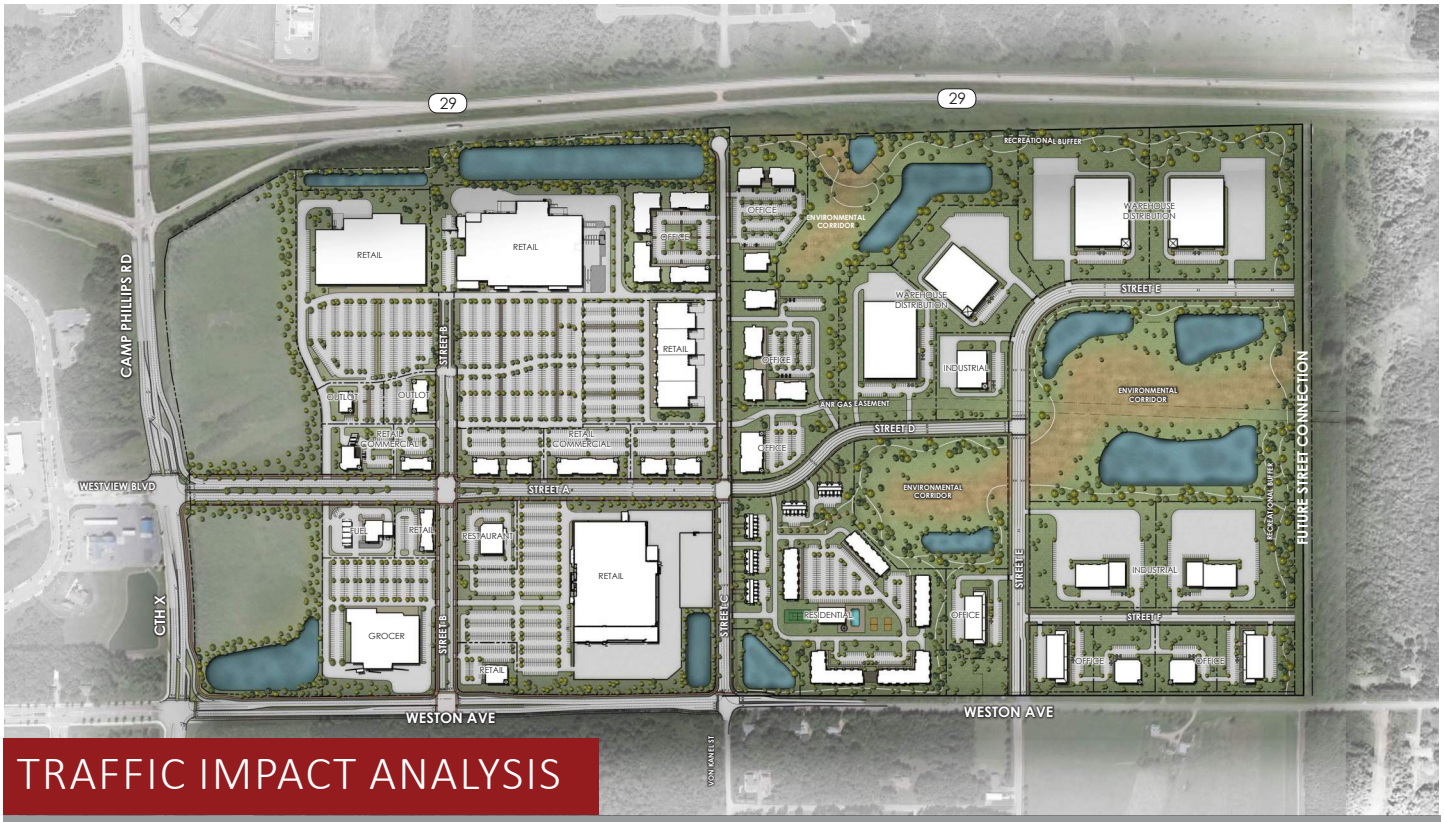

TRAFFIC IMPACT ANALYSIS

CAMP PHILLIPS CENTRE

VILLAGE OF WESTON, WI

Prepared for
Wisconsin Department of Transportation
North Central Region

MSA PROFESSIONAL SERVICES

TRAFFIC IMPACT STUDY FOR:

CAMP PHILLIPS CENTRE DEVELOPMENT

VILLAGE OF WESTON, WISCONSIN

DATE SUBMITTED:

Friday, September 01, 2017

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"I certify that this Traffic Impact Analysis has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering."

_____

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Chapter 1 – INTRODUCTION & EXECUTIVE SUMMARY

PART A – PURPOSE OF REPORT AND STUDY OBJECTIVES

At the request of the Village of Weston, MSA Professional Services has prepared a Traffic Impact Analysis for the Camp Phillips Centre development. This report documents the procedures, findings, and conclusions of the traffic impact analysis performed to evaluate the impact of the development on the existing state highway system. The analysis identifies recommended improvements based on existing and planned roadway geometrics, background traffic volumes, and additional traffic expected to be generated by the development.

PART B – EXECUTIVE SUMMARY

The executive summary contains a synopsis of the proposed development, the findings of the analysis of the impacts, and the recommendations.

B1. Development Description and Site Location

The Village of Weston has engaged in a detailed planning effort to redefine the role of Country Road X (CR X), also known as Camp Phillips Road as a primary development corridor and to establish a strategic framework for land use, development policy, and public and private investment decisions to encourage development and redevelopment along the corridor. The corridor has various attributes that make it a viable development corridor including, accessibility to regional transportation networks, proximity to the Wausau metropolitan area, and local utility availability which make it ideal for development.

The master plan for Camp Phillips Centre proposes to develop 320 acres in the southeast quadrant of WIS 29 and County Road X (CR X).

B2. Land Use and Intensity

The existing site is currently vacant. As part of the Village of Weston's Comprehensive Plan, adopted in October 2016, the land is zoned for commercial uses. The Village's intent for the area is to grow the local economy, increase commercial services, and encourage community building.

Mixed-use development consisting of commercial, retail, office space, industrial, and warehousing have been proposed for Camp Phillips Centre, as summarized below in ***Table 1-1***. The ITE Land Use codes associated with each type of development are included as well as the appropriate size and unit per land use.

There are handful of existing business located on the west side of County Road X near the intersection of Westview Boulevard. Businesses such as The Store Gas Station, Schierl Tire and Service, Connexus Credit Union, and other small business would consider Westview Boulevard and County Road X as part of their primary access. Marshfield Clinic – Weston Center is also located west of County Road X however primary access is located off of Birch Street and Weston Avenue. Access to WIS 29 is most conveniently located off of County Road X. Marshfield Clinic is the primary care center for Weston and other surrounding communities such as Rothschild, Schofield, and Ringle.

Table 1-1: *On-Site Land Uses*

	Site Plan Lot Number	ITE Land Use	ITE Code	Size	Units
Phase I	1	Free-Standing Discount Superstore	813	187,000	Square Feet
	2	Free-Standing Discount Superstore	813	146,000	Square Feet
	3	Supermarket	850	78,000	Square Feet
	4	Home Improvement Superstore	862	210,000	Square Feet
	5	Shopping Center	820	78,000	Square Feet
	6	Shopping Center	820	17,000	Square Feet
	7	Shopping Center	820	20,000	Square Feet
	8	Shopping Center	820	17,000	Square Feet
	9	Shopping Center	820	10,000	Square Feet
	10	Shopping Center	820	5,000	Square Feet
	11	Drive-in Bank	912/Combo *	4	Drive-in Lanes
	12	Shopping Center	820	7,000	Square Feet
	13	Shopping Center	820	11,000	Square Feet
	14	Gasoline/Service Station with Convenience Market and Car Wash	946	20	Fueling Stations
	15	Shopping Center	820	15,000	Square Feet
	16	Fast-Food Restaurant without Drive-Through Window	933	8,000	Square Feet
	17	General Office Building	710	60,000	Square Feet
Phase II	26A-26E	Residential Condominium/Townhouse	230	30	Dwelling Units
	26F-26J	Apartment	220	282	Dwelling Units
	26K	Recreational Community Center	495	9,000	Square Feet
	27	General Office Building	710	21,000	Square Feet
	28	General Office Building	710	19,000	Square Feet
	29A-29D	General Office Building	710	46,000	Square Feet
	30A-30C	General Office Building	710	28,000	Square Feet
	31	Warehousing	150	85,000	Square Feet
	32	Warehousing	150	56,000	Square Feet
	33	General Light Industrial	110	24,000	Square Feet
	34	Warehousing	150	77,000	Square Feet
	35	Warehousing	150	77,000	Square Feet
	36	General Light Industrial	110	25,000	Square Feet
	37	General Light Industrial	110	25,000	Square Feet
	38	General Office Building	710	21,000	Square Feet
	39	General Office Building	710	13,000	Square Feet
	40	General Office Building	710	13,000	Square Feet
	41	General Office Building	710	21,000	Square Feet

**The Mixed-Use Development Study was used for the PM peak hour trip generation data that combines the ITE Trip Generation Manual and local data collected around the State of Wisconsin*

B3. Proposed Site Plan

Several access locations are proposed in order to accommodate the 320 acre development of Camp Phillips Centre, as seen in ***Exhibit 1-1A,*** *Site Plan*. The primary access to Camp Phillips Centre will be located at the intersection of County Road X & Westview Boulevard, approximately 1,100-ft south of the WIS 29 interchange. Other access to the development will be located along Weston Avenue, the south border of the development. Three (3) access points are proposed including one new access between County Road X and Von Kanel Street (Street B), the existing intersection of Van Kanel Street (Street C), a new northern street connection at Heeren Street (Street E).

The intersections along Weston Avenue east of County Road X are included in this report for trip assignment and balancing only. Additional detail of the plan, including preliminary building footprints, can be seen in ***Exhibit 1-1B*** and ***Exhibit 1-1C***.

B4. Development Phasing and Timing

Camp Phillips Centre is proposed for phased development. Phase I of the development is concentrated in the west 160 acres and is anticipated to consist of mixed-use commercial development including retail,

restaurants, and commercial shopping**.** The second phase is located in the east 160 acres of the parcel and will consist of light industrial, warehousing, general office, and a small portion of apartment uses.

The horizon year analyses for the AM and PM peak hours will be complied using the following methodology:

- **2020** = (build year of Phase I)
- **2030** = (full build out; Phase I + Phase II)
- **2040** = (full build out + 10 years)

B5. Area of Significant Traffic Impact

The Village's initiatives for the study area are intended to focus public and private efforts to promote and support the growth along County Road X for development of viable, sustainable, large scale commercial activity.

County Road X is a critically important north-south travel route in the suburban and regional travel network that links the Village and the neighboring communities of Wausau, Schofield, Rothschild, and Kronenwetter.

The Wausau metropolitan area, as well as the central areas of Wisconsin, rely on WIS 29 to travel east-west across the state between Minneapolis and Green Bay. WIS 29 also has direct access to WIS 39 and WIS 51 which are the primary north-south highway routes within the state of Wisconsin. Approximately 30,000 vehicles per day (vpd) travel on WIS 29 for commuting or hauling goods.

Weston Avenue has been prioritized for reconstruction east of County Road X as part of the Village's Comprehensive Plan. The Village has planned to reconstruct Weston Avenue with intersection improvements and a wider cross section in order to help promote development of Camp Phillips Centre.

B6. Off-Site Land Use and Development

The existing study area is zoned for highway business, including retail and commercial development. The Village's Comprehensive Plan outlines the study area as future commercial and mixed-use development, which is consistent with the proposed development. The surrounding lands are zoned for business or office park as well as single family residential areas.

No specific additional off-site developments of significance are known or included as part of this study. If developed in the future, an additional study analyzing the traffic impacts will need to be coordinated through the Village of Weston, Marathon County, and/or WisDOT and the developer.

B7. Existing Area Roadway System

The existing transportation system consists of County Road X (CR X), which is a four-lane urban arterial. The corridor speed limit transitions from 35 miles per hour (mph) to 30 mph near the WIS 29 interchange heading north into the Village proper. The roadway consists of concrete pavement, urban curb & gutter, 10-ft multi-use path on the west side of the roadway. The existing roadway right-of-way is approximately 170-ft.

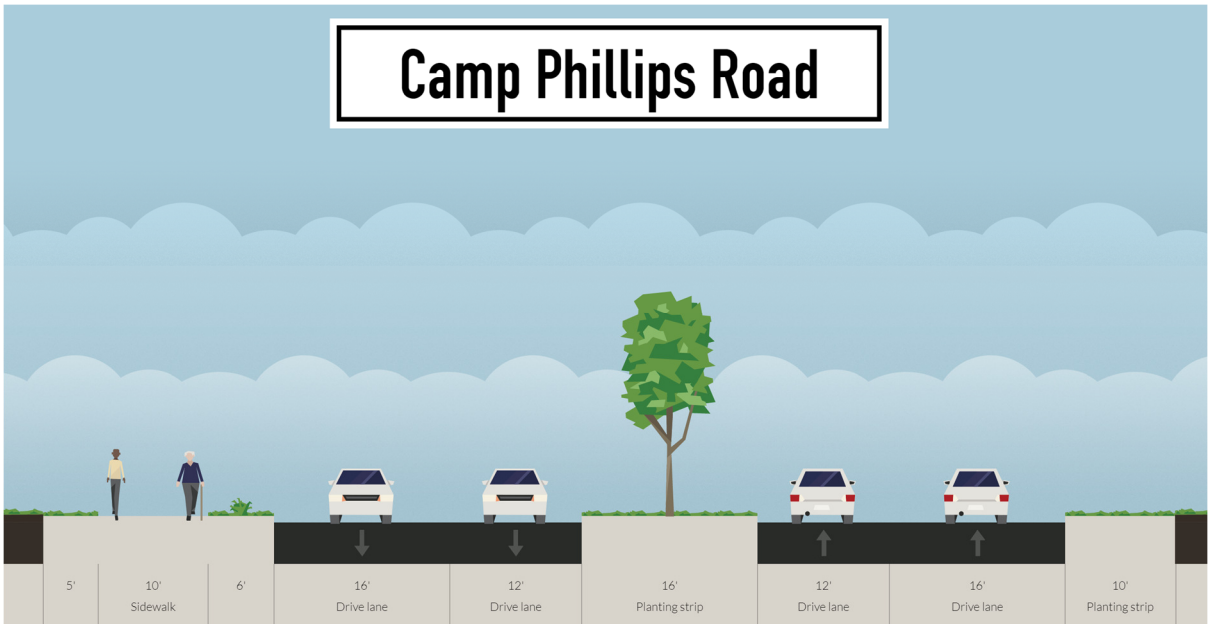

Figure 1-1: *Existing Roadway Configuration*

Exhibit 1-1 illustrates the specific intersection diagrams and transportation layout of the study area intersections. All study area intersection are full access with the exception of the WIS 29 ramp terminals which only allow one-way traffic to access the state highway. Standard traffic signal installations are present at all study area locations not specifically noted as stop controlled intersections.

B8. Future Area Roadway System

The Weston Avenue intersections east of County Road X are planned for improvement as part of the Camp Phillips Centre development. Special improvements will be determined through completion of a supplemental traffic impact analysis after approval of this study.

There are no known additional state or local roadway projects planned for the study area intersections.

B9. Conclusions

2020 Background Traffic

Traffic signal warrants are not met at the intersection of County Road X and Westview Boulevard. Therefore, the existing intersection configuration is appropriate and no further geometric improvements are recommended.

2030 Background Traffic

<u>County Road X & WIS 29 Interchange</u>

- Extend southbound right-turn lane to 300-ft storage length

Exhibit 1-5, *2030 Interim Year Background Traffic Recommended Improvements* illustrates this improvement in comparison to the existing conditions.

2040 Background Traffic

County Road X & Barbican Avenue

- Extend southbound left-turn lane to 175-ft storage length
- Extend northbound right-turn lane to 225-ft storage length

County Road X & WIS 29 Interchange

- 2030 Background Improvements
- Extend northbound left-turn lane to 375-ft storage length

County Road X & Weston Avenue

- Extend westbound left-turn lane to 75-ft storage length

Exhibit 1-8, *2040 Horizon Year Background Traffic Recommended Improvements* illustrates the recommended improvements in comparison to the existing conditions and 2030 background recommended improvements.

2020 Phase I Development Traffic

A summary of the recommended improvements for each study intersection is outlined below. ***Exhibit 1-3****, 2020 Base Year Build Traffic Recommended Improvements* illustrates the recommended improvements for the Phase I development in comparison to the existing conditions.

County Road X & Barbican Avenue

- No geometric improvements recommended
- Retime and time-base coordinate traffic signal timing plan with WIS 29 interchange

County Road X & WIS 29 Interchange

- Install dual westbound left-turn lanes at County Road X & WIS 29
- Install dual northbound left-turn lanes at County Road X & WIS 29
- Extend southbound right-turn lane to 300-ft storage length
- Extend eastbound right-turn lane to 450-ft storage length
- Expand the existing bridge to accommodate additional capacity
- Install new traffic signals with monotubes and follow head-per-lane requirements per MUTCD.

County Road X & Westview Boulevard

- Install a permanent traffic signal, with protected phasing and over-lap phasing, and time-base coordinate with WIS 29 interchange
- Dual southbound left-turn lanes, with storage length to accommodate 600-ft of queue
- Restripe existing intersection geometry on west approach to accommodate dual left-turn lanes

County Road X & Weston Avenue

- Retime and coordinate traffic signal timing plan with Westview Boulevard intersection

2030 Full Build Development Traffic

A summary of the recommended improvements for each study intersection is outlined below. ***Exhibit 1-6**, 2030 Interim Year Build Traffic Recommended Improvements* illustrates the recommended improvements for the 2030 Full Build development in comparison to the existing conditions and 2020 Build development recommended improvements. The below recommendations are in addition to the previous recommendations for 2020 Build traffic conditions.

<u>County Road X & Barbican Avenue</u>

- Extend southbound left-turn lane to 175-ft storage length

<u>County Road X & WIS 29 Interchange</u>

- Install third northbound through lane at WIS 29 eastbound ramp

<u>County Road X & Westview Boulevard</u>

- Install dual westbound right-turn lanes
- Install third northbound through lane
- Extend southbound left-turn lanes to 625-ft storage length
- Extend westbound right-turn lane to 575-ft storage length

2040 Full Build Development Traffic

A summary of the recommended improvements for each study intersection is outlined below. ***Exhibit 1-9**, 2040 Horizon Year Build Traffic Recommended Improvements* illustrates the recommended improvements for the 2040 Full Build development in comparison to the existing conditions, 2020 Build development recommended improvements, and 2030 Full Build development recommended improvements. The below recommendations are in addition to the previously mentioned improvement recommendations for each intersection.

<u>County Road X & Barbican Avenue</u>

- Restripe east approach to dedicated left-turn lane and shared thru/right lane
- Restripe west approach to dedicated left-turn lane, thru lane, and an additional dedicated right-turn lane
- Install a third southbound shared through/right-turn lane

<u>County Road X & WIS 29 Interchange</u>

- Install third southbound through lane

<u>County Road X & Westview Boulevard</u>

- Extend southbound left-turn lane to 700-ft storage length
- Extend westbound right-turn lane to 626-ft storage length

<u>County Road X & Weston Avenue</u>

- Extend westbound left-turn lane to 150-ft storage length

Exhibit 1-1A: Site Plan

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin

Date: 06.29.17

EXHIBIT B - MASTER PLAN

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.

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Camp Phillips Centre
COMMERCIAL DISTRICT
VILLAGE OF WESTON, WI

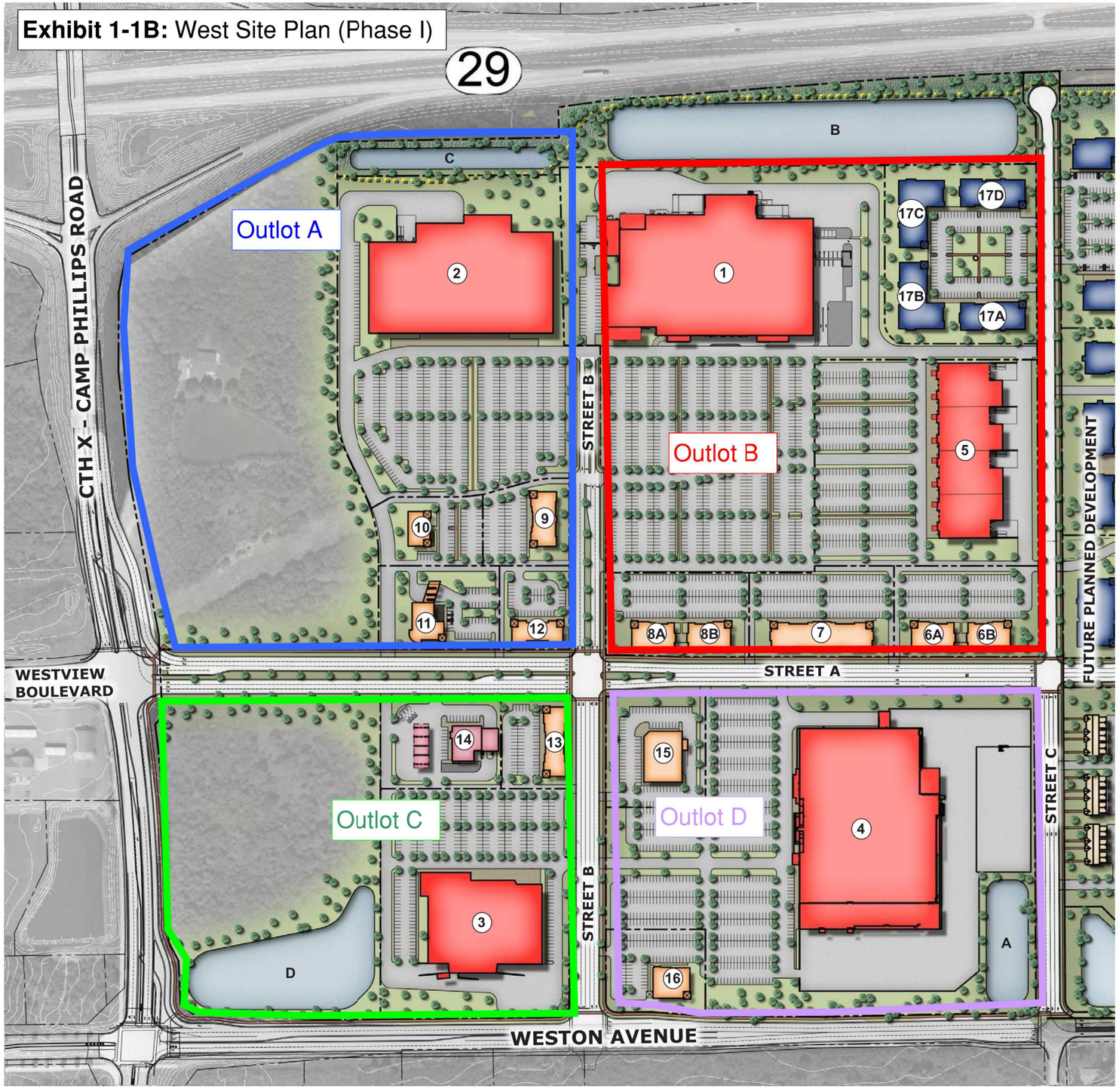
FDG

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

north

SCALE IN FEET

200' 0 200'



LAND USE KEY: PHASE 1

LOT 1 - 18.95 ACRES
Large Retail - 186,931 sq. ft.
Surface Parking - 838 stalls
Percentage of net land = 21.41%

LOT 2 - 12.38 ACRES
Large Retail - 146,259 sq. ft.
Surface Parking - 441 stalls
Percentage of net land = 13.99%

LOT 3 - 7.48 ACRES
Large Retail - 78,173 sq. ft.
Surface Parking - 312 stalls
Percentage of net land = 8.45%

LOT 4 - 19.10 ACRES
Large Retail - 210,000 sq. ft.
Surface Parking - 642 stalls
Percentage of net land = 21.58%

LOT 5 - 7.93 ACRES
Large Retail - 78,051 sq. ft.
Surface Parking - 378 stalls
Percentage of net land = 8.96%

LOT 6 - 2.28 ACRES
A- Commerical/Retail - 8,382 sq. ft.
B- Commerical/Retail - 8,382 sq. ft.
Surface Parking - 134 stalls
Percentage of net land = 2.58%

LOT 7 - 2.20 ACRES
Commerical/Retail - 19,609 sq. ft.
Surface Parking - 152 stalls
Percentage of net land = 2.49%

LOT 8 - 2.08 ACRES
A- Commerical/Retail - 8,382 sq. ft.
B- Commerical/Retail - 8,382 sq. ft.
Surface Parking -137 stalls
Percentage of net land = 2.35%

LOT 9 - 1.22 ACRES
Commerical/Retail - 9,480 sq. ft.
Surface Parking - 66 stalls
Percentage of net land = 1.38%

LOT 10 - 1.24 ACRES
Commerical/Retail - 5,060 sq. ft.
Surface Parking - 49 stalls
Percentage of net land = 1.40%

LOT 11 - 1.73 ACRES
Commerical/Retail - 7,639 sq. ft.
Surface Parking - 42 stalls
Percentage of net land = 1.95%

LOT 12 - 1.01 ACRES
Commerical/Retail - 7,257 sq. ft.
Surface Parking - 36 stalls
Percentage of net land = 1.14%

LOT 13 - 1.05 ACRES
Commerical/Retail - 10,840 sq. ft.
Surface Parking - 55 stalls
Percentage of net land = 1.19%

LOT 14 - 1.82 ACRES
Fuel - 7,296 sq. ft.
Surface Parking - 20 stalls
Percentage of net land = 2.06%

LOT 15 - 1.96 ACRES
Commerical/Retail - 14,580 sq. ft.
Surface Parking - 94 stalls
Percentage of net land = 2.21%

LOT 16 - 1.41 ACRES
Commerical/Retail - 8,229 sq. ft.
Surface Parking - 84 stalls
Percentage of net land = 1.59%

LOT 17 - 4.68 ACRES
A - Office- 12,900 sq. ft.
B - Office- 16,975 sq. ft.
C - Office - 16,975 sq. ft.
D - Office - 12,900 sq. ft.
Surface Parking - 134 stalls
Percentage of net land = 5.29%

STORMWATER
A - 0.87 acres / 38,077 sq. ft.
B - 6.89 acres / 179,260 sq. ft.
C - 1.37 acres / 32,329 sq. ft.
D - 11.70 acres / 106,318 sq. ft.

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin **Date:** 06.29.17

MASTER CONCEPT PLAN
COMMERCIAL DISTRICT

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.

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north
SCALE IN FEET
200' 0 200'

FDG

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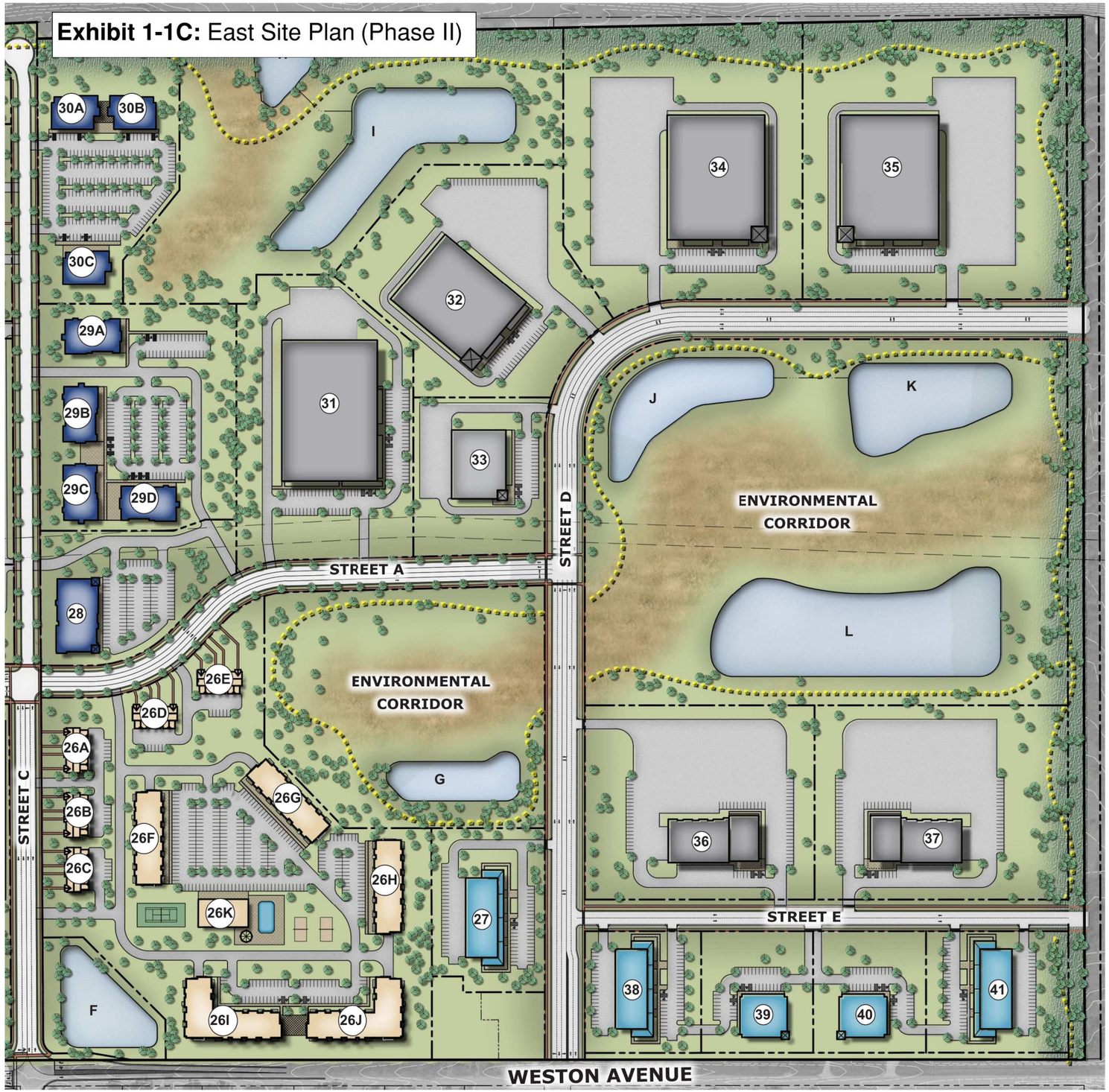

LAND USE KEY: PHASE 1

LOT 26 - 17.00 ACRES
A - Residential - 6,000 sq. ft.
B - Residential - 6,000 sq. ft.
C - Residential - 6,000 sq. ft.
D - Residential - 6,000 sq. ft.
E - Residential - 6,000 sq. ft.
F - Residential - 16,000 sq. ft.
G - Residential - 16,000 sq. ft.
H - Residential - 16,000 sq. ft.
I - Residential - 16,000 sq. ft.
J - Residential - 16,000 sq. ft.
K - Clubhouse - 8,900 sq. ft.
Surface Parking - 347 stalls
Percentage of net land = XX.X%

LOT 27 - 2.60 ACRES
Office - 21,200 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 28 - 3.12 ACRES
Office - 19,168 sq. ft.
Surface Parking - 312 stalls
Percentage of net land = XX.X%

LOT 29 - 6.35 ACRES
A - Office - 11,602 sq. ft.
B - Office - 11,602 sq. ft.
C - Office - 11,602 sq. ft.
D - Office - 11,602 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 30 - 4.79 ACRES
A - Office - 9,166 sq. ft.
B - Office - 9,166 sq. ft.
C - Office - 9,166 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 31 - 6.82 ACRES
Industrial - 85,068 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 32 - 6.37 ACRES
Industrial - 55,869 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 33 - 2.99 ACRES
Industrial - 23,521sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 34 - 9.40 ACRES
Industrial - 77,344 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 35 - 10.63 ACRES
Industrial - 77,344 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 36 - 6.43 ACRES
Industrial - 25,117 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 37 - 7.07 ACRES
Industrial - 25,117 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 38 - 2.03 ACRES
Office - 21,200 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 39 - 1.97 ACRES
Office - 13,058 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 40 - 1.97 ACRES
Office - 13,058 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 41 - 2.48 ACRES
Office - 21,200 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

STORMWATER
F - 1.60 acres / 41,702 sq. ft.
G - 9.20 acres / 62,586 sq. ft.
H - 11.47 acres / 18,542 sq. ft.
I - Shared / 99,148 sq. ft.
J - 25.14 acres / 61,098 sq. ft.
K - Shared / 71,257 sq. ft.
L - Shared /162,486 sq. ft.

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin **Date:** 03.28.17

MASTER CONCEPT PLAN - EAST 160

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.

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north
SCALE IN FEET
200' 0 200'

FDG

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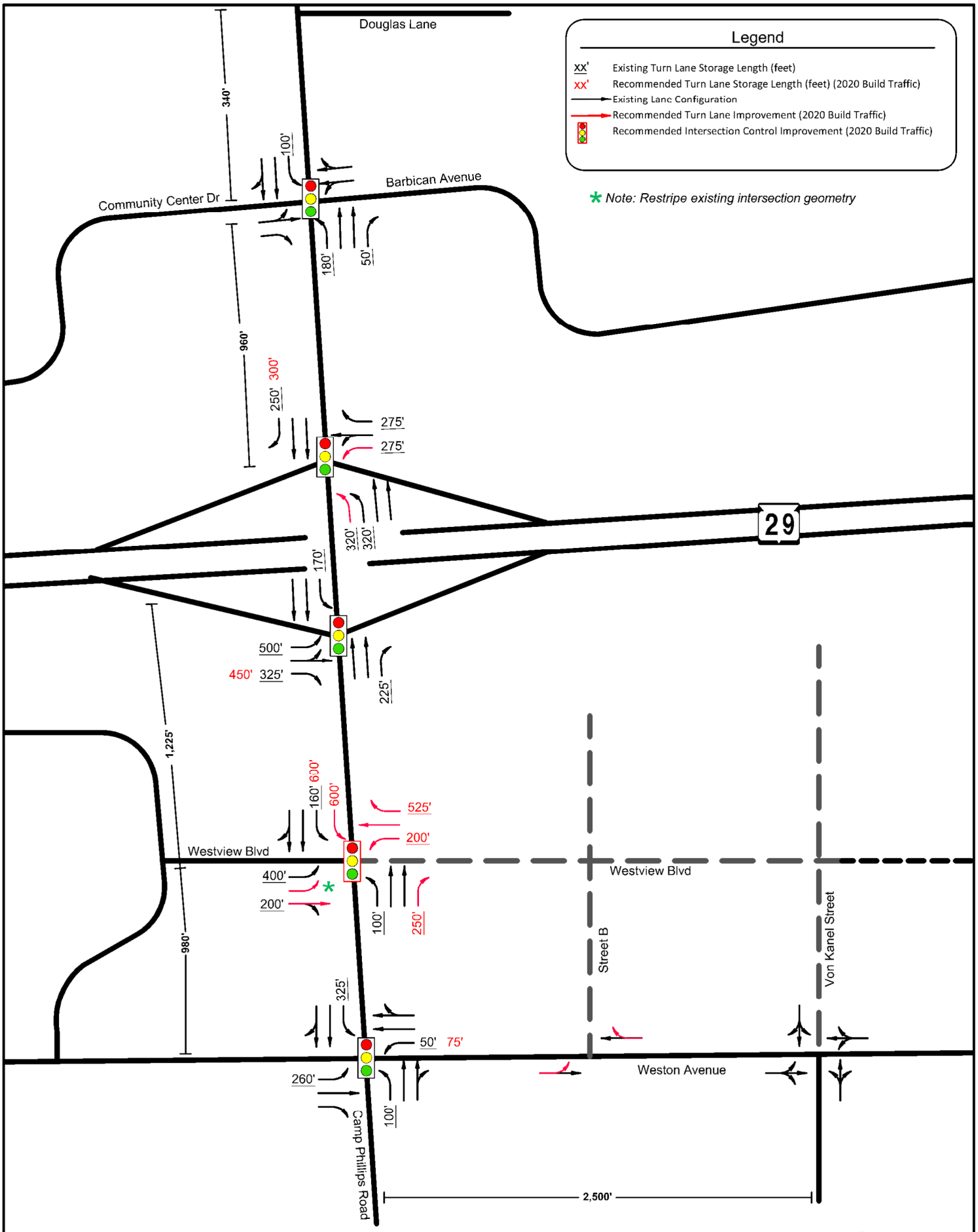

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Exhibit 1-3, 2020 Base Year Build Traffic Recommended Improvements

Village of Weston [Marathon County]

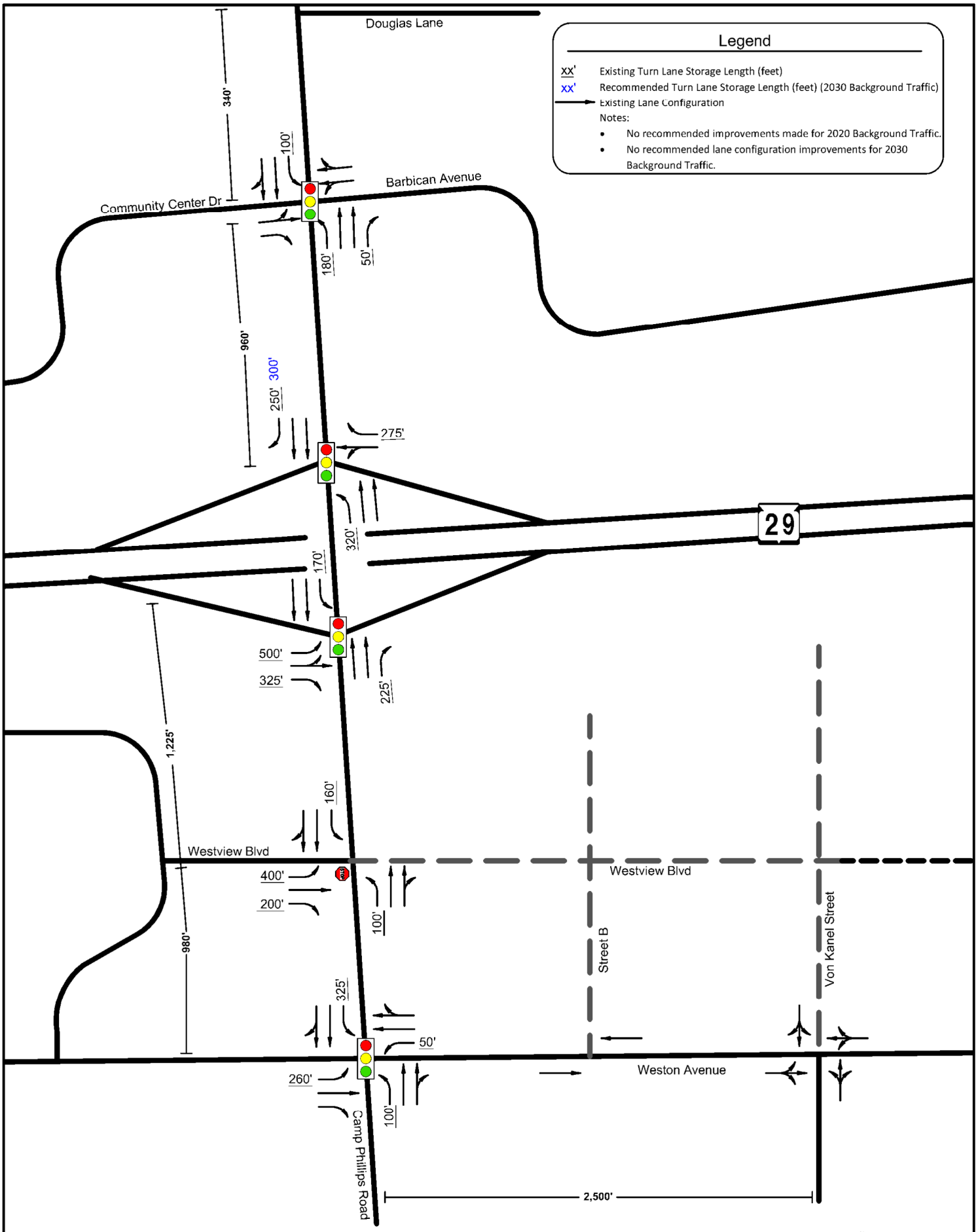

Exhibit 1-5, 2030 Interim Year Background Traffic Improvements

Village of Weston [Marathon County]

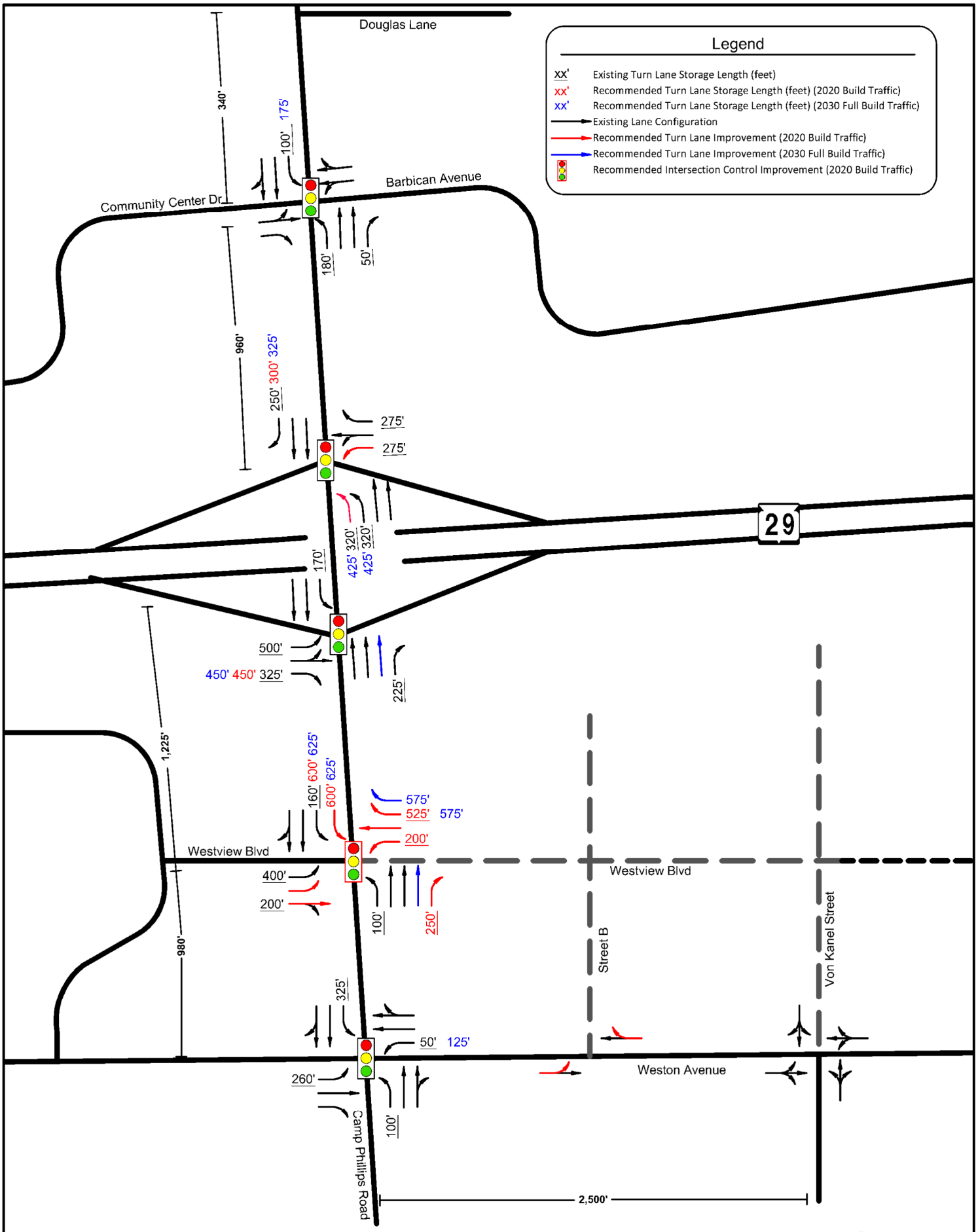

Exhibit 1-6, 2030 Interim Year Full Build Traffic Recommended Improvements

Village of Weston [Marathon County]

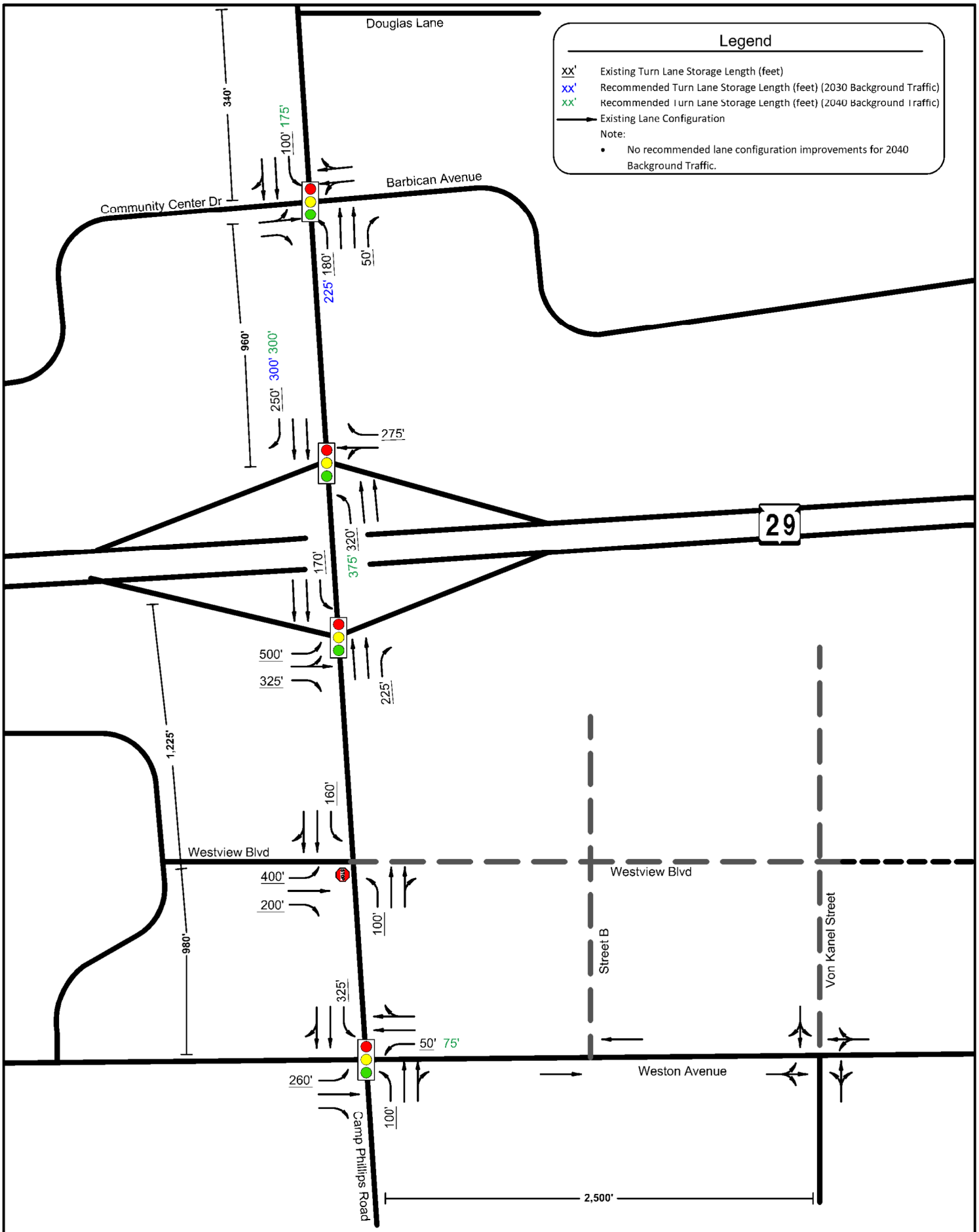

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Exhibit 1-8, 2040 Horizon Year Background Traffic Improvements

Village of Weston [Marathon County]

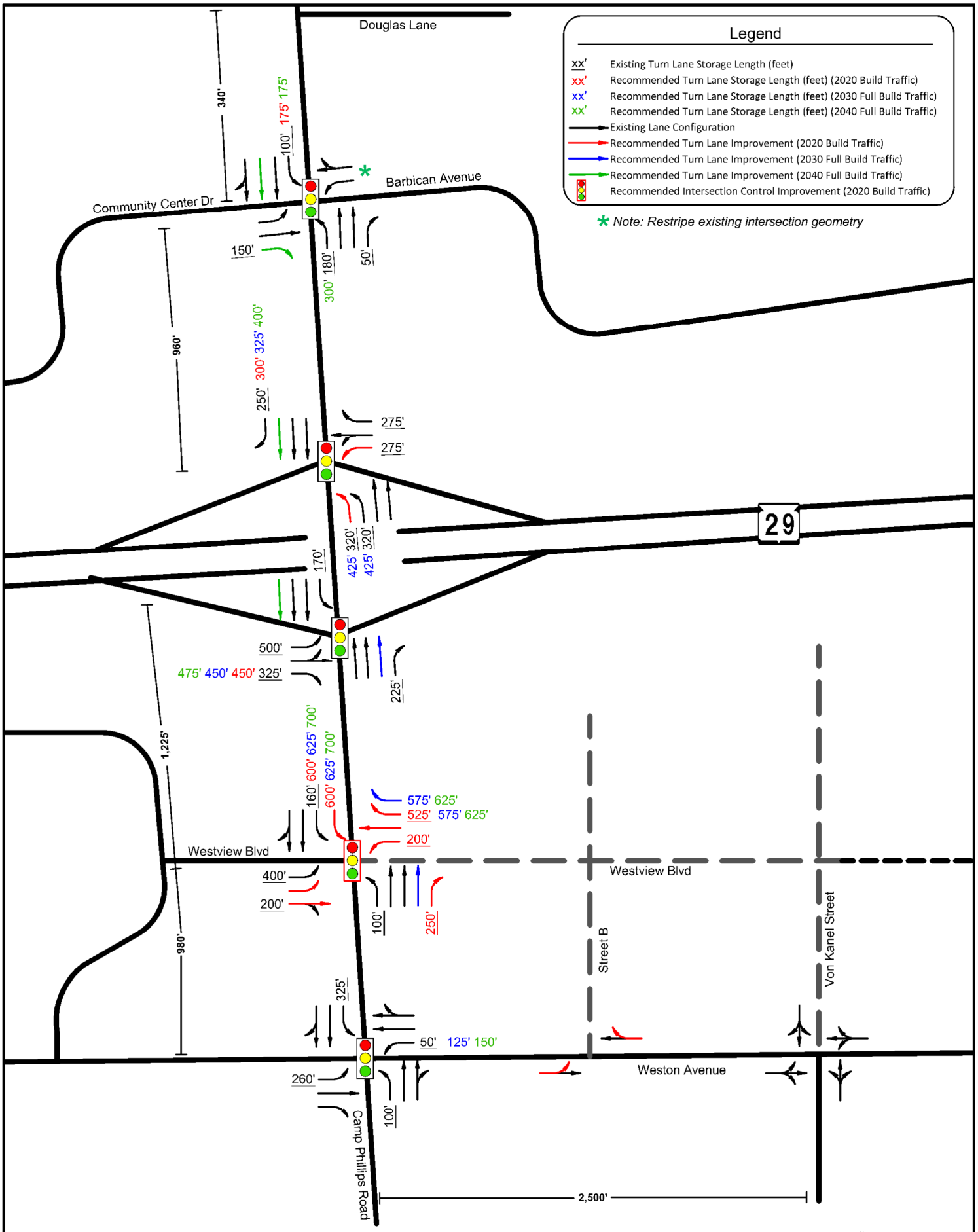

Exhibit 1-9, 2040 Horizon Year Full Build Traffic Recommended Improvements

Village of Weston [Marathon County]

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N

NOT TO SCALE

Chapter 2 – PROPOSED DEVELOPMENT

This chapter of the report provides a description of the proposed development and the adjacent area. The description includes the location of the site, the planned land uses, the intensity of the development, and the development stages. In addition, the influence area of the development, the area of significant traffic impact, and the site accessibility are identified.

PART A – ON-SITE DEVELOPMENT

A1. Development Description and Site Location

The Village of Weston has engaged in a detailed planning effort to redefine the role of County Road X, also known as County Trunk Highway (CTH) X, as a primary development corridor and to establish a strategic framework for land use, development policy, and public and private investment decisions to encourage development and redevelopment along the corridor. The corridor has various attributes that make it a viable development corridor including, accessibility to regional transportation networks, proximity to the Wausau metropolitan area, and local utility availability which make it ideal for development.

The master plan for Camp Phillips Centre proposes to develop 320 acres in the southeast quadrant of WIS 29 and County Road X (CR X), as seen in ***Exhibit 2-1****, Site Location Map*.

A2. Land Use and Intensity

The existing site is currently vacant. As part of the Village of Weston's Comprehensive Plan, adopted in October 2016, the land is zoned for commercial uses. The Village's intent for the area is to grow the local economy, increase commercial services, and encourage community building.

Mixed-use development consisting of commercial, retail, office space, industrial, and warehousing have been proposed for Camp Phillips Centre, as summarized below in ***Table 2-1***. The ITE Land Use codes associated with each type of development are included as well as the appropriate size and unit per land use.

There are handful of existing business located on the west side of County Road X near the intersection of Westview Boulevard. Businesses such as The Store Gas Station, Schierl Tire and Service, Connexus Credit Union, and other small business would consider Westview Boulevard and County Road X as part of their primary access. Marshfield Clinic – Weston Center is also located west of County Road X however primary access is located off of Birch Street and Weston Avenue. Access to WIS 29 is most conveniently located off of County Road X. Marshfield Clinic is the primary care center for Weston and other surrounding communities such as Rothschild, Schofield, and Ringle.

Table 2-1: *On-Site Land Uses*

	Site Plan Lot Number	ITE Land Use	ITE Code	Size	Units
Phase I	1	Free-Standing Discount Superstore	813	187,000	Square Feet
	2	Free-Standing Discount Superstore	813	146,000	Square Feet
	3	Supermarket	850	78,000	Square Feet
	4	Home Improvement Superstore	862	210,000	Square Feet
	5	Shopping Center	820	78,000	Square Feet
	6	Shopping Center	820	17,000	Square Feet
	7	Shopping Center	820	20,000	Square Feet
	8	Shopping Center	820	17,000	Square Feet
	9	Shopping Center	820	10,000	Square Feet
	10	Shopping Center	820	5,000	Square Feet
	11	Drive-in Bank	912/Combo *	4	Drive-in Lanes
	12	Shopping Center	820	7,000	Square Feet
	13	Shopping Center	820	11,000	Square Feet
	14	Gasoline/Service Station with Convenience Market and Car Wash	946	20	Fueling Stations
	15	Shopping Center	820	15,000	Square Feet
	16	Fast-Food Restaurant without Drive-Through Window	933	8,000	Square Feet
	17	General Office Building	710	60,000	Square Feet
Phase II	26A-26E	Residential Condominium/Townhouse	230	30	Dwelling Units
	26F-26J	Apartment	220	282	Dwelling Units
	26K	Recreational Community Center	495	9,000	Square Feet
	27	General Office Building	710	21,000	Square Feet
	28	General Office Building	710	19,000	Square Feet
	29A-29D	General Office Building	710	46,000	Square Feet
	30A-30C	General Office Building	710	28,000	Square Feet
	31	Warehousing	150	85,000	Square Feet
	32	Warehousing	150	56,000	Square Feet
	33	General Light Industrial	110	24,000	Square Feet
	34	Warehousing	150	77,000	Square Feet
	35	Warehousing	150	77,000	Square Feet
	36	General Light Industrial	110	25,000	Square Feet
	37	General Light Industrial	110	25,000	Square Feet
	38	General Office Building	710	21,000	Square Feet
	39	General Office Building	710	13,000	Square Feet
	40	General Office Building	710	13,000	Square Feet
	41	General Office Building	710	21,000	Square Feet

**The Mixed-Use Development Study was used for the PM peak hour trip generation data that combines the ITE Trip Generation Manual and local data collected around the State of Wisconsin*

A3. Proposed Site Plan

Several access locations are proposed in order to accommodate the 320 acre development of Camp Phillips Centre, as seen in ***Exhibit 2-2A,*** *Site Plan*. The primary access to Camp Phillips Centre will be located at the intersection of County Road X & Westview Boulevard, approximately 1,100-ft south of the WIS 29 interchange. Other access to the development will be located along Weston Avenue, the south border of the development. Three (3) access points are proposed including one new access between County Road X and Von Kanel Street (Street B), the existing intersection of Van Kanel Street (Street C), a new northern street connection at Heeren Street (Street E).

The intersections along Weston Avenue east of County Road X are included in this report for trip assignment and balancing only. Additional detail of the plan, including preliminary building footprints, can be seen in ***Exhibit 2-2B*** and ***Exhibit 2-2C***.

A4. Development Phasing and Timing

Camp Phillips Centre is proposed for phased development, as shown in ***Exhibit 2-3,*** *Development Staging Detail*. Phase I of the development is concentrated in the west 160 acres and is anticipated to consist of mixed-use commercial development including retail, restaurants, and commercial shopping, see **Exhibit 2-2B,** *Phase I Site Plan***.** The second phase is located in the east 160 acres of the parcel and will consist of light industrial, warehousing, general office, and a small portion of apartment uses as seen in **Exhibit 2-2C,** *Phase II Site Plan*.

The horizon year analyses for the AM and PM peak hours will be complied using the following methodology:

- **2020** = (build year of Phase I)
- **2030** = (full build out; Phase I + Phase II)
- **2040** = (full build out + 10 years)

PART B – STUDY AREA

B1. Influence Area

The proposed project's influence area is the geographic area bounded by WIS 29 to the north, existing property boundaries to the east, Weston Avenue to the south, and County Road X (CR X) to the west.

B2. Area of Significant Traffic Impact

The Village's initiatives for the study area are intended to focus public and private efforts to promote and support the growth along County Road X for development of viable, sustainable, large scale commercial activity.

County Road X is a critically important north-south travel route in the suburban and regional travel network that links the Village and the neighboring communities of Wausau, Schofield, Rothschild, and Kronenwetter.

The Wausau metropolitan area, as well as the central areas of Wisconsin, rely on WIS 29 to travel east-west across the state between Minneapolis and Green Bay. WIS 29 also has direct access to WIS 39 and WIS 51 which are the primary north-south highway routes within the state of Wisconsin. Approximately 30,000 vehicles per day (vpd) travel on WIS 29 for commuting or hauling goods.

Weston Avenue has been prioritized for reconstruction east of County Road X as part of the Village's Comprehensive Plan. The Village has planned to reconstruct Weston Avenue with intersection improvements and a wider cross section in order to help promote development of Camp Phillips Centre.

PART C – OFF-SITE LAND USE AND DEVELOPMENT

The existing study area is zoned for highway business, including retail and commercial development, as seen in ***Exhibit 2-4A,*** *Existing Land Use Map*. The Village's Comprehensive Plan outlines the study area as

future commercial and mixed-use development, as seen in ***Exhibit 2-4B,*** *Future Land Use Map,* which is consistent with the proposed development. The surrounding lands are zoned for business or office park as well as single family residential areas.

No specific additional off-site developments of significance are known or included as part of this study. If developed in the future, an additional study analyzing the traffic impacts will need to be coordinated through the Village of Weston, Marathon County, and/or WisDOT and the developer.

PART D – SITE ACCESSIBILITY

A multiuse trail overpass of WIS 29 is located west of the project area, as seen in ***Exhibit 2-4C****, Future Recreational Facilities.* The trail connects to an off-street multiuse path on the south side of Weston Avenue and extends to the west side of County Road X. There are limited crossings and alternate routes currently in place within the project area. Future trail connections are anticipated along Weston Avenue and off-street paths within Camp Phillips Centre. No direct trail connection on County Road X across WIS 29 to the north side of the Village is anticipated.

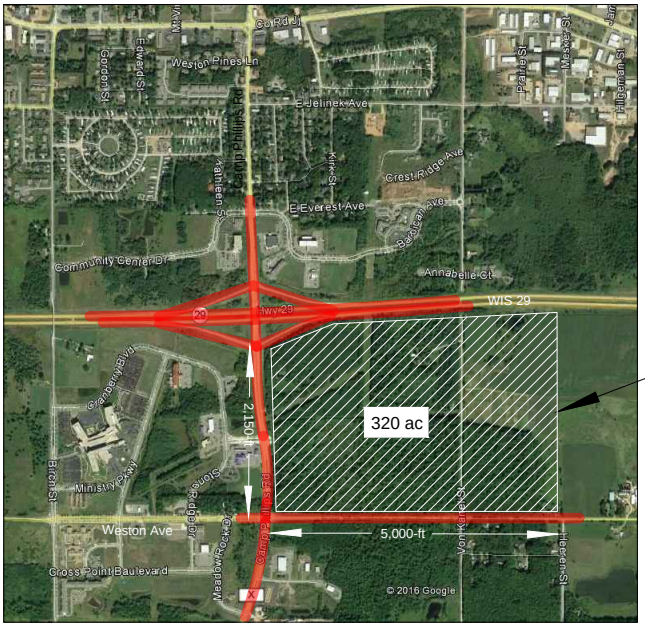
Pedestrians were not counted during the traffic counts and a limited amount of pedestrians have been actively observed along the corridor. Very few residential neighborhoods surround the proposed development.

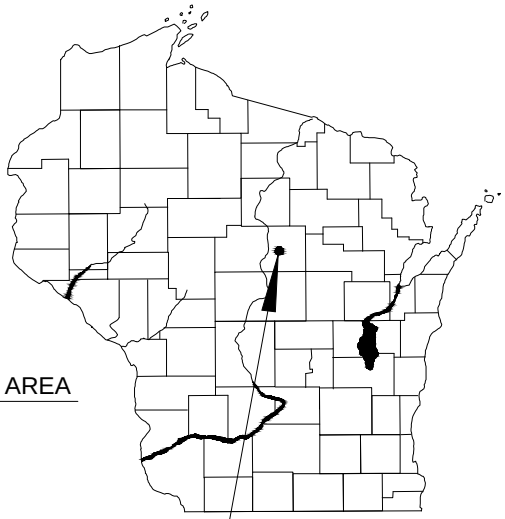
The Wausau area transit system, Metro Ride, is located northwest of the project area, only within the City of Wausau proper. No current routes continue into the Village of Weston at this time.

Due to the land use of the surrounding and adjacent parcels and limited or lack of existing and proposed multimodal systems or supporting land uses, it was assumed that no new trips would arrive to the site using alternative modes of transportation. However, the office space, retail services, and food industry land uses proposed for the development may attract some trips within the site to be linked using different modes of transportation, including walking.

Exhibit 2-1: Project Location Map

Camp Phillips Centre Development
Village of Weston, Marathon County

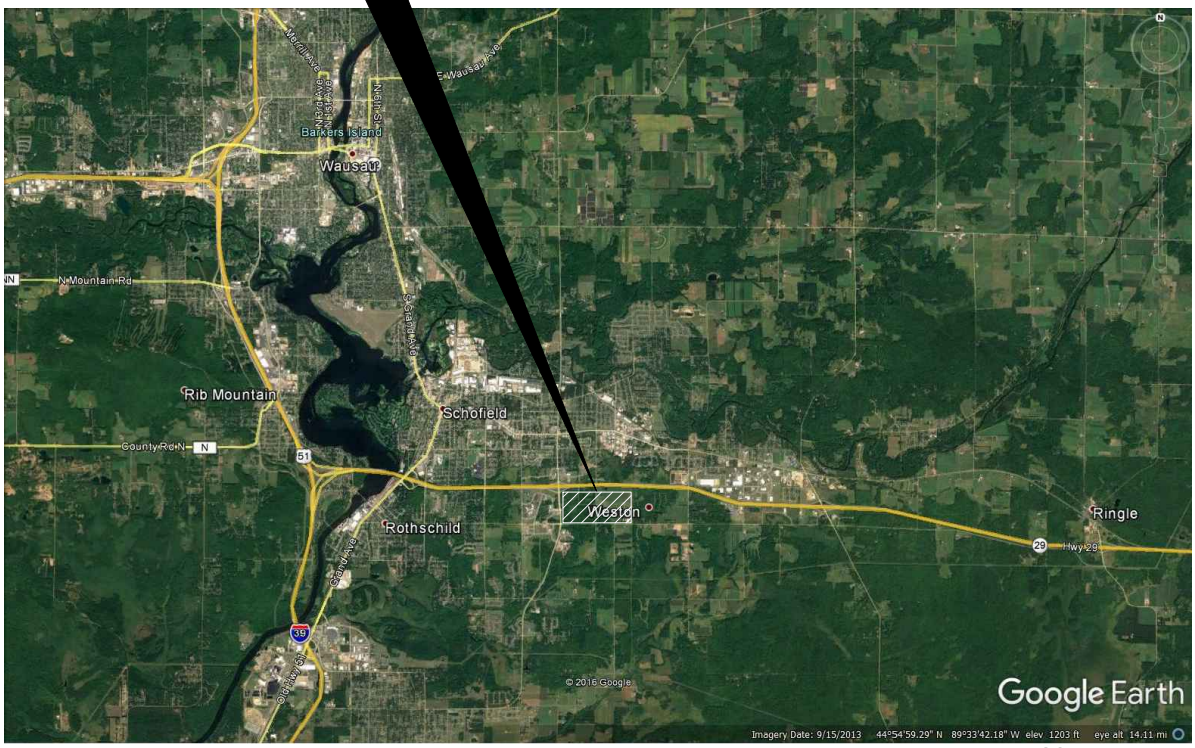




PROJECT AREA

PROJECT LOCATION

Village of Weston



SCALE: None

MSA PROFESSIONAL SERVICES

Exhibit 2-2A: Site Plan

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin

Date: 06.29.17

EXHIBIT B - MASTER PLAN

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.

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Camp Phillips Centre
COMMERCIAL DISTRICT
VILLAGE OF WESTON, WI

FDG

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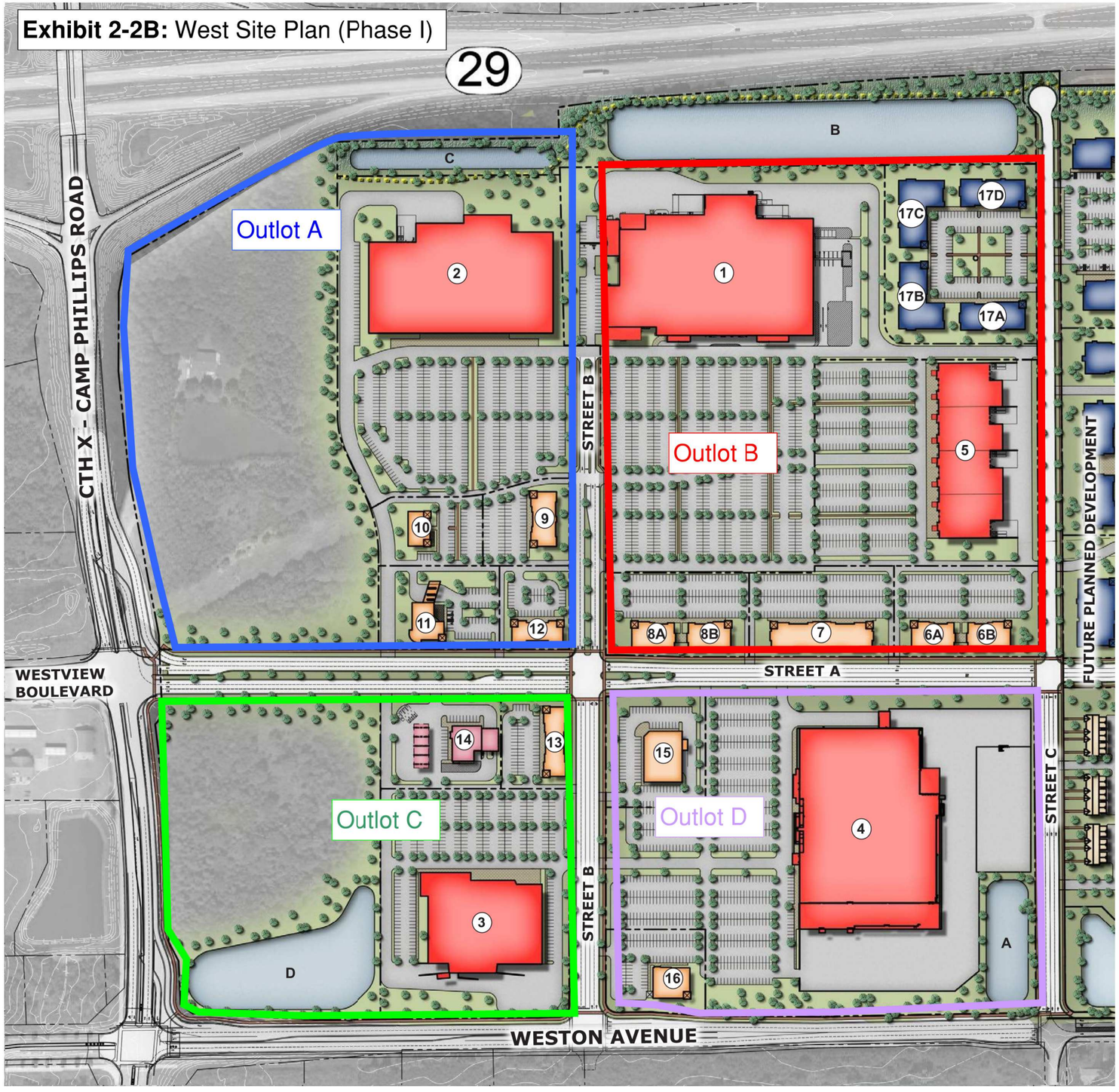
north

SCALE IN FEET

200' 0 200'



LAND USE KEY: PHASE 1

LOT 1 - 18.95 ACRES
Large Retail - 186,931 sq. ft.
Surface Parking - 838 stalls
Percentage of net land = 21.41%

LOT 2 - 12.38 ACRES
Large Retail - 146,259 sq. ft.
Surface Parking - 441 stalls
Percentage of net land = 13.99%

LOT 3 - 7.48 ACRES
Large Retail - 78,173 sq. ft.
Surface Parking - 312 stalls
Percentage of net land = 8.45%

LOT 4 - 19.10 ACRES
Large Retail - 210,000 sq. ft.
Surface Parking - 642 stalls
Percentage of net land = 21.58%

LOT 5 - 7.93 ACRES
Large Retail - 78,051 sq. ft.
Surface Parking - 378 stalls
Percentage of net land = 8.96%

LOT 6 - 2.28 ACRES
A- Commerical/Retail - 8,382 sq. ft.
B- Commerical/Retail - 8,382 sq. ft.
Surface Parking - 134 stalls
Percentage of net land = 2.58%

LOT 7 - 2.20 ACRES
Commerical/Retail - 19,609 sq. ft.
Surface Parking - 152 stalls
Percentage of net land = 2.49%

LOT 8 - 2.08 ACRES
A- Commerical/Retail - 8,382 sq. ft.
B- Commerical/Retail - 8,382 sq. ft.
Surface Parking -137 stalls
Percentage of net land = 2.35%

LOT 9 - 1.22 ACRES
Commerical/Retail - 9,480 sq. ft.
Surface Parking - 66 stalls
Percentage of net land = 1.38%

LOT 10 - 1.24 ACRES
Commerical/Retail - 5,060 sq. ft.
Surface Parking - 49 stalls
Percentage of net land = 1.40%

LOT 11 - 1.73 ACRES
Commerical/Retail - 7,639 sq. ft.
Surface Parking - 42 stalls
Percentage of net land = 1.95%

LOT 12 - 1.01 ACRES
Commerical/Retail - 7,257 sq. ft.
Surface Parking - 36 stalls
Percentage of net land = 1.14%

LOT 13 - 1.05 ACRES
Commerical/Retail - 10,840 sq. ft.
Surface Parking - 55 stalls
Percentage of net land = 1.19%

LOT 14 - 1.82 ACRES
Fuel - 7,296 sq. ft.
Surface Parking - 20 stalls
Percentage of net land = 2.06%

LOT 15 - 1.96 ACRES
Commerical/Retail - 14,580 sq. ft.
Surface Parking - 94 stalls
Percentage of net land = 2.21%

LOT 16 - 1.41 ACRES
Commerical/Retail - 8,229 sq. ft.
Surface Parking - 84 stalls
Percentage of net land = 1.59%

LOT 17 - 4.68 ACRES
A - Office- 12,900 sq. ft.
B - Office- 16,975 sq. ft.
C - Office - 16,975 sq. ft.
D - Office - 12,900 sq. ft.
Surface Parking - 134 stalls
Percentage of net land = 5.29%

STORMWATER
A - 0.87 acres / 38,077 sq. ft.
B - 6.89 acres / 179,260 sq. ft.
C - 1.37 acres / 32,329 sq. ft.
D - 11.70 acres / 106,318 sq. ft.

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin **Date:** 06.29.17

MASTER CONCEPT PLAN
COMMERCIAL DISTRICT

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.

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north
SCALE IN FEET
200' 0 200'

FDG

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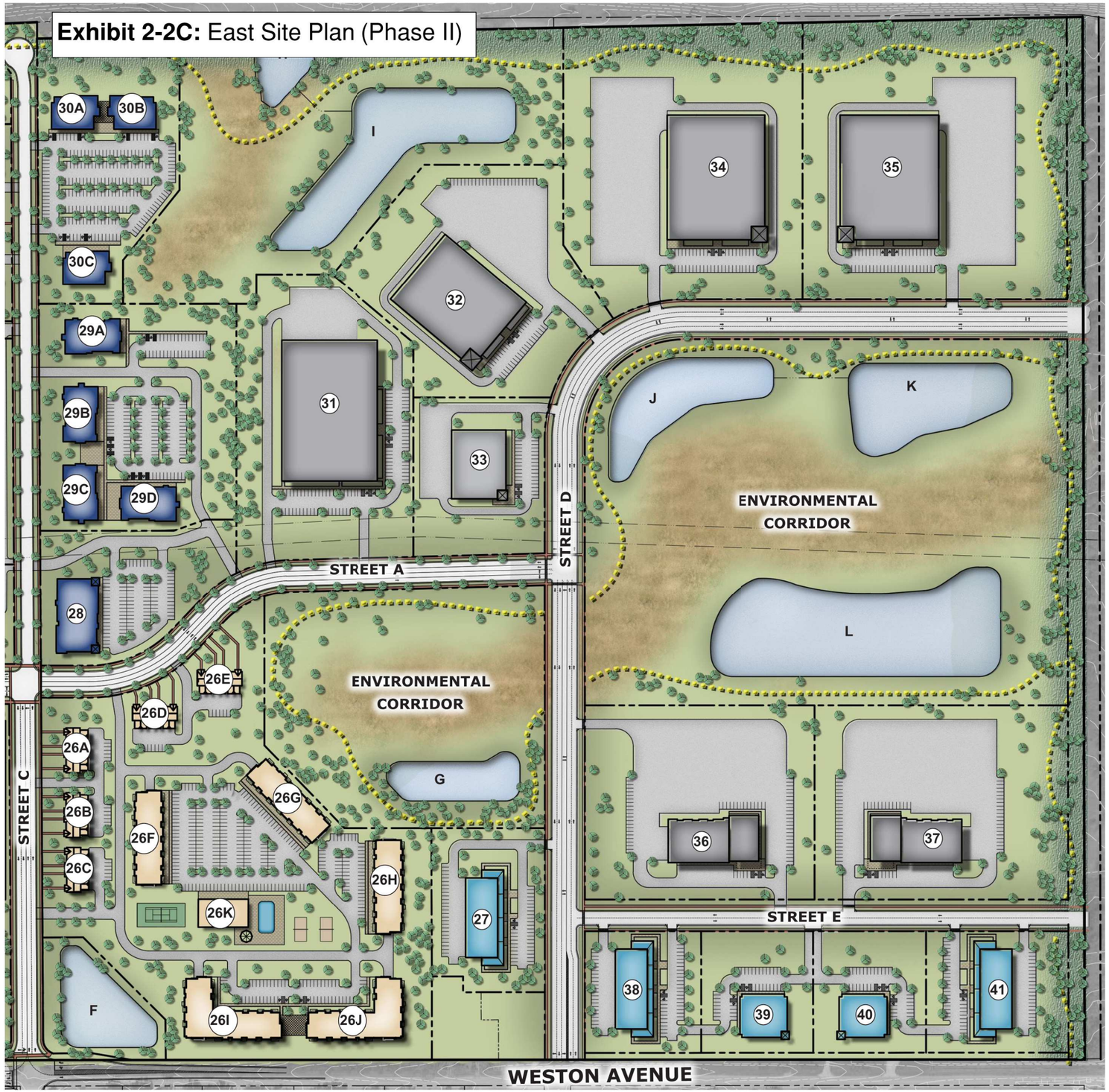

Exhibit 2-2C: East Site Plan (Phase II)

LAND USE KEY: PHASE 1

LOT 26 - 17.00 ACRES
A - Residential - 6,000 sq. ft.
B - Residential - 6,000 sq. ft.
C - Residential - 6,000 sq. ft.
D - Residential - 6,000 sq. ft.
E - Residential - 6,000 sq. ft.
F - Residential - 16,000 sq. ft.
G - Residential - 16,000 sq. ft.
H - Residential - 16,000 sq. ft.
I - Residential - 16,000 sq. ft.
J - Residential - 16,000 sq. ft.
K - Clubhouse - 8,900 sq. ft.
Surface Parking - 347 stalls
Percentage of net land = XX.X%

LOT 27 - 2.60 ACRES
Office - 21,200 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 28 - 3.12 ACRES
Office - 19,168 sq. ft.
Surface Parking - 312 stalls
Percentage of net land = XX.X%

LOT 29 - 6.35 ACRES
A - Office - 11,602 sq. ft.
B - Office - 11,602 sq. ft.
C - Office - 11,602 sq. ft.
D - Office - 11,602 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 30 - 4.79 ACRES
A - Office - 9,166 sq. ft.
B - Office - 9,166 sq. ft.
C - Office - 9,166 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 31 - 6.82 ACRES
Industrial - 85,068 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 32 - 6.37 ACRES
Industrial - 55,869 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 33 - 2.99 ACRES
Industrial - 23,521sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 34 - 9.40 ACRES
Industrial - 77,344 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 35 - 10.63 ACRES
Industrial - 77,344 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 36 - 6.43 ACRES
Industrial - 25,117 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 37 - 7.07 ACRES
Industrial - 25,117 sq.ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 38 - 2.03 ACRES
Office - 21,200 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 39 - 1.97 ACRES
Office - 13,058 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 40 - 1.97 ACRES
Office - 13,058 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

LOT 41 - 2.48 ACRES
Office - 21,200 sq. ft.
Surface Parking - XXX stalls
Percentage of net land = XX.X%

STORMWATER
F - 1.60 acres / 41,702 sq. ft.
G - 9.20 acres / 62,586 sq. ft.
H - 11.47 acres / 18,542 sq. ft.
I - Shared / 99,148 sq. ft.
J - 25.14 acres / 61,098 sq. ft.
K - Shared / 71,257 sq. ft.
L - Shared /162,486 sq. ft.

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin **Date:** 03.28.17

MASTER CONCEPT PLAN - EAST 160

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.

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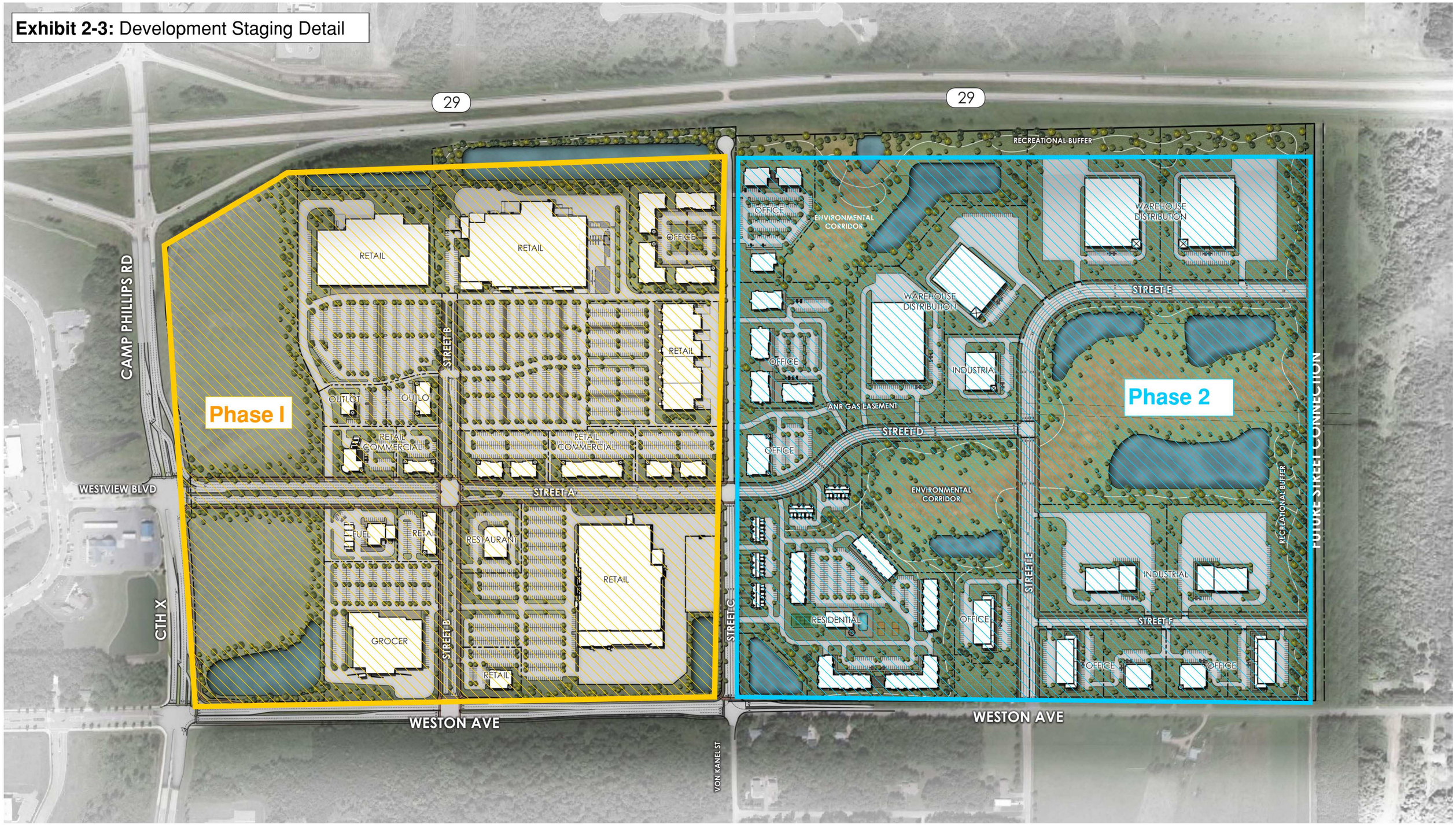
north
SCALE IN FEET
200' 0 200'

FDG

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

Exhibit 2-3: Development Staging Detail



CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin

Date: 06.29.17

EXHIBIT B - MASTER PLAN

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Camp Phillips Centre
COMMERCIAL DISTRICT
VILLAGE OF WESTON, WI

FDG

JSD Professional Services, Inc.
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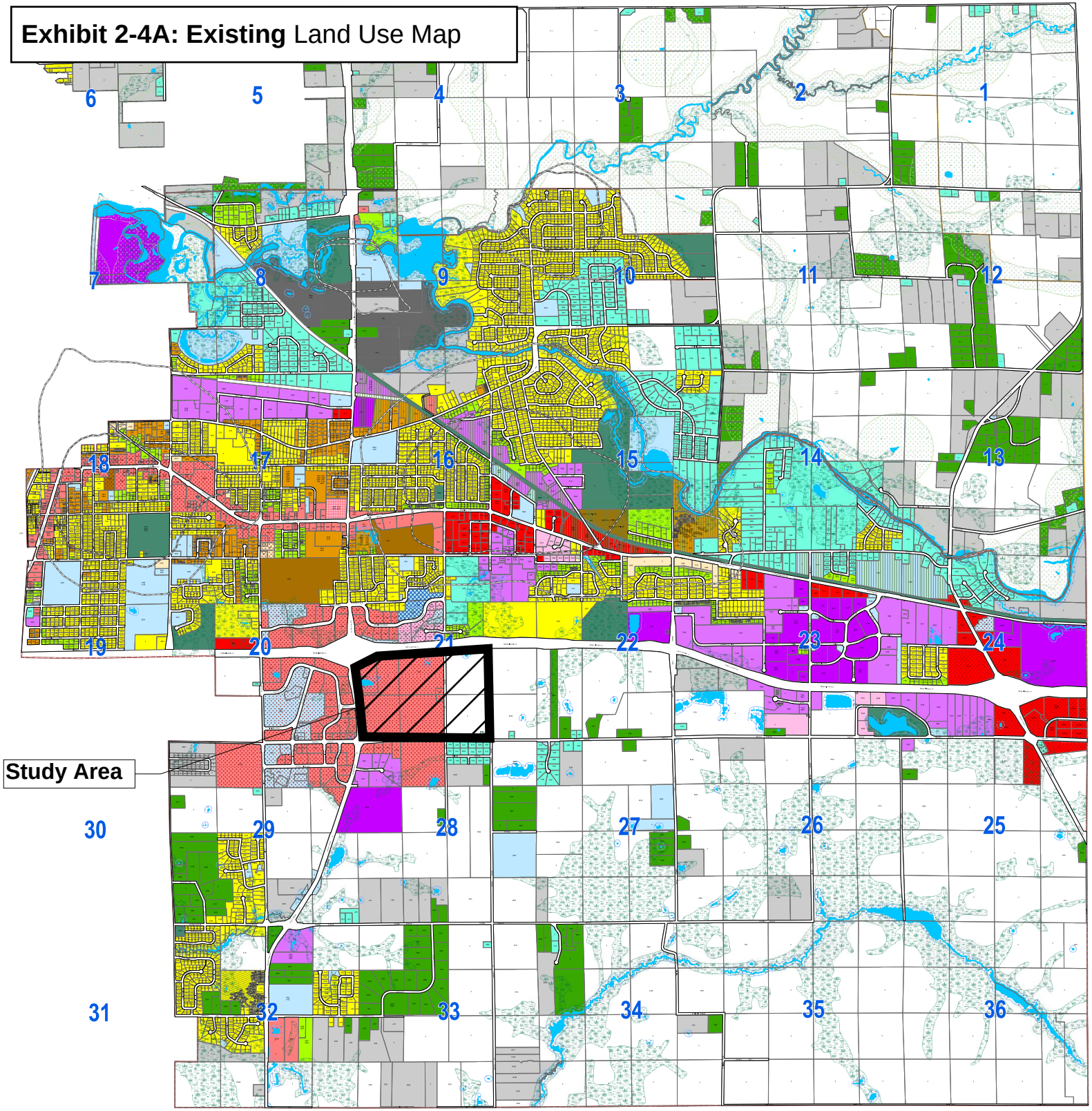
north
SCALE IN FEET
200' 0 200'

Exhibit 2-4A: Existing Land Use Map



Village and Town of Weston
Marathon County, Wisconsin

OFFICIAL ZONING MAPS

Map Date:	4/6/2017
Adoption Date (Village):	2/22/2017
Adoption Date (ETZ):	2/22/2017
Adoption Date (Town):	1/23/2016

Map by the Technology Services Department
Village of Weston

0 0.25 0.5 1 Miles

COPY

LEGEND

- Village of Weston
- Extraterritorial Zoning (ETZ) Boundary
- Town of Weston
- Right-of-way
- Parcel Boundary
- Surface Water
- Wetland

ZONING DISTRICTS

- AR - Agriculture and Residential
- PR - Parks and Recreation
- RR-2 - Rural Residential-2 Acre
- RR-5 - Rural Residential-5 Acre
- SF-L - Single Family Residential-Large Lot
- SF-S - Single Family Residential-Small Lot
- 2F - Two Family Residential
- MF - Multiple Family Residential
- MH - Manufactured Home
- INT - Institutional
- B-1 - Neighborhood Business
- B-2 - Highway Business
- B-3 - General Business
- BP - Business Park
- LI - Limited Industrial
- GI - General Industrial
- RM - Rural Mix

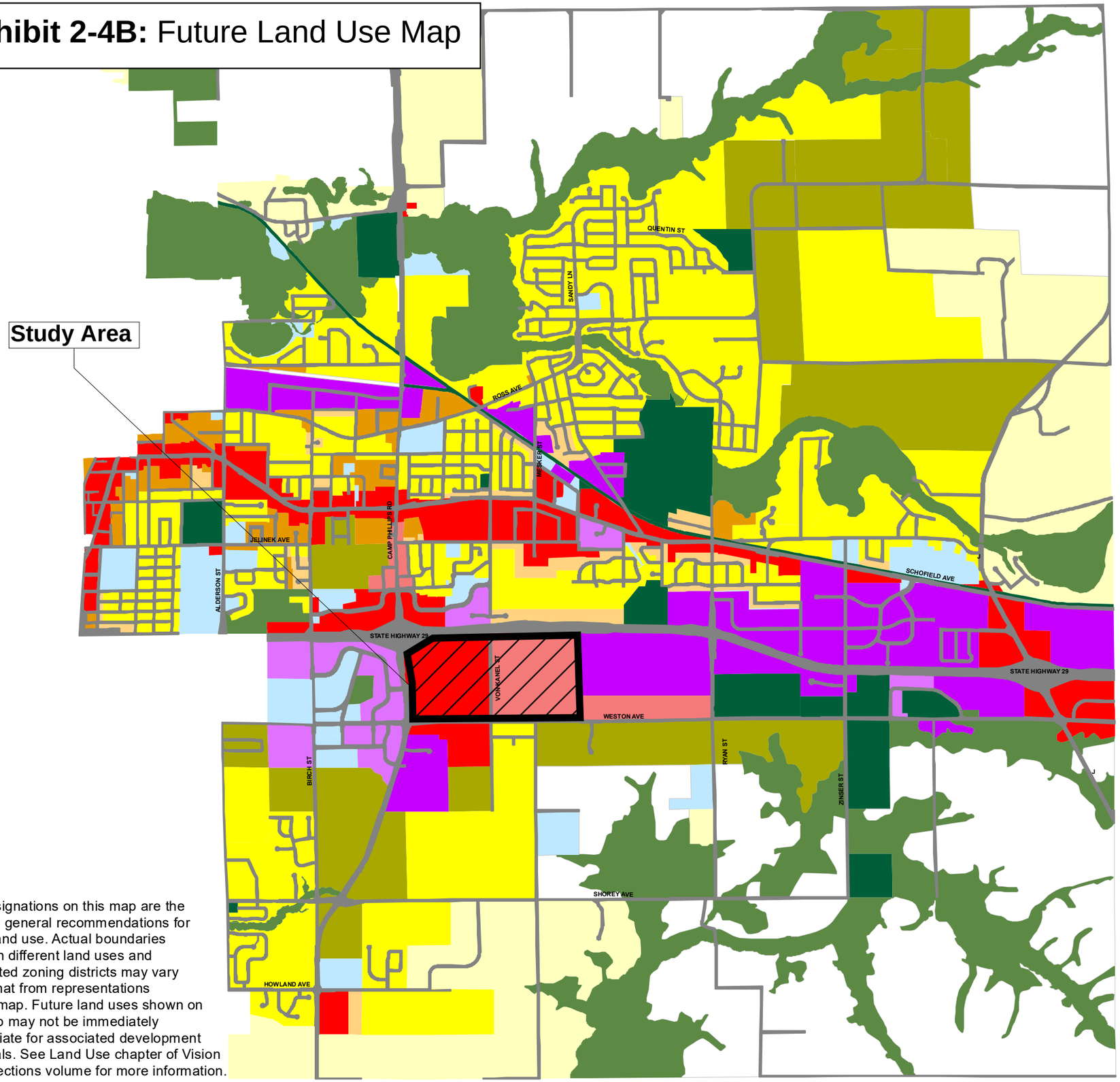
OVERLAY ZONING DISTRICTS

- Design - Commercial Corridor
- Design - Condominium
- Design - Renaissance
- Design - Rail-to-Trail
- Design - Weston Marketplace
- Village of Weston Shoreland Overlay Zoning
- Marathon County Shoreland Overlay Zoning

WELLHEAD PROTECTION ZONES

- Zone A
- Zone B

Exhibit 2-4B: Future Land Use Map



Note:
The designations on this map are the village's general recommendations for future land use. Actual boundaries between different land uses and associated zoning districts may vary somewhat from representations on this map. Future land uses shown on this map may not be immediately appropriate for associated development approvals. See Land Use chapter of Vision and Directions volume for more information.

Village of Weston Comprehensive Plan

3-1

Future Land Use

Approval Date: 10/3/2016

Map Date: 09/07/2016

Created by the Village of Weston Tech. Services Department

0 0.25 0.5 1 Mile

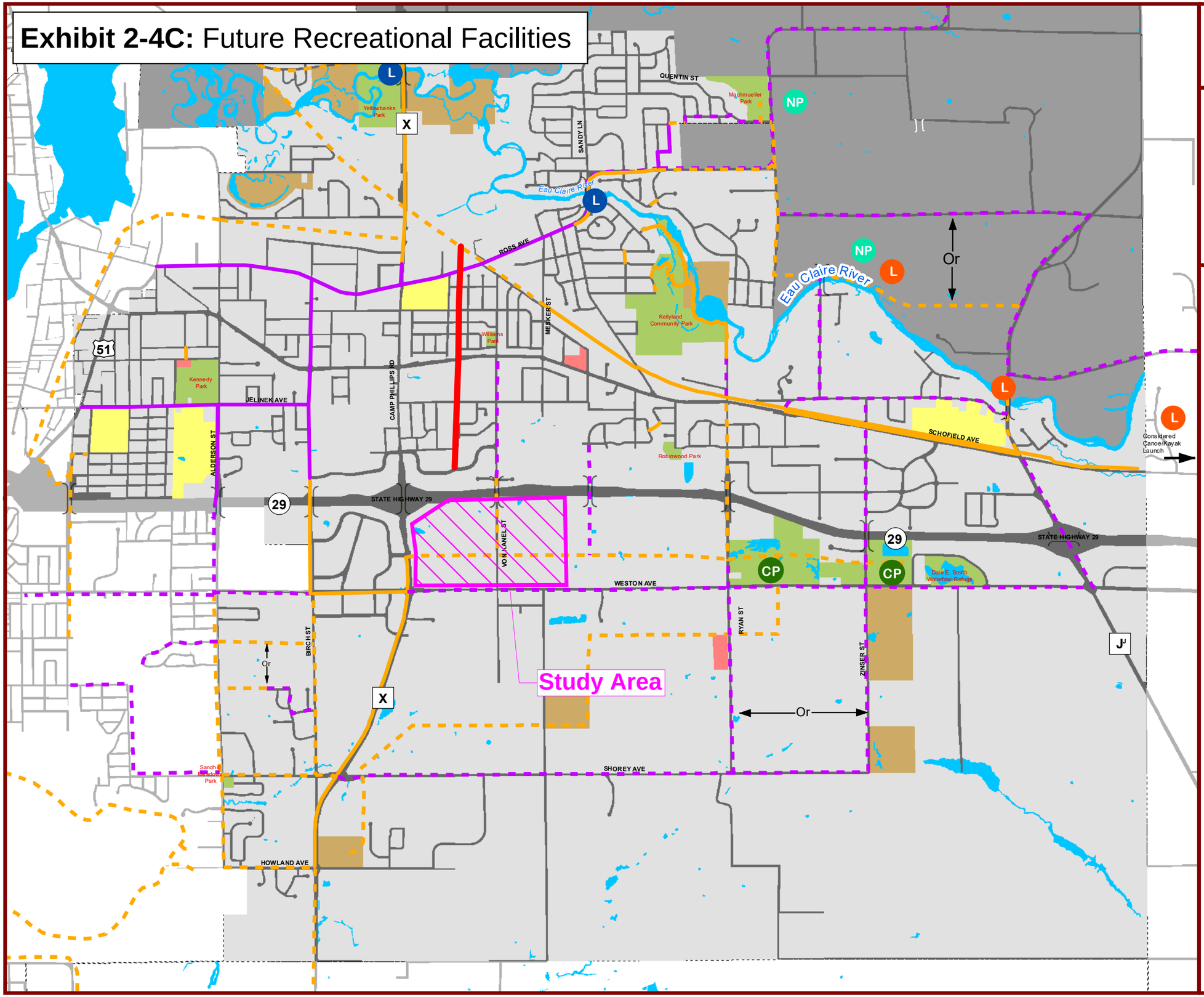
Legend

- Right-of-Way

Future Land Use Designations

- Single Family Residential - Unsewered
- Single Family Residential - Sewered
- Two Family Residential
- Multple Family Residential
- Planned Neighborhood
- Commercial
- Business/Office Park
- Mixed Use/Flex
- Industrial
- Institutional
- Parks and Recreation
- Agriculture
- Environmental Corridor

Exhibit 2-4C: Future Recreational Facilities



Village of Weston Comprehensive Plan

7-3

Future Parks and Recreational Faciltites

Adoption Date: 10/03/2016

Map Date: 09/07/2016

Created by the Village of Weston Tech. Services Department

0 0.225 0.45 0.9 Miles

Legend

- Village of Weston
- Town of Weston
- Other Municipalities
- Existing Village/Town Roads
- Other Existing Roads
- Surface Water

Existing Facilities

- L Canoe/Kayak Launch
- Off-Road Trail
- On-Street Bike Connector
- Municipal Buildings
- Public Parks
- Privately Owned Recreational Facilities
- Public School Recreational Facilities

Future Facilities

- L Canoe/Kayak Launch
- NP Neighborhood Park
- CP Community Park
- Off-Road Trail
- On-Street Bike Connector
- Conceptual Snowmobile Connection

Chapter 3 – ANALYSIS OF EXISTING CONDITIONS

The analysis of existing conditions provides a base against which the incremental traffic impacts of the proposed development can be measured. This chapter includes the following topics:

- Physical characteristics of the existing transportation
- Traffic volumes
- Capacity / Level of Service
- Sources of Data

PART A – PHYSICAL CHARACTERISTICS

A1. Existing Area Roadway System

The existing transportation system consists of County Road X (CR X), which is a four-lane urban arterial. The corridor speed limit transitions from 35 miles per hour (mph) to 30 mph near the WIS 29 interchange heading north into the Village proper, as shown in **Exhibit 3-1**, *Existing Transportation System*. The roadway consists of concrete pavement, urban curb & gutter, 10-ft multi-use path on the west side of the roadway. The existing roadway right-of-way is approximately 170-ft.

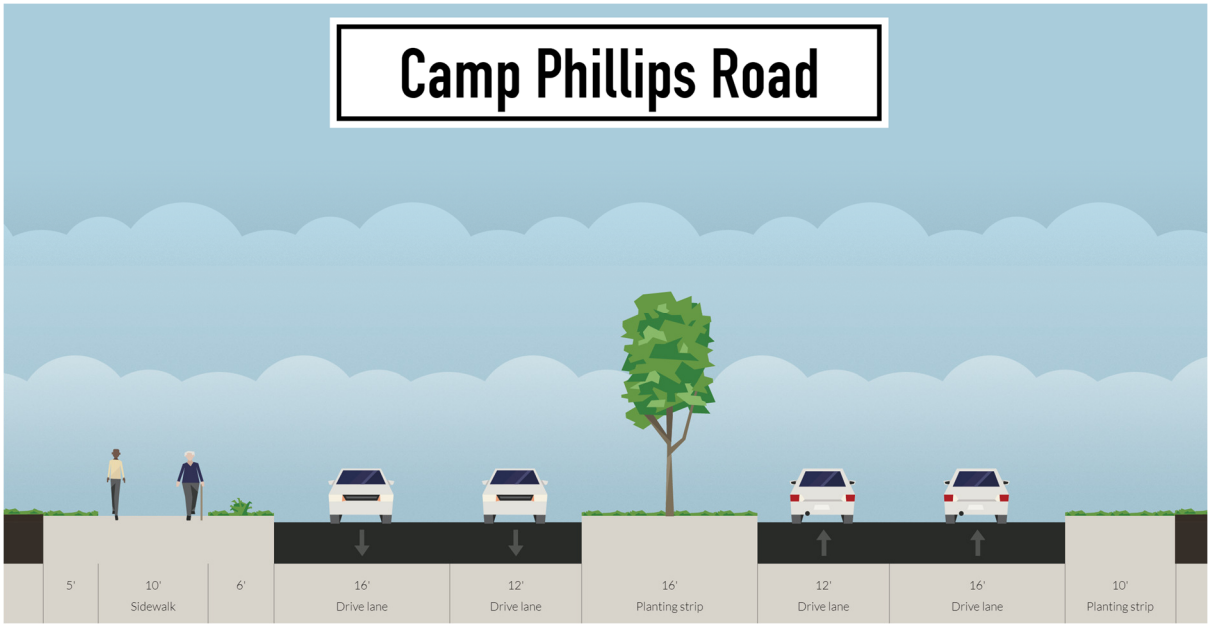


Figure 3-1: *Existing Roadway Configuration*

Exhibit 3-1 illustrates the specific intersection diagrams and transportation layout of the study area intersections. All study area intersection are full access with the exception of the WIS 29 ramp terminals which only allow one-way traffic to access the state highway. Standard traffic signal installations are present at all study area locations not specifically noted as stop controlled intersections.

The west approach of the intersection of County Road X & Weston Avenue is currently painted as an exclusive left turn lane, a single thru lane, and a shared thru/right lane. The receiving lanes and upstream east approach of the intersection only has one true receiving lane. Therefore, the west approach of County Road X & Weston Avenue was modeling as an exclusive left, thru, and right turn lane.

A2. Future Area Roadway System

The Weston Avenue intersections east of County Road X are planned for improvement as part of the Camp Phillips Centre development. Special improvements will be determined through completion of a supplemental traffic impact analysis after approval of this study.

There are no known additional state or local roadway projects planned for the study area intersections.

PART B – TRAFFIC VOLUMES

Background (2015) traffic volume turning movement counts were collected by JSD Professional Services, Inc. during the week of Monday, October 19, 2015 to Thursday, October 22, 2015. Data collection was performed at the following locations:

- County Road X & Weston Avenue
- County Road X & Westview Avenue
- County Road X & WIS 29 EB Ramp Terminal
- County Road X & WIS 29 WB Ramp Terminal
- County Road X & Community Center Drive/Barbican Avenue

No Saturday turning movement counts were completed. As part of the Initial Review it was determined that the AM and PM peak hours were sufficient for analysis.

A peak hour analysis was conducted to determine the corridor peak hour. **Figure 3-2** below illustrates the variation per intersection. As shown, there is a steady peak hour progression throughout the study area corridor. Raw data traffic volumes are included in **Appendix A**.

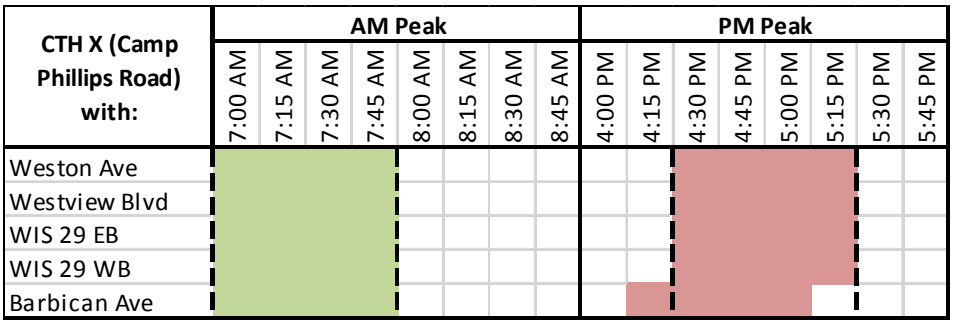


Figure 3-2: *Peak Hour Summary*

A traffic forecast was completed by WisDOT Traffic Forecasting Group in which the 2015 turning movement counts were assumed to be the baseline 2016 as the raw data was collected in late fall of 2015. A summary of the collected turning movement counts are shown in ***Exhibit 3-2A****, 2016 Existing Traffic Volumes (Balanced).* The average annual daily traffic (AADT) volumes were reviewed as part of the WisDOT Traffic Forecast process. The AADT for study area roadways and can also be seen in ***Exhibit 3-2A****.*

Phase I of development is anticipated to occur in 2020. A forecast rate was interpolated from the WisDOT Traffic Forecast completed in 2016, as seen in **Appendix A**. A factor of 1.6% per year was calculated and applied to the 2016 traffic volumes to create the 2020 baseline traffic volumes. ***Exhibit 3-***

***2B**, 2020 Base Year Background Traffic Volumes* illustrates a summary of the balanced baseline peak hour volumes.

PART C – CAPACITY/LEVEL OF SERVICE

The purpose of this section of the report is to show the relationship between traffic operations and roadway geometrics, and to identify improvement needs. The analysis of the base year traffic volumes, capacity, and Level of Service was performed for the study area intersections.

An operational and capacity analysis was completed for each intersection using Synchro 9 which is based on the procedures, methods, and techniques contained in the Highway Capacity Manual, 2010 Edition. This type of analysis assigns a Level of Service to each movement. Level of Service is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, LOS "A," to very poor, LOS "F." The delay is measured in seconds per vehicle, which can be used to determine the Level of Service for the intersection. The below tables represent the delay criteria used for determining the Level of Service at an intersection.

***Table 3-1**: Highway Capacity Manual Level of Service*

Level of Service	Average Control Delay (sec/veh)	
	Stop Control	Signal Control
"A" (best)	0 to 10	0 to 10
"B" (good)	> 10 and ≤ 15	> 10 and ≤ 20
"C" (desirable)	> 15 and ≤ 25	> 20 and ≤ 35
"D" (delay)	> 25 and ≤ 35	> 35 and ≤ 55
"E" (congestion)	> 35 and ≤ 50	> 55 and ≤ 80
"F" (forced flow)	> 50	> 80

The HCM 2010 was adopted by WisDOT for all traffic operations calculations and reports. The study area corridor has several intersections with channelized, yielding right turn lanes. According to Page 18-9 in the HCM, "only right turns that are controlled by the signal should be represented in the right turn volume input…". Synchro 9, using HCM 2010 outputs, does not yield a delay or v/c ratio for channelized right turn movements not controlled by the traffic signal. In order to model the delay that yielding right turn vehicles may experience due to mainline capacity, limited gaps in traffic, and queuing (most specifically on the WIS 29 ramps) HCM 2000 reports were output for those movements. All LOS summary tables will illustrates those movements and outputs highlighted in grey.

C1. Year 2020 Background Traffic Operations

***Exhibit 3-3**, 2020 Base Year Background Traffic Capacity/LOS Analysis – Existing Transportation System* shows the base year background traffic analysis for the existing transportation system.

At the intersection of Westview Boulevard & County Road X, the east and west approaches will operate at LOS E and LOS F, as shown in ***Exhibit 3-3***. All other movements at the intersection of Westview Boulevard operate at LOS D or better.

Due to the existing traffic volumes, Traffic Signal Warrants are not anticipated to be met at this time.

All other intersections within the study area are expected to operate as LOS D or better during the weekday peak hours. The analysis indicates that those intersections are expected to have acceptable queuing and capacity.

Traffic operations resulting from the Camp Phillips Centre Development, intersection improvement scenarios, and recommendations are discussed in Chapter 5 and Chapter 6, respectively.

PART D – SOURCES OF DATA

- Intersection Turning Movement Counts – JSD Professional Services, Inc.
- AADT Counts – Wisconsin Department of Transportation
- Traffic Growth Percentages – Wisconsin Department of Transportation, Traffic Forecasting Section
- On-Site Development Information – JSD Professional Services, Inc.

MSA PROFESSIONAL SERVICES

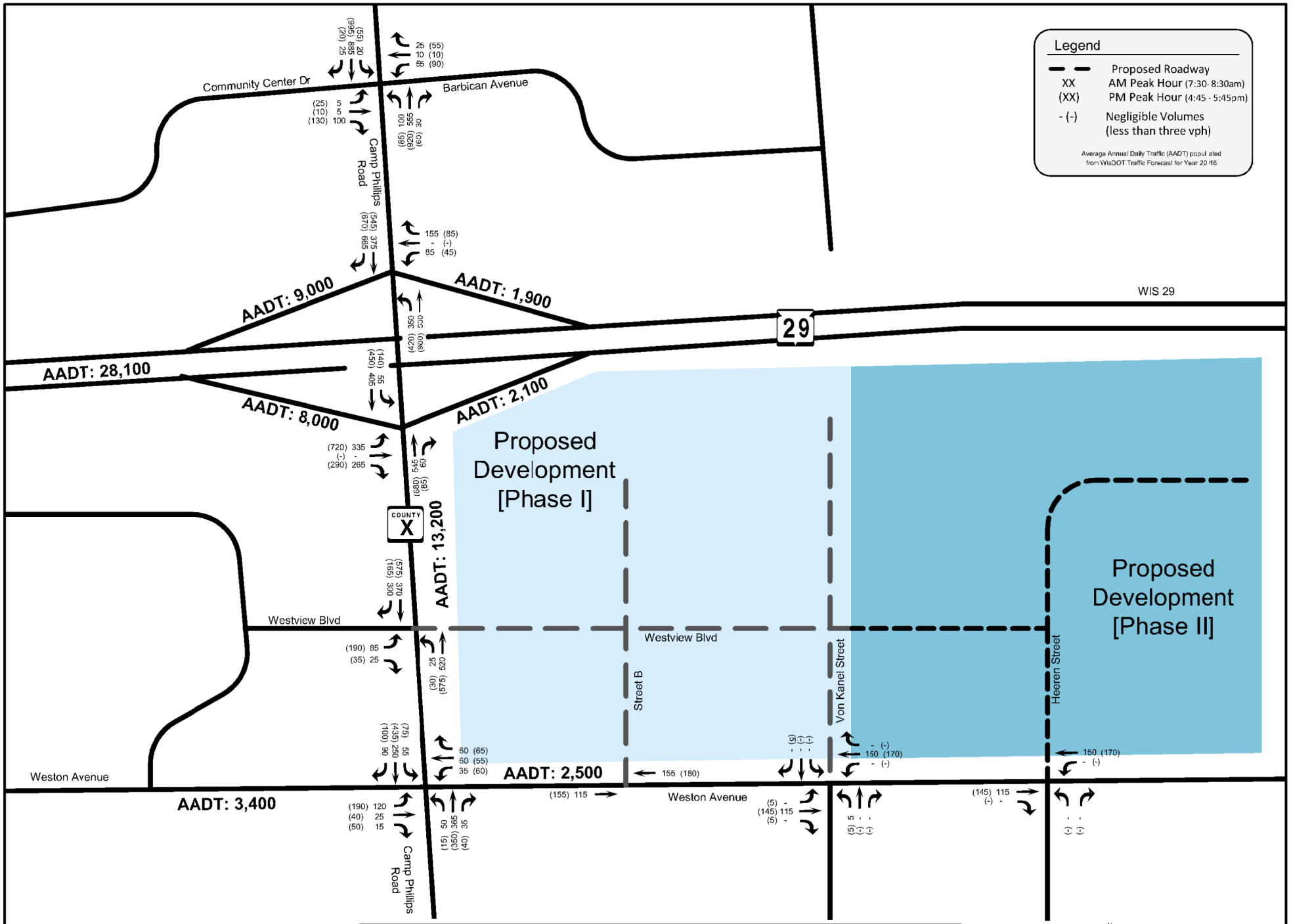
Exhibit 3-1: Existing Transportation System

Village of Weston [Marathon County]

Legend:
XXX' - Length of Existing Storage Bay

N

NOT TO SCALE



MSA PROFESSIONAL SERVICES

Exhibit 3-2A: 2016 Existing Traffic Volumes (Balanced)

Village of Weston [Marathon County]

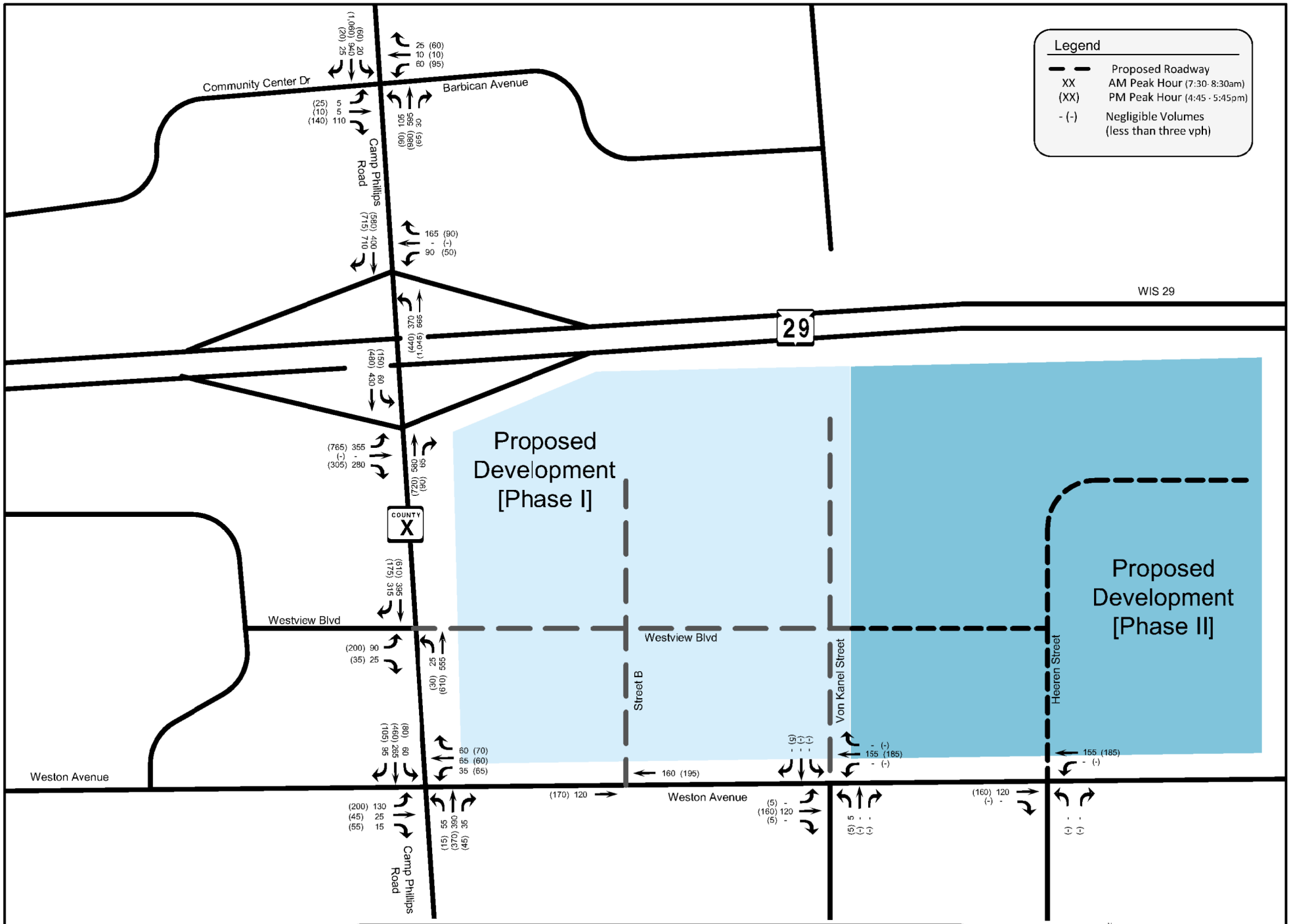


Exhibit 3-2B: 2020 Base Year Background Traffic Volumes

Village of Weston [Marathon County]

Exhibit 3-3, 2020 Base Year Background Traffic Capacity/LOS Analysis - Existing Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	2		2 Shared			1	2	1	1	2		
		AM Peak	LOS	B	B		C		C	A	A	A	A	B		B
			Delay (s)	19.5	15.9		20.8		20.2	8.5	5.1	4.3	8.8	13.4		10.8
			v/c ratio	0.03	0.08		0.19		0.15	0.29	0.31	0.02	0.05	0.67		
			Queue (ft)	25	50		50		50	75	175	25	25	#425		
			Lanes	1	2		2 Shared			1	2	1	1	2		
		PM Peak	LOS	C	B		C		C	A	A	A	B	B		B
			Delay (s)	21.3	17.1		25.4		22.0	9.0	6.3	5.3	10.2	14.5		11.7
			v/c ratio	0.12	0.09		0.34		0.28	0.26	0.48	0.04	0.18	0.69		
			Queue (ft)	50	50		50		50	50	300	25	75	#475		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				1		1	1	2			2	1	
		AM Peak	LOS				D		D	A	B			A	B	B
			Delay (s)				40.9		41.6	5.2	12.8			7.9	11.9	11.2
			v/c ratio				0.53		0.53	0.51	0.23			0.20	0.42	
			Queue (ft)				100		100	275	25			100	250	
			Lanes				1		1	1	2			2	1	
		PM Peak	LOS				D		D	A	A			C	C	A
			Delay (s)				41.4		40.0	4.4	0.3			25.2	30.6	9.0
			v/c ratio				0.38		0.35	0.50	0.39			0.51	0.66	
			Queue (ft)				75		50	50	0			200	300	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	1	Shared LT/TH	1					2	1	1	2		
		AM Peak	LOS	D	D	C					A	A	A	A		B
			Delay (s)	39.6	38.2	34.9					8.6	8.9	4.9	0.2		13.6
			v/c ratio	0.78	0.64	0.54					0.30	0.04	0.11	0.19		
			Queue (ft)	175	175	150					175	25	50	125		
			Lanes	1	Shared LT/TH	1					2	1	1	2		
		PM Peak	LOS	D	C	C					C	B	C	A		C
			Delay (s)	35.2	34.2	24.3					28.7	17.3	21.7	3.8		24.9
			v/c ratio	0.85	0.75	0.32					0.64	0.07	0.27	0.22		
			Queue (ft)	300	300	100					250	50	125	200		
Camp Phillips Road & Westview Boulevard	Stop (West) [Phase I]		Lanes	1		1				1	2			2		
		AM Peak	LOS	E		B				A						A
			Delay (s)	36.0		11.2				9.4						2.7
			v/c ratio	0.46		0.04				0.03						
			Queue (ft)	75		25				25						
			Lanes	1		1				1	2			2		
		PM Peak	LOS	F		B				A						D
			Delay (s)	245.1		11.5				9.7						30.0
			v/c ratio	1.34		0.06				0.04						
			Queue (ft)	325		25				25						
Camp Phillips Road & Weston Avenue	Signal		Lanes	1	1	1	1	2		1	2		1	2		
		AM Peak	LOS	B	B	B	B	B		A	A		A	A		A
			Delay (s)	12.7	10.1	10.0	10.6	10.7		8.8	7.6		9.2	7.5		8.7
			v/c ratio	0.29	0.05	0.02	0.08	0.18		0.11	0.31		0.13	0.29		
			Queue (ft)	50	25	25	25	25		25	75		25	50		
			Lanes	1	1	1	1	2		1	2		1	2		
		PM Peak	LOS	B	B	B	B	B		B	A		B	A		A
			Delay (s)	13.5	10.0	10.0	10.9	10.4		10.4	8.3		10.2	8.9		9.7
			v/c ratio	0.42	0.09	0.06	0.13	0.17		0.04	0.31		0.17	0.43		
			Queue (ft)	100	25	25	50	25		25	75		50	100		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs for delay and v/c ratio.
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Chapter 4 – PROJECTED TRAFFIC

The future traffic volumes in the vicinity of the site consist of background traffic plus the additional traffic generated by the proposed development. This section of the report includes background traffic forecasting to the future development year scenarios.

PART A - BACKGROUND TRAFFIC FORECASTING

A1. Traffic Forecast

The background traffic volumes represent the amount of traffic that will be on the area roadway network without the proposed development. The forecast traffic growth represents the growth expectation outside the study area.

Future year volumes were forecasted by WisDOT Traffic Forecasting in conjunction with the Metropolitan Planning Organization (MPO) modeling for the years of 2026, 2036, and 2050; see **Appendix A**. Due to the development phasing timeline, the WisDOT forecast volumes were interpolated to the development phasing years of 2020, 2030, and 2040. The rounded and balanced forecast volumes can be seen in the following exhibits:

- **Exhibit 4-1A***, 2026 Forecasted Background Traffic Volumes (Balanced)*
- **Exhibit 4-2A***, 2036 Forecasted Background Traffic Volumes (Balanced)*

The following formula, provided by WisDOT Bureau of Planning and Economic Development, was used to interpolate the forecast years to the phasing years:

$$\%\ Growth\ Rate\ =\ (\frac{Future\ Year\ Volume\ -\ Base\ Year\ Volume}{Base\ Year\ Volume}) \div (Future\ Year\ -\ Base\ Year)$$

The average linear growth rate (%GR) between all analysis years was determine to be the following:

Table 4-1: *Growth Rate Interpolation of Traffic Forecast Volumes*

Traffic Forecast Years Interpolated	Calculated Growth Rate Used
2016-2026	1.6%
2026-2036	1.3%
2036-2050	1.2%

The projected traffic forecast volumes provided by WisDOT were rounded and balanced within the study area. From there, the balanced traffic forecast volumes were projects to the development phasing years using the following formulas:

$$2030\ Background\ Volumes\ =\ (2026\ Forecasted\ Volumes{:}\ Balanced\ )\ x\ (1 + (1.3\% * 4\ years))$$

$$2040\ Background\ Volumes\ =\ (2036\ Forecasted\ Volumes{:}\ Balanced\ )\ x\ (1 + (1.2 * 4\ years))$$

The following exhibits illustrate the balanced future year volumes:

- **Exhibit 4-1B***, 2030 Interim Year Background Traffic Volumes*
- **Exhibit 4-2B***, 2040 Horizon Year Background Traffic Volumes*

PART B – ON-SITE AND OFF-SITE DEVELOPMENT TRAFFIC FORECASTING

To determine the impact of the proposed development on the future traffic operating conditions, it is necessary to estimate the general characteristics of the additional traffic that will be generated by the proposed development and the distribution of this traffic on the area roadway network. This requires five steps:

1. Trip generation
2. Mode split
3. Determination of internally linked and pass-by trip traffic (if applicable)
4. Trip distribution
5. Trip assignment

B1. Trip Generation

The major factors determining the amount of traffic that will be generated are the development's size and land use. In particular, the type of land use (e.g., recreational, residential, retail, industrial, office, etc.) will have a significant impact on the amount of new traffic that will be added to the area roadway network and the time of day when it will occur.

A description of the proposed development, including expected land use and square footage, was provided by JSD Professional Services, Inc. Trip generation rates were supplied by the *ITE Trip Generation Manual, 9th Edition* for the proposed developments.

WisDOT recently published the *Mixed-Use Development (MXD) Trip Generation Study (2017)* in which collected local trip generation and linked trip percentages at mature Wisconsin mixed-use developments. Trip generation rates for Camp Phillips Centre land uses were compared using the *ITE Trip Generation Manual* against local data; all other land uses will use the ITE rates. The following land use will use a combination of ITE and local data published from the MXD Study:

- Drive-in Bank

The number of new trips was calculated for Phase I development per outlot site shown in **Exhibit 2-2A**; trip generation per outlot is illustrated in the following tables:

- **Exhibit 4-3A**, *Trip Generation Table Phase I/Outlot A*
- **Exhibit 4-3B,** *Trip Generation Table Phase I/Outlot B*
- **Exhibit 4-3C**, *Trip Generation Table Phase I/Outlot C*
- **Exhibit 4-3D**, *Trip Generation Table Phase I/Outlot D*

The entire trip generation for Phase II of the development can be seen in **Exhibit 4-3E**: *Trip Generation Table Phase II.*

B2. Mode Split

As discussed in *Chapter 2*, sidewalk is present within the study area however there are limited connections and direct routes for multimodal travel. Due to the proposed land uses within Camp Phillips Centre it is anticipated that a majority of new trips to the retail, commercial, and industrial businesses will be by passenger vehicle. As a conservative estimate, all new trips were assumed to be automobile trips.

B3. Determination of Pass-By, Internally-Linked, Multi-Linked, and Externally-Linked Trip Traffic

B3-1. Determination of Linked Trips

Camp Phillips Centre is being constructed as a multi-use retail and industrial site and it is expected that a certain percentage of trips will be internally linked within the site. Internally linked trips occur when patrons visit more than one land use without leaving the site (i.e. a person refuels their vehicle and then stops at the supermarket for groceries). The *ITE Trip Generation Handbook* was used to determine appropriate linked trip percentages for each land use.

Land Use (Phase I)	Linked Trip Percentage	Notes
Free-Standing Discount Superstore	10%	This percentages assumes that most users frequent this store as a destination, however a small percentage will link to another use within the development.
Drive-in Bank	30%	This percentage includes patrons that are shopping at the adjacent retail or shopping centers and link to the bank within the same peak hour.
Fast-Food Restaurant	25%	This percentage includes patrons that are shopping at the adjacent retail or working in the office space and visiting a fast-food restaurant. It was also assumed that patrons will not visit the High-Turnover (Sit-Down) Restaurants or Supermarket during the same trip.
Gasoline/Service Station with Convenience Market	50%	This percentage includes patrons that would be refueling with gas and potentially stopping at various shopping centers, going to/leaving work, or visiting a restaurant on-site.
Supermarket	25%	This percentage includes patrons that would be potentially stopping at the gas station, working at the offices, or running an errand at another retail use and also stopping at the grocery store.
General Office Building	None	This land use assumed a destination trip only. Linked trip percentages were taken from the other retail users as part of Phase I of development.
All other users	20%	This percentage assumes that patrons will link to the other shopping centers and retail stores within Phase I development. Trips to the other uses described above were accounted for separately in the other linked trip assumptions.

Figure 4-1: Linked Trips (Phase I)

Land Use (Phase II)	Linked Trip Percentage	Notes
All Uses	10%	This percentage includes patrons that work or live within the industrial half of the development would potentially stop at various retails stores such as the supermarket, fast-food restaurant, or gas station. This percentage does not assume that trips within Phase II would link within itself, rather that trips would be linked to the Phase I land uses. It was assumed that one in every ten trips (either working or living on the east side of the development) would make a linked trip to the Phase I developments within Camp Phillips Centre.

Figure 4-2: Linked Trips (Phase II)

The recommended linked trip ranges for Wisconsin TIAs can be seen below in **Table 4-1** per the WisDOT MXD Study. The Camp Phillips Centre development will have little other commercial land uses surrounding the site. As such, the 0-20% '*Range of % Other Commercial*' is an appropriate linked trip percentage for the study area and development. The 0-20% range correlates to a recommended linked trip percentage of 20%.

***Table 4-2**: Recommended Linked Trip Percentage Rates (MXD Study)*

MXD Site	PM Peak Linked	SAT Peak Linked	Site Commercial Total Size	Off-Site Commercial Total Size	% of Off-Site Commercial	Avg. Linked %	Rec. Linked %	Range of % Other Commercial
Chippewa Falls	28%	25%	112,715 SF	0,000 SF	0%	19%	20%	0-20%
Delavan	3%	20%	547,825 SF	27,980 SF	5%			
Wisconsin Rapids	11%	8%	249,328 SF	106,250 SF	30%	15%	15%	21-45%
Tomah	16%	16%	204,894 SF	98,050 SF	32%			
Kohler	21%	19%	436,387 SF	334,650 SF	43%			
Fond du Lac	6%	1%	120,503 SF	106,380 SF	47%	9%	10%	46-70%
Rice Lake	7%	14%	277,200 SF	255,990 SF	48%			
Oak Creek	1%	6%	272,203 SF	259,390 SF	49%			
New Berlin	3%	7%	94,747 SF	102,640 SF	52%			
Stevens Point/Plover	1%	2%	238,220 SF	294,000 SF	55%			
Muskego	12%	15%	101,342 SF	129,844 SF	56%			
Madison/Fitchburg	22%	24%	207,704 SF	372,775 SF	64%			
Marshfield	3%	15%	274,910 SF	525,400 SF	66%			
Grafton	1%	4%	251,027 SF	729,052 SF	74%	5%	5%	>70%
Bellevue	15%	11%	150,338 SF	503,030 SF	77%			
Eau Claire	0%	0%	266,717 SF	973,250 SF	78%			

As a check, it was determined that the breakdown of linked trips per phase of development amounted to approximately a 20% linked trip volume for the entire development, see **Table 4-2**. A 20% linked trip percentage is consistent with the *ITE Trip Generation Handbook* methodology and anticipated interaction between land uses.

***Table 4-3**: Total Linked Trip Percentage*

Camp Phillips Centre	AM Peak Hour	PM Peak Hour	Daily
	Total	Total	Two-way*
Phase I Development	*2,080*	*4,055*	*47,655*
Phase II Development	630	655	5,930
Total Development	**2,710**	**4,710**	**53,585**
Linked Total Phase I	445	835	9,630
Linked Total Phase II	65	65	595
Total Linked Trips	**510**	**900**	**10,225**
Linked Trip %	***18.8%***	***19.1%***	***19.1%***

The breakdown of linked trips per site can be seen in **Exhibits 4-3,** *Trip Generation Table* attached**.** Linked trips are deducted from the total trip generation so as not to double count total driveway trips for those users assuming to utilize more than one land use.

No multi-linked or externally-linked trips are assumed for this development based study area.

B3-2. Determination of Pass-by Trips

Pass-by trips are drawn away from the adjacent roadway traffic steam. It assumes that patrons will be traveling on County Road X, turn into the site, patronize the development, and then return to the adjacent roadway to continue in the same direction. The *ITE Trip Generation Handbook* was used to determine an appropriate pass-by percentage.

Table 4-3 below illustrates a summary of the total driveway trips per outlot in Phase I. Pass-by trips are analyzed as rerouted vehicles from adjacent street traffic however those trips are not removed from the total driveway trip volume. For this study and the anticipated land uses, a 5% pass-by rate was applied to Phase I. The pass-by trips will be applied to County Road X only.

***Table 4-4**: Pass-by Trips for Phase I Development*

Phase I Development	AM Peak Hour			PM Peak Hour			Daily
	Total	In	Out	Total	In	Out	Two-way*
Outlot A	**290**	**165**	**125**	**720**	**355**	**365**	**7,810**
Outlot B	**510**	**320**	**190**	**1,215**	**565**	**650**	**13,710**
Outlot C	**325**	**190**	**135**	**720**	**365**	**355**	**6,860**
Outlot D	**510**	**300**	**210**	**565**	**280**	**285**	**9,645**
Total Driveway Trips	**1,635**	**975**	**660**	**3,220**	**1,565**	**1,655**	**38,025**
Pass-by Trips (5%)	(90)	(45)	(45)	(160)	(80)	(80)	(1,900)
Subtotal	**1,545**	**930**	**615**	**3,060**	**1,485**	**1,575**	**36,125**

Pass-by trips are closely linked to the size of the development and to the volume of traffic on the adjacent street (County Road X). A rule-of-thumb, per the *WisDOT TIA Guidelines*, for determining pass-by trips states that the total number of pass-by trips should not exceed 10% of the build year adjacent street volume. This check is included in ***Figure 4-3***.

	Total Pass-by Trips	Adjacent Street Volume (2020)	% of Total Traffic
AM Peak Hour	90	1,405	6.4%
PM Peak Hour	160	1,660	9.6%

***Figure 4-3**: Pass-by Percentage Checks*

The pass-by trips shown in **Figure 4-3** indicates the pass-by volume of trips is acceptable for the adjacent street roadway volume of County Road X.

The directional split for County Road X in the AM and PM peak hours is approximately 50/50 northbound and southbound. **Exhibit 4-5C-1***, Pass-by Trips* illustrates the volume that will be diverted to the development from County Road X existing vehicle traffic.

Due to the nature of Phase II of the development which consists of office space, industrial warehousing, and apartments, it was assumed that all trips to the site would be destinational in use. No additional pass-by trips were applied to Phase II.

B3-3. Determination of Diverted Pass-by Trips

Diverted pass-by trips are drawn away from a roadway traffic steam that is adjacent to the study area corridor. For this study, it assumes that patrons traveling on WIS 29 and already exiting onto County Road X will divert away from their intended destination to frequent the development.

For instance, a vehicle exiting eastbound WIS 29, who lives or works to the north in the Village of Weston and usually turns left (to travel north) at County Road X, will now turn right (to travel south) to the development. After their trip, they will continue to their work place or home traveling northbound on County Road X.

Using the same technique as described above for pass-by trips, a 5% diverted pass-by rate was applied to the new development trips, see **Table 4-4**. The WIS 29 turning movements that were assumed to divert to the development are the eastbound left, southbound right, and westbound right turn movements which are summarized in **Figure 4-4** below using the 2020 build year traffic volumes.

Table 4-5: Diverted Pass-by Trips

Phase I Development	AM Peak Hour			PM Peak Hour			Daily
	Total	In	Out	Total	In	Out	Two-way*
Outlot A	290	165	125	720	355	365	7,810
Outlot B	510	320	190	1,215	565	650	13,710
Outlot C	325	190	135	720	365	355	6,860
Outlot D	510	300	210	565	280	285	9,645
Total Driveway Trips	1,635	975	660	3,220	1,565	1,655	38,025
Pass-by Trips (5%)	(90)	(45)	(45)	(160)	(80)	(80)	(1,900)
Subtotal	1,545	930	615	3,060	1,485	1,575	36,125
Diverted Pass-by Trips (5%)	(80)	(40)	(40)	(150)	(75)	(75)	(1,805)
Total New Trips	1,465	890	575	2,910	1,410	1,500	34,320

	Diverted Pass-by Trips	WIS 29 Ramp Volume (2020)	% of Total Traffic
AM Peak Hour	80	1,230	6.5%
PM Peak Hour	150	1,570	9.6%

Figure 4-4: Diverted Pass-by Trips, Adjacent Street Volume Check for WIS 29

The pass-by trips shown in **Figure 4-4** indicates the pass-by volume of trips is acceptable for the WIS 29 turning movement volumes.

The directional splits for the diverted pass-by trips was determined by correlating the existing ramp volume traveling away from the development and applying the diverted pass-by rate proportionally for

each of the movements. **Exhibit 4-5C-2***, Diverted Pass-by Trips* illustrates the volume that will be diverted to the development from WIS 29 interchange ramps.

Similarly, due to the nature of Phase II of the development, it was assumed that all trips to the site would be destinational in use. No additional diverted pass-by trips were applied to Phase II.

B4. Trip Distribution

Trip distribution percentages were developed by reviewing the proposed site plan, existing traffic distribution patterns, and regional population centers. An overall distribution percentage was generated for each of the outlying roadways (County Road X, Weston Avenue, and WIS 29) surrounding the site. Each percentage was verified by the raw data traffic splits and confirmed with the WisDOT continuous count and average daily traffic volumes for the surrounding area; see ***Exhibit 4-4A****, Trip Distribution – Overall*.

Trips were dispersed into and out of the development using the nearest or most likely access location for each particular destination for passenger vehicles. Trip distribution patterns into and out of the proposed site for Phase I can be seen in ***Exhibit 4-4B,*** *Trip Distribution – Phase I.*

Trip distribution patterns into and out of the proposed site for Phase II were adjusted slightly from Phase I. Due to the layout of the site, it is anticipated that a portion of entering traffic from the north will travel through the Westfield Boulevard intersection to Weston Avenue to enter the site. All other patterns remain the same from Phase I. The trip distribution patterns can be seen in ***Exhibit 4-4C****, Trip Distribution – Phase II.*

B5. Trip Assignment

The additional trips generated by the developments were assigned to the roadway network using the trip distribution percentages corresponding to the appropriate land uses. Trips were dispersed into and out of the development using the nearest or most likely access location for each particular destination for passenger vehicles.

- ***Exhibit 4-5A****, Phase I On-Site Development Traffic Assignment: New Trips*
- ***Exhibit 4-5C-1****, Phase I On-Site Development Traffic Assignment: Pass-by Trips*
- ***Exhibit 4-5C-2****, Phase I On-Site Development Traffic Assignment: Diverted Pass-by Trips*
- ***Exhibit 4-5D****, Phase I On-Site Development Traffic Assignment: Driveway Trips*

- ***Exhibit 4-6A****, Phase II On-Site Development Traffic Assignment: New Trips*
  Note that since Phase II includes no pass-by or multi-linked trips, new trips equal driveway trips.

PART C – BUILD AND TOTAL TRAFFIC

C1. Phase I Development

For the initial phase of development, the following scenarios will be analyzed:

- (***Exhibit 3-2B****, 2020 Base Year Background Traffic Volumes*) + (**Exhibit 4-5D,** *Phase I On-Site Development Traffic Assignment: Driveway Trips*)

Exhibit 4-11*, 2020 Base Year Build Development Traffic Volumes* summarizes the background traffic and new trips that will occur in the base year.

C2. Future Build Development

For the second and final phase of the on-site development, the following scenarios will be analyzed:

- (**Exhibit 4-1***, 2030 Interim Year Background Traffic Volumes*) + (***Exhibit 4-5D****, Phase I On-Site Development Traffic Assignment: Driveway Trips*) + (***Exhibit 4-6A****, Phase II On-Site Development Traffic Assignment: New Trips*)
- (**Exhibit 4-2***, 2040 Horizon Year Background Traffic Volumes*) + (***Exhibit 4-5D****, Phase I On-Site Development Traffic Assignment: Driveway Trips*) + (***Exhibit 4-6A****, Phase II On-Site Development Traffic Assignment: New Trips*)

Exhibit 4-12*, 2030 Interim Year Build Development Traffic Volumes* summarizes the background traffic and development trips that will occur in the interim development year.

Exhibit 4-13*, 2040 Horizon Year Build Development Traffic Volumes* summarizes the background traffic and development trips that will occur in the horizon development year.

