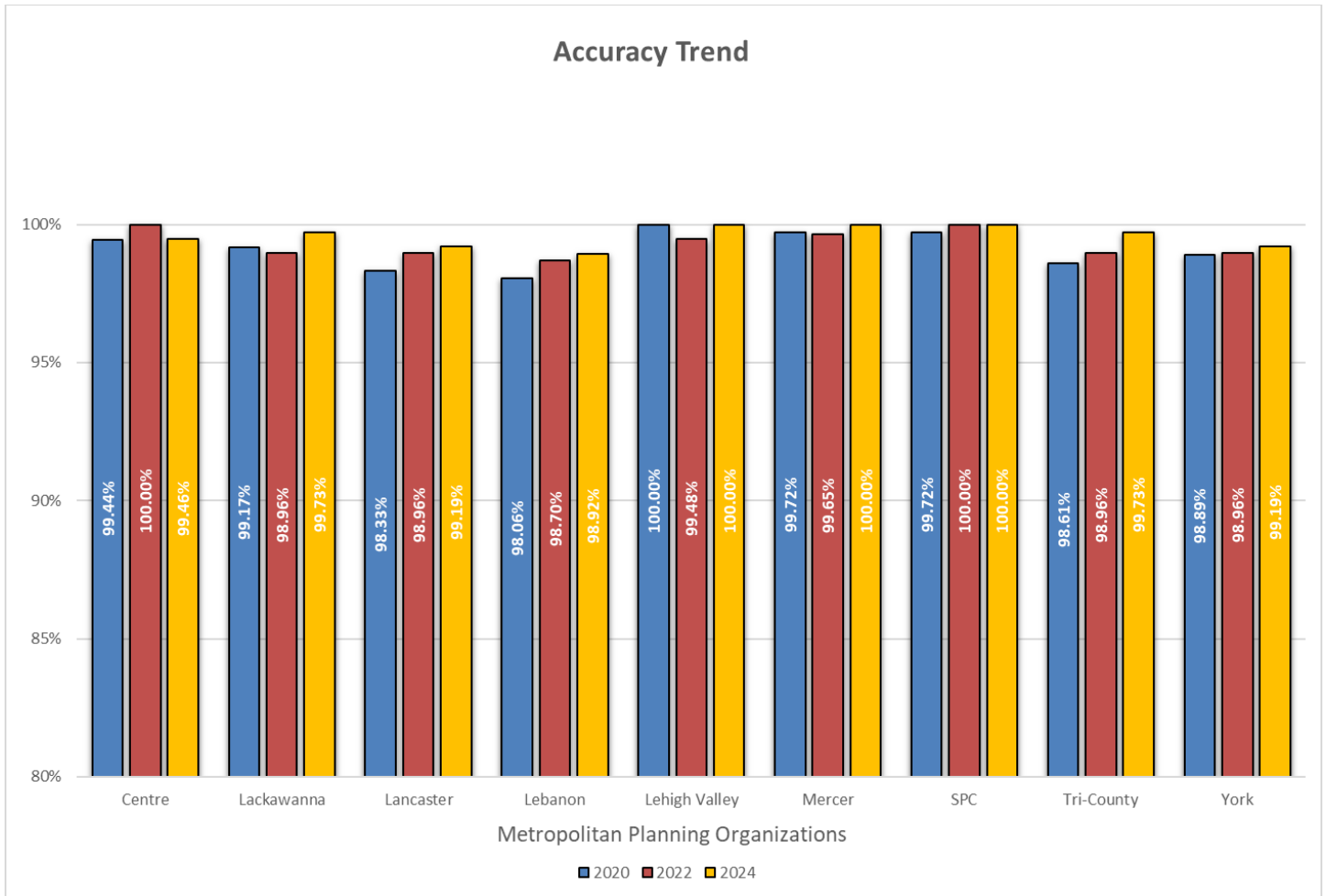
REVIEW ANALYSIS

The following table quantifies the findings of this year's quality reviews. The table indicates, by data source, the number of errors found for each field verifiable data item for each of the agencies reviewed the total number of errors for each agency, and the percent of error for each agency. The overall accuracy rate for each agency is also included in this table. Percent of error was calculated by dividing the total number of errors by the number of segments reviewed in each agency multiplied by the number of data items reviewed per data source.

