Recirculated
Draft Environmental Impact Report

SCH# 2009051005

Volume 4

Appendix M through P

99 HOUGHTON INDUSTRIAL PARK PROJECT
By McIntosh & Associates

General Plan Amendment 1, 143-07;
Zone Change Case 2, Map 143-07;
Conditional Use Permit 5, Map 143-07;
Ag Preserve No. 13 – Excl.

Kern County
Planning and Natural Resources Department
Bakersfield, California

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October 2019

Appendices

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VOLUME 4

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Appendix M

Traffic Impact Study

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TRAFFIC IMPACT STUDY

FOR

99/Houghton Industrial Project

Portion of Section 7, Township 31 South, Range 28 East, MDM

Zone Change and General Plan Amendment

Kern County, California

Job Number 06-012.01

Prepared for:

99/Houghton Industrial Project

November 2016

Prepared by:

McINTOSH & ASSOCIATES

Traffic Impact Study

99/Houghton Industrial Park

Portion of Section 7, Township 31 South, Range 28 East, MDM

For:

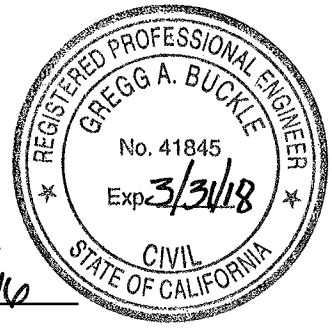
99/Houghton Industrial Park

November 2016

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I. Introduction

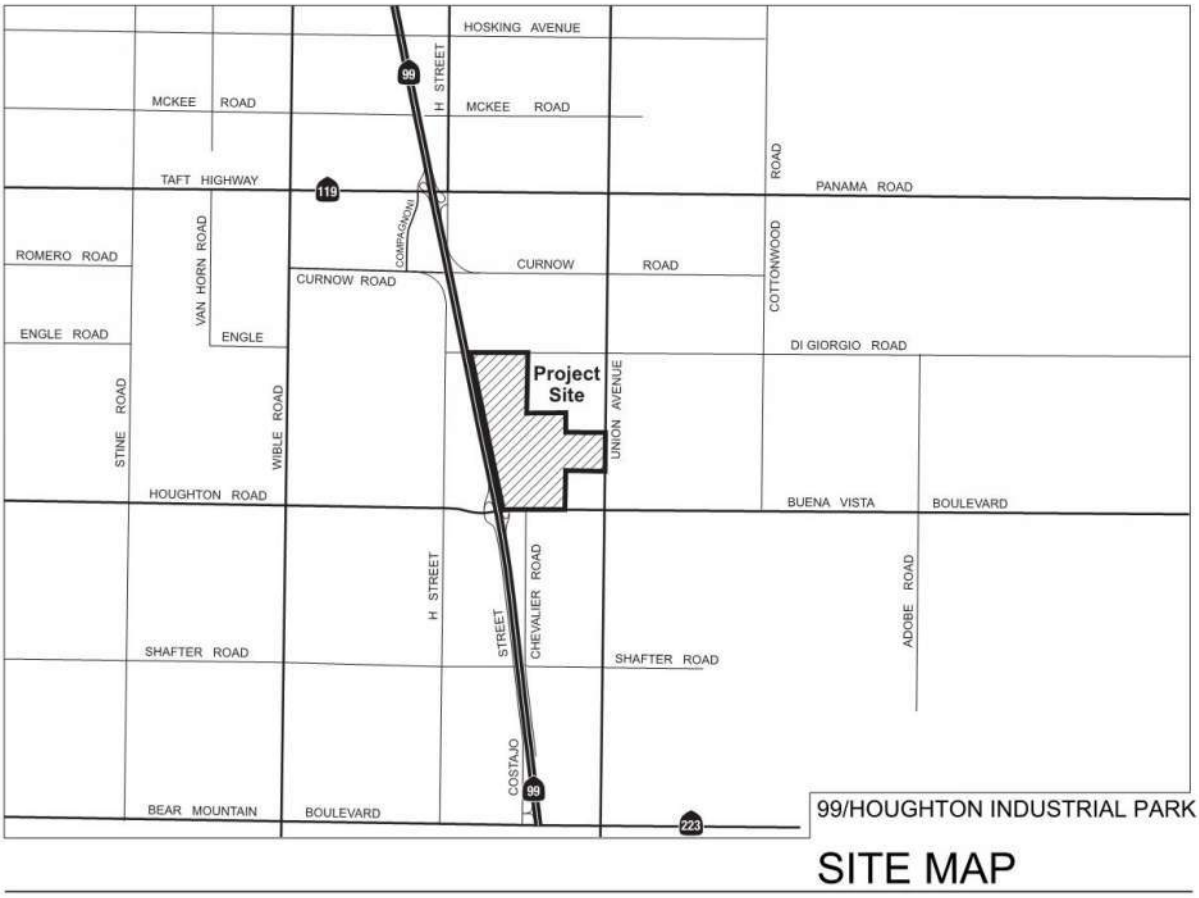
This traffic study has been prepared to evaluate future impacts on the surrounding roadway system due to projected traffic generated by the proposed commercial and industrial development in support of the General Plan Amendment and Zone Change.

