



HAMILTON ROAD STORAGE  
TRAFFIC IMPACT ANALYSIS

*Lewis County, WA*



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# HAMILTON ROAD STORAGE TRAFFIC IMPACT ANALYSIS

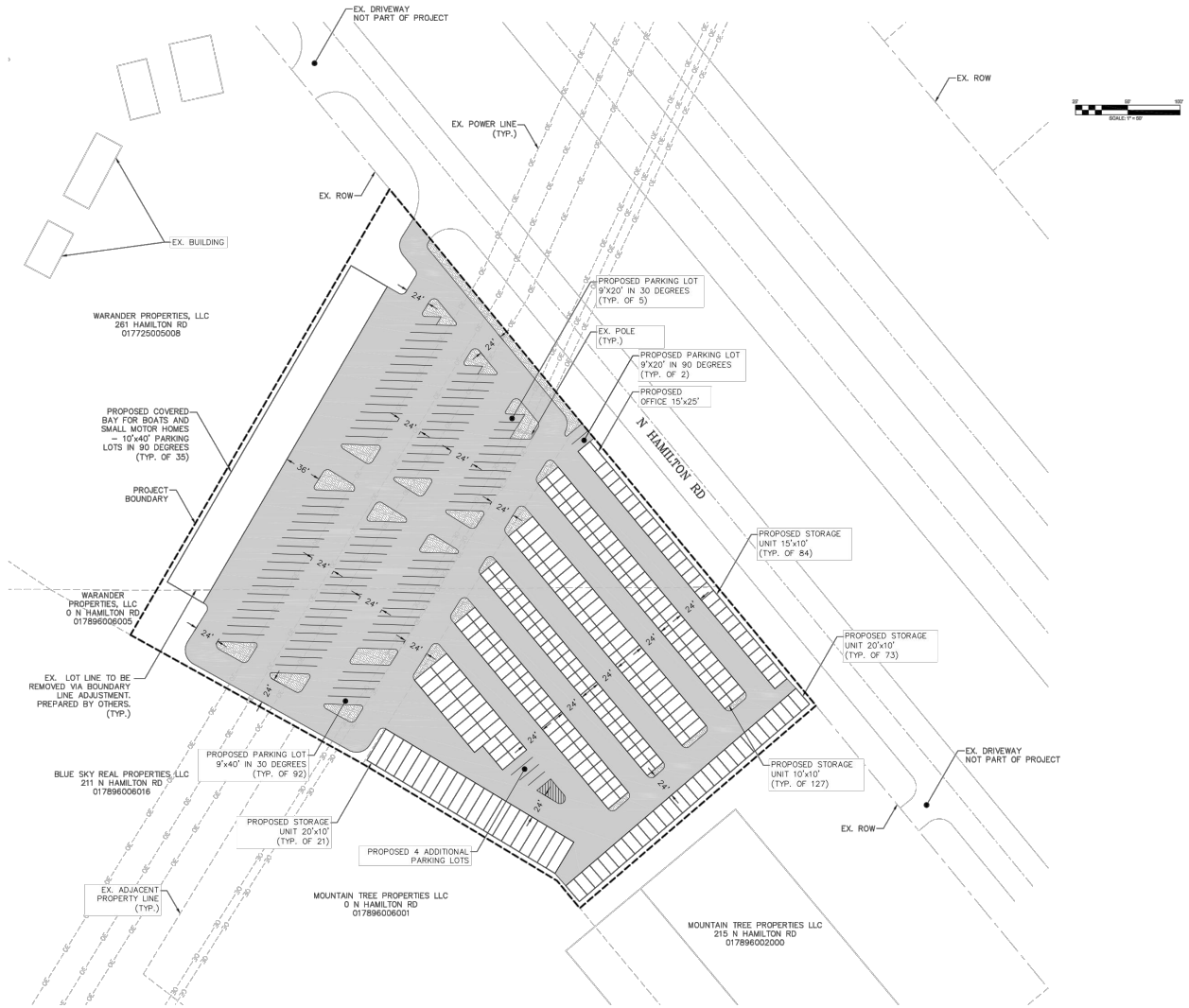
## 1. INTRODUCTION

The main goals of this study focus on the analysis of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent street system, baseline vehicular volumes, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined.

## 2. PROJECT DESCRIPTION

Hamilton Road Storage is a proposed self-storage and RV storage facility located in the Chehalis Urban Growth Area of Lewis County. Hamilton Road Storage is proposing 44,475 square feet of self-storage and 135 RV/Boat Stalls, 35 of which are covered and located on the northwest portion of the subject site. The subject site is bordered to the northeast by N Hamilton Road and is on a cumulative, undeveloped land totaling 5.0-acres within tax parcel #'s: 017765004002, 017896006003, 017765005000, 017896005000. Site access is proposed via one new driveway extending southwest from N Hamilton Road. Figure 1 below depicts the subject site's vicinity and surrounding roadway network. Figure 2 on the following page illustrates the conceptual site plan.





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**HAMILTON ROAD STORAGE**

SITE PLAN  
FIGURE 2

### 3. EXISTING CONDITIONS

#### 3.1 Existing Street System

The main roadway serving the proposed project is N Hamilton Road. N Hamilton Road is a two-lane minor arterial located northeast of the subject site. The roadway provides access to I-5 via Labree Road to the north and Rush Road to the south. Travel lanes are approximately 10-11 feet in width and shoulders are paved varying in width. No pedestrian infrastructure is available. The posted speed limit in the subject site vicinity is 50-mph and reduces to 35-mph further southeast.

#### 3.2 Public Transit

A review of the Twin Transit regional bus schedule indicates that transit service is not provided in the project's vicinity.