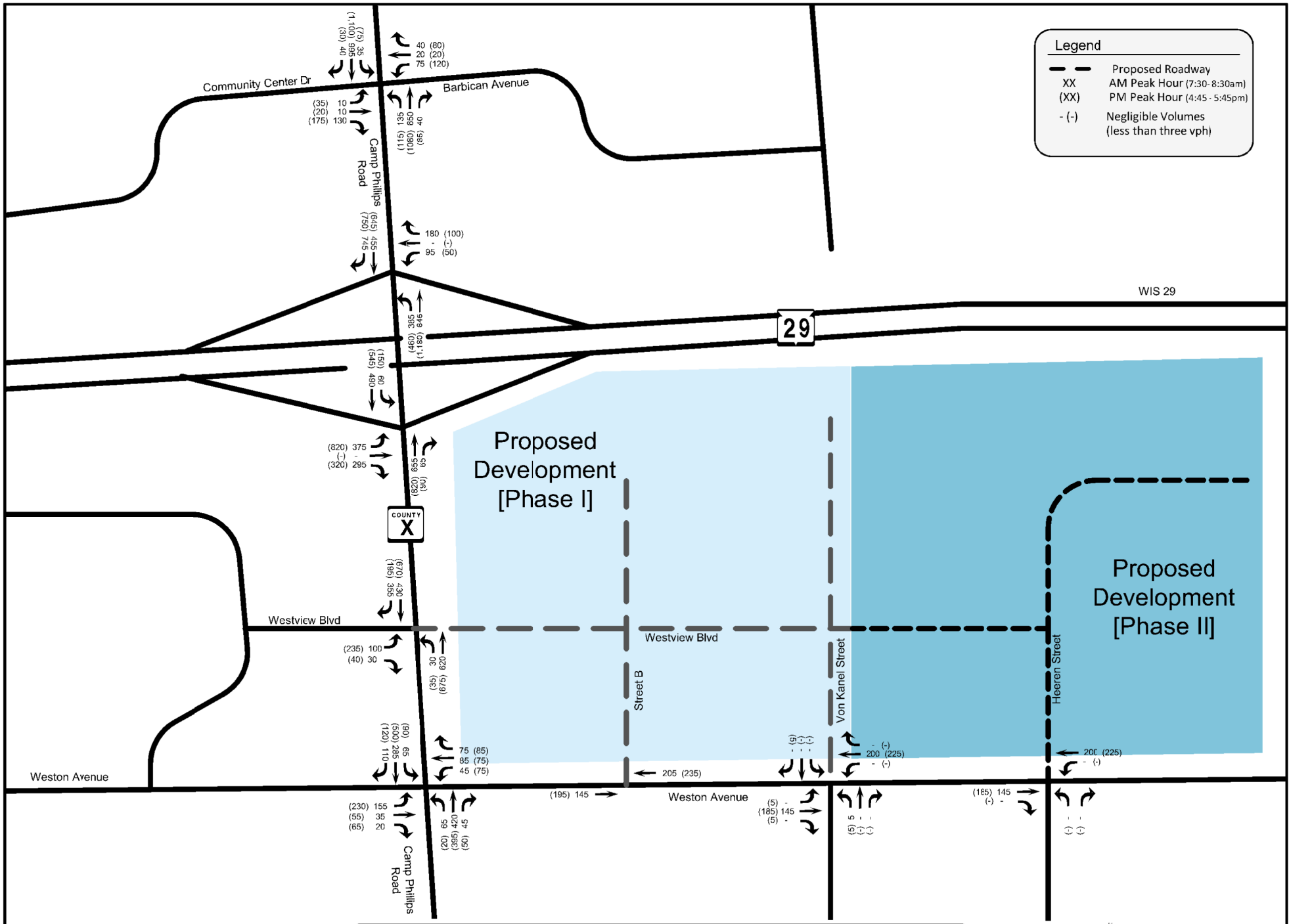


Exhibit 4-1A: 2026 Forecasted Background Traffic Volumes (Balanced)

Village of Weston [Marathon County]

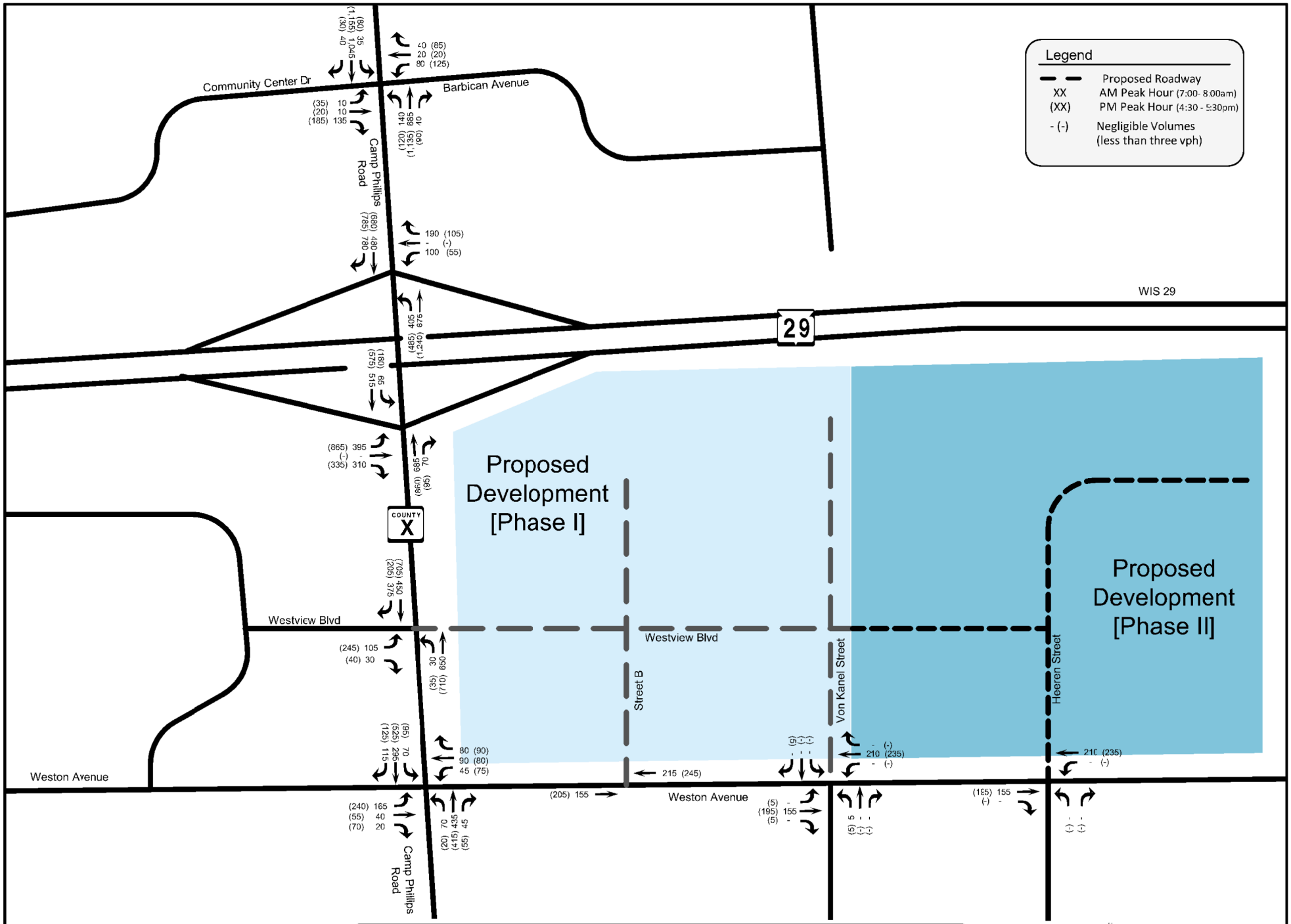


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Exhibit 4-1B: 2030 Interim Year Background Traffic Volumes

Village of Weston [Marathon County]

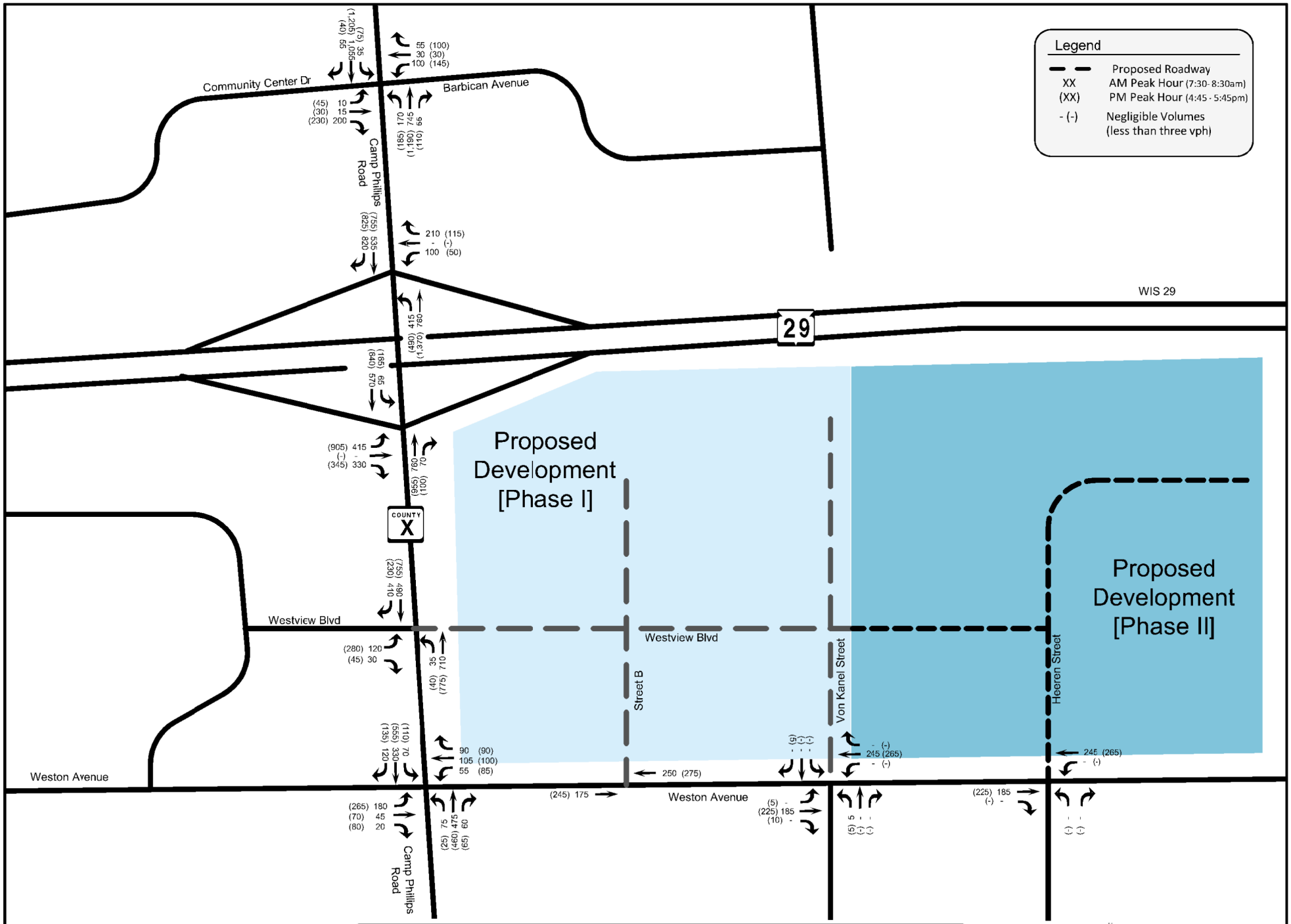

Exhibit 4-2A: 2036 Forecasted Background Traffic Volumes (Balanced)

Village of Weston [Marathon County]

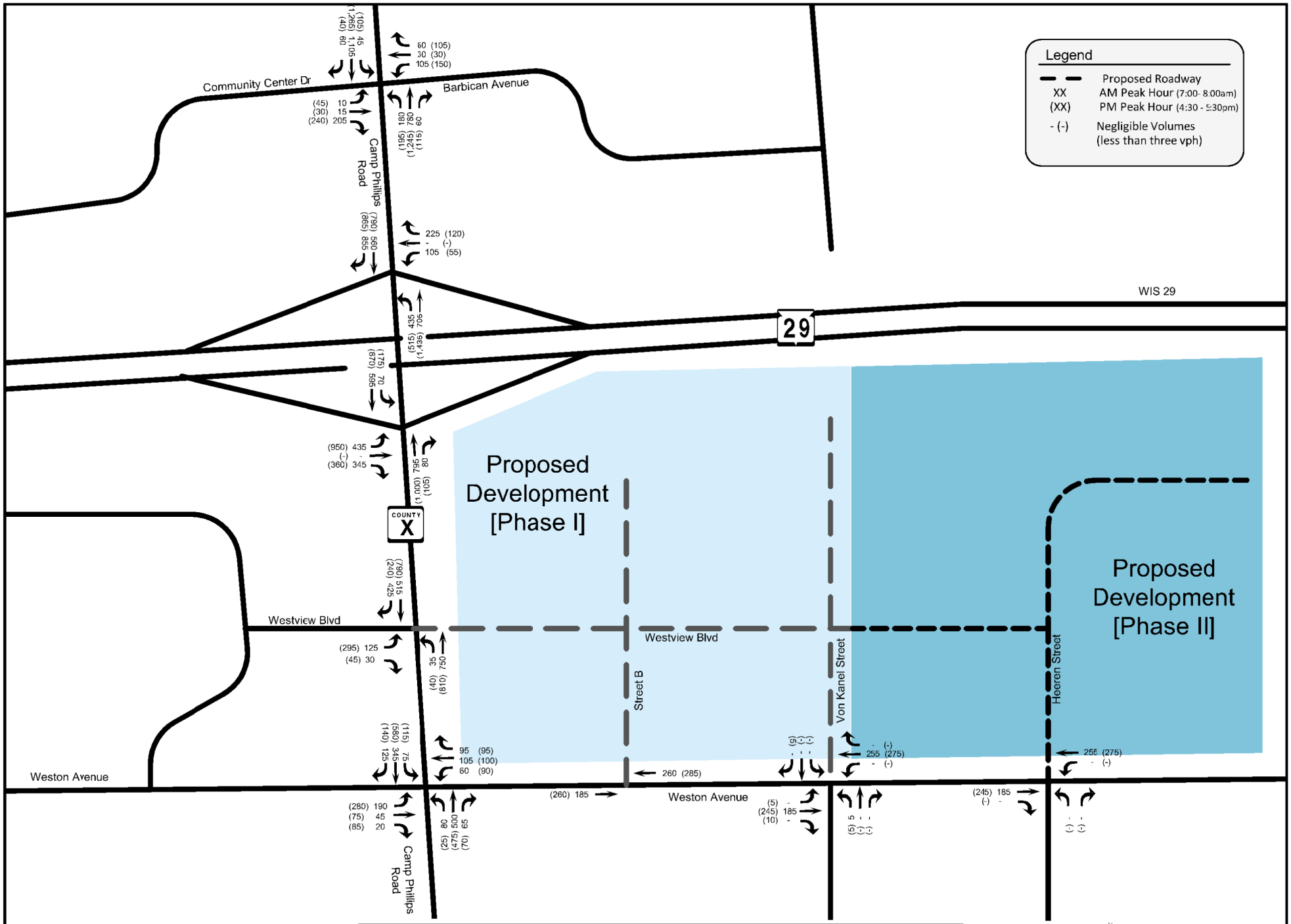

Exhibit 4-2B: 2040 Horizon Year Background Traffic Volumes

Village of Weston [Marathon County]

Exhibit 4-3A: Trip Generation Phase I/Outlot A

Phase I (West): Camp Phillips Centre - Weston, Wisconsin

Lot Number	ITE Land Use	ITE Code	Square Feet	Units	Size		AM Peak Hour			PM Peak Hour			Daily
							Total	In	Out	Total	In	Out	Two-way*
2	Free-Standing Discount Superstore	813	146,000	1,000 Square Feet	146.0	Rates	1.85	1.04	0.81	4.35	2.13	2.22	50.75
						Percentage		56%	44%		49%	51%	
						Trips	270	150	120	635	310	325	7410
		Minus On-Site Linked Trips			*10%*	Trips	(25)	(15)	(10)	(65)	(30)	(35)	(740)
						Shopping Center Subtotal	**245**	**135**	**110**	**570**	**280**	**290**	**6670**
9	Shopping Center	820	10,000	1,000 Square Feet	10.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	10	5	5	35	20	15	425
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(10)	(5)	(5)	(85)
						Specialty Retail Center Subtotal	**10**	**5**	**5**	**25**	**15**	**10**	**340**
10	Shopping Center	820	5,000	1,000 Square Feet	5.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	5	5	0	20	10	10	215
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	0	0	0	(45)
						Specialty Retail Center Subtotal	**5**	**5**	**0**	**20**	**10**	**10**	**170**
11	Drive-in Bank	912/ Combo	N/A	Drive-in Lanes	4.0	Rates	9.29	5.57	3.72	32.13	15.74	16.39	139.25
						Percentage		60%	40%		49%	51%	
						Trips	35	20	15	130	65	65	555
		Minus On-Site Linked Trips			*30%*	Trips	(10)	(5)	(5)	(40)	(20)	(20)	(165)
						Drive-in Bank Subtotal	**25**	**15**	**10**	**90**	**45**	**45**	**390**
12	Shopping Center	820	7,000	1,000 Square Feet	7.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	5	5	0	25	10	15	300
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(10)	(5)	(5)	(60)
						Specialty Retail Center Subtotal	**5**	**5**	**0**	**15**	**5**	**10**	**240**
						Subtotal Outlot Driveway Trips	**290**	**165**	**125**	**720**	**355**	**365**	**7,810**
						Pass-by Trips 5%	(20)	(10)	(10)	(30)	(15)	(15)	(390)
						Diverted Pass-by Trips 5%	(20)	(10)	(10)	(30)	(15)	(15)	(370)
						Subtotal Outlot A New Trips	**250**	**145**	**105**	**660**	**325**	**335**	**7,050**

Exhibit 4-3B: Trip Generation Phase I/Outlot B

Phase I (West): Camp Phillips Centre - Weston, Wisconsin

Lot Number	ITE Land Use	ITE Code	Square Feet	Units	Size		AM Peak Hour			PM Peak Hour			Daily
							Total	In	Out	Total	In	Out	Two-way*
1	Free-Standing Discount Superstore	813	187,000	1,000 Square Feet	187.0	Rates	1.85	1.04	0.81	4.35	2.13	2.22	50.75
						Percentage		56%	44%		49%	51%	
						Trips	345	195	150	815	400	415	9490
		Minus On-Site Linked Trips			*10%*	Trips	(35)	(20)	(15)	(80)	(40)	(40)	(950)
		Shopping Center Subtotal					**310**	**175**	**135**	**735**	**360**	**375**	**8540**
5	Shopping Center	820	78,000	1,000 Square Feet	78.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	75	45	30	290	140	150	3330
		Minus On-Site Linked Trips			*20%*	Trips	(20)	(10)	(10)	(60)	(30)	(30)	(665)
		Shopping Center Subtotal					**55**	**35**	**20**	**230**	**110**	**120**	**2665**
7	Shopping Center	820	20,000	1,000 Square Feet	20.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	20	10	10	75	35	40	855
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(15)	(5)	(10)	(170)
		Specialty Retail Center Subtotal					**20**	**10**	**10**	**60**	**30**	**30**	**685**
8	Shopping Center	820	17,000	1,000 Square Feet	17.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	15	10	5	65	30	35	725
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(15)	(5)	(10)	(145)
		Specialty Retail Center Subtotal					**15**	**10**	**5**	**50**	**25**	**25**	**580**
6	Shopping Center	820	17,000	1,000 Square Feet	17.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	15	10	5	65	30	35	725
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(15)	(5)	(10)	(145)
		Specialty Retail Center Subtotal					**15**	**10**	**5**	**50**	**25**	**25**	**580**
17	General Office Building	710	60,000	1,000 Square Feet	60.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	95	80	15	90	15	75	660
Subtotal Outlot Driveway Trips							**510**	**320**	**190**	**1,215**	**565**	**650**	**13,710**
Pass-by Trips						***5%***	(20)	(10)	(10)	(60)	(30)	(30)	(685)
Diverted Pass-by Trips						***5%***	(20)	(10)	(10)	(60)	(30)	(30)	(650)
Subtotal Outlot B New Trips							**470**	**300**	**170**	**1,095**	**505**	**590**	**12,375**

Exhibit 4-3C: Trip Generation Phase I/Outlot C

Phase I (West): Camp Phillips Centre - Weston, Wisconsin

Lot Number	ITE Land Use	ITE Code	Square Feet	Units	Size		AM Peak Hour			PM Peak Hour			Daily
							Total	In	Out	Total	In	Out	Two-way*
3	Supermarket	850	78,000	1,000 Square Feet	78.0	Rates	3.40	2.11	1.29	9.48	4.83	4.65	66.95
						Percentage		62%	38%		51%	49%	
						Trips	265	165	100	740	375	365	6615
		Minus On-Site Linked Trips			*25%*	Trips	(65)	(40)	(25)	(185)	(95)	(90)	(1655)
		Supermarket Subtotal					**200**	**125**	**75**	**555**	**280**	**275**	**4960**
14	Gasoline/Service Station with Convenience Market and Car Wash	946	N/A	Fueling Stations	20.0	Rates	11.84	6.04	5.80	13.86	7.07	6.79	152.84
						Percentage		51%	49%		51%	49%	
						Trips	235	120	115	275	140	135	3055
		Minus On-Site Linked Trips			*50%*	Trips	(120)	(60)	(60)	(140)	(70)	(70)	(1530)
		Home Improvement Superstore Subtotal					**115**	**60**	**55**	**135**	**70**	**65**	**1525**
13	Shopping Center	820	11,000	1,000 Square Feet	11.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	10	5	5	40	20	20	470
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(10)	(5)	(5)	(95)
		Specialty Retail Center Subtotal					**10**	**5**	**5**	**30**	**15**	**15**	**375**
Subtotal Outlot Driveway Trips							**325**	**190**	**135**	**720**	**365**	**355**	**6,860**
Pass-by Trips						***5%***	(30)	(15)	(15)	(40)	(20)	(20)	(345)
Diverted Pass-by Trips						***5%***	(20)	(10)	(10)	(30)	(15)	(15)	(325)
Subtotal Outlot Outlot C New Trips							**275**	**165**	**110**	**650**	**330**	**320**	**6,190**

Exhibit 4-3D: Trip Generation Phase I/Outlot D

Phase I (West): Camp Phillips Centre - Weston, Wisconsin

Lot Number	ITE Land Use	ITE Code	Square Feet	Units	Size		AM Peak Hour			PM Peak Hour			Daily
							Total	In	Out	Total	In	Out	Two-way*
4	Home Improvement Superstore	862	210,000	1,000 Square Feet	210.0	Rates	1.49	0.85	0.64	2.33	1.14	1.19	30.74
						Percentage		57%	43%		49%	51%	
						Trips	315	180	135	490	240	250	6455
		Minus On-Site Linked Trips			*25%*	Trips	(80)	(45)	(35)	(125)	(60)	(65)	(1615)
		Home Improvement Superstore Subtotal					**235**	**135**	**100**	**365**	**180**	**185**	**4840**
15	Shopping Center	820	15,000	1,000 Square Feet	15.0	Rates	0.96	0.60	0.36	3.71	1.78	1.93	42.70
						Percentage		62%	38%		48%	52%	
						Trips	15	10	5	55	25	30	640
		Minus On-Site Linked Trips			*20%*	Trips	0	0	0	(10)	(5)	(5)	(130)
		Specialty Retail Center Subtotal					**15**	**10**	**5**	**45**	**20**	**25**	**510**
16	Fast-Food Restaurant without Drive-Through Window	933	8,000	1,000 Square Feet	8.0	Rates	43.87	26.32	17.55	26.15	13.34	12.81	716.00
						Percentage		60%	40%		51%	49%	
						Trips	350	210	140	210	105	105	5730
		Minus On-Site Linked Trips			*25%*	Trips	(90)	(55)	(35)	(55)	(25)	(30)	(1435)
		Fast Food Restaurant Subtotal					**260**	**155**	**105**	**155**	**80**	**75**	**4295**
Subtotal Outlot Driveway Trips							**510**	**300**	**210**	**565**	**280**	**285**	**9,645**
Pass-by Trips						***5%***	(20)	(10)	(10)	(30)	(15)	(15)	(480)
Diverted Pass-by Trips						***5%***	(20)	(10)	(10)	(30)	(15)	(15)	(460)
Subtotal Outlot D New Trips							**470**	**280**	**190**	**505**	**250**	**255**	**8,705**

Exhibit 4-3E: Trip Generation Phase II

Phase II (East): Camp Phillips Centre - Weston, Wisconsin

Lot Number	ITE Land Use	ITE Code	Square Feet	Units	Size		AM Peak Hour			PM Peak Hour			Daily
							Total	In	Out	Total	In	Out	Two-way*
26A-26E	Residential Condominium/Townhouse	230	N/A	Dwelling Units	30.0	Rates	0.44	0.07	0.37	0.52	0.35	0.17	5.81
						Percentage		17%	83%		67%	33%	
						Trips	15	0	15	15	10	5	175
26F-26J	Apartment	220	N/A	Dwelling Units	282.0	Rates	0.51	0.10	0.41	0.62	0.40	0.22	6.65
						Percentage		20%	80%		65%	35%	
						Trips	145	30	115	175	115	60	1875
26K	Recreational Community Center	495	9,000	1,000 Square Feet	9.0	Rates	2.05	1.35	0.70	2.74	1.34	1.40	33.82
						Percentage		66%	34%		49%	51%	
						Trips	20	10	10	25	10	15	305
27	General Office Building	710	21,000	1,000 Square Feet	21.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	35	30	5	30	5	25	230
28	General Office Building	710	19,000	1,000 Square Feet	19.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	30	25	5	30	5	25	210
29A-29D	General Office Building	710	46,000	1,000 Square Feet	46.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	70	65	5	70	10	60	505
30A-30C	General Office Building	710	28,000	1,000 Square Feet	28.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	45	40	5	40	5	35	310
31	Warehousing	150	85,000	1,000 Square Feet	85.0	Rates	0.30	0.24	0.06	0.32	0.08	0.24	3.56
						Percentage		79%	21%		25%	75%	
						Trips	25	20	5	25	5	20	305
32	Warehousing	150	56,000	1,000 Square Feet	56.0	Rates	0.30	0.24	0.06	0.32	0.08	0.24	3.56
						Percentage		79%	21%		25%	75%	
						Trips	15	10	5	20	5	15	200
33	General Light Industrial	110	24,000	1,000 Square Feet	24.0	Rates	0.92	0.81	0.11	0.97	0.12	0.85	6.97
						Percentage		88%	12%		12%	88%	
						Trips	20	20	0	25	5	20	165
34	Warehousing	150	77,000	1,000 Square Feet	77.0	Rates	0.30	0.24	0.06	0.32	0.08	0.24	3.56
						Percentage		79%	21%		25%	75%	
						Trips	25	20	5	25	5	20	275
35	Warehousing	150	77,000	1,000 Square Feet	77.0	Rates	0.30	0.24	0.06	0.32	0.08	0.24	3.56
						Percentage		79%	21%		25%	75%	
						Trips	25	20	5	25	5	20	275
36	General Light Industrial	110	25,000	1,000 Square Feet	25.0	Rates	0.92	0.81	0.11	0.97	0.12	0.85	6.97
						Percentage		88%	12%		12%	88%	
						Trips	25	20	5	25	5	20	175
37	General Light Industrial	110	25,000	1,000 Square Feet	25.0	Rates	0.92	0.81	0.11	0.97	0.12	0.85	6.97
						Percentage		88%	12%		12%	88%	
						Trips	25	20	5	25	5	20	175
38	General Office Building	710	21,000	1,000 Square Feet	21.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	35	30	5	30	5	25	230
39	General Office Building	710	13,000	1,000 Square Feet	13.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	20	20	0	20	5	15	145
40	General Office Building	710	13,000	1,000 Square Feet	13.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	20	20	0	20	5	15	145
41	General Office Building	710	21,000	1,000 Square Feet	21.0	Rates	1.56	1.37	0.19	1.49	0.25	1.24	11.03
						Percentage		88%	12%		17%	83%	
						Trips	35	30	5	30	5	25	230
						Subtotal Trips	**630**	**430**	**200**	**655**	**215**	**440**	**5,930**
						Subtotal Linked Trips 10%	(65)	(45)	(20)	(65)	(20)	(45)	(595)
						Subtotal Phase II New Trips	**565**	**385**	**180**	**590**	**195**	**395**	**5,335**

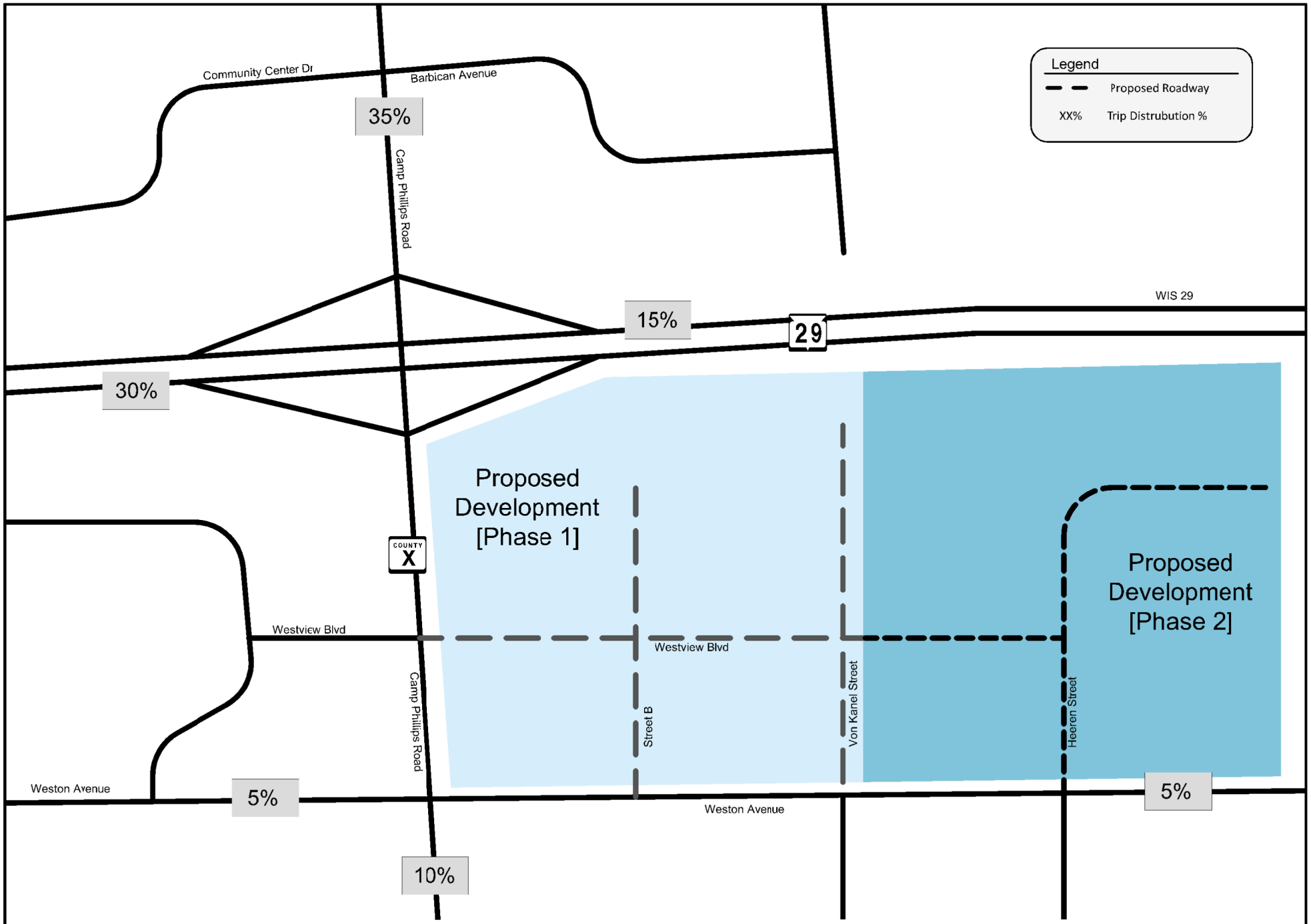

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Exhibit 4-4A: Trip Distribution - Overall

Village of Weston [Marathon County]

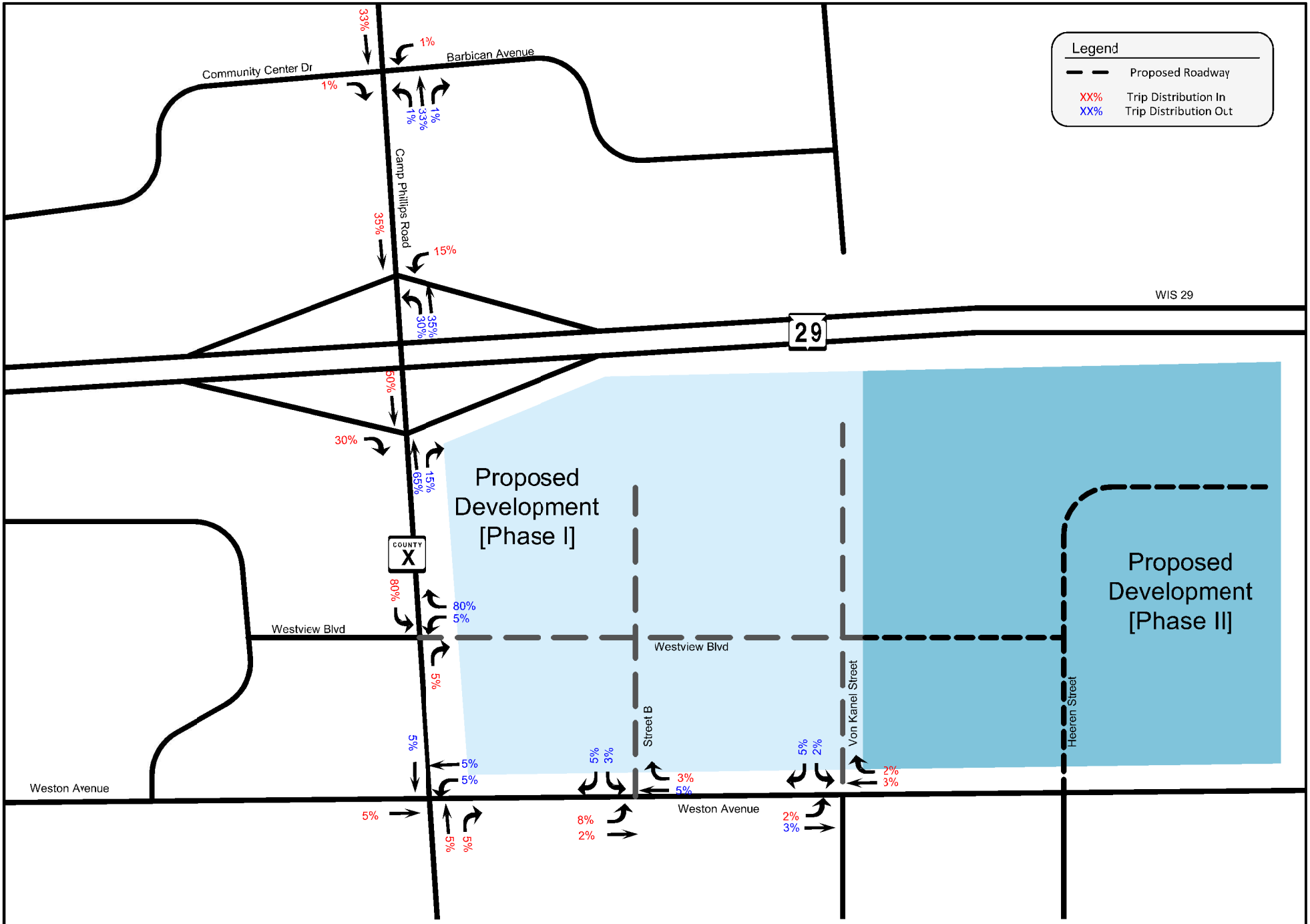

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Exhibit 4-4B: Trip Distribution - Phase I

Village of Weston [Marathon County]

N

NOT TO SCALE

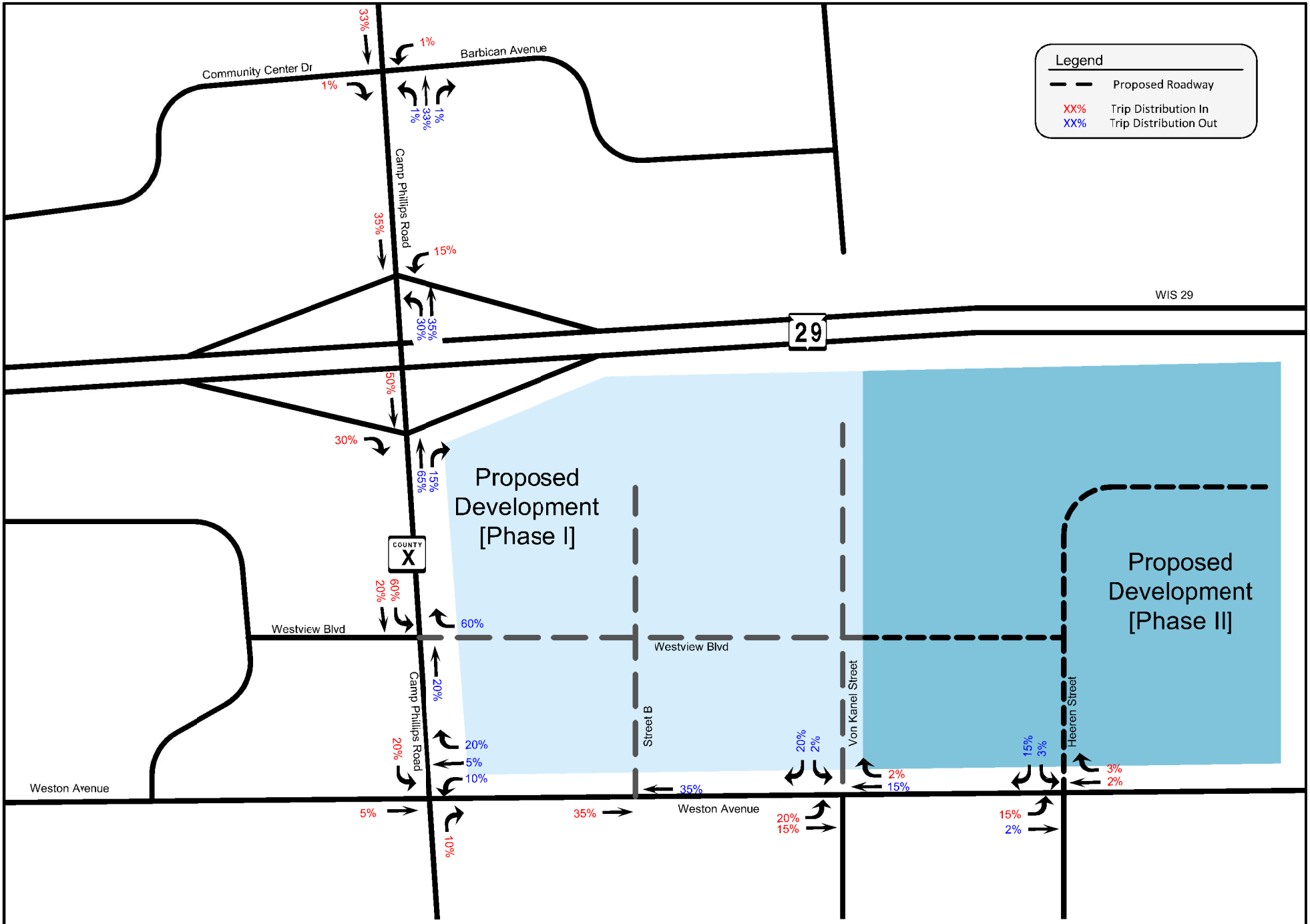

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Exhibit 4-4C: Trip Distribution - Phase II

Village of Weston [Marathon County]

N

NOT TO SCALE

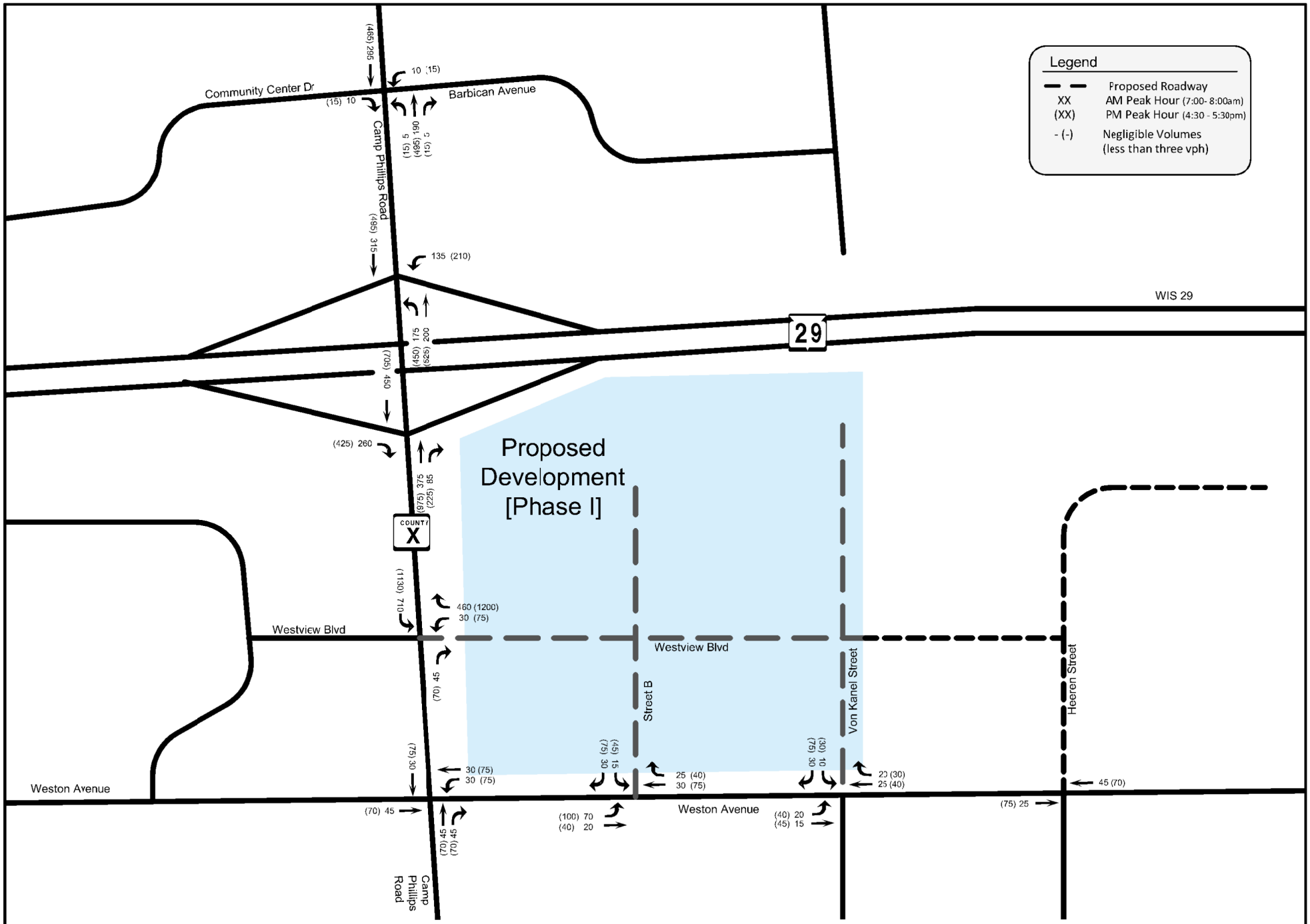

Exhibit 4-5A: Phase I On-Site Development
Traffic Assignment: New Trips
Village of Weston [Marathon County]

NOT TO SCALE

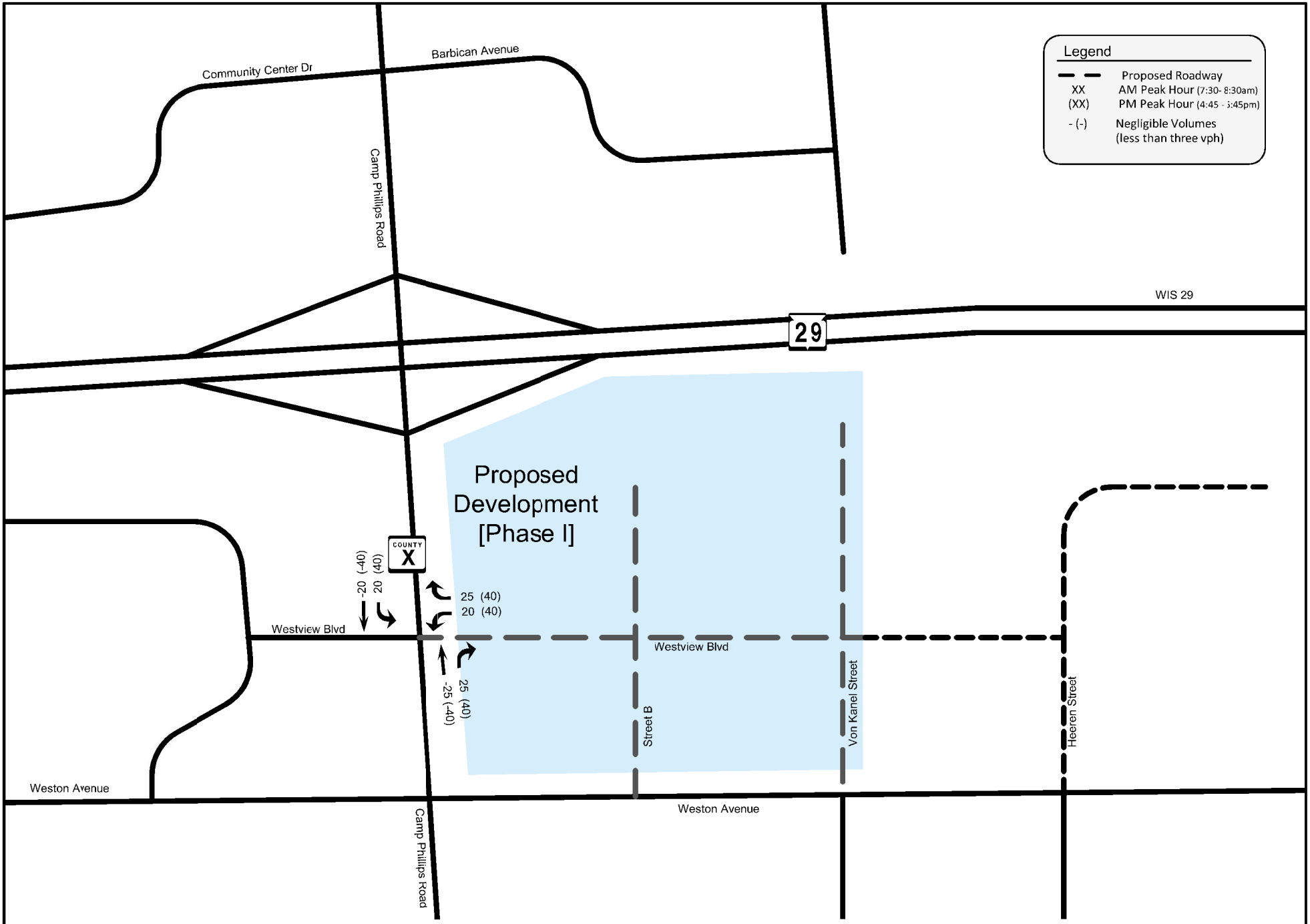

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Exhibit 4-5C-1: Phase I On-site Development
Traffic Assignment: Pass-by Trips
Village of Weston [Marathon County]

N

NOT TO SCALE

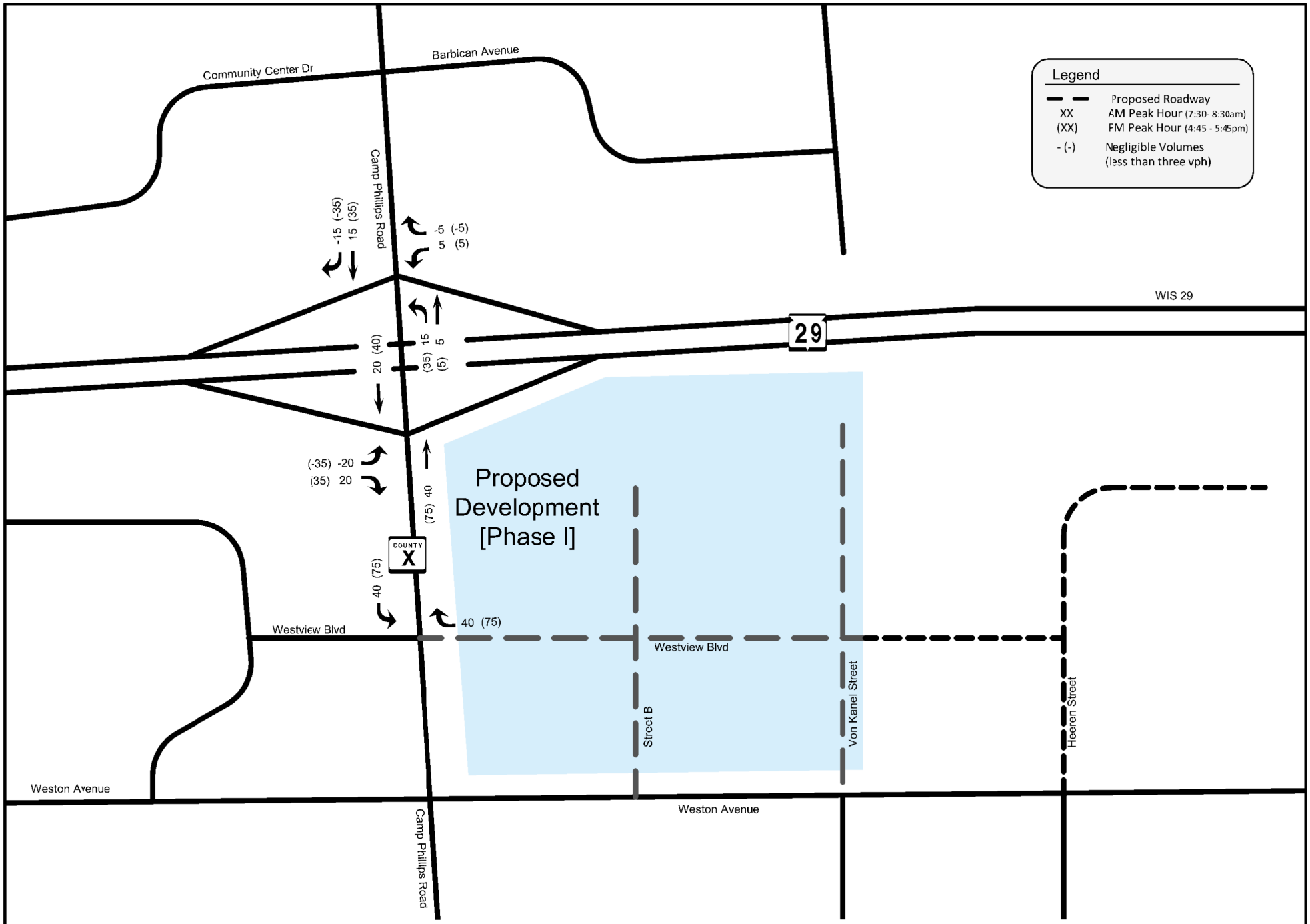

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Exhibit 4-5C-2: Phase I On-site Development Traffic Assignment: Diverted Pass-by Trips

Village of Weston [Marathon County]

N

NOT TO SCALE

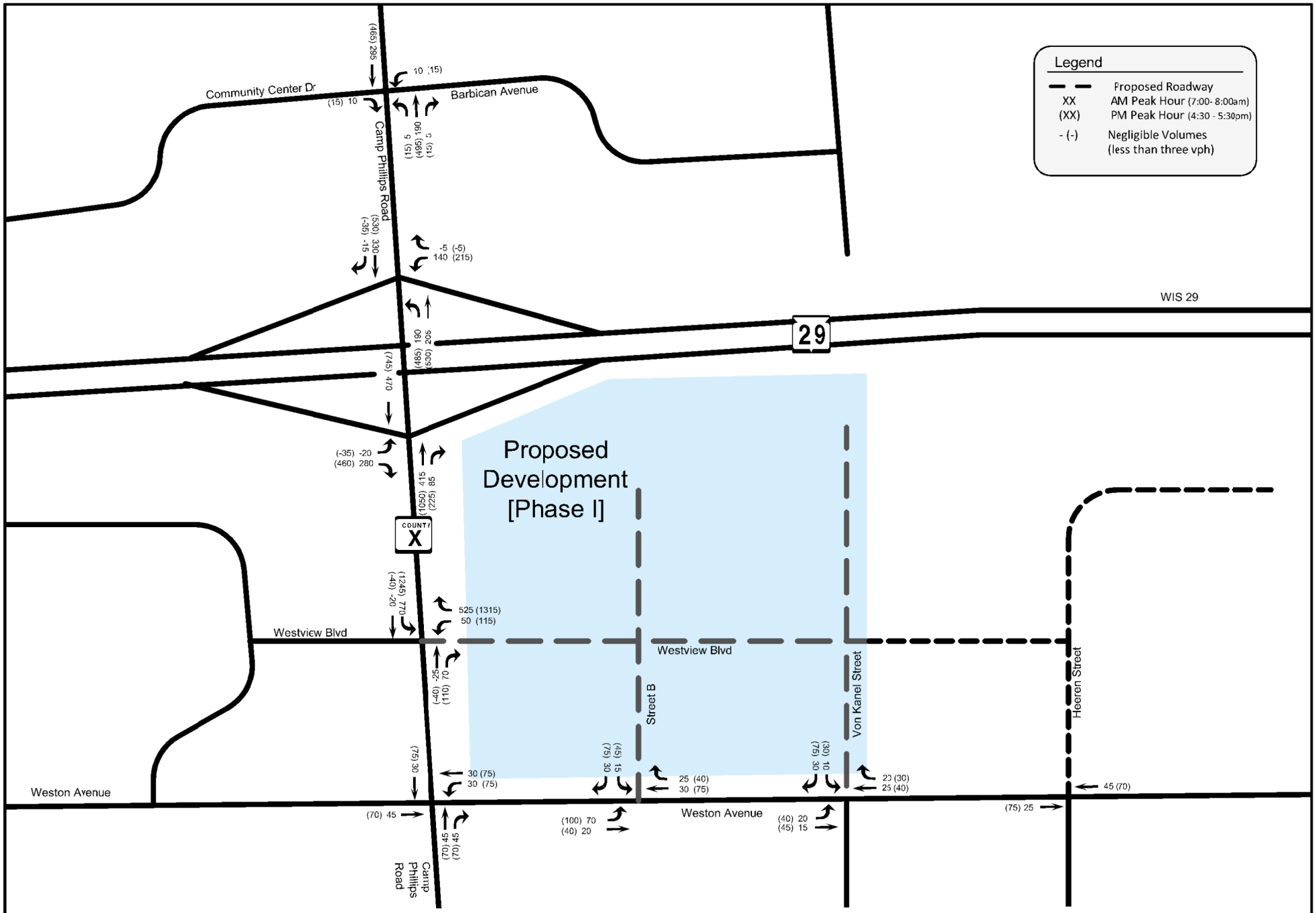

Exhibit 4-5D: Phase I On-Site Development Traffic Assignment: Driveway Trips

(Phase I On-Site Development Traffic Assignment: New Trips + Phase I On-Site Development Traffic Assignment: Pass-by Trips + Phase I On-Site Development Traffic Assignment: Diverted Pass-by Trips)

Village of Weston [Marathon County]

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N

NOT TO SCALE

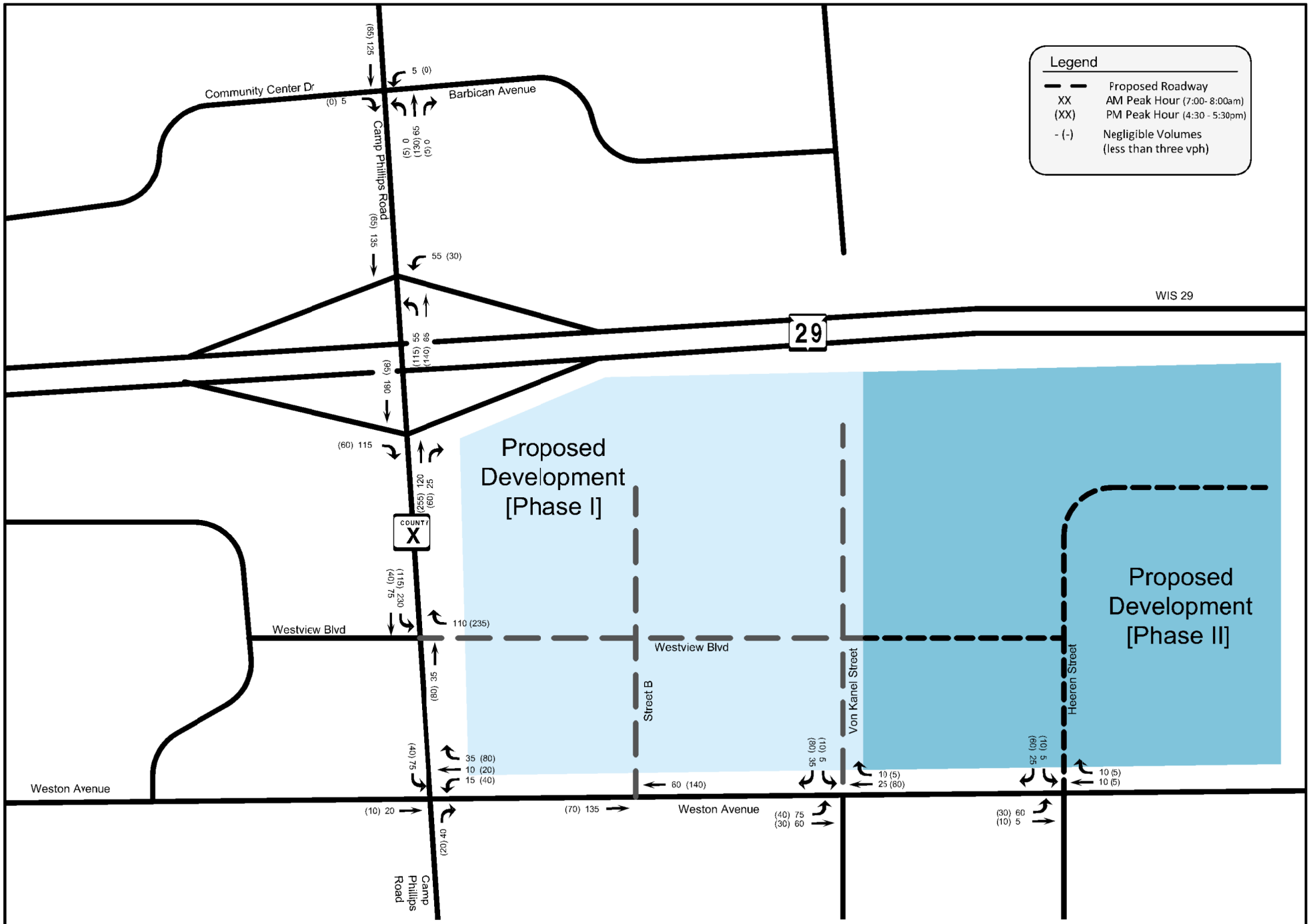

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Exhibit 4-6A: Phase II On-Site Development
Traffic Assignment: New Trips
Village of Weston [Marathon County]

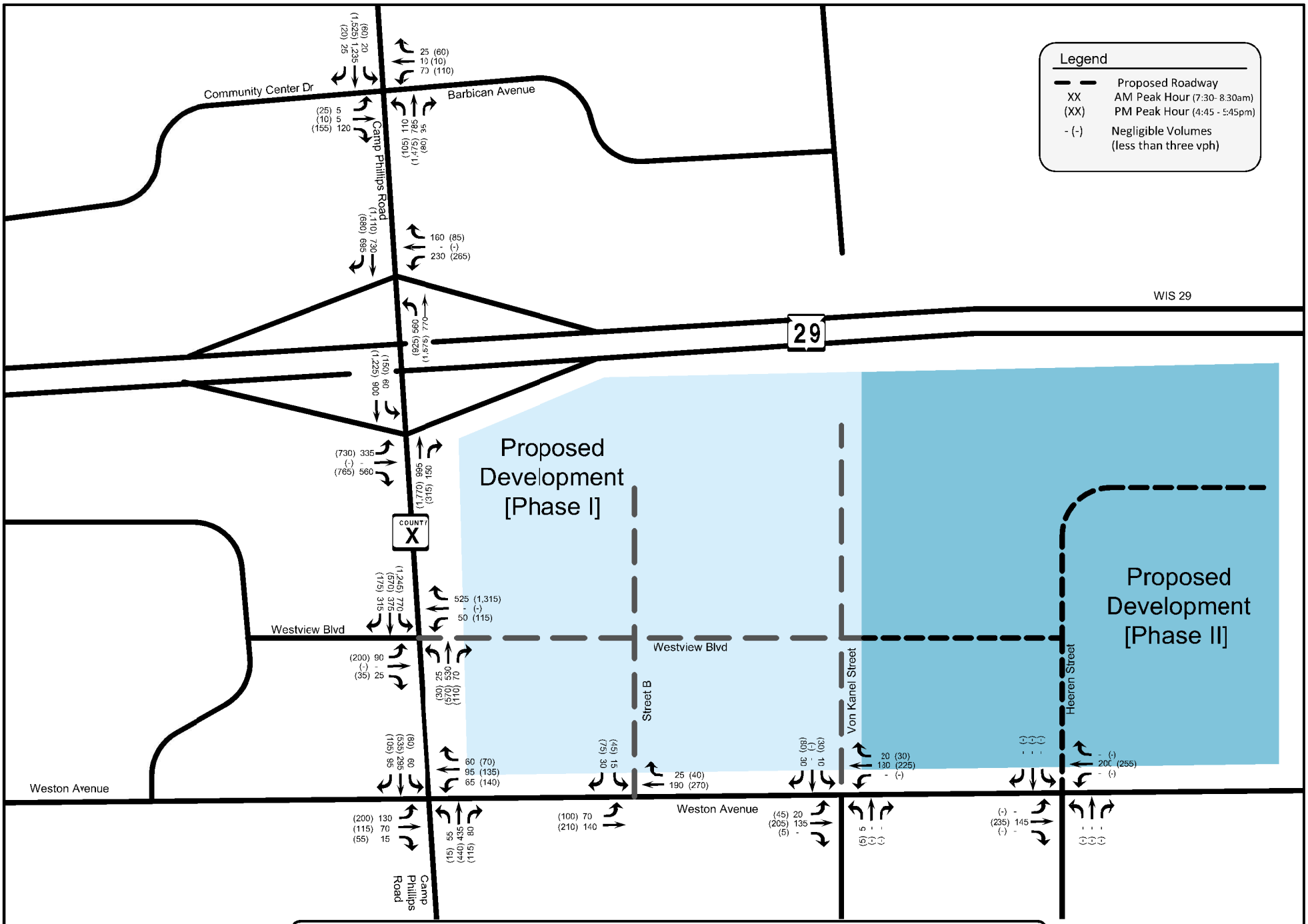


Exhibit 4-11: 2020 Base Year Build Development Traffic Volumes

(2020 Base Year Background Traffic Volumes + Phase I On-Site Development Traffic Assignment: Driveway Trips)

Village of Weston [Marathon County]

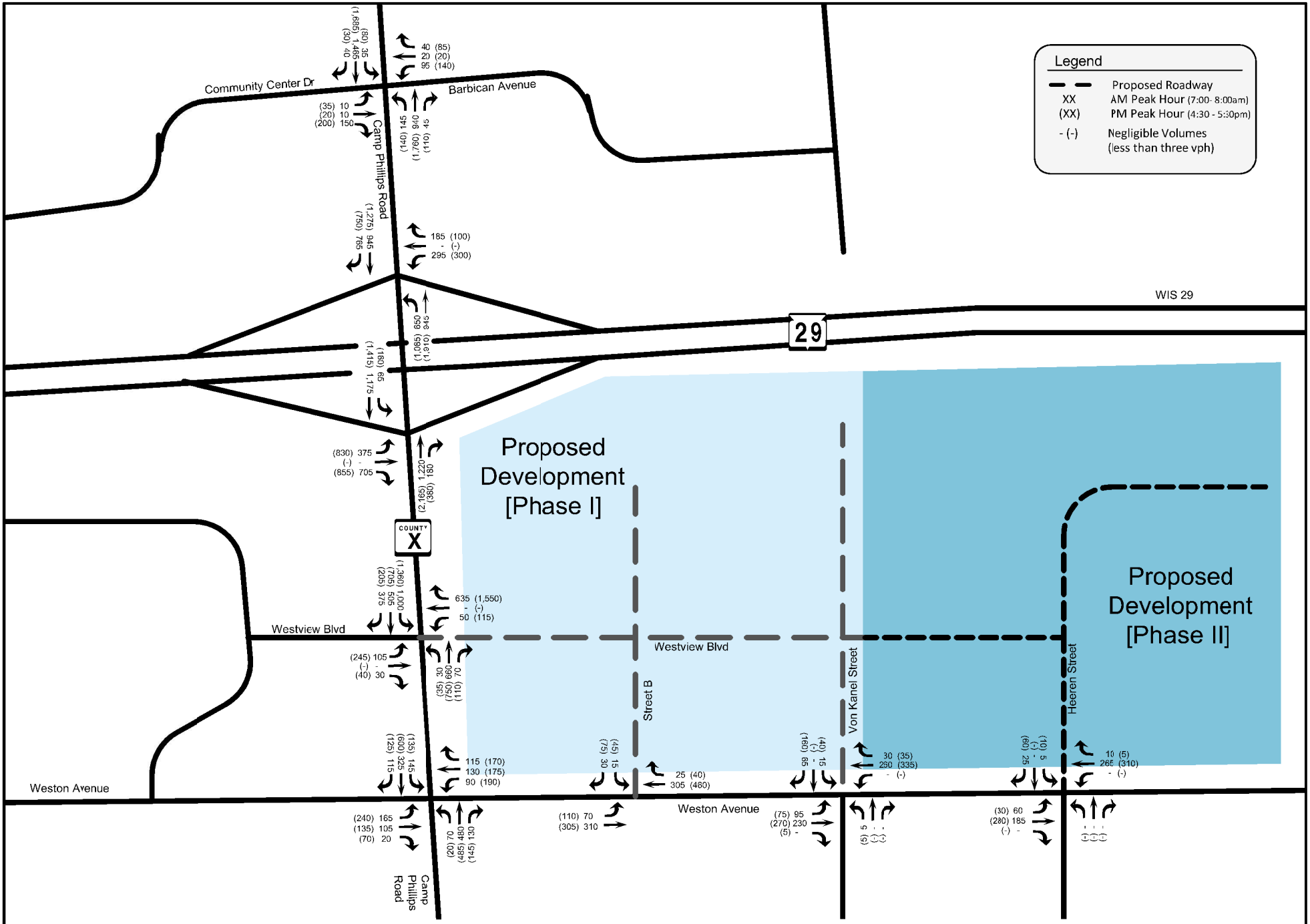


Exhibit 4-12: 2030 Interim Year Build Development Traffic Volumes

(2030 Interim Year Background Traffic Volumes + Phase I On-Site Development Traffic Assignment: Driveway Trips + Phase II On-Site Development Traffic Assignment: New Trips)

Village of Weston [Marathon County]

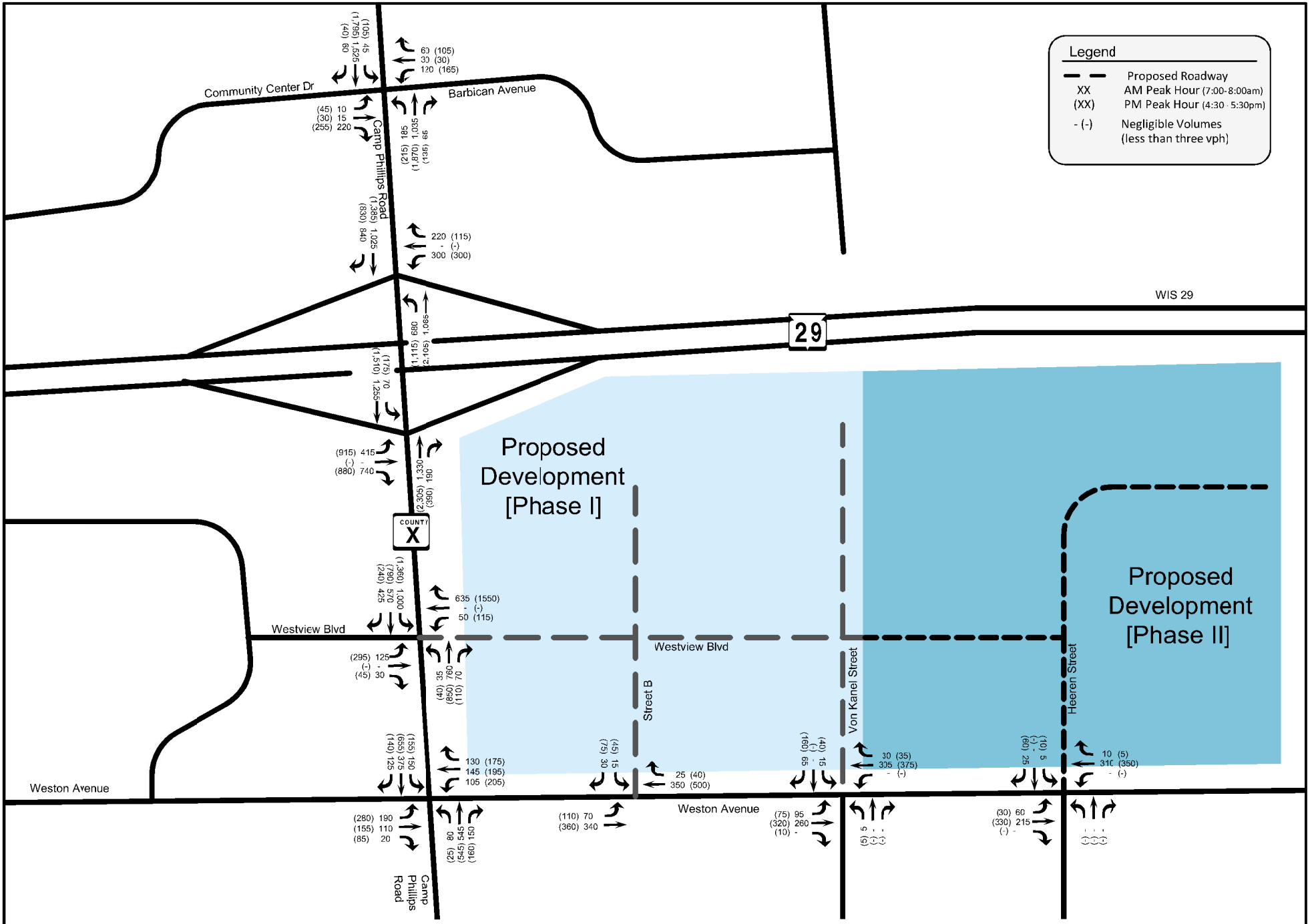


Exhibit 4-13: 2040 Horizon Year Build Development Traffic Volumes

(2040 Horizon Year Background Traffic Volumes + Phase I On-Site Development Traffic Assignment: Driveway Trips + Phase II On-Site Development Traffic Assignment: New Trips)

Village of Weston [Marathon County]

MSA PROFESSIONAL SERVICES

N

NOT TO SCALE

Chapter 5 – TRAFFIC AND IMPROVEMENT ANALYSIS

After the traffic forecasts were made for the 2017 base year and 2037 horizon year, the next step in the process was to analyze the future traffic conditions, identify needs (if any), and analyze alternative improvements. The analysis of the roadway and intersections included the following elements:

- Site access,
- Capacity / level of service analysis,
- Queuing analysis,
- Pedestrian, bicycle, and multi-use trail considerations,
- Speed considerations,
- Traffic control needs/warrant analysis; and
- Traffic signal warrant analysis

PART A – SITE ACCESS

The main access to Camp Phillips Centre is proposed to be the east approach of the existing t-intersection of Camp Phillips Centre & Westview Boulevard. The intersection is 1,110-ft south of the WIS 29 eastbound interchange ramp terminal and approximately 825-ft north of the intersection with Weston Avenue. No other access points are proposed along County Road X.

Three additional access points will be located on Weston Avenue. The access locations will be evenly spaced and will maintain 1,000-ft spacing, at a minimum. The intersections along Weston Avenue, east of County Road X, are included in this report for trip assignment and balancing only; no operational modeling was completed at part of this TIA.

PART B – CAPACITY/LEVEL OF SERVICE ANALYSIS

An operational and capacity analysis was completed for each intersection using Synchro 9 which is based on the procedures, methods, and techniques contained in the Highway Capacity Manual, 2010 Edition.

The HCM 2010 was adopted by WisDOT for all traffic operations calculations and reports. The study area corridor has several intersections with channelized, yielding right turn lanes. According to Page 18-9 in the HCM, “only right turns that are controlled by the signal should be represented in the right turn volume input…”. Synchro 9, using HCM 2010 outputs, does not yield a delay or v/c ratio for channelized right turn movements not controlled by the traffic signal. In order to model the delay that yielding right turn vehicles may experience due to mainline capacity, limited gaps in traffic, and queuing (most specifically on the WIS 29 ramps) HCM 2000 reports were output for those movements. All LOS summary tables will illustrates those movements and outputs highlighted in grey.

All operational outputs can be viewed in Appendices B through F.

B1. 2030 Background Traffic Operations – Existing Transportation System

At the intersection of Westview Boulevard, the west approach will operate at LOS F, as shown in **Exhibit 5-1:** *2030 Interim Year Background Traffic – Capacity/LOS Analysis, Existing Transportation System*. All other movements at the intersection of Westview Boulevard will operate at LOS D or better.

All other study area intersection report acceptable operations at LOS D or better.

The intersection of County Road X & WIS 29 westbound ramp may experience queues that extend past the existing storage length in the southbound right-turn movement. The queue lengths at all other intersection approaches are not expected to impact operations or safety of the intersections nor block any access to surrounding driveways or intersections.

B2. 2040 Background Traffic Operations – Existing Transportation System

At the intersection of Westview Boulevard, the west approach will operate at LOS F, as shown in **Exhibit 5-2:** *2040 Horizon Year Background Traffic – Capacity/LOS Analysis, Existing Transportation System*. All other movements at the intersection of Westview Boulevard will operate at LOS D or better.

All other study area intersection report acceptable operations at LOS D or better.

Queues are anticipated to extend past the available storage lengths at the intersections of County Road X & Barbican Avenue and County Road X & WIS 29 westbound ramp. The queue lengths at all other intersection approaches are not expected to impact operations or safety of the intersections nor block any access to surrounding driveways or intersections.

B3. 2020 Phase I Build Development Traffic Operations – Existing Transportation System

As shown in **Exhibit 5-3,** *2020 Phase I Build Development Traffic – Capacity/LOS Analysis, Existing Transportation System*, two intersections (Westview Boulevard and WIS 29 westbound ramp) will fail with development traffic. At the intersection of County Road X & WIS 29 eastbound ramp, the west approach (off-ramp) will operate at LOS E and several movements will be nearing capacity.

All other study area intersection report acceptable operations at LOS D or better.

A majority of the intersections will experience queues that extend past existing storage lengths and will block thru traffic. Improvements will look to address the queueing issues to improve safety and efficiency of the intersections. The queue lengths at the intersection of County Road X & Weston Avenue are not expected to impact operations or safety of the intersections nor block any access to surrounding driveways or intersections.

B4. 2030 Full Build Development Traffic Operations – Existing Transportation System

The interim year, 2030, build development analysis includes all anticipated Phase I and Phase II development traffic with the existing intersection configurations.

As shown in **Exhibit 5-4,** *2030 Full Build Development Traffic – Capacity/LOS Analysis, Existing Transportation System*, all study area intersections except Weston Avenue will fail with development traffic.

A majority of the intersections will experience queues that extend past existing storage lengths and will block through traffic. The queue lengths at the intersection of County Road X & Weston Avenue are not

expected to impact operations or safety of the intersections nor block any access to surrounding driveways or intersections.

B5. 2040 Full Build Development Traffic Operations – Existing Transportation System

The horizon year, 2040, build development analysis includes all anticipated Phase I and Phase II development traffic with the existing intersection configurations.

As shown in **Exhibit 5-5,** *2040 Full Build Development Traffic – Capacity/LOS Analysis, Existing Transportation System*, all study area intersections except Weston Avenue will fail with development traffic.

A majority of the intersections will experience queues that extend past existing storage lengths and will block through traffic. Improvements will look to address the queueing issues to improve safety and efficiency of the intersections. The queue lengths at the intersection of County Road X & Weston Avenue are not expected to impact operations or safety of the intersections nor block any access to surrounding driveways or intersections.

B6. 2020 Background Traffic Operations – Improved Transportation System

Improvements to accommodate base year background traffic volume are summarized in *Chapter 6 – Recommendations and Conclusions.*

- *County Road X & Westview Boulevard*
  As discussed in **Part G** below, traffic signal warrants were reviewed at the intersection of County Road X & Westview Boulevard. The primary volume traffic signal warrants, Warrant 1 and Warrant 2, are not anticipated to be met in the background condition. Traffic signals are generally only installed if the primary volume warrants (Warrant 1 and Warrant 2) are met. It is uncommon to warrant the installation without the volume warrants met.

  However, due to poor intersection operations and long queues under the stop control condition, a traffic signal was analyzed and will operate at LOS B or better if installed. **Exhibit 5-9,** *2020 Background Traffic – Capacity/LOS Analysis, Improved Transportation System* shows the expected improvements to achieve LOS D or better for all movements at the intersection of County Road X & Westview Boulevard.

All other intersections will operate at LOS D or better with signal timing improvements to accommodate the base year background traffic volumes. Analyses also concluded acceptable queueing which will not impact operations or safety nor block access to any adjacent driveways or intersections.

B7. 2030 Background Traffic Operations – Improved Transportation System

In addition to the improvements described for the 2020 Background Traffic Operations, the following improvements are also needed to accommodate 2030 interim year background traffic volume. The additional improvements are shown below and also summarized in *Chapter 6 – Recommendations and Conclusions.*

- *County Road X & WIS 29 westbound ramp*
  The anticipated queues for the southbound right-turn lane at the signalized intersection of Camp Phillips Drive & WIS 29 westbound ramp may extend past the available storage by up to 50-ft in the peak hours. There appears to be sufficient available space to extend the turn lane 50-ft to accommodate the appropriate queue storage.

- *County Road X & Westview Boulevard*
  It is expected that traffic signals will be installed at the intersection of County Road X & Westview Boulevard as part of Phase I development. The primary volume traffic signal warrants are not anticipated to be met in the 2030 background condition. Due to poor intersection operations and long queues under the stop control condition, a traffic signal was analyzed and would operate at LOS B or better if installed. See **Exhibit 5-10,** *2030 Background Traffic – Capacity/LOS Analysis, Improved Transportation System.*

All other intersections will operate at LOS D or better with signal timing improvements to accommodate the base year background traffic volumes. Analyses also concluded acceptable queueing which will not impact operations or safety nor block access to any adjacent driveways or intersections.

B8. 2040 Background Traffic Operations – Improved Transportation System

In addition to the improvements described for the 2020 and 2030 Background Traffic Operations, the following improvements are also needed to accommodate 2040 horizon year background traffic volume. The additional improvements are provided below and also summarized in *Chapter 6 – Recommendations and Conclusions.* **Exhibit 5-11,** *2040 Background Traffic – Capacity/LOS Analysis, Improved Transportation System* shows the expected improvements to achieve LOS D or better for all movements at the evaluated intersections.

- *County Road X & Barbican Avenue*
  The anticipated queues for the southbound left-turn and northbound left-turn at the signalized intersection of County Road X & Barbican Avenue may extend past the available storage by up to 75-ft and 45-ft, respectively, in the PM peak Hour. Intersection approach widening would likely be required if the turn lanes are to lengthen in order to store vehicles within the turn lanes and not block thru traffic.

- *County Road X & WIS 29 westbound ramp*
  The anticipated queues for the southbound right-turn and northbound left-turn at the signalized intersection of Camp Phillips Drive & WIS 29 westbound ramp may extend past the available storage by up to 50-ft and 55-ft, respectively, in the peak hours.

  There appears to be sufficient available space to extend the southbound right-turn lane 50-ft to accommodate the appropriate queue storage.

  There does not appear to be sufficient existing available space to extend the northbound left-turn lane 55-ft to accommodate the appropriate queue storage. Structure widening would be required to accommodate the appropriate queue storage.

- *County Road X & Westview Boulevard*
  It is expected that traffic signals will be installed at the intersection of County Road X & Westview Boulevard as part of Phase I development. The primary volume traffic signal warrants are not anticipated to be met in the 2040 background condition. Due to poor intersection operations and long queues under the stop control condition, a traffic signal was analyzed and will operate at LOS C or better if installed, as seen in **Exhibit 5-11**.

- *County Road X & Weston Avenue*
  At the intersection of County Road X & Weston Avenue, the westbound left-turn queue may extend past the available storage by up to 25-ft in the PM peak hour. Reconstruction of Weston Avenue, east of County Road X, will likely be required due to the development. A storage length of approximately 75-ft, at a minimum, should be accommodated for the westbound left-turn movement.

All other intersections will operate at LOS D or better with signal timing improvements to accommodate the base year background traffic volumes. Analyses also concluded acceptable queueing which will not impact operations or safety nor block access to any adjacent driveways or intersections.

B9. 2020 Phase I Build Development Traffic Operations, Improved Transportation System

Improvements to accommodate base year background traffic volume plus Phase I on-site development traffic volumes are summarized below and also in *Chapter 6 – Recommendations and Conclusions.* **Exhibit 5-12,** *2020 Phase I Development Traffic Operations – Capacity/LOS Analysis, Improved Transportation System* shows the expected improvements to achieve LOS D or better for all movements at the evaluated intersections.

- *County Road X & WIS 29 westbound ramp*
  As shown in **Exhibit 5-3**, the northbound left-turn, southbound thru, and westbound left-turn movements are expected to operate at LOS F in the PM peak hour.

  As shown in **Exhibit 5-12**, in order to improve the movements to LOS D or better, accommodating dual northbound left-turn lanes and dual westbound left-turn lanes at the ramp increases the capacity to achieve LOS D or better at all intersection movements.

  The southbound right-turn lane queue may extend past the available storage by up to 50-ft (equal to the 2040 background improvement recommendation) in the peak hours. There appears to be sufficient available space to extend the turn lane 50-ft to accommodate the appropriate queue storage.

- *County Road X & WIS 29 eastbound ramp*
  The eastbound right-turn lane queue may extend past the available storage by up to 125-ft in the peak hours. There appears to be sufficient available space to extend the turn lane 125-ft to accommodate the appropriate queue storage.

- *County Road X & Westview Boulevard*
  As shown in **Exhibit 5-3**, the intersection of County Road X & Westview Boulevard is expected to operate at LOS F in the AM and PM peak hours.

A traffic signal warrant analysis was completed for the intersection of County Road X & Westview Boulevard in which traffic signal warrants were reviewed and are met for Phase I build year conditions; see **Part G** for additional information.

As shown in **Exhibit 5-12**, in order to improve the movements to LOS D or better, accommodating dual southbound left-turn lanes, dual eastbound left-turn lanes, and an exclusive northbound right-turn lane increases the capacity to achieve LOS D or better at all intersection movements. The new east approach of the intersection should be constructed to accommodate a left, thru, and right turn lane with the ability to add dual right-turn lanes in the future.

The southbound dual-left turn lane queue may extend past the available storage by up to 440-ft in the PM peak hour. Intersection reconstruction will likely be required with the additional lanes and additional queue storage should also be accommodated. A storage length of approximately 600-ft, at a minimum, should be accommodated.

- *County Road X & Weston Avenue*
  At the intersection of County Road X & Weston Avenue, the westbound left-turn queue may extend past the available storage by up to 25-ft (equal to the 2040 background improvement recommendation) in the PM peak hour. Reconstruction of Weston Avenue, east of County Road X, will likely be required due to the development. A storage length of approximately 75-ft, at a minimum, should be accommodated for the westbound left-turn movement.

All other intersections will operate at LOS D or better with signal timing improvements to accommodate the base year background plus Phase I development traffic volumes. Analyses also concluded acceptable queueing at intersections not already discussed and those will not impact operations or safety nor block access to any adjacent driveways or intersections.

B10. 2030 Full Build Development Traffic Operations, Improved Transportation System

Improvements to accommodate base year background traffic volume plus Phase I and Phase II on-site development traffic volumes are summarized below and also in *Chapter 6 – Recommendations and Conclusions.* **Exhibit 5-13,** *2030 Full Build Development Traffic Operations – Capacity/LOS Analysis, Improved Transportation System* shows the expected improvements to achieve LOS D or better for all movements at the evaluated intersections.

- *County Road X & Barbican Avenue*
  The southbound right-turn lane queue may extend past the available storage by up to 75-ft (equal to the 2040 background recommended improvement) in the AM peak hour. Intersection approach widening would likely be required if the turn lane is to be lengthened in order to store vehicles within the turn lane and not block thru traffic.

- *County Road X & WIS 29 westbound ramp*
  The southbound right-turn lane queue may extend past the available storage by up to 75-ft (an additional 25-ft from the 2020 Phase I improvements) in the peak hours. There appears to be sufficient available space to extend the turn lane 75-ft to accommodate the appropriate queue storage.

- *County Road X & WIS 29 eastbound ramp*
  As shown in **Exhibit 5-4**, the intersection of County Road X & WIS 29 eastbound ramp is expected to operate at LOS F in the AM and PM peak hours.

  As shown in **Exhibit 5-13**, a third northbound thru lane increases the capacity to achieve LOS D or better at all intersection movements.

  The eastbound right-turn lane queue may extend past the available storage by up to 125-ft (equal to that in the 2020 Phase I development scenario) in the peak hours. There appears to be sufficient available space to extend the turn lane 125-ft to accommodate the appropriate queue storage.

- *County Road X & Westview Boulevard*
  As shown in **Exhibit 5-4**, the existing two-way stop controlled intersection of County Road X & Westview Boulevard is expected to operate at LOS F in the AM and PM peak hours. A traffic signal is anticipated to be installed at part of Phase I development.

  As shown in **Exhibit 5-13**, improvements beyond the *2020 Phase I Build Development Traffic Operations, Improved Transportation System – Capacity/LOS Analysis* recommendations, include adding a third northbound thru lane and a second westbound right-turn lane which would increase capacity to achieve LOS D or better for all movements.

  The southbound dual-left turn lane queue may extend past the available storage by up to 465-ft (an additional 25-ft from the 2020 Phase I improvements) in the PM peak hour. Intersection reconstruction will likely be required with the additional lanes and additional queue storage should also be accommodated. A storage length of approximately 625-ft, at a minimum, should be accommodated.

- *County Road X & Weston Avenue*
  At the intersection of County Road X & Weston Avenue, the westbound left-turn queue may extend past the available storage by up to 75-ft (an additional 50-ft from the 2020 Phase I improvements) in the PM peak hour. Reconstruction of Weston Avenue, east of County Road X, will likely be required due to the development. A storage length of approximately 125-ft, at a minimum, should be accommodated for the westbound left-turn movement.

All other intersections will operate at LOS D or better with signal timing improvements to accommodate the base year background plus Phase I and Phase II development traffic volumes. Analyses also concluded acceptable queueing at intersections not already discussed and those will not impact operations or safety nor block access to any adjacent driveways or intersections.

B11. 2040 Full Build Development Traffic Operations, Improved Transportation System

Improvements to accommodate base year background traffic volume plus Phase I and Phase II on-site development traffic volumes are summarized in *Chapter 6 – Recommendations and Conclusions.* **Exhibit 5-14A,** *2040 Full Build Development Traffic Operations – Capacity/LOS Analysis, Improved Transportation System* shows the expected improvements to achieve LOS D or better for all movements at the evaluated intersections.

- *County Road X & Barbican Avenue*
  As shown in **Exhibit 5-5**, the northbound left-turn and southbound left-turn movements at the intersection County Road X & Barbican Avenue is expected to operate at LOS F in the PM peak hour.

  As shown in **Exhibit 5-14A**, an additional southbound shared thru/right lane and an additional eastbound right-turn lane, along with intersection re-striping on the east and west approaches, increases the capacity to achieve LOS D or better at all intersection movements. The existing lane configuration of the west approach should be restriped to include an exclusive left-turn, a thru lane, and the addition of the exclusive right-turn lane, with right-turn overlap phasing. Additional mainline capacity is also needed to accommodate the heavy north and southbound movements. It is recommended to install an additional southbound through lane which would tie together with other corridor improvements for continuity along County Road X.

  The southbound right-turn lane queue may extend past the available storage by up to 75-ft (equal to that in the 2030 Full Build scenario) in the peak hours. Intersection approach widening would likely be required if the turn lane is to be lengthened in order to store vehicles within the turn lane and not block thru traffic.

- *County Road X & WIS 29 westbound ramp*
  As shown in **Exhibit 5-5**, the intersection of County Road X & WIS 29 westbound ramp is expected to operate at LOS F in the AM and PM peak hours.
  As shown in **Exhibit 5-14A**, improvements beyond the *2030 Full Build Development Traffic Operations, Improved Transportation System* recommendations, include adding a third southbound thru lane which would increase capacity to achieve LOS D or better for all movements.

  The southbound right-turn lane queue may extend past the available storage by up to 75-ft (equal to that in the 2030 Full Build scenario) in the PM peak hour. There appears to be sufficient available space to extend the turn lane 75-ft to accommodate the appropriate queue storage.

- *County Road X & WIS 29 eastbound ramp*
  As shown in **Exhibit 5-5**, the intersection of County Road X & WIS 29 eastbound ramp is expected to operate at LOS E and LOS F in the AM and PM peak hours.

  As shown in **Exhibit 5-14A**, improvements beyond the *2030 Full Build Development Traffic Operations, Improved Transportation System* recommendations, include adding a third southbound thru lane which would increase capacity to achieve LOS D or better for all movements.

  The eastbound right-turn lane queue may extend past the available storage by up to 150-ft (an additional 25-ft from the 2030 Full Build improvements) in the peak hours. There appears to be sufficient available space to extend the turn lane 150-ft to accommodate the appropriate queue storage.

- *County Road X & Westview Boulevard*
  As shown in **Exhibit 5-5**, the existing two-way stop controlled intersection of County Road X & Westview Boulevard is expected to operate at LOS F in the AM and PM peak hours. A traffic signal is anticipated to be installed at part of Phase I development.

  No additional geometric improvements beyond the *2030 Full Build Development Traffic Operations, Improved Transportation System* recommendations at this time. As shown in **Exhibit 5-14A**, the intersection will operate at LOS D or better on the mainline. However, the eastbound dual left-turn lanes will operate at LOS E. The movement operates at LOS E and less than 20 seconds of extra delay. Queue lengths are not anticipated to be longer than 200-ft (8 vehicles) and will not block adjacent driveways or intersections. Notably, the simulation models illustrate that the queues will clear in a single cycle length.

  The southbound dual-left turn lane queue may extend past the available storage by up to 540-ft (an additional 75-ft from the 2030 Full Build improvements) in the PM peak hour. Intersection reconstruction will likely be required with the additional lanes and additional queue storage should also be accommodated. A storage length of approximately 700-ft, at a minimum, should be accommodated.

- *County Road X & Weston Avenue*
  At the intersection of County Road X & Weston Avenue, the westbound left-turn queue may extend past the available storage by up to 100-ft (an additional 25-ft from the 2030 Full Build improvements) in the PM peak hour. Reconstruction of Weston Avenue, east of County Road X, will likely be required due to the development. A storage length of approximately 125-ft, at a minimum, should be accommodated for the westbound left-turn movement.

All other intersections will operate at LOS D or better with signal timing improvements to accommodate the base year background plus Phase I and Phase II development traffic volumes. Analyses also concluded acceptable queueing at intersections not already discussed and those will not impact operations or safety nor block access to any adjacent driveways or intersections.

Additional Intersection Configurations:
A Phase I scoping level intersection control evaluation (ICE) report was completed at County Road X & WIS 29 interchange ramps to further evaluate alternative intersection designs. Based on the operational outputs, a multilane roundabout is not a feasible alternative and is not recommended as a long term solution at the WIS 29 interchange. An analysis was completed to analyze the WIS 29 interchange system as a diverging diamond interchange. The diverging diamond interchange (DDI) was analyzed using Synchro 9 software and HCM 2000 outputs as HCM 2010 does not output results for non-standard intersections. The completed Phase I ICE report can be seen in **Appendix J** and is further discussed in **Part F** below.

After further operational and geometric evaluation, standard traffic signal configurations are recommended for installation at the WIS 29 interchange.

B12. 2040 Full Build Development Traffic Operations, Improved Transportation System – Sensitivity Analysis

As requested by WisDOT as part of the Initial Review process, a sensitivity analysis was completed at the intersection of Camp Philips Road & Westview Boulevard. It is possible that vehicles exiting the development to travel northbound may divert to Weston Avenue to travel northbound on County Road X instead of exiting the development at the Westview Boulevard intersection. A 15% diversion of traffic was agreed to as part of the Initial Review process. As seen in ***Figure 5-1*** below, the turning movement volumes were reduced from the westbound right-turn movement and added to the northbound thru movement.

	2040 Full Build Traffic Volumes						15% Removed from Westbound Right Turn, 15% Added to Northbound Through						2040 Full Build Sensitivity Analysis Volumes					
Westview Boulevard	240	790	1360	RT	635	1550				RT	-95	-235	240	790	1360	RT	540	1315
	425	570	1000	TH	0	0				TH			425	570	1000	TH	0	0
	RT	TH	LT	LT	50	115	RT	TH	LT	LT			RT	TH	LT	LT	50	115
	295	125	LT	LT	TH	RT			LT	LT	TH	RT	295	125	LT	LT	TH	RT
	0	0	TH	35	760	70			TH		95		0	0	TH	35	855	70
	45	30	RT	40	850	110			RT		235		45	30	RT	40	1085	110
Weston Avenue	140	655	155	RT	130	175				RT	95	235	140	655	155	RT	225	410
	125	375	150	TH	145	195				TH			125	375	150	TH	145	195
	RT	TH	LT	LT	105	205	RT	TH	LT	LT			RT	TH	LT	LT	105	205
	280	190	LT	LT	TH	RT			LT	LT	TH	RT	280	190	LT	LT	TH	RT
	155	110	TH	80	545	150			TH				155	110	TH	80	545	150
	85	20	RT	25	545	160			RT				85	20	RT	25	545	160

Figure 5-1: *2040 Full Build Sensitivity Analysis Traffic Volumes*

Synchro models were analyzed with the sensitivity analysis volumes. The eastbound dual left-turn movement and northbound thru will degrade to LOS E or LOS F with the diversion of traffic as seen in ***Exhibit 5-14C****, 2040 Full Build Development Traffic Operations – Capacity/LOS Analysis, Improved Transportation System – Sensitivity Analysis (Westbound).* Queue lengths will not extend past adjacent intersections or driveway.

Additional improvements beyond the proposed intersection configuration would be required. It is anticipated that an alternative intersection design would need to be constructed in order to accommodate a large diversion of traffic to the surrounding transportation network.

A second sensitivity analysis was completed using the same theory for vehicles entering the site from the north. Patrons traveling southbound on County Road X may by-pass the dual left-turn lanes into the development and continue to Weston Avenue to enter the site. As seen in ***Figure 5-2*** below, the turning movement volumes were subtracted from the southbound left-turn volume and added to the southbound thru lane volumes. The sensitivity analysis takes into account diversion of both the southbound left movement and the westbound right movement.

	2040 Full Build Traffic Volumes						15% Removed from Westbound Right Turn,						2040 Full Build Sensitivity Analysis Volumes					
Westview Boulevard	240	790	1360	RT	635	1550		204	-204	RT	-95	-235	240	994	1156	RT	540	1315
	425	570	1000	TH	0	0		150	-150	TH			425	720	850	TH	0	0
	RT	TH	LT	LT	50	115	RT	TH	LT	LT			RT	TH	LT	LT	50	115
	295	125	LT	LT	TH	RT			LT	LT	TH	RT	295	125	LT	LT	TH	RT
	0	0	TH	35	760	70			TH		95		0	0	TH	35	855	70
	45	30	RT	40	850	110			RT		235		45	30	RT	40	1085	110
Weston Avenue	140	655	155	RT	130	175			204	RT	95	235	140	655	359	RT	225	410
	125	375	150	TH	145	195			150	TH			125	375	300	TH	145	195
	RT	TH	LT	LT	105	205	RT	TH	LT	LT			RT	TH	LT	LT	105	205
	280	190	LT	LT	TH	RT			LT	LT	TH	RT	280	190	LT	LT	TH	RT
	155	110	TH	80	545	150			TH				155	110	TH	80	545	150
	85	20	RT	25	545	160			RT				85	20	RT	25	545	160

Figure 5-2: *2040 Full Build Sensitivity Analysis Traffic Volumes*

As seen in ***Exhibit 5-14D**, 2040 Full Build Development Traffic Operations – Capacity/LOS Analysis, Improved Transportation System – Sensitivity Analysis (Southbound)* the intersection will operate at LOS D or better on the mainline. However, the eastbound dual left-turn lanes will operate at LOS E. The movements operating at LOS E with less than 15 seconds of extra delay. The queue length is not anticipated to be longer than 150-ft (6 vehicles). Notably, the simulation models illustrate that the queues will clear in a single cycle length. The southbound left-turn queue is reduced from 700-ft to 575-ft with the diversion of traffic. It is likely that patrons familiar with the development, or approaching the intersection with long left-turn queues may divert to Weston Avenue, especially if arriving at the intersection on green.

Based on the sensitivity analysis modeling, it is anticipated that patrons will divert both southbound and westbound. No additional intersection improvements are recommended based on the sensitivity analysis. It is anticipated that patrons will self-regulate to alternative access points and traffic will balance with the proposed intersection configurations.

PART C – QUEUING ANALYSIS

A queuing analysis was conducted for all movements in the study area intersections. The primary purpose of this analysis is to estimate the queue lengths that may need to be accommodated at the intersections. The 95th percentile queue may be used for the design of turn bays at traffic signals and stop controlled intersections. The following exhibits summarize the 95th percentile queue lengths obtained from Synchro for each scenario.

***Exhibit 5-18**, Maximum Queue Lengths: 2020 Base Year Background Traffic*
***Exhibit 5-19,** Maximum Queue Lengths: 2030 Interim Year Background Traffic*
***Exhibit 5-20,** Maximum Queue Lengths: 2040 Horizon Year Background Traffic*

***Exhibit 5-21,** Maximum Queue Lengths: 2020 Phase I Development Traffic*
***Exhibit 5-22,** Maximum Queue Lengths: 2030 Full Build Development Traffic*
***Exhibit 5-22,** Maximum Queue Lengths: 2040 Full Build Development Traffic*

The intersection of Barbican Avenue southbound thru queue will reach up to 800-ft in the Phase I and Full Build development scenarios. In reviewing the 50th percentile queues for the southbound through lanes, queues from to the traffic signal will extend to Douglas Lane (approximately 350-ft north) and will block adjacent residential driveways. While the mainline traffic queues are anticipated to be long, they are expected to clear within one cycle length.

The west approach of Westview Boulevard has several driveways within close proximity; one full driveway access 200-ft west and one right-in/right-out access point approximately 75-ft west of the intersection. The operational analyses indicates that queues will not extend or block the full access however queues will block the right-in/right-out access point.

Queues at all other study area intersections are not anticipated to block adjacent driveways or intersections if the recommended improvements are constructed and traffic signal timings are updated and maintained.

PART D – PEDESTRIAN, BICYCLE, AND MULTI-USE TRAIL CONSIDERATIONS

The Village has outlined future off-road trail connections surrounding the study area as well as through the proposed development, including above-grade crossings of WIS 29. It is recommended that convenient walking and bicycle paths connecting the existing sidewalks and multi-use path to the development be included in the site plan. Bicycle parking racks should also be included near entrances to commercial, retail, and office spaces. Providing safe and convenient paths and parking may increase the likelihood of multimodal trips to the development. Any improvements to traffic signal infrastructure, including newly signalized intersections, should include pedestrian push buttons, count down timers, and consideration should be given for accessible pedestrian signals (APS) when appropriate.

PART E – SPEED CONSIDERATIONS/SIGHT DISTANCE

The current posted speed on County Road X is 35 miles-per-hour (mph) and transitions to 30 mph as vehicles approach the freeway. It is assumed that vehicles driving on the side streets will operate at a maximum posted speed of 25 mph.

A passenger vehicle and a single-unit truck (SU) were used as the design vehicle checks to evaluate the intersection sight distances and vision corner sight distances. Guidelines for vision triangles were obtained from *FDM Chapter 11-10, Attachment 5.13*. Intersection sight distances criteria were obtained from *FDM Chapter 11-10, Attachment 3: Table 5.2*.

Intersection sight distance and vision corner triangles were reviewed under the existing transportation system. As illustrated in ***Exhibit 5-27,*** *Intersection Sight Distance,* the existing two-way stop controlled intersection of Westview Boulevard was reviewed and sight distance is met for passenger vehicles and single unit trucks for both left and right-turning movements.

County Road X, within the study area, is relatively flat, with little change in horizontal or vertical profile. There are no trees, structures, or utility poles to block drivers' sight of oncoming traffic in either direction and the vision triangles will remain clear.

E1. Interchange Ramp Considerations

Stopping sight distance (SSD) for vehicles exiting WIS 29 was verified in the horizon year in order to ensure sufficient distance for vehicles to safety slow down before reaching the back of queue at County Road X.

Per the American Association of State Highway and Transportation Officials (AASHTO) 2011 Green Book Table 10-5, the deceleration length from the highway, at a design speed of 70mph, is 615-ft. Both existing off-ramps for WIS 29 are approximately 1,300-ft to the stop bar of County Road X.

The following is the maximum back of queue at the signalized intersections of County Road X for the PM peak hour in the 2040 Full Build Development traffic scenario:

- Eastbound Off-Ramp: $1{,}300\ ft - 500\ ft = 800\ ft$
- Westbound Off-Ramp: $1{,}300\ ft - 225\ \mathrm{ft} = 1{,}0075\ ft$

As shown in level of service summary tables, the back of queue for off-ramp approaches will not exceed 500-ft. Therefore, the existing ramp configuration will accommodate adequate deceleration and storage length in the future year conditions.

PART F – TRAFFIC CONTROL NEEDS

A Phase I scoping level intersection control evaluation (ICE) report was completed at three study area intersections, County Road X & WIS 29 interchange, County Road X & Westview Boulevard, and County Road X & Weston Avenue to determine a long-term recommended traffic control treatment.

County Road X & WIS 29 Interchange
A roundabout operational analysis was performed to determine the feasibility of the intersection control at the WIS 29 Interchange; analyses were run using Highway Capacity Software (HCS) Software. It was determined that a roundabout would not be an appropriate intersection control, as the anticipated 2040 full build-out traffic volumes exceed the recommended capacity for a two-lane roundabout. Based on the operational outputs, a roundabout is not a feasible alternative and is not recommended as a long term solution at the WIS 29 interchange.

Other alternative intersection designs were evaluated on a high-level basis. A diverging diamond interchange (DDI) was analyzed using Synchro 9 software and HCM 2000 outputs. Additional pavement/lane requirements, additional signalization, and lack of favorable corridor coordination possibilities make this alternative unfavorable and was deemed not desirable.

The improved overall structure width would require seven travel lanes, plus median width to separate travel lanes. The approaches to the interchange would need to be widen in order to accommodate appropriate shifting and merging tapers.

A single-point intersection (SPI) was also investigated using Synchro 9 software and HCM 2000 outputs. A SPI would require nine travel lanes, plus median width to separate travel lanes. Additional structure width would be necessary to accommodate where the ramps intersect County Road X. The eastbound ramp alone requires three left and two right turn lanes to accommodate the projected traffic volumes. The large structure requirements deem this alternative not to be desirable.

The full Phase I ICE report is included in **Appendix J**.

County Road X & Westview Boulevard
Since the intersection will meet traffic signal warrants, an all-way stop control (AWSC) will not be considered for this location. Additionally, the existing width of the roadway would prove challenging to navigate as pedestrian without the aid of traffic signals.

A roundabout operational analysis was performed to determine the feasibility of the intersection control at the intersection of Westview Boulevard; analyses were run using HCS. It was determined that a roundabout would not be an appropriate intersection control, as the anticipated 2040 full build-out traffic volumes exceed the recommended capacity for a two-lane roundabout. Based on the operational outputs, a roundabout is not a feasible alternative and is not recommended as a long term solution at the intersection of County Road X & Westview Boulevard.

While the recommended improvement at the intersection of County Road X & Westview Boulevard will experience LOS E movements on the side-street, the conventional intersection alternative with a traffic signal is still recommended for installation. The intersection queues will not block adjacent driveways or intersections and simulation modeling suggests that queues will clear in a single cycle length. Alternative intersections could be investigated as a long-term solution however installation of larger-scale improvement may result in an over-built corridor if the development traffic volumes do not generation what the current manuals estimate.

Geometric design standards for a continuous flow intersection (CFI) were reviewed on a high-level basis. The distance between the WIS 29 westbound ramp and Westview Boulevard cannot accommodate the weaving, shifting, and queue storage necessary to install a CFI. Other alternative intersection designs such as a J-turn, and a median U-turn were not considered viable options for this location due to the lack of space for proper implementation and the insufficient spacing between intersections. Grade separated alternatives were not applicable for this intersection type and access needs.

The full Phase I ICE report is included in **Appendix J**.

County Road X & Weston Avenue
The existing traffic signal control was evaluated for operations under the projected 2040 full build-out traffic volumes, and was found to operate at LOS C or better without requiring any geometric modifications.

A roundabout operational analysis was performed to determine the feasibility of the intersection control at the intersection of Weston Avenue; analyses were run using HCS. It was determined that a multilane roundabout could be an appropriate intersection control as the anticipated traffic volumes are well-below the recommended capacity for a two-lane roundabout. Based on the operational output, a roundabout is a feasible alternative as it would operate at LOS B or better with queues of 100-ft or less. Despite satisfactory operations of the roundabout alternative, since the existing signal configuration operates acceptably with the projected additional traffic without requiring any geometric changes, the cost associated with changing the intersection to a roundabout cannot be justified. Based on cost, the roundabout is removed from further consideration

Other alternative intersection designs such as a J-turn, and a median U-turn were not considered viable options for this location due to the lack of space for proper implementation, insufficient spacing between intersections, and costs. Grade separated alternatives were not applicable for this intersection type and access needs.

The full Phase I ICE report is included in **Appendix J**.

PART G – TRAFFIC SIGNAL WARRANT ANALYSIS

The existing 2020 background traffic operations at intersection of County Road X & Westview Boulevard reach LOS F during the base year under the existing two-way stop control condition on the minor street approaches, as shown in **Exhibit 3-3**. Due to the anticipated increase in turning movement volume from the development, an intersection improvement may be desired to provide the safe and efficient movement of vehicles. Based on the methods outlined in the Manual on Uniform Traffic Control Devices (MUTCD) and WisDOT's Traffic Signal Design Manual (TSDM), the following traffic signal warrant analysis procedure was completed.

Intersection turning movement counts were only collected for the peak four hours at County Road X & Westview Boulevard. As part of the WisDOT initial review process, it was determined that a four-hour count is acceptable and a 12-hour count would not need to be collected. Therefore, the following warrant analysis only evaluated Warrant 2 (Four-Hour), Warrant 3 (Peak Hour), and Warrant 7 (Crash Experience).

Two scenarios were analyzed; 2020 Background Traffic and 2020 Phase I Development Traffic. The complete warrant analyses can be reviewed in **Appendix I**.

G1. Traffic Volume Determination

A traffic signal warrant analysis at the proposed full access intersection of County Road X & Westview Boulevard was completed. Warrant analyses were completed to determine if the intersection meets warrants outlined in the MUTCD based on the anticipated trip generation for the proposed development traffic volumes and available traffic counts and crash data.

Daily two-way trip generation rates were calculated using the *ITE Trip Generation Manual* as described in Chapter 4. WisDOT has generated 12-hour distribution breakdowns for a variety of land uses based on data collected throughout the state of Wisconsin, see ***Figure 5-1*** below for an example distribution.

	WisDOT Proposed	
Hour	% In	% Out
6-7 am	1.7%	1.7%
7-8 am	3.1%	2.8%
8-9 am	2.8%	2.4%
9-10 am	5.1%	3.5%
10-11 am	6.4%	7.2%
11am-12pm	8.2%	7.5%
12-1 pm	9.3%	9.0%
1-2 pm	6.2%	8.0%
2-3 pm	6.8%	7.8%
3-4 pm	6.6%	6.7%
4-5 pm	7.4%	7.0%
5-6 pm	5.4%	5.6%
	69.0%	69.2%

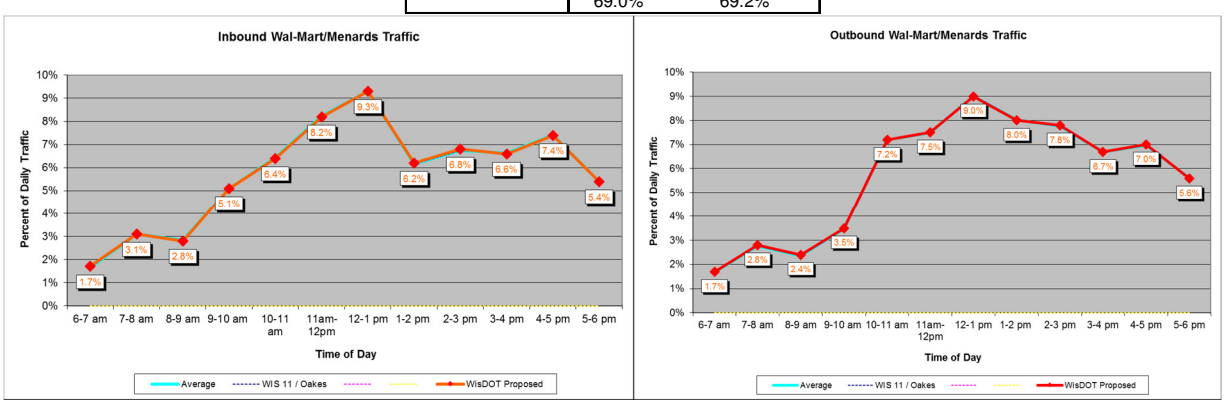


Figure 5-3: *WisDOT Hourly Distribution by Land Use*

For each land use in Phase I, the dispersion of traffic volume into and out of the site were calculated by applying the respective WisDOT 12-hour distribution percentages. This was accomplished by taking the Total Daily Two-Way volume, from the *ITE Trip Generation Manual* for each land use, and dividing the Two-Way volume in half to represent a one-way volume ingress and egress to the site. The hourly 'In Volume' and 'Out Volume' were calculated by multiplying the one-way volume to the WisDOT hourly percentage. The turning movement breakdown on County Road X & Westview Boulevard was

determined using *2020 Phase I Development - Trip Distribution* percentages as illustrated in **Exhibit 4-4B**. The WisDOT hourly distributions used for the Phase I developments are included in **Appendix I**.

Table 5-1: *Hourly Distribution for Apartment Building*

	Hour	Supermarket							
		In Volume	In %	**Southbound** Left In (80%)	**Northbound** Right In (5%)	**Out Volume**	Out %	**Westbound** Left Out (5%)	**Westbound** Right Out (80%)
AM	6-7	45	1.8%	36	2	32	1.3%	2	26
	7-8	68	2.7%	54	3	43	1.7%	2	34
	8-9	92	3.7%	74	5	85	3.4%	4	68
	9-10	110	4.4%	88	6	99	4.0%	5	79
	10-11	135	5.4%	108	7	126	5.1%	6	101
	11-12	162	6.5%	130	8	146	5.9%	7	117
	12-1	153	6.2%	122	8	165	6.6%	8	132
PM	1-2	183	7.4%	146	9	186	7.5%	9	149
	2-3	223	9.0%	178	11	245	9.9%	12	196
	3-4	260	10.5%	208	13	242	9.8%	12	194
	4-5	257	10.3%	206	13	271	10.9%	14	217
	5-6	161	6.5%	129	8	211	8.5%	11	169
		Total Daily %	*74.6%*			*Total Daily %*	*74.6%*		
	24-Hour Daily One-Way	2480			24-Hour Daily One-Way	2480			
			Total Daily Two-Way	4960					

The hourly distribution procedure was completed for each land use and then aggregated into the appropriate turning movements at County Road X & Westview Boulevard. The total trips were added to the 2020 Background Volume as the basis of the warrant analysis. The final traffic volumes used in the warrant analysis can be seen below in **Table 5-2** using the equation below:

2020 Background Traffic + Phase I Development TMC = Total Traffic Volumes for Phase I

Table 5-2: *Total Traffic Volumes for Phase I Warrant Analysis*

2020 BACKGROUND TRAFFIC

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am				0	0				0	0	0									0	0	0
7-8 am		367	300	367	667	28	555		584	584	1250.264						85		25	85	110	110
8-9 am		271	176	271	447	14	260		274	274	721.024						83		14	83	96	96
9-10 am				0	0				0	0	0									0	0	0
10-11 am				0	0				0	0	0									0	0	0
11-12 pm				0	0				0	0	0									0	0	0
12-1 pm				0	0				0	0	0									0	0	0
1-2 pm				0	0				0	0	0									0	0	0
2-3 pm				0	0				0	0	0									0	0	0
3-4 pm				0	0				0	0	0									0	0	0
4-5 pm		563	176	563	739	26	545		571	571	1310						180		36	180	216	216
5-6 pm		529	105	529	634	28	498		526	526	1160.136						170		28	170	198	198

Development TMC

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am	246			246	246			15	0	15	260.95	14		220	14	234				0	0	234
7-8 am	427			427	427			27	0	27	453.9	21		341	21	362				0	0	362
8-9 am	512			512	512			32	0	32	544	25		396	25	421				0	0	421
9-10 am	694			694	694			43	0	43	736.95	34		542	34	576				0	0	576
10-11 am	894			894	894			56	0	56	949.45	56		894	56	950				0	0	950
11-12 pm	1230			1230	1230			77	0	77	1307.3	71		1140	71	1211				0	0	1211
12-1 pm	1415			1415	1415			88	0	88	1503.65	95		1518	95	1613				0	0	1613
1-2 pm	1003			1003	1003			63	0	63	1065.9	77		1225	77	1301				0	0	1301
2-3 pm	1057			1057	1057			66	0	66	1122.85	71		1142	71	1213				0	0	1213
3-4 pm	1110			1110	1110			69	0	69	1178.95	71		1130	71	1201				0	0	1201
4-5 pm	1208			1208	1208			76	0	76	1283.5	72		1159	72	1232				0	0	1232
5-6 pm	1154			1154	1154			72	0	72	1225.7	74		1185	74	1259				0	0	1259

Total Traffic Volumes Phase I

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am	246			246	246			15	0	15	261	14		220	14	234				0	0	234
7-8 am	427	367	300	794	1094	28	555	27	583	610	1704	21		341	21	362	85		25	85	110	472
8-9 am	512	271	176	783	959	14	260	32	274	306	1265	25		396	25	421	83		14	83	97	518
9-10 am	694			694	694			43	0	43	737	34		542	34	576				0	0	576
10-11 am	894			894	894			56	0	56	950	56		894	56	950				0	0	950
11-12 pm	1230			1230	1230			77	0	77	1307	71		1140	71	1211				0	0	1211
12-1 pm	1415			1415	1415			88	0	88	1503	95		1518	95	1613				0	0	1613
1-2 pm	1003			1003	1003			63	0	63	1066	77		1225	77	1302				0	0	1302
2-3 pm	1057			1057	1057			66	0	66	1123	71		1142	71	1213				0	0	1213
3-4 pm	1110			1110	1110			69	0	69	1179	71		1130	71	1201				0	0	1201
4-5 pm	1208	563	176	1771	1947	26	545	76	571	647	2594	72		1159	72	1231	180		36	180	216	1447
5-6 pm	1154	529	105	1683	1788	28	498	72	526	598	2386	74		1185	74	1259	170		28	170	198	1457

G2. Traffic Signal Warrant Discussion

The Manual on Uniform Traffic Control Devices 2009 Edition (MUTCD) specifies nine warrants that are used to justify the installation of a traffic signal. For this study only, the four-hour vehicular volume (Warrant 2), the peak hour vehicular volume (Warrant 3), and crash history (Warrant 7) were evaluated to determine if a traffic signal should be installed at an intersection. The remaining signal warrants were not reviewed as part of this warrant analysis.

Both warrant analyses was performed using the 100 percent volume level since the mainline road posted speed is less than 40 mph and the built-up area population surrounding the intersection is greater than 10,000. A 0% right turn inclusion was used on Westview Boulevard due the exclusive right-turn lanes on the east and west approaches. Section 4C.01 of the MUTCD states that reviewers have the following option for use during an analysis:

"At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume."

Since the southbound left-turn volume will be higher than nearly every other approach movement at the intersection of County Road X & Westview Boulevard, it was determined that the warrants shall

utilize the MUTCD option to evaluate the southbound left-turn as the minor street volume. As a conservative approach, the warrant criteria of 'two or more lanes' was used to represent the dual left-turn lanes for the minor approach. It is understood that dual left-turn lanes would not be constructed under a stop control condition and only implemented with protective signal phasing.

Warrant 7 (Crash Experience) was reviewed and five crashes were observed within a 12 month period that would be correctable by the installation of a traffic signal. It should be noted that 25 crashes have occurred within the most recent 5 years; 12 of which were left-turn crashes, as illustrated in the crash diagram provided in **Appendix J**. The intersection presents a safety concern due to the prevalent pattern of left-turn crashes.

The Highway Safety Manual (HSM) presents methods for quantitatively estimating crash frequency or severity at intersections. It provides expected change in crash frequency due to different design alternative treatments and a comparison of net safety benefit. The comparison factor for treatments is known as a Crash Modification Factor (CMF).

"The Highway Safety Manual defines a Crash Modification Factor (CMF) as being used to estimate the change in amount of crashes due to an improvement to the existing condition; a change less than 1.0 indicates an improvement in crash frequency."

The potential crash effect of converting from a stop controlled intersection to a signalized intersection yields a CMF of 0.95 for total crashes. The potential crash effect of converting from a stop controlled intersection to a signalized intersection yields a CMF of 0.33 for angle crashes, per the WisDOT-approved CMF table.

G2.A 2020 Background Traffic Volumes

A preliminary warrant analysis was completed using the background volumes at the intersection of Westview Boulevard. The background traffic volumes do satisfy Warrant 3 (Peak Hour Volume) and Warrant 7 (Crash Experience). Traffic signals are generally only installed if the primary volume warrants (Warrant 1 and Warrant 2) are met. It is uncommon to warrant the installation without the volume warrants met.

Outputs for the background warrant analysis of can be reviewed in **Appendix I**.

G2.B 2020 Phase I Development Traffic Volumes

A second traffic signal warrant analysis was completed which incorporated the planned Phase I Development traffic volumes.

WisDOT 12-hour distributions were used to generate development traffic volumes in order to complete the warrant analysis, as described above. In a similar fashion, the background volumes on County Road X were also projected utilizing the forecasted average annual daily traffic (AADT) volumes and the collected four hours of turning movement count data.

The traffic forecast report completed by WisDOT shows a count station between the WIS 29 eastbound ramp and Westview Avenue. At that location the 2016 forecasted AADT on County Road X is 13,200 vpd and the 2026 forecasted AADT is 15,550 vpd. Interpolating the AADT to 2020 produces an AADT of 14,140 vpd. The four-hour turning movement counts that cross the same location of the WisDOT count station are the northbound thru, eastbound left, southbound thru,

and southbound right movements. Those collected turning movement counts were subtracted from the 2020 AADT:

14,140 – 4,863 = 9,277 vehicles

The remaining vehicles represent the residual 20 hours of a typical day. Using a very conservative estimate that assumes all hours of the day will be evenly traveled, the remaining 9,277 vehicles were divided evenly by 20 hours. Using this methodology and assuming a 50/50 directional split, the corridor will experience approximately 232 vehicles per hour (vph) in each direction.

The generated background volumes of 232 vph were added to the traffic signal warrant analysis for the northbound thru movement only, see **Appendix I** for the warrant study. As seen in **Appendix A**, of the four hours of turning movement counts collected, the northbound thru movement produced volumes of 260, 498, 545, and 555 vehicles per hour. An estimate of 232 vehicles per hour is an appropriate, if not low, estimate of anticipated thru volume that may occur during a 12-hour period along this corridor.

As seen in ***Figure 5-4***, it is anticipated that with the projected development traffic and projected background volumes, the southbound left-turn and northbound thru volume will generate enough vehicle traffic to meet the four-hour warrant and satisfy the volume requirements for installing a traffic signal.

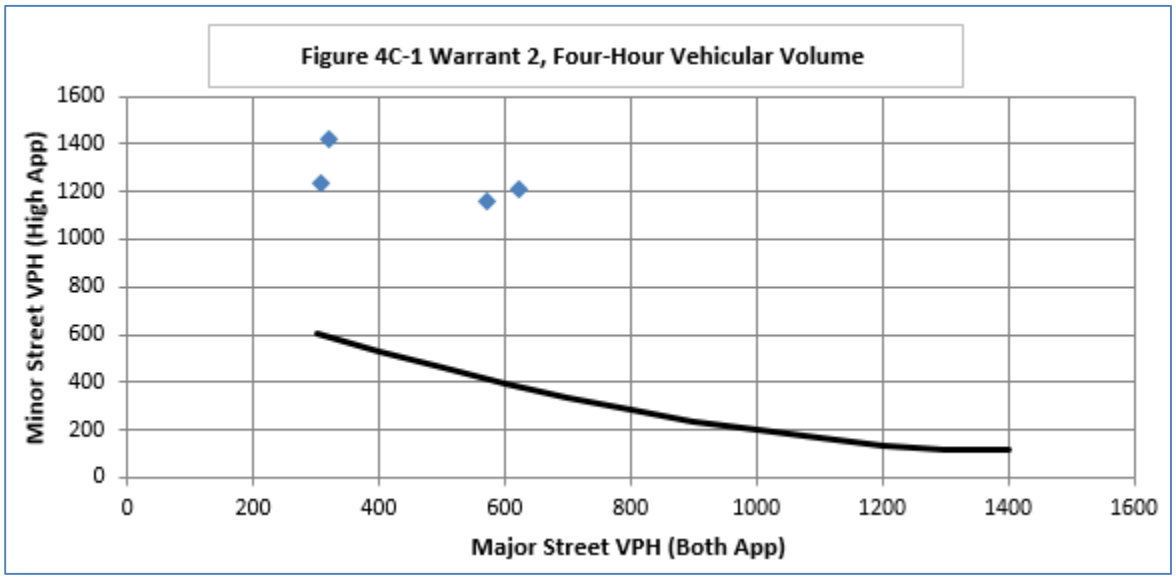


Figure 5-4: *MUTCD - Four-Hour Warrant Graph*

As part of the eight-hour warrant analysis, acting at the 'minor approach', the southbound left-turn volume meets the volume requirement for all 12- hours. It is anticipated that if collected, additional hours of the major street northbound thru volume would warrant the installation of a traffic signal.

With the development traffic volumes included, Warrant 3 and Warrant 7 are also met.

Outputs for the development traffic volume warrant analysis of can be reviewed in **Appendix I**.

G3. Traffic Signal Warrant Conclusion

The four-hour vehicle warrant is intended to be applied when the volume of intersecting traffic is the principal reason to consider installing a traffic signal. The anticipated development volume will produce a large number of conflicting vehicles to warrant the installation of a traffic signal. Of the data hours collected, all four hours are met for Warrant 2. It is anticipated that if collected, other vehicle volume hours would be met.

With Phase I development traffic included, the intersection of County Road X & Westview Boulevard will meet the peak hour warrant and the crash experience warrant. Therefore, based on the safety considerations and operational analysis, it is recommended to install a traffic signal at the intersection of County Road X & Westview Boulevard as part of Phase I development

Exhibit 5-1, 2030 Interim Year Background Traffic Capacity/LOS Analysis - Existing Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	2		2 Shared			1	2	1	1	2		
		AM Peak	LOS	C	B		C		C	B	A	A	A	B		B
			Delay (s)	20.9	16.9		24.6		22.0	10.6	5.4	5.1	9.3	15.7		12.5
			v/c ratio	0.06	0.11		0.29		0.25	0.42	0.35	0.02	0.09	0.73		
			Queue (ft)	25	50		50		50	#125	200	25	50	#500		
			Lanes	1	2		2 Shared			1	2	1	1	2		
		PM Peak	LOS	C	B		C		C	B	A	A	B	B		B
			Delay (s)	23.7	18.5		30.2		24.0	13.4	9.0	5.3	17.0	19.6		15.7
			v/c ratio	0.16	0.13		0.44		0.32	0.41	0.57	0.05	0.30	0.75		
			Queue (ft)	50	50		100		100	#100	375	50	100	#550		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				1		1	1	2			2	1	
		AM Peak	LOS				D		D	A	A			B	C	A
			Delay (s)				42.0		42.4	7.3	0.2			19.5	28.1	10.0
			v/c ratio				0.57		0.57	0.52	0.28			0.37	0.67	
			Queue (ft)				100		#125	275	25			150	300	
			Lanes				1		1	1	2			2	1	
		PM Peak	LOS				D		D	A	A			C	C	A
			Delay (s)				41.0		40.9	8.8	0.4			21.0	24.5	8.7
			v/c ratio				0.40		0.41	0.62	0.47			0.50	0.61	
			Queue (ft)				75		75	50	25			200	300	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	1	Shared LT/TH	1					2	1	1	2		
		AM Peak	LOS	D	D	C					C	B	B	A		B
			Delay (s)	39.0	38.0	34.2					22.1	10.6	13.5	1.1		19.3
			v/c ratio	0.80	0.67	0.55					0.54	0.05	0.11	0.23		
			Queue (ft)	175	175	150					225	50	25	175		
			Lanes	1	Shared LT/TH	1					2	1	1	2		
		PM Peak	LOS	D	D	C					C	B	C	A		C
			Delay (s)	35.1	35.3	23.1					30.6	17.9	26.9	5.1		26.0
			v/c ratio	0.86	0.79	0.33					0.74	0.08	0.35	0.28		
			Queue (ft)	350	350	125					300	50	125	200		
Camp Phillips Road & Westview Boulevard	Stop (West) [Phase I]		Lanes	1		1				1	2			2		
		AM Peak	LOS	F		B				A						A
			Delay (s)	67.7		11.9				9.9						4.7
			v/c ratio	0.70		0.06				0.04						
			Queue (ft)	125		25				25						
			Lanes	1		1				1	2			2		
		PM Peak	LOS	F		B				B						F
			Delay (s)	656.4		12.3				10.3						83.3
			v/c ratio	2.26		0.08				0.05						
			Queue (ft)	575		25				25						
Camp Phillips Road & Weston Avenue	Signal		Lanes	1	1	1	1	2		1	2		1	2		
		AM Peak	LOS	B	B	B	B	B		B	A		B	A		A
			Delay (s)	13.9	10.3	10.1	11.0	10.9		10.1	8.3		10.5	8.2		9.6
			v/c ratio	0.38	0.08	0.02	0.09	0.22		0.16	0.36		0.17	0.33		
			Queue (ft)	75	25	25	25	50		50	100		50	75		
			Lanes	1	1	1	1	2		1	2		1	2		
		PM Peak	LOS	B	B	B	B	B		B	A		B	B		B
			Delay (s)	15.9	10.9	10.8	12.1	11.4		13.1	9.8		12.7	10.7		11.4
			v/c ratio	0.51	0.09	0.07	0.15	0.19		0.06	0.34		0.23	0.47		
			Queue (ft)	150	50	25	50	50		25	100		75	150		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs for delay and v/c ratio.
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Exhibit 5-2, 2040 Horizon Year Background Traffic Capacity/LOS Analysis - Existing Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	2		2 Shared			1	2	1	1	2		
		AM Peak	LOS	C	B		C		C	B	A	A	B	C		B
			Delay (s)	21.1	17.4		26.8		22.7	15.5	6.6	5.2	10.6	20.3		15.7
			v/c ratio	0.07	0.18		0.38		0.32	0.60	0.41	0.04	0.12	0.80		
			Queue (ft)	25	50		75		75	#200	225	25	50	#550		
			Lanes	1	2		2 Shared			1	2	1	1	2		
		PM Peak	LOS	C	B		C		C	C	B	A	C	C		C
			Delay (s)	24.6	18.0		32.9		24.0	33.7	12.7	5.7	28.5	32.6		24.1
			v/c ratio	0.21	0.16		0.51		0.35	0.80	0.66	0.06	0.52	0.88		
			Queue (ft)	75	75		100		100	#225	425	50	#175	#625		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				1		1	1	2			2	1	
		AM Peak	LOS				D		D	B	A			B	C	A
			Delay (s)				41.6		42.4	11.3	0.3			16.5	22.9	9.9
			v/c ratio				0.60		0.60	0.62	0.33			0.38	0.64	
			Queue (ft)				125		125	275	25			150	300	
			Lanes				1		1	1	2			2	1	
		PM Peak	LOS				D		D	A	A			C	C	A
			Delay (s)				41.0		40.3	9.2	0.4			23.8	21.4	9.4
			v/c ratio				0.40		0.43	0.67	0.54			0.61	0.60	
			Queue (ft)				75		75	375	25			250	300	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	1	Shared LT/TH	1					2	1	1	2		
		AM Peak	LOS	D	D	C					C	B	B	A		B
			Delay (s)	38.4	38.1	34.1					20.8	10.4	16.2	1.5		18.6
			v/c ratio	0.81	0.69	0.58					0.58	0.05	0.14	0.27		
			Queue (ft)	200	200	150					250	50	25	50		
			Lanes	1	Shared LT/TH	1					2	1	1	2		
		PM Peak	LOS	D	D	C					C	B	C	A		C
			Delay (s)	36.8	41.3	23.2					31.6	18.2	28.0	0.4		25.7
			v/c ratio	0.89	0.86	0.35					0.80	0.09	0.48	0.34		
			Queue (ft)	#425	#425	125					350	50	125	50		
Camp Phillips Road & Westview Boulevard	Stop (West) [Phase I]		Lanes	1		1				1	2			2		
		AM Peak	LOS	F		B				B						B
			Delay (s)	180.4		12.6				10.5						12.4
			v/c ratio	1.10		0.06				0.05						
			Queue (ft)	200		25				25						
			Lanes	1		1				1	2			2		
		PM Peak	LOS	F		B				B						F
			Delay (s)	1297.0		13.2				11.0						172.8
			v/c ratio	3.65		0.10				0.07						
			Queue (ft)	800		25				25						
Camp Phillips Road & Weston Avenue	Signal		Lanes	1	1	1	1	2		1	2		1	2		
		AM Peak	LOS	B	B	B	B	B		B	A		B	A		B
			Delay (s)	16.3	11.4	11.1	12.4	12.2		11.9	9.5		12.6	9.2		10.9
			v/c ratio	0.45	0.08	0.02	0.13	0.24		0.19	0.40		0.20	0.35		
			Queue (ft)	100	25	25	50	50		50	125		50	100		
			Lanes	1	1	1	1	2		1	2		1	2		
		PM Peak	LOS	B	B	B	B	B		B	B		B	B		B
			Delay (s)	19.2	12.3	12.1	14.1	12.7		16.4	11.8		16.5	12.8		13.6
			v/c ratio	0.59	0.12	0.08	0.20	0.18		0.08	0.38		0.31	0.51		
			Queue (ft)	200	50	50	75	50		25	150		100	200		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs for delay and v/c ratio.
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Exhibit 5-3, 2020 Phase I Development Traffic Capacity/LOS Analysis - Existing Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	2		2 Shared			1	2	1	1	2		
		AM Peak	LOS	C	B		C		C	B	A	A	A	B		B
			Delay (s)	21.7	17.9		23.4		22.4	11.7	5.3	4.1	8.5	18.6		13.8
			v/c ratio	0.03	0.10		0.23		0.16	0.37	0.39	0.02	0.50	0.80		
			Queue (ft)	25	50		50		50	#100	250	25	25	#625		
			Lanes	1	2		2 Shared			1	2	1	1	2		
		PM Peak	LOS	C	B		C		C	B	A	A	B	D		C
			Delay (s)	22.4	18.0		27.2		23.0	15.3	9.4	5.3	19.5	38.5		23.8
			v/c ratio	0.12	0.11		0.39		0.27	0.43	0.72	0.05	0.30	0.96		
			Queue (ft)	50	50		75		75	75	#600	50	#100	#800		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				1		1	1	2			2	1	
		AM Peak	LOS				D		C	B	A			D	D	C
			Delay (s)				54.4		33.1	13.5	0.3			35.5	44.9	20.2
			v/c ratio				0.86		0.31	0.81	0.34			0.81	0.82	
			Queue (ft)				#250		100	#175	50			#300	#350	
			Lanes				1		1	1	2			2	1	
		PM Peak	LOS				F		D	F	A			F	D	E
			Delay (s)				135.9		43.4	134.1	0.2			77.3	45.6	63.5
			v/c ratio				1.10		0.20	1.27	0.62			1.07	0.74	
			Queue (ft)				#400		75	m#800	m275			#625	350	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	1	Shared LT/TH	1					2	1	1	2		
		AM Peak	LOS	D	C	D					C	B	B	A		B
			Delay (s)	40.0	28.4	40.5					26.5	13.0	13.3	0.2		17.8
			v/c ratio	0.78	0.44	0.78					0.76	0.11	0.12	0.39		
			Queue (ft)	150	150	250					350	50	m25	350		
			Lanes	1	Shared LT/TH	1					2	1	1	2		
		PM Peak	LOS	D	D	E					D	B	D	A		C
			Delay (s)	53.7	54.7	71.6					45.4	15.6	42.9	0.1		32.5
			v/c ratio	0.90	0.85	0.94					0.98	0.20	0.64	0.53		
			Queue (ft)	#450	#450	#475					#850	100	m100	m100		
Camp Phillips Road & Westview Boulevard	Stop (West) [Phase I]		Lanes	1	1	1	1	1	1	1	2		1	2		
		AM Peak	LOS	F		B	F		D	A	A		D	A		F
			Delay (s)	49,611.5		11.1	7,283.4		30.3	9.3			28.9			1,754.2
			v/c ratio	95.75		0.04	13.30		0.83	0.03			0.88			
			Queue (ft)	375		25	225		225	25			300			
			Lanes	1	1	1	1	1	1	1	2		1	2		
		PM Peak	LOS	F		B	F		F	A	A		F	A		F
			Delay (s)	Err		11.3	Err		547.0	9.5			241.1			68.8
			v/c ratio			0.06			2.17	0.04			1.49			
			Queue (ft)			25			2,475	25			1,550			
Camp Phillips Road & Weston Avenue	Signal		Lanes	1	1	1	1	2		1	2		1	2		
		AM Peak	LOS	B	B	B	B	B		A	A		A	A		A
			Delay (s)	13.4	10.8	10.3	12.0	11.1		9.0	7.9		9.9	7.5		9.1
			v/c ratio	0.31	0.15	0.02	0.15	0.22		0.11	0.38		0.15	0.30		
			Queue (ft)	75	50	25	50	50		25	100		50	75		
			Lanes	1	1	1	1	2		1	2		1	2		
		PM Peak	LOS	B	B	B	B	B		B	A		B	B		B
			Delay (s)	16.2	12.0	11.3	14.8	12.1		12.4	9.9		13.0	10.2		11.5
			v/c ratio	0.45	0.20	0.06	0.31	0.21		0.04	0.39		0.21	0.45		
			Queue (ft)	100	50	25	75	50		25	125		50	150		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Exhibit 5-4, 2030 Full Build Development Traffic Capacity/LOS Analysis - Existing Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	2		2 Shared			1	2	1	1	2		
		AM Peak	LOS	C	B		C		C	B	A	A	A	D		C
			Delay (s)	22.5	18.5		27.0		23.4	16.2	5.9	5.1	9.2	36.7		24.1
			v/c ratio	0.06	0.13		0.36		0.26	0.57	0.46	0.03	0.10	0.96		
			Queue (ft)	25	50		50		50	#150	300	25	50	#800		
			Lanes	1	2		2 Shared			1	2	1	1	2		
		PM Peak	LOS	C	C		D		C	C	B	A	D	D		C
			Delay (s)	28.6	22.6		37.1		28.4	30.3	15.3	5.0	45.9	47.7		31.4
			v/c ratio	0.18	0.15		0.55		0.33	0.73	0.84	0.06	0.63	0.99		
			Queue (ft)	50	75		100		100	#150	#825	50	#175	#925		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				1		1	1	2			2	1	
		AM Peak	LOS				E		D	F	A			D	E	C
			Delay (s)				78.1		42.7	48.4	0.3			45.9	59.4	34.6
			v/c ratio				0.93		0.33	1.02	0.42			0.97	0.87	
			Queue (ft)				#425		125	#300	175			#550	#475	
			Lanes				1		1	1	2			2	1	
		PM Peak	LOS				F		D	F	A			F	E	F
			Delay (s)				155.1		48.1	249.4	0.4			150.2	55.1	111.4
			v/c ratio				1.15		0.22	1.50	0.75			1.23	0.81	
			Queue (ft)				#475		75	m#975	m225			#825	#450	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	1	Shared LT/TH	1					2	1	1	2		
		AM Peak	LOS	D	C	E					C	B	B	A		C
			Delay (s)	53.2	34.5	56.0					33.8	15.6	19.7	0.1		22.1
			v/c ratio	0.83	0.44	0.87					0.84	0.12	0.14	0.49		
			Queue (ft)	200	200	400					575	75	m25	m550		
			Lanes	1	Shared LT/TH	1					2	1	1	2		
		PM Peak	LOS	E	F	F					F	B	F	A		E
			Delay (s)	66.0	92.9	122.9					82.3	14.3	107.4	3.7		55.9
			v/c ratio	0.95	1.01	1.01					1.10	0.22	1.13	0.62		
			Queue (ft)	#600	#600	#600					#1,200	125	m50	m150		
Camp Phillips Road & Westview Boulevard	Stop (West) [Phase I]		Lanes	1	1	1	1	1	1	1	2		1	2		
		AM Peak	LOS	F		B	F		F	B	A		A	A		E
			Delay (s)	Err		12.2	93.8		154.1	10.2						44.6
			v/c ratio			0.06	1.11		1.28	0.04						
			Queue (ft)			25	525		1000	25						
			Lanes	1	1	1	1	1	1	1	2		1	2		
		PM Peak	LOS	F		B	F		F	B	A		A	A		F
			Delay (s)	Err		12.3	896.5		432.1	10.3						115.0
			v/c ratio			0.08	2.95		1.92	0.05						
			Queue (ft)			25	3,475		2,300	25						
Camp Phillips Road & Weston Avenue	Signal		Lanes	1	1	1	1	2		1	2		1	2		
		AM Peak	LOS	C	B	B	B	B		B	A		B	A		B
			Delay (s)	20.1	14.4	13.5	16.9	15.1		11.6	9.8		15.4	9.2		12.4
			v/c ratio	0.45	0.20	0.02	0.23	0.27		0.29	0.15		0.39	0.30		
			Queue (ft)	125	75	25	75	75		50	125		100	100		
			Lanes	1	1	1	1	2		1	2		1	2		
		PM Peak	LOS	C	B	B	B	B		B	B		C	B		B
			Delay (s)	23.5	14.2	13.3	18.9	15.0		19.6	14.7		22.6	15.3		16.5
			v/c ratio	0.60	0.19	0.06	0.40	0.29		0.07	0.44		0.43	0.50		
			Queue (ft)	200	100	25	125	100		25	200		125	225		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

MSA PROFESSIONAL SERVICES
More ideas. Better solutions.

Exhibit 5-5, 2040 Full Build Development Traffic Capacity/LOS Analysis - Existing Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	2		2 Shared			1	2	1	1	2		
		AM Peak	LOS	C	C		C		C	D	A	A	B	D		C
			Delay (s)	25.2	21.4		32.6		27.0	41.4	7.5	4.9	12.4	42.4		29.4
			v/c ratio	0.07	0.21		0.47		0.32	0.84	0.51	0.04	0.15	0.98		
			Queue (ft)	25	75		100		100	#250	325	25	50	#850		
			Lanes	1	2		2 Shared			1	2	1	1	2		
		PM Peak	LOS	D	C		E		D	F	C	A	F	D		D
			Delay (s)	40.6	30.5		66.3		38.0	224.8	21.1	6.8	177.5	53.8		50.3
			v/c ratio	0.26	0.20		0.77		0.39	1.34	0.87	0.07	1.11	0.99		
			Queue (ft)	100	125		150		150	#375	850	50	#225	#1075		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				1		1	1	2			2	1	
		AM Peak	LOS				F		D	E	A			F	F	D
			Delay (s)				88.3		37.2	61.9	0.3			81.3	78.9	49.6
			v/c ratio				0.99		0.41	1.08	0.47			1.09	1.00	
			Queue (ft)				#375		125	m#350	275			#550	#500	
			Lanes				1		1	1	2			2	1	
		PM Peak	LOS				F		D	F	A			F	E	F
			Delay (s)				175.6		49.1	251.8	0.3			177.6	60.1	118.3
			v/c ratio				1.20		0.26	1.50	0.82			1.29	0.87	
			Queue (ft)				#500		100	m#1025	m375			#1000	#525	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	1	Shared LT/TH	1					2	1	1	2		
		AM Peak	LOS	D	C	E					B	B	B	A		B
			Delay (s)	43.3	30.2	61.9					15.6	14.8	10.9	0.1		12.9
			v/c ratio	0.82	0.50	0.94					0.70	0.14	0.28	0.55		
			Queue (ft)	200	200	#450					#600	75	m25	m125		
			Lanes	1	Shared LT/TH	1					2	1	1	2		
		PM Peak	LOS	F	F	F					F	B	F	B		E
			Delay (s)	108.6	144.0	153.7					97.1	13.8	196.1	12.6		76.8
			v/c ratio	1.09	1.16	1.18					1.14	0.22	1.29	0.64		
			Queue (ft)	#700	#700	#650					#1350	125	m100	m25		
Camp Phillips Road & Westview Boulevard	Stop (West) [Phase I]		Lanes	1	1	1	1	1	1	1	2		1	2		
		AM Peak	LOS	F		B	F		F	B	A		A	A		F
			Delay (s)	Err		13.0	129.5		208.2	10.8						56.4
			v/c ratio			0.07	1.20		1.41	0.06						
			Queue (ft)			25	625		1175	25						
			Lanes	1	1	1	1	1	1	1	2		1	2		
		PM Peak	LOS	F		B	F		F	B	A		A	A		F
			Delay (s)	Err		13.2	1006.2		516.1	11.0						130.2
			v/c ratio			0.10	3.19		2.10	0.07						
			Queue (ft)			25	3,625		2,500	25						
Camp Phillips Road & Weston Avenue	Signal		Lanes	1	1	1	1	2		1	2		1	2		
		AM Peak	LOS	C	B	B	B	B		B	B		B	B		B
			Delay (s)	23.7	15.9	14.9	19.0	16.8		14.2	11.6		19.7	10.8		14.4
			v/c ratio	0.53	0.19	0.02	0.26	0.30		0.19	0.44		0.47	0.33		
			Queue (ft)	150	75	25	75	100		50	175		125	125		
			Lanes	1	1	1	1	2		1	2		1	2		
		PM Peak	LOS	C	B	B	C	B		C	B		C	B		B
			Delay (s)	29.0	15.2	14.2	21.1	16.0		24.7	17.9		31.4	18.8		19.9
			v/c ratio	0.69	0.20	0.07	0.43	0.29		0.10	0.50		0.58	0.55		
			Queue (ft)	225	100	50	150	100		25	225		#175	250		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer

Exhibit 5-9, 2020 Base Year Background Traffic Capacity/LOS Analysis - Improved Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Westview Boulevard	Signal	Lanes		1		1				1	2 Shared			2		
		AM Peak	LOS	B		B				A	A			A		A
			Delay (s)	14.4		13.6				8.0	5.6			6.3		6.6
			v/c ratio	0.20		0.05				0.06	0.32			0.44		
			Queue (ft)	50		25				25	75			100		
		Lanes		1		1				1	2 Shared			2		
		PM Peak	LOS	B		B				A	A			A		A
			Delay (s)	16.1		14.0				9.4	6.4			7.1		8.1
			v/c ratio	0.39		0.05				0.08	0.35			0.46		
			Queue (ft)	125		25				25	100			150		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs for delay and v/c ratio.
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Exhibit 5-10, 2030 Base Year Background Traffic Capacity/LOS Analysis - Improved Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Westview Boulevard	Signal	Lanes		1		1				1	2 Shared			2		
		AM Peak	LOS	B		B				A	A			A		A
			Delay (s)	17.0		15.9				8.6	5.5			6.3		6.8
			v/c ratio	0.25		0.06				0.08	0.35			0.47		
			Queue (ft)	75		25				25	100			125		
		Lanes		1		1				1	2 Shared			2		
		PM Peak	LOS	B		B				A	A			A		A
			Delay (s)	19.3		16.1				9.9	6.2			7.0		8.4
			v/c ratio	0.52		0.07				0.10	0.38			0.49		
			Queue (ft)	150		25				25	150			200		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs for delay and v/c ratio.
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Exhibit 5-11, 2040 Base Year Background Traffic Capacity/LOS Analysis - Improved Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Westview Boulevard	Signal	Lanes		1		1				1	2 Shared			2		
		AM Peak	LOS	B		B				A	A			A		A
			Delay (s)	20.0		18.3				9.2	5.5			6.4		7.1
			v/c ratio	0.31		0.06				0.10	0.38			0.50		
			Queue (ft)	100		25				25	125			175		
		Lanes		1		1				1	2 Shared			2		
		PM Peak	LOS	C		B				B	A			A		A
			Delay (s)	22.4		17.9				12.1	7.0			8.0		9.8
			v/c ratio	0.61		0.07				0.13	0.42			0.54		
			Queue (ft)	225		25				50	225			300		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs for delay and v/c ratio.
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal

Exhibit 5-12, 2020 Phase I Development Traffic Capacity/LOS Analysis - Improved Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				2 Shared		1	2	2			2	1	
		AM Peak	LOS				D		D	B	A			C	C	B
			Delay (s)				39.7		37.2	12.9	0.3			24.8	21.5	15.9
			v/c ratio				0.61		0.23	0.56	0.32			0.62	0.33	
			Queue (ft)				125		100	125	100			250	275	
			Lanes				2 Shared		1	2	2			2	1	
		PM Peak	LOS				D		D	B	A			D	C	B
			Delay (s)				47.7		41.0	11.3	0.2			35.2	24.0	16.5
			v/c ratio				0.78		0.13	0.76	0.60			0.93	0.31	
			Queue (ft)				150		50	m200	m300			#500	300	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	2 Shared		1					2	1	1	2		
		AM Peak	LOS	C		D					C	B	B	A		B
			Delay (s)	33.6		40.1					25.9	16.5	18.0	0.5		18.8
			v/c ratio	0.57		0.81					0.76	0.10	0.14	0.42		
			Queue (ft)	150		250					350	50	m25	100		
			Lanes	2 Shared		1					2	1	1	2		
		PM Peak	LOS	D		D					D	B	D	A		C
			Delay (s)	47.6		50.1					35.6	13.3	45.5	0.4		28.3
			v/c ratio	0.89		0.83					0.99	0.17	0.73	0.54		
			Queue (ft)	#400		#450					#775	100	m100	m125		
Camp Phillips Road & Westview Boulevard	Signal		Lanes	2	1 Shared		1	1	1	1	2	1	2	2 Shared		
		AM Peak	LOS	D	C		C	-	B	C	C	C	C	B		C
			Delay (s)	35.1	21.2		32.4		17.8	22.7	31.5	25.1	32.6	14.4		25.5
			v/c ratio	0.33	0.06		0.20		0.44	0.09	0.72	0.11	0.86	0.46		
			Queue (ft)	50	50		75		150	25	225	50	300	200		
			Lanes	2	1 Shared		1	1	1	1	2	1	2	2 Shared		
		PM Peak	LOS	D	C		D	-	C	D	D	C	D	B		D
			Delay (s)	51.7	29.1		46.8		21.2	36.3	49.8	33.4	53.4	12.7		37.8
			v/c ratio	0.75	0.10		0.57		0.90	0.23	0.88	0.19	0.99	0.40		
			Queue (ft)	100	50		#200		#525	50	#300	75	#600	200		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal
Red indicates an improvement is Recommended

Exhibit 5-13, 2030 Full Build Development Traffic Capacity/LOS Analysis - Improved Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal	AM Peak	Lanes				2 Shared		1	2	2			2	1	
			LOS				D		D	D	B			B	B	C
			Delay (s)				41.6		37.4	50.6	17.1			19.7	16.1	27.5
			v/c ratio				0.76		0.30	0.89	0.39			0.65	0.32	
			Queue (ft)				150		100	#250	150			350	300	
		PM Peak	Lanes				2 Shared		1	2	2			2	1	
			LOS				D		D	C	A			D	C	C
			Delay (s)				53.8		40.6	30.5	0.6			41.5	22.7	22.7
			v/c ratio				0.82		0.17	0.99	0.73			0.99	0.35	
			Queue (ft)				#200		75	m#425	m100			#600	325	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal	AM Peak	Lanes	2 Shared		1					3	1	1	2		
			LOS	C		D					3	B	B	C		C
			Delay (s)	30.5		55.0					15.5	11.7	11.0	25.7		24.4
			v/c ratio	0.52		0.90					0.52	0.10	0.24	0.59		
			Queue (ft)	200		#425					150	50	m25	25		
		PM Peak	Lanes	2 Shared		1					3	1	1	2		
			LOS	D		D					C	B	C	A		C
			Delay (s)	42.7		45.4					23.3	14.0	24.1	5.4		22.7
			v/c ratio	0.88		0.83					0.85	0.21	0.81	0.66		
			Queue (ft)	#450		#450					550	125	m50	m425		
Camp Phillips Road & Westview Boulevard	Signal	AM Peak	Lanes	2	1 Shared		1	1	2	1	3	1	2	2 Shared		
			LOS	D	C		D	-	A	C	D	C	B	A		B
			Delay (s)	40.1	25.6		37.5		4.2	34.9	44.5	33.0	17.4	4.6		19.1
			v/c ratio	0.41	0.08		0.23		0.35	0.21	0.83	0.14	0.83	0.53		
			Queue (ft)	50	50		75		75	50	#200	50	m375	m225		
		PM Peak	Lanes	2	1 Shared		1	1	2	1	3	1	2	2 Shared		
			LOS	D	D		D	-	B	D	D	C	D	B		C
			Delay (s)	54.4	41.6		38.4		11.9	38.6	53.6	21.8	51.8	13.3		34.3
			v/c ratio	0.79	0.25		0.38		0.82	0.26	0.91	0.21	1.00	0.49		
			Queue (ft)	100	75		#175		#575	50	#250	75	#625	250		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal
Red indicates an improvement is Recommended

Exhibit 5-14A, 2040 Full Build Development Traffic Capacity/LOS Analysis - Improved Transportation System

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Barbican Avenue	Signal		Lanes	1	1	1	1	1 Shared		1	2	1	1	3		
		AM Peak	LOS	C	C	C	C	C		B	A	A	A	B		B
			Delay (s)	31.1	27.5	24.2	32.0	29.9		16.6	5.7	5.1	9.4	12.5		12.0
			v/c ratio	0.05	0.06	0.25	0.46	0.38		0.64	0.48	0.04	0.14	0.62		
			Queue (ft)	25	25	100	125	100		#250	325	25	50	425		
			Lanes	1	1	1	1	1 Shared		1	2	1	1	3		
		PM Peak	LOS	D	D	D	D	D		C	C	B	C	B		C
			Delay (s)	50.1	48.7	43.6	47.1	40.6		29.7	29.4	10.6	34.5	17.6		26.2
			v/c ratio	0.28	0.20	0.39	0.62	0.44		0.86	0.94	0.08	0.66	0.65		
			Queue (ft)	75	50	125	200	150		#300	#1275	75	#175	#750		
Camp Phillips Road & WIS 29 WB Off-Ramp	Signal		Lanes				2 Shared		1	2	2			3	1	
		AM Peak	LOS				D		D	B	A			C	C	B
			Delay (s)				50.2		44.9	17.5	0.4			24.7	23.6	18.2
			v/c ratio				0.79		0.41	0.69	0.43			0.55	0.42	
			Queue (ft)				175		125	#125	100			250	375	
			Lanes				2 Shared		1	2	2			3	1	
		PM Peak	LOS				D		D	C	A			C	C	C
			Delay (s)				54.6		39.1	31.1	7.4			32.6	26.6	23.1
			v/c ratio				0.82		0.22	0.93	0.81			0.84	0.46	
			Queue (ft)				#225		75	m150	m25			350	#400	
Camp Phillips Road & WIS 29 EB Off-Ramp	Signal		Lanes	2 Shared		1					3	1	1	3		
		AM Peak	LOS	C		D					C	C	C	A		C
			Delay (s)	33.8		45.1					31.9	22.4	23.6	0.4		21.4
			v/c ratio	0.53		0.86					0.78	0.15	0.17	0.44		
			Queue (ft)	175		350					375	100	50	350		
			Lanes	2 Shared		1					3	1	1	3		
		PM Peak	LOS	D		D					D	B	D	A		C
			Delay (s)	52.5		47.1					35.8	15.7	52.9	0.3		29.1
			v/c ratio	0.95		0.85					0.99	0.24	0.86	0.50		
			Queue (ft)	#500		#475					#625	125	m100	100		
Camp Phillips Road & Westview Boulevard	Signal		Lanes	2	1 Shared		1	1	2	1	3	1	2	2 Shared		
		AM Peak	LOS	D	C		D	-	A	D	D	C	C	B		C
			Delay (s)	44.4	28.9		41.3		5.3	35.7	40.1	32.0	32.0	15.0		26.1
			v/c ratio	0.50	0.09		0.25		0.36	0.26	0.79	0.12	0.83	0.57		
			Queue (ft)	75	50		75		100	50	250	50	425	300		
			Lanes	2	1 Shared		1	1	2	1	3	1	2	2 Shared		
		PM Peak	LOS	E	D		D	-	B	D	D	C	D	B		C
			Delay (s)	65.0	49.6		46.7		17.7	41.4	51.3	23.2	47.6	13.1		35.0
			v/c ratio	0.84	0.33		0.44		0.85	0.32	0.87	0.18	0.97	0.51		
			Queue (ft)	150	75		#200		#625	50	300	75	#700	300		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal
Red indicates an improvement is Recommended

Exhibit 5-14B, 2040 Full Build Development Traffic Capacity/LOS Analysis - Improved Transportation System: Sensitivity Analysis (Westbound)

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Westview Boulevard	Signal		Lanes	2	1 Shared		1	1	2	1	3	1	2	2 Shared		
		AM Peak	LOS	D	C		D	-	A	C	D	C	D	B		C
			Delay (s)	39.4	24.6		36.6		5.0	32.4	43.9	29.0	42.9	16.8		31.1
			v/c ratio	0.46	0.08		0.22		0.32	0.24	0.89	0.12	0.94	0.62		
			Queue (ft)	75	50		75		75	50	#250	50	#425	300		
			Lanes	2	1 Shared		1	1	2	1	3	1	2	2 Shared		
		PM Peak	LOS	F	D		D	-	C	C	E	C	D	B		D
			Delay (s)	159.7	53.7		45.7		25.1	29.8	56.9	33.5	51.2	11.3		45.3
			v/c ratio	1.17	0.48		0.48		0.73	0.16	0.95	0.15	0.98	0.49		
			Queue (ft)	150	#100		#200		450	50	#400	75	#675	275		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal
Red indicates an improvement is Recommended

Exhibit 5-14C, 2040 Full Build Development Traffic Capacity/LOS Analysis - Improved Transportation System: Sensitivity Analysis (Southbound)

Intersection	Traffic Control	Peak Hour	Parameters	West Approach			East Approach			South Approach			North Approach			Overall Intersection
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Camp Phillips Road & Westview Boulevard	Signal		Lanes	2	1 Shared		1 Shared		2	1	3	1	2	2 Shared		
		AM Peak	LOS	D	C		D		A	C	D	C	C	C		C
			Delay (s)	38.5	23.8		35.7		5.4	31.0	37.5	27.4	34.8	20.1		27.3
			v/c ratio	0.45	0.08		0.22		0.34	0.24	0.83	0.11	0.86	0.72		
			Queue (ft)	75	50		75		75	50	225	50	#350	375		
			Lanes	2	1 Shared		1 Shared		2	1	3	1	2	2 Shared		
		PM Peak	LOS	E	D		D		C	C	D	C	D	B		D
			Delay (s)	66.0	45.4		42.9		29.5	29.2	52.2	32.7	50.1	16.7		38.8
			v/c ratio	0.86	0.27		0.40		0.79	0.18	0.93	0.15	0.96	0.64		
			Queue (ft)	150	75		#200		#525	25	#375	75	#575	400		

HCM 2010 Outputs using Synchro 9 Software, queues reported using Synchro outputs.
All yield control right turn lanes were reported using HCM 2000 outputs.
Err: Excess delay and volume-to-capacity cannot be reported accurately and no output is available
#: 95th percentile volume exceed capacity, queue may be longer
m: volume for 95th percentile queue is metered by upstream signal
Red indicates an improvement is Recommended

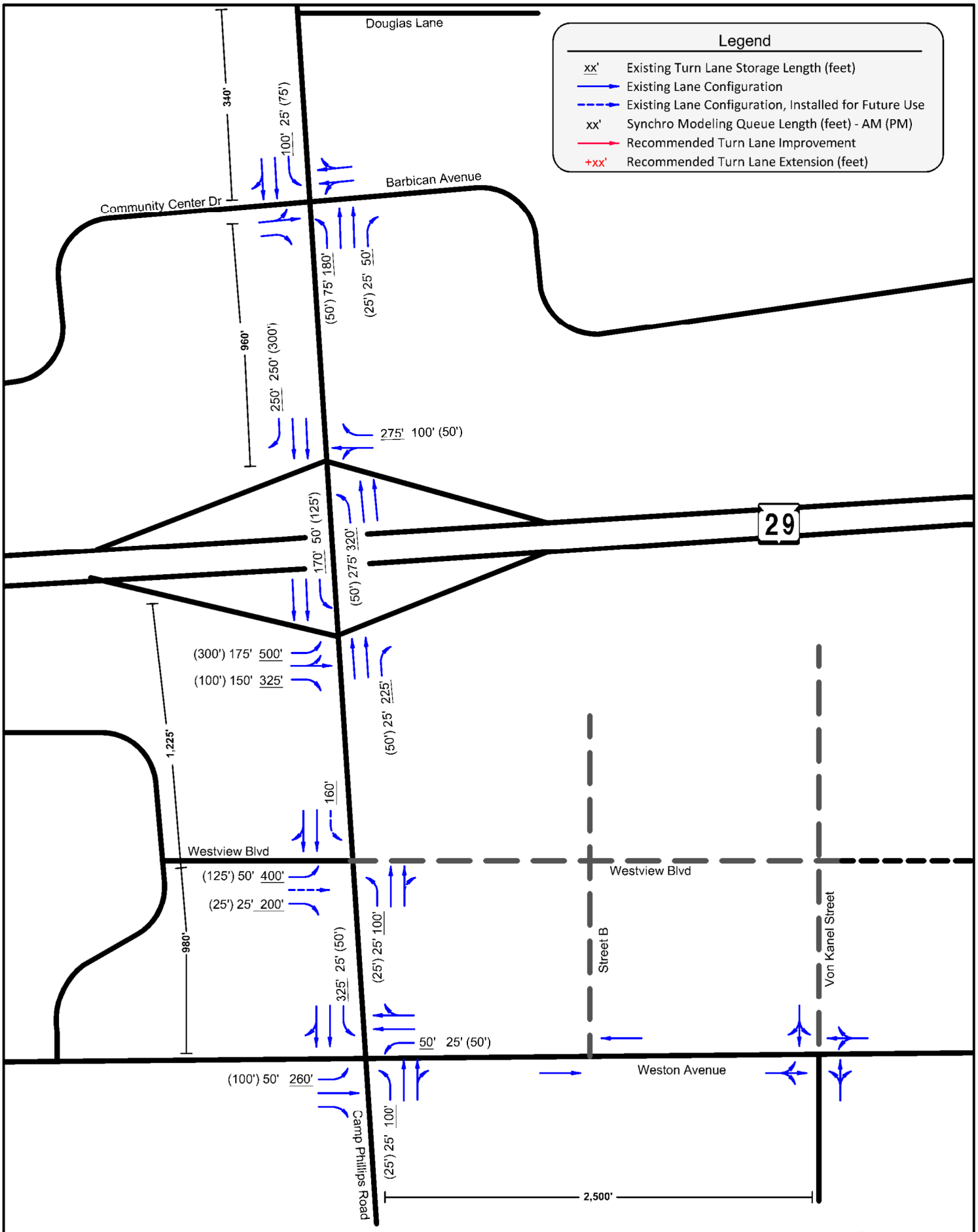


Exhibit 5-18, Maximum Queue Lengths:
2020 Base Year Background Traffic Volumes
Village of Weston [Marathon County]

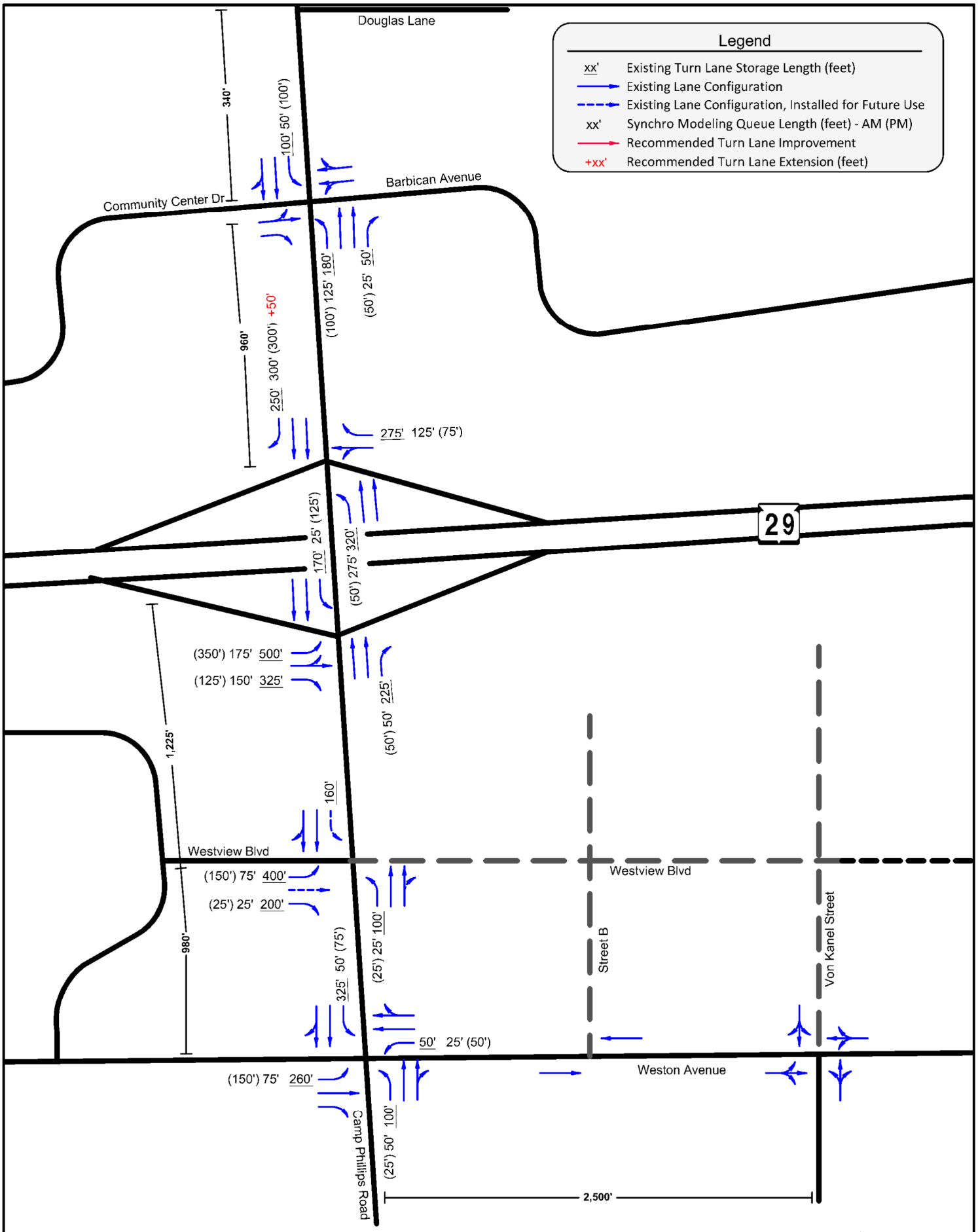


Exhibit 5-19, Maximum Queue Lengths:
2030 Base Year Background Traffic Volumes
Village of Weston [Marathon County]

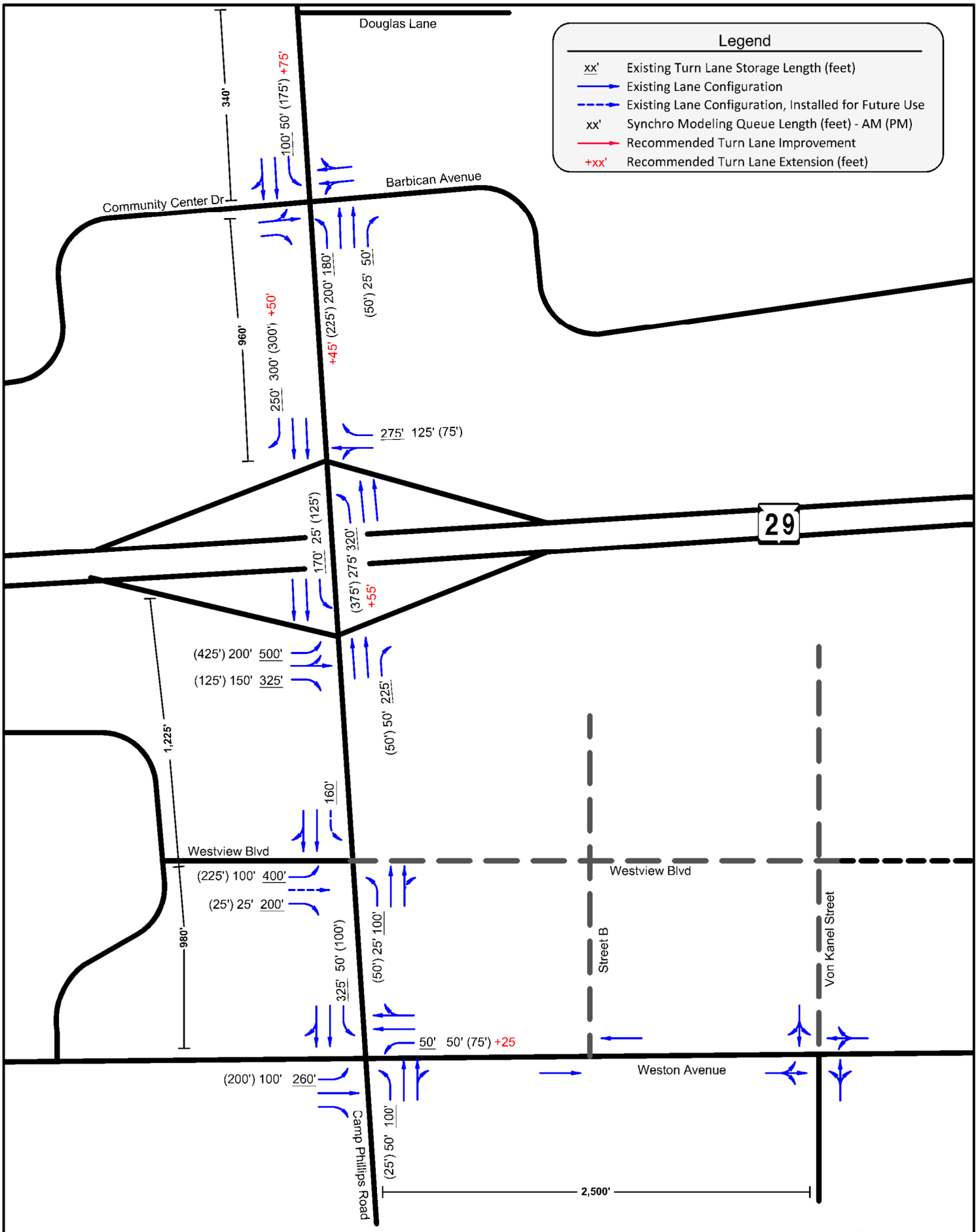


Exhibit 5-20, Maximum Queue Lengths:
2040 Base Year Background Traffic Volumes
Village of Weston [Marathon County]

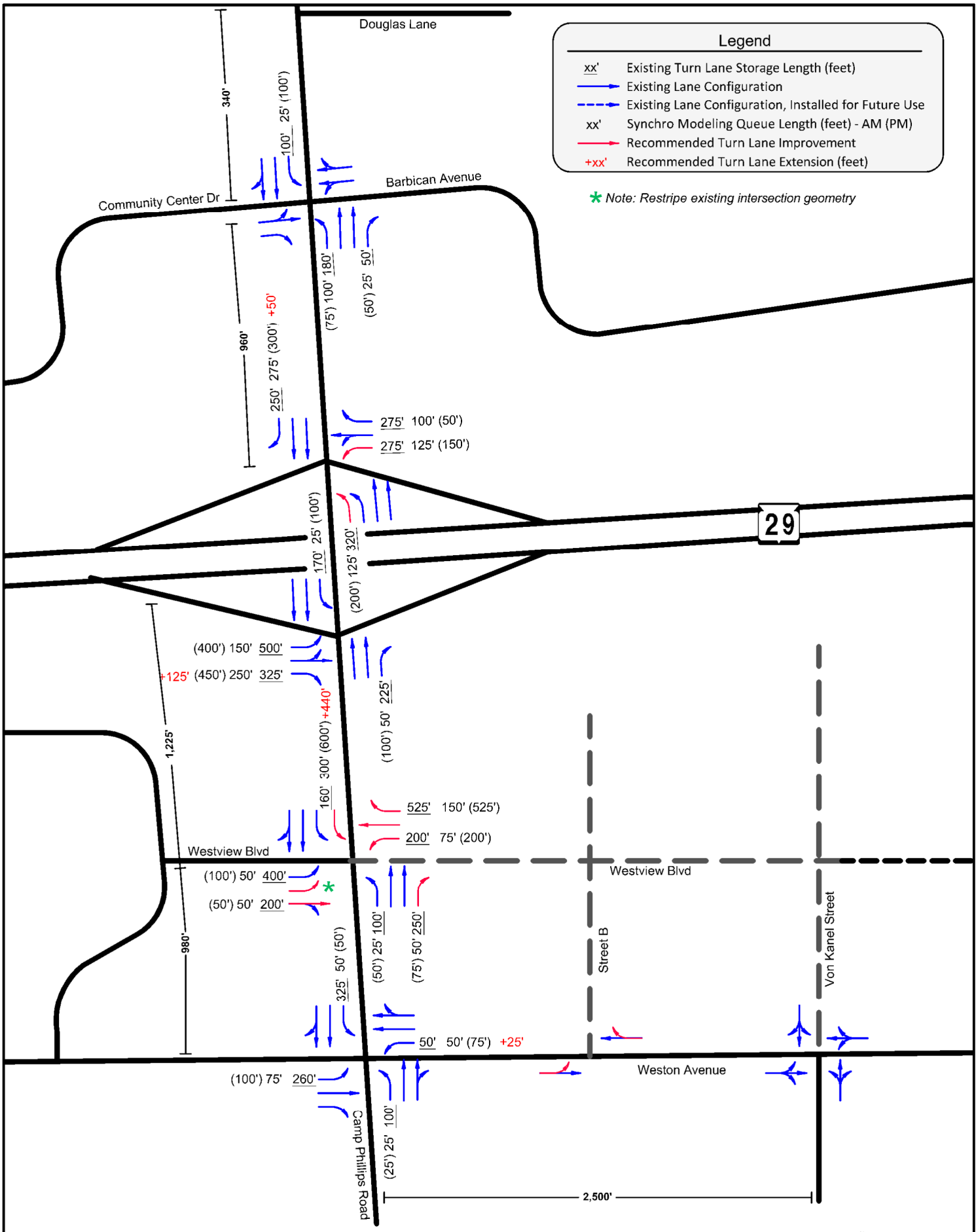


Exhibit 5-21, Maximum Queue Lengths:
2020 Phase I Development Traffic
Village of Weston [Marathon County]

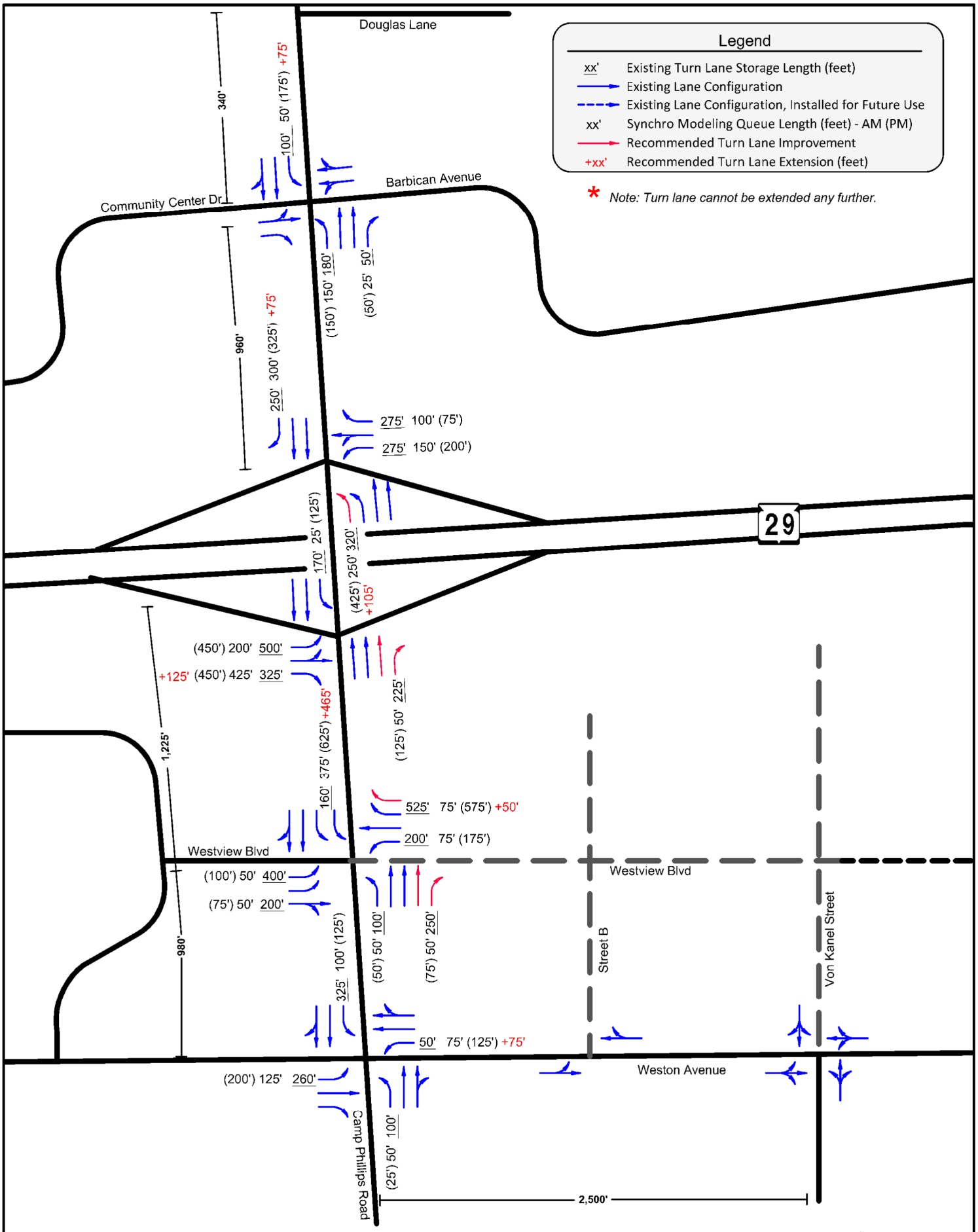


Exhibit 5-22, Maximum Queue Lengths:
2030 Full Build Development Traffic
Village of Weston [Marathon County]

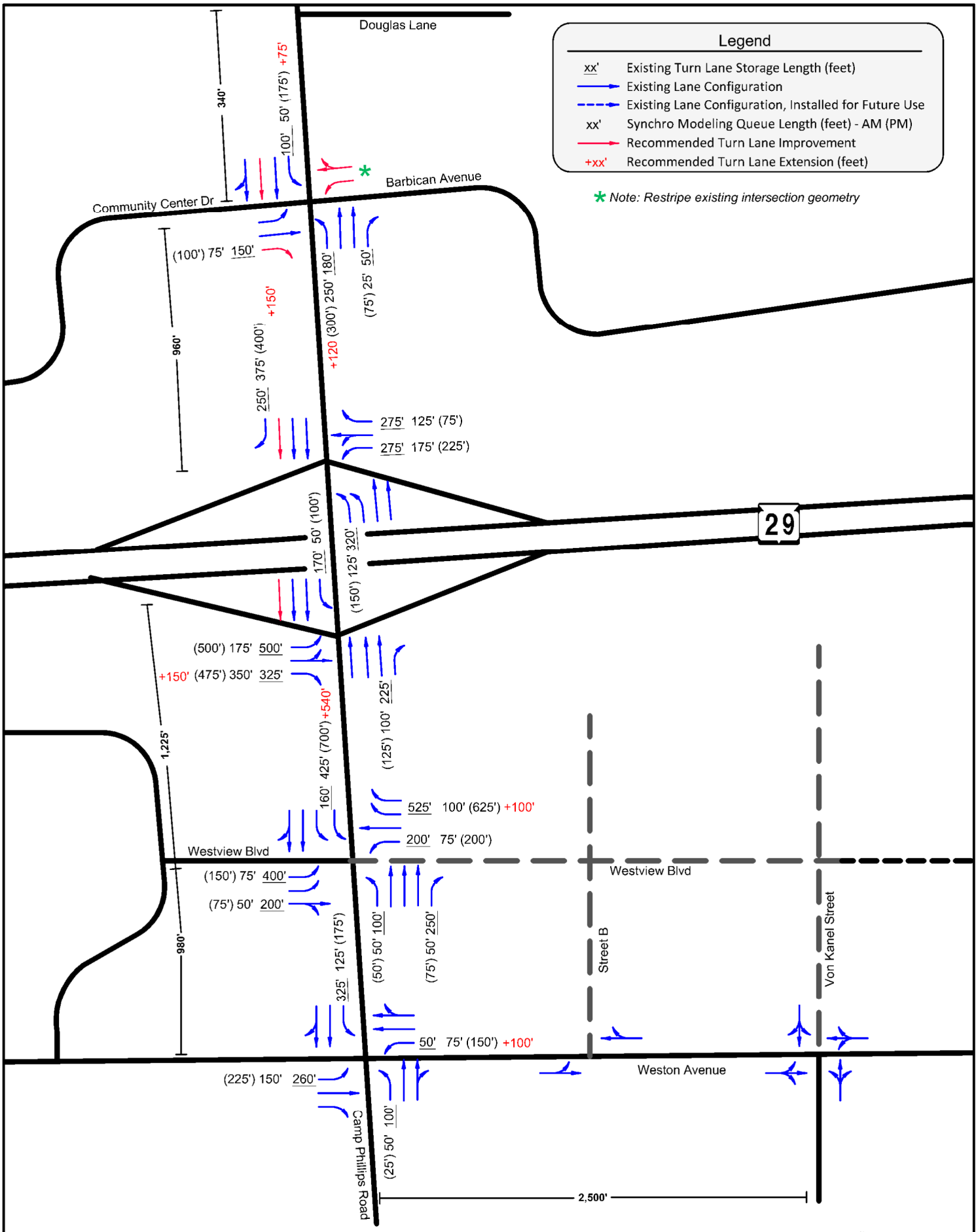
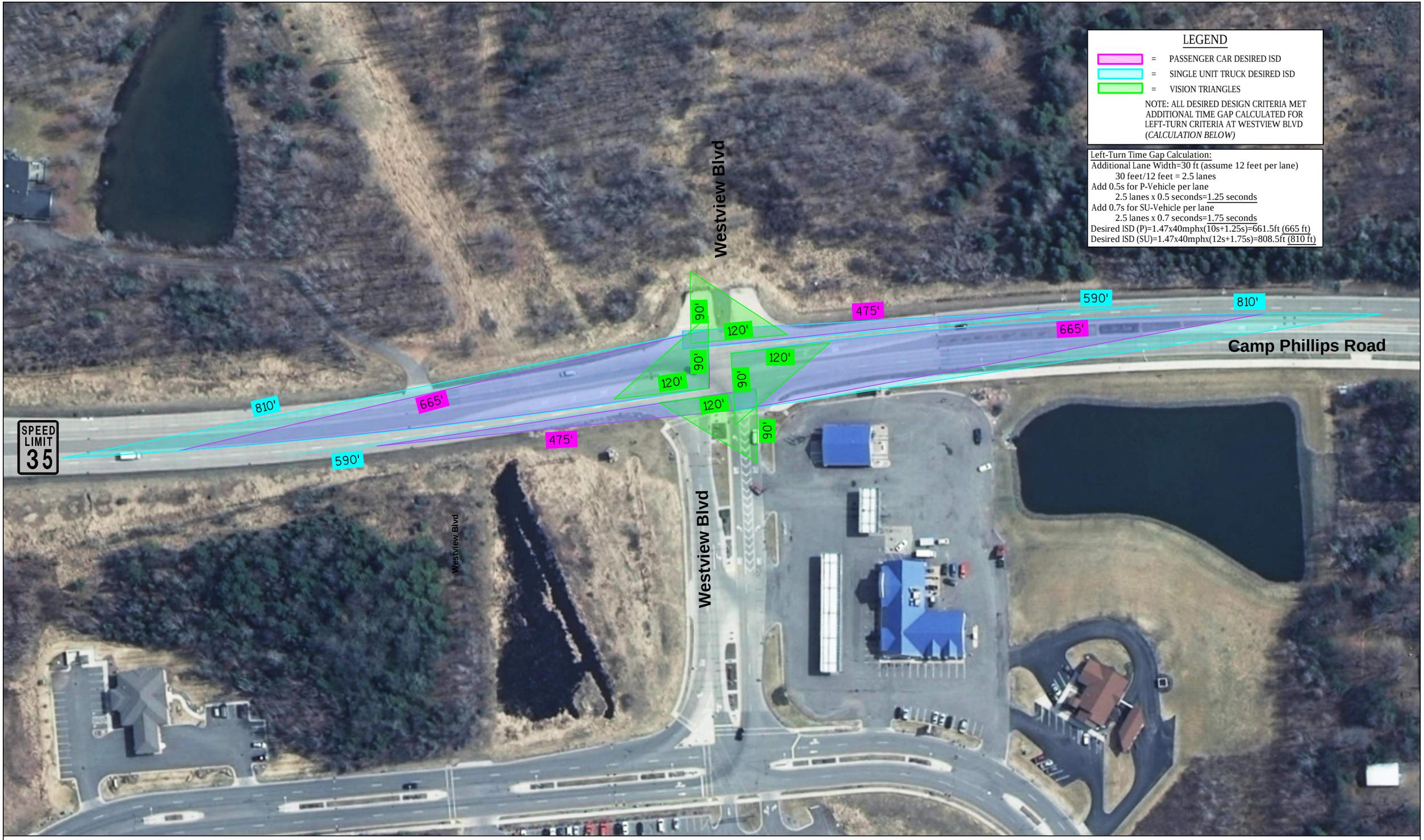


Exhibit 5-23, Maximum Queue Lengths:
2040 Full Build Development Traffic
Village of Weston [Marathon County]



MSA PROFESSIONAL SERVICES

Exhibit 5-27: Intersection Sight Distance

Village of Weston [Marathon County]

NOT TO SCALE

Chapter 6 – CONCLUSIONS AND RECOMMENDATIONS

This chapter contains the conclusions that were drawn in regard to the analysis of existing and future conditions. Based upon the conclusions, recommendations are made to mitigate the identified deficiencies and the preferred alternative is described.

Note that improvements are recommended to WisDOT for consideration and are not legally binding. WisDOT reserves the right to determine alternative solutions.

PART A – CONCLUSIONS

The intersection of County Road X & Barbican Avenue will operate with acceptable operations until the horizon year full build scenario. In the horizon year, intersection improvement recommendations include restriping of the east and west approaches to allow for more efficient operations as well as adding an eastbound dedicated right-turn lane. In the future, a third southbound thru lane is recommended for installation. The thru lane will complement the other intersection improvements at the WIS 29 interchange and maintain corridor continuity.

The WIS 29 interchange with County Road X will require extensive improvement and capacity expansion in order to accommodate the development traffic volumes. Additional capacity is required on all approaches in order to yield acceptable intersection operations. Specific intersection and interchange improvements are described in **Part B** below. Alternative interchange designs were reviewed as part of a Phase I Intersection Control Evaluation (ICE) report. Other interchange designs can be accommodated geometrically at this location however additional vetting of operations and corridor continuity concluded that the standard intersection design with traffic signals is most appropriate at this location.

The existing two-way stop controlled intersection of County Road X & Westview Boulevard will fail on the side street approaches in the background condition. A traffic signal warrant analysis was completed for the 2020 Build Year (Phase I Development) traffic conditions, in which the four-hour volume warrant (Warrant 2), peak hour warrant (Warrant 3), and crash experience warrant (Warrant 7) are met. Operational analyses were run to determine a desired geometric lane configuration at the intersection, described in **Part B** below. While the recommended improvement at the intersection of County Road X & Westview Boulevard will experience LOS E movements on the side-street, the conventional intersection alternative with a traffic signal is still recommended for installation. Alternative intersection were reviewed at a high-level and determined to not satisfy the geometric requirements and additional safety concerns dismissed other intersection alternatives.

At the intersection of County Road X & Weston Avenue, no geometric intersection improvements are required based on operational analyses.

PART B – RECOMMENDATIONS

B1. 2020 Background Traffic

A permanent traffic signal at the intersection of County Road X & Westview Boulevard, if installed, would improve operations to acceptable levels. Volume warrants are not met at this time, however left-

turn and angle crashes are prevalent. Converting the existing stop controlled intersection to a signalized intersection has several safety benefits along with improvements to side-street delay. Other improvements such as a roundabout or additional stop control capacity do not cost-effectively improve operations and are not considered viable due to the needs of future build year traffic. At this time, the existing intersection configuration is appropriate and no further geometric improvements are recommended.

If the Village decides to install a traffic signal, it should include monotubes and follow head-per-lane requirements as outlined in the Manual on Uniform Traffic Control Devices (MUTCD), Traffic Engineering, Operations, and Safety Manual (TEOpS), and Traffic Signal Design Manual (TSDM).

B2. 2030 Background Traffic

In addition to the improvements described for the 2020 Background Traffic operations section, it is recommended to extend the southbound right-turn lane 50-ft at the signalized intersection of Camp Phillips Drive & WIS 29 westbound ramp to accommodate the anticipate queue length. ***Exhibit 1-5****, 2030 Interim Year Background Traffic Improvements*, illustrates the recommended improvements.

B3. 2040 Background Traffic

In addition to the improvements described for the 2020 Background Traffic and 2030 Background Traffic operations sections, it is recommended to extend storage lengths at three study intersections. At the intersection of County Road X & Barbican Avenue, it is recommended to extend the southbound left-turn lane 75-ft and the northbound left-turn lane 45 feet. At the intersection of County Road X & WIS 29 westbound ramp, it is recommended to extend the storage length by 50-ft for the southbound right-turn lane and 55-ft for the northbound left-turn lane. At the intersection of County Road X & Weston Avenue, it is recommended to provide an available storage length of approximately 75-ft to accommodate the westbound left-turn queue lengths. ***Exhibit 1-8****, 2040 Horizon Year Background Traffic Improvements*, illustrates the recommended improvements.

B4. 2020 Phase I Development Traffic

Exhibit 1-3*, 2020 Base Year Build Traffic Recommended Improvements,* illustrates the improvements to the existing transportation system. County Road X is currently a 4-lane roadway cross-section which will not allow for turn-lane capacity expansion without reconstruction of the roadway and right-of-way impacts.

All turn lane and intersection improvements and traffic signal design shall follow WisDOT FDM requirements, including appropriate turn bay tapers, storage length, and deceleration distances. All median widths are proposed to be minimum 8-feet curb face to curb face.

<u>County Road X & Barbican Avenue</u>
The intersection of County Road X & Barbican Avenue will not require geometric improvements however is it recommended to retime and time-base coordinate the traffic signal timing plan with the WIS 29 interchange.

<u>County Road X & WIS 29 Interchange</u>
The intersection of County Road X & WIS 29 westbound interchange ramp is recommended to install dual westbound left-turn lanes and dual northbound left-turn lanes. Per the FDM (Chapter 11-25,

5.4.3.1) dual left turn lanes should be considered at a signalized intersection when demand exceeds 300 vehicles per hour (vph). The analysis shows that the Phase I development volumes will exceed the threshold for the northbound left-turn vehicles during each peak hour. Therefore, it is recommended to accommodate northbound dual left-turn lanes, including appropriate storage lengths and lane configuration, into the improved transportation system. Accommodating dual northbound left-turn lanes would require two receiving lanes on the westbound on-ramp to WIS 29. Appropriate merging tapers should be accommodated per the FDM standards.

To accommodate for the additional capacity, the existing structure on County Road X over WIS 29 (B-37-177) would require improvements such as widening to provide for the additional travel lanes and potential on-street bike and pedestrian accommodations. A preliminary structural analysis was conducted and anticipates that expansion work to meet the increased roadway width on the existing bridge is feasible. Based on the preliminary analysis, a full reconstruction of the bridge is not necessary.

The east approach of the intersection of County Road X & WIS 29 westbound interchange ramp experiences a higher volume of left-turn movements however does not meet the 300 vph threshold. An operational analysis was completed which concluded that dual left-turn lanes would experience an operational benefit with installation. The FDM states that dual left-turn lanes can also be considered when right-of-way is limited and the cross street volume is minimal (< 400 ADT). The ramp terminal does not experience any cross traffic and is constrained by the highway to the south. Therefore, it is recommended to install dual left-turn lanes on the east approach of the intersection on the basis of constrained environment and operational benefit. It is recommended that the southbound right-turn lane be extended 125-ft, at a minimum, to accommodate the anticipated queueing at the traffic signal.

The intersection of County Road X & WIS 29 eastbound interchange ramp terminal will not require additional capacity expansion. However, it is recommended that the eastbound right-turn lane be extended 125-ft to accommodate the anticipated queueing at the traffic signal.

It is recommended that new traffic signals be installed at the interchange ramp system that include monotubes and follow head-per-lane requirements as outlined in the Manual on Uniform Traffic Control Devices (MUTCD), Traffic Engineering, Operations, and Safety Manual (TEOpS), and Traffic Signal Design Manual (TSDM). Currently all right-turn movements at the interchange are yield controlled. It is recommended that with the new traffic signal installation, the right-turn movements change to signalized mvoements.

<u>County Road X & Westview Boulevard</u>
A signal warrant analysis was conducted, and the four hour warrant (Warrant 2), peak hour warrant (Warrant 3), and crash experience warrant (Warrant 7) are met for the 2020 Build Traffic conditions. Based on this review, it is recommended to install a permanent traffic signal at the intersection of County Road X & Westview Boulevard. Other intersection alternatives were reviewed as part of a Phase I Intersection Control Evaluation, however none met the operational and capacity demands required for the development and background traffic, see **Appendix J**. The proposed traffic signal is recommended to use monotubes and head-per-lane indications. Protected phasing and over-lap phasing should also be used to improve operational efficiency. It is recommended to time-base coordinate the traffic signal timing plan with the WIS 29 interchange as best as possible to create corridor progression.

The FDM (Section 11-2, Table 2.5) states that a desirable queue storage for an exclusive right-turn lane length equals the 90th percentile queue plus the maneuver distance. The northbound exclusive right-turn lane should accommodate, at a minimum, 100-ft of maneuver distance and 75-ft of queue storage.

In conjunction with the installation of a permanent traffic signal at the intersection County Road X & Westview Boulevard, intersection turn lane improvements are also recommended for implementation based on the FDM criteria for dual turn lanes outlined in the previous section. Based on the Phase I development volumes, it is recommended to construct dual southbound left-turn lanes, including appropriate storage lengths and lane configuration, into the improved transportation system.

The west approach of the intersection of County Road X & Westview Boulevard experiences a higher volume of left-turn movements however does not meet the 300 vph threshold. However, it is recommended to install dual left-turn lanes on the west approach of the intersection on the basis of constrained environment and operational benefit.

Additionally, the FDM (Section 11-25, 10.4.1) states that dual right-turn lanes should be considered when the right-turn volume is greater than 500 vph. Traffic volumes indicate that the Phase I development westbound right-turn movement will exceed the threshold volumes during each peak hour. While the operational analysis do not warrant the need for dual right-turn lanes, consideration could be taken to installing the turn lanes during the baseline improvement condition. The County Road X corridor can accommodate two receiving lanes and the right-turn overlap phase will ease concern for lane utilization.

All turn lane improvements and traffic signal design shall follow appropriate WisDOT design guide/manual requirements, including appropriate turn bay tapers, storage length, and deceleration distances.

<u>County Road X & Weston Avenue</u>
The intersection of County Road X & Weston Avenue will not require geometric improvements however, is it recommended to retime and coordinate the traffic signal timing plan with the Westview Boulevard intersection.

B5. 2030 Full Build Development Traffic

Exhibit 1-6*, 2030 Interim Year Full Build Traffic Recommended Improvements,* illustrates the improvements to the existing transportation system.

As part of the 2030 recommended improvements, all turn lane and intersection improvements and traffic signal design shall follow WisDOT FDM requirements, including appropriate turn bay tapers, storage length, and deceleration distances. All median widths are proposed to be minimum 8-feet curb face to curb face. Improvements identified are in addition to the improvements outlined previously in Section B4.

<u>County Road X & Barbican Avenue</u>
In addition to the recommended improvements to the signal timing coordination with the WIS 29 interchange, it is recommended to extend the southbound left-turn lane by 75-ft to accommodate the additional queue length.

<u>County Road X & WIS 29 Interchange</u>
Additional capacity northbound on County Road X is required in order to maintain acceptable intersection operations. It is recommended to install a third northbound thru lane at the WIS 29

eastbound ramp. The inside thru lane approaching the intersection will become a dedicated left-turn lane to travel westbound on WIS 29. Only two thru lanes will be carried through the WIS 29 westbound ramp intersection.

County Road X & Westview Boulevard
Based on the FDM guidance previously outlined, it is recommended to construct a second right-turn lane for the westbound volumes.

Install a third northbound thru lane at the Westview Boulevard intersection that is carried through to the WIS 29 interchange. The southbound dual-left turn lanes should be extended to accommodate anticipated queue lengths and provide acceptable storage lengths.

County Road X & Weston Avenue
The intersection of County Road X & Weston Avenue will not require geometric improvements however is it recommended to retime and coordinate the traffic signal timing plan with the Westview Boulevard intersection as best as possible.

B6. 2040 Full Build Development Traffic

***Exhibit 1-9**, 2040 Horizon Year Full Build Traffic Recommended Improvements,* illustrates the improvements to the 2030 intersection and corridor recommendations.

As part of the 2040 recommended improvements, all turn lane and intersection improvements and traffic signal design shall follow WisDOT FDM requirements, including appropriate turn bay tapers, storage length, and deceleration distances. All median widths are proposed to be minimum 8-feet curb face to curb face. Improvements identified are in addition to the improvements outlined previously in Section B5.

County Road X & Barbican Avenue
The intersection of County Road X & Barbican Avenue will require additional turn lanes in the horizon year. Intersection improvement recommendations include restriping of the east to a dedicated left turn lane and a shared thru/right lane. The exclusive left-turn lane will allow for protected/permissive phasing during the peak hour. The west approach is recommended to be restriped to an exclusive left-turn lane, thru-lane, and the addition of an exclusive right-turn lane to accommodate the right-turn overlap phase. In the future, a third southbound shared thru/right-turn lane is recommended for installation. The thru lane will complement the other intersection improvements along Camp Philips Road and at the WIS 29 interchange and maintain corridor continuity.

County Road X & WIS 29 Interchange
Additional capacity southbound on County Road X is required in order to maintain acceptable intersection operations. It is recommended to install a third southbound thru lane at the WIS 29 westbound ramp. The inside thru lane approaching the intersection will become a dedicated left-turn lane to travel eastbound into the proposed development at Westview Boulevard. Only two thru lanes will be carried through the Weston Avenue intersection.

County Road X & Westview Boulevard

The lane configuration and intersection control implemented as part of 2030 improvements will accommodate the horizon year anticipated volumes. The southbound dual-left turn lanes should be extended to accommodate anticipated queue lengths and provide acceptable storage lengths.

County Road X & Weston Avenue

The westbound left-turn lane at the intersection of County Road X & Weston Avenue will exceed the existing storage capacity. It is recommended that the storage length be lengthen to accommodate future queueing. It is also recommended to retime and coordinate the traffic signal timing plan with the Westview Boulevard intersection.

Exhibit 6-1A, *Intersection Conceptual Improvements – North Intersections,* and ***Exhibit 6-1B,*** *Intersection Conceptual Improvements – South Intersections* illustrate the conclusive recommended improvements to accommodate the 2040 Full Build traffic anticipated for the development.

Weston Avenue, from County Road X to Heeren Street, is proposed to be reconstructed by the Village. The anticipated development volumes should be taken into consideration when preparing for reconstruction and evaluating intersection control.

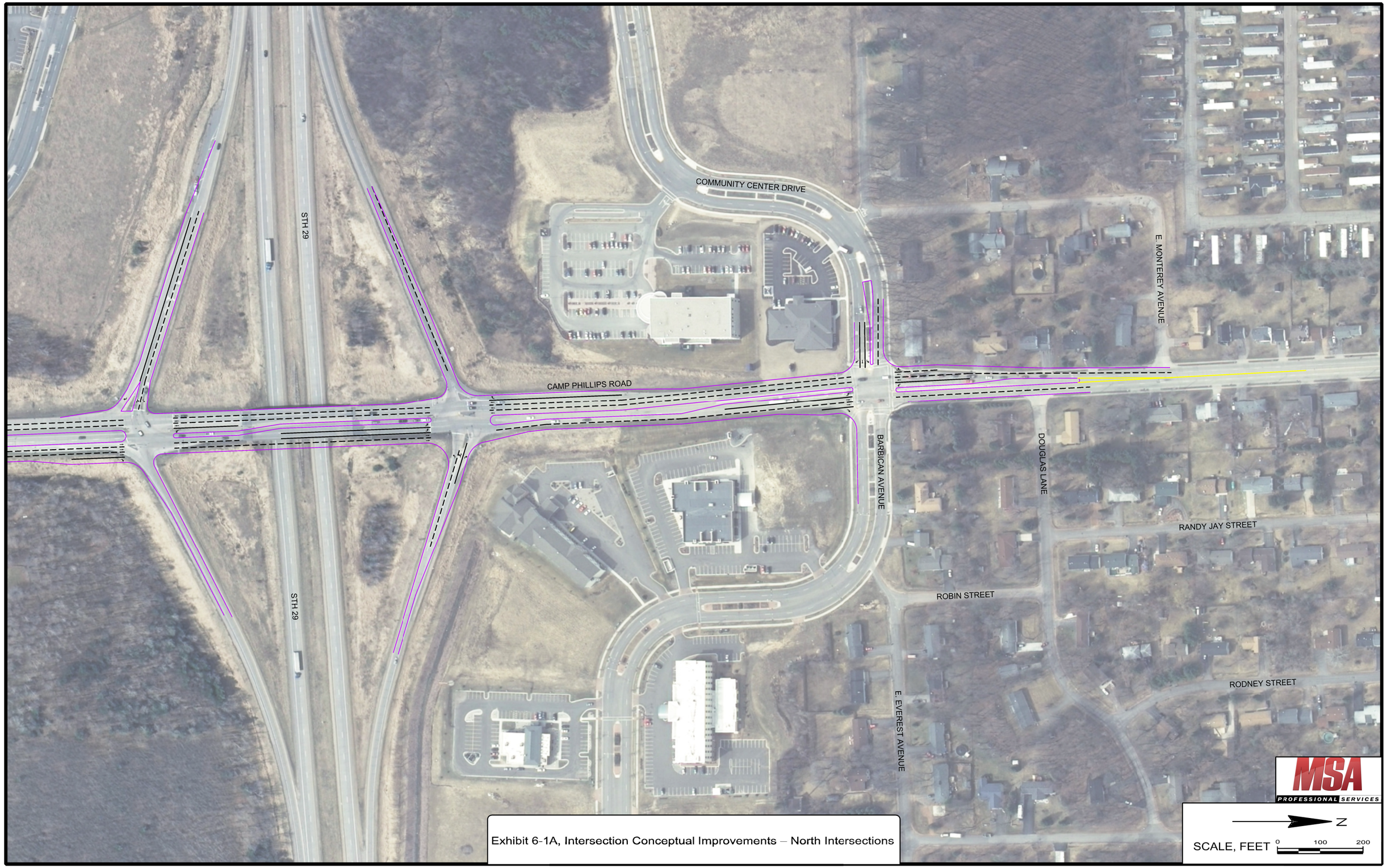


Exhibit 6-1A, Intersection Conceptual Improvements – North Intersections

Exhibit 6-1B, Intersection Conceptual Improvements – South Intersections

Appendix A

Traffic

I. Summary of PHF and Percent Heavy Vehicles
II. Turning Movement Count Data
III. WisDOT Traffic Forecast Report

Appendix A: Traffic

Summary of PHF and Percent Heavy Vehicles

Intersection	Time Period	% Trucks				PHF
		EB	WB	NB	SB	
Ross Avenue	AM	11	3	8	6	0.91
	PM	4	2	3	4	0.93
Schofield	AM	4	4	4	4	0.93
	PM	2 [2]	2	2	3	0.95
Barbican	AM	2	2	6	5	0.92
	PM	2	2 [2]	3	3	0.94
WIS 29 WB	AM		2	7	6	0.95
	PM		9	4	4	0.98
WIS 29 EB	AM	7		2	2	0.90
	PM	2		2	2	0.99
Westview	AM	6	2	2	3	0.94
	PM	2 [2]	2	2 [2]	2 [2]	0.95
Weston	AM	2	14	2	5	0.93
	PM	2 [2]	6	2	2 [2]	0.95
Street B	AM	5	16		2	0.92
	PM	5	8		2	0.92
Von Kanel	AM	8	18	2	5 [3]	0.76 [1]
	PM	9	10	2	5 [3]	0.92
Heeren	AM	8	18		5 [3]	0.76 [1]
	PM	9	10		5 [3]	0.92

[1] The minimum PHF used in this study was 0.80

[2] Truck percentages less than 2.0 but above 1.0 were rounded up to 2% as a conservative estimate

[3] Phase II development will have a higher percentage of truck traffic due to industrial land uses. Assumed 5% trucks.

Appendix A: Traffic

Turning Movement Count Data

Intersection Traffic Volume Report

Count Basics			*Page 5 of 11*
Start Date:	Tuesday, October 20, 2015	Weekday	Schools in Session
Total Number of Hours Counted: 4		Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Camp Phillips Road / CTH X and Barbican Avenue

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (Camp Phillips Road / CTH X)					From East (Barbican Avenue)					From South (Camp Phillips Road / CTH X)					From West (Forest Avenue)					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 AM	5	233	0	0	238	3	1	18	0	22	7	110	33	0	150	30	0	1	0	31	441	1752	0.92
	7:15 AM	8	214	4	0	226	9	4	11	0	24	5	162	30	0	197	27	1	0	0	28	475	1644	0.87
	7:30 AM	4	207	1	0	212	7	3	14	0	24	2	140	9	0	151	19	2	3	0	24	411	1555	0.91
	7:45 AM	6	178	16	0	200	6	2	12	0	20	17	151	23	0	191	11	2	1	0	14	425	1504	0.88
	8:00 AM	2	143	4	0	149	6	0	12	0	18	8	121	23	0	152	12	0	2	0	14	333	1383	0.90
	8:15 AM	4	177	3	0	184	4	1	14	0	19	7	121	18	0	146	25	4	8	0	37	386		
	8:30 AM	6	181	9	0	196	6	1	10	0	17	8	109	15	0	132	13	0	2	0	15	360		
	8:45 AM	4	131	4	0	139	5	2	11	0	18	7	109	13	0	129	15	1	2	0	18	304		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	4:00 PM	5	242	9	0	256	10	3	19	0	32	7	185	27	0	219	34	1	5	0	40	547	2274	0.96
	4:15 PM	7	202	15	0	224	11	0	21	0	32	16	233	19	0	268	27	4	3	0	34	558	2354	0.94
	4:30 PM	2	246	10	0	258	14	3	24	0	41	10	209	18	0	237	32	3	6	0	41	577	2346	0.94
	4:45 PM	7	237	13	0	257	12	2	16	0	30	16	222	30	0	268	31	1	5	0	37	592	2264	0.90
	5:00 PM	4	240	13	0	257	16	5	21	0	42	17	260	13	0	290	28	2	8	0	38	627	2097	0.84
	5:15 PM	0	182	12	0	194	11	2	17	0	30	13	263	16	0	292	29	1	4	0	34	550		
	5:30 PM	5	177	8	0	190	11	1	15	0	27	32	192	22	0	246	26	2	4	0	32	495		
	5:45 PM	5	173	8	0	186	12	2	13	0	27	10	152	15	0	177	29	2	4	0	35	425		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		74	3163	129	0	3366	143	32	248	0	423	182	2739	324	0	3245	388	26	58	0	472	7506		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (Camp Phillips Road / CTH X)					From East (Barbican Avenue)					From South (Camp Phillips Road / CTH X)					From West (Forest Avenue)					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	23	832	21	0	876	25	10	55	0	90	31	563	95	0	689	87	5	5	0	97	1752	0.92
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:15 PM	20	925	51	0	996	53	10	82	0	145	59	924	80	0	1063	118	10	22	0	150	2354	0.94

Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Wednesday, October 21, 2015	Weekday	Schools in Session
Total Number of Hours Counted: 4		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Camp Phillips Road / CTH X and STH 29 WB

Peak Hour Volumes, Truck Percentages, and PHFs

Wednesday, October 21, 2015		From North					From East					From South					From West					
	AM Peak Hour	Camp Phillips Road / CTH X					STH 29 WB					Camp Phillips Road / CTH X					STH 29 WB					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	171	90	0	0	261	36	0	23	0	59	0	92	82	0	174	0	0	0	0	0	494
	7:15 AM	179	91	0	0	270	45	0	15	0	60	0	109	95	0	204	0	0	0	0	0	534
	7:30 AM	167	86	0	0	253	39	0	18	0	57	0	144	102	0	246	0	0	0	0	0	556
	7:45 AM	138	84	0	0	222	33	0	23	0	56	0	176	69	0	245	0	0	0	0	0	523
	Peak Hour Volume	655	351	0	0	1006	153	0	79	0	232	0	521	348	0	869	0	0	0	0	0	2107
	Rounded Hourly Volume	655	350	0	0	1005	155	0	80	0	235	0	520	350	0	870	0	0	0	0	0	2110
	% Single Unit Trucks	4.1	4.0	0.0	0.0	4.1	0.7	0.0	0.0	0.0	0.4	0.0	4.4	4.9	0.0	4.6	0.0	0.0	0.0	0.0	0.0	3.9
	% Heavy Trucks	2.1	0.9	0.0	0.0	1.7	2.0	0.0	0.0	0.0	1.3	0.0	3.1	1.7	0.0	2.5	0.0	0.0	0.0	0.0	0.0	2.0
	% Trucks (Total)	6.3	4.8	0.0	0.0	5.8	2.6	0.0	0.0	0.0	1.7	0.0	7.5	6.6	0.0	7.1	0.0	0.0	0.0	0.0	0.0	5.9
	Peak Hour Factor (PHF)	0.91	0.96	0.00	0.00	0.93	0.85	0.00	0.86	0.00	0.97	0.00	0.74	0.85	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.95

N/A		From North					From East					From South					From West					
	MD Peak Hour	Camp Phillips Road / CTH X					STH 29 WB					Camp Phillips Road / CTH X					STH 29 WB					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Peak Hour Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rounded Hourly Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Single Unit Trucks	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	0.0	0.0
	% Heavy Trucks	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	0.0	0.0
	% Trucks (Total)	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	0.0	0.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Wednesday, October 21, 2015		From North					From East					From South					From West					
	PM Peak Hour	Camp Phillips Road / CTH X					STH 29 WB					Camp Phillips Road / CTH X					STH 29 WB					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:30 PM	173	131	0	0	304	19	0	14	0	33	0	240	96	0	336	0	0	0	0	0	673
	4:45 PM	157	143	0	0	300	22	0	13	0	35	0	274	104	0	378	0	0	0	0	0	713
	5:00 PM	169	139	0	0	308	21	1	11	0	33	0	241	125	0	366	0	0	0	0	0	707
	5:15 PM	163	137	0	0	300	20	0	8	0	28	0	273	118	0	391	0	0	0	0	0	719
	Peak Hour Volume	662	550	0	0	1212	82	1	46	0	129	0	1028	443	0	1471	0	0	0	0	0	2812
	Rounded Hourly Volume	660	550	0	0	1210	80	0	45	0	125	0	1030	445	0	1475	0	0	0	0	0	2810
	% Single Unit Trucks	1.8	2.5	0.0	0.0	2.1	3.7	0.0	6.5	0.0	4.7	0.0	3.0	2.3	0.0	2.8	0.0	0.0	0.0	0.0	0.0	2.6
	% Heavy Trucks	1.7	1.3	0.0	0.0	1.5	6.1	0.0	0.0	0.0	3.9	0.0	0.7	0.9	0.0	0.7	0.0	0.0	0.0	0.0	0.0	1.2
	% Trucks (Total)	3.5	3.8	0.0	0.0	3.6	9.8	0.0	6.5	0.0	8.5	0.0	3.7	3.2	0.0	3.5	0.0	0.0	0.0	0.0	0.0	3.8
	Peak Hour Factor (PHF)	0.96	0.96	0.00	0.00	0.98	0.93	0.25	0.82	0.00	0.92	0.00	0.94	0.89	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.98

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Camp Phillips Road / CTH X			STH 29 WB			Camp Phillips Road / CTH X			STH 29 WB			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	1	0	1	0	0	0	0	0	0	1
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	10	0	10	0	0	0	0	0	0	0	0	0	10
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	10	0	10	1	0	1	0	0	0	0	0	0	11
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	2	0	2	1	0	1	0	0	0	0	0	0	3
	Total	2	0	2	1	0	1	0	0	0	0	0	0	3

Intersection Traffic Volume Report

Count Basics			*Page 5 of 11*
Start Date:	Wednesday, October 21, 2015	Weekday	Schools in Session
Total Number of Hours Counted: 4		Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Camp Phillips Road / CTH X and STH 29 EB

15-Minute Motor Vehicle Data

	15-Minute Time Period Start Time	From North (Camp Phillips Road / CTH X)					From East (STH 29 EB)					From South (Camp Phillips Road / CTH X)					From West (STH 29 EB)					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 AM	0	91	15	0	106	0	0	0	0	0	17	118	0	0	135	49	0	73	0	122	363	1634	0.90
	7:15 AM	0	105	14	0	119	0	0	0	0	0	18	137	0	0	155	64	0	75	0	139	413	1598	0.88
	7:30 AM	0	95	13	0	108	0	0	0	0	0	12	143	0	0	155	55	0	88	0	143	406	1500	0.83
	7:45 AM	0	106	14	0	120	0	0	0	0	0	10	136	0	0	146	92	0	94	0	186	452	1403	0.78
	8:00 AM	0	70	10	0	80	0	0	0	0	0	11	94	0	0	105	53	0	89	0	142	327	1246	0.95
	8:15 AM	0	70	5	0	75	0	0	0	0	0	17	102	0	0	119	48	0	73	0	121	315		
	8:30 AM	0	79	9	0	88	0	0	0	0	0	6	111	0	0	117	38	0	66	0	104	309		
	8:45 AM	0	57	7	0	64	0	0	0	0	0	5	106	0	0	111	38	0	82	0	120	295		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	4:00 PM	0	107	34	0	141	0	0	0	0	0	16	136	0	0	152	66	1	141	0	208	501	2213	0.95
	4:15 PM	0	87	35	0	122	0	0	0	0	0	24	144	0	0	168	71	0	183	0	254	544	2298	0.98
	4:30 PM	0	106	40	0	146	0	0	0	0	0	36	168	0	0	204	69	1	165	0	235	585	2324	0.99
	4:45 PM	0	120	22	0	142	0	0	0	0	0	22	155	0	0	177	66	0	198	0	264	583	2188	0.93
	5:00 PM	0	119	29	0	148	0	0	0	0	0	15	186	0	0	201	78	0	159	0	237	586	2043	0.87
	5:15 PM	0	94	47	0	141	0	0	0	0	0	9	158	0	0	167	73	0	189	0	262	570		
	5:30 PM	0	82	24	0	106	0	0	0	0	0	15	110	0	0	125	40	0	178	0	218	449		
	5:45 PM	0	101	19	0	120	0	0	0	0	0	15	112	0	0	127	45	0	146	0	191	438		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		0	1489	337	0	1826	0	0	0	0	0	248	2116	0	0	2364	945	2	1999	0	2946	7136		

Peak Hour All Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Camp Phillips Road / CTH X)					From East (STH 29 EB)					From South (Camp Phillips Road / CTH X)					From West (STH 29 EB)					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	0	397	56	0	453	0	0	0	0	0	57	534	0	0	591	260	0	330	0	590	1634	0.90
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:30 PM	0	439	138	0	577	0	0	0	0	0	82	667	0	0	749	286	1	711	0	998	2324	0.99

Intersection Traffic Volume Report

Count Basics			*Page 5 of 11*
Start Date:	Tuesday, October 20, 2015	Weekday	Schools in Session
Total Number of Hours Counted: 4		Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Camp Phillips Road / CTH X and Westview Boulevard

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (Camp Phillips Road / CTH X)					From East (Westview Boulevard)					From South (Camp Phillips Road / CTH X)					From West (Westview Boulevard)					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 AM	46	75	0	0	121	0	0	0	0	0	0	142	7	0	149	7	0	20	0	27	297	1298	0.94
	7:15 AM	70	95	0	0	165	0	0	0	0	0	0	129	6	0	135	4	0	23	0	27	327	1220	0.88
	7:30 AM	78	93	0	0	171	0	0	0	0	0	0	137	9	0	146	8	0	22	0	30	347	1129	0.81
	7:45 AM	92	87	0	0	179	0	0	0	0	0	0	122	5	0	127	5	0	16	0	21	327	987	0.75
	8:00 AM	37	72	0	0	109	0	0	0	0	0	0	89	3	0	92	4	0	14	0	18	219	880	0.93
	8:15 AM	51	65	0	0	116	0	0	0	0	0	0	95	2	0	97	4	0	19	0	23	236		
	8:30 AM	37	60	0	0	97	0	0	0	0	0	0	74	6	0	80	2	0	26	0	28	205		
	8:45 AM	43	62	0	0	105	0	0	0	0	0	0	90	2	0	92	3	0	20	0	23	220		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	4:00 PM	32	128	0	0	160	0	0	0	0	0	0	122	6	0	128	9	0	47	0	56	344	1456	0.92
	4:15 PM	37	141	0	0	178	0	0	0	0	0	0	128	5	0	133	9	0	35	0	44	355	1508	0.95
	4:30 PM	53	133	0	0	186	0	0	0	0	0	0	151	8	0	159	7	0	44	0	51	396	1508	0.95
	4:45 PM	46	135	0	0	181	0	0	0	0	0	0	119	6	0	125	9	0	46	0	55	361	1421	0.90
	5:00 PM	25	151	0	0	176	0	0	0	0	0	0	145	11	0	156	9	0	55	0	64	396	1295	0.82
	5:15 PM	33	132	0	0	165	0	0	0	0	0	0	127	6	0	133	10	0	47	0	57	355		
	5:30 PM	25	118	0	0	143	0	0	0	0	0	0	114	8	0	122	5	0	39	0	44	309		
	5:45 PM	17	104	0	0	121	0	0	0	0	0	0	88	2	0	90	3	0	21	0	24	235		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		722	1651	0	0	2373	0	0	0	0	0	0	1872	92	0	1964	98	0	494	0	592	4929		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (Camp Phillips Road / CTH X)					From East (Westview Boulevard)					From South (Camp Phillips Road / CTH X)					From West (Westview Boulevard)					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	286	350	0	0	636	0	0	0	0	0	0	530	27	0	557	24	0	81	0	105	1298	0.94
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:15 PM	161	560	0	0	721	0	0	0	0	0	0	543	30	0	573	34	0	180	0	214	1508	0.95

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Monday, October 19, 2015	Weekday	Schools in Session
Total Number of Hours Counted: 4	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Camp Phillips Road / CTH X and Weston Avenue

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (Camp Phillips Road / CTH X)					From East (Weston Avenue)					From South (Camp Phillips Road / CTH X)					From West (Weston Avenue)					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 AM	18	51	13	0	82	14	19	7	0	40	13	77	11	0	101	5	4	28	0	37	260	1188	0.93
	7:15 AM	25	63	17	0	105	13	23	19	0	55	7	103	12	0	122	2	9	27	0	38	320	1142	0.89
	7:30 AM	22	76	14	0	112	21	10	5	0	36	7	93	17	0	117	4	3	36	0	43	308	845	0.69
	7:45 AM	27	79	9	0	115	12	7	4	0	23	9	101	9	0	119	3	8	32	0	43	300	717	0.60
	8:00 AM	11	51	3	0	65	6	3	12	0	21	7	75	9	0	91	5	6	26	0	37	214	610	0.71
	8:15 AM	2	4	1	0	7	1	1	1	0	3	5	5	2	0	12	0	1	0	0	1	23		
	8:30 AM	14	31	2	0	47	7	2	10	0	19	1	60	9	0	70	5	6	33	0	44	180		
	8:45 AM	16	46	10	0	72	12	8	8	0	28	6	51	10	0	67	2	3	21	0	26	193		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	4:00 PM	27	105	18	0	150	9	7	9	0	25	12	65	9	0	86	8	15	31	0	54	315	1328	0.93
	4:15 PM	20	103	20	0	143	12	12	12	0	36	11	81	6	0	98	6	17	37	0	60	337	1381	0.94
	4:30 PM	23	106	14	0	143	11	22	16	0	49	11	76	4	0	91	15	11	47	0	73	356	1399	0.95
	4:45 PM	15	113	12	0	140	14	8	12	0	34	12	80	5	0	97	11	9	29	0	49	320	1327	0.90
	5:00 PM	32	115	19	0	166	16	13	15	0	44	10	74	4	0	88	12	8	50	0	70	368	1285	0.87
	5:15 PM	28	116	27	0	171	19	11	15	0	45	6	74	4	0	84	10	9	36	0	55	355		
	5:30 PM	32	92	11	0	135	11	5	5	0	21	10	66	5	0	81	5	8	34	0	47	284		
	5:45 PM	37	76	18	0	131	13	8	6	0	27	13	53	8	0	74	4	15	27	0	46	278		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		349	1227	208	0	1784	191	159	156	0	506	140	1134	124	0	1398	97	132	494	0	723	4411		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (Camp Phillips Road / CTH X)					From East (Weston Avenue)					From South (Camp Phillips Road / CTH X)					From West (Weston Avenue)					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	92	269	53	0	414	60	59	35	0	154	36	374	49	0	459	14	24	123	0	161	1188	0.93
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:30 PM	98	450	72	0	620	60	54	58	0	172	39	304	17	0	360	48	37	162	0	247	1399	0.95

Appendix A: Traffic

WisDOT Traffic Forecast Report

Weston, WI						
Site: 371381 (CTH X, N of Weston Ave)		Site: 370282 (CTH X, N of Westview Blvd)		Site: 371145 (CTH X, N of Jelinek)		
Year	AADT	Year	AADT	Year	AADT	
2013	10100	2013	12500	2013	15400	Count Year
2016	10600	2016	13200	2016	15950	
2026	12250	2026	15550	2026	17700	
2036	13900	2036	17900	2036	19500	
2050	16150	2050	21150	2050	22000	
	Growth Rates					
2013-2016	1.7%	**2010-2016**	1.867%	**2010-2016**	1.190%	
2016-2026	1.6%	**2016-2026**	1.780%	**2016-2026**	1.097%	
2026-2036	1.3%	**2026-2036**	1.511%	**2026-2036**	1.017%	
2036-2050	1.2%	**2036-2050**	1.297%	**2036-2050**	0.916%	
Average	1.4%		1.614%		1.055%	
Total Average						

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management

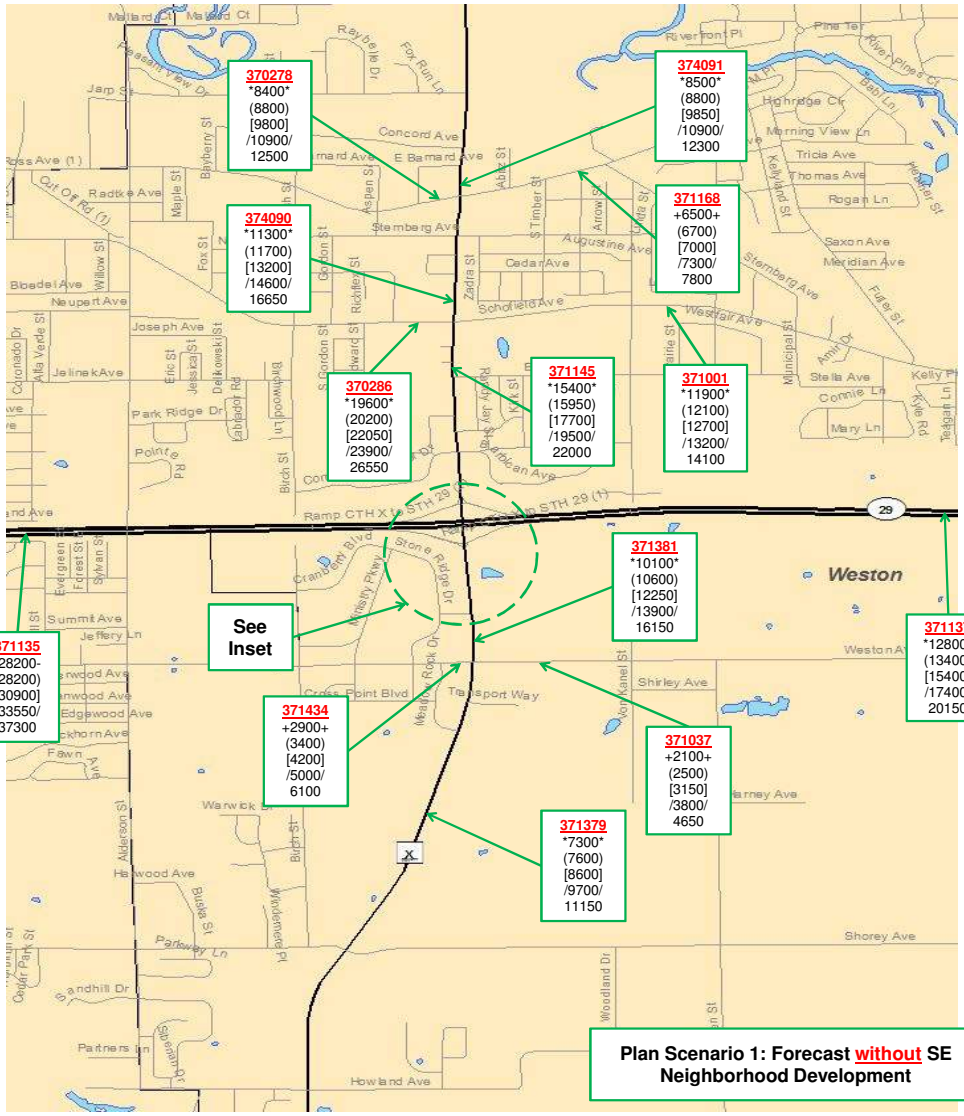
WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S):	0095-64-14
ROUTE(S):	CTH X / Camp Phillips Rd
Region/COUNTY(IES):	NC/MARATHON
LOCATION:	Weston Ave - Schofield Ave
COMPLETED:	04/12/2016

Developed By: Vu Dang
Phone: (608) 266-2571
FAX #: (608) 267-0294
E-Mail: vu.dang@dot.wi.gov

Design Values (%)			
Site(s)	371145	370282	
Routes(s)	Camp Phillips Rd	CTH X	
Volume(s)	21980	21140	
Site Growth %	1.15%	1.87%	
K250	10.0	10.1	
K100	10.8	10.8	
K30	11.3	11.3	
P	12.5	12.5	
D(Dsgn. Hr.)	59/41	59/41	
T(DHV)	4.7	2.9	
T(PHV)	4.1	2.5	
Truck Classification			
AADTT	840	420	
2D	1.6	1.3	
3AX	1.6	0.9	
2S1+2S2	0.7	0.5	
3-S2	1.3	0.5	
DBL-BTM	0.3	0.1	
Total %	5.5%	3.4%	
Full Vehicle Classification			
Site(s)			
Routes(s)			
MC			
CARS			
SU2-4			
BUSES			
SU2-6			
SU3			
SU4+			
ST4-			
ST5			
ST6+			
MU5-			
MU6			
MU7+			

N



SITE ID = Colored, **bolded**, and underlined

Symbol	Count	Symbol	Forecast
-000-	2016 Count	000	2050 AADT
000	2013 Count	/000/	2036 AADT
+000+	2010 Count	[000]	2026 AADT
		(000)	2016 AADT

NOTES ON THE FORECAST:

1. This projection assumes that no major new traffic generators will be added to the development already included in the 2010/2050 Marathon County Travel Demand Model.

2. Truck classification percentages were taken from a table representative of similar facilities and locations throughout the state of Wisconsin.

3. Camp Phillips Rd is a Factor Group II (Urban-Other) roadway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Urban Minor Arterial (16) for count purposes at sites # 374091 and 374090.

4. Camp Phillips Rd is a Factor Group II (Urban-Other) roadway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Urban Principal Arterial (14) for count purposes at sites # 371145.

5. CTH X is a Factor Group II (Urban-Other) roadway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Urban Minor Arterial (16) for count purposes.

6. The 2010/2050 Marathon County Travel Demand Model was used to complete this forecast. Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

7. Roadway improvements coded within the existing plus committed (E+C) network of the 2010/2050 Marathon County Travel Demand Model were assumed to be in place for the purposes of developing this forecast.

8. Turning movement count data were unbalanced at the two intersections of the interchange STH 29 & CTH X / Camp Phillips Rd. Balancing method tested out 80th, 85th, and 90th percentile. All passed the 85th percentile while most passed the 90th percentile. Balanced results were therefore reasonable to use for 2015 base year forecast. The south leg of WB STH 29 intersection was altered to match the north leg of EB STH 29 intersection. Same method was applied to forecasted years to balance. Procedure repeated for the Weston Ave & Von Kanel St intersection.

9. Turning movement forecasts are based on a T-intersection at the CTH X & Westview Blvd intersection without an east leg. Satellite imagery shows the east leg is cut off but has potentiality to expand into a new road.

10. Von Kanel St at the intersection of Weston Ave & Von Kanel St utilizes same growth rate as No Development. This is due to inadequate information provided for the SE Neighborhood Plan such as **number of floors and building square footage** in calculating number of trips generated in a With Development scenario using ITE Trip Generation Manual. More trips should be expected to come out from here for the turning movement forecast. AADT estimate could not be provided here as collected turning movement count data had a total of 4-hour observed summary, result would yield highly inaccurate estimate.

11. Plan Scenario 1 forecasts (No Development) uses the following constraints: (1) 2014 WisDOT socioeconomic data, **(2) TAZ 112 and 113 uses Base Year 2010 socioeconomic values**, and (3) TAZs 101, 102, 114, 117, 188, 189, 190, 320, 351, and 352 had HH and/or job numbers readjusted with respect to the meeting between Central Office, WisDOT NC Region, and Wausau MPO.

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management

WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S):	0095-64-14
ROUTE(S):	CTH X / Camp Phillips Rd
Region/COUNTY(IES):	NC/MARATHON
LOCATION:	Weston Ave - Schofield Ave
COMPLETED:	04/07/2016

Developed By: Vu Dang
Phone: (608) 266-2571
FAX #: (608) 267-0294
E-Mail: vu.dang@dot.wi.gov

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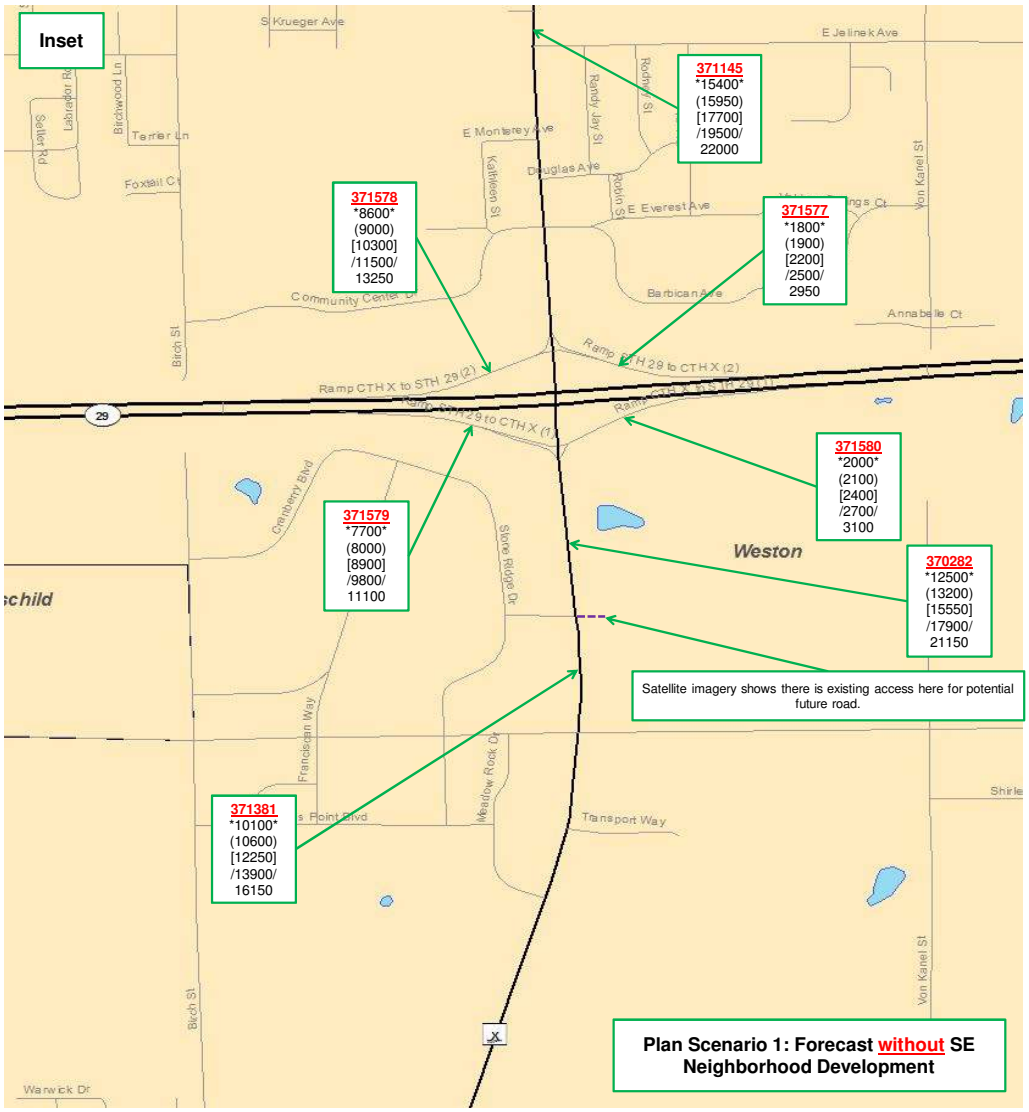
DBL-BTM	0.3	0.1	
Total %	5.5%	3.4%	
Full Vehicle Classification			
Site(s)			
Routes(s)			
MC			
CARS			
SU2-4			
BUSES			
SU2-6			
SU3			
SU4+			
ST4-			
ST5			
ST6+			
MU5-			
MU6			
MU7+			

N



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WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

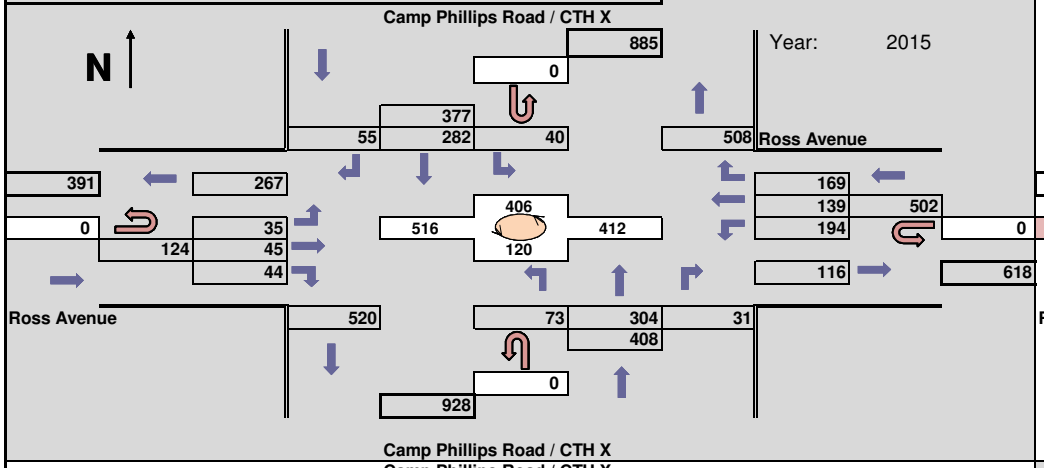
Forecast Completed: 4/12/2016

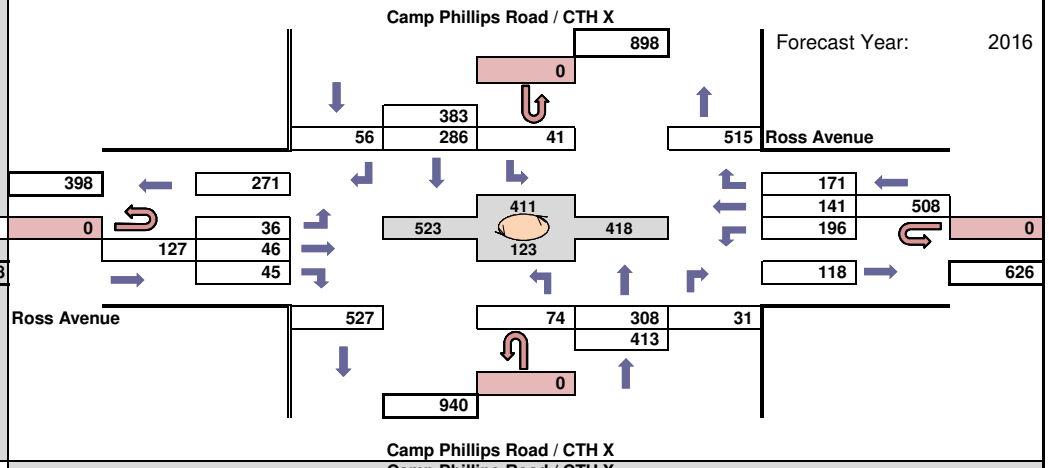
Design Hour Turning Movement Data

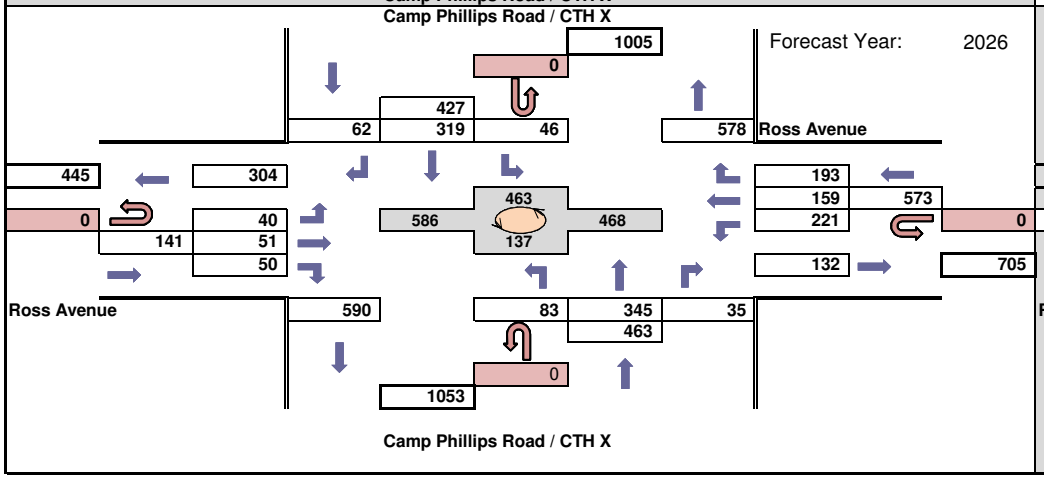
Project Description

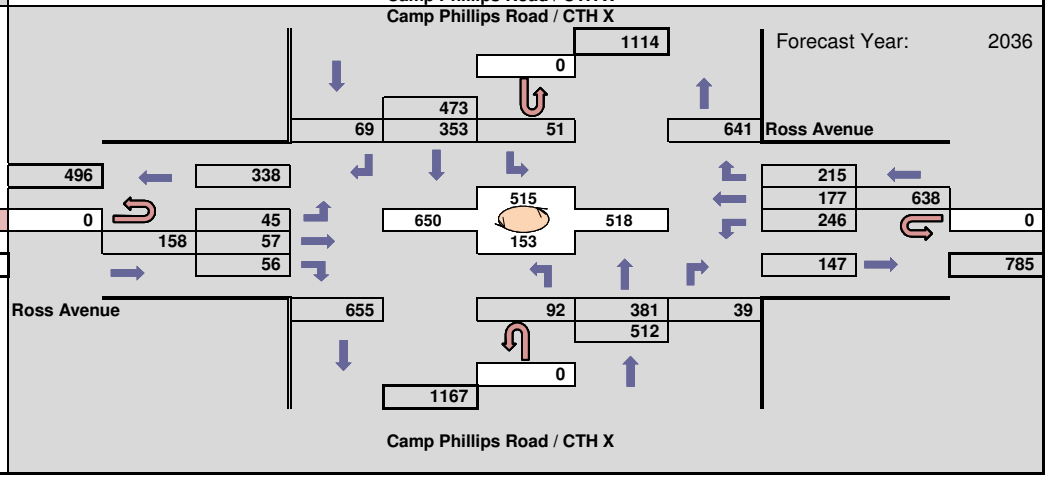
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

Forecast Completed: 4/12/2016

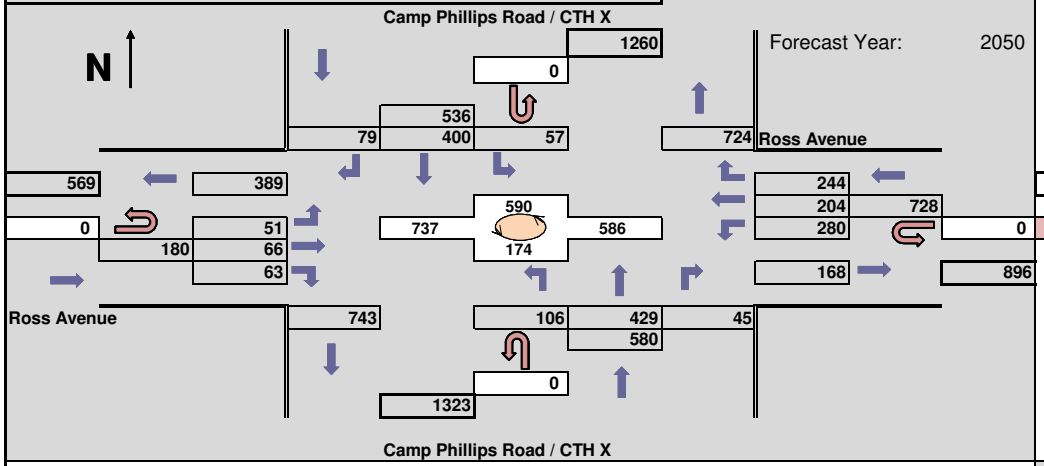
Project Description

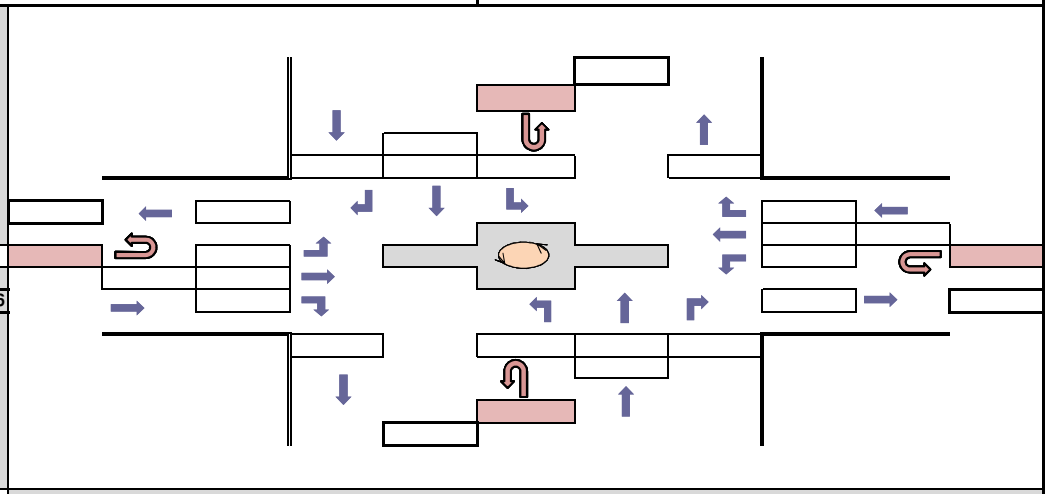
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

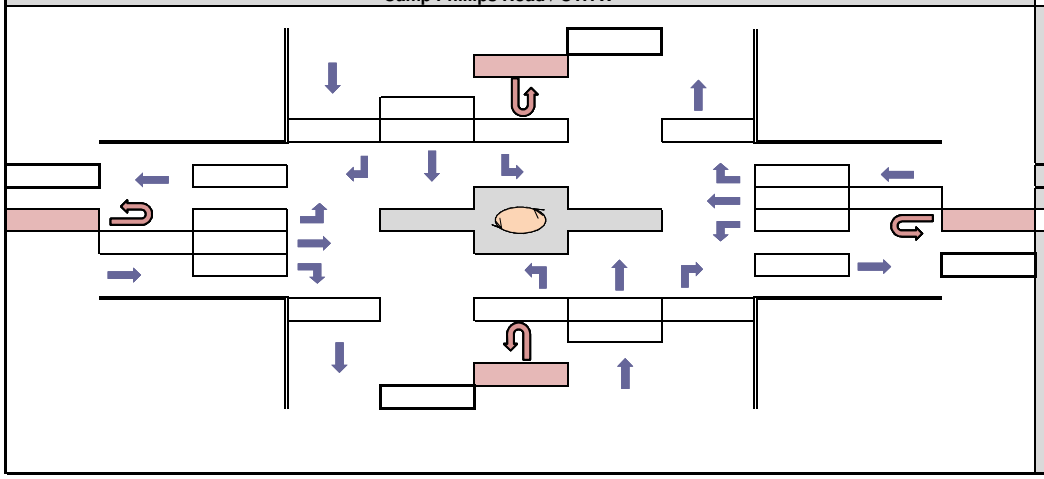
Design Hour Turning Movement Data

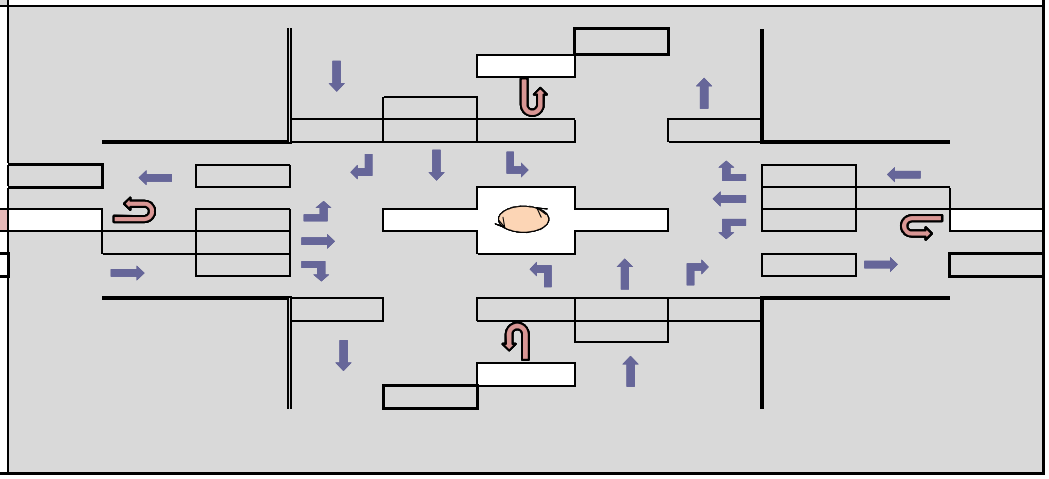
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

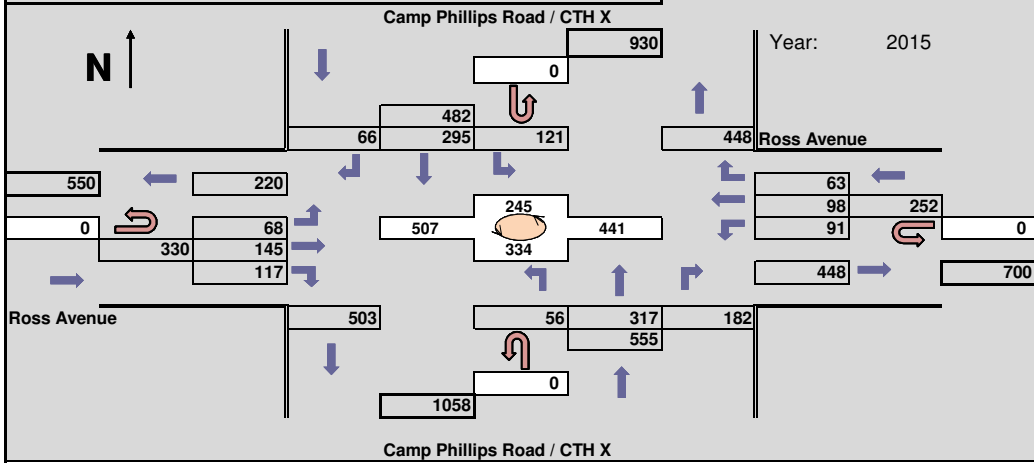
Forecast Completed: 4/12/2016

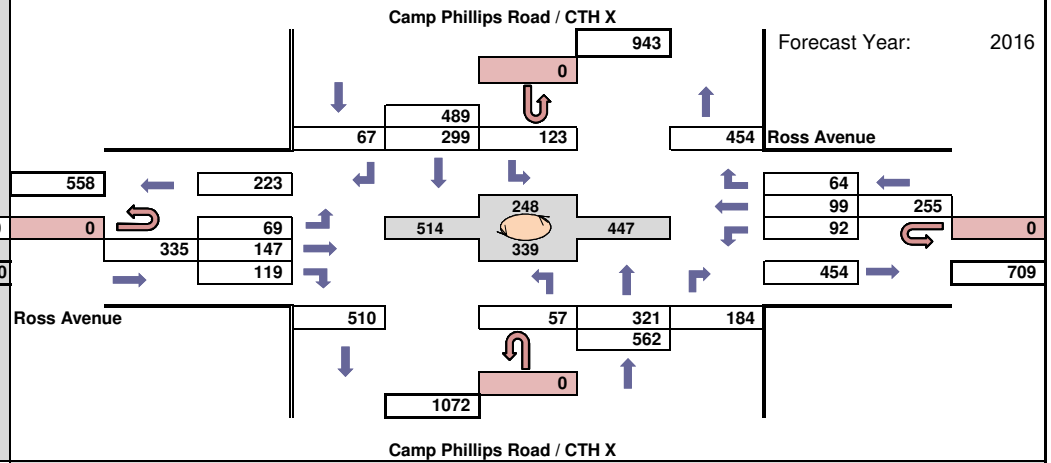
Design Hour Turning Movement Data

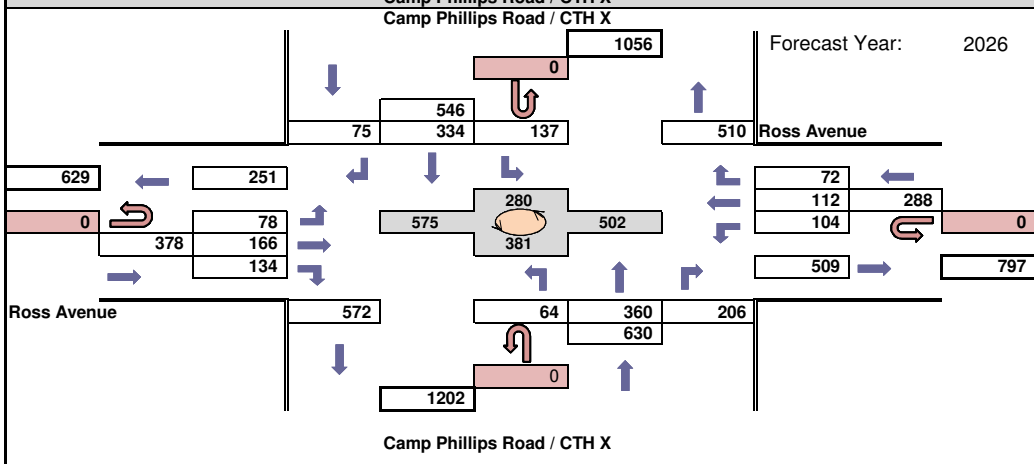
Project Description

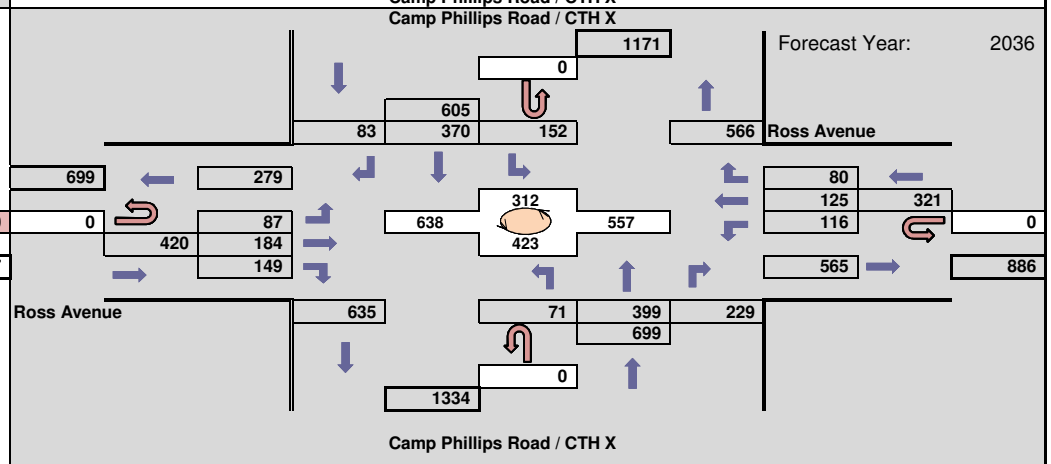
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected PM Design Hour Traffic Volumes

Indicates roundabout

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Forecast Completed: 4/12/2016

Project Description

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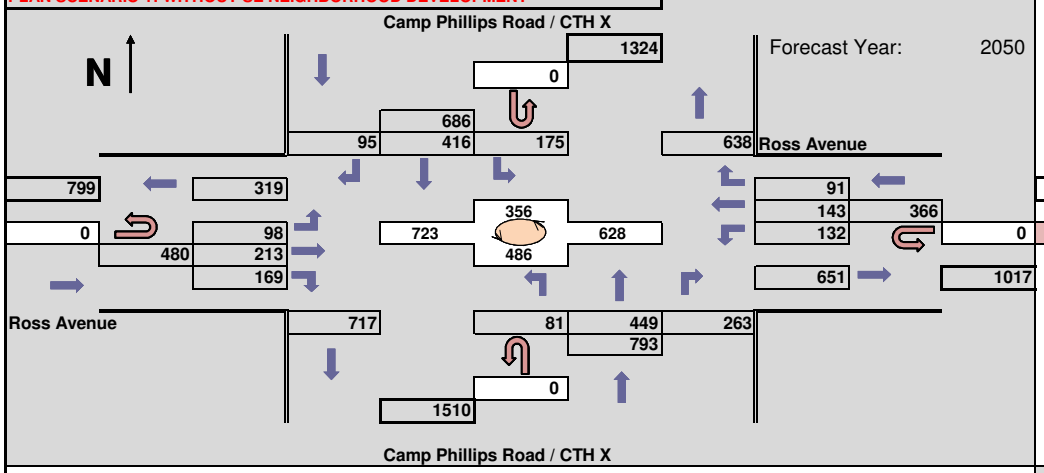
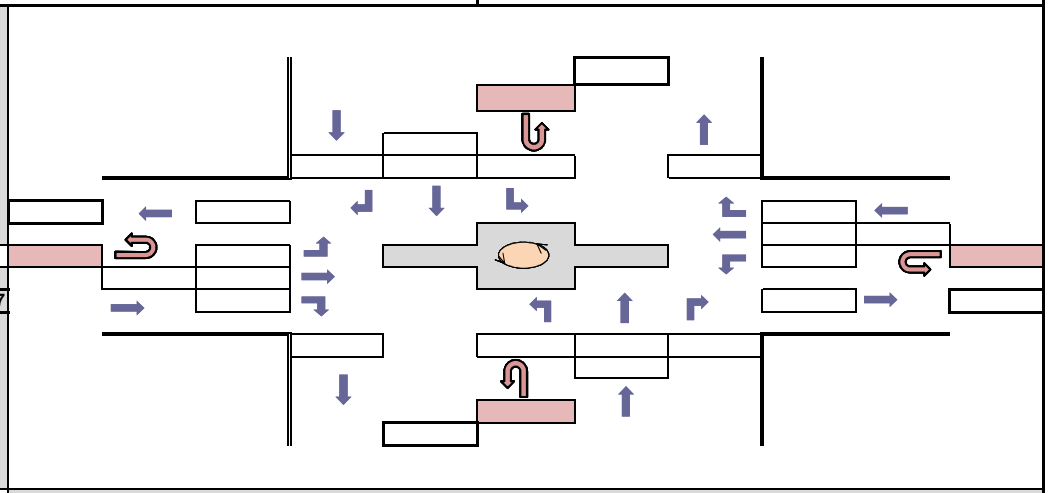
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

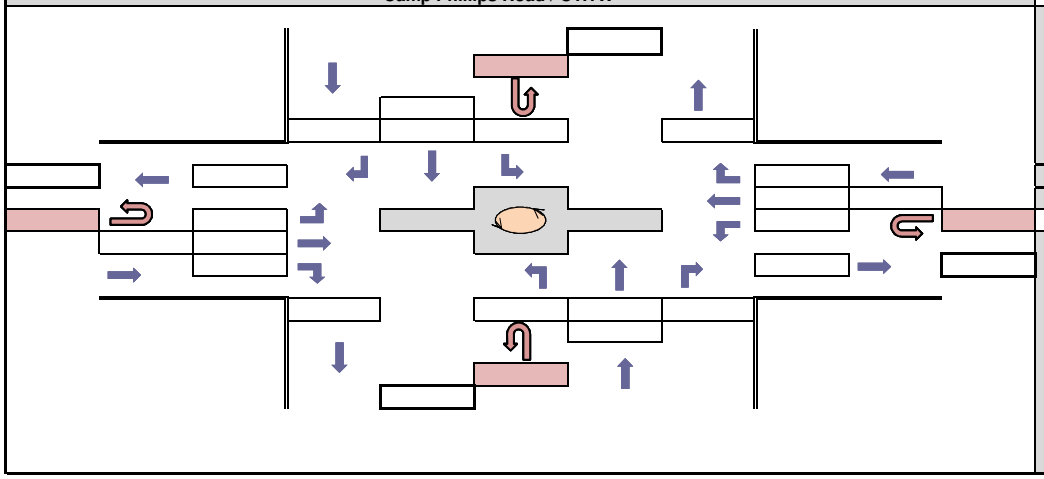
Design Hour Turning Movement Data

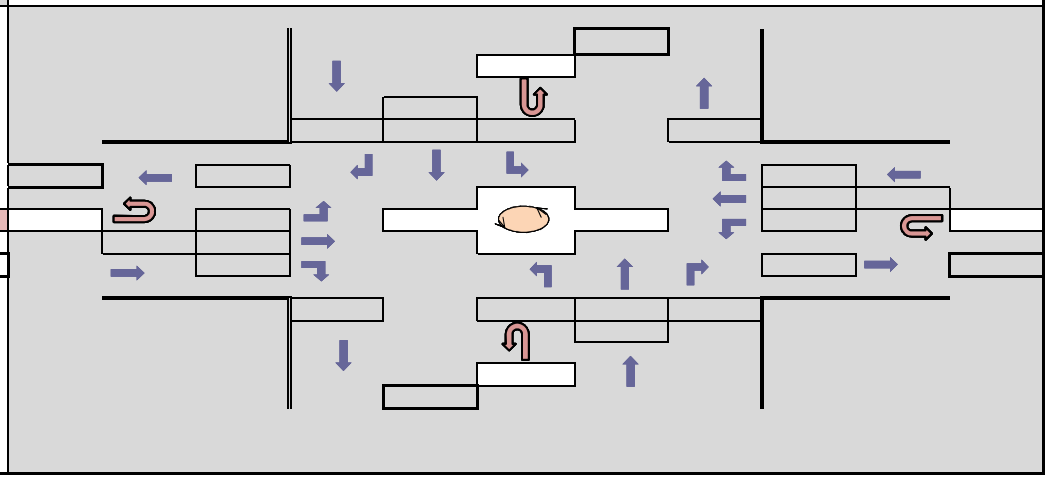
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

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Forecast Completed: 4/12/2016

Design Hour Turning Movement Data

Project Description

Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
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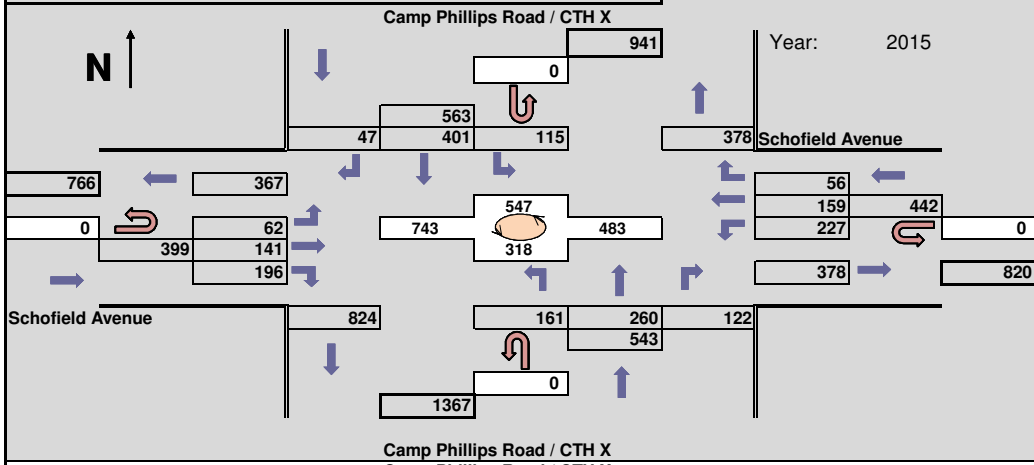
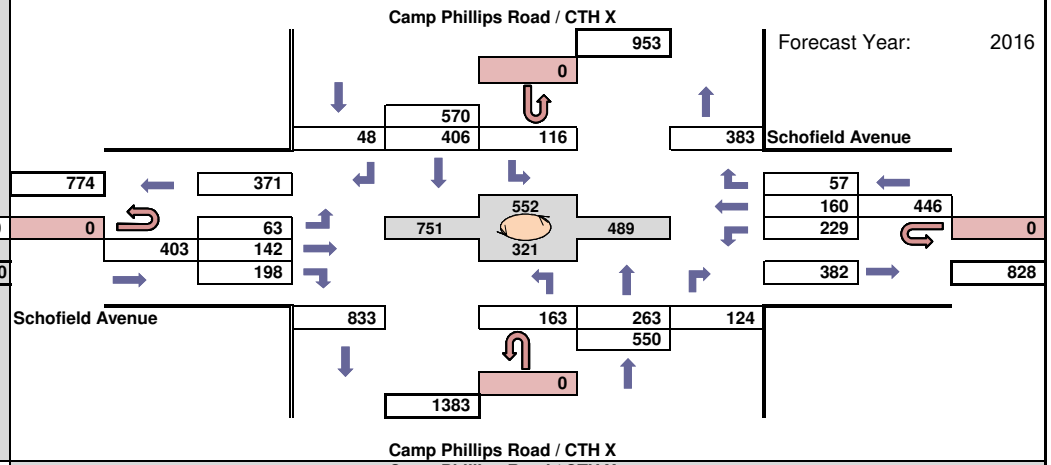
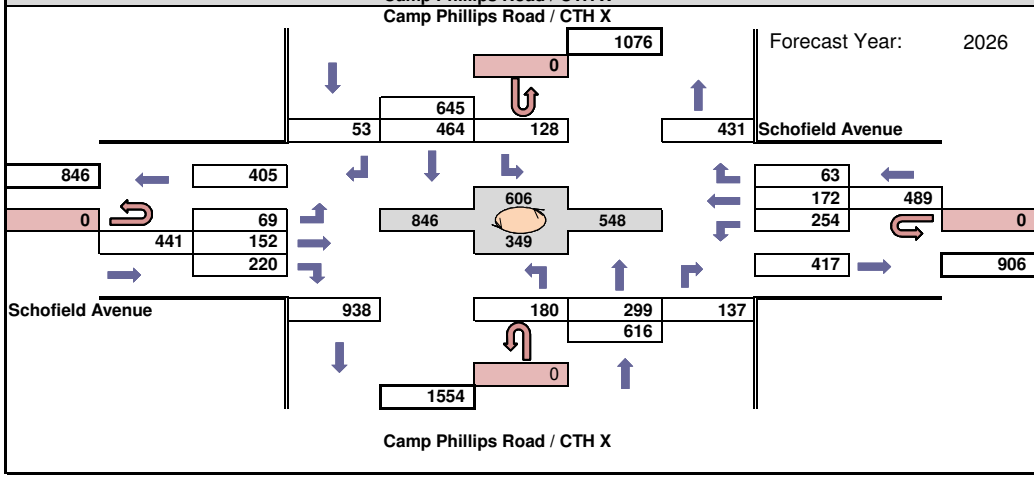
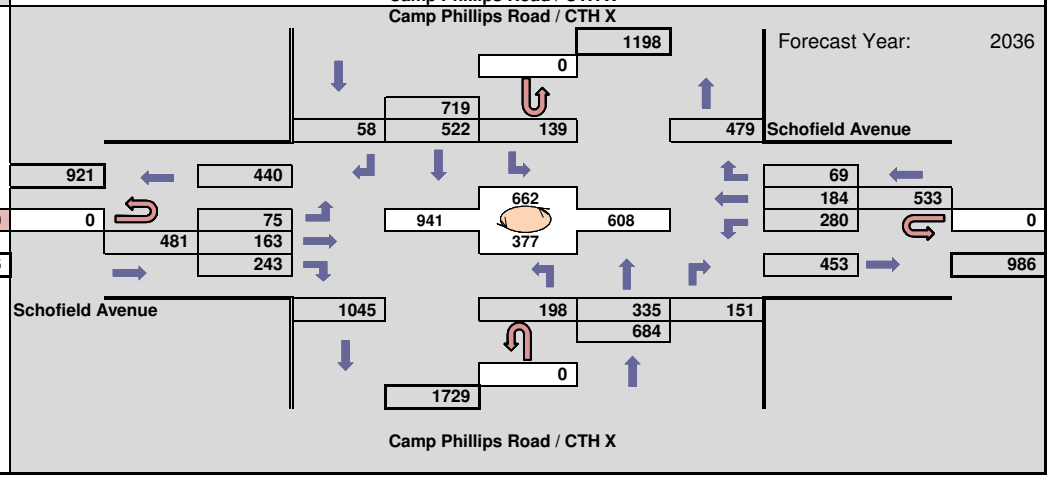
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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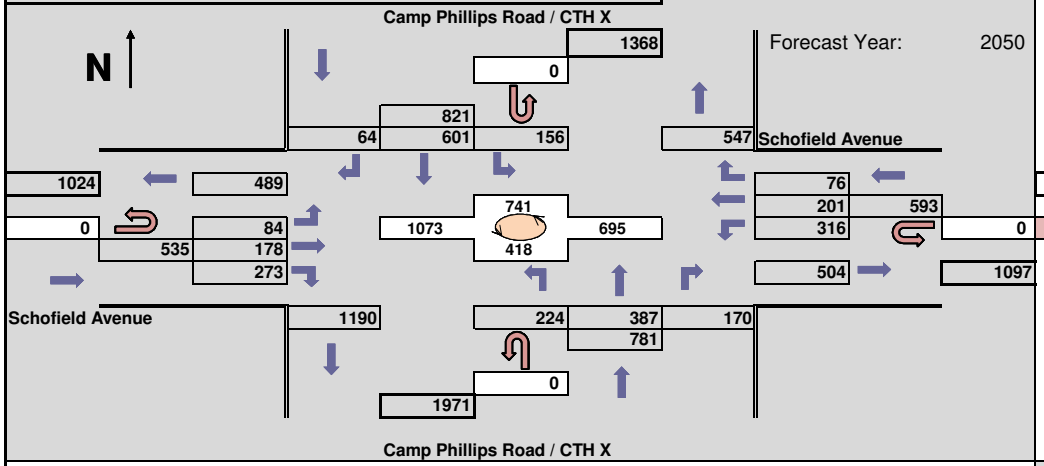
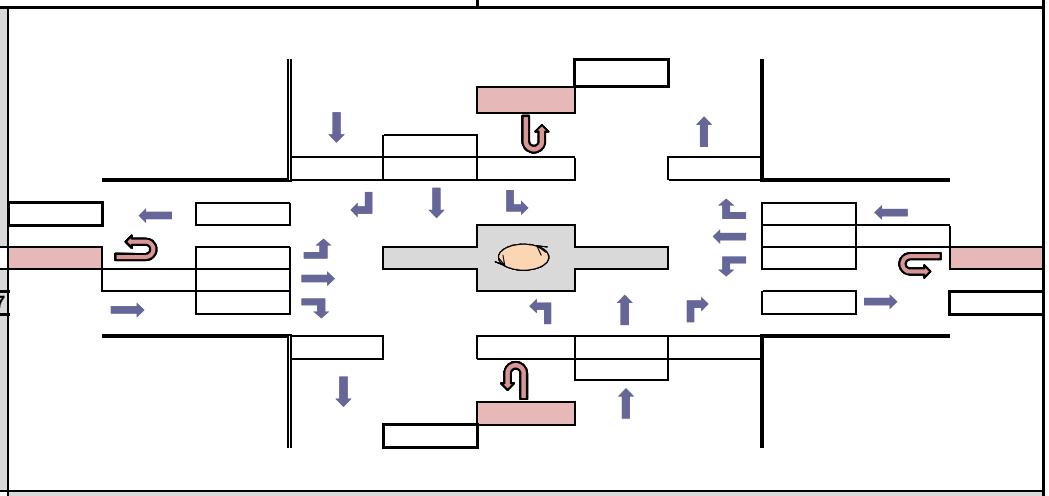
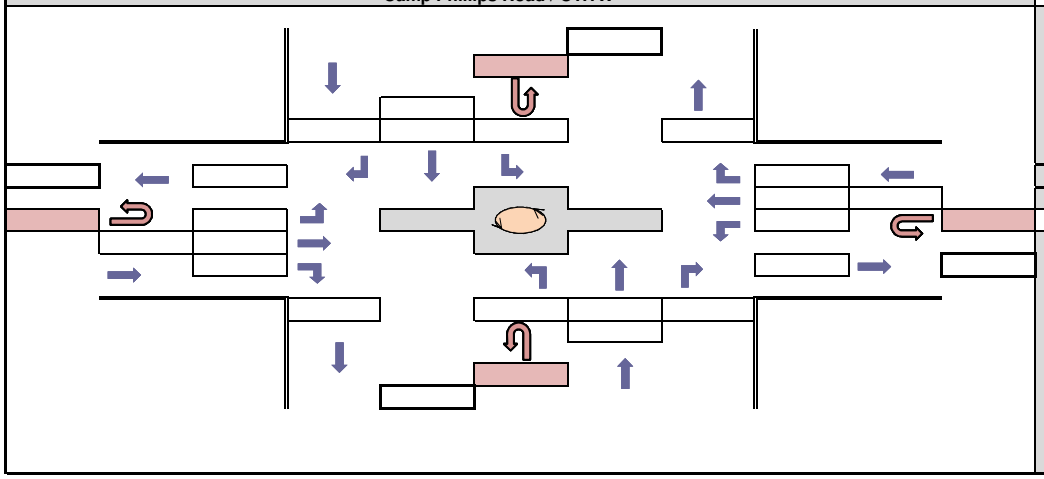
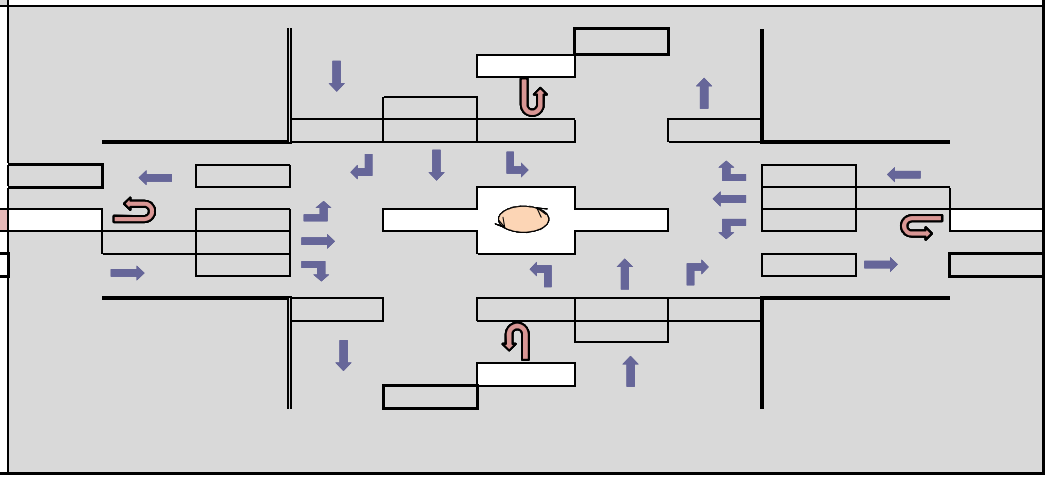
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:15-5:15pm

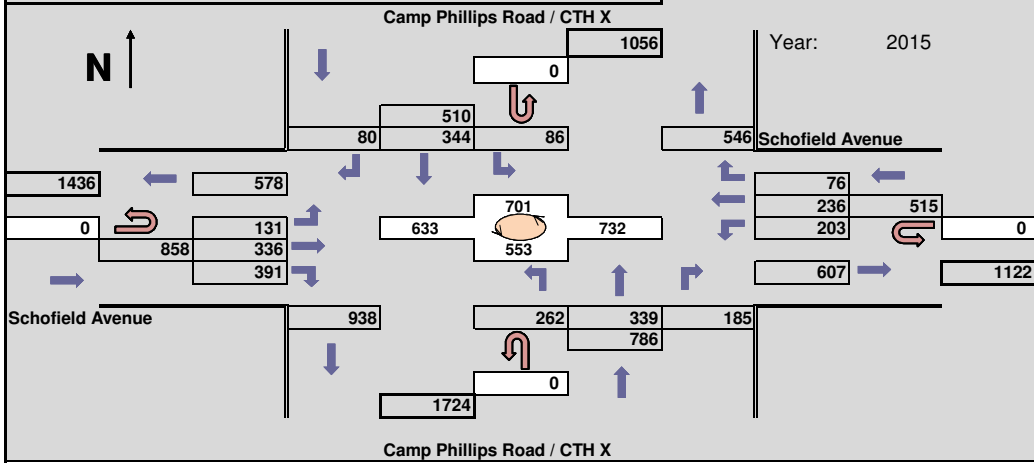
Forecast Completed: 4/12/2016

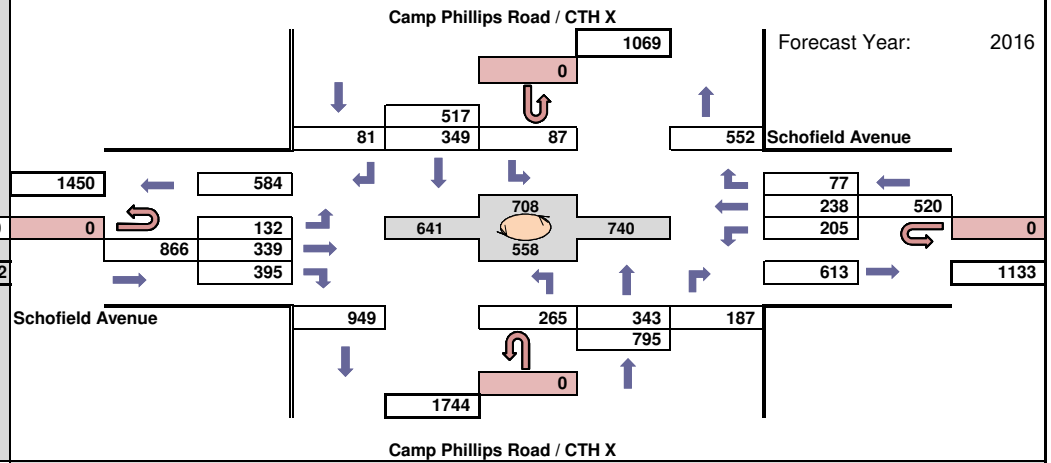
Design Hour Turning Movement Data

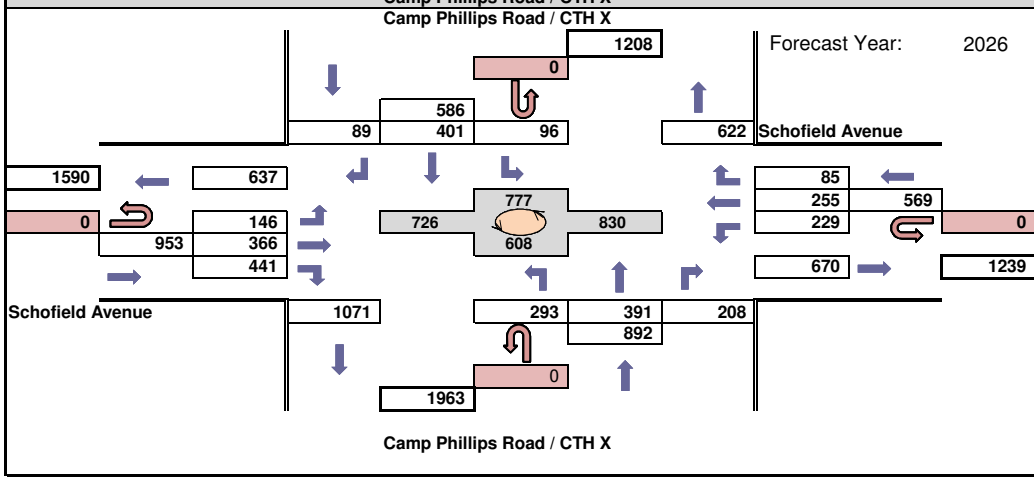
Project Description

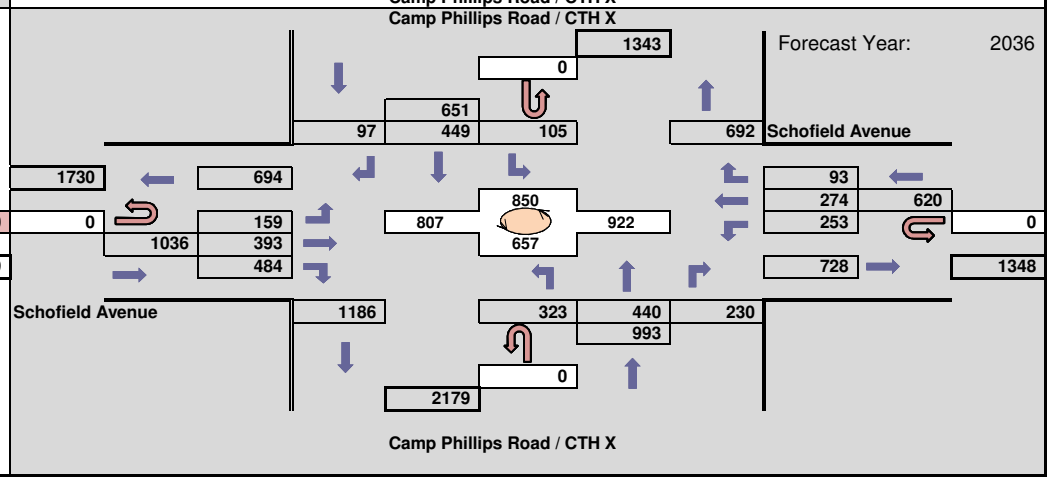
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Project Description

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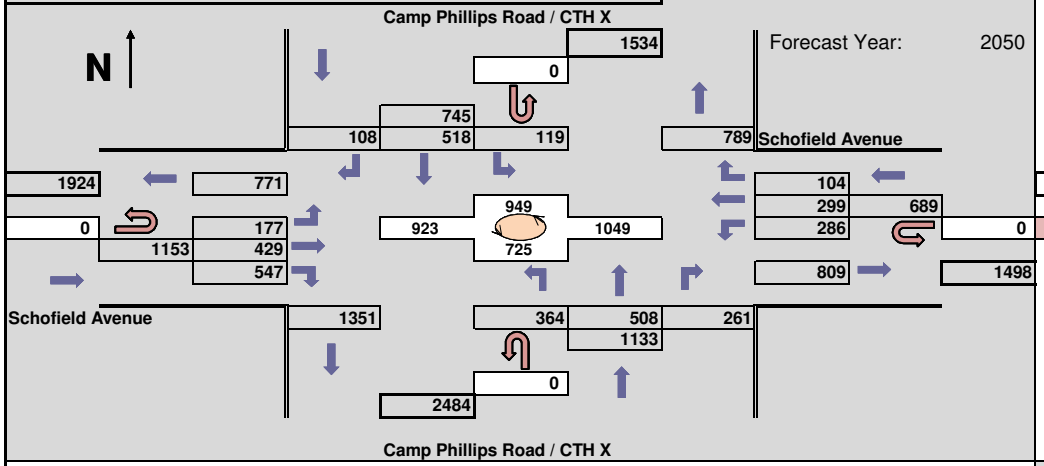
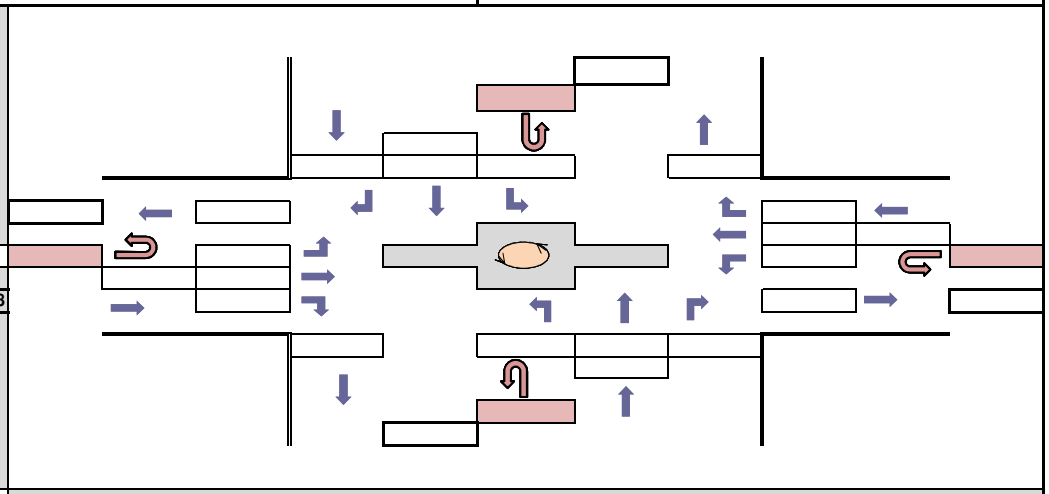
Location: Weston Ave - Schofield Ave

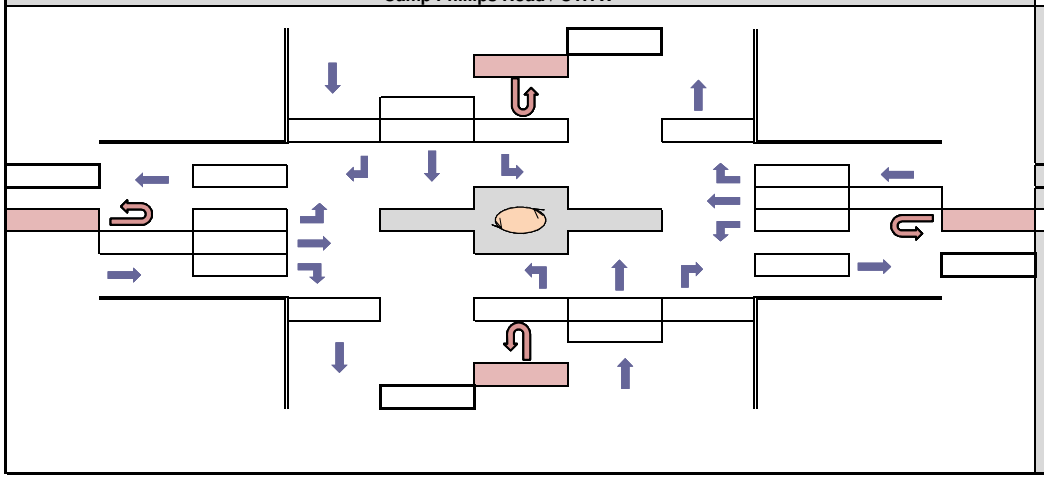
Design Hour Turning Movement Data

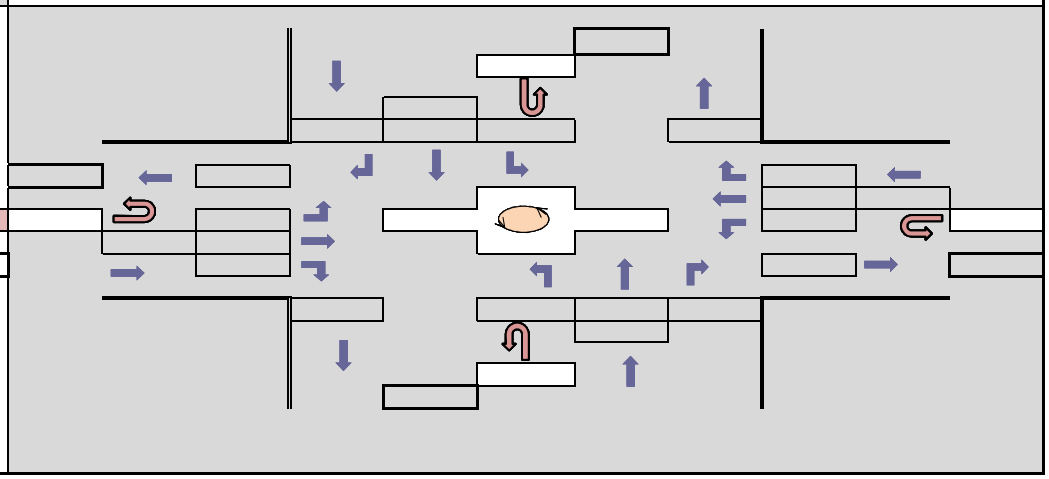
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

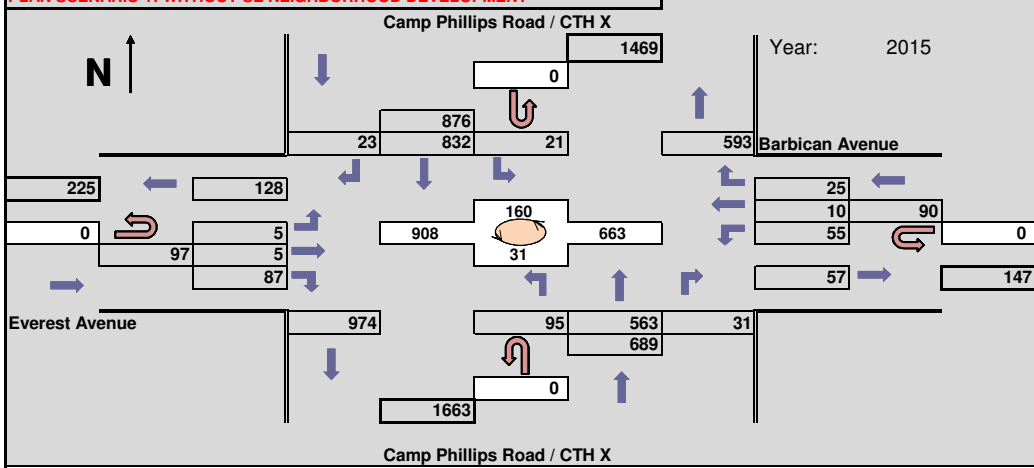
Forecast Completed: 4/12/2016

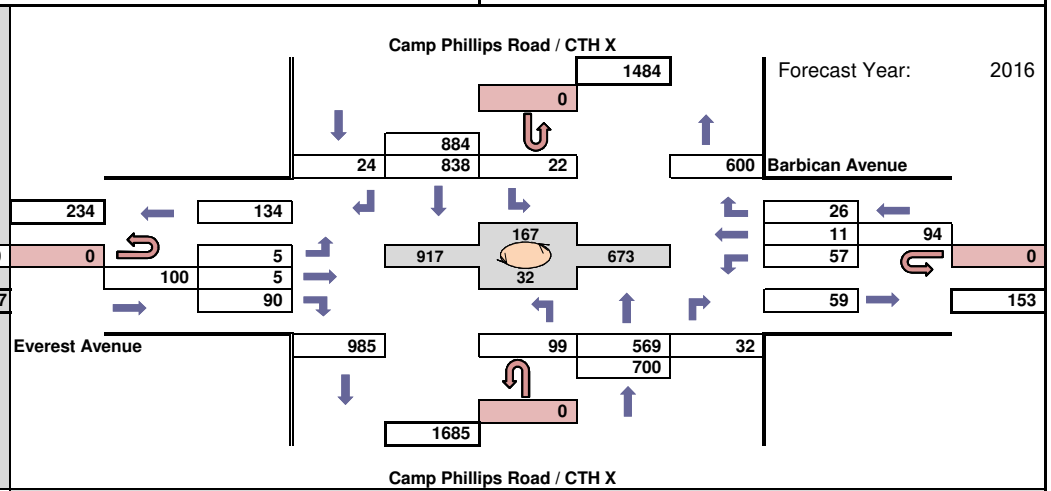
Design Hour Turning Movement Data

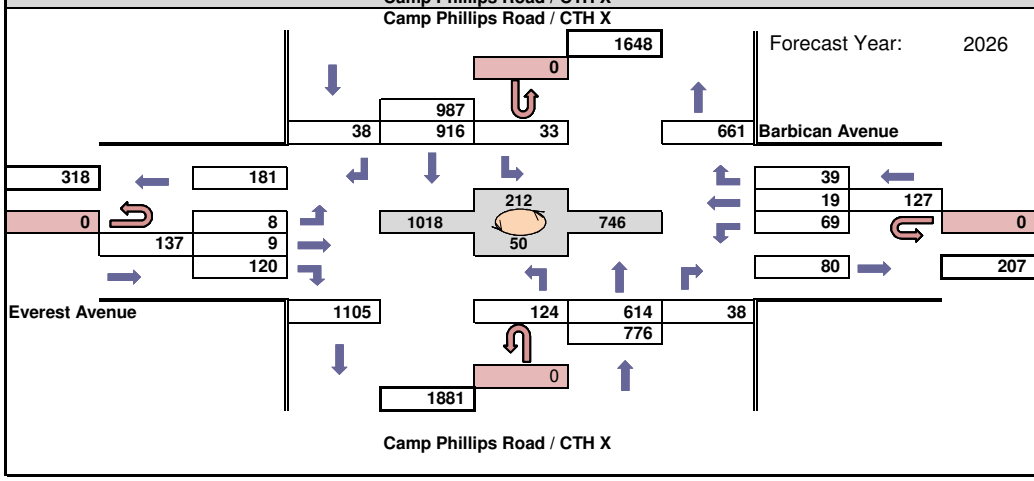
Project Description

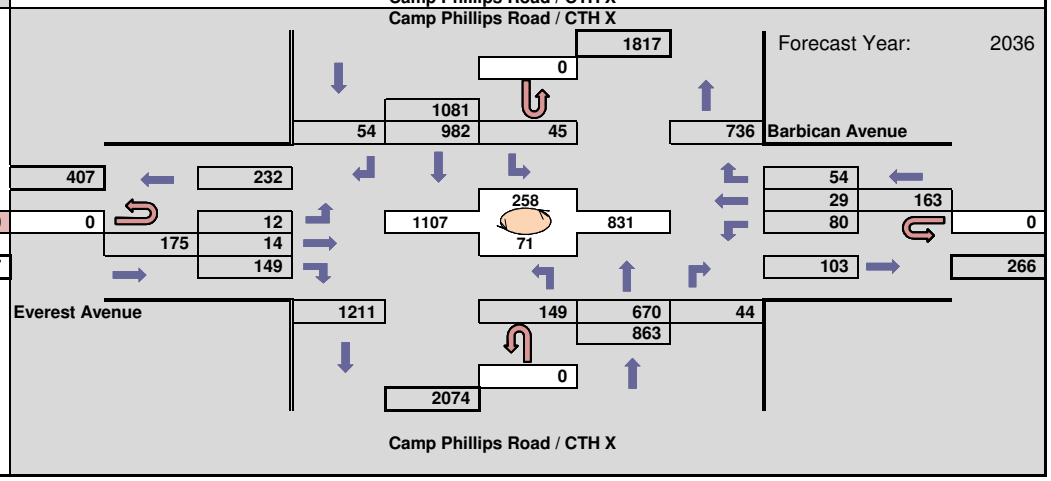
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

Forecast Completed: 4/12/2016

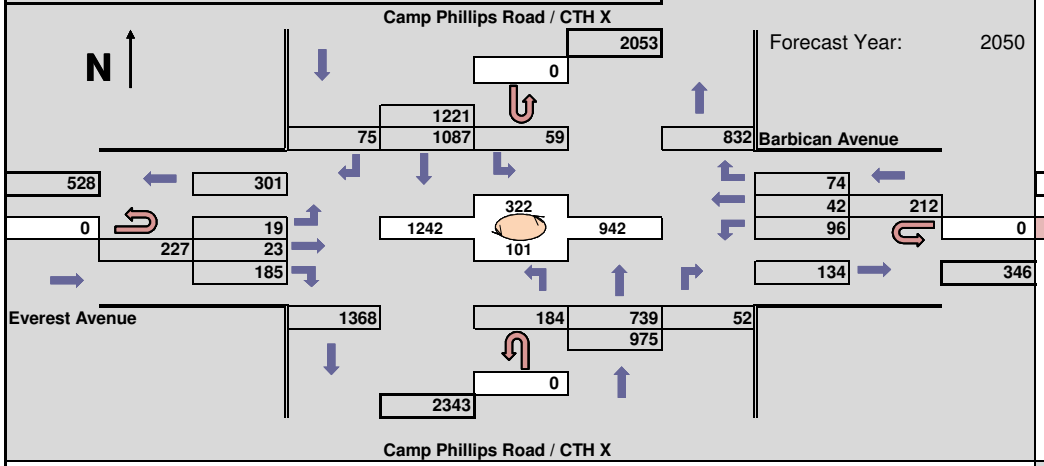
Project Description

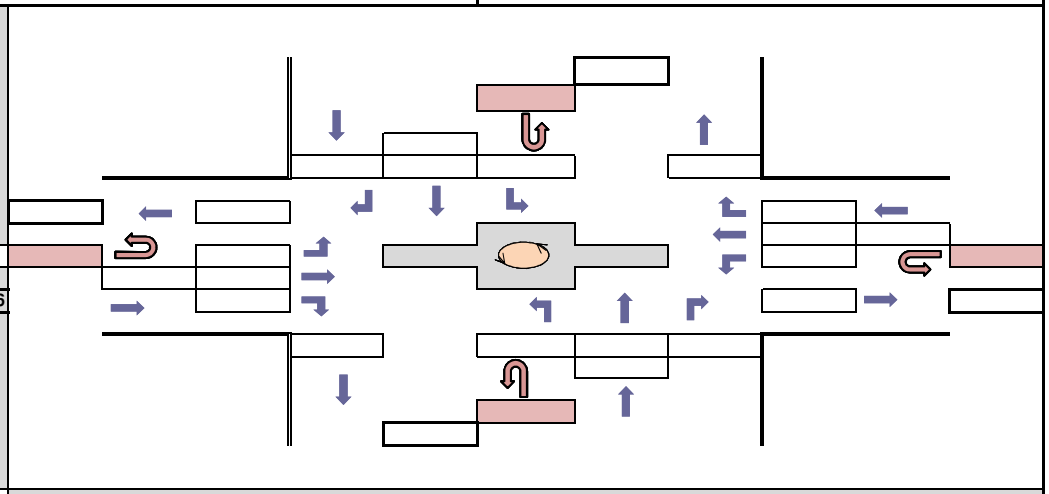
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

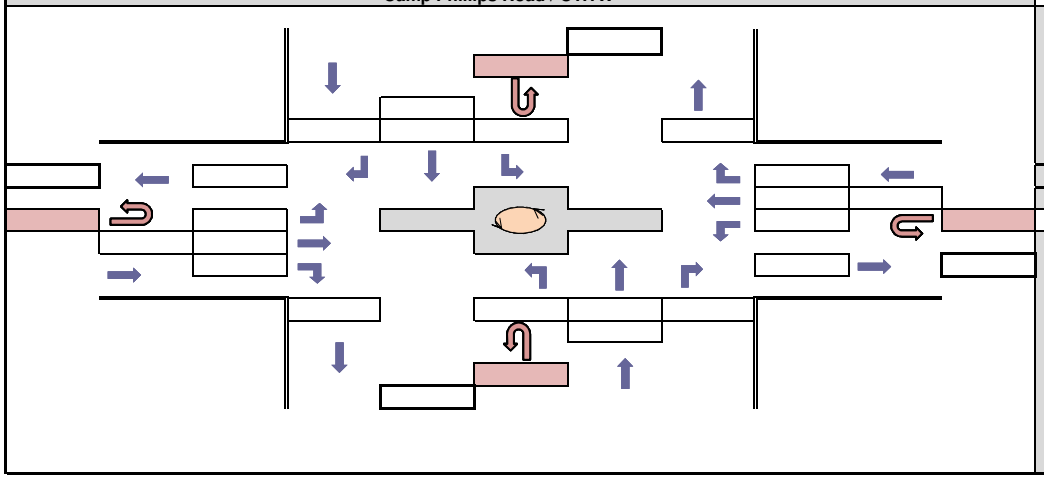
Design Hour Turning Movement Data

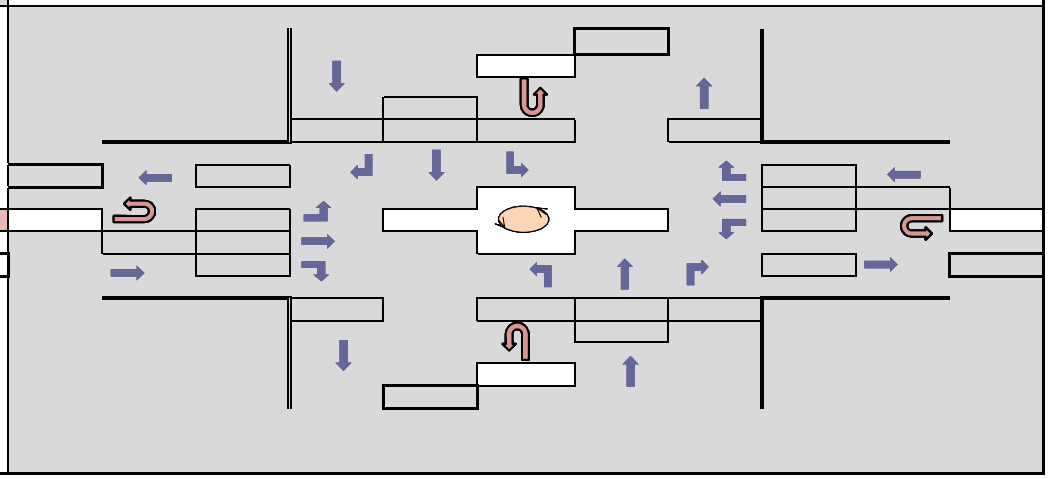
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:15-5:15pm

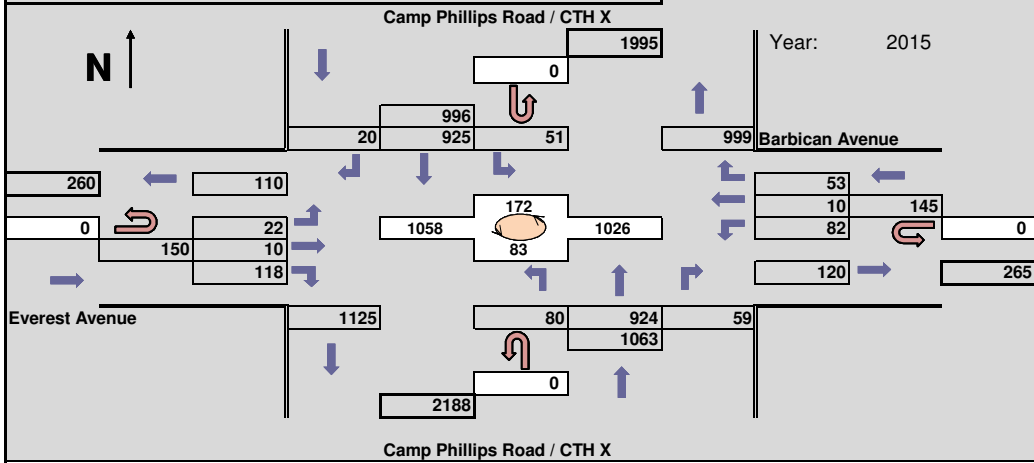
Forecast Completed: 4/12/2016

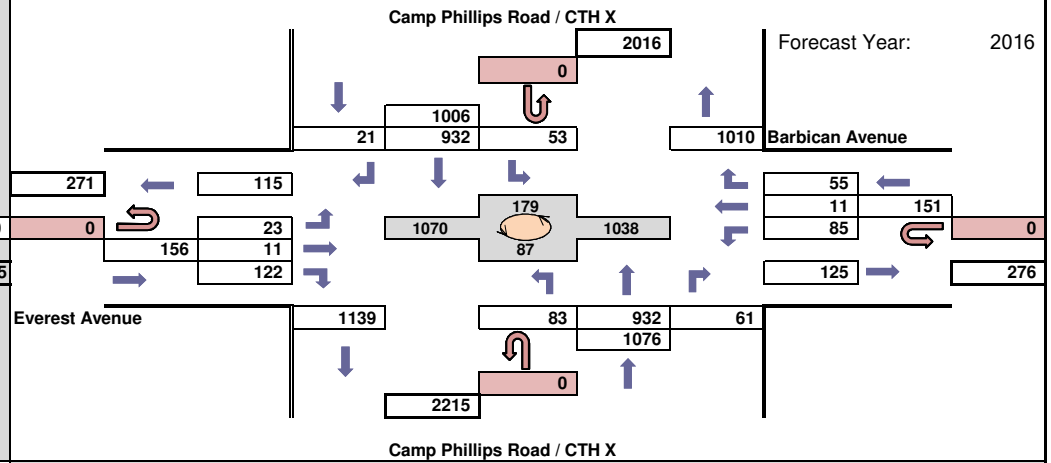
Design Hour Turning Movement Data

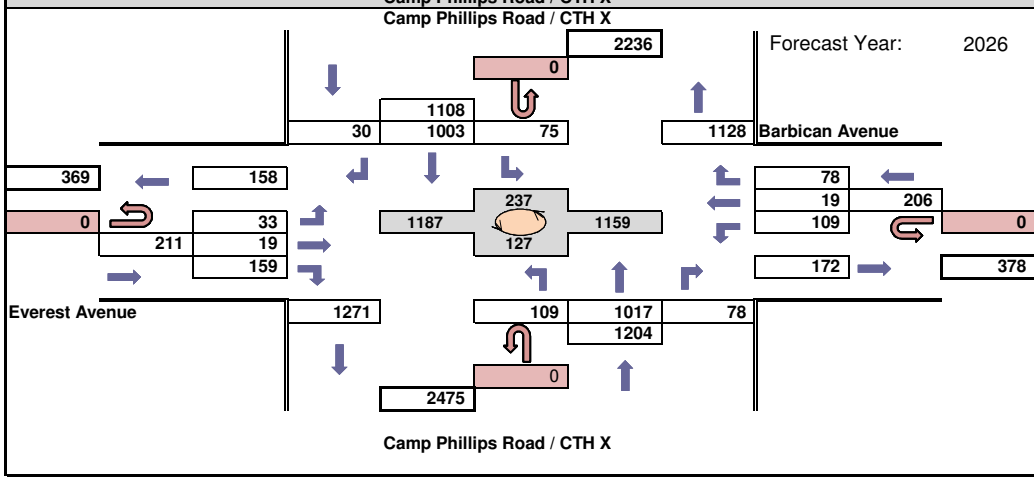
Project Description

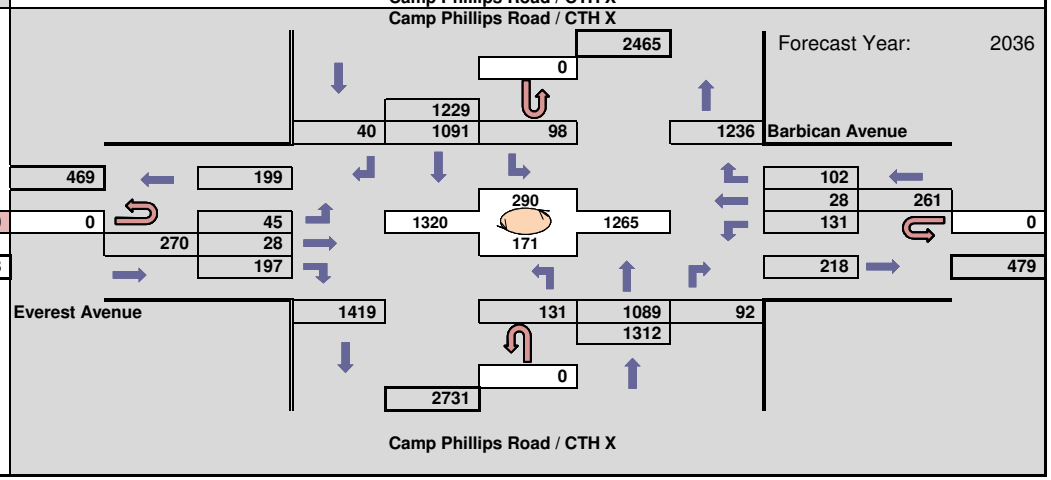
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Design Hour Turning Movement Data

Project Description

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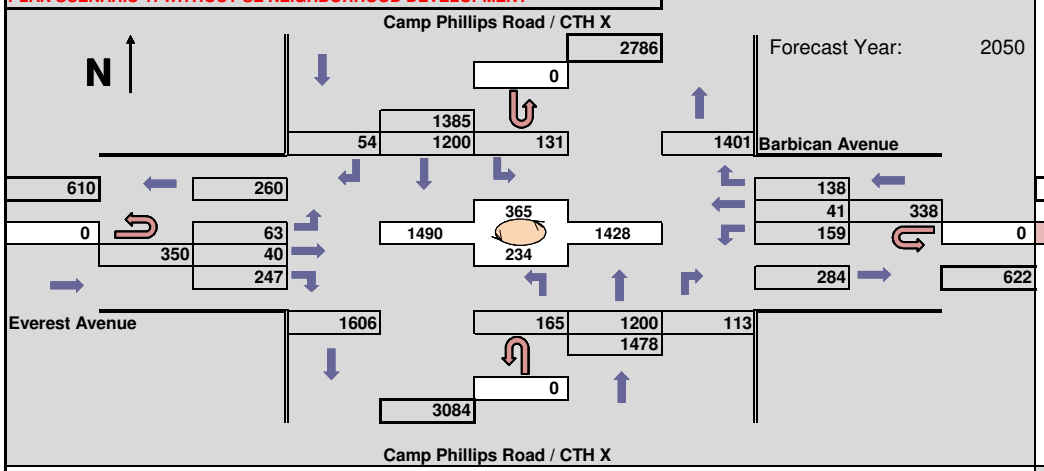
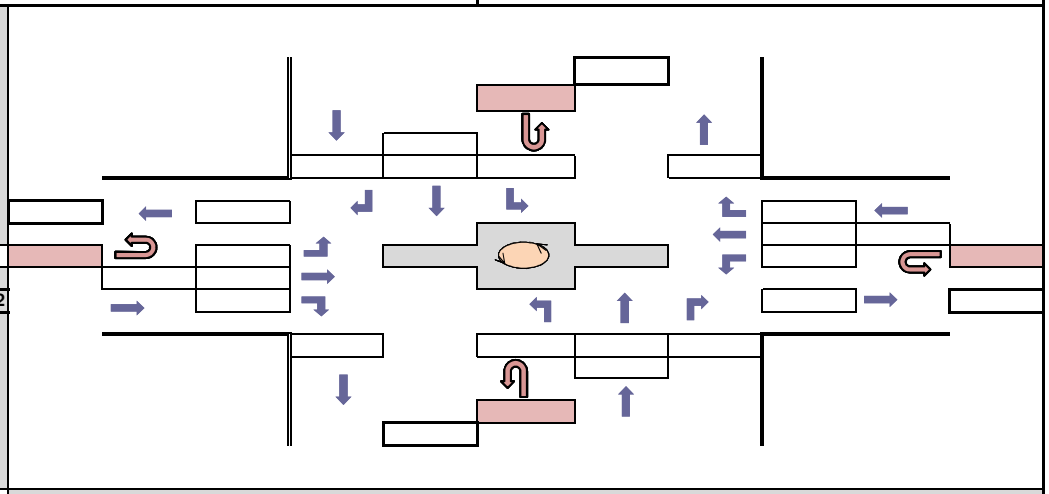
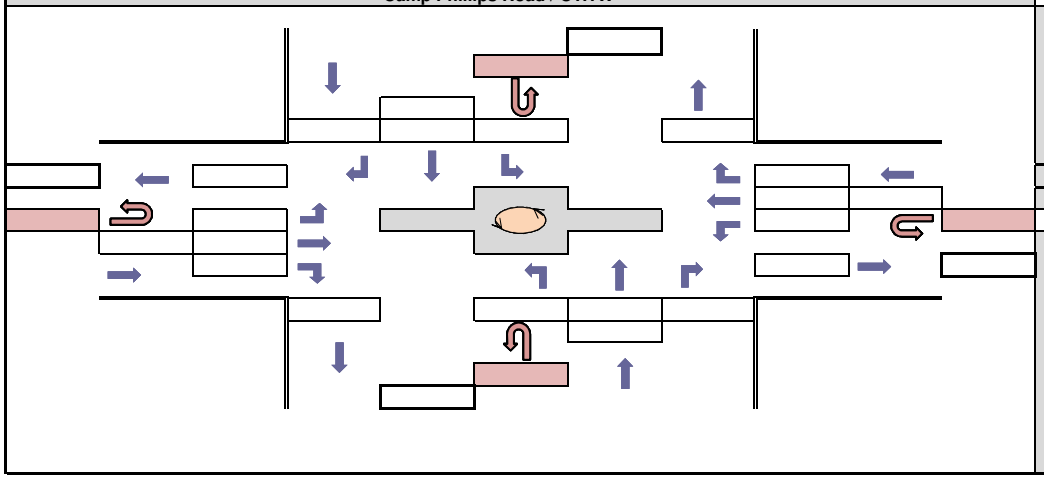
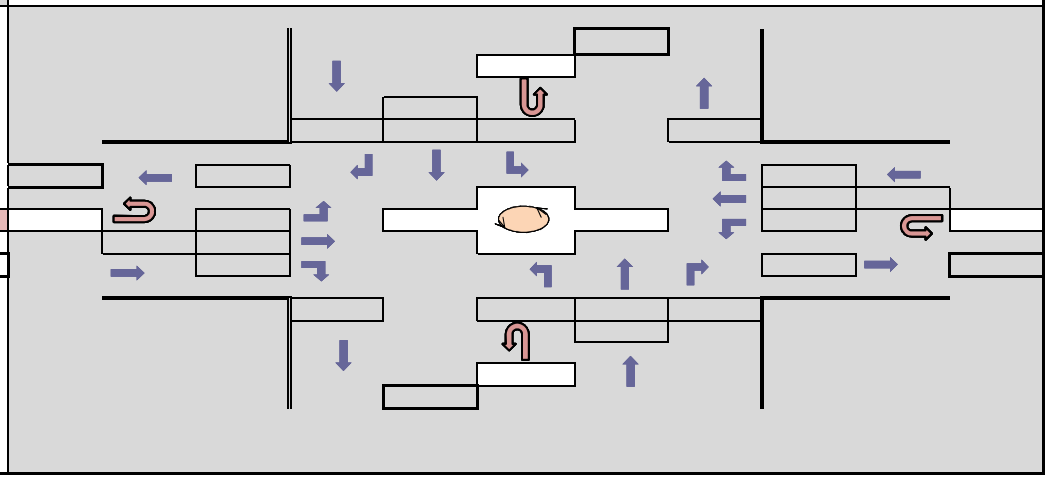
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

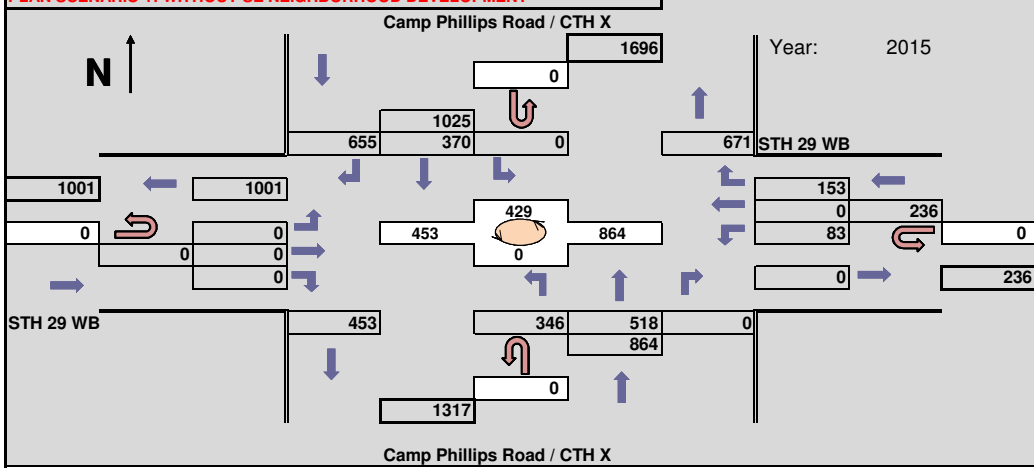
Forecast Completed: 4/12/2016

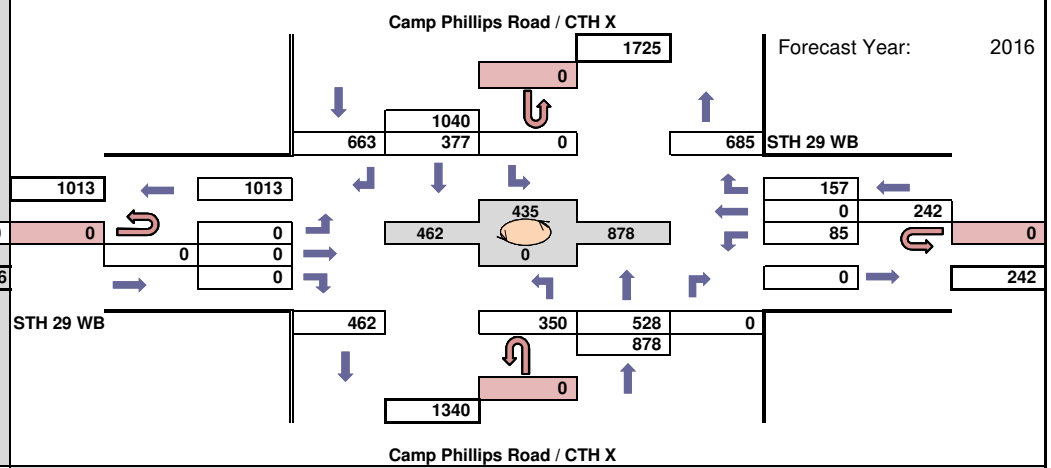
Design Hour Turning Movement Data

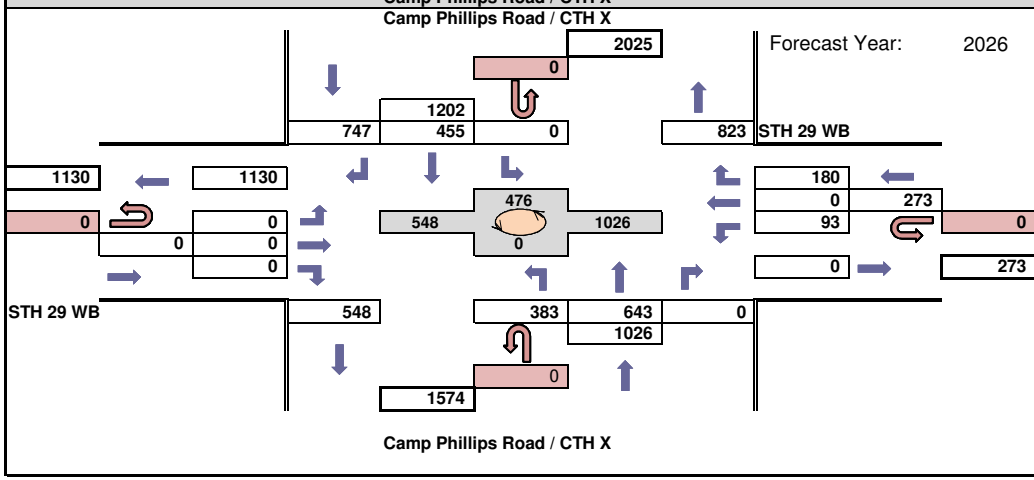
Project Description

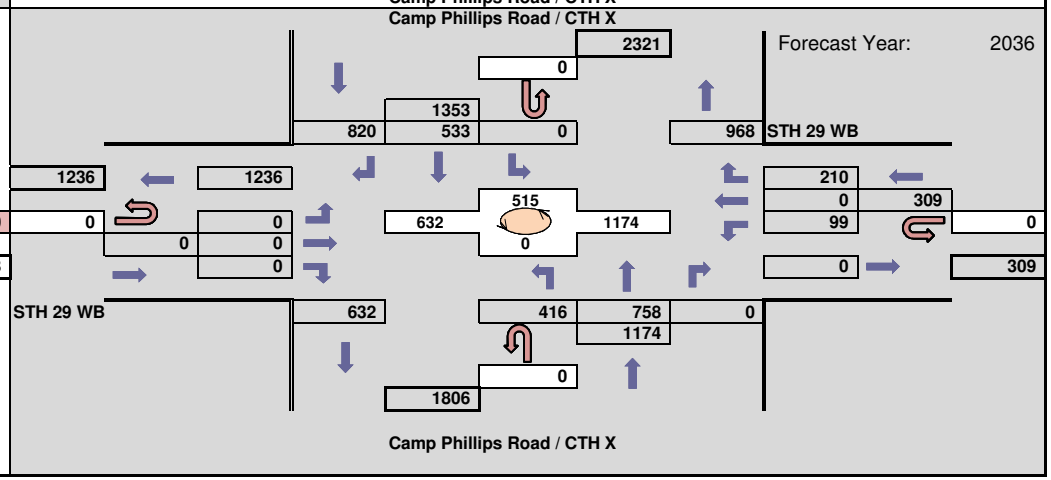
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

Forecast Completed: 4/12/2016

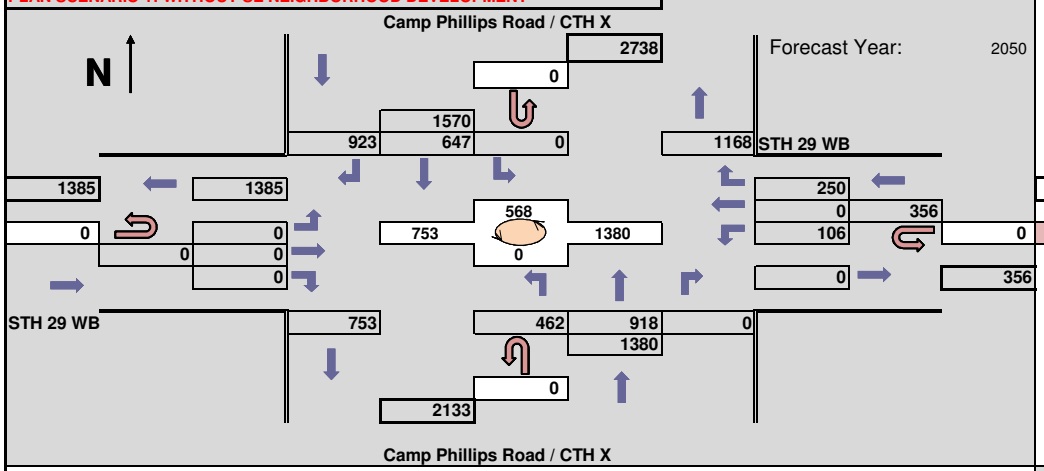
Project Description

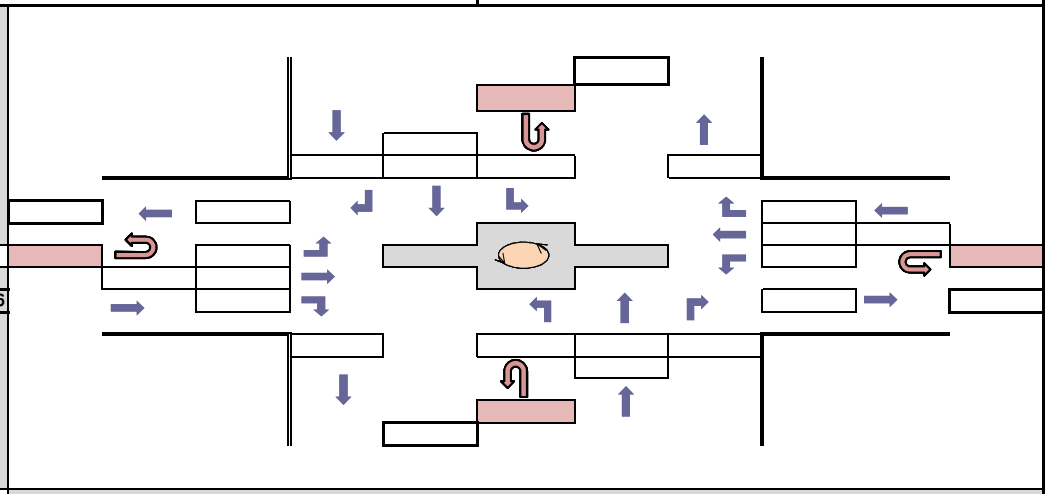
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

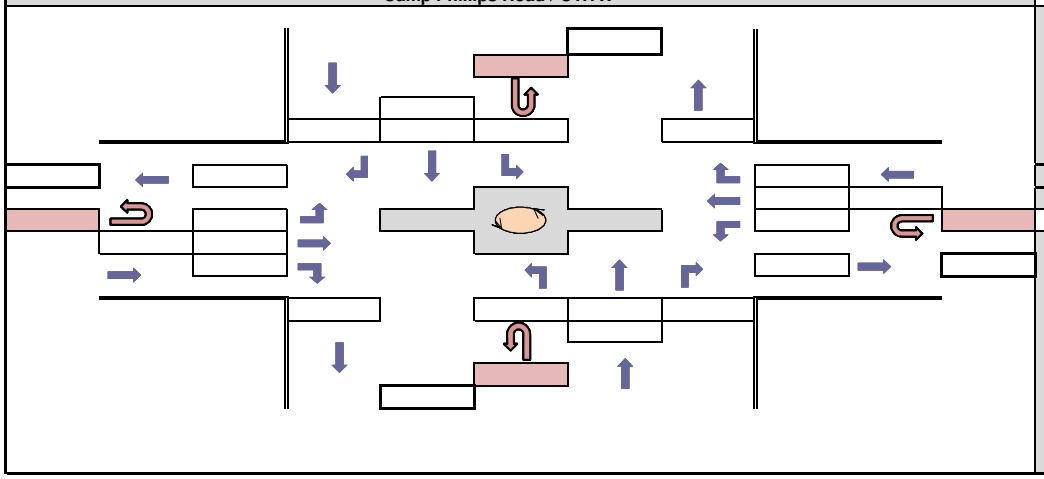
Design Hour Turning Movement Data

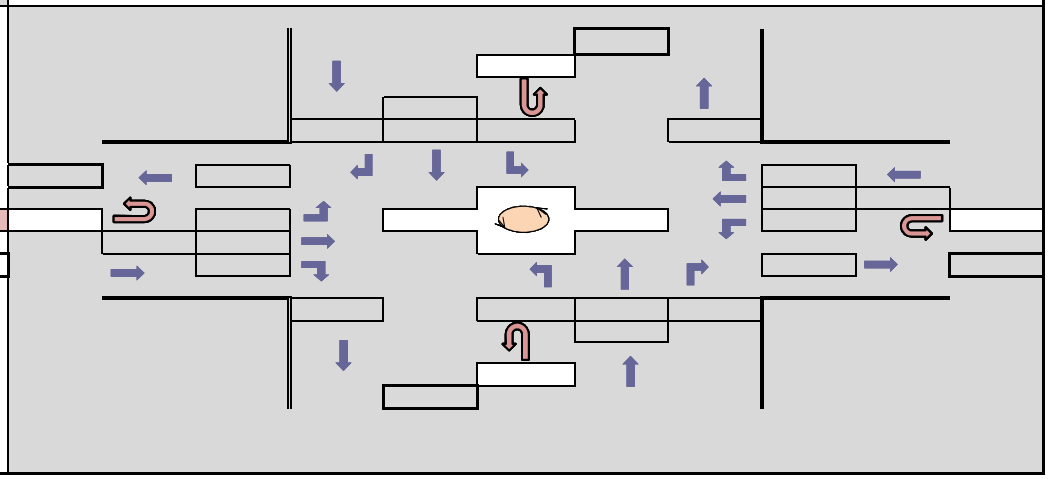
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

