Appendix K:

Road Segment Analysis

ROADWAY SEGMENT ANALYSIS

A roadway segment analysis was completed along the Mt. Pleasant Road site frontage from a point just west of the proposed western site driveway and a point just west of the eastern driveway. The LOS is based on Follower Density information provided by HCS 7 Two-Lane Highway Operational Data for Lower-Speed Highways as noted in **Table 1**.

TABLE 1

LEVEL OF SERVICE CRITERIA – HCS 7 TWO-LANE HIGHWAY ANALYSIS

Level of Service	Follower Density Lower-Speed Highways
	Posted Speed Limit < 50 mi/h
A	< 2.5
B	> 2.5 and < 5.0
C	> 5.0 and < 10.0
D	> 10.0 and < 15.0
E	> 15.0
F	Exists Only When Demand Exceeds Capacity

Roadway Segment Analysis for the subject segments for the for 2035 Projected (Build) conditions are shown in **Table 2** for the weekday A.M., and weekday P.M. peak hours. Highway Capacity Software 2025 edition Two-Lane Highway software was used to analyze the following roadway segments:

- Mt Pleasant Road from Cloverleaf Road to proposed western driveway
- Mt Pleasant Road from proposed western driveway to proposed eastern driveway

TABLE 2

ROADWAY SEGMENT ANALYSIS LEVEL OF SERVICE SUMMARY

Roadway Segment on Mt Pleasant Road	Direction	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour
		2035 Design	
		Projected	Projected
Cloverleaf Road to proposed western driveway	Eastbound	A	A
	Westbound	A	A
Mt Pleasant Road from proposed western driveway to proposed eastern driveway	Eastbound	A	A
	Westbound	A	A

Projected = Full Buildout of Greiner Development Project , 2035 is five year design year after build-out of Greiner

As shown in **Table 2**, the analyzed eastbound and westbound segments along Mt Pleasant Road will operate in accordance with the standards contained in the Mount Joy Township Ordinance for TIS (LOS D or better). Roadway segment analysis worksheets are provided in **Appendix K.**

HCS Two-Lane Highway Report

Project Information			
Analyst	Dylan Zerphey	Date	11/13/2025
Agency	TPD	Analysis Year	Projected (Build) 2035 Condition
Jurisdiction	Mount Joy Township	Time Analyzed	Weekday A.M. Peak Hour Eastbound
Project Description	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)	Units	U.S. Customary

Segment 1

Vehicle Inputs			
Segment Type	Passing Constrained	Length, ft	1235
Lane Width, ft	12	Shoulder Width, ft	1
Speed Limit, mi/h	40	Access Point Density, pts/mi	0.0

Demand and Capacity			
Directional Demand Flow Rate, veh/h	87	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.84	Total Trucks, %	25.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

Intermediate Results			
Segment Vertical Class	1	Free-Flow Speed, mi/h	41.3
Speed Slope Coefficient (m)	2.74542	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.50123	PF Power Coefficient (p)	0.68539
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	0.5
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	1235	-	-	41.3

Vehicle Results			
Average Speed, mi/h	41.3	Percent Followers, %	24.5
Segment Travel Time, minutes	0.34	Adj. Follower Density, followers/mi/ln	0.5
Vehicle LOS	A		

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TWO-LANE HIGHWAY SEGMENT ANALYSIS

File Name:	Node 1 EB AM 2035.xuf
Analyst:	Dylan Zerphey
Agency:	TPD
Jurisdiction:	Mount Joy Township
Date:	11/13/2025
Analysis Year:	Projected (Build) 2035 Condition
Time Analyzed:	Weekday A.M. Peak Hour Eastbound
Project Description:	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)
Units:	U.S. Customary

Facility LOS and Performance Measures

Facility Length	0.23	mi
Facility VMT	4	veh-mi/AP
Facility VHD	0.00	veh-h/p
Facility Average Follower Density, FD	0.5	followers/mi/ln
Facility Average Speed Limit	40	mi/h
Facility Level of Service, LOS	A	

Segment 1

LOS and Performance Measures

Coded Segment Type	Passing Constrained	
Analyzed Segment Type	Passing Constrained	
Actual Segment Length, L	1235	ft
Segment Length Used in Calculation	0.25	mi
Demand Flow Rate in Analysis Direction, vd	87	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Capacity, cap	1700	veh/h
Free-Flow Speed, FFS	41.3	mi/h
Speed, S	41.3	mi/h
Percent Followers, PF	24.5	%
Follower Density, FD	0.5	followers/mi/ln
Level of Service, LOS	A	

Step 1: Identify Facility Study Boundaries and Corresponding Segmentation

Segment Type	Passing Constrained	
Vertical Class	1	
Minimum Segment Length	0.25	mi
Maximum Segment Length	3.00	mi

Step 2: Determine Demand Flow Rates, Capacity, and d/c Ratio

Demand Volume in Analysis Direction, Vd	73	veh/h
Demand Volume in Opposing Direction, Vo	-	veh/h
Peak Hour Factor, PHF	0.84	
Demand Flow Rate in Analysis Direction, vd	87	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
d/c Ratio	0.05	

Step 3: Determine the Vertical Alignment Classification

Segment Length, L	1235	ft
Segment Percent Grade	0.00	%
Vertical Class	1	

Step 4: Determine the Free-Flow Speed

Posted Speed Limit, Sp	40	mi/h
Base Free-Flow Speed, BFFS	45.6	mi/h
Coeff. Value from Exhibit 15-12, a0	0.00000	
Coeff. Value from Exhibit 15-12, a1	0.00000	
Coeff. Value from Exhibit 15-12, a2	0.00000	

Coeff. Value from Exhibit 15-12, a3	0.00000	
Coeff. Value from Exhibit 15-12, a4	0.00000	
Coeff. Value from Exhibit 15-12, a5	0.00000	
Coeff. for Heavy Vehicle Adjustment, a	0.03330	
Percentage of Heavy Vehicles, %HV	25.00	%
Lane Width, LW	12	ft
Shoulder Width, SW	1	ft
Adjustment for Lane and Shoulder Width, fLS	3.5	mi/h
Access-Point Density, APD	0.0	access points/mi
Adjustment for Access-Point Density, fA	0.0	mi/h
Free-Flow Speed, FFS	41.3	mi/h

Step 5: Estimate the Average Speed

Note: If the demand flow rate is less than 100 veh/h, the average speed is equal to FFS and Step 5 can be skipped.

Demand Flow Rate in Analysis Direction, vd	87	veh/h
Free-Flow Speed, FFS	41.3	mi/h
Average Speed, S	41.3	mi/h

Step 6: Estimate the Percent Followers

Segment Type	Passing Constrained	
Vertical Class	1	
Free-Flow Speed, FFS	41.3	mi/h
Demand Flow Rate in Analysis Direction, vd	87	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Directional Capacity, cap	1700	veh/h
Segment Length, L	0.25	mi
Percentage of Heavy Vehicles	25.00	%

Step 6a: Calculate Percent Followers at Capacity

Coeff. Value for Equation 15-18 or 15-19, b0	37.68080	
Coeff. Value for Equation 15-18 or 15-19, b1	3.05089	
Coeff. Value for Equation 15-18 or 15-19, b2	-7.90866	
Coeff. Value for Equation 15-18 or 15-19, b3	-0.94321	
Coeff. Value for Equation 15-18 or 15-19, b4	13.64266	
Coeff. Value for Equation 15-18 or 15-19, b5	-0.00050	
Coeff. Value for Equation 15-18 or 15-19, b6	-0.05500	
Coeff. Value for Equation 15-18 or 15-19, b7	7.13758	
Percent Followers at Capacity Flow Rate, PFcap	88.5	%

Step 6b: Calculate Percent Followers at 25% of Capacity

Coeff. Value for Equation 15-20 or 15-21, c0	18.01780	
Coeff. Value for Equation 15-20 or 15-21, c1	10.00000	
Coeff. Value for Equation 15-20 or 15-21, c2	-21.60000	
Coeff. Value for Equation 15-20 or 15-21, c3	-0.97853	
Coeff. Value for Equation 15-20 or 15-21, c4	12.05214	
Coeff. Value for Equation 15-20 or 15-21, c5	-0.00750	
Coeff. Value for Equation 15-20 or 15-21, c6	-0.06700	
Coeff. Value for Equation 15-20 or 15-21, c7	11.60410	
Percent Followers of 25% of Capacity Flow Rate, PF25cap	56.6	%

Step 6c: Calculate the Slope Coefficient

Coeff. Value for Equation 15-22, d1	-0.29764	
Coeff. Value for Equation 15-22, d2	-0.71917	
Slope Coefficient, m	-1.50123	

Step 6d: Calculate the Power Coefficient

Coeff. Value for Equation 15-23, e0	0.81165	
Coeff. Value for Equation 15-23, e1	0.37920	
Coeff. Value for Equation 15-23, e2	-0.49524	
Coeff. Value for Equation 15-23, e3	-2.11289	
Coeff. Value for Equation 15-23, e4	2.41146	
Power Coefficient, p	0.68539	

Step 6e: Calculate Percent Followers for the Segment

Percent Followers, PF	24.5	%

Step 7: Estimate Additional Performance Measure for Passing Lane

Step 8: Estimate Follower Density

Percent Followers, PF	24.5	%
Demand Flow Rate in Analysis Direction, vd	87	veh/h
Average Speed, with consideration of horizontal curves, S	41.3	mi/h
Follower Density, FD	0.5	followers/mi/ln

Step 9: Determine Potential Adjustment to Follower Density

Effective Length of Upstream Passing Lane	1.00	mi
Distance Downstream from Start of Passing Lane Segment	0.23	mi
PF for Upstream Passing Lane Seg., PF	0.0	%
PF for Analysis Segment, PF	24.5	%
Length of Passing Lane Segment, PassLaneLength	0.00	mi
Flow Rate Entering for Analysis Segment	87	veh/h
% Improve to PF, %ImprovePF	0.0	%
% Improve to the Average Speed, %ImproveS	0.0	%
Adjusted Average Speed for Analysis Segment, S	41.3	mi/h
Adjusted Follower Density, FDadj	0.5	followers/mi/ln

Step 10: Determine LOS

Posted Speed Limit, Sp	40	mi/h
Follower Density, FD	0.5	followers/mi/ln
Level of Service, LOS	A	

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HCS Two-Lane Highway Report

Project Information

Analyst	Dylan Zerphey	Date	11/13/2025
Agency	TPD	Analysis Year	Projected (Build) 2035 Condition
Jurisdiction	Mount Joy Township	Time Analyzed	Weekday A.M. Peak Hour Westbound
Project Description	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)	Units	U.S. Customary

Segment 1

Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	1235
Lane Width, ft	12	Shoulder Width, ft	1
Speed Limit, mi/h	40	Access Point Density, pts/mi	0.0

Demand and Capacity

Directional Demand Flow Rate, veh/h	77	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.84	Total Trucks, %	15.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	41.6
Speed Slope Coefficient (m)	2.76347	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.50227	PF Power Coefficient (p)	0.68531
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	0.4
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	1235	-	-	41.6

Vehicle Results

Average Speed, mi/h	41.6	Percent Followers, %	22.9
Segment Travel Time, minutes	0.34	Adj. Follower Density, followers/mi/ln	0.4
Vehicle LOS	A		

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TWO-LANE HIGHWAY SEGMENT ANALYSIS

File Name:	Node 1 WB AM 2035.xuf
Analyst:	Dylan Zerphey
Agency:	TPD
Jurisdiction:	Mount Joy Township
Date:	11/13/2025
Analysis Year:	Projected (Build) 2035 Condition
Time Analyzed:	Weekday A.M. Peak Hour Westbound
Project Description:	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)
Units:	U.S. Customary

Facility LOS and Performance Measures

Facility Length	0.23	mi
Facility VMT	4	veh-mi/AP
Facility VHD	0.00	veh-h/p
Facility Average Follower Density, FD	0.4	followers/mi/ln
Facility Average Speed Limit	40	mi/h
Facility Level of Service, LOS	A	

Segment 1

LOS and Performance Measures

Coded Segment Type	Passing Constrained	
Analyzed Segment Type	Passing Constrained	
Actual Segment Length, L	1235	ft
Segment Length Used in Calculation	0.25	mi
Demand Flow Rate in Analysis Direction, vd	77	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Capacity, cap	1700	veh/h
Free-Flow Speed, FFS	41.6	mi/h
Speed, S	41.6	mi/h
Percent Followers, PF	22.9	%
Follower Density, FD	0.4	followers/mi/ln
Level of Service, LOS	A	

Step 1: Identify Facility Study Boundaries and Corresponding Segmentation

Segment Type	Passing Constrained	
Vertical Class	1	
Minimum Segment Length	0.25	mi
Maximum Segment Length	3.00	mi

Step 2: Determine Demand Flow Rates, Capacity, and d/c Ratio

Demand Volume in Analysis Direction, Vd	65	veh/h
Demand Volume in Opposing Direction, Vo	-	veh/h
Peak Hour Factor, PHF	0.84	
Demand Flow Rate in Analysis Direction, vd	77	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
d/c Ratio	0.05	

Step 3: Determine the Vertical Alignment Classification

Segment Length, L	1235	ft
Segment Percent Grade	-1.00	%
Vertical Class	1	

Step 4: Determine the Free-Flow Speed

Posted Speed Limit, Sp	40	mi/h
Base Free-Flow Speed, BFFS	45.6	mi/h
Coeff. Value from Exhibit 15-12, a0	0.00000	
Coeff. Value from Exhibit 15-12, a1	0.00000	
Coeff. Value from Exhibit 15-12, a2	0.00000	

Coeff. Value from Exhibit 15-12, a3	0.00000	
Coeff. Value from Exhibit 15-12, a4	0.00000	
Coeff. Value from Exhibit 15-12, a5	0.00000	
Coeff. for Heavy Vehicle Adjustment, a	0.03330	
Percentage of Heavy Vehicles, %HV	15.00	%
Lane Width, LW	12	ft
Shoulder Width, SW	1	ft
Adjustment for Lane and Shoulder Width, fLS	3.5	mi/h
Access-Point Density, APD	0.0	access points/mi
Adjustment for Access-Point Density, fA	0.0	mi/h
Free-Flow Speed, FFS	41.6	mi/h

Step 5: Estimate the Average Speed

Note: If the demand flow rate is less than 100 veh/h, the average speed is equal to FFS and Step 5 can be skipped.

Demand Flow Rate in Analysis Direction, vd	77	veh/h
Free-Flow Speed, FFS	41.6	mi/h
Average Speed, S	41.6	mi/h

Step 6: Estimate the Percent Followers

Segment Type	Passing Constrained	
Vertical Class	1	
Free-Flow Speed, FFS	41.6	mi/h
Demand Flow Rate in Analysis Direction, vd	77	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Directional Capacity, cap	1700	veh/h
Segment Length, L	0.25	mi
Percentage of Heavy Vehicles	15.00	%

Step 6a: Calculate Percent Followers at Capacity

Coeff. Value for Equation 15-18 or 15-19, b0	37.68080	
Coeff. Value for Equation 15-18 or 15-19, b1	3.05089	
Coeff. Value for Equation 15-18 or 15-19, b2	-7.90866	
Coeff. Value for Equation 15-18 or 15-19, b3	-0.94321	
Coeff. Value for Equation 15-18 or 15-19, b4	13.64266	
Coeff. Value for Equation 15-18 or 15-19, b5	-0.00050	
Coeff. Value for Equation 15-18 or 15-19, b6	-0.05500	
Coeff. Value for Equation 15-18 or 15-19, b7	7.13758	
Percent Followers at Capacity Flow Rate, PFcap	88.5	%

Step 6b: Calculate Percent Followers at 25% of Capacity

Coeff. Value for Equation 15-20 or 15-21, c0	18.01780	
Coeff. Value for Equation 15-20 or 15-21, c1	10.00000	
Coeff. Value for Equation 15-20 or 15-21, c2	-21.60000	
Coeff. Value for Equation 15-20 or 15-21, c3	-0.97853	
Coeff. Value for Equation 15-20 or 15-21, c4	12.05214	
Coeff. Value for Equation 15-20 or 15-21, c5	-0.00750	
Coeff. Value for Equation 15-20 or 15-21, c6	-0.06700	
Coeff. Value for Equation 15-20 or 15-21, c7	11.60410	
Percent Followers of 25% of Capacity Flow Rate, PF25cap	56.7	%

Step 6c: Calculate the Slope Coefficient

Coeff. Value for Equation 15-22, d1	-0.29764	
Coeff. Value for Equation 15-22, d2	-0.71917	
Slope Coefficient, m	-1.50227	

Step 6d: Calculate the Power Coefficient

Coeff. Value for Equation 15-23, e0	0.81165	
Coeff. Value for Equation 15-23, e1	0.37920	
Coeff. Value for Equation 15-23, e2	-0.49524	
Coeff. Value for Equation 15-23, e3	-2.11289	
Coeff. Value for Equation 15-23, e4	2.41146	
Power Coefficient, p	0.68531	