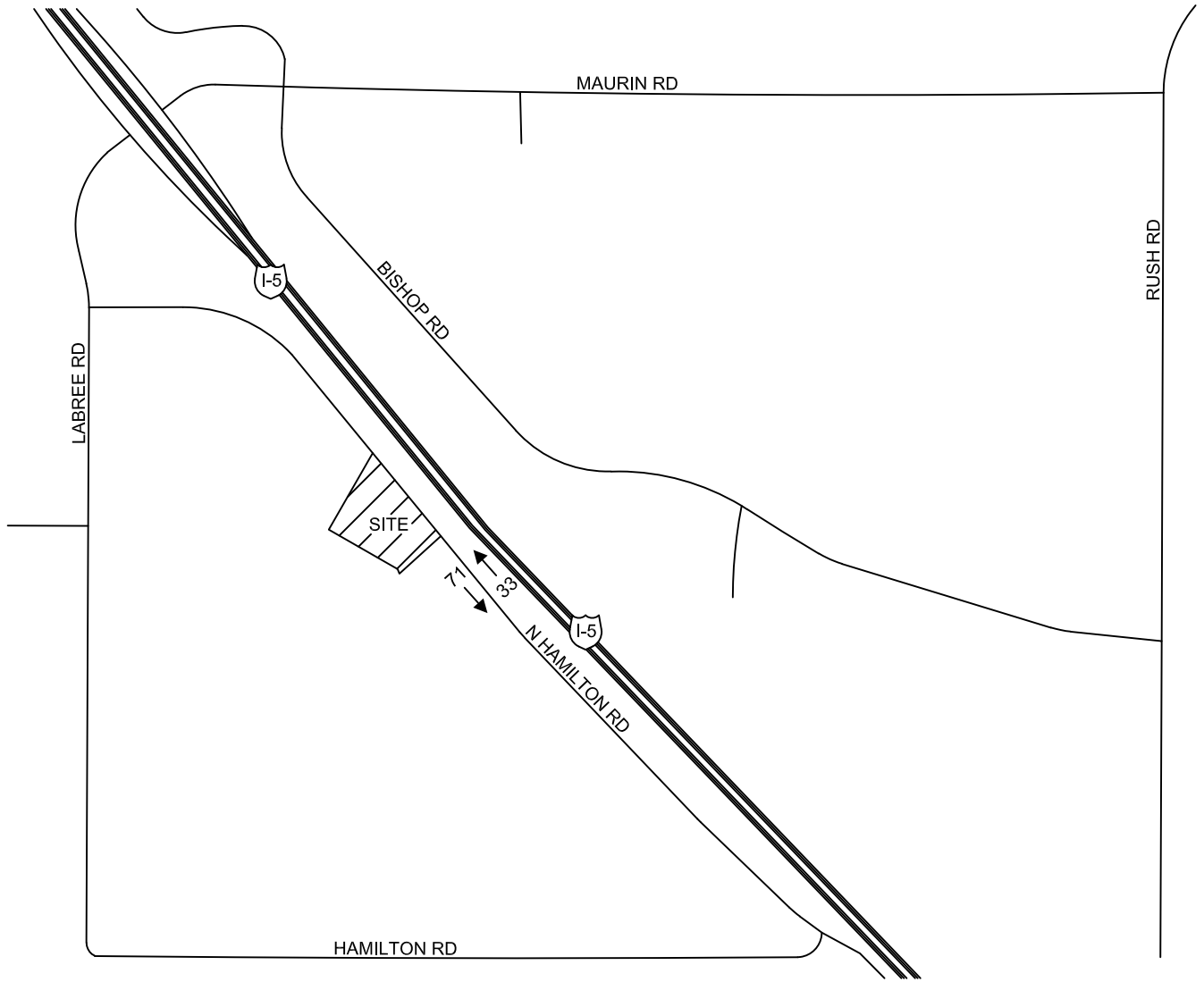
#### 3.3 Existing Peak Hour Volumes and Patterns

Field data for this study was collected in September of 2021. Traffic counts were recorded along N Hamilton Road at the approximate location of the proposed driveway serving the subject property. Data were obtained during the evening peak period between the hours of 4:00-6:00 PM, which generally translates to highest overall roadway volumes in a given 24-hour period. The one hour reflecting highest overall roadway volumes (peak hour) was then derived from these counts.

The observed peak hour was shown to occur from 4:15-5:15 PM with a total of 104 vehicles (71 southwest/33 northwest). Figure 3 illustrates existing PM peak hour through-volumes along the project frontage. Full count sheets have been attached in the appendix.

#### 3.4 Pedestrian and Bicycle Activity

During field observations, no non-motorist transport was observed along the project frontage on N Hamilton Road. The roadway and surrounding development are rural in nature and little to no additional non-motorist traffic would be expected as a result of the subject development.



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**HAMILTON ROAD STORAGE**  
EXISTING PM PEAK HOUR VOLUMES  
FIGURE 3

### 3.5 Roadway Improvements

A review of the City of Chehalis Six-Year (2022-2027) Transportation Improvement Program indicates the following planned projects in the general area.

*Countywide Culvert Replacement: (map ID:2):* This project entails replacing multiple culvert locations in Lewis County, specifically on Labree Road located 0.5 miles northwest of the subject site. The first phase of the project has a start year of 2021 and the project cost is approximately \$119,622.

### 3.6 Sight Distance

One new driveway extending southwest from N Hamilton Road is proposed to serve the project site. See site plan in Figure 2 for driveway location on the northern corner. The posted speed limit on N Hamilton Road in the project vicinity is 50-mph. In accordance with established AASHTO standards, a minimum entering sight distance of 555 feet is required. Based on preliminary measurements at the access location, no sight deficiencies are identified. Sight lines are clear in excess of 600 feet looking either direction. The access roadway (Hamilton Road) is relatively flat in grade and has no horizontal curvature that would impair the required visibility.

## 4. FUTURE TRAFFIC CONDITIONS

### 4.1 Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour (AM or PM) or an entire day. Data presented in this report was derived from the Institute of Transportation Engineer's publication *Trip Generation*, 10th Edition. The designated land use for this project is defined as Mini-Warehouse (LUC 151). Table 1 on the following page summarizes the estimated project trip generation using ITE average rates to determine trips ends with square footage (self-storage component) and storage units (RV/Boat stalls) as the input variables. Each proposed RV/Boat parking stall (covered & uncovered) were considered a "storage unit" while total square footage was applied to the self-storage aggregate buildings. Included are the average weekday daily traffic (AWDT) and the AM and PM peak hours. Refer to the appendix for trip generation output.

**Table 1: Project Trip Generation**

Land Use	Size	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Self-Storage	44,475 sq. ft.	<b>67</b>	2	2	<b>4</b>	4	4	<b>8</b>
RV/Boat Storage	135 Stalls	<b>24</b>	1	1	<b>2</b>	1	2	<b>3</b>
New Trips		<b>91</b>	3	3	<b>6</b>	5	6	<b>11</b>

Based on ITE data, the project is anticipated to generate 91 new daily weekday trips with 6 trips (3 inbound / 3 outbound) occurring in the AM peak hour and 11 trips (5 inbound / 6 outbound) in the PM peak hour.

#### 4.2 Trip Distribution and Assignment

Trip distribution describes the process by which project generated trips are dispersed on the street network surrounding the site. PM peak hour trips generated by the project are expected to follow the general trip pattern as shown on Figure 4. Percentages are primarily based on existing travel patterns as observed from the field counts.

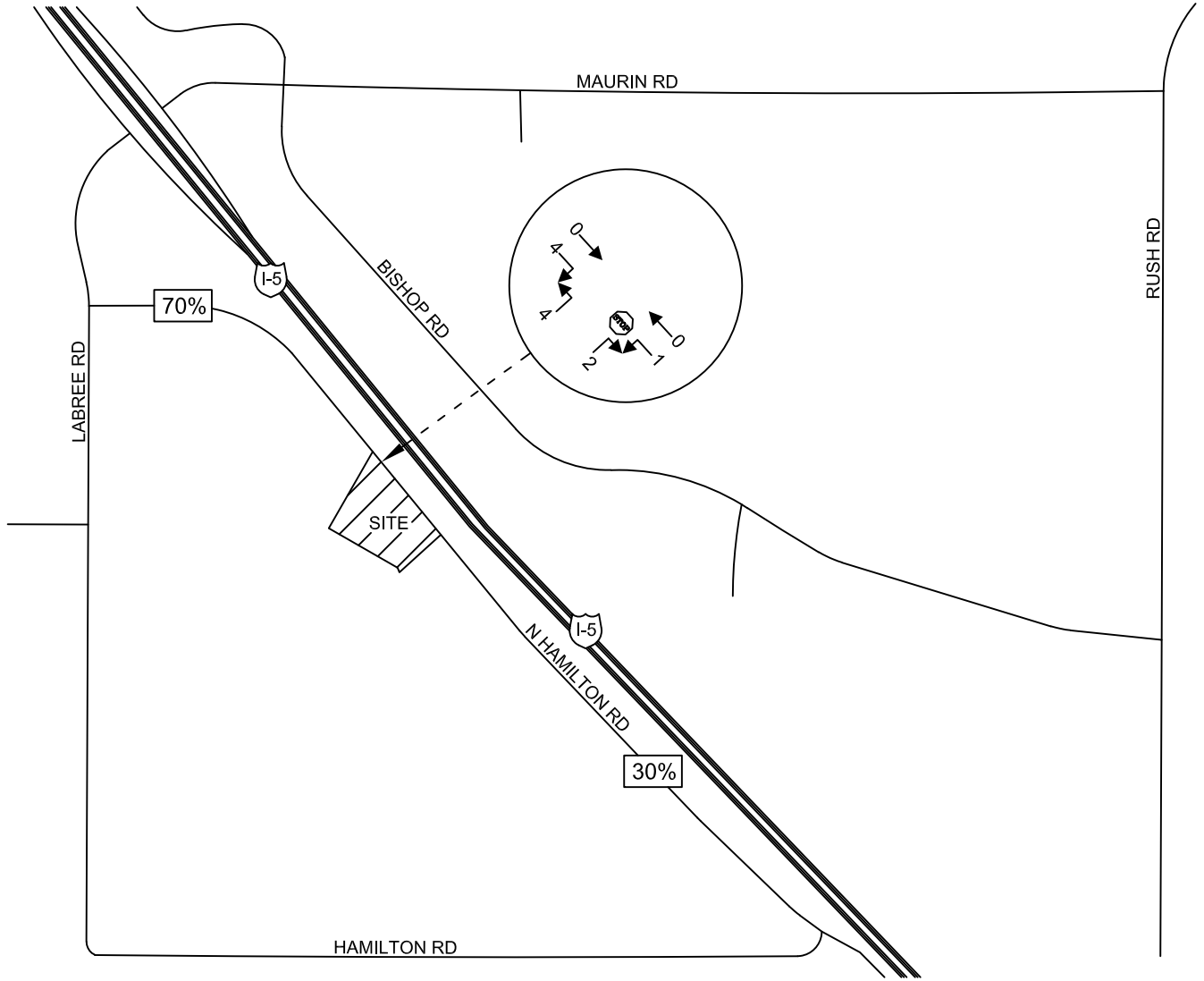
#### 4.3 Future Peak Hour Volumes

A 5-year horizon of 2026 was used for future traffic delay analysis. The proposed development is located within the Chehalis UGA of Lewis County. A compound annual growth rate of 3.0% was utilized to present a conservative analysis. Forecast 2026 PM peak hour volumes without and with the addition of project-generated traffic are shown in Figures 5 and 6, respectively.



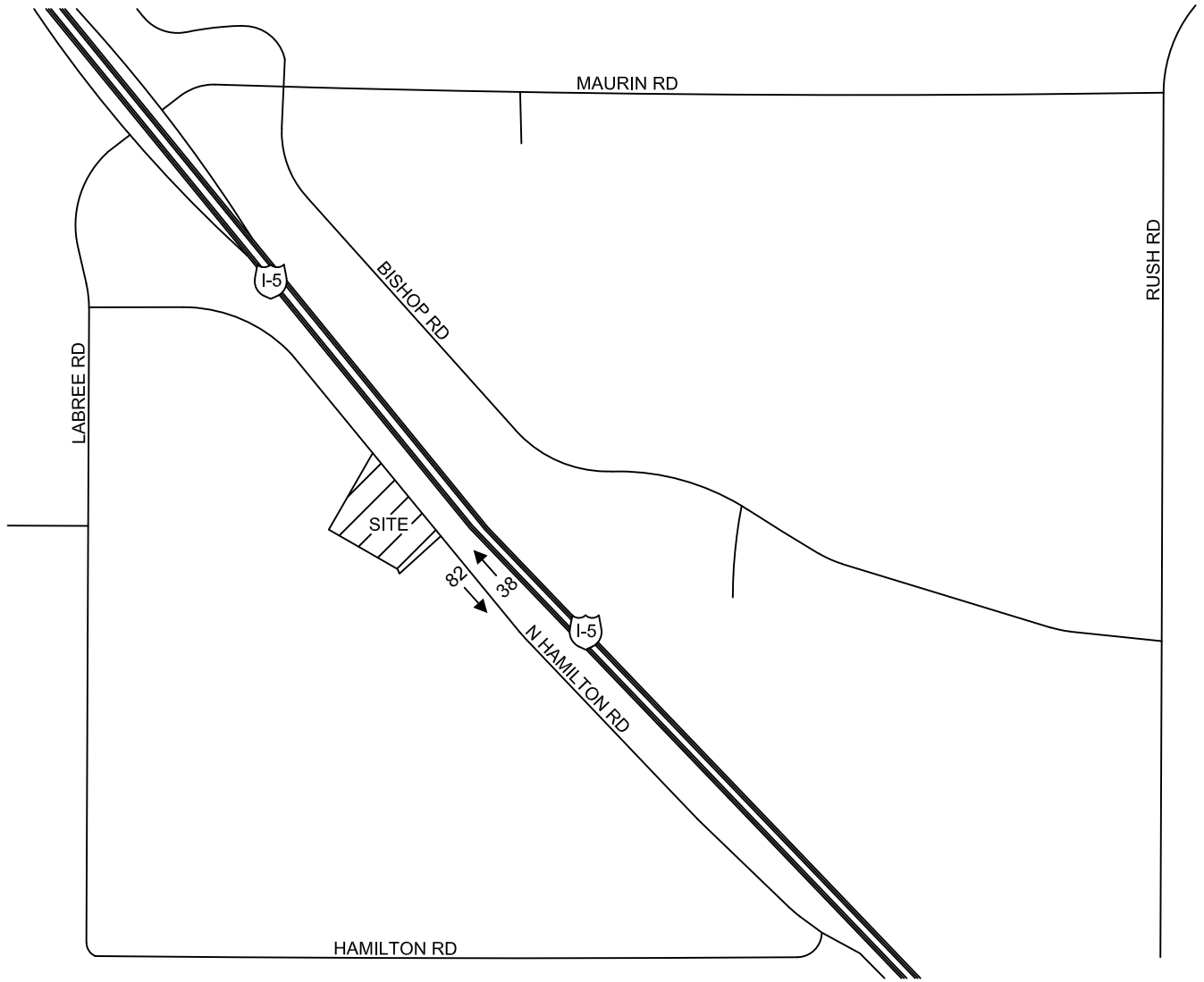


NEW PM PEAK HOUR TRIPS  
INBOUND: 5 VPH  
OUTBOUND: 6 VPH



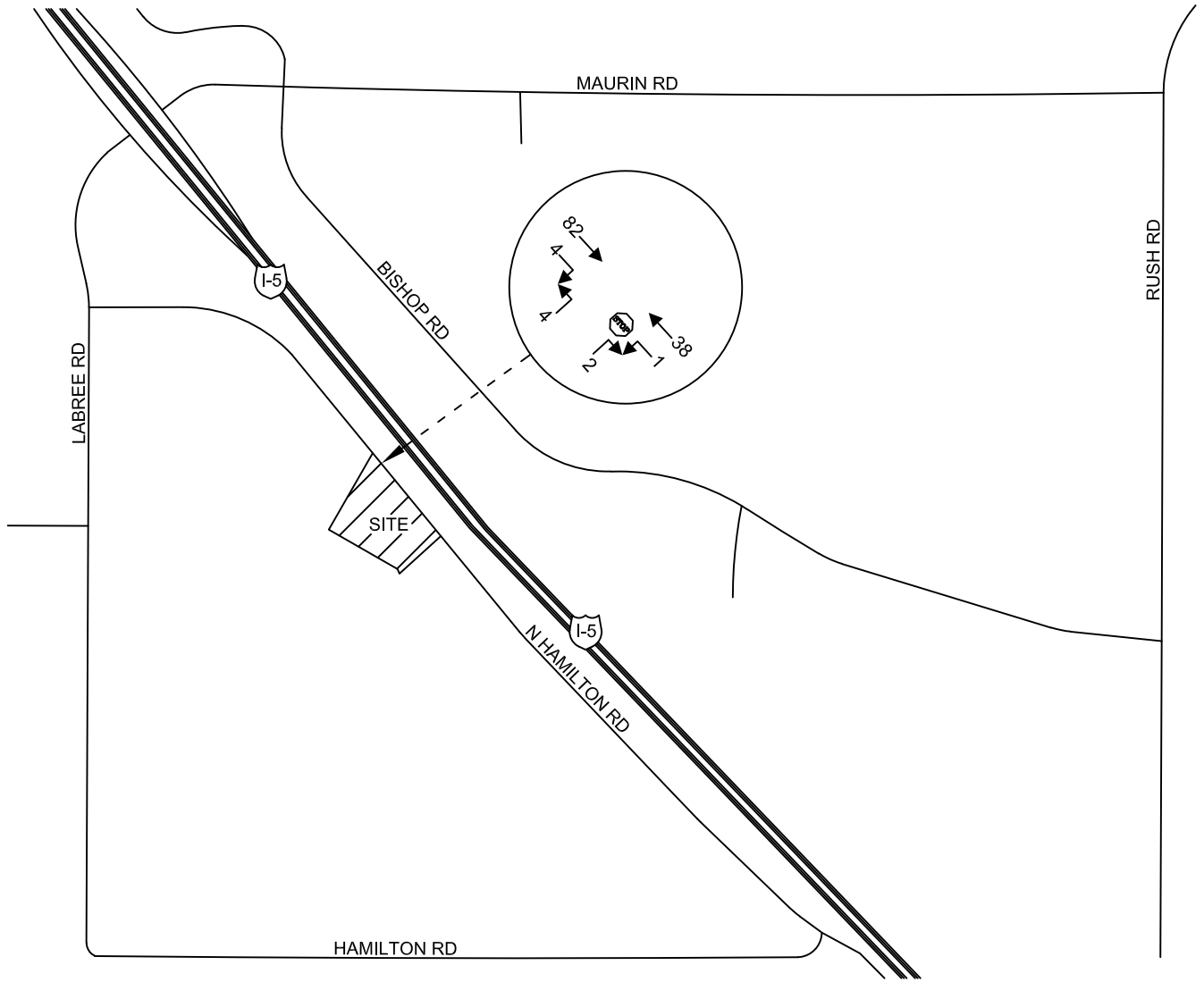
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HAMILTON ROAD STORAGE  
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT  
FIGURE 4



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**HAMILTON ROAD STORAGE**  
FORECAST 2026 PM PEAK HOUR VOLUMES WITHOUT PROJECT  
FIGURE 5



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**HAMILTON ROAD STORAGE**  
FORECAST 2026 PM PEAK HOUR VOLUMES WITH PROJECT  
FIGURE 6

#### 4.4 Future Level of Service

Intersection delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range<sup>1</sup> for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 11* analysis program. For side-street, stop-controlled intersections, LOS is determined by the approach with the highest delay. Delays for the access intersection under future conditions is shown below in Table 2.

**Table 2: Forecast 2026 PM Peak Hour Level of Service with Project**  
*Delays given in seconds per vehicle*

Intersection	Control	LOS	Delay
N Hamilton Road & Access	Stop	A	9.3

The proposed access serving the subject property is shown to operate with acceptable LOS A conditions under the forecast horizon year. N Hamilton Road has relatively light traffic volumes and delay experienced by motorists leaving the self-storage site would be minimal. No operational deficiencies are identified as a result of the proposed development.

<sup>1</sup> *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

*Stop Controlled Intersections – Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Highway Capacity Manual, 6th Edition

#### 4.5 Left Turn Lane Warrants

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures described by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain storage requirements at the intersection of N Hamilton Road & the project access. Requirements are based on a function of vehicular volumes, number of left-turning vehicles from the major roadway, and posted speed limits. Based on forecast 2026 PM peak hour volumes with project traffic, a left turn lane *would not be warranted* at the access intersection. Refer to the appendix for the warrant nomographs.

### 5. SUMMARY

Hamilton Road Storage is a proposed storage facility comprising approximately 44,475 square feet of self-storage and 135 RV/Boat stalls, 35 of which are covered. The subject site is located in Urban Growth Area of Lewis County on a cumulative 5.0-acres within four tax parcels. Access to the site is proposed via one new driveway extending southwest from N Hamilton Road. A conceptual site plan is illustrated in Figure 2.

Based on ITE data, the project is not a significant generator of new traffic with an estimated 6 new trips in the AM peak hour and 11 new trips in the PM peak hour. For forecast analyses, a five-year horizon was evaluated to assess impacts under future conditions. Table 2 summarizes forecast 2026 PM peak hour LOS delays with the project at the proposed driveway onto N Hamilton Road. Delays are expected to be minor with LOS A operating conditions indicating no deficiencies. Furthermore, a left-turn lane along N Hamilton Road at the proposed driveway location was determined to be not warranted based on WSDOT criteria.

Based on the analysis above, no mitigation is identified at this time.

HAMILTON ROAD STORAGE  
TRAFFIC IMPACT ANALYSIS

*APPENDIX*

## LEVEL OF SERVICE

The following are excerpts from the *2016 Highway Capacity Manual - Transportation Research Board Special Report 209*.

Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions.

### Level-of-Service definitions

*Level of service A* represents primarily free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the arterial classification. Vehicles are seldom impeded in their ability to maneuver in the traffic stream. Delay at signalized intersections is minimal.

*Level of service B* represents reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the arterial classification. The ability to maneuver in the traffic stream is only slightly restricted and delays are not bothersome.

*Level of service C* represents stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than in LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the average free-flow speed for the arterial classification.

*Level of service D* borders on a range in which small increases in flow may cause substantial increases in approach delay and hence decreases in arterial speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40 percent of free-flow speed.

*Level of service E* is characterized by significant delays and average travel speeds of one-third the free-flow speed or less. Such operations are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

*Level of service F* characterizes arterial flow at extremely low speeds, from less than one-third to one-quarter of the free-flow speed. Intersection congestion is likely at critical signalized locations, with long delays and extensive queuing.

# Heath & Associates

PO Box 397  
Puyallup, WA 98371

File Name : 4721a  
Site Code : 00004721  
Start Date : 8/31/2021  
Page No : 1

## Groups Printed- Passenger + - Heavy

Start Time	N Hamilton Rd Southbound		N Hamilton Rd Northbound		Int. Total
	Thru	App. Total	Thru	App. Total	
04:00 PM	13	13	7	7	20
04:15 PM	15	15	6	6	21
04:30 PM	16	16	12	12	28
04:45 PM	14	14	5	5	19
Total	58	58	30	30	88
05:00 PM	26	26	10	10	36
05:15 PM	10	10	7	7	17
05:30 PM	8	8	7	7	15
05:45 PM	10	10	5	5	15
Total	54	54	29	29	83
Grand Total	112	112	59	59	171
Apprch %	100		100		
Total %	65.5	65.5	34.5	34.5	
Passenger +	108	108	51	51	159
% Passenger +	96.4	96.4	86.4	86.4	93
Heavy	4	4	8	8	12
% Heavy	3.6	3.6	13.6	13.6	7

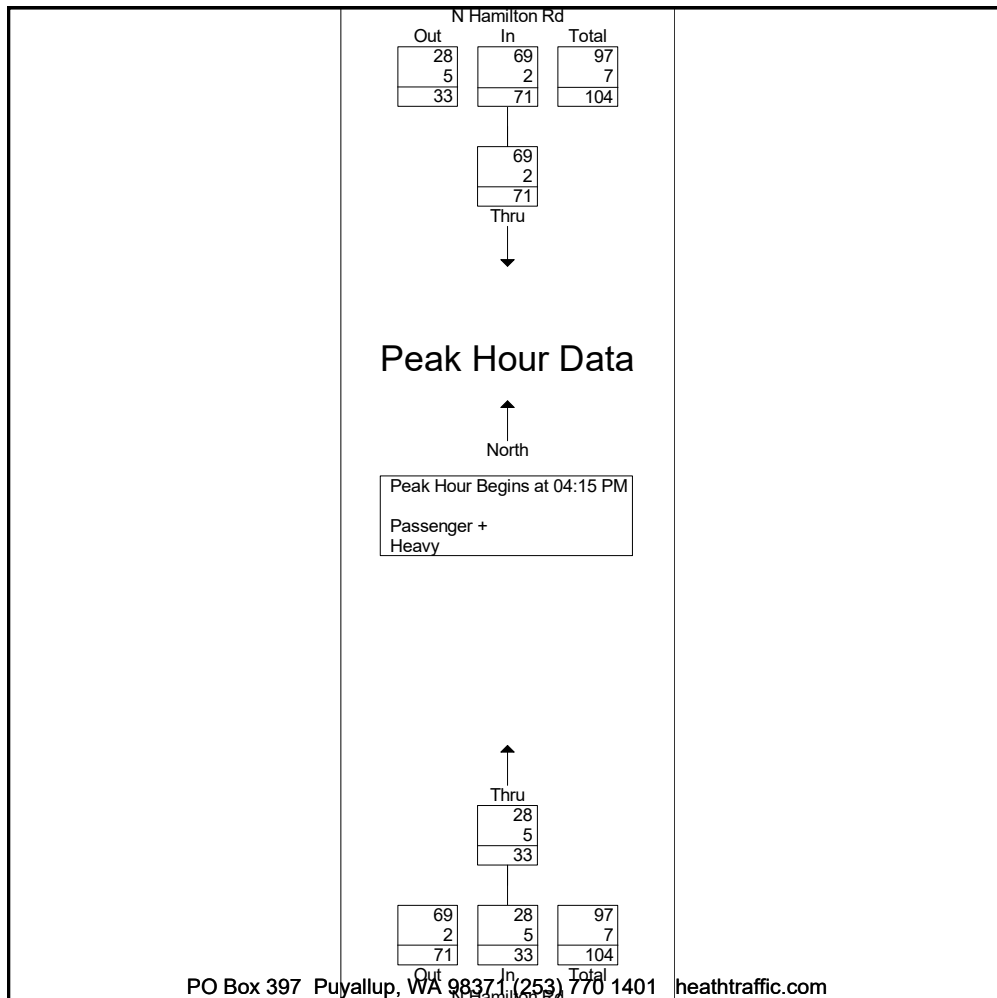


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File Name : 4721a  
Site Code : 00004721  
Start Date : 8/31/2021  
Page No : 2

Start Time	N Hamilton Rd Southbound		N Hamilton Rd Northbound		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 04:15 PM					
04:15 PM	15	15	6	6	21
04:30 PM	16	16	12	12	28
04:45 PM	14	14	5	5	19
05:00 PM	26	26	10	10	36
Total Volume	71	71	33	33	104
% App. Total	100		100		
PHF	.683	.683	.688	.688	.722
Passenger +	69	69	28	28	97
% Passenger +	97.2	97.2	84.8	84.8	93.3
Heavy	2	2	5	5	7
% Heavy	2.8	2.8	15.2	15.2	6.7