This report recommends mitigation measures for intersections and street segments that fall below an acceptable level of service due to the impact of cumulative traffic both with and without the proposed project. For every mitigation measure necessary, such as street improvements or signalization of an intersection, a proportionate share of the costs of these improvements has been identified for the proposed project. The study evaluates the cumulative impact of projected future traffic and the addition of project traffic on existing and proposed roadway facilities after completion of the proposed project. It is anticipated that opening day of the proposed project will occur by Year 2025. Additionally, analysis was performed for project volumes at Year 2035 to determine required improvements and necessary mitigation to coincide with the current traffic model horizon year used for preparation of the Phase IV RTIF program. Included in the future 2025 and 2035 traffic volumes was traffic projected to be generated by all existing and proposed future projects to evaluate the cumulative impact of all projects on the surrounding road networks. Street segments and intersections investigated in this study were based on the adopted CalTrans sliding scale criteria for added project peak hour trips to existing facilities.

Project Description

The proposed project is development of light to medium industrial park on 314.30 acres. The project proposes to revise the existing land use and zoning (R-IA/A) in support of the GPA/ZC for the development of Service and Light Industrial (SI/M-2 PD., LI/M-1 PD), General Commercial (GC/C-2/PD) and Highway Commercial (HC/CH/PD). The proposed project is located on Houghton Road between State Route 99 and South Union Avenue, with site access from Houghton Road, South Union Avenue and DiGiorgio Road, further described as a portion of Section 7, Township 31 South, Range 28 East, M.D.M.; County of Kern. The Assessor's Parcel Number (APN) for this proposed project is 185-140-08.

A mixture of existing land uses surrounds the proposed project area. The majority of existing land use is designated by the Metropolitan Bakersfield General Plan as Low Medium Density Residential (LMR), Rural Residential (RR), Intensive Agriculture (R-IA), Service Industrial (SI) Public Transportation Corridor (PT) and Highway Commercial (HC).



II. Summary of Impacts

Executive Summary of Impacts

The following Table 1 summarizes the mitigation/improvements required due to the impacts of project generated traffic and background traffic growth. The table is separated into the various scenarios analyzed. It indicates the various improvements required due to future growth in background traffic for the analysis scenarios of "2025 without project" and "2035 without project". It also identifies mitigation measures required due to the addition of project generated traffic at these future year scenarios.

The following abbreviations are used throughout Table 1 : **NL** = Northbound Left; **NT** = Northbound Through; **NR** = Northbound Right; **EL** = Eastbound Left; **ET** = Eastbound Through; **ER** = Eastbound Right; **SL** = Southbound Left; **ST** = Southbound Through; **SR** = Southbound Right; **WL** = Westbound Left; **WT** = Westbound Through; **WR** = Westbound Right; **COK** = County of Kern; **LOS** = Level of Service; **s/v** = seconds per vehicle in delay; **Overlap** = Provide overlapping phasing for right turn lane as indicated; **Restripe** = Revise the existing striping to reconfigure approach laneage.

II. Summary of Impacts (continued)

Table 1: Executive Summary of Impacts

Analysis Scenario/Traffic Facility	**Improvement/Mitigation Measure**	**Level of Significance After Improvement/Mitigation**
Year 2025 without Project		
Signalization		
Panama Lane & Cottonwood Road	Provide Signal	Improvements req'd without Project
Hosking Road & Hughes Lane	Provide Signal	Improvements req'd without Project
Hosking Road & SR 99 Southbound Ramp	Signal Under Construction	Improvements req'd without Project
Hosking Road & SR 99 Northbound Ramp	Signal Under Construction	Improvements req'd without Project
Taft Highway/Panama Road & Cottonwood Road	Provide Signal	Improvements req'd without Project
Intersection Improvements		
Panama Lane & South H Street	Add 1 ET, & 1 NT	Improvements req'd without Project
Panama Lane & South Union Avenue	Add 1 EL, 1 NL, 1 SL & 1 SR	Improvements req'd without Project
Panama Lane & Cottonwood Road	Add 1 EL, 1 ER, 1 WL, 1 WR, 1 NL, 1 NR, 1 SL, & 1 SR	Improvements req'd without Project
Hosking Road & Hughes Lane	Add 1 ET & 1 WT	Improvements req'd without Project
Hosking Road & SR 99 Southbound Ramp	Hosking Road & SR 99 Southbound Ramp Under Construction	Improvements req'd without Project
Hosking Road & SR 99 Northbound Ramp	Hosking Road & SR 99 Northbound Ramp Under Construction	Improvements req'd without Project

Analysis Scenario/Traffic Facility	**Improvement/Mitigation Measure**	**Level of Significance After Improvement/Mitigation**
Year 2025 without Project (Cont'd)		
Intersection Improvements		
Hosking Road & South H Street	Add 1 EL, 1 ER, 1 NT, 1 SL, & 1 ST	Improvements req'd without Project
Hosking Rd. & South Union Ave.	Add 1 EL, SR & Overlapping SR	Improvements req'd without Project
Taft Hwy. & Compagnoni Rd/SR 99 SB Ramp	Add 1 ET	Improvements req'd without Project
Taft Hwy. & South H. St	Add 1 EL, 1 ET, 1 WT, & 1 SR	Improvements req'd without Project
Taft Hwy./Panama Rd & Cottonwood Rd.	Add 1 EL, 1 ER, 1 WL, 1 WR, 1 NL, 1 NR 1 SL, & 1 SR	Improvements req'd without Project
Segment Improvements		
Panama Ln. – South Union Ave. to Cottonwood Rd.	Improve to 4-lane Collector	Improvements req'd without Project
Taft Hwy./Panama Rd. – Compagnoni Street/SR 99 SB Ramp to East of Cottonwood Rd.	Improve to 4-lane Collector	Improvements req'd without Project
Year 2025 with Project		
Signalization		
Houghton Road & Chevalier Road	Provide Signal	Not Significant
Intersection Mitigation		
DiGiorgio Rd. & Chevalier Rd./Project Entrance #1	Construct Entrance with 1 ET/R, 1 WT/L, & 1 NL/R	Not Significant

Analysis Scenario/Traffic Facility	**Improvement/Mitigation Measure**	**Level of Significance After Improvement/Mitigation**
Year 2025 with Project (Cont'd)		
Intersection Mitigation		
DiGiorgio Road & South Union Avenue	Construct East Approach with EL, 1 ET/R, & Add 1 WL, 1 NL, & 1 SR	Not Significant
South Union Ave. & Project Entrance #3	Construct Entrance with 1 ER, & Add NL	Not Significant
South Union Ave. & Mugsy Rd./Project Entrance #4	Construct East Approach	Not Significant
Houghton Rd. & Project Entrance #7	Construct Entrance with SR, & Add 1 WR	Not Significant
Houghton Rd. & Chevalier Rd./Project Entrance #6	Construct Entrance & Add 2 EL, 1 ET, 1 WL, 2 WT, 1 WR, 1 NT, 1 SL, 1 ST, & 2 SR	Not Significant
Houghton Rd. & Project Entrance #5	Construct Entrance with SR, & Add 1 EL & 1 WR	Not Significant
Houghton Rd. & South Union Ave.	Add 1 EL	Not Significant
Segment Mitigation		
DiGiorgio Rd. – West of Chevalier Rd.	Construct 2-Lane Collector	Not Significant
DiGiorgio Rd. – Chevalier Rd. to South Union Ave.	Construct 2-Lane Collector	Not Significant
Houghton Rd. – SR99 NB Ramp to Project Entrance #5	Construct 4-Lane Collector	
Chevalier Rd. – DiGiorgio Rd. to Houghton Rd.	Construct 2-Lane Collector	Not Significant

Analysis Scenario/Traffic Facility	**Improvement/Mitigation Measure**	**Level of Significance After Improvement/Mitigation**
Year 2035 without Project		
Signalization		
No Improvements at this Scenario		
Intersection Improvements		
Panama Ln. & South Union Ave.	Add 1 ET, 2 WT, 1 WL, 1 WR, 1 NT, & 1 ST	Improvements req'd without Project
Panama Ln. & Cottonwood Rd.	Add 1 WT & 1 ET	Improvements req'd without Project
Hosking Rd. & Hughes Ln.	Add 1 WL, & 1 NR	Improvements req'd without Project
Hosking Rd. & South H St.	Add 1 ET, 1 WL, 1 WT, 1 NL, 1 NT, 1 NR, 1 ST, & 1 SR	Improvements req'd without Project
Hosking Rd. & South Union Ave.	Add 2 ET, 1 ER, 1 WT, 1 NL, 1 NT, 1 NR, 1 ST, & 1 SR	Improvements req'd without Project
Taft Hwy. & Wible Rd.	Add 1 ET, 1 WT, 1 NL, 2 SL, & 1 SR	Improvements req'd without Project
Taft Hwy & Compagnoni St./SR 99 SB Ramp	Add 1 ET, 2 WT, 1 NR, Convert ST to ST/L, & 1 SR	Improvements req'd without Project
Taft Hwy. & South H St.	Add 1 ET, 1 WT, & 1 WR	Improvements req'd without Project
Taft Hwy. & South Union Ave.	Add 1 ET, & 1 WT	Improvements req'd without Project
Taft Hwy./Panama Rd. & Cottonwood Rd.	Add 1 EL, 2 ET, 2 WT, 1 WR, 2 NT, 1 ST, & 2 ST	Improvements req'd without Project
Segment Improvements		
Panama Ln. – East of Cottonwood Rd.	Improve to 4-Lane Collector	Improvements req'd without Project
Taft Hwy. – West of Wible Rd. to Compangnoni St./SR 99 SB Ramp	Improve to 4-Lane Collector	Improvements req'd without Project