2024 QUALITY REVIEW SUMMARY														
AGENCY CODING ERRORS PER ITEM REVIEWED														
Data Items Reviewed	Centre MPO	Lackawanna MPO	Lancaster MPO	Lebanon MPO	Lehigh Valley MPO	Mercer MPO	SPC MPO	Tri-County MPO	York MPO	District 1-0	District 2-0	District 5-0	District 11-0	TOTAL
3 - Facility Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 - Structure ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - Access Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 - Through Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - HOV Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 - HOV Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 - Peak Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - Counter Peak Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 - Right Turn Lanes	1	0	0	1	0	0	0	0	0	0	0	0	0	2
13 - Left Turn Lanes	0	1	1	0	0	0	0	0	0	0	0	0	0	2
14 - Speed Limit	0	0	2	0	0	0	0	0	0	0	0	0	0	2
17 - Route Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 - Route Signing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 - Route Qualifier	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 - Road Name	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - Signal Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 - Percent Green Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31 - Signalized Intersections	0	0	0	2	0	0	0	1	0	0	0	0	0	3
32 - Stop Sign Controlled Intersections	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33 - At-Grade Other Intersections	1	0	0	1	0	0	0	0	3	0	0	0	0	5
34 - Lane Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35 - Median Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36 - Median Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37 - Shoulder Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38 - Right Shoulder Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39 - Left Shoulder Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 - Peak Parking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 - Widening Potential	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44 - Terrain Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46 - Percent Passing Sight Distance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Errors	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Errors	2	1	3	4	0	0	0	1	3	0	0	0	0	14
Error Rate	0.54%	0.27%	0.81%	1.08%	0.00%	0.00%	0.00%	0.27%	0.81%	0.00%	0.00%	0.00%	0.00%	0.29%
Local Fed. Aid Seg. Reviewed	4	4	6	5	8	6	3	1	7	0	0	0	0	44
State Segments Reviewed	8	8	6	7	4	6	9	11	5	12	12	12	11	111
Total Segments Reviewed	12	12	12	12	12	12	12	12	12	12	12	12	11	155
Overall Accuracy Rate	99.46%	99.73%	99.19%	98.92%	100.00%	100.00%	100.00%	99.73%	99.19%	100.00%	100.00%	100.00%	100.00%	99.71%