# Mini-Warehouse (151)

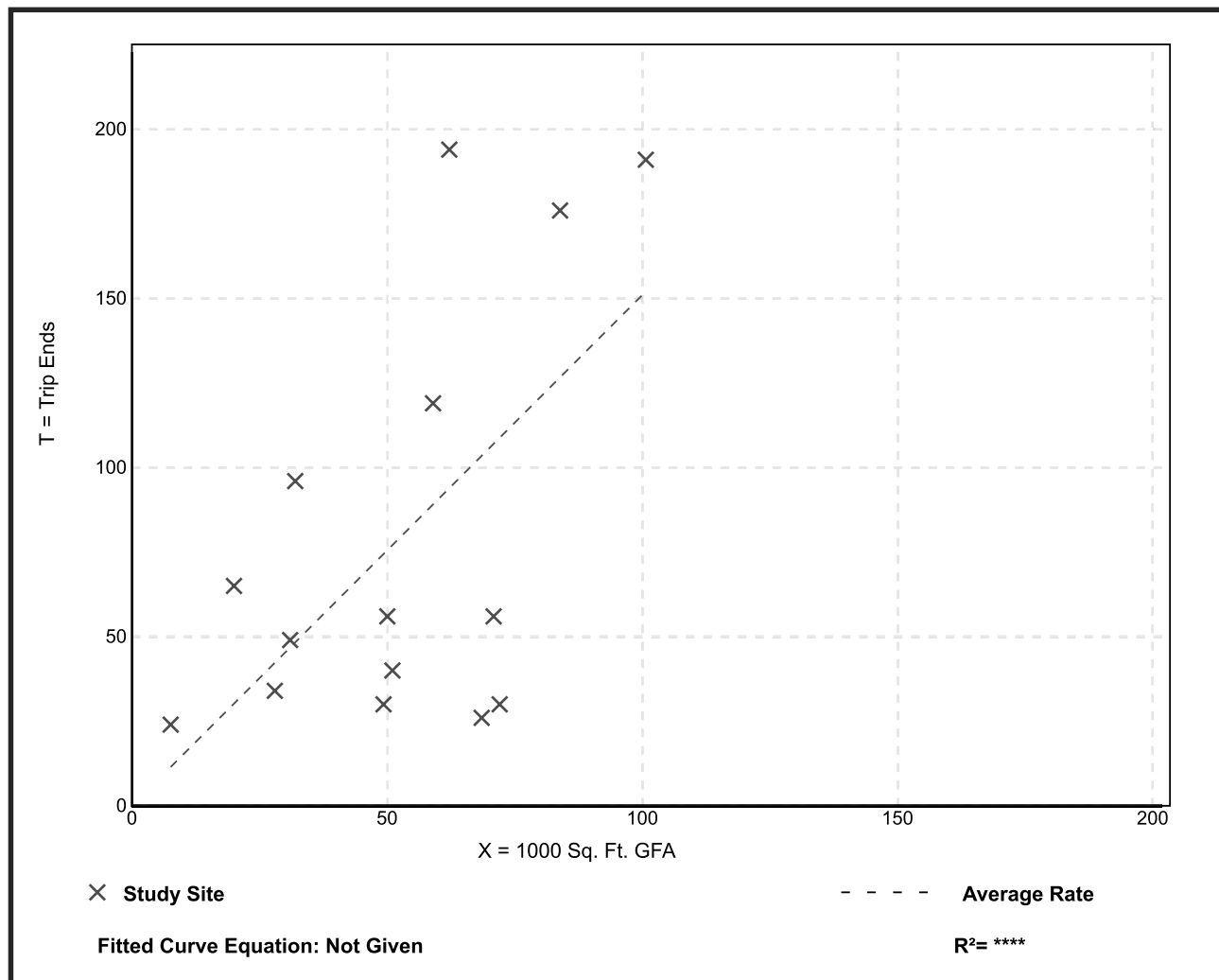
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
Number of Studies: 15  
Avg. 1000 Sq. Ft. GFA: 52  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.51	0.38 - 3.25	0.95

## Data Plot and Equation



*Trip Generation Manual, 10th Edition* • Institute of Transportation Engineers

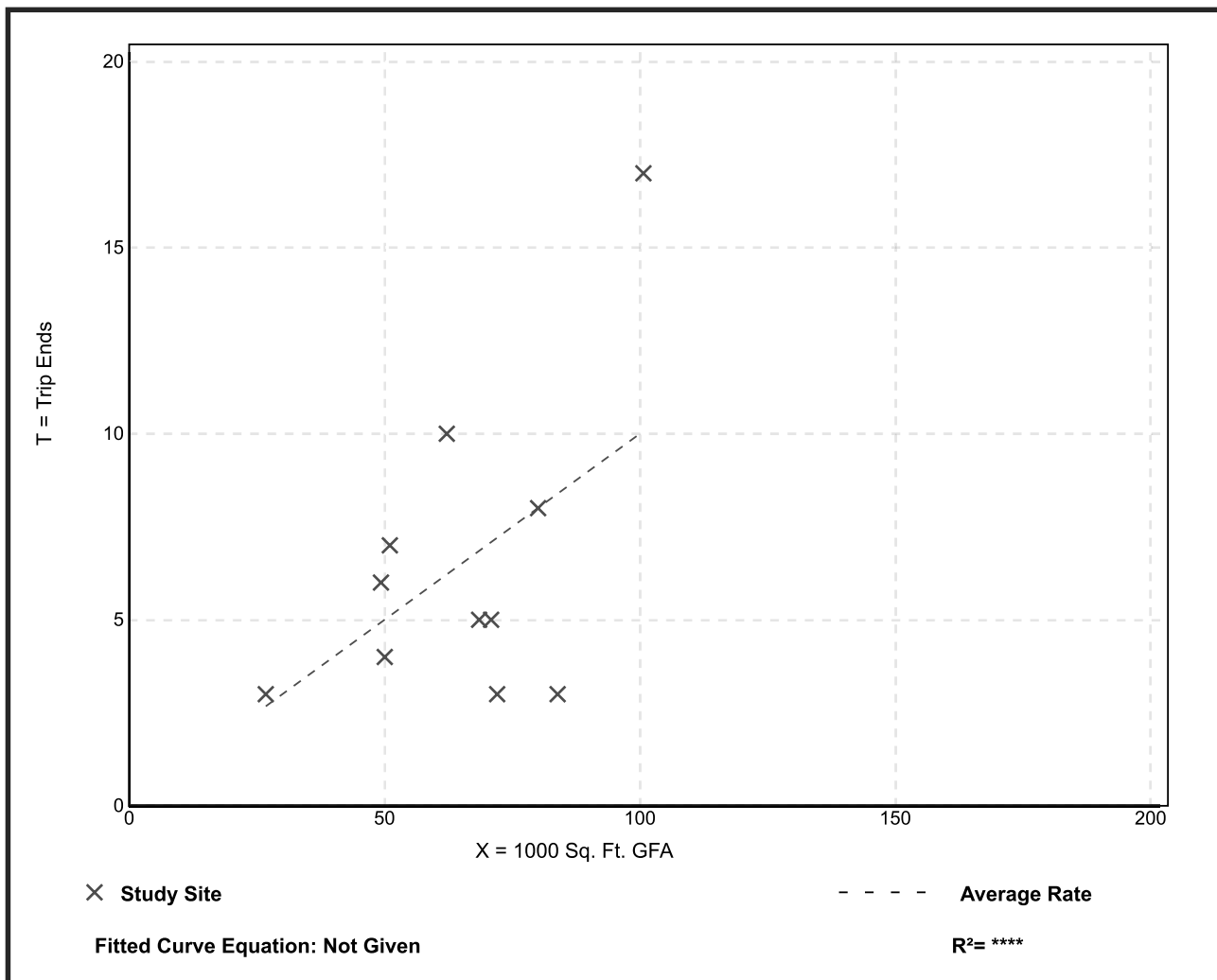
# Mini-Warehouse (151)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 11  
 Avg. 1000 Sq. Ft. GFA: 65  
 Directional Distribution: 60% entering, 40% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.10	0.04 - 0.17	0.05

## Data Plot and Equation



*Trip Generation Manual*, 10th Edition • Institute of Transportation Engineers



# Mini-Warehouse (151)

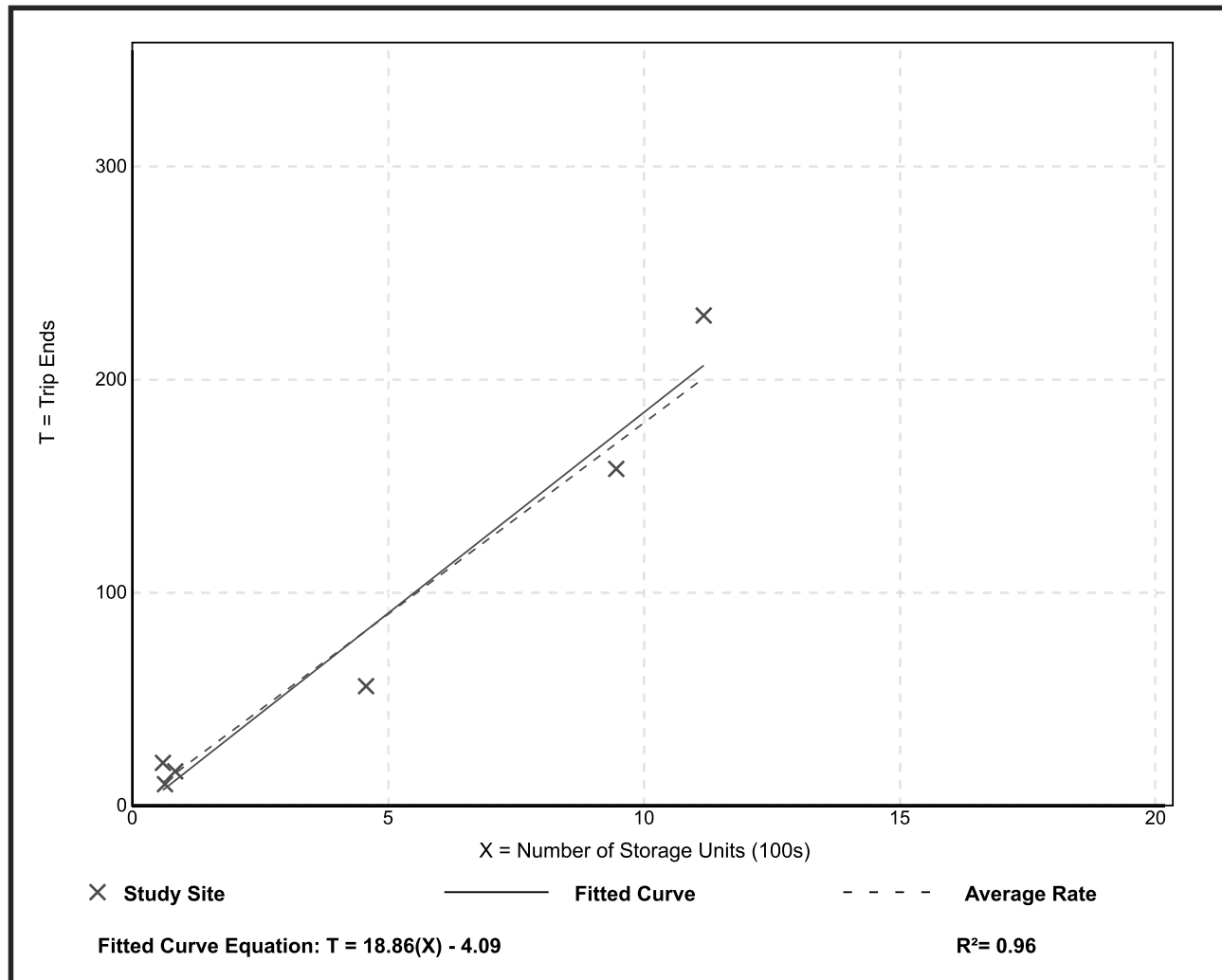
**Vehicle Trip Ends vs: Storage Units (100s)**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 6  
 Avg. Num. of Storage Units (100s): 5  
 Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Storage Unit (100s)

Average Rate	Range of Rates	Standard Deviation
17.96	12.25 - 33.33	4.13

## Data Plot and Equation



*Trip Generation Manual, 10th Edition* • Institute of Transportation Engineers

# Mini-Warehouse (151)

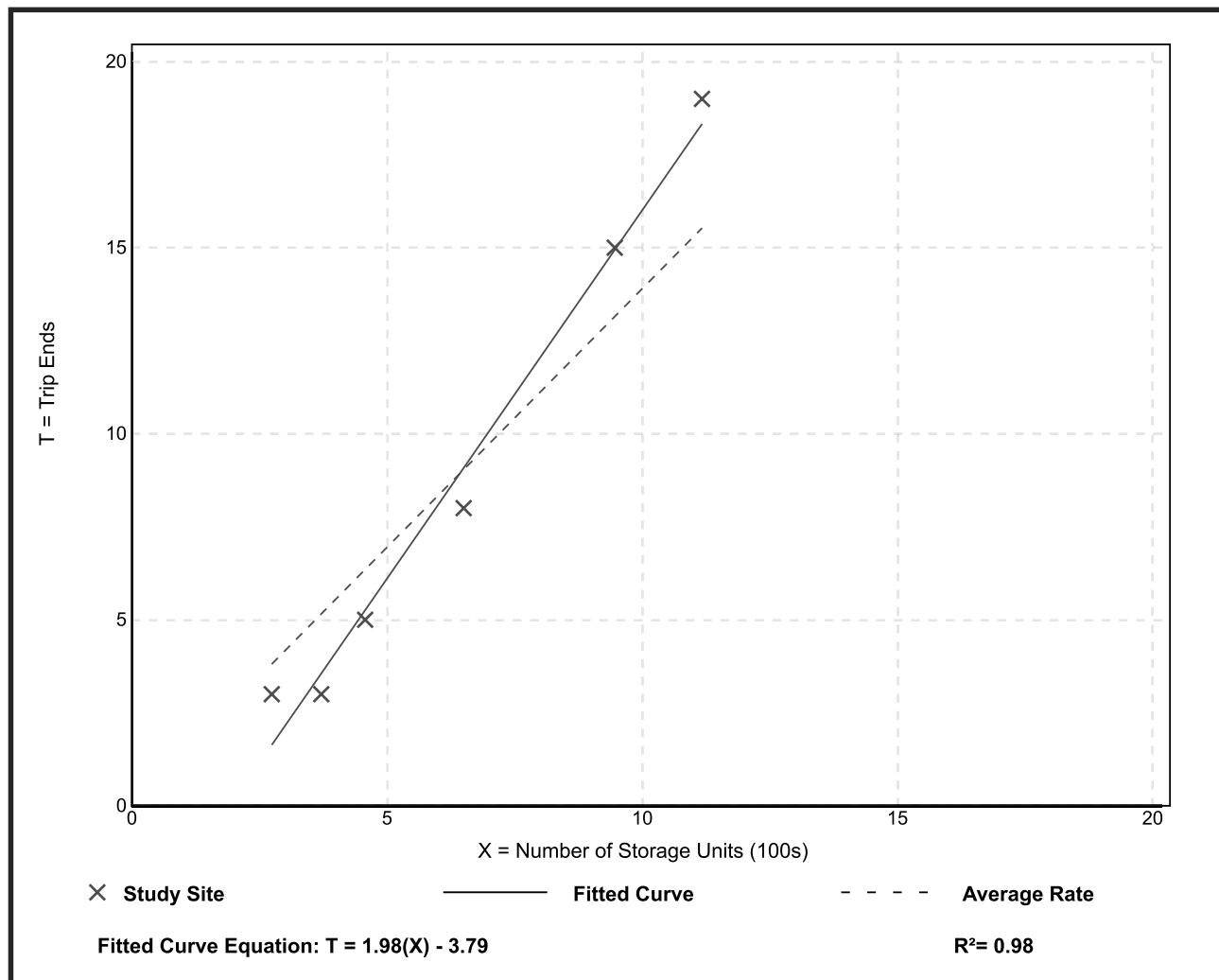
**Vehicle Trip Ends vs: Storage Units (100s)**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 6  
 Avg. Num. of Storage Units (100s): 6  
 Directional Distribution: 51% entering, 49% exiting

## Vehicle Trip Generation per Storage Unit (100s)

Average Rate	Range of Rates	Standard Deviation
1.39	0.81 - 1.70	0.33

## Data Plot and Equation



*Trip Generation Manual, 10th Edition* • Institute of Transportation Engineers

# Mini-Warehouse (151)

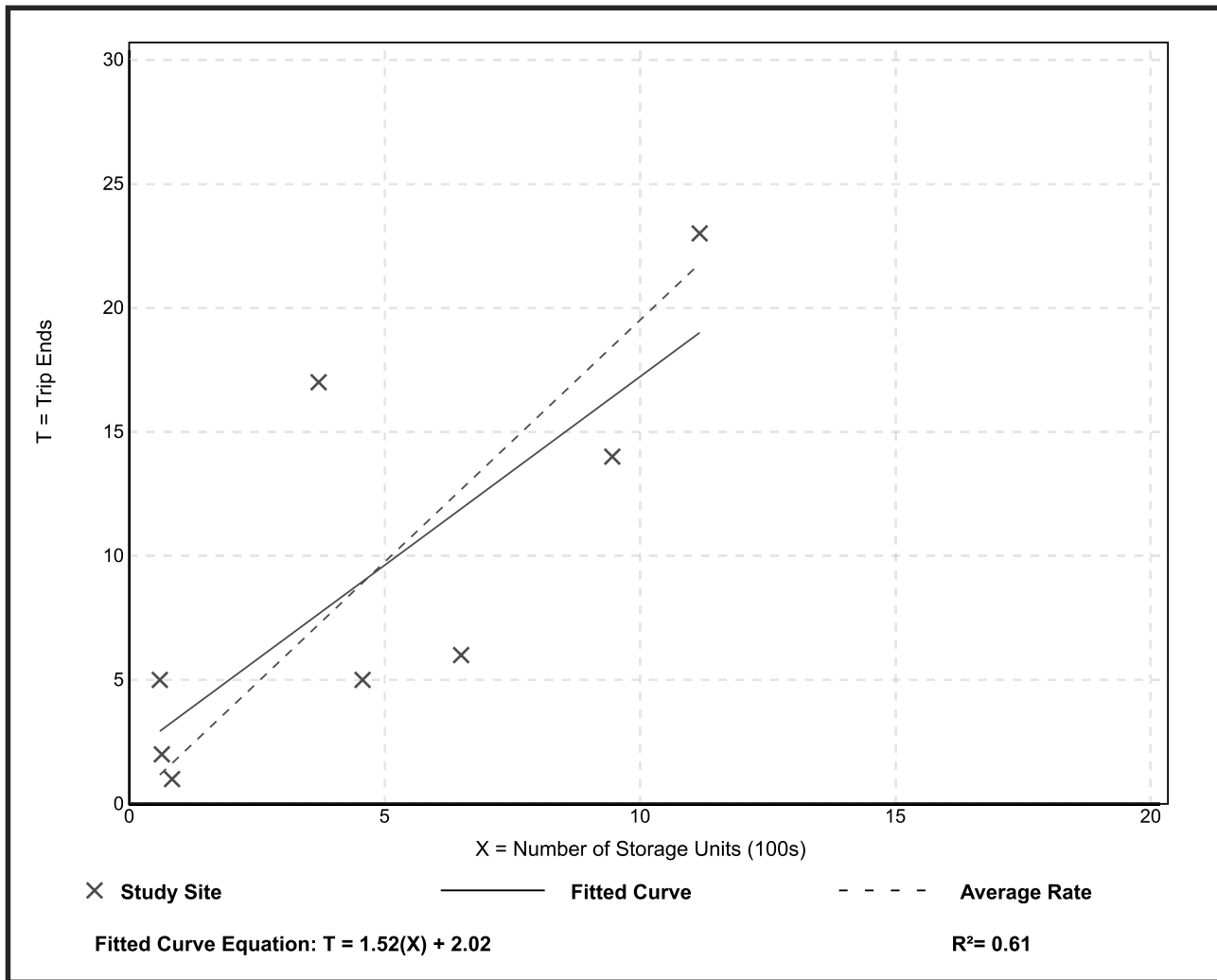
**Vehicle Trip Ends vs: Storage Units (100s)**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 8  
 Avg. Num. of Storage Units (100s): 5  
 Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Storage Unit (100s)

Average Rate	Range of Rates	Standard Deviation
1.95	0.92 - 8.33	1.40

## Data Plot and Equation



*Trip Generation Manual, 10th Edition* • Institute of Transportation Engineers

Intersection						
Int Delay, s/veh	0.5					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	82	4	1	38	4	2
Future Vol, veh/h	82	4	1	38	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	5	2	2	15	2	2
Mvmt Flow	114	6	1	53	6	3

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	120	0	172
Stage 1	-	-	-	-	117
Stage 2	-	-	-	-	55
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1468	-	818
Stage 1	-	-	-	-	908
Stage 2	-	-	-	-	968
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1468	-	817
Mov Cap-2 Maneuver	-	-	-	-	817
Stage 1	-	-	-	-	908
Stage 2	-	-	-	-	967

Approach	SE	NW	NE
HCM Control Delay, s	0	0.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	853	1468	-	-	-
HCM Lane V/C Ratio	0.01	0.001	-	-	-
HCM Control Delay (s)	9.3	7.5	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	0	-	-	-



Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized