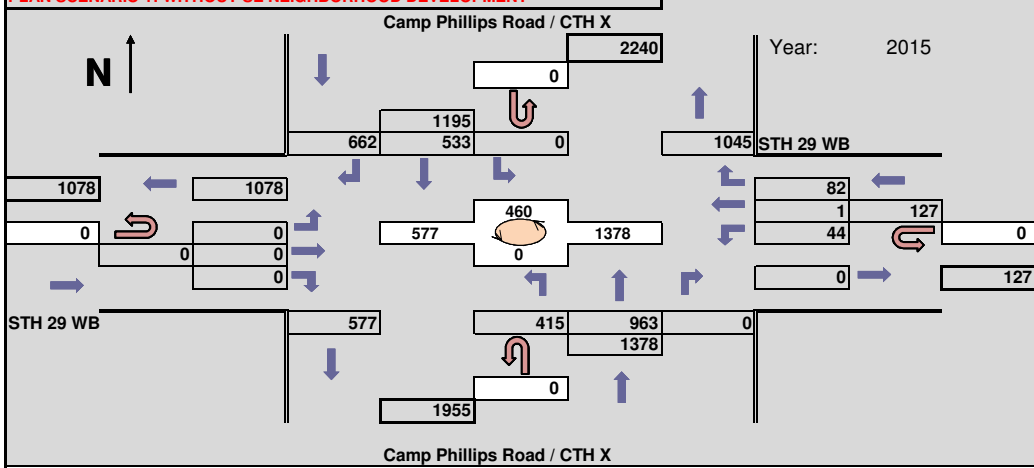
Forecast Completed: 4/12/2016

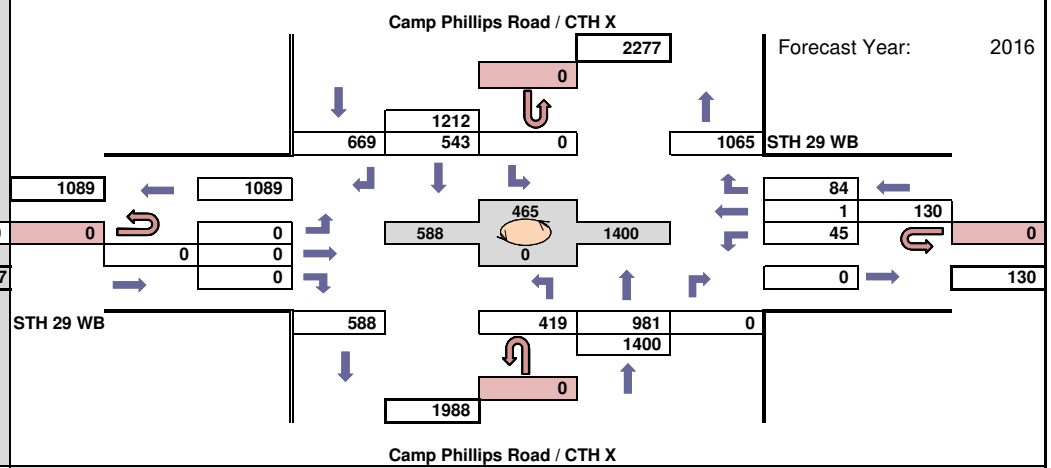
Design Hour Turning Movement Data

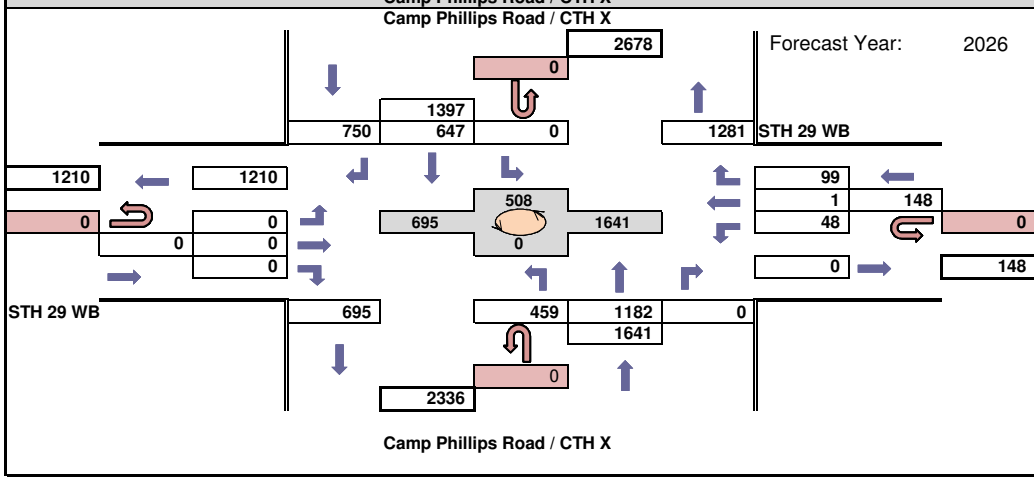
Project Description

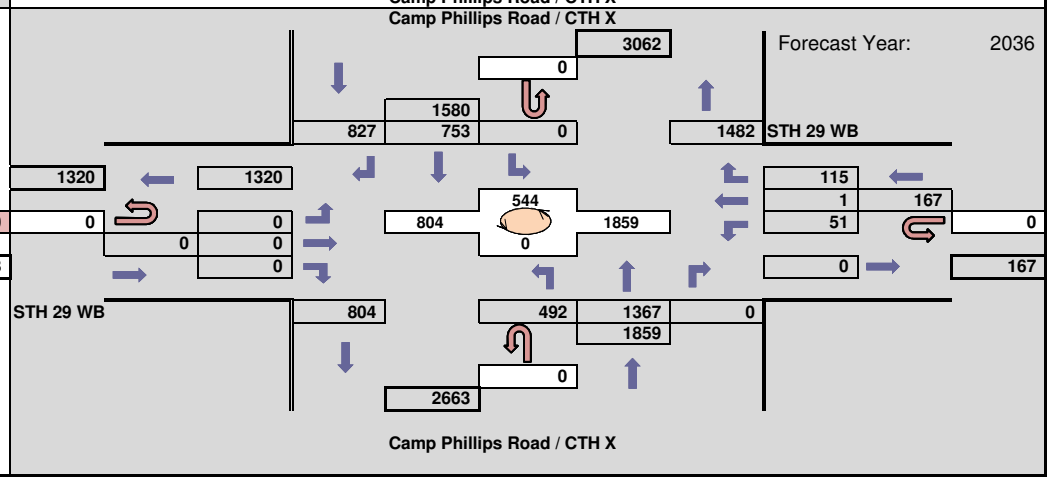
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Indicates roundabout

Design Hour: 4:30-5:30pm

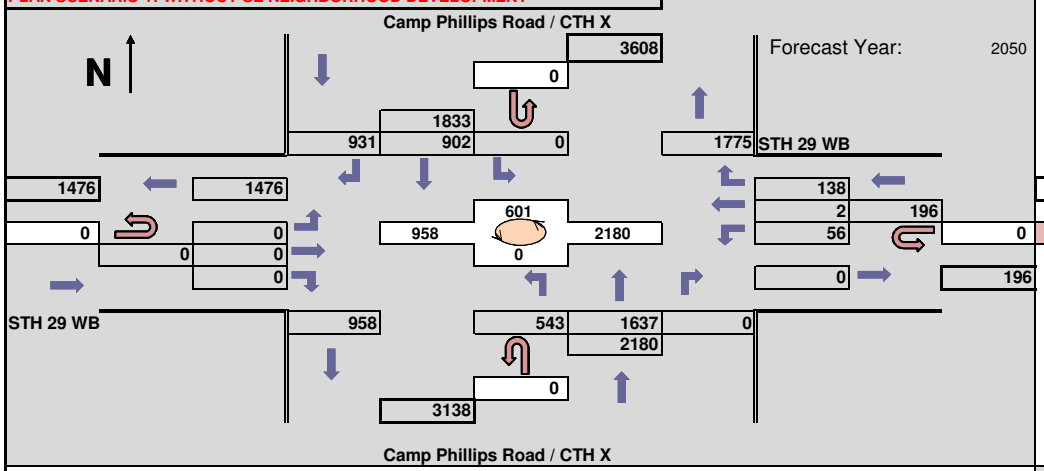
Forecast Completed: 4/12/2016

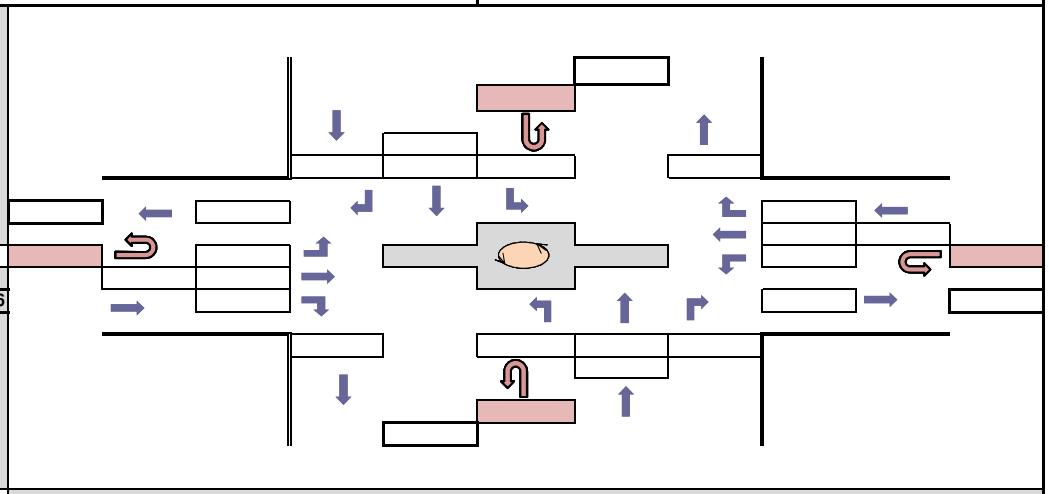
Design Hour Turning Movement Data

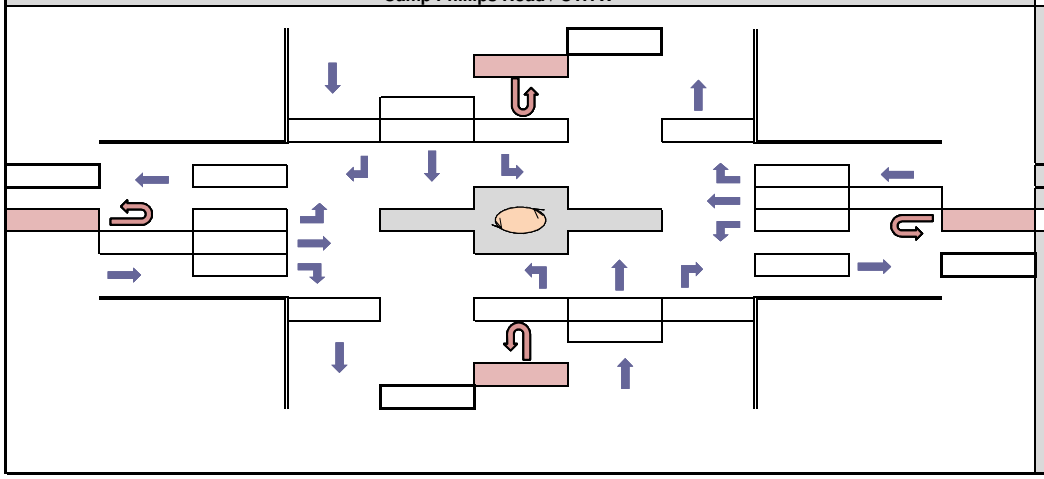
Project Description

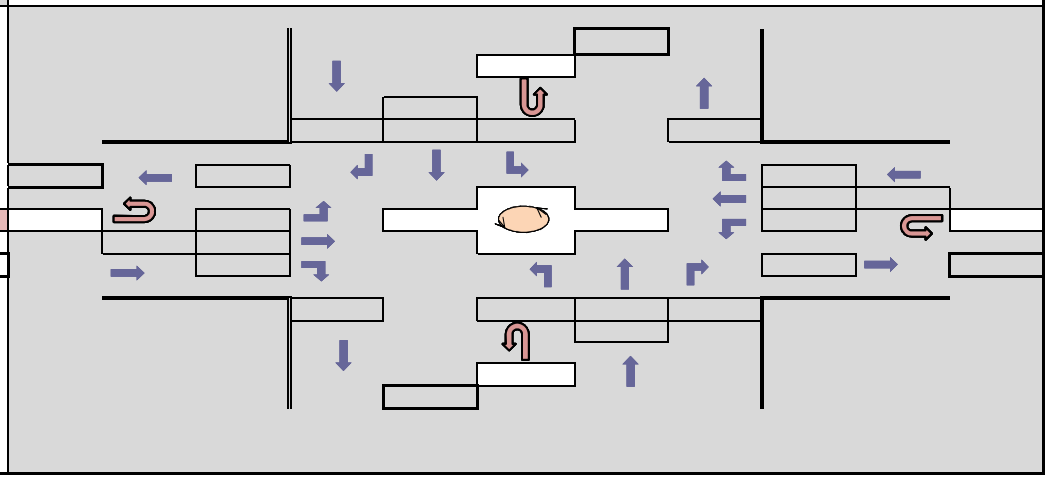
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

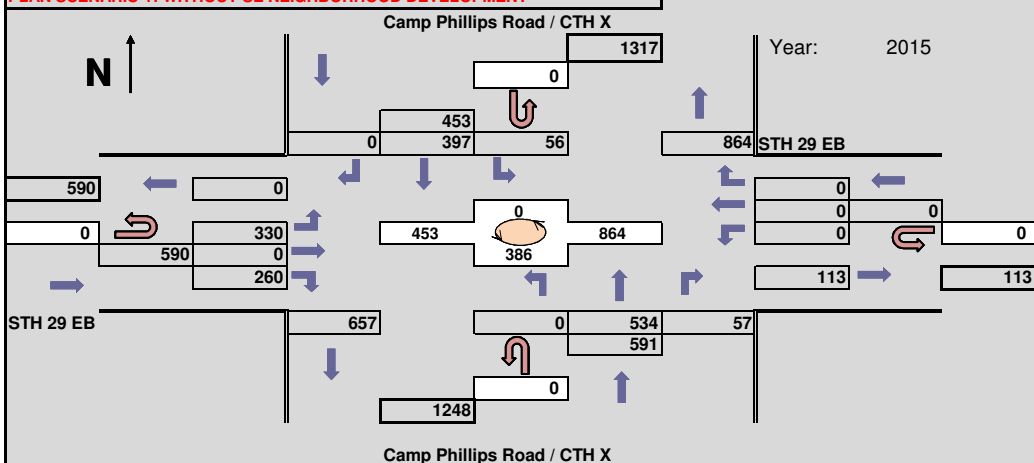
Forecast Completed: 4/12/2016

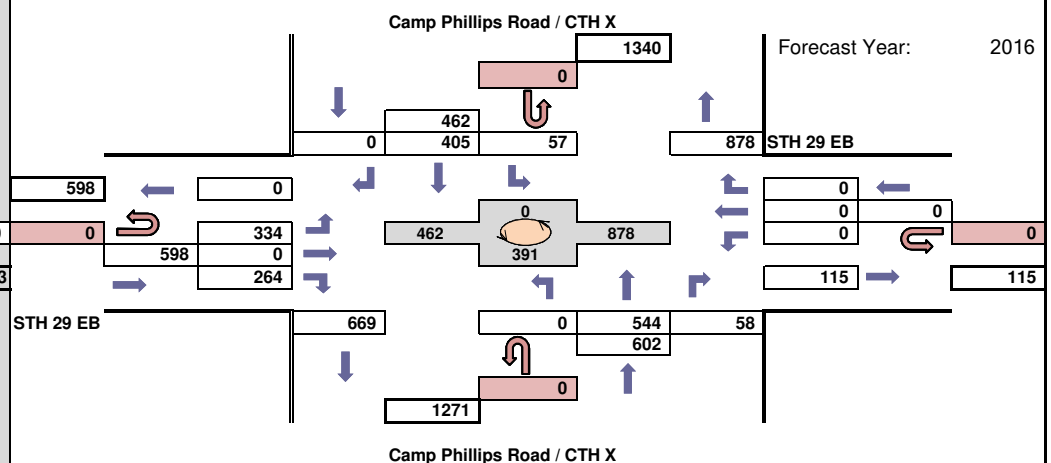
Design Hour Turning Movement Data

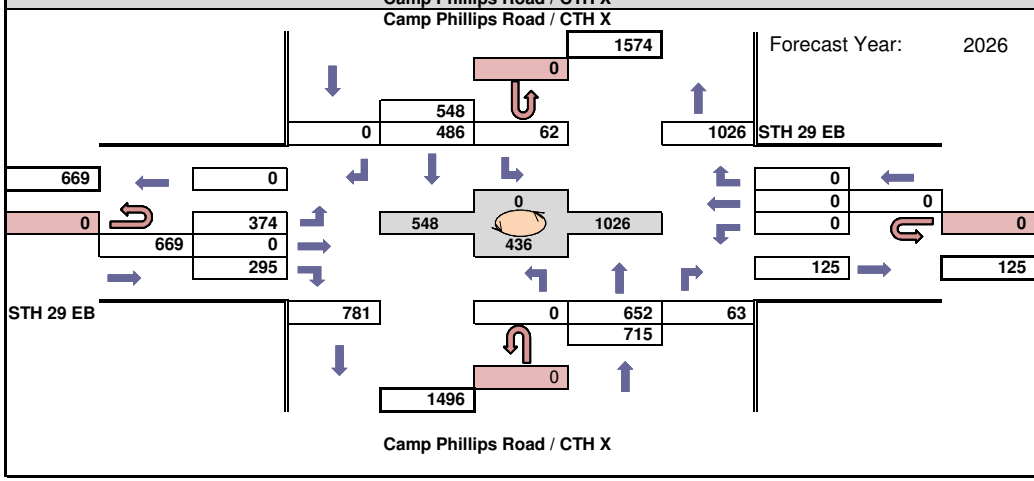
Project Description

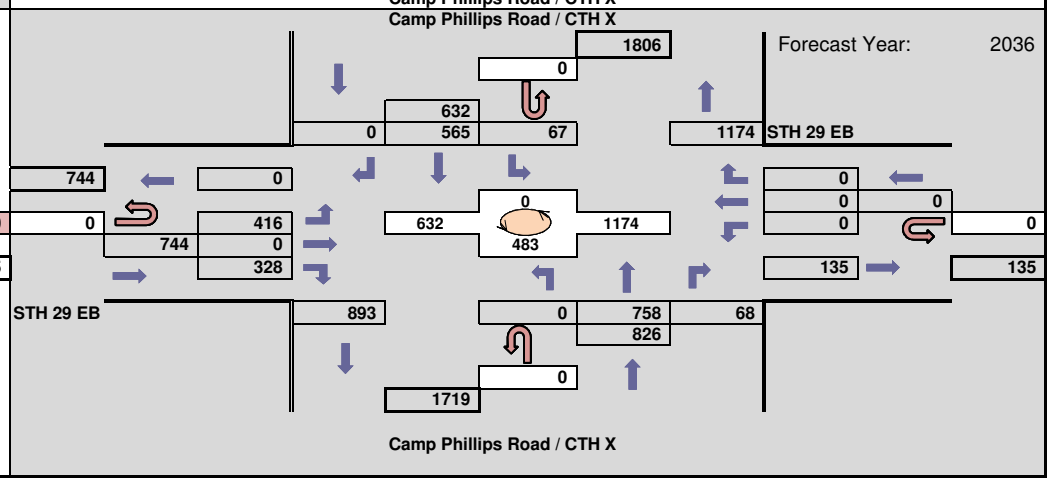
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Project Description

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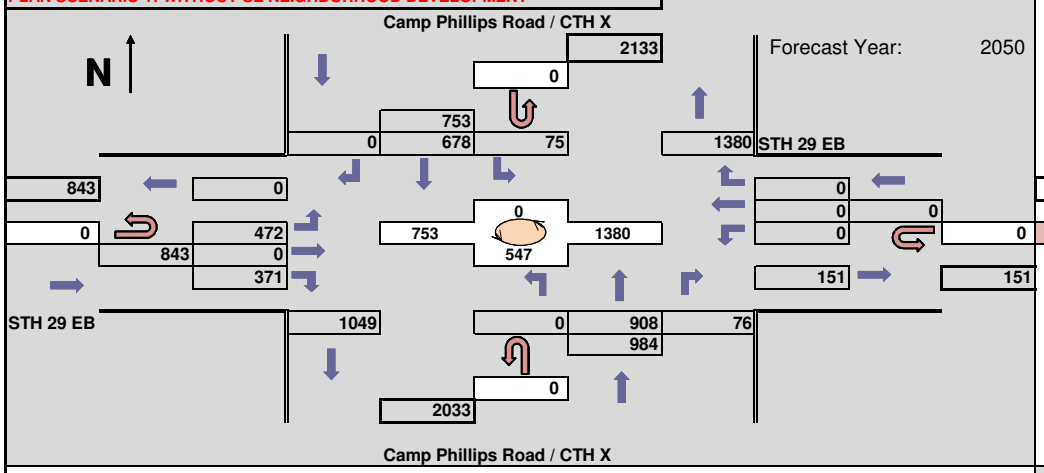
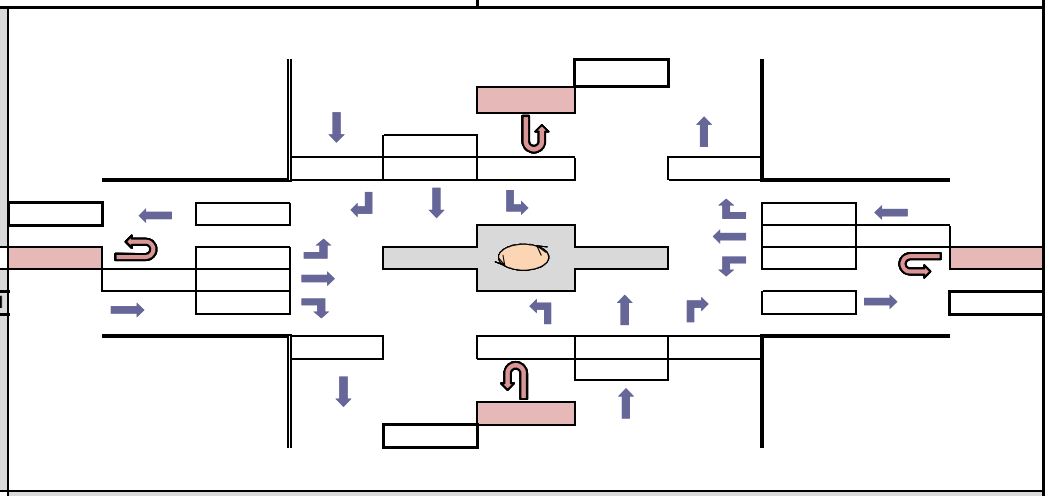
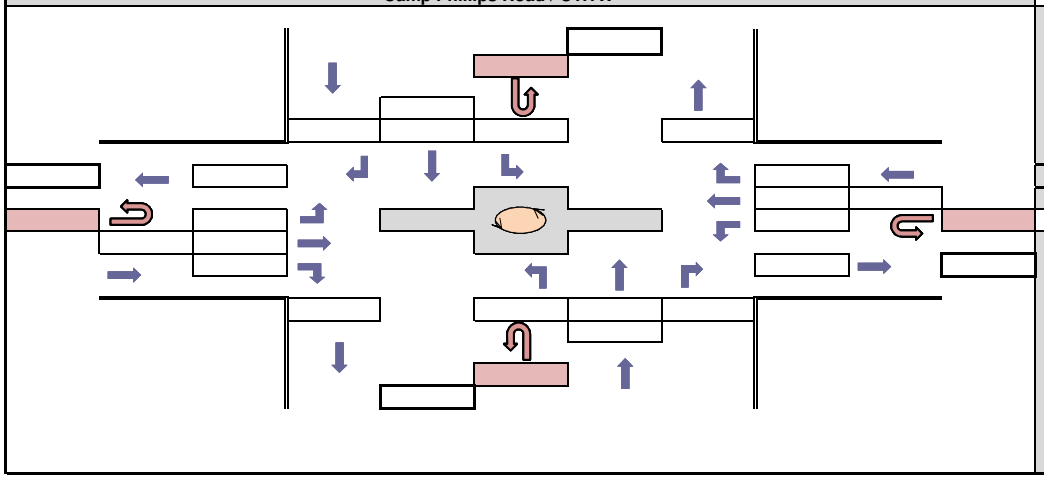
Design Hour Turning Movement Data

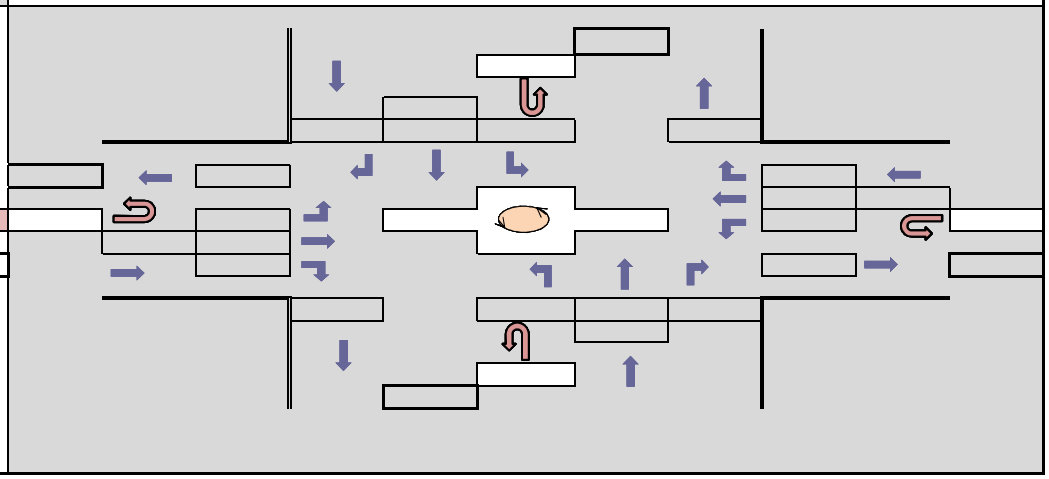
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

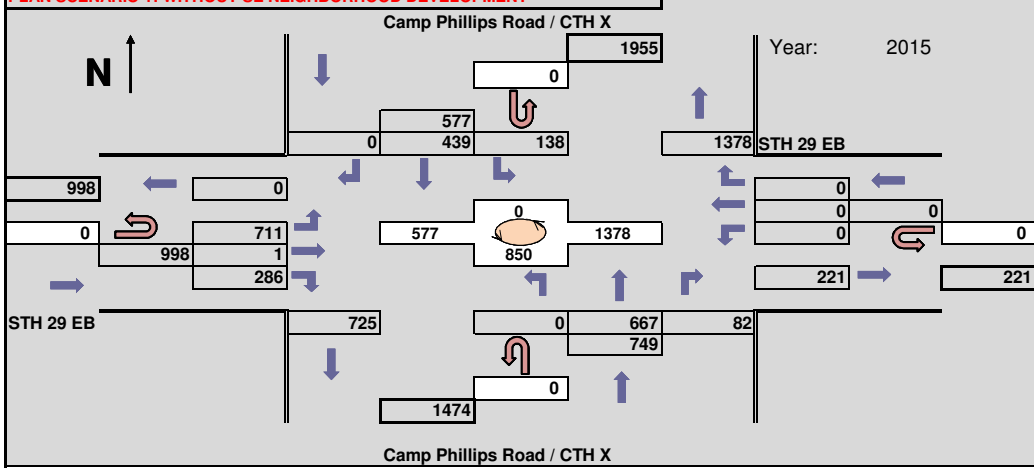
Forecast Completed: 4/12/2016

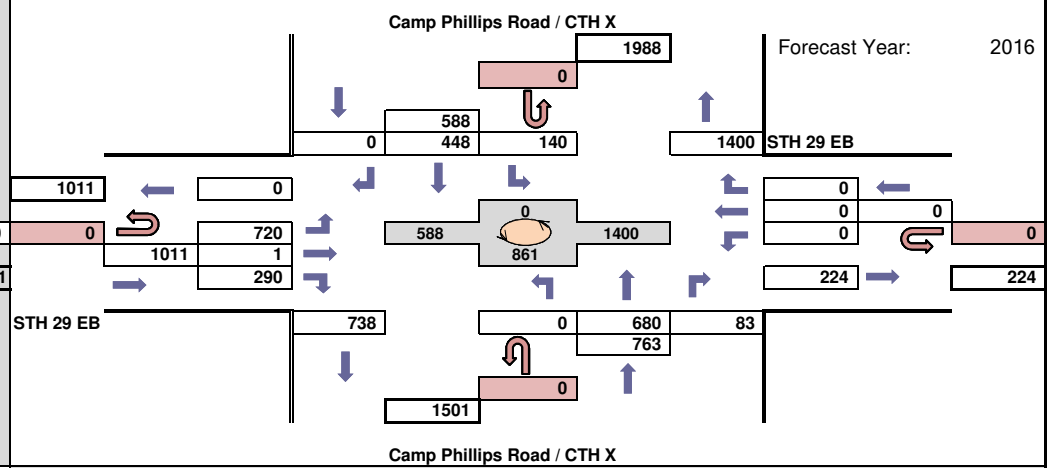
Design Hour Turning Movement Data

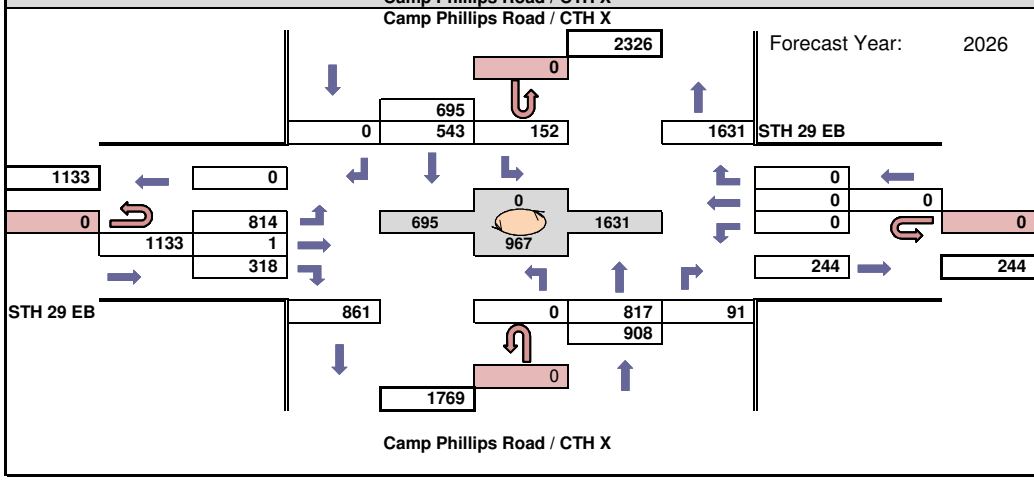
Project Description

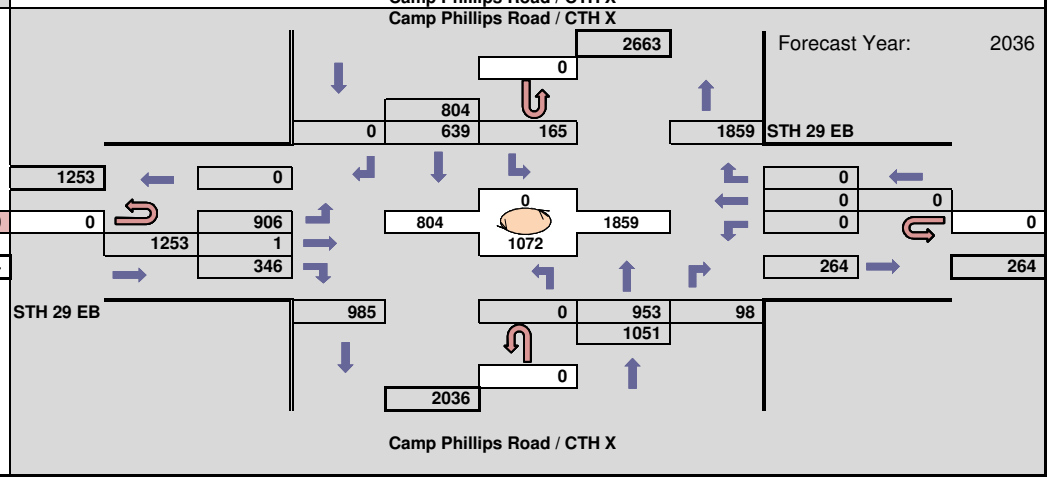
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Forecast Completed: 4/12/2016

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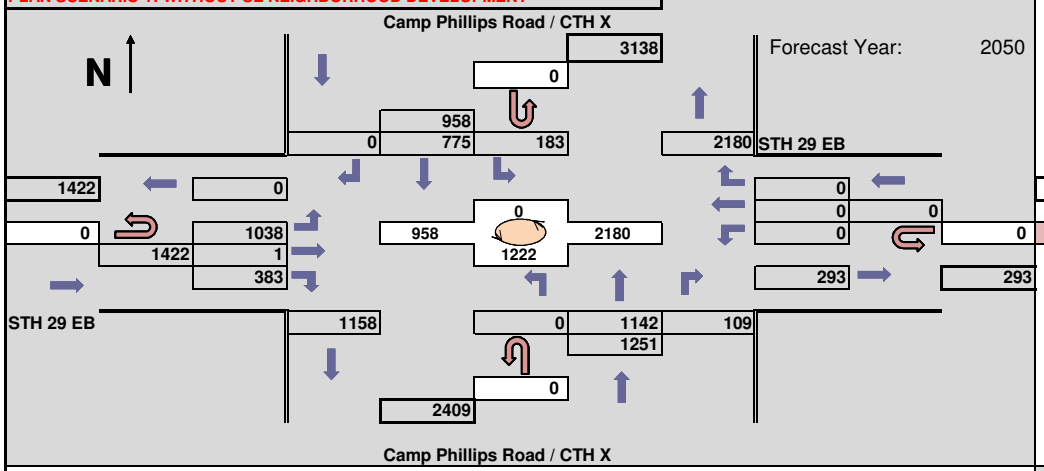
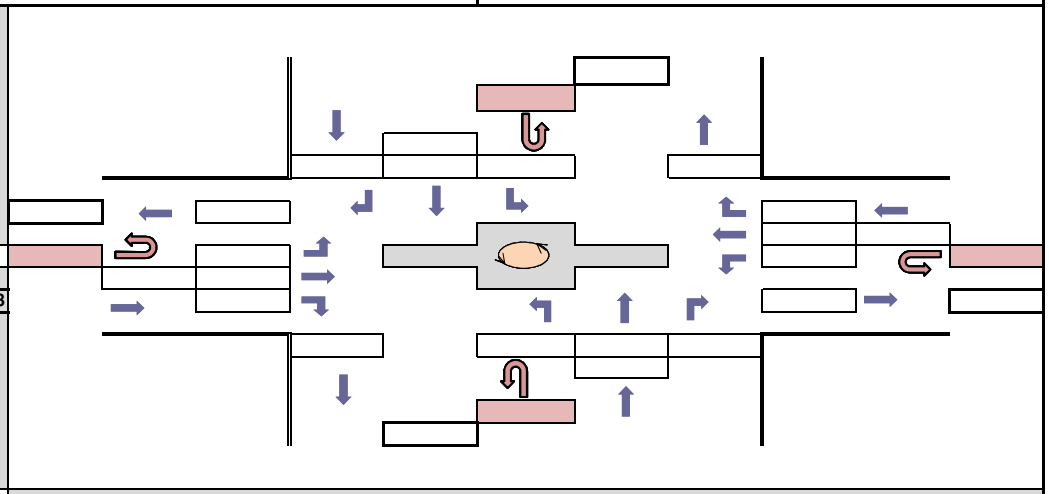
Location: Weston Ave - Schofield Ave

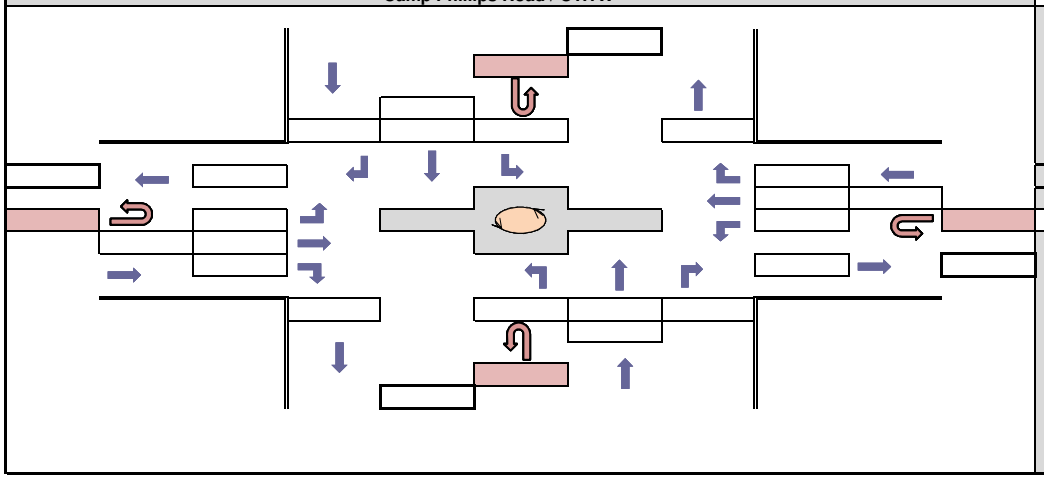
Design Hour Turning Movement Data

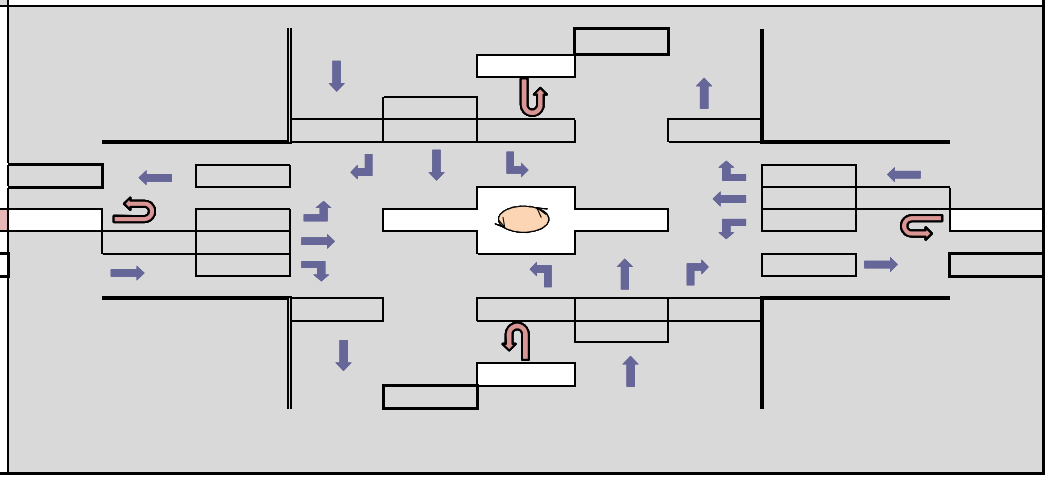
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Forecast by: Vu Dang
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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

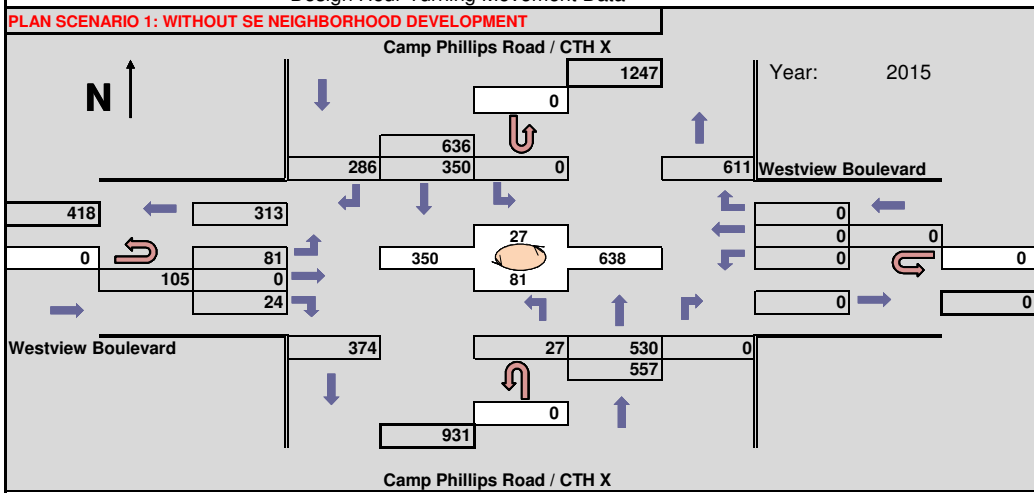
Forecast Completed: 4/12/2016

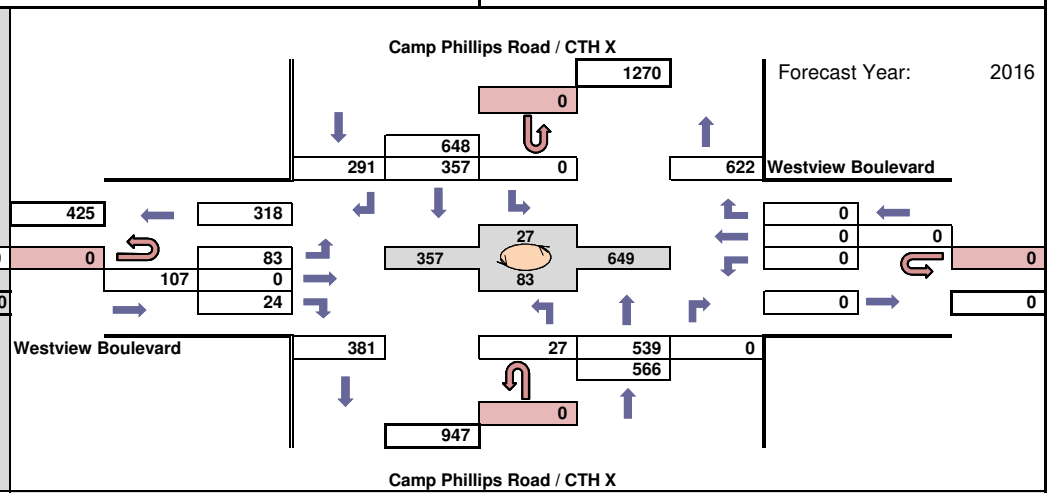
Design Hour Turning Movement Data

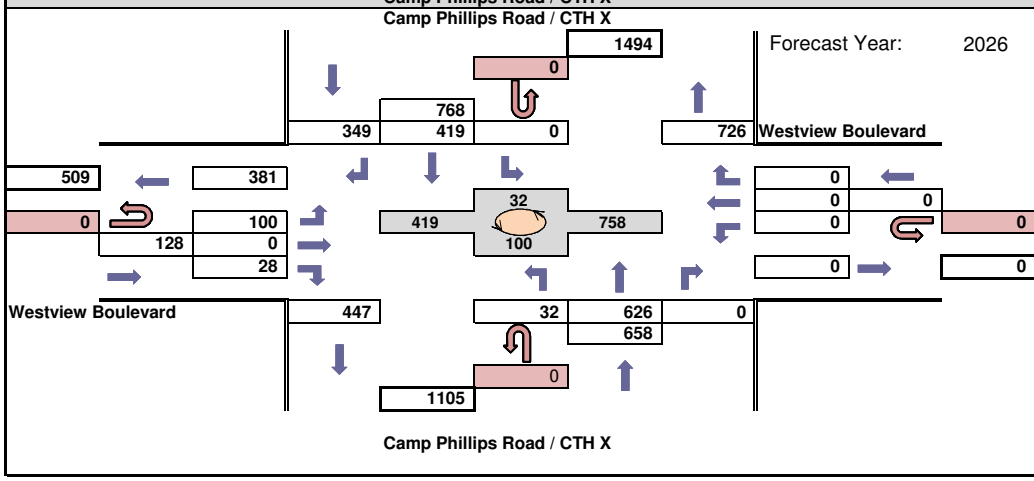
Project Description

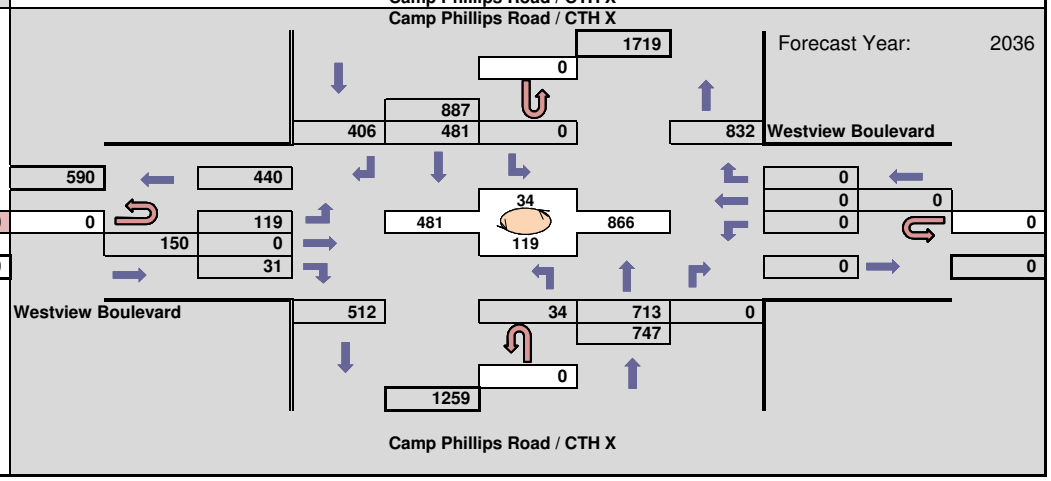
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









WisDot Bureau of Planning
Traffic Forecasting Section
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Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:15-5:15pm

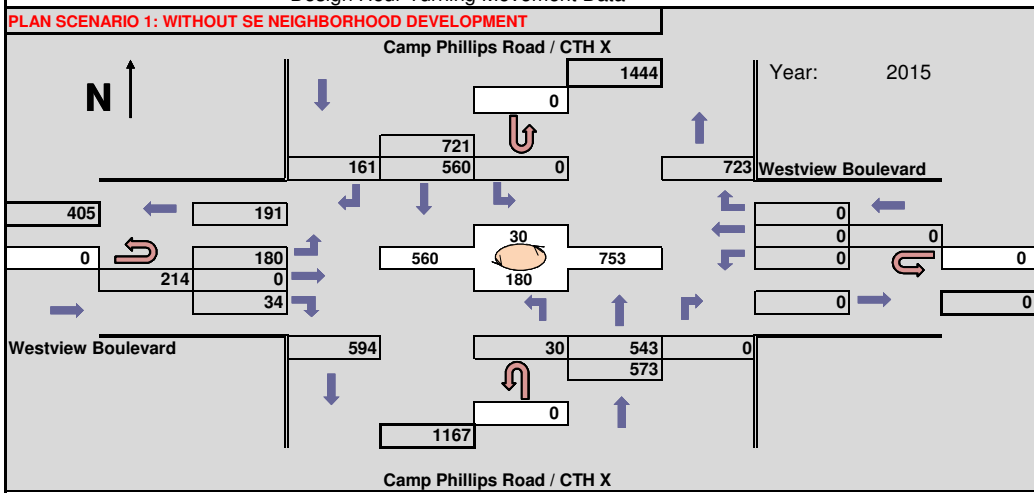
Forecast Completed: 4/12/2016

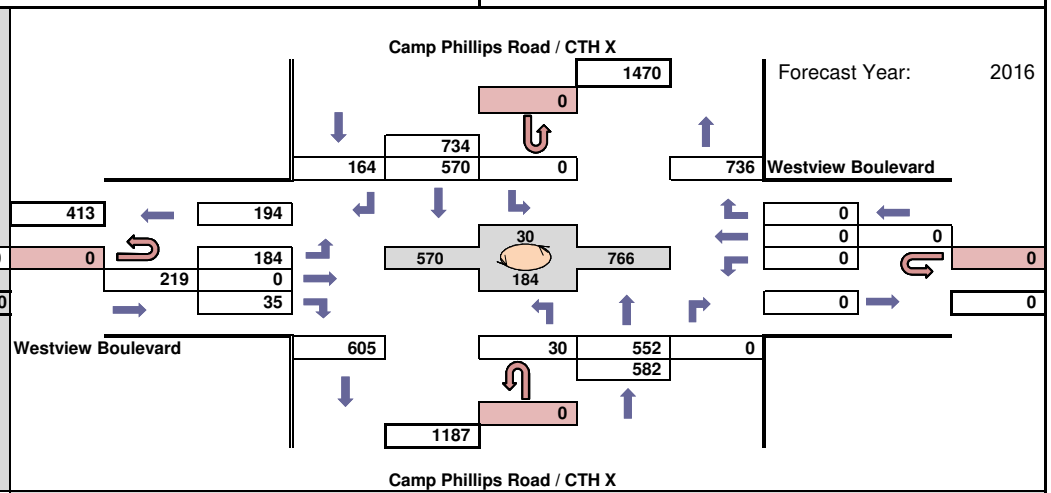
Design Hour Turning Movement Data

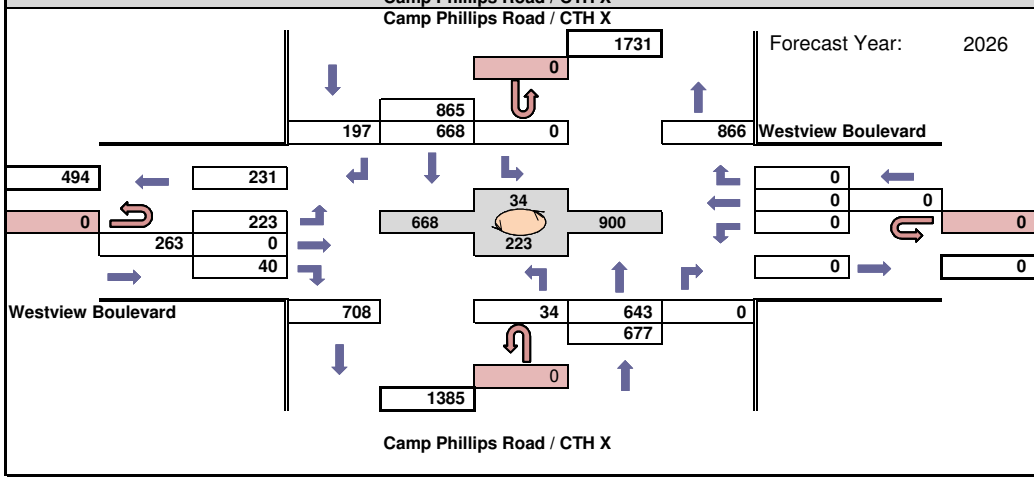
Project Description

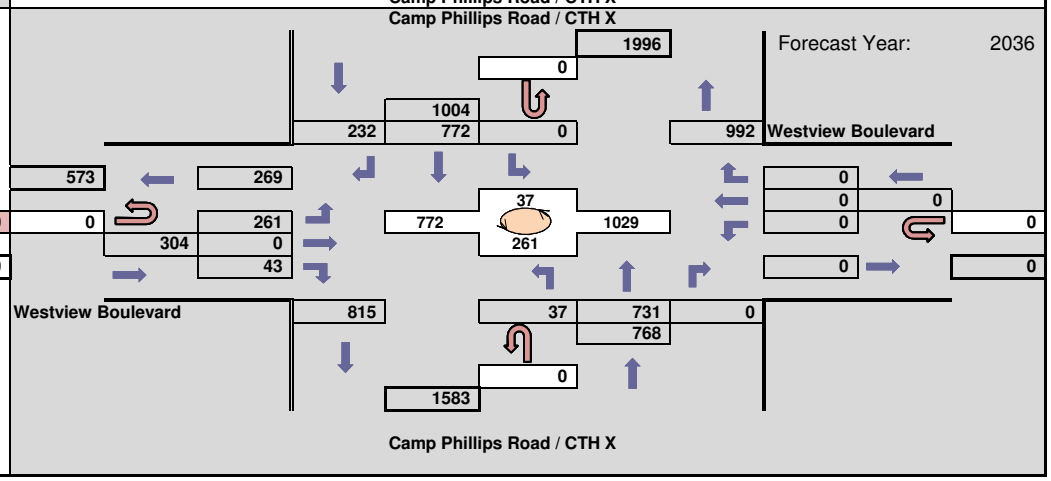
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

Forecast Completed: 4/12/2016

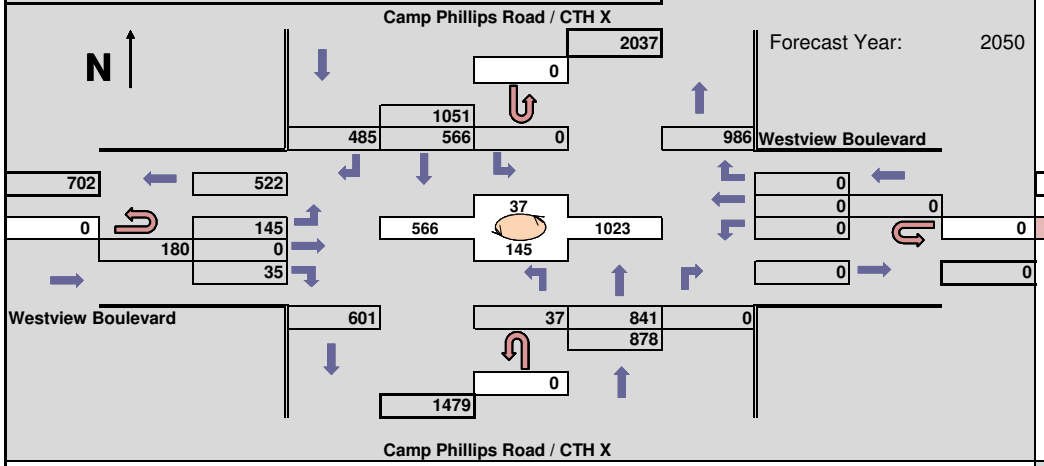
Project Description

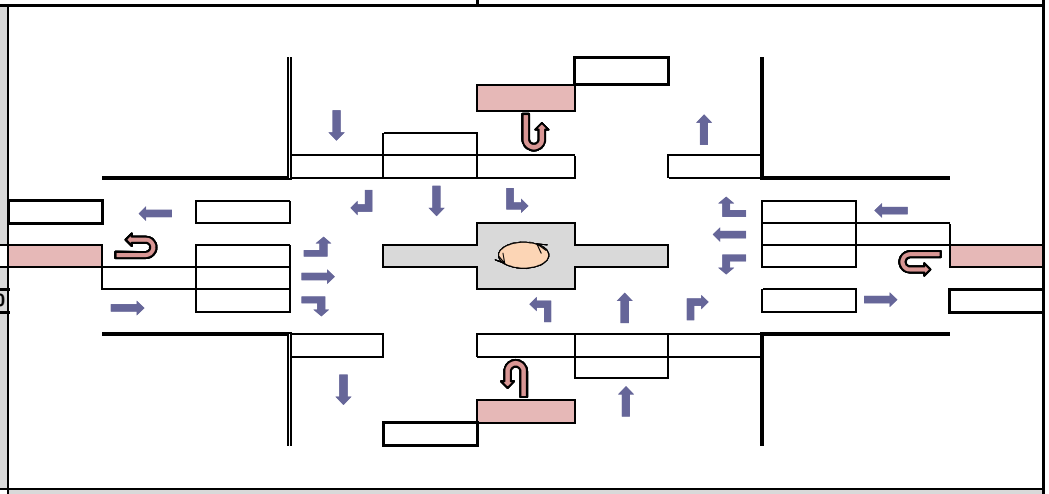
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

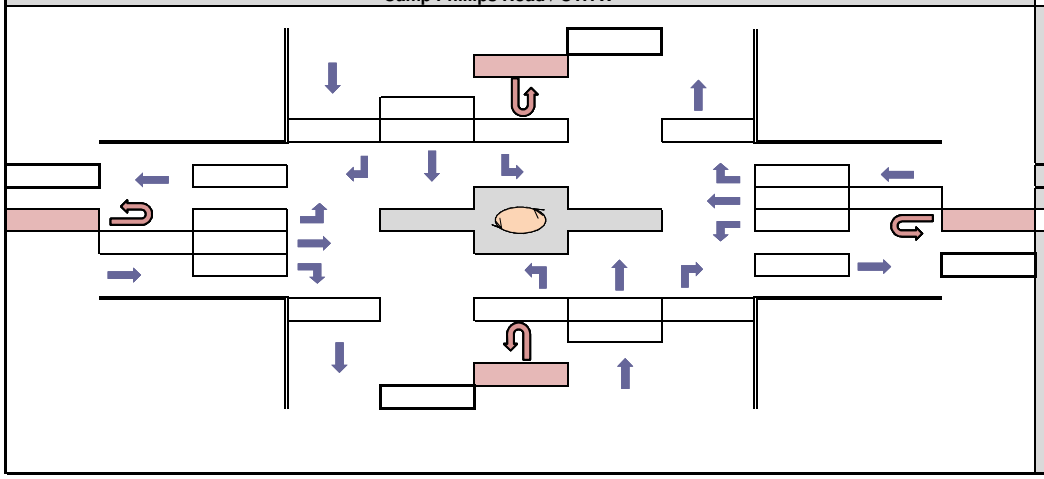
Design Hour Turning Movement Data

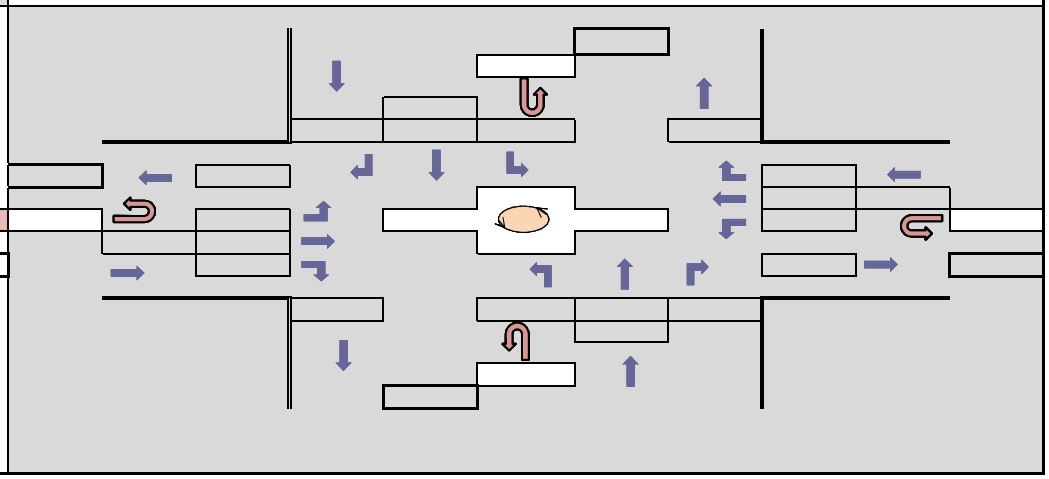
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:15-5:15pm

Forecast Completed: 4/12/2016

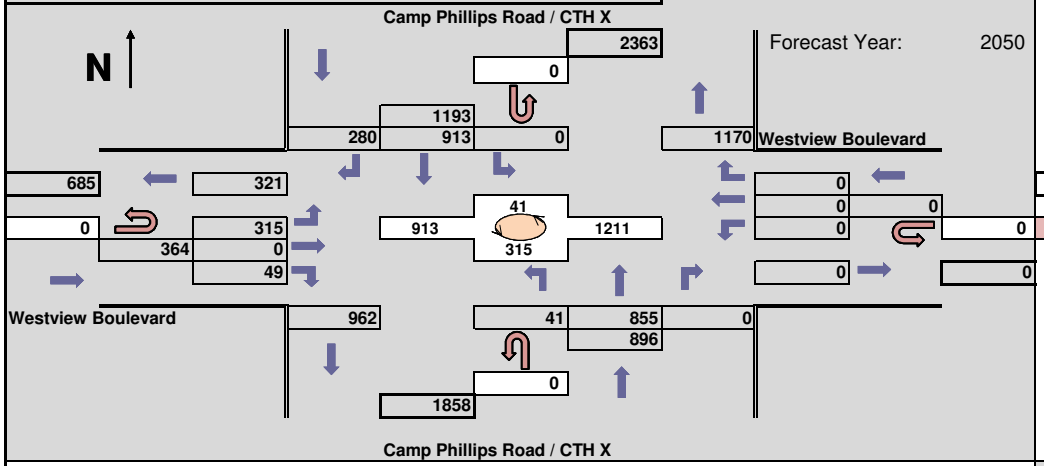
Project Description

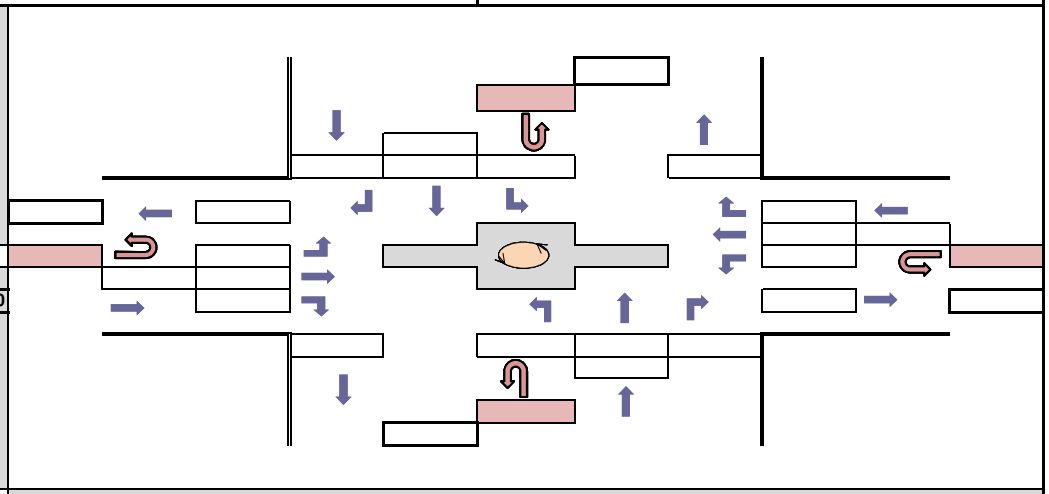
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

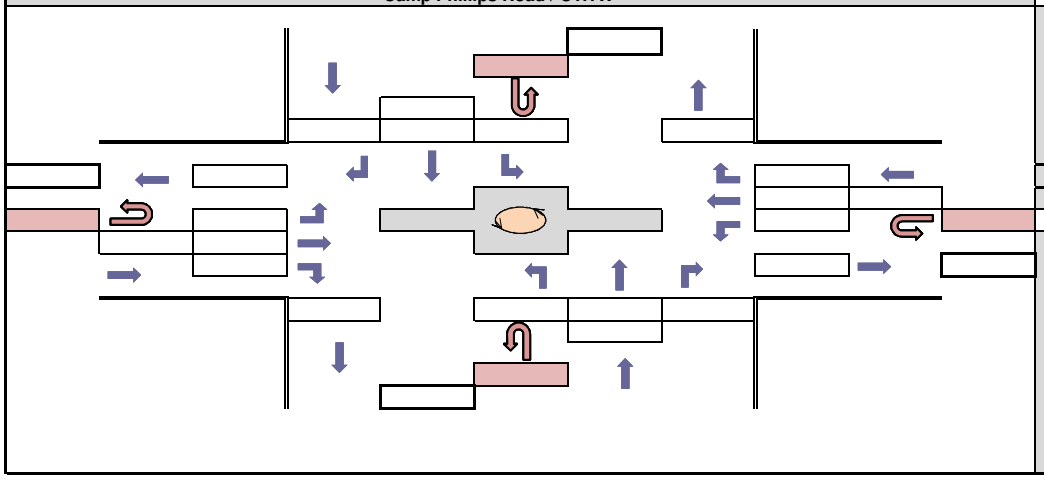
Design Hour Turning Movement Data

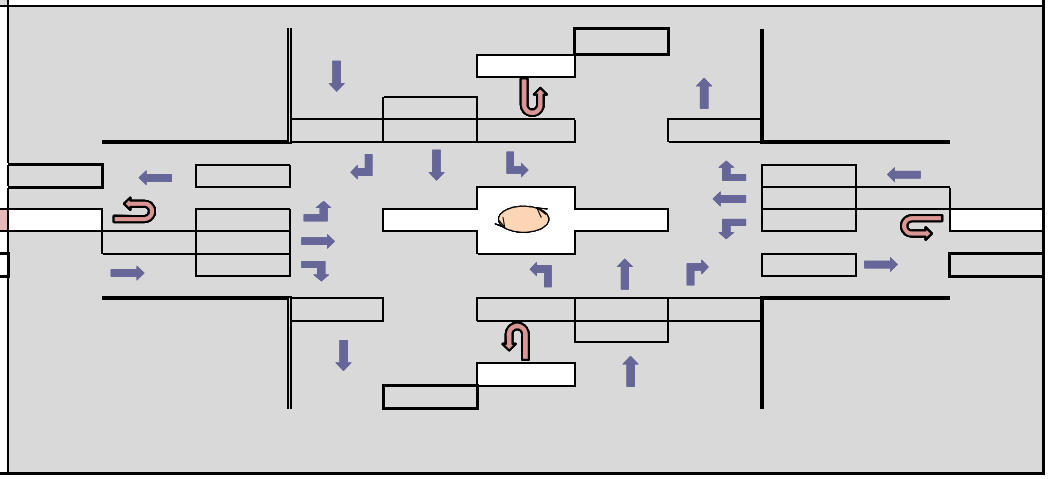
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

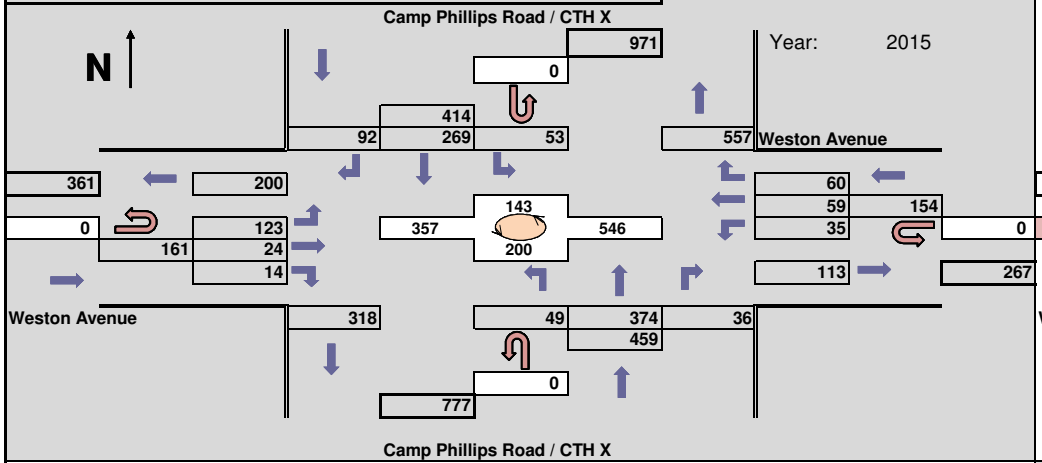
Forecast Completed: 4/12/2016

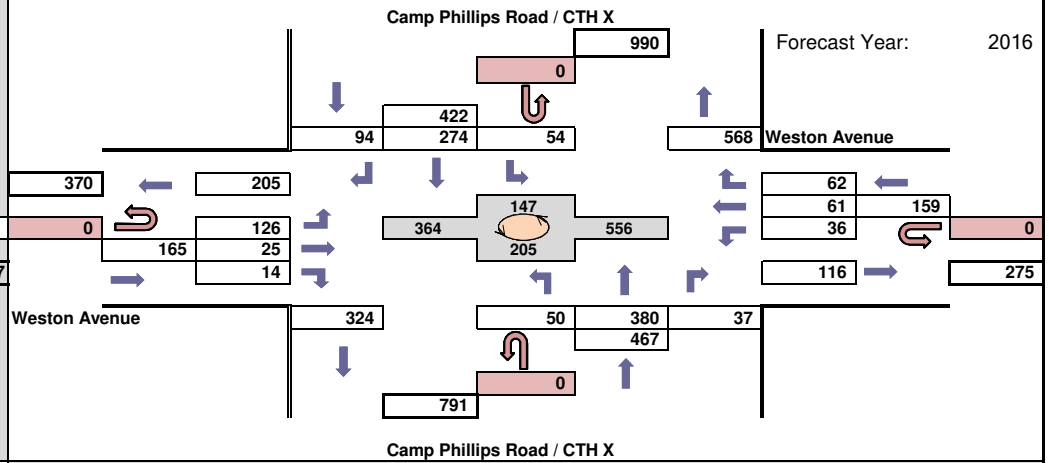
Design Hour Turning Movement Data

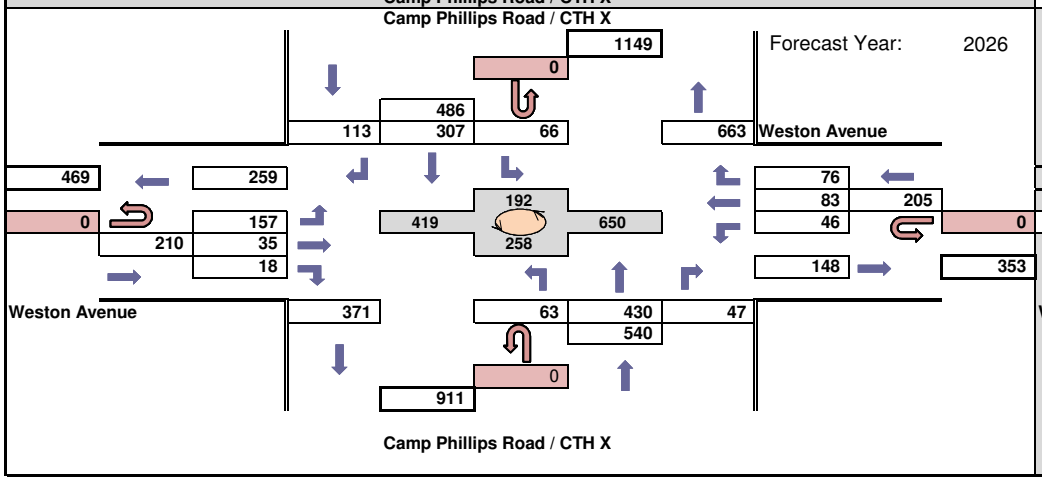
Project Description

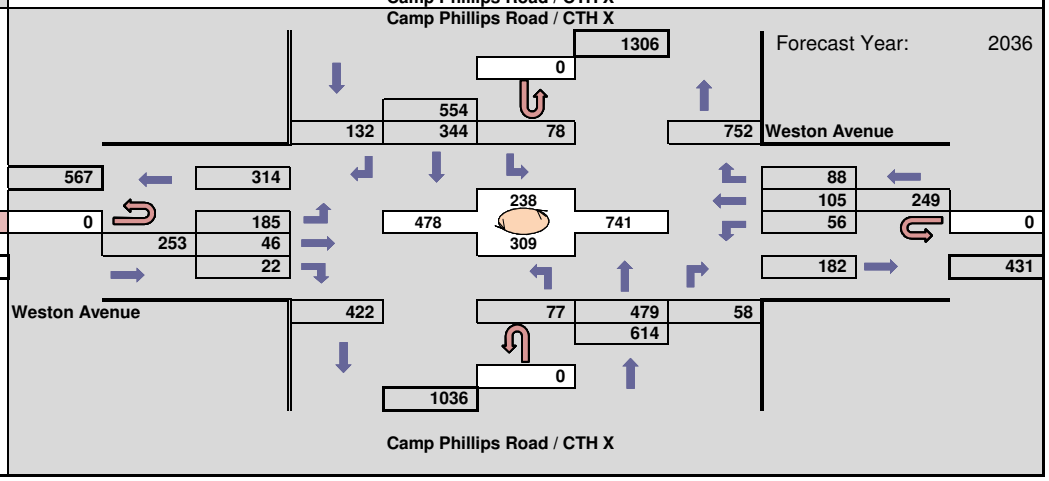
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Indicates roundabout

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Forecast Completed: 4/12/2016

Design Hour Turning Movement Data

Project Description

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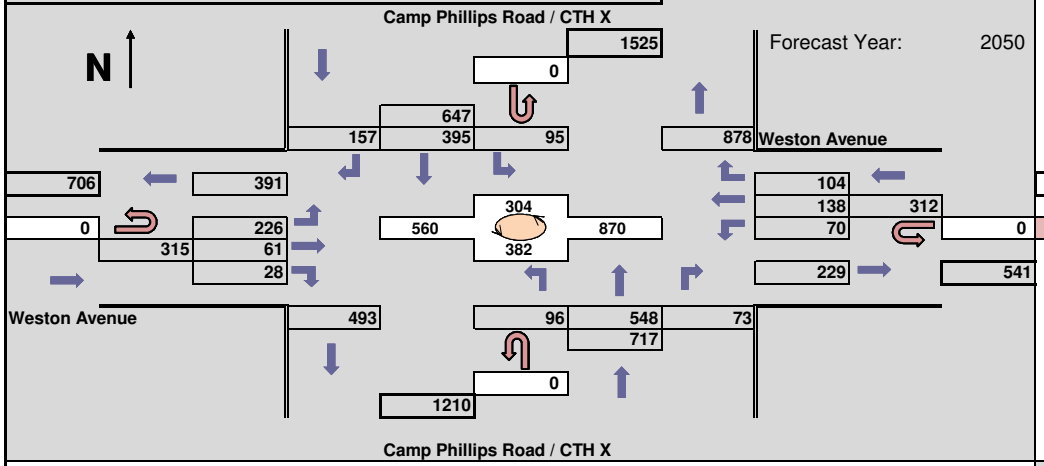
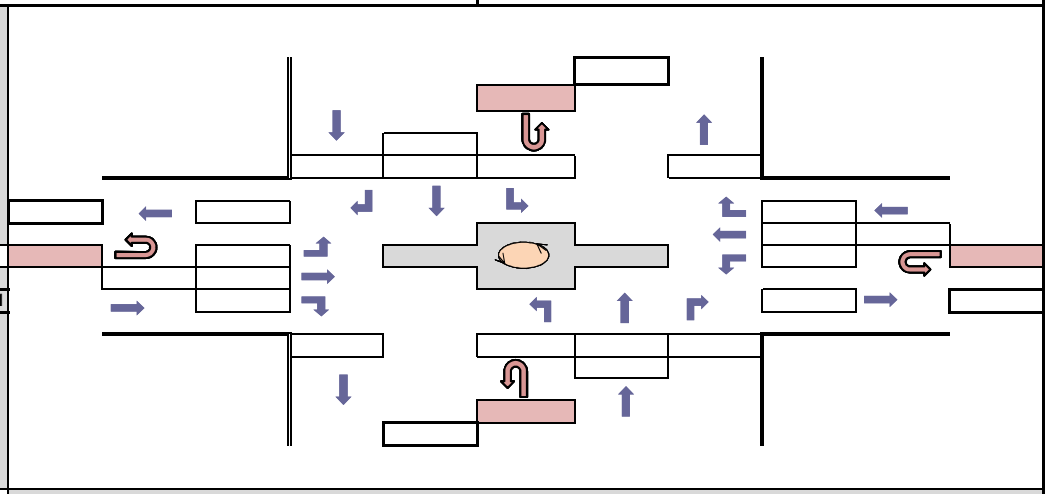
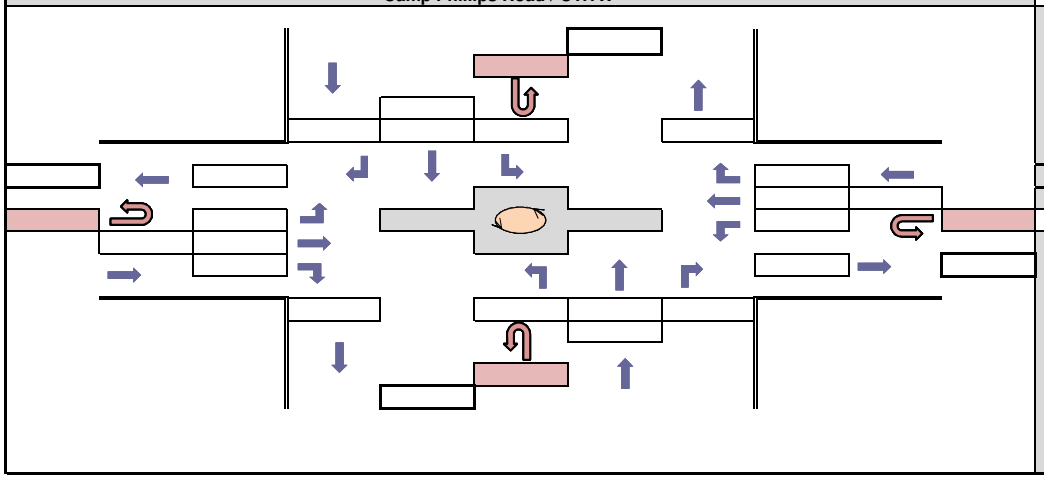
Location: Weston Ave - Schofield Ave

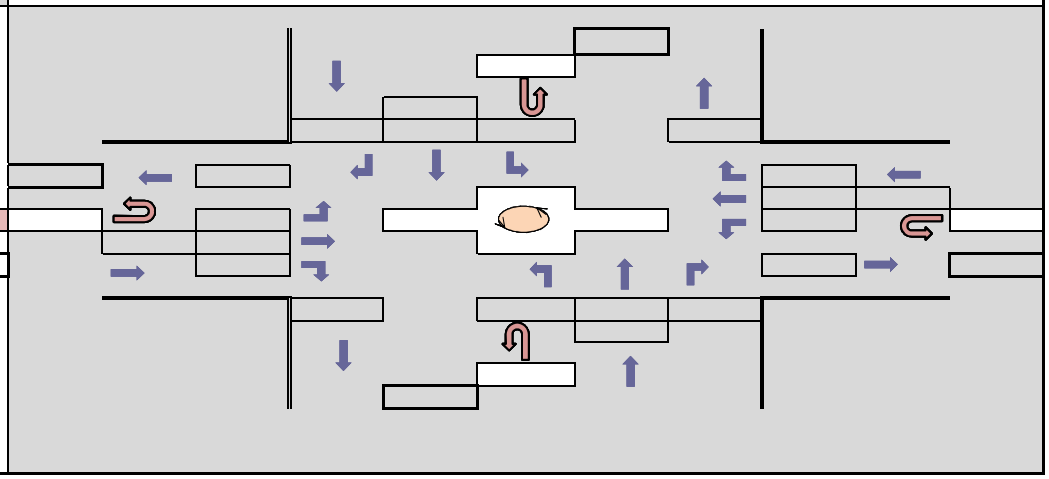
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









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Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

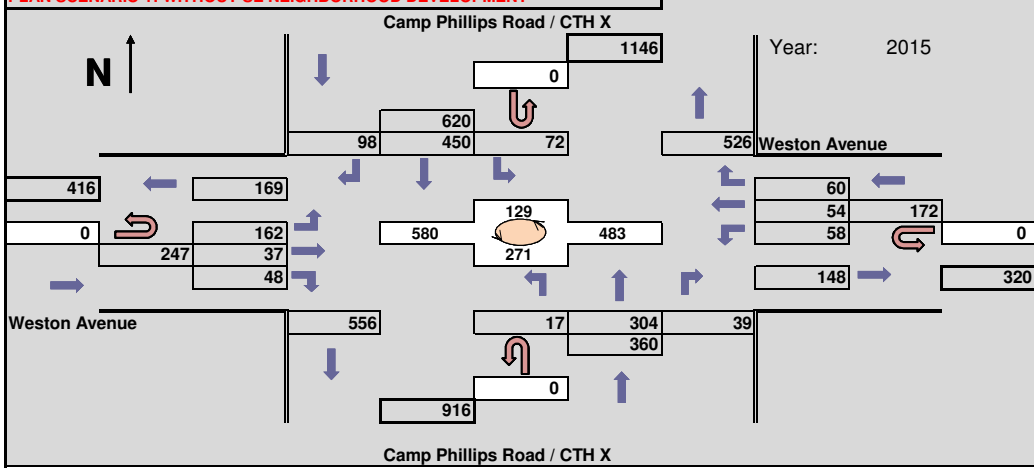
Forecast Completed: 4/12/2016

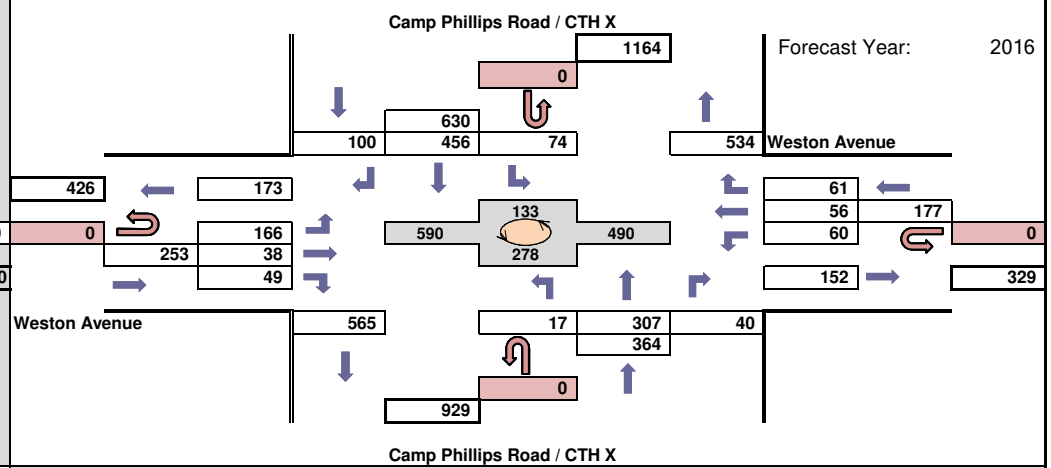
Design Hour Turning Movement Data

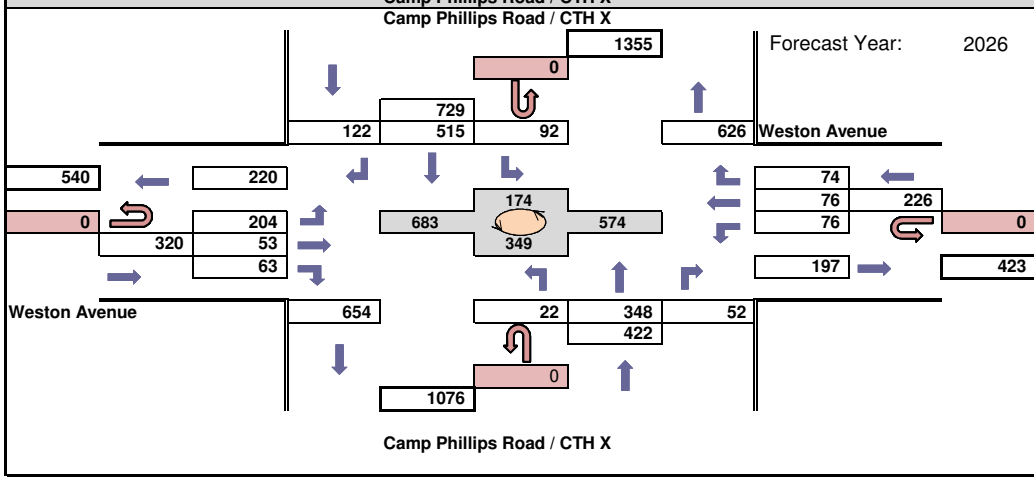
Project Description

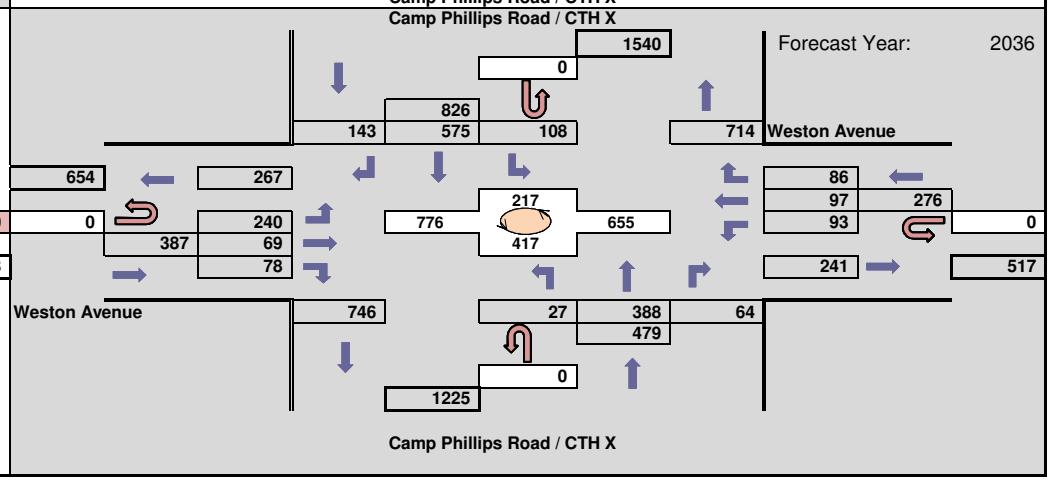
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

Forecast Completed: 4/12/2016

Design Hour Turning Movement Data

Project Description

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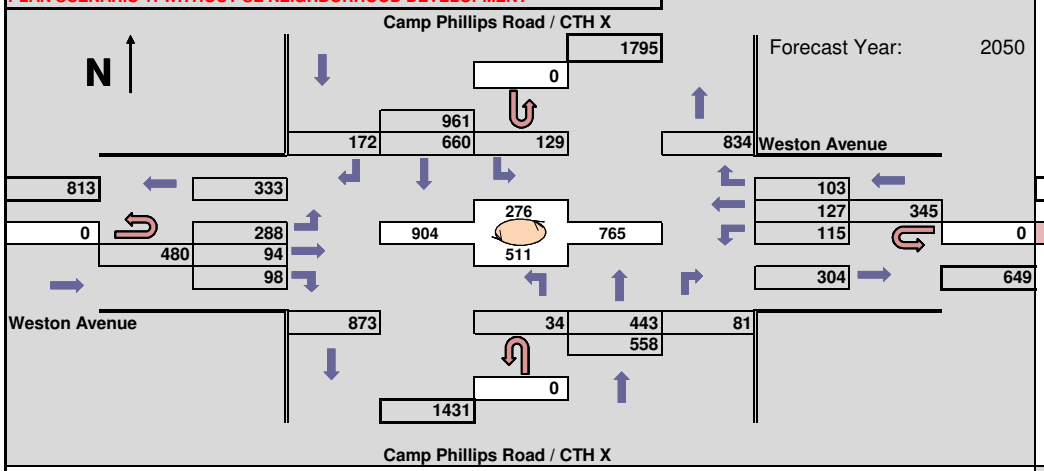
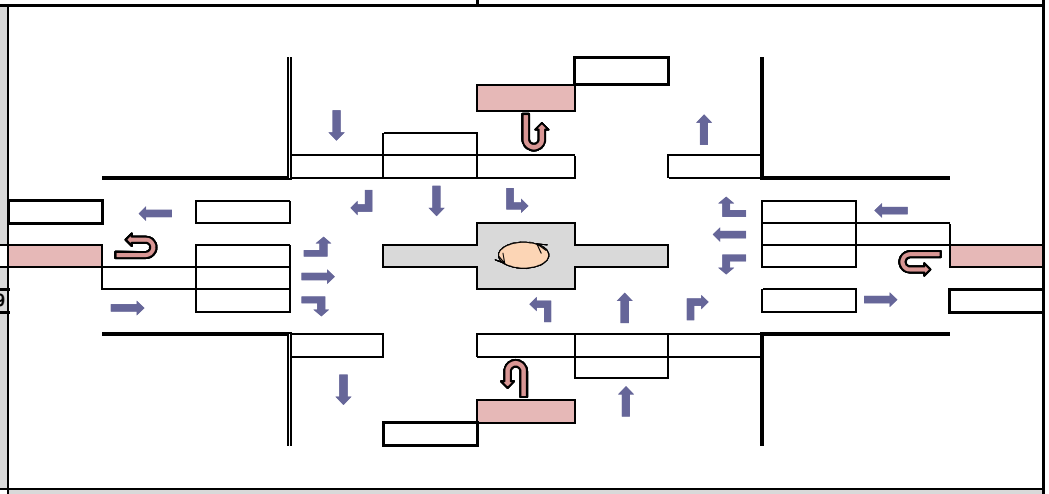
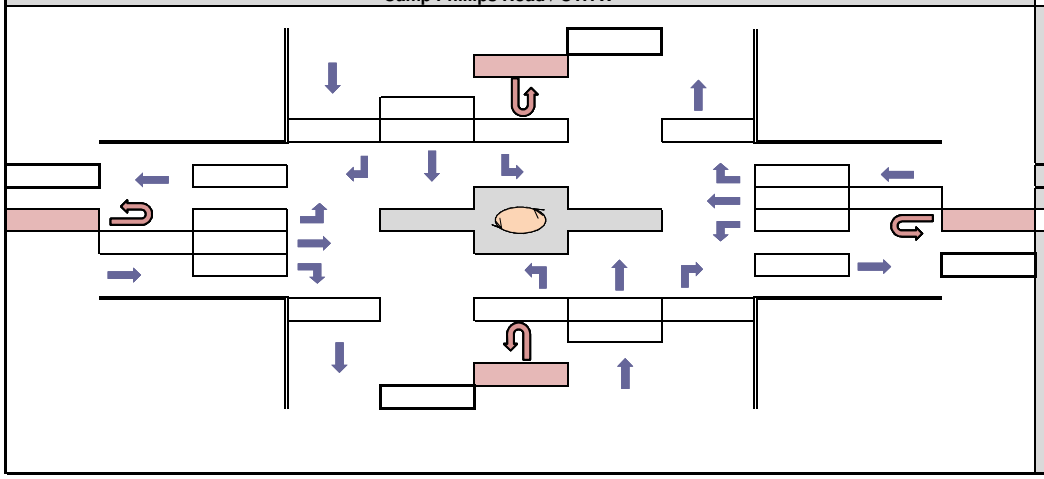
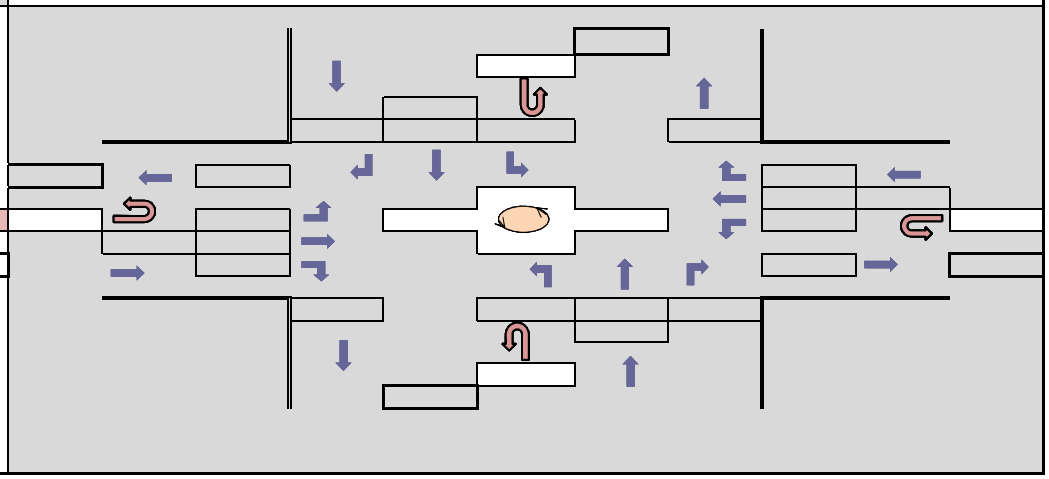
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

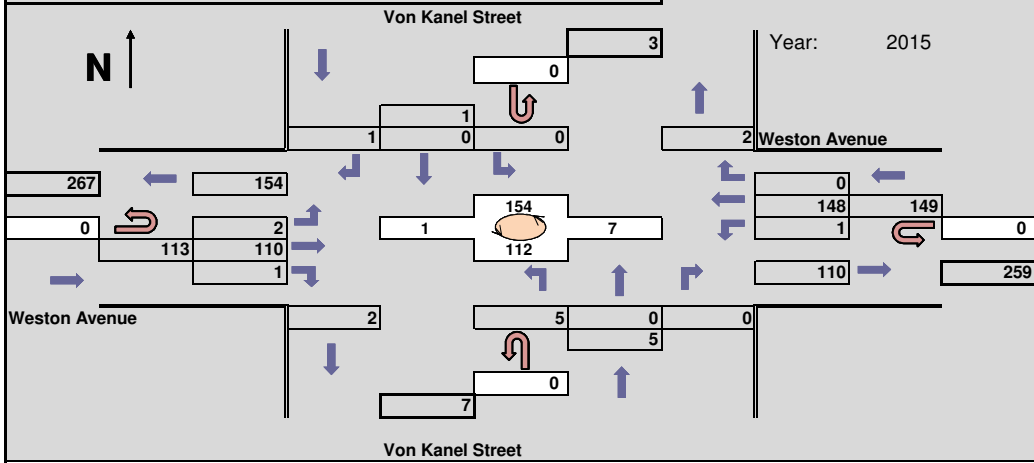
Forecast Completed: 4/12/2016

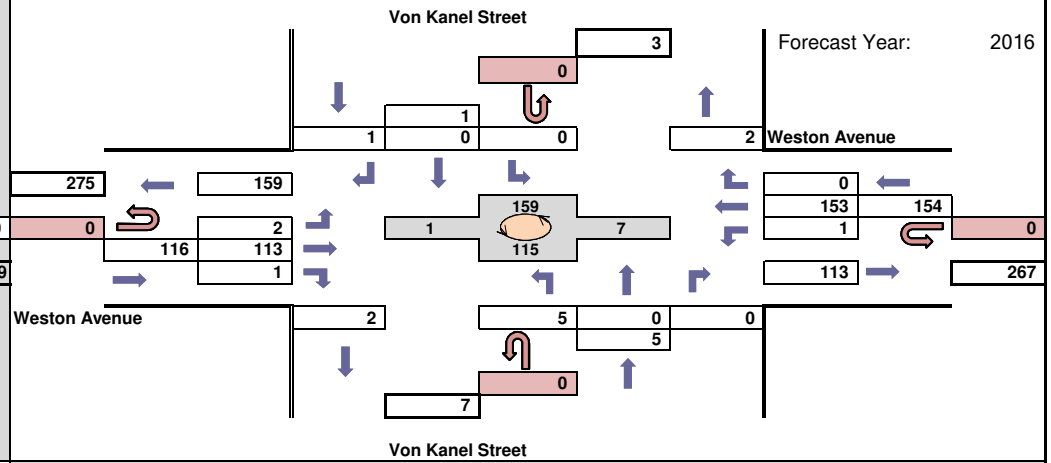
Design Hour Turning Movement Data

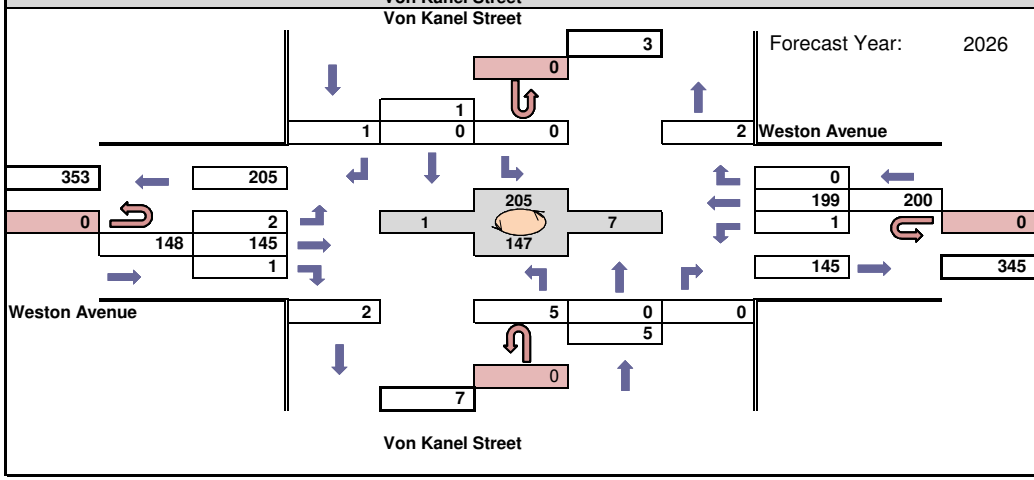
Project Description

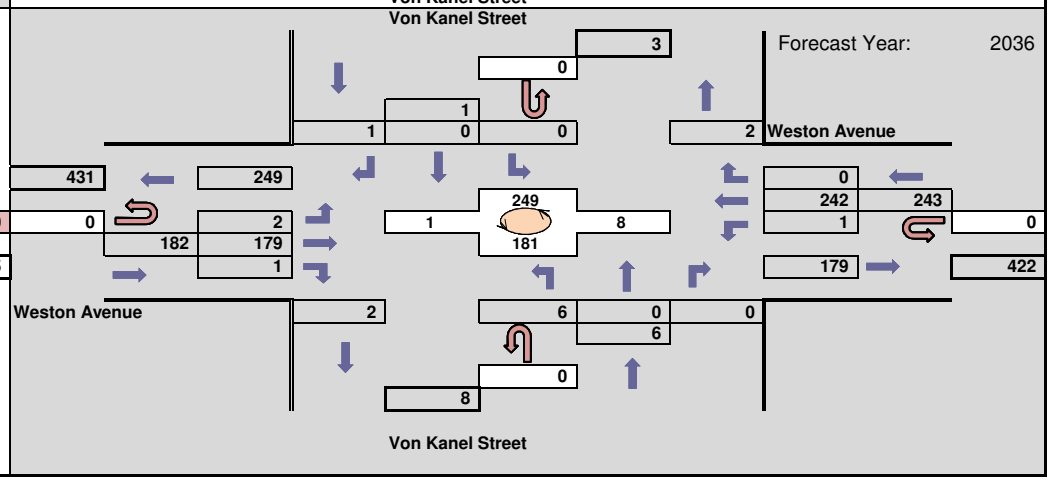
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









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Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected AM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 7:00-8:00am

Forecast Completed: 4/12/2016

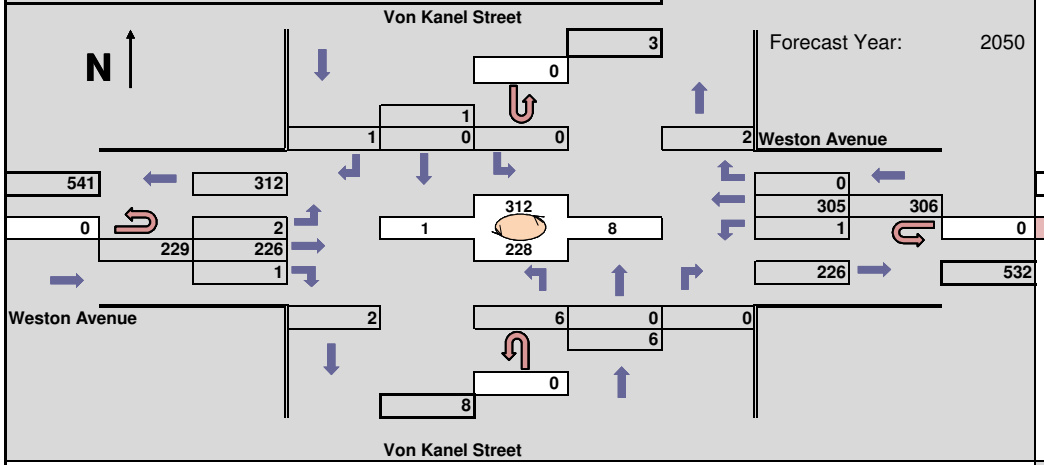
Project Description

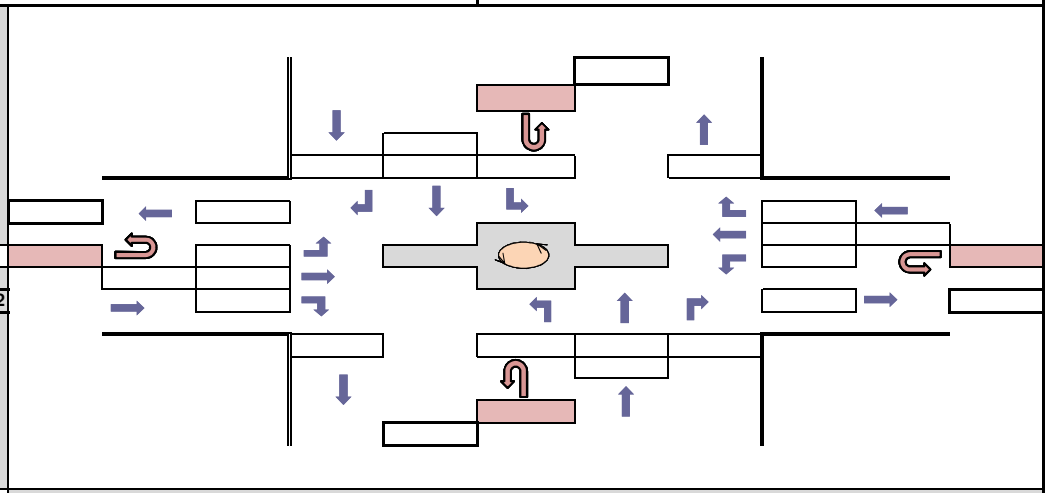
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

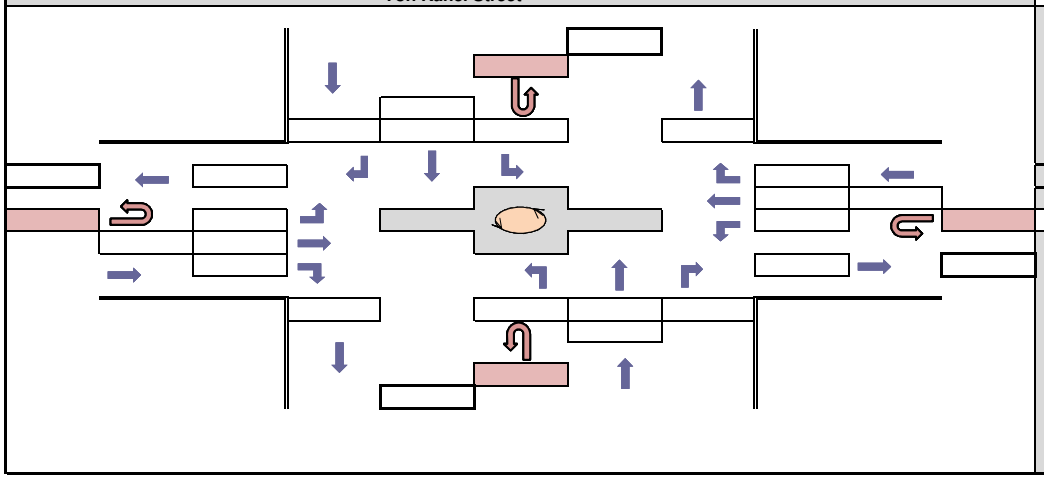
Design Hour Turning Movement Data

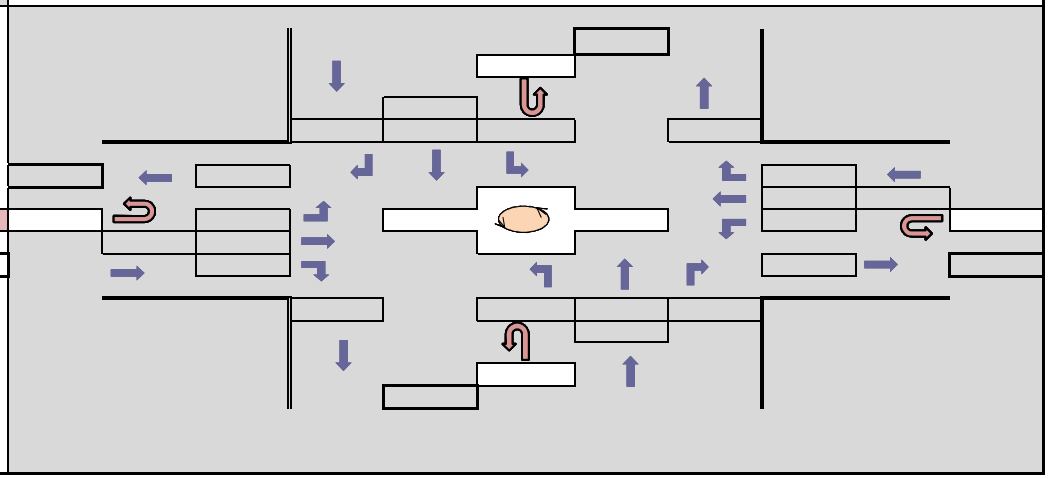
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

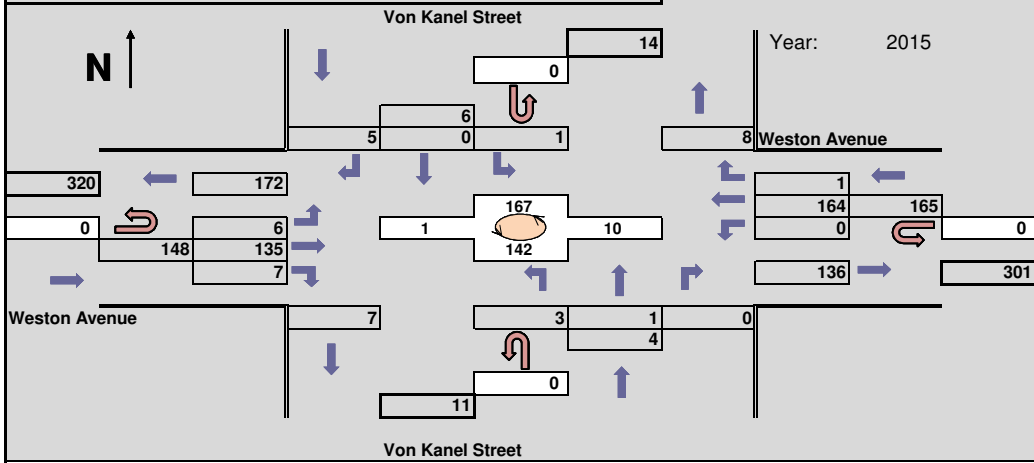
Forecast Completed: 4/12/2016

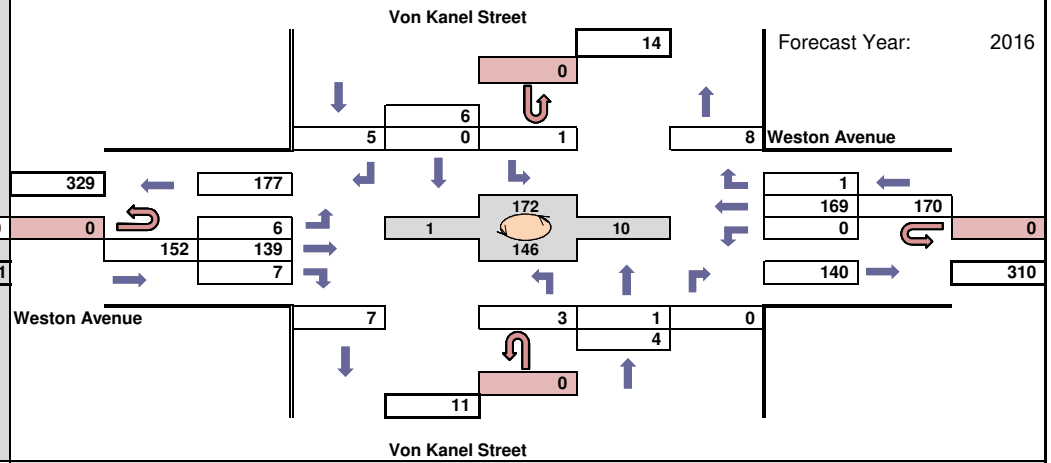
Design Hour Turning Movement Data

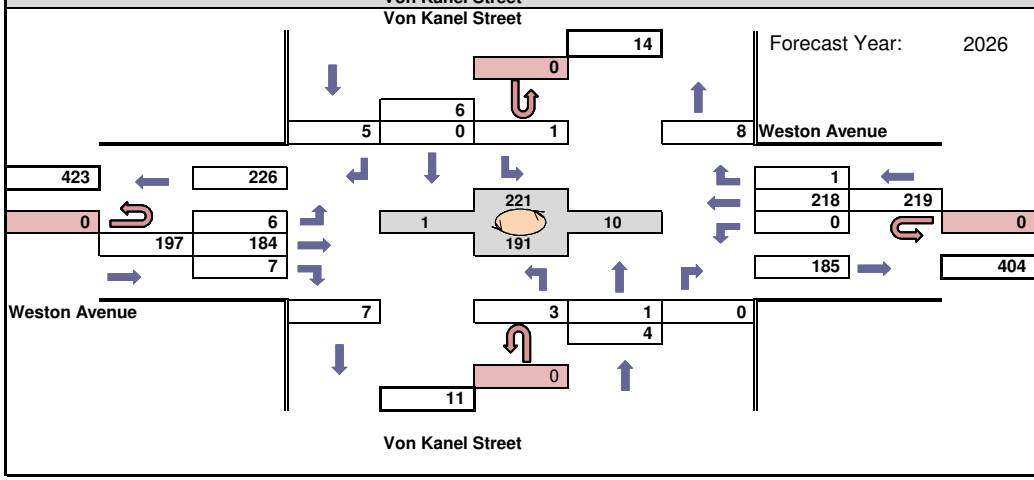
Project Description

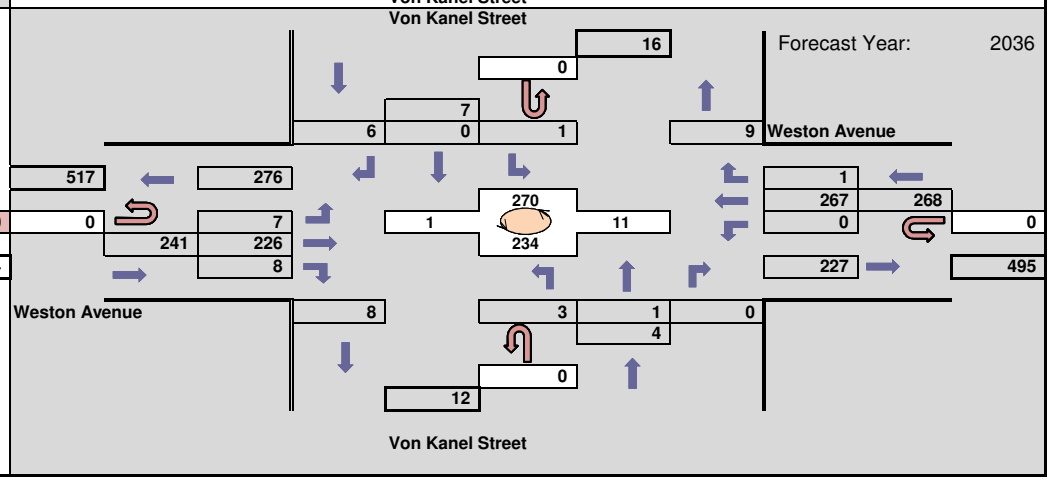
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT









WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Vu Dang
Phone: 608-266-2571
Email: vu.dang@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:30-5:30pm

Forecast Completed: 4/12/2016

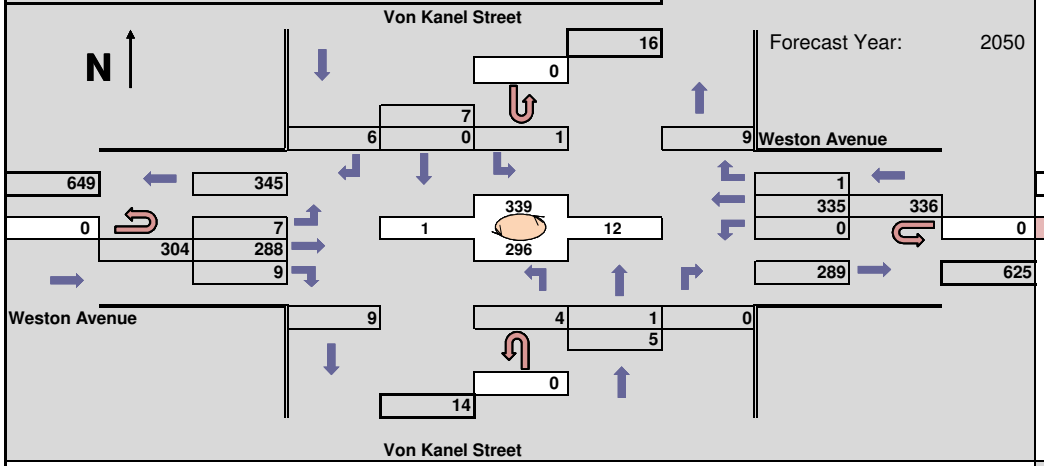
Design Hour Turning Movement Data

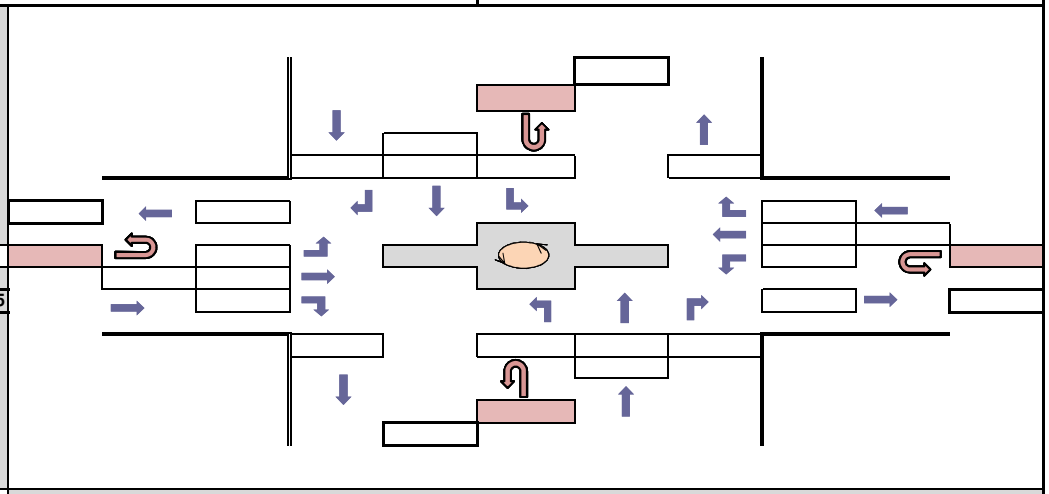
Project Description

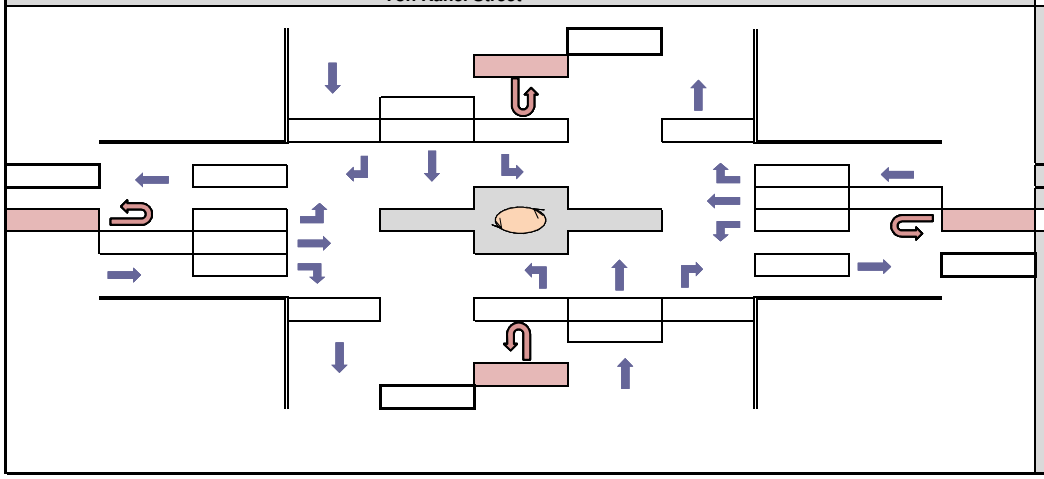
Project ID(s): 0095-64-14
Route(s): Camp Phillips Rd / CTH X
Region/COUNTY(IES): NC/MARATHON
Location: Weston Ave - Schofield Ave

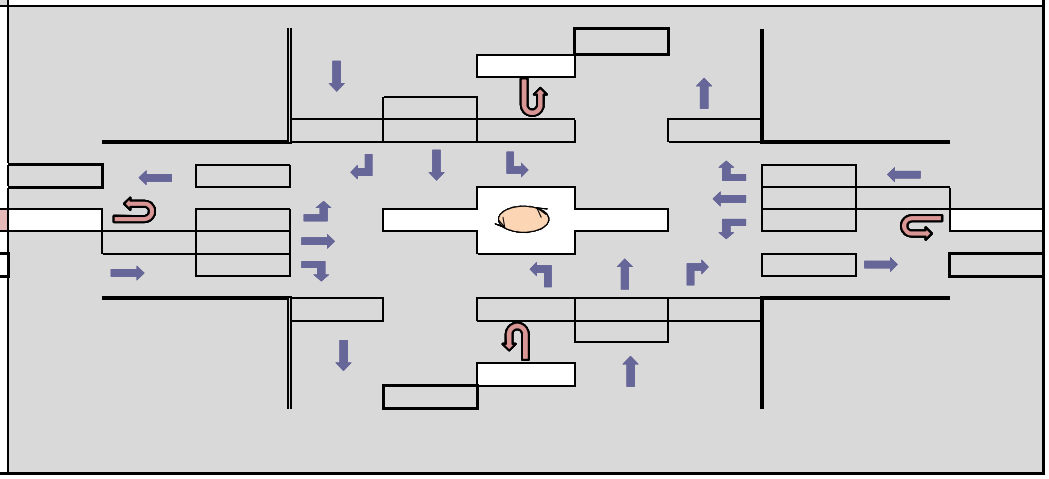
PLAN SCENARIO 1: WITHOUT SE NEIGHBORHOOD DEVELOPMENT

Forecast Year: 2050









Appendix B

Existing/Planned Transportation System with Background Traffic Operational Analysis

I. 2020 Background Traffic, Existing Transportation System – Synchro 9 Outputs
II. 2030 Background Traffic, Existing Transportation System – Synchro 9 Outputs
III. 2040 Background Traffic, Existing Transportation System – Synchro 9 Outputs

Appendix B:
Existing Transportation System with Background Traffic Operational Analysis

2020 Background Traffic, Existing Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	110	60	10	25	105	595	30	20	940	25
Future Volume (veh/h)	5	5	110	60	10	25	105	595	30	20	940	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	5	5	32	65	11	27	114	647	0	22	1022	27
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	201	169	406	351	73	179	391	2105	942	469	1536	41
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.09	0.62	0.00	0.45	0.45	0.45
Sat Flow, veh/h	625	1007	1581	1326	435	1069	1707	3406	1524	757	3422	90
Grp Volume(v), veh/h	10	0	32	65	0	38	114	647	0	22	513	536
Grp Sat Flow(s),veh/h/ln	1633	0	1581	1326	0	1504	1707	1703	1524	757	1719	1793
Q Serve(g_s), s	0.0	0.0	0.9	2.3	0.0	1.2	1.7	5.0	0.0	0.9	13.1	13.1
Cycle Q Clear(g_c), s	0.3	0.0	0.9	2.6	0.0	1.2	1.7	5.0	0.0	0.9	13.1	13.1
Prop In Lane	0.50		1.00	1.00		0.71	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	370	0	406	351	0	252	391	2105	942	469	772	805
V/C Ratio(X)	0.03	0.00	0.08	0.19	0.00	0.15	0.29	0.31	0.00	0.05	0.67	0.67
Avail Cap(c_a), veh/h	1118	0	1157	999	0	967	431	2555	1143	551	958	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	15.8	20.6	0.0	19.9	8.1	5.0	0.0	8.8	12.1	12.1
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.3	0.0	0.3	0.4	0.1	0.0	0.0	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	0.7	1.6	0.0	0.9	1.4	4.2	0.0	0.4	10.5	10.9
LnGrp Delay(d),s/veh	19.5	0.0	15.9	20.8	0.0	20.2	8.5	5.1	0.0	8.8	13.4	13.3
LnGrp LOS	B		B	C		C	A	A		A	B	B
Approach Vol, veh/h		42			103			761			1071	
Approach Delay, s/veh		16.7			20.6			5.6			13.3	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		40.6		15.4	9.5	31.1		15.4
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.3	31.2		36.0
Max Q Clear Time (g_c+I1), s		7.0		2.9	3.7	15.1		4.6
Green Ext Time (p_c), s		15.2		0.7	0.1	9.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	10.8
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	110	60	10	25	105	595	30	20	940	25
Future Volume (vph)	5	5	110	60	10	25	105	595	30	20	940	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1817	1569		3284		1703	3406	1488	1717	3424	
Flt Permitted		0.85	1.00		0.80		0.17	1.00	1.00	0.41	1.00	
Satd. Flow (perm)		1578	1569		2695		312	3406	1488	734	3424	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	5	5	60	65	11	27	114	647	16	22	1022	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	60	0	103	0	114	647	16	22	1049	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		11.0	15.7		11.0		39.9	39.9	39.9	30.7	30.7	
Effective Green, g (s)		11.0	15.7		11.0		39.9	39.9	39.9	30.7	30.7	
Actuated g/C Ratio		0.17	0.25		0.17		0.63	0.63	0.63	0.49	0.49	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		275	391		471		301	2160	943	358	1671	
v/s Ratio Prot			0.01				0.03	c0.19			c0.31	
v/s Ratio Perm		0.01	0.03		c0.04		0.21		0.01	0.03		
v/c Ratio		0.04	0.15		0.22		0.38	0.30	0.02	0.06	0.63	
Uniform Delay, d1		21.5	18.4		22.3		6.2	5.2	4.3	8.5	11.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	0.2		0.2		0.8	0.1	0.0	0.1	0.7	
Delay (s)		21.6	18.6		22.5		7.0	5.3	4.3	8.6	12.6	
Level of Service		C	B		C		A	A	A	A	B	
Approach Delay (s)		19.0			22.5			5.5			12.5	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	62.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	10	60	103	114	647	16	22	1049
v/c Ratio	0.03	0.12	0.16	0.32	0.28	0.02	0.06	0.57
Control Delay	19.3	12.5	20.8	9.7	8.1	8.6	15.1	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	12.5	20.8	9.7	8.1	8.6	15.1	17.6
Queue Length 50th (ft)	3	13	16	12	46	2	4	148
Queue Length 95th (ft)	13	34	35	65	166	16	26	#411
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	1016	490	1735	364	2446	1067	409	1911
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.12	0.06	0.31	0.26	0.01	0.05	0.55

Intersection Summary

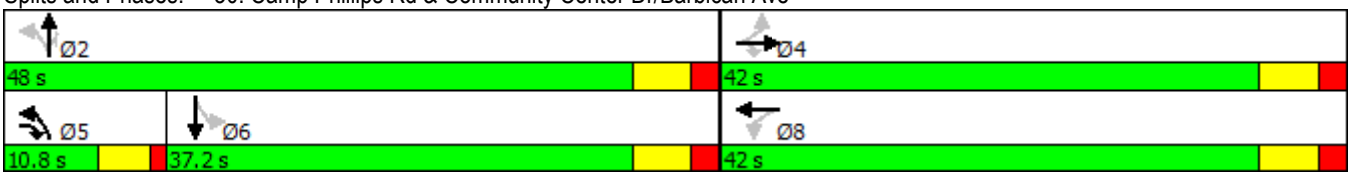
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	10.8	42.0	42.0		10.8	48.0	48.0	37.2	37.2	
Total Split (%)	46.7%	46.7%	12.0%	46.7%	46.7%		12.0%	53.3%	53.3%	41.3%	41.3%	
Maximum Green (s)	36.0	36.0	6.3	36.0	36.0		6.3	42.0	42.0	31.2	31.2	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.4	18.9		14.4		40.5	40.8	40.8	32.7	32.7	
Actuated g/C Ratio		0.24	0.31		0.24		0.67	0.67	0.67	0.54	0.54	
v/c Ratio		0.03	0.12		0.16		0.32	0.28	0.02	0.06	0.57	
Control Delay		19.3	12.5		20.8		9.7	8.1	8.6	15.1	17.6	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		19.3	12.5		20.8		9.7	8.1	8.6	15.1	17.6	
LOS		B	B		C		A	A	A	B	B	
Approach Delay		13.5			20.8			8.3			17.6	
Approach LOS		B			C			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 60.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 14.0 — Intersection LOS: B
Intersection Capacity Utilization 56.9% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	110	60	10	25	105	595	30	20	940	25
Future Volume (vph)	5	5	110	60	10	25	105	595	30	20	940	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00		1.00		0.98	1.00	1.00	
Frt			0.850		0.961				0.850		0.996	
Flt Protected		0.976			0.969		0.950			0.950		
Satd. Flow (prot)	0	1818	1583	0	3285	0	1703	3406	1524	1719	3423	0
Flt Permitted		0.847			0.795		0.174			0.406		
Satd. Flow (perm)	0	1577	1563	0	2694	0	312	3406	1486	733	3423	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	5	5	60	65	11	27	114	647	16	22	1022	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	60	0	103	0	114	647	16	22	1049	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	0	165	370	565	0	0	400	710
Future Volume (veh/h)	0	0	0	90	0	165	370	565	0	0	400	710
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				95	0	0	389	595	0	0	421	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				179	0	160	766	2584	0	0	2087	933
Arrive On Green				0.10	0.00	0.00	0.03	0.25	0.00	0.00	0.61	0.00
Sat Flow, veh/h				1774	0	1583	1691	3463	0	0	3495	1524
Grp Volume(v), veh/h				95	0	0	389	595	0	0	421	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1691	1687	0	0	1703	1524
Q Serve(g_s), s				4.6	0.0	0.0	6.3	12.6	0.0	0.0	4.9	0.0
Cycle Q Clear(g_c), s				4.6	0.0	0.0	6.3	12.6	0.0	0.0	4.9	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				179	0	160	766	2584	0	0	2087	933
V/C Ratio(X)				0.53	0.00	0.00	0.51	0.23	0.00	0.00	0.20	0.00
Avail Cap(c_a), veh/h				335	0	299	958	2584	0	0	2087	933
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.93	0.93	0.00	0.00	0.82	0.00
Uniform Delay (d), s/veh				38.4	0.0	0.0	4.7	12.6	0.0	0.0	7.7	0.0
Incr Delay (d2), s/veh				2.4	0.0	0.0	0.5	0.2	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				4.3	0.0	0.0	5.4	9.8	0.0	0.0	4.2	0.0
LnGrp Delay(d),s/veh				40.9	0.0	0.0	5.2	12.8	0.0	0.0	7.9	0.0
LnGrp LOS				D			A	B			A	
Approach Vol, veh/h					95			984			421	
Approach Delay, s/veh					40.9			9.8			7.9	
Approach LOS					D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		74.9			13.8	61.1		15.1
Change Period (Y+Rc), s		6.0			4.5	6.0		6.0
Max Green Setting (Gmax), s		61.0			19.5	37.0		17.0
Max Q Clear Time (g_c+I1), s		14.6			8.3	6.9		6.6
Green Ext Time (p_c), s		8.8			1.0	8.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	165	370	565	0	0	400	710
Future Volume (vph)	0	0	0	90	0	165	370	565	0	0	400	710
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	4.5	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1770	1583	1687	3374			3406	1524
Flt Permitted					0.95	1.00	0.47	1.00			1.00	1.00
Satd. Flow (perm)					1770	1583	827	3374			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	95	0	87	389	595	0	0	421	374
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	95	87	389	595	0	0	421	374
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					9.3	9.3	68.7	68.7			52.4	52.4
Effective Green, g (s)					9.3	9.3	68.7	68.7			52.4	52.4
Actuated g/C Ratio					0.10	0.10	0.76	0.76			0.58	0.58
Clearance Time (s)					6.0	6.0	4.5	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					182	163	744	2575			1983	887
v/s Ratio Prot							c0.07	0.18			0.12	
v/s Ratio Perm					0.05	c0.05	c0.33					0.25
v/c Ratio					0.52	0.53	0.52	0.23			0.21	0.42
Uniform Delay, d1					38.2	38.3	3.5	3.1			9.0	10.4
Progression Factor					1.00	1.00	1.20	0.57			1.00	1.00
Incremental Delay, d2					2.7	3.3	0.6	0.2			0.2	1.5
Delay (s)					40.9	41.6	4.8	1.9			9.2	11.9
Level of Service					D	D	A	A			A	B
Approach Delay (s)		0.0			41.3			3.1			10.5	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	95	87	389	595	421	374
v/c Ratio	0.43	0.44	0.51	0.22	0.21	0.41
Control Delay	42.1	43.2	6.4	2.1	10.8	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	43.2	6.4	2.1	10.8	14.2
Queue Length 50th (ft)	52	47	13	23	56	112
Queue Length 95th (ft)	94	90	277	13	106	232
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	334	299	842	2664	2026	906
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.29	0.46	0.22	0.21	0.41

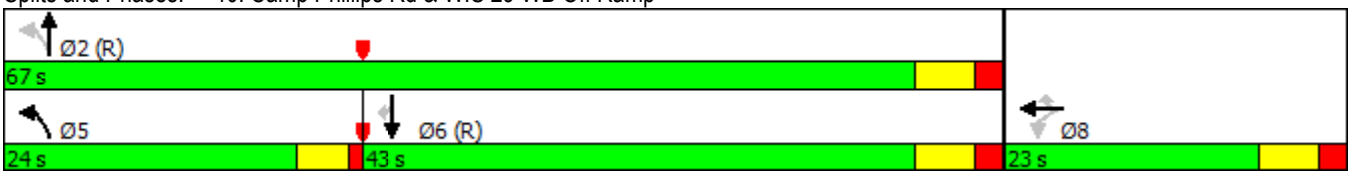
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	10.5	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	24.0	67.0			43.0	43.0
Total Split (%)				25.6%	25.6%	25.6%	26.7%	74.4%			47.8%	47.8%
Maximum Green (s)				17.0	17.0	17.0	19.5	61.0			37.0	37.0
Yellow Time (s)				4.0	4.0	4.0	3.5	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	1.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	4.5	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Act Effct Green (s)					11.3	11.3	71.4	71.1			53.5	53.5
Actuated g/C Ratio					0.13	0.13	0.79	0.79			0.59	0.59
v/c Ratio					0.43	0.44	0.51	0.22			0.21	0.41
Control Delay					42.1	43.2	6.4	2.1			10.8	14.2
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					42.1	43.2	6.4	2.1			10.8	14.2
LOS					D	D	A	A			B	B
Approach Delay					42.6			3.8			12.4	
Approach LOS					D			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 10.9 Intersection LOS: B
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	165	370	565	0	0	400	710
Future Volume (vph)	0	0	0	90	0	165	370	565	0	0	400	710
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1770	1583	1687	3374	0	0	3406	1524
Flt Permitted					0.950		0.466					
Satd. Flow (perm)	0	0	0	0	1770	1583	827	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	95	0	87	389	595	0	0	421	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	95	87	389	595	0	0	421	374
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	355	0	280	0	0	0	0	580	65	60	430	0
Future Volume (veh/h)	355	0	280	0	0	0	0	580	65	60	430	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	394	0	0				0	644	0	67	478	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	503	0	224				0	2172	972	589	2541	0
Arrive On Green	0.15	0.00	0.00				0.00	0.61	0.00	0.11	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	394	0	0				0	644	0	67	478	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	10.1	0.0	0.0				0.0	7.7	0.0	1.1	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0				0.0	7.7	0.0	1.1	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	503	0	224				0	2172	972	589	2541	0
V/C Ratio(X)	0.78	0.00	0.00				0.00	0.30	0.00	0.11	0.19	0.00
Avail Cap(c_a), veh/h	1090	0	486				0	2172	972	681	2541	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.99	0.99	0.00
Uniform Delay (d), s/veh	36.9	0.0	0.0				0.0	8.2	0.0	4.8	0.0	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0				0.0	0.3	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	0.0				0.0	7.0	0.0	0.9	0.1	0.0
LnGrp Delay(d),s/veh	39.6	0.0	0.0				0.0	8.6	0.0	4.9	0.2	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		394						644			545	
Approach Delay, s/veh		39.6						8.6			0.7	
Approach LOS		D						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.4	61.2		19.4		70.6		
Change Period (Y+Rc), s	4.5	6.0		6.0		6.0		
Max Green Setting (Gmax), s	9.5	35.0		29.0		49.0		
Max Q Clear Time (g_c+I1), s	3.1	9.7		12.1		2.0		
Green Ext Time (p_c), s	0.1	8.2		1.3		9.5		

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	0	280	0	0	0	0	580	65	60	430	0
Future Volume (vph)	355	0	280	0	0	0	0	580	65	60	430	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	4.5	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1603	1509					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.35	1.00	
Satd. Flow (perm)	1603	1603	1509					3539	1583	654	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	394	0	156	0	0	0	0	644	36	67	478	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	197	197	156	0	0	0	0	644	36	67	478	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	17.2	17.2	17.2					50.7	50.7	60.8	60.8	
Effective Green, g (s)	17.2	17.2	17.2					50.7	50.7	60.8	60.8	
Actuated g/C Ratio	0.19	0.19	0.19					0.56	0.56	0.68	0.68	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	306	306	288					1993	891	511	2390	
v/s Ratio Prot								c0.18		0.01	c0.14	
v/s Ratio Perm	c0.12	0.12	0.10						0.02	0.08		
v/c Ratio	0.64	0.64	0.54					0.32	0.04	0.13	0.20	
Uniform Delay, d1	33.6	33.6	32.8					10.5	8.8	5.3	5.5	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.63	1.20	
Incremental Delay, d2	4.6	4.6	2.1					0.4	0.1	0.1	0.2	
Delay (s)	38.2	38.2	34.9					10.9	8.9	8.7	6.8	
Level of Service	D	D	C					B	A	A	A	
Approach Delay (s)		37.2			0.0			10.8			7.0	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	197	197	156	644	36	67	478
v/c Ratio	0.64	0.64	0.54	0.32	0.04	0.12	0.20
Control Delay	42.5	42.5	38.7	12.3	12.0	9.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	42.5	38.7	12.3	12.0	9.9	7.7
Queue Length 50th (ft)	109	109	81	98	9	10	34
Queue Length 95th (ft)	165	165	127	170	28	48	110
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	516	516	486	2030	908	570	2391
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.38	0.32	0.32	0.04	0.12	0.20

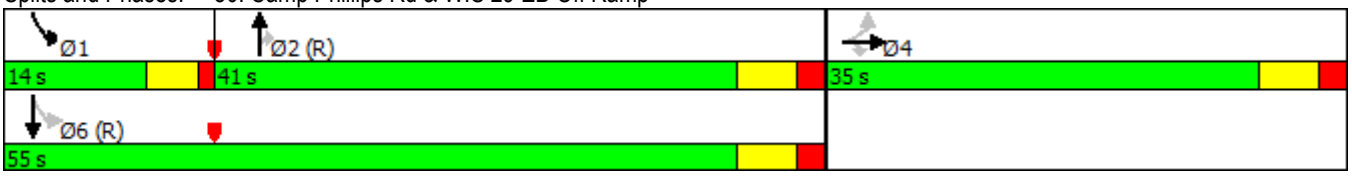
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	10.5	22.5	
Total Split (s)	35.0	35.0	35.0					41.0	41.0	14.0	55.0	
Total Split (%)	38.9%	38.9%	38.9%					45.6%	45.6%	15.6%	61.1%	
Maximum Green (s)	29.0	29.0	29.0					35.0	35.0	9.5	49.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	4.5	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	17.2	17.2	17.2					51.6	51.6	62.3	60.8	
Actuated g/C Ratio	0.19	0.19	0.19					0.57	0.57	0.69	0.68	
v/c Ratio	0.64	0.64	0.54					0.32	0.04	0.12	0.20	
Control Delay	42.5	42.5	38.7					12.3	12.0	9.9	7.7	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	42.5	42.5	38.7					12.3	12.0	9.9	7.7	
LOS	D	D	D					B	B	A	A	
Approach Delay		41.4						12.3			8.0	
Approach LOS		D						B			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 44 (49%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 20.0 Intersection LOS: B
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	0	280	0	0	0	0	580	65	60	430	0
Future Volume (vph)	355	0	280	0	0	0	0	580	65	60	430	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.351		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	654	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	394	0	156	0	0	0	0	644	36	67	478	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	197	197	156	0	0	0	0	644	36	67	478	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	90	0	25	0	0	0	25	555	0	0	395	315
Future Vol, veh/h	90	0	25	0	0	0	25	555	0	0	395	315
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	-	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	0	0	0	2	2	2	3	3	3
Mvmt Flow	96	0	27	0	0	0	27	590	0	0	420	335

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	936	1232	378	854	1399	295	755	0	0	590	0	0
Stage 1	588	588	-	644	644	-	-	-	-	-	-	-
Stage 2	348	644	-	210	755	-	-	-	-	-	-	-
Critical Hdwy	7.62	6.62	7.02	7.5	6.5	6.9	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.62	5.62	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	5.62	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.06	3.36	3.5	4	3.3	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	214	170	608	256	142	707	851	-	-	975	-	-
Stage 1	452	484	-	433	471	-	-	-	-	-	-	-
Stage 2	630	456	-	778	420	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	209	165	608	239	137	707	851	-	-	975	-	-
Mov Cap-2 Maneuver	209	165	-	239	137	-	-	-	-	-	-	-
Stage 1	438	484	-	419	456	-	-	-	-	-	-	-
Stage 2	610	442	-	744	420	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.6	0	0.4	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	851	-	-	209	-	608	-	975	-	-
HCM Lane V/C Ratio	0.031	-	-	0.458	-	0.044	-	-	-	-
HCM Control Delay (s)	9.4	-	-	36	0	11.2	0	0	-	-
HCM Lane LOS	A	-	-	E	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.2	-	0.1	-	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	25	0	0	0	25	555	0	0	395	315
Future Volume (vph)	90	0	25	0	0	0	25	555	0	0	395	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.933	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	1792	1524	0	1900	0	1770	3539	0	1845	3270	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1703	1792	1524	0	1900	0	1770	3539	0	1845	3270	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	6%	6%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	96	0	27	0	0	0	27	590	0	0	420	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	0	27	0	0	0	27	590	0	0	755	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 32.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	25	15	35	65	60	55	390	35	60	265	95
Future Volume (veh/h)	130	25	15	35	65	60	55	390	35	60	265	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	140	27	8	38	70	65	59	419	38	65	285	102
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	481	493	419	507	434	362	524	1342	121	487	1021	358
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1249	1863	1583	1224	1642	1367	992	3284	297	904	2499	875
Grp Volume(v), veh/h	140	27	8	38	67	68	59	225	232	65	194	193
Grp Sat Flow(s),veh/h/ln	1249	1863	1583	1224	1583	1425	992	1770	1810	904	1719	1655
Q Serve(g_s), s	3.6	0.4	0.1	0.9	1.2	1.3	1.6	3.2	3.2	1.9	2.8	2.9
Cycle Q Clear(g_c), s	4.9	0.4	0.1	1.3	1.2	1.3	4.4	3.2	3.2	5.1	2.8	2.9
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.16	1.00		0.53
Lane Grp Cap(c), veh/h	481	493	419	507	419	377	524	723	740	487	702	676
V/C Ratio(X)	0.29	0.05	0.02	0.08	0.16	0.18	0.11	0.31	0.31	0.13	0.28	0.29
Avail Cap(c_a), veh/h	1511	2030	1725	1516	1725	1553	1146	1832	1874	1053	1779	1713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.3	10.1	10.0	10.6	10.4	10.4	8.7	7.4	7.4	9.1	7.2	7.3
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.4	0.1	0.5	1.0	1.0	0.8	2.8	2.9	0.9	2.4	2.4
LnGrp Delay(d),s/veh	12.7	10.1	10.0	10.6	10.5	10.7	8.8	7.6	7.6	9.2	7.4	7.5
LnGrp LOS	B	B	A	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		175			173			516			452	
Approach Delay, s/veh		12.1			10.6			7.7			7.7	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		21.0		15.7		21.0		15.7
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		6.4		6.9		7.1		3.3
Green Ext Time (p_c), s		6.3		1.6		6.3		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

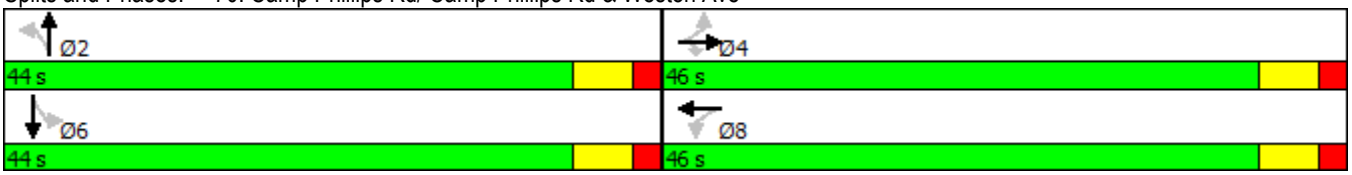
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	27	8	38	135	59	457	65	387
v/c Ratio	0.39	0.05	0.02	0.11	0.16	0.12	0.25	0.14	0.23
Control Delay	14.6	9.9	9.6	10.7	10.5	8.7	8.1	9.1	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	9.9	9.6	10.7	10.5	8.7	8.1	9.1	8.0
Queue Length 50th (ft)	23	4	1	6	11	7	31	8	25
Queue Length 95th (ft)	56	15	7	20	24	26	63	29	54
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1238	1859	1580	1230	2933	962	3455	874	3262
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.01	0.01	0.03	0.05	0.06	0.13	0.07	0.12

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	10.8	10.8	10.8	10.8	10.8		19.2	19.2		19.2	19.2	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29		0.52	0.52		0.52	0.52	
v/c Ratio	0.39	0.05	0.02	0.11	0.16		0.12	0.25		0.14	0.23	
Control Delay	14.6	9.9	9.6	10.7	10.5		8.7	8.1		9.1	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.6	9.9	9.6	10.7	10.5		8.7	8.1		9.1	8.0	
LOS	B	A	A	B	B		A	A		A	A	
Approach Delay		13.6			10.6			8.2			8.2	
Approach LOS		B			B			A			A	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 37.2	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 61.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	25	15	35	65	60	55	390	35	60	265	95
Future Volume (vph)	130	25	15	35	65	60	55	390	35	60	265	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.928			0.988			0.960	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2939	0	1770	3497	0	1719	3301	0
Flt Permitted	0.666			0.740			0.523			0.489		
Satd. Flow (perm)	1241	1863	1583	1233	2939	0	974	3497	0	885	3301	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	140	27	8	38	70	65	59	419	38	65	285	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	27	8	38	135	0	59	457	0	65	387	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	10	140	95	10	60	90	980	65	60	1060	20
Future Volume (veh/h)	25	10	140	95	10	60	90	980	65	60	1060	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	27	11	38	101	11	64	96	1043	0	64	1128	21
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	240	81	409	294	39	225	364	2180	975	365	1647	31
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.08	0.62	0.00	0.47	0.47	0.47
Sat Flow, veh/h	771	454	1581	974	216	1255	1757	3505	1568	533	3520	66
Grp Volume(v), veh/h	38	0	38	101	0	75	96	1043	0	64	562	587
Grp Sat Flow(s),veh/h/ln	1225	0	1581	974	0	1471	1757	1752	1568	533	1752	1833
Q Serve(g_s), s	0.3	0.0	1.1	4.3	0.0	2.7	1.5	9.7	0.0	4.4	15.1	15.1
Cycle Q Clear(g_c), s	3.0	0.0	1.1	7.3	0.0	2.7	1.5	9.7	0.0	4.8	15.1	15.1
Prop In Lane	0.71		1.00	1.00		0.85	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	322	0	409	294	0	264	364	2180	975	365	820	857
V/C Ratio(X)	0.12	0.00	0.09	0.34	0.00	0.28	0.26	0.48	0.00	0.18	0.68	0.69
Avail Cap(c_a), veh/h	922	0	1069	857	0	878	413	2439	1091	390	900	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	0.0	17.0	24.7	0.0	21.4	8.7	6.1	0.0	9.9	12.6	12.6
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.7	0.0	0.6	0.4	0.2	0.0	0.2	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	0.0	0.9	2.9	0.0	2.0	1.3	8.2	0.0	1.2	12.1	12.6
LnGrp Delay(d),s/veh	21.3	0.0	17.1	25.4	0.0	22.0	9.0	6.3	0.0	10.2	14.5	14.4
LnGrp LOS	C		B	C		C	A	A		B	B	B
Approach Vol, veh/h		76			176			1139			1213	
Approach Delay, s/veh		19.2			24.0			6.5			14.2	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		43.5		16.8	9.3	34.2		16.8
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.5	31.0		36.0
Max Q Clear Time (g_c+I1), s		11.7		5.0	3.5	17.1		9.3
Green Ext Time (p_c), s		20.2		1.4	0.1	11.1		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	140	95	10	60	90	980	65	60	1060	20
Future Volume (vph)	25	10	140	95	10	60	90	980	65	60	1060	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1798	1569		3237		1752	3505	1531	1751	3494	
Flt Permitted		0.73	1.00		0.79		0.13	1.00	1.00	0.27	1.00	
Satd. Flow (perm)		1353	1569		2627		240	3505	1531	506	3494	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	27	11	74	101	11	64	96	1043	35	64	1128	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	38	74	0	176	0	96	1043	35	64	1149	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		14.3	19.3		14.3		40.1	40.1	40.1	30.6	30.6	
Effective Green, g (s)		14.3	19.3		14.3		40.1	40.1	40.1	30.6	30.6	
Actuated g/C Ratio		0.22	0.29		0.22		0.60	0.60	0.60	0.46	0.46	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		291	456		565		258	2116	924	233	1610	
v/s Ratio Prot			0.01				0.03	c0.30			c0.33	
v/s Ratio Perm		0.03	0.03		c0.07		0.20		0.02	0.13		
v/c Ratio		0.13	0.16		0.31		0.37	0.49	0.04	0.27	0.71	
Uniform Delay, d1		21.0	17.5		21.9		8.1	7.4	5.3	11.0	14.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.2	0.2		0.3		0.9	0.2	0.0	0.6	1.5	
Delay (s)		21.2	17.7		22.2		9.0	7.6	5.3	11.7	15.9	
Level of Service		C	B		C		A	A	A	B	B	
Approach Delay (s)		18.9			22.2			7.6			15.7	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	16.5
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	38	74	176	96	1043	35	64	1149
v/c Ratio	0.13	0.14	0.31	0.32	0.50	0.04	0.27	0.71
Control Delay	21.6	13.3	23.2	10.1	10.3	8.3	19.4	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	13.3	23.2	10.1	10.3	8.3	19.4	20.1
Queue Length 50th (ft)	13	19	33	10	87	4	14	168
Queue Length 95th (ft)	33	40	55	56	295	27	66	#472
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	767	538	1489	302	2318	1011	247	1705
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.14	0.12	0.32	0.45	0.03	0.26	0.67

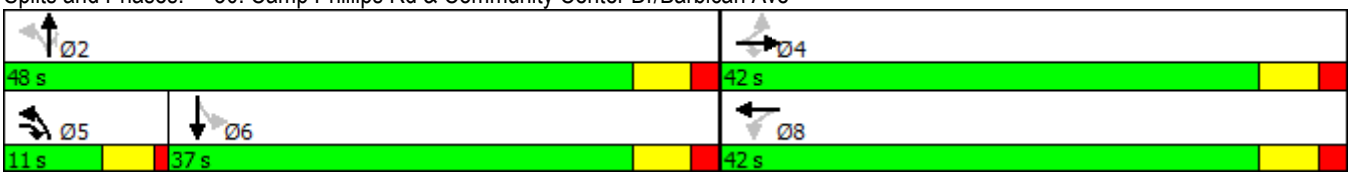
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	48.0	48.0	37.0	37.0	
Total Split (%)	46.7%	46.7%	12.2%	46.7%	46.7%		12.2%	53.3%	53.3%	41.1%	41.1%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	42.0	42.0	31.0	31.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.3	22.5		14.3		40.7	39.1	39.1	30.6	30.6	
Actuated g/C Ratio		0.22	0.34		0.22		0.62	0.59	0.59	0.46	0.46	
v/c Ratio		0.13	0.14		0.31		0.32	0.50	0.04	0.27	0.71	
Control Delay		21.6	13.3		23.2		10.1	10.3	8.3	19.4	20.1	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		21.6	13.3		23.2		10.1	10.3	8.3	19.4	20.1	
LOS		C	B		C		B	B	A	B	C	
Approach Delay		16.1			23.2			10.2			20.0	
Approach LOS		B			C			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 65.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	140	95	10	60	90	980	65	60	1060	20
Future Volume (vph)	25	10	140	95	10	60	90	980	65	60	1060	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99				0.98	1.00	1.00	
Frt			0.850		0.945				0.850		0.997	
Flt Protected		0.966			0.972		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	3236	0	1752	3505	1568	1752	3493	0
Flt Permitted		0.727			0.789		0.130			0.275		
Satd. Flow (perm)	0	1354	1563	0	2626	0	240	3505	1529	507	3493	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	27	11	74	101	11	64	96	1043	35	64	1128	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	74	0	176	0	96	1043	35	64	1149	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	50	0	90	440	1045	0	0	580	715
Future Volume (veh/h)	0	0	0	50	0	90	440	1045	0	0	580	715
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				51	0	0	449	1066	0	0	592	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				133	0	119	893	2730	0	0	1157	518
Arrive On Green				0.08	0.00	0.00	0.77	1.00	0.00	0.00	0.33	0.00
Sat Flow, veh/h				1660	0	1482	1740	3563	0	0	3563	1553
Grp Volume(v), veh/h				51	0	0	449	1066	0	0	592	0
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1740	1736	0	0	1736	1553
Q Serve(g_s), s				2.6	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0
Cycle Q Clear(g_c), s				2.6	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				133	0	119	893	2730	0	0	1157	518
V/C Ratio(X)				0.38	0.00	0.00	0.50	0.39	0.00	0.00	0.51	0.00
Avail Cap(c_a), veh/h				184	0	165	893	2730	0	0	1157	518
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.77	0.77	0.00	0.00	0.69	0.00
Uniform Delay (d), s/veh				39.3	0.0	0.0	4.0	0.0	0.0	0.0	24.1	0.0
Incr Delay (d2), s/veh				1.8	0.0	0.0	0.3	0.3	0.0	0.0	1.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				2.3	0.0	0.0	4.2	0.2	0.0	0.0	9.5	0.0
LnGrp Delay(d),s/veh				41.1	0.0	0.0	4.4	0.3	0.0	0.0	25.2	0.0
LnGrp LOS				D			A	A			C	
Approach Vol, veh/h					51			1515			592	
Approach Delay, s/veh					41.1			1.5			25.2	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		76.8			40.8	36.0		13.2
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		68.0			32.0	30.0		10.0
Max Q Clear Time (g_c+I1), s		2.0			2.0	14.3		4.6
Green Ext Time (p_c), s		12.7			10.9	3.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.0
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	50	0	90	440	1045	0	0	580	715
Future Volume (vph)	0	0	0	50	0	90	440	1045	0	0	580	715
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1656	1482	1736	3471			3471	1553
Flt Permitted					0.95	1.00	0.36	1.00			1.00	1.00
Satd. Flow (perm)					1656	1482	656	3471			3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	51	0	46	449	1066	0	0	592	365
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	51	46	449	1066	0	0	592	365
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					8.0	8.0	70.0	70.0			32.0	32.0
Effective Green, g (s)					8.0	8.0	70.0	70.0			32.0	32.0
Actuated g/C Ratio					0.09	0.09	0.78	0.78			0.36	0.36
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					147	131	894	2699			1234	552
v/s Ratio Prot							c0.18	0.31			0.17	
v/s Ratio Perm					0.03	c0.03	0.21					c0.24
v/c Ratio					0.35	0.35	0.50	0.39			0.48	0.66
Uniform Delay, d1					38.5	38.6	8.6	3.2			22.5	24.4
Progression Factor					1.00	1.00	0.40	0.21			1.00	1.00
Incremental Delay, d2					1.4	1.6	0.4	0.4			1.3	6.1
Delay (s)					40.0	40.2	3.8	1.0			23.9	30.6
Level of Service					D	D	A	A			C	C
Approach Delay (s)		0.0			40.1			1.9			26.4	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	51	46	449	1066	592	365
v/c Ratio	0.28	0.28	0.50	0.38	0.46	0.64
Control Delay	41.0	41.6	5.1	1.1	24.2	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	41.6	5.1	1.1	24.2	31.2
Queue Length 50th (ft)	27	24	1	0	141	179
Queue Length 95th (ft)	62	58	55	0	192	283
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	184	164	902	2792	1280	572
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.28	0.50	0.38	0.46	0.64

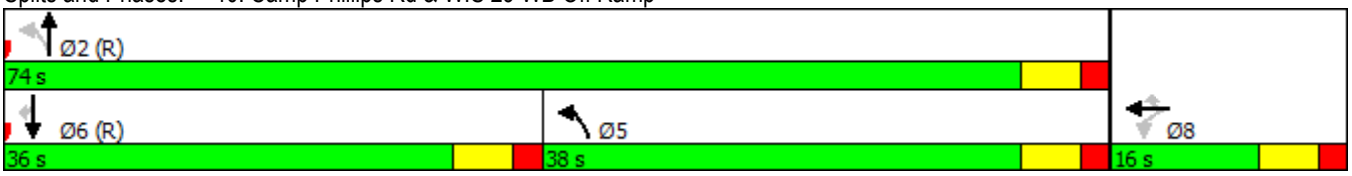
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	12.0	24.0			22.5	22.5
Total Split (s)				16.0	16.0	16.0	38.0	74.0			36.0	36.0
Total Split (%)				17.8%	17.8%	17.8%	42.2%	82.2%			40.0%	40.0%
Maximum Green (s)				10.0	10.0	10.0	32.0	68.0			30.0	30.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					10.0	10.0	71.2	72.4			33.2	33.2
Actuated g/C Ratio					0.11	0.11	0.79	0.80			0.37	0.37
v/c Ratio					0.28	0.28	0.50	0.38			0.46	0.64
Control Delay					41.0	41.6	5.1	1.1			24.2	31.2
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					41.0	41.6	5.1	1.1			24.2	31.2
LOS					D	D	A	A			C	C
Approach Delay					41.3			2.3			26.9	
Approach LOS					D			A			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 12.9 Intersection LOS: B
Intersection Capacity Utilization 69.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	50	0	90	440	1045	0	0	580	715
Future Volume (vph)	0	0	0	50	0	90	440	1045	0	0	580	715
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1656	1482	1736	3471	0	0	3471	1553
Flt Permitted					0.950		0.359					
Satd. Flow (perm)	0	0	0	0	1656	1482	656	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	51	0	46	449	1066	0	0	592	365
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	51	46	449	1066	0	0	592	365
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	765	0	305	0	0	0	0	720	90	150	480	0
Future Volume (veh/h)	765	0	305	0	0	0	0	720	90	150	480	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	773	0	0				0	727	0	152	485	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	914	0	408				0	1140	510	561	2156	0
Arrive On Green	0.26	0.00	0.00				0.00	0.32	0.00	0.29	0.81	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	773	0	0				0	727	0	152	485	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	18.6	0.0	0.0				0.0	15.8	0.0	0.0	2.9	0.0
Cycle Q Clear(g_c), s	18.6	0.0	0.0				0.0	15.8	0.0	0.0	2.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	914	0	408				0	1140	510	561	2156	0
V/C Ratio(X)	0.85	0.00	0.00				0.00	0.64	0.00	0.27	0.22	0.00
Avail Cap(c_a), veh/h	1340	0	598				0	1140	510	561	2156	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.88	0.88	0.00
Uniform Delay (d), s/veh	31.7	0.0	0.0				0.0	26.0	0.0	21.5	3.6	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.0				0.0	2.7	0.0	0.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.6	0.0	0.0				0.0	12.8	0.0	4.9	2.5	0.0
LnGrp Delay(d),s/veh	35.2	0.0	0.0				0.0	28.7	0.0	21.7	3.8	0.0
LnGrp LOS	D							C		C	A	
Approach Vol, veh/h		773						727			637	
Approach Delay, s/veh		35.2						28.7			8.1	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	25.8	35.0		29.2		60.8		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	9.0	29.0		34.0		44.0		
Max Q Clear Time (g_c+I1), s	2.0	17.8		20.6		4.9		
Green Ext Time (p_c), s	2.0	3.7		2.6		3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	765	0	305	0	0	0	0	720	90	150	480	0
Future Volume (vph)	765	0	305	0	0	0	0	720	90	150	480	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1681	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.30	1.00	
Satd. Flow (perm)	1681	1681	1583					3539	1583	552	3539	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	773	0	154	0	0	0	0	727	45	152	485	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	386	387	154	0	0	0	0	727	45	152	485	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	27.6	27.6	27.6					35.4	35.4	50.4	50.4	
Effective Green, g (s)	27.6	27.6	27.6					35.4	35.4	50.4	50.4	
Actuated g/C Ratio	0.31	0.31	0.31					0.39	0.39	0.56	0.56	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	515	515	485					1392	622	430	1981	
v/s Ratio Prot								c0.21		c0.04	0.14	
v/s Ratio Perm	0.23	0.23	0.10						0.03	0.16		
v/c Ratio	0.75	0.75	0.32					0.52	0.07	0.35	0.24	
Uniform Delay, d1	28.1	28.1	24.0					20.8	17.0	16.6	10.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.77	0.58	
Incremental Delay, d2	5.9	6.1	0.4					1.4	0.2	0.5	0.3	
Delay (s)	34.0	34.2	24.3					22.2	17.3	13.2	6.2	
Level of Service	C	C	C					C	B	B	A	
Approach Delay (s)		32.5			0.0			22.0			7.8	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	386	387	154	727	45	152	485
v/c Ratio	0.75	0.75	0.32	0.52	0.07	0.35	0.24
Control Delay	37.0	37.1	24.3	23.8	20.3	14.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	37.1	24.3	23.8	20.3	14.1	6.8
Queue Length 50th (ft)	203	204	66	165	16	38	16
Queue Length 95th (ft)	284	285	106	245	42	110	186
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	635	635	598	1392	622	430	1982
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.61	0.26	0.52	0.07	0.35	0.24