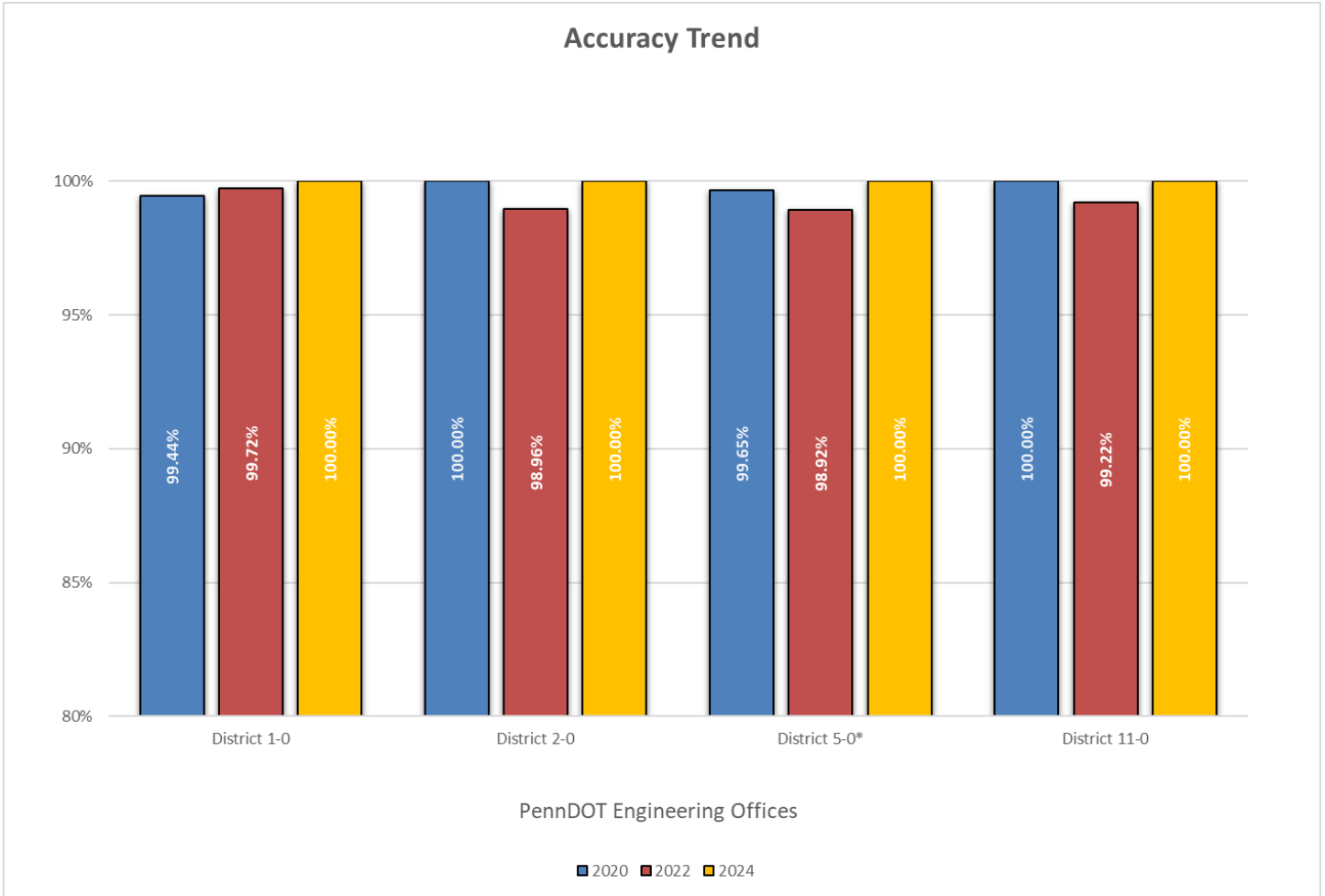
AGENCY SUMMARY

The following chart shows the accuracy trend for each Metropolitan Planning Organization (MPO) over the past three reviews.



PENNDOT DISTRICT OFFICE SUMMARY

The following chart shows the accuracy trend for each PennDOT District Office over the past three reviews.



* District 5-0's previous reviews were in 2018 and 2021.

DATA ITEM ERROR SUMMARY

The following chart shows the five highest reported errors in 2024. Of the data items reviewed, At-Grade Other Intersections with a reported error rate of 35.71%, Signalized Intersections with a reported error rate of 21.43%, Left Turn Lanes, Right Turn Lanes and Speed Limit each with a reported error rate of 14.29%. Of the five highest reported errors in 2024, three of the items were consistently one of the top errors reported over the past three reviews.

At-Grade Other Intersection errors often could be attributed to changing segment lengths over the years. Right and Left Turn Lane errors are caused by the signage and striping issues. Speed Limit errors are a result of miscalculating the predominate speed limit length and Signalized Intersections errors are due to confusion with beginning and ending points of the segments.

The BPR provides a web link to the FHWA’s HPMS Field Manual (December 2016) and a link to PennDOT’s HPMS Data Collection Guide (August 2023) to all PennDOT District Offices and MPOs to assist them with collecting HPMS data. Both the FHWA HPMS Field Manual and the PennDOT HPMS Data Collection Guide include photos and graphic representations of the various situations encountered in the field and explain the data items in detail.



* In 2023 FHWA combined data items Widening Obstacle with Widening Potential.

CONCLUSIONS & RECOMMENDATIONS

HPMS Field Program

Through the review of the field findings, the following conclusions and recommendations can be made:

Centre Regional Planning Agency: The quality of the data is outstanding. Keep up the great work.

Lackawanna County Department of Planning and Economic Development: The quality of the data is outstanding. Keep up the great work.

Lancaster County Planning Commission: The quality of the data is outstanding. Keep up the great work.

Lebanon County Planning Department: The quality of the data is outstanding. Keep up the great work.

Lehigh Valley Planning Commission: A 100% accuracy rate is outstanding. Keep up the great work.