Analysis Scenario/Traffic Facility	**Improvement/Mitigation Measure**	**Level of Significance After Improvement/Mitigation**
Year 2035 without Project (Cont'd)		
Segment Improvements		
Taft Hwy – South H St. to South Union Ave.	Improve to 4-Lane Arterial	Improvements req'd without Project
Cottonwood Rd – North of Panama Ln.	Improve to 4-Lane Collector	Improvements req'd without Project
Year 2035 with Project		
Signalization		
Houghton Rd. & SR 99 SB Ramp/Costajo Road	Provide Signal	Not Significant
Houghton Rd. & SR 99 NB Ramp/Costajo Road	Provide Signal	Not Significant
Houghton Rd. & South Union Ave.	Provide Signal	Not Significant
Intersection Mitigation		
Taft Hwy. & South H St.	Add 1 NL	Not Significant
Curnow Rd. & South Union Ave.	Add 1 ER	Not Significant
South Union Ave. & Lamb Ave.	Add 1 ER	Not Significant
Houghton Rd. & SR 99 SB Ramp/Costajo Rd.	Add 1 EL, 1 WL, 1 NL, & 2 SL	Not Significant
Houghton Rd. & SR 99 NB Ramp/Costajo Rd.	Add 2 ET, 2 WL, 2 WT, & Overlapping NR	Not Significant
Houghton Rd. & Project Entrance #7	Add 2 ET, 2 WT, 1 SR	Not Significant
Houghton Rd. & Chevalier Rd.	Add 1 ET, 1 ER, 1 SL, & Overlapping SR	Not Significant

Analysis Scenario/Traffic Facility	**Improvement/Mitigation Measure**	**Level of Significance After Improvement/Mitigation**
Year 2035 with Project (Cont'd)		
Segment Mitigation		
Houghton Rd. & South Union Ave.	Add 1 EL, 1 ET, 1 WL, 1 WT, 1 NL, 1 SL, & 1 SR	Not Significant
Bear Mountain Blvd./Costajo Rd. & SR 99 SB Ramp	Add 1 NR	Not Significant
Houghton Rd. – SR 99 SB Ramp to SR 99 NB Ramp	Improve to 4-Lane Collector	Not Significant
Houghton Rd. – SR 99 NB Ramp to Chevalier Rd.	Improve to 6-Lane Arterial	Not Significant
Houghton Rd. – Project Entrance #5 to South Union Ave.	Improve to 4-Lane Collector	Not Significant

III. Existing & Proposed Street Network

The following is a summary of existing and proposed streets that will serve the Project and will be impacted to some extent from traffic generated by the development.

Panama Lane

Panama Lane is a designated east-west arterial west of the State Route 99 Southbound Off Ramp to east of Cottonwood Road in various stages of widening. Panama Lane currently exists as a six (6) lane, divided roadway from the west of State Route 99 Southbound Off Ramp to South H Street. It then continues east from South H Street as a four (4) lane, divided roadway to South Union Avenue. Panama Lane exists at a two (2) lane, undivided roadway from South Union Avenue to the east of Cottonwood Road.

Hosking Avenue

Hosking Avenue is a designated east-west arterial that exists as a two (2) lane, undivided roadway from west of State Route 99 to Cottonwood Road.

Taft Highway/ State Route 119/ East Panama Road

Taft Highway/ State Route 119 is a designated east-west expressway from west of Wible Road to State Route 99 and a designated arterial from State Route 99 to the east of Cottonwood Road. Taft Highway/ State Route 119 is aligned with East Panama Road to the east of South Union Avenue. Taft Highway/ State Route 119 currently exists as a two (2) lane, undivided roadway from west of Wible Road to South Union Avenue. East Panama Road exists as a two (2) lane, undivided roadway from South Union Avenue to the east of Cottonwood Road.

Curnow Road

Curnow Road is a designated east-west collector that currently exists as a two (2) lane, undivided roadway from west of South Union Avenue to Cottonwood Road.

DiGiorgio Road

DiGiorgio Road is a designated east-west arterial that currently exists as a two (2) lane, undivided roadway from South Union Avenue to the east of Cottonwood Road. DiGiorgio Road will be constructed in the future along the project's frontage and from the future Chevalier Road to South Union Avenue. DiGiorgio Road will provide direct access to the project site via the project's northern frontage.

Lamb Avenue

Lamb Avenue is a designated east-west collector that currently exists as a two (2) lane, undivided roadway to the east of South Union Avenue. Lamb Avenue will be constructed in the future within the proposed project boundary from Chevalier Road to South Union Avenue, and it will serve as direct access to the proposed project site via several entrances on both the north and south sides of Lamb Avenue.

Mugsy Avenue

Mugsy Avenue is a designated east-west local roadway that currently exists as a two (2) lane, undivided roadway from South Union Avenue to east of South Union Avenue. Mugsy Avenue will provide direct access to the project site via several entrances within the project's interior.

III. Existing & Proposed Street Network (continued)

Houghton Road/ Buena Vista Boulevard

Houghton Road is a designated east-west arterial that currently exists as a two (2) lane, undivided roadway from west of Stine Road to South Union Avenue. Houghton Road is aligned with Buena Vista Boulevard at South Union Avenue and becomes Buena Vista Boulevard to the east of South Union Avenue. Buena Vista Boulevard is a designated east-west arterial that currently exists as a two (2) lane, undivided roadway from South Union Avenue to east of Adobe Road. Houghton Road will front the proposed project's southern boundary and provide direct access to the project site via entrances on the project's southern frontage.