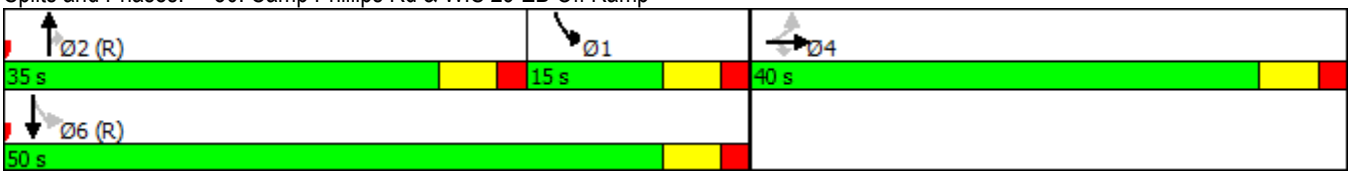
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	40.0	40.0	40.0					35.0	35.0	15.0	50.0	
Total Split (%)	44.4%	44.4%	44.4%					38.9%	38.9%	16.7%	55.6%	
Maximum Green (s)	34.0	34.0	34.0					29.0	29.0	9.0	44.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	27.6	27.6	27.6					35.4	35.4	50.4	50.4	
Actuated g/C Ratio	0.31	0.31	0.31					0.39	0.39	0.56	0.56	
v/c Ratio	0.75	0.75	0.32					0.52	0.07	0.35	0.24	
Control Delay	37.0	37.1	24.3					23.8	20.3	14.1	6.8	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	37.0	37.1	24.3					23.8	20.3	14.1	6.8	
LOS	D	D	C					C	C	B	A	
Approach Delay		35.0						23.6			8.5	
Approach LOS		C						C			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 24 (27%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 24.0 Intersection LOS: C
Intersection Capacity Utilization 69.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	765	0	305	0	0	0	0	720	90	150	480	0
Future Volume (vph)	765	0	305	0	0	0	0	720	90	150	480	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.296		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	551	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	773	0	154	0	0	0	0	727	45	152	485	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	386	387	154	0	0	0	0	727	45	152	485	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	30

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	200	0	35	0	0	0	30	610	0	0	610	175
Future Vol, veh/h	200	0	35	0	0	0	30	610	0	0	610	175
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	-	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	2	2	2
Mvmt Flow	211	0	37	0	0	0	32	642	0	0	642	184

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1118	1439	413	1026	1531	321	826	0	0	642	0	0
Stage 1	734	734	-	705	705	-	-	-	-	-	-	-
Stage 2	384	705	-	321	826	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.5	6.5	6.9	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.5	4	3.3	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 162	132	588	192	118	681	800	-	-	939	-	-
Stage 1	378	424	-	398	442	-	-	-	-	-	-	-
Stage 2	611	437	-	671	389	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 157	127	588	174	113	681	800	-	-	939	-	-
Mov Cap-2 Maneuver	~ 157	127	-	174	113	-	-	-	-	-	-	-
Stage 1	363	424	-	382	424	-	-	-	-	-	-	-
Stage 2	587	420	-	629	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	210.3	0	0.5	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	800	-	-	157	-	588	-	939	-	-
HCM Lane V/C Ratio	0.039	-	-	1.341	-	0.063	-	-	-	-
HCM Control Delay (s)	9.7	-	-	245.1	0	11.5	0	0	-	-
HCM Lane LOS	A	-	-	F	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	12.8	-	0.2	-	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	0	35	0	0	0	30	610	0	0	610	175
Future Volume (vph)	200	0	35	0	0	0	30	610	0	0	610	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.967	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	1583	0	1900	0	1770	3539	0	1863	3422	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	1863	1583	0	1900	0	1770	3539	0	1863	3422	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	211	0	37	0	0	0	32	642	0	0	642	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	0	37	0	0	0	32	642	0	0	826	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	45	55	65	60	70	15	370	45	80	460	105
Future Volume (veh/h)	200	45	55	65	60	70	15	370	45	80	460	105
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	211	47	29	68	63	74	16	389	47	84	484	111
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	505	545	464	533	499	446	411	1269	152	483	1142	260
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1247	1863	1583	1268	1703	1524	819	3183	382	949	2864	653
Grp Volume(v), veh/h	211	47	29	68	63	74	16	215	221	84	298	297
Grp Sat Flow(s),veh/h/ln	1247	1863	1583	1268	1703	1524	819	1770	1795	949	1770	1748
Q Serve(g_s), s	5.9	0.7	0.5	1.6	1.1	1.4	0.6	3.2	3.3	2.6	4.7	4.8
Cycle Q Clear(g_c), s	7.3	0.7	0.5	2.3	1.1	1.4	5.4	3.2	3.3	5.9	4.7	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.21	1.00		0.37
Lane Grp Cap(c), veh/h	505	545	464	533	499	446	411	705	716	483	705	697
V/C Ratio(X)	0.42	0.09	0.06	0.13	0.13	0.17	0.04	0.31	0.31	0.17	0.42	0.43
Avail Cap(c_a), veh/h	1455	1964	1669	1499	1795	1606	864	1684	1708	1008	1684	1663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	10.0	9.9	10.8	10.1	10.2	10.4	8.0	8.0	10.0	8.5	8.5
Incr Delay (d2), s/veh	0.6	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.2	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	0.7	0.4	1.0	0.9	1.1	0.2	2.9	3.0	1.3	4.2	4.2
LnGrp Delay(d),s/veh	13.5	10.0	10.0	10.9	10.2	10.4	10.4	8.2	8.3	10.2	8.9	8.9
LnGrp LOS	B	B	A	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		287			205			452			679	
Approach Delay, s/veh		12.6			10.5			8.3			9.0	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		21.5		17.4		21.5		17.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		7.4		9.3		7.9		4.3
Green Ext Time (p_c), s		7.7		2.2		7.6		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

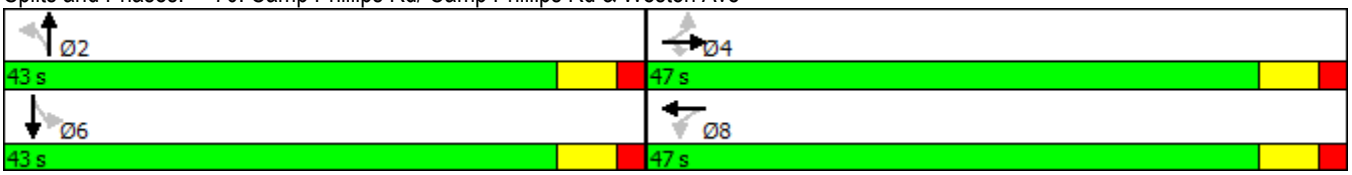
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	211	47	29	68	137	16	436	84	595
v/c Ratio	0.54	0.08	0.06	0.17	0.14	0.05	0.32	0.23	0.44
Control Delay	17.5	10.2	10.1	11.3	10.4	9.9	10.2	11.7	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	10.2	10.1	11.3	10.4	9.9	10.2	11.7	11.2
Queue Length 50th (ft)	37	7	4	10	11	2	33	12	47
Queue Length 95th (ft)	95	25	18	34	27	12	75	43	104
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1178	1772	1506	1237	2977	720	3154	842	3115
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.03	0.02	0.05	0.05	0.02	0.14	0.10	0.19

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	13.1	13.1	13.1	13.1	13.1		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32		0.39	0.39		0.39	0.39	
v/c Ratio	0.54	0.08	0.06	0.17	0.14		0.05	0.32		0.23	0.44	
Control Delay	17.5	10.2	10.1	11.3	10.4		9.9	10.2		11.7	11.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.5	10.2	10.1	11.3	10.4		9.9	10.2		11.7	11.2	
LOS	B	B	B	B	B		A	B		B	B	
Approach Delay		15.6			10.7			10.2			11.3	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 41.5	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 11.7	Intersection LOS: B
Intersection Capacity Utilization 68.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	45	55	65	60	70	15	370	45	80	460	105
Future Volume (vph)	200	45	55	65	60	70	15	370	45	80	460	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.919			0.984			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3130	0	1770	3483	0	1770	3440	0
Flt Permitted	0.665			0.726			0.427			0.499		
Satd. Flow (perm)	1239	1863	1583	1301	3130	0	795	3483	0	930	3440	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	211	47	29	68	63	74	16	389	47	84	484	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	47	29	68	137	0	16	436	0	84	595	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Appendix B:
Existing Transportation System with Background Traffic Operational Analysis

2030 Background Traffic, Existing Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	135	80	20	40	140	685	40	35	1045	40
Future Volume (veh/h)	10	10	135	80	20	40	140	685	40	35	1045	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	11	11	45	87	22	43	152	745	0	38	1136	43
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	193	164	415	298	87	171	364	2143	959	440	1560	59
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.09	0.63	0.00	0.46	0.46	0.46
Sat Flow, veh/h	606	961	1581	1047	513	1003	1707	3406	1524	691	3378	128
Grp Volume(v), veh/h	22	0	45	87	0	65	152	745	0	38	578	601
Grp Sat Flow(s),veh/h/ln	1568	0	1581	1047	0	1516	1707	1703	1524	691	1719	1787
Q Serve(g_s), s	0.0	0.0	1.3	3.6	0.0	2.2	2.4	6.2	0.0	1.9	16.3	16.3
Cycle Q Clear(g_c), s	2.2	0.0	1.3	5.8	0.0	2.2	2.4	6.2	0.0	1.9	16.3	16.3
Prop In Lane	0.50		1.00	1.00		0.66	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	357	0	415	298	0	258	364	2143	959	440	794	825
V/C Ratio(X)	0.06	0.00	0.11	0.29	0.00	0.25	0.42	0.35	0.00	0.09	0.73	0.73
Avail Cap(c_a), veh/h	1026	0	1097	877	0	912	392	2390	1069	478	890	926
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	16.8	24.1	0.0	21.5	9.8	5.3	0.0	9.2	13.1	13.1
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.5	0.0	0.5	0.8	0.1	0.0	0.1	2.7	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	1.0	2.5	0.0	1.7	2.2	5.3	0.0	0.7	13.0	13.4
LnGrp Delay(d),s/veh	20.9	0.0	16.9	24.6	0.0	22.0	10.6	5.4	0.0	9.3	15.7	15.6
LnGrp LOS	C		B	C		C	B	A		A	B	B
Approach Vol, veh/h		67			152			897			1217	
Approach Delay, s/veh		18.2			23.5			6.2			15.5	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		43.7		16.2	10.0	33.6		16.2
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.5	31.0		36.0
Max Q Clear Time (g_c+I1), s		8.2		4.2	4.4	18.3		7.8
Green Ext Time (p_c), s		18.1		1.1	0.1	9.3		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	135	80	20	40	140	685	40	35	1045	40
Future Volume (vph)	10	10	135	80	20	40	140	685	40	35	1045	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1817	1570		3282		1703	3406	1487	1717	3418	
Flt Permitted		0.83	1.00		0.80		0.12	1.00	1.00	0.37	1.00	
Satd. Flow (perm)		1551	1570		2688		215	3406	1487	666	3418	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	11	11	73	87	22	43	152	745	22	38	1136	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	22	73	0	152	0	152	745	22	38	1179	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		14.2	20.8		14.2		42.8	42.8	42.8	31.7	31.7	
Effective Green, g (s)		14.2	20.8		14.2		42.8	42.8	42.8	31.7	31.7	
Actuated g/C Ratio		0.21	0.30		0.21		0.62	0.62	0.62	0.46	0.46	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		319	473		553		275	2112	922	305	1570	
v/s Ratio Prot			0.01				c0.05	0.22			c0.34	
v/s Ratio Perm		0.01	0.03		c0.06		0.29		0.01	0.06		
v/c Ratio		0.07	0.15		0.27		0.55	0.35	0.02	0.12	0.75	
Uniform Delay, d1		22.1	17.7		23.1		9.1	6.4	5.0	10.7	15.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	0.2		0.3		2.4	0.1	0.0	0.2	2.1	
Delay (s)		22.2	17.8		23.3		11.5	6.5	5.1	10.9	17.5	
Level of Service		C	B		C		B	A	A	B	B	
Approach Delay (s)		18.8			23.3			7.3			17.3	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	22	73	152	152	745	22	38	1179
v/c Ratio	0.07	0.14	0.28	0.54	0.35	0.02	0.12	0.76
Control Delay	20.6	13.5	23.2	17.0	8.7	8.4	15.7	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	13.5	23.2	17.0	8.7	8.4	15.7	21.8
Queue Length 50th (ft)	7	19	28	17	55	2	8	177
Queue Length 95th (ft)	22	40	48	#121	195	20	39	#498
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	822	506	1425	280	2106	919	304	1560
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.14	0.11	0.54	0.35	0.02	0.13	0.76

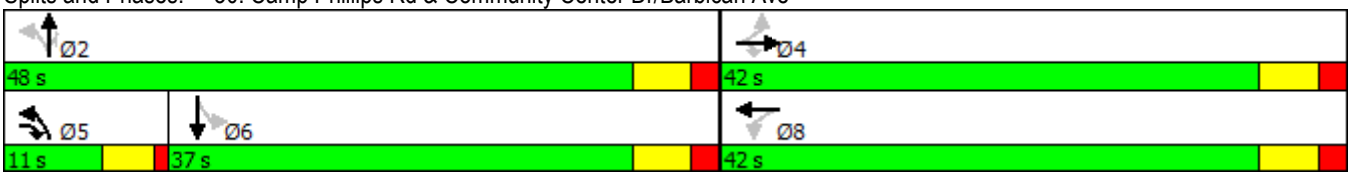
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	48.0	48.0	37.0	37.0	
Total Split (%)	46.7%	46.7%	12.2%	46.7%	46.7%		12.2%	53.3%	53.3%	41.1%	41.1%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	42.0	42.0	31.0	31.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.2	22.3		14.2		44.3	42.8	42.8	31.6	31.6	
Actuated g/C Ratio		0.21	0.32		0.21		0.64	0.62	0.62	0.46	0.46	
v/c Ratio		0.07	0.14		0.28		0.54	0.35	0.02	0.12	0.76	
Control Delay		20.6	13.5		23.2		17.0	8.7	8.4	15.7	21.8	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		20.6	13.5		23.2		17.0	8.7	8.4	15.7	21.8	
LOS		C	B		C		B	A	A	B	C	
Approach Delay		15.1			23.3			10.0			21.6	
Approach LOS		B			C			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 69.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	135	80	20	40	140	685	40	35	1045	40
Future Volume (vph)	10	10	135	80	20	40	140	685	40	35	1045	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98	1.00	1.00	
Frt			0.850		0.958				0.850		0.995	
Flt Protected		0.976			0.972		0.950			0.950		
Satd. Flow (prot)	0	1818	1583	0	3284	0	1703	3406	1524	1719	3419	0
Flt Permitted		0.833			0.796		0.120			0.369		
Satd. Flow (perm)	0	1551	1563	0	2688	0	215	3406	1486	667	3419	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	11	11	73	87	22	43	152	745	22	38	1136	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	73	0	152	0	152	745	22	38	1179	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	100	0	190	405	675	0	0	480	780
Future Volume (veh/h)	0	0	0	100	0	190	405	675	0	0	480	780
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				105	0	0	426	711	0	0	505	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				183	0	163	814	2576	0	0	1362	609
Arrive On Green				0.10	0.00	0.00	0.59	1.00	0.00	0.00	0.40	0.00
Sat Flow, veh/h				1774	0	1583	1691	3463	0	0	3495	1524
Grp Volume(v), veh/h				105	0	0	426	711	0	0	505	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1691	1687	0	0	1703	1524
Q Serve(g_s), s				5.1	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0
Cycle Q Clear(g_c), s				5.1	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				183	0	163	814	2576	0	0	1362	609
V/C Ratio(X)				0.57	0.00	0.00	0.52	0.28	0.00	0.00	0.37	0.00
Avail Cap(c_a), veh/h				197	0	176	814	2576	0	0	1362	609
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.89	0.89	0.00	0.00	0.62	0.00
Uniform Delay (d), s/veh				38.5	0.0	0.0	6.8	0.0	0.0	0.0	19.0	0.0
Incr Delay (d2), s/veh				3.5	0.0	0.0	0.5	0.2	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				4.8	0.0	0.0	6.8	0.2	0.0	0.0	7.3	0.0
LnGrp Delay(d),s/veh				42.0	0.0	0.0	7.3	0.2	0.0	0.0	19.5	0.0
LnGrp LOS				D			A	A			B	
Approach Vol, veh/h					105			1137			505	
Approach Delay, s/veh					42.0			2.9			19.5	
Approach LOS					D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		74.7			32.7	42.0		15.3
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		68.0			26.0	36.0		10.0
Max Q Clear Time (g_c+I1), s		2.0			2.0	11.4		7.1
Green Ext Time (p_c), s		7.9			6.9	3.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	190	405	675	0	0	480	780
Future Volume (vph)	0	0	0	100	0	190	405	675	0	0	480	780
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1770	1583	1687	3374			3406	1524
Flt Permitted					0.95	1.00	0.43	1.00			1.00	1.00
Satd. Flow (perm)					1770	1583	762	3374			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	105	0	100	426	711	0	0	505	411
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	105	100	426	711	0	0	505	411
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					10.0	10.0	68.0	68.0			36.0	36.0
Effective Green, g (s)					10.0	10.0	68.0	68.0			36.0	36.0
Actuated g/C Ratio					0.11	0.11	0.76	0.76			0.40	0.40
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					196	175	842	2549			1362	609
v/s Ratio Prot							c0.15	0.21			0.15	
v/s Ratio Perm					0.06	c0.06	0.24					c0.27
v/c Ratio					0.54	0.57	0.51	0.28			0.37	0.67
Uniform Delay, d1					37.8	38.0	7.4	3.4			19.0	22.2
Progression Factor					1.00	1.00	0.84	0.26			1.00	1.00
Incremental Delay, d2					2.8	4.5	0.4	0.3			0.8	5.9
Delay (s)					40.6	42.4	6.6	1.1			19.8	28.1
Level of Service					D	D	A	A			B	C
Approach Delay (s)		0.0			41.5			3.2			23.5	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	105	100	426	711	505	411
v/c Ratio	0.54	0.57	0.51	0.28	0.37	0.67
Control Delay	48.6	51.8	8.1	1.2	20.0	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	51.8	8.1	1.2	20.0	28.9
Queue Length 50th (ft)	57	55	118	10	104	188
Queue Length 95th (ft)	110	#115	273	12	145	295
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	196	175	842	2549	1362	609
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.57	0.51	0.28	0.37	0.67

Intersection Summary

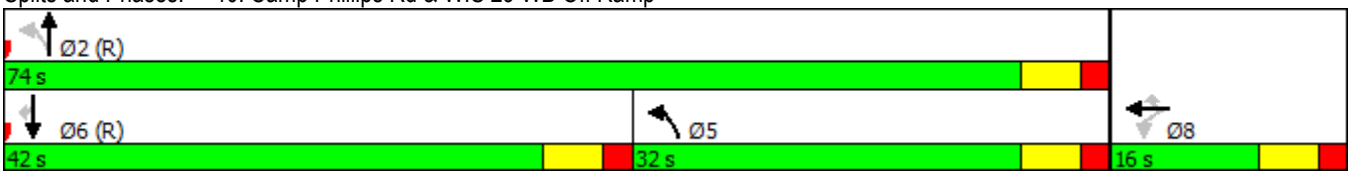
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	12.0	24.0			22.5	22.5
Total Split (s)				16.0	16.0	16.0	32.0	74.0			42.0	42.0
Total Split (%)				17.8%	17.8%	17.8%	35.6%	82.2%			46.7%	46.7%
Maximum Green (s)				10.0	10.0	10.0	26.0	68.0			36.0	36.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					10.0	10.0	68.0	68.0			36.0	36.0
Actuated g/C Ratio					0.11	0.11	0.76	0.76			0.40	0.40
v/c Ratio					0.54	0.57	0.51	0.28			0.37	0.67
Control Delay					48.6	51.8	8.1	1.2			20.0	28.9
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					48.6	51.8	8.1	1.2			20.0	28.9
LOS					D	D	A	A			C	C
Approach Delay					50.2			3.8			24.0	
Approach LOS					D			A			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 69.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	190	405	675	0	0	480	780
Future Volume (vph)	0	0	0	100	0	190	405	675	0	0	480	780
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1770	1583	1687	3374	0	0	3406	1524
Flt Permitted					0.950		0.429					
Satd. Flow (perm)	0	0	0	0	1770	1583	762	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	105	0	100	426	711	0	0	505	411
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	105	100	426	711	0	0	505	411
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	0	310	0	0	0	0	685	70	65	515	0
Future Volume (veh/h)	395	0	310	0	0	0	0	685	70	65	515	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	439	0	0				0	761	0	72	572	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	550	0	245				0	1416	633	651	2492	0
Arrive On Green	0.16	0.00	0.00				0.00	0.40	0.00	0.32	0.94	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	439	0	0				0	761	0	72	572	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	11.2	0.0	0.0				0.0	14.8	0.0	0.0	1.2	0.0
Cycle Q Clear(g_c), s	11.2	0.0	0.0				0.0	14.8	0.0	0.0	1.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	550	0	245				0	1416	633	651	2492	0
V/C Ratio(X)	0.80	0.00	0.00				0.00	0.54	0.00	0.11	0.23	0.00
Avail Cap(c_a), veh/h	1052	0	470				0	1416	633	651	2492	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.94	0.94	0.00
Uniform Delay (d), s/veh	36.3	0.0	0.0				0.0	20.6	0.0	13.4	0.9	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0				0.0	1.5	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.3	0.0	0.0				0.0	12.0	0.0	1.8	1.0	0.0
LnGrp Delay(d),s/veh	39.0	0.0	0.0				0.0	22.1	0.0	13.5	1.1	0.0
LnGrp LOS	D							C		B	A	
Approach Vol, veh/h		439						761			644	
Approach Delay, s/veh		39.0						22.1			2.5	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	27.4	42.0		20.6		69.4		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	8.0	36.0		28.0		50.0		
Max Q Clear Time (g_c+I1), s	2.0	16.8		13.2		3.2		
Green Ext Time (p_c), s	2.0	5.0		1.4		4.4		

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	0	310	0	0	0	0	685	70	65	515	0
Future Volume (vph)	395	0	310	0	0	0	0	685	70	65	515	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1603	1509					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.32	1.00	
Satd. Flow (perm)	1603	1603	1509					3539	1583	596	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	439	0	172	0	0	0	0	761	39	72	572	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	219	220	172	0	0	0	0	761	39	72	572	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	18.5	18.5	18.5					47.1	47.1	59.5	59.5	
Effective Green, g (s)	18.5	18.5	18.5					47.1	47.1	59.5	59.5	
Actuated g/C Ratio	0.21	0.21	0.21					0.52	0.52	0.66	0.66	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	329	329	310					1852	828	477	2339	
v/s Ratio Prot								c0.22		0.01	c0.16	
v/s Ratio Perm	0.14	0.14	0.11						0.02	0.09		
v/c Ratio	0.67	0.67	0.55					0.41	0.05	0.15	0.24	
Uniform Delay, d1	32.9	32.9	32.1					13.0	10.5	8.4	6.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.46	0.84	
Incremental Delay, d2	5.0	5.1	2.1					0.7	0.1	0.1	0.2	
Delay (s)	37.9	38.0	34.2					13.7	10.6	4.0	5.4	
Level of Service	D	D	C					B	B	A	A	
Approach Delay (s)		36.9			0.0			13.6			5.2	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	219	220	172	761	39	72	572
v/c Ratio	0.66	0.67	0.55	0.40	0.05	0.15	0.24
Control Delay	41.8	42.0	37.7	15.2	13.9	4.3	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	42.0	37.7	15.2	13.9	4.3	6.1
Queue Length 50th (ft)	122	122	88	136	11	1	35
Queue Length 95th (ft)	178	180	136	218	32	15	177
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	498	498	469	1897	848	498	2338
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.44	0.37	0.40	0.05	0.14	0.24

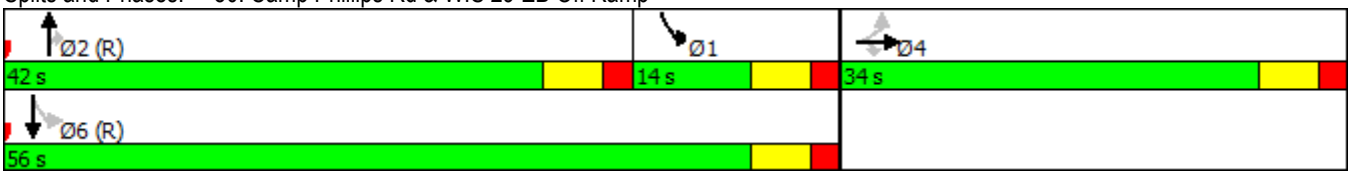
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	34.0	34.0	34.0					42.0	42.0	14.0	56.0	
Total Split (%)	37.8%	37.8%	37.8%					46.7%	46.7%	15.6%	62.2%	
Maximum Green (s)	28.0	28.0	28.0					36.0	36.0	8.0	50.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	18.5	18.5	18.5					48.3	48.3	59.5	59.5	
Actuated g/C Ratio	0.21	0.21	0.21					0.54	0.54	0.66	0.66	
v/c Ratio	0.66	0.67	0.55					0.40	0.05	0.15	0.24	
Control Delay	41.8	42.0	37.7					15.2	13.9	4.3	6.1	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	41.8	42.0	37.7					15.2	13.9	4.3	6.1	
LOS	D	D	D					B	B	A	A	
Approach Delay		40.7						15.1			5.9	
Approach LOS		D						B			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 24 (27%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 19.9 Intersection LOS: B
Intersection Capacity Utilization 69.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	0	310	0	0	0	0	685	70	65	515	0
Future Volume (vph)	395	0	310	0	0	0	0	685	70	65	515	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.320		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	596	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	439	0	172	0	0	0	0	761	39	72	572	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	219	220	172	0	0	0	0	761	39	72	572	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	0	30	0	0	0	30	650	0	0	450	375
Future Vol, veh/h	105	0	30	0	0	0	30	650	0	0	450	375
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	-	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	0	0	0	2	2	2	3	3	3
Mvmt Flow	112	0	32	0	0	0	32	691	0	0	479	399

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1088	1433	439	994	1633	346	878	0	0	691	0	0
Stage 1	678	678	-	755	755	-	-	-	-	-	-	-
Stage 2	410	755	-	239	878	-	-	-	-	-	-	-
Critical Hdwy	7.62	6.62	7.02	7.5	6.5	6.9	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.62	5.62	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	5.62	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.06	3.36	3.5	4	3.3	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	165	128	555	202	102	656	765	-	-	893	-	-
Stage 1	399	440	-	371	420	-	-	-	-	-	-	-
Stage 2	579	405	-	749	368	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	160	123	555	184	98	656	765	-	-	893	-	-
Mov Cap-2 Maneuver	160	123	-	184	98	-	-	-	-	-	-	-
Stage 1	382	440	-	355	402	-	-	-	-	-	-	-
Stage 2	555	388	-	706	368	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	55.3	0	0.4	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	765	-	-	160	-	555	-	893	-	-
HCM Lane V/C Ratio	0.042	-	-	0.698	-	0.058	-	-	-	-
HCM Control Delay (s)	9.9	-	-	67.7	0	11.9	0	0	-	-
HCM Lane LOS	A	-	-	F	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	4.1	-	0.2	-	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	0	30	0	0	0	30	650	0	0	450	375
Future Volume (vph)	105	0	30	0	0	0	30	650	0	0	450	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.932	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	1792	1524	0	1900	0	1770	3539	0	1845	3267	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1703	1792	1524	0	1900	0	1770	3539	0	1845	3267	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	6%	6%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	112	0	32	0	0	0	32	691	0	0	479	399
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	0	32	0	0	0	32	691	0	0	878	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	40	20	45	90	80	70	435	45	70	295	115
Future Volume (veh/h)	165	40	20	45	90	80	70	435	45	70	295	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	177	43	11	48	97	86	75	468	48	75	317	124
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	468	534	454	508	478	386	483	1322	135	446	991	380
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1196	1863	1583	1203	1667	1346	944	3243	331	856	2431	933
Grp Volume(v), veh/h	177	43	11	48	92	91	75	255	261	75	222	219
Grp Sat Flow(s),veh/h/ln	1196	1863	1583	1203	1583	1429	944	1770	1804	856	1719	1645
Q Serve(g_s), s	5.2	0.7	0.2	1.2	1.7	1.9	2.3	3.9	3.9	2.6	3.5	3.6
Cycle Q Clear(g_c), s	7.1	0.7	0.2	1.9	1.7	1.9	5.9	3.9	3.9	6.6	3.5	3.6
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.18	1.00		0.57
Lane Grp Cap(c), veh/h	468	534	454	508	454	410	483	722	736	446	701	671
V/C Ratio(X)	0.38	0.08	0.02	0.09	0.20	0.22	0.16	0.35	0.36	0.17	0.32	0.33
Avail Cap(c_a), veh/h	1343	1897	1612	1388	1612	1455	1011	1712	1745	926	1663	1591
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	10.2	10.1	10.9	10.6	10.7	10.0	8.0	8.1	10.3	7.9	7.9
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.1	0.2	0.3	0.1	0.3	0.3	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.6	0.2	0.7	1.4	1.4	1.1	3.5	3.6	1.1	3.0	2.9
LnGrp Delay(d),s/veh	13.9	10.3	10.1	11.0	10.8	10.9	10.1	8.3	8.3	10.5	8.2	8.2
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		231			231			591			516	
Approach Delay, s/veh		13.0			10.9			8.6			8.5	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.0		17.3		22.0		17.3
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		7.9		9.1		8.6		3.9
Green Ext Time (p_c), s		7.5		2.2		7.5		2.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

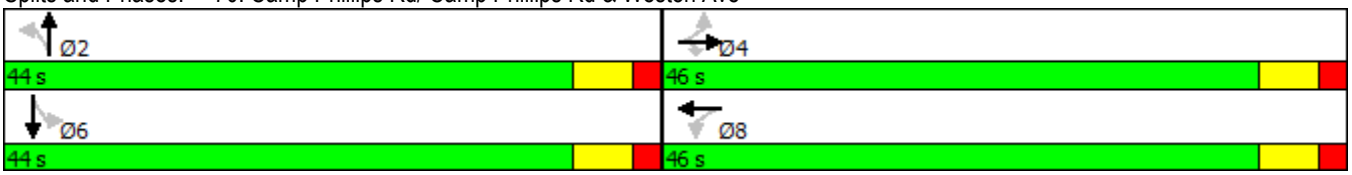
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	43	11	48	183	75	516	75	441
v/c Ratio	0.44	0.07	0.02	0.12	0.18	0.16	0.29	0.18	0.26
Control Delay	15.3	10.0	9.6	10.7	10.6	10.1	9.0	10.5	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	10.0	9.6	10.7	10.6	10.1	9.0	10.5	8.9
Queue Length 50th (ft)	30	6	2	7	14	10	37	10	31
Queue Length 95th (ft)	76	22	9	25	33	36	81	37	71
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1151	1810	1538	1180	2861	880	3326	795	3139
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.02	0.01	0.04	0.06	0.09	0.16	0.09	0.14

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	12.4	12.4	12.4	12.4	12.4		18.8	18.8		18.8	18.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34		0.51	0.51		0.51	0.51	
v/c Ratio	0.44	0.07	0.02	0.12	0.18		0.16	0.29		0.18	0.26	
Control Delay	15.3	10.0	9.6	10.7	10.6		10.1	9.0		10.5	8.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.3	10.0	9.6	10.7	10.6		10.1	9.0		10.5	8.9	
LOS	B	B	A	B	B		B	A		B	A	
Approach Delay		14.0			10.6			9.2			9.2	
Approach LOS		B			B			A			A	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 36.7	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 10.1	Intersection LOS: B
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	40	20	45	90	80	70	435	45	70	295	115
Future Volume (vph)	165	40	20	45	90	80	70	435	45	70	295	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.930			0.986			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2945	0	1770	3490	0	1719	3294	0
Flt Permitted	0.636			0.729			0.496			0.461		
Satd. Flow (perm)	1185	1863	1583	1215	2945	0	924	3490	0	834	3294	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	177	43	11	48	97	86	75	468	48	75	317	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	43	11	48	183	0	75	516	0	75	441	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	20	185	125	20	85	120	1135	90	80	1155	30
Future Volume (veh/h)	35	20	185	125	20	85	120	1135	90	80	1155	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	37	21	62	133	21	90	128	1207	0	85	1229	32
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	236	117	485	301	65	278	309	2122	949	280	1634	43
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.08	0.61	0.00	0.47	0.47	0.47
Sat Flow, veh/h	673	506	1581	878	280	1201	1757	3505	1568	457	3490	91
Grp Volume(v), veh/h	58	0	62	133	0	111	128	1207	0	85	617	644
Grp Sat Flow(s),veh/h/ln	1179	0	1581	878	0	1481	1757	1752	1568	457	1752	1828
Q Serve(g_s), s	1.0	0.0	2.1	7.0	0.0	4.6	2.5	15.2	0.0	10.1	21.2	21.2
Cycle Q Clear(g_c), s	5.6	0.0	2.1	12.6	0.0	4.6	2.5	15.2	0.0	15.3	21.2	21.2
Prop In Lane	0.64		1.00	1.00		0.81	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	353	0	485	301	0	342	309	2122	949	280	821	856
V/C Ratio(X)	0.16	0.00	0.13	0.44	0.00	0.32	0.41	0.57	0.00	0.30	0.75	0.75
Avail Cap(c_a), veh/h	726	0	896	640	0	727	331	2244	1004	290	860	897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	18.3	29.2	0.0	23.5	12.5	8.7	0.0	16.4	16.0	16.0
Incr Delay (d2), s/veh	0.2	0.0	0.1	1.0	0.0	0.5	0.9	0.3	0.0	0.6	3.6	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	0.0	1.7	4.7	0.0	3.4	2.2	11.7	0.0	2.4	16.3	16.9
LnGrp Delay(d),s/veh	23.7	0.0	18.5	30.2	0.0	24.0	13.4	9.0	0.0	17.0	19.6	19.5
LnGrp LOS	C		B	C		C	B	A		B	B	B
Approach Vol, veh/h		120			244			1335			1346	
Approach Delay, s/veh		21.0			27.4			9.4			19.4	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		50.4		22.9	10.1	40.4		22.9
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		47.0		36.0	6.5	36.0		36.0
Max Q Clear Time (g_c+I1), s		17.2		7.6	4.5	23.2		14.6
Green Ext Time (p_c), s		22.8		2.0	0.1	11.1		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	20	185	125	20	85	120	1135	90	80	1155	30
Future Volume (vph)	35	20	185	125	20	85	120	1135	90	80	1155	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1569		3238		1752	3505	1530	1751	3490	
Flt Permitted		0.70	1.00		0.78		0.10	1.00	1.00	0.23	1.00	
Satd. Flow (perm)		1295	1569		2611		190	3505	1530	430	3490	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	37	21	98	133	21	90	128	1207	48	85	1229	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	58	98	0	244	0	128	1207	48	85	1261	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		15.4	22.0		15.4		45.4	45.4	45.4	34.3	34.3	
Effective Green, g (s)		15.4	22.0		15.4		45.4	45.4	45.4	34.3	34.3	
Actuated g/C Ratio		0.21	0.30		0.21		0.62	0.62	0.62	0.47	0.47	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		273	474		552		260	2185	954	202	1644	
v/s Ratio Prot			0.02				0.04	c0.34			c0.36	
v/s Ratio Perm		0.04	0.04		c0.09		0.26		0.03	0.20		
v/c Ratio		0.21	0.21		0.44		0.49	0.55	0.05	0.42	0.77	
Uniform Delay, d1		23.7	18.9		25.0		9.9	7.9	5.3	12.7	15.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.4	0.2		0.6		1.5	0.3	0.0	1.4	2.2	
Delay (s)		24.1	19.1		25.5		11.4	8.2	5.3	14.1	18.1	
Level of Service		C	B		C		B	A	A	B	B	
Approach Delay (s)		21.0			25.5			8.4			17.9	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	58	98	244	128	1207	48	85	1261
v/c Ratio	0.21	0.19	0.44	0.48	0.55	0.05	0.42	0.77
Control Delay	25.1	15.8	27.3	15.1	10.8	8.1	24.6	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	15.8	27.3	15.1	10.8	8.1	24.6	22.1
Queue Length 50th (ft)	22	29	52	16	120	6	21	208
Queue Length 95th (ft)	50	56	81	#93	360	33	94	#531
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	651	506	1315	264	2304	1004	215	1757
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.19	0.19	0.48	0.52	0.05	0.40	0.72

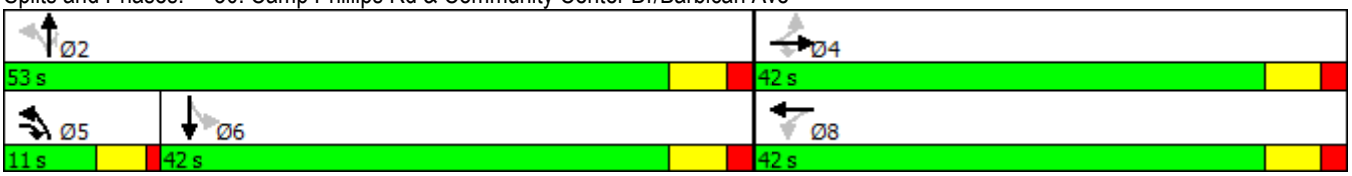
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	39.0	39.0	10.5	42.0	42.0		10.5	39.0	39.0	38.0	38.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	53.0	53.0	42.0	42.0	
Total Split (%)	44.2%	44.2%	11.6%	44.2%	44.2%		11.6%	55.8%	55.8%	44.2%	44.2%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	47.0	47.0	36.0	36.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	28.0	28.0		31.0	31.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		15.4	23.6		15.4		46.9	45.4	45.4	34.2	34.2	
Actuated g/C Ratio		0.21	0.32		0.21		0.64	0.62	0.62	0.47	0.47	
v/c Ratio		0.21	0.19		0.44		0.48	0.55	0.05	0.42	0.77	
Control Delay		25.1	15.8		27.3		15.1	10.8	8.1	24.6	22.1	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		25.1	15.8		27.3		15.1	10.8	8.1	24.6	22.1	
LOS		C	B		C		B	B	A	C	C	
Approach Delay		19.3			27.3			11.1			22.3	
Approach LOS		B			C			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 95	
Actuated Cycle Length: 73.1	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 73.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	20	185	125	20	85	120	1135	90	80	1155	30
Future Volume (vph)	35	20	185	125	20	85	120	1135	90	80	1155	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99				0.97	1.00	1.00	
Frt			0.850		0.945				0.850		0.996	
Flt Protected		0.969			0.973		0.950			0.950		
Satd. Flow (prot)	0	1805	1583	0	3239	0	1752	3505	1568	1752	3489	0
Flt Permitted		0.695			0.785		0.103			0.233		
Satd. Flow (perm)	0	1294	1563	0	2612	0	190	3505	1528	429	3489	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	37	21	98	133	21	90	128	1207	48	85	1229	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	58	98	0	244	0	128	1207	48	85	1261	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	55	0	105	485	1240	0	0	680	785
Future Volume (veh/h)	0	0	0	55	0	105	485	1240	0	0	680	785
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				56	0	0	495	1265	0	0	694	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				139	0	124	797	2718	0	0	1388	621
Arrive On Green				0.08	0.00	0.00	0.63	1.00	0.00	0.00	0.40	0.00
Sat Flow, veh/h				1660	0	1482	1740	3563	0	0	3563	1553
Grp Volume(v), veh/h				56	0	0	495	1265	0	0	694	0
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1740	1736	0	0	1736	1553
Q Serve(g_s), s				2.9	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0
Cycle Q Clear(g_c), s				2.9	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				139	0	124	797	2718	0	0	1388	621
V/C Ratio(X)				0.40	0.00	0.00	0.62	0.47	0.00	0.00	0.50	0.00
Avail Cap(c_a), veh/h				184	0	165	797	2718	0	0	1388	621
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.66	0.66	0.00	0.00	0.61	0.00
Uniform Delay (d), s/veh				39.1	0.0	0.0	7.8	0.0	0.0	0.0	20.2	0.0
Incr Delay (d2), s/veh				1.9	0.0	0.0	1.0	0.4	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				2.5	0.0	0.0	7.6	0.3	0.0	0.0	9.9	0.0
LnGrp Delay(d),s/veh				41.0	0.0	0.0	8.8	0.4	0.0	0.0	21.0	0.0
LnGrp LOS				D			A	A			C	
Approach Vol, veh/h					56			1760			694	
Approach Delay, s/veh					41.0			2.8			21.0	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		76.5			34.5	42.0		13.5
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		68.0			26.0	36.0		10.0
Max Q Clear Time (g_c+I1), s		2.0			2.0	15.5		4.9
Green Ext Time (p_c), s		17.1			12.3	4.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	55	0	105	485	1240	0	0	680	785
Future Volume (vph)	0	0	0	55	0	105	485	1240	0	0	680	785
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1656	1482	1736	3471			3471	1553
Flt Permitted					0.95	1.00	0.32	1.00			1.00	1.00
Satd. Flow (perm)					1656	1482	592	3471			3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	56	0	54	495	1265	0	0	694	401
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	56	54	495	1265	0	0	694	401
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					8.0	8.0	70.0	70.0			38.0	38.0
Effective Green, g (s)					8.0	8.0	70.0	70.0			38.0	38.0
Actuated g/C Ratio					0.09	0.09	0.78	0.78			0.42	0.42
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					147	131	790	2699			1465	655
v/s Ratio Prot							c0.18	0.36			0.20	
v/s Ratio Perm					0.03	c0.04	c0.31					0.26
v/c Ratio					0.38	0.41	0.63	0.47			0.47	0.61
Uniform Delay, d1					38.7	38.8	10.2	3.5			18.8	20.3
Progression Factor					1.00	1.00	0.57	0.20			1.00	1.00
Incremental Delay, d2					1.6	2.1	1.2	0.4			1.1	4.2
Delay (s)					40.3	40.9	7.1	1.1			19.9	24.5
Level of Service					D	D	A	A			B	C
Approach Delay (s)		0.0			40.6			2.8			21.6	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	56	54	495	1265	694	401
v/c Ratio	0.30	0.33	0.62	0.45	0.46	0.59
Control Delay	41.7	43.0	9.5	1.1	20.2	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	43.0	9.5	1.1	20.2	25.3
Queue Length 50th (ft)	30	29	227	1	152	180
Queue Length 95th (ft)	67	65	58	1	203	283
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	184	164	798	2792	1511	676
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.33	0.62	0.45	0.46	0.59

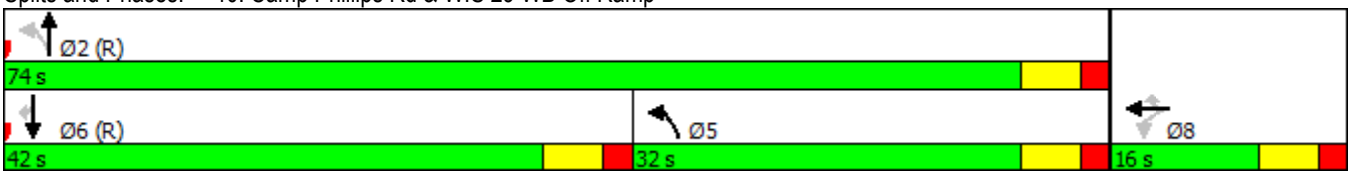
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	12.0	24.0			22.5	22.5
Total Split (s)				16.0	16.0	16.0	32.0	74.0			42.0	42.0
Total Split (%)				17.8%	17.8%	17.8%	35.6%	82.2%			46.7%	46.7%
Maximum Green (s)				10.0	10.0	10.0	26.0	68.0			36.0	36.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					10.0	10.0	71.2	72.4			39.2	39.2
Actuated g/C Ratio					0.11	0.11	0.79	0.80			0.44	0.44
v/c Ratio					0.30	0.33	0.62	0.45			0.46	0.59
Control Delay					41.7	43.0	9.5	1.1			20.2	25.3
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					41.7	43.0	9.5	1.1			20.2	25.3
LOS					D	D	A	A			C	C
Approach Delay					42.3			3.5			22.1	
Approach LOS					D			A			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 11.8 Intersection LOS: B
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	55	0	105	485	1240	0	0	680	785
Future Volume (vph)	0	0	0	55	0	105	485	1240	0	0	680	785
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1656	1482	1736	3471	0	0	3471	1553
Flt Permitted					0.950		0.324					
Satd. Flow (perm)	0	0	0	0	1656	1482	592	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	56	0	54	495	1265	0	0	694	401
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	56	54	495	1265	0	0	694	401
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	865	0	335	0	0	0	0	860	95	160	575	0
Future Volume (veh/h)	865	0	335	0	0	0	0	860	95	160	575	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	874	0	0				0	869	0	162	581	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1015	0	453				0	1180	528	460	2055	0
Arrive On Green	0.29	0.00	0.00				0.00	0.33	0.00	0.24	0.77	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	874	0	0				0	869	0	162	581	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	21.0	0.0	0.0				0.0	19.5	0.0	0.0	4.3	0.0
Cycle Q Clear(g_c), s	21.0	0.0	0.0				0.0	19.5	0.0	0.0	4.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1015	0	453				0	1180	528	460	2055	0
V/C Ratio(X)	0.86	0.00	0.00				0.00	0.74	0.00	0.35	0.28	0.00
Avail Cap(c_a), veh/h	1340	0	598				0	1180	528	460	2055	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	30.4	0.0	0.0				0.0	26.5	0.0	26.4	4.8	0.0
Incr Delay (d2), s/veh	4.7	0.0	0.0				0.0	4.1	0.0	0.4	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	16.3	0.0	0.0				0.0	15.5	0.0	5.6	3.8	0.0
LnGrp Delay(d),s/veh	35.1	0.0	0.0				0.0	30.6	0.0	26.9	5.1	0.0
LnGrp LOS	D							C		C	A	
Approach Vol, veh/h		874						869			743	
Approach Delay, s/veh		35.1						30.6			9.8	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	22.3	36.0		31.7		58.3		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	8.0	30.0		34.0		44.0		
Max Q Clear Time (g_c+I1), s	2.0	21.5		23.0		6.3		
Green Ext Time (p_c), s	2.2	3.7		2.7		4.7		

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	865	0	335	0	0	0	0	860	95	160	575	0
Future Volume (vph)	865	0	335	0	0	0	0	860	95	160	575	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1681	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1681	1681	1583					3539	1583	414	3539	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	874	0	169	0	0	0	0	869	48	162	581	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	437	437	169	0	0	0	0	869	48	162	581	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	29.5	29.5	29.5					34.5	34.5	48.5	48.5	
Effective Green, g (s)	29.5	29.5	29.5					34.5	34.5	48.5	48.5	
Actuated g/C Ratio	0.33	0.33	0.33					0.38	0.38	0.54	0.54	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	550	550	518					1356	606	343	1907	
v/s Ratio Prot								c0.25		c0.04	0.16	
v/s Ratio Perm	c0.26	0.26	0.11						0.03	0.21		
v/c Ratio	0.79	0.79	0.33					0.64	0.08	0.47	0.30	
Uniform Delay, d1	27.5	27.5	22.8					22.7	17.6	22.4	11.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.80	0.59	
Incremental Delay, d2	7.8	7.8	0.4					2.3	0.3	0.9	0.4	
Delay (s)	35.3	35.3	23.1					25.0	17.9	19.0	7.2	
Level of Service	D	D	C					C	B	B	A	
Approach Delay (s)		33.3			0.0			24.6			9.7	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	437	437	169	869	48	162	581
v/c Ratio	0.79	0.79	0.33	0.64	0.08	0.47	0.30
Control Delay	38.3	38.3	23.4	26.4	20.5	20.4	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	38.3	23.4	26.4	20.5	20.4	7.7
Queue Length 50th (ft)	227	227	69	216	18	53	109
Queue Length 95th (ft)	331	331	115	297	44	113	205
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	635	635	598	1356	606	343	1907
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.69	0.28	0.64	0.08	0.47	0.30

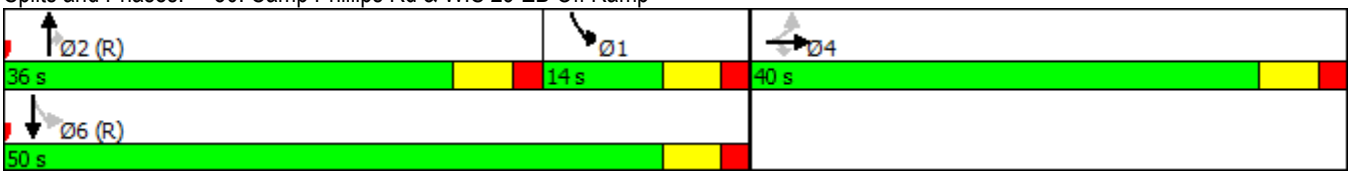
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	40.0	40.0	40.0					36.0	36.0	14.0	50.0	
Total Split (%)	44.4%	44.4%	44.4%					40.0%	40.0%	15.6%	55.6%	
Maximum Green (s)	34.0	34.0	34.0					30.0	30.0	8.0	44.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	29.5	29.5	29.5					34.5	34.5	48.5	48.5	
Actuated g/C Ratio	0.33	0.33	0.33					0.38	0.38	0.54	0.54	
v/c Ratio	0.79	0.79	0.33					0.64	0.08	0.47	0.30	
Control Delay	38.3	38.3	23.4					26.4	20.5	20.4	7.7	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	38.3	38.3	23.4					26.4	20.5	20.4	7.7	
LOS	D	D	C					C	C	C	A	
Approach Delay		35.9						26.1			10.5	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 24 (27%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 25.6 Intersection LOS: C
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	865	0	335	0	0	0	0	860	95	160	575	0
Future Volume (vph)	865	0	335	0	0	0	0	860	95	160	575	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.222		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	414	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	874	0	169	0	0	0	0	869	48	162	581	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	437	437	169	0	0	0	0	869	48	162	581	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	83.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	245	0	40	0	0	0	35	710	0	0	705	205
Future Vol, veh/h	245	0	40	0	0	0	35	710	0	0	705	205
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	-	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	2	2	2
Mvmt Flow	258	0	42	0	0	0	37	747	0	0	742	216

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1297	1671	479	1192	1779	374	958	0	0	747	0	0
Stage 1	850	850	-	821	821	-	-	-	-	-	-	-
Stage 2	447	821	-	371	958	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.5	6.5	6.9	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.5	4	3.3	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 119	95	533	145	83	629	714	-	-	857	-	-
Stage 1	322	375	-	339	391	-	-	-	-	-	-	-
Stage 2	560	387	-	627	338	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 114	90	533	128	79	629	714	-	-	857	-	-
Mov Cap-2 Maneuver	~ 114	90	-	128	79	-	-	-	-	-	-	-
Stage 1	305	375	-	321	371	-	-	-	-	-	-	-
Stage 2	531	367	-	577	338	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 566	0	0.5	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	714	-	-	114	-	533	-	857	-	-
HCM Lane V/C Ratio	0.052	-	-	2.262	-	0.079	-	-	-	-
HCM Control Delay (s)	10.3	-	-	$ 656.4	0	12.3	0	0	-	-
HCM Lane LOS	B	-	-	F	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	22.3	-	0.3	-	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	0	40	0	0	0	35	710	0	0	705	205
Future Volume (vph)	245	0	40	0	0	0	35	710	0	0	705	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.966	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	1583	0	1900	0	1770	3539	0	1863	3419	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	1863	1583	0	1900	0	1770	3539	0	1863	3419	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	258	0	42	0	0	0	37	747	0	0	742	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	0	42	0	0	0	37	747	0	0	958	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 49.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	55	70	75	80	90	20	415	55	95	525	125
Future Volume (veh/h)	240	55	70	75	80	90	20	415	55	95	525	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	253	58	37	79	84	95	21	437	58	100	553	132
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	500	623	530	542	570	510	355	1296	171	437	1170	278
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1200	1863	1583	1247	1703	1524	754	3144	415	899	2838	675
Grp Volume(v), veh/h	253	58	37	79	84	95	21	245	250	100	344	341
Grp Sat Flow(s),veh/h/ln	1200	1863	1583	1247	1703	1524	754	1770	1789	899	1770	1744
Q Serve(g_s), s	9.0	1.0	0.8	2.2	1.6	2.1	1.0	4.5	4.5	4.1	6.7	6.8
Cycle Q Clear(g_c), s	11.1	1.0	0.8	3.2	1.6	2.1	7.8	4.5	4.5	8.6	6.7	6.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.23	1.00		0.39
Lane Grp Cap(c), veh/h	500	623	530	542	570	510	355	729	737	437	729	719
V/C Ratio(X)	0.51	0.09	0.07	0.15	0.15	0.19	0.06	0.34	0.34	0.23	0.47	0.47
Avail Cap(c_a), veh/h	1138	1613	1371	1205	1474	1319	633	1383	1398	768	1383	1362
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	10.8	10.7	11.9	11.0	11.2	13.0	9.5	9.5	12.4	10.2	10.2
Incr Delay (d2), s/veh	0.8	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.3	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.5	0.9	0.6	1.4	1.4	1.6	0.4	4.0	4.1	1.9	6.0	6.0
LnGrp Delay(d),s/veh	15.9	10.9	10.8	12.1	11.1	11.4	13.1	9.8	9.8	12.7	10.6	10.7
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	B	B
Approach Vol, veh/h		348			258			516			785	
Approach Delay, s/veh		14.5			11.5			9.9			10.9	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		25.5		21.8		25.5		21.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		9.8		13.1		10.6		5.2
Green Ext Time (p_c), s		9.0		2.8		8.9		2.8

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

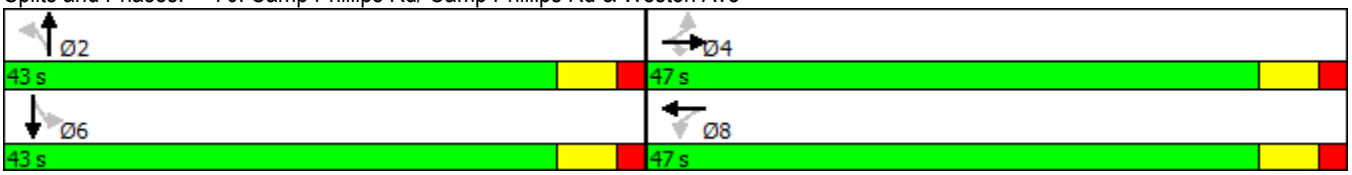
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	253	58	37	79	179	21	495	100	685
v/c Ratio	0.62	0.09	0.07	0.18	0.17	0.08	0.37	0.29	0.51
Control Delay	20.3	10.9	10.9	12.0	11.1	11.9	12.0	14.4	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	10.9	10.9	12.0	11.1	11.9	12.0	14.4	13.4
Queue Length 50th (ft)	49	9	6	13	15	3	44	17	65
Queue Length 95th (ft)	133	32	24	42	39	18	104	60	148
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1048	1641	1394	1135	2759	585	2959	746	2926
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.04	0.03	0.07	0.06	0.04	0.17	0.13	0.23

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	16.1	16.1	16.1	16.1	16.1		18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34		0.39	0.39		0.39	0.39	
v/c Ratio	0.62	0.09	0.07	0.18	0.17		0.08	0.37		0.29	0.51	
Control Delay	20.3	10.9	10.9	12.0	11.1		11.9	12.0		14.4	13.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.3	10.9	10.9	12.0	11.1		11.9	12.0		14.4	13.4	
LOS	C	B	B	B	B		B	B		B	B	
Approach Delay		17.8			11.4			12.0			13.5	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 46.8	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 72.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	55	70	75	80	90	20	415	55	95	525	125
Future Volume (vph)	240	55	70	75	80	90	20	415	55	95	525	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.920			0.982			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3133	0	1770	3476	0	1770	3437	0
Flt Permitted	0.639			0.719			0.369			0.471		
Satd. Flow (perm)	1190	1863	1583	1289	3133	0	687	3476	0	877	3437	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	253	58	37	79	84	95	21	437	58	100	553	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	58	37	79	179	0	21	495	0	100	685	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Appendix B:
Existing Transportation System with Background Traffic Operational Analysis

2040 Background Traffic, Existing Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	205	105	30	60	180	780	60	45	1105	60
Future Volume (veh/h)	10	15	205	105	30	60	180	780	60	45	1105	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	11	16	83	114	33	65	196	848	0	49	1201	65
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	172	217	460	298	102	202	325	2091	936	397	1509	82
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.61	0.00	0.45	0.45	0.45
Sat Flow, veh/h	465	1079	1581	929	510	1005	1707	3406	1524	628	3317	179
Grp Volume(v), veh/h	27	0	83	114	0	98	196	848	0	49	622	644
Grp Sat Flow(s),veh/h/ln	1545	0	1581	929	0	1516	1707	1703	1524	628	1719	1777
Q Serve(g_s), s	0.0	0.0	2.5	5.4	0.0	3.6	3.6	8.3	0.0	3.0	20.0	20.1
Cycle Q Clear(g_c), s	3.6	0.0	2.5	9.0	0.0	3.6	3.6	8.3	0.0	3.0	20.0	20.1
Prop In Lane	0.41		1.00	1.00		0.66	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	388	0	460	298	0	304	325	2091	936	397	782	808
V/C Ratio(X)	0.07	0.00	0.18	0.38	0.00	0.32	0.60	0.41	0.00	0.12	0.80	0.80
Avail Cap(c_a), veh/h	948	0	1021	755	0	842	343	2208	988	412	822	850
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	17.2	26.0	0.0	22.1	12.8	6.4	0.0	10.4	15.1	15.1
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.8	0.0	0.6	2.7	0.1	0.0	0.1	5.2	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	0.0	2.0	3.5	0.0	2.8	3.5	7.1	0.0	1.0	15.8	16.2
LnGrp Delay(d),s/veh	21.1	0.0	17.4	26.8	0.0	22.7	15.5	6.6	0.0	10.6	20.3	20.2
LnGrp LOS	C		B	C		C	B	A		B	C	C
Approach Vol, veh/h		110			212			1044			1315	
Approach Delay, s/veh		18.3			24.9			8.2			19.9	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.8		19.0	10.3	35.5		19.0
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.5	31.0		36.0
Max Q Clear Time (g_c+I1), s		10.3		5.6	5.6	22.1		11.0
Green Ext Time (p_c), s		19.8		1.7	0.1	7.4		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	15	205	105	30	60	180	780	60	45	1105	60
Future Volume (vph)	10	15	205	105	30	60	180	780	60	45	1105	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1825	1570		3274		1703	3406	1487	1717	3409	
Flt Permitted		0.84	1.00		0.80		0.11	1.00	1.00	0.33	1.00	
Satd. Flow (perm)		1566	1570		2691		198	3406	1487	602	3409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	11	16	111	114	33	65	196	848	33	49	1201	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	111	0	212	0	196	848	33	49	1266	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		14.6	21.2		14.6		42.8	42.8	42.8	31.7	31.7	
Effective Green, g (s)		14.6	21.2		14.6		42.8	42.8	42.8	31.7	31.7	
Actuated g/C Ratio		0.21	0.31		0.21		0.62	0.62	0.62	0.46	0.46	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		329	479		566		265	2100	917	274	1557	
v/s Ratio Prot			0.02				c0.07	0.25			c0.37	
v/s Ratio Perm		0.02	0.05		c0.08		0.39		0.02	0.08		
v/c Ratio		0.08	0.23		0.37		0.74	0.40	0.04	0.18	0.81	
Uniform Delay, d1		22.0	18.0		23.5		11.1	6.8	5.2	11.2	16.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	0.2		0.4		10.3	0.1	0.0	0.3	3.4	
Delay (s)		22.1	18.3		23.9		21.4	6.9	5.2	11.5	19.7	
Level of Service		C	B		C		C	A	A	B	B	
Approach Delay (s)		19.0			23.9			9.5			19.4	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	16.5
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	27	111	212	196	848	33	49	1266
v/c Ratio	0.08	0.22	0.38	0.73	0.41	0.04	0.18	0.82
Control Delay	20.6	14.2	24.4	30.0	9.3	8.5	17.0	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	14.2	24.4	30.0	9.3	8.5	17.0	24.4
Queue Length 50th (ft)	9	30	40	23	67	4	10	202
Queue Length 95th (ft)	26	56	65	#198	228	26	50	#556
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	824	513	1415	268	2092	913	272	1545
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.22	0.15	0.73	0.41	0.04	0.18	0.82

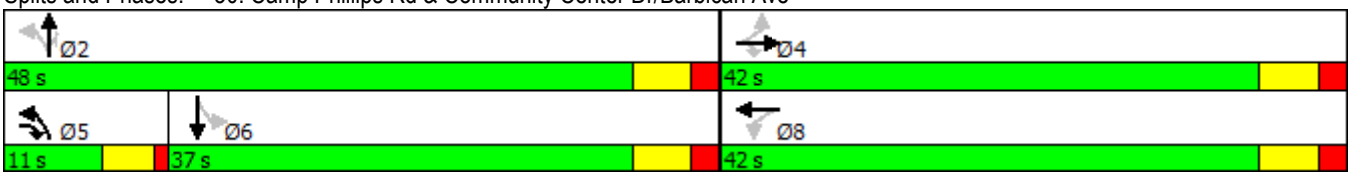
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	48.0	48.0	37.0	37.0	
Total Split (%)	46.7%	46.7%	12.2%	46.7%	46.7%		12.2%	53.3%	53.3%	41.1%	41.1%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	42.0	42.0	31.0	31.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.6	22.8		14.6		44.3	42.8	42.8	31.6	31.6	
Actuated g/C Ratio		0.21	0.33		0.21		0.64	0.61	0.61	0.45	0.45	
v/c Ratio		0.08	0.22		0.38		0.73	0.41	0.04	0.18	0.82	
Control Delay		20.6	14.2		24.4		30.0	9.3	8.5	17.0	24.4	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		20.6	14.2		24.4		30.0	9.3	8.5	17.0	24.4	
LOS		C	B		C		C	A	A	B	C	
Approach Delay		15.5			24.4			13.0			24.1	
Approach LOS		B			C			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 69.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 19.3	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	15	205	105	30	60	180	780	60	45	1105	60
Future Volume (vph)	10	15	205	105	30	60	180	780	60	45	1105	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98	1.00	1.00	
Frt			0.850		0.954				0.850		0.992	
Flt Protected		0.980			0.974		0.950			0.950		
Satd. Flow (prot)	0	1825	1583	0	3276	0	1703	3406	1524	1719	3408	0
Flt Permitted		0.841			0.800		0.110			0.333		
Satd. Flow (perm)	0	1566	1563	0	2689	0	197	3406	1486	602	3408	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	11	16	111	114	33	65	196	848	33	49	1201	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	27	111	0	212	0	196	848	33	49	1266	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	105	0	225	435	795	0	0	560	865
Future Volume (veh/h)	0	0	0	105	0	225	435	795	0	0	560	865
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				111	0	0	458	837	0	0	589	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				185	0	165	737	2572	0	0	1551	694
Arrive On Green				0.10	0.00	0.00	0.48	1.00	0.00	0.00	0.46	0.00
Sat Flow, veh/h				1774	0	1583	1691	3463	0	0	3495	1524
Grp Volume(v), veh/h				111	0	0	458	837	0	0	589	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1691	1687	0	0	1703	1524
Q Serve(g_s), s				5.4	0.0	0.0	0.0	0.0	0.0	0.0	10.2	0.0
Cycle Q Clear(g_c), s				5.4	0.0	0.0	0.0	0.0	0.0	0.0	10.2	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				185	0	165	737	2572	0	0	1551	694
V/C Ratio(X)				0.60	0.00	0.00	0.62	0.33	0.00	0.00	0.38	0.00
Avail Cap(c_a), veh/h				237	0	211	737	2572	0	0	1551	694
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.85	0.85	0.00	0.00	0.55	0.00
Uniform Delay (d), s/veh				38.5	0.0	0.0	9.9	0.0	0.0	0.0	16.1	0.0
Incr Delay (d2), s/veh				3.1	0.0	0.0	1.4	0.3	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				5.1	0.0	0.0	9.6	0.2	0.0	0.0	7.6	0.0
LnGrp Delay(d),s/veh				41.6	0.0	0.0	11.3	0.3	0.0	0.0	16.5	0.0
LnGrp LOS				D			B	A			B	
Approach Vol, veh/h					111			1295			589	
Approach Delay, s/veh					41.6			4.2			16.5	
Approach LOS					D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		74.6			27.6	47.0		15.4
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		66.0			19.0	41.0		12.0
Max Q Clear Time (g_c+I1), s		2.0			2.0	12.2		7.4
Green Ext Time (p_c), s		9.8			7.1	4.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	105	0	225	435	795	0	0	560	865
Future Volume (vph)	0	0	0	105	0	225	435	795	0	0	560	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1770	1583	1687	3374			3406	1524
Flt Permitted					0.95	1.00	0.39	1.00			1.00	1.00
Satd. Flow (perm)					1770	1583	699	3374			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	111	0	118	458	837	0	0	589	455
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	111	118	458	837	0	0	589	455
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					11.2	11.2	66.8	66.8			41.8	41.8
Effective Green, g (s)					11.2	11.2	66.8	66.8			41.8	41.8
Actuated g/C Ratio					0.12	0.12	0.74	0.74			0.46	0.46
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					220	196	727	2504			1581	707
v/s Ratio Prot							c0.13	0.25			0.17	
v/s Ratio Perm					0.06	c0.07	c0.33					0.30
v/c Ratio					0.50	0.60	0.63	0.33			0.37	0.64
Uniform Delay, d1					36.8	37.3	10.3	4.0			15.6	18.4
Progression Factor					1.00	1.00	1.03	0.36			1.00	1.00
Incremental Delay, d2					1.8	5.1	1.6	0.3			0.7	4.5
Delay (s)					38.6	42.4	12.1	1.8			16.3	22.9
Level of Service					D	D	B	A			B	C
Approach Delay (s)		0.0			40.6			5.4			19.2	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	111	118	458	837	589	455
v/c Ratio	0.50	0.60	0.63	0.33	0.37	0.64
Control Delay	45.2	50.6	14.5	1.8	16.6	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	50.6	14.5	1.8	16.6	23.8
Queue Length 50th (ft)	59	64	130	4	111	194
Queue Length 95th (ft)	112	120	280	4	153	304
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	236	211	727	2505	1582	708
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.56	0.63	0.33	0.37	0.64

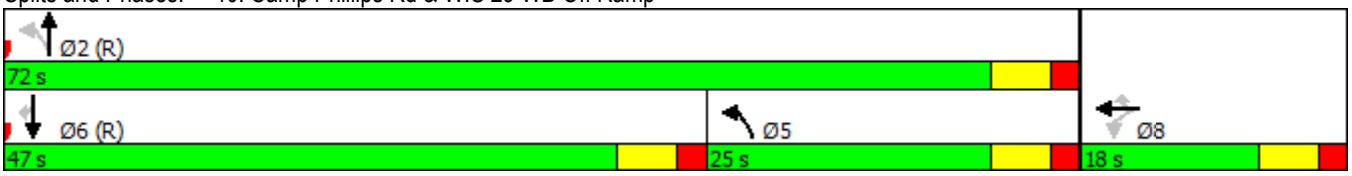
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	12.0	21.0			21.0	21.0
Total Split (s)				18.0	18.0	18.0	25.0	72.0			47.0	47.0
Total Split (%)				20.0%	20.0%	20.0%	27.8%	80.0%			52.2%	52.2%
Maximum Green (s)				12.0	12.0	12.0	19.0	66.0			41.0	41.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					11.2	11.2	66.8	66.8			41.8	41.8
Actuated g/C Ratio					0.12	0.12	0.74	0.74			0.46	0.46
v/c Ratio					0.50	0.60	0.63	0.33			0.37	0.64
Control Delay					45.2	50.6	14.5	1.8			16.6	23.8
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					45.2	50.6	14.5	1.8			16.6	23.8
LOS					D	D	B	A			B	C
Approach Delay					48.0			6.3			19.8	
Approach LOS					D			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 15.5 Intersection LOS: B
Intersection Capacity Utilization 74.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	105	0	225	435	795	0	0	560	865
Future Volume (vph)	0	0	0	105	0	225	435	795	0	0	560	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1770	1583	1687	3374	0	0	3406	1524
Flt Permitted					0.950		0.393					
Satd. Flow (perm)	0	0	0	0	1770	1583	698	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	111	0	118	458	837	0	0	589	455
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	111	118	458	837	0	0	589	455
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	435	0	345	0	0	0	0	795	80	70	595	0
Future Volume (veh/h)	435	0	345	0	0	0	0	795	80	70	595	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	483	0	0				0	883	0	78	661	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	595	0	265				0	1534	686	558	2445	0
Arrive On Green	0.18	0.00	0.00				0.00	0.43	0.00	0.25	0.92	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	483	0	0				0	883	0	78	661	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	12.4	0.0	0.0				0.0	17.0	0.0	0.0	1.8	0.0
Cycle Q Clear(g_c), s	12.4	0.0	0.0				0.0	17.0	0.0	0.0	1.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	595	0	265				0	1534	686	558	2445	0
V/C Ratio(X)	0.81	0.00	0.00				0.00	0.58	0.00	0.14	0.27	0.00
Avail Cap(c_a), veh/h	1015	0	453				0	1534	686	558	2445	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.94	0.94	0.00
Uniform Delay (d), s/veh	35.7	0.0	0.0				0.0	19.3	0.0	16.1	1.2	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0				0.0	1.6	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.0	0.0	0.0				0.0	13.3	0.0	2.2	1.6	0.0
LnGrp Delay(d),s/veh	38.4	0.0	0.0				0.0	20.8	0.0	16.2	1.5	0.0
LnGrp LOS	D							C		B	A	
Approach Vol, veh/h		483						883			739	
Approach Delay, s/veh		38.4						20.8			3.0	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.2	45.0		21.8		68.2		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	39.0		27.0		51.0		
Max Q Clear Time (g_c+I1), s	2.0	19.0		14.4		3.8		
Green Ext Time (p_c), s	1.7	6.1		1.5		5.3		

Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	435	0	345	0	0	0	0	795	80	70	595	0
Future Volume (vph)	435	0	345	0	0	0	0	795	80	70	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1603	1509					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1603	1603	1509					3539	1583	501	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	483	0	192	0	0	0	0	883	44	78	661	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	241	242	192	0	0	0	0	883	44	78	661	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	19.7	19.7	19.7					47.5	47.5	58.3	58.3	
Effective Green, g (s)	19.7	19.7	19.7					47.5	47.5	58.3	58.3	
Actuated g/C Ratio	0.22	0.22	0.22					0.53	0.53	0.65	0.65	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	350	350	330					1867	835	392	2292	
v/s Ratio Prot								c0.25		0.01	c0.19	
v/s Ratio Perm	0.15	0.15	0.13						0.03	0.12		
v/c Ratio	0.69	0.69	0.58					0.47	0.05	0.20	0.29	
Uniform Delay, d1	32.3	32.4	31.5					13.4	10.3	10.5	6.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.09	0.26	
Incremental Delay, d2	5.6	5.8	2.6					0.9	0.1	0.2	0.3	
Delay (s)	37.9	38.1	34.1					14.2	10.4	1.1	2.1	
Level of Service	D	D	C					B	B	A	A	
Approach Delay (s)		36.9			0.0			14.1			2.0	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	241	242	192	883	44	78	661
v/c Ratio	0.69	0.69	0.58	0.46	0.05	0.19	0.29
Control Delay	41.8	42.0	37.6	15.5	13.3	1.8	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	42.0	37.6	15.5	13.3	1.8	2.3
Queue Length 50th (ft)	133	133	98	162	12	1	36
Queue Length 95th (ft)	195	196	149	253	34	3	47
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	480	480	452	1914	856	409	2292
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.50	0.42	0.46	0.05	0.19	0.29

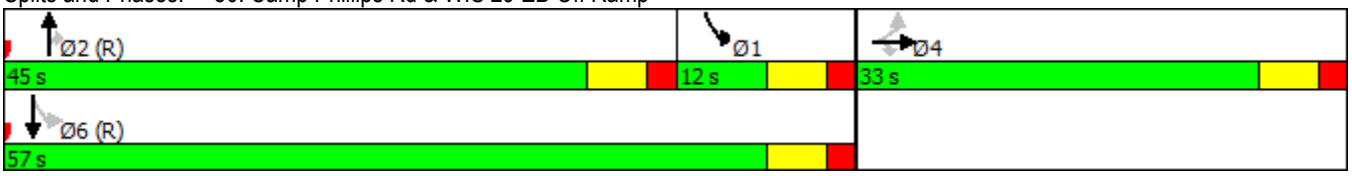
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	33.0	33.0	33.0					45.0	45.0	12.0	57.0	
Total Split (%)	36.7%	36.7%	36.7%					50.0%	50.0%	13.3%	63.3%	
Maximum Green (s)	27.0	27.0	27.0					39.0	39.0	6.0	51.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	19.7	19.7	19.7					48.7	48.7	58.3	58.3	
Actuated g/C Ratio	0.22	0.22	0.22					0.54	0.54	0.65	0.65	
v/c Ratio	0.69	0.69	0.58					0.46	0.05	0.19	0.29	
Control Delay	41.8	42.0	37.6					15.5	13.3	1.8	2.3	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	41.8	42.0	37.6					15.5	13.3	1.8	2.3	
LOS	D	D	D					B	B	A	A	
Approach Delay		40.7						15.4			2.3	
Approach LOS		D						B			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 13 (14%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 18.5 — Intersection LOS: B
Intersection Capacity Utilization 74.2% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	435	0	345	0	0	0	0	795	80	70	595	0
Future Volume (vph)	435	0	345	0	0	0	0	795	80	70	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.269		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	501	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	483	0	192	0	0	0	0	883	44	78	661	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	241	242	192	0	0	0	0	883	44	78	661	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	12.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	0	30	0	0	0	35	750	0	0	515	425
Future Vol, veh/h	125	0	30	0	0	0	35	750	0	0	515	425
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	-	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	0	0	0	2	2	2	3	3	3
Mvmt Flow	133	0	32	0	0	0	37	798	0	0	548	452

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1247	1646	500	1146	1872	399	1000	0	0	798	0	0
Stage 1	774	774	-	872	872	-	-	-	-	-	-	-
Stage 2	473	872	-	274	1000	-	-	-	-	-	-	-
Critical Hdwy	7.62	6.62	7.02	7.5	6.5	6.9	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.62	5.62	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	5.62	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.06	3.36	3.5	4	3.3	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	~ 126	95	506	157	73	606	688	-	-	814	-	-
Stage 1	349	397	-	316	371	-	-	-	-	-	-	-
Stage 2	531	357	-	714	324	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 121	90	506	141	69	606	688	-	-	814	-	-
Mov Cap-2 Maneuver	~ 121	90	-	141	69	-	-	-	-	-	-	-
Stage 1	330	397	-	299	351	-	-	-	-	-	-	-
Stage 2	502	338	-	669	324	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	147.9	0	0.5	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	688	-	-	121	-	506	-	814	-	-
HCM Lane V/C Ratio	0.054	-	-	1.099	-	0.063	-	-	-	-
HCM Control Delay (s)	10.5	-	-	180.4	0	12.6	0	0	-	-
HCM Lane LOS	B	-	-	F	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	7.8	-	0.2	-	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	0	0	0	35	750	0	0	515	425
Future Volume (vph)	125	0	30	0	0	0	35	750	0	0	515	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.932	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	1792	1524	0	1900	0	1770	3539	0	1845	3267	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1703	1792	1524	0	1900	0	1770	3539	0	1845	3267	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	6%	6%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	32	0	0	0	37	798	0	0	548	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	0	32	0	0	0	37	798	0	0	1000	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	45	20	60	105	95	80	500	65	75	345	125
Future Volume (veh/h)	190	45	20	60	105	95	80	500	65	75	345	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	204	48	11	65	113	102	86	538	70	81	371	134
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	454	584	496	508	516	427	446	1354	176	399	1068	381
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1162	1863	1583	1198	1648	1362	890	3151	409	786	2487	886
Grp Volume(v), veh/h	204	48	11	65	108	107	86	301	307	81	255	250
Grp Sat Flow(s),veh/h/ln	1162	1863	1583	1198	1583	1426	890	1770	1791	786	1719	1653
Q Serve(g_s), s	7.4	0.8	0.2	1.9	2.4	2.6	3.4	5.5	5.5	3.7	4.6	4.7
Cycle Q Clear(g_c), s	10.0	0.8	0.2	2.7	2.4	2.6	8.1	5.5	5.5	9.2	4.6	4.7
Prop In Lane	1.00		1.00	1.00		0.95	1.00		0.23	1.00		0.54
Lane Grp Cap(c), veh/h	454	584	496	508	496	447	446	760	769	399	739	710
V/C Ratio(X)	0.45	0.08	0.02	0.13	0.22	0.24	0.19	0.40	0.40	0.20	0.35	0.35
Avail Cap(c_a), veh/h	1085	1596	1356	1158	1356	1222	788	1440	1457	701	1399	1345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.6	11.3	11.1	12.3	11.8	11.9	11.7	9.2	9.2	12.3	8.9	9.0
Incr Delay (d2), s/veh	0.7	0.1	0.0	0.1	0.2	0.3	0.2	0.3	0.3	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.3	0.8	0.2	1.1	1.9	1.9	1.5	4.8	5.0	1.5	4.1	4.0
LnGrp Delay(d),s/veh	16.3	11.4	11.1	12.4	12.0	12.2	11.9	9.5	9.5	12.6	9.2	9.2
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		263			280			694			586	
Approach Delay, s/veh		15.2			12.2			9.8			9.7	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		26.1		20.6		26.1		20.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		10.1		12.0		11.2		4.7
Green Ext Time (p_c), s		9.0		2.7		8.9		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	10.9
HCM 2010 LOS	B

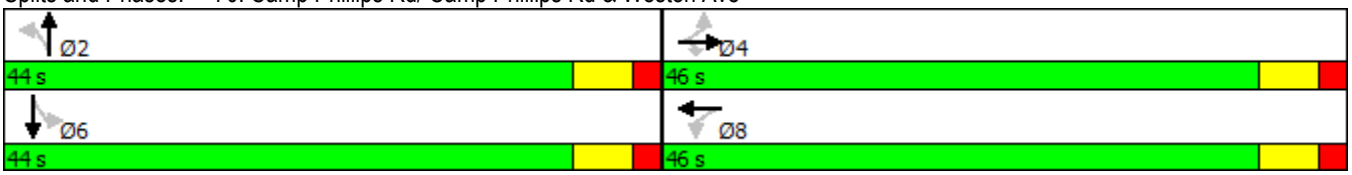
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	204	48	11	65	215	86	608	81	505
v/c Ratio	0.55	0.08	0.02	0.17	0.23	0.26	0.45	0.27	0.39
Control Delay	18.3	10.3	9.8	11.4	11.1	12.4	11.5	13.1	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	10.3	9.8	11.4	11.1	12.4	11.5	13.1	11.1
Queue Length 50th (ft)	36	7	2	10	17	12	50	12	40
Queue Length 95th (ft)	96	25	10	33	41	45	109	45	91
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1074	1742	1480	1131	2750	789	3164	695	3002
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.03	0.01	0.06	0.08	0.11	0.19	0.12	0.17

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	13.5	13.5	13.5	13.5	13.5		16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32		0.39	0.39		0.39	0.39	
v/c Ratio	0.55	0.08	0.02	0.17	0.23		0.26	0.45		0.27	0.39	
Control Delay	18.3	10.3	9.8	11.4	11.1		12.4	11.5		13.1	11.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.3	10.3	9.8	11.4	11.1		12.4	11.5		13.1	11.1	
LOS	B	B	A	B	B		B	B		B	B	
Approach Delay		16.5			11.1			11.6			11.3	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 42.1	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	45	20	60	105	95	80	500	65	75	345	125
Future Volume (vph)	190	45	20	60	105	95	80	500	65	75	345	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.929			0.983			0.960	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2942	0	1770	3479	0	1719	3301	0
Flt Permitted	0.617			0.726			0.466			0.422		
Satd. Flow (perm)	1149	1863	1583	1210	2942	0	868	3479	0	764	3301	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	204	48	11	65	113	102	86	538	70	81	371	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	48	11	65	215	0	86	608	0	81	505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	30	240	150	30	105	195	1245	115	105	1265	40
Future Volume (veh/h)	45	30	240	150	30	105	195	1245	115	105	1265	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	48	32	92	160	32	112	207	1324	0	112	1346	43
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	244	146	567	312	92	323	260	2013	901	217	1524	49
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.08	0.57	0.00	0.44	0.44	0.44
Sat Flow, veh/h	622	524	1582	803	331	1158	1757	3505	1568	408	3467	111
Grp Volume(v), veh/h	80	0	92	160	0	144	207	1324	0	112	680	709
Grp Sat Flow(s),veh/h/ln	1146	0	1582	803	0	1489	1757	1752	1568	408	1752	1825
Q Serve(g_s), s	2.0	0.0	3.2	9.8	0.0	6.3	5.0	21.1	0.0	21.1	29.0	29.1
Cycle Q Clear(g_c), s	8.3	0.0	3.2	18.0	0.0	6.3	5.0	21.1	0.0	31.3	29.0	29.1
Prop In Lane	0.60		1.00	1.00		0.78	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	390	0	567	312	0	415	260	2013	901	217	771	802
V/C Ratio(X)	0.21	0.00	0.16	0.51	0.00	0.35	0.80	0.66	0.00	0.52	0.88	0.88
Avail Cap(c_a), veh/h	622	0	823	516	0	656	260	2017	902	217	773	804
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	17.9	31.6	0.0	23.5	17.9	11.9	0.0	26.4	20.9	21.0
Incr Delay (d2), s/veh	0.3	0.0	0.1	1.3	0.0	0.5	15.8	0.8	0.0	2.1	11.6	11.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.0	2.6	6.3	0.0	4.8	6.3	15.6	0.0	4.5	23.1	23.9
LnGrp Delay(d),s/veh	24.6	0.0	18.0	32.9	0.0	24.0	33.7	12.7	0.0	28.5	32.6	32.4
LnGrp LOS	C		B	C		C	C	B		C	C	C
Approach Vol, veh/h		172			304			1531			1501	
Approach Delay, s/veh		21.0			28.7			15.5			32.2	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		52.9		28.7	11.0	41.9		28.7
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		47.0		36.0	6.5	36.0		36.0
Max Q Clear Time (g_c+I1), s		23.1		10.3	7.0	33.3		20.0
Green Ext Time (p_c), s		20.6		2.7	0.0	2.6		2.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	30	240	150	30	105	195	1245	115	105	1265	40
Future Volume (vph)	45	30	240	150	30	105	195	1245	115	105	1265	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1808	1569		3242		1752	3505	1530	1751	3487	
Flt Permitted		0.67	1.00		0.78		0.10	1.00	1.00	0.20	1.00	
Satd. Flow (perm)		1240	1569		2590		180	3505	1530	371	3487	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	48	32	128	160	32	112	207	1324	61	112	1346	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	80	128	0	304	0	207	1324	61	112	1389	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		16.7	23.3		16.7		47.6	47.6	47.6	36.5	36.5	
Effective Green, g (s)		16.7	23.3		16.7		47.6	47.6	47.6	36.5	36.5	
Actuated g/C Ratio		0.22	0.31		0.22		0.62	0.62	0.62	0.48	0.48	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		271	479		566		248	2186	954	177	1668	
v/s Ratio Prot			0.02				c0.07	0.38			0.40	
v/s Ratio Perm		0.06	0.06		c0.12		c0.45		0.04	0.30		
v/c Ratio		0.30	0.27		0.54		0.83	0.61	0.06	0.63	0.83	
Uniform Delay, d1		24.9	20.0		26.4		15.9	8.7	5.6	14.9	17.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.6	0.3		1.0		20.8	0.5	0.0	7.2	3.7	
Delay (s)		25.5	20.3		27.4		36.7	9.2	5.7	22.1	21.0	
Level of Service		C	C		C		D	A	A	C	C	
Approach Delay (s)		22.3			27.4			12.6			21.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	76.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	80	128	304	207	1324	61	112	1389
v/c Ratio	0.30	0.25	0.54	0.82	0.61	0.06	0.64	0.84
Control Delay	26.5	16.5	29.2	42.1	12.0	8.4	38.9	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	16.5	29.2	42.1	12.0	8.4	38.9	25.1
Queue Length 50th (ft)	32	39	66	38	154	9	34	259
Queue Length 95th (ft)	65	72	100	#226	413	40	#160	#617
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	591	508	1234	251	2182	951	176	1662
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.25	0.25	0.82	0.61	0.06	0.64	0.84

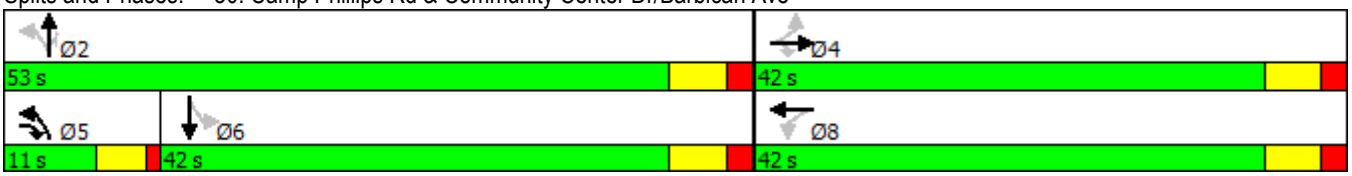
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	39.0	39.0	10.5	42.0	42.0		10.5	39.0	39.0	38.0	38.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	53.0	53.0	42.0	42.0	
Total Split (%)	44.2%	44.2%	11.6%	44.2%	44.2%		11.6%	55.8%	55.8%	44.2%	44.2%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	47.0	47.0	36.0	36.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	28.0	28.0		31.0	31.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		16.7	24.8		16.7		49.2	47.6	47.6	36.5	36.5	
Actuated g/C Ratio		0.22	0.32		0.22		0.64	0.62	0.62	0.48	0.48	
v/c Ratio		0.30	0.25		0.54		0.82	0.61	0.06	0.64	0.84	
Control Delay		26.5	16.5		29.2		42.1	12.0	8.4	38.9	25.1	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		26.5	16.5		29.2		42.1	12.0	8.4	38.9	25.1	
LOS		C	B		C		D	B	A	D	C	
Approach Delay		20.3			29.2			15.8			26.2	
Approach LOS		C			C			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 95	
Actuated Cycle Length: 76.5	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 21.5	Intersection LOS: C
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	30	240	150	30	105	195	1245	115	105	1265	40
Future Volume (vph)	45	30	240	150	30	105	195	1245	115	105	1265	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99				0.97	1.00	1.00	
Frt			0.850		0.945				0.850		0.995	
Flt Protected		0.971			0.974		0.950			0.950		
Satd. Flow (prot)	0	1809	1583	0	3242	0	1752	3505	1568	1752	3486	0
Flt Permitted		0.666			0.778		0.098			0.201		
Satd. Flow (perm)	0	1240	1563	0	2589	0	181	3505	1528	371	3486	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	48	32	128	160	32	112	207	1324	61	112	1346	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	80	128	0	304	0	207	1324	61	112	1389	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	55	0	120	515	1435	0	0	790	865
Future Volume (veh/h)	0	0	0	55	0	120	515	1435	0	0	790	865
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				56	0	0	526	1464	0	0	806	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				139	0	124	779	2718	0	0	1311	587
Arrive On Green				0.08	0.00	0.00	0.68	1.00	0.00	0.00	0.38	0.00
Sat Flow, veh/h				1660	0	1482	1740	3563	0	0	3563	1553
Grp Volume(v), veh/h				56	0	0	526	1464	0	0	806	0
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1740	1736	0	0	1736	1553
Q Serve(g_s), s				2.9	0.0	0.0	0.0	0.0	0.0	0.0	16.9	0.0
Cycle Q Clear(g_c), s				2.9	0.0	0.0	0.0	0.0	0.0	0.0	16.9	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				139	0	124	779	2718	0	0	1311	587
V/C Ratio(X)				0.40	0.00	0.00	0.67	0.54	0.00	0.00	0.61	0.00
Avail Cap(c_a), veh/h				314	0	280	779	2718	0	0	1311	587
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.52	0.52	0.00	0.00	0.52	0.00
Uniform Delay (d), s/veh				39.1	0.0	0.0	8.0	0.0	0.0	0.0	22.7	0.0
Incr Delay (d2), s/veh				1.9	0.0	0.0	1.2	0.4	0.0	0.0	1.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				2.5	0.0	0.0	7.0	0.3	0.0	0.0	11.7	0.0
LnGrp Delay(d),s/veh				41.0	0.0	0.0	9.2	0.4	0.0	0.0	23.8	0.0
LnGrp LOS				D			A	A			C	
Approach Vol, veh/h					56			1990			806	
Approach Delay, s/veh					41.0			2.7			23.8	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		76.5			36.5	40.0		13.5
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		61.0			21.0	34.0		17.0
Max Q Clear Time (g_c+I1), s		2.0			2.0	18.9		4.9
Green Ext Time (p_c), s		21.7			12.3	4.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	55	0	120	515	1435	0	0	790	865
Future Volume (vph)	0	0	0	55	0	120	515	1435	0	0	790	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1656	1482	1736	3471			3471	1553
Flt Permitted					0.95	1.00	0.28	1.00			1.00	1.00
Satd. Flow (perm)					1656	1482	520	3471			3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	56	0	61	526	1464	0	0	806	441
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	56	61	526	1464	0	0	806	441
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					8.7	8.7	69.3	69.3			42.3	42.3
Effective Green, g (s)					8.7	8.7	69.3	69.3			42.3	42.3
Actuated g/C Ratio					0.10	0.10	0.77	0.77			0.47	0.47
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					160	143	684	2672			1631	729
v/s Ratio Prot							c0.18	0.42			0.23	
v/s Ratio Perm					0.03	c0.04	c0.41					0.28
v/c Ratio					0.35	0.43	0.77	0.55			0.49	0.60
Uniform Delay, d1					38.0	38.3	12.6	4.1			16.5	17.7
Progression Factor					1.00	1.00	0.78	0.29			1.00	1.00
Incremental Delay, d2					1.3	2.0	3.6	0.5			1.1	3.7
Delay (s)					39.3	40.3	13.4	1.7			17.5	21.4
Level of Service					D	D	B	A			B	C
Approach Delay (s)		0.0			39.9			4.8			18.9	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	56	61	526	1464	806	441
v/c Ratio	0.29	0.35	0.76	0.53	0.48	0.59
Control Delay	39.9	42.0	18.0	1.8	18.0	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	42.0	18.0	1.8	18.0	22.4
Queue Length 50th (ft)	30	33	258	1	165	184
Queue Length 95th (ft)	64	69	369	2	232	305
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	312	279	691	2766	1678	751
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.22	0.76	0.53	0.48	0.59

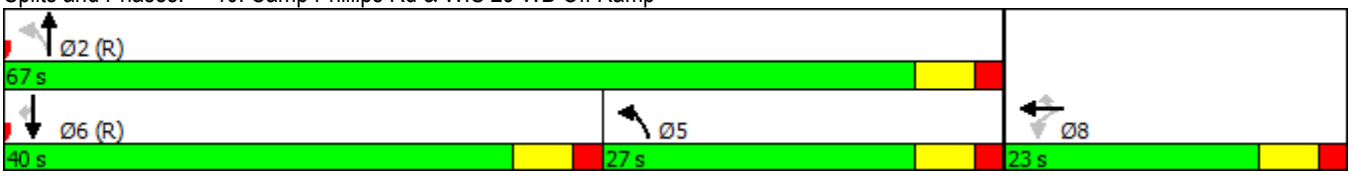
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	27.0	67.0			40.0	40.0
Total Split (%)				25.6%	25.6%	25.6%	30.0%	74.4%			44.4%	44.4%
Maximum Green (s)				17.0	17.0	17.0	21.0	61.0			34.0	34.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					10.7	10.7	70.5	71.7			43.5	43.5
Actuated g/C Ratio					0.12	0.12	0.78	0.80			0.48	0.48
v/c Ratio					0.29	0.35	0.76	0.53			0.48	0.59
Control Delay					39.9	42.0	18.0	1.8			18.0	22.4
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					39.9	42.0	18.0	1.8			18.0	22.4
LOS					D	D	B	A			B	C
Approach Delay					41.0			6.1			19.6	
Approach LOS					D			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 12.3 Intersection LOS: B
Intersection Capacity Utilization 78.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	55	0	120	515	1435	0	0	790	865
Future Volume (vph)	0	0	0	55	0	120	515	1435	0	0	790	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1656	1482	1736	3471	0	0	3471	1553
Flt Permitted					0.950		0.285					
Satd. Flow (perm)	0	0	0	0	1656	1482	521	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	56	0	61	526	1464	0	0	806	441
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	56	61	526	1464	0	0	806	441
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	950	0	360	0	0	0	0	1000	105	175	670	0
Future Volume (veh/h)	950	0	360	0	0	0	0	1000	105	175	670	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	960	0	0				0	1010	0	177	677	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1084	0	484				0	1258	563	368	1986	0
Arrive On Green	0.31	0.00	0.00				0.00	0.36	0.00	0.28	1.00	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	960	0	0				0	1010	0	177	677	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	23.2	0.0	0.0				0.0	23.2	0.0	0.4	0.0	0.0
Cycle Q Clear(g_c), s	23.2	0.0	0.0				0.0	23.2	0.0	0.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1084	0	484				0	1258	563	368	1986	0
V/C Ratio(X)	0.89	0.00	0.00				0.00	0.80	0.00	0.48	0.34	0.00
Avail Cap(c_a), veh/h	1262	0	563				0	1258	563	368	1986	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.87	0.87	0.00
Uniform Delay (d), s/veh	29.7	0.0	0.0				0.0	26.2	0.0	27.2	0.0	0.0
Incr Delay (d2), s/veh	7.0	0.0	0.0				0.0	5.5	0.0	0.8	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	18.2	0.0	0.0				0.0	17.9	0.0	5.9	0.2	0.0
LnGrp Delay(d),s/veh	36.8	0.0	0.0				0.0	31.6	0.0	28.0	0.4	0.0
LnGrp LOS	D							C		C	A	
Approach Vol, veh/h		960						1010			854	
Approach Delay, s/veh		36.8						31.6			6.1	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	18.5	38.0		33.5		56.5		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	8.0	32.0		32.0		46.0		
Max Q Clear Time (g_c+I1), s	2.4	25.2		25.2		2.0		
Green Ext Time (p_c), s	2.4	3.6		2.3		5.8		

Intersection Summary	
HCM 2010 Ctrl Delay	25.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	950	0	360	0	0	0	0	1000	105	175	670	0
Future Volume (vph)	950	0	360	0	0	0	0	1000	105	175	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1681	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.16	1.00	
Satd. Flow (perm)	1681	1681	1583					3539	1583	300	3539	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	960	0	182	0	0	0	0	1010	53	177	677	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	480	480	182	0	0	0	0	1010	53	177	677	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	29.8	29.8	29.8					34.2	34.2	48.2	48.2	
Effective Green, g (s)	29.8	29.8	29.8					34.2	34.2	48.2	48.2	
Actuated g/C Ratio	0.33	0.33	0.33					0.38	0.38	0.54	0.54	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	556	556	524					1344	601	291	1895	
v/s Ratio Prot								c0.29		c0.05	0.19	
v/s Ratio Perm	c0.29	0.29	0.11						0.03	0.27		
v/c Ratio	0.86	0.86	0.35					0.75	0.09	0.61	0.36	
Uniform Delay, d1	28.2	28.2	22.7					24.2	17.9	27.2	12.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.76	0.47	
Incremental Delay, d2	13.1	13.1	0.4					3.9	0.3	3.2	0.5	
Delay (s)	41.3	41.3	23.2					28.1	18.2	23.8	6.1	
Level of Service	D	D	C					C	B	C	A	
Approach Delay (s)		38.4			0.0			27.6			9.8	
Approach LOS		D			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	480	480	182	1010	53	177	677
v/c Ratio	0.86	0.86	0.35	0.75	0.09	0.61	0.36
Control Delay	44.9	44.9	24.2	29.2	19.8	26.9	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	44.9	24.2	29.2	19.8	26.9	6.4
Queue Length 50th (ft)	255	255	74	268	20	59	142
Queue Length 95th (ft)	#425	#425	128	348	45	113	46
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	597	597	562	1344	601	291	1895
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.80	0.32	0.75	0.09	0.61	0.36

Intersection Summary

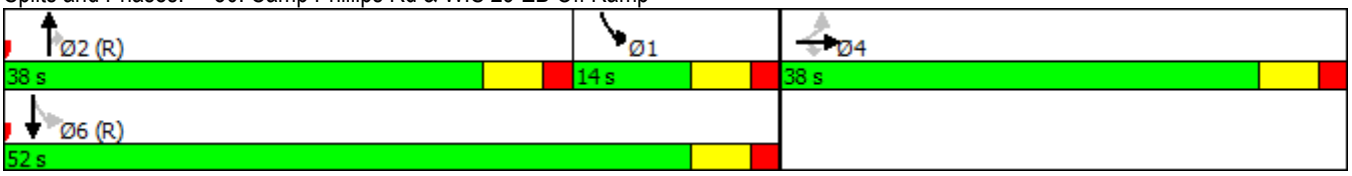
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	38.0	38.0	38.0					38.0	38.0	14.0	52.0	
Total Split (%)	42.2%	42.2%	42.2%					42.2%	42.2%	15.6%	57.8%	
Maximum Green (s)	32.0	32.0	32.0					32.0	32.0	8.0	46.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	29.8	29.8	29.8					34.2	34.2	48.2	48.2	
Actuated g/C Ratio	0.33	0.33	0.33					0.38	0.38	0.54	0.54	
v/c Ratio	0.86	0.86	0.35					0.75	0.09	0.61	0.36	
Control Delay	44.9	44.9	24.2					29.2	19.8	26.9	6.4	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	44.9	44.9	24.2					29.2	19.8	26.9	6.4	
LOS	D	D	C					C	B	C	A	
Approach Delay		41.6						28.7			10.7	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 15 (17%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 28.5 Intersection LOS: C
Intersection Capacity Utilization 78.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	950	0	360	0	0	0	0	1000	105	175	670	0
Future Volume (vph)	950	0	360	0	0	0	0	1000	105	175	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.161		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	300	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	960	0	182	0	0	0	0	1010	53	177	677	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	480	480	182	0	0	0	0	1010	53	177	677	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	172.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	295	0	45	0	0	0	40	810	0	0	790	240
Future Vol, veh/h	295	0	45	0	0	0	40	810	0	0	790	240
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	-	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	2	2	2
Mvmt Flow	311	0	47	0	0	0	42	853	0	0	832	253

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1469	1895	542	1353	2021	426	1084	0	0	853	0	0
Stage 1	958	958	-	937	937	-	-	-	-	-	-	-
Stage 2	511	937	-	416	1084	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.5	6.5	6.9	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.5	4	3.3	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 89	69	485	110	59	582	639	-	-	782	-	-
Stage 1	~ 276	334	-	289	346	-	-	-	-	-	-	-
Stage 2	514	342	-	590	296	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 85	64	485	94	55	582	639	-	-	782	-	-
Mov Cap-2 Maneuver	~ 85	64	-	94	55	-	-	-	-	-	-	-
Stage 1	~ 258	334	-	270	323	-	-	-	-	-	-	-
Stage 2	480	320	-	532	296	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1127.1	0	0.5	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	639	-	-	85	-	485	-	782	-	-
HCM Lane V/C Ratio	0.066	-	-	3.653	-	0.098	-	-	-	-
HCM Control Delay (s)	11	-	-	$ 1297	0	13.2	0	0	-	-
HCM Lane LOS	B	-	-	F	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	31.8	-	0.3	-	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	0	0	0	40	810	0	0	790	240
Future Volume (vph)	295	0	45	0	0	0	40	810	0	0	790	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.965	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	1583	0	1900	0	1770	3539	0	1863	3415	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	1863	1583	0	1900	0	1770	3539	0	1863	3415	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	311	0	47	0	0	0	42	853	0	0	832	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	0	47	0	0	0	42	853	0	0	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 56.3%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	75	85	100	110	90	25	475	70	115	580	140
Future Volume (veh/h)	280	75	85	100	110	90	25	475	70	115	580	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	295	79	45	105	116	95	26	500	74	121	611	147
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	498	686	583	536	681	514	312	1322	195	387	1210	290
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1166	1863	1583	1214	1851	1398	704	3096	456	835	2832	680
Grp Volume(v), veh/h	295	79	45	105	106	105	26	285	289	121	381	377
Grp Sat Flow(s),veh/h/ln	1166	1863	1583	1214	1703	1546	704	1770	1782	835	1770	1743
Q Serve(g_s), s	13.5	1.6	1.1	3.7	2.5	2.7	1.6	6.4	6.5	6.8	9.2	9.3
Cycle Q Clear(g_c), s	16.2	1.6	1.1	5.3	2.5	2.7	10.9	6.4	6.5	13.3	9.2	9.3
Prop In Lane	1.00		1.00	1.00		0.90	1.00		0.26	1.00		0.39
Lane Grp Cap(c), veh/h	498	686	583	536	627	569	312	756	761	387	756	744
V/C Ratio(X)	0.59	0.12	0.08	0.20	0.17	0.18	0.08	0.38	0.38	0.31	0.50	0.51
Avail Cap(c_a), veh/h	885	1304	1108	939	1192	1082	456	1118	1126	558	1118	1101
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	12.2	12.0	14.0	12.5	12.5	16.2	11.5	11.5	16.0	12.3	12.3
Incr Delay (d2), s/veh	1.1	0.1	0.1	0.2	0.1	0.2	0.1	0.3	0.3	0.5	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	1.5	0.9	2.3	2.1	2.1	0.6	5.7	5.8	2.9	8.1	8.0
LnGrp Delay(d),s/veh	19.2	12.3	12.1	14.1	12.6	12.7	16.4	11.8	11.8	16.5	12.8	12.8
LnGrp LOS	B	B	B	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		419			316			600			879	
Approach Delay, s/veh		17.1			13.1			12.0			13.3	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		31.0		27.6		31.0		27.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		12.9		18.2		15.3		7.3
Green Ext Time (p_c), s		10.2		3.4		9.7		3.6

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B

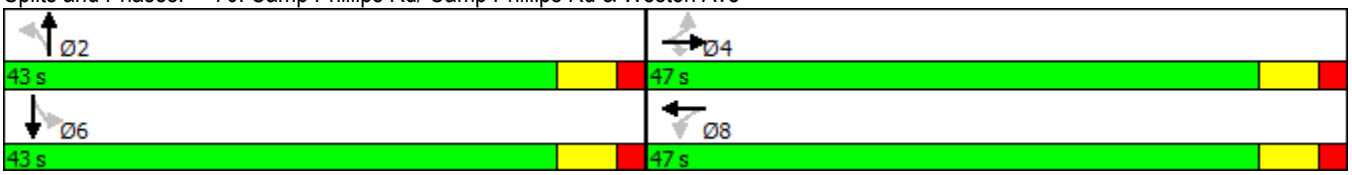
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	295	79	45	105	211	26	574	121	758
v/c Ratio	0.69	0.11	0.08	0.22	0.18	0.12	0.42	0.39	0.56
Control Delay	24.3	12.1	12.0	13.6	12.1	14.7	14.2	18.6	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	12.1	12.0	13.6	12.1	14.7	14.2	18.6	15.8
Queue Length 50th (ft)	69	14	8	20	21	5	62	25	87
Queue Length 95th (ft)	190	47	31	63	53	25	147	87	203
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	918	1482	1259	1006	2525	424	2554	583	2528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.05	0.04	0.10	0.08	0.06	0.22	0.21	0.30

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	20.1	20.1	20.1	20.1	20.1		21.2	21.2		21.2	21.2	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.39	0.39		0.39	0.39	
v/c Ratio	0.69	0.11	0.08	0.22	0.18		0.12	0.42		0.39	0.56	
Control Delay	24.3	12.1	12.0	13.6	12.1		14.7	14.2		18.6	15.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.3	12.1	12.0	13.6	12.1		14.7	14.2		18.6	15.8	
LOS	C	B	B	B	B		B	B		B	B	
Approach Delay		20.7			12.6			14.2			16.2	
Approach LOS		C			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 54.2	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 76.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	75	85	100	110	90	25	475	70	115	580	140
Future Volume (vph)	280	75	85	100	110	90	25	475	70	115	580	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.932			0.981			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3174	0	1770	3472	0	1770	3437	0
Flt Permitted	0.620			0.706			0.310			0.426		
Satd. Flow (perm)	1155	1863	1583	1265	3174	0	577	3472	0	794	3437	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	295	79	45	105	116	95	26	500	74	121	611	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	79	45	105	211	0	26	574	0	121	758	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Appendix C

Existing Transportation System with Build Traffic Operational Analysis

I. 2020 Phase I Build Traffic, Existing Transportation System – Synchro 9 Outputs
II. 2030 Full Build Traffic, Existing Transportation System – Synchro 9 Outputs
III. 2040 Full Build Traffic, Existing Transportation System – Synchro 9 Outputs

Appendix C:
Existing Transportation System with Build Traffic Operational Analysis

2020 Phase I Build Traffic, Existing Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	120	70	10	25	110	785	35	20	1235	25
Future Volume (veh/h)	5	5	120	70	10	25	110	785	35	20	1235	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	5	5	37	76	11	27	120	853	0	22	1342	27
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	190	160	389	329	70	171	323	2191	980	421	1670	34
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.09	0.64	0.00	0.48	0.48	0.48
Sat Flow, veh/h	632	999	1580	1318	435	1069	1707	3406	1524	625	3447	69
Grp Volume(v), veh/h	10	0	37	76	0	38	120	853	0	22	669	700
Grp Sat Flow(s),veh/h/ln	1630	0	1580	1318	0	1504	1707	1703	1524	625	1719	1797
Q Serve(g_s), s	0.0	0.0	1.1	3.1	0.0	1.3	1.8	7.3	0.0	1.1	20.1	20.1
Cycle Q Clear(g_c), s	0.3	0.0	1.1	3.3	0.0	1.3	1.8	7.3	0.0	1.1	20.1	20.1
Prop In Lane	0.50		1.00	1.00		0.71	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	350	0	389	329	0	241	323	2191	980	421	833	871
V/C Ratio(X)	0.03	0.00	0.10	0.23	0.00	0.16	0.37	0.39	0.00	0.05	0.80	0.80
Avail Cap(c_a), veh/h	1024	0	1066	910	0	885	358	2339	1046	435	871	911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.7	0.0	17.8	23.1	0.0	22.1	11.0	5.2	0.0	8.4	13.3	13.3
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.4	0.0	0.3	0.7	0.1	0.0	0.1	5.3	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.9	2.1	0.0	1.0	2.0	6.0	0.0	0.4	16.1	16.6
LnGrp Delay(d),s/veh	21.7	0.0	17.9	23.4	0.0	22.4	11.7	5.3	0.0	8.5	18.6	18.4
LnGrp LOS	C		B	C		C	B	A		A	B	B
Approach Vol, veh/h		47			114			973			1391	
Approach Delay, s/veh		18.7			23.1			6.1			18.3	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.3		15.8	9.7	35.6		15.8
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.5	31.0		36.0
Max Q Clear Time (g_c+I1), s		9.3		3.1	3.8	22.1		5.3
Green Ext Time (p_c), s		21.1		0.8	0.1	7.5		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	120	70	10	25	110	785	35	20	1235	25
Future Volume (vph)	5	5	120	70	10	25	110	785	35	20	1235	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1817	1569		3292		1703	3406	1487	1717	3427	
Flt Permitted		0.85	1.00		0.79		0.10	1.00	1.00	0.33	1.00	
Satd. Flow (perm)		1578	1569		2682		178	3406	1487	599	3427	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	5	5	65	76	11	27	120	853	19	22	1342	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	65	0	114	0	120	853	19	22	1369	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		11.6	16.6		11.6		45.3	45.3	45.3	35.8	35.8	
Effective Green, g (s)		11.6	16.6		11.6		45.3	45.3	45.3	35.8	35.8	
Actuated g/C Ratio		0.17	0.24		0.17		0.66	0.66	0.66	0.52	0.52	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		265	378		451		227	2239	977	311	1780	
v/s Ratio Prot			0.01				c0.04	0.25			c0.40	
v/s Ratio Perm		0.01	0.03		c0.04		0.31		0.01	0.04		
v/c Ratio		0.04	0.17		0.25		0.53	0.38	0.02	0.07	0.77	
Uniform Delay, d1		24.0	20.7		24.9		8.9	5.4	4.1	8.3	13.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	0.2		0.3		2.2	0.1	0.0	0.1	2.1	
Delay (s)		24.0	20.9		25.2		11.2	5.5	4.1	8.4	15.3	
Level of Service		C	C		C		B	A	A	A	B	
Approach Delay (s)		21.3			25.2			6.2			15.2	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	10	65	114	120	853	19	22	1369
v/c Ratio	0.03	0.14	0.20	0.44	0.36	0.02	0.07	0.71
Control Delay	19.8	13.4	22.3	14.3	8.4	8.5	15.3	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	13.4	22.3	14.3	8.4	8.5	15.3	20.5
Queue Length 50th (ft)	3	17	21	13	66	2	4	224
Queue Length 95th (ft)	13	36	38	#90	230	18	26	#622
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	876	457	1489	274	2340	1021	335	1917
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.14	0.08	0.44	0.36	0.02	0.07	0.71

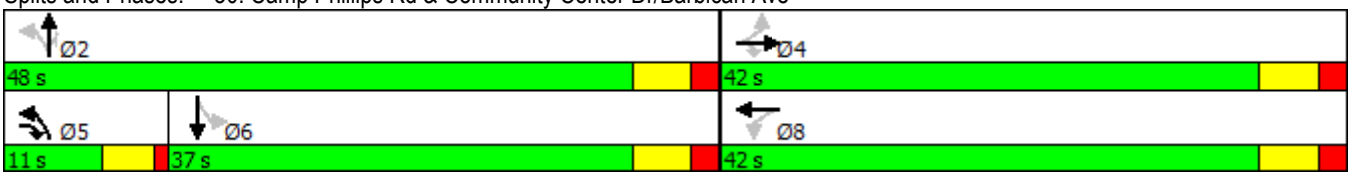
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	48.0	48.0	37.0	37.0	
Total Split (%)	46.7%	46.7%	12.2%	46.7%	46.7%		12.2%	53.3%	53.3%	41.1%	41.1%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	42.0	42.0	31.0	31.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.2	19.4		14.2		45.9	45.9	45.9	37.4	37.4	
Actuated g/C Ratio		0.21	0.29		0.21		0.69	0.69	0.69	0.56	0.56	
v/c Ratio		0.03	0.14		0.20		0.44	0.36	0.02	0.07	0.71	
Control Delay		19.8	13.4		22.3		14.3	8.4	8.5	15.3	20.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		19.8	13.4		22.3		14.3	8.4	8.5	15.3	20.5	
LOS		B	B		C		B	A	A	B	C	
Approach Delay		14.3			22.3			9.1			20.4	
Approach LOS		B			C			A			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 66.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	120	70	10	25	110	785	35	20	1235	25
Future Volume (vph)	5	5	120	70	10	25	110	785	35	20	1235	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98	1.00	1.00	
Frt			0.850		0.964				0.850		0.997	
Flt Protected		0.976			0.968		0.950			0.950		
Satd. Flow (prot)	0	1818	1583	0	3293	0	1703	3406	1524	1719	3427	0
Flt Permitted		0.847			0.788		0.099			0.332		
Satd. Flow (perm)	0	1577	1563	0	2679	0	177	3406	1486	600	3427	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	5	5	65	76	11	27	120	853	19	22	1342	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	65	0	114	0	120	853	19	22	1369	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	230	0	160	560	770	0	0	730	695
Future Volume (veh/h)	0	0	0	230	0	160	560	770	0	0	730	695
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				242	0	0	589	811	0	0	768	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				281	0	251	725	2389	0	0	946	423
Arrive On Green				0.16	0.00	0.00	0.73	1.00	0.00	0.00	0.28	0.00
Sat Flow, veh/h				1774	0	1583	1691	3463	0	0	3495	1524
Grp Volume(v), veh/h				242	0	0	589	811	0	0	768	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1691	1687	0	0	1703	1524
Q Serve(g_s), s				12.0	0.0	0.0	8.8	0.0	0.0	0.0	18.9	0.0
Cycle Q Clear(g_c), s				12.0	0.0	0.0	8.8	0.0	0.0	0.0	18.9	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				281	0	251	725	2389	0	0	946	423
V/C Ratio(X)				0.86	0.00	0.00	0.81	0.34	0.00	0.00	0.81	0.00
Avail Cap(c_a), veh/h				335	0	299	725	2389	0	0	946	423
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.77	0.77	0.00	0.00	0.67	0.00
Uniform Delay (d), s/veh				36.9	0.0	0.0	8.1	0.0	0.0	0.0	30.3	0.0
Incr Delay (d2), s/veh				17.5	0.0	0.0	5.5	0.3	0.0	0.0	5.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				11.6	0.0	0.0	10.8	0.2	0.0	0.0	13.7	0.0
LnGrp Delay(d),s/veh				54.4	0.0	0.0	13.5	0.3	0.0	0.0	35.5	0.0
LnGrp LOS				D			B	A			D	
Approach Vol, veh/h					242			1400			768	
Approach Delay, s/veh					54.4			5.9			35.5	
Approach LOS					D			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		69.7			38.7	31.0		20.3
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		61.0			30.0	25.0		17.0
Max Q Clear Time (g_c+I1), s		2.0			10.8	20.9		14.0
Green Ext Time (p_c), s		10.4			7.9	1.9		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	160	560	770	0	0	730	695
Future Volume (vph)	0	0	0	230	0	160	560	770	0	0	730	695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1770	1583	1687	3374			3406	1524
Flt Permitted					0.95	1.00	0.22	1.00			1.00	1.00
Satd. Flow (perm)					1770	1583	395	3374			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	242	0	84	589	811	0	0	768	366
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	242	84	589	811	0	0	768	366
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					15.6	15.6	62.4	62.4			26.4	26.4
Effective Green, g (s)					15.6	15.6	62.4	62.4			26.4	26.4
Actuated g/C Ratio					0.17	0.17	0.69	0.69			0.29	0.29
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					306	274	704	2339			999	447
v/s Ratio Prot							c0.28	0.24			0.23	
v/s Ratio Perm					0.14	0.05	c0.30					0.24
v/c Ratio					0.79	0.31	0.84	0.35			0.77	0.82
Uniform Delay, d1					35.6	32.5	17.8	5.6			29.0	29.6
Progression Factor					1.00	1.00	0.51	0.49			1.00	1.00
Incremental Delay, d2					13.0	0.6	6.8	0.4			5.7	15.3
Delay (s)					48.7	33.1	15.8	3.1			34.7	44.9
Level of Service					D	C	B	A			C	D
Approach Delay (s)		0.0			44.6			8.5			38.0	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	242	84	589	811	768	366
v/c Ratio	0.79	0.31	0.84	0.35	0.77	0.82
Control Delay	54.7	35.1	21.1	3.2	35.7	47.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	35.1	21.1	3.2	35.7	47.2
Queue Length 50th (ft)	131	41	48	20	214	197
Queue Length 95th (ft)	#235	83	#165	53	#286	#355
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	334	299	704	2339	1000	447
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.28	0.84	0.35	0.77	0.82

Intersection Summary

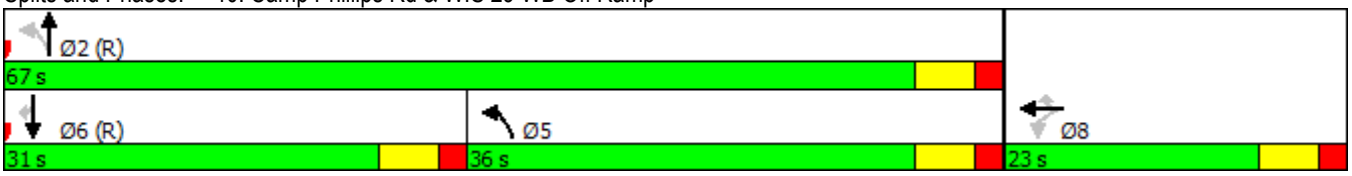
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	36.0	67.0			31.0	31.0
Total Split (%)				25.6%	25.6%	25.6%	40.0%	74.4%			34.4%	34.4%
Maximum Green (s)				17.0	17.0	17.0	30.0	61.0			25.0	25.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					15.6	15.6	62.4	62.4			26.4	26.4
Actuated g/C Ratio					0.17	0.17	0.69	0.69			0.29	0.29
v/c Ratio					0.79	0.31	0.84	0.35			0.77	0.82
Control Delay					54.7	35.1	21.1	3.2			35.7	47.2
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					54.7	35.1	21.1	3.2			35.7	47.2
LOS					D	D	C	A			D	D
Approach Delay					49.7			10.7			39.4	
Approach LOS					D			B			D	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 26.5 Intersection LOS: C
Intersection Capacity Utilization 80.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	160	560	770	0	0	730	695
Future Volume (vph)	0	0	0	230	0	160	560	770	0	0	730	695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1770	1583	1687	3374	0	0	3406	1524
Flt Permitted					0.950		0.222					
Satd. Flow (perm)	0	0	0	0	1770	1583	394	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	242	0	84	589	811	0	0	768	366
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	242	84	589	811	0	0	768	366
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	0	560	0	0	0	0	995	150	60	900	0
Future Volume (veh/h)	335	0	560	0	0	0	0	995	150	60	900	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	372	0	0				0	1106	0	67	1000	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	479	0	214				0	1455	651	580	2566	0
Arrive On Green	0.14	0.00	0.00				0.00	0.41	0.00	0.49	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	372	0	0				0	1106	0	67	1000	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	9.5	0.0	0.0				0.0	24.1	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.0				0.0	24.1	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	479	0	214				0	1455	651	580	2566	0
V/C Ratio(X)	0.78	0.00	0.00				0.00	0.76	0.00	0.12	0.39	0.00
Avail Cap(c_a), veh/h	1090	0	486				0	1455	651	580	2566	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.55	0.55	0.00
Uniform Delay (d), s/veh	37.2	0.0	0.0				0.0	22.7	0.0	13.2	0.0	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0				0.0	3.8	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.2	0.0	0.0				0.0	18.2	0.0	1.4	0.2	0.0
LnGrp Delay(d),s/veh	40.0	0.0	0.0				0.0	26.5	0.0	13.3	0.2	0.0
LnGrp LOS	D							C		B	A	
Approach Vol, veh/h		372						1106			1067	
Approach Delay, s/veh		40.0						26.5			1.1	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	28.2	43.0		18.8		71.2		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	37.0		29.0		49.0		
Max Q Clear Time (g_c+I1), s	2.0	26.1		11.5		2.0		
Green Ext Time (p_c), s	2.4	5.6		1.2		9.1		

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	335	0	560	0	0	0	0	995	150	60	900	0
Future Volume (vph)	335	0	560	0	0	0	0	995	150	60	900	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1603	1509					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1603	1603	1509					3539	1583	323	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	372	0	311	0	0	0	0	1106	83	67	1000	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	186	186	311	0	0	0	0	1106	83	67	1000	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	23.7	23.7	23.7					43.5	43.5	54.3	54.3	
Effective Green, g (s)	23.7	23.7	23.7					43.5	43.5	54.3	54.3	
Actuated g/C Ratio	0.26	0.26	0.26					0.48	0.48	0.60	0.60	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	422	422	397					1710	765	272	2135	
v/s Ratio Prot								c0.31		0.01	c0.28	
v/s Ratio Perm	0.12	0.12	c0.21						0.05	0.14		
v/c Ratio	0.44	0.44	0.78					0.65	0.11	0.25	0.47	
Uniform Delay, d1	27.6	27.6	30.8					17.5	12.7	17.4	9.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.44	0.91	
Incremental Delay, d2	0.7	0.7	9.7					1.9	0.3	0.4	0.5	
Delay (s)	28.4	28.4	40.5					19.4	13.0	8.0	9.5	
Level of Service	C	C	D					B	B	A	A	
Approach Delay (s)		33.9			0.0			18.9			9.4	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	186	186	311	1106	83	67	1000
v/c Ratio	0.44	0.44	0.78	0.63	0.11	0.23	0.47
Control Delay	29.9	29.9	44.5	20.6	15.6	6.9	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	29.9	44.5	20.6	15.6	6.9	10.4
Queue Length 50th (ft)	91	91	162	250	26	1	125
Queue Length 95th (ft)	145	145	241	356	58	m2	350
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	516	516	486	1758	786	290	2135
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.36	0.64	0.63	0.11	0.23	0.47

Intersection Summary

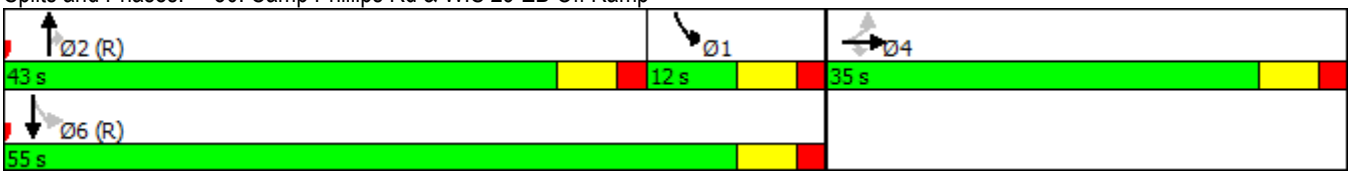
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	35.0	35.0	35.0					43.0	43.0	12.0	55.0	
Total Split (%)	38.9%	38.9%	38.9%					47.8%	47.8%	13.3%	61.1%	
Maximum Green (s)	29.0	29.0	29.0					37.0	37.0	6.0	49.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	23.7	23.7	23.7					44.7	44.7	54.3	54.3	
Actuated g/C Ratio	0.26	0.26	0.26					0.50	0.50	0.60	0.60	
v/c Ratio	0.44	0.44	0.78					0.63	0.11	0.23	0.47	
Control Delay	29.9	29.9	44.5					20.6	15.6	6.9	10.4	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	29.9	29.9	44.5					20.6	15.6	6.9	10.4	
LOS	C	C	D					C	B	A	B	
Approach Delay		36.6						20.3			10.2	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 19 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 20.4 Intersection LOS: C
Intersection Capacity Utilization 80.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	335	0	560	0	0	0	0	995	150	60	900	0
Future Volume (vph)	335	0	560	0	0	0	0	995	150	60	900	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.173		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	322	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	372	0	311	0	0	0	0	1106	83	67	1000	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	186	186	311	0	0	0	0	1106	83	67	1000	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	1754.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	90	0	25	50	0	525	25	530	70	770	375	315
Future Vol, veh/h	90	0	25	50	0	525	25	530	70	770	375	315
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	0	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	3	3	3
Mvmt Flow	96	0	27	53	0	559	27	564	74	819	399	335

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2540	2896	367	2492	3026	319	734	0	0	638	0	0
Stage 1	2205	2205	-	654	654	-	-	-	-	-	-	-
Stage 2	335	691	-	1838	2372	-	-	-	-	-	-	-
Critical Hdwy	7.62	6.62	7.02	7.54	6.54	6.94	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.62	5.62	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	5.62	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.06	3.36	3.52	4.02	3.32	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	~ 13	15	619	~ 15	13	677	867	-	-	935	-	-
Stage 1	~ 43	77	-	422	461	-	-	-	-	-	-	-
Stage 2	642	434	-	78	66	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 1	2	619	~ 4	2	677	867	-	-	935	-	-
Mov Cap-2 Maneuver	~ 1	2	-	~ 4	2	-	-	-	-	-	-	-
Stage 1	~ 42	10	-	409	447	-	-	-	-	-	-	-
Stage 2	109	420	-	~ 9	8	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 38828.8	$ 661	0.4	15.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	867	-	-	1	-	619	4	677	935	-	-
HCM Lane V/C Ratio	0.031	-	-	95.745	-	0.043	13.298	0.825	0.876	-	-
HCM Control Delay (s)	9.3	-	$ 49	611.5	0	11.3	$ 7283.4	30.3	28.9	-	-
HCM Lane LOS	A	-	-	F	A	B	F	D	D	-	-
HCM 95th %tile Q(veh)	0.1	-	-	14.3	-	0.1	8.5	8.9	11.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	25	50	0	525	25	530	70	770	375	315
Future Volume (vph)	90	0	25	50	0	525	25	530	70	770	375	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.850			0.983			0.932	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1583	0	1770	3479	0	1752	3267	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1703	1792	1524	1770	1583	0	1770	3479	0	1752	3267	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	96	0	27	53	0	559	27	564	74	819	399	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	0	27	53	559	0	27	638	0	819	734	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 110.4%		ICU Level of Service H	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	70	15	65	95	60	55	435	80	60	295	95
Future Volume (veh/h)	130	70	15	65	95	60	55	435	80	60	295	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	140	75	8	70	102	65	59	468	86	65	317	102
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	456	490	417	463	504	299	514	1251	229	447	1076	340
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1214	1863	1583	1172	1913	1136	964	2990	546	827	2572	813
Grp Volume(v), veh/h	140	75	8	70	83	84	59	276	278	65	210	209
Grp Sat Flow(s),veh/h/ln	1214	1863	1583	1172	1583	1466	964	1770	1766	827	1719	1666
Q Serve(g_s), s	3.8	1.2	0.1	1.8	1.5	1.7	1.6	4.0	4.1	2.2	3.1	3.1
Cycle Q Clear(g_c), s	5.5	1.2	0.1	3.0	1.5	1.7	4.8	4.0	4.1	6.3	3.1	3.1
Prop In Lane	1.00		1.00	1.00		0.77	1.00		0.31	1.00		0.49
Lane Grp Cap(c), veh/h	456	490	417	463	417	386	514	740	739	447	719	697
V/C Ratio(X)	0.31	0.15	0.02	0.15	0.20	0.22	0.11	0.37	0.38	0.15	0.29	0.30
Avail Cap(c_a), veh/h	1425	1977	1681	1399	1681	1556	1082	1784	1781	935	1733	1680
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.0	10.7	10.3	11.8	10.8	10.8	8.9	7.6	7.6	9.7	7.3	7.3
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.1	0.2	0.3	0.1	0.3	0.3	0.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.4	1.1	0.1	1.1	1.3	1.3	0.8	3.6	3.6	0.9	2.6	2.7
LnGrp Delay(d),s/veh	13.4	10.8	10.3	12.0	11.0	11.1	9.0	7.9	7.9	9.9	7.5	7.5
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		223			237			613			484	
Approach Delay, s/veh		12.4			11.3			8.0			7.8	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		21.8		15.9		21.8		15.9
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		6.8		7.5		8.3		5.0
Green Ext Time (p_c), s		7.5		2.2		7.4		2.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A

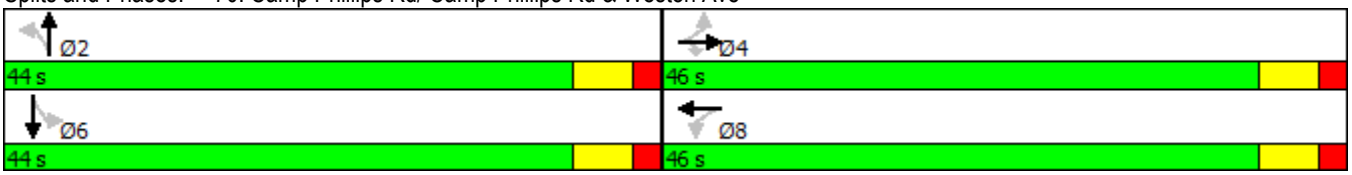
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	75	8	70	167	59	554	65	419
v/c Ratio	0.38	0.13	0.02	0.19	0.18	0.12	0.31	0.16	0.24
Control Delay	14.7	10.9	10.0	12.0	10.9	8.9	8.5	9.5	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	10.9	10.0	12.0	10.9	8.9	8.5	9.5	8.2
Queue Length 50th (ft)	23	11	1	11	13	7	38	8	27
Queue Length 95th (ft)	61	33	8	34	31	27	80	30	61
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1180	1827	1553	1157	2926	915	3353	781	3211
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.04	0.01	0.06	0.06	0.06	0.17	0.08	0.13

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	11.3	11.3	11.3	11.3	11.3		19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.52	0.52		0.52	0.52	
v/c Ratio	0.38	0.13	0.02	0.19	0.18		0.12	0.31		0.16	0.24	
Control Delay	14.7	10.9	10.0	12.0	10.9		8.9	8.5		9.5	8.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.7	10.9	10.0	12.0	10.9		8.9	8.5		9.5	8.2	
LOS	B	B	A	B	B		A	A		A	A	
Approach Delay		13.2			11.3			8.5			8.4	
Approach LOS		B			B			A			A	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 36.6	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	70	15	65	95	60	55	435	80	60	295	95
Future Volume (vph)	130	70	15	65	95	60	55	435	80	60	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.942			0.977			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2983	0	1770	3458	0	1719	3311	0
Flt Permitted	0.646			0.708			0.507			0.445		
Satd. Flow (perm)	1203	1863	1583	1180	2983	0	944	3458	0	805	3311	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	140	75	8	70	102	65	59	468	86	65	317	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	75	8	70	167	0	59	554	0	65	419	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	10	155	110	10	60	105	1475	80	60	1525	20
Future Volume (veh/h)	25	10	155	110	10	60	105	1475	80	60	1525	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	27	11	46	117	11	64	112	1569	0	64	1622	21
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	245	85	428	298	41	239	261	2191	980	214	1687	22
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.08	0.63	0.00	0.48	0.48	0.48
Sat Flow, veh/h	790	444	1581	986	216	1255	1757	3505	1568	323	3543	46
Grp Volume(v), veh/h	38	0	46	117	0	75	112	1569	0	64	801	842
Grp Sat Flow(s),veh/h/ln	1233	0	1581	986	0	1471	1757	1752	1568	323	1752	1836
Q Serve(g_s), s	0.4	0.0	1.4	5.4	0.0	2.8	1.8	19.8	0.0	10.9	28.8	28.9
Cycle Q Clear(g_c), s	3.3	0.0	1.4	8.6	0.0	2.8	1.8	19.8	0.0	21.0	28.8	28.9
Prop In Lane	0.71		1.00	1.00		0.85	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	330	0	428	298	0	280	261	2191	980	214	834	874
V/C Ratio(X)	0.12	0.00	0.11	0.39	0.00	0.27	0.43	0.72	0.00	0.30	0.96	0.96
Avail Cap(c_a), veh/h	851	0	1001	784	0	813	296	2260	1011	214	834	874
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	0.0	17.8	26.4	0.0	22.5	14.2	8.3	0.0	18.7	16.5	16.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.8	0.0	0.5	1.1	1.1	0.0	0.8	22.0	21.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.1	0.0	1.1	3.7	0.0	2.1	2.0	14.8	0.0	1.8	26.0	27.1
LnGrp Delay(d),s/veh	22.4	0.0	18.0	27.2	0.0	23.0	15.3	9.4	0.0	19.5	38.5	38.3
LnGrp LOS	C		B	C		C	B	A		B	D	D
Approach Vol, veh/h		84			192			1681			1707	
Approach Delay, s/veh		20.0			25.6			9.8			37.7	
Approach LOS		B			C			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		46.7		18.4	9.7	37.0		18.4
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.5	31.0		36.0
Max Q Clear Time (g_c+I1), s		21.8		5.3	3.8	30.9		10.6
Green Ext Time (p_c), s		18.9		1.5	0.1	0.1		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	23.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	155	110	10	60	105	1475	80	60	1525	20
Future Volume (vph)	25	10	155	110	10	60	105	1475	80	60	1525	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1798	1569		3248		1752	3505	1531	1752	3497	
Flt Permitted		0.72	1.00		0.78		0.11	1.00	1.00	0.13	1.00	
Satd. Flow (perm)		1337	1569		2618		202	3505	1531	235	3497	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	27	11	82	117	11	64	112	1569	43	64	1622	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	38	82	0	192	0	112	1569	43	64	1643	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		14.4	19.5		14.4		41.7	41.7	41.7	32.1	32.1	
Effective Green, g (s)		14.4	19.5		14.4		41.7	41.7	41.7	32.1	32.1	
Actuated g/C Ratio		0.21	0.29		0.21		0.61	0.61	0.61	0.47	0.47	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		282	449		553		239	2146	937	110	1648	
v/s Ratio Prot			0.01				0.03	c0.45			c0.47	
v/s Ratio Perm		0.03	0.04		c0.07		0.25		0.03	0.27		
v/c Ratio		0.13	0.18		0.35		0.47	0.73	0.05	0.58	1.00	
Uniform Delay, d1		21.8	18.3		22.9		13.5	9.3	5.3	13.1	18.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.2	0.2		0.4		1.5	1.3	0.0	7.6	21.3	
Delay (s)		22.0	18.5		23.2		14.9	10.6	5.3	20.7	39.2	
Level of Service		C	B		C		B	B	A	C	D	
Approach Delay (s)		19.6			23.2			10.7			38.5	
Approach LOS		B			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	38	82	192	112	1569	43	64	1643
v/c Ratio	0.13	0.16	0.34	0.41	0.74	0.05	0.57	0.99
Control Delay	21.7	13.6	23.8	11.7	14.8	8.3	43.6	40.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	13.6	23.8	11.7	14.8	8.3	43.6	40.8
Queue Length 50th (ft)	13	21	36	12	166	5	16	305
Queue Length 95th (ft)	33	43	60	63	#607	31	#109	#790
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	734	527	1436	279	2245	979	112	1664
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.16	0.13	0.40	0.70	0.04	0.57	0.99

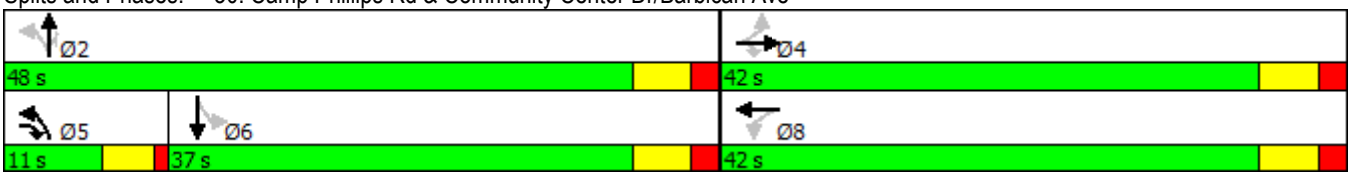
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	48.0	48.0	37.0	37.0	
Total Split (%)	46.7%	46.7%	12.2%	46.7%	46.7%		12.2%	53.3%	53.3%	41.1%	41.1%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	42.0	42.0	31.0	31.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.4	22.5		14.4		42.2	40.6	40.6	32.1	32.1	
Actuated g/C Ratio		0.21	0.33		0.21		0.63	0.60	0.60	0.48	0.48	
v/c Ratio		0.13	0.16		0.34		0.41	0.74	0.05	0.57	0.99	
Control Delay		21.7	13.6		23.8		11.7	14.8	8.3	43.6	40.8	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		21.7	13.6		23.8		11.7	14.8	8.3	43.6	40.8	
LOS		C	B		C		B	B	A	D	D	
Approach Delay		16.1			23.8			14.4			40.9	
Approach LOS		B			C			B			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 81.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	155	110	10	60	105	1475	80	60	1525	20
Future Volume (vph)	25	10	155	110	10	60	105	1475	80	60	1525	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98		1.00	
Frt			0.850		0.950				0.850		0.998	
Flt Protected		0.966			0.970		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	3247	0	1752	3505	1568	1752	3497	0
Flt Permitted		0.718			0.782		0.109			0.128		
Satd. Flow (perm)	0	1337	1563	0	2617	0	201	3505	1529	236	3497	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	27	11	82	117	11	64	112	1569	43	64	1622	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	82	0	192	0	112	1569	43	64	1643	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	265	0	85	925	1575	0	0	1110	680
Future Volume (veh/h)	0	0	0	265	0	85	925	1575	0	0	1110	680
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				270	0	0	944	1607	0	0	1133	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				245	0	219	743	2596	0	0	1056	473
Arrive On Green				0.15	0.00	0.00	0.78	1.00	0.00	0.00	0.30	0.00
Sat Flow, veh/h				1660	0	1482	1740	3563	0	0	3563	1553
Grp Volume(v), veh/h				270	0	0	944	1607	0	0	1133	0
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1740	1736	0	0	1736	1553
Q Serve(g_s), s				17.0	0.0	0.0	45.0	0.0	0.0	0.0	35.0	0.0
Cycle Q Clear(g_c), s				17.0	0.0	0.0	45.0	0.0	0.0	0.0	35.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				245	0	219	743	2596	0	0	1056	473
V/C Ratio(X)				1.10	0.00	0.00	1.27	0.62	0.00	0.00	1.07	0.00
Avail Cap(c_a), veh/h				245	0	219	743	2596	0	0	1056	473
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.19	0.19	0.00	0.00	0.21	0.00
Uniform Delay (d), s/veh				49.0	0.0	0.0	10.6	0.0	0.0	0.0	40.0	0.0
Incr Delay (d2), s/veh				86.9	0.0	0.0	123.5	0.2	0.0	0.0	37.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				24.6	0.0	0.0	82.8	0.1	0.0	0.0	40.0	0.0
LnGrp Delay(d),s/veh				135.9	0.0	0.0	134.1	0.2	0.0	0.0	77.3	0.0
LnGrp LOS				F			F	A			F	
Approach Vol, veh/h					270			2551			1133	
Approach Delay, s/veh					135.9			49.8			77.3	
Approach LOS					F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		92.0			51.0	41.0		23.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		86.0			45.0	35.0		17.0
Max Q Clear Time (g_c+I1), s		2.0			47.0	37.0		19.0
Green Ext Time (p_c), s		36.9			0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	265	0	85	925	1575	0	0	1110	680
Future Volume (vph)	0	0	0	265	0	85	925	1575	0	0	1110	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1656	1482	1736	3471			3471	1553
Flt Permitted					0.95	1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)					1656	1482	178	3471			3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	270	0	43	944	1607	0	0	1133	347
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	270	43	944	1607	0	0	1133	347
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					17.0	17.0	86.0	86.0			35.0	35.0
Effective Green, g (s)					17.0	17.0	86.0	86.0			35.0	35.0
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.30	0.30
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					244	219	742	2595			1056	472
v/s Ratio Prot							c0.50	0.46			0.33	
v/s Ratio Perm					0.16	0.03	c0.45					0.22
v/c Ratio					1.11	0.20	1.27	0.62			1.07	0.74
Uniform Delay, d1					49.0	43.0	30.8	6.8			40.0	35.8
Progression Factor					1.00	1.00	0.35	0.62			1.00	1.00
Incremental Delay, d2					89.2	0.4	126.0	0.5			49.5	9.8
Delay (s)					138.2	43.4	136.8	4.7			89.5	45.6
Level of Service					F	D	F	A			F	D
Approach Delay (s)		0.0			125.1			53.6			79.2	
Approach LOS		A			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	67.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	270	43	944	1607	1133	347
v/c Ratio	1.11	0.20	1.27	0.62	1.07	0.74
Control Delay	134.8	45.7	141.8	4.8	88.2	46.6
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	134.8	45.7	141.8	5.3	88.2	46.6
Queue Length 50th (ft)	~228	28	~812	303	~491	230
Queue Length 95th (ft)	#396	63	m#809	m269	#625	342
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	244	219	743	2595	1056	472
Starvation Cap Reductn	0	0	0	501	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.20	1.27	0.77	1.07	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

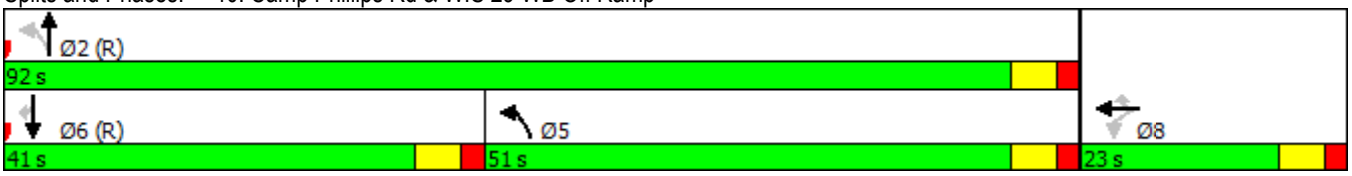
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	51.0	92.0			41.0	41.0
Total Split (%)				20.0%	20.0%	20.0%	44.3%	80.0%			35.7%	35.7%
Maximum Green (s)				17.0	17.0	17.0	45.0	86.0			35.0	35.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					17.0	17.0	86.0	86.0			35.0	35.0
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.30	0.30
v/c Ratio					1.11	0.20	1.27	0.62			1.07	0.74
Control Delay					134.8	45.7	141.8	4.8			88.2	46.6
Queue Delay					0.0	0.0	0.0	0.5			0.0	0.0
Total Delay					134.8	45.7	141.8	5.3			88.2	46.6
LOS					F	D	F	A			F	D
Approach Delay					122.5			55.8			78.4	
Approach LOS					F			E			E	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 68.3 Intersection LOS: E
Intersection Capacity Utilization 111.6% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	265	0	85	925	1575	0	0	1110	680
Future Volume (vph)	0	0	0	265	0	85	925	1575	0	0	1110	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1656	1482	1736	3471	0	0	3471	1553
Flt Permitted					0.950		0.098					
Satd. Flow (perm)	0	0	0	0	1656	1482	179	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	270	0	43	944	1607	0	0	1133	347
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	270	43	944	1607	0	0	1133	347
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	730	0	765	0	0	0	0	1770	315	150	1225	0
Future Volume (veh/h)	730	0	765	0	0	0	0	1770	315	150	1225	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	737	0	0				0	1788	0	152	1237	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	819	0	366				0	1816	812	239	2353	0
Arrive On Green	0.23	0.00	0.00				0.00	0.51	0.00	0.20	1.00	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	737	0	0				0	1788	0	152	1237	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	23.2	0.0	0.0				0.0	57.2	0.0	4.6	0.0	0.0
Cycle Q Clear(g_c), s	23.2	0.0	0.0				0.0	57.2	0.0	4.6	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	819	0	366				0	1816	812	239	2353	0
V/C Ratio(X)	0.90	0.00	0.00				0.00	0.98	0.00	0.64	0.53	0.00
Avail Cap(c_a), veh/h	926	0	413				0	1816	812	239	2353	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	42.9	0.0	0.0				0.0	27.6	0.0	42.4	0.0	0.0
Incr Delay (d2), s/veh	10.8	0.0	0.0				0.0	17.8	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	18.4	0.0	0.0				0.0	41.6	0.0	5.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	0.0	0.0				0.0	45.4	0.0	42.9	0.1	0.0
LnGrp LOS	D							D		D	A	
Approach Vol, veh/h		737						1788			1389	
Approach Delay, s/veh		53.7						45.4			4.8	
Approach LOS		D						D			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.4	65.0		32.6		82.4		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	8.0	59.0		30.0		73.0		
Max Q Clear Time (g_c+I1), s	6.6	59.2		25.2		2.0		
Green Ext Time (p_c), s	1.1	0.0		1.4		13.7		

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	0	765	0	0	0	0	1770	315	150	1225	0
Future Volume (vph)	730	0	765	0	0	0	0	1770	315	150	1225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1681	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.06	1.00	
Satd. Flow (perm)	1681	1681	1583					3539	1583	114	3539	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	737	0	386	0	0	0	0	1788	159	152	1237	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	368	369	386	0	0	0	0	1788	159	152	1237	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	29.8	29.8	29.8					59.2	59.2	73.2	73.2	
Effective Green, g (s)	29.8	29.8	29.8					59.2	59.2	73.2	73.2	
Actuated g/C Ratio	0.26	0.26	0.26					0.51	0.51	0.64	0.64	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	435	435	410					1821	814	187	2252	
v/s Ratio Prot								c0.51		c0.06	0.35	
v/s Ratio Perm	0.22	0.22	c0.24						0.10	0.46		
v/c Ratio	0.85	0.85	0.94					0.98	0.20	0.81	0.55	
Uniform Delay, d1	40.4	40.5	41.7					27.4	15.1	46.5	11.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.93	0.66	
Incremental Delay, d2	14.1	14.2	29.9					17.2	0.5	2.5	0.1	
Delay (s)	54.5	54.7	71.6					44.6	15.6	45.8	7.8	
Level of Service	D	D	E					D	B	D	A	
Approach Delay (s)		60.4			0.0			42.2			12.0	
Approach LOS		E			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	368	369	386	1788	159	152	1237
v/c Ratio	0.85	0.85	0.94	0.98	0.20	0.81	0.55
Control Delay	59.3	59.6	75.0	45.0	15.9	39.4	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	59.6	75.0	45.0	15.9	39.4	8.0
Queue Length 50th (ft)	272	272	280	661	61	94	153
Queue Length 95th (ft)	#441	#441	#468	#853	102	m86	m103
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	438	438	412	1822	815	187	2253
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.84	0.94	0.98	0.20	0.81	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

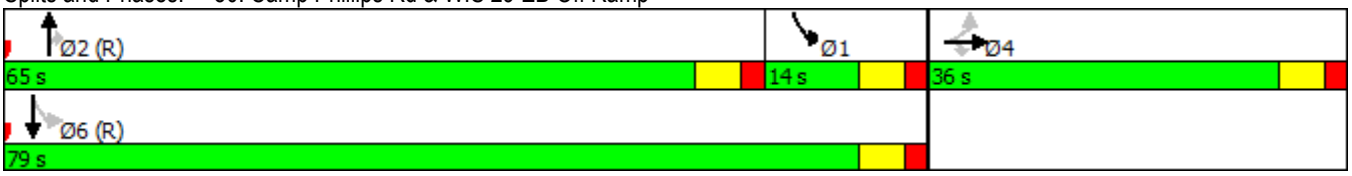
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	36.0	36.0	36.0					65.0	65.0	14.0	79.0	
Total Split (%)	31.3%	31.3%	31.3%					56.5%	56.5%	12.2%	68.7%	
Maximum Green (s)	30.0	30.0	30.0					59.0	59.0	8.0	73.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	29.8	29.8	29.8					59.2	59.2	73.2	73.2	
Actuated g/C Ratio	0.26	0.26	0.26					0.51	0.51	0.64	0.64	
v/c Ratio	0.85	0.85	0.94					0.98	0.20	0.81	0.55	
Control Delay	59.3	59.6	75.0					45.0	15.9	39.4	8.0	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	59.3	59.6	75.0					45.0	15.9	39.4	8.0	
LOS	E	E	E					D	B	D	A	
Approach Delay		64.8						42.7			11.4	
Approach LOS		E						D			B	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 12 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 38.5 Intersection LOS: D
Intersection Capacity Utilization 111.6% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	0	765	0	0	0	0	1770	315	150	1225	0
Future Volume (vph)	730	0	765	0	0	0	0	1770	315	150	1225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.061		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	114	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	737	0	386	0	0	0	0	1788	159	152	1237	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	368	369	386	0	0	0	0	1788	159	152	1237	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	68.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	200	0	35	115	0	1315	30	570	110	1245	570	175
Future Vol, veh/h	200	0	35	115	0	1315	30	570	110	1245	570	175
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	0	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	211	0	37	121	0	1384	32	600	116	1311	600	184

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3676	4092	392	3642	4126	358	784	0	0	716	0	0
Stage 1	3313	3313	-	721	721	-	-	-	-	-	-	-
Stage 2	363	779	-	2921	3405	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 2	2	607	~ 2	2	~ 638	830	-	-	~ 880	-	-
Stage 1	~ 8	21	-	385	430	-	-	-	-	-	-	-
Stage 2	628	404	-	~ 15	18	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	607	-	0	~ 638	830	-	-	~ 880	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 8	0	-	370	413	-	-	-	-	-	-	-
Stage 2	-	388	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.4	150.8
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	830	-	-	-	-	607	-	638	~ 880	-	-
HCM Lane V/C Ratio	0.038	-	-	-	-	0.061	-	2.17	1.489	-	-
HCM Control Delay (s)	9.5	-	-	-	0	11.3	-	$ 547.2	241.1	-	-
HCM Lane LOS	A	-	-	-	A	B	-	F	F	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.2	-	98.5	61.8	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	0	35	115	0	1315	30	570	110	1245	570	175
Future Volume (vph)	200	0	35	115	0	1315	30	570	110	1245	570	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.850			0.976			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1583	0	1770	3454	0	1770	3415	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1583	0	1770	3454	0	1770	3415	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	0	37	121	0	1384	32	600	116	1311	600	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	0	37	121	1384	0	32	716	0	1311	784	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 194.1%	ICU Level of Service H
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	115	55	140	135	70	15	440	115	80	535	105
Future Volume (veh/h)	200	115	55	140	135	70	15	440	115	80	535	105
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	211	121	29	147	142	74	16	463	121	84	563	111
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	468	605	514	478	717	355	371	1191	309	407	1263	248
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1161	1863	1583	1186	2209	1093	761	2783	722	828	2950	580
Grp Volume(v), veh/h	211	121	29	147	108	108	16	293	291	84	337	337
Grp Sat Flow(s),veh/h/ln	1161	1863	1583	1186	1703	1600	761	1770	1735	828	1770	1760
Q Serve(g_s), s	7.8	2.3	0.6	5.0	2.2	2.4	0.7	5.5	5.6	3.8	6.5	6.6
Cycle Q Clear(g_c), s	10.2	2.3	0.6	7.2	2.2	2.4	7.3	5.5	5.6	9.4	6.5	6.6
Prop In Lane	1.00		1.00	1.00		0.68	1.00		0.42	1.00		0.33
Lane Grp Cap(c), veh/h	468	605	514	478	553	519	371	758	743	407	758	754
V/C Ratio(X)	0.45	0.20	0.06	0.31	0.19	0.21	0.04	0.39	0.39	0.21	0.44	0.45
Avail Cap(c_a), veh/h	1072	1574	1338	1095	1439	1351	626	1349	1323	684	1349	1342
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.6	11.8	11.3	14.5	11.8	11.9	12.4	9.5	9.5	12.7	9.8	9.8
Incr Delay (d2), s/veh	0.7	0.2	0.0	0.4	0.2	0.2	0.0	0.3	0.3	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.6	2.2	0.5	3.0	1.9	1.9	0.3	5.0	4.9	1.6	5.9	5.9
LnGrp Delay(d),s/veh	16.2	12.0	11.3	14.8	12.0	12.1	12.4	9.8	9.9	13.0	10.2	10.2
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	B	B
Approach Vol, veh/h		361			363			600			758	
Approach Delay, s/veh		14.4			13.2			9.9			10.5	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		26.8		21.8		26.8		21.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		9.3		12.2		11.4		9.2
Green Ext Time (p_c), s		9.7		3.6		9.4		3.6

Intersection Summary	
HCM 2010 Ctrl Delay	11.5
HCM 2010 LOS	B

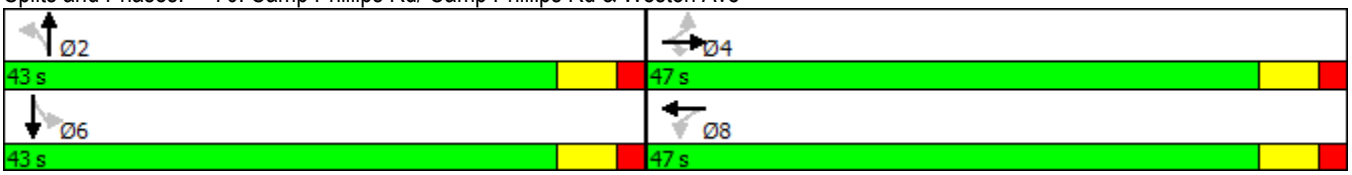
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	211	121	29	147	216	16	584	84	674
v/c Ratio	0.56	0.20	0.06	0.37	0.20	0.06	0.43	0.27	0.50
Control Delay	19.0	11.8	10.8	14.7	11.3	10.7	11.7	13.2	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	11.8	10.8	14.7	11.3	10.7	11.7	13.2	12.3
Queue Length 50th (ft)	38	19	4	25	17	2	50	13	59
Queue Length 95th (ft)	107	56	19	73	44	14	114	48	133
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	1077	1747	1484	1141	3031	613	2950	692	2968
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.07	0.02	0.13	0.07	0.03	0.20	0.12	0.23