Mercer County Regional Planning Commission: A 100% accuracy rate is outstanding. Keep up the great work.

Southwest Pennsylvania Commission: A 100% accuracy rate is outstanding. Keep up the great work.

Tri-County Regional Planning Commission: The quality of the data is outstanding. Keep up the great work.

York County Planning Commission: The quality of the data is outstanding. Keep up the great work.

PennDOT District Office 1-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 2-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 5-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 11-0: A 100% accuracy rate is outstanding. Keep up the great work.

It should be noted that each quality review is held with the appropriate agency's HPMS staff present, therefore each quality review also serves as onsite training for our HPMS partners. Data reporting inadequacies are addressed immediately as conditions are found during the field view. Additional training is provided by the Bureau of Planning and Research on request.

PROPOSED 2025 ACTION ITEMS

HPMS Training: An attendee optional in-person and virtual statewide HPMS workshop was held in July 2024. The virtual format style was well received by the agencies as sixty-two (62) participants utilized this format to attend the workshop. Meanwhile, twenty (20) participants chose to attend the workshop in person. These types of meetings and workshops are an effective way to provide attendees with new information and discuss HPMS data coding problems.

2025 Action Item: A statewide virtual HPMS workshop will be scheduled in 2025. The primary focus of this conference will be any data items that are consistently troublesome during the quality reviews. Any changes and updates from FHWA pertaining to HPMS data items will also be discussed.

Quality Reviews: The HPMS Quality Review serves as a measuring tool for assessing the quality of the HPMS data submitted to the FHWA and reported in the Department's highway statistics report. It is used to ensure continuity and consistency of the field observations regardless of who is doing the review, the location of the review and the time of the review. The HPMS Quality Assurance field reviews include the participation of our data providers.

2025 Action Item: Eighteen Quality Reviews will be conducted in 2025. Each review will be conducted by the Transportation Planning Division's HPMS staff and the appropriate PennDOT District Office or MPO representative. The following Agencies and PennDOT District Offices will be scheduled for a review in 2025:

Adams County Planning Commission
Berks County Planning Commission
Blair County Planning Commission
Cambria County Planning Commission
Delaware Valley Regional Planning Commission
Erie County Department of Planning
Franklin County Planning Commission
Luzerne County Planning Commission
Lycoming County Planning Commission

Northeastern Pennsylvania Alliance
SEDA - Council of Governments
PennDOT District Office 3-0
PennDOT District Office 4-0
PennDOT District Office 6-0
PennDOT District Office 8-0
PennDOT District Office 9-0
PennDOT District Office 10-0
PennDOT District Office 12-0

Use of PennDOT SharePoint website: In 2024, the HPMS yearly sample packets were posted to the PennDOT SharePoint website as well as through the HPMS Mobile application, for distribution to the MPO's and PennDOT District Offices. This enabled the Department to provide the packets faster and eliminate postage and printing costs.

2025 Action Item: HPMS yearly sample packets will be distributed through the HPMS Mobile application as well as SharePoint for the 2025 data collection season. The MPO's and PennDOT District Offices will be notified via email when the 2025 packets are completed. While HPMS Mobile provides all of the HPMS samples for the partners to access, PennDOT will continue to place PDF versions of the HPMS sample sheets on SharePoint for those who wish to print for field use. Also, posted on SharePoint, will be technical manuals and information pertinent to data collection and coding.

HPMS Mobile: The creation of a HPMS Mobile application was implemented prior to the 2023 data collection season. After a season of usage by the planning partners and district personnel, updates were suggested and implemented prior to the 2024 data collection season. These updates include but are not limited to filtering enhancements which include the option to sort on multiple columns, the ability for supervisors to revert the status of a sample, bulk approval and automatic approval if no changes were made to the sample data items, a darker background was added for easier viewing in high light conditions and a google street view link was added to the sample review page.

2025 Action Item: Review of the login and use of the HPMS Mobile application will occur during the HPMS workshop as a refresher and for any new users. Use of HPMS Mobile application will be the mandatory method of submitting samples to Central Office. Suggestions for improvements to the HPMS Mobile application are reviewed and implemented if feasible.



U.S. Department of Transportation
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