



April 19, 2024
Revised August 9, 2024

Ref: 20578.01

Mr. Scott Leyton
Leyton Properties

561 Seventh Avenue-Suite 903
New York, NY 10018

Re: Updated Traffic Impact Evaluation, Townhouse Development, Hudson Way, Town of Marlborough, NY

Dear Mr. Leyton:

VHB Engineering, Surveying, Landscape Architecture and Geology, PC (VHB) has conducted an update to the traffic impact evaluation letter dated April 19, 2024, to assess the potential traffic impacts associated with the construction of the proposed residential development located on US Route 9W in the Town of Marlborough, New York. The proposed development includes construction of 103 townhomes with a club house and recreation area. The previously completed letter was updated based on comments received from the Town of Marlborough and the New York State Department of Transportation (NYSDOT) requesting the relocation of the primary site access from Dock Road to US Route 9W. The updated Overall Layout and Materials Plan, prepared by VHB, dated August 9, 2024, is included as Attachment A.

This letter includes an evaluation of the existing traffic operations and future conditions with and without construction of the Proposed Project. As detailed herein, the Proposed Project is expected to have minimal impact on local traffic operations.

Site Location and Proposed Development

The project site is located along US Route 9W and Dock Road in the Town of Marlborough, New York as seen in Figure 1. Access to the site is proposed via a full movement driveway intersecting with US Route 9W and an emergency only access on Dock Road. The project is anticipated to be fully constructed in 2026.

Existing Conditions

Based on the original proposal that included primary access to the site via Dock Road, the traffic study includes an evaluation of the US Route 9W at Dock Road intersection. The following section provides a description of the existing study area roadway and intersection characteristics.

US Route 9W

US Route 9W is classified as an urban principal arterial under the jurisdiction of the New York State Department of Transportation (NYSDOT). It generally provides north-south travel through the Town of Marlborough and Ulster County. Near the project site, US Route 9W provides one travel lane in both the northbound and southbound



directions. US Route 9W has approximately twelve-foot-wide travel lanes and paved shoulders that range between 3.5-feet wide and 14-feet wide. US Route 9W has a posted speed limit of 30-mph. Sidewalks are provided along the east side of US Route 9W south of Dock Road and along the west side north of Dock Road. Land use in the study area is a mix of residential and commercial. The latest data (2023) from NYSDOT Traffic Data Viewer (TDV) indicates that the annual average daily traffic (AADT) on US Route 9W is estimated to be 15,919 vehicles per day (vpd) near the site.

Dock Road

Dock Road is classified as an urban local roadway providing east-west travel from US Route 9W to the west and dead-ending to the east at the Hudson River and the West Shore Marine Services and Marlborough Yacht Club. Dock Road is under the jurisdiction of the Town of Marlborough. Along the project frontage, Dock Road provides one travel lane in both the eastbound and westbound directions and has an approximate downward grade of six percent from US Route 9W. Dock Road has a posted speed limit of 30-mph. There are no sidewalks on Dock Road. The NYSDOT TDV 2022 traffic volume data indicates that the AADT on Dock Road is 133 vpd.

US Route 9W at Dock Road

The US Route 9W at Dock Road intersection is an unsignalized three-way intersection with Dock Road operating under stop control. The US Route 9W northbound and southbound approaches provide a single lane for shared through and turn movements. The Dock Road westbound approach provides a single lane for shared left turn/right turn movements. Sidewalks are provided along the east side of US Route 9W south of Dock Road and along the west side of US Route 9W north of Dock Road. There are no marked crosswalks at the intersection.

Traffic Volumes

Automatic Traffic Recorder (ATR) data was collected on US Route 9W and on Dock Road for this project for the period from Tuesday, November 15, 2022, through Friday, December 2, 2022. The data is included as Attachment B.

Peak hour turning movement counts (TMCs) were conducted at the US Route 9W at Dock Road intersection on Thursday, October 27, 2022, during the weekday AM peak period from 7:00 to 9:00 a.m. and the weekday PM peak period from 4:00 to 6:00 p.m. Based on the collected data, the weekday AM peak hour occurred from 7:15 to 8:15 a.m. and the weekday PM peak hour occurred from 4:30 to 5:30 p.m. Based on the progress of other planned developments in the area (see below) and a conservative growth rate of 0.5 percent per year, the 2022 volumes were increased to estimate current 2024 volumes in the study area. The traffic volume count data are provided in Attachment C. The 2024 Existing AM and PM peak hour traffic volumes are illustrated on Figure 2.

Future Conditions

To determine the impacts of the site-generated traffic volumes near the site, future traffic conditions were evaluated. The project is expected to be fully built and occupied in 2026.

Traffic growth on area roadways is a function of the expected land development, environmental activity, and changes in demographics. A frequently used procedure is to identify estimated traffic generated by planned developments that would be expected to affect the project study area roadways. An alternative procedure is to



estimate an annual percentage increase and apply that increase to study area traffic volumes. For this evaluation, both procedures were used. The following summarizes this traffic forecasting process.

Historic Growth

A regression analysis of historical NYSDOT ATR data indicates that traffic volumes on US Route 9W, near the study area, are decreasing by a rate of approximately 0.9 percent. To provide a conservative evaluation of the potential growth in the study area, a growth rate of 0.5 percent for two years was used for this project.

Site Specific Growth

Based on information provided by the Town of Marlborough and the Town of Newburgh, trips associated with the following projects were added to the study area intersection as appropriate.

- › Bayside Mixed-Use Development – A 104 unit residential and 12,600 square-foot (sf) commercial space mixed use development on US Route 9W between Purdy Avenue and Birdsall Avenue in the Town of Marlborough. Currently, this project is approximately 75 percent complete and operational, and is expected to be fully built and occupied prior to completion of the proposed project. Of the site generated trips, 75 percent are included in the 2024 Existing traffic volumes and 25 percent are included in the 2026 No-Build traffic volumes.
- › Overlook Ponds – A 216 unit residential (including 23 senior units) and 25,000 sf supermarket mixed use development on US Route 9W between Morris Drive and Oak Street in the Town of Newburgh. This project is currently in the planning stage and is expected to be completed in 2025. The site generated trips are included in the 2026 No-Build traffic volumes.
- › Dollar General – A 9,300 sf Dollar General store proposed at the southeast quadrant of the US Route 9W at North Hill Lane, in the Town of Newburgh expected to be completed in 2023. All of the site generated trips are included in the 2024 Existing traffic volumes.

No-Build Traffic Volumes

The 2026 No-Build traffic volumes were generated with consideration of the general and site-specific growth described above. The resulting 2026 No-Build peak hour traffic volumes are provided on Figure 2 and represent future traffic volumes in the study area prior to development of the Proposed Project.

Site Generated Traffic Volumes

The site generated traffic for the weekday AM and PM peak hours was estimated using the Institute of Transportation Engineers' (ITE) publication *Trip Generation, 11th Edition*¹. The number of vehicle trips generated by the Proposed Project were estimated based on Land Use Code (LUC) 215 – Single Family Attached Housing. Vehicle trips were estimated for the weekday AM and PM peak hours to best represent the peak travel periods for the site and on the adjacent roadway network. The peak hour trip generation is summarized in Table 1.

¹ ITE Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, Washington D.C., September 2021



Table 1 Trip Generation Summary

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Townhouses (103 units) ^a	12	36	48	34	24	58

^a Trip generation estimate based on ITE LUC 215 – Single Family Attached Housing for 103 units.

The Proposed Project is expected to generate 48 new vehicle trips during the weekday AM peak hour (12 entering and 36 exiting) and 58 new vehicle trips during the weekday PM peak hour (34 entering and 24 exiting).

The magnitude of site generated trips results in less than the NYSDOT and ITE trip thresholds of the generation of 100 vehicle trips on a single intersection approach for determining the need for detailed off-site intersection analysis. These agency thresholds were developed as a tool to identify locations where the magnitude of traffic generated has the potential to impact operations at off-site intersections and screen out locations that do not meet the threshold and are therefore unlikely to require mitigation. Since the original site access was proposed via Dock Road, the US Route 9W at Dock Road intersection was evaluated for the Existing, No-Build, and Build conditions and the site access intersection with US Route 9W was evaluated for the Build conditions.

Trip Distribution

The directional distribution of traffic approaching and departing the site is a function of several variables including population densities, existing travel patterns, and the efficiency of the roadways leading to and from the site. The overall trip distribution patterns for the project were estimated to be 50 percent of the site generated traffic will travel to and from the north on US Route 9W and 50 percent will travel to and from the south on US Route 9W. The primary trip distributions and trip assignments for the project are illustrated on Figures 2 and 3, respectively.

Build Traffic Volumes

The project-related traffic volumes shown in Table 1 were assigned to the study area roadway network based on the trip distribution pattern. These assigned volumes were then added to the 2026 No-Build peak hour traffic volumes to develop the 2026 Build peak hour traffic volumes. The 2026 Build traffic volumes are summarized on Figure 3.

Traffic Operations Analysis

Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them. Roadway operating conditions are classified by calculated levels of service (LOS). The evaluation criteria used to analyze the study area intersections is based on the procedures set forth in the 6th edition of the *Highway Capacity Manual* (HCM)². LOS is a measure that considers several factors including roadway geometry, speed, and

² Highway Capacity Manual, 6th Edition, Transportation Research Board, Washington D.C., 2016



travel delay. Levels of service range from A to F, with LOS A representing short vehicle delays and LOS F representing longer vehicle delays. The LOS definitions are included in Attachment D.

Intersection Capacity Analysis

Levels of service analyses were conducted for the 2024 Existing, 2026 No-Build, and 2026 Build conditions for the US Route 9W at Dock Road intersection and the 2026 Build condition for the proposed site access on US Route 9W. Table 2 summarizes the capacity analysis results and the capacity analyses worksheets are included in Attachment E.

The analyses show that the US Route 9W southbound left turn movement at Dock Road operates at the same LOS during the Build condition as the Existing and No-Build conditions during both peak hours. The Dock Road westbound approach shows LOS C and LOS F during the weekday AM and PM peak hours, respectively for both the Existing and No-Build conditions. The project is expected to increase traffic volumes on US Route 9W at the intersection by 24 vehicles during the AM peak hour and 29 vehicles during the PM peak hour (approximately 1.5 percent), resulting in minor increases in delay on the Dock Road approach to US Route 9W between the No-Build and Build conditions and maintaining LOS C/F operations.

The analysis shows that at the US Route 9W at Site Access intersection, the southbound approach will experience LOS B, with 10 to 11 seconds of delay, and the westbound site access will experience a LOS F, with 50 to 70 seconds of delay, during both peak hours. Since the mainline operates at a good LOS and the higher delays are experienced on the private driveway, it is recommended that the intersection operate under stop sign control with single lane approaches on US Route 9W and single lanes entering and exiting the site.



Table 2 Intersection Levels of Service Summary

Location/Movement		2024 Existing		2026 No-Build		2026 Build	
		Delay ^a	LOS ^b	Delay	LOS	Delay	LOS
US Route 9W at Dock Road							
AM Peak Hour							
Dock Road WB LR		22.6	C	23.9	C	24.1	C
US Route 9W SB L		11.7	B	11.9	B	12.0	B
PM Peak Hour							
Dock Road WB LR		81.7	F	110.1	F	116.3	F
US Route 9W SB L		9.5	A	9.8	A	9.9	A
US Route 9W at Site Access							
AM Peak Hour							
Site Access WB LR		NA		NA		69.2	F
US Route 9W SB LT						10.9	B
PM Peak Hour							
Site Access WB LR		NA		NA		52.6	F
US Route 9W SB LT						10.0	B
a	Average total delay in seconds per vehicle						
b	Level of service						
NA	Not Applicable						

Sight Distance

Sight distance analysis, in conformance with guidelines of the American Association of State Highway and Transportation Officials (AASHTO) in *A Policy on the Geometric Design of Highways and Streets, 7th Edition*³ was performed at the proposed site access on US Route 9W. Both stopping sight distance (SSD) and intersection sight distance (ISD) at the proposed site access were measured. The posted speed limit on US Route 9W near the project site is 30-mph. The travel speed data collected by VHB in December 2022 on US Route 9W near the proposed site access showed that the 85th percentile operating speed was 37-mph in the northbound direction and 36-mph in the southbound direction; therefore, the measured distances were compared to a 40-mph operating speed.

SSD is the distance along the roadway for a vehicle approaching an intersection from either direction to perceive, react, and come to a complete stop before colliding with an object in the road, in this case a vehicle exiting a

³ A Policy on the Geometric Design of Highways and Streets, 7th, Edition, American Association of State Highway and Transportation Officials, 2018.



driveway or a vehicle waiting on the mainline to turn into the site. Table 3 summarizes the stopping sight distance evaluation.

Table 3 Stopping Sight Distance

Location	Traveling	Field Measurement (feet) ^a	AASHTO Guideline (feet)
US Route 9W at Site Access	NB ^b	450+	305
	SB ^c	450+	320

^a Based on field measurements taken by VHB.
^b Based on standards established in A Policy on the Geometric Design of Highways and Streets, AASHTO, 2018 for a 40-mph operating speed
^c Based on standards established in A Policy on the Geometric Design of Highways and Streets, AASHTO, 2018 for a 40-mph operating speed and a 4% downgrade

Table 3 shows that the stopping sight distances along US Route 9W meet the AASHTO recommended guidelines for the identified operating speeds.

ISD is based on the time required for perception, reaction, and completion of the desired turning maneuver into or out of the site driveway. Calculation of the ISD includes the time to (1) turn and clear the intersection without conflicting with approaching vehicles; and (2) upon turning, to accelerate to the operating speed on the roadway without causing approaching vehicles on the main road to unduly reduce their speed. Table 4 summarizes the intersection sight distance analysis.

Table 4 Intersection Sight Distance

Location	View	Field Measurement (feet) ^a	AASHTO Guideline (feet)		
			Left-turn Out	Right-turn Out	Left-turn In
US Route 9W at Site Access ^b	Looking Left	665	445	385	--
	Looking Right	560	445	--	--
	Looking Straight	665	--	--	325

^a Based on field measurements taken by VHB.
^b Based on standards established in A Policy on the Geometric Design of Highways and Streets, AASHTO, 2018 for a 40-mph operating speed on US Route 9W.
 -- Not applicable

A review of Table 4 shows that the intersection sight distances along US Route 9W meet the AASHTO recommended guidelines for all movements entering and exiting the site. To maintain good sight lines at the site access intersection, vegetation along the site access should be cleared and maintained a minimum of 14.5 feet back from the travel way. Site signage and landscaping should also be designed to maintain good sight lines.



Conclusions

VHB has conducted a traffic impact evaluation to assess the potential traffic impacts associated with the construction of the proposed residential development located on US Route 9W in the Town of Marlborough, New York. The proposed development includes construction of 103 townhomes with a club house and recreation area. Access to the site is proposed via a full movement driveway intersecting with US Route 9W and an emergency only access on Dock Road. The project is anticipated to be fully constructed and occupied in 2026.