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	14.6	14.6	14.6	14.6	14.6		17.4	17.4		17.4	17.4	
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.39	0.39		0.39	0.39	
v/c Ratio	0.56	0.20	0.06	0.37	0.20		0.06	0.43		0.27	0.50	
Control Delay	19.0	11.8	10.8	14.7	11.3		10.7	11.7		13.2	12.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.0	11.8	10.8	14.7	11.3		10.7	11.7		13.2	12.3	
LOS	B	B	B	B	B		B	B		B	B	
Approach Delay		15.9			12.7			11.7			12.4	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 44.4	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 12.9	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	115	55	140	135	70	15	440	115	80	535	105
Future Volume (vph)	200	115	55	140	135	70	15	440	115	80	535	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.949			0.969			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3232	0	1770	3429	0	1770	3451	0
Flt Permitted	0.617			0.679			0.383			0.432		
Satd. Flow (perm)	1149	1863	1583	1217	3232	0	713	3429	0	805	3451	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	211	121	29	147	142	74	16	463	121	84	563	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	121	29	147	216	0	16	584	0	84	674	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Appendix C:
Existing Transportation System with Build Traffic Operational Analysis

2030 Full Build Traffic, Existing Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	150	95	20	40	145	940	45	35	1465	40
Future Volume (veh/h)	10	10	150	95	20	40	145	940	45	35	1465	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	11	11	54	103	22	43	158	1022	0	38	1592	43
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	184	157	402	283	85	166	275	2199	984	373	1664	45
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.09	0.65	0.00	0.49	0.49	0.49
Sat Flow, veh/h	601	944	1580	1028	513	1003	1707	3406	1524	533	3420	92
Grp Volume(v), veh/h	22	0	54	103	0	65	158	1022	0	38	799	836
Grp Sat Flow(s),veh/h/ln	1545	0	1580	1028	0	1516	1707	1703	1524	533	1719	1793
Q Serve(g_s), s	0.0	0.0	1.7	4.7	0.0	2.4	2.6	9.7	0.0	2.5	28.4	28.6
Cycle Q Clear(g_c), s	2.4	0.0	1.7	7.1	0.0	2.4	2.6	9.7	0.0	2.5	28.4	28.6
Prop In Lane	0.50		1.00	1.00		0.66	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	341	0	402	283	0	251	275	2199	984	373	837	873
V/C Ratio(X)	0.06	0.00	0.13	0.36	0.00	0.26	0.57	0.46	0.00	0.10	0.95	0.96
Avail Cap(c_a), veh/h	961	0	1034	815	0	857	298	2246	1005	373	837	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	18.3	26.2	0.0	23.1	13.9	5.7	0.0	9.0	15.7	15.7
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.8	0.0	0.5	2.3	0.2	0.0	0.1	20.8	21.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	1.3	3.2	0.0	1.9	2.9	7.9	0.0	0.7	25.1	26.2
LnGrp Delay(d),s/veh	22.5	0.0	18.5	27.0	0.0	23.7	16.2	5.9	0.0	9.2	36.5	36.7
LnGrp LOS	C		B	C		C	B	A		A	D	D
Approach Vol, veh/h		76			168			1180			1673	
Approach Delay, s/veh		19.6			25.7			7.2			36.0	
Approach LOS		B			C			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		47.1		16.6	10.1	37.0		16.6
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		42.0		36.0	6.5	31.0		36.0
Max Q Clear Time (g_c+I1), s		11.7		4.4	4.6	30.6		9.1
Green Ext Time (p_c), s		24.2		1.3	0.1	0.4		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	150	95	20	40	145	940	45	35	1465	40
Future Volume (vph)	10	10	150	95	20	40	145	940	45	35	1465	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1817	1570		3290		1703	3406	1487	1717	3423	
Flt Permitted		0.83	1.00		0.79		0.11	1.00	1.00	0.28	1.00	
Satd. Flow (perm)		1541	1570		2674		198	3406	1487	507	3423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	11	11	82	103	22	43	158	1022	24	38	1592	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	22	82	0	168	0	158	1022	24	38	1635	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		14.3	20.9		14.3		42.8	42.8	42.8	31.7	31.7	
Effective Green, g (s)		14.3	20.9		14.3		42.8	42.8	42.8	31.7	31.7	
Actuated g/C Ratio		0.21	0.30		0.21		0.62	0.62	0.62	0.46	0.46	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		318	474		553		266	2109	921	232	1570	
v/s Ratio Prot			0.02				0.06	c0.30			c0.48	
v/s Ratio Perm		0.01	0.04		c0.06		0.31		0.02	0.07		
v/c Ratio		0.07	0.17		0.30		0.59	0.48	0.03	0.16	1.04	
Uniform Delay, d1		22.0	17.7		23.2		13.7	7.2	5.1	10.9	18.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	0.2		0.3		3.5	0.2	0.0	0.3	34.3	
Delay (s)		22.1	17.9		23.5		17.3	7.3	5.1	11.3	53.0	
Level of Service		C	B		C		B	A	A	B	D	
Approach Delay (s)		18.8			23.5			8.6			52.0	
Approach LOS		B			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	22	82	168	158	1022	24	38	1635
v/c Ratio	0.07	0.16	0.30	0.59	0.49	0.03	0.17	1.05
Control Delay	20.6	13.7	23.6	20.1	10.0	8.4	17.1	58.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	13.7	23.6	20.1	10.0	8.4	17.1	58.1
Queue Length 50th (ft)	7	21	31	18	85	3	8	309
Queue Length 95th (ft)	22	43	53	#140	292	21	41	#793
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	816	507	1416	269	2103	917	230	1560
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.16	0.12	0.59	0.49	0.03	0.17	1.05

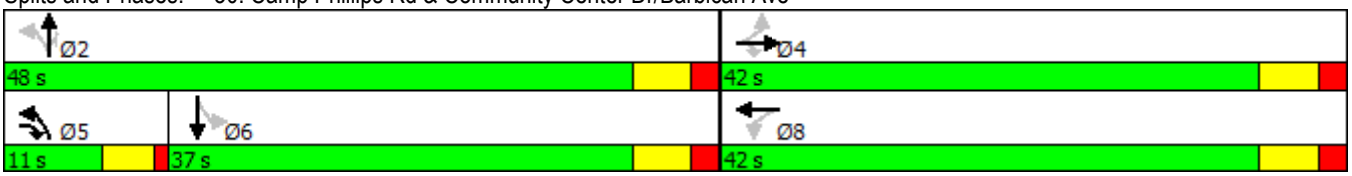
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	48.0	48.0	37.0	37.0	
Total Split (%)	46.7%	46.7%	12.2%	46.7%	46.7%		12.2%	53.3%	53.3%	41.1%	41.1%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	42.0	42.0	31.0	31.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		14.3	22.4		14.3		44.3	42.8	42.8	31.6	31.6	
Actuated g/C Ratio		0.21	0.32		0.21		0.64	0.62	0.62	0.46	0.46	
v/c Ratio		0.07	0.16		0.30		0.59	0.49	0.03	0.17	1.05	
Control Delay		20.6	13.7		23.6		20.1	10.0	8.4	17.1	58.1	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		20.6	13.7		23.6		20.1	10.0	8.4	17.1	58.1	
LOS		C	B		C		C	A	A	B	E	
Approach Delay		15.1			23.6			11.3			57.2	
Approach LOS		B			C			B			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 69.3	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 36.4	Intersection LOS: D
Intersection Capacity Utilization 76.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	150	95	20	40	145	940	45	35	1465	40
Future Volume (vph)	10	10	150	95	20	40	145	940	45	35	1465	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98	1.00	1.00	
Frt			0.850		0.962				0.850		0.996	
Flt Protected		0.976			0.970		0.950			0.950		
Satd. Flow (prot)	0	1818	1583	0	3292	0	1703	3406	1524	1719	3423	0
Flt Permitted		0.828			0.789		0.110			0.280		
Satd. Flow (perm)	0	1542	1563	0	2676	0	197	3406	1486	506	3423	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	11	11	82	103	22	43	158	1022	24	38	1592	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	82	0	168	0	158	1022	24	38	1635	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	295	0	185	650	945	0	0	945	765
Future Volume (veh/h)	0	0	0	295	0	185	650	945	0	0	945	765
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				311	0	0	684	995	0	0	995	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				336	0	300	670	2397	0	0	1022	457
Arrive On Green				0.19	0.00	0.00	0.72	1.00	0.00	0.00	0.30	0.00
Sat Flow, veh/h				1774	0	1583	1691	3463	0	0	3495	1524
Grp Volume(v), veh/h				311	0	0	684	995	0	0	995	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1691	1687	0	0	1703	1524
Q Serve(g_s), s				20.7	0.0	0.0	43.3	0.0	0.0	0.0	34.7	0.0
Cycle Q Clear(g_c), s				20.7	0.0	0.0	43.3	0.0	0.0	0.0	34.7	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				336	0	300	670	2397	0	0	1022	457
V/C Ratio(X)				0.93	0.00	0.00	1.02	0.42	0.00	0.00	0.97	0.00
Avail Cap(c_a), veh/h				340	0	303	670	2397	0	0	1022	457
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.66	0.66	0.00	0.00	0.09	0.00
Uniform Delay (d), s/veh				47.8	0.0	0.0	14.8	0.0	0.0	0.0	41.5	0.0
Incr Delay (d2), s/veh				30.3	0.0	0.0	33.7	0.3	0.0	0.0	4.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				18.8	0.0	0.0	48.7	0.2	0.0	0.0	18.9	0.0
LnGrp Delay(d),s/veh				78.1	0.0	0.0	48.4	0.3	0.0	0.0	45.9	0.0
LnGrp LOS				E			F	A			D	
Approach Vol, veh/h					311			1679			995	
Approach Delay, s/veh					78.1			19.9			45.9	
Approach LOS					E			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		91.3			49.3	42.0		28.7
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		85.0			43.0	36.0		23.0
Max Q Clear Time (g_c+I1), s		2.0			45.3	36.7		22.7
Green Ext Time (p_c), s		14.9			0.0	0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	295	0	185	650	945	0	0	945	765
Future Volume (vph)	0	0	0	295	0	185	650	945	0	0	945	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1770	1583	1687	3374			3406	1524
Flt Permitted					0.95	1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)					1770	1583	170	3374			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	311	0	97	684	995	0	0	995	403
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	311	97	684	995	0	0	995	403
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					22.6	22.6	85.4	85.4			36.4	36.4
Effective Green, g (s)					22.6	22.6	85.4	85.4			36.4	36.4
Actuated g/C Ratio					0.19	0.19	0.71	0.71			0.30	0.30
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					333	298	664	2401			1033	462
v/s Ratio Prot							c0.37	0.29			0.29	
v/s Ratio Perm					0.18	0.06	c0.36					0.26
v/c Ratio					0.93	0.33	1.03	0.41			0.96	0.87
Uniform Delay, d1					48.0	42.1	32.1	7.1			41.1	39.6
Progression Factor					1.00	1.00	0.41	0.69			1.00	1.00
Incremental Delay, d2					32.4	0.6	36.4	0.4			20.4	19.8
Delay (s)					80.4	42.7	49.5	5.3			61.6	59.4
Level of Service					F	D	D	A			E	E
Approach Delay (s)		0.0			71.5			23.3			60.9	
Approach LOS		A			E			C			E	

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	311	97	684	995	995	403
v/c Ratio	0.93	0.33	1.03	0.41	0.96	0.87
Control Delay	83.6	45.4	53.6	5.4	62.0	60.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.6	45.4	53.6	5.4	62.0	60.4
Queue Length 50th (ft)	238	65	~516	31	400	297
Queue Length 95th (ft)	#408	118	#303	167	#543	#479
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	339	303	664	2401	1033	462
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.32	1.03	0.41	0.96	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

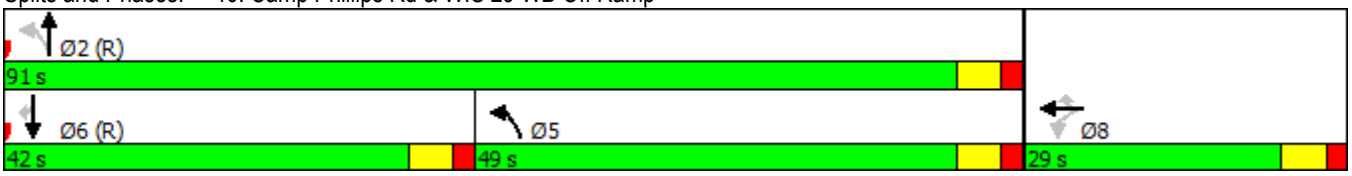
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				29.0	29.0	29.0	49.0	91.0			42.0	42.0
Total Split (%)				24.2%	24.2%	24.2%	40.8%	75.8%			35.0%	35.0%
Maximum Green (s)				23.0	23.0	23.0	43.0	85.0			36.0	36.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					22.6	22.6	85.4	85.4			36.4	36.4
Actuated g/C Ratio					0.19	0.19	0.71	0.71			0.30	0.30
v/c Ratio					0.93	0.33	1.03	0.41			0.96	0.87
Control Delay					83.6	45.4	53.6	5.4			62.0	60.4
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					83.6	45.4	53.6	5.4			62.0	60.4
LOS					F	D	D	A			E	E
Approach Delay					74.5			25.0			61.5	
Approach LOS					E			C			E	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 45.5 Intersection LOS: D
Intersection Capacity Utilization 93.5% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	295	0	185	650	945	0	0	945	765
Future Volume (vph)	0	0	0	295	0	185	650	945	0	0	945	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1770	1583	1687	3374	0	0	3406	1524
Flt Permitted					0.950		0.096					
Satd. Flow (perm)	0	0	0	0	1770	1583	170	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	311	0	97	684	995	0	0	995	403
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	311	97	684	995	0	0	995	403
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	375	0	705	0	0	0	0	1220	180	65	1175	0
Future Volume (veh/h)	375	0	705	0	0	0	0	1220	180	65	1175	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	417	0	0				0	1356	0	72	1306	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	503	0	224				0	1622	726	533	2659	0
Arrive On Green	0.15	0.00	0.00				0.00	0.46	0.00	0.49	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	417	0	0				0	1356	0	72	1306	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	14.4	0.0	0.0				0.0	40.4	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.4	0.0	0.0				0.0	40.4	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	503	0	224				0	1622	726	533	2659	0
V/C Ratio(X)	0.83	0.00	0.00				0.00	0.84	0.00	0.14	0.49	0.00
Avail Cap(c_a), veh/h	1156	0	516				0	1622	726	533	2659	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.18	0.18	0.00
Uniform Delay (d), s/veh	49.6	0.0	0.0				0.0	28.5	0.0	19.7	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	5.3	0.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.3	0.0	0.0				0.0	28.3	0.0	2.0	0.1	0.0
LnGrp Delay(d),s/veh	53.2	0.0	0.0				0.0	33.8	0.0	19.7	0.1	0.0
LnGrp LOS	D							C		B	A	
Approach Vol, veh/h		417						1356			1378	
Approach Delay, s/veh		53.2						33.8			1.1	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	35.2	61.0		23.8		96.2		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	55.0		41.0		67.0		
Max Q Clear Time (g_c+I1), s	2.0	42.4		16.4		2.0		
Green Ext Time (p_c), s	2.9	7.5		1.5		14.4		

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	375	0	705	0	0	0	0	1220	180	65	1175	0
Future Volume (vph)	375	0	705	0	0	0	0	1220	180	65	1175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1603	1509					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1603	1603	1509					3539	1583	193	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	417	0	392	0	0	0	0	1356	100	72	1306	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	208	209	392	0	0	0	0	1356	100	72	1306	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	35.9	35.9	35.9					61.3	61.3	72.1	72.1	
Effective Green, g (s)	35.9	35.9	35.9					61.3	61.3	72.1	72.1	
Actuated g/C Ratio	0.30	0.30	0.30					0.51	0.51	0.60	0.60	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	479	479	451					1807	808	179	2126	
v/s Ratio Prot								c0.38		0.02	c0.37	
v/s Ratio Perm	0.13	0.13	c0.26						0.06	0.23		
v/c Ratio	0.43	0.44	0.87					0.75	0.12	0.40	0.61	
Uniform Delay, d1	33.9	33.9	39.8					23.3	15.3	33.4	15.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.89	1.32	
Incremental Delay, d2	0.6	0.6	16.1					2.9	0.3	0.8	0.7	
Delay (s)	34.5	34.5	56.0					26.2	15.6	30.7	20.7	
Level of Service	C	C	E					C	B	C	C	
Approach Delay (s)		44.9			0.0			25.5			21.2	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	208	209	392	1356	100	72	1306
v/c Ratio	0.44	0.44	0.87	0.74	0.12	0.37	0.61
Control Delay	35.9	35.9	59.5	27.3	17.8	23.3	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Total Delay	35.9	35.9	59.5	27.3	17.8	23.3	23.0
Queue Length 50th (ft)	132	133	279	450	42	19	537
Queue Length 95th (ft)	200	201	394	573	79	m23	m540
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	547	547	515	1844	824	195	2127
Starvation Cap Reductn	0	0	0	0	0	0	463
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.38	0.76	0.74	0.12	0.37	0.78

Intersection Summary

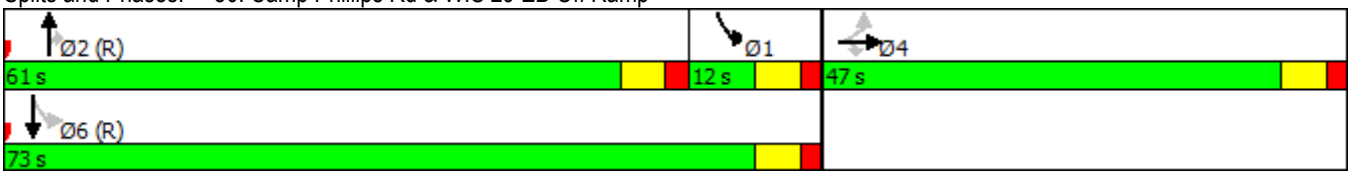
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	47.0	47.0	47.0					61.0	61.0	12.0	73.0	
Total Split (%)	39.2%	39.2%	39.2%					50.8%	50.8%	10.0%	60.8%	
Maximum Green (s)	41.0	41.0	41.0					55.0	55.0	6.0	67.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	35.9	35.9	35.9					62.5	62.5	72.1	72.1	
Actuated g/C Ratio	0.30	0.30	0.30					0.52	0.52	0.60	0.60	
v/c Ratio	0.44	0.44	0.87					0.74	0.12	0.37	0.61	
Control Delay	35.9	35.9	59.5					27.3	17.8	23.3	22.2	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.8	
Total Delay	35.9	35.9	59.5					27.3	17.8	23.3	23.0	
LOS	D	D	E					C	B	C	C	
Approach Delay		47.3						26.7			23.0	
Approach LOS		D						C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 27 (23%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 29.9 Intersection LOS: C
Intersection Capacity Utilization 93.5% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	375	0	705	0	0	0	0	1220	180	65	1175	0
Future Volume (vph)	375	0	705	0	0	0	0	1220	180	65	1175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.104		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	194	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	417	0	392	0	0	0	0	1356	100	72	1306	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	208	209	392	0	0	0	0	1356	100	72	1306	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	44.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	0	30	50	0	635	30	660	70	1000	505	375
Future Vol, veh/h	105	0	30	50	0	635	30	660	70	1000	505	375
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	0	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	3	3	3
Mvmt Flow	112	0	32	53	0	676	32	702	74	1064	537	399

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3279	3704	468	3199	3867	388	936	0	0	777	0	0
Stage 1	2864	2864	-	803	803	-	-	-	-	-	-	-
Stage 2	415	840	-	2396	3064	-	-	-	-	-	-	-
Critical Hdwy	7.62	6.62	7.02	7.54	6.54	6.94	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.62	5.62	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	5.62	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.06	3.36	3.52	4.02	3.32	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	~ 3	4	531	~ 4	3	~ 611	727	-	-	~ 829	-	-
Stage 1	~ 16	34	-	343	394	-	-	-	-	-	-	-
Stage 2	575	370	-	~ 34	28	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	531	-	0	~ 611	727	-	-	~ 829	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 15	0	-	328	377	-	-	-	-	-	-	-
Stage 2	-	354	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.4	82
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	727	-	-	-	-	531	-	611	~ 829	-	-
HCM Lane V/C Ratio	0.044	-	-	-	-	0.06	-	1.106	1.283	-	-
HCM Control Delay (s)	10.2	-	-	-	0	12.2	-	93.8	154.1	-	-
HCM Lane LOS	B	-	-	-	A	B	-	F	F	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.2	-	20.5	39.5	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	0	30	50	0	635	30	660	70	1000	505	375
Future Volume (vph)	105	0	30	50	0	635	30	660	70	1000	505	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.850			0.986			0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1583	0	1770	3490	0	1752	3281	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1703	1792	1524	1770	1583	0	1770	3490	0	1752	3281	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	112	0	32	53	0	676	32	702	74	1064	537	399
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	0	32	53	676	0	32	776	0	1064	936	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 134.3%	ICU Level of Service H
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	105	20	90	130	115	70	480	130	145	325	115
Future Volume (veh/h)	165	105	20	90	130	115	70	480	130	145	325	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	177	113	11	97	140	124	75	516	140	156	349	124
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	395	578	491	428	513	421	486	1314	355	395	1192	417
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1111	1863	1583	1129	1653	1357	917	2757	744	752	2500	874
Grp Volume(v), veh/h	177	113	11	97	134	130	75	330	326	156	238	235
Grp Sat Flow(s),veh/h/ln	1111	1863	1583	1129	1583	1427	917	1770	1731	752	1719	1655
Q Serve(g_s), s	8.1	2.5	0.3	3.9	3.6	3.9	3.1	6.8	6.8	9.5	4.7	4.9
Cycle Q Clear(g_c), s	12.0	2.5	0.3	6.4	3.6	3.9	7.9	6.8	6.8	16.3	4.7	4.9
Prop In Lane	1.00		1.00	1.00		0.95	1.00		0.43	1.00		0.53
Lane Grp Cap(c), veh/h	395	578	491	428	491	443	486	844	826	395	820	789
V/C Ratio(X)	0.45	0.20	0.02	0.23	0.27	0.29	0.15	0.39	0.39	0.39	0.29	0.30
Avail Cap(c_a), veh/h	839	1321	1123	878	1123	1012	666	1192	1167	543	1158	1115
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.3	14.3	13.5	16.6	14.6	14.8	11.4	9.5	9.5	14.8	9.0	9.0
Incr Delay (d2), s/veh	0.8	0.2	0.0	0.3	0.3	0.4	0.1	0.3	0.3	0.6	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.6	2.4	0.2	2.2	2.9	2.8	1.4	6.1	6.0	3.6	4.1	4.1
LnGrp Delay(d),s/veh	20.1	14.4	13.5	16.9	14.9	15.1	11.6	9.8	9.8	15.4	9.2	9.2
LnGrp LOS	C	B	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		301			361			731			629	
Approach Delay, s/veh		17.7			15.5			10.0			10.7	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		32.9		23.5		32.9		23.5
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		9.9		14.0		18.3		8.4
Green Ext Time (p_c), s		9.9		3.5		8.5		3.6

Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

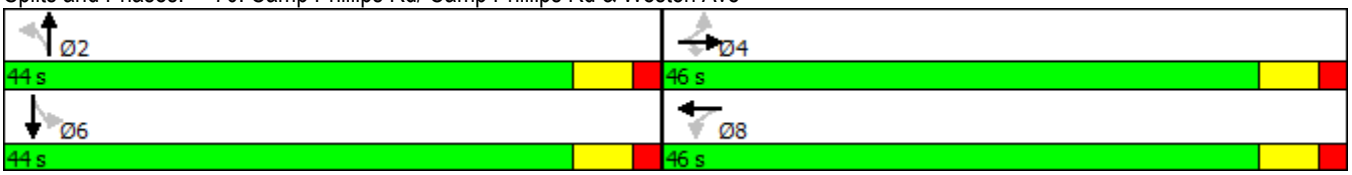
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	113	11	97	264	75	656	156	473
v/c Ratio	0.53	0.20	0.02	0.28	0.30	0.19	0.44	0.50	0.33
Control Delay	22.4	15.1	14.5	17.1	15.0	10.7	10.9	17.5	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	15.1	14.5	17.1	15.0	10.7	10.9	17.5	10.1
Queue Length 50th (ft)	34	19	2	17	24	11	56	27	38
Queue Length 95th (ft)	122	72	14	68	74	41	128	92	91
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	930	1579	1342	966	2497	739	2828	592	2727
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.07	0.01	0.10	0.11	0.10	0.23	0.26	0.17

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	14.8	14.8	14.8	14.8	14.8		21.1	21.1		21.1	21.1	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.43	0.43		0.43	0.43	
v/c Ratio	0.53	0.20	0.02	0.28	0.30		0.19	0.44		0.50	0.33	
Control Delay	22.4	15.1	14.5	17.1	15.0		10.7	10.9		17.5	10.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.4	15.1	14.5	17.1	15.0		10.7	10.9		17.5	10.1	
LOS	C	B	B	B	B		B	B		B	B	
Approach Delay		19.4			15.5			10.9			11.9	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 48.8	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 67.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	105	20	90	130	115	70	480	130	145	325	115
Future Volume (vph)	165	105	20	90	130	115	70	480	130	145	325	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.930			0.968			0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2945	0	1770	3426	0	1719	3304	0
Flt Permitted	0.589			0.684			0.481			0.396		
Satd. Flow (perm)	1097	1863	1583	1140	2945	0	896	3426	0	717	3304	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	177	113	11	97	140	124	75	516	140	156	349	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	113	11	97	264	0	75	656	0	156	473	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	20	200	140	20	85	140	1760	110	80	1685	30
Future Volume (veh/h)	35	20	200	140	20	85	140	1760	110	80	1685	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	37	21	70	149	21	90	149	1872	0	85	1793	32
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	218	109	464	273	63	270	205	2225	996	136	1813	32
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.07	0.63	0.00	0.51	0.51	0.51
Sat Flow, veh/h	663	486	1581	838	280	1201	1757	3505	1568	241	3523	63
Grp Volume(v), veh/h	58	0	70	149	0	111	149	1872	0	85	890	935
Grp Sat Flow(s),veh/h/ln	1149	0	1581	838	0	1481	1757	1752	1568	241	1752	1833
Q Serve(g_s), s	1.5	0.0	2.8	9.5	0.0	5.4	3.1	35.9	0.0	18.5	43.0	43.4
Cycle Q Clear(g_c), s	6.9	0.0	2.8	16.4	0.0	5.4	3.1	35.9	0.0	44.1	43.0	43.4
Prop In Lane	0.64		1.00	1.00		0.81	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	327	0	464	273	0	334	205	2225	996	136	902	943
V/C Ratio(X)	0.18	0.00	0.15	0.55	0.00	0.33	0.73	0.84	0.00	0.63	0.99	0.99
Avail Cap(c_a), veh/h	389	0	531	328	0	397	219	2247	1005	136	902	943
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	22.4	35.4	0.0	27.8	19.7	12.3	0.0	37.2	20.5	20.6
Incr Delay (d2), s/veh	0.3	0.0	0.1	1.7	0.0	0.6	10.6	3.0	0.0	8.7	26.6	27.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.0	2.2	6.3	0.0	4.0	4.5	25.1	0.0	4.2	35.7	37.7
LnGrp Delay(d),s/veh	28.6	0.0	22.6	37.1	0.0	28.4	30.3	15.3	0.0	45.9	47.2	47.7
LnGrp LOS	C		C	D		C	C	B		D	D	D
Approach Vol, veh/h		128			260			2021			1910	
Approach Delay, s/veh		25.3			33.4			16.4			47.4	
Approach LOS		C			C			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		60.5		25.3	10.3	50.1		25.3
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		55.0		23.0	6.5	44.0		23.0
Max Q Clear Time (g_c+I1), s		37.9		8.9	5.1	46.1		18.4
Green Ext Time (p_c), s		16.6		1.8	0.0	0.0		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	20	200	140	20	85	140	1760	110	80	1685	30
Future Volume (vph)	35	20	200	140	20	85	140	1760	110	80	1685	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1569		3246		1752	3505	1529	1752	3495	
Flt Permitted		0.68	1.00		0.78		0.08	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1275	1569		2599		151	3505	1529	166	3495	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	37	21	106	149	21	90	149	1872	59	85	1793	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	58	106	0	260	0	149	1872	59	85	1825	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		16.4	23.0		16.4		55.6	55.6	55.6	44.5	44.5	
Effective Green, g (s)		16.4	23.0		16.4		55.6	55.6	55.6	44.5	44.5	
Actuated g/C Ratio		0.20	0.27		0.20		0.66	0.66	0.66	0.53	0.53	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		248	429		507		225	2319	1012	87	1851	
v/s Ratio Prot			0.02				0.05	c0.53			c0.52	
v/s Ratio Perm		0.05	0.05		c0.10		0.39		0.04	0.51		
v/c Ratio		0.23	0.25		0.51		0.66	0.81	0.06	0.98	0.99	
Uniform Delay, d1		28.5	23.8		30.2		18.0	10.3	5.0	19.3	19.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5	0.3		0.9		7.1	2.2	0.0	88.0	17.5	
Delay (s)		29.0	24.1		31.1		25.1	12.5	5.0	107.3	37.0	
Level of Service		C	C		C		C	B	A	F	D	
Approach Delay (s)		25.8			31.1			13.2			40.1	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	58	106	260	149	1872	59	85	1825
v/c Ratio	0.23	0.23	0.51	0.66	0.81	0.06	0.98	0.99
Control Delay	29.3	19.9	33.1	27.7	16.3	7.5	120.1	40.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	19.9	33.1	27.7	16.3	7.5	120.1	40.2
Queue Length 50th (ft)	26	38	64	20	282	8	37	422
Queue Length 95th (ft)	56	71	97	#154	#816	38	#169	#919
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	384	456	783	227	2316	1010	87	1847
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.23	0.33	0.66	0.81	0.06	0.98	0.99

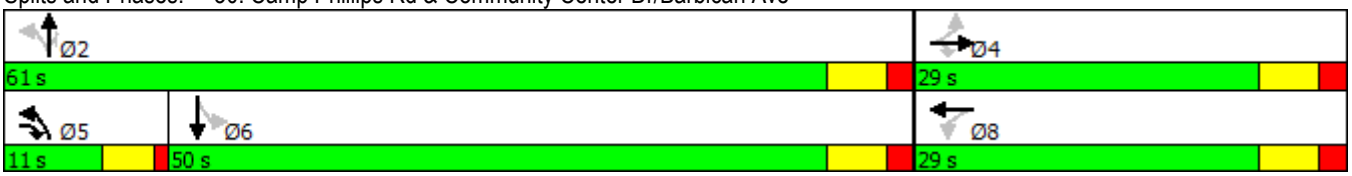
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	29.0	29.0	11.0	29.0	29.0		11.0	61.0	61.0	50.0	50.0	
Total Split (%)	32.2%	32.2%	12.2%	32.2%	32.2%		12.2%	67.8%	67.8%	55.6%	55.6%	
Maximum Green (s)	23.0	23.0	6.5	23.0	23.0		6.5	55.0	55.0	44.0	44.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		16.4	24.5		16.4		57.2	55.6	55.6	44.5	44.5	
Actuated g/C Ratio		0.19	0.29		0.19		0.68	0.66	0.66	0.53	0.53	
v/c Ratio		0.23	0.23		0.51		0.66	0.81	0.06	0.98	0.99	
Control Delay		29.3	19.9		33.1		27.7	16.3	7.5	120.1	40.2	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		29.3	19.9		33.1		27.7	16.3	7.5	120.1	40.2	
LOS		C	B		C		C	B	A	F	D	
Approach Delay		23.2			33.1			16.8			43.8	
Approach LOS		C			C			B			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 84.2	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 91.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	20	200	140	20	85	140	1760	110	80	1685	30
Future Volume (vph)	35	20	200	140	20	85	140	1760	110	80	1685	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98		1.00	
Frt			0.850		0.948				0.850		0.997	
Flt Protected		0.969			0.972		0.950			0.950		
Satd. Flow (prot)	0	1805	1583	0	3247	0	1752	3505	1568	1752	3493	0
Flt Permitted		0.685			0.778		0.082			0.090		
Satd. Flow (perm)	0	1276	1563	0	2598	0	151	3505	1529	166	3493	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	37	21	106	149	21	90	149	1872	59	85	1793	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	58	106	0	260	0	149	1872	59	85	1825	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Future Volume (veh/h)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				306	0	0	1107	1949	0	0	1301	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				266	0	237	740	2583	0	0	1055	472
Arrive On Green				0.16	0.00	0.00	0.52	0.99	0.00	0.00	0.30	0.00
Sat Flow, veh/h				1660	0	1482	1740	3563	0	0	3563	1553
Grp Volume(v), veh/h				306	0	0	1107	1949	0	0	1301	0
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1740	1736	0	0	1736	1553
Q Serve(g_s), s				20.0	0.0	0.0	49.0	2.9	0.0	0.0	38.0	0.0
Cycle Q Clear(g_c), s				20.0	0.0	0.0	49.0	2.9	0.0	0.0	38.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				266	0	237	740	2583	0	0	1055	472
V/C Ratio(X)				1.15	0.00	0.00	1.50	0.75	0.00	0.00	1.23	0.00
Avail Cap(c_a), veh/h				266	0	237	740	2583	0	0	1055	472
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	0.21	0.00
Uniform Delay (d), s/veh				52.5	0.0	0.0	25.2	0.2	0.0	0.0	43.5	0.0
Incr Delay (d2), s/veh				102.6	0.0	0.0	224.2	0.2	0.0	0.0	106.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				30.1	0.0	0.0	122.4	0.7	0.0	0.0	60.7	0.0
LnGrp Delay(d),s/veh				155.1	0.0	0.0	249.4	0.4	0.0	0.0	150.2	0.0
LnGrp LOS				F			F	A			F	
Approach Vol, veh/h					306			3056			1301	
Approach Delay, s/veh					155.1			90.6			150.2	
Approach LOS					F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		99.0			55.0	44.0		26.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		93.0			49.0	38.0		20.0
Max Q Clear Time (g_c+I1), s		4.9			51.0	40.0		22.0
Green Ext Time (p_c), s		68.9			0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	111.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Future Volume (vph)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1656	1482	1736	3471			3471	1553
Flt Permitted					0.95	1.00	0.09	1.00			1.00	1.00
Satd. Flow (perm)					1656	1482	166	3471			3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	306	0	51	1107	1949	0	0	1301	383
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	306	51	1107	1949	0	0	1301	383
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					20.0	20.0	93.0	93.0			38.0	38.0
Effective Green, g (s)					20.0	20.0	93.0	93.0			38.0	38.0
Actuated g/C Ratio					0.16	0.16	0.74	0.74			0.30	0.30
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					264	237	738	2582			1055	472
v/s Ratio Prot							c0.59	0.56			0.37	
v/s Ratio Perm					0.18	0.03	c0.53					0.25
v/c Ratio					1.16	0.22	1.50	0.75			1.23	0.81
Uniform Delay, d1					52.5	45.7	33.3	9.3			43.5	40.2
Progression Factor					1.00	1.00	0.47	0.52			1.00	1.00
Incremental Delay, d2					105.3	0.5	225.7	0.2			113.3	14.1
Delay (s)					157.8	46.1	241.3	5.1			156.8	54.3
Level of Service					F	D	F	A			F	D
Approach Delay (s)		0.0			141.9			90.6			133.5	
Approach LOS		A			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	108.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	127.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	306	51	1107	1949	1301	383
v/c Ratio	1.16	0.22	1.50	0.75	1.23	0.81
Control Delay	151.5	48.4	245.3	5.2	151.1	55.1
Queue Delay	1.8	0.0	0.4	0.7	0.0	0.0
Total Delay	153.3	48.4	245.7	5.9	151.1	55.1
Queue Length 50th (ft)	~292	36	~1159	257	~684	286
Queue Length 95th (ft)	#473	76	m#970	m223	#822	#444
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	264	237	738	2582	1055	472
Starvation Cap Reductn	0	0	46	291	0	0
Spillback Cap Reductn	32	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.32	0.22	1.60	0.85	1.23	0.81

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

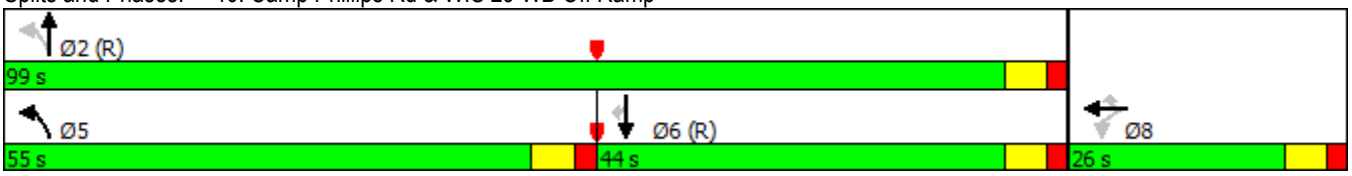
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				26.0	26.0	26.0	55.0	99.0			44.0	44.0
Total Split (%)				20.8%	20.8%	20.8%	44.0%	79.2%			35.2%	35.2%
Maximum Green (s)				20.0	20.0	20.0	49.0	93.0			38.0	38.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					20.0	20.0	93.0	93.0			38.0	38.0
Actuated g/C Ratio					0.16	0.16	0.74	0.74			0.30	0.30
v/c Ratio					1.16	0.22	1.50	0.75			1.23	0.81
Control Delay					151.5	48.4	245.3	5.2			151.1	55.1
Queue Delay					1.8	0.0	0.4	0.7			0.0	0.0
Total Delay					153.3	48.4	245.7	5.9			151.1	55.1
LOS					F	D	F	A			F	E
Approach Delay					138.3			92.8			129.2	
Approach LOS					F			F			F	

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.50
Intersection Signal Delay: 108.0 Intersection LOS: F
Intersection Capacity Utilization 127.0% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Future Volume (vph)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1656	1482	1736	3471	0	0	3471	1553
Flt Permitted					0.950		0.091					
Satd. Flow (perm)	0	0	0	0	1656	1482	166	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	306	0	51	1107	1949	0	0	1301	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	306	51	1107	1949	0	0	1301	383
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	830	0	855	0	0	0	0	2165	380	160	1415	0
Future Volume (veh/h)	830	0	855	0	0	0	0	2165	380	160	1415	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	838	0	0				0	2187	0	162	1429	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	880	0	393				0	1982	887	143	2322	0
Arrive On Green	0.25	0.00	0.00				0.00	0.56	0.00	0.06	0.87	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	838	0	0				0	2187	0	162	1429	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	29.1	0.0	0.0				0.0	70.0	0.0	6.0	13.9	0.0
Cycle Q Clear(g_c), s	29.1	0.0	0.0				0.0	70.0	0.0	6.0	13.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	880	0	393				0	1982	887	143	2322	0
V/C Ratio(X)	0.95	0.00	0.00				0.00	1.10	0.00	1.13	0.62	0.00
Avail Cap(c_a), veh/h	880	0	393				0	1982	887	143	2322	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	46.3	0.0	0.0				0.0	27.5	0.0	38.3	3.6	0.0
Incr Delay (d2), s/veh	19.7	0.0	0.0				0.0	54.8	0.0	69.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	23.3	0.0	0.0				0.0	88.1	0.0	13.8	7.6	0.0
LnGrp Delay(d),s/veh	66.0	0.0	0.0				0.0	82.3	0.0	107.4	3.7	0.0
LnGrp LOS	E							F		F	A	
Approach Vol, veh/h		838						2187			1591	
Approach Delay, s/veh		66.0						82.3			14.3	
Approach LOS		E						F			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	12.0	76.0		37.0		88.0		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	70.0		31.0		82.0		
Max Q Clear Time (g_c+I1), s	8.0	72.0		31.1		15.9		
Green Ext Time (p_c), s	0.0	0.0		0.0		59.5		

Intersection Summary	
HCM 2010 Ctrl Delay	55.9
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	830	0	855	0	0	0	0	2165	380	160	1415	0
Future Volume (vph)	830	0	855	0	0	0	0	2165	380	160	1415	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1681	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.05	1.00	
Satd. Flow (perm)	1681	1681	1583					3539	1583	98	3539	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	838	0	432	0	0	0	0	2187	192	162	1429	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	419	419	432	0	0	0	0	2187	192	162	1429	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	31.0	31.0	31.0					70.0	70.0	82.0	82.0	
Effective Green, g (s)	31.0	31.0	31.0					70.0	70.0	82.0	82.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.56	0.56	0.66	0.66	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	416	416	392					1981	886	144	2321	
v/s Ratio Prot								0.62		c0.05	0.40	
v/s Ratio Perm	0.25	0.25	c0.27						0.12	c0.68		
v/c Ratio	1.01	1.01	1.10					1.10	0.22	1.12	0.62	
Uniform Delay, d1	47.0	47.0	47.0					27.5	13.8	39.6	12.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.54	0.59	
Incremental Delay, d2	45.9	45.9	75.9					55.0	0.6	65.0	0.1	
Delay (s)	92.9	92.9	122.9					82.5	14.3	125.9	7.5	
Level of Service	F	F	F					F	B	F	A	
Approach Delay (s)		103.1			0.0			77.0			19.5	
Approach LOS		F			A			E			B	

Intersection Summary			
HCM 2000 Control Delay	65.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	127.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	419	419	432	2187	192	162	1429
v/c Ratio	1.01	1.01	1.10	1.10	0.22	1.12	0.62
Control Delay	92.9	92.9	119.7	82.7	14.6	96.7	7.6
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0	3.6
Total Delay	92.9	92.9	119.7	83.2	14.6	96.7	11.2
Queue Length 50th (ft)	~362	~362	~396	~1058	74	~88	515
Queue Length 95th (ft)	#586	#586	#601	#1193	117	m52	m135
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	416	416	392	1981	886	145	2321
Starvation Cap Reductn	0	0	0	0	0	0	780
Spillback Cap Reductn	0	0	0	347	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	1.01	1.10	1.34	0.22	1.12	0.93

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

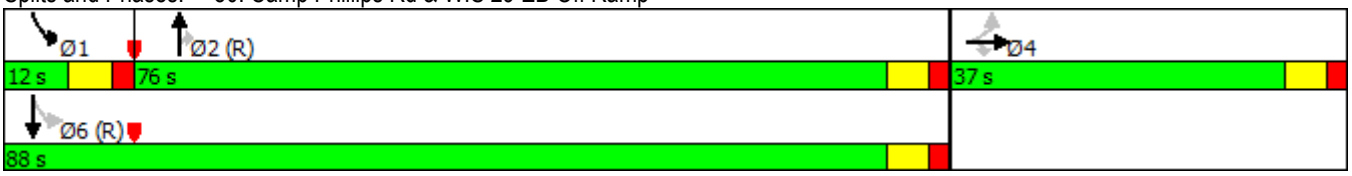
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	37.0	37.0	37.0					76.0	76.0	12.0	88.0	
Total Split (%)	29.6%	29.6%	29.6%					60.8%	60.8%	9.6%	70.4%	
Maximum Green (s)	31.0	31.0	31.0					70.0	70.0	6.0	82.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	31.0	31.0	31.0					70.0	70.0	82.0	82.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.56	0.56	0.66	0.66	
v/c Ratio	1.01	1.01	1.10					1.10	0.22	1.12	0.62	
Control Delay	92.9	92.9	119.7					82.7	14.6	96.7	7.6	
Queue Delay	0.0	0.0	0.0					0.6	0.0	0.0	3.6	
Total Delay	92.9	92.9	119.7					83.2	14.6	96.7	11.2	
LOS	F	F	F					F	B	F	B	
Approach Delay		102.0						77.7			19.9	
Approach LOS		F						E			B	

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 34 (27%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 66.0 Intersection LOS: E
Intersection Capacity Utilization 127.0% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	830	0	855	0	0	0	0	2165	380	160	1415	0
Future Volume (vph)	830	0	855	0	0	0	0	2165	380	160	1415	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.053		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	99	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	838	0	432	0	0	0	0	2187	192	162	1429	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	419	419	432	0	0	0	0	2187	192	162	1429	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	115

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	245	0	40	115	0	1550	35	750	110	1360	705	205
Future Vol, veh/h	245	0	40	115	0	1550	35	750	110	1360	705	205
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	0	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	258	0	42	121	0	1632	37	789	116	1432	742	216

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	4181	4692	479	4155	4742	453	958	0	0	905	0	0
Stage 1	3713	3713	-	921	921	-	-	-	-	-	-	-
Stage 2	468	979	-	3234	3821	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 1	1	533	~ 1	1	~ 554	714	-	-	~ 747	-	-
Stage 1	~ 4	12	-	291	347	-	-	-	-	-	-	-
Stage 2	545	326	-	~ 9	11	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	533	-	0	~ 554	714	-	-	~ 747	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 4	0	-	276	329	-	-	-	-	-	-	-
Stage 2	-	309	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.4	258.9
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	714	-	-	-	-	533	-	554	~ 747	-	-
HCM Lane V/C Ratio	0.052	-	-	-	-	0.079	-	2.945	1.916	-	-
HCM Control Delay (s)	10.3	-	-	-	0	12.3	-	$ 896.5	$ 432.1	-	-
HCM Lane LOS	B	-	-	-	A	B	-	F	F	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.3	-	139.1	91.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	0	40	115	0	1550	35	750	110	1360	705	205
Future Volume (vph)	245	0	40	115	0	1550	35	750	110	1360	705	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.850			0.981			0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1583	0	1770	3472	0	1770	3419	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1583	0	1770	3472	0	1770	3419	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	258	0	42	121	0	1632	37	789	116	1432	742	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	0	42	121	1632	0	37	905	0	1432	958	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 222.5%	ICU Level of Service H
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	135	70	190	175	170	20	485	145	135	600	125
Future Volume (veh/h)	240	135	70	190	175	170	20	485	145	135	600	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	253	142	37	200	184	179	21	511	153	142	632	132
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	425	746	634	505	682	610	293	1165	347	330	1264	264
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1015	1863	1583	1155	1703	1524	700	2690	801	768	2917	608
Grp Volume(v), veh/h	253	142	37	200	184	179	21	335	329	142	383	381
Grp Sat Flow(s),veh/h/ln	1015	1863	1583	1155	1703	1524	700	1770	1721	768	1770	1755
Q Serve(g_s), s	16.3	3.6	1.0	9.8	5.2	5.8	1.6	9.6	9.7	11.5	11.3	11.3
Cycle Q Clear(g_c), s	22.1	3.6	1.0	13.4	5.2	5.8	13.0	9.6	9.7	21.1	11.3	11.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.35
Lane Grp Cap(c), veh/h	425	746	634	505	682	610	293	767	746	330	767	761
V/C Ratio(X)	0.60	0.19	0.06	0.40	0.27	0.29	0.07	0.44	0.44	0.43	0.50	0.50
Avail Cap(c_a), veh/h	595	1057	899	698	967	865	348	906	882	390	906	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	14.0	13.3	18.4	14.5	14.7	19.5	14.3	14.3	21.7	14.8	14.8
Incr Delay (d2), s/veh	1.3	0.1	0.0	0.5	0.2	0.3	0.1	0.4	0.4	0.9	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.3	3.3	0.8	5.7	4.5	4.4	0.6	8.3	8.2	4.5	9.5	9.5
LnGrp Delay(d),s/veh	23.5	14.2	13.3	18.9	14.8	15.0	19.6	14.7	14.7	22.6	15.3	15.3
LnGrp LOS	C	B	B	B	B	B	B	B	B	C	B	B
Approach Vol, veh/h		432			563			685			906	
Approach Delay, s/veh		19.6			16.3			14.9			16.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		37.3		34.9		37.3		34.9
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		15.0		24.1		23.1		15.4
Green Ext Time (p_c), s		10.8		4.9		8.2		5.5

Intersection Summary	
HCM 2010 Ctrl Delay	16.5
HCM 2010 LOS	B

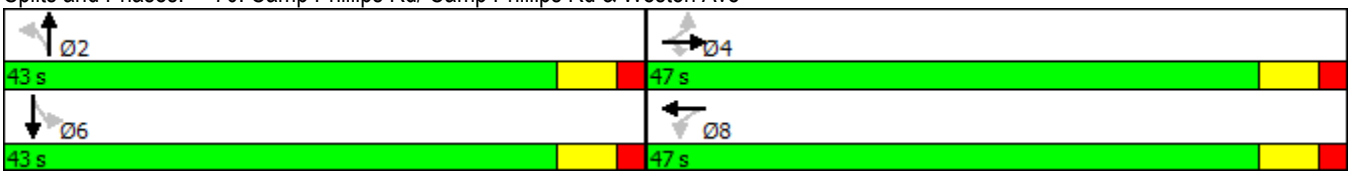
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	253	142	37	200	363	21	664	142	764
v/c Ratio	0.69	0.21	0.06	0.46	0.31	0.09	0.49	0.52	0.55
Control Delay	27.0	13.8	12.9	18.1	13.8	14.8	15.2	23.9	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	13.8	12.9	18.1	13.8	14.8	15.2	23.9	16.0
Queue Length 50th (ft)	61	28	7	43	38	4	75	31	90
Queue Length 95th (ft)	182	82	29	127	94	22	185	117	217
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	769	1437	1221	921	2433	409	2444	486	2467
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.10	0.03	0.22	0.15	0.05	0.27	0.29	0.31

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	21.0	21.0	21.0	21.0	21.0		22.9	22.9		22.9	22.9	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.40	0.40		0.40	0.40	
v/c Ratio	0.69	0.21	0.06	0.46	0.31		0.09	0.49		0.52	0.55	
Control Delay	27.0	13.8	12.9	18.1	13.8		14.8	15.2		23.9	16.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.0	13.8	12.9	18.1	13.8		14.8	15.2		23.9	16.0	
LOS	C	B	B	B	B		B	B		C	B	
Approach Delay		21.4			15.3			15.2			17.2	
Approach LOS		C			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 57.2	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 76.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	135	70	190	175	170	20	485	145	135	600	125
Future Volume (vph)	240	135	70	190	175	170	20	485	145	135	600	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.926			0.965			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3154	0	1770	3415	0	1770	3447	0
Flt Permitted	0.535			0.666			0.307			0.365		
Satd. Flow (perm)	997	1863	1583	1194	3154	0	572	3415	0	680	3447	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	253	142	37	200	184	179	21	511	153	142	632	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	142	37	200	363	0	21	664	0	142	764	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Appendix C:
Existing Transportation System with Build Traffic Operational Analysis

2040 Full Build Traffic, Existing Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	220	120	30	60	185	1035	65	45	1525	60
Future Volume (veh/h)	10	15	220	120	30	60	185	1035	65	45	1525	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	11	16	92	130	33	65	201	1125	0	49	1658	65
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	159	205	447	279	103	202	238	2193	981	320	1700	66
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.08	0.64	0.00	0.50	0.50	0.50
Sat Flow, veh/h	467	1022	1581	927	510	1005	1707	3406	1524	484	3373	132
Grp Volume(v), veh/h	27	0	92	130	0	98	201	1125	0	49	842	881
Grp Sat Flow(s),veh/h/ln	1489	0	1581	927	0	1516	1707	1703	1524	484	1719	1786
Q Serve(g_s), s	0.0	0.0	3.4	7.5	0.0	4.3	4.4	13.6	0.0	4.6	36.8	37.4
Cycle Q Clear(g_c), s	4.3	0.0	3.4	11.8	0.0	4.3	4.4	13.6	0.0	7.4	36.8	37.4
Prop In Lane	0.41		1.00	1.00		0.66	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	365	0	447	279	0	305	238	2193	981	320	866	900
V/C Ratio(X)	0.07	0.00	0.21	0.47	0.00	0.32	0.84	0.51	0.00	0.15	0.97	0.98
Avail Cap(c_a), veh/h	618	0	702	485	0	548	242	2200	984	320	866	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	21.1	31.4	0.0	26.4	18.8	7.3	0.0	12.2	18.7	18.8
Incr Delay (d2), s/veh	0.1	0.0	0.2	1.2	0.0	0.6	22.6	0.2	0.0	0.2	23.8	24.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	0.0	2.7	4.9	0.0	3.3	9.6	10.4	0.0	1.1	30.9	32.4
LnGrp Delay(d),s/veh	25.2	0.0	21.4	32.6	0.0	27.0	41.4	7.5	0.0	12.4	42.4	43.7
LnGrp LOS	C		C	C		C	D	A		B	D	D
Approach Vol, veh/h		119			228			1326			1772	
Approach Delay, s/veh		22.2			30.2			12.7			42.2	
Approach LOS		C			C			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		55.8		21.5	10.8	45.0		21.5
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		50.0		28.0	6.5	39.0		28.0
Max Q Clear Time (g_c+I1), s		15.6		6.3	6.4	39.4		13.8
Green Ext Time (p_c), s		28.6		1.7	0.0	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Future Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1825	1569		3281		1703	3406	1487	1717	3417	
Flt Permitted		0.84	1.00		0.79		0.09	1.00	1.00	0.25	1.00	
Satd. Flow (perm)		1557	1569		2677		163	3406	1487	457	3417	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	11	16	120	130	33	65	201	1125	35	49	1658	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	120	0	228	0	201	1125	35	49	1723	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		15.3	21.9		15.3		50.7	50.7	50.7	39.6	39.6	
Effective Green, g (s)		15.3	21.9		15.3		50.7	50.7	50.7	39.6	39.6	
Actuated g/C Ratio		0.20	0.28		0.20		0.65	0.65	0.65	0.51	0.51	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		305	440		525		236	2213	966	232	1734	
v/s Ratio Prot			0.02				c0.07	0.33			c0.50	
v/s Ratio Perm		0.02	0.05		c0.09		0.48		0.02	0.11		
v/c Ratio		0.09	0.27		0.43		0.85	0.51	0.04	0.21	0.99	
Uniform Delay, d1		25.6	21.8		27.5		19.8	7.1	4.9	10.6	19.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1	0.3		0.6		24.4	0.2	0.0	0.5	20.0	
Delay (s)		25.8	22.2		28.1		44.2	7.3	4.9	11.0	39.1	
Level of Service		C	C		C		D	A	A	B	D	
Approach Delay (s)		22.8			28.1			12.7			38.3	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	27	120	228	201	1125	35	49	1723
v/c Ratio	0.09	0.26	0.44	0.84	0.51	0.04	0.21	1.00
Control Delay	24.3	18.2	29.3	46.3	9.9	7.8	17.2	42.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	18.2	29.3	46.3	9.9	7.8	17.2	42.6
Queue Length 50th (ft)	11	39	51	39	107	4	11	363
Queue Length 95th (ft)	29	72	80	#232	327	26	52	#854
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	591	469	1015	238	2210	964	231	1729
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.26	0.22	0.84	0.51	0.04	0.21	1.00

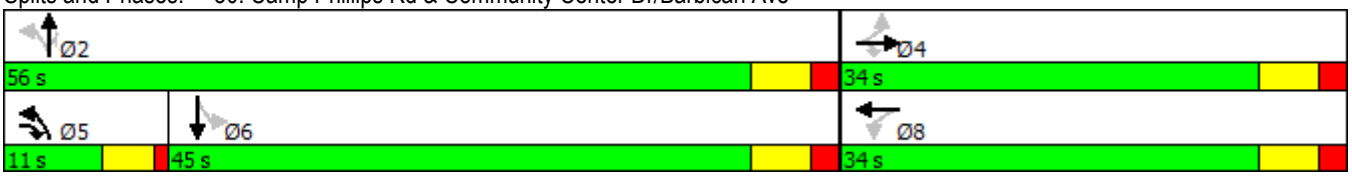
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	34.0	34.0	11.0	34.0	34.0		11.0	56.0	56.0	45.0	45.0	
Total Split (%)	37.8%	37.8%	12.2%	37.8%	37.8%		12.2%	62.2%	62.2%	50.0%	50.0%	
Maximum Green (s)	28.0	28.0	6.5	28.0	28.0		6.5	50.0	50.0	39.0	39.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		15.2	23.4		15.2		52.2	50.7	50.7	39.5	39.5	
Actuated g/C Ratio		0.19	0.30		0.19		0.67	0.65	0.65	0.51	0.51	
v/c Ratio		0.09	0.26		0.44		0.84	0.51	0.04	0.21	1.00	
Control Delay		24.3	18.2		29.3		46.3	9.9	7.8	17.2	42.6	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		24.3	18.2		29.3		46.3	9.9	7.8	17.2	42.6	
LOS		C	B		C		D	A	A	B	D	
Approach Delay		19.3			29.3			15.2			41.9	
Approach LOS		B			C			B			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 78.1	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 29.8	Intersection LOS: C
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Future Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00				0.98	1.00	1.00	
Frt			0.850		0.957				0.850		0.994	
Flt Protected		0.980			0.972		0.950			0.950		
Satd. Flow (prot)	0	1825	1583	0	3280	0	1703	3406	1524	1719	3416	0
Flt Permitted		0.836			0.793		0.091			0.253		
Satd. Flow (perm)	0	1557	1563	0	2675	0	163	3406	1486	457	3416	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	11	16	120	130	33	65	201	1125	35	49	1658	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	27	120	0	228	0	201	1125	35	49	1723	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (veh/h)	0	0	0	300	0	220	680	1065	0	0	1025	840
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				316	0	0	716	1121	0	0	1079	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				319	0	285	664	2362	0	0	988	442
Arrive On Green				0.18	0.00	0.00	0.70	1.00	0.00	0.00	0.29	0.00
Sat Flow, veh/h				1774	0	1583	1691	3463	0	0	3495	1524
Grp Volume(v), veh/h				316	0	0	716	1121	0	0	1079	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1691	1687	0	0	1703	1524
Q Serve(g_s), s				17.8	0.0	0.0	35.0	0.0	0.0	0.0	29.0	0.0
Cycle Q Clear(g_c), s				17.8	0.0	0.0	35.0	0.0	0.0	0.0	29.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				319	0	285	664	2362	0	0	988	442
V/C Ratio(X)				0.99	0.00	0.00	1.08	0.47	0.00	0.00	1.09	0.00
Avail Cap(c_a), veh/h				319	0	285	664	2362	0	0	988	442
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.50	0.50	0.00	0.00	0.21	0.00
Uniform Delay (d), s/veh				40.9	0.0	0.0	13.1	0.0	0.0	0.0	35.5	0.0
Incr Delay (d2), s/veh				47.4	0.0	0.0	48.8	0.3	0.0	0.0	45.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				18.8	0.0	0.0	46.7	0.2	0.0	0.0	35.7	0.0
LnGrp Delay(d),s/veh				88.3	0.0	0.0	61.9	0.3	0.0	0.0	81.3	0.0
LnGrp LOS				F			F	A			F	
Approach Vol, veh/h					316			1837			1079	
Approach Delay, s/veh					88.3			24.3			81.3	
Approach LOS					F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		76.0			41.0	35.0		24.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		70.0			35.0	29.0		18.0
Max Q Clear Time (g_c+I1), s		2.0			37.0	31.0		19.8
Green Ext Time (p_c), s		17.8			0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1770	1583	1687	3374			3406	1524
Flt Permitted					0.95	1.00	0.11	1.00			1.00	1.00
Satd. Flow (perm)					1770	1583	203	3374			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	316	0	116	716	1121	0	0	1079	442
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	316	116	716	1121	0	0	1079	442
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					18.0	18.0	70.0	70.0			29.0	29.0
Effective Green, g (s)					18.0	18.0	70.0	70.0			29.0	29.0
Actuated g/C Ratio					0.18	0.18	0.70	0.70			0.29	0.29
Clearance Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					318	284	661	2361			987	441
v/s Ratio Prot							c0.38	0.33			0.32	
v/s Ratio Perm					0.18	0.07	c0.38					0.29
v/c Ratio					0.99	0.41	1.08	0.47			1.09	1.00
Uniform Delay, d1					40.9	36.3	28.0	6.7			35.5	35.5
Progression Factor					1.00	1.00	0.62	1.32			1.00	1.00
Incremental Delay, d2					48.5	1.0	50.7	0.5			57.5	43.4
Delay (s)					89.5	37.2	68.1	9.4			93.0	78.9
Level of Service					F	D	E	A			F	E
Approach Delay (s)		0.0			75.4			32.3			88.9	
Approach LOS		A			E			C			F	

Intersection Summary			
HCM 2000 Control Delay	59.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	316	116	716	1121	1079	442
v/c Ratio	0.99	0.41	1.08	0.47	1.09	1.00
Control Delay	91.5	41.3	71.6	9.6	92.3	80.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.5	41.3	71.6	9.6	92.3	80.4
Queue Length 50th (ft)	203	66	~186	214	~411	~281
Queue Length 95th (ft)	#377	121	m#339	278	#540	#486
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	318	284	661	2361	987	441
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.41	1.08	0.47	1.09	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

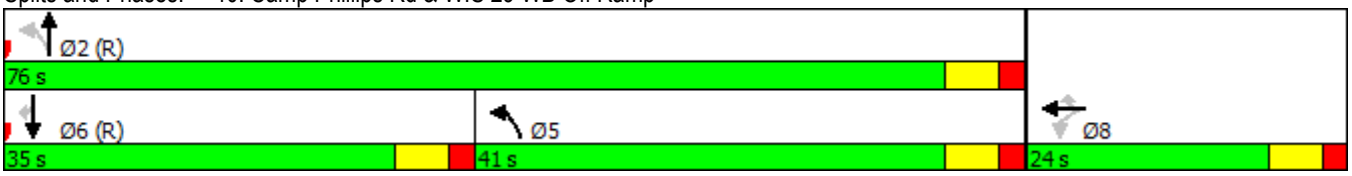
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				24.0	24.0	24.0	41.0	76.0			35.0	35.0
Total Split (%)				24.0%	24.0%	24.0%	41.0%	76.0%			35.0%	35.0%
Maximum Green (s)				18.0	18.0	18.0	35.0	70.0			29.0	29.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					18.0	18.0	70.0	70.0			29.0	29.0
Actuated g/C Ratio					0.18	0.18	0.70	0.70			0.29	0.29
v/c Ratio					0.99	0.41	1.08	0.47			1.09	1.00
Control Delay					91.5	41.3	71.6	9.6			92.3	80.4
Queue Delay					0.0	0.0	0.0	0.0			0.0	0.0
Total Delay					91.5	41.3	71.6	9.6			92.3	80.4
LOS					F	D	E	A			F	F
Approach Delay					78.0			33.7			88.8	
Approach LOS					E			C			F	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 60.9 Intersection LOS: E
Intersection Capacity Utilization 97.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1770	1583	1687	3374	0	0	3406	1524
Flt Permitted					0.950		0.114					
Satd. Flow (perm)	0	0	0	0	1770	1583	202	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	316	0	116	716	1121	0	0	1079	442
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	316	116	716	1121	0	0	1079	442
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (veh/h)	415	0	740	0	0	0	0	1330	190	70	1255	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	461	0	0				0	1478	0	78	1394	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	562	0	251				0	2126	951	278	2526	0
Arrive On Green	0.17	0.00	0.00				0.00	0.60	0.00	0.11	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	461	0	0				0	1478	0	78	1394	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	13.2	0.0	0.0				0.0	28.6	0.0	1.5	0.0	0.0
Cycle Q Clear(g_c), s	13.2	0.0	0.0				0.0	28.6	0.0	1.5	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	562	0	251				0	2126	951	278	2526	0
V/C Ratio(X)	0.82	0.00	0.00				0.00	0.70	0.00	0.28	0.55	0.00
Avail Cap(c_a), veh/h	1015	0	453				0	2126	951	290	2526	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	40.2	0.0	0.0				0.0	13.7	0.0	10.8	0.0	0.0
Incr Delay (d2), s/veh	3.0	0.0	0.0				0.0	1.9	0.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.5	0.0	0.0				0.0	20.5	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	43.3	0.0	0.0				0.0	15.6	0.0	10.9	0.1	0.0
LnGrp LOS	D							B		B	A	
Approach Vol, veh/h		461						1478			1472	
Approach Delay, s/veh		43.3						15.6			0.7	
Approach LOS		D						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.3	66.1		22.6		77.4		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	46.0		30.0		58.0		
Max Q Clear Time (g_c+I1), s	3.5	30.6		15.2		2.0		
Green Ext Time (p_c), s	0.0	13.9		1.5		41.8		

Intersection Summary	
HCM 2010 Ctrl Delay	12.9
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1603	1509					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1603	1603	1509					3539	1583	138	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	461	0	411	0	0	0	0	1478	106	78	1394	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	230	231	411	0	0	0	0	1478	106	78	1394	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	29.1	29.1	29.1					48.1	48.1	58.9	58.9	
Effective Green, g (s)	29.1	29.1	29.1					48.1	48.1	58.9	58.9	
Actuated g/C Ratio	0.29	0.29	0.29					0.48	0.48	0.59	0.59	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	466	466	439					1702	761	159	2084	
v/s Ratio Prot								c0.42		0.02	c0.39	
v/s Ratio Perm	0.14	0.14	c0.27						0.07	0.26		
v/c Ratio	0.49	0.50	0.94					0.87	0.14	0.49	0.67	
Uniform Delay, d1	29.3	29.4	34.5					23.1	14.4	18.0	13.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.99	0.65	
Incremental Delay, d2	0.8	0.8	27.4					6.3	0.4	0.8	0.5	
Delay (s)	30.2	30.2	61.9					29.4	14.8	36.7	9.6	
Level of Service	C	C	E					C	B	D	A	
Approach Delay (s)		45.1			0.0			28.5			11.0	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	230	231	411	1478	106	78	1394
v/c Ratio	0.49	0.50	0.94	0.85	0.14	0.44	0.67
Control Delay	33.4	33.4	65.8	29.2	15.9	22.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	33.4	65.8	29.2	15.9	22.7	9.9
Queue Length 50th (ft)	125	126	251	445	38	14	376
Queue Length 95th (ft)	203	204	#432	#601	71	m12	m122
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	480	480	452	1745	781	178	2085
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.48	0.91	0.85	0.14	0.44	0.67

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

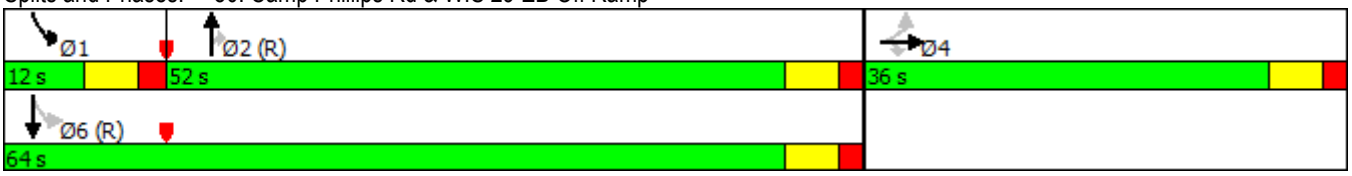
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	36.0	36.0	36.0					52.0	52.0	12.0	64.0	
Total Split (%)	36.0%	36.0%	36.0%					52.0%	52.0%	12.0%	64.0%	
Maximum Green (s)	30.0	30.0	30.0					46.0	46.0	6.0	58.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	29.1	29.1	29.1					49.3	49.3	58.9	58.9	
Actuated g/C Ratio	0.29	0.29	0.29					0.49	0.49	0.59	0.59	
v/c Ratio	0.49	0.50	0.94					0.85	0.14	0.44	0.67	
Control Delay	33.4	33.4	65.8					29.2	15.9	22.7	9.9	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	33.4	33.4	65.8					29.2	15.9	22.7	9.9	
LOS	C	C	E					C	B	C	A	
Approach Delay		48.7						28.3			10.6	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 24 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 97.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.074		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	138	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	461	0	411	0	0	0	0	1478	106	78	1394	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	230	231	411	0	0	0	0	1478	106	78	1394	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	56.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	0	30	50	0	635	35	760	70	1000	570	425
Future Vol, veh/h	125	0	30	50	0	635	35	760	70	1000	570	425
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	0	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	3	3	3
Mvmt Flow	133	0	32	53	0	676	37	809	74	1064	606	452

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3439	3917	529	3351	4106	441	1059	0	0	883	0	0
Stage 1	2960	2960	-	920	920	-	-	-	-	-	-	-
Stage 2	479	957	-	2431	3186	-	-	-	-	-	-	-
Critical Hdwy	7.62	6.62	7.02	7.54	6.54	6.94	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.62	5.62	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.62	5.62	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.56	4.06	3.36	3.52	4.02	3.32	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	~ 2	3	484	~ 3	2	~ 564	653	-	-	~ 756	-	-
Stage 1	~ 14	30	-	292	348	-	-	-	-	-	-	-
Stage 2	526	325	-	~ 32	24	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	484	-	0	~ 564	653	-	-	~ 756	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 13	0	-	275	328	-	-	-	-	-	-	-
Stage 2	-	307	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.4	104.4
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	653	-	-	-	-	484	-	564	~ 756	-	-
HCM Lane V/C Ratio	0.057	-	-	-	-	0.066	-	1.198	1.407	-	-
HCM Control Delay (s)	10.8	-	-	-	0	13	-	129.5	208.2	-	-
HCM Lane LOS	B	-	-	-	A	B	-	F	F	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.2	-	24.3	47	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	50	0	635	35	760	70	1000	570	425
Future Volume (vph)	125	0	30	50	0	635	35	760	70	1000	570	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.850			0.987			0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1770	1583	0	1770	3493	0	1752	3281	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1703	1792	1524	1770	1583	0	1770	3493	0	1752	3281	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	32	53	0	676	37	809	74	1064	606	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	0	32	53	676	0	37	883	0	1064	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 138.2%		ICU Level of Service H	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	110	20	105	145	130	80	545	150	150	375	125
Future Volume (veh/h)	190	110	20	105	145	130	80	545	150	150	375	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	204	118	11	113	156	140	86	586	161	161	403	134
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	388	625	531	434	550	460	442	1333	365	346	1234	406
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1079	1863	1583	1124	1638	1370	864	2747	753	691	2544	837
Grp Volume(v), veh/h	204	118	11	113	150	146	86	377	370	161	271	266
Grp Sat Flow(s),veh/h/ln	1079	1863	1583	1124	1583	1425	864	1770	1730	691	1719	1662
Q Serve(g_s), s	11.5	3.0	0.3	5.3	4.7	5.1	4.5	9.3	9.4	13.3	6.4	6.6
Cycle Q Clear(g_c), s	16.6	3.0	0.3	8.3	4.7	5.1	11.1	9.3	9.4	22.7	6.4	6.6
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.44	1.00		0.50
Lane Grp Cap(c), veh/h	388	625	531	434	531	478	442	858	839	346	834	806
V/C Ratio(X)	0.53	0.19	0.02	0.26	0.28	0.30	0.19	0.44	0.44	0.47	0.32	0.33
Avail Cap(c_a), veh/h	671	1114	947	729	947	852	514	1005	983	403	977	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	15.8	14.9	18.7	16.3	16.5	14.0	11.3	11.3	18.7	10.5	10.6
Incr Delay (d2), s/veh	1.1	0.1	0.0	0.3	0.3	0.4	0.2	0.4	0.4	1.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.3	2.8	0.2	3.0	3.8	3.7	2.0	8.1	8.0	4.7	5.5	5.4
LnGrp Delay(d),s/veh	23.7	15.9	14.9	19.0	16.6	16.8	14.2	11.6	11.6	19.7	10.7	10.8
LnGrp LOS	C	B	B	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		333			409			833			698	
Approach Delay, s/veh		20.6			17.3			11.9			12.8	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		38.5		28.4		38.5		28.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		13.1		18.6		24.7		10.3
Green Ext Time (p_c), s		11.2		3.8		7.8		4.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

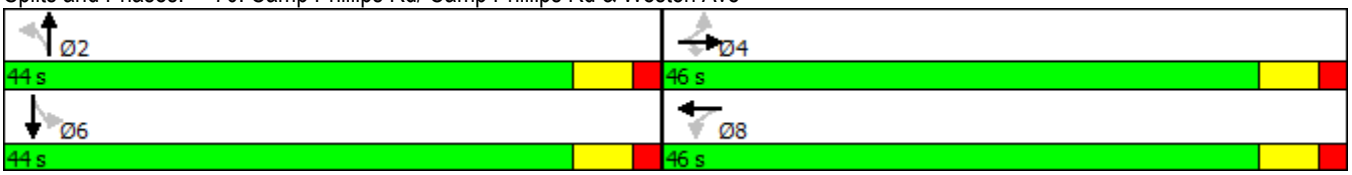
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	204	118	11	113	296	86	747	161	537
v/c Ratio	0.61	0.20	0.02	0.32	0.32	0.22	0.48	0.59	0.36
Control Delay	27.0	16.7	15.7	19.3	16.8	12.1	12.1	22.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	16.7	15.7	19.3	16.8	12.1	12.1	22.8	11.0
Queue Length 50th (ft)	55	27	2	27	37	15	81	35	54
Queue Length 95th (ft)	144	74	14	78	82	52	167	120	116
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	804	1408	1196	857	2223	613	2494	441	2410
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.08	0.01	0.13	0.13	0.14	0.30	0.37	0.22

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	17.6	17.6	17.6	17.6	17.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.45	0.45		0.45	0.45	
v/c Ratio	0.61	0.20	0.02	0.32	0.32		0.22	0.48		0.59	0.36	
Control Delay	27.0	16.7	15.7	19.3	16.8		12.1	12.1		22.8	11.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.0	16.7	15.7	19.3	16.8		12.1	12.1		22.8	11.0	
LOS	C	B	B	B	B		B	B		C	B	
Approach Delay		23.0			17.5			12.1			13.8	
Approach LOS		C			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 56.1	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 15.2	Intersection LOS: B
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	110	20	105	145	130	80	545	150	150	375	125
Future Volume (vph)	190	110	20	105	145	130	80	545	150	150	375	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.929			0.968			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2942	0	1770	3426	0	1719	3311	0
Flt Permitted	0.571			0.681			0.452			0.335		
Satd. Flow (perm)	1064	1863	1583	1135	2942	0	842	3426	0	606	3311	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	204	118	11	113	156	140	86	586	161	161	403	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	118	11	113	296	0	86	747	0	161	537	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	30	255	165	30	105	215	1870	135	105	1795	40
Future Volume (veh/h)	45	30	255	165	30	105	215	1870	135	105	1795	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	48	32	100	176	32	112	229	1989	0	112	1910	43
Adj No. of Lanes	0	1	1	0	2	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	194	118	494	230	83	290	171	2278	1019	101	1927	43
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.06	0.65	0.00	0.55	0.55	0.55
Sat Flow, veh/h	582	471	1581	680	331	1158	1757	3505	1568	215	3504	79
Grp Volume(v), veh/h	80	0	100	176	0	144	229	1989	0	112	951	1002
Grp Sat Flow(s),veh/h/ln	1053	0	1581	680	0	1489	1757	1752	1568	215	1752	1831
Q Serve(g_s), s	4.1	0.0	5.6	16.3	0.0	9.6	7.5	55.1	0.0	22.9	64.1	65.2
Cycle Q Clear(g_c), s	13.7	0.0	5.6	30.0	0.0	9.6	7.5	55.1	0.0	66.0	64.1	65.2
Prop In Lane	0.60		1.00	1.00		0.78	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	311	0	494	230	0	372	171	2278	1019	101	964	1007
V/C Ratio(X)	0.26	0.00	0.20	0.77	0.00	0.39	1.34	0.87	0.00	1.11	0.99	0.99
Avail Cap(c_a), veh/h	311	0	494	230	0	372	171	2278	1019	101	964	1007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	30.3	52.1	0.0	37.4	38.9	17.0	0.0	55.4	26.6	26.8
Incr Delay (d2), s/veh	0.4	0.0	0.2	14.2	0.0	0.7	185.9	4.1	0.0	122.2	25.8	27.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	0.0	4.4	11.0	0.0	7.3	26.1	36.1	0.0	12.2	47.6	50.8
LnGrp Delay(d),s/veh	40.6	0.0	30.5	66.3	0.0	38.0	224.8	21.1	0.0	177.5	52.4	53.8
LnGrp LOS	D		C	E		D	F	C		F	D	D
Approach Vol, veh/h		180			320			2218			2065	
Approach Delay, s/veh		35.0			53.6			42.1			59.9	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		84.0		36.0	12.0	72.0		36.0
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		78.0		30.0	7.5	66.0		30.0
Max Q Clear Time (g_c+I1), s		57.1		15.7	9.5	68.0		32.0
Green Ext Time (p_c), s		20.6		2.4	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Future Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1808	1568		3247		1752	3505	1527	1752	3492	
Flt Permitted		0.58	1.00		0.77		0.06	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		1073	1568		2569		104	3505	1527	114	3492	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	48	32	136	176	32	112	229	1989	72	112	1910	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	80	136	0	320	0	229	1989	72	112	1953	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		20.7	28.2		20.7		78.4	78.4	78.4	66.4	66.4	
Effective Green, g (s)		20.7	28.2		20.7		78.4	78.4	78.4	66.4	66.4	
Actuated g/C Ratio		0.19	0.25		0.19		0.71	0.71	0.71	0.60	0.60	
Clearance Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		199	397		478		184	2473	1077	68	2087	
v/s Ratio Prot			0.02				c0.08	0.57			0.56	
v/s Ratio Perm		0.07	0.06		c0.12		0.79		0.05	c0.99		
v/c Ratio		0.40	0.34		0.67		1.24	0.80	0.07	1.65	0.94	
Uniform Delay, d1		39.8	33.9		42.0		36.3	11.1	5.1	22.3	20.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.3	0.5		3.5		147.3	2.0	0.0	347.6	8.6	
Delay (s)		41.1	34.4		45.6		183.6	13.1	5.1	370.0	29.0	
Level of Service		D	C		D		F	B	A	F	C	
Approach Delay (s)		36.9			45.6			29.9			47.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	111.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	80	136	320	229	1989	72	112	1953
v/c Ratio	0.40	0.32	0.67	1.23	0.80	0.07	1.67	0.94
Control Delay	45.0	30.8	48.8	169.6	16.1	6.8	377.8	31.6
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	45.0	30.8	48.8	169.6	16.3	6.8	377.8	31.6
Queue Length 50th (ft)	50	73	112	~145	415	13	~113	594
Queue Length 95th (ft)	96	122	157	#367	847	42	#217	#1064
Internal Link Dist (ft)	445		550		899			2315
Turn Bay Length (ft)				180		50	250	
Base Capacity (vph)	301	419	721	186	2472	1076	67	2085
Starvation Cap Reductn	0	0	0	0	76	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.32	0.44	1.23	0.83	0.07	1.67	0.94

Intersection Summary

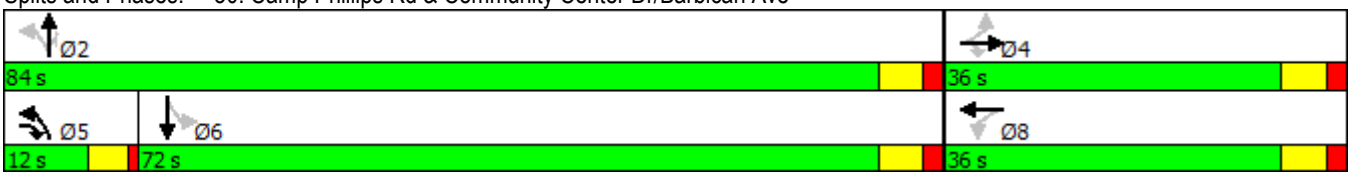
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	36.0	36.0	12.0	36.0	36.0		12.0	84.0	84.0	72.0	72.0	
Total Split (%)	30.0%	30.0%	10.0%	30.0%	30.0%		10.0%	70.0%	70.0%	60.0%	60.0%	
Maximum Green (s)	30.0	30.0	7.5	30.0	30.0		7.5	78.0	78.0	66.0	66.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	4.5		6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)		20.7	29.7		20.7		79.9	78.4	78.4	66.3	66.3	
Actuated g/C Ratio		0.19	0.27		0.19		0.72	0.71	0.71	0.60	0.60	
v/c Ratio		0.40	0.32		0.67		1.23	0.80	0.07	1.67	0.94	
Control Delay		45.0	30.8		48.8		169.6	16.1	6.8	377.8	31.6	
Queue Delay		0.0	0.0		0.0		0.0	0.2	0.0	0.0	0.0	
Total Delay		45.0	30.8		48.8		169.6	16.3	6.8	377.8	31.6	
LOS		D	C		D		F	B	A	F	C	
Approach Delay		36.1			48.8			31.3			50.4	
Approach LOS		D			D			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 111.1	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.67	
Intersection Signal Delay: 40.7	Intersection LOS: D
Intersection Capacity Utilization 103.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Future Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		50	250		0
Storage Lanes	0		1	0		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99				0.97		1.00	
Frt			0.850		0.947				0.850		0.997	
Flt Protected		0.971			0.973		0.950			0.950		
Satd. Flow (prot)	0	1809	1583	0	3246	0	1752	3505	1568	1752	3493	0
Flt Permitted		0.576			0.770		0.056			0.062		
Satd. Flow (perm)	0	1073	1563	0	2568	0	103	3505	1526	114	3493	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	48	32	136	176	32	112	229	1989	72	112	1910	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	80	136	0	320	0	229	1989	72	112	1953	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (veh/h)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				306	0	0	1138	2148	0	0	1413	0
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				255	0	228	758	2617	0	0	1095	490
Arrive On Green				0.15	0.00	0.00	0.54	1.00	0.00	0.00	0.32	0.00
Sat Flow, veh/h				1660	0	1482	1740	3563	0	0	3563	1553
Grp Volume(v), veh/h				306	0	0	1138	2148	0	0	1413	0
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1740	1736	0	0	1736	1553
Q Serve(g_s), s				20.0	0.0	0.0	52.5	0.0	0.0	0.0	41.0	0.0
Cycle Q Clear(g_c), s				20.0	0.0	0.0	52.5	0.0	0.0	0.0	41.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				255	0	228	758	2617	0	0	1095	490
V/C Ratio(X)				1.20	0.00	0.00	1.50	0.82	0.00	0.00	1.29	0.00
Avail Cap(c_a), veh/h				255	0	228	758	2617	0	0	1095	490
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	0.32	0.00
Uniform Delay (d), s/veh				55.0	0.0	0.0	25.6	0.0	0.0	0.0	44.5	0.0
Incr Delay (d2), s/veh				120.6	0.0	0.0	226.2	0.3	0.0	0.0	133.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				31.9	0.0	0.0	128.0	0.2	0.0	0.0	71.7	0.0
LnGrp Delay(d),s/veh				175.6	0.0	0.0	251.8	0.3	0.0	0.0	177.6	0.0
LnGrp LOS				F			F	A			F	
Approach Vol, veh/h					306			3286			1413	
Approach Delay, s/veh					175.6			87.4			177.6	
Approach LOS					F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		104.0			57.0	47.0		26.0
Change Period (Y+Rc), s		6.0			4.5	6.0		6.0
Max Green Setting (Gmax), s		98.0			52.5	41.0		20.0
Max Q Clear Time (g_c+I1), s		2.0			54.5	43.0		22.0
Green Ext Time (p_c), s		81.5			0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	118.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0	6.0	4.5	6.0			6.0	6.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1656	1482	1736	3471			3471	1553
Flt Permitted					0.95	1.00	0.09	1.00			1.00	1.00
Satd. Flow (perm)					1656	1482	161	3471			3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Adj. Flow (vph)	0	0	0	306	0	59	1138	2148	0	0	1413	423
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	306	59	1138	2148	0	0	1413	423
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)					20.0	20.0	98.0	98.0			41.0	41.0
Effective Green, g (s)					20.0	20.0	98.0	98.0			41.0	41.0
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.32	0.32
Clearance Time (s)					6.0	6.0	4.5	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					254	228	757	2616			1094	489
v/s Ratio Prot							c0.61	0.62			0.41	
v/s Ratio Perm					0.18	0.04	c0.53					0.27
v/c Ratio					1.20	0.26	1.50	0.82			1.29	0.87
Uniform Delay, d1					55.0	48.5	34.3	10.3			44.5	41.9
Progression Factor					1.00	1.00	1.14	0.95			1.00	1.00
Incremental Delay, d2					123.3	0.6	227.1	0.3			138.1	18.2
Delay (s)					178.3	49.1	266.1	10.1			182.6	60.1
Level of Service					F	D	F	B			F	E
Approach Delay (s)		0.0			157.4			98.7			154.4	
Approach LOS		A			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	121.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	130.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	306	59	1138	2148	1413	423
v/c Ratio	1.20	0.26	1.50	0.82	1.29	0.87
Control Delay	169.5	51.9	255.0	10.5	175.3	60.8
Queue Delay	0.0	0.0	0.2	5.1	0.0	0.0
Total Delay	169.5	51.9	255.3	15.6	175.3	60.8
Queue Length 50th (ft)	~313	44	~1287	446	~797	335
Queue Length 95th (ft)	#497	88	m#1020	m363	#936	#518
Internal Link Dist (ft)	701			658	899	
Turn Bay Length (ft)		250	320			275
Base Capacity (vph)	254	228	759	2616	1094	489
Starvation Cap Reductn	0	0	30	411	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.20	0.26	1.56	0.97	1.29	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

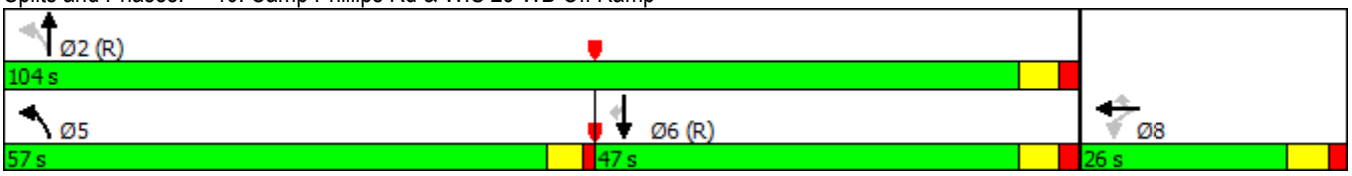
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	6.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	12.0	24.0			22.5	22.5
Total Split (s)				26.0	26.0	26.0	57.0	104.0			47.0	47.0
Total Split (%)				20.0%	20.0%	20.0%	43.8%	80.0%			36.2%	36.2%
Maximum Green (s)				20.0	20.0	20.0	52.5	98.0			41.0	41.0
Yellow Time (s)				4.0	4.0	4.0	3.5	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	1.0	2.0			2.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)					6.0	6.0	4.5	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)					20.0	20.0	99.5	98.0			41.0	41.0
Actuated g/C Ratio					0.15	0.15	0.77	0.75			0.32	0.32
v/c Ratio					1.20	0.26	1.50	0.82			1.29	0.87
Control Delay					169.5	51.9	255.0	10.5			175.3	60.8
Queue Delay					0.0	0.0	0.2	5.1			0.0	0.0
Total Delay					169.5	51.9	255.3	15.6			175.3	60.8
LOS					F	D	F	B			F	E
Approach Delay					150.5			98.6			148.9	
Approach LOS					F			F			F	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.50
Intersection Signal Delay: 118.9 Intersection LOS: F
Intersection Capacity Utilization 130.4% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	320		0	0		275
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected					0.950		0.950					
Satd. Flow (prot)	0	0	0	0	1656	1482	1736	3471	0	0	3471	1553
Flt Permitted					0.950		0.088					
Satd. Flow (perm)	0	0	0	0	1656	1482	161	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	306	0	59	1138	2148	0	0	1413	423
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	306	59	1138	2148	0	0	1413	423
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (veh/h)	915	0	880	0	0	0	0	2305	390	175	1510	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	924	0	0				0	2328	0	177	1525	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	846	0	378				0	2042	913	137	2369	0
Arrive On Green	0.24	0.00	0.00				0.00	0.58	0.00	0.05	0.67	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	924	0	0				0	2328	0	177	1525	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	31.0	0.0	0.0				0.0	75.0	0.0	6.0	32.6	0.0
Cycle Q Clear(g_c), s	31.0	0.0	0.0				0.0	75.0	0.0	6.0	32.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	846	0	378				0	2042	913	137	2369	0
V/C Ratio(X)	1.09	0.00	0.00				0.00	1.14	0.00	1.29	0.64	0.00
Avail Cap(c_a), veh/h	846	0	378				0	2042	913	137	2369	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	49.5	0.0	0.0				0.0	27.5	0.0	60.8	12.5	0.0
Incr Delay (d2), s/veh	59.1	0.0	0.0				0.0	69.6	0.0	135.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	39.8	0.0	0.0				0.0	100.8	0.0	18.1	17.7	0.0
LnGrp Delay(d),s/veh	108.6	0.0	0.0				0.0	97.1	0.0	196.1	12.6	0.0
LnGrp LOS	F							F		F	B	
Approach Vol, veh/h		924						2328			1702	
Approach Delay, s/veh		108.6						97.1			31.7	
Approach LOS		F						F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	12.0	81.0		37.0		93.0		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	75.0		31.0		87.0		
Max Q Clear Time (g_c+I1), s	8.0	77.0		33.0		34.6		
Green Ext Time (p_c), s	0.0	0.0		0.0		19.1		

Intersection Summary	
HCM 2010 Ctrl Delay	76.8
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1681	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.05	1.00	
Satd. Flow (perm)	1681	1681	1583					3539	1583	92	3539	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	924	0	444	0	0	0	0	2328	197	177	1525	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	462	462	444	0	0	0	0	2328	197	177	1525	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	31.0	31.0	31.0					75.0	75.0	87.0	87.0	
Effective Green, g (s)	31.0	31.0	31.0					75.0	75.0	87.0	87.0	
Actuated g/C Ratio	0.24	0.24	0.24					0.58	0.58	0.67	0.67	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	400	400	377					2041	913	139	2368	
v/s Ratio Prot								0.66		c0.06	0.43	
v/s Ratio Perm	0.27	0.27	c0.28						0.12	c0.79		
v/c Ratio	1.16	1.16	1.18					1.14	0.22	1.27	0.64	
Uniform Delay, d1	49.5	49.5	49.5					27.5	13.3	57.9	12.5	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	0.17	
Incremental Delay, d2	94.5	94.5	104.2					69.8	0.5	128.2	0.1	
Delay (s)	144.0	144.0	153.7					97.3	13.8	186.1	2.3	
Level of Service	F	F	F					F	B	F	A	
Approach Delay (s)		147.2			0.0			90.8			21.4	
Approach LOS		F			A			F			C	

Intersection Summary			
HCM 2000 Control Delay	83.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	130.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	462	462	444	2328	197	177	1525
v/c Ratio	1.16	1.16	1.18	1.14	0.22	1.28	0.64
Control Delay	138.5	138.5	147.6	97.4	14.1	169.3	2.3
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0	3.0
Total Delay	138.5	138.5	147.6	97.9	14.1	169.3	5.3
Queue Length 50th (ft)	~482	~482	~447	~1204	77	~166	48
Queue Length 95th (ft)	#705	#705	#655	#1336	119	m98	m0
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	400	400	377	2041	913	138	2368
Starvation Cap Reductn	0	0	0	0	0	0	708
Spillback Cap Reductn	0	0	0	378	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.16	1.16	1.18	1.40	0.22	1.28	0.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

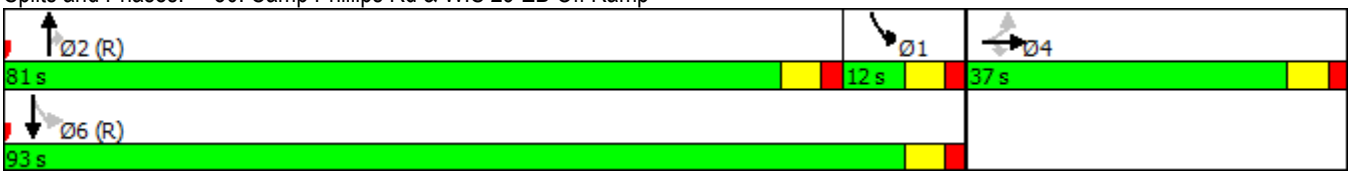
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	37.0	37.0	37.0					81.0	81.0	12.0	93.0	
Total Split (%)	28.5%	28.5%	28.5%					62.3%	62.3%	9.2%	71.5%	
Maximum Green (s)	31.0	31.0	31.0					75.0	75.0	6.0	87.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	31.0	31.0	31.0					75.0	75.0	87.0	87.0	
Actuated g/C Ratio	0.24	0.24	0.24					0.58	0.58	0.67	0.67	
v/c Ratio	1.16	1.16	1.18					1.14	0.22	1.28	0.64	
Control Delay	138.5	138.5	147.6					97.4	14.1	169.3	2.3	
Queue Delay	0.0	0.0	0.0					0.6	0.0	0.0	3.0	
Total Delay	138.5	138.5	147.6					97.9	14.1	169.3	5.3	
LOS	F	F	F					F	B	F	A	
Approach Delay		141.5						91.4			22.3	
Approach LOS		F						F			C	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 10 (8%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.28
Intersection Signal Delay: 82.6 Intersection LOS: F
Intersection Capacity Utilization 130.4% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.049		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	91	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	924	0	444	0	0	0	0	2328	197	177	1525	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	462	462	444	0	0	0	0	2328	197	177	1525	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	

Intersection	
Int Delay, s/veh	130.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	295	0	45	115	0	1550	40	850	110	1360	790	240
Future Vol, veh/h	295	0	45	115	0	1550	40	850	110	1360	790	240
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	200	0	-	-	100	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	311	0	47	121	0	1632	42	895	116	1432	832	253

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	4353	4916	542	4316	4984	505	1084	0	0	1011	0	0
Stage 1	3821	3821	-	1037	1037	-	-	-	-	-	-	-
Stage 2	532	1095	-	3279	3947	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	1	485	~ 1	1	~ 512	639	-	-	~ 681	-	-
Stage 1	~ 4	11	-	247	307	-	-	-	-	-	-	-
Stage 2	499	288	-	~ 9	9	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	485	-	0	~ 512	639	-	-	~ 681	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 4	0	-	231	287	-	-	-	-	-	-	-
Stage 2	-	269	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.4	293.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	639	-	-	-	-	485	-	512	~ 681	-	-
HCM Lane V/C Ratio	0.066	-	-	-	-	0.098	-	3.187	2.102	-	-
HCM Control Delay (s)	11	-	-	-	0	13.2	$	1006.2	$ 516.1	-	-
HCM Lane LOS	B	-	-	-	A	B	-	F	F	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.3	-	144.2	99.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	115	0	1550	40	850	110	1360	790	240
Future Volume (vph)	295	0	45	115	0	1550	40	850	110	1360	790	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.850			0.983			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1583	0	1770	3479	0	1770	3415	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1583	0	1770	3479	0	1770	3415	0
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			3.9			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	311	0	47	121	0	1632	42	895	116	1432	832	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	0	47	121	1632	0	42	1011	0	1432	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 228.0%	ICU Level of Service H
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	155	85	205	195	175	25	545	160	155	655	140
Future Volume (veh/h)	280	155	85	205	195	175	25	545	160	155	655	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	295	163	45	216	205	184	26	574	168	163	689	147
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	429	797	677	505	747	636	250	1162	339	282	1248	266
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	991	1863	1583	1125	1746	1487	654	2704	789	715	2904	619
Grp Volume(v), veh/h	295	163	45	216	200	189	26	375	367	163	420	416
Grp Sat Flow(s),veh/h/ln	991	1863	1583	1125	1703	1530	654	1770	1723	715	1770	1753
Q Serve(g_s), s	23.3	4.6	1.4	12.6	6.4	6.8	2.6	12.9	13.0	18.0	14.9	15.0
Cycle Q Clear(g_c), s	30.1	4.6	1.4	17.2	6.4	6.8	17.6	12.9	13.0	31.0	14.9	15.0
Prop In Lane	1.00		1.00	1.00		0.97	1.00		0.46	1.00		0.35
Lane Grp Cap(c), veh/h	429	797	677	505	729	655	250	760	741	282	760	754
V/C Ratio(X)	0.69	0.20	0.07	0.43	0.27	0.29	0.10	0.49	0.50	0.58	0.55	0.55
Avail Cap(c_a), veh/h	487	906	770	571	829	745	257	777	757	289	777	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	15.1	14.2	20.5	15.6	15.7	24.5	17.4	17.4	28.6	18.0	18.0
Incr Delay (d2), s/veh	3.4	0.1	0.0	0.6	0.2	0.2	0.2	0.5	0.5	2.7	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.1	4.3	1.1	7.2	5.5	5.2	0.9	10.5	10.3	6.7	11.9	11.8
LnGrp Delay(d),s/veh	29.0	15.2	14.2	21.1	15.8	16.0	24.7	17.9	17.9	31.4	18.8	18.8
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		503			605			768			999	
Approach Delay, s/veh		23.2			17.7			18.1			20.8	
Approach LOS		C			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		42.2		42.1		42.2		42.1
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		19.6		32.1		33.0		19.2
Green Ext Time (p_c), s		10.6		3.9		3.2		6.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	295	163	45	216	389	26	742	163	836
v/c Ratio	0.79	0.23	0.07	0.48	0.32	0.13	0.52	0.68	0.58
Control Delay	35.4	15.5	14.3	20.4	15.5	17.0	17.2	35.8	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	15.5	14.3	20.4	15.5	17.0	17.2	35.8	18.1
Queue Length 50th (ft)	111	47	12	70	61	7	117	54	137
Queue Length 95th (ft)	228	93	33	139	101	27	216	#176	250
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	636	1219	1035	766	2070	293	2053	346	2070
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.13	0.04	0.28	0.19	0.09	0.36	0.47	0.40

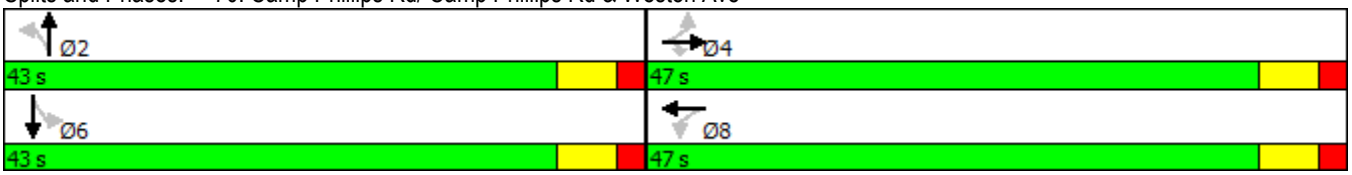
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	26.3	26.3	26.3	26.3	26.3		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39		0.42	0.42		0.42	0.42	
v/c Ratio	0.79	0.23	0.07	0.48	0.32		0.13	0.52		0.68	0.58	
Control Delay	35.4	15.5	14.3	20.4	15.5		17.0	17.2		35.8	18.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.4	15.5	14.3	20.4	15.5		17.0	17.2		35.8	18.1	
LOS	D	B	B	C	B		B	B		D	B	
Approach Delay		27.1			17.3			17.2			21.0	
Approach LOS		C			B			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 67.9	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	155	85	205	195	175	25	545	160	155	655	140
Future Volume (vph)	280	155	85	205	195	175	25	545	160	155	655	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.929			0.966			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3164	0	1770	3419	0	1770	3447	0
Flt Permitted	0.522			0.654			0.262			0.310		
Satd. Flow (perm)	972	1863	1583	1172	3164	0	488	3419	0	577	3447	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	295	163	45	216	205	184	26	574	168	163	689	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	163	45	216	389	0	26	742	0	163	836	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Appendix D

Existing Transportation System with Total Traffic Operational Analysis

Not Applicable

Appendix E

Transportation System Improvements with Background Traffic Operational Analysis

I. 2020 Background Traffic, Improved Transportation System – Synchro 9 Outputs
II. 2030 Background Traffic, Improved Transportation System – Synchro 9 Outputs
III. 2040 Background Traffic, Improved Transportation System – Synchro 9 Outputs

Appendix E:
Transportation System Improvements with Background Traffic Operational Analysis

2020 Background Traffic, Improved Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	0	25	0	0	0	25	555	0	0	395	315
Future Volume (veh/h)	90	0	25	0	0	0	25	555	0	0	395	315
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1900	1863	1900	1863	1863	1900	1845	1845	1900
Adj Flow Rate, veh/h	96	0	13	0	0	0	27	590	0	0	420	335
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	483	316	269	0	329	0	450	1842	0	182	969	768
Arrive On Green	0.18	0.00	0.18	0.00	0.00	0.00	0.52	0.52	0.00	0.00	0.52	0.52
Sat Flow, veh/h	1707	1792	1524	0	1863	0	706	3632	0	815	1862	1475
Grp Volume(v), veh/h	96	0	13	0	0	0	27	590	0	0	395	360
Grp Sat Flow(s),veh/h/ln	1707	1792	1524	0	1863	0	706	1770	0	815	1752	1584
Q Serve(g_s), s	1.9	0.0	0.3	0.0	0.0	0.0	1.0	3.8	0.0	0.0	5.5	5.6
Cycle Q Clear(g_c), s	1.9	0.0	0.3	0.0	0.0	0.0	6.6	3.8	0.0	0.0	5.5	5.6
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.93
Lane Grp Cap(c), veh/h	483	316	269	0	329	0	450	1842	0	182	912	824
V/C Ratio(X)	0.20	0.00	0.05	0.00	0.00	0.00	0.06	0.32	0.00	0.00	0.43	0.44
Avail Cap(c_a), veh/h	1303	1177	1001	0	1224	0	1010	4650	0	829	2302	2082
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	13.5	0.0	0.0	0.0	7.9	5.5	0.0	0.0	5.9	5.9
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.7	0.0	0.2	0.0	0.0	0.0	0.3	3.3	0.0	0.0	4.9	4.5
LnGrp Delay(d),s/veh	14.4	0.0	13.6	0.0	0.0	0.0	8.0	5.6	0.0	0.0	6.2	6.3
LnGrp LOS	B		B				A	A			A	A
Approach Vol, veh/h		109			0			617			755	
Approach Delay, s/veh		14.3			0.0			5.7			6.2	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		26.6		13.0		26.6		13.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		52.0		26.0		52.0		26.0
Max Q Clear Time (g_c+I1), s		8.6		3.9		7.6		0.0
Green Ext Time (p_c), s		12.0		0.3		12.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.6
HCM 2010 LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	96	13	27	590	755
v/c Ratio	0.29	0.03	0.07	0.28	0.39
Control Delay	16.0	12.4	7.0	6.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	12.4	7.0	6.9	7.7
Queue Length 50th (ft)	16	2	3	41	57
Queue Length 95th (ft)	50	12	13	71	97
Internal Link Dist (ft)				933	1163
Turn Bay Length (ft)		200	100		
Base Capacity (vph)	848	952	680	3539	3270
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.01	0.04	0.17	0.23

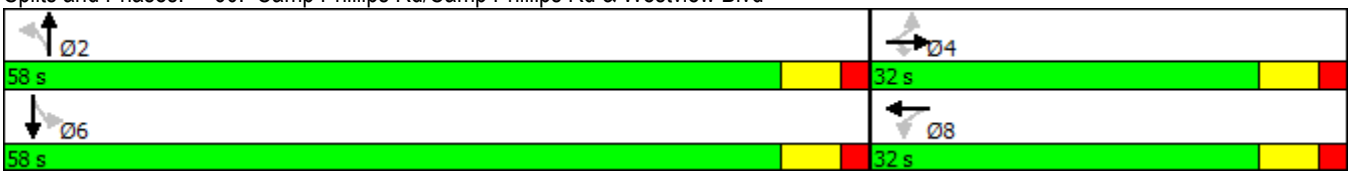
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0		58.0	58.0		58.0	58.0	
Total Split (%)	35.6%	35.6%	35.6%	35.6%	35.6%		64.4%	64.4%		64.4%	64.4%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		52.0	52.0		52.0	52.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	10.4		10.4				24.8	24.8			24.8	
Actuated g/C Ratio	0.25		0.25				0.59	0.59			0.59	
v/c Ratio	0.29		0.03				0.07	0.28			0.39	
Control Delay	16.0		12.4				7.0	6.9			7.7	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	16.0		12.4				7.0	6.9			7.7	
LOS	B		B				A	A			A	
Approach Delay		15.6						6.9			7.7	
Approach LOS		B						A			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 42.3
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 8.0 — Intersection LOS: A
Intersection Capacity Utilization 39.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	25	0	0	0	25	555	0	0	395	315
Future Volume (vph)	90	0	25	0	0	0	25	555	0	0	395	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.933	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	1792	1524	0	1863	0	1770	3539	0	1845	3270	0
Flt Permitted	0.757						0.365					
Satd. Flow (perm)	1357	1792	1524	0	1863	0	680	3539	0	1845	3270	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			4.6			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	96	0	13	0	0	0	27	590	0	0	420	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	0	13	0	0	0	27	590	0	0	755	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm		Perm				Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	0	35	0	0	0	30	610	0	0	610	175
Future Volume (veh/h)	200	0	35	0	0	0	30	610	0	0	610	175
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	211	0	18	0	0	0	32	642	0	0	642	184
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	539	395	336	0	395	0	405	1830	0	162	1405	402
Arrive On Green	0.21	0.00	0.21	0.00	0.00	0.00	0.52	0.52	0.00	0.00	0.52	0.52
Sat Flow, veh/h	1774	1863	1583	0	1863	0	661	3632	0	784	2717	778
Grp Volume(v), veh/h	211	0	18	0	0	0	32	642	0	0	418	408
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	0	1863	0	661	1770	0	784	1770	1725
Q Serve(g_s), s	4.7	0.0	0.4	0.0	0.0	0.0	1.4	4.7	0.0	0.0	6.6	6.6
Cycle Q Clear(g_c), s	4.7	0.0	0.4	0.0	0.0	0.0	8.1	4.7	0.0	0.0	6.6	6.6
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.45
Lane Grp Cap(c), veh/h	539	395	336	0	395	0	405	1830	0	162	915	892
V/C Ratio(X)	0.39	0.00	0.05	0.00	0.00	0.00	0.08	0.35	0.00	0.00	0.46	0.46
Avail Cap(c_a), veh/h	1444	1345	1143	0	1345	0	749	3674	0	571	1837	1791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	15.6	0.0	13.9	0.0	0.0	0.0	9.3	6.3	0.0	0.0	6.8	6.8
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	0.0	0.3	0.0	0.0	0.0	0.5	4.2	0.0	0.0	5.8	5.7
LnGrp Delay(d),s/veh	16.1	0.0	14.0	0.0	0.0	0.0	9.4	6.4	0.0	0.0	7.1	7.1
LnGrp LOS	B		B				A	A			A	A
Approach Vol, veh/h		229			0			674			826	
Approach Delay, s/veh		15.9			0.0			6.6			7.1	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		28.9		15.4		28.9		15.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		46.0		32.0		46.0		32.0
Max Q Clear Time (g_c+I1), s		10.1		6.7		8.6		0.0
Green Ext Time (p_c), s		12.9		0.6		13.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	211	18	32	642	826
v/c Ratio	0.52	0.04	0.13	0.41	0.55
Control Delay	19.1	12.6	9.9	9.9	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	12.6	9.9	9.9	11.3
Queue Length 50th (ft)	40	3	4	51	71
Queue Length 95th (ft)	110	16	20	106	144
Internal Link Dist (ft)				933	1163
Turn Bay Length (ft)		200	100		
Base Capacity (vph)	1024	1149	547	3375	3263
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.02	0.06	0.19	0.25

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	38.0	38.0	38.0	38.0	38.0		52.0	52.0		52.0	52.0	
Total Split (%)	42.2%	42.2%	42.2%	42.2%	42.2%		57.8%	57.8%		57.8%	57.8%	
Maximum Green (s)	32.0	32.0	32.0	32.0	32.0		46.0	46.0		46.0	46.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	12.9		12.9				19.9	19.9			19.9	
Actuated g/C Ratio	0.29		0.29				0.44	0.44			0.44	
v/c Ratio	0.52		0.04				0.13	0.41			0.55	
Control Delay	19.1		12.6				9.9	9.9			11.3	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	19.1		12.6				9.9	9.9			11.3	
LOS	B		B				A	A			B	
Approach Delay		18.6						9.9			11.3	
Approach LOS		B						A			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 45.1	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 11.7	Intersection LOS: B
Intersection Capacity Utilization 46.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	0	35	0	0	0	30	610	0	0	610	175
Future Volume (vph)	200	0	35	0	0	0	30	610	0	0	610	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.967	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	0	1863	3422	0
Flt Permitted	0.757						0.308					
Satd. Flow (perm)	1410	1863	1583	0	1863	0	574	3539	0	1863	3422	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			4.6			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	211	0	18	0	0	0	32	642	0	0	642	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	0	18	0	0	0	32	642	0	0	826	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm		Perm				Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Appendix E:
Transportation System Improvements with Background Traffic Operational Analysis

2030 Background Traffic, Improved Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	0	30	0	0	0	30	650	0	0	450	375
Future Volume (veh/h)	105	0	30	0	0	0	30	650	0	0	450	375
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1900	1863	1900	1863	1863	1900	1845	1845	1900
Adj Flow Rate, veh/h	112	0	16	0	0	0	32	691	0	0	479	399
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	456	314	267	0	327	0	413	1993	0	157	1024	852
Arrive On Green	0.18	0.00	0.18	0.00	0.00	0.00	0.56	0.56	0.00	0.00	0.56	0.56
Sat Flow, veh/h	1707	1792	1524	0	1863	0	629	3632	0	742	1818	1512
Grp Volume(v), veh/h	112	0	16	0	0	0	32	691	0	0	462	416
Grp Sat Flow(s),veh/h/ln	1707	1792	1524	0	1863	0	629	1770	0	742	1752	1578
Q Serve(g_s), s	2.7	0.0	0.4	0.0	0.0	0.0	1.5	4.9	0.0	0.0	7.2	7.2
Cycle Q Clear(g_c), s	2.7	0.0	0.4	0.0	0.0	0.0	8.6	4.9	0.0	0.0	7.2	7.2
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.96
Lane Grp Cap(c), veh/h	456	314	267	0	327	0	413	1993	0	157	987	889
V/C Ratio(X)	0.25	0.00	0.06	0.00	0.00	0.00	0.08	0.35	0.00	0.00	0.47	0.47
Avail Cap(c_a), veh/h	1087	976	830	0	1015	0	785	4087	0	596	2024	1822
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	16.7	0.0	15.8	0.0	0.0	0.0	8.5	5.4	0.0	0.0	5.9	5.9
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.3	0.0	0.3	0.0	0.0	0.0	0.5	4.2	0.0	0.0	6.2	5.6
LnGrp Delay(d),s/veh	17.0	0.0	15.9	0.0	0.0	0.0	8.6	5.5	0.0	0.0	6.3	6.3
LnGrp LOS	B		B				A	A			A	A
Approach Vol, veh/h		128			0			723			878	
Approach Delay, s/veh		16.8			0.0			5.7			6.3	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		31.8		14.0		31.8		14.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		53.0		25.0		53.0		25.0
Max Q Clear Time (g_c+I1), s		10.6		4.7		9.2		0.0
Green Ext Time (p_c), s		15.2		0.3		15.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.8
HCM 2010 LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	112	16	32	691	878
v/c Ratio	0.34	0.04	0.09	0.33	0.45
Control Delay	17.9	14.1	7.3	7.1	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	14.1	7.3	7.1	8.1
Queue Length 50th (ft)	20	3	4	50	70
Queue Length 95th (ft)	63	15	16	90	125
Internal Link Dist (ft)				933	1163
Turn Bay Length (ft)		200	100		
Base Capacity (vph)	788	885	577	3539	3267
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.02	0.06	0.20	0.27

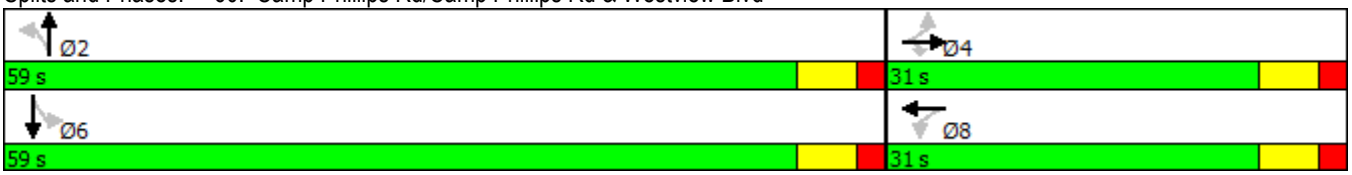
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	31.0	31.0	31.0	31.0	31.0		59.0	59.0		59.0	59.0	
Total Split (%)	34.4%	34.4%	34.4%	34.4%	34.4%		65.6%	65.6%		65.6%	65.6%	
Maximum Green (s)	25.0	25.0	25.0	25.0	25.0		53.0	53.0		53.0	53.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	10.8		10.8				26.1	26.1			26.1	
Actuated g/C Ratio	0.25		0.25				0.60	0.60			0.60	
v/c Ratio	0.34		0.04				0.09	0.33			0.45	
Control Delay	17.9		14.1				7.3	7.1			8.1	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	17.9		14.1				7.3	7.1			8.1	
LOS	B		B				A	A			A	
Approach Delay		17.4						7.1			8.1	
Approach LOS		B						A			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 43.7
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 8.4 — Intersection LOS: A
Intersection Capacity Utilization 43.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	0	30	0	0	0	30	650	0	0	450	375
Future Volume (vph)	105	0	30	0	0	0	30	650	0	0	450	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.932	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	1792	1524	0	1863	0	1770	3539	0	1845	3267	0
Flt Permitted	0.757						0.310					
Satd. Flow (perm)	1357	1792	1524	0	1863	0	577	3539	0	1845	3267	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			4.6			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	112	0	16	0	0	0	32	691	0	0	479	399
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	0	16	0	0	0	32	691	0	0	878	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm		Perm				Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	0	40	0	0	0	35	710	0	0	705	205
Future Volume (veh/h)	245	0	40	0	0	0	35	710	0	0	705	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	258	0	21	0	0	0	37	747	0	0	742	216
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	499	370	315	0	370	0	374	1972	0	146	1508	439
Arrive On Green	0.20	0.00	0.20	0.00	0.00	0.00	0.56	0.56	0.00	0.00	0.56	0.56
Sat Flow, veh/h	1774	1863	1583	0	1863	0	584	3632	0	711	2706	788
Grp Volume(v), veh/h	258	0	21	0	0	0	37	747	0	0	485	473
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	0	1863	0	584	1770	0	711	1770	1724
Q Serve(g_s), s	6.7	0.0	0.5	0.0	0.0	0.0	2.0	5.8	0.0	0.0	8.2	8.2
Cycle Q Clear(g_c), s	6.7	0.0	0.5	0.0	0.0	0.0	10.3	5.8	0.0	0.0	8.2	8.2
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.46
Lane Grp Cap(c), veh/h	499	370	315	0	370	0	374	1972	0	146	986	960
V/C Ratio(X)	0.52	0.00	0.07	0.00	0.00	0.00	0.10	0.38	0.00	0.00	0.49	0.49
Avail Cap(c_a), veh/h	1373	1288	1095	0	1288	0	571	3166	0	386	1583	1542
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	16.0	0.0	0.0	0.0	9.8	6.1	0.0	0.0	6.6	6.6
Incr Delay (d2), s/veh	0.8	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.1	0.0	0.4	0.0	0.0	0.0	0.6	5.1	0.0	0.0	7.2	7.0
LnGrp Delay(d),s/veh	19.3	0.0	16.1	0.0	0.0	0.0	9.9	6.2	0.0	0.0	7.0	7.0
LnGrp LOS	B		B				A	A			A	A
Approach Vol, veh/h		279			0			784			958	
Approach Delay, s/veh		19.1			0.0			6.4			7.0	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.4		15.8		33.4		15.8
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		44.0		34.0		44.0		34.0
Max Q Clear Time (g_c+I1), s		12.3		8.7		10.2		0.0
Green Ext Time (p_c), s		15.1		0.8		15.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.4
HCM 2010 LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	258	21	37	747	958
v/c Ratio	0.59	0.04	0.19	0.48	0.63
Control Delay	22.5	14.3	12.6	11.5	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	14.3	12.6	11.5	13.5
Queue Length 50th (ft)	60	4	6	72	101
Queue Length 95th (ft)	158	20	27	151	208
Internal Link Dist (ft)				933	1163
Turn Bay Length (ft)		200	100		
Base Capacity (vph)	987	1108	377	3049	2946
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.02	0.10	0.24	0.33

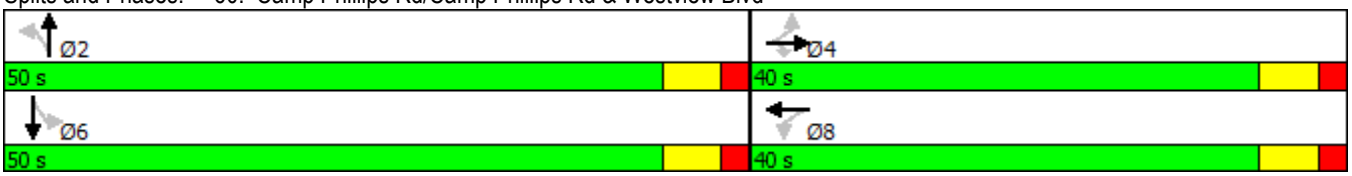
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		50.0	50.0		50.0	50.0	
Total Split (%)	44.4%	44.4%	44.4%	44.4%	44.4%		55.6%	55.6%		55.6%	55.6%	
Maximum Green (s)	34.0	34.0	34.0	34.0	34.0		44.0	44.0		44.0	44.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	15.8		15.8				22.7	22.7			22.7	
Actuated g/C Ratio	0.31		0.31				0.44	0.44			0.44	
v/c Ratio	0.59		0.04				0.19	0.48			0.63	
Control Delay	22.5		14.3				12.6	11.5			13.5	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	22.5		14.3				12.6	11.5			13.5	
LOS	C		B				B	B			B	
Approach Delay		21.8						11.5			13.5	
Approach LOS		C						B			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 51.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 13.9 — Intersection LOS: B
Intersection Capacity Utilization 52.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	0	40	0	0	0	35	710	0	0	705	205
Future Volume (vph)	245	0	40	0	0	0	35	710	0	0	705	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.966	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	0	1863	3419	0
Flt Permitted	0.757						0.235					
Satd. Flow (perm)	1410	1863	1583	0	1863	0	438	3539	0	1863	3419	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			4.6			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	258	0	21	0	0	0	37	747	0	0	742	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	0	21	0	0	0	37	747	0	0	958	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm		Perm				Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Appendix E:
Transportation System Improvements with Background Traffic Operational Analysis

2040 Background Traffic, Improved Transportation System – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	0	30	0	0	0	35	750	0	0	515	425
Future Volume (veh/h)	125	0	30	0	0	0	35	750	0	0	515	425
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1900	1863	1900	1863	1863	1900	1845	1845	1900
Adj Flow Rate, veh/h	133	0	16	0	0	0	37	798	0	0	548	452
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	427	303	258	0	315	0	379	2128	0	138	1097	905
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.60	0.60	0.00	0.00	0.60	0.60
Sat Flow, veh/h	1707	1792	1524	0	1863	0	561	3632	0	672	1826	1506
Grp Volume(v), veh/h	133	0	16	0	0	0	37	798	0	0	526	474
Grp Sat Flow(s),veh/h/ln	1707	1792	1524	0	1863	0	561	1770	0	672	1752	1579
Q Serve(g_s), s	3.7	0.0	0.5	0.0	0.0	0.0	2.1	6.1	0.0	0.0	8.9	8.9
Cycle Q Clear(g_c), s	3.7	0.0	0.5	0.0	0.0	0.0	11.0	6.1	0.0	0.0	8.9	8.9
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.95
Lane Grp Cap(c), veh/h	427	303	258	0	315	0	379	2128	0	138	1053	949
V/C Ratio(X)	0.31	0.00	0.06	0.00	0.00	0.00	0.10	0.38	0.00	0.00	0.50	0.50
Avail Cap(c_a), veh/h	954	857	729	0	891	0	611	3588	0	415	1777	1601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	18.2	0.0	0.0	0.0	9.1	5.4	0.0	0.0	5.9	5.9
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.0	0.4	0.0	0.0	0.0	0.6	5.2	0.0	0.0	7.8	7.1
LnGrp Delay(d),s/veh	20.0	0.0	18.3	0.0	0.0	0.0	9.2	5.5	0.0	0.0	6.3	6.4
LnGrp LOS	B		B				A	A			A	A
Approach Vol, veh/h		149			0			835			1000	
Approach Delay, s/veh		19.8			0.0			5.6			6.3	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		37.4		14.9		37.4		14.9
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		53.0		25.0		53.0		25.0
Max Q Clear Time (g_c+I1), s		13.0		5.7		10.9		0.0
Green Ext Time (p_c), s		18.4		0.4		18.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.1
HCM 2010 LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	133	16	37	798	1000
v/c Ratio	0.40	0.04	0.13	0.37	0.50
Control Delay	20.6	15.9	8.0	7.5	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	15.9	8.0	7.5	8.7
Queue Length 50th (ft)	28	3	5	60	84
Queue Length 95th (ft)	83	17	20	116	162
Internal Link Dist (ft)				933	1163
Turn Bay Length (ft)		200	100		
Base Capacity (vph)	749	841	470	3456	3191
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.02	0.08	0.23	0.31

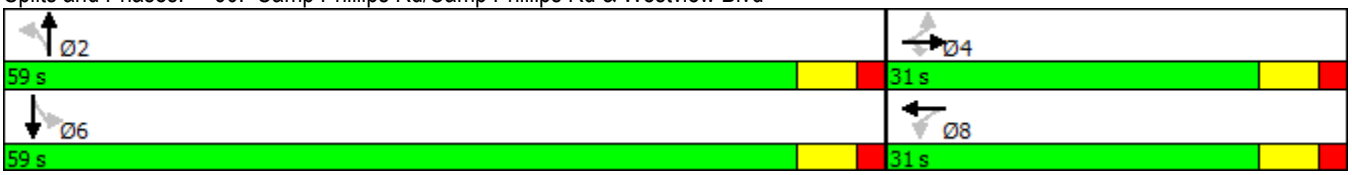
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	0	0	0	35	750	0	0	515	425
Future Volume (vph)	125	0	30	0	0	0	35	750	0	0	515	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.932	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	1792	1524	0	1863	0	1770	3539	0	1845	3267	0
Flt Permitted	0.757						0.258					
Satd. Flow (perm)	1357	1792	1524	0	1863	0	481	3539	0	1845	3267	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			4.6			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	16	0	0	0	37	798	0	0	548	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	0	16	0	0	0	37	798	0	0	1000	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm		Perm				Perm	NA		Perm	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	31.0	31.0	31.0	31.0	31.0		59.0	59.0		59.0	59.0	
Total Split (%)	34.4%	34.4%	34.4%	34.4%	34.4%		65.6%	65.6%		65.6%	65.6%	
Maximum Green (s)	25.0	25.0	25.0	25.0	25.0		53.0	53.0		53.0	53.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	11.5		11.5				28.4	28.4			28.4	
Actuated g/C Ratio	0.25		0.25				0.61	0.61			0.61	
v/c Ratio	0.40		0.04				0.13	0.37			0.50	
Control Delay	20.6		15.9				8.0	7.5			8.7	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	20.6		15.9				8.0	7.5			8.7	
LOS	C		B				A	A			A	
Approach Delay		20.1						7.5			8.7	
Approach LOS		C						A			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 46.6	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 47.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	0	45	0	0	0	40	810	0	0	790	240
Future Volume (veh/h)	295	0	45	0	0	0	40	810	0	0	790	240
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	311	0	24	0	0	0	42	853	0	0	832	253
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	511	405	344	0	405	0	323	2029	0	126	1534	466
Arrive On Green	0.22	0.00	0.22	0.00	0.00	0.00	0.57	0.57	0.00	0.00	0.57	0.57
Sat Flow, veh/h	1774	1863	1583	0	1863	0	518	3632	0	644	2676	813
Grp Volume(v), veh/h	311	0	24	0	0	0	42	853	0	0	550	535
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	0	1863	0	518	1770	0	644	1770	1719
Q Serve(g_s), s	9.5	0.0	0.7	0.0	0.0	0.0	3.1	7.8	0.0	0.0	11.0	11.0
Cycle Q Clear(g_c), s	9.5	0.0	0.7	0.0	0.0	0.0	14.2	7.8	0.0	0.0	11.0	11.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.47
Lane Grp Cap(c), veh/h	511	405	344	0	405	0	323	2029	0	126	1014	985
V/C Ratio(X)	0.61	0.00	0.07	0.00	0.00	0.00	0.13	0.42	0.00	0.00	0.54	0.54
Avail Cap(c_a), veh/h	1180	1106	940	0	1106	0	424	2721	0	252	1360	1322
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	0.0	17.8	0.0	0.0	0.0	12.0	6.9	0.0	0.0	7.6	7.6
Incr Delay (d2), s/veh	1.2	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.4	0.0	0.6	0.0	0.0	0.0	0.8	6.7	0.0	0.0	9.3	9.1
LnGrp Delay(d),s/veh	22.4	0.0	17.9	0.0	0.0	0.0	12.1	7.0	0.0	0.0	8.0	8.0
LnGrp LOS	C		B				B	A			A	A
Approach Vol, veh/h		335			0			895			1085	
Approach Delay, s/veh		22.1			0.0			7.2			8.0	
Approach LOS		C						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		38.8		18.4		38.8		18.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		44.0		34.0		44.0		34.0
Max Q Clear Time (g_c+I1), s		16.2		11.5		13.0		0.0
Green Ext Time (p_c), s		16.6		1.0		17.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	311	24	42	853	1085
v/c Ratio	0.68	0.05	0.27	0.52	0.69
Control Delay	27.7	16.4	17.0	13.3	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	16.4	17.0	13.3	16.0
Queue Length 50th (ft)	90	6	8	101	143
Queue Length 95th (ft)	225	25	38	211	296
Internal Link Dist (ft)				933	1163
Turn Bay Length (ft)		200	100		
Base Capacity (vph)	856	961	256	2683	2589
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.02	0.16	0.32	0.42

Intersection Summary

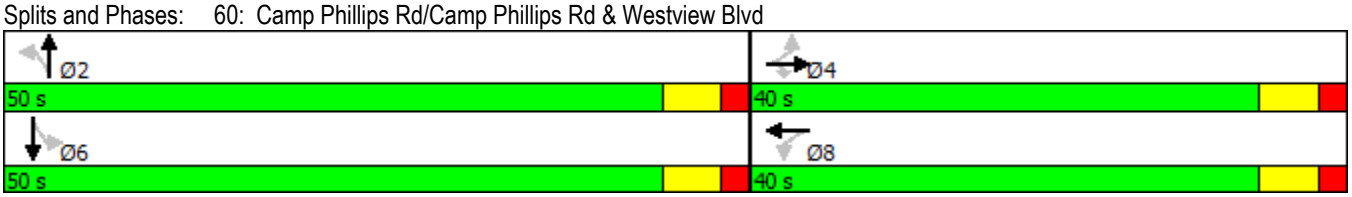
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	0	0	0	40	810	0	0	790	240
Future Volume (vph)	295	0	45	0	0	0	40	810	0	0	790	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	100		0	160		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850								0.965	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	0	1863	3415	0
Flt Permitted	0.757						0.182					
Satd. Flow (perm)	1410	1863	1583	0	1863	0	339	3539	0	1863	3415	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			170			1013			1243	
Travel Time (s)		10.8			4.6			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	311	0	24	0	0	0	42	853	0	0	832	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	0	24	0	0	0	42	853	0	0	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm		Perm				Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		50.0	50.0		50.0	50.0	
Total Split (%)	44.4%	44.4%	44.4%	44.4%	44.4%		55.6%	55.6%		55.6%	55.6%	
Maximum Green (s)	34.0	34.0	34.0	34.0	34.0		44.0	44.0		44.0	44.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	19.6		19.6				28.0	28.0			28.0	
Actuated g/C Ratio	0.32		0.32				0.46	0.46			0.46	
v/c Ratio	0.68		0.05				0.27	0.52			0.69	
Control Delay	27.7		16.4				17.0	13.3			16.0	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	27.7		16.4				17.0	13.3			16.0	
LOS	C		B				B	B			B	
Approach Delay		26.9						13.5			16.0	
Approach LOS		C						B			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 60.7
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 16.6 Intersection LOS: B
Intersection Capacity Utilization 59.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Appendix F

Transportation System Improvements with Build Traffic Operational Analysis

I. 2020 Phase I Build Transportation System Improvements – Synchro 9 Outputs
II. 2030 Full Build Transportation System Improvements – Synchro 9 Outputs
III. 2040 Full Build Transportation System Improvements – Synchro 9 Outputs
IV. 2040 Full Build Transportation System Improvements – Sensitivity Analysis (Westbound) – Synchro 9 Outputs
V. 2040 Full Build Transportation System Improvements – Sensitivity Analysis (Southbound) – Synchro 9 Outputs

Appendix F:
Transportation System Improvements with Build Traffic Operational Analysis

2020 Phase I Build Transportation System Improvements – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	230	0	160	560	770	0	0	730	695
Future Volume (veh/h)	0	0	0	230	0	160	560	770	0	0	730	695
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				242	0	41	589	811	0	0	768	182
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				394	0	176	1057	2549	0	0	1249	559
Arrive On Green				0.11	0.00	0.11	0.64	1.00	0.00	0.00	0.37	0.37
Sat Flow, veh/h				3548	0	1583	3281	3463	0	0	3495	1524
Grp Volume(v), veh/h				242	0	41	589	811	0	0	768	182
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1640	1687	0	0	1703	1524
Q Serve(g_s), s				5.9	0.0	2.1	9.0	0.0	0.0	0.0	16.6	7.7
Cycle Q Clear(g_c), s				5.9	0.0	2.1	9.0	0.0	0.0	0.0	16.6	7.7
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				394	0	176	1057	2549	0	0	1249	559
V/C Ratio(X)				0.61	0.00	0.23	0.56	0.32	0.00	0.00	0.62	0.33
Avail Cap(c_a), veh/h				670	0	299	1057	2549	0	0	1249	559
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.77	0.77	0.00	0.00	0.67	0.67
Uniform Delay (d), s/veh				38.2	0.0	36.5	12.4	0.0	0.0	0.0	23.3	20.5
Incr Delay (d2), s/veh				1.6	0.0	0.7	0.5	0.3	0.0	0.0	1.5	1.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				5.3	0.0	1.7	6.9	0.2	0.0	0.0	11.8	5.9
LnGrp Delay(d),s/veh				39.7	0.0	37.2	12.9	0.3	0.0	0.0	24.8	21.5
LnGrp LOS				D		D	B	A			C	C
Approach Vol, veh/h					283			1400			950	
Approach Delay, s/veh					39.4			5.6			24.2	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		74.0			35.0	39.0		16.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		61.0			22.0	33.0		17.0
Max Q Clear Time (g_c+I1), s		2.0			11.0	18.6		7.9
Green Ext Time (p_c), s		10.8			5.9	5.2		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	121	121	84	589	811	768	366
v/c Ratio	0.52	0.52	0.38	0.74	0.33	0.54	0.58
Control Delay	43.6	43.6	39.6	17.3	2.2	22.1	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	43.6	39.6	17.3	2.2	22.1	25.5
Queue Length 50th (ft)	68	68	45	158	6	165	153
Queue Length 95th (ft)	118	118	83	119	60	245	271
Internal Link Dist (ft)		701			658	899	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	317	317	299	800	2456	1419	635
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.38	0.28	0.74	0.33	0.54	0.58

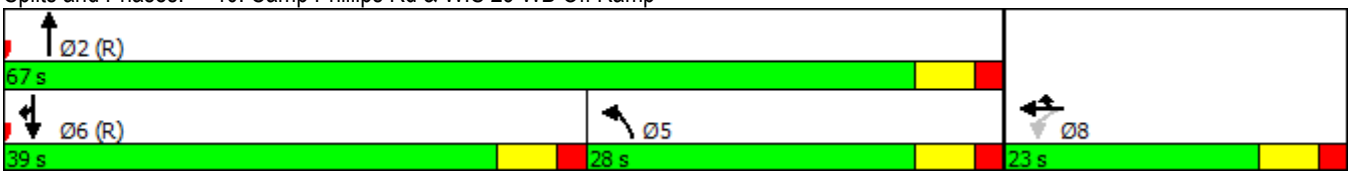
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	14.0	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	28.0	67.0			39.0	39.0
Total Split (%)				25.6%	25.6%	25.6%	31.1%	74.4%			43.3%	43.3%
Maximum Green (s)				17.0	17.0	17.0	22.0	61.0			33.0	33.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				12.5	12.5	12.5	22.0	65.5			37.5	37.5
Actuated g/C Ratio				0.14	0.14	0.14	0.24	0.73			0.42	0.42
v/c Ratio				0.52	0.52	0.38	0.74	0.33			0.54	0.58
Control Delay				43.6	43.6	39.6	17.3	2.2			22.1	25.5
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				43.6	43.6	39.6	17.3	2.2			22.1	25.5
LOS				D	D	D	B	A			C	C
Approach Delay					42.6			8.6			23.2	
Approach LOS					D			A			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 18.2 Intersection LOS: B
Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	230	0	160	560	770	0	0	730	695
Future Volume (vph)	0	0	0	230	0	160	560	770	0	0	730	695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1681	1681	1583	3273	3374	0	0	3406	1524
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1681	1681	1583	3273	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	242	0	84	589	811	0	0	768	366
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	121	121	84	589	811	0	0	768	366
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	0	560	0	0	0	0	995	150	60	900	0
Future Volume (veh/h)	335	0	560	0	0	0	0	995	150	60	900	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	372	0	238				0	1106	66	67	1000	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	656	0	293				0	1455	651	484	2381	0
Arrive On Green	0.19	0.00	0.19				0.00	0.41	0.41	0.39	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	372	0	238				0	1106	66	67	1000	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1770	1583	1774	1770	0
Q Serve(g_s), s	9.0	0.0	13.6				0.0	24.1	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	13.6				0.0	24.1	2.3	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	656	0	293				0	1455	651	484	2381	0
V/C Ratio(X)	0.57	0.00	0.81				0.00	0.76	0.10	0.14	0.42	0.00
Avail Cap(c_a), veh/h	1090	0	486				0	1455	651	484	2381	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.85	0.85	0.83	0.83	0.00
Uniform Delay (d), s/veh	32.8	0.0	34.7				0.0	22.7	16.3	17.9	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	5.4				0.0	3.2	0.3	0.1	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.6	0.0	10.2				0.0	17.6	1.9	1.8	0.3	0.0
LnGrp Delay(d),s/veh	33.6	0.0	40.1				0.0	25.9	16.5	18.0	0.5	0.0
LnGrp LOS	C		D					C	B	B	A	
Approach Vol, veh/h		610						1172			1067	
Approach Delay, s/veh		36.2						25.4			1.6	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	23.5	43.0		23.5		66.5		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	37.0		29.0		49.0		
Max Q Clear Time (g_c+I1), s	2.0	26.1		15.6		2.0		
Green Ext Time (p_c), s	2.4	5.7		1.9		9.1		

Intersection Summary	
HCM 2010 Ctrl Delay	18.8
HCM 2010 LOS	B

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	186	186	311	1106	83	67	1000
v/c Ratio	0.44	0.44	0.78	0.63	0.11	0.23	0.47
Control Delay	29.9	29.9	44.5	20.6	15.6	3.4	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	29.9	44.5	20.6	15.6	3.4	6.2
Queue Length 50th (ft)	91	91	162	250	26	1	83
Queue Length 95th (ft)	145	145	241	356	58	m2	95
Internal Link Dist (ft)		918		1152			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	516	516	486	1758	786	290	2135
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.36	0.64	0.63	0.11	0.23	0.47

Intersection Summary

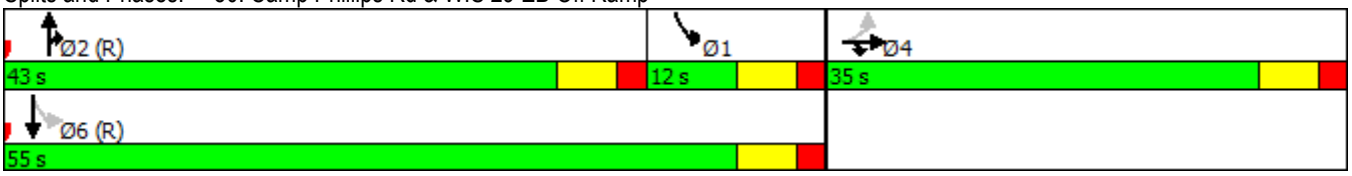
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2	2	1	6	
Permitted Phases	4									6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	35.0	35.0	35.0					43.0	43.0	12.0	55.0	
Total Split (%)	38.9%	38.9%	38.9%					47.8%	47.8%	13.3%	61.1%	
Maximum Green (s)	29.0	29.0	29.0					37.0	37.0	6.0	49.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	23.7	23.7	23.7					44.7	44.7	54.3	54.3	
Actuated g/C Ratio	0.26	0.26	0.26					0.50	0.50	0.60	0.60	
v/c Ratio	0.44	0.44	0.78					0.63	0.11	0.23	0.47	
Control Delay	29.9	29.9	44.5					20.6	15.6	3.4	6.2	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	29.9	29.9	44.5					20.6	15.6	3.4	6.2	
LOS	C	C	D					C	B	A	A	
Approach Delay		36.6						20.3			6.0	
Approach LOS		D						C			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 11 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 18.9 Intersection LOS: B
Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	335	0	560	0	0	0	0	995	150	60	900	0
Future Volume (vph)	335	0	560	0	0	0	0	995	150	60	900	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.173		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	3539	1583	322	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1232			738	
Travel Time (s)		19.4			12.0			24.0			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	372	0	311	0	0	0	0	1106	83	67	1000	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	186	186	311	0	0	0	0	1106	83	67	1000	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Prot	pm+pt	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	0	25	50	0	525	25	530	70	770	375	315
Future Volume (veh/h)	90	0	25	50	0	525	25	530	70	770	375	315
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900	1863	1863	1863	1863	1863	1863	1845	1845	1900
Adj Flow Rate, veh/h	96	0	27	53	0	279	27	564	37	819	399	335
Adj No. of Lanes	2	1	0	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	291	0	428	261	232	640	309	783	350	954	872	726
Arrive On Green	0.09	0.00	0.28	0.12	0.00	0.12	0.03	0.22	0.22	0.28	0.48	0.48
Sat Flow, veh/h	3312	0	1524	1378	1863	1583	1774	3539	1583	3408	1817	1513
Grp Volume(v), veh/h	96	0	27	53	0	279	27	564	37	819	385	349
Grp Sat Flow(s),veh/h/ln	1656	0	1524	1378	1863	1583	1774	1770	1583	1704	1752	1578
Q Serve(g_s), s	2.2	0.0	1.0	2.8	0.0	10.0	0.9	11.9	1.5	18.3	11.7	11.9
Cycle Q Clear(g_c), s	2.2	0.0	1.0	2.8	0.0	10.0	0.9	11.9	1.5	18.3	11.7	11.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.96
Lane Grp Cap(c), veh/h	291	0	428	261	232	640	309	783	350	954	841	757
V/C Ratio(X)	0.33	0.00	0.06	0.20	0.00	0.44	0.09	0.72	0.11	0.86	0.46	0.46
Avail Cap(c_a), veh/h	351	0	455	261	232	640	393	881	394	1210	938	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	0.0	21.1	32.0	0.0	17.3	22.6	29.0	24.9	27.4	13.9	14.0
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.4	0.0	0.5	0.1	2.5	0.1	5.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	0.0	0.8	2.0	0.0	8.1	0.8	10.1	1.2	14.2	9.7	9.0
LnGrp Delay(d),s/veh	35.1	0.0	21.2	32.4	0.0	17.8	22.7	31.5	25.1	32.6	14.3	14.4
LnGrp LOS	D		C	C		B	C	C	C	C	B	B
Approach Vol, veh/h		123			332			628			1553	
Approach Delay, s/veh		32.0			20.1			30.7			24.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	23.8		28.6	7.2	44.5	12.6	16.0
Change Period (Y+Rc), s	5.5	6.0		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	28.5	20.0		24.0	6.5	43.0	8.5	10.0
Max Q Clear Time (g_c+I1), s	20.3	13.9		3.0	2.9	13.9	4.2	12.0
Green Ext Time (p_c), s	2.2	3.9		1.2	0.0	10.2	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	96	27	53	279	27	564	37	819	734
v/c Ratio	0.22	0.07	0.23	0.42	0.08	0.61	0.09	0.76	0.35
Control Delay	37.6	25.2	38.5	16.7	11.5	31.6	28.0	30.1	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	25.2	38.5	16.7	11.5	31.6	28.0	30.1	11.7
Queue Length 50th (ft)	26	11	28	92	5	153	17	212	102
Queue Length 95th (ft)	51	32	65	151	15	215	42	283	190
Internal Link Dist (ft)		316				946			1152
Turn Bay Length (ft)			150		100		200	700	
Base Capacity (vph)	444	551	228	849	369	1066	477	1460	2126
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.05	0.23	0.33	0.07	0.53	0.08	0.56	0.35

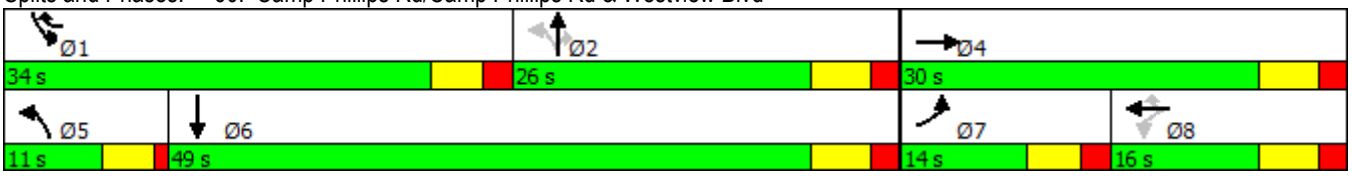
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	13.5	10.5	21.0	21.0	13.5	21.0	
Total Split (s)	14.0	30.0		16.0	16.0	34.0	11.0	26.0	26.0	34.0	49.0	
Total Split (%)	15.6%	33.3%		17.8%	17.8%	37.8%	12.2%	28.9%	28.9%	37.8%	54.4%	
Maximum Green (s)	8.5	24.0		10.0	10.0	28.5	6.5	20.0	20.0	28.5	43.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	5.5	4.5	6.0	6.0	5.5	6.0	
Lead/Lag	Lead			Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.7	18.0		11.1		31.2	27.7	19.2	19.2	23.3	47.3	
Actuated g/C Ratio	0.13	0.24		0.15		0.42	0.37	0.26	0.26	0.32	0.64	
v/c Ratio	0.22	0.07		0.23		0.42	0.08	0.61	0.09	0.76	0.35	
Control Delay	37.6	25.2		38.5		16.7	11.5	31.6	28.0	30.1	11.7	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.6	25.2		38.5		16.7	11.5	31.6	28.0	30.1	11.7	
LOS	D	C		D		B	B	C	C	C	B	
Approach Delay		34.9			20.2			30.5			21.4	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 73.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 24.0 — Intersection LOS: C
Intersection Capacity Utilization 60.6% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	25	50	0	525	25	530	70	770	375	315
Future Volume (vph)	90	0	25	50	0	525	25	530	70	770	375	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		0	100		200	700		0
Storage Lanes	2		0	1		1	1		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.932	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3303	1524	0	1770	1863	1583	1770	3539	1583	3400	3267	0
Flt Permitted	0.950			0.816			0.373			0.950		
Satd. Flow (perm)	3303	1524	0	1520	1863	1583	695	3539	1583	3400	3267	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			555			1026			1232	
Travel Time (s)		10.8			12.6			20.0			24.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	96	0	27	53	0	279	27	564	37	819	399	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	27	0	53	0	279	27	564	37	819	734	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	265	0	85	925	1575	0	0	1110	680
Future Volume (veh/h)	0	0	0	265	0	85	925	1575	0	0	1110	680
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1743	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				270	0	20	944	1607	0	0	1133	167
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				347	0	155	1234	2692	0	0	1215	544
Arrive On Green				0.10	0.00	0.10	0.73	1.00	0.00	0.00	0.35	0.35
Sat Flow, veh/h				3320	0	1482	3375	3563	0	0	3563	1553
Grp Volume(v), veh/h				270	0	20	944	1607	0	0	1133	167
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1688	1736	0	0	1736	1553
Q Serve(g_s), s				7.9	0.0	1.2	17.1	0.0	0.0	0.0	31.5	7.8
Cycle Q Clear(g_c), s				7.9	0.0	1.2	17.1	0.0	0.0	0.0	31.5	7.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				347	0	155	1234	2692	0	0	1215	544
V/C Ratio(X)				0.78	0.00	0.13	0.76	0.60	0.00	0.00	0.93	0.31
Avail Cap(c_a), veh/h				531	0	237	1234	2692	0	0	1215	544
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.16	0.16	0.00	0.00	0.21	0.21
Uniform Delay (d), s/veh				43.7	0.0	40.7	10.8	0.0	0.0	0.0	31.4	23.7
Incr Delay (d2), s/veh				4.0	0.0	0.4	0.5	0.2	0.0	0.0	3.8	0.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				6.9	0.0	0.9	9.5	0.1	0.0	0.0	18.8	4.8
LnGrp Delay(d),s/veh				47.7	0.0	41.0	11.3	0.2	0.0	0.0	35.2	24.0
LnGrp LOS				D		D	B	A			D	C
Approach Vol, veh/h					290			2551			1300	
Approach Delay, s/veh					47.2			4.3			33.8	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		83.6			42.6	41.0		16.4
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		72.0			31.0	35.0		16.0
Max Q Clear Time (g_c+I1), s		2.0			19.1	33.5		9.9
Green Ext Time (p_c), s		33.9			10.0	1.1		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	16.5
HCM 2010 LOS	B

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	135	135	43	944	1607	1133	347
v/c Ratio	0.64	0.64	0.22	0.91	0.62	0.87	0.60
Control Delay	54.7	54.7	40.2	17.5	3.9	38.3	31.0
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	54.7	54.7	40.2	17.5	4.2	38.3	31.0
Queue Length 50th (ft)	86	86	25	199	18	349	176
Queue Length 95th (ft)	149	149	56	m201	m287	#499	283
Internal Link Dist (ft)		701			658	899	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	251	251	237	1043	2587	1303	582
Starvation Cap Reductn	0	0	0	0	346	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.54	0.18	0.91	0.72	0.87	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

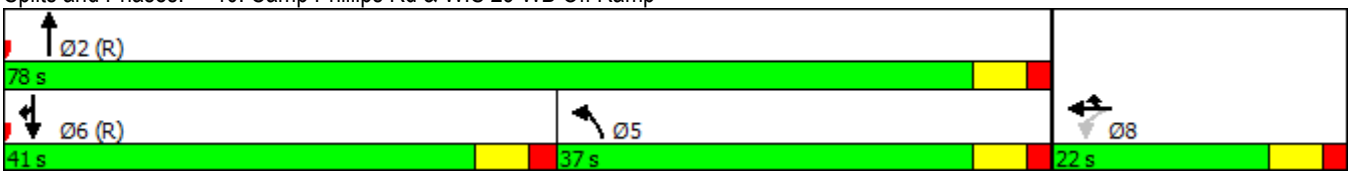
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	14.0	24.0			22.5	22.5
Total Split (s)				22.0	22.0	22.0	37.0	78.0			41.0	41.0
Total Split (%)				22.0%	22.0%	22.0%	37.0%	78.0%			41.0%	41.0%
Maximum Green (s)				16.0	16.0	16.0	31.0	72.0			35.0	35.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				13.5	13.5	13.5	31.0	74.5			37.5	37.5
Actuated g/C Ratio				0.14	0.14	0.14	0.31	0.74			0.38	0.38
v/c Ratio				0.64	0.64	0.22	0.91	0.62			0.87	0.60
Control Delay				54.7	54.7	40.2	17.5	3.9			38.3	31.0
Queue Delay				0.0	0.0	0.0	0.0	0.3			0.0	0.0
Total Delay				54.7	54.7	40.2	17.5	4.2			38.3	31.0
LOS				D	D	D	B	A			D	C
Approach Delay					52.7			9.1			36.6	
Approach LOS					D			A			D	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 21.6 Intersection LOS: C
Intersection Capacity Utilization 92.5% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	265	0	85	925	1575	0	0	1110	680
Future Volume (vph)	0	0	0	265	0	85	925	1575	0	0	1110	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1573	1573	1482	3367	3471	0	0	3471	1553
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1573	1573	1482	3367	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	270	0	43	944	1607	0	0	1133	347
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	135	135	43	944	1607	0	0	1133	347
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	730	0	765	0	0	0	0	1770	315	150	1225	0
Future Volume (veh/h)	730	0	765	0	0	0	0	1770	315	150	1225	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	737	0	309				0	1788	136	152	1237	0
Adj No. of Lanes	2	0	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	829	0	370				0	1805	807	207	2287	0
Arrive On Green	0.23	0.00	0.23				0.00	0.51	0.51	0.15	1.00	0.00
Sat Flow, veh/h	3548	0	1583				0	3632	1583	1774	3632	0
Grp Volume(v), veh/h	737	0	309				0	1788	136	152	1237	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1770	1583	1774	1770	0
Q Serve(g_s), s	20.1	0.0	18.6				0.0	50.0	4.6	3.9	0.0	0.0
Cycle Q Clear(g_c), s	20.1	0.0	18.6				0.0	50.0	4.6	3.9	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	829	0	370				0	1805	807	207	2287	0
V/C Ratio(X)	0.89	0.00	0.83				0.00	0.99	0.17	0.73	0.54	0.00
Avail Cap(c_a), veh/h	887	0	396				0	1805	807	207	2287	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.40	0.40	0.42	0.42	0.00
Uniform Delay (d), s/veh	37.1	0.0	36.5				0.0	24.3	13.1	39.9	0.0	0.0
Incr Delay (d2), s/veh	10.5	0.0	13.6				0.0	11.4	0.2	5.6	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	16.5	0.0	14.6				0.0	32.6	3.5	6.4	0.2	0.0
LnGrp Delay(d),s/veh	47.6	0.0	50.1				0.0	35.6	13.3	45.5	0.4	0.0
LnGrp LOS	D		D					D	B	D	A	
Approach Vol, veh/h		1046						1924			1389	
Approach Delay, s/veh		48.3						34.1			5.3	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	13.6	57.0		29.4		70.6		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	51.0		25.0		63.0		
Max Q Clear Time (g_c+I1), s	5.9	52.0		22.1		2.0		
Green Ext Time (p_c), s	0.1	0.0		1.3		13.5		

Intersection Summary	
HCM 2010 Ctrl Delay	28.3
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	368	369	386	1788	159	152	1237
v/c Ratio	0.88	0.88	0.98	0.99	0.20	0.84	0.55
Control Delay	59.1	59.4	78.7	44.3	14.2	48.8	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.1	59.4	78.7	44.3	14.2	48.8	6.9
Queue Length 50th (ft)	237	237	245	568	53	72	97
Queue Length 95th (ft)	#408	#411	#432	#760	91	m90	m112
Internal Link Dist (ft)		918		1163			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	420	420	395	1804	807	180	2229
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.88	0.98	0.99	0.20	0.84	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2	2	1	6	
Permitted Phases	4									6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	31.0	31.0	31.0					57.0	57.0	12.0	69.0	
Total Split (%)	31.0%	31.0%	31.0%					57.0%	57.0%	12.0%	69.0%	
Maximum Green (s)	25.0	25.0	25.0					51.0	51.0	6.0	63.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	25.0	25.0	25.0					51.0	51.0	63.0	63.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.51	0.51	0.63	0.63	
v/c Ratio	0.88	0.88	0.98					0.99	0.20	0.84	0.55	
Control Delay	59.1	59.4	78.7					44.3	14.2	48.8	6.9	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	59.1	59.4	78.7					44.3	14.2	48.8	6.9	
LOS	E	E	E					D	B	D	A	
Approach Delay		66.0						41.8			11.5	
Approach LOS		E						D			B	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 10 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 38.5 Intersection LOS: D
Intersection Capacity Utilization 92.5% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	0	765	0	0	0	0	1770	315	150	1225	0
Future Volume (vph)	730	0	765	0	0	0	0	1770	315	150	1225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.070		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	3539	1583	130	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1243			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	737	0	386	0	0	0	0	1788	159	152	1237	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	368	369	386	0	0	0	0	1788	159	152	1237	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Prot	pm+pt	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	0	35	115	0	1315	30	570	110	1245	570	175
Future Volume (veh/h)	200	0	35	115	0	1315	30	570	110	1245	570	175
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	211	0	37	121	0	692	32	600	58	1311	600	184
Adj No. of Lanes	2	1	0	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	0	380	213	190	768	137	683	306	1319	1485	454
Arrive On Green	0.08	0.00	0.24	0.10	0.00	0.10	0.04	0.19	0.19	0.38	0.56	0.56
Sat Flow, veh/h	3442	0	1583	1365	1863	1583	1774	3539	1583	3442	2671	817
Grp Volume(v), veh/h	211	0	37	121	0	692	32	600	58	1311	397	387
Grp Sat Flow(s),veh/h/ln	1721	0	1583	1365	1863	1583	1774	1770	1583	1721	1770	1718
Q Serve(g_s), s	5.9	0.0	1.8	8.5	0.0	10.0	1.5	16.1	3.0	37.1	12.6	12.6
Cycle Q Clear(g_c), s	5.9	0.0	1.8	8.5	0.0	10.0	1.5	16.1	3.0	37.1	12.6	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	280	0	380	213	190	768	137	683	306	1319	984	955
V/C Ratio(X)	0.75	0.00	0.10	0.57	0.00	0.90	0.23	0.88	0.19	0.99	0.40	0.40
Avail Cap(c_a), veh/h	334	0	404	213	190	768	191	723	324	1319	984	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	0.0	29.0	43.3	0.0	7.5	35.4	38.4	33.1	30.1	12.4	12.5
Incr Delay (d2), s/veh	7.7	0.0	0.1	3.5	0.0	13.7	0.9	11.5	0.3	23.3	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.6	0.0	1.4	6.2	0.0	16.9	1.4	13.8	2.4	29.4	10.2	10.0
LnGrp Delay(d),s/veh	51.7	0.0	29.1	46.8	0.0	21.2	36.3	49.8	33.4	53.4	12.7	12.7
LnGrp LOS	D		C	D		C	D	D	C	D	B	B
Approach Vol, veh/h		248			813			690			2095	
Approach Delay, s/veh		48.3			25.1			47.8			38.2	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	43.5	24.9		29.5	8.0	60.4	13.5	16.0
Change Period (Y+Rc), s	6.0	* 6		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	37.5	* 20		25.0	6.5	52.0	9.5	10.0
Max Q Clear Time (g_c+I1), s	39.1	18.1		3.8	3.5	14.6	7.9	12.0
Green Ext Time (p_c), s	0.0	0.8		3.5	0.0	14.7	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.8
HCM 2010 LOS	D

Notes

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	211	37	121	692	32	600	58	1311	784
v/c Ratio	0.66	0.09	0.88	0.90	0.17	0.87	0.19	1.01	0.41
Control Delay	54.2	29.7	96.6	33.9	33.9	53.2	35.2	58.9	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	29.7	96.6	33.9	33.9	53.2	35.2	58.9	13.9
Queue Length 50th (ft)	68	18	77	266	16	195	31	~442	156
Queue Length 95th (ft)	106	44	#185	#516	42	#283	67	#589	203
Internal Link Dist (ft)		316				933			1163
Turn Bay Length (ft)			150		100		200	450	
Base Capacity (vph)	329	399	137	766	186	714	319	1299	1923
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.09	0.88	0.90	0.17	0.84	0.18	1.01	0.41

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

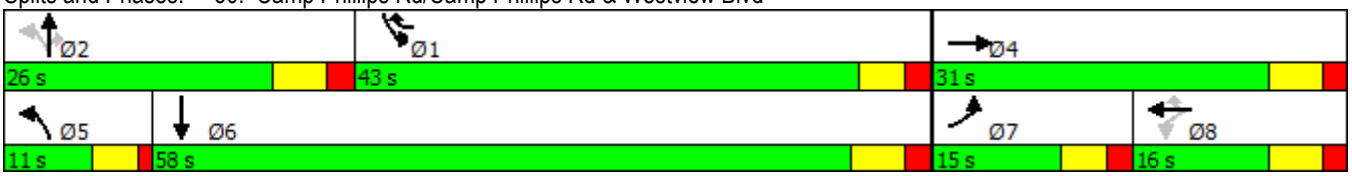
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	13.5	10.5	21.0	21.0	13.5	21.0	
Total Split (s)	15.0	31.0		16.0	16.0	43.0	11.0	26.0	26.0	43.0	58.0	
Total Split (%)	15.0%	31.0%		16.0%	16.0%	43.0%	11.0%	26.0%	26.0%	43.0%	58.0%	
Maximum Green (s)	9.5	25.0		10.0	10.0	37.5	6.5	20.0	20.0	37.5	52.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	5.5	4.5	6.0	6.0	5.5	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.2	24.7		10.0		48.0	20.8	19.3	19.3	37.5	55.8	
Actuated g/C Ratio	0.09	0.25		0.10		0.48	0.21	0.19	0.19	0.38	0.56	
v/c Ratio	0.66	0.09		0.88		0.90	0.17	0.87	0.19	1.01	0.41	
Control Delay	54.2	29.7		96.6		33.9	33.9	53.2	35.2	58.9	13.9	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.2	29.7		96.6		33.9	33.9	53.2	35.2	58.9	13.9	
LOS	D	C		F		C	C	D	D	E	B	
Approach Delay		50.6			43.2			50.8			42.1	
Approach LOS		D			D			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 99.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 44.4 — Intersection LOS: D
Intersection Capacity Utilization 78.9% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	0	35	115	0	1315	30	570	110	1245	570	175
Future Volume (vph)	200	0	35	115	0	1315	30	570	110	1245	570	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		0	100		200	450		200
Storage Lanes	2		0	1		1	1		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1583	0	1770	1863	1583	1770	3539	1583	3433	3415	0
Flt Permitted	0.950			0.733			0.260			0.950		
Satd. Flow (perm)	3433	1583	0	1365	1863	1583	484	3539	1583	3433	3415	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			498			1013			1243	
Travel Time (s)		10.8			11.3			19.7			24.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	211	0	37	121	0	692	32	600	58	1311	600	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	37	0	121	0	692	32	600	58	1311	784	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	
Protected Phases	7	4			8	1	5	2		1	6	

Appendix F:
Transportation System Improvements with Build Traffic Operational Analysis

2030 Full Build Transportation System Improvements – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	295	0	185	650	945	0	0	945	765
Future Volume (veh/h)	0	0	0	295	0	185	650	945	0	0	945	765
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				311	0	54	684	995	0	0	995	219
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				407	0	182	768	2537	0	0	1537	688
Arrive On Green				0.11	0.00	0.11	0.08	0.25	0.00	0.00	0.45	0.45
Sat Flow, veh/h				3548	0	1583	3281	3463	0	0	3495	1524
Grp Volume(v), veh/h				311	0	54	684	995	0	0	995	219
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1640	1687	0	0	1703	1524
Q Serve(g_s), s				7.7	0.0	2.8	18.6	22.1	0.0	0.0	20.4	8.3
Cycle Q Clear(g_c), s				7.7	0.0	2.8	18.6	22.1	0.0	0.0	20.4	8.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				407	0	182	768	2537	0	0	1537	688
V/C Ratio(X)				0.76	0.00	0.30	0.89	0.39	0.00	0.00	0.65	0.32
Avail Cap(c_a), veh/h				631	0	281	802	2537	0	0	1537	688
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.84	0.84	0.00	0.00	0.24	0.24
Uniform Delay (d), s/veh				38.6	0.0	36.5	40.4	16.7	0.0	0.0	19.1	15.8
Incr Delay (d2), s/veh				3.0	0.0	0.9	10.2	0.4	0.0	0.0	0.5	0.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				7.1	0.0	2.3	14.2	15.4	0.0	0.0	12.2	5.0
LnGrp Delay(d),s/veh				41.6	0.0	37.4	50.6	17.1	0.0	0.0	19.7	16.1
LnGrp LOS				D		D	D	B			B	B
Approach Vol, veh/h					365			1679			1214	
Approach Delay, s/veh					41.0			30.8			19.0	
Approach LOS					D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		73.7			27.1	46.6		16.3
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		62.0			22.0	34.0		16.0
Max Q Clear Time (g_c+I1), s		24.1			20.6	22.4		9.7
Green Ext Time (p_c), s		22.8			0.5	9.4		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	155	156	97	684	995	995	403
v/c Ratio	0.62	0.63	0.41	0.86	0.41	0.71	0.65
Control Delay	47.0	47.2	39.7	24.2	6.4	26.5	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	47.2	39.7	24.2	6.4	26.5	28.3
Queue Length 50th (ft)	88	88	51	108	98	255	190
Queue Length 95th (ft)	150	150	95	#258	137	334	300
Internal Link Dist (ft)		701			658	899	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	298	298	281	818	2424	1392	623
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.52	0.35	0.84	0.41	0.71	0.65

Intersection Summary

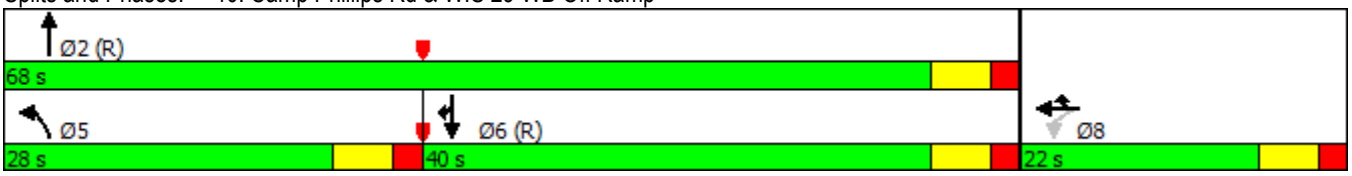
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	14.0	24.0			22.5	22.5
Total Split (s)				22.0	22.0	22.0	28.0	68.0			40.0	40.0
Total Split (%)				24.4%	24.4%	24.4%	31.1%	75.6%			44.4%	44.4%
Maximum Green (s)				16.0	16.0	16.0	22.0	62.0			34.0	34.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				13.3	13.3	13.3	21.9	64.7			36.8	36.8
Actuated g/C Ratio				0.15	0.15	0.15	0.24	0.72			0.41	0.41
v/c Ratio				0.62	0.63	0.41	0.86	0.41			0.71	0.65
Control Delay				47.0	47.2	39.7	24.2	6.4			26.5	28.3
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				47.0	47.2	39.7	24.2	6.4			26.5	28.3
LOS				D	D	D	C	A			C	C
Approach Delay					45.3			13.7			27.0	
Approach LOS					D			B			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 22.7 Intersection LOS: C
Intersection Capacity Utilization 68.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	295	0	185	650	945	0	0	945	765
Future Volume (vph)	0	0	0	295	0	185	650	945	0	0	945	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1681	1681	1583	3273	3374	0	0	3406	1524
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1681	1681	1583	3273	3374	0	0	3406	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	311	0	97	684	995	0	0	995	403
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	155	156	97	684	995	0	0	995	403
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Right	Right	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	375	0	705	0	0	0	0	1220	180	65	1175	0
Future Volume (veh/h)	375	0	705	0	0	0	0	1220	180	65	1175	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	417	0	319				0	1356	83	72	1306	0
Adj No. of Lanes	2	0	1				0	3	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	798	0	356				0	2585	805	301	2232	0
Arrive On Green	0.24	0.00	0.24				0.00	0.51	0.51	0.02	0.21	0.00
Sat Flow, veh/h	3382	0	1509				0	5253	1583	1774	3632	0
Grp Volume(v), veh/h	417	0	319				0	1356	83	72	1306	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1695	1583	1774	1770	0
Q Serve(g_s), s	9.7	0.0	18.4				0.0	16.1	2.4	1.6	29.9	0.0
Cycle Q Clear(g_c), s	9.7	0.0	18.4				0.0	16.1	2.4	1.6	29.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	798	0	356				0	2585	805	301	2232	0
V/C Ratio(X)	0.52	0.00	0.90				0.00	0.52	0.10	0.24	0.59	0.00
Avail Cap(c_a), veh/h	864	0	386				0	2585	805	320	2232	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.89	0.89	0.65	0.65	0.00
Uniform Delay (d), s/veh	30.0	0.0	33.3				0.0	14.8	11.5	10.7	25.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	21.6				0.0	0.7	0.2	0.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.1	0.0	14.9				0.0	12.0	2.0	1.4	20.1	0.0
LnGrp Delay(d),s/veh	30.5	0.0	55.0				0.0	15.5	11.7	11.0	25.7	0.0
LnGrp LOS	C		D					B	B	B	C	
Approach Vol, veh/h		736						1439			1378	
Approach Delay, s/veh		41.1						15.3			25.0	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.0	51.8		27.2		62.8		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	43.0		23.0		55.0		
Max Q Clear Time (g_c+I1), s	3.6	18.1		20.4		31.9		
Green Ext Time (p_c), s	0.0	20.6		0.8		19.3		

Intersection Summary	
HCM 2010 Ctrl Delay	24.4
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	208	209	392	1356	100	72	1306
v/c Ratio	0.51	0.51	1.02	0.53	0.13	0.30	0.60
Control Delay	33.8	33.9	86.0	12.4	10.7	5.9	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	33.9	86.0	12.4	10.7	5.9	2.4
Queue Length 50th (ft)	106	107	~230	108	18	1	8
Queue Length 95th (ft)	180	181	#413	154	40	m1	16
Internal Link Dist (ft)		918		1164			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	409	409	385	2565	798	242	2162
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.51	1.02	0.53	0.13	0.30	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

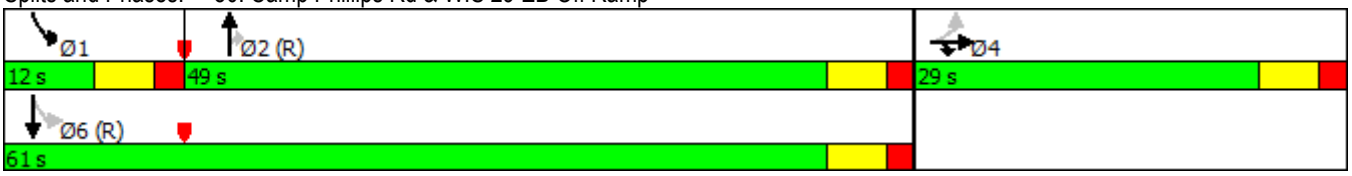
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2		1	6	
Permitted Phases	4								2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	29.0	29.0	29.0					49.0	49.0	12.0	61.0	
Total Split (%)	32.2%	32.2%	32.2%					54.4%	54.4%	13.3%	67.8%	
Maximum Green (s)	23.0	23.0	23.0					43.0	43.0	6.0	55.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	23.0	23.0	23.0					45.4	45.4	55.0	55.0	
Actuated g/C Ratio	0.26	0.26	0.26					0.50	0.50	0.61	0.61	
v/c Ratio	0.51	0.51	1.02					0.53	0.13	0.30	0.60	
Control Delay	33.8	33.9	86.0					12.4	10.7	5.9	2.4	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	33.8	33.9	86.0					12.4	10.7	5.9	2.4	
LOS	C	C	F					B	B	A	A	
Approach Delay		59.1						12.3			2.6	
Approach LOS		E						B			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 24 (27%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 19.0 Intersection LOS: B
Intersection Capacity Utilization 68.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	375	0	705	0	0	0	0	1220	180	65	1175	0
Future Volume (vph)	375	0	705	0	0	0	0	1220	180	65	1175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	5085	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.123		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	5085	1583	229	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1244			738	
Travel Time (s)		19.4			12.0			24.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	417	0	392	0	0	0	0	1356	100	72	1306	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	208	209	392	0	0	0	0	1356	100	72	1306	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			18			18	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Perm	pm+pt	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	0	30	50	0	635	30	660	70	1000	505	375
Future Volume (veh/h)	105	0	30	50	0	635	30	660	70	1000	505	375
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900	1863	1863	1863	1863	1863	1863	1845	1845	1900
Adj Flow Rate, veh/h	112	0	32	53	0	473	32	702	37	1064	537	399
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	276	0	390	232	207	1362	154	848	264	1287	1006	748
Arrive On Green	0.08	0.00	0.26	0.11	0.00	0.11	0.04	0.17	0.17	0.63	0.88	0.88
Sat Flow, veh/h	3312	0	1524	1372	1863	2787	1774	5085	1583	3408	1919	1426
Grp Volume(v), veh/h	112	0	32	53	0	473	32	702	37	1064	490	446
Grp Sat Flow(s),veh/h/ln	1656	0	1524	1372	1863	1393	1774	1695	1583	1704	1752	1593
Q Serve(g_s), s	2.9	0.0	1.4	3.2	0.0	2.7	1.4	12.0	1.8	21.7	5.9	5.9
Cycle Q Clear(g_c), s	2.9	0.0	1.4	3.2	0.0	2.7	1.4	12.0	1.8	21.7	5.9	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.90
Lane Grp Cap(c), veh/h	276	0	390	232	207	1362	154	848	264	1287	919	835
V/C Ratio(X)	0.41	0.00	0.08	0.23	0.00	0.35	0.21	0.83	0.14	0.83	0.53	0.53
Avail Cap(c_a), veh/h	313	0	406	232	207	1362	217	848	264	1287	919	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.89	0.89	0.89	0.65	0.65	0.65
Uniform Delay (d), s/veh	39.1	0.0	25.5	37.0	0.0	4.1	34.3	36.3	32.0	14.3	3.0	3.0
Incr Delay (d2), s/veh	1.0	0.0	0.1	0.5	0.0	0.2	0.6	8.2	1.0	3.0	1.4	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.4	0.0	1.1	2.3	0.0	3.0	1.3	10.1	1.5	14.6	5.1	4.7
LnGrp Delay(d),s/veh	40.1	0.0	25.6	37.5	0.0	4.2	34.9	44.5	33.0	17.4	4.5	4.6
LnGrp LOS	D		C	D		A	C	D	C	B	A	A
Approach Vol, veh/h		144			526			771			2000	
Approach Delay, s/veh		36.8			7.6			43.5			11.4	
Approach LOS		D			A			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	40.0	21.0		29.0	7.8	53.2	13.0	16.0
Change Period (Y+Rc), s	6.0	6.0		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	33.0	15.0		24.0	6.5	43.0	8.5	10.0
Max Q Clear Time (g_c+I1), s	23.7	14.0		3.4	3.4	7.9	4.9	5.2
Green Ext Time (p_c), s	6.3	0.5		2.3	0.0	14.3	0.1	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	112	32	53	473	32	702	37	1064	936
v/c Ratio	0.35	0.10	0.35	0.40	0.14	0.50	0.09	0.88	0.45
Control Delay	41.3	26.7	44.0	13.1	31.4	32.5	32.0	32.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	26.7	44.0	13.1	31.4	32.5	32.0	32.8	10.8
Queue Length 50th (ft)	31	14	28	47	15	142	18	291	171
Queue Length 95th (ft)	57	36	65	67	40	#199	46	m361	m223
Internal Link Dist (ft)		316				933			1164
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	326	406	152	1207	232	1400	435	1246	2092
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.08	0.35	0.39	0.14	0.50	0.09	0.85	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

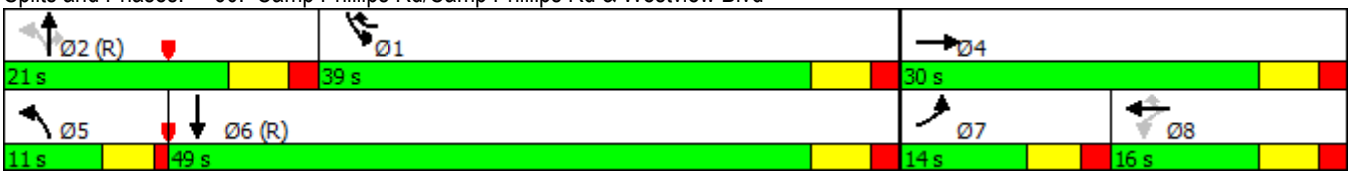
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	14.0	10.5	21.0	21.0	14.0	21.0	
Total Split (s)	14.0	30.0		16.0	16.0	39.0	11.0	21.0	21.0	39.0	49.0	
Total Split (%)	15.6%	33.3%		17.8%	17.8%	43.3%	12.2%	23.3%	23.3%	43.3%	54.4%	
Maximum Green (s)	8.5	24.0		10.0	10.0	33.0	6.5	15.0	15.0	33.0	43.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min	C-Min	None	C-Min	
Act Effct Green (s)	8.8	18.4		10.0		38.0	26.3	24.8	24.8	32.0	57.4	
Actuated g/C Ratio	0.10	0.20		0.11		0.42	0.29	0.28	0.28	0.36	0.64	
v/c Ratio	0.35	0.10		0.35		0.40	0.14	0.50	0.09	0.88	0.45	
Control Delay	41.3	26.7		44.0		13.1	31.4	32.5	32.0	32.8	10.8	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.3	26.7		44.0		13.1	31.4	32.5	32.0	32.8	10.8	
LOS	D	C		D		B	C	C	C	C	B	
Approach Delay		38.0			16.2			32.5			22.5	
Approach LOS		D			B			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 24.4 Intersection LOS: C
Intersection Capacity Utilization 65.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	0	30	50	0	635	30	660	70	1000	505	375
Future Volume (vph)	105	0	30	50	0	635	30	660	70	1000	505	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		0
Storage Lanes	2		0	1		1	1		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3303	1524	0	1770	1863	2787	1770	5085	1583	3400	3281	0
Flt Permitted	0.950			0.736			0.256			0.950		
Satd. Flow (perm)	3303	1524	0	1371	1863	2787	477	5085	1583	3400	3281	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			616			1013			1244	
Travel Time (s)		10.8			14.0			19.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	112	0	32	53	0	473	32	702	37	1064	537	399
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	32	0	53	0	473	32	702	37	1064	936	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Future Volume (veh/h)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1743	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				306	0	28	1107	1949	0	0	1301	203
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				374	0	167	1114	2664	0	0	1310	586
Arrive On Green				0.11	0.00	0.11	0.66	1.00	0.00	0.00	0.38	0.38
Sat Flow, veh/h				3320	0	1482	3375	3563	0	0	3563	1553
Grp Volume(v), veh/h				306	0	28	1107	1949	0	0	1301	203
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1688	1736	0	0	1736	1553
Q Serve(g_s), s				9.0	0.0	1.7	32.4	0.0	0.0	0.0	37.3	9.4
Cycle Q Clear(g_c), s				9.0	0.0	1.7	32.4	0.0	0.0	0.0	37.3	9.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				374	0	167	1114	2664	0	0	1310	586
V/C Ratio(X)				0.82	0.00	0.17	0.99	0.73	0.00	0.00	0.99	0.35
Avail Cap(c_a), veh/h				432	0	193	1114	2664	0	0	1310	586
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.31	0.31	0.00	0.00	0.23	0.23
Uniform Delay (d), s/veh				43.4	0.0	40.1	16.9	0.0	0.0	0.0	31.0	22.3
Incr Delay (d2), s/veh				10.5	0.0	0.5	13.6	0.6	0.0	0.0	10.5	0.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.2	0.0	1.3	20.3	0.4	0.0	0.0	23.3	5.7
LnGrp Delay(d),s/veh				53.8	0.0	40.6	30.5	0.6	0.0	0.0	41.5	22.7
LnGrp LOS				D		D	C	A			D	C
Approach Vol, veh/h					334			3056			1504	
Approach Delay, s/veh					52.7			11.4			39.0	
Approach LOS					D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		82.7			39.0	43.7		17.3
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		75.0			33.0	36.0		13.0
Max Q Clear Time (g_c+I1), s		2.0			34.4	39.3		11.0
Green Ext Time (p_c), s		60.9			0.0	0.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	153	51	1107	1949	1301	383
v/c Ratio	0.78	0.78	0.28	0.98	0.74	1.04	0.69
Control Delay	70.1	70.1	43.7	28.1	2.6	69.4	34.7
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	70.1	70.1	43.7	28.1	2.7	69.4	34.7
Queue Length 50th (ft)	100	100	30	155	20	~474	205
Queue Length 95th (ft)	#204	#204	66	m#414	m88	#608	313
Internal Link Dist (ft)		701			658	899	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	204	204	192	1131	2624	1249	559
Starvation Cap Reductn	0	0	0	0	60	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.75	0.27	0.98	0.76	1.04	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

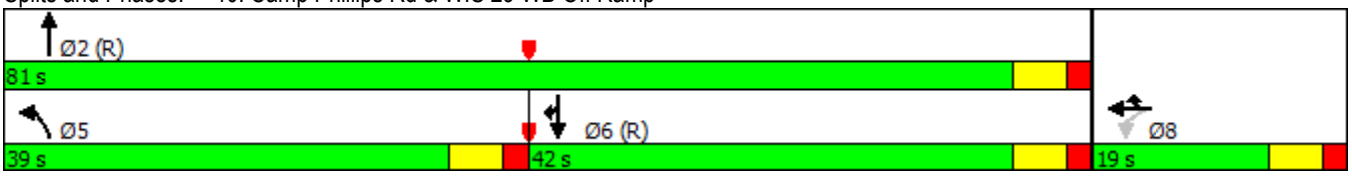
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	14.0	24.0			22.5	22.5
Total Split (s)				19.0	19.0	19.0	39.0	81.0			42.0	42.0
Total Split (%)				19.0%	19.0%	19.0%	39.0%	81.0%			42.0%	42.0%
Maximum Green (s)				13.0	13.0	13.0	33.0	75.0			36.0	36.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				12.4	12.4	12.4	33.6	75.6			36.0	36.0
Actuated g/C Ratio				0.12	0.12	0.12	0.34	0.76			0.36	0.36
v/c Ratio				0.78	0.78	0.28	0.98	0.74			1.04	0.69
Control Delay				70.1	70.1	43.7	28.1	2.6			69.4	34.7
Queue Delay				0.0	0.0	0.0	0.0	0.1			0.0	0.0
Total Delay				70.1	70.1	43.7	28.1	2.7			69.4	34.7
LOS				E	E	D	C	A			E	C
Approach Delay					66.3			11.9			61.5	
Approach LOS					E			B			E	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 32.1 Intersection LOS: C
Intersection Capacity Utilization 89.5% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Future Volume (vph)	0	0	0	300	0	100	1085	1910	0	0	1275	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1573	1573	1482	3367	3471	0	0	3471	1553
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1573	1573	1482	3367	3471	0	0	3471	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		12.0			15.2			14.4			19.1	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	306	0	51	1107	1949	0	0	1301	383
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	153	153	51	1107	1949	0	0	1301	383
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	830	0	855	0	0	0	0	2165	380	160	1415	0
Future Volume (veh/h)	830	0	855	0	0	0	0	2165	380	160	1415	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	838	0	355				0	2187	169	162	1429	0
Adj No. of Lanes	2	0	1				0	3	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	957	0	427				0	2562	798	201	2160	0
Arrive On Green	0.27	0.00	0.27				0.00	0.50	0.50	0.08	0.81	0.00
Sat Flow, veh/h	3548	0	1583				0	5253	1583	1774	3632	0
Grp Volume(v), veh/h	838	0	355				0	2187	169	162	1429	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1695	1583	1774	1770	0
Q Serve(g_s), s	22.6	0.0	21.1				0.0	37.4	5.9	4.2	16.4	0.0
Cycle Q Clear(g_c), s	22.6	0.0	21.1				0.0	37.4	5.9	4.2	16.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	957	0	427				0	2562	798	201	2160	0
V/C Ratio(X)	0.88	0.00	0.83				0.00	0.85	0.21	0.81	0.66	0.00
Avail Cap(c_a), veh/h	1064	0	475				0	2562	798	207	2160	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.44	0.44	0.09	0.09	0.00
Uniform Delay (d), s/veh	34.9	0.0	34.4				0.0	21.6	13.8	21.9	5.2	0.0
Incr Delay (d2), s/veh	7.8	0.0	11.0				0.0	1.7	0.3	2.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.8	0.0	15.8				0.0	22.4	4.4	3.2	9.1	0.0
LnGrp Delay(d),s/veh	42.7	0.0	45.4				0.0	23.3	14.0	24.1	5.4	0.0
LnGrp LOS	D		D					C	B	C	A	
Approach Vol, veh/h		1193						2356			1591	
Approach Delay, s/veh		43.5						22.7			7.3	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	10.7	56.4		33.0		67.0		
Change Period (Y+Rc), s	4.5	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.5	47.0		30.0		58.0		
Max Q Clear Time (g_c+I1), s	6.2	39.4		24.6		18.4		
Green Ext Time (p_c), s	0.0	7.4		2.4		36.9		

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	419	419	432	2187	192	162	1429
v/c Ratio	0.85	0.85	0.93	0.91	0.26	0.82	0.69
Control Delay	50.6	50.6	62.9	31.6	17.1	19.0	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	50.6	62.9	31.6	17.1	19.0	12.8
Queue Length 50th (ft)	261	261	264	458	71	41	412
Queue Length 95th (ft)	#430	#430	#448	536	119	m38	m411
Internal Link Dist (ft)		918		1139			658
Turn Bay Length (ft)	500		325		225	180	
Base Capacity (vph)	504	504	474	2400	747	197	2073
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.83	0.91	0.91	0.26	0.82	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

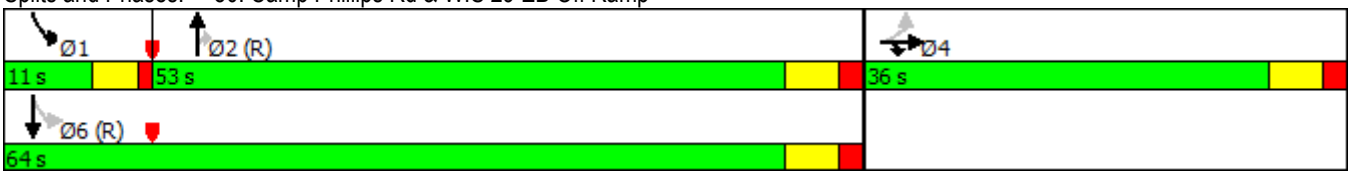
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2		1	6	
Permitted Phases	4								2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	10.5	21.0	
Total Split (s)	36.0	36.0	36.0					53.0	53.0	11.0	64.0	
Total Split (%)	36.0%	36.0%	36.0%					53.0%	53.0%	11.0%	64.0%	
Maximum Green (s)	30.0	30.0	30.0					47.0	47.0	6.5	58.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	4.5	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	29.4	29.4	29.4					47.2	47.2	60.1	58.6	
Actuated g/C Ratio	0.29	0.29	0.29					0.47	0.47	0.60	0.59	
v/c Ratio	0.85	0.85	0.93					0.91	0.26	0.82	0.69	
Control Delay	50.6	50.6	62.9					31.6	17.1	19.0	12.8	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	50.6	50.6	62.9					31.6	17.1	19.0	12.8	
LOS	D	D	E					C	B	B	B	
Approach Delay		54.8						30.4			13.4	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 41 (41%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 31.2 Intersection LOS: C
Intersection Capacity Utilization 89.5% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	830	0	855	0	0	0	0	2165	380	160	1415	0
Future Volume (vph)	830	0	855	0	0	0	0	2165	380	160	1415	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	5085	1583	1770	3539	0
Flt Permitted	0.950	0.950								0.077		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	5085	1583	143	3539	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1219			738	
Travel Time (s)		19.4			12.0			23.7			14.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	838	0	432	0	0	0	0	2187	192	162	1429	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	419	419	432	0	0	0	0	2187	192	162	1429	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			18			18	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Perm	pm+pt	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	0	40	115	0	1550	35	750	110	1360	705	205
Future Volume (veh/h)	245	0	40	115	0	1550	35	750	110	1360	705	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	258	0	42	121	0	1142	37	789	58	1432	742	216
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	0	168	322	150	1388	141	870	271	1437	1529	445
Arrive On Green	0.09	0.00	0.11	0.08	0.00	0.08	0.04	0.17	0.17	0.42	0.56	0.56
Sat Flow, veh/h	3442	0	1583	1774	1863	2787	1774	5085	1583	3442	2706	788
Grp Volume(v), veh/h	258	0	42	121	0	1142	37	789	58	1432	485	473
Grp Sat Flow(s),veh/h/ln	1721	0	1583	1774	1863	1393	1774	1695	1583	1721	1770	1724
Q Serve(g_s), s	7.3	0.0	2.4	6.1	0.0	8.0	1.8	15.1	2.4	41.3	16.3	16.3
Cycle Q Clear(g_c), s	7.3	0.0	2.4	6.1	0.0	8.0	1.8	15.1	2.4	41.3	16.3	16.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.46
Lane Grp Cap(c), veh/h	326	0	168	322	150	1388	141	870	271	1437	1000	974
V/C Ratio(X)	0.79	0.00	0.25	0.38	0.00	0.82	0.26	0.91	0.21	1.00	0.49	0.49
Avail Cap(c_a), veh/h	364	0	168	351	150	1388	180	870	271	1437	1000	974
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	0.0	40.8	37.7	0.0	7.7	37.6	40.4	21.4	28.9	13.0	13.0
Incr Delay (d2), s/veh	10.4	0.0	0.8	0.7	0.0	4.1	1.0	13.1	0.4	22.9	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.1	0.0	2.0	5.4	0.0	16.2	1.7	12.8	2.4	32.1	12.7	12.4
LnGrp Delay(d),s/veh	54.4	0.0	41.6	38.4	0.0	11.9	38.6	53.6	21.8	51.8	13.3	13.3
LnGrp LOS	D		D	D		B	D	D	C	D	B	B
Approach Vol, veh/h		300			1263			884			2390	
Approach Delay, s/veh		52.6			14.4			50.9			36.4	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	47.5	23.0	12.4	16.5	8.3	62.2	14.9	14.0
Change Period (Y+Rc), s	6.0	* 6	4.5	6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	41.5	* 17	9.5	10.0	6.0	53.5	10.5	8.0
Max Q Clear Time (g_c+I1), s	43.3	17.1	8.1	4.4	3.8	18.3	9.3	10.0
Green Ext Time (p_c), s	0.0	0.0	0.0	2.8	0.0	17.9	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	258	42	121	1142	37	789	58	1432	958
v/c Ratio	0.39	0.25	0.64	0.92	0.20	0.86	0.20	0.94	0.45
Control Delay	34.1	45.1	59.0	39.6	36.2	49.0	37.3	39.5	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	45.1	59.0	39.6	36.2	49.0	37.3	39.5	12.5
Queue Length 50th (ft)	69	25	76	401	20	182	32	~465	197
Queue Length 95th (ft)	104	59	#164	#568	48	#257	69	#627	252
Internal Link Dist (ft)		315				956			1139
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	674	169	189	1238	186	926	288	1526	2124
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.25	0.64	0.92	0.20	0.85	0.20	0.94	0.45

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

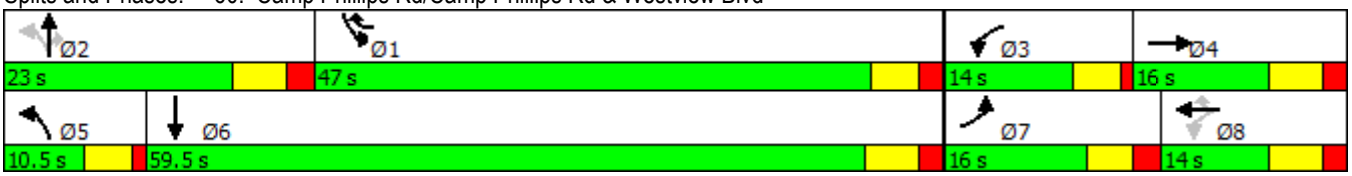
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8	2		2			
Detector Phase	7	4		3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		6.0	8.0	6.0	6.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	13.5	16.0		10.5	14.0	11.5	10.5	21.0	21.0	11.5	21.0	
Total Split (s)	16.0	16.0		14.0	14.0	47.0	10.5	23.0	23.0	47.0	59.5	
Total Split (%)	16.0%	16.0%		14.0%	14.0%	47.0%	10.5%	23.0%	23.0%	47.0%	59.5%	
Maximum Green (s)	10.5	10.0		9.5	8.0	41.5	6.0	17.0	17.0	41.5	53.5	
Yellow Time (s)	3.5	4.0		3.5	4.0	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		4.5	6.0	5.5	4.5	6.0	6.0	5.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	18.1	10.1		10.1		41.8	18.5	17.0	17.0	41.8	58.4	
Actuated g/C Ratio	0.19	0.11		0.11		0.44	0.20	0.18	0.18	0.44	0.62	
v/c Ratio	0.39	0.25		0.64		0.92	0.20	0.86	0.20	0.94	0.45	
Control Delay	34.1	45.1		59.0		39.6	36.2	49.0	37.3	39.5	12.5	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.1	45.1		59.0		39.6	36.2	49.0	37.3	39.5	12.5	
LOS	C	D		E		D	D	D	D	D	B	
Approach Delay		35.7			41.4			47.7			28.7	
Approach LOS		D			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 94
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 35.9 — Intersection LOS: D
Intersection Capacity Utilization 81.5% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	0	40	115	0	1550	35	750	110	1360	705	205
Future Volume (vph)	245	0	40	115	0	1550	35	750	110	1360	705	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		200
Storage Lanes	2		0	1		1	1		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1583	0	1770	1863	2787	1770	5085	1583	3433	3419	0
Flt Permitted	0.950			0.000			0.294			0.950		
Satd. Flow (perm)	3433	1583	0	0	1863	2787	548	5085	1583	3433	3419	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		395			557			1036			1219	
Travel Time (s)		10.8			12.7			20.2			23.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	258	0	42	121	0	1142	37	789	58	1432	742	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	42	0	121	0	1142	37	789	58	1432	958	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt		pm+ov	pm+pt	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	

Appendix F:
Transportation System Improvements with Build Traffic Operational Analysis

2040 Full Build Transportation System Improvements – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	15	220	120	30	60	185	1035	65	45	1525	60
Future Volume (veh/h)	10	15	220	120	30	60	185	1035	65	45	1525	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1792	1792	1792	1810	1810	1900
Adj Flow Rate, veh/h	11	16	92	130	33	65	201	1125	0	49	1658	65
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	6	6	6	5	5	5
Cap, veh/h	225	288	367	283	87	171	314	2343	1048	353	2689	105
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.69	0.00	0.55	0.55	0.55
Sat Flow, veh/h	1290	1863	1580	1278	561	1105	1707	3406	1524	484	4878	191
Grp Volume(v), veh/h	11	16	92	130	0	98	201	1125	0	49	1119	604
Grp Sat Flow(s),veh/h/ln	1290	1863	1580	1278	0	1665	1707	1703	1524	484	1647	1775
Q Serve(g_s), s	0.6	0.6	3.6	7.4	0.0	4.0	3.5	11.7	0.0	4.0	17.6	17.6
Cycle Q Clear(g_c), s	4.6	0.6	3.6	7.9	0.0	4.0	3.5	11.7	0.0	5.3	17.6	17.6
Prop In Lane	1.00		1.00	1.00		0.66	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	225	288	367	283	0	257	314	2343	1048	353	1816	979
V/C Ratio(X)	0.05	0.06	0.25	0.46	0.00	0.38	0.64	0.48	0.00	0.14	0.62	0.62
Avail Cap(c_a), veh/h	636	880	870	689	0	787	327	2549	1140	379	1989	1072
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	27.5	23.8	30.8	0.0	28.9	12.6	5.5	0.0	9.2	11.6	11.6
Incr Delay (d2), s/veh	0.1	0.1	0.4	1.2	0.0	0.9	4.0	0.2	0.0	0.2	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	0.5	2.9	4.8	0.0	3.5	5.0	9.4	0.0	1.0	12.7	13.7
LnGrp Delay(d),s/veh	31.1	27.5	24.2	32.0	0.0	29.9	16.6	5.7	0.0	9.4	12.1	12.5
LnGrp LOS	C	C	C	C		C	B	A		A	B	B
Approach Vol, veh/h		119			228			1326			1772	
Approach Delay, s/veh		25.3			31.1			7.3			12.2	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		58.4		17.8	10.4	48.0		17.8
Change Period (Y+Rc), s		6.0		6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s		57.0		36.0	6.5	46.0		36.0
Max Q Clear Time (g_c+I1), s		13.7		6.6	5.5	19.6		9.9
Green Ext Time (p_c), s		33.6		1.4	0.1	22.4		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Future Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.5	6.0	6.0		4.5	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1769	1863	1569	1768	1663		1703	3406	1501	1718	4909	
Flt Permitted	0.69	1.00	1.00	0.75	1.00		0.09	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	1291	1863	1569	1391	1663		163	3406	1501	458	4909	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	11	16	120	130	33	65	201	1125	35	49	1658	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	11	16	120	130	98	0	201	1125	35	49	1723	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	16.0	16.0	22.7	16.0	16.0		50.7	50.7	50.7	39.5	39.5	
Effective Green, g (s)	16.0	16.0	22.7	16.0	16.0		50.7	50.7	50.7	39.5	39.5	
Actuated g/C Ratio	0.20	0.20	0.29	0.20	0.20		0.64	0.64	0.64	0.50	0.50	
Clearance Time (s)	6.0	6.0	4.5	6.0	6.0		4.5	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	262	378	452	282	338		236	2194	966	229	2463	
v/s Ratio Prot		0.01	0.02		0.06		c0.07	0.33			0.35	
v/s Ratio Perm	0.01		0.05	c0.09			c0.48		0.02	0.11		
v/c Ratio	0.04	0.04	0.27	0.46	0.29		0.85	0.51	0.04	0.21	0.70	
Uniform Delay, d1	25.2	25.2	21.6	27.6	26.5		15.9	7.4	5.1	10.9	15.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.0	0.3	1.2	0.5		24.4	0.2	0.0	0.5	0.9	
Delay (s)	25.3	25.2	21.9	28.8	27.0		40.2	7.6	5.1	11.4	15.9	
Level of Service	C	C	C	C	C		D	A	A	B	B	
Approach Delay (s)		22.5			28.0			12.4			15.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	16.5
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	16	120	130	98	201	1125	35	49	1723
v/c Ratio	0.04	0.04	0.25	0.46	0.29	0.84	0.52	0.04	0.22	0.71
Control Delay	25.9	25.9	19.8	34.0	29.7	47.1	9.9	7.5	16.7	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	25.9	19.8	34.0	29.7	47.1	9.9	7.5	16.7	18.3
Queue Length 50th (ft)	5	7	41	58	42	42	115	5	11	201
Queue Length 95th (ft)	18	23	82	112	85	#240	324	26	50	422
Internal Link Dist (ft)		445			550		899			2315
Turn Bay Length (ft)			100			300		50	250	
Base Capacity (vph)	608	877	480	654	783	238	2540	1118	275	2954
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.02	0.25	0.20	0.13	0.84	0.44	0.03	0.18	0.58

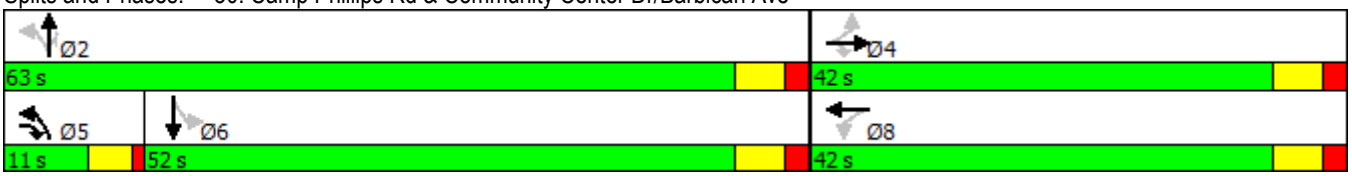
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0		6.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	39.0	39.0		10.5	24.0	24.0	33.0	33.0	
Total Split (s)	42.0	42.0	11.0	42.0	42.0		11.0	63.0	63.0	52.0	52.0	
Total Split (%)	40.0%	40.0%	10.5%	40.0%	40.0%		10.5%	60.0%	60.0%	49.5%	49.5%	
Maximum Green (s)	36.0	36.0	6.5	36.0	36.0		6.5	57.0	57.0	46.0	46.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.5	6.0	6.0		4.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	31.0	31.0		28.0	28.0			13.0	13.0	22.0	22.0	
Pedestrian Calls (#/hr)	1	1		1	1			2	2	3	3	
Act Effct Green (s)	16.0	16.0	24.2	16.0	16.0		52.3	50.7	50.7	39.3	39.3	
Actuated g/C Ratio	0.20	0.20	0.31	0.20	0.20		0.66	0.64	0.64	0.50	0.50	
v/c Ratio	0.04	0.04	0.25	0.46	0.29		0.84	0.52	0.04	0.22	0.71	
Control Delay	25.9	25.9	19.8	34.0	29.7		47.1	9.9	7.5	16.7	18.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	25.9	25.9	19.8	34.0	29.7		47.1	9.9	7.5	16.7	18.3	
LOS	C	C	B	C	C		D	A	A	B	B	
Approach Delay		20.9			32.2			15.3			18.2	
Approach LOS		C			C			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 105	
Actuated Cycle Length: 79.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 69.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Future Volume (vph)	10	15	220	120	30	60	185	1035	65	45	1525	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		0	300		50	250		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99				0.98	1.00	1.00	
Frt			0.850		0.901				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1664	0	1703	3406	1524	1719	4908	0
Flt Permitted	0.694			0.747			0.091			0.253		
Satd. Flow (perm)	1292	1863	1563	1390	1664	0	163	3406	1500	458	4908	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			979			2395	
Travel Time (s)		10.2			12.3			19.1			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Adj. Flow (vph)	11	16	120	130	33	65	201	1125	35	49	1658	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	16	120	130	98	0	201	1125	35	49	1723	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (veh/h)	0	0	0	300	0	220	680	1065	0	0	1025	840
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				316	0	73	716	1121	0	0	1079	258
Adj No. of Lanes				2	0	1	2	2	0	0	3	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				399	0	178	1037	2609	0	0	1957	609
Arrive On Green				0.11	0.00	0.11	0.63	1.00	0.00	0.00	0.40	0.40
Sat Flow, veh/h				3548	0	1583	3281	3463	0	0	5055	1524
Grp Volume(v), veh/h				316	0	73	716	1121	0	0	1079	258
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1640	1687	0	0	1631	1524
Q Serve(g_s), s				9.1	0.0	4.5	15.0	0.0	0.0	0.0	17.8	12.8
Cycle Q Clear(g_c), s				9.1	0.0	4.5	15.0	0.0	0.0	0.0	17.8	12.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				399	0	178	1037	2609	0	0	1957	609
V/C Ratio(X)				0.79	0.00	0.41	0.69	0.43	0.00	0.00	0.55	0.42
Avail Cap(c_a), veh/h				574	0	256	1037	2609	0	0	1957	609
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.77	0.77	0.00	0.00	0.39	0.39
Uniform Delay (d), s/veh				45.4	0.0	43.4	16.0	0.0	0.0	0.0	24.2	22.8
Incr Delay (d2), s/veh				4.8	0.0	1.5	1.5	0.4	0.0	0.0	0.4	0.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.3	0.0	3.7	10.6	0.3	0.0	0.0	11.0	7.9
LnGrp Delay(d),s/veh				50.2	0.0	44.9	17.5	0.4	0.0	0.0	24.7	23.6
LnGrp LOS				D		D	B	A			C	C
Approach Vol, veh/h					389			1837			1337	
Approach Delay, s/veh					49.2			7.0			24.5	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		87.2			39.2	48.0		17.8
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		76.0			28.0	42.0		17.0
Max Q Clear Time (g_c+I1), s		2.0			17.0	19.8		11.1
Green Ext Time (p_c), s		18.3			7.6	9.3		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.2
HCM 2010 LOS	B

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	158	158	116	716	1121	1079	442
v/c Ratio	0.69	0.69	0.54	0.82	0.44	0.52	0.68
Control Delay	58.5	58.5	51.1	19.7	2.9	23.8	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	58.5	51.1	19.7	2.9	23.8	31.8
Queue Length 50th (ft)	107	107	73	232	87	193	238
Queue Length 95th (ft)	176	176	129	#126	84	245	372
Internal Link Dist (ft)		701			658	899	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	272	272	256	872	2527	2080	648
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.58	0.45	0.82	0.44	0.52	0.68

Intersection Summary

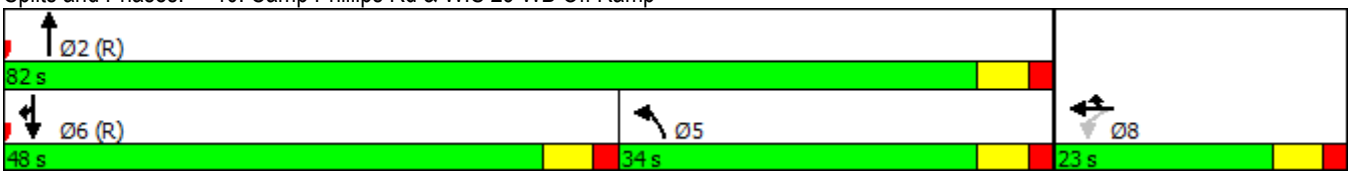
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	14.0	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	34.0	82.0			48.0	48.0
Total Split (%)				21.9%	21.9%	21.9%	32.4%	78.1%			45.7%	45.7%
Maximum Green (s)				17.0	17.0	17.0	28.0	76.0			42.0	42.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				14.4	14.4	14.4	28.0	78.6			44.6	44.6
Actuated g/C Ratio				0.14	0.14	0.14	0.27	0.75			0.42	0.42
v/c Ratio				0.69	0.69	0.54	0.82	0.44			0.52	0.68
Control Delay				58.5	58.5	51.1	19.7	2.9			23.8	31.8
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				58.5	58.5	51.1	19.7	2.9			23.8	31.8
LOS				E	E	D	B	A			C	C
Approach Delay					56.5			9.4			26.1	
Approach LOS					E			A			C	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 21.5 Intersection LOS: C
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1681	1681	1583	3273	3374	0	0	4893	1524
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1681	1681	1583	3273	3374	0	0	4893	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	316	0	116	716	1121	0	0	1079	442
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	158	158	116	716	1121	0	0	1079	442
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (veh/h)	415	0	740	0	0	0	0	1330	190	70	1255	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	461	0	338				0	1478	89	78	1394	0
Adj No. of Lanes	2	0	1				0	3	1	1	3	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	877	0	391				0	1889	588	451	3186	0
Arrive On Green	0.26	0.00	0.26				0.00	0.37	0.37	0.40	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	5253	1583	1774	5253	0
Grp Volume(v), veh/h	461	0	338				0	1478	89	78	1394	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1695	1583	1774	1695	0
Q Serve(g_s), s	12.3	0.0	22.4				0.0	27.0	3.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.3	0.0	22.4				0.0	27.0	3.9	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	877	0	391				0	1889	588	451	3186	0
V/C Ratio(X)	0.53	0.00	0.86				0.00	0.78	0.15	0.17	0.44	0.00
Avail Cap(c_a), veh/h	1353	0	604				0	1889	588	451	3186	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.79	0.79	0.83	0.83	0.00
Uniform Delay (d), s/veh	33.4	0.0	37.1				0.0	29.2	22.0	23.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	8.0				0.0	2.6	0.4	0.1	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	0.0	15.4				0.0	18.3	3.2	2.5	0.2	0.0
LnGrp Delay(d),s/veh	33.8	0.0	45.1				0.0	31.9	22.4	23.6	0.4	0.0
LnGrp LOS	C		D					C	C	C	A	
Approach Vol, veh/h		799						1567			1472	
Approach Delay, s/veh		38.6						31.3			1.6	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	26.8	45.0		33.2		71.8		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	39.0		42.0		51.0		
Max Q Clear Time (g_c+I1), s	2.0	29.0		24.4		2.0		
Green Ext Time (p_c), s	3.0	6.7		2.8		14.6		

Intersection Summary	
HCM 2010 Ctrl Delay	21.4
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	230	231	411	1478	106	78	1394
v/c Ratio	0.43	0.43	0.82	0.63	0.15	0.39	0.50
Control Delay	28.8	28.8	45.6	25.0	20.4	21.7	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	28.8	45.6	25.0	20.4	21.7	12.9
Queue Length 50th (ft)	123	124	246	288	43	18	292
Queue Length 95th (ft)	178	178	338	377	87	51	342
Internal Link Dist (ft)		918		1152			658
Turn Bay Length (ft)	500		325		225	175	
Base Capacity (vph)	641	641	603	2351	731	201	2816
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.36	0.68	0.63	0.15	0.39	0.50

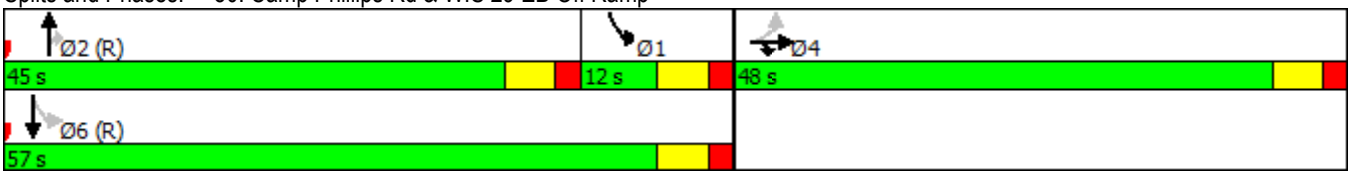
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2		1	6	
Permitted Phases	4								2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	48.0	48.0	48.0					45.0	45.0	12.0	57.0	
Total Split (%)	45.7%	45.7%	45.7%					42.9%	42.9%	11.4%	54.3%	
Maximum Green (s)	42.0	42.0	42.0					39.0	39.0	6.0	51.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	34.8	34.8	34.8					48.6	48.6	58.2	58.2	
Actuated g/C Ratio	0.33	0.33	0.33					0.46	0.46	0.55	0.55	
v/c Ratio	0.43	0.43	0.82					0.63	0.15	0.39	0.50	
Control Delay	28.8	28.8	45.6					25.0	20.4	21.7	12.9	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	28.8	28.8	45.6					25.0	20.4	21.7	12.9	
LOS	C	C	D					C	C	C	B	
Approach Delay		36.7						24.7			13.4	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 23 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 23.1 Intersection LOS: C
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	175		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	5085	1583	1770	5085	0
Flt Permitted	0.950	0.950								0.108		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	5085	1583	201	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1232			738	
Travel Time (s)		19.4			12.0			24.0			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	461	0	411	0	0	0	0	1478	106	78	1394	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	230	231	411	0	0	0	0	1478	106	78	1394	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			18			18	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Perm	pm+pt	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	0	30	50	0	635	35	760	70	1000	570	425
Future Volume (veh/h)	125	0	30	50	0	635	35	760	70	1000	570	425
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900	1863	1863	1863	1863	1863	1863	1845	1845	1900
Adj Flow Rate, veh/h	133	0	32	53	0	473	37	809	37	1064	606	452
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	265	0	365	215	191	1331	143	1021	318	1278	1058	789
Arrive On Green	0.08	0.00	0.24	0.10	0.00	0.10	0.04	0.20	0.20	0.38	0.55	0.55
Sat Flow, veh/h	3312	0	1524	1372	1863	2787	1774	5085	1583	3408	1917	1428
Grp Volume(v), veh/h	133	0	32	53	0	473	37	809	37	1064	554	504
Grp Sat Flow(s),veh/h/ln	1656	0	1524	1372	1863	1393	1774	1695	1583	1704	1752	1593
Q Serve(g_s), s	3.7	0.0	1.6	3.5	0.0	2.7	1.7	14.7	1.9	27.6	20.1	20.2
Cycle Q Clear(g_c), s	3.7	0.0	1.6	3.5	0.0	2.7	1.7	14.7	1.9	27.6	20.1	20.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.90
Lane Grp Cap(c), veh/h	265	0	365	215	191	1331	143	1021	318	1278	968	879
V/C Ratio(X)	0.50	0.00	0.09	0.25	0.00	0.36	0.26	0.79	0.12	0.83	0.57	0.57
Avail Cap(c_a), veh/h	323	0	391	215	191	1331	193	1202	374	1366	1027	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.9	0.0	28.8	40.7	0.0	5.1	34.7	37.0	31.8	27.6	14.3	14.3
Incr Delay (d2), s/veh	1.5	0.0	0.1	0.6	0.0	0.2	0.9	3.2	0.2	4.3	0.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.0	1.2	2.4	0.0	3.6	1.6	11.6	1.5	19.9	15.0	13.9
LnGrp Delay(d),s/veh	44.4	0.0	28.9	41.3	0.0	5.3	35.7	40.1	32.0	32.0	15.0	15.0
LnGrp LOS	D		C	D		A	D	D	C	C	B	B
Approach Vol, veh/h		165			526			883			2122	
Approach Delay, s/veh		41.4			8.9			39.6			23.5	
Approach LOS		D			A			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	42.5	25.5		29.3	8.3	59.7	13.3	16.0
Change Period (Y+Rc), s	6.0	6.0		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	39.0	23.0		25.0	6.5	57.0	9.5	10.0
Max Q Clear Time (g_c+I1), s	29.6	16.7		3.6	3.7	22.2	5.7	5.5
Green Ext Time (p_c), s	6.9	2.8		2.3	0.0	16.0	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	133	32	53	473	37	809	37	1064	1058
v/c Ratio	0.39	0.09	0.36	0.38	0.19	0.73	0.11	0.86	0.55
Control Delay	47.9	31.9	51.9	11.3	34.0	40.2	33.7	37.1	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	31.9	51.9	11.3	34.0	40.2	33.7	37.1	15.1
Queue Length 50th (ft)	44	17	34	65	20	186	20	332	240
Queue Length 95th (ft)	75	42	75	89	47	233	48	419	303
Internal Link Dist (ft)		316				945			1152
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	348	410	147	1388	194	1261	392	1429	2049
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.08	0.36	0.34	0.19	0.64	0.09	0.74	0.52

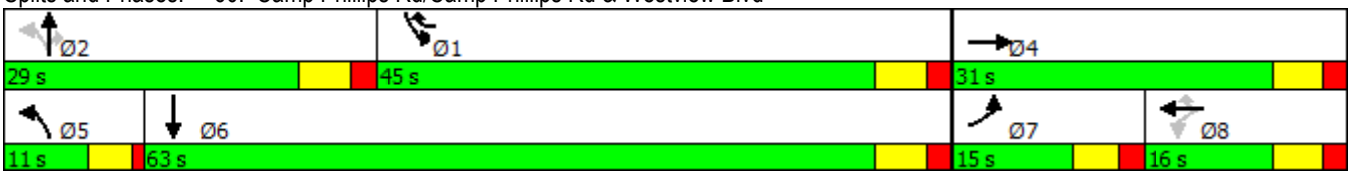
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	14.0	10.5	21.0	21.0	14.0	21.0	
Total Split (s)	15.0	31.0		16.0	16.0	45.0	11.0	29.0	29.0	45.0	63.0	
Total Split (%)	14.3%	29.5%		15.2%	15.2%	42.9%	10.5%	27.6%	27.6%	42.9%	60.0%	
Maximum Green (s)	9.5	25.0		10.0	10.0	39.0	6.5	23.0	23.0	39.0	57.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.9	21.3		10.3		42.4	22.6	21.0	21.0	34.9	56.1	
Actuated g/C Ratio	0.10	0.22		0.11		0.44	0.24	0.22	0.22	0.36	0.59	
v/c Ratio	0.39	0.09		0.36		0.38	0.19	0.73	0.11	0.86	0.55	
Control Delay	47.9	31.9		51.9		11.3	34.0	40.2	33.7	37.1	15.1	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.9	31.9		51.9		11.3	34.0	40.2	33.7	37.1	15.1	
LOS	D	C		D		B	C	D	C	D	B	
Approach Delay		44.8			15.4			39.7			26.1	
Approach LOS		D			B			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 95.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 28.7 — Intersection LOS: C
Intersection Capacity Utilization 68.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	50	0	635	35	760	70	1000	570	425
Future Volume (vph)	125	0	30	50	0	635	35	760	70	1000	570	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		0
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3303	1524	0	1770	1863	2787	1770	5085	1583	3400	3281	0
Flt Permitted	0.950			0.736			0.230			0.950		
Satd. Flow (perm)	3303	1524	0	1371	1863	2787	428	5085	1583	3400	3281	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			650			1025			1232	
Travel Time (s)		10.8			14.8			20.0			24.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	32	53	0	473	37	809	37	1064	606	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	32	0	53	0	473	37	809	37	1064	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	30	255	165	30	105	215	1870	135	105	1795	40
Future Volume (veh/h)	45	30	255	165	30	105	215	1870	135	105	1795	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	48	32	100	176	32	112	229	1989	0	112	1910	43
Adj No. of Lanes	1	1	1	1	1	0	1	2	1	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	172	164	256	286	74	257	265	2108	943	170	2933	66
Arrive On Green	0.09	0.09	0.09	0.07	0.20	0.20	0.07	0.60	0.00	0.05	0.58	0.58
Sat Flow, veh/h	1236	1863	1578	1774	364	1272	1757	3505	1568	1757	5068	114
Grp Volume(v), veh/h	48	32	100	176	0	144	229	1989	0	112	1265	688
Grp Sat Flow(s),veh/h/ln	1236	1863	1578	1774	0	1636	1757	1752	1568	1757	1679	1824
Q Serve(g_s), s	4.2	1.8	6.4	8.5	0.0	8.8	5.9	59.5	0.0	2.9	29.0	29.0
Cycle Q Clear(g_c), s	4.2	1.8	6.4	8.5	0.0	8.8	5.9	59.5	0.0	2.9	29.0	29.0
Prop In Lane	1.00		1.00	1.00		0.78	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	172	164	256	286	0	331	265	2108	943	170	1943	1056
V/C Ratio(X)	0.28	0.20	0.39	0.62	0.00	0.44	0.86	0.94	0.00	0.66	0.65	0.65
Avail Cap(c_a), veh/h	172	164	256	286	0	331	452	2281	1020	181	1943	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	48.1	42.6	43.2	0.0	39.7	21.2	20.9	0.0	26.7	16.2	16.2
Incr Delay (d2), s/veh	0.9	0.6	1.0	3.9	0.0	0.9	8.6	8.5	0.0	7.8	0.8	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	1.7	5.2	2.6	0.0	7.3	8.3	40.1	0.0	4.3	19.6	21.3
LnGrp Delay(d),s/veh	50.1	48.7	43.6	47.1	0.0	40.6	29.7	29.4	0.0	34.5	17.0	17.6
LnGrp LOS	D	D	D	D		D	C	C		C	B	B
Approach Vol, veh/h		180			320			2218			2065	
Approach Delay, s/veh		46.2			44.2			29.5			18.1	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	74.4	13.0	16.0	12.9	71.8		29.0
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0		6.0
Max Green Setting (Gmax), s	6.5	74.0	8.5	10.0	20.5	60.0		23.0
Max Q Clear Time (g_c+I1), s	4.9	61.5	10.5	8.4	7.9	31.0		10.8
Green Ext Time (p_c), s	0.0	6.9	0.0	0.2	0.5	27.9		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Future Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.5	4.5	6.0		4.5	6.0	6.0	4.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1768	1863	1574	1769	1629		1752	3505	1543	1752	5018	
Flt Permitted	0.67	1.00	1.00	0.53	1.00		0.06	1.00	1.00	0.06	1.00	
Satd. Flow (perm)	1238	1863	1574	992	1629		111	3505	1543	119	5018	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	48	32	136	176	32	112	229	1989	72	112	1910	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	48	32	136	176	144	0	229	1989	72	112	1953	0
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	11.8	11.8	27.0	25.9	25.9		81.7	70.5	70.5	68.7	62.0	
Effective Green, g (s)	11.8	11.8	27.0	25.9	25.9		81.7	70.5	70.5	68.7	62.0	
Actuated g/C Ratio	0.10	0.10	0.23	0.22	0.22		0.68	0.59	0.59	0.57	0.52	
Clearance Time (s)	6.0	6.0	4.5	4.5	6.0		4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	122	183	355	277	352		284	2066	909	159	2601	
v/s Ratio Prot		0.02	0.05	c0.05	0.09		c0.10	c0.57		0.04	0.39	
v/s Ratio Perm	0.04		0.04	c0.09			0.45		0.05	0.36		
v/c Ratio	0.39	0.17	0.38	0.64	0.41		0.81	0.96	0.08	0.70	0.75	
Uniform Delay, d1	50.5	49.4	39.2	41.2	40.3		34.6	23.3	10.6	25.4	22.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	0.5	0.7	4.7	0.8		15.3	12.2	0.0	13.2	1.3	
Delay (s)	52.6	49.9	39.9	45.9	41.0		49.9	35.5	10.6	38.6	24.0	
Level of Service	D	D	D	D	D		D	D	B	D	C	
Approach Delay (s)		44.2			43.7			36.2			24.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	21.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	48	32	136	176	144	229	1989	72	112	1953
v/c Ratio	0.32	0.14	0.36	0.63	0.43	0.80	0.95	0.08	0.69	0.74
Control Delay	55.0	49.2	35.5	50.9	44.8	51.3	35.3	13.1	46.0	26.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	55.0	49.2	35.5	50.9	44.8	51.3	35.5	13.1	46.0	26.8
Queue Length 50th (ft)	36	24	85	122	100	117	672	21	29	402
Queue Length 95th (ft)	74	53	129	186	159	#285	#1276	64	#174	#737
Internal Link Dist (ft)		445			550		884			2315
Turn Bay Length (ft)			100			300		50	250	
Base Capacity (vph)	151	228	452	279	383	370	2253	992	163	2728
Starvation Cap Reductn	0	0	0	0	0	0	24	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.14	0.30	0.63	0.38	0.62	0.89	0.07	0.69	0.72

Intersection Summary

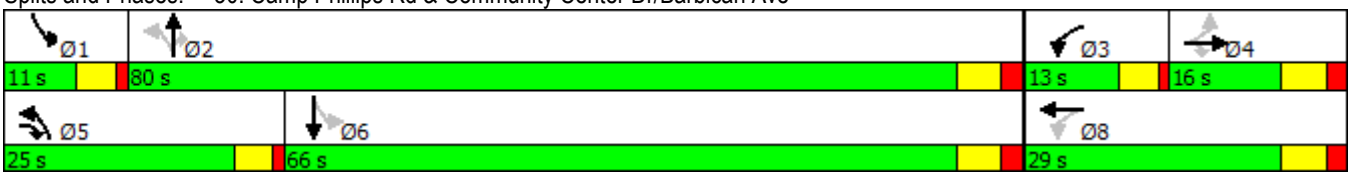
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	5	3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	6.0	10.0		6.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	42.0	42.0	10.5	10.5	39.0		10.5	24.0	24.0	10.5	33.0	
Total Split (s)	16.0	16.0	25.0	13.0	29.0		25.0	80.0	80.0	11.0	66.0	
Total Split (%)	13.3%	13.3%	20.8%	10.8%	24.2%		20.8%	66.7%	66.7%	9.2%	55.0%	
Maximum Green (s)	10.0	10.0	20.5	8.5	23.0		20.5	74.0	74.0	6.5	60.0	
Yellow Time (s)	4.0	4.0	3.5	3.5	4.0		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0	1.0	1.0	2.0		1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.5	4.5	6.0		4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lag	Lag	Lead	Lead			Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min	Min	None	Min	
Walk Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Flash Dont Walk (s)	31.0	31.0			28.0			13.0	13.0		22.0	
Pedestrian Calls (#/hr)	1	1			1			2	2		3	
Act Effct Green (s)	14.5	14.5	28.1	25.9	24.3		82.7	70.5	70.5	70.1	61.9	
Actuated g/C Ratio	0.12	0.12	0.24	0.22	0.21		0.70	0.60	0.60	0.59	0.52	
v/c Ratio	0.32	0.14	0.36	0.63	0.43		0.80	0.95	0.08	0.69	0.74	
Control Delay	55.0	49.2	35.5	50.9	44.8		51.3	35.3	13.1	46.0	26.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.2	0.0	0.0	0.0	
Total Delay	55.0	49.2	35.5	50.9	44.8		51.3	35.5	13.1	46.0	26.8	
LOS	E	D	D	D	D		D	D	B	D	C	
Approach Delay		41.9			48.1			36.4			27.8	
Approach LOS		D			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 118.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 33.8 — Intersection LOS: C
Intersection Capacity Utilization 93.6% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 30: Camp Phillips Rd & Community Center Dr/Barbican Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Future Volume (vph)	45	30	255	165	30	105	215	1870	135	105	1795	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		0	300		50	250		200
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor	1.00		0.99	1.00	0.99				0.98		1.00	
Frt			0.850		0.883				0.850		0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1628	0	1752	3505	1568	1752	5019	0
Flt Permitted	0.665			0.533			0.060			0.065		
Satd. Flow (perm)	1238	1863	1563	992	1628	0	111	3505	1543	120	5019	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		525			630			964			2395	
Travel Time (s)		10.2			12.3			18.8			46.7	
Confl. Peds. (#/hr)	1		1	1		1	3		2	2		3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	48	32	136	176	32	112	229	1989	72	112	1910	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	32	136	176	144	0	229	1989	72	112	1953	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (veh/h)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1743	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				306	0	36	1138	2148	0	0	1413	243
Adj No. of Lanes				2	0	1	2	2	0	0	3	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				371	0	166	1221	2644	0	0	1680	523
Arrive On Green				0.11	0.00	0.11	0.36	0.76	0.00	0.00	0.34	0.34
Sat Flow, veh/h				3320	0	1482	3375	3563	0	0	5152	1553
Grp Volume(v), veh/h				306	0	36	1138	2148	0	0	1413	243
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1688	1736	0	0	1663	1553
Q Serve(g_s), s				8.6	0.0	2.1	30.8	36.7	0.0	0.0	24.9	11.7
Cycle Q Clear(g_c), s				8.6	0.0	2.1	30.8	36.7	0.0	0.0	24.9	11.7
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				371	0	166	1221	2644	0	0	1680	523
V/C Ratio(X)				0.82	0.00	0.22	0.93	0.81	0.00	0.00	0.84	0.46
Avail Cap(c_a), veh/h				384	0	172	1221	2644	0	0	1680	523
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.11	0.11	0.00	0.00	0.63	0.63
Uniform Delay (d), s/veh				41.3	0.0	38.4	29.2	7.1	0.0	0.0	29.1	24.8
Incr Delay (d2), s/veh				13.2	0.0	0.6	1.9	0.3	0.0	0.0	3.4	1.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.1	0.0	1.6	16.8	19.4	0.0	0.0	16.4	8.3
LnGrp Delay(d),s/veh				54.5	0.0	39.1	31.1	7.4	0.0	0.0	32.6	26.6
LnGrp LOS				D		D	C	A			C	C
Approach Vol, veh/h					342			3286			1656	
Approach Delay, s/veh					52.9			15.6			31.7	
Approach LOS					D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		78.4			40.4	38.0		16.6
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		72.0			34.0	32.0		11.0
Max Q Clear Time (g_c+I1), s		38.7			32.8	26.9		10.6
Green Ext Time (p_c), s		28.9			1.1	3.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	23.1
HCM 2010 LOS	C

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	153	59	1138	2148	1413	423
v/c Ratio	0.85	0.85	0.35	0.94	0.82	0.84	0.81
Control Delay	80.2	80.2	45.1	13.4	3.1	34.6	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	80.2	80.2	45.1	13.4	3.6	34.6	42.3
Queue Length 50th (ft)	96	96	33	146	1	286	230
Queue Length 95th (ft)	#211	#211	73	m141	m1	346	#388
Internal Link Dist (ft)		701			673	884	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	182	182	171	1205	2635	1687	525
Starvation Cap Reductn	0	0	0	0	167	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.84	0.35	0.94	0.87	0.84	0.81

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

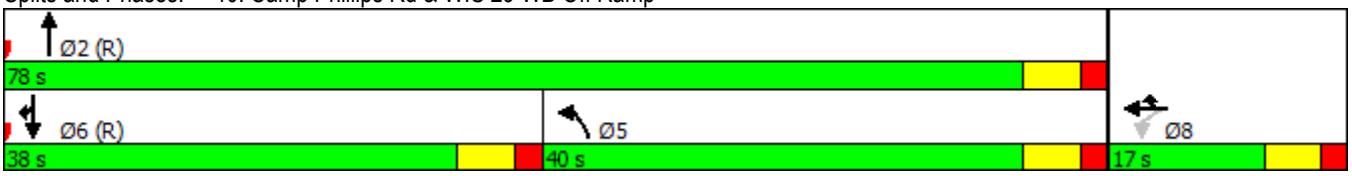
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	14.0	24.0			22.5	22.5
Total Split (s)				17.0	17.0	17.0	40.0	78.0			38.0	38.0
Total Split (%)				17.9%	17.9%	17.9%	42.1%	82.1%			40.0%	40.0%
Maximum Green (s)				11.0	11.0	11.0	34.0	72.0			32.0	32.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				10.9	10.9	10.9	34.0	72.1			32.1	32.1
Actuated g/C Ratio				0.11	0.11	0.11	0.36	0.76			0.34	0.34
v/c Ratio				0.85	0.85	0.35	0.94	0.82			0.84	0.81
Control Delay				80.2	80.2	45.1	13.4	3.1			34.6	42.3
Queue Delay				0.0	0.0	0.0	0.0	0.5			0.0	0.0
Total Delay				80.2	80.2	45.1	13.4	3.6			34.6	42.3
LOS				F	F	D	B	A			C	D
Approach Delay					74.6			7.0			36.4	
Approach LOS					E			A			D	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 21.3 Intersection LOS: C
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1573	1573	1482	3367	3471	0	0	4988	1553
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1573	1573	1482	3367	3471	0	0	4988	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			753			964	
Travel Time (s)		12.0			15.2			14.7			18.8	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	306	0	59	1138	2148	0	0	1413	423
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	153	153	59	1138	2148	0	0	1413	423
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Right	Right	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (veh/h)	915	0	880	0	0	0	0	2305	390	175	1510	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	924	0	367				0	2328	174	177	1525	0
Adj No. of Lanes	2	0	1				0	3	1	1	3	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	971	0	433				0	2355	733	207	3051	0
Arrive On Green	0.27	0.00	0.27				0.00	0.46	0.46	0.15	1.00	0.00
Sat Flow, veh/h	3548	0	1583				0	5253	1583	1774	5253	0
Grp Volume(v), veh/h	924	0	367				0	2328	174	177	1525	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1695	1583	1774	1695	0
Q Serve(g_s), s	24.3	0.0	20.8				0.0	43.1	6.3	5.0	0.0	0.0
Cycle Q Clear(g_c), s	24.3	0.0	20.8				0.0	43.1	6.3	5.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	971	0	433				0	2355	733	207	3051	0
V/C Ratio(X)	0.95	0.00	0.85				0.00	0.99	0.24	0.86	0.50	0.00
Avail Cap(c_a), veh/h	971	0	433				0	2355	733	207	3051	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.44	0.44	0.43	0.43	0.00
Uniform Delay (d), s/veh	33.9	0.0	32.6				0.0	25.2	15.4	38.6	0.0	0.0
Incr Delay (d2), s/veh	18.3	0.0	14.4				0.0	9.9	0.3	14.3	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	20.5	0.0	16.2				0.0	27.3	4.7	7.7	0.1	0.0
LnGrp Delay(d),s/veh	52.2	0.0	47.1				0.0	35.1	15.7	52.9	0.3	0.0
LnGrp LOS	D		D					D	B	D	A	
Approach Vol, veh/h		1291						2502			1702	
Approach Delay, s/veh		50.7						33.8			5.7	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	13.0	50.0		32.0		63.0		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	7.0	44.0		26.0		57.0		
Max Q Clear Time (g_c+I1), s	7.0	45.1		26.3		2.0		
Green Ext Time (p_c), s	0.0	0.0		0.0		18.0		

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	462	462	444	2328	197	177	1525
v/c Ratio	1.00	1.00	1.03	0.99	0.27	0.85	0.50
Control Delay	79.2	79.2	85.7	42.0	16.9	47.7	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.2	79.2	85.7	42.0	16.9	47.7	4.8
Queue Length 50th (ft)	~295	~295	~288	491	70	84	73
Queue Length 95th (ft)	#508	#508	#473	#628	118	m#108	83
Internal Link Dist (ft)		918		1130			673
Turn Bay Length (ft)	500		325		225	175	
Base Capacity (vph)	460	460	433	2355	733	208	3051
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	1.00	1.03	0.99	0.27	0.85	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

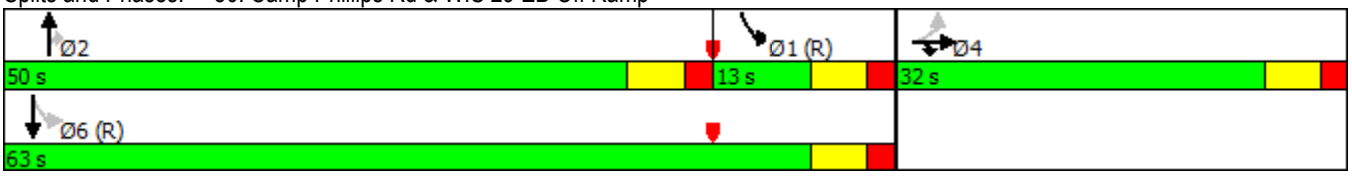
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2		1	6	
Permitted Phases	4								2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	32.0	32.0	32.0					50.0	50.0	13.0	63.0	
Total Split (%)	33.7%	33.7%	33.7%					52.6%	52.6%	13.7%	66.3%	
Maximum Green (s)	26.0	26.0	26.0					44.0	44.0	7.0	57.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					Max	Max	C-Max	C-Max	
Act Effct Green (s)	26.0	26.0	26.0					44.0	44.0	57.0	57.0	
Actuated g/C Ratio	0.27	0.27	0.27					0.46	0.46	0.60	0.60	
v/c Ratio	1.00	1.00	1.03					0.99	0.27	0.85	0.50	
Control Delay	79.2	79.2	85.7					42.0	16.9	47.7	4.8	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	79.2	79.2	85.7					42.0	16.9	47.7	4.8	
LOS	E	E	F					D	B	D	A	
Approach Delay		81.3						40.1			9.3	
Approach LOS		F						D			A	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 63 (66%), Referenced to phase 1:SBL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 40.8 — Intersection LOS: D
Intersection Capacity Utilization 94.6% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	175		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	5085	1583	1770	5085	0
Flt Permitted	0.950	0.950								0.080		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	5085	1583	149	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1210			753	
Travel Time (s)		19.4			12.0			23.6			14.7	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	924	0	444	0	0	0	0	2328	197	177	1525	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	462	462	444	0	0	0	0	2328	197	177	1525	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			18			18	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Perm	pm+pt	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	0	45	115	0	1550	40	850	110	1360	790	240
Future Volume (veh/h)	295	0	45	115	0	1550	40	850	110	1360	790	240
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	311	0	47	121	0	1142	42	895	58	1432	832	253
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	368	0	142	277	99	1346	133	1027	320	1479	1622	493
Arrive On Green	0.11	0.00	0.09	0.08	0.00	0.05	0.04	0.20	0.20	0.43	0.61	0.61
Sat Flow, veh/h	3442	0	1583	1774	1863	2787	1774	5085	1583	3442	2676	813
Grp Volume(v), veh/h	311	0	47	121	0	1142	42	895	58	1432	550	535
Grp Sat Flow(s),veh/h/ln	1721	0	1583	1774	1863	1393	1774	1695	1583	1721	1770	1719
Q Serve(g_s), s	10.0	0.0	3.1	7.2	0.0	6.0	2.2	19.3	2.7	45.9	20.1	20.1
Cycle Q Clear(g_c), s	10.0	0.0	3.1	7.2	0.0	6.0	2.2	19.3	2.7	45.9	20.1	20.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	368	0	142	277	99	1346	133	1027	320	1479	1073	1042
V/C Ratio(X)	0.84	0.00	0.33	0.44	0.00	0.85	0.32	0.87	0.18	0.97	0.51	0.51
Avail Cap(c_a), veh/h	381	0	142	285	99	1346	166	1081	336	1493	1073	1042
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.5	0.0	48.2	45.6	0.0	12.4	40.0	43.6	22.9	31.4	12.7	12.7
Incr Delay (d2), s/veh	15.5	0.0	1.4	1.1	0.0	5.3	1.3	7.7	0.3	16.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	0.0	2.6	6.4	0.0	19.3	2.0	14.9	2.6	33.2	15.1	14.7
LnGrp Delay(d),s/veh	65.0	0.0	49.6	46.7	0.0	17.7	41.4	51.3	23.2	47.6	13.1	13.1
LnGrp LOS	E		D	D		B	D	D	C	D	B	B
Approach Vol, veh/h		358			1263			995			2517	
Approach Delay, s/veh		63.0			20.5			49.3			32.8	
Approach LOS		E			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	54.6	28.8	13.5	16.1	8.9	74.5	17.6	12.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	49.0	24.0	9.5	10.0	6.5	68.0	12.5	6.0
Max Q Clear Time (g_c+I1), s	47.9	21.3	9.2	5.1	4.2	22.1	12.0	8.0
Green Ext Time (p_c), s	0.7	1.6	0.0	2.5	0.0	22.3	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.0
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	311	47	121	1142	42	895	58	1432	1085
v/c Ratio	0.48	0.39	0.75	0.92	0.25	0.85	0.18	0.94	0.49
Control Delay	42.6	60.0	78.4	43.1	39.5	51.0	38.9	43.1	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	60.0	78.4	43.1	39.5	51.0	38.9	43.1	12.3
Queue Length 50th (ft)	103	33	89	448	25	231	35	516	231
Queue Length 95th (ft)	147	73	#196	#626	56	287	73	#692	295
Internal Link Dist (ft)		348				970			1130
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	654	143	162	1240	167	1108	345	1527	2219
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.33	0.75	0.92	0.25	0.81	0.17	0.94	0.49

Intersection Summary

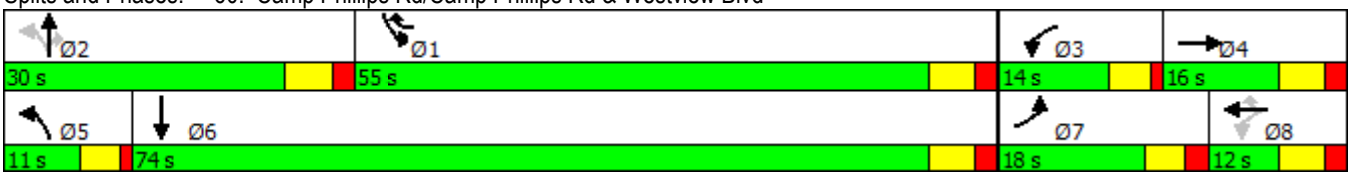
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8	2		2			
Detector Phase	7	4		3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	6.0		6.0	6.0	6.0	6.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	13.5	12.0		10.5	12.0	12.0	10.5	21.0	21.0	12.0	21.0	
Total Split (s)	18.0	16.0		14.0	12.0	55.0	11.0	30.0	30.0	55.0	74.0	
Total Split (%)	15.7%	13.9%		12.2%	10.4%	47.8%	9.6%	26.1%	26.1%	47.8%	64.3%	
Maximum Green (s)	12.5	10.0		9.5	6.0	49.0	6.5	24.0	24.0	49.0	68.0	
Yellow Time (s)	3.5	4.0		3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	20.8	8.3		10.2		49.2	24.5	23.0	23.0	49.2	71.9	
Actuated g/C Ratio	0.19	0.08		0.09		0.44	0.22	0.21	0.21	0.44	0.65	
v/c Ratio	0.48	0.39		0.75		0.92	0.25	0.85	0.18	0.94	0.49	
Control Delay	42.6	60.0		78.4		43.1	39.5	51.0	38.9	43.1	12.3	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.6	60.0		78.4		43.1	39.5	51.0	38.9	43.1	12.3	
LOS	D	E		E		D	D	D	D	D	B	
Approach Delay		44.9			46.5			49.8			29.8	
Approach LOS		D			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 110.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 38.9 — Intersection LOS: D
Intersection Capacity Utilization 85.3% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	115	0	1550	40	850	110	1360	790	240
Future Volume (vph)	295	0	45	115	0	1550	40	850	110	1360	790	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		200
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1583	0	1770	1863	2787	1770	5085	1583	3433	3415	0
Flt Permitted	0.950			0.000			0.208			0.950		
Satd. Flow (perm)	3433	1583	0	0	1863	2787	387	5085	1583	3433	3415	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		428			648			1050			1210	
Travel Time (s)		11.7			14.7			20.5			23.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	311	0	47	121	0	1142	42	895	58	1432	832	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	47	0	121	0	1142	42	895	58	1432	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt		pm+ov	pm+pt	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	

Appendix F:
Transportation System Improvements with Build Traffic Operational Analysis

2040 Full Build Transportation System Improvements – Sensitivity Analysis (Westbound) – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	0	30	50	0	540	35	855	70	1000	570	425
Future Volume (veh/h)	125	0	30	50	0	540	35	855	70	1000	570	425
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900	1863	1863	1863	1863	1863	1863	1845	1845	1900
Adj Flow Rate, veh/h	133	0	32	53	0	402	37	910	37	1064	606	452
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	289	0	400	237	211	1241	154	1023	319	1131	977	728
Arrive On Green	0.09	0.00	0.26	0.11	0.00	0.11	0.04	0.20	0.20	0.33	0.51	0.51
Sat Flow, veh/h	3312	0	1524	1372	1863	2787	1774	5085	1583	3408	1917	1428
Grp Volume(v), veh/h	133	0	32	53	0	402	37	910	37	1064	554	504
Grp Sat Flow(s),veh/h/ln	1656	0	1524	1372	1863	1393	1774	1695	1583	1704	1752	1593
Q Serve(g_s), s	3.4	0.0	1.4	3.1	0.0	2.2	1.6	15.4	1.7	26.8	20.0	20.0
Cycle Q Clear(g_c), s	3.4	0.0	1.4	3.1	0.0	2.2	1.6	15.4	1.7	26.8	20.0	20.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.90
Lane Grp Cap(c), veh/h	289	0	400	237	211	1241	154	1023	319	1131	893	812
V/C Ratio(X)	0.46	0.00	0.08	0.22	0.00	0.32	0.24	0.89	0.12	0.94	0.62	0.62
Avail Cap(c_a), veh/h	319	0	414	237	211	1241	212	1037	323	1159	893	812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	24.5	36.1	0.0	4.9	31.6	34.3	28.8	28.6	15.5	15.5
Incr Delay (d2), s/veh	1.1	0.0	0.1	0.5	0.0	0.2	0.8	9.6	0.2	14.3	1.3	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	1.1	2.2	0.0	2.8	1.4	12.7	1.4	21.1	15.0	13.9
LnGrp Delay(d),s/veh	39.4	0.0	24.6	36.6	0.0	5.0	32.4	43.9	29.0	42.9	16.8	17.0
LnGrp LOS	D		C	D		A	C	D	C	D	B	B
Approach Vol, veh/h		165			455			984			2122	
Approach Delay, s/veh		36.6			8.7			42.9			29.9	
Approach LOS		D			A			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.3	23.8		29.2	8.1	51.0	13.2	16.0
Change Period (Y+Rc), s	6.0	6.0		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	30.0	18.0		24.0	6.5	43.0	8.5	10.0
Max Q Clear Time (g_c+I1), s	28.8	17.4		3.4	3.6	22.0	5.4	5.1
Green Ext Time (p_c), s	0.5	0.4		1.9	0.0	12.3	0.1	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	133	32	53	402	37	910	37	1064	1058
v/c Ratio	0.35	0.10	0.32	0.35	0.17	0.83	0.11	0.89	0.57
Control Delay	39.7	26.0	42.1	11.4	29.8	40.5	30.1	37.7	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	26.0	42.1	11.4	29.8	40.5	30.1	37.7	15.8
Queue Length 50th (ft)	37	14	28	44	17	186	17	299	234
Queue Length 95th (ft)	66	36	65	64	42	#259	44	#428	305
Internal Link Dist (ft)		316				945			1152
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	377	445	166	1203	220	1114	346	1241	1855
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.07	0.32	0.33	0.17	0.82	0.11	0.86	0.57

Intersection Summary

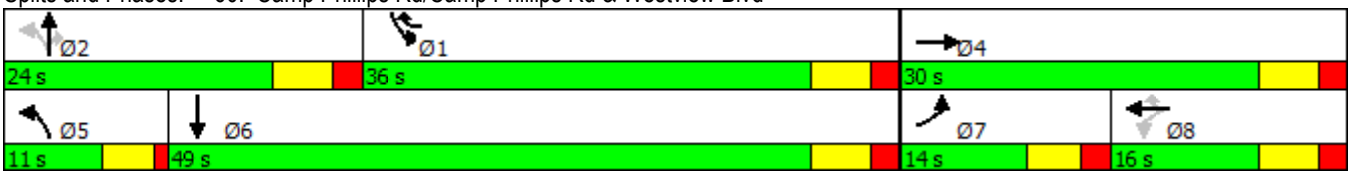
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	14.0	10.5	21.0	21.0	14.0	21.0	
Total Split (s)	14.0	30.0		16.0	16.0	36.0	11.0	24.0	24.0	36.0	49.0	
Total Split (%)	15.6%	33.3%		17.8%	17.8%	40.0%	12.2%	26.7%	26.7%	40.0%	54.4%	
Maximum Green (s)	8.5	24.0		10.0	10.0	30.0	6.5	18.0	18.0	30.0	43.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.5	17.9		10.1		34.7	19.3	17.8	17.8	29.2	47.0	
Actuated g/C Ratio	0.11	0.22		0.12		0.42	0.23	0.21	0.21	0.35	0.57	
v/c Ratio	0.35	0.10		0.32		0.35	0.17	0.83	0.11	0.89	0.57	
Control Delay	39.7	26.0		42.1		11.4	29.8	40.5	30.1	37.7	15.8	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.7	26.0		42.1		11.4	29.8	40.5	30.1	37.7	15.8	
LOS	D	C		D		B	C	D	C	D	B	
Approach Delay		37.0			15.0			39.8			26.8	
Approach LOS		D			B			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 83.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 29.2 — Intersection LOS: C
Intersection Capacity Utilization 70.3% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	50	0	540	35	855	70	1000	570	425
Future Volume (vph)	125	0	30	50	0	540	35	855	70	1000	570	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		0
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3303	1524	0	1770	1863	2787	1770	5085	1583	3400	3281	0
Flt Permitted	0.950			0.736			0.282			0.950		
Satd. Flow (perm)	3303	1524	0	1371	1863	2787	525	5085	1583	3400	3281	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			650			1025			1232	
Travel Time (s)		10.8			14.8			20.0			24.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	32	53	0	402	37	910	37	1064	606	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	32	0	53	0	402	37	910	37	1064	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	0	45	115	0	1315	40	1085	110	1360	790	240
Future Volume (veh/h)	295	0	45	115	0	1315	40	1085	110	1360	790	240
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	311	0	47	121	0	969	42	1142	58	1432	832	253
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	266	0	97	251	102	1330	258	1202	374	1455	1682	511
Arrive On Green	0.08	0.00	0.06	0.08	0.00	0.05	0.04	0.24	0.24	0.42	0.63	0.63
Sat Flow, veh/h	3442	0	1583	1774	1863	2787	1774	5085	1583	3442	2676	813
Grp Volume(v), veh/h	311	0	47	121	0	969	42	1142	58	1432	550	535
Grp Sat Flow(s),veh/h/ln	1721	0	1583	1774	1863	1393	1774	1695	1583	1721	1770	1719
Q Serve(g_s), s	8.5	0.0	3.2	7.0	0.0	6.0	1.9	24.3	3.2	45.2	18.4	18.4
Cycle Q Clear(g_c), s	8.5	0.0	3.2	7.0	0.0	6.0	1.9	24.3	3.2	45.2	18.4	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	266	0	97	251	102	1330	258	1202	374	1455	1113	1081
V/C Ratio(X)	1.17	0.00	0.48	0.48	0.00	0.73	0.16	0.95	0.15	0.98	0.49	0.49
Avail Cap(c_a), veh/h	266	0	97	263	102	1330	293	1202	374	1455	1113	1081
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.8	0.0	50.0	44.3	0.0	23.0	29.5	41.4	33.3	31.4	11.0	11.0
Incr Delay (d2), s/veh	108.9	0.0	3.7	1.4	0.0	2.1	0.3	15.5	0.2	19.9	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.5	0.0	2.7	6.3	0.0	17.9	1.7	19.1	2.6	33.8	13.9	13.6
LnGrp Delay(d),s/veh	159.7	0.0	53.7	45.7	0.0	25.1	29.8	56.9	33.5	51.2	11.3	11.4
LnGrp LOS	F		D	D		C	C	E	C	D	B	B
Approach Vol, veh/h		358			1090			1242			2517	
Approach Delay, s/veh		145.8			27.4			54.9			34.0	
Approach LOS		F			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	52.0	32.0	13.3	12.7	8.8	75.2	14.0	12.0
Change Period (Y+Rc), s	5.5	6.0	4.5	6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	46.5	26.0	9.5	6.0	6.5	67.0	8.5	6.0
Max Q Clear Time (g_c+I1), s	47.2	26.3	9.0	5.2	3.9	20.4	10.5	8.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.5	0.0	25.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	45.3
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	311	47	121	969	42	1142	58	1432	1085
v/c Ratio	0.54	0.53	0.78	0.80	0.18	0.93	0.15	0.96	0.48
Control Delay	44.6	73.0	80.8	33.4	17.1	54.1	34.7	47.0	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	73.0	80.8	33.4	17.1	54.1	34.7	47.0	10.9
Queue Length 50th (ft)	102	33	85	336	12	292	33	505	213
Queue Length 95th (ft)	146	#85	#186	435	27	#384	68	#670	268
Internal Link Dist (ft)		348				970			1130
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	571	88	156	1207	232	1231	383	1486	2278
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.53	0.78	0.80	0.18	0.93	0.15	0.96	0.48

Intersection Summary

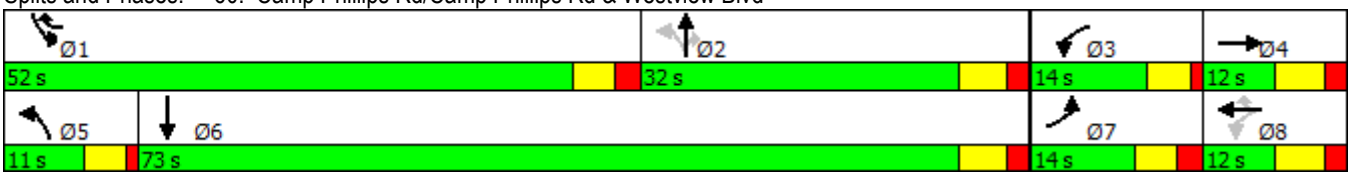
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8	2		2			
Detector Phase	7	4		3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	6.0		6.0	6.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	12.0		10.5	12.0	13.5	10.5	21.0	21.0	13.5	21.0	
Total Split (s)	14.0	12.0		14.0	12.0	52.0	11.0	32.0	32.0	52.0	73.0	
Total Split (%)	12.7%	10.9%		12.7%	10.9%	47.3%	10.0%	29.1%	29.1%	47.3%	66.4%	
Maximum Green (s)	8.5	6.0		9.5	6.0	46.5	6.5	26.0	26.0	46.5	67.0	
Yellow Time (s)	3.5	4.0		3.5	4.0	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		4.5	6.0	5.5	4.5	6.0	6.0	5.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	17.9	6.0		9.5		46.6	33.8	26.1	26.1	46.6	71.8	
Actuated g/C Ratio	0.17	0.06		0.09		0.43	0.31	0.24	0.24	0.43	0.67	
v/c Ratio	0.54	0.53		0.78		0.80	0.18	0.93	0.15	0.96	0.48	
Control Delay	44.6	73.0		80.8		33.4	17.1	54.1	34.7	47.0	10.9	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.6	73.0		80.8		33.4	17.1	54.1	34.7	47.0	10.9	
LOS	D	E		F		C	B	D	C	D	B	
Approach Delay		48.3			38.7			51.9			31.4	
Approach LOS		D			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 107.6
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 39.0 — Intersection LOS: D
Intersection Capacity Utilization 89.4% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	115	0	1315	40	1085	110	1360	790	240
Future Volume (vph)	295	0	45	115	0	1315	40	1085	110	1360	790	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		200
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1583	0	1770	1863	2787	1770	5085	1583	3433	3415	0
Flt Permitted	0.950			0.000			0.263			0.950		
Satd. Flow (perm)	3433	1583	0	0	1863	2787	490	5085	1583	3433	3415	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		428			648			1050			1210	
Travel Time (s)		11.7			14.7			20.5			23.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	311	0	47	121	0	969	42	1142	58	1432	832	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	47	0	121	0	969	42	1142	58	1432	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt		pm+ov	pm+pt	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	

Appendix F:
Transportation System Improvements with Build Traffic Operational Analysis

2040 Full Build Transportation System Improvements – Sensitivity Analysis (Southbound) – Synchro 9 Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	0	45	115	0	1315	40	1085	110	1156	994	240
Future Volume (veh/h)	295	0	45	115	0	1315	40	1085	110	1156	994	240
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	311	0	47	121	0	969	42	1142	58	1217	1046	253
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	0	173	305	137	1231	239	1231	383	1268	1641	395
Arrive On Green	0.11	0.00	0.11	0.08	0.00	0.07	0.04	0.24	0.24	0.37	0.58	0.58
Sat Flow, veh/h	3442	0	1583	1774	1863	2787	1774	5085	1583	3442	2831	682
Grp Volume(v), veh/h	311	0	47	121	0	969	42	1142	58	1217	652	647
Grp Sat Flow(s),veh/h/ln	1721	0	1583	1774	1863	1393	1774	1695	1583	1721	1770	1742
Q Serve(g_s), s	9.7	0.0	3.0	6.8	0.0	8.0	1.9	23.9	3.1	37.7	26.7	27.1
Cycle Q Clear(g_c), s	9.7	0.0	3.0	6.8	0.0	8.0	1.9	23.9	3.1	37.7	26.7	27.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	363	0	173	305	137	1231	239	1231	383	1268	1026	1010
V/C Ratio(X)	0.86	0.00	0.27	0.40	0.00	0.79	0.18	0.93	0.15	0.96	0.64	0.64
Avail Cap(c_a), veh/h	363	0	173	320	137	1231	274	1259	392	1278	1026	1010
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.0	0.0	44.6	42.1	0.0	26.1	28.8	40.4	32.5	33.7	15.2	15.3
Incr Delay (d2), s/veh	18.0	0.0	0.8	0.8	0.0	3.5	0.3	11.8	0.2	16.5	1.3	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	0.0	2.4	6.1	0.0	18.9	1.7	18.4	2.5	28.3	19.4	19.3
LnGrp Delay(d),s/veh	66.0	0.0	45.4	42.9	0.0	29.5	29.2	52.2	32.7	50.1	16.5	16.7
LnGrp LOS	E		D	D		C	C	D	C	D	B	B
Approach Vol, veh/h		358			1090			1242			2516	
Approach Delay, s/veh		63.3			31.0			50.5			32.8	
Approach LOS		E			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	45.7	32.4	13.1	17.9	8.8	69.2	17.0	14.0
Change Period (Y+Rc), s	5.5	6.0	4.5	6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	40.5	27.0	9.5	11.0	6.5	62.0	11.5	8.0
Max Q Clear Time (g_c+I1), s	39.7	25.9	8.8	5.0	3.9	29.1	11.7	10.0
Green Ext Time (p_c), s	0.5	0.5	0.0	2.5	0.0	23.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	38.8
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	311	47	121	969	42	1142	58	1217	1299
v/c Ratio	0.44	0.31	0.71	0.92	0.20	0.89	0.15	0.93	0.61
Control Delay	38.5	52.0	71.5	46.2	16.6	48.6	33.5	46.2	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	52.0	71.5	46.2	16.6	48.6	33.5	46.2	15.2
Queue Length 50th (ft)	96	31	84	366	10	284	32	422	311
Queue Length 95th (ft)	137	70	#186	#521	23	#372	68	#576	396
Internal Link Dist (ft)		348				970			1130
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	708	165	170	1074	214	1306	406	1322	2146
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.28	0.71	0.90	0.20	0.87	0.14	0.92	0.61

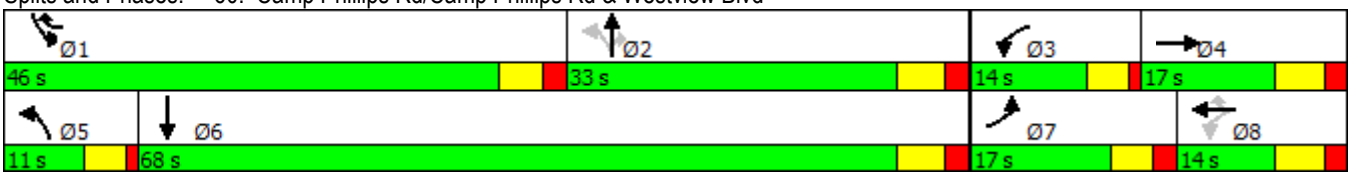
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8	2		2			
Detector Phase	7	4		3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		6.0	8.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		10.5	14.0	13.5	10.5	21.0	21.0	13.5	21.0	
Total Split (s)	17.0	17.0		14.0	14.0	46.0	11.0	33.0	33.0	46.0	68.0	
Total Split (%)	15.5%	15.5%		12.7%	12.7%	41.8%	10.0%	30.0%	30.0%	41.8%	61.8%	
Maximum Green (s)	11.5	11.0		9.5	8.0	40.5	6.5	27.0	27.0	40.5	62.0	
Yellow Time (s)	3.5	4.0		3.5	4.0	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		4.5	6.0	5.5	4.5	6.0	6.0	5.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	21.8	10.2		10.2		40.1	34.4	26.6	26.6	40.1	66.0	
Actuated g/C Ratio	0.21	0.10		0.10		0.38	0.33	0.25	0.25	0.38	0.62	
v/c Ratio	0.44	0.31		0.71		0.92	0.20	0.89	0.15	0.93	0.61	
Control Delay	38.5	52.0		71.5		46.2	16.6	48.6	33.5	46.2	15.2	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.5	52.0		71.5		46.2	16.6	48.6	33.5	46.2	15.2	
LOS	D	D		E		D	B	D	C	D	B	
Approach Delay		40.2			49.0			46.8			30.2	
Approach LOS		D			D			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 105.6	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 38.8	Intersection LOS: D
Intersection Capacity Utilization 83.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	115	0	1315	40	1085	110	1156	994	240
Future Volume (vph)	295	0	45	115	0	1315	40	1085	110	1156	994	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		200
Storage Lanes	2		0	1		2	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1583	0	1770	1863	2787	1770	5085	1583	3433	3437	0
Flt Permitted	0.950			0.000			0.212			0.950		
Satd. Flow (perm)	3433	1583	0	0	1863	2787	395	5085	1583	3433	3437	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		428			648			1050			1210	
Travel Time (s)		11.7			14.7			20.5			23.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	311	0	47	121	0	969	42	1142	58	1217	1046	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	47	0	121	0	969	42	1142	58	1217	1299	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt		pm+ov	pm+pt	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	0	30	50	0	540	35	855	70	850	720	425
Future Volume (veh/h)	125	0	30	50	0	540	35	855	70	850	720	425
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900	1863	1863	1863	1863	1863	1863	1845	1845	1900
Adj Flow Rate, veh/h	133	0	32	53	0	402	37	910	37	904	766	452
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	294	0	408	242	215	1184	156	1093	340	1054	1066	625
Arrive On Green	0.09	0.00	0.27	0.12	0.00	0.12	0.04	0.21	0.21	0.31	0.50	0.50
Sat Flow, veh/h	3312	0	1524	1372	1863	2787	1774	5085	1583	3408	2129	1248
Grp Volume(v), veh/h	133	0	32	53	0	402	37	910	37	904	630	588
Grp Sat Flow(s),veh/h/ln	1656	0	1524	1372	1863	1393	1774	1695	1583	1704	1752	1624
Q Serve(g_s), s	3.3	0.0	1.4	3.1	0.0	2.2	1.5	14.8	1.6	21.6	24.2	24.5
Cycle Q Clear(g_c), s	3.3	0.0	1.4	3.1	0.0	2.2	1.5	14.8	1.6	21.6	24.2	24.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	294	0	408	242	215	1184	156	1093	340	1054	877	813
V/C Ratio(X)	0.45	0.00	0.08	0.22	0.00	0.34	0.24	0.83	0.11	0.86	0.72	0.72
Avail Cap(c_a), veh/h	325	0	423	242	215	1184	216	1175	366	1103	877	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	0.0	23.7	35.2	0.0	5.3	30.2	32.5	27.3	28.1	16.8	16.9
Incr Delay (d2), s/veh	1.1	0.0	0.1	0.5	0.0	0.2	0.8	5.0	0.1	6.7	2.8	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	1.0	2.1	0.0	2.9	1.4	11.9	1.3	16.6	18.2	17.3
LnGrp Delay(d),s/veh	38.5	0.0	23.8	35.7	0.0	5.4	31.0	37.5	27.4	34.8	19.7	20.1
LnGrp LOS	D		C	D		A	C	D	C	C	B	C
Approach Vol, veh/h		165			455			984			2122	
Approach Delay, s/veh		35.7			8.9			36.8			26.2	
Approach LOS		D			A			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.8	24.6		29.2	8.0	49.3	13.2	16.0
Change Period (Y+Rc), s	6.0	6.0		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	28.0	20.0		24.0	6.5	43.0	8.5	10.0
Max Q Clear Time (g_c+I1), s	23.6	16.8		3.4	3.5	26.5	5.3	5.1
Green Ext Time (p_c), s	3.2	1.8		2.0	0.0	10.8	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.3
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	133	32	53	402	37	910	37	904	1218
v/c Ratio	0.33	0.09	0.27	0.36	0.16	0.71	0.09	0.79	0.59
Control Delay	39.4	25.8	40.0	11.7	27.8	32.7	28.2	32.0	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	25.8	40.0	11.7	27.8	32.7	28.2	32.0	16.4
Queue Length 50th (ft)	37	14	28	48	16	180	17	246	288
Queue Length 95th (ft)	66	36	65	70	41	229	42	#348	374
Internal Link Dist (ft)		316				945			1152
Turn Bay Length (ft)			150	450	100		350	700	
Base Capacity (vph)	407	507	198	1267	243	1410	438	1319	2025
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.06	0.27	0.32	0.15	0.65	0.08	0.69	0.60

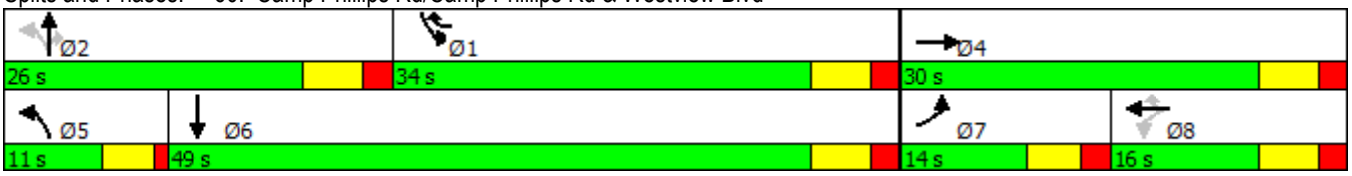
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	14.0	10.5	21.0	21.0	14.0	21.0	
Total Split (s)	14.0	30.0		16.0	16.0	34.0	11.0	26.0	26.0	34.0	49.0	
Total Split (%)	15.6%	33.3%		17.8%	17.8%	37.8%	12.2%	28.9%	28.9%	37.8%	54.4%	
Maximum Green (s)	8.5	24.0		10.0	10.0	28.0	6.5	20.0	20.0	28.0	43.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.4	17.9		10.7		31.2	21.1	19.5	19.5	26.0	48.3	
Actuated g/C Ratio	0.12	0.23		0.14		0.40	0.27	0.25	0.25	0.34	0.62	
v/c Ratio	0.33	0.09		0.27		0.36	0.16	0.71	0.09	0.79	0.59	
Control Delay	39.4	25.8		40.0		11.7	27.8	32.7	28.2	32.0	16.4	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.4	25.8		40.0		11.7	27.8	32.7	28.2	32.0	16.4	
LOS	D	C		D		B	C	C	C	C	B	
Approach Delay		36.7			15.0			32.3			23.0	
Approach LOS		D			B			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 77.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 25.1	Intersection LOS: C
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	50	0	540	35	855	70	850	720	425
Future Volume (vph)	125	0	30	50	0	540	35	855	70	850	720	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		350	700		0
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.944	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3303	1524	0	1770	1863	2787	1770	5085	1583	3400	3309	0
Flt Permitted	0.950			0.769			0.247			0.950		
Satd. Flow (perm)	3303	1524	0	1432	1863	2787	460	5085	1583	3400	3309	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		396			650			1025			1232	
Travel Time (s)		10.8			14.8			20.0			24.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	32	53	0	402	37	910	37	904	766	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	32	0	53	0	402	37	910	37	904	1218	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	

Appendix G

Transportation System Improvements with Total Traffic Operational Analysis

Not Applicable

Appendix H

Justification for a Regulatory Speed Limit Change

Not Applicable

Appendix I

Warrant Analysis for Intersection Traffic Control

I. 2020 Background Traffic Volumes Signal Warrant Analysis
II. 2020 with Phase I Development Traffic Volumes Signal Warrant Analysis

12-Hour Distributions by Land Use

	Hour	Free-Standing Superstore							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	129	1.7%	103	6	129	1.7%	6	103
	7-8	236	3.1%	189	12	213	2.8%	11	170
	8-9	213	2.8%	170	11	183	2.4%	9	146
	9-10	388	5.1%	310	19	266	3.5%	13	213
	10-11	487	6.4%	390	24	548	7.2%	27	438
	11-12	624	8.2%	499	31	570	7.5%	29	456
	12-1	707	9.3%	566	35	684	9.0%	34	547
PM	1-2	472	6.2%	378	24	608	8.0%	30	486
	2-3	517	6.8%	414	26	593	7.8%	30	474
	3-4	502	6.6%	402	25	510	6.7%	26	408
	4-5	563	7.4%	450	28	532	7.0%	27	426
	5-6	411	5.4%	329	21	426	5.6%	21	341
		Total Daily %	*69.0%*			*Total Daily %*	*69.2%*		
	24-Hour Daily One-Way	7605			24-Hour Daily One-Way	7605			
			Total Daily Two-Way	15210					

	Hour	Shopping Center							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	45	1.5%	36	2	30	1.0%	2	24
	7-8	76	2.5%	61	4	73	2.4%	4	58
	8-9	118	3.9%	94	6	73	2.4%	4	58
	9-10	166	5.5%	133	8	112	3.7%	6	90
	10-11	230	7.6%	184	12	196	6.5%	10	157
	11-12	230	7.6%	184	12	254	8.4%	13	203
	12-1	230	7.6%	184	12	248	8.2%	12	198
PM	1-2	209	6.9%	167	10	227	7.5%	11	182
	2-3	272	9.0%	218	14	236	7.8%	12	189
	3-4	290	9.6%	232	15	287	9.5%	14	230
	4-5	293	9.7%	234	15	314	10.4%	16	251
	5-6	311	10.3%	249	16	332	11.0%	17	266
		Total Daily %	*81.7%*			*Total Daily %*	*78.8%*		
	24-Hour Daily One-Way	3023			24-Hour Daily One-Way	3023			
			Total Daily Two-Way	6045					

	Hour	Home Improvement Store							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	46	1.9%	37	2	19	0.8%	1	15
	7-8	85	3.5%	68	4	36	1.5%	2	29
	8-9	119	4.9%	95	6	85	3.5%	4	68
	9-10	131	5.4%	105	7	136	5.6%	7	109
	10-11	160	6.6%	128	8	155	6.4%	8	124
	11-12	225	9.3%	180	11	186	7.7%	9	149
	12-1	254	10.5%	203	13	276	11.4%	14	221
PM	1-2	194	8.0%	155	10	247	10.2%	12	198
	2-3	186	7.7%	149	9	165	6.8%	8	132
	3-4	150	6.2%	120	8	186	7.7%	9	149
	4-5	157	6.5%	126	8	177	7.3%	9	142
	5-6	179	7.4%	143	9	206	8.5%	10	165
		Total Daily %	*77.9%*			*Total Daily %*	*77.4%*		
	24-Hour Daily One-Way	2420			24-Hour Daily One-Way	2420			
			Total Daily Two-Way	4840					

	Hour	Supermarket							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	45	1.8%	36	2	32	1.3%	2	26
	7-8	68	2.7%	54	3	43	1.7%	2	34
	8-9	92	3.7%	74	5	85	3.4%	4	68
	9-10	110	4.4%	88	6	99	4.0%	5	79
	10-11	135	5.4%	108	7	126	5.1%	6	101
	11-12	162	6.5%	130	8	146	5.9%	7	117
	12-1	153	6.2%	122	8	165	6.6%	8	132
PM	1-2	183	7.4%	146	9	186	7.5%	9	149
	2-3	223	9.0%	178	11	245	9.9%	12	196
	3-4	260	10.5%	208	13	242	9.8%	12	194
	4-5	257	10.3%	206	13	271	10.9%	14	217
	5-6	161	6.5%	129	8	211	8.5%	11	169
		Total Daily %	*74.6%*			*Total Daily %*	*74.6%*		
	24-Hour Daily One-Way	2480			24-Hour Daily One-Way	2480			
			Total Daily Two-Way	4960					

12-Hour Distributions by Land Use

	Hour	Gasoline/Service Station with Convenience Market and Car Wash							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	33	4.3%	26	2	56	7.3%	3	45
	7-8	60	7.9%	48	3	52	6.8%	3	42
	8-9	44	5.8%	35	2	50	6.5%	3	40
	9-10	46	6.0%	37	2	46	6.0%	2	37
	10-11	34	4.5%	27	2	29	3.8%	1	23
	11-12	50	6.6%	40	3	37	4.8%	2	30
	12-1	53	6.9%	42	3	61	8.0%	3	49
PM	1-2	37	4.8%	30	2	50	6.5%	3	40
	2-3	52	6.8%	42	3	68	8.9%	3	54
	3-4	60	7.9%	48	3	59	7.7%	3	47
	4-5	55	7.2%	44	3	43	5.6%	2	34
	5-6	54	7.1%	43	3	46	6.0%	2	37
		Total Daily %	*75.8%*			*Total Daily %*	*77.9%*		
	24-Hour Daily One-Way	763			24-Hour Daily One-Way	763			
			Total Daily Two-Way	1525					

	Hour	Fast-Food Restaurant without Drive-Through Window							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	9	0.4%	7	0	9	0.4%	0	7
	7-8	9	0.4%	7	0	9	0.4%	0	7
	8-9	54	2.5%	43	3	19	0.9%	1	15
	9-10	26	1.2%	21	1	19	0.9%	1	15
	10-11	71	3.3%	57	4	64	3.0%	3	51
	11-12	247	11.5%	198	12	232	10.8%	12	186
	12-1	372	17.3%	298	19	464	21.6%	23	371
PM	1-2	159	7.4%	127	8	213	9.9%	11	170
	2-3	71	3.3%	57	4	120	5.6%	6	96
	3-4	125	5.8%	100	6	129	6.0%	6	103
	4-5	185	8.6%	148	9	112	5.2%	6	90
	5-6	326	15.2%	261	16	260	12.1%	13	208
		Total Daily %	*76.9%*			*Total Daily %*	*76.8%*		
	24-Hour Daily One-Way	2148			24-Hour Daily One-Way	2148			
			Total Daily Two-Way	4295					

	Hour	General Office							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	44	13.4%	35	2	6	1.7%	0	5
	7-8	67	20.2%	54	3	6	1.9%	0	5
	8-9	64	19.5%	51	3	4	1.3%	0	3
	9-10	26	7.9%	21	1	5	1.6%	0	4
	10-11	9	2.6%	7	0	5	1.6%	0	4
	11-12	9	2.8%	7	0	13	4.0%	1	10
	12-1	10	2.9%	8	1	13	3.9%	1	10
PM	1-2	10	3.0%	8	1	10	3.0%	1	8
	2-3	7	2.0%	6	0	22	6.6%	1	18
	3-4	7	2.2%	6	0	59	17.8%	3	47
	4-5	5	1.6%	4	0	75	22.6%	4	60
	5-6	5	1.4%	4	0	44	13.2%	2	35
		Total Daily %	*79.5%*			*Total Daily %*	*79.2%*		
	24-Hour Daily One-Way	330			24-Hour Daily One-Way	330			
			Total Daily Two-Way	660					

	Hour	Drive-In Bank (General Office Land Use Distribution Used)							
		In Volume	In %	Southbound Left In (80%)	Northbound Right In (5%)	Out Volume	Out %	Westbound Left Out (5%)	Westbound Right Out (80%)
AM	6-7	26	13.4%	21	1	3	1.7%	0	2
	7-8	39	20.2%	31	2	4	1.9%	0	3
	8-9	38	19.5%	30	2	3	1.3%	0	2
	9-10	15	7.9%	12	1	3	1.6%	0	2
	10-11	5	2.6%	4	0	3	1.6%	0	2
	11-12	5	2.8%	4	0	8	4.0%	0	6
	12-1	6	2.9%	5	0	8	3.9%	0	6
PM	1-2	6	3.0%	5	0	6	3.0%	0	5
	2-3	4	2.0%	3	0	13	6.6%	1	10
	3-4	4	2.2%	3	0	35	17.8%	2	28
	4-5	3	1.6%	2	0	44	22.6%	2	35
	5-6	3	1.4%	2	0	26	13.2%	1	21
		Total Daily %	*79.5%*			*Total Daily %*	*79.2%*		
	24-Hour Daily One-Way	195			24-Hour Daily One-Way	195			
			Total Daily Two-Way	390					

Total Turning Movement Count Breakdown for Phase I Development Summary Table

Hour	Left In (80%)	Right In (5%)		Left Out (5%)	Right Out (80%)
6-7	266	17		14	222
7-8	458	29		22	344
8-9	542	34		25	398
9-10	706	44		34	545
10-11	898	56		56	897
11-12	1234	77		72	1146
12-1	1420	89		95	1525
1-2	1008	63		77	1230
2-3	1060	66		72	1152
3-4	1113	70		72	1158
4-5	1210	76		75	1194
5-6	1156	72		75	1206

Total Traffic Summary

2016 BACKGROUND TRAFFIC

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am				0	0				0	0	0									0	0	0
7-8 am		350	286	350	636	27	530		557	557	1193						81		24	81	105	105
8-9 am		259	168	259	427	13	248		261	261	688						79		13	79	92	92
9-10 am				0	0				0	0	0									0	0	0
10-11 am				0	0				0	0	0									0	0	0
11-12 pm				0	0				0	0	0									0	0	0
12-1 pm				0	0				0	0	0									0	0	0
1-2 pm				0	0				0	0	0									0	0	0
2-3 pm				0	0				0	0	0									0	0	0
3-4 pm				0	0				0	0	0									0	0	0
4-5 pm		537	168	537	705	25	520		545	545	1250						172		34	172	206	206
5-6 pm		505	100	505	605	27	475		502	502	1107						162		27	162	189	189

2020 BACKGROUND TRAFFIC

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am				0	0				0	0	0									0	0	0
7-8 am		367	300	367	667	28	555		584	584	1250.264						85		25	85	110	110
8-9 am		271	176	271	447	14	260		274	274	721.024						83		14	83	96	96
9-10 am				0	0				0	0	0									0	0	0
10-11 am				0	0				0	0	0									0	0	0
11-12 pm				0	0				0	0	0									0	0	0
12-1 pm				0	0				0	0	0									0	0	0
1-2 pm				0	0				0	0	0									0	0	0
2-3 pm				0	0				0	0	0									0	0	0
3-4 pm				0	0				0	0	0									0	0	0
4-5 pm		563	176	563	739	26	545		571	571	1310						180		36	180	216	216
5-6 pm		529	105	529	634	28	498		526	526	1160.136						170		28	170	198	198

Development TMC

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am	266			266	266			17	0	17	283.05	14		222	14	236				0	0	236
7-8 am	458			458	458			29	0	29	487.05	22		344	22	366				0	0	366
8-9 am	542			542	542			34	0	34	576.3	25		398	25	423				0	0	423
9-10 am	706			706	706			44	0	44	749.7	34		545	34	579				0	0	579
10-11 am	898			898	898			56	0	56	953.7	56		897	56	953				0	0	953
11-12 pm	1234			1234	1234			77	0	77	1311.55	72		1146	72	1218				0	0	1218
12-1 pm	1420			1420	1420			89	0	89	1508.75	95		1525	95	1620				0	0	1620
1-2 pm	1008			1008	1008			63	0	63	1071	77		1230	77	1306				0	0	1306
2-3 pm	1060			1060	1060			66	0	66	1126.25	72		1152	72	1224				0	0	1224
3-4 pm	1113			1113	1113			70	0	70	1182.35	72		1158	72	1231				0	0	1231
4-5 pm	1210			1210	1210			76	0	76	1286.05	75		1194	75	1269				0	0	1269
5-6 pm	1156			1156	1156			72	0	72	1228.25	75		1206	75	1281				0	0	1281

Total Traffic Volumes Phase I

Start Time	NORTH/SOUTH ROADWAY										TOTAL	EAST/WEST ROADWAY										TOTAL
	SB					NB						WB					EB					
	LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL		LT	TH	RT	LT+TH	TOTAL	LT	TH	RT	LT+TH	TOTAL	
6-7 am	266			266	266			17	0	17	283	14		222	14	236				0	0	236
7-8 am	458	367	300	825	1125	28	555	29	583	612	1737	22		344	22	366	85		25	85	110	476
8-9 am	542	271	176	813	989	14	260	34	274	308	1297	25		398	25	423	83		14	83	97	520
9-10 am	706			706	706			44	0	44	750	34		545	34	579				0	0	579
10-11 am	898			898	898			56	0	56	954	56		897	56	953				0	0	953
11-12 pm	1234			1234	1234			77	0	77	1311	72		1146	72	1218				0	0	1218
12-1 pm	1420			1420	1420			89	0	89	1509	95		1525	95	1620				0	0	1620
1-2 pm	1008			1008	1008			63	0	63	1071	77		1230	77	1307				0	0	1307
2-3 pm	1060			1060	1060			66	0	66	1126	72		1152	72	1224				0	0	1224
3-4 pm	1113			1113	1113			70	0	70	1183	72		1158	72	1230				0	0	1230
4-5 pm	1210	563	176	1773	1949	26	545	76	571	647	2596	75		1194	75	1269	180		36	180	216	1485
5-6 pm	1156	529	105	1685	1790	28	498	72	526	598	2388	75		1206	75	1281	170		28	170	198	1479

DOCTNMBR		DOCTNMBR	ACCDDATE	NTPHHOUR	REGION	COUNTY	MUNICIPALITY	MUNITYPE	ONHWYTRP	ONHWYDIR	ONHWY	ONSTR	ATHWY	ATSTR	ATNMBR	INTDIR	INTDIS	ACCDTYPE		MNRCOLL	RLTNRDWY	ROADCOND	WTHRCOND	LGTCOND	ROADHOR	ROADVERT	ACCDSVR	INJSVR	TOTFATL	TOTINJ	ALCFLAG	BIKEFLAG	PEDFLAG	TOTVEH	TRVLDIR1	DRVROO1	TRFCNTL1	INJSVR1	DRVRPC1	TRVLDIR2	DRVROO2	TRFCNTL2	INJSVR2	DRVRPC2	STNM21	STNM22	Notes
L573CN2	07/15/2011		16	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON		CLDY		H	PD			0	0				2 E	LT TRN	SS		FTY	S	GO STR	NONE						
L56572T	08/29/2011		14	NC	MARATHON	WESTON	V				WESTVIEW X	CAMP PHIL				0		x	REAR	ON		CLDY			INJ	C		0	1				2 E	GO STR	SS		ID	E	STOPED	SS	C					
L5743ZX	10/23/2012		16	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL				0		x	REAR	ON	WET	RAIN			PD			0	0				2 E	SL/ST	SS		FVC	E	STOPED	SS						
L56CWBK	08/02/2012		10	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL				0		x	REAR	ON		CLDY			INJ	C		0	3				3 E	SL/ST	SS	C	ID,FVC	E	SL/ST	SS						
L56FCMW	01/21/2013		12	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL				0		x	ANGL	ON		CLR			INJ	B		0	1				2 E	LT TRN	SS		FTY	S	GO STR	NONE	B		341.04 1	344.62 1		
L56VPL8	02/07/2013		16	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL		W		1	OTHFX	x	NO	MED	SNOW	SNOW			PD			0	0				1 W	RT TRN	NONE		TFC,FVC									
L56CWDM	05/03/2013		14	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON	WET	RAIN		H	INJ	C		0	1				2 E	LT TRN	SS		FTY,FVC	S	GO STR	NONE	C					
L573CWF	10/17/2013		6	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON		FOG	DAWN		PD			0	0				2 E	LT TRN	SS		FTY	S	GO STR	NONE						
L57443J	12/13/2013		15	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON	SNOW	CLDY	DUSK		PD			0	0				2 E	LT TRN	SS			S	GO STR	NONE						
L574425	06/04/2013		19	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL				0		x	REAR	ON	WET	RAIN			PD			0	0				2 E	SL/ST	SS		ID	E	RT TRN	SS						
L573CVP	06/21/2013		15	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL				0		x	REAR	ON		CLDY			INJ	C		0	1				3 E	GO STR	SS		ID	E	STOPED	SS	C					
L56CWDQ	05/09/2013		12	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON	WET	RAIN		H	PD			0	0				2 E	LT TRN	SS		FTY	S	GO STR	NONE						
L574422	05/23/2013		15	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	SSOP	ON		CLR			PD			0	0				2 N	LT TRN	SS		FTY	S	GO STR	NONE			343.44 1	B		
L57W2NS	01/10/2014		17	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	REAR	ON	SNOW	SNOW	LIGT		INJ	C		0	1				3 S	LT TRN	SS	C	IT	N	GO STR	NONE						
L57WSZ4	11/14/2014		16	NC	MARATHON	WESTON	V				WESTVIEW BLVD	CAMP PHIL				0		x	REAR	ON		CLR			PD			0	0				2 E	SL/ST	SS		FTC	E	STOPED	SS						
L583QMT	07/23/2014		12	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0	CURB	x	NO	RTSH		CLR			INJ	C		0	1				1 S	GO STR	NONE	C	FVC									
L57W2Q2	05/28/2014		7	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON		CLDY			INJ	B		0	2				2 E	LT TRN	SS	B	FTY	S	GO STR	NONE	C					
L56DMMR	03/10/2014		16	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON	WET	CLR			PD			0	0				2 E	LT TRN	SS		FTY	S	GO STR	NONE						
L5C5L66	05/08/2015		7	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	ANGL	ON		CLDY			INJ	B		0	2				2 E	LT TRN	SS	B	FTY	S	GO STR	NONE	C					
L56WFRC	01/26/2015		17	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0	TFSIGN	x	NO	MED	SNOW	SNOW	LIGT	C		PD			0	0				2 S	GO STR	NONE			E	LT TRN	SS		FTY	346.18 3			
L57FQQ0	01/28/2016		8	NC	MARATHON	WESTON	V				WESTVIEW X	CAMP PHIL				0	OBNFX	x	NO	MED	ICE	CLDY	DAWN		PD			0	0				1 W	RT TRN	NONE		TFC,FVC									
L56SGWJ	02/15/2016		15	NC	MARATHON	WESTON	V				WESTVIEW X	CAMP PHIL				0		x	REAR	ON		CLDY			PD			0	0				2 E	SL/ST	SS		ID	E	STOPED	SS						
L5C6BHP	04/18/2016		11	NC	MARATHON	WESTON	V				CTH X	WESTVIEW				0		x	ANGL	ON		CLR			PD			0	0				2 E	LT TRN	SS		FTY	S	GO STR	NONE						
L5C6BJQ	09/29/2016		17	NC	MARATHON	WESTON	V				WESTVIEW X	CAMP PHIL				0		x	REAR	ON		CLR			PD			0	0				2 E	GO STR	SS			E	SL/ST	SS						
L5C4V3F	12/07/2016		14	NC	MARATHON	WESTON	V				CAMP PHILLIPS RD	WESTVIEW				0		x	SSS	ON		CLDY			PD			0	0				2 N	LT TRN	SS		FTY	N	GO STR	NONE						

Appendix I:
Warrant Analysis for Intersection Traffic Control

2020 Background Traffic Volumes Signal Warrant Analysis

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Camp Phillips Road & Westview Boulevard
County: Marathon
City: Weston

Major Street: Camp Phillips Rd
Critical Approach Speed: 35 mph
Lanes: 2 or more lanes

Minor Street: Westview Blvd
Critical Approach Speed: 25 mph
Lanes: 2 or more lanes

% Right Turns Included
From North (SB) 100%
From East (WB) 0%
From South (NB) 100%
From West (EB) 0%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? No

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
1/1/2020	Yes				

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**N/A**
Condition A: Minimum Vehicular Volume	
Condition B: Interruption of Continuous Traffic	
Condition C: Combination: 80% of A and B	
Warrant 2: Four-Hour Volume	**No**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	No
Criterion B: Peak-Hour	No
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**Yes**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: SBG
Agency: MSA Professional Services
Date: 8/27/2017

Warrant 1: Eight - Hour Vehicular Volume 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	600	480
Minor Rd. Req	200	160
Number of Hours	0	2
		Satisfied?

Condition B: Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	900	720
Minor Rd. Req	100	80
Number of Hours	2	4
		Satisfied?

Condition C: Combination of A & B at 80%
Satisfied?

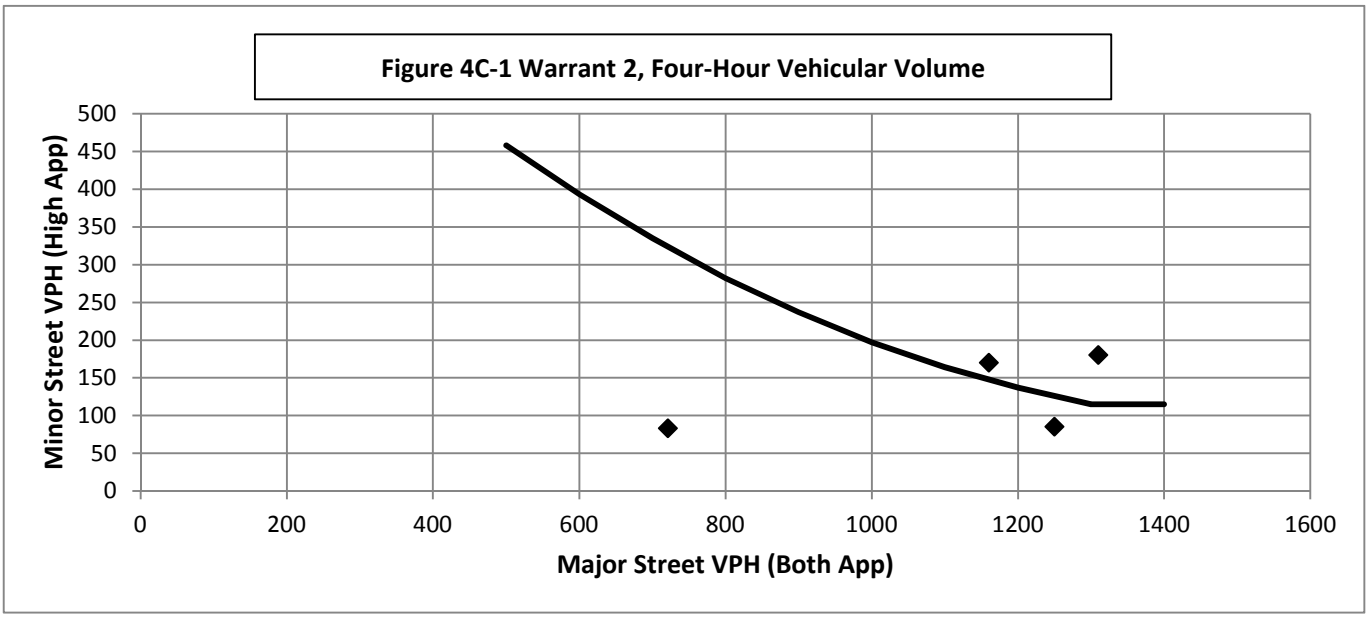
6:00 AM Enter Start Time (Military Time) (HH:MM)

Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	0	0	0
2	7:00	8:00	1250	85	1335
3	8:00	9:00	721	83	804
4	9:00	10:00	0	0	0
5	10:00	11:00	0	0	0
6	11:00	12:00	0	0	0
7	12:00	13:00	0	0	0
8	13:00	14:00	0	0	0
9	14:00	15:00	0	0	0
10	15:00	16:00	0	0	0
11	16:00	17:00	1310	180	1490
12	17:00	18:00	1160	170	1330
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 100%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To:

Hour Start	16:00	17:00	7:00	8:00
Major Road Vol.	1310	1160	1250	721
Minor Road Vol.	180	170	85	83



Warrant 3: Peak Hour Volume 100%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To: Yes**

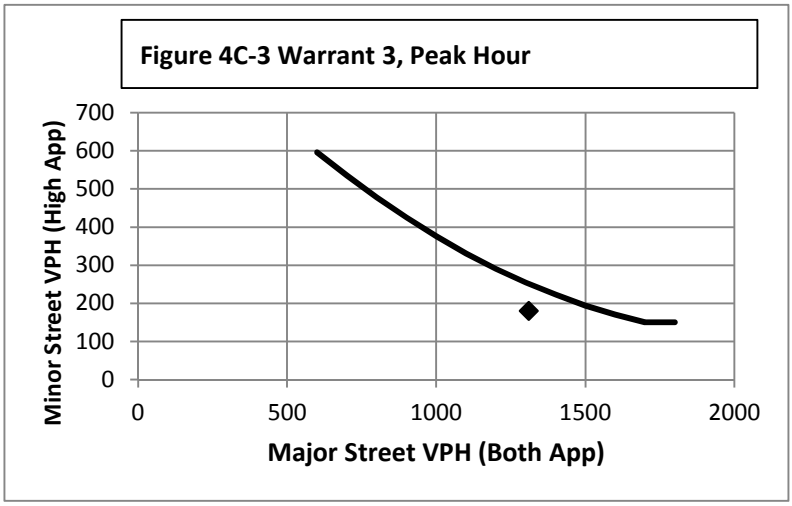
Condition justifying use of warrant:

Based on MUTCD Section 4C.04, Warrant 3 is met if either A or B condition is met. Condition A is met.

Criteria		Met?
Delay on Minor Approach	5	
Volume on Minor Approach	150	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour? No

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	1310	180



Warrant 4: Pedestrian Volume 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

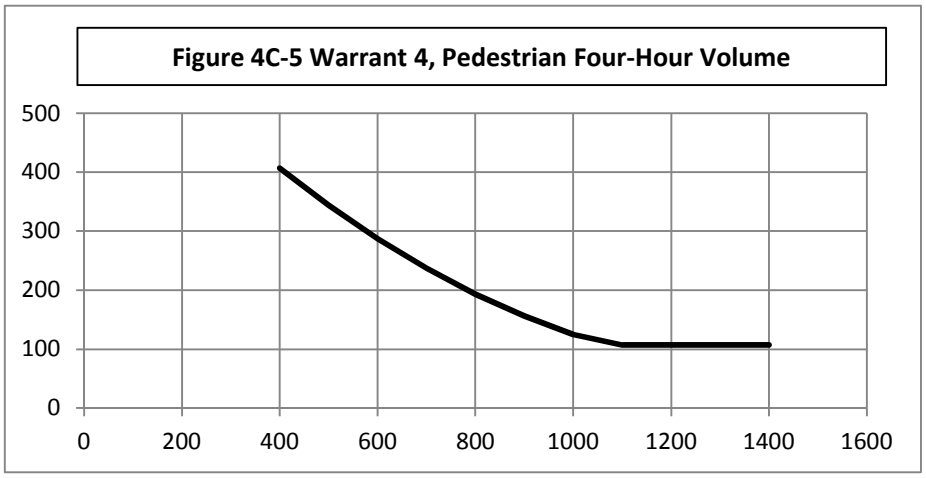
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
12:00		0
15:00		0
16:00		1310
11:00		0

Manually Set Major Rd Vol? No

Avg. walk speed less than 3.5 ft/s? No

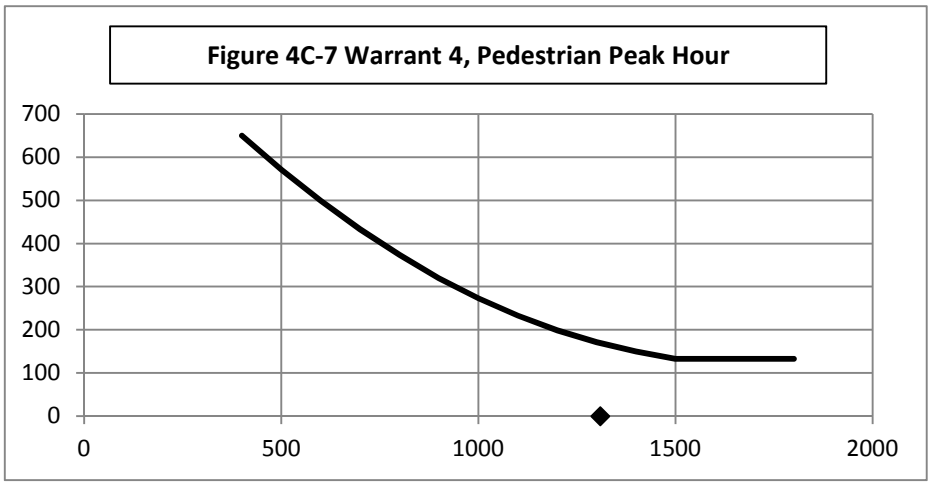
Criterion A Satisfied? No



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
16:00	0	1310

Criterion B Satisfied? No



Warrant 5: School Crossing 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	Yes
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	Yes
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	Yes

Warrant 6: Coordinated Signal System 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	No
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	Yes

Warrant 7: Crash Experience 100%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			Yes
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		Yes
		5		
3	Warrant 1, Condition A (80%)		No	Yes
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		Yes	

Warrant 8: Roadway Network 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1490	Yes	Yes
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.			1	Yes	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	No
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
				16:00	1310	180	180

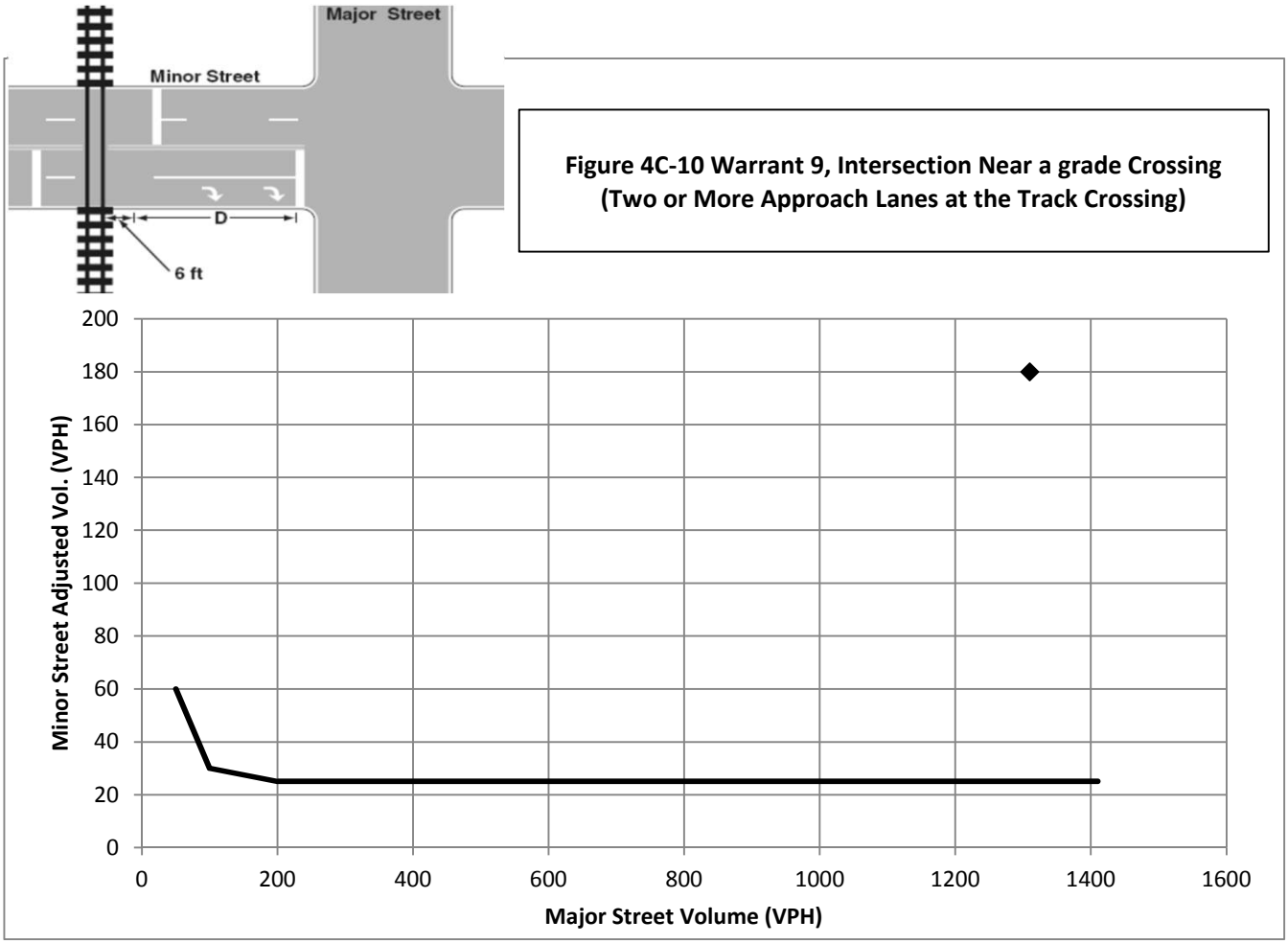


Figure 4C-10 Warrant 9, Intersection Near a grade Crossing (Two or More Approach Lanes at the Track Crossing)

Conclusions/Comments:

Updated: 6/23/2015

Appendix I:
Warrant Analysis for Intersection Traffic Control

2020 with Phase I Development Traffic Volumes Signal Warrant Analysis

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Camp Phillips Road & Westview Boulevard
County: Marathon
Village: Weston

Major Street: Camp Phillips Road
Critical Approach Speed: 35 mph
Lanes: 2 or more lanes

Minor Street: Westview Boulevard
Critical Approach Speed: 25 mph
Lanes: 2 or more lanes

% Right Turns Included
From North (SB) 100%
From East (WB) 0%
From South (NB) 100%
From West (EB) 0%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? No

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
1/1/2020	Yes				

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**Yes**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: SBG
Agency: MSA
Date: 8/30/2017

Warrant 1: Eight - Hour Vehicular Volume 100%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	600	480
Minor Rd. Req	200	160
Number of Hours	1	3

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	900	720
Minor Rd. Req	100	80
Number of Hours	0	0

Satisfied? No

Condition C: Combination of A & B at 80%

Satisfied? No

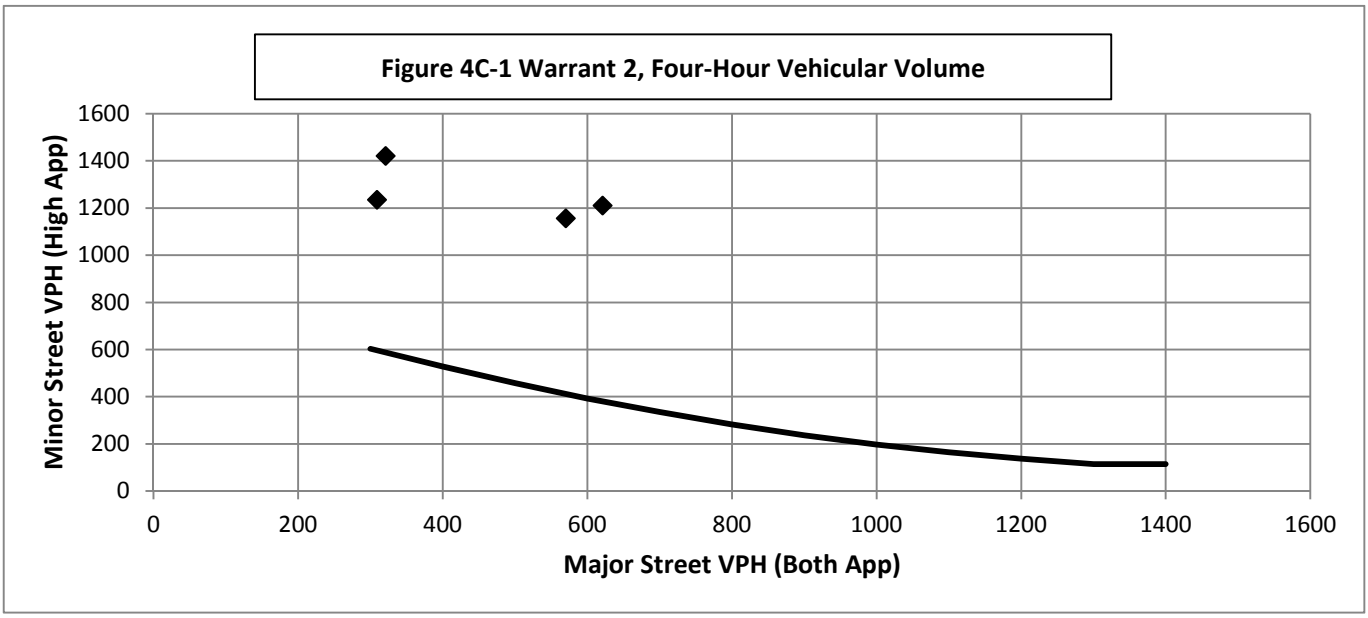
6:00 AM Enter Start Time (Military Time) (HH:MM)

Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	249	266	515
2	7:00	8:00	584	458	1042
3	8:00	9:00	294	542	836
4	9:00	10:00	276	706	982
5	10:00	11:00	288	898	1186
6	11:00	12:00	309	1234	1543
7	12:00	13:00	321	1420	1741
8	13:00	14:00	295	1008	1303
9	14:00	15:00	298	1060	1358
10	15:00	16:00	302	1113	1415
11	16:00	17:00	621	1210	1831
12	17:00	18:00	570	1156	1726
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 100%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	16:00	12:00	17:00	11:00
Major Road Vol.	621	321	570	309
Minor Road Vol.	1210	1420	1156	1234



Warrant 3: Peak Hour Volume 100%

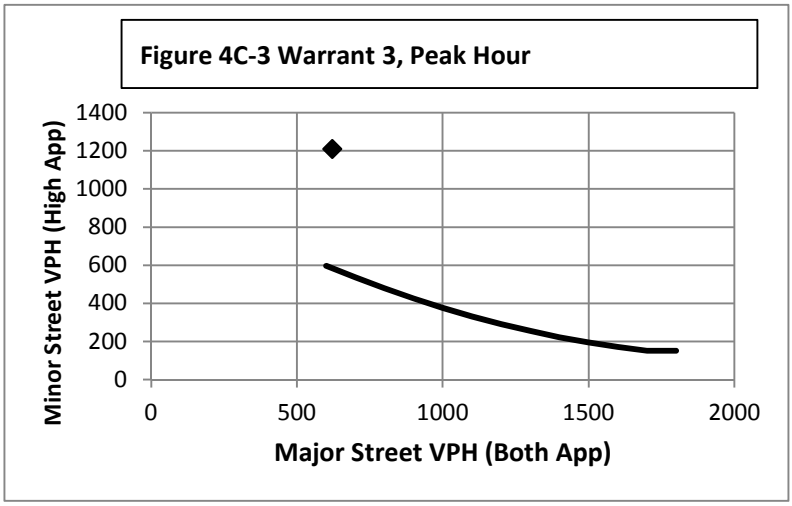
Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	5	
Volume on Minor Approach	150	Yes
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	621	1210



Warrant 4: Pedestrian Volume 100%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

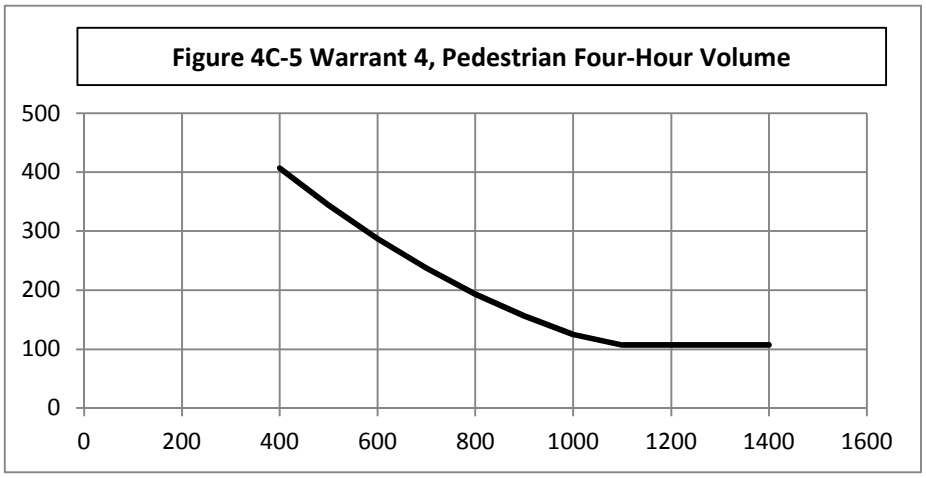
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

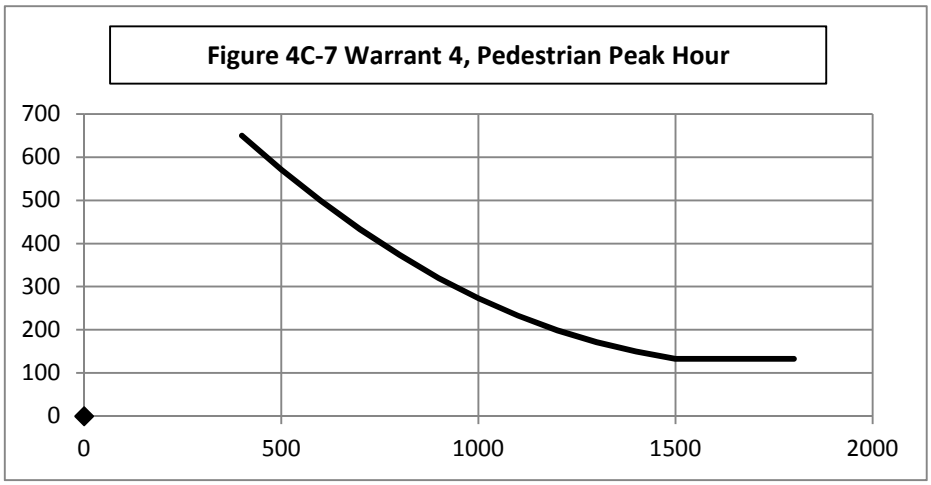
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?



Warrant 5: School Crossing 100%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 100%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 100%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			Yes
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		Yes
		5		
3	Warrant 1, Condition A (80%)		No	Yes
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		Yes	

Warrant 8: Roadway Network 100%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

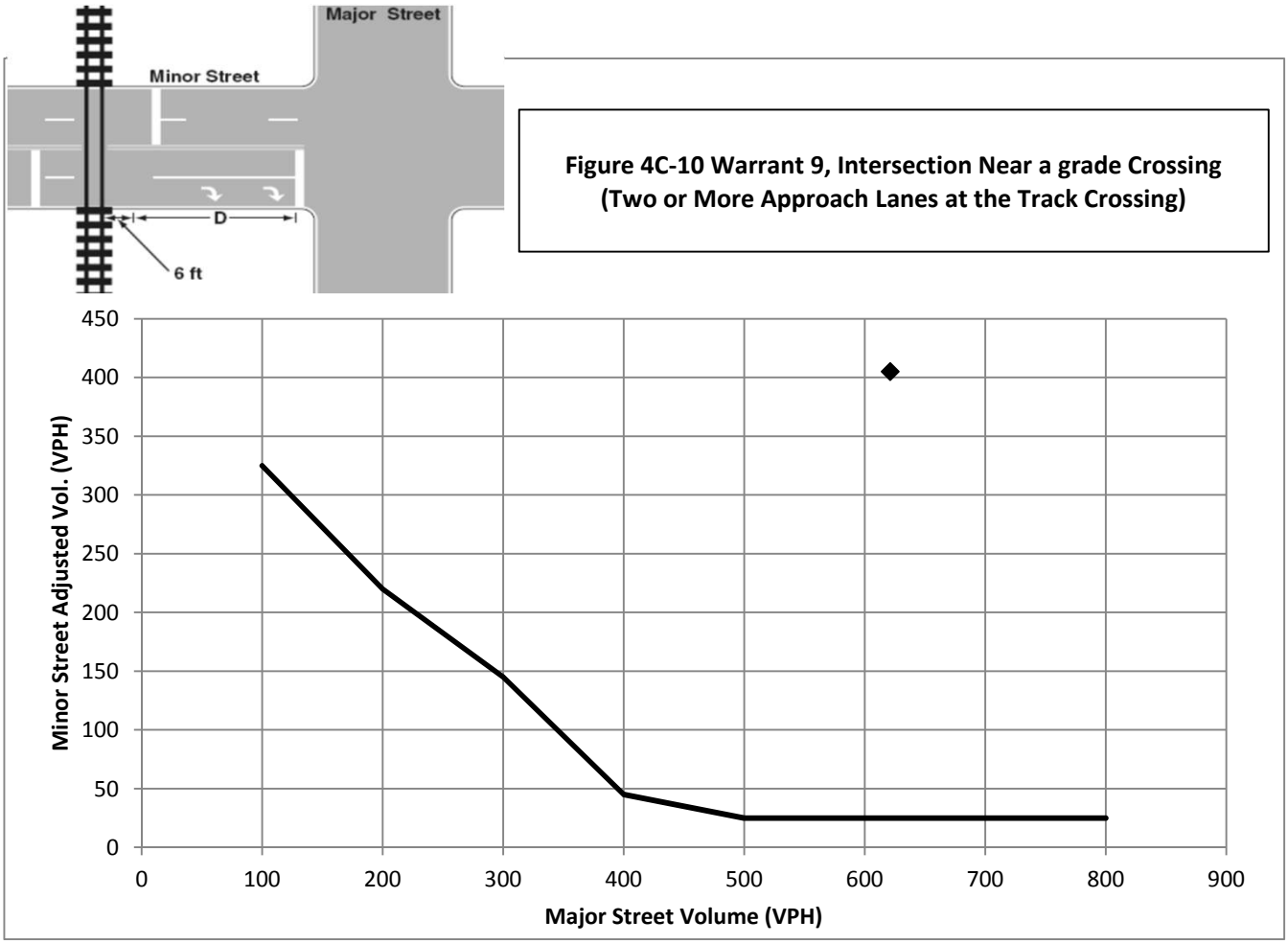
	Criteria			Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour		1831	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.			No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)				
	Hour				
	Volume				

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 100%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	16:00	621	1210	405.35



Conclusions/Comments:

Updated: 2/18/2016

Appendix J

Intersection Control Evaluation (ICE)

I. Phase I: Scoping ICE for Camp Phillips Road & WIS 29 Interchange (2040 Full Build Traffic)
II. Phase I: Scoping ICE for Camp Phillips Road & Westview Boulevard (2040 Full Build Traffic)
III. Phase I: Scoping ICE for Camp Phillips Road & Weston Avenue (2040 Full Build Traffic)

Appendix J:
Intersection Control Evaluation (ICE)

Phase I: Scoping ICE for Camp Phillips Road & WIS 29 Interchange (2040 Full Build Traffic)

To: DOT ICE Review
From: Eric Frailing, PE – MSA Professional Services, Inc.
Date: 8/30/2017
RE: Project ID n/a
WIS 29 at CTH X (Camp Phillips Rd)
Village of Weston, Marathon County
Local Projects

Project Description:

A proposed 310+ acre mixed-use development (Camp Phillips Centre) is proposed for the land immediately southeast of the WIS 29 and CTH X (Camp Phillips Rd) intersection. The development is proposed to occur in two phases, with the following analysis being based on full-buildout (Phase I and Phase II). The focus of this study is the CTH X corridor, from the WIS 29 interchange to Weston Ave, and is part of an overall Traffic Impact Analysis (TIA) being completed for the corridor. The project location can be seen in Attachment 1, Project Location Map.

WIS 29 is a four-lane divided freeway, with a posted speed of 65-mph. It connects to IH-39/US 51 approximately 3.25 miles west of CTH X. CTH X is a four-lane divided urban arterial roadway, with a posted speed of 30-mph. It is one of the main north-south roadways leading into the village of Weston. Attachment 2, Site Plan illustrates the proposed land uses anticipated with the development. Full-build 2040 traffic volumes were used for analysis and are shown in Attachment 3, Traffic Volumes & Projections.

The existing intersection of WIS 29 and CTH X is a diamond interchange, with CTH X passing over WIS 29. The ramp terminal intersections are both traffic signal controlled, with all right turns controlled by Yield signs and physically separated by islands. Exclusive left-turn lanes are provided to the respective on-ramps, controlled by protected/permissive phasing. Right-turns from CTH X are channelized and Yield sign-controlled. The westbound ramp has two approach lanes, including an exclusive right-turn lane; the eastbound ramp has three approach lanes, including an exclusive left-turn and right-turn lanes.

No bicycle or pedestrian facilities are provided for at either ramp terminal intersection, nor have provisions been constructed for future tie-in. Further, the CTH X structure over WIS 29 does not have adequate width to incorporate future bicycle or pedestrian accommodations without significant narrowing of vehicular travel lanes.

Alternatives:

Please refer to Attachment 4, Phase I: ICE Brainstorming Guide. Several alternatives were reviewed to determine the feasibility of each possible intersection control improvement. The guide includes comments for each alternative considered.

Safety Considerations:

Please refer to Attachment 5, Intersection Crash Diagram. During an approximately six-year period (January 2011 through November 2016), the westbound ramp terminal intersection experienced 25 crashes, which resolves into a rate of 4.23 crashes per year or 0.41 crashes per million entering vehicles. The predominant crash issue at the westbound ramp terminal intersection is failure to yield the right-of-way by vehicles turning left, with the majority of the crashes of this type originating from westbound traffic (northbound left-turning traffic also shows a lesser, but similar pattern).

During the same approximately six-year period (January 2011 through November 2016), the eastbound ramp terminal intersection experienced 33 crashes, which resolves into a rate of 5.57 crashes per year or 0.66 crashes per million entering vehicles. The predominant crash issue at the eastbound ramp terminal intersection is rear-end collisions, split amongst eastbound left and right-turning vehicles, in addition to northbound through vehicles. Left-turn failure to yield the right-of-way pattern is also present at this location, but is not in as significant of volume as the westbound intersection.

Operational Analysis:

Due to the current traffic signal control of both ramp terminal intersections, stop-control alternatives will not be considered. Intersection control alternatives must take into account both ramp terminals to coincide with driver expectations of the corridor in addition to the joint-operational nature of ramp terminal intersections.

Traffic signal control was analyzed in Synchro 9 software; its preliminary results are attached. Traffic signals are projected to operate better than LOS D for all approaches in 2040 under full build-out conditions and lane modifications.

A roundabout can be considered when the minimum vehicular volume warrants for a traffic signal control are met or if unique safety concerns are present, according to the WisDOT Facilities Development Manual (FDM) Chapter 11-25, Section 3.1.2. A roundabout alternative was reviewed, and an operational analysis was performed with the 2040 full build-out volumes. Analyses were run using Highway Capacity Software (HCS) Software. With two-lanes on each approach and right-turn bypasses applied where appropriate, level of service (LOS) failed to achieve better than LOS F and was significantly over-capacity in 2040. Since WisDOT policy discourages roundabouts with three or more approach lanes, roundabouts were removed from further analysis.

Analysis data can be found in Attachment 6, Synchro and HCS Outputs.

Other Considerations:

Impacts to the existing bridge structure and the number of additional lanes/pavement required were considered as factors impacting intersection alternatives. An option may be considered excluded if the structural impacts are deemed too large given the scope of the development project. Note the existing bridge structure is five lanes wide, with a raised concrete divider (curb-height), and has no pedestrian or bicycle accommodations or shoulders.

Feasibility of Alternatives:
Operational analysis ruled-out further consideration of a roundabout intersection control.

Alternatives such as Right-In/Right-Out (and its variants), Displaced Left Turn, J-Turn, Median U-Turn, Continuous Green-T, and Echelon configurations were not considered viable options as they are not applicable to interchange ramp terminal intersections. Please refer to Attachment 4: Phase I: ICE Brainstorming Guide for further explanation for each control type considered.

A Diverging Diamond Interchange (DDI) was initially considered, but assessed to not be viable. Additional pavement/lane requirements, additional signalization, and lack of favorable corridor coordination possibilities make this alternative unfavorable. Additional details are provided in Attachment 4, Phase I: ICE Brainstorming Guide, in addition to a draft configuration in Attachment 7, Draft DDI Layout.

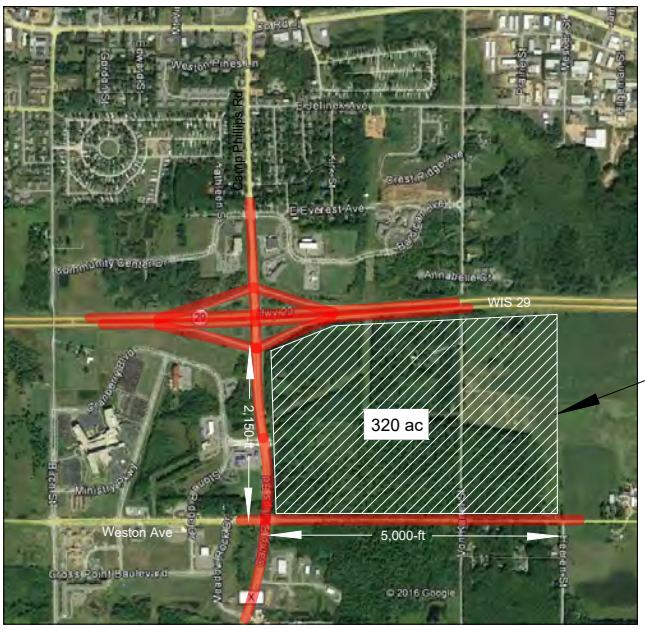
Conclusion:
Since the traffic signal control type is the only viable alternative for this intersection, a Phase II ICE Report is not deemed necessary. For the purposes of the TIA, a traffic signal control alternative will be carried through to draft design stages.

Attachments:
Attachment 1: Project Location Map
Attachment 2: Site Plan
Attachment 3: Traffic Volumes & Projections
Attachment 4: Phase I: ICE Brainstorming Guide
Attachment 5: Intersection Crash Diagram
Attachment 6: Synchro and HCS Outputs
Attachment 7: Draft DDI Layout

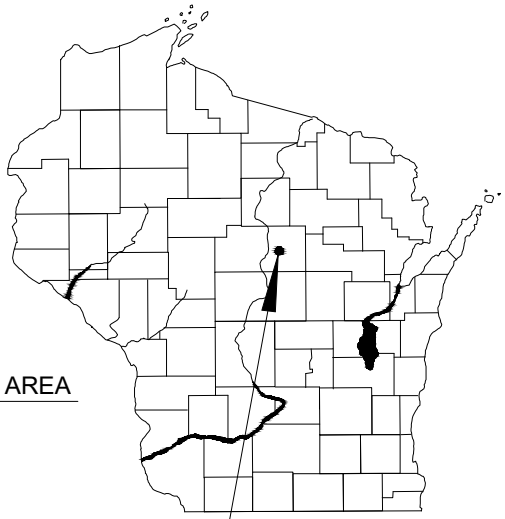
Attachment 1: Project Location Map

Attachment 1: Project Location Map

Camp Phillips Centre Development
Village of Weston, Marathon County

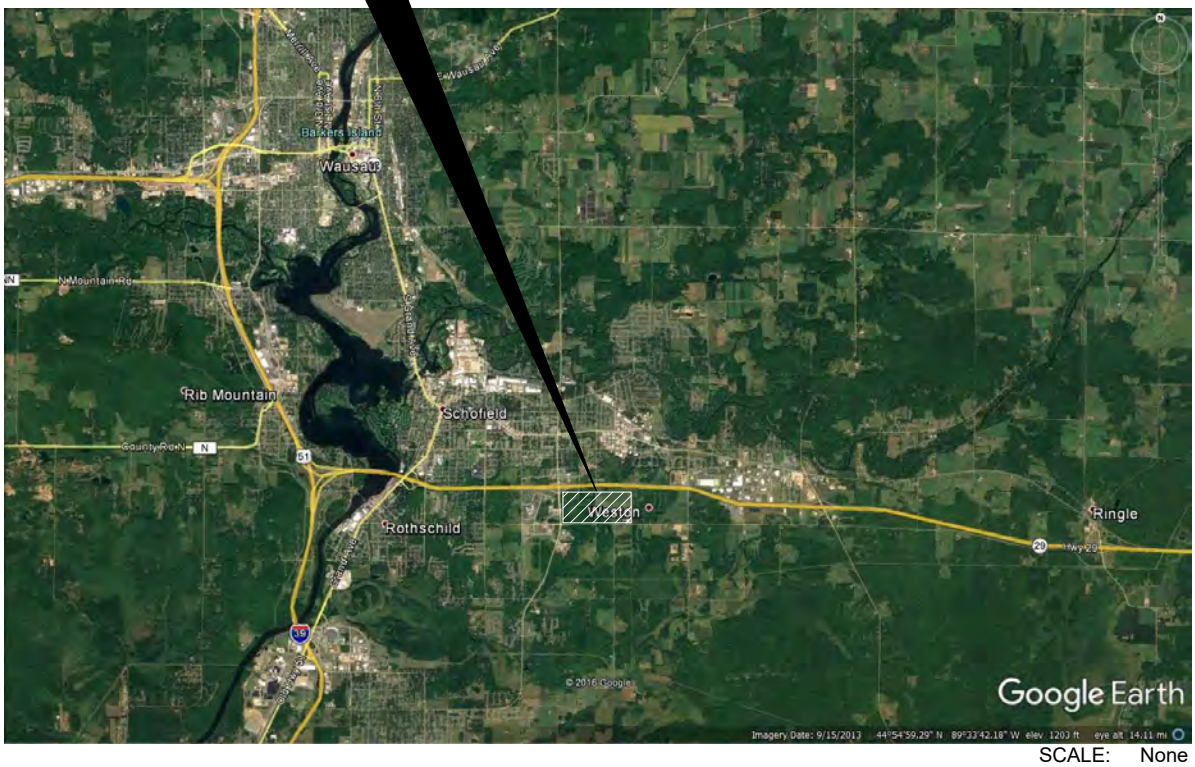


PROJECT AREA



PROJECT LOCATION

Village of Weston



SCALE: None

MSA PROFESSIONAL SERVICES

Attachment 2: Site Plan

Attachment 2: Site Plan

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin

Date: 06.29.17

EXHIBIT B - MASTER PLAN

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.
© 06-29-17

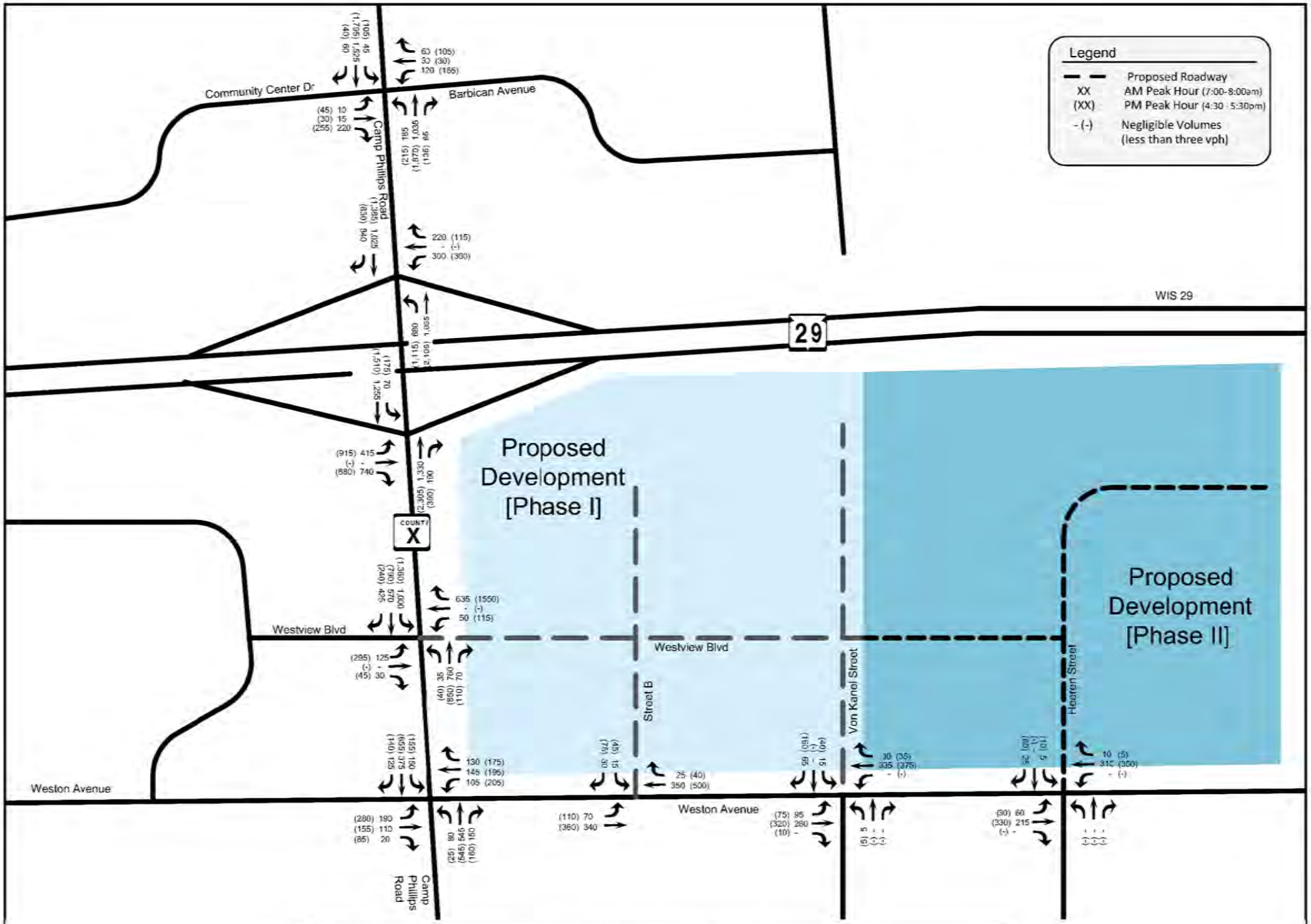
Camp Phillips Centre
COMMERCIAL DISTRICT
VILLAGE OF WESTON, WI

FDG

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

north
SCALE IN FEET
200' 0 200'

Attachment 3: Traffic Volumes & Projections



Attachment 3: 2040 Horizon Year Build Development Traffic Volumes

Village of Weston [Marathon County]

Attachment 4: Phase I: ICE Brainstorming Guide

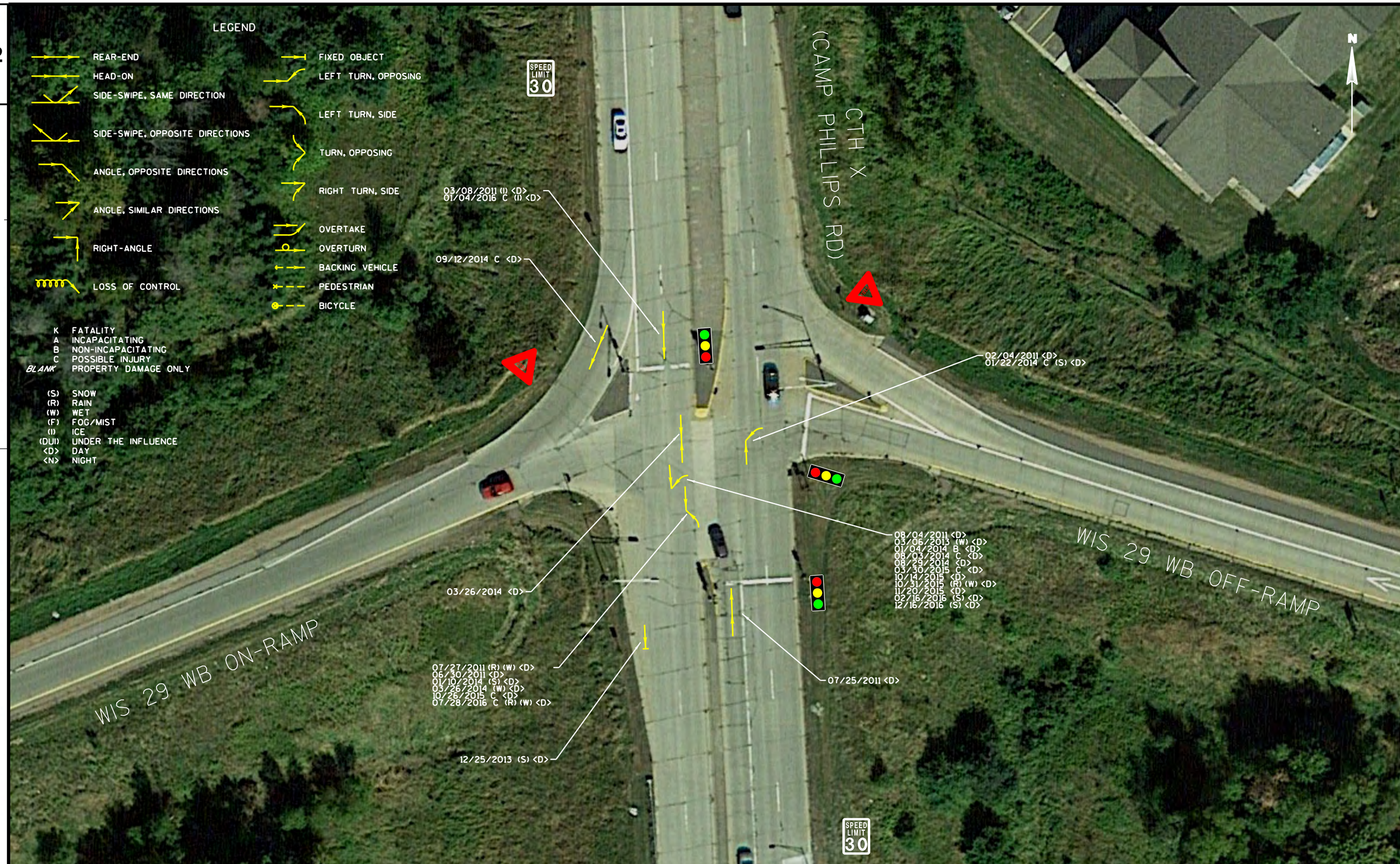
Phase I: ICE Brainstorming Guide

Date: 8/28/2017
Intersection: WIS 29 at CTH X (Camp Phillips Rd)
Project ID: n/a
Reason for ICE: Proposed mixed-use development in the SE quadrant of the WIS 29/CTH X interchange requires additional corridor capacity
Control: Signal
Major Road AADT: 12500 CTH X
Minor Road AADT: 1800/7700 WB/EB Ramp

List of Alternatives:

Alt. #	Control Type	Viable Alternative?	Addresses reason for ICE?	Performance measures acceptable?	ROW impacts acceptable?	Meets Warrants? (If Applicable)	Manually Exclude?	Manually Accept?	Explanation/Comments
1	Minor Road Stop Control	No	No			N/A			Ramp terminals are currently signalized
2	All-Way Stop Control	No	No			N/A			Ramp terminals are currently signalized
3	Traffic Signal	Yes	Yes	Yes	Yes	Yes			Current intersection control; preliminary analysis suggests 7 lanes are required (CTH X) in addition to pedestrian accommodations. Lengthening of existing eastbound off-ramp lanes would be required. An additional westbound off-ramp lane would be necessary.
4	Roundabout	No	Yes	No		N/A			2-lane roundabouts are significantly over-capacity and have LOS F before 2040
5	Right-In/Right-Out	No	No			N/A			Not applicable for interchange ramps
6	Right-In/Right-Out/Left-In	No	No			N/A			Not applicable for interchange ramps
7	J-turn	No	No			N/A			Not applicable for interchange ramps
8	Median U-Turn	No	No			N/A			Not applicable for interchange ramps
9	Displaced left Turn	No	No			N/A			Not applicable for interchange ramps
10	Continuous Green-T	No	No			N/A			Not applicable for interchange ramps
11	Echelon	No	No			N/A			Not applicable for interchange ramps
12	Diamond	Yes	Yes			N/A			Interchange currently in this format
13	Cloverleaf/ Partial Cloverleaf	No	Yes		No	N/A			ROW impact too great; would impact developed land
14	Diverging Diamond	No	Yes		Yes	N/A	Yes		Preliminary analyis suggests 7 lanes are required (CTH X), in addition to pedestrian accommodations. Triple lefts and dual rights would be needed on the EB off-ramp approach. SB right and NB lefts would require dual lanes for each movement, resulting in an unconventional signalized junction of the merge. DDIs are also difficult to coordinate with neighboring intersections -- a necessity with the projected volumes along the corridor.
15	Single Point	No	Yes	No	Yes	N/A			Structure required to accommodate projected volumes would be 9 lanes wide, not including pedestrian accommodations or how ramps would curve/tie into structure
16	[Add more as needed]	-							

Attachment 5: Intersection Crash Diagram

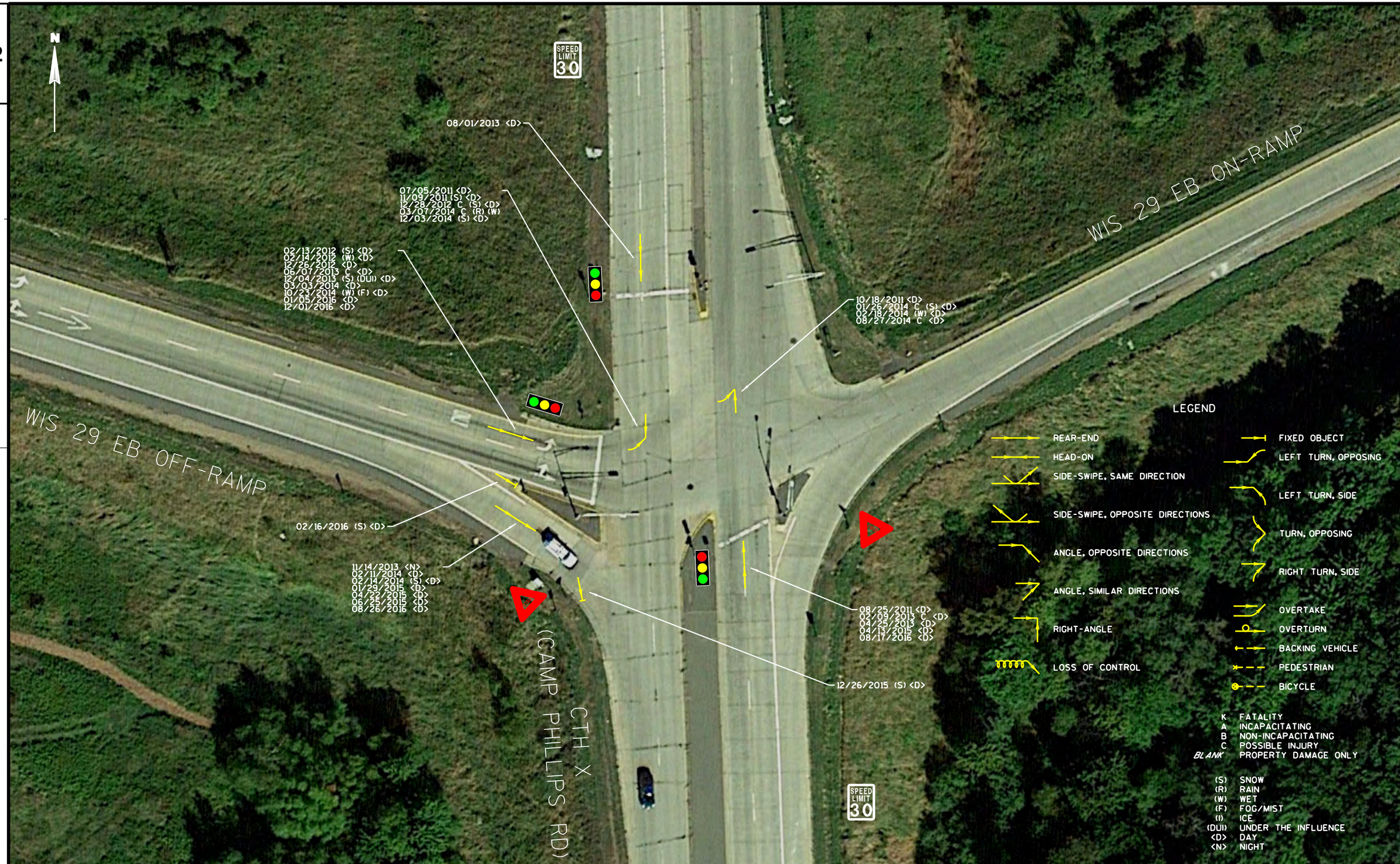


PROJECT NO:XXXX-XX-XX	HWY:CTH X/CAMP PHILLIPS RD	COUNTY:MARATHON	CRASH DIAGRAM - WIS 29 WESTBOUND & CTH X	SHEET	E

FILE NAME : P:\11600s\11690s\11694\11694002\Traffic\Crash Data\Crash Diagram.dgn PLOT DATE : 4/28/2017 PLOT BY : efrailing PLOT NAME : PLOT SCALE : 1:40

WISDOT/CADDS SHEET 42

Crash Diagram.dgn 4/28/2017 1:24:54 PM efrailing



PROJECT NO:XXXX-XX-XX	HWY:CTH X/CAMP PHILLIPS RD	COUNTY:MARATHON	CRASH DIAGRAM - WIS 29 EASTBOUND & CTH X	SHEET	E

FILE NAME : P:\11600s\11690s\11694\11694002\Traffic\Crash Data\Crash Diagram.dgn PLOT DATE : 4/28/2017 PLOT BY : efrailing PLOT NAME : PLOT SCALE : 1:40

WISDOT/CADDS SHEET 42

Crash Diagram.dgn 4/28/2017 1:25:40 PM efrailing

Attachment 6: Synchro and HCS Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (veh/h)	0	0	0	300	0	220	680	1065	0	0	1025	840
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1776	1776	0	0	1792	1792
Adj Flow Rate, veh/h				316	0	73	716	1121	0	0	1079	258
Adj No. of Lanes				2	0	1	2	2	0	0	3	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	7	7	0	0	6	6
Cap, veh/h				399	0	178	1037	2609	0	0	1957	609
Arrive On Green				0.11	0.00	0.11	0.63	1.00	0.00	0.00	0.40	0.40
Sat Flow, veh/h				3548	0	1583	3281	3463	0	0	5055	1524
Grp Volume(v), veh/h				316	0	73	716	1121	0	0	1079	258
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1640	1687	0	0	1631	1524
Q Serve(g_s), s				9.1	0.0	4.5	15.0	0.0	0.0	0.0	17.8	12.8
Cycle Q Clear(g_c), s				9.1	0.0	4.5	15.0	0.0	0.0	0.0	17.8	12.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				399	0	178	1037	2609	0	0	1957	609
V/C Ratio(X)				0.79	0.00	0.41	0.69	0.43	0.00	0.00	0.55	0.42
Avail Cap(c_a), veh/h				574	0	256	1037	2609	0	0	1957	609
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.77	0.77	0.00	0.00	0.39	0.39
Uniform Delay (d), s/veh				45.4	0.0	43.4	16.0	0.0	0.0	0.0	24.2	22.8
Incr Delay (d2), s/veh				4.8	0.0	1.5	1.5	0.4	0.0	0.0	0.4	0.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.3	0.0	3.7	10.6	0.3	0.0	0.0	11.0	7.9
LnGrp Delay(d),s/veh				50.2	0.0	44.9	17.5	0.4	0.0	0.0	24.7	23.6
LnGrp LOS				D		D	B	A			C	C
Approach Vol, veh/h					389			1837			1337	
Approach Delay, s/veh					49.2			7.0			24.5	
Approach LOS					D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		87.2			39.2	48.0		17.8
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		76.0			28.0	42.0		17.0
Max Q Clear Time (g_c+I1), s		2.0			17.0	19.8		11.1
Green Ext Time (p_c), s		18.3			7.6	9.3		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.2
HCM 2010 LOS	B

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	158	158	116	716	1121	1079	442
v/c Ratio	0.69	0.69	0.54	0.82	0.44	0.52	0.68
Control Delay	58.5	58.5	51.1	19.7	2.9	23.8	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	58.5	51.1	19.7	2.9	23.8	31.8
Queue Length 50th (ft)	107	107	73	232	87	193	238
Queue Length 95th (ft)	176	176	129	#126	84	245	372
Internal Link Dist (ft)		701			658	899	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	272	272	256	872	2527	2080	648
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.58	0.45	0.82	0.44	0.52	0.68

Intersection Summary

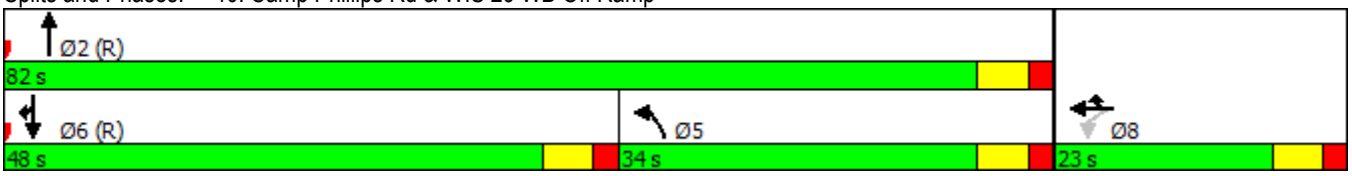
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				22.5	22.5	22.5	14.0	24.0			22.5	22.5
Total Split (s)				23.0	23.0	23.0	34.0	82.0			48.0	48.0
Total Split (%)				21.9%	21.9%	21.9%	32.4%	78.1%			45.7%	45.7%
Maximum Green (s)				17.0	17.0	17.0	28.0	76.0			42.0	42.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				14.4	14.4	14.4	28.0	78.6			44.6	44.6
Actuated g/C Ratio				0.14	0.14	0.14	0.27	0.75			0.42	0.42
v/c Ratio				0.69	0.69	0.54	0.82	0.44			0.52	0.68
Control Delay				58.5	58.5	51.1	19.7	2.9			23.8	31.8
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				58.5	58.5	51.1	19.7	2.9			23.8	31.8
LOS				E	E	D	B	A			C	C
Approach Delay					56.5			9.4			26.1	
Approach LOS					E			A			C	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 21.5 Intersection LOS: C
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Future Volume (vph)	0	0	0	300	0	220	680	1065	0	0	1025	840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1681	1681	1583	3273	3374	0	0	4893	1524
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1681	1681	1583	3273	3374	0	0	4893	1524
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		614			781			738			979	
Travel Time (s)		14.0			11.8			16.8			22.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	7%	7%	7%	6%	6%	6%
Adj. Flow (vph)	0	0	0	316	0	116	716	1121	0	0	1079	442
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	158	158	116	716	1121	0	0	1079	442
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (veh/h)	415	0	740	0	0	0	0	1330	190	70	1255	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	461	0	338				0	1478	89	78	1394	0
Adj No. of Lanes	2	0	1				0	3	1	1	3	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7				0	2	2	2	2	0
Cap, veh/h	877	0	391				0	1889	588	451	3186	0
Arrive On Green	0.26	0.00	0.26				0.00	0.37	0.37	0.40	1.00	0.00
Sat Flow, veh/h	3382	0	1509				0	5253	1583	1774	5253	0
Grp Volume(v), veh/h	461	0	338				0	1478	89	78	1394	0
Grp Sat Flow(s),veh/h/ln	1691	0	1509				0	1695	1583	1774	1695	0
Q Serve(g_s), s	12.3	0.0	22.4				0.0	27.0	3.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.3	0.0	22.4				0.0	27.0	3.9	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	877	0	391				0	1889	588	451	3186	0
V/C Ratio(X)	0.53	0.00	0.86				0.00	0.78	0.15	0.17	0.44	0.00
Avail Cap(c_a), veh/h	1353	0	604				0	1889	588	451	3186	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.79	0.79	0.83	0.83	0.00
Uniform Delay (d), s/veh	33.4	0.0	37.1				0.0	29.2	22.0	23.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	8.0				0.0	2.6	0.4	0.1	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	0.0	15.4				0.0	18.3	3.2	2.5	0.2	0.0
LnGrp Delay(d),s/veh	33.8	0.0	45.1				0.0	31.9	22.4	23.6	0.4	0.0
LnGrp LOS	C		D					C	C	C	A	
Approach Vol, veh/h		799						1567			1472	
Approach Delay, s/veh		38.6						31.3			1.6	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	26.8	45.0		33.2		71.8		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	6.0	39.0		42.0		51.0		
Max Q Clear Time (g_c+I1), s	2.0	29.0		24.4		2.0		
Green Ext Time (p_c), s	3.0	6.7		2.8		14.6		

Intersection Summary	
HCM 2010 Ctrl Delay	21.4
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	230	231	411	1478	106	78	1394
v/c Ratio	0.43	0.43	0.82	0.63	0.15	0.39	0.50
Control Delay	28.8	28.8	45.6	25.0	20.4	21.7	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	28.8	45.6	25.0	20.4	21.7	12.9
Queue Length 50th (ft)	123	124	246	288	43	18	292
Queue Length 95th (ft)	178	178	338	377	87	51	342
Internal Link Dist (ft)		918		1152			658
Turn Bay Length (ft)	500		325		225	175	
Base Capacity (vph)	641	641	603	2351	731	201	2816
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.36	0.68	0.63	0.15	0.39	0.50

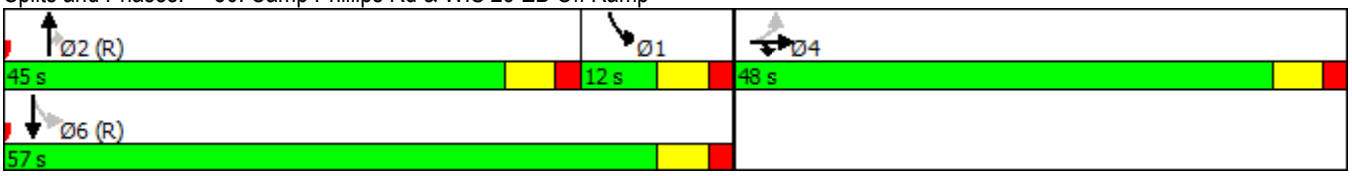
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2		1	6	
Permitted Phases	4								2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	22.5	22.5	22.5					22.5	22.5	12.0	22.5	
Total Split (s)	48.0	48.0	48.0					45.0	45.0	12.0	57.0	
Total Split (%)	45.7%	45.7%	45.7%					42.9%	42.9%	11.4%	54.3%	
Maximum Green (s)	42.0	42.0	42.0					39.0	39.0	6.0	51.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Max	C-Max	None	C-Max	
Act Effct Green (s)	34.8	34.8	34.8					48.6	48.6	58.2	58.2	
Actuated g/C Ratio	0.33	0.33	0.33					0.46	0.46	0.55	0.55	
v/c Ratio	0.43	0.43	0.82					0.63	0.15	0.39	0.50	
Control Delay	28.8	28.8	45.6					25.0	20.4	21.7	12.9	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	28.8	28.8	45.6					25.0	20.4	21.7	12.9	
LOS	C	C	D					C	C	C	B	
Approach Delay		36.7						24.7			13.4	
Approach LOS		D						C			B	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 23 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 23.1 Intersection LOS: C
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Future Volume (vph)	415	0	740	0	0	0	0	1330	190	70	1255	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	175		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1603	1603	1509	0	0	0	0	5085	1583	1770	5085	0
Flt Permitted	0.950	0.950								0.108		
Satd. Flow (perm)	1603	1603	1509	0	0	0	0	5085	1583	201	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1232			738	
Travel Time (s)		19.4			12.0			24.0			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	461	0	411	0	0	0	0	1478	106	78	1394	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	230	231	411	0	0	0	0	1478	106	78	1394	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			18			18	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Perm	pm+pt	NA	

HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	7/7/2017
Analysis Year	2040
Time Period	AM Peak
Project Description	

Site Information

Intersection	WIS 29 WB at CTH X
E/W Street Name	WIS 29 WB
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.95
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	0	0	0	1	1	0	0	1	1	0	0	0	2	0
Lane Assignment					L		LT		L		LT		T		T	
Volume (V), veh/h					0	300	0	220	0	680	1065		0		1025	840
Percent Heavy Vehicles, %					2	2	2	2	7	7	7		6		6	6
Flow Rate (v_{PCE}), pc/h					0	322	0	236	0	766	1200		0		1144	937
Right-Turn Bypass	None				Yielding				None				Yielding			
Conflicting Lanes					2				1				2			
Pedestrians Crossing, p/h					0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)				4.0000	4.0000	4.0000	4.2000	4.2000		4.0000	4.0000	4.0000
Follow-Up Headway (s)				2.8000	2.8000	2.8000	2.8000	2.8000		2.8000	2.8000	2.8000

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h				171	151	236	1042	924		538	606	937
Entry Volume veh/h				167	148	231	974	864		507	572	884
Circulating Flow (v_c), pc/h	1466			1966			0			1088		
Exiting Flow (v_{ex}), pc/h	0			766			1200			1466		
Capacity (c_{pce}), pc/h				311	311	540	1286	1286		586	586	739
Capacity (c), veh/h				305	305	530	1202	1202		553	553	698
v/c Ratio (x)				0.55	0.49	0.44	0.81	0.72		0.92	1.03	1.27

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh				28.0	25.0	14.1	18.4	13.8		47.6	74.9	151.3
Lane LOS				D	C	B	C	B		E	F	F
95% Queue, veh				3.1	2.5	2.2	9.6	6.6		11.2	15.9	33.3
Approach Delay, s/veh				21.3			16.2			102.3		
Approach LOS				C			C			F		
Intersection Delay, s/veh | LOS	55.7						F					

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HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	7/7/2017
Analysis Year	2040
Time Period	AM Peak
Project Description	

Site Information

Intersection	WIS 29 EB at CTH X
E/W Street Name	WIS 29 EB
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	1	1	0	0	0	0	0	0	0	2	0	0	0	2	0
Lane Assignment	L		LT						T		T		LT		T	
Volume (V), veh/h	0	415	0	740					0		1330	190	0	70	1255	
Percent Heavy Vehicles, %	7	7	7	7					2		2	2	2	2	2	
Flow Rate (v_{PCE}), pc/h	0	493	0	880					0		1507	215	0	79	1422	
Right-Turn Bypass	Non-Yielding				None				Yielding				None			
Conflicting Lanes	2								2				1			
Pedestrians Crossing, p/h	0								0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000					4.0000	4.0000	4.0000	4.2000	4.2000	
Follow-Up Headway (s)	2.8000	2.8000					2.8000	2.8000	2.8000	2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	261	232	880				708	799	215	705	796	
Entry Volume veh/h	244	217	822				694	783	211	692	780	
Circulating Flow (v_c), pc/h	1501			2000			572			0		
Exiting Flow (v_{ex}), pc/h	79			0			2000			1422		
Capacity (c_{pce}), pc/h	435	435					851	851	1214	1286	1286	
Capacity (c), veh/h	406	406					834	834	1191	1261	1261	
v/c Ratio (x)	0.60	0.53					0.83	0.94	0.18	0.55	0.62	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	24.3	21.2	0.0				25.9	40.1	4.6	9.0	10.5	
Lane LOS	C	C	A				D	E	A	A	B	
95% Queue, veh	3.8	3.0					9.6	14.2	0.6	3.5	4.5	
Approach Delay, s/veh	8.2						29.9			9.8		
Approach LOS	A						D			A		
Intersection Delay, s/veh | LOS	17.0						C					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (veh/h)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1743	1743	1743	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				306	0	36	1138	2148	0	0	1413	243
Adj No. of Lanes				2	0	1	2	2	0	0	3	1
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				9	9	9	4	4	0	0	4	4
Cap, veh/h				371	0	166	1221	2644	0	0	1680	523
Arrive On Green				0.11	0.00	0.11	0.36	0.76	0.00	0.00	0.34	0.34
Sat Flow, veh/h				3320	0	1482	3375	3563	0	0	5152	1553
Grp Volume(v), veh/h				306	0	36	1138	2148	0	0	1413	243
Grp Sat Flow(s),veh/h/ln				1660	0	1482	1688	1736	0	0	1663	1553
Q Serve(g_s), s				8.6	0.0	2.1	30.8	36.7	0.0	0.0	24.9	11.7
Cycle Q Clear(g_c), s				8.6	0.0	2.1	30.8	36.7	0.0	0.0	24.9	11.7
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				371	0	166	1221	2644	0	0	1680	523
V/C Ratio(X)				0.82	0.00	0.22	0.93	0.81	0.00	0.00	0.84	0.46
Avail Cap(c_a), veh/h				384	0	172	1221	2644	0	0	1680	523
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.11	0.11	0.00	0.00	0.63	0.63
Uniform Delay (d), s/veh				41.3	0.0	38.4	29.2	7.1	0.0	0.0	29.1	24.8
Incr Delay (d2), s/veh				13.2	0.0	0.6	1.9	0.3	0.0	0.0	3.4	1.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.1	0.0	1.6	16.8	19.4	0.0	0.0	16.4	8.3
LnGrp Delay(d),s/veh				54.5	0.0	39.1	31.1	7.4	0.0	0.0	32.6	26.6
LnGrp LOS				D		D	C	A			C	C
Approach Vol, veh/h					342			3286			1656	
Approach Delay, s/veh					52.9			15.6			31.7	
Approach LOS					D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		78.4			40.4	38.0		16.6
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		72.0			34.0	32.0		11.0
Max Q Clear Time (g_c+I1), s		38.7			32.8	26.9		10.6
Green Ext Time (p_c), s		28.9			1.1	3.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	23.1
HCM 2010 LOS	C

Notes

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	153	59	1138	2148	1413	423
v/c Ratio	0.85	0.85	0.35	0.94	0.82	0.84	0.81
Control Delay	80.2	80.2	45.1	13.4	3.1	34.6	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	80.2	80.2	45.1	13.4	3.6	34.6	42.3
Queue Length 50th (ft)	96	96	33	146	1	286	230
Queue Length 95th (ft)	#211	#211	73	m141	m1	346	#388
Internal Link Dist (ft)		701			673	884	
Turn Bay Length (ft)			250	450			275
Base Capacity (vph)	182	182	171	1205	2635	1687	525
Starvation Cap Reductn	0	0	0	0	167	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.84	0.35	0.94	0.87	0.84	0.81

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

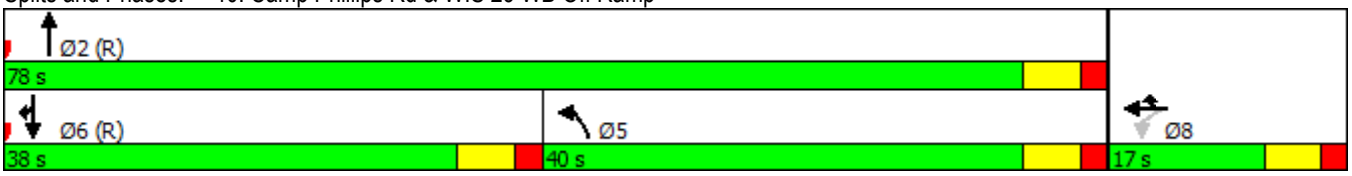
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases					8	8	5	2			6	6
Permitted Phases				8								
Detector Phase				8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	8.0	15.0			15.0	15.0
Minimum Split (s)				16.0	16.0	16.0	14.0	24.0			22.5	22.5
Total Split (s)				17.0	17.0	17.0	40.0	78.0			38.0	38.0
Total Split (%)				17.9%	17.9%	17.9%	42.1%	82.1%			40.0%	40.0%
Maximum Green (s)				11.0	11.0	11.0	34.0	72.0			32.0	32.0
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode				None	None	None	None	C-Max			C-Max	C-Max
Act Effct Green (s)				10.9	10.9	10.9	34.0	72.1			32.1	32.1
Actuated g/C Ratio				0.11	0.11	0.11	0.36	0.76			0.34	0.34
v/c Ratio				0.85	0.85	0.35	0.94	0.82			0.84	0.81
Control Delay				80.2	80.2	45.1	13.4	3.1			34.6	42.3
Queue Delay				0.0	0.0	0.0	0.0	0.5			0.0	0.0
Total Delay				80.2	80.2	45.1	13.4	3.6			34.6	42.3
LOS				F	F	D	B	A			C	D
Approach Delay					74.6			7.0			36.4	
Approach LOS					E			A			D	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 21.3 Intersection LOS: C
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 40: Camp Phillips Rd & WIS 29 WB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Future Volume (vph)	0	0	0	300	0	115	1115	2105	0	0	1385	830
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		250	450		0	0		275
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1573	1573	1482	3367	3471	0	0	4988	1553
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1573	1573	1482	3367	3471	0	0	4988	1553
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		614			781			753			964	
Travel Time (s)		12.0			15.2			14.7			18.8	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	50%	100%	100%	100%	100%	100%	50%
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	306	0	59	1138	2148	0	0	1413	423
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	153	153	59	1138	2148	0	0	1413	423
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Right	Right	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			30			30	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Prot	Prot	NA			NA	Prot

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (veh/h)	915	0	880	0	0	0	0	2305	390	175	1510	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	924	0	367				0	2328	174	177	1525	0
Adj No. of Lanes	2	0	1				0	3	1	1	3	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	971	0	433				0	2355	733	207	3051	0
Arrive On Green	0.27	0.00	0.27				0.00	0.46	0.46	0.15	1.00	0.00
Sat Flow, veh/h	3548	0	1583				0	5253	1583	1774	5253	0
Grp Volume(v), veh/h	924	0	367				0	2328	174	177	1525	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				0	1695	1583	1774	1695	0
Q Serve(g_s), s	24.3	0.0	20.8				0.0	43.1	6.3	5.0	0.0	0.0
Cycle Q Clear(g_c), s	24.3	0.0	20.8				0.0	43.1	6.3	5.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	971	0	433				0	2355	733	207	3051	0
V/C Ratio(X)	0.95	0.00	0.85				0.00	0.99	0.24	0.86	0.50	0.00
Avail Cap(c_a), veh/h	971	0	433				0	2355	733	207	3051	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.44	0.44	0.43	0.43	0.00
Uniform Delay (d), s/veh	33.9	0.0	32.6				0.0	25.2	15.4	38.6	0.0	0.0
Incr Delay (d2), s/veh	18.3	0.0	14.4				0.0	9.9	0.3	14.3	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	20.5	0.0	16.2				0.0	27.3	4.7	7.7	0.1	0.0
LnGrp Delay(d),s/veh	52.2	0.0	47.1				0.0	35.1	15.7	52.9	0.3	0.0
LnGrp LOS	D		D					D	B	D	A	
Approach Vol, veh/h		1291						2502			1702	
Approach Delay, s/veh		50.7						33.8			5.7	
Approach LOS		D						C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	13.0	50.0		32.0		63.0		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	7.0	44.0		26.0		57.0		
Max Q Clear Time (g_c+I1), s	7.0	45.1		26.3		2.0		
Green Ext Time (p_c), s	0.0	0.0		0.0		18.0		

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	462	462	444	2328	197	177	1525
v/c Ratio	1.00	1.00	1.03	0.99	0.27	0.85	0.50
Control Delay	79.2	79.2	85.7	42.0	16.9	47.7	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.2	79.2	85.7	42.0	16.9	47.7	4.8
Queue Length 50th (ft)	~295	~295	~288	491	70	84	73
Queue Length 95th (ft)	#508	#508	#473	#628	118	m#108	83
Internal Link Dist (ft)		918		1130			673
Turn Bay Length (ft)	500		325		225	175	
Base Capacity (vph)	460	460	433	2355	733	208	3051
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	1.00	1.03	0.99	0.27	0.85	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

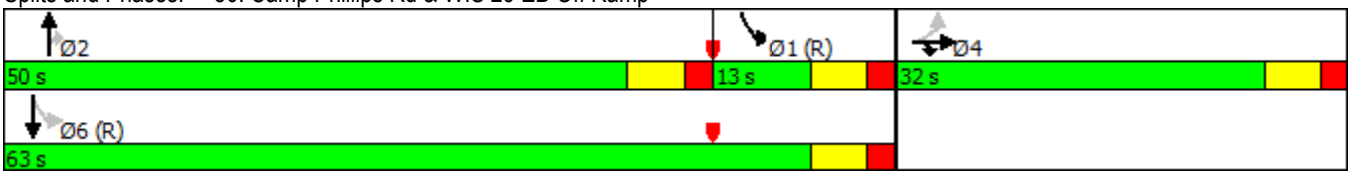
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4	4					2		1	6	
Permitted Phases	4								2	6		
Detector Phase	4	4	4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					15.0	15.0	6.0	15.0	
Minimum Split (s)	16.0	16.0	16.0					21.0	21.0	12.0	21.0	
Total Split (s)	32.0	32.0	32.0					50.0	50.0	13.0	63.0	
Total Split (%)	33.7%	33.7%	33.7%					52.6%	52.6%	13.7%	66.3%	
Maximum Green (s)	26.0	26.0	26.0					44.0	44.0	7.0	57.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					Max	Max	C-Max	C-Max	
Act Effct Green (s)	26.0	26.0	26.0					44.0	44.0	57.0	57.0	
Actuated g/C Ratio	0.27	0.27	0.27					0.46	0.46	0.60	0.60	
v/c Ratio	1.00	1.00	1.03					0.99	0.27	0.85	0.50	
Control Delay	79.2	79.2	85.7					42.0	16.9	47.7	4.8	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	79.2	79.2	85.7					42.0	16.9	47.7	4.8	
LOS	E	E	F					D	B	D	A	
Approach Delay		81.3						40.1			9.3	
Approach LOS		F						D			A	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 63 (66%), Referenced to phase 1:SBL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 40.8 Intersection LOS: D
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 50: Camp Phillips Rd & WIS 29 EB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Future Volume (vph)	915	0	880	0	0	0	0	2305	390	175	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		325	0		0	0		225	175		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950	0.950								0.950		
Satd. Flow (prot)	1681	1681	1583	0	0	0	0	5085	1583	1770	5085	0
Flt Permitted	0.950	0.950								0.080		
Satd. Flow (perm)	1681	1681	1583	0	0	0	0	5085	1583	149	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		998			614			1210			753	
Travel Time (s)		19.4			12.0			23.6			14.7	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	924	0	444	0	0	0	0	2328	197	177	1525	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	462	462	444	0	0	0	0	2328	197	177	1525	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			18			18	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Prot					NA	Perm	pm+pt	NA	

HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	7/7/2017
Analysis Year	2040
Time Period	PM Peak
Project Description	

Site Information

Intersection	WIS 29 WB at CTH X
E/W Street Name	WIS 29 WB
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.98
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	0	0	0	1	1	0	0	1	1	0	0	0	2	0
Lane Assignment					L		LT		L		LT		T		T	
Volume (V), veh/h					0	300	0	115	0	1115	2105		0		1385	830
Percent Heavy Vehicles, %					9	9	9	9	4	4	4		4		4	4
Flow Rate (v_{PCE}), pc/h					0	334	0	128	0	1183	2234		0		1470	881
Right-Turn Bypass	None				Yielding				None				Yielding			
Conflicting Lanes					2				1				2			
Pedestrians Crossing, p/h					0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)				4.0000	4.0000	4.0000	4.2000	4.2000		4.0000	4.0000	4.0000
Follow-Up Headway (s)				2.8000	2.8000	2.8000	2.8000	2.8000		2.8000	2.8000	2.8000

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h				177	157	128	1811	1606		691	779	881
Entry Volume veh/h				162	144	117	1741	1544		664	749	847
Circulating Flow (v_c), pc/h	1804			3417			0			1517		
Exiting Flow (v_{ex}), pc/h	0			1183			2234			1804		
Capacity (c_{pce}), pc/h				109	109	256	1286	1286		430	430	547
Capacity (c), veh/h				100	100	235	1236	1236		413	413	526
v/c Ratio (x)				1.62	1.44	0.50	1.41	1.25		1.61	1.81	1.61

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh				396.0	322.2	32.2	201.3	133.1		308.4	397.8	303.5
Lane LOS				F	F	D	F	F		F	F	F
95% Queue, veh				12.6	10.6	2.6	72.2	50.1		37.9	47.8	46.9
Approach Delay, s/veh				270.1			169.2			336.2		
Approach LOS				F			F			F		
Intersection Delay, s/veh | LOS	239.6						F					

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HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	7/7/2017
Analysis Year	2040
Time Period	PM Peak
Project Description	

Site Information

Intersection	WIS 29 EB at CTH X
E/W Street Name	WIS 29 EB
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.99
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	1	1	0	0	0	0	0	0	0	2	0	0	0	2	0
Lane Assignment	L		LT						T		T		LT		T	
Volume (V), veh/h	0	915	0	880					0		2305	390	0	175	1510	
Percent Heavy Vehicles, %	2	2	2	2					2		2	2	2	2	2	
Flow Rate (v_{PCE}), pc/h	0	943	0	907					0		2375	402	0	180	1556	
Right-Turn Bypass	Non-Yielding				None				Yielding				None			
Conflicting Lanes	2								2				1			
Pedestrians Crossing, p/h	0								0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000					4.0000	4.0000	4.0000	4.2000	4.2000	
Follow-Up Headway (s)	2.8000	2.8000					2.8000	2.8000	2.8000	2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	500	443	907				1116	1259	402	816	920	
Entry Volume veh/h	490	435	889				1094	1234	394	800	902	
Circulating Flow (v_c), pc/h	1736			3318			1123			0		
Exiting Flow (v_{ex}), pc/h	180			0			3318			1556		
Capacity (c_{pce}), pc/h	367	367					571	571	1129	1286	1286	
Capacity (c), veh/h	360	360					560	560	1107	1261	1261	
v/c Ratio (x)	1.36	1.21					1.95	2.20	0.36	0.63	0.72	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	209.4	149.1	0.0				453.4	564.3	6.8	10.8	13.3	
Lane LOS	F	F	A				F	F	A	B	B	
95% Queue, veh	23.9	18.3					72.4	89.4	1.6	4.8	6.6	
Approach Delay, s/veh	92.3						439.0			12.1		
Approach LOS	F						F			B		
Intersection Delay, s/veh | LOS	221.7						F					

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Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1510	0	0	0	0	0	2305	0
Future Volume (vph)	0	0	0	0	1510	0	0	0	0	0	2305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0						6.0	
Lane Util. Factor					0.91						0.91	
Frt					1.00						1.00	
Flt Protected					1.00						1.00	
Satd. Flow (prot)					5085						5085	
Flt Permitted					1.00						1.00	
Satd. Flow (perm)					5085						5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1641	0	0	0	0	0	2505	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1641	0	0	0	0	0	2505	0
Turn Type					NA						NA	
Protected Phases					4						2	
Permitted Phases												
Actuated Green, G (s)					39.0						69.0	
Effective Green, g (s)					39.0						69.0	
Actuated g/C Ratio					0.32						0.58	
Clearance Time (s)					6.0						6.0	
Lane Grp Cap (vph)					1652						2923	
v/s Ratio Prot					c0.32						c0.49	
v/s Ratio Perm												
v/c Ratio					0.99						0.86	
Uniform Delay, d1					40.4						21.4	
Progression Factor					0.66						0.67	
Incremental Delay, d2					16.0						0.3	
Delay (s)					42.4						14.7	
Level of Service					D						B	
Approach Delay (s)		0.0			42.4			0.0			14.7	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SBT	NWT
Lane Group Flow (vph)	1641	2505
v/c Ratio	0.99	0.86
Control Delay	43.5	15.0
Queue Delay	1.1	4.8
Total Delay	44.6	19.7
Queue Length 50th (ft)	204	527
Queue Length 95th (ft)	m#552	m352
Internal Link Dist (ft)	73	62
Turn Bay Length (ft)		
Base Capacity (vph)	1652	2923
Starvation Cap Reductn	0	0
Spillback Cap Reductn	8	361
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.00	0.98

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	0	0	1510	0	0	880
Future Volume (vph)	0	0	1510	0	0	880
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			6.0
Lane Util. Factor			0.91			0.88
Frt			1.00			0.85
Flt Protected			1.00			1.00
Satd. Flow (prot)			5085			2787
Flt Permitted			1.00			1.00
Satd. Flow (perm)			5085			2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1641	0	0	957
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1641	0	0	957
Turn Type			NA			Perm
Protected Phases			4			
Permitted Phases						2
Actuated Green, G (s)			39.0			69.0
Effective Green, g (s)			39.0			69.0
Actuated g/C Ratio			0.32			0.58
Clearance Time (s)			6.0			6.0
Lane Grp Cap (vph)			1652			1602
v/s Ratio Prot			c0.32			
v/s Ratio Perm						c0.34
v/c Ratio			0.99			0.60
Uniform Delay, d1			40.4			16.5
Progression Factor			0.18			1.00
Incremental Delay, d2			9.4			1.7
Delay (s)			16.5			18.2
Level of Service			B			B
Approach Delay (s)		0.0	16.5		18.2	
Approach LOS		A	B		B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SBT	SER
Lane Group Flow (vph)	1641	957
v/c Ratio	0.99	0.60
Control Delay	18.8	18.4
Queue Delay	0.0	0.0
Total Delay	18.8	18.4
Queue Length 50th (ft)	40	258
Queue Length 95th (ft)	m#44	328
Internal Link Dist (ft)	68	
Turn Bay Length (ft)		
Base Capacity (vph)	1652	1602
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.99	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SBL	SBR	NWL	NWR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	0	0	2305	915	0
Future Volume (vph)	0	0	0	2305	915	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.64	0.97	
Frt				0.85	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				4053	3433	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				4053	3433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2505	995	0
RTOR Reduction (vph)	0	0	0	18	0	0
Lane Group Flow (vph)	0	0	0	2487	995	0
Turn Type		Perm		Prot	Prot	
Protected Phases				2	4	
Permitted Phases		2				
Actuated Green, G (s)				69.0	39.0	
Effective Green, g (s)				69.0	39.0	
Actuated g/C Ratio				0.58	0.32	
Clearance Time (s)				6.0	6.0	
Lane Grp Cap (vph)				2330	1115	
v/s Ratio Prot				c0.61	c0.29	
v/s Ratio Perm						
v/c Ratio				1.07	0.89	
Uniform Delay, d1				25.5	38.5	
Progression Factor				0.22	1.00	
Incremental Delay, d2				35.4	10.9	
Delay (s)				41.0	49.4	
Level of Service				D	D	
Approach Delay (s)	0.0		41.0		49.4	
Approach LOS	A		D		D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NWR	NEL
Lane Group Flow (vph)	2505	995
v/c Ratio	1.07	0.89
Control Delay	44.2	49.9
Queue Delay	3.3	0.0
Total Delay	47.5	49.9
Queue Length 50th (ft)	~318	376
Queue Length 95th (ft)	#199	#492
Internal Link Dist (ft)		107
Turn Bay Length (ft)		
Base Capacity (vph)	2348	1115
Starvation Cap Reductn	17	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.07	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	1385	300	0
Future Volume (vph)	0	0	0	1385	300	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5085	3433	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5085	3433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1505	326	0
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	1505	325	0
Turn Type				NA	Prot	
Protected Phases				4	2	
Permitted Phases						
Actuated Green, G (s)				39.0	69.0	
Effective Green, g (s)				39.0	69.0	
Actuated g/C Ratio				0.32	0.58	
Clearance Time (s)				6.0	6.0	
Lane Grp Cap (vph)				1652	1973	
v/s Ratio Prot				c0.30	c0.09	
v/s Ratio Perm						
v/c Ratio				0.91	0.16	
Uniform Delay, d1				38.8	12.0	
Progression Factor				0.12	1.00	
Incremental Delay, d2				4.0	0.2	
Delay (s)				8.6	12.1	
Level of Service				A	B	
Approach Delay (s)	0.0			8.6	12.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SBT	SWL
Lane Group Flow (vph)	1505	326
v/c Ratio	0.91	0.17
Control Delay	9.5	12.1
Queue Delay	0.0	0.0
Total Delay	9.5	12.1
Queue Length 50th (ft)	14	57
Queue Length 95th (ft)	m#49	80
Internal Link Dist (ft)	87	162
Turn Bay Length (ft)		
Base Capacity (vph)	1652	1975
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.91	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations	↑↑↑			↑		↱
Traffic Volume (vph)	2105	0	0	0	0	115
Future Volume (vph)	2105	0	0	0	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0					6.0
Lane Util. Factor	0.91					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	5085					1611
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5085					1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2288	0	0	0	0	125
RTOR Reduction (vph)	0	0	0	0	0	22
Lane Group Flow (vph)	2288	0	0	0	0	103
Turn Type	NA					Perm
Protected Phases	2 4			4 2		
Permitted Phases						2
Actuated Green, G (s)	120.0					69.0
Effective Green, g (s)	120.0					69.0
Actuated g/C Ratio	1.00					0.58
Clearance Time (s)						6.0
Lane Grp Cap (vph)	5085					926
v/s Ratio Prot	c0.45					
v/s Ratio Perm						0.06
v/c Ratio	0.45					0.11
Uniform Delay, d1	0.0					11.6
Progression Factor	1.00					1.00
Incremental Delay, d2	0.2					0.2
Delay (s)	0.2					11.8
Level of Service	A					B
Approach Delay (s)	0.2			0.0	11.8	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	0.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBT	NWR
Lane Group Flow (vph)	2288	125
v/c Ratio	0.45	0.13
Control Delay	0.2	7.3
Queue Delay	0.0	0.0
Total Delay	0.2	7.3
Queue Length 50th (ft)	0	24
Queue Length 95th (ft)	0	53
Internal Link Dist (ft)	110	
Turn Bay Length (ft)		
Base Capacity (vph)	5085	948
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.45	0.13

Intersection Summary

Movement	EBL	EBR	NWL	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	1115	0	0	830
Future Volume (vph)	0	0	1115	0	0	830
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			6.0
Lane Util. Factor			0.97			0.88
Frt			1.00			0.85
Flt Protected			0.95			1.00
Satd. Flow (prot)			3433			2787
Flt Permitted			0.95			1.00
Satd. Flow (perm)			3433			2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1212	0	0	902
RTOR Reduction (vph)	0	0	21	0	0	78
Lane Group Flow (vph)	0	0	1191	0	0	824
Turn Type			Prot			Perm
Protected Phases			2			
Permitted Phases						4
Actuated Green, G (s)			69.0			39.0
Effective Green, g (s)			69.0			39.0
Actuated g/C Ratio			0.58			0.32
Clearance Time (s)			6.0			6.0
Lane Grp Cap (vph)			1973			905
v/s Ratio Prot			c0.35			
v/s Ratio Perm						c0.30
v/c Ratio			0.60			0.91
Uniform Delay, d1			16.6			38.8
Progression Factor			0.51			1.00
Incremental Delay, d2			0.1			14.8
Delay (s)			8.6			53.7
Level of Service			A			D
Approach Delay (s)	0.0		8.6		53.7	
Approach LOS	A		A		D	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

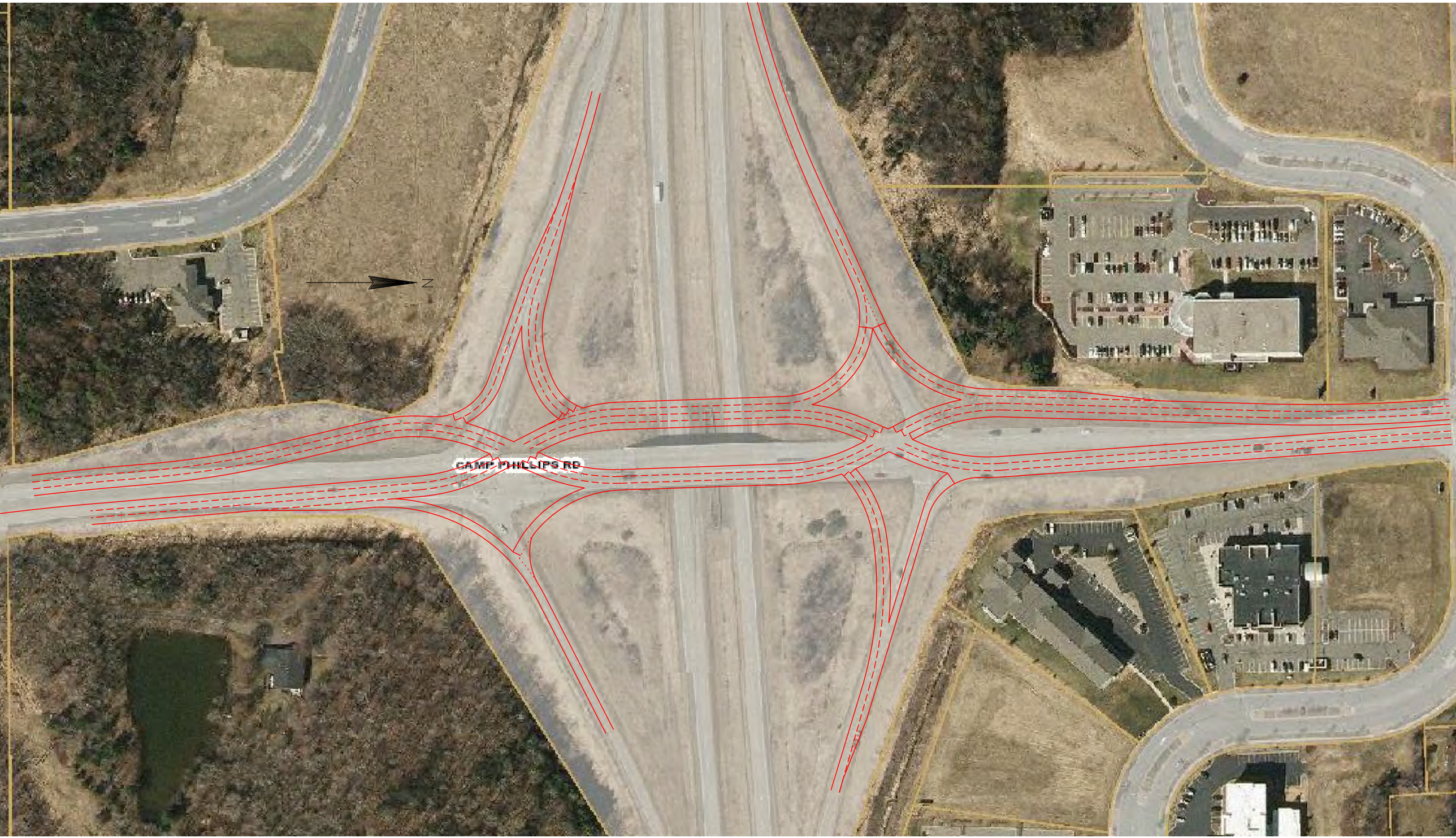
Lane Group	NWL	SWR
Lane Group Flow (vph)	1212	902
v/c Ratio	0.61	0.92
Control Delay	8.3	49.0
Queue Delay	0.0	0.0
Total Delay	8.3	49.0
Queue Length 50th (ft)	90	340
Queue Length 95th (ft)	m84	#481
Internal Link Dist (ft)	180	
Turn Bay Length (ft)		
Base Capacity (vph)	1994	983
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.61	0.92

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Attachment 7: Draft DDI Layout



DDI_001.dgn 8/30/2017 6:29:47 PM efrailing

Appendix J:
Intersection Control Evaluation (ICE)

Phase I: Scoping ICE for Camp Phillips Road & Westview Boulevard (2040 Full Build Traffic)

To: DOT ICE Review
From: Eric Frailing, PE – MSA Professional Services, Inc.
Date: 8/29/2017
RE: Project ID n/a
CTH X (Camp Phillips Rd) at Westview Blvd
Village of Weston, Marathon County
Local Projects

Project Description:

A proposed 310+ acre mixed-use development (Camp Phillips Centre) is proposed for the land immediately southeast of the WIS 29 and CTH X (Camp Phillips Rd) intersection. The development is proposed to occur in two phases, with the following analysis being based on full-buildout (Phase I and Phase II). The focus of this study is the CTH X corridor, from the WIS 29 interchange to Weston Ave, and is part of an overall Traffic Impact Analysis (TIA) being completed for the corridor. The project location can be seen in Attachment 1, Project Location Map.

CTH X is a four-lane divided urban arterial roadway, with a posted speed of 35-mph. It is one of the main north-south roadways leading into the village of Weston. Westview Blvd is a short, four-lane divided local road, with a posted speed limit of 25-mph. It currently serves to connect CTH X a small commercial development, including a gas station/convenience store/car wash. While not providing the most direct access, it also connects to the Marshfield Clinic/Hospital complex. When constructed, the east side of this intersection will serve as the main ingress and egress to the Camp Phillips Centre development. Attachment 2, Site Plan illustrates the proposed land uses anticipated with the development. Full-build 2040 traffic volumes were used for analysis and are shown in Attachment 3, Traffic Volumes & Projections.

The intersection of CTH X and Westview Blvd is currently an at-grade multilane intersection. It is minor-street stop controlled, with CTH X as the through-roadway. Exclusive left-turn lanes are provided for all approaches (the eastern approach exists only as a stub). CTH X has two sets of through lanes (one each for northbound and southbound); the outside lanes double as right-turn lanes. The western approach has a future through lane included, but is currently striped-out.

A shared-use bicycle/pedestrian path is provided south of the intersection, along the west side of CTH X. This ties into a standard sidewalk, which runs along the northern side of Westview Blvd.

Alternatives:

Please refer to Attachment 4, Phase I: ICE Brainstorming Guide. Several alternatives were reviewed to determine the feasibility of each possible intersection control improvement. The guide includes comments for each alternative considered.

Safety Considerations:

Please refer to Attachment 5, Intersection Crash Diagram. During an approximately six-year period (January 2011 through November 2016), the intersection experienced 25 crashes, which resolves into a rate of 4.22 crashes per year or 0.77 crashes per million entering vehicles. The predominant crash issue at this intersection is failure to yield the right-of-way by vehicles turning left from Westview Blvd. The same approach direction also has a significant number of rear-end crashes as well.

Operational Analysis:

This intersection does currently meet warrants for an All-Way Stop Control (AWSC). In its current form, the level of service (LOS) analysis failed to achieve better than LOS F. The current intersection configuration is at the Highway Capacity Manual (2010 Edition)'s limit for the number of approach lanes (three in all directions). Furthermore, any further expansion of this footprint will make pedestrian accommodations more difficult in addition to increasing the complexity for motorists to navigate. Because of these operational deficiencies, the AWSC will not be examined in further analysis.

Traffic signal warrant analysis was completed for this intersection for existing and five-year construction traffic volumes (post-Phase I, 2020). Existing traffic fails to meet any signal warrants. Post-construction traffic is projected to meet Warrant 2: Four-Hour Volume, Warrant 3: Peak Hour Volume, and Warrant 7: Crash Experience. Therefore, traffic signal control will be considered for further operational analysis. Analysis results from Synchro 9 software are attached. Traffic signals are projected to reach LOS E for the side street approaches in 2040 under full build-out conditions. Queues are expected to be small despite the poor LOS (250-ft or less). Mainline approaches are projected to have LOS D or better for the same year.

Both AWSC and signal warrant analysis is documented in Attachment 6, AWSC and Traffic Signal Warrants.

A roundabout can be considered when the minimum vehicular volume warrants for a traffic signal control are met or if unique safety concerns are present, according to the WisDOT Facilities Development Manual (FDM) Chapter 11-25, Section 3.1.2. A roundabout alternative was reviewed, and an operational analysis was performed with the 2040 full build-out volumes. Analyses were run using Highway Capacity Software (HCS) Software. With two-lanes on each approach and right-turn bypasses applied where appropriate, control analysis failed to achieve better than LOS F and was significantly over-capacity in 2040. Since WisDOT policy discourages roundabouts with three or more approach lanes, roundabouts were removed from further analysis.

Full analysis data can be found in Attachment 7, Synchro and HCS Outputs.

Other Considerations:

While LOS E would typically eliminate a control alternative from consideration, the combination of manageable queue lengths for the approaches with LOS E and the mainline still operating at LOS D or

better, it is felt that the intersection will operate acceptably for the majority of the design life of the intersection.

Feasibility of Alternatives:

Operational analysis ruled-out further consideration of a roundabout intersection control.

Alternatives such as a Displaced Left Turn, J-Turn, and Median U-Turn were not considered viable options for an intersection control due to the lack of space for proper implementation and the insufficient spacing between intersections. Grade separated alternatives were not applicable for this intersection type and access needs. Please refer to Attachment 4: Phase I: ICE Brainstorming Guide for further explanation for each control type considered.

Conclusion:

Since the traffic signal control type is the only viable alternative for this intersection, a Phase II ICE Report is not deemed necessary. For the purposes of the TIA, a traffic signal control alternative will be carried through to draft design stages.

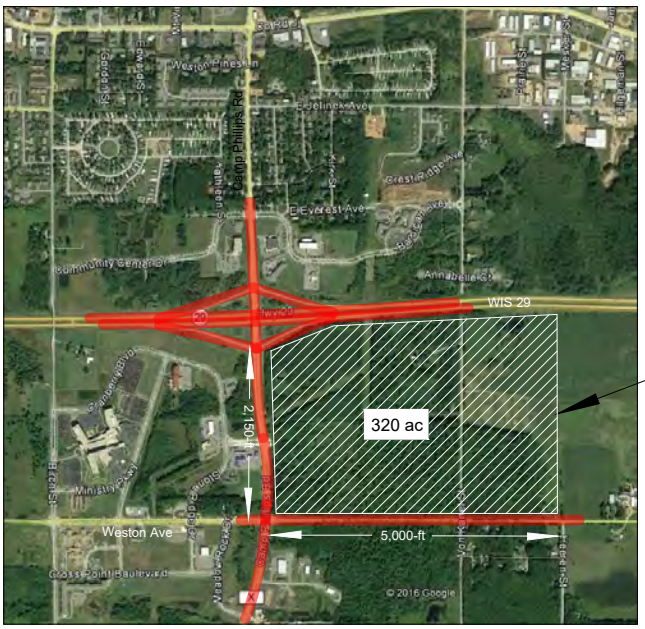
Attachments:

Attachment 1: Project Location Map
Attachment 2: Site Plan
Attachment 3: Traffic Volumes & Projections
Attachment 4: Phase I: ICE Brainstorming Guide
Attachment 5: Intersection Crash Diagram
Attachment 6: AWSC and Traffic Signal Warrants
Attachment 7: Synchro and HCS Outputs

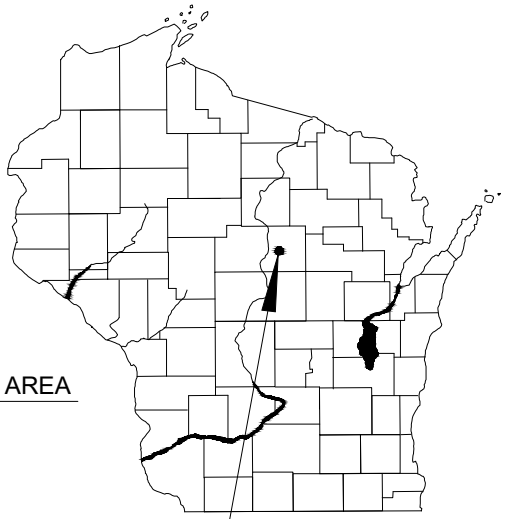
Attachment 1: Project Location Map

Attachment 1: Project Location Map

Camp Phillips Centre Development
Village of Weston, Marathon County

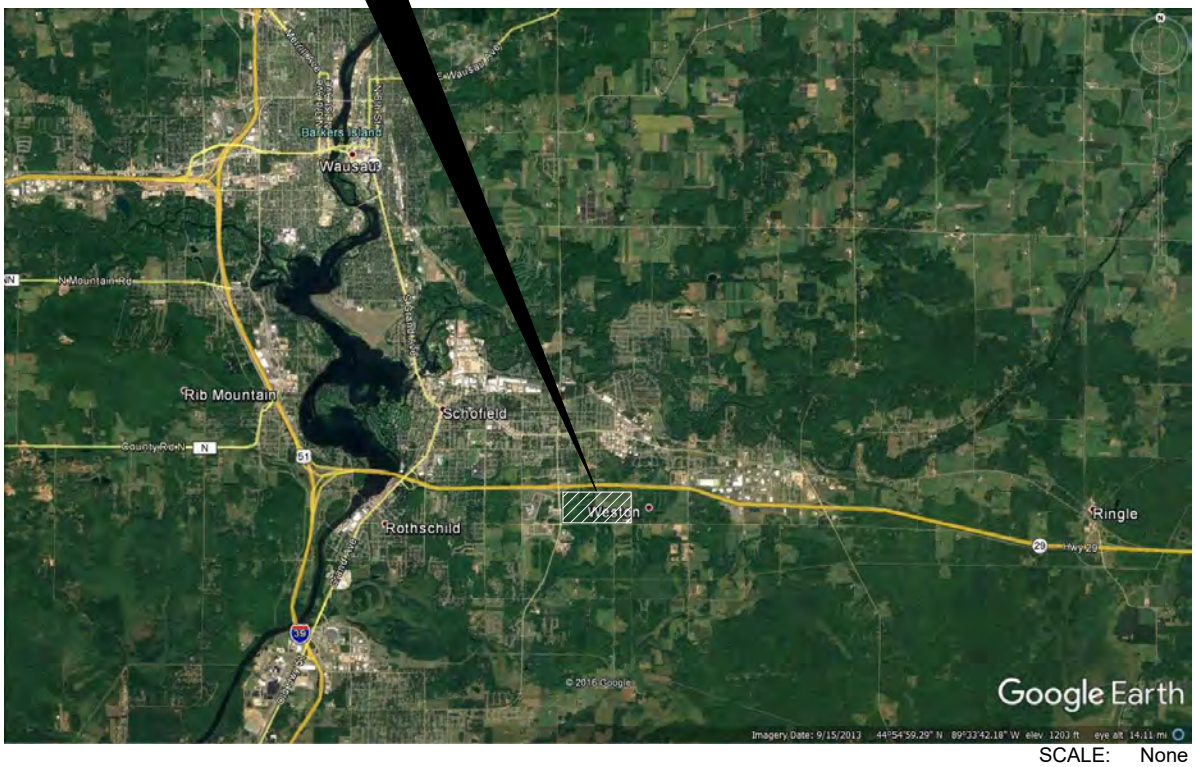


PROJECT AREA



PROJECT LOCATION

Village of Weston



SCALE: None

MSA PROFESSIONAL SERVICES

Attachment 2: Site Plan

Attachment 2: Site Plan

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin

Date: 06.29.17

EXHIBIT B - MASTER PLAN

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.
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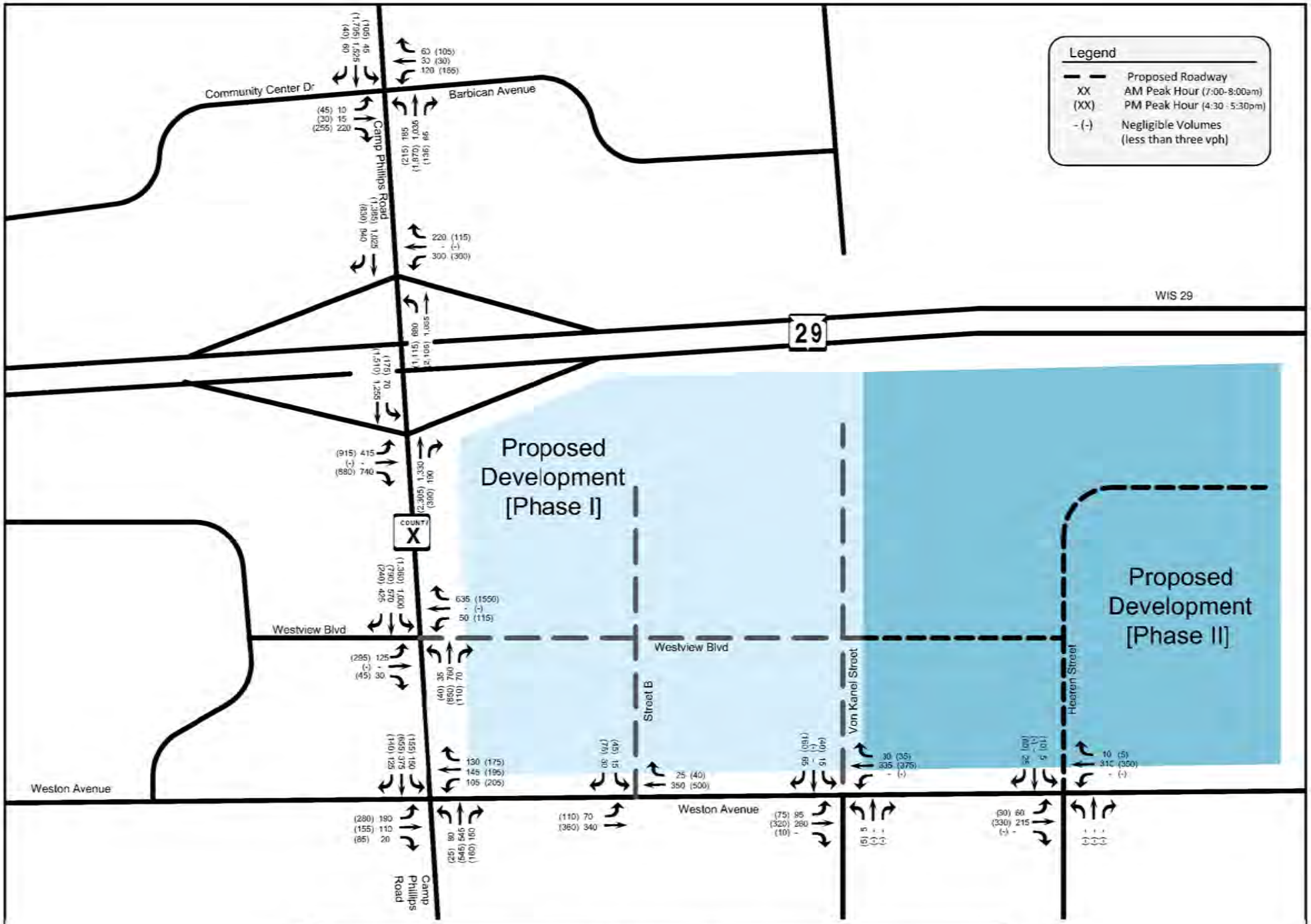
Camp Phillips Centre
COMMERCIAL DISTRICT
VILLAGE OF WESTON, WI

FDG

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

north
SCALE IN FEET
200' 0 200'

Attachment 3: Traffic Volumes & Projections



Attachment 3: 2040 Horizon Year Build Development Traffic Volumes

Village of Weston [Marathon County]

Attachment 4: Phase I: ICE Brainstorming Guide

Phase I: ICE Brainstorming Guide

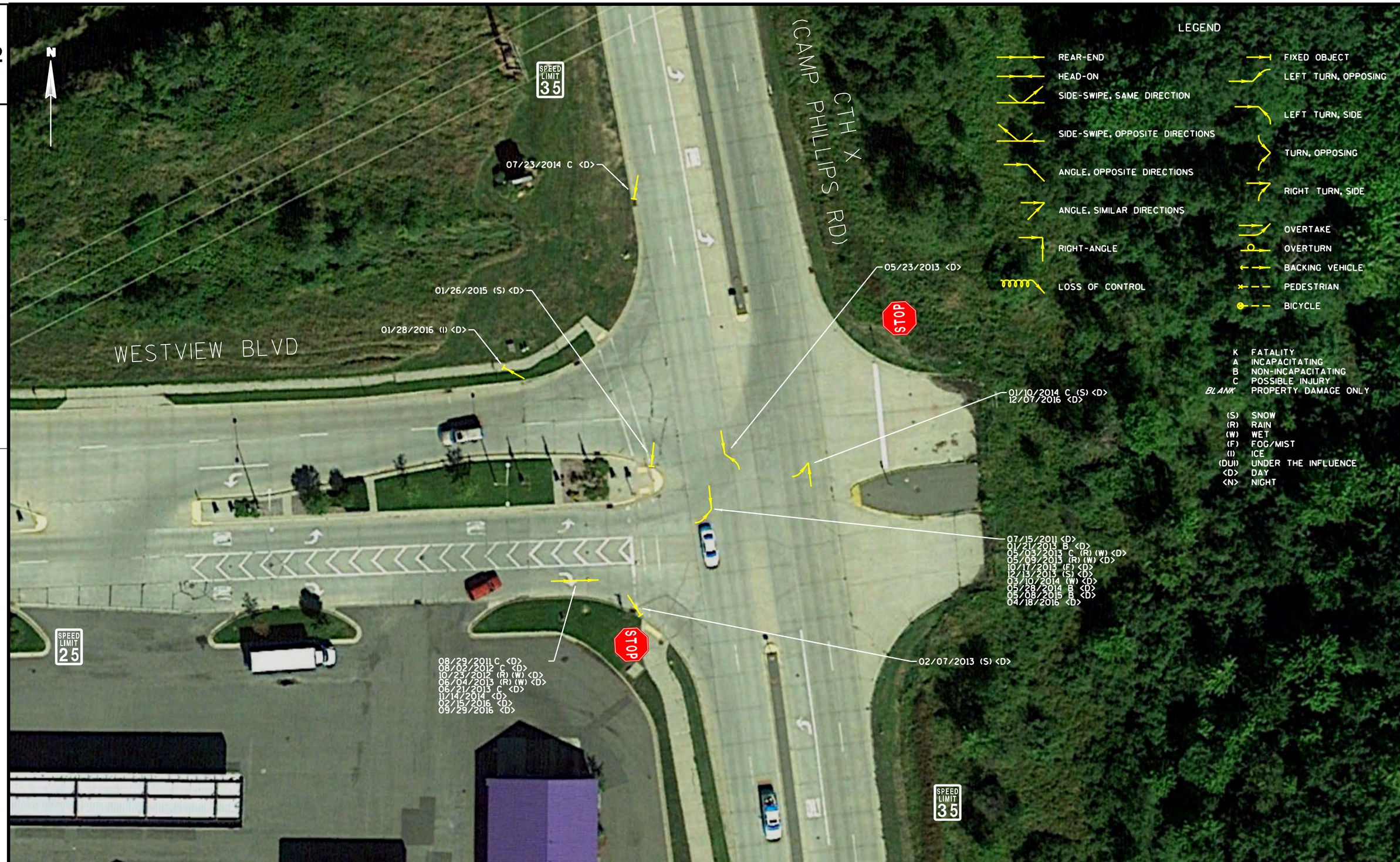
Date: 8/28/2017
Project ID: n/a
Control: Stop Control
Major Road AADT: 12500
Minor Road AADT: 810

Intersection: CTH X (Camp Phillips Rd) at Westview Blvd
Reason for ICE: Proposed mixed-use development in the SE quadrant of the WIS 29/CTH X interchange requires additional corridor capacity

List of Alternatives:

Alt. #	Control Type	Viable Alternative?	Addresses reason for ICE?	Performance measures acceptable?	ROW impacts acceptable?	Meets Warrants? (If Applicable)	Manually Exclude?	Manually Accept?	Explanation/Comments
1	Minor Road Stop Control	No	No	No		N/A			Current intersection control
2	All-Way Stop Control	No	Yes	No		Yes			AWSC is not desirable given the existing width of roadway and number of lanes for pedestrians to navigate
3	Traffic Signal	Yes	Yes	Yes	Yes	Yes			Conventional traffic signal functions with no more than 2 left turn lanes
4	Roundabout	No	Yes	No	No	N/A			2-lane roundabouts are significantly over-capacity and have LOS F before 2040
5	Right-In/Right-Out	No	No	No		N/A			Not desirable, given the access needs to the development and successfully meeting other warrants
6	Right-In/Right-Out/Left-In	No	No			N/A			Would cause significant access impacts to existing businesses on Westview, especially if roundabout is not built at Weston Ave (to allow for U-turns)
7	J-turn	No	No			N/A			Intersection spacing not great enough for proper design
8	Median U-Turn	No	No			N/A			Intersection spacing not great enough for proper design
9	Displaced left Turn	No	Yes			N/A	Yes		Intersection spacing not great enough for proper design
10	Continuous Green-T	No	Yes	No		N/A			Not applicable for this intersection type; intersection will have more than 3-legs
11	Echelon	No	Yes			N/A	Yes		Structural costs too great for development
12	Diamond	No	Yes		No	N/A			Not practical for this intersection type
13	Cloverleaf/ Partial Cloverleaf	No	Yes		No	N/A			Not practical for this intersection type
14	Diverging Diamond	No	No		No	N/A			Not applicable for this intersection type
15	Single Point	No	No			N/A			Not applicable for this intersection type
16	[Add more as needed]	-							

Attachment 5: Intersection Crash Diagram



PROJECT NO:XXXX-XX-XX	HWY:CTH X/CAMP PHILLIPS RD	COUNTY:MARATHON	CRASH DIAGRAM - CTH X & WESTVIEW BLVD	SHEET	E

FILE NAME : P:\11600s\11690s\11694\11694002\Traffic\Crash Data\Crash Diagram.dgn PLOT DATE : 4/28/2017 PLOT BY : efrailing PLOT NAME : PLOT SCALE : 1:40 WISDOT/CADDS SHEET 42

Crash Diagram.dgn 4/28/2017 1:26:11 PM efrailing

Attachment 6: AWSC and Traffic Signal Warrants

ASWC Warrant Criteria

MUTCD Yes WisDOT Yes

MUTCD A, B, 3,

Met?	Criteria
Yes	A. Is a signal justified? Yes
Yes	B. # of crashes in a 12 month period that can be corrected by multi-way stop control: 6
No	C. Minimum Volumes

1. Major road approach volume (total of both) at least 300 vph for min 8 hours?
2. Combined ped, bike, and veh volume on minor approach (total of both) at least 200 units per hour for the same 8 hours as criteria C-1?
3. If the 85th percentile speed on the major road exceeds 40 mph, may use 70% of the values in C-1 and C-2

Major Street 85th percentile mph: 35

Time Period	From	To	Major Road: Both App.	Minor Road: Both App. (VPH)	C-1	C-2	Both Met?	D (80%)		Both Met?
1	6:00	7:00	0	0	No	No	No	No	No	No
2	7:00	8:00	1193	105	Yes	No	No	No	No	No
3	8:00	9:00	788	92	Yes	No	No	No	No	No
4	9:00	10:00	0	0	No	No	No	No	No	No
5	10:00	11:00	0	0	No	No	No	No	No	No
6	11:00	12:00	0	0	No	No	No	No	No	No
7	12:00	13:00	0	0	No	No	No	No	No	No
8	13:00	14:00	0	0	No	No	No	No	No	No
9	14:00	15:00	0	0	No	No	No	No	No	No
10	15:00	16:00	0	0	No	No	No	No	No	No
11	16:00	17:00	1250	206	Yes	Yes	Yes	No	No	No
12	17:00	18:00	1106	189	Yes	No	No	No	No	No
13	18:00	19:00	0	0	No	No	No	No	No	No
14	19:00	20:00	0	0	No	No	No	No	No	No
15	20:00	21:00	0	0	No	No	No	No	No	No
16	21:00	22:00	0	0	No	No	No	No	No	No

No D. Use when previous criteria have not been met:
If 80% minimum values of Criteria B, C-1, and C-2 (C-3 excluded) are satisfied, warrant is met.

WisDOT

Met?	Criteria
No	1 Functional Highway Classification

Approach	Classification
1: (SB)	Minor Arterial
2: (WB)	
3: (NB)	Minor Arterial
4: (EB)	Local Road

No 2 Average Daily Traffic

Approach	AADT
Minor 1	810
Minor 2	
Major 1	12500
Major 2	

Yes 3 Crash History
# of crashes in a 12 month period that can be corrected by multi-way stop control: 6
Expected to significantly reduce the overall severity of future crashes? No

4 Alternatives
Refer to TGM 13-26-5 Section D.

No 5 Mobility Impact
Will the high-volume "through" street experience significant delays for the benefit of reducing delays for a low-volume side street? Yes

6 Right Turn Inclusion
Refer to WisDOT TSDM 2-3-2

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Camp Phillips Road & Westview Boulevard
County: Marathon
City: Weston

Major Street: Camp Phillips Rd
Critical Approach Speed: 35 mph
Lanes: 2 or more lanes

Minor Street: Westview Blvd
Critical Approach Speed: 25 mph
Lanes: 2 or more lanes

% Right Turns Included
From North (SB) 100%
From East (WB) 0%
From South (NB) 100%
From West (EB) 0%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? No

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
1/1/2020	Yes				

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**N/A**
Condition A: Minimum Vehicular Volume	
Condition B: Interruption of Continuous Traffic	
Condition C: Combination: 80% of A and B	
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	No
Criterion B: Peak-Hour	No
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**Yes**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: SBG
Agency: MSA Professional Services
Date: 8/27/2017

Warrant 1: Eight - Hour Vehicular Volume 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	600	480
Minor Rd. Req	200	160
Number of Hours	1	3
		Satisfied?

Condition B: Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	900	720
Minor Rd. Req	100	80
Number of Hours	0	0
		Satisfied?

Condition C: Combination of A & B at 80%
Satisfied?

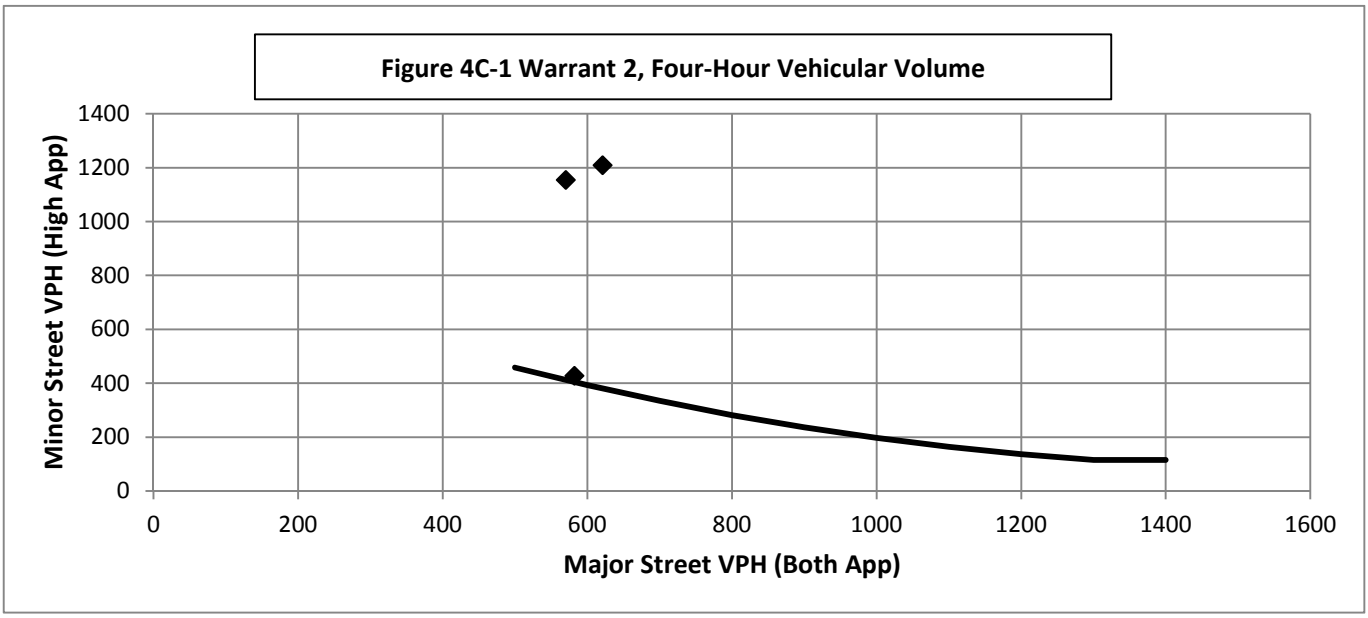
6:00 AM Enter Start Time (Military Time) (HH:MM)

Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	0	0	0
2	7:00	8:00	582	427	1009
3	8:00	9:00	292	512	804
4	9:00	10:00	0	0	0
5	10:00	11:00	0	0	0
6	11:00	12:00	0	0	0
7	12:00	13:00	0	0	0
8	13:00	14:00	0	0	0
9	14:00	15:00	0	0	0
10	15:00	16:00	0	0	0
11	16:00	17:00	621	1208	1829
12	17:00	18:00	570	1154	1724
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 100%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To: Yes

Hour Start	16:00	17:00	7:00	#N/A
Major Road Vol.	621	570	582	#N/A
Minor Road Vol.	1208	1154	427	#N/A



Warrant 3: Peak Hour Volume 100%

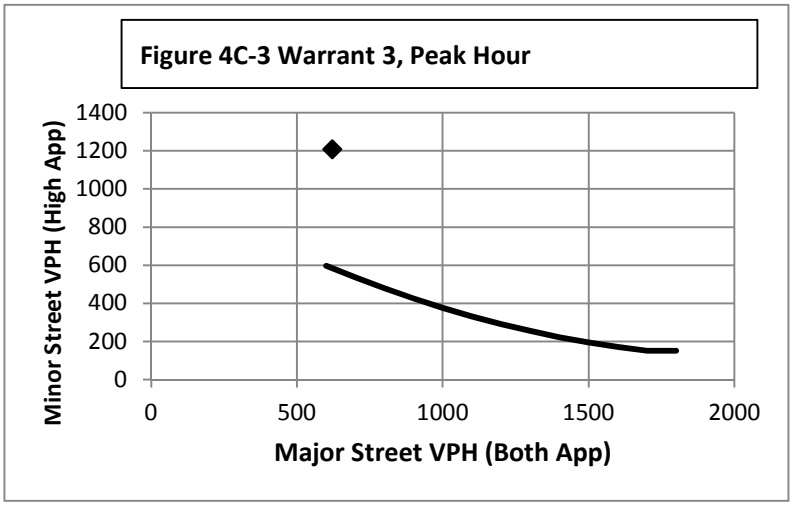
Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	5	
Volume on Minor Approach	150	Yes
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour? No

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	621	1208



Warrant 4: Pedestrian Volume 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

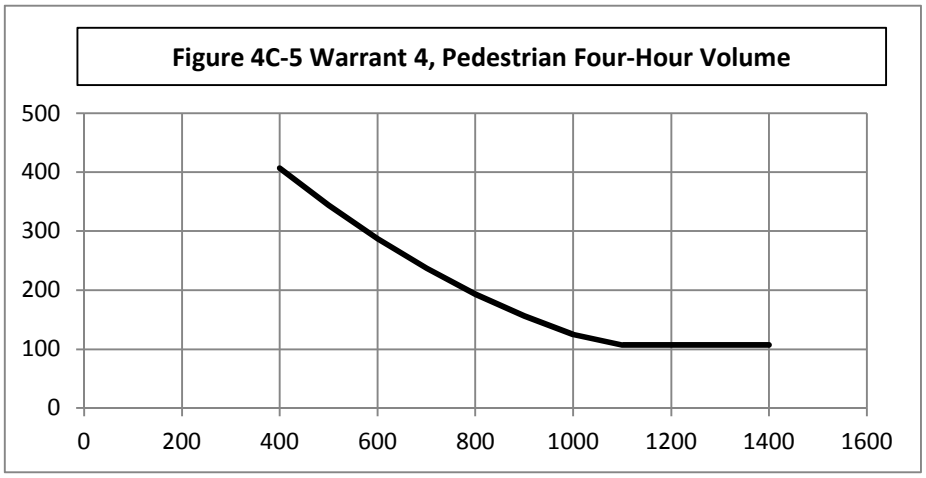
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
12:00		0
15:00		0
16:00		621
11:00		0

Manually Set Major Rd Vol? No

Avg. walk speed less than 3.5 ft/s? No

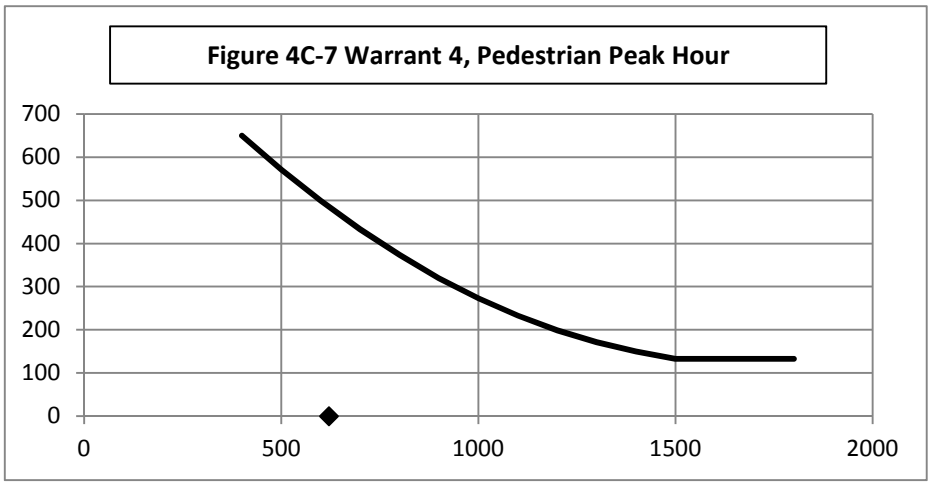
Criterion A Satisfied? No



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
16:00	0	621

Criterion B Satisfied? No



Warrant 5: School Crossing 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	Yes
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	Yes
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	Yes

Warrant 6: Coordinated Signal System 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	No
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	Yes

Warrant 7: Crash Experience 100%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			Yes
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		Yes
		5		
3	Warrant 1, Condition A (80%)		No	Yes
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		Yes	

Warrant 8: Roadway Network 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

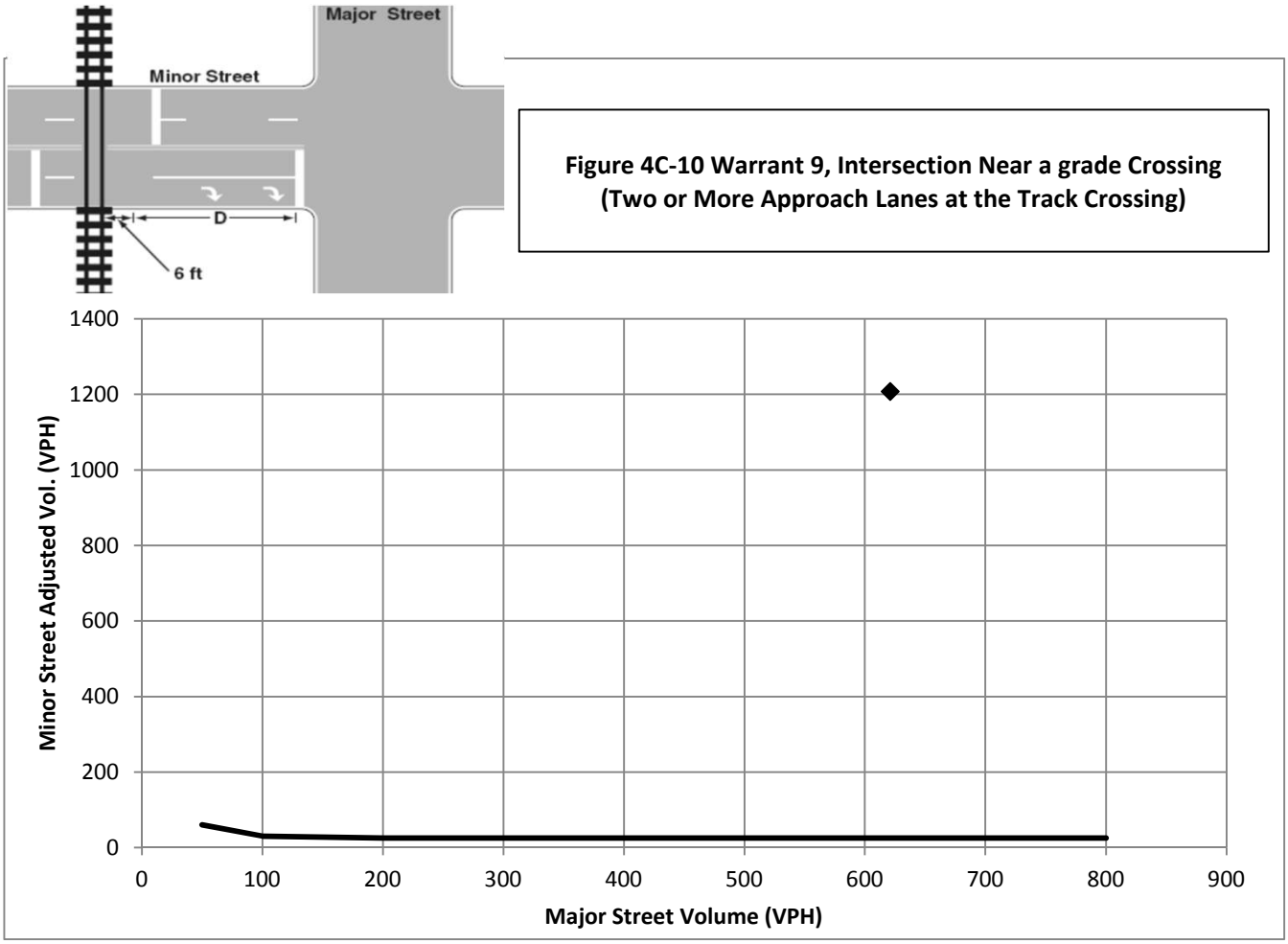
	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1829	Yes	Yes
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.			1	Yes	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	No
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
				16:00	621	1208	1208



Conclusions/Comments:

Updated: 6/23/2015

Attachment 7: Synchro and HCS Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	0	30	50	0	635	35	760	70	1000	570	425
Future Volume (veh/h)	125	0	30	50	0	635	35	760	70	1000	570	425
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900	1863	1863	1863	1863	1863	1863	1845	1845	1900
Adj Flow Rate, veh/h	133	0	32	53	0	473	37	809	37	1064	606	452
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	2	2	2	2	2	2	3	3	3
Cap, veh/h	265	0	365	215	191	1331	143	1021	318	1278	1058	789
Arrive On Green	0.08	0.00	0.24	0.10	0.00	0.10	0.04	0.20	0.20	0.38	0.55	0.55
Sat Flow, veh/h	3312	0	1524	1372	1863	2787	1774	5085	1583	3408	1917	1428
Grp Volume(v), veh/h	133	0	32	53	0	473	37	809	37	1064	554	504
Grp Sat Flow(s),veh/h/ln	1656	0	1524	1372	1863	1393	1774	1695	1583	1704	1752	1593
Q Serve(g_s), s	3.7	0.0	1.6	3.5	0.0	2.7	1.7	14.7	1.9	27.6	20.1	20.2
Cycle Q Clear(g_c), s	3.7	0.0	1.6	3.5	0.0	2.7	1.7	14.7	1.9	27.6	20.1	20.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.90
Lane Grp Cap(c), veh/h	265	0	365	215	191	1331	143	1021	318	1278	968	879
V/C Ratio(X)	0.50	0.00	0.09	0.25	0.00	0.36	0.26	0.79	0.12	0.83	0.57	0.57
Avail Cap(c_a), veh/h	323	0	391	215	191	1331	193	1202	374	1366	1027	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.9	0.0	28.8	40.7	0.0	5.1	34.7	37.0	31.8	27.6	14.3	14.3
Incr Delay (d2), s/veh	1.5	0.0	0.1	0.6	0.0	0.2	0.9	3.2	0.2	4.3	0.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.0	1.2	2.4	0.0	3.6	1.6	11.6	1.5	19.9	15.0	13.9
LnGrp Delay(d),s/veh	44.4	0.0	28.9	41.3	0.0	5.3	35.7	40.1	32.0	32.0	15.0	15.0
LnGrp LOS	D		C	D		A	D	D	C	C	B	B
Approach Vol, veh/h		165			526			883			2122	
Approach Delay, s/veh		41.4			8.9			39.6			23.5	
Approach LOS		D			A			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	42.5	25.5		29.3	8.3	59.7	13.3	16.0
Change Period (Y+Rc), s	6.0	6.0		6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	39.0	23.0		25.0	6.5	57.0	9.5	10.0
Max Q Clear Time (g_c+I1), s	29.6	16.7		3.6	3.7	22.2	5.7	5.5
Green Ext Time (p_c), s	6.9	2.8		2.3	0.0	16.0	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	133	32	53	473	37	809	37	1064	1058
v/c Ratio	0.39	0.09	0.36	0.38	0.19	0.73	0.11	0.86	0.55
Control Delay	47.9	31.9	51.9	11.3	34.0	40.2	33.7	37.1	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	31.9	51.9	11.3	34.0	40.2	33.7	37.1	15.1
Queue Length 50th (ft)	44	17	34	65	20	186	20	332	240
Queue Length 95th (ft)	75	42	75	89	47	233	48	419	303
Internal Link Dist (ft)		316				945			1152
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	348	410	147	1388	194	1261	392	1429	2049
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.08	0.36	0.34	0.19	0.64	0.09	0.74	0.52

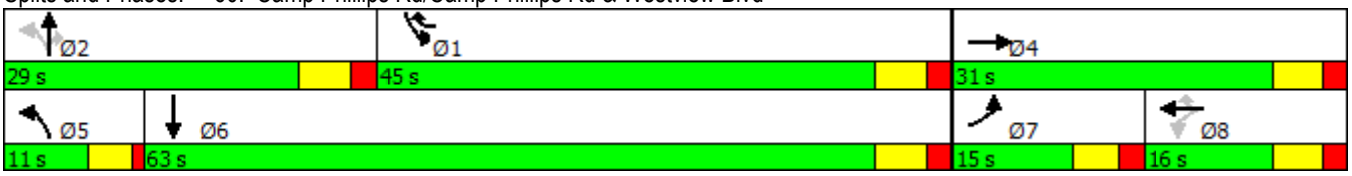
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2		2			
Detector Phase	7	4		8	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0	8.0	6.0	15.0	15.0	8.0	15.0	
Minimum Split (s)	13.5	16.0		16.0	16.0	14.0	10.5	21.0	21.0	14.0	21.0	
Total Split (s)	15.0	31.0		16.0	16.0	45.0	11.0	29.0	29.0	45.0	63.0	
Total Split (%)	14.3%	29.5%		15.2%	15.2%	42.9%	10.5%	27.6%	27.6%	42.9%	60.0%	
Maximum Green (s)	9.5	25.0		10.0	10.0	39.0	6.5	23.0	23.0	39.0	57.0	
Yellow Time (s)	3.5	4.0		4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		6.0	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.9	21.3		10.3		42.4	22.6	21.0	21.0	34.9	56.1	
Actuated g/C Ratio	0.10	0.22		0.11		0.44	0.24	0.22	0.22	0.36	0.59	
v/c Ratio	0.39	0.09		0.36		0.38	0.19	0.73	0.11	0.86	0.55	
Control Delay	47.9	31.9		51.9		11.3	34.0	40.2	33.7	37.1	15.1	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.9	31.9		51.9		11.3	34.0	40.2	33.7	37.1	15.1	
LOS	D	C		D		B	C	D	C	D	B	
Approach Delay		44.8			15.4			39.7			26.1	
Approach LOS		D			B			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 95.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 28.7 — Intersection LOS: C
Intersection Capacity Utilization 68.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	0	30	50	0	635	35	760	70	1000	570	425
Future Volume (vph)	125	0	30	50	0	635	35	760	70	1000	570	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		0
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3303	1524	0	1770	1863	2787	1770	5085	1583	3400	3281	0
Flt Permitted	0.950			0.736			0.230			0.950		
Satd. Flow (perm)	3303	1524	0	1371	1863	2787	428	5085	1583	3400	3281	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		396			650			1025			1232	
Travel Time (s)		10.8			14.8			20.0			24.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	133	0	32	53	0	473	37	809	37	1064	606	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	32	0	53	0	473	37	809	37	1064	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm		pm+ov	pm+pt	NA	Perm	Prot	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	0	45	115	0	1550	40	850	110	1360	790	240
Future Volume (veh/h)	295	0	45	115	0	1550	40	850	110	1360	790	240
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	311	0	47	121	0	1142	42	895	58	1432	832	253
Adj No. of Lanes	2	1	0	1	1	2	1	3	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	368	0	142	277	99	1346	133	1027	320	1479	1622	493
Arrive On Green	0.11	0.00	0.09	0.08	0.00	0.05	0.04	0.20	0.20	0.43	0.61	0.61
Sat Flow, veh/h	3442	0	1583	1774	1863	2787	1774	5085	1583	3442	2676	813
Grp Volume(v), veh/h	311	0	47	121	0	1142	42	895	58	1432	550	535
Grp Sat Flow(s),veh/h/ln	1721	0	1583	1774	1863	1393	1774	1695	1583	1721	1770	1719
Q Serve(g_s), s	10.0	0.0	3.1	7.2	0.0	6.0	2.2	19.3	2.7	45.9	20.1	20.1
Cycle Q Clear(g_c), s	10.0	0.0	3.1	7.2	0.0	6.0	2.2	19.3	2.7	45.9	20.1	20.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	368	0	142	277	99	1346	133	1027	320	1479	1073	1042
V/C Ratio(X)	0.84	0.00	0.33	0.44	0.00	0.85	0.32	0.87	0.18	0.97	0.51	0.51
Avail Cap(c_a), veh/h	381	0	142	285	99	1346	166	1081	336	1493	1073	1042
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.5	0.0	48.2	45.6	0.0	12.4	40.0	43.6	22.9	31.4	12.7	12.7
Incr Delay (d2), s/veh	15.5	0.0	1.4	1.1	0.0	5.3	1.3	7.7	0.3	16.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	0.0	2.6	6.4	0.0	19.3	2.0	14.9	2.6	33.2	15.1	14.7
LnGrp Delay(d),s/veh	65.0	0.0	49.6	46.7	0.0	17.7	41.4	51.3	23.2	47.6	13.1	13.1
LnGrp LOS	E		D	D		B	D	D	C	D	B	B
Approach Vol, veh/h		358			1263			995			2517	
Approach Delay, s/veh		63.0			20.5			49.3			32.8	
Approach LOS		E			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	54.6	28.8	13.5	16.1	8.9	74.5	17.6	12.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	4.5	6.0	5.5	6.0
Max Green Setting (Gmax), s	49.0	24.0	9.5	10.0	6.5	68.0	12.5	6.0
Max Q Clear Time (g_c+I1), s	47.9	21.3	9.2	5.1	4.2	22.1	12.0	8.0
Green Ext Time (p_c), s	0.7	1.6	0.0	2.5	0.0	22.3	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.0
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	311	47	121	1142	42	895	58	1432	1085
v/c Ratio	0.48	0.39	0.75	0.92	0.25	0.85	0.18	0.94	0.49
Control Delay	42.6	60.0	78.4	43.1	39.5	51.0	38.9	43.1	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	60.0	78.4	43.1	39.5	51.0	38.9	43.1	12.3
Queue Length 50th (ft)	103	33	89	448	25	231	35	516	231
Queue Length 95th (ft)	147	73	#196	#626	56	287	73	#692	295
Internal Link Dist (ft)		348				970			1130
Turn Bay Length (ft)			150	450	100		250	700	
Base Capacity (vph)	654	143	162	1240	167	1108	345	1527	2219
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.33	0.75	0.92	0.25	0.81	0.17	0.94	0.49

Intersection Summary

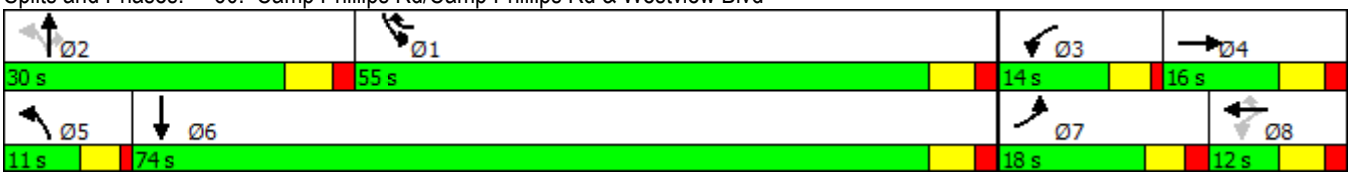
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8	2		2			
Detector Phase	7	4		3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	6.0		6.0	6.0	6.0	6.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	13.5	12.0		10.5	12.0	12.0	10.5	21.0	21.0	12.0	21.0	
Total Split (s)	18.0	16.0		14.0	12.0	55.0	11.0	30.0	30.0	55.0	74.0	
Total Split (%)	15.7%	13.9%		12.2%	10.4%	47.8%	9.6%	26.1%	26.1%	47.8%	64.3%	
Maximum Green (s)	12.5	10.0		9.5	6.0	49.0	6.5	24.0	24.0	49.0	68.0	
Yellow Time (s)	3.5	4.0		3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.0		4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	20.8	8.3		10.2		49.2	24.5	23.0	23.0	49.2	71.9	
Actuated g/C Ratio	0.19	0.08		0.09		0.44	0.22	0.21	0.21	0.44	0.65	
v/c Ratio	0.48	0.39		0.75		0.92	0.25	0.85	0.18	0.94	0.49	
Control Delay	42.6	60.0		78.4		43.1	39.5	51.0	38.9	43.1	12.3	
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.6	60.0		78.4		43.1	39.5	51.0	38.9	43.1	12.3	
LOS	D	E		E		D	D	D	D	D	B	
Approach Delay		44.9			46.5			49.8			29.8	
Approach LOS		D			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 110.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 38.9 — Intersection LOS: D
Intersection Capacity Utilization 85.3% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 60: Camp Phillips Rd/Camp Phillips Rd & Westview Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	0	45	115	0	1550	40	850	110	1360	790	240
Future Volume (vph)	295	0	45	115	0	1550	40	850	110	1360	790	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	150		450	100		250	700		200
Storage Lanes	2		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.88	1.00	0.91	1.00	0.97	0.95	0.95
Frt		0.850				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1583	0	1770	1863	2787	1770	5085	1583	3433	3415	0
Flt Permitted	0.950			0.000			0.208			0.950		
Satd. Flow (perm)	3433	1583	0	0	1863	2787	387	5085	1583	3433	3415	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			30			35			35	
Link Distance (ft)		428			648			1050			1210	
Travel Time (s)		11.7			14.7			20.5			23.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	70%	100%	100%	50%	100%	100%	100%
Adj. Flow (vph)	311	0	47	121	0	1142	42	895	58	1432	832	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	311	47	0	121	0	1142	42	895	58	1432	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt		pm+ov	pm+pt	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	

HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	7/7/2017
Analysis Year	2040
Time Period	AM Peak
Project Description	

Site Information

Intersection	CTH X at Westview Blvd
E/W Street Name	Westview Blvd
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	1	1	0	0	0	1	0	0	0	2	0	0	1	1	0
Lane Assignment	L		LT				LT		LT		T		L		LT	
Volume (V), veh/h	0	125	0	30	0	50	0	635	0	35	760	70	0	1000	570	425
Percent Heavy Vehicles, %	6	6	6	6	2	2	2	2	2	2	2	2	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	141	0	34	0	54	0	689	0	38	825	76	0	1096	625	466
Right-Turn Bypass	Yielding				Non-Yielding				Yielding				Yielding			
Conflicting Lanes	2				2				2				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000	4.0000		4.0000		4.0000	4.0000	4.0000	4.2000	4.2000	4.2000
Follow-Up Headway (s)	2.8000	2.8000	2.8000		2.8000		2.8000	2.8000	2.8000	2.8000	2.8000	2.8000

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	75	66	34		54	689	406	457	76	912	809	466
Entry Volume veh/h	71	63	32		53	675	398	448	75	886	785	452
Circulating Flow (v_c), pc/h	1775			1004			1237			92		
Exiting Flow (v_{ex}), pc/h	1096			38			966			679		
Capacity (c_{pce}), pc/h	357	357	787		623		526	526	583	1197	1197	1248
Capacity (c), veh/h	337	337	743		610		516	516	571	1162	1162	1212
v/c Ratio (x)	0.21	0.19	0.04		0.09		0.77	0.87	0.13	0.76	0.68	0.37

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	14.6	14.0	5.3		6.9	0.0	30.5	41.9	7.9	16.0	12.7	6.6
Lane LOS	B	B	A		A	A	D	E	A	C	B	A
95% Queue, veh	0.8	0.7	0.1		0.3		6.9	9.4	0.4	7.8	5.6	1.8
Approach Delay, s/veh	12.6			0.5			34.2			12.8		
Approach LOS	B			A			D			B		
Intersection Delay, s/veh | LOS	15.5						C					

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HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	7/7/2017
Analysis Year	2040
Time Period	PM Peak
Project Description	

Site Information

Intersection	CTH X at Westview Blvd
E/W Street Name	Westview Blvd
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.95
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	1	1	0	0	0	1	0	0	0	2	0	0	1	1	0
Lane Assignment	L		LT				LT		LT		T		L		LT	
Volume (V), veh/h	0	295	0	45	0	115	0	1550	0	40	850	110	0	1360	790	240
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	317	0	48	0	123	0	1664	0	43	913	118	0	1460	848	258
Right-Turn Bypass	Yielding				Non-Yielding				Yielding				Yielding			
Conflicting Lanes	2				2				2				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000	4.0000		4.0000		4.0000	4.0000	4.0000	4.2000	4.2000	4.2000
Follow-Up Headway (s)	2.8000	2.8000	2.8000		2.8000		2.8000	2.8000	2.8000	2.8000	2.8000	2.8000

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	168	149	48		123	1664	449	507	118	1223	1085	258
Entry Volume veh/h	165	146	47		121	1631	441	497	116	1199	1063	253
Circulating Flow (v_c), pc/h	2431			1273			1777			166		
Exiting Flow (v_{ex}), pc/h	1460			43			1230			971		
Capacity (c_{pce}), pc/h	222	222	638		513		356	356	448	1130	1130	1243
Capacity (c), veh/h	218	218	625		503		349	349	439	1108	1108	1219
v/c Ratio (x)	0.76	0.67	0.08		0.24		1.26	1.42	0.26	1.08	0.96	0.21

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	58.4	48.2	6.6		10.6	0.0	170.5	235.3	12.4	70.7	37.6	4.8
Lane LOS	F	E	A		B	A	F	F	B	F	E	A
95% Queue, veh	5.2	4.2	0.2		0.9		19.8	25.7	1.0	27.7	17.4	0.8
Approach Delay, s/veh	47.4			0.7			183.7			50.1		
Approach LOS	E			A			F			F		
Intersection Delay, s/veh | LOS	59.5						F					

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Appendix J:
Intersection Control Evaluation (ICE)

Phase I: Scoping ICE for Camp Phillips Road & Weston Avenue (2040 Full Build Traffic)

To: DOT ICE Review
From: Eric Frailing, PE – MSA Professional Services, Inc.
Date: 8/30/2017
RE: Project ID n/a
CTH X (Camp Phillips Rd) at Weston Ave
Village of Weston, Marathon County
Local Projects

Project Description:

A proposed 310+ acre mixed-use development (Camp Phillips Centre) is proposed for the land immediately southeast of the WIS 29 and CTH X (Camp Phillips Rd) intersection. The focus of this study is the CTH X corridor, from the WIS 29 interchange to Weston Ave, and is part of an overall Traffic Impact Analysis (TIA) being completed for the corridor. The project location can be seen in Attachment 1, Project Location Map.

CTH X is a four-lane divided urban arterial roadway, with a posted speed of 35-mph. Weston Ave west of the intersection is a four-lane divided urban arterial roadway, with a posted speed of 35-mph. Weston Ave transitions to a two-lane rural cross section with a posted speed of 45-mph east of the intersection, as it exits the village of Weston. This intersection will serve as the southern and western boundary of the Camp Phillips Centre development. Attachment 2, Site Plan illustrates the proposed land uses anticipated with the development. Full-build 2040 traffic volumes were used for analysis and are shown in Attachment 3, Traffic Volumes & Projections.

The intersection of CTH X and Weston Ave is currently an at-grade, signalized, multilane intersection. Exclusive left-turn lanes are provided for all approaches A dedicated through lane and a shared through/right movement lane are also provided for all approaches. No protected moments are provided; all left-turns operate as permissive-only (no flashing yellow arrow is present).

A shared-use bicycle/pedestrian path is provided along the west side of CTH X, through the intersection with Weston Ave. No pedestrian or bicycle facilities are present along the east side of CTH X. On the west side of CTH X, this intersects standard sidewalk which runs along the north side of Weston Ave and another shared-use bicycle/pedestrian path which runs along the south side of Weston Ave. On the east side of CTH X, the path along the south side of Weston Ave transitions/terminates into the eastbound shoulder. The sidewalk on the north side abruptly terminates, able to be continued once development occurs.

Alternatives:

Please refer to Attachment 4, Phase I: ICE Brainstorming Guide. Several alternatives were reviewed to determine the feasibility of each possible intersection control improvement. The guide includes comments for each alternative considered.

Safety Considerations:
Please refer to Attachment 5, Intersection Crash Diagram. During an approximately six-year period (January 2011 through November 2016), the westbound ramp terminal intersection experienced 13 crashes, which resolves into a rate of 2.20 crashes per year or 0.43 crashes per million entering vehicles. The predominant crash issue at this intersection is failure to yield the right-of-way by vehicles turning left, with the majority of the crashes of this type originating from eastbound traffic (northbound left-turning traffic also shows a lesser, but similar pattern).

Operational Analysis:
Due to the current traffic signal control, stop-control alternatives will not be considered.

Traffic signal control was analyzed in Synchro 9 software; its preliminary results are attached. Traffic signals are projected to operate at level of service (LOS) C or better for all approaches in 2040 under full build-out conditions and lane modifications.

A roundabout can be considered when the minimum vehicular volume warrants for a traffic signal control are met or if unique safety concerns are present, according to the WisDOT Facilities Development Manual (FDM) Chapter 11-25, Section 3.1.2. A roundabout alternative was reviewed, and an operational analysis was performed with the 2040 full build-out volumes. Analyses were run using Highway Capacity Software (HCS) Software. With two-lanes on each approach, a roundabout is projected to operate at LOS B or better for all approaches in 2040 under full build-out conditions.

Full analysis data can be found in Attachment 6, Synchro and HCS Outputs.

Other Considerations:
None.

Feasibility of Alternatives:
Alternatives such as a Displaced Left Turn, J-Turn, and Median U-Turn were not considered viable options for an intersection control due to the lack of space for proper implementation and the insufficient spacing between intersections. Grade separated alternatives were not applicable for this intersection type and access needs. Please refer to Attachment 4: Phase I: ICE Brainstorming Guide for further explanation for each control type considered.

Conclusion:
Since the existing traffic signal control operates with acceptable LOS with full build-out traffic and no geometric modifications are required, the roundabout alternative will be removed as a viable alternative in terms of this ICE. With the existing control requiring little to no improvements, the cost of converting the intersection into a roundabout cannot be justified. Since the traffic signal control is the only viable alternative for this intersection, a Phase II ICE Report is not deemed necessary.

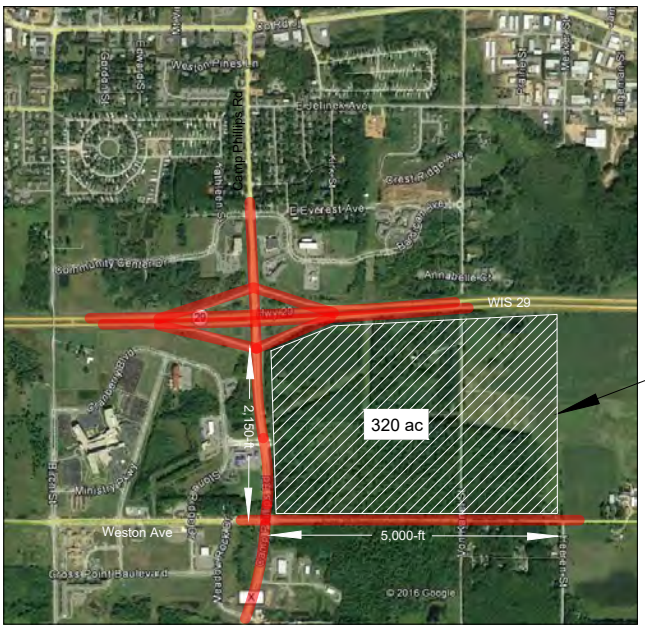
Attachments:

Attachment 1: Project Location Map
Attachment 2: Site Plan
Attachment 3: Traffic Volumes & Projections
Attachment 4: Phase I: ICE Brainstorming Guide
Attachment 5: Intersection Crash Diagram
Attachment 6: Synchro and HCS Outputs

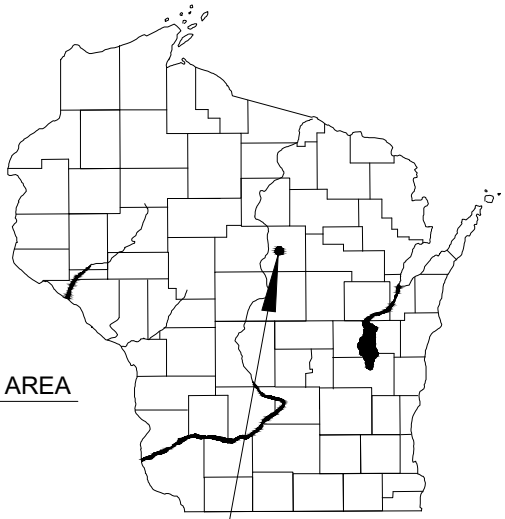
Attachment 1: Project Location Map

Attachment 1: Project Location Map

Camp Phillips Centre Development
Village of Weston, Marathon County

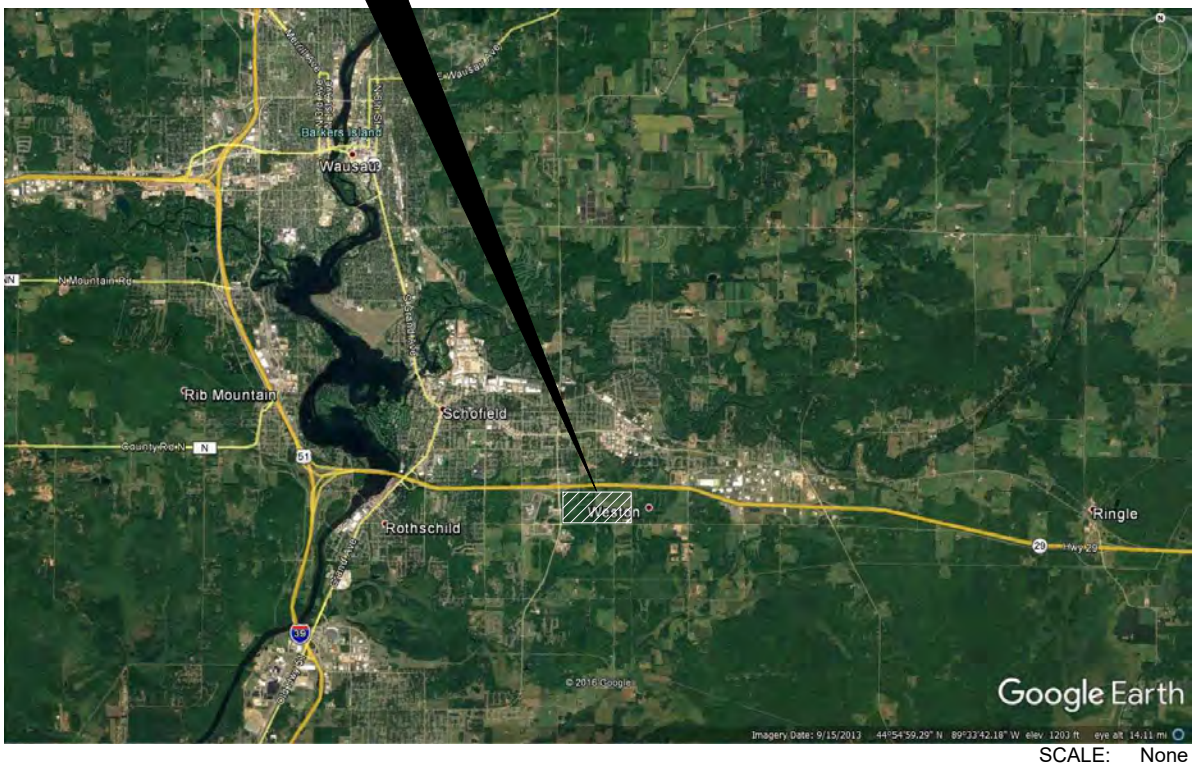


PROJECT AREA



PROJECT LOCATION

Village of Weston



SCALE: None

MSA PROFESSIONAL SERVICES

Attachment 2: Site Plan

Attachment 2: Site Plan

CAMP PHILLIPS CENTRE

Location: Weston, Wisconsin

Date: 06.29.17

EXHIBIT B - MASTER PLAN

PLEASE NOTE: POTENTIAL BUILDING AND SITE LAYOUTS SHOWN ON THIS PLAN ARE FOR ILLUSTRATION PURPOSES ONLY AND ARE COPYRIGHT PROTECTED BY JSD PROFESSIONAL SERVICES.
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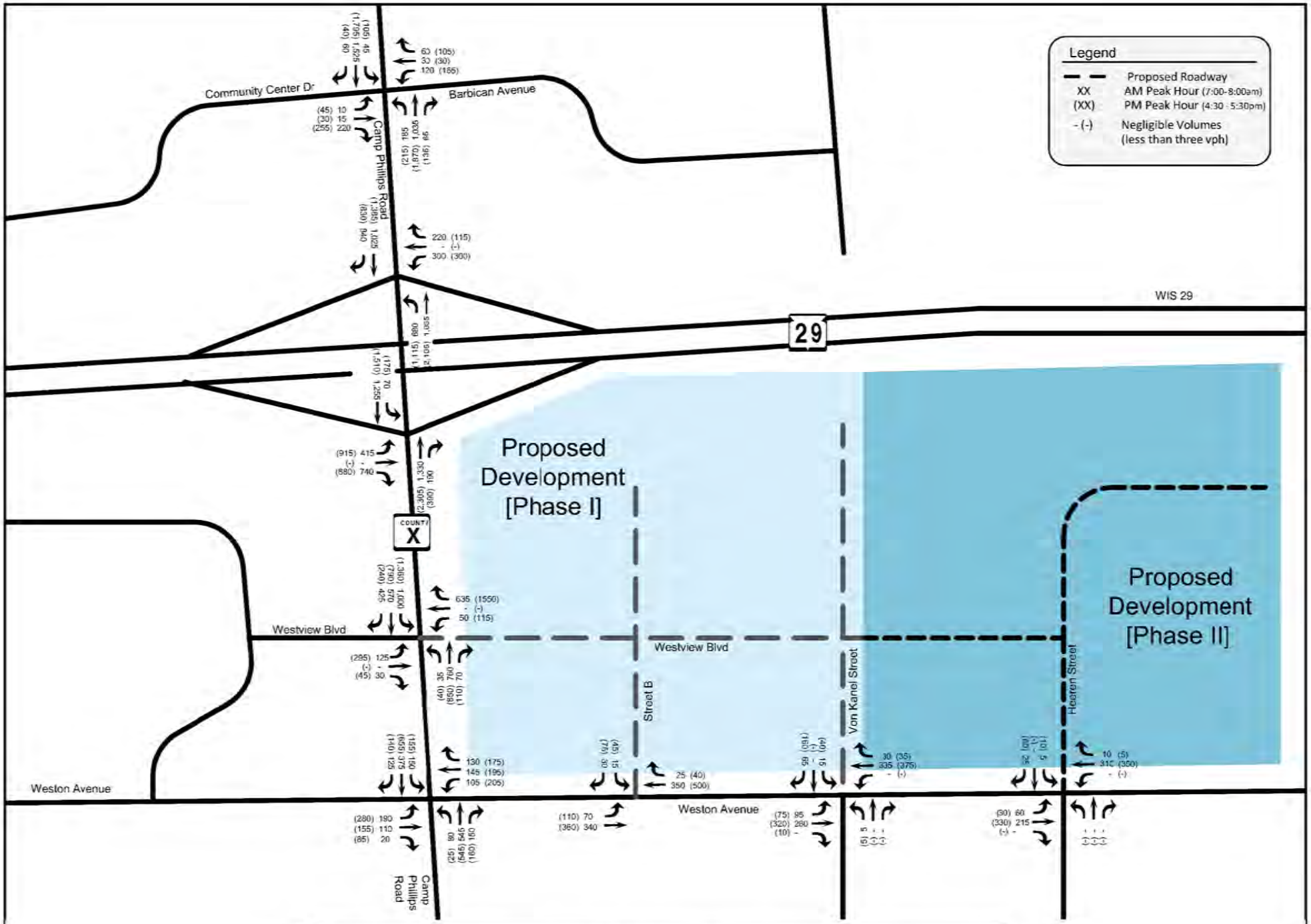
Camp Phillips Centre
COMMERCIAL DISTRICT
VILLAGE OF WESTON, WI

FDG

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

north
SCALE IN FEET
200' 0 200'

Attachment 3: Traffic Volumes & Projections



Attachment 3: 2040 Horizon Year Build Development Traffic Volumes

Village of Weston [Marathon County]

Attachment 4: Phase I: ICE Brainstorming Guide

Phase I: ICE Brainstorming Guide

Date: 8/28/2017
Project ID: n/a
Control: Signal
Major Road AADT: 10100
Minor Road AADT: 3300

Intersection: CTH X (Camp Phillips Rd) at Weston Ave
Reason for ICE: Proposed mixed-use development in the SE quadrant of the WIS 29/CTH X interchange requires additional corridor capacity

List of Alternatives:

Alt. #	Control Type	Viable Alternative?	Addresses reason for ICE?	Performance measures acceptable?	ROW impacts acceptable?	Meets Warrants? (If Applicable)	Manually Exclude?	Manually Accept?	Explaination/Comments
1	Minor Road Stop Control	No	No			N/A			Intersection currently signalized
2	All-Way Stop Control	No	No			N/A			Intersection currently signalized
3	Traffic Signal	Yes	Yes	Yes		Yes			Current intersection control
4	Roundabout	Yes	Yes	Yes		N/A			Roundabout has satisfactory operations in 2040, with excess capacity, featuring a simple symmetric design
5	Right-In/Right-Out	No	No			N/A			Not practical given current intersection geometry and signal control
6	Right-In/Right-Out/Left-In	No	No	No		N/A			Not practical given current intersection geometry and signal control; no opportunity for a roundabout or other means of a nearby U-turn opportunity
7	J-turn	No	No			N/A			Intersection spacing not great enough for proper design
8	Median U-Turn	No	No			N/A			Intersection spacing not great enough for proper design
9	Displaced left Turn	No	Yes			N/A	Yes		Overly complex when simpler alternatives exist
10	Continuous Green-T	Yes	Yes			N/A			Not applicable for this intersection type; intersection will have more than 3-legs
11	Echelon	No	Yes			N/A	Yes		Structural costs too great for development
12	Diamond	No	Yes			N/A	Yes		Not practical for this intersection type
13	Cloverleaf/ Partrial Cloverleaf	No	Yes			N/A	Yes		Not practical for this intersection type
14	Diverging Diamond	No	No			N/A			Not applicable for this intersection type
15	Single Point	No	No			N/A			Not applicable for this intersection type
16	[Add more as needed]	-							

Attachment 5: Intersection Crash Diagram

2

N

SPEED LIMIT 35

CTH X
(CAMP PHILLIPS RD)

05/24/2013 B <D>

06/01/2016 <D>

12/04/2015 <D>

09/30/2013 C <D>
11/10/2014 (S) (I) <D>

07/20/2014 C <D>

09/25/2012 B <D>

WESTON AVE

SPEED LIMIT 45

01/13/2016 (S) <D>
11/20/2016 <D>

01/07/2015 (S) <D>

05/19/2014 B <D>

11/20/2013 (S) (W) <D>
01/14/2016 (W) <D>

05/25/2016 B (R) (W) <D>

SPEED LIMIT 35

CTH X
(CAMP PHILLIPS RD)

SPEED LIMIT 45

WESTON AVE

LEGEND

K	FATALITY
A	INCAPACITATING
B	NON-INCAPACITATING
C	POSSIBLE INJURY
BLANK	PROPERTY DAMAGE ONLY
(S)	SNOW
(R)	RAIN
(W)	WET
(F)	FOG/MIST
(I)	ICE
(DUI)	UNDER THE INFLUENCE
<D>	DAY
<N>	NIGHT

REAR-END
HEAD-ON
SIDE-SWIPE, SAME DIRECTION
SIDE-SWIPE, OPPOSITE DIRECTIONS
ANGLE, OPPOSITE DIRECTIONS
ANGLE, SIMILAR DIRECTIONS
RIGHT-ANGLE
LOSS OF CONTROL

FIXED OBJECT
LEFT TURN, OPPOSING
LEFT TURN, SIDE
TURN, OPPOSING
RIGHT TURN, SIDE
OVERTAKE
OVERTURN
BACKING VEHICLE
PEDESTRIAN
BICYCLE

2

PROJECT NO:XXXX-XX-XX	HWY:CTH X/CAMP PHILLIPS RD	COUNTY:MARATHON	CRASH DIAGRAM - CTH X & WESTON AVE	SHEET	E

FILE NAME : P:\11600s\11690s\11694\11694002\Traffic\Crash Data\Crash Diagram.dgn PLOT DATE : 4/28/2017 PLOT BY : efrailing PLOT NAME : PLOT SCALE : 1:40

WISDOT/CADDS SHEET 42

Crash Diagram.dgn 4/28/2017 1:26:45 PM efrailing

Attachment 6: Synchro and HCS Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	110	20	105	145	130	80	545	150	150	375	125
Future Volume (veh/h)	190	110	20	105	145	130	80	545	150	150	375	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1667	1667	1900	1863	1863	1900	1810	1810	1900
Adj Flow Rate, veh/h	204	118	11	113	156	140	86	586	161	161	403	134
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	14	14	14	2	2	2	5	5	5
Cap, veh/h	388	625	531	434	550	460	442	1333	365	346	1234	406
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1079	1863	1583	1124	1638	1370	864	2747	753	691	2544	837
Grp Volume(v), veh/h	204	118	11	113	150	146	86	377	370	161	271	266
Grp Sat Flow(s),veh/h/ln	1079	1863	1583	1124	1583	1425	864	1770	1730	691	1719	1662
Q Serve(g_s), s	11.5	3.0	0.3	5.3	4.7	5.1	4.5	9.3	9.4	13.3	6.4	6.6
Cycle Q Clear(g_c), s	16.6	3.0	0.3	8.3	4.7	5.1	11.1	9.3	9.4	22.7	6.4	6.6
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.44	1.00		0.50
Lane Grp Cap(c), veh/h	388	625	531	434	531	478	442	858	839	346	834	806
V/C Ratio(X)	0.53	0.19	0.02	0.26	0.28	0.30	0.19	0.44	0.44	0.47	0.32	0.33
Avail Cap(c_a), veh/h	671	1114	947	729	947	852	514	1005	983	403	977	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	15.8	14.9	18.7	16.3	16.5	14.0	11.3	11.3	18.7	10.5	10.6
Incr Delay (d2), s/veh	1.1	0.1	0.0	0.3	0.3	0.4	0.2	0.4	0.4	1.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.3	2.8	0.2	3.0	3.8	3.7	2.0	8.1	8.0	4.7	5.5	5.4
LnGrp Delay(d),s/veh	23.7	15.9	14.9	19.0	16.6	16.8	14.2	11.6	11.6	19.7	10.7	10.8
LnGrp LOS	C	B	B	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		333			409			833			698	
Approach Delay, s/veh		20.6			17.3			11.9			12.8	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		38.5		28.4		38.5		28.4
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		13.1		18.6		24.7		10.3
Green Ext Time (p_c), s		11.2		3.8		7.8		4.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

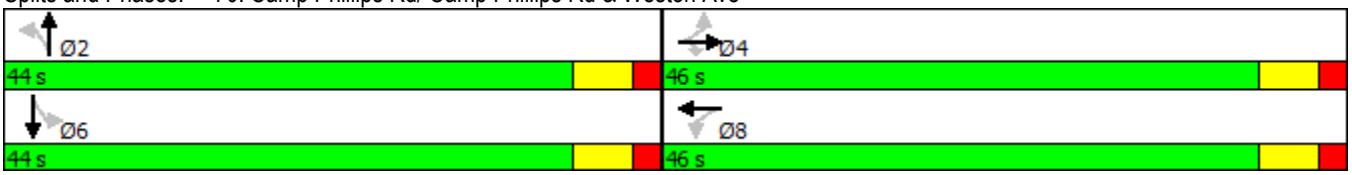
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	204	118	11	113	296	86	747	161	537
v/c Ratio	0.61	0.20	0.02	0.32	0.32	0.22	0.48	0.59	0.36
Control Delay	27.0	16.7	15.7	19.3	16.8	12.1	12.1	22.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	16.7	15.7	19.3	16.8	12.1	12.1	22.8	11.0
Queue Length 50th (ft)	55	27	2	27	37	15	81	35	54
Queue Length 95th (ft)	144	74	14	78	82	52	167	120	116
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	804	1408	1196	857	2223	613	2494	441	2410
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.08	0.01	0.13	0.13	0.14	0.30	0.37	0.22

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		41.0	41.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%	51.1%	51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		30.0	30.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	17.6	17.6	17.6	17.6	17.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.45	0.45		0.45	0.45	
v/c Ratio	0.61	0.20	0.02	0.32	0.32		0.22	0.48		0.59	0.36	
Control Delay	27.0	16.7	15.7	19.3	16.8		12.1	12.1		22.8	11.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.0	16.7	15.7	19.3	16.8		12.1	12.1		22.8	11.0	
LOS	C	B	B	B	B		B	B		C	B	
Approach Delay		23.0			17.5			12.1			13.8	
Approach LOS		C			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 56.1	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 15.2	Intersection LOS: B
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	110	20	105	145	130	80	545	150	150	375	125
Future Volume (vph)	190	110	20	105	145	130	80	545	150	150	375	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.929			0.968			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1583	2942	0	1770	3426	0	1719	3311	0
Flt Permitted	0.571			0.681			0.452			0.335		
Satd. Flow (perm)	1064	1863	1583	1135	2942	0	842	3426	0	606	3311	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	14%	14%	2%	2%	2%	5%	5%	5%
Adj. Flow (vph)	204	118	11	113	156	140	86	586	161	161	403	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	118	11	113	296	0	86	747	0	161	537	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	155	85	205	195	175	25	545	160	155	655	140
Future Volume (veh/h)	280	155	85	205	195	175	25	545	160	155	655	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1792	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	295	163	45	216	205	184	26	574	168	163	689	147
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	2	2	2	2
Cap, veh/h	429	797	677	505	747	636	250	1162	339	282	1248	266
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	991	1863	1583	1125	1746	1487	654	2704	789	715	2904	619
Grp Volume(v), veh/h	295	163	45	216	200	189	26	375	367	163	420	416
Grp Sat Flow(s),veh/h/ln	991	1863	1583	1125	1703	1530	654	1770	1723	715	1770	1753
Q Serve(g_s), s	23.3	4.6	1.4	12.6	6.4	6.8	2.6	12.9	13.0	18.0	14.9	15.0
Cycle Q Clear(g_c), s	30.1	4.6	1.4	17.2	6.4	6.8	17.6	12.9	13.0	31.0	14.9	15.0
Prop In Lane	1.00		1.00	1.00		0.97	1.00		0.46	1.00		0.35
Lane Grp Cap(c), veh/h	429	797	677	505	729	655	250	760	741	282	760	754
V/C Ratio(X)	0.69	0.20	0.07	0.43	0.27	0.29	0.10	0.49	0.50	0.58	0.55	0.55
Avail Cap(c_a), veh/h	487	906	770	571	829	745	257	777	757	289	777	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	15.1	14.2	20.5	15.6	15.7	24.5	17.4	17.4	28.6	18.0	18.0
Incr Delay (d2), s/veh	3.4	0.1	0.0	0.6	0.2	0.2	0.2	0.5	0.5	2.7	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.1	4.3	1.1	7.2	5.5	5.2	0.9	10.5	10.3	6.7	11.9	11.8
LnGrp Delay(d),s/veh	29.0	15.2	14.2	21.1	15.8	16.0	24.7	17.9	17.9	31.4	18.8	18.8
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		503			605			768			999	
Approach Delay, s/veh		23.2			17.7			18.1			20.8	
Approach LOS		C			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		42.2		42.1		42.2		42.1
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		37.0		41.0		37.0		41.0
Max Q Clear Time (g_c+I1), s		19.6		32.1		33.0		19.2
Green Ext Time (p_c), s		10.6		3.9		3.2		6.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	295	163	45	216	389	26	742	163	836
v/c Ratio	0.79	0.23	0.07	0.48	0.32	0.13	0.52	0.68	0.58
Control Delay	35.4	15.5	14.3	20.4	15.5	17.0	17.2	35.8	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	15.5	14.3	20.4	15.5	17.0	17.2	35.8	18.1
Queue Length 50th (ft)	111	47	12	70	61	7	117	54	137
Queue Length 95th (ft)	228	93	33	139	101	27	216	#176	250
Internal Link Dist (ft)		731			1215		394		933
Turn Bay Length (ft)	255			50		100		320	
Base Capacity (vph)	636	1219	1035	766	2070	293	2053	346	2070
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.13	0.04	0.28	0.19	0.09	0.36	0.47	0.40

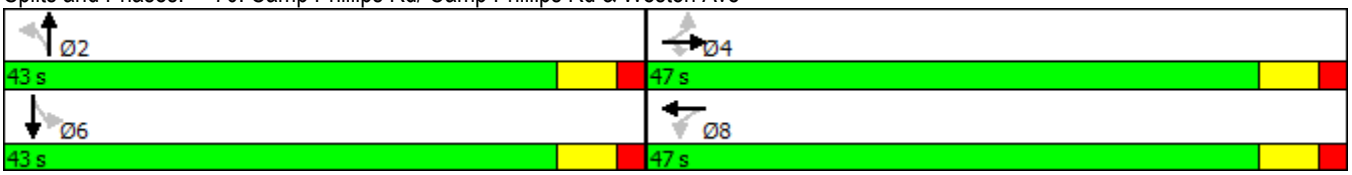
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	44.0	44.0	44.0	42.0	42.0		41.0	41.0		40.0	40.0	
Total Split (s)	47.0	47.0	47.0	47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0		37.0	37.0		37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	33.0	33.0	33.0	31.0	31.0		30.0	30.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	26.3	26.3	26.3	26.3	26.3		28.4	28.4		28.4	28.4	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39		0.42	0.42		0.42	0.42	
v/c Ratio	0.79	0.23	0.07	0.48	0.32		0.13	0.52		0.68	0.58	
Control Delay	35.4	15.5	14.3	20.4	15.5		17.0	17.2		35.8	18.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.4	15.5	14.3	20.4	15.5		17.0	17.2		35.8	18.1	
LOS	D	B	B	C	B		B	B		D	B	
Approach Delay		27.1			17.3			17.2			21.0	
Approach LOS		C			B			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 67.9	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 70: Camp Phillips Rd/ Camp Phillips Rd & Weston Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	155	85	205	195	175	25	545	160	155	655	140
Future Volume (vph)	280	155	85	205	195	175	25	545	160	155	655	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	255		0	50		50	100		0	320		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.929			0.966			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1703	3164	0	1770	3419	0	1770	3447	0
Flt Permitted	0.522			0.654			0.262			0.310		
Satd. Flow (perm)	972	1863	1583	1172	3164	0	488	3419	0	577	3447	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		811			1295			474			1013	
Travel Time (s)		15.8			25.2			9.2			19.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	295	163	45	216	205	184	26	574	168	163	689	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	163	45	216	389	0	26	742	0	163	836	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	

HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	4/21/2017
Analysis Year	2040
Time Period	AM Peak
Project Description	

Site Information

Intersection	CTH X at Weston Ave
E/W Street Name	Weston Ave
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.93
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	2	0	0	0	2	0
Lane Assignment	LT		TR		LT		TR		LT		TR		LT		TR	
Volume (V), veh/h	0	190	110	20	0	105	145	130	0	80	545	150	0	150	375	125
Percent Heavy Vehicles, %	2	2	2	2	14	14	14	14	2	2	2	2	5	5	5	5
Flow Rate (v_{PCE}), pc/h	0	208	121	22	0	129	178	159	0	88	598	165	0	169	423	141
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000		4.0000	4.0000		4.0000	4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000		2.8000	2.8000		2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	208	143		219	247		400	451		345	388	
Entry Volume veh/h	204	140		192	217		392	442		328	370	
Circulating Flow (v_c), pc/h	721			894			498			395		
Exiting Flow (v_{ex}), pc/h	455			407			965			574		
Capacity (c_{pce}), pc/h	764	764		674	674		897	897		967	967	
Capacity (c), veh/h	749	749		591	591		880	880		921	921	
v/c Ratio (x)	0.27	0.19		0.32	0.37		0.45	0.50		0.36	0.40	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	8.0	6.8		10.6	11.4		9.6	10.7		7.8	8.5	
Lane LOS	A	A		B	B		A	B		A	A	
95% Queue, veh	1.1	0.7		1.4	1.7		2.3	2.9		1.6	2.0	
Approach Delay, s/veh	7.5			11.0			10.2			8.2		
Approach LOS	A			B			B			A		
Intersection Delay, s/veh | LOS	9.3						A					

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HCS 2010 Roundabouts Report

General Information

Analyst	MSA-PS, ERF
Agency or Co.	WisDOT
Date Performed	4/21/2017
Analysis Year	2040
Time Period	PM Peak
Project Description	

Site Information

Intersection	CTH X at Weston Ave
E/W Street Name	Weston Ave
N/S Street Name	CTH X
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.95
Jurisdiction	NC Region

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	2	0	0	0	2	0
Lane Assignment	LT		TR		LT		TR		LT		TR		LT		TR	
Volume (V), veh/h	0	280	155	85	0	205	195	175	0	25	545	160	0	155	655	140
Percent Heavy Vehicles, %	2	2	2	2	6	6	6	6	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	301	166	91	0	229	218	195	0	27	585	172	0	166	703	150
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000		4.0000	4.0000		4.0000	4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000		2.8000	2.8000		2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	301	257		302	340		368	416		479	540	
Entry Volume veh/h	295	252		285	321		361	407		470	529	
Circulating Flow (v_c), pc/h	1098			913			633			474		
Exiting Flow (v_{ex}), pc/h	504			395			1081			1023		
Capacity (c_{pce}), pc/h	582	582		665	665		814	814		913	913	
Capacity (c), veh/h	570	570		627	627		798	798		895	895	
v/c Ratio (x)	0.52	0.44		0.45	0.51		0.45	0.51		0.52	0.59	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	15.5	13.4		12.7	14.2		10.5	11.7		11.0	12.6	
Lane LOS	C	B		B	B		B	B		B	B	
95% Queue, veh	3.0	2.2		2.4	2.9		2.4	3.0		3.1	4.0	
Approach Delay, s/veh	14.5			13.5			11.1			11.9		
Approach LOS	B			B			B			B		
Intersection Delay, s/veh | LOS	12.5						B					

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