Step 6e: Calculate Percent Followers for the Segment

Percent Followers, PF	22.9	%

Step 7: Estimate Additional Performance Measure for Passing Lane

Step 8: Estimate Follower Density

Percent Followers, PF	22.9	%
Demand Flow Rate in Analysis Direction, vd	77	veh/h
Average Speed, with consideration of horizontal curves, S	41.6	mi/h
Follower Density, FD	0.4	followers/mi/ln

Step 9: Determine Potential Adjustment to Follower Density

Effective Length of Upstream Passing Lane	1.00	mi
Distance Downstream from Start of Passing Lane Segment	0.23	mi
PF for Upstream Passing Lane Seg., PF	0.0	%
PF for Analysis Segment, PF	22.9	%
Length of Passing Lane Segment, PassLaneLength	0.00	mi
Flow Rate Entering for Analysis Segment	77	veh/h
% Improve to PF, %ImprovePF	0.0	%
% Improve to the Average Speed, %ImproveS	0.0	%
Adjusted Average Speed for Analysis Segment, S	41.6	mi/h
Adjusted Follower Density, FDadj	0.4	followers/mi/ln

Step 10: Determine LOS

Posted Speed Limit, Sp	40	mi/h
Follower Density, FD	0.4	followers/mi/ln
Level of Service, LOS	A	

This Two-Lane Highway text report was created in HCS™ Highways Version 2025 on 11/13/2025 09:59:08

HCS Two-Lane Highway Report

Project Information			
Analyst	Dylan Zerphey	Date	11/13/2025
Agency	TPD	Analysis Year	Projected (Build) 2035 Condition
Jurisdiction	Mount Joy Township	Time Analyzed	Weekday P.M. Peak Hour Eastbound
Project Description	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)	Units	U.S. Customary

Segment 1

Vehicle Inputs			
Segment Type	Passing Constrained	Length, ft	1235
Lane Width, ft	12	Shoulder Width, ft	1
Speed Limit, mi/h	40	Access Point Density, pts/mi	0.0

Demand and Capacity			
Directional Demand Flow Rate, veh/h	107	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.91	Total Trucks, %	8.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.06

Intermediate Results			
Segment Vertical Class	1	Free-Flow Speed, mi/h	41.8
Speed Slope Coefficient (m)	2.77610	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.50296	PF Power Coefficient (p)	0.68525
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	0.7
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	1235	-	-	41.5

Vehicle Results			
Average Speed, mi/h	41.5	Percent Followers, %	27.7
Segment Travel Time, minutes	0.34	Adj. Follower Density, followers/mi/ln	0.7
Vehicle LOS	A		

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TWO-LANE HIGHWAY SEGMENT ANALYSIS

File Name:	Node 1 EB PM 2035.xuf
Analyst:	Dylan Zerphey
Agency:	TPD
Jurisdiction:	Mount Joy Township
Date:	11/13/2025
Analysis Year:	Projected (Build) 2035 Condition
Time Analyzed:	Weekday P.M. Peak Hour Eastbound
Project Description:	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)
Units:	U.S. Customary

Facility LOS and Performance Measures

Facility Length	0.23	mi
Facility VMT	6	veh-mi/AP
Facility VHD	0.00	veh-h/p
Facility Average Follower Density, FD	0.7	followers/mi/ln
Facility Average Speed Limit	40	mi/h
Facility Level of Service, LOS	A	

Segment 1

LOS and Performance Measures

Coded Segment Type	Passing Constrained	
Analyzed Segment Type	Passing Constrained	
Actual Segment Length, L	1235	ft
Segment Length Used in Calculation	0.25	mi
Demand Flow Rate in Analysis Direction, vd	107	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Capacity, cap	1700	veh/h
Free-Flow Speed, FFS	41.8	mi/h
Speed, S	41.5	mi/h
Percent Followers, PF	27.7	%
Follower Density, FD	0.7	followers/mi/ln
Level of Service, LOS	A	

Step 1: Identify Facility Study Boundaries and Corresponding Segmentation

Segment Type	Passing Constrained	
Vertical Class	1	
Minimum Segment Length	0.25	mi
Maximum Segment Length	3.00	mi

Step 2: Determine Demand Flow Rates, Capacity, and d/c Ratio

Demand Volume in Analysis Direction, Vd	97	veh/h
Demand Volume in Opposing Direction, Vo	-	veh/h
Peak Hour Factor, PHF	0.91	
Demand Flow Rate in Analysis Direction, vd	107	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
d/c Ratio	0.06	

Step 3: Determine the Vertical Alignment Classification

Segment Length, L	1235	ft
Segment Percent Grade	0.00	%
Vertical Class	1	

Step 4: Determine the Free-Flow Speed

Posted Speed Limit, Sp	40	mi/h
Base Free-Flow Speed, BFFS	45.6	mi/h
Coeff. Value from Exhibit 15-12, a0	0.00000	
Coeff. Value from Exhibit 15-12, a1	0.00000	
Coeff. Value from Exhibit 15-12, a2	0.00000	

Coeff. Value from Exhibit 15-12, a3	0.00000	
Coeff. Value from Exhibit 15-12, a4	0.00000	
Coeff. Value from Exhibit 15-12, a5	0.00000	
Coeff. for Heavy Vehicle Adjustment, a	0.03330	
Percentage of Heavy Vehicles, %HV	8.00	%
Lane Width, LW	12	ft
Shoulder Width, SW	1	ft
Adjustment for Lane and Shoulder Width, fLS	3.5	mi/h
Access-Point Density, APD	0.0	access points/mi
Adjustment for Access-Point Density, fA	0.0	mi/h
Free-Flow Speed, FFS	41.8	mi/h

Step 5: Estimate the Average Speed

Vertical Class	1	
Free-Flow Speed, FFS	41.8	mi/h
Demand Flow Rate in Analysis Direction, vd	107	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Segment Length, L	0.25	mi
Percentage of Heavy Vehicles	8.00	%

Step 5a: Calculate the Slope Coefficient

Coeff. for Speed-Flow Slope Model, b0	0.05580	
Coeff. for Speed-Flow Slope Model, b1	0.05420	
Coeff. for Speed-Flow Slope Model, b2	0.32780	
Coeff. for b3 Segment Length Coeff. Model, c0	0.10290	
Coeff. for b3 Segment Length Coeff. Model, c1	0.00000	
Coeff. for b3 Segment Length Coeff. Model, c2	0.00000	
Coeff. for b3 Segment Length Coeff. Model, c3	0.00000	
Coeff. for Speed-Flow Slope Model, b3	0.10290	
Coeff. for b4 Heavy Vehicle Percentage Coeff. Model, d0	0.00000	
Coeff. for b4 Heavy Vehicle Percentage Coeff. Model, d1	0.00000	
Coeff. for b4 Heavy Vehicle Percentage Coeff. Model, d2	0.00000	
Coeff. for b4 Heavy Vehicle Percentage Coeff. Model, d3	0.00000	
Coeff. for Speed-Flow Slope Model, b4	0.00000	
Coeff. for Speed-Flow Slope Model, b5	0.00000	
Slope Coefficient, m	2.77610	

Step 5b: Calculate the Slope Coefficient

Coeff. for Speed-Flow Slope Model, f0	0.67576	
Coeff. for Speed-Flow Slope Model, f1	0.00000	
Coeff. for Speed-Flow Slope Model, f2	0.00000	
Coeff. for Speed-Flow Slope Model, f3	0.12060	
Coeff. for Speed-Flow Slope Model, f4	-0.35919	
Coeff. for Speed-Flow Slope Model, f5	0.00000	
Coeff. for Speed-Flow Slope Model, f6	0.00000	
Coeff. for Speed-Flow Slope Model, f7	0.00000	
Coeff. for Speed-Flow Slope Model, f8	0.00000	
Power Coefficient, p	0.41674	

Step 5c: Calculate Average Speed for the Segment

Average Speed, S	41.5	mi/h
Average Speed, with consideration of horizontal curves, S	41.5	mi/h

Step 6: Estimate the Percent Followers

Segment Type	Passing Constrained	
Vertical Class	1	
Free-Flow Speed, FFS	41.8	mi/h
Demand Flow Rate in Analysis Direction, vd	107	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Directional Capacity, cap	1700	veh/h
Segment Length, L	0.25	mi
Percentage of Heavy Vehicles	8.00	%

Step 6a: Calculate Percent Followers at Capacity

Coeff. Value for Equation 15-18 or 15-19, b0	37.68080	
Coeff. Value for Equation 15-18 or 15-19, b1	3.05089	

Coeff. Value for Equation 15-18 or 15-19, b2	-7.90866	
Coeff. Value for Equation 15-18 or 15-19, b3	-0.94321	
Coeff. Value for Equation 15-18 or 15-19, b4	13.64266	
Coeff. Value for Equation 15-18 or 15-19, b5	-0.00050	
Coeff. Value for Equation 15-18 or 15-19, b6	-0.05500	
Coeff. Value for Equation 15-18 or 15-19, b7	7.13758	
Percent Followers at Capacity Flow Rate, PFcap	88.6	%

Step 6b: Calculate Percent Followers at 25% of Capacity

Coeff. Value for Equation 15-20 or 15-21, c0	18.01780	
Coeff. Value for Equation 15-20 or 15-21, c1	10.00000	
Coeff. Value for Equation 15-20 or 15-21, c2	-21.60000	
Coeff. Value for Equation 15-20 or 15-21, c3	-0.97853	
Coeff. Value for Equation 15-20 or 15-21, c4	12.05214	
Coeff. Value for Equation 15-20 or 15-21, c5	-0.00750	
Coeff. Value for Equation 15-20 or 15-21, c6	-0.06700	
Coeff. Value for Equation 15-20 or 15-21, c7	11.60410	
Percent Followers of 25% of Capacity Flow Rate, PF25cap	56.7	%

Step 6c: Calculate the Slope Coefficient

Coeff. Value for Equation 15-22, d1	-0.29764	
Coeff. Value for Equation 15-22, d2	-0.71917	
Slope Coefficient, m	-1.50296	

Step 6d: Calculate the Power Coefficient

Coeff. Value for Equation 15-23, e0	0.81165	
Coeff. Value for Equation 15-23, e1	0.37920	
Coeff. Value for Equation 15-23, e2	-0.49524	
Coeff. Value for Equation 15-23, e3	-2.11289	
Coeff. Value for Equation 15-23, e4	2.41146	
Power Coefficient, p	0.68525	

Step 6e: Calculate Percent Followers for the Segment

Percent Followers, PF	27.7	%

Step 7: Estimate Additional Performance Measure for Passing Lane

Step 8: Estimate Follower Density

Percent Followers, PF	27.7	%
Demand Flow Rate in Analysis Direction, vd	107	veh/h
Average Speed, with consideration of horizontal curves, S	41.5	mi/h
Follower Density, FD	0.7	followers/mi/ln

Step 9: Determine Potential Adjustment to Follower Density

Effective Length of Upstream Passing Lane	1.00	mi
Distance Downstream from Start of Passing Lane Segment	0.23	mi
PF for Upstream Passing Lane Seg., PF	0.0	%
PF for Analysis Segment, PF	27.7	%
Length of Passing Lane Segment, PassLaneLength	0.00	mi
Flow Rate Entering for Analysis Segment	107	veh/h
% Improve to PF, %ImprovePF	0.0	%
% Improve to the Average Speed, %ImproveS	0.0	%
Adjusted Average Speed for Analysis Segment, S	41.5	mi/h
Adjusted Follower Density, FDadj	0.7	followers/mi/ln

Step 10: Determine LOS

Posted Speed Limit, Sp	40	mi/h
Follower Density, FD	0.7	followers/mi/ln
Level of Service, LOS	A	

HCS Two-Lane Highway Report

Project Information			
Analyst	Dylan Zerphey	Date	11/13/2025
Agency	TPD	Analysis Year	Projected (Build) 2035 Condition
Jurisdiction	Mount Joy Township	Time Analyzed	Weekday P.M. Peak Hour Westbound
Project Description	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)	Units	U.S. Customary

Segment 1

Vehicle Inputs			
Segment Type	Passing Constrained	Length, ft	1235
Lane Width, ft	12	Shoulder Width, ft	1
Speed Limit, mi/h	40	Access Point Density, pts/mi	0.0

Demand and Capacity			
Directional Demand Flow Rate, veh/h	86	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.91	Total Trucks, %	15.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

Intermediate Results			
Segment Vertical Class	1	Free-Flow Speed, mi/h	41.6
Speed Slope Coefficient (m)	2.76347	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.50227	PF Power Coefficient (p)	0.68531
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	0.5
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	1235	-	-	41.6

Vehicle Results			
Average Speed, mi/h	41.6	Percent Followers, %	24.3
Segment Travel Time, minutes	0.34	Adj. Follower Density, followers/mi/ln	0.5
Vehicle LOS	A		

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TWO-LANE HIGHWAY SEGMENT ANALYSIS

File Name:	Node 1 WB PM 2035.xuf
Analyst:	Dylan Zerphey
Agency:	TPD
Jurisdiction:	Mount Joy Township
Date:	11/13/2025
Analysis Year:	Projected (Build) 2035 Condition
Time Analyzed:	Weekday P.M. Peak Hour Westbound
Project Description:	Roadway Link Analysis (Mt Pleasant Road from Cloverleaf Road to proposed western driveway)
Units:	U.S. Customary

Facility LOS and Performance Measures

Facility Length	0.23	mi
Facility VMT	5	veh-mi/AP
Facility VHD	0.00	veh-h/p
Facility Average Follower Density, FD	0.5	followers/mi/ln
Facility Average Speed Limit	40	mi/h
Facility Level of Service, LOS	A	

Segment 1

LOS and Performance Measures

Coded Segment Type	Passing Constrained	
Analyzed Segment Type	Passing Constrained	
Actual Segment Length, L	1235	ft
Segment Length Used in Calculation	0.25	mi
Demand Flow Rate in Analysis Direction, vd	86	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
Capacity, cap	1700	veh/h
Free-Flow Speed, FFS	41.6	mi/h
Speed, S	41.6	mi/h
Percent Followers, PF	24.3	%
Follower Density, FD	0.5	followers/mi/ln
Level of Service, LOS	A	

Step 1: Identify Facility Study Boundaries and Corresponding Segmentation

Segment Type	Passing Constrained	
Vertical Class	1	
Minimum Segment Length	0.25	mi
Maximum Segment Length	3.00	mi

Step 2: Determine Demand Flow Rates, Capacity, and d/c Ratio

Demand Volume in Analysis Direction, Vd	78	veh/h
Demand Volume in Opposing Direction, Vo	-	veh/h
Peak Hour Factor, PHF	0.91	
Demand Flow Rate in Analysis Direction, vd	86	veh/h
Demand Flow Rate in Opposing Direction, vo	1500	veh/h
d/c Ratio	0.05	

Step 3: Determine the Vertical Alignment Classification

Segment Length, L	1235	ft
Segment Percent Grade	-1.00	%
Vertical Class	1	

Step 4: Determine the Free-Flow Speed

Posted Speed Limit, Sp	40	mi/h
Base Free-Flow Speed, BFFS	45.6	mi/h
Coeff. Value from Exhibit 15-12, a0	0.00000	
Coeff. Value from Exhibit 15-12, a1	0.00000	
Coeff. Value from Exhibit 15-12, a2	0.00000	

Coeff. Value from Exhibit 15-12, a3	0.00000	
Coeff. Value from Exhibit 15-12, a4	0.00000	
Coeff. Value from Exhibit 15-12, a5	0.00000	
Coeff. for Heavy Vehicle Adjustment, a	0.03330	
Percentage of Heavy Vehicles, %HV	15.00	%
Lane Width, LW	12	ft
Shoulder Width, SW	1	ft
Adjustment for Lane and Shoulder Width, fLS	3.5	mi/h
Access-Point Density, APD	0.0	access points/mi
Adjustment for Access-Point Density, fA	0.0	mi/h
Free-Flow Speed, FFS	41.6	mi/h

Step 5: Estimate the Average Speed

Note: If the demand flow rate is less than 100 veh/h, the average speed is equal to FFS and Step 5 can be skipped.

Demand Flow Rate in Analysis Direction, vd	86	veh/h
Free-Flow Speed, FFS	41.6	mi/h
Average Speed, S	41.6	mi/h

Step 6: Estimate the Percent Followers

Segment Type	Passing Constrained	
Vertical Class	1	
Free-Flow Speed, FFS	41.6	mi/h
Demand Flow Rate in Analysis Direction, vd	86	veh/h
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Level of Service, LOS	A	

This Two-Lane Highway text report was created in HCS™ Highways Version 2025 on 11/13/2025 10:00:53