Shafter Road

Shafter Road is a designated east-west collector that currently exists as a two (2) lane, undivided roadway from Chevalier Road to South Union Avenue. Shafter Road then becomes a designated arterial to the east of South Union Avenue, and it exists as a two (2) lane, undivided roadway to the east of South Union Avenue.

Bear Mountain Boulevard/ State Route 223

Bear Mountain Boulevard/ State Route 223 is a designated east-west arterial that currently exists as a two (2) lane, undivided roadway from west of Costajo Street to east of South Union Avenue.

Stine Road

Stine Road is a designated north-south arterial that currently exists as a two (2) lane, undivided roadway from north of Houghton Road to south of Houghton Road.

Wible Road

Wible Road is a designated north-south arterial that currently exists as a two (2) lane, undivided roadway from north of Taft Highway/ State Route 119 to south of Houghton Road.

South H Street

South H Street is a designated north-south arterial that currently exists in various stages of widening. South H Street currently exists as a four (4) lane, divided roadway to the north of Panama Lane, and it continues southerly from Panama Lane to south of Houghton Road as a two (2) lane, undivided roadway. South H Street is aligned with Curnow Road to the south of Taft Highway/ State Route 119, but it realigns with its original alignment on the west side of State Route 99 to the south of Curnow Road.

State Route 99

State Route 99 is a designated north-south freeway that currently exists as a six (6) lane, divided roadway from north of Panama Lane to south of Bear Mountain Boulevard/ State Route 223. The freeway right-of-way will serve as the western boundary of the project site.

Costajo Road

Costajo Road is a designated north-south collector that currently exist as a two (2) lane, undivided roadway from Houghton Road to Bear Mountain Boulevard.

III. Existing & Proposed Street Network (continued)

Chevalier Road

Chevalier Road is a designated north-south collector that currently exists as a two (2) lane, undivided roadway from Houghton Road to Kaiser Lane. Chevalier Road will be constructed in the future within the project boundary from DiGiorgio Road to Houghton Road. Chevalier Road will provide direct access to the proposed project via several entrances within the project's interior.

South Union Avenue/ State Route 99 Business

South Union Avenue/ State Route 99 Business is a designated north-south arterial that currently exists as a four (4) lane, divided roadway from north of Panama Lane to south of Bear Mountain Boulevard/ State Route 223. This roadway will provide direct access to the project site via entrances along the project's eastern frontage.

Cottonwood Road

Cottonwood Road is a designated north-south arterial that currently exists as a two (2) lane, undivided roadway from north of Panama Road to Buena Vista Boulevard.

Adobe Road

Adobe Road is a designated north-south arterial that currently exists as a two (2) lane, undivided roadway from north of Buena Vista Boulevard to south of Buena Vista Boulevard.

IV. Traffic Projections

Existing Traffic Volumes - Traffic Counts

Traffic counts were taken at major intersections within the study area as required by the County of Kern. Counts were used to determine the local peak hour, directional distribution, and existing operational level of service. Existing traffic counts were taken at the AM and PM Peak Hours for all intersections within the study area. Figures 1 and 1A show the existing turning movement volumes at major intersections from actual field surveys during the PM and AM peak hour scenarios, respectively. These existing conditions were used as the baseline to assess the traffic impacts of the proposed project.

Year 2025 and Year 2035 Future Traffic Volumes – Cumulative Impacts

A traffic projection for Year 2035 volumes, with the project traffic assumed to be at "Full Build-out", is needed to evaluate the cumulative impact of the project and future traffic growth upon the transportation network. Year 2025 traffic volume projections were used to analyze project generated traffic impacts at the time of the anticipated "Opening Day" of the project. Project generated traffic impact analysis is also provided for Year 2035 traffic volume projections to coincide with the current traffic model horizon year used for preparation of the Phase IV RTIF program.

These projected volumes were used to analyze cumulative impacts on existing and proposed transportation facilities. If cumulative impacts to these facilities could not be mitigated by the improvements proposed by the Metropolitan Bakersfield Regional Transportation Impact Fee Program then additional improvements/mitigation measures were identified by the Year 2025 and Year 2035 analyses. These future year projections take into consideration all existing and known proposed land uses at reasonable demand-driven build-out rates as determined by the City of Bakersfield and the County of

IV. Traffic Projections (continued)

Kern in conjunction with Kern Council of Governments, the local transportation planning authority, by using data from the KernCOG traffic model.

The Metropolitan Bakersfield Transportation Impact Fee mitigation program takes into consideration the relationship between future growth within the Metropolitan Bakersfield General Plan area through 2035, by looking at the capital facilities that will be needed to accommodate the additional traffic caused by new residential and commercial development. If capital facilities are not mitigated properly the existing facilities will not be able to serve the community or the Level of Service requirement. The Impact Fee will pay for construction of both regional and local facilities on the Metropolitan Bakersfield Transportation Impact Facilities List. Through the Transportation Impact Fee Ordinance in Appendix C, fees are imposed on new development and are collected at the building permit stage for any development that produces additional traffic over that assigned to the land use in its pre-existing condition before the new development is in place. The fees are placed in a separate interest bearing account, per the requirements of GC 66000 et seq, and are only used to construct those facilities listed on the facilities list which can be found in Appendix D.