- The Proposed Project is expected to generate 48 new vehicle trips during the weekday AM peak hour (12 entering and 36 exiting). During the PM peak hour, the Proposed Project is expected to generate 58 new vehicle trips (34 entering and 24 exiting). The magnitude of site generated trips results in less than the NYSDOT and ITE trip thresholds of the generation of 100 vehicle trips on a single intersection approach for determining the need for detailed off-site intersection analysis.
- The capacity analyses show that the US Route 9W southbound left turn movement at Dock Road operates at the same LOS during the Build condition as the Existing and No-Build conditions during both peak hours. The Dock Road westbound approach shows LOS C and LOS F during the weekday AM and PM peak hours, respectively for both the Existing, No-Build, and Build conditions with minor increases in delay associated with the Proposed Project.
- The capacity analyses for the Build condition shows that at the US Route 9W at Site Access intersection, the southbound approach will experience a LOS B, with 10 to 12 seconds of delay, and the westbound site access will experience a LOS F, with 50 to 70 seconds of delay, during both peak hours. This level of delay is typical for an unsignalized approach to a high-volume roadway. The intersection will operate adequately with single lanes entering and exiting the site and stop control.
- The stopping sight distances along US Route 9W in the northbound and southbound direction at the proposed site driveway meet the AASHTO recommended guidelines for a 40-mph operating speed.
- The intersection sight distances exiting the site driveway looking to the left, right, and straight along US Route 9W meet the AASHTO recommended guidelines for a 40-mph operating speed.

Please call with any questions regarding the above evaluation.

Sincerely,

VHB

A handwritten signature in black ink, appearing to read "Alanna Moran".

Alanna Moran, PE

Project Manager

A handwritten signature in black ink, appearing to read "Eamon McCandless".

Eamon McCandless

Project Engineer

Attachments



Not to Scale

Legend



Study Intersection



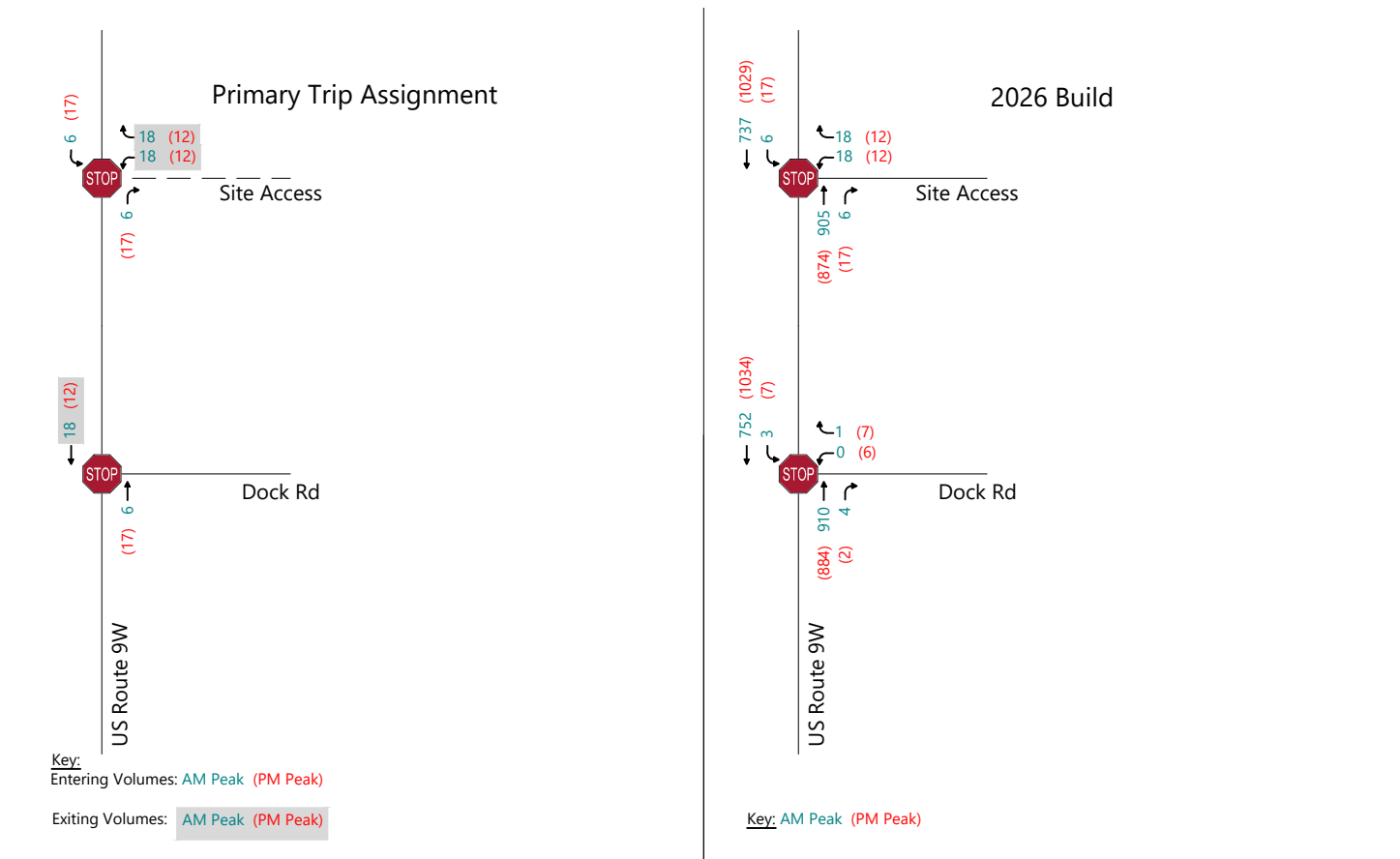
Project Location
Marlborough Residential
Dock Road at US Route 9W
Marlborough, New York

Figure 1



Traffic Volumes
Marlborough Residential
Dock Road at US Route 9W
Marlborough, NY

Figure 2



Not to Scale



Traffic Volumes (Cont'd)
Marlborough Residential
Dock Road at US Route 9W
Marlborough, NY

Figure 3

Attachments

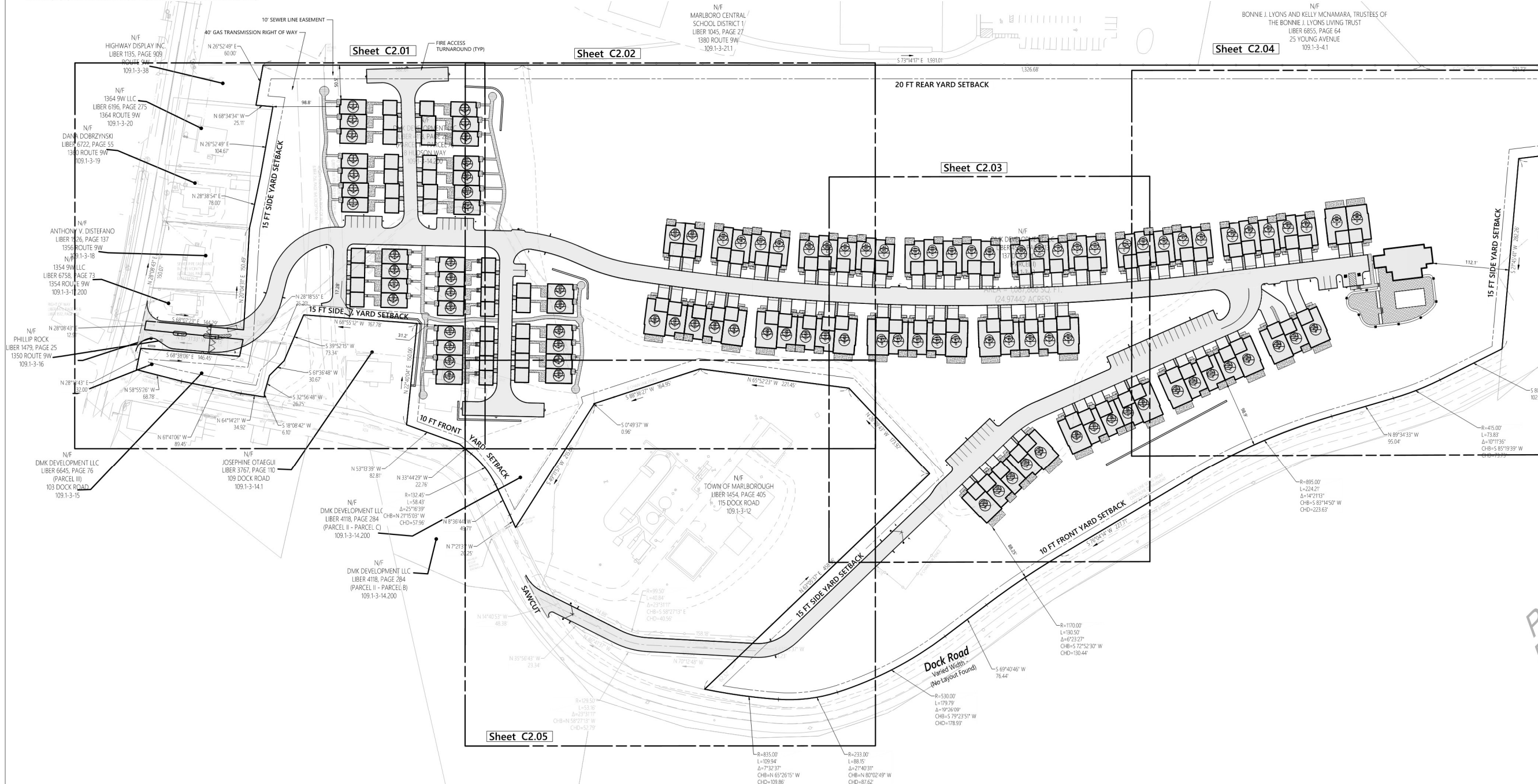
- A. Overall Layout and Materials Plan
- B. Automatic Traffic Recorder Volumes
- C. Traffic Volume Data
- D. Level of Service Definitions
- E. Capacity Analysis Worksheets

Attachment A – Overall Layout and Materials Plan



**Engineering, Surveying,
Landscape Architecture
and Geology, PC**
100 Motor Parkway
Suite 350
Hauppauge, NY 11788
631.787.3400

Progress Print
For Review Only
August 6, 2024



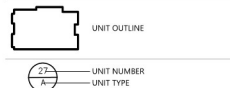
Zoning Summary Chart

Zoning District(S):	Residential (R)	
Proposed Use(S):	Townhomes	
Existing Use(S):	Vacant / Residences	
School District:	Marlboro Central School District	
Zoning Regulation Requirements	Required ¹	Provided
MINIMUM LOT AREA ²	7,500 SF	25.0 Acres
FRONT YARD SETBACK	10 Feet	98.90 Feet
SIDE YARD SETBACK (ONE/BOTH)	10/25 Feet	18.30 Feet
REAR YARD SETBACK	20 Feet	50.50 Feet
MINIMUM LOT WIDTH	75 Feet	1,839 Feet
MINIMUM LOT DEPTH	100 Feet	559 Feet
MAXIMUM BUILDING HEIGHT	2 1/2 Stories / 35 Feet	2 1/2 Stories / 35 Feet
MAXIMUM BUILDING COVERAGE	30.0 %	14.0 %

UNIT SUMMARY

Unit	Provided
A	32
B	18
C	53
TOTAL	103

Unit Symbol Legend



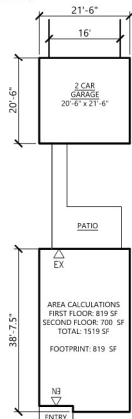
Parking Summary Chart

Description	Size		Spaces	
	Required	Provided	Required	Provided
STANDARD SPACES	162 SF (MIN.)	9x18 (162 SF)	154*	206**
VISITOR PARKING SPACES *	162 SF (MIN.)	9x18 (162 SF)	15	46
STANDARD ACCESSIBLE SPACES ***	8x19 (MIN.)	10x19	2	2
TOTAL SPACES			171**	254

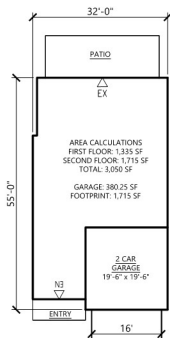
* BASED ON SECTION 155-27 (TABLE 1) OF THE TOWN CODE, RESIDENTIAL CLUSTER USES ARE REQUIRED TO PROVIDE 1.5 SPACES FOR EACH DWELLING UNIT (ROUNDED DOWN TO A WHOLE NUMBER); PLUS 10% OF ALL OFF-STREET PARKING FOR VISITOR PARKING

** EACH DWELLING UNIT HAS A DEDICATED ENCLOSED GARAGE PROVIDING TWO STANDARD PARKING SPACES

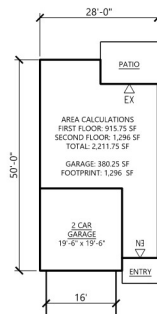
*** 2 ADA STALLS REQUIRED FOR 26-50 TOTAL PARKING STALLS PROVIDED (ONLY APPLIED TO SURFACE VISITOR PARKING)



Unit A



Unit B



Unit C

Density Calculations






PROPOSED DENSITY:
 $\frac{103 \text{ UNITS}}{25 \text{ ACRES}} = 4.12 \text{ UNITS / ACRE}$
 4.12 UNITS / ACRE < 6 UNITS / ACRE OK
 *SECTION 155-30 STATES MAXIMUM DENSITY
 SHALL BE SIX DWELLING UNITS PER ACRE

Notes

General

1. MAIL FOR ALL UNITS TO BE IN LOCATED IN THE CLUBHOUSE
2. PRIVATE TRASH PICKUP FOR EACH UNIT

Sign Summary

M.U.T.C.D. Number	Specification		Desc.
	Width	Height	
R1-1	30"	30"	
R2-1	18"	24"	
R5-1	30"	30"	
R7-1	12"	18"	
R7-8	12"	18"	



Leyton Properties

Residences

Dock Road
Marlborough, NY

[illegible]

Designed by	DB	Checked by	AL
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Site Plan Approval August 9, 2024

Not Approved for Construction

Overall Layout and Materials Plan

C2.00

sheet	oil
2	48

Project Number
20578.01

IT IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER, UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL

Attachment B – Automatic Traffic Recorder Volumes

Tri-State Traffic Data Inc.

Location:Marlboro
Road Name:9W
Segment:262' S/O Dock Rd
Date:11/15/2022

184 Baker Rd
Coatesville PA 19320
Serving Transportation Professionals since 1995

GPS: 41.60599109254927, -73.971155975082

Start Time	14-Nov-22		15-Nov-22		16-Nov-22		17-Nov-22		18-Nov-22		Weekday Average		19-Nov-22		20-Nov-22	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	77	76	82	78	78	71	79	75	103	108	*	*
01:00	*	*	*	*	36	25	26	30	41	34	34	30	66	84	*	*
02:00	*	*	*	*	28	16	26	17	32	26	29	20	42	49	*	*
03:00	*	*	*	*	27	33	23	34	49	38	33	35	47	39	*	*
04:00	*	*	*	*	39	60	49	56	46	64	45	60	51	57	*	*
05:00	*	*	*	*	115	125	127	145	113	139	118	136	55	84	*	*
06:00	*	*	*	*	328	336	383	379	331	358	347	358	137	122	*	*
07:00	*	*	*	*	625	645	689	653	663	621	659	640	208	242	*	*
08:00	*	*	*	*	836	575	801	570	790	583	809	576	363	320	*	*
09:00	*	*	*	*	663	545	695	596	639	585	666	575	435	440	*	*
10:00	*	*	*	*	429	454	507	508	533	484	490	482	556	564	*	*
11:00	*	*	*	*	428	467	513	508	560	501	500	492	582	621	*	*
12:00 PM	*	*	*	*	489	506	535	517	585	594	536	539	476	443	*	*
01:00	*	*	*	*	475	487	579	532	533	594	529	538	*	*	*	*
02:00	*	*	423	471	570	560	562	590	647	613	550	558	*	*	*	*
03:00	*	*	668	734	646	708	713	718	711	770	684	732	*	*	*	*
04:00	*	*	676	704	642	832	588	770	669	894	644	800	*	*	*	*
05:00	*	*	690	889	702	911	702	885	678	859	693	886	*	*	*	*
06:00	*	*	513	649	522	610	589	743	651	635	569	659	*	*	*	*
07:00	*	*	357	340	438	390	439	381	512	409	436	380	*	*	*	*
08:00	*	*	238	239	292	305	363	351	330	322	306	304	*	*	*	*
09:00	*	*	203	176	224	246	231	263	294	291	238	244	*	*	*	*
10:00	*	*	160	140	156	145	181	201	221	260	180	186	*	*	*	*
11:00	*	*	85	100	99	112	130	109	187	179	125	125	*	*	*	*
Total	0	0	4013	4442	8886	9169	9533	9634	9893	9924	9299	9430	3121	3173	0	0
Day	0		8455		18055		19167		19817		18729		6294		0	
AM Peak	-	-	-	-	08:00	07:00	08:00	07:00	08:00	07:00	08:00	07:00	11:00	11:00	-	-
Vol.	-	-	-	-	836	645	801	653	790	621	809	640	582	621	-	-
PM Peak	-	-	17:00	17:00	17:00	17:00	15:00	17:00	15:00	16:00	17:00	17:00	12:00	12:00	-	-
Vol.	-	-	690	889	702	911	713	885	711	894	693	886	476	443	-	-

Comb. Total	0	8455	18055	19167	19817	18729	6294	0
ADT	ADT 18,258	AADT 18,258						

Tri-State Traffic Data Inc.

Location: Marlboro, NY
Road Name: Dock St
Segment: 266' W/O US 9W
Date: 11/15/2022

184 Baker Rd
Coatesville PA 19320
Serving Transportation Professionals since 1995

GPS: 41.605970, -73.970113

Start Time	14-Nov-22		15-Nov-22		16-Nov-22		17-Nov-22		18-Nov-22		Weekday Average		19-Nov-22		20-Nov-22	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	0	0	0	0	0	0	0	0	0	0	*	*
01:00	*	*	*	*	0	0	0	0	0	0	0	0	0	0	*	*
02:00	*	*	*	*	0	0	0	0	0	0	0	0	0	0	*	*
03:00	*	*	*	*	0	0	0	0	0	0	0	0	0	0	*	*
04:00	*	*	*	*	0	0	0	0	0	0	0	0	0	0	*	*
05:00	*	*	*	*	0	0	0	0	1	0	0	0	2	0	*	*
06:00	*	*	*	*	0	0	1	0	1	0	1	0	1	0	*	*
07:00	*	*	*	*	2	0	2	1	2	0	2	0	1	1	*	*
08:00	*	*	*	*	0	0	5	3	3	1	3	1	3	1	*	*
09:00	*	*	*	*	4	2	1	1	3	2	3	2	2	1	*	*
10:00	*	*	*	*	2	4	4	4	2	7	3	5	2	1	*	*
11:00	*	*	*	*	2	1	7	5	11	6	7	4	5	1	*	*
12:00 PM	*	*	*	*	2	2	2	3	6	4	3	3	*	*	*	*
01:00	*	*	*	*	4	3	3	2	4	7	4	4	*	*	*	*
02:00	*	*	7	8	7	4	8	7	5	2	7	5	*	*	*	*
03:00	*	*	3	3	4	5	7	2	6	3	5	3	*	*	*	*
04:00	*	*	1	6	0	6	4	9	1	7	2	7	*	*	*	*
05:00	*	*	1	1	0	0	19	3	0	1	5	1	*	*	*	*
06:00	*	*	0	0	0	0	21	0	0	0	5	0	*	*	*	*
07:00	*	*	0	1	0	0	8	6	9	9	4	4	*	*	*	*
08:00	*	*	1	1	0	0	2	40	6	1	2	10	*	*	*	*
09:00	*	*	0	0	0	0	0	4	2	4	0	2	*	*	*	*
10:00	*	*	0	0	0	0	0	2	0	7	0	2	*	*	*	*
11:00	*	*	0	0	0	0	0	0	0	0	0	0	*	*	*	*
Total Day	0	0	13	20	27	27	94	92	62	61	56	53	16	5	0	0
AM Peak	-	-	-	-	09:00	10:00	11:00	11:00	11:00	10:00	11:00	10:00	11:00	07:00	-	-
Vol.	-	-	-	-	4	4	7	5	11	7	7	5	5	1	-	-
PM Peak	-	-	14:00	14:00	14:00	16:00	18:00	20:00	19:00	19:00	14:00	20:00	-	-	-	-
Vol.	-	-	7	8	7	6	21	40	9	9	7	10	-	-	-	-

Comb. Total	0	33	54	186	123	109	21	0
ADT	ADT 107	AADT 107						

Attachment C – Traffic Volume Data

Intersection: Elm St Pine St
 Location: Kennett Square, PA
 Site: 01
 Survey Date: Wednesday, 04-28-2021
 GPS: 42.948550, -72.790034



TSTData.com

Page 1 of 1

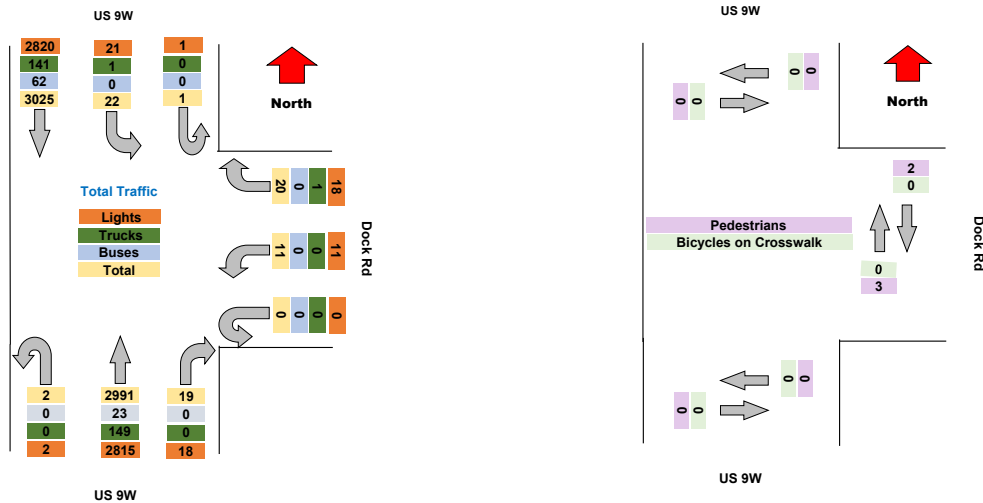
Project	VHB
Project Code	11148-1
Site Name	Intersection of US9W & Dock Rd
Legs and Movements	All Processed Legs & Movements
Bin Size	15 minutes
Survey Date	2022/10/27, Thursday
Location	Intersection of US9W & Dock Rd
Latitude and Longitude	41.606204, -73.970723

	Start	End	PHF
AM Peak	2022/10/27 07:15:00	2022/10/27 08:15:00	0.8086
PM Peak	2022/10/27 16:30:00	2022/10/27 17:30:00	0.9576

Turning Movement Data

Leg Direction	US 9W Southbound						Dock Rd Westbound						US 9W Northbound						Total
	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	U-Turn	App Total	Peds CW	Peds CCW	
Start Time																			
7:00:00 AM	145	0	0	145	0	0	0	0	0	0	0	0	0	132	0	132	0	0	277
7:15:00 AM	226	0	0	226	0	0	0	0	0	0	0	0	2	237	0	239	0	0	465
7:30:00 AM	138	0	0	138	0	0	1	0	0	1	0	0	0	209	0	209	0	0	348
7:45:00 AM	155	0	1	156	0	0	0	0	0	0	0	0	1	198	0	199	0	0	355
Hourly Total	664	0	1	665	0	0	1	0	0	1	0	0	3	776	0	779	0	0	1445
8:00:00 AM	140	3	0	143	0	0	0	0	0	0	0	0	1	192	0	193	0	0	336
8:15:00 AM	159	3	0	162	0	0	1	0	0	1	0	0	2	206	0	208	0	0	371
8:30:00 AM	134	1	0	135	0	0	2	0	0	2	0	0	2	191	0	193	0	0	330
8:45:00 AM	187	1	0	188	0	0	0	0	0	0	0	0	0	165	0	165	0	0	353
Hourly Total	620	8	0	628	0	0	3	0	0	3	0	0	5	754	0	759	0	0	1390
4:00:00 PM	207	1	0	208	0	0	5	2	0	7	0	1	2	174	0	176	0	0	391
4:15:00 PM	208	1	0	209	0	0	3	1	0	4	1	0	3	188	1	192	0	0	405
4:30:00 PM	221	2	0	223	0	0	0	1	0	1	0	1	0	189	0	189	0	0	413
4:45:00 PM	234	3	0	237	0	0	2	4	0	6	0	0	1	192	0	193	0	0	436
Hourly Total	870	7	0	877	0	0	10	8	0	18	1	2	6	743	1	750	0	0	1645
5:00:00 PM	216	2	0	218	0	0	2	0	0	2	0	0	0	186	0	186	0	0	406
5:15:00 PM	231	0	0	231	0	0	3	1	0	4	1	0	1	178	1	180	0	0	415
5:30:00 PM	217	3	0	220	0	0	1	1	0	2	0	1	1	187	0	188	0	0	410
5:45:00 PM	207	2	0	209	0	0	0	1	0	1	0	0	3	167	0	170	0	0	380
Hourly Total	871	7	0	878	0	0	6	3	0	9	1	1	5	718	1	724	0	0	1611
Grand Total	3025	22	1	3048	0	0	20	11	0	31	2	3	19	2991	2	3012	0	0	6091
% Approach	99.2%	0.7%	0.0%	0.0%	0.0%	0.0%	64.5%	35.5%	0.0%	0.0%	0.0%	0.0%	0.6%	99.3%	0.1%	0.0%	0.0%	0.0%	0.0%
% Total	49.7%	0.4%	0.0%	50.0%	0.0%	0.0%	0.3%	0.2%	0.0%	0.5%	0.0%	0.0%	0.3%	49.1%	0.0%	48.5%	0.0%	0.0%	0.0%
Lights	2820	21	1	2842	0	0	18	11	0	29	0	0	18	2815	2	2835	0	0	5706
% Lights	93.2%	95.5%	100.0%	93.2%	0.0%	0.0%	90.0%	100.0%	0.0%	93.5%	0.0%	0.0%	94.7%	94.1%	100.0%	94.1%	0.0%	0.0%	93.7%
Trucks	141	1	0	142	0	0	1	0	0	1	0	0	0	149	0	149	0	0	292
% Trucks	4.7%	4.5%	0.0%	4.7%	0.0%	0.0%	5.0%	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%	5.0%	0.0%	4.9%	0.0%	0.0%	4.8%
Buses	62	0	0	62	0	0	0	0	0	0	0	0	0	23	0	23	0	0	85
% Buses	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	1.4%
Pedestrians	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0
% Pedestrians	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

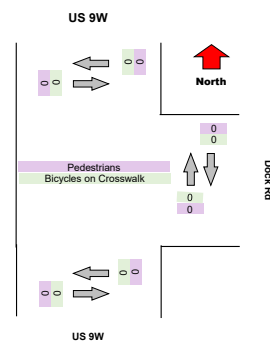
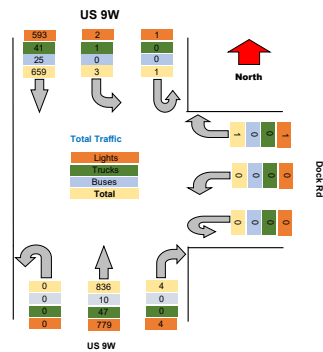
Turning Movement Data Plot



Turning Movement Peak Hour Data (AM)

7:15:00 AM

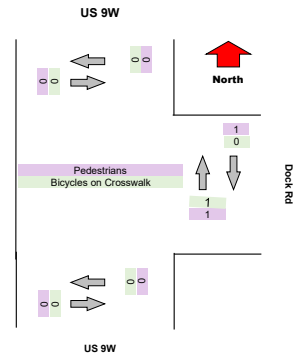
Leg	US 9W						Dock Rd						US 9W						Total
Direction	Southbound						Westbound						Northbound						
Start Time	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	U-Turn	App Total	Peds CW	Peds CCW	
7:15:00 AM	226	0	0	226	0	0	0	0	0	0	0	0	2	237	0	239	0	0	465
7:30:00 AM	138	0	0	138	0	0	1	0	0	1	0	0	0	209	0	209	0	0	348
7:45:00 AM	155	0	1	156	0	0	0	0	0	0	0	0	1	198	0	199	0	0	355
8:00:00 AM	140	3	0	143	0	0	0	0	0	0	0	0	1	192	0	193	0	0	336
Grand Total	659	3	1	663	0	0	1	0	0	1	0	0	4	836	0	840	0	0	1504
% Approach	99.4%	0.5%	0.2%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	99.5%	0.0%	0.0%	0.0%	0.0%	
% Total	43.8%	0.2%	0.1%	44.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.3%	55.6%	0.0%	55.9%	0.0%	0.0%	
PHF	0.729	0.250	0.250	0.733	0.000	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.500	0.882	0.000	0.879	0.000	0.000	0.809
Lights	593	2	1	596	0	0	1	0	0	1	0	0	4	779	0	783	0	0	1380
% Lights	90.0%	66.7%	100.0%	89.9%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	93.2%	0.0%	93.2%	0.0%	0.0%	91.8%
Trucks	41	1	0	42	0	0	0	0	0	0	0	0	0	47	0	47	0	0	89
% Trucks	6.2%	33.3%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	5.6%	0.0%	0.0%	5.9%
Buses	25	0	0	25	0	0	0	0	0	0	0	0	0	10	0	10	0	0	35
% Buses	3.8%	0.0%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	1.2%	0.0%	0.0%	2.3%
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%



Turning Movement Peak Hour Data (PM)

4:30:00 PM

Leg Direction	US 9W Southbound						Dock Rd Westbound						US 9W Northbound						Total
	Thru	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Left	U-Turn	App Total	Peds CW	Peds CCW	Right	Thru	U-Turn	App Total	Peds CW	Peds CCW	
Start Time																			
4:30:00 PM	221	2	0	223	0	0	0	1	0	1	0	1	0	189	0	189	0	0	413
4:45:00 PM	234	3	0	237	0	0	2	4	0	6	0	0	1	192	0	193	0	0	436
5:00:00 PM	216	2	0	218	0	0	2	0	0	2	0	0	0	186	0	186	0	0	406
5:15:00 PM	231	0	0	231	0	0	3	1	0	4	1	0	1	178	1	180	0	0	415
Grand Total	902	7	0	909	0	0	7	6	0	13	1	1	2	745	1	748	0	0	1670
% Approach	99.2%	0.8%	0.0%	0.0%	0.0%	0.0%	53.8%	46.2%	0.0%	0.0%	0.0%	0.0%	0.3%	99.6%	0.1%	0.0%	0.0%	0.0%	
% Total	54.0%	0.4%	0.0%	54.4%	0.0%	0.0%	0.4%	0.4%	0.0%	0.8%	0.0%	0.0%	0.1%	44.6%	0.1%	44.8%	0.0%	0.0%	
PHF	0.964	0.583	0.000	0.959	0.000	0.000	0.583	0.375	0.000	0.542	0.000	0.000	0.500	0.970	0.250	0.969	0.000	0.000	0.958
Lights	865	7	0	872	0	0	7	6	0	13	0	0	1	717	1	719	0	0	1604
% Lights	95.9%	100.0%	0.0%	95.9%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%	0.0%	0.0%	50.0%	96.2%	100.0%	96.1%	0.0%	0.0%	96.0%
Trucks	29	0	0	29	0	0	0	0	0	0	0	0	0	25	0	25	0	0	54
% Trucks	3.2%	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%	3.3%	0.0%	0.0%	3.2%
Buses	7	0	0	7	0	0	0	0	0	0	0	0	0	1	0	1	0	0	8
% Buses	0.8%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%
Pedestrians	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
% Pedestrians	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%



Attachment D – Level of Service Definitions

Level of Service Definitions

Signal Controlled Intersections

The evaluation criteria used to analyze signalized intersections is based on the procedures set forth in the latest version of the *Highway Capacity Manual* (HCM)¹.

The level of service (LOS) of a signalized intersection can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay and volume-to-capacity ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group.

The levels of service range between level of service A (relatively congestion-free) and level of service F (congested).

Level of service A – This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

Level of service B – This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

Level of service C – This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

Level of service D – This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective, or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

Level of service E – This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

¹ Highway Capacity Manual, 6th Edition, Transportation Research Board, Washington D.C., 2016.

Level of Service F - This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

The following lists the LOS thresholds established for motorized vehicle mode at a signalized intersection.

CONTROL DELAY (s/veh)	LOS by Volume-to-Capacity Ratio ^a	
	≤1.0	≥1.0
≤10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

^aFor approach-based and intersection wide assessments, LOS is defined solely by control delay.

Two Way Stop Controlled Intersections

The evaluation criteria used to analyze Two-Way Stop Controlled (TWSC) intersections is based on the procedures set forth in the latest version of the *Highway Capacity Manual* (HCM)¹.

Level of service (LOS) for a TWSC intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor street movement (or shared movement), as well as the major -street left turns, by using the criteria given in the Table below. LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (c) the resulting low delay can mask LOS deficiencies for minor movements. LOS F is assigned to a movement if its volume-to-capacity ratio exceeds 1.0, regardless of the control delay.

The LOS criteria for TWSC intersections differ somewhat from the criteria for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals.

The levels of service range between level of service A (relatively congestion-free) and level of service F (very congested).

The following thresholds are used to determine TWSC levels of service:

CONTROL DELAY (s/veh)	LOS by Volume-to-Capacity Ratio ^a	
	v/c ≤ 1.0	v/c ≥ 1.0
≤ 10	A	F
> 10-15	B	F
> 15-25	C	F
> 25-35	D	F
> 35-50	E	F
> 50	F	F

^a The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

All Way Stop Controlled Intersections

The evaluation criteria used to analyze All-Way Stop Controlled (AWSC) intersections is based on the procedures set forth in the latest version of the *Highway Capacity Manual* (HCM)¹.

The level of service of an AWSC intersection are the criteria by which the quality of traffic service is measured. The levels of service range between level of service A (relatively congestion-free) and level of service F (very congested).

AWSC intersections are a type of unsignalized intersection that require drivers on all approaches to stop at the intersection before proceeding. Because each driver must stop, the decision to proceed into the intersection is a function of traffic conditions on the other approaches. If no traffic is present on the other approaches, a driver can proceed immediately after stopping. If there is traffic on one or more of the other approaches, a driver proceeds only after determining that no vehicles are currently in the intersection and that it is the driver's turn to proceed. The AWSC methodology analyzes each intersection approach separately.

The key variable in determining the capacity of an AWSC intersection is the distribution of traffic volumes among the approaches. Under ideal conditions traffic would be

evenly distributed among the approaches. The flow rate for any given approach increases as the traffic decreases on the other approaches, allowing a smaller headway between vehicles departing from the stop line.

The following thresholds are used to determine AWSC levels of service:

CONTROL DELAY (s/veh)	LOS by Volume-to-Capacity Ratio ^a	
	v/c≤1.0	v/c≥1.0
≤10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F




^a For approaches and intersection wide assessment, LOS is defined solely by control delay.

Attachment E – Capacity Analysis Worksheets

1: US Rte 9W/US Route 9W & Dock Rd
HCM 6th TWSC

2024 Existing
AM Peak Hour

Intersection

Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	868	4	3	700
Future Vol, veh/h	0	1	868	4	3	700
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	9	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	0	7	0	33	10
Mvmt Flow	0	1	1072	5	4	864

Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1947	1075	0	0	1077	0
Stage 1	1075	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Critical Hdwy	8.2	7.1	-	-	4.43	-
Critical Hdwy Stg 1	7.2	-	-	-	-	-
Critical Hdwy Stg 2	7.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.497	-
Pot Cap-1 Maneuver	27	206	-	-	544	-
Stage 1	193	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	27	206	-	-	544	-
Mov Cap-2 Maneuver	27	-	-	-	-	-
Stage 1	193	-	-	-	-	-
Stage 2	263	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	206	544
HCM Lane V/C Ratio	-	-	0.006	0.007
HCM Control Delay (s)	-	-	22.6	11.7
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0	0

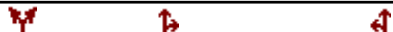
1: US Rte 9W/US Route 9W & Dock Rd
HCM 6th TWSC

2024 Existing
PM Peak Hour

Intersection

Int Delay, s/veh 0.6

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations 

Traffic Vol, veh/h 6 7 809 2 7 959

Future Vol, veh/h 6 7 809 2 7 959

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - 0 - - 0

Grade, % 9 - 0 - - 0

Peak Hour Factor 96 96 96 96 96 96

Heavy Vehicles, % 0 0 4 50 0 4

Mvmt Flow 6 7 843 2 7 999

Major/Minor Minor1 Major1 Major2

Conflicting Flow All 1857 844 0 0 845 0

Stage 1 844 - - - - -

Stage 2 1013 - - - - -

Critical Hdwy 8.2 7.1 - - 4.1 -

Critical Hdwy Stg 1 7.2 - - - - -

Critical Hdwy Stg 2 7.2 - - - - -

Follow-up Hdwy 3.5 3.3 - - 2.2 -

Pot Cap-1 Maneuver 32 297 - - 800 -

Stage 1 279 - - - - -

Stage 2 213 - - - - -

Platoon blocked, % - - - - -

Mov Cap-1 Maneuver 31 297 - - 800 -

Mov Cap-2 Maneuver 31 - - - - -

Stage 1 279 - - - - -

Stage 2 209 - - - - -

Approach WB NB SB

HCM Control Delay, s 81.7 0 0.1

HCM LOS F

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

Capacity (veh/h) - - 60 800 -

HCM Lane V/C Ratio - - 0.226 0.009 -

HCM Control Delay (s) - - 81.7 9.5 0

HCM Lane LOS - - F A A




HCM 95th %tile Q(veh) - - 0.8 0 -

1: US Rte 9W/US Route 9W & Dock Rd
HCM 6th TWSC

2026 No-Build
AM Peak Hour

Intersection

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	904	4	3	734
Future Vol, veh/h	0	1	904	4	3	734
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	9	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	0	7	0	33	10
Mvmt Flow	0	1	1116	5	4	906

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	2033	1119	0
Stage 1	1119	-	-
Stage 2	914	-	-
Critical Hdwy	8.2	7.1	-
Critical Hdwy Stg 1	7.2	-	-
Critical Hdwy Stg 2	7.2	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	23	192	-
Stage 1	180	-	-
Stage 2	250	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	23	192	-
Mov Cap-2 Maneuver	23	-	-
Stage 1	180	-	-
Stage 2	246	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	192	522
HCM Lane V/C Ratio	-	-	0.006	0.007
HCM Control Delay (s)	-	-	23.9	11.9
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0	0

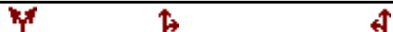
1: US Rte 9W/US Route 9W & Dock Rd
HCM 6th TWSC

2026 No-Build
PM Peak Hour

Intersection

Int Delay, s/veh 0.8

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations 

Traffic Vol, veh/h 6 7 867 2 7 1022

Future Vol, veh/h 6 7 867 2 7 1022

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - 0 - - 0

Grade, % 9 - 0 - - 0

Peak Hour Factor 96 96 96 96 96 96

Heavy Vehicles, % 0 0 4 50 0 4

Mvmt Flow 6 7 903 2 7 1065

Major/Minor Minor1 Major1 Major2

Conflicting Flow All 1983 904 0 0 905 0

Stage 1 904 - - - - -

Stage 2 1079 - - - - -

Critical Hdwy 8.2 7.1 - - 4.1 -

Critical Hdwy Stg 1 7.2 - - - - -

Critical Hdwy Stg 2 7.2 - - - - -

Follow-up Hdwy 3.5 3.3 - - 2.2 -

Pot Cap-1 Maneuver 25 270 - - 760 -

Stage 1 254 - - - - -

Stage 2 192 - - - - -

Platoon blocked, % - - - - -

Mov Cap-1 Maneuver 24 270 - - 760 -

Mov Cap-2 Maneuver 24 - - - - -

Stage 1 254 - - - - -

Stage 2 188 - - - - -

Approach WB NB SB

HCM Control Delay, s 110.1 0 0.1

HCM LOS F

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

Capacity (veh/h) - - 47 760 -

HCM Lane V/C Ratio - - 0.288 0.01 -

HCM Control Delay (s) - - 110.1 9.8 0

HCM Lane LOS - - F A A




HCM 95th %tile Q(veh) - - 1 0 -

1: US Rte 9W/US Route 9W & Dock Rd
HCM 6th TWSC

2026 Build
AM Peak Hour

Intersection

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	910	4	3	752
Future Vol, veh/h	0	1	910	4	3	752
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	9	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	0	7	0	33	10
Mvmt Flow	0	1	1123	5	4	928

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	2062	1126	0
Stage 1	1126	-	-
Stage 2	936	-	-
Critical Hdwy	8.2	7.1	-
Critical Hdwy Stg 1	7.2	-	-
Critical Hdwy Stg 2	7.2	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	22	190	-
Stage 1	178	-	-
Stage 2	241	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	22	190	-
Mov Cap-2 Maneuver	22	-	-
Stage 1	178	-	-
Stage 2	237	-	-




Approach	WB	NB	SB
HCM Control Delay, s	24.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	190	519
HCM Lane V/C Ratio	-	-	0.006	0.007
HCM Control Delay (s)	-	-	24.1	12
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0	0

2: US Route 9W & Site Access HCM 6th TWSC

2026 Build
AM Peak Hour

Intersection

Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	18	905	6	6	737
Future Vol, veh/h	18	18	905	6	6	737
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	7	2	2	10
Mvmt Flow	22	22	1117	7	7	910

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	2045	1121	0
Stage 1	1121	-	-
Stage 2	924	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	62	251	-
Stage 1	311	-	-
Stage 2	387	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	61	251	-
Mov Cap-2 Maneuver	61	-	-
Stage 1	311	-	-
Stage 2	378	-	-

Approach	WB	NB	SB
HCM Control Delay, s	69.2	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	98	621
HCM Lane V/C Ratio	-	-	0.454	0.012
HCM Control Delay (s)	-	-	69.2	10.9
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	1.9	0




1: US Rte 9W/US Route 9W & Dock Rd
HCM 6th TWSC

2026 Build
PM Peak Hour

Intersection

Int Delay, s/veh 0.8

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations						
Traffic Vol, veh/h	6	7	884	2	7	1034
Future Vol, veh/h	6	7	884	2	7	1034
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	9	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	4	50	0	4
Mvmt Flow	6	7	921	2	7	1077

Major/Minor Minor1 Major1 Major2

Conflicting Flow All	2013	922	0	0	923	0
Stage 1	922	-	-	-	-	-
Stage 2	1091	-	-	-	-	-
Critical Hdwy	8.2	7.1	-	-	4.1	-
Critical Hdwy Stg 1	7.2	-	-	-	-	-
Critical Hdwy Stg 2	7.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	24	262	-	-	748	-
Stage 1	246	-	-	-	-	-
Stage 2	188	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	23	262	-	-	748	-
Mov Cap-2 Maneuver	23	-	-	-	-	-
Stage 1	246	-	-	-	-	-
Stage 2	184	-	-	-	-	-

Approach WB NB SB

HCM Control Delay, s	116.3	0	0.1
HCM LOS	F		




Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	45	748	-
HCM Lane V/C Ratio	-	-	0.301	0.01	-
HCM Control Delay (s)	-	-	116.3	9.9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	1	0	-

2: US Route 9W & Site Access
HCM 6th TWSC

2026 Build
PM Peak Hour

Intersection

Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	12	874	17	17	1029
Future Vol, veh/h	12	12	874	17	17	1029
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	3	2	2	4
Mvmt Flow	13	13	910	18	18	1072

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2027	919	0	0	928
Stage 1	919	-	-	-	-
Stage 2	1108	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	63	329	-	-	737
Stage 1	389	-	-	-	-
Stage 2	316	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	59	329	-	-	737
Mov Cap-2 Maneuver	59	-	-	-	-
Stage 1	389	-	-	-	-
Stage 2	297	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	52.6	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	100	737
HCM Lane V/C Ratio	-	-	0.25	0.024
HCM Control Delay (s)	-	-	52.6	10
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	0.9	0.1