Year 2025 and Year 2035 Traffic Volumes were determined using data from the Phase IV RTIF model prepared by KernCOG. The KernCOG model uses traffic software, which bases traffic projections on Traffic Analysis Zone (T.A.Z.) Socio-Economic data projected for future year scenarios. This "cumulative" traffic model run was provided by KernCOG for the Year 2035 with projected background traffic along with traffic from all other known future proposed projects that add traffic to the surrounding roadway network.

Future traffic volumes are based on socio-economic data for all of the proposed projects and predicted growth for future years. This model accounts for cumulative impacts of all proposed projects when performing impact analysis on the existing and proposed street network. The Year 2025 and Year 2035 without Project traffic volume data was derived from the 2035 traffic model that was used to prepare the Phase IV RTIF program provided by KernCOG. The Year 2025 and Year 2035 With Project traffic volume data was derived by adding the proposed project traffic volumes, manually distributed, to the 2025 and 2035 without Project traffic volumes, respectively. Figure 8, herein, shows the KernCOG Year 2035 model.

KernCOG's future model volumes are projected by applying growth factors, provided by Kern Regional Transportation Modeling Committee (KRTMC), to existing land uses within the Metropolitan Bakersfield area. The projected future volumes are increased further by including in the model additional growth related to proposed General Plan Amendments/Zone Changes. Information on these proposed GPA/Zone Changes are given to KernCOG by the local jurisdictions. The County of Kern keeps an updated map and list of Cumulative projects. The current version at the time of the model preparation is shown in Appendix A.

Traffic Model Calibration and Average Growth

The traffic model data is calibrated using segment ADT volumes rather than actual turning movement volumes. Therefore, to determine projected increases in turning movement volumes, individual percentage increase/decrease growth rates for roadway segments adjacent to study intersections were determined from the model data and used to project future turning movement volumes by applying these growth rates to existing turning movement volumes. Since the KernCOG model does not include all collector designated road segments, some study intersections are not specifically represented by the model nodes. For these intersections, growth rates from adjacent intersections were applied to existing turning movement volumes to determine future volumes.

Figures 2 and 2A herein show the PM and AM projected turning movement volumes, respectively, for Year 2025 without Project generated traffic. Figures 5 and 5A herein show the PM and AM projected turning movement volumes, respectively, for Year 2025 Future volumes with Project generated traffic.

IV. Traffic Projections (continued)

Similarly, figures 3 and 3A herein show the PM and AM projected turning movement volumes, respectively, for Year 2035 without Project generated traffic, and figures 6 and 6A herein show the PM and AM projected turning movement volumes, respectively, for Year 2035 Future volumes with Project generated traffic.

Project Traffic

For analysis purposes "opening day" of the Project is assumed to occur by the Year 2025, with full build-out to occur by Year 2035. The traffic volumes generated from the proposed project, were estimated using the "Institute of Transportation Engineers" Trip Generation Manual, 9th ed. © 2012.

Project Traffic – PM Peak Hour

The P.M. Peak Hour traffic volumes generated from the proposed land uses were estimated using the "Institute of Transportation Engineers" Trip Generation Manual, 9th ed. © 2012

Table 2a: Proposed Project Traffic - P.M. Peak Hour Trip Ends

Land Use	Acres	*GLFA*	ITE Code	Rate	Peak Hour Trips-PM	Split In	Split Out
Light Industrial	267.30	N/A	210	Note 1	2280	502	1778
General Commercial	47.00	*511,830*	820	Note 2	1789	877	912
20% Reduction to Account for "Pass By"					(358)	(175)	(182)
				TOTAL	3711	1203	2509

Note 1: ***Used Fitted Curve Equation: T = 8.53 x (Acres) to determine trip generation.***
Note 2: ***Used Fitted Curve Equation: Ln(T) = 0.67Ln(x) + 3.31 to determine trip generation, with 25% of the Net Acreage for the GLFA. And 20% reduction to account for "Pass-By" and "Diverted-Linked" trips.***

Project Traffic – AM Peak Hour

The A.M. Peak Hour traffic volumes generated from the proposed land uses were estimated using the "Institute of Transportation Engineers" Trip Generation Manual, 9th ed. © 2012

Table 2b: Proposed Project Traffic - A.M. Peak Hour Trip Ends

Land Use	Acres	*GLFA*	ITE Code	Rate	Peak Hour Trips-AM	Split In	Split Out
Light Industrial	267.30	N/A	130	Note 1	2192	1819	373
General Commercial	47.00	*511,830*	820	Note 2	422	257	165
20% Reduction to Account for "Pass By"					(84)	(51)	(33)
				TOTAL	2530	2026	504

Note 1: ***Used Fitted Curve Equation: T = 8.20 x + (Acres) to determine trip generation.***
Note 2: ***Used Fitted Curve Equation: Ln(T) = 0.61Ln(x) + 2.24 to determine trip generation, with 25% of the Net Acreage for the GLFA. And 20% reduction to account for "Pass-By" and "Diverted-Linked" trips.***

IV. Traffic Projections (continued)

Project Traffic – Daily Traffic (A.A.D.T.)

The Average Daily Traffic volumes generated from the proposed land uses were estimated using the "Institute of Transportation Engineers" Trip Generation Manual, 9th ed. © 2012

Table 2c: Proposed Project Traffic – Daily Traffic Trip Ends (A.A.D.T.)

Land Use	Acres	*GLFA*	ITE Code	Rate	Daily Trip Ends-AADT	Split In	Split Out
Light Industrial	267.30	N/A	130	Note 1	16351	8176	8176
General Commercial	47.00	*511,830*	820	Note 2	19628	9814	9814
20% Reduction to Account for "Pass By"					(3926)	(1963)	(1963)
				TOTAL	32053	16027	16027

Note 1: ***Used Fitted Curve Equation: T = 61.17 x (Acres) to determine trip generation.***
Note 2: ***Used Fitted Curve Equation: Ln(T) = 0.65Ln(x) + 5.83 to determine trip generation, with 25% of the Net Acreage for the GLFA. And 20% reduction to account for "Pass-By" and "Diverted-Linked" trips.***

V. Traffic Analysis

Study Scope

Traffic facilities included in the study scope were based on the CalTrans sliding scale criteria. A facility is included in the scope of the analysis if the project generated AM or PM Peak Hour trips utilizing that facility exceed 50 vehicles per hour (vph). For facilities currently at service levels of "C" or less the "sliding scale" criteria is used where the peak hour volume threshold varies with the service level. Those various thresholds are as follow:

LOS "C" ----- 40 vph, project generated trips

LOS "D" ----- 30 vph, project generated trips

LOS "E" ----- 20 vph, project generated trips

LOS "F" ----- 10 vph, project generated trips

Traffic Assignment

Project generated traffic was assigned to the existing and proposed surface street network within the project boundary and to immediately adjacent intersections based on observations of existing traffic patterns during the AM and PM peak hour, projections of traffic patterns for Years 2025 and 2035, study counts of directional movements at intersections, characteristics of the existing and future street network, knowledge of trip attractors, and the quantity of generated trips relative to the area. Refer to figure 4 and 4A, herein, for distribution of project generated traffic that was estimated for the proposed commercial project within the study area.

V. Traffic Analysis (continued)

Level of Service

Operational analysis of existing and proposed streets and intersections was performed using methods outlined in the "*Transportation Research Board, National Research Council"*, Highway Capacity Manual, ©2010.

A "Level of Service" designation is the generally accepted gauge for describing the quality of operation of either a roadway segment or intersection. Other attributes of operational quality associated with each level of service are v/c - volume to capacity ratio for street segments and vehicle delay through an intersection.

For each type of street segment or intersection analysis, the criteria to arrive at a particular Level of Service vary slightly. Levels of Service for every type of roadway or intersection are described thoroughly in the Highway Capacity Manual, however, the following brief descriptions have been provided:

Table 3: Signalized Intersections

Level of Service	Control Delay per Vehicle (sec.)
A	<10
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80

Table 4: Unsignalized Intersections

Level of Service	Average Total Delay (sec/veh)	Expected Delay to Minor Street Traffic
A	<10	Little or no delay.
B	>10 and <15	Short traffic delay.
C	>15 and <25	Average traffic delay.
D	>25 and <35	Long traffic delay.
E	>35 and <50	Very long traffic delay.
F	>50	see Note 1

Note 1: When demand volume exceeds the capacity of the lane, extreme delays will be encountered. This condition usually warrants improvement to the intersection.

V. Traffic Analysis (continued)

Table 5: Level of Service for Highways and Arterials

Level of Service	Description	V/C Ratio
A	Free flow conditions, unimpeded ability to maneuver and pass, very little delay, no platoons, highest average travel speeds.	**0.00-0.60**
B	Mostly free flow conditions, presence of other vehicles begins to be noticeable. Passing is required to maintain speeds, slightly less average travel speeds than Level of Service "A".	**0.61-0.70**
C	Traffic density clearly affects the ability to pass and maneuver within the stream. Speeds are reduced to about 50 mph on highways and to about 50% of the average on urban arterials.	**0.71-0.80**
D	Unstable flow. Speeds are reduced from 40% to 60% of normal. Passing demand is high although mostly impossible on 2-Lane Highways. Traffic disruptions usually cause extensive queues.	**0.81-0.90**
E	Very unstable flow at or near capacity. Passing and maneuvering virtually impossible. Extensive platooning on highways and queuing on arterials. Speeds range from 20 mph or less on arterials and 2-Lane Highways, and up to 50 mph on Multi-Lane Highways.	**0.91-1.0**
F	Forced or breakdown flow. Demand exceeds capacity. Vehicles experience short spurts of movement followed by stoppages. Intersection congestion, long queues and delays are common.	**Above 1.0**

Traffic Analysis

Methods used to evaluate cumulative plus project traffic conditions were taken from the above referenced Highway Capacity Manual. In addition to these methods, a computer software package "*SYNCHRO 9*", was used to primarily coordinate and facilitate extensive HCM intersection calculations. All computer-generated reports are included in the Appendix B of this report.

Summaries of intersection level of service calculations for the analyzed scenarios are shown in Table 7. The scenarios include Existing, Year 2025 with and without project generated traffic, and Year 2035 with and without project generated traffic. The summary includes Highway Capacity Manual (HCM) service level results for signalized intersections, non-signalized intersections and all-way stop intersections.

Roadway segments were evaluated by calculating Volume-to-Capacity ratios using existing segment volumes, projected Year 2025 Future Volumes, and projected Year 2035 Future Volumes with and without adding project generated traffic. Roadway segment laneage configurations for existing conditions and improved configurations are indicated on Table 9. Also shown is the required laneage configurations determined for the Year 2025 Future volumes with and without Project traffic scenarios and the Year 2035 Future volumes with and without Project traffic scenarios. Required laneage configurations are based on maintaining existing or projected future service levels anticipated for future year scenarios.

VI. Warrant Analysis

Traffic Signal Warrant

Signalization of an intersection is not necessarily justified by the satisfaction of a single warrant. Poor operation (Levels of Service) and poor safety characteristics, as well as satisfaction of multiple warrants are normally the criteria for installing a traffic signal. For purposes of this study, a poor operational level of service for multiple movements, and satisfaction of signal warrants, was considered justification for traffic signal installations.

VI. Warrant Analysis (continued)

All unsignalized intersections within the study scope were analyzed for traffic signal warrants using the procedures outlined in the *California MUTCD* for Warrants ***1A*** "Figure 4C-103(CA): ADT - Minimum Vehicular Traffic", ***1B*** "Figure 4C-103(CA): ADT - Interruption of Continuous Traffic", ***1A&B*** "Figure 4C-103(CA): ADT - Combinations of Warrants 1A and 1B" and ***3*** "Figure 4C-4, Peak Hour (70% Factor) Warrant." Details of the warrant analyses are included with SYNCHRO's HCM analyses in Appendix B. Below is a list of the intersections analyzed for traffic signal warrants. The results are included in Table 6, "Intersection Improvements/Mitigation/Pro-Rata Share".

Panama Lane & Cottonwood Road - Warrants 1 & 3 Satisfied @ 2025 Future without Project Volumes. Signalization of this intersection is included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Hosking Road and Hughes Lane - Warrants 1 & 3 Satisfied @ 2025 Future without Project Volumes. Signalization of this intersection is included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Hosking Road and SR 99 Northbound Ramp - Warrants 1 & 3 Satisfied @ 2025 Future without Project Volumes. Signalization of this intersection is included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Hosking Road and SR 99 Southbound Ramp - Warrants 1 & 3 Satisfied @ 2025 Future without Project Volumes. Signalization of this intersection is included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Hosking Road and Cottonwood Road - Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Taft Highway and Cottonwood Road - Warrants 1 & 3 Satisfied @ 2025 Future without Project Volumes. Signalization of this intersection is included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

South Union Avenue and Curnow Road – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Cottonwood Road & Curnow Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Di Giorgio Road & Chevalier Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

South Union Avenue & Di Giorgio Road – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

VI. Warrant Analysis (continued)

Cottonwood Road & Di Giorgio Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

South Union Avenue & Lamb Avenue – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

South Union Avenue & Project Entrance #3 – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

South Union Avenue & Mugsy Road – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & Stine Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & Wible Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & South H Street – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & SR 99 Southbound Ramp – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & SR 99 Northbound Ramp – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & Project Entrance #7 – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & Chevalier Road – Warrants 1 & 3 Satisfied @ 2025 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Houghton Road & Project Entrance #5 – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

VI. Warrant Analysis (continued)

Houghton Road & South Union Avenue – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Buena Vista Boulevard & Cottonwood Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Buena Vista Boulevard & Adobe Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

South Union Avenue & Shafter Road – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Costajo Road & SR 99 Southbound Ramp – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Costajo Road & Bear Mountain Boulevard – Warrants 1& 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Bear Mountain Boulevard & SR 99 Northbound Ramp – Warrants 1 & 3 Not Satisfied @ 2035 Future with Project Volumes. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

Bear Mountain Boulevard & South Union Avenue – Warrants 1 & 3 Satisfied @ 2035 Future with Project Volumes. However, acceptable service levels can be achieved without the addition of a traffic signal. Signalization of this intersection is not included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program (RTIF).

VII. Mitigation

Criteria for Mitigation

In accordance with CalTrans standards, (CalTrans' "Guide for the Preparation of Traffic Impact Studies"), mitigation is normally considered necessary if a particular intersection or street segment is degraded to below Level of Service "C" by the impact of Project generated traffic. If the existing operational or projected Level of Service of a facility is below "C" prior to the addition of Project generated traffic and the addition of project traffic substantially degrades the Level of Service further, then mitigation to restore the facility to at least its existing or projected operational Level of Service is deemed appropriate. Projected service levels for future year scenarios are based on the assumption that all improvements identified in the RTIF program have been completed for the particular facility being analyzed.

VII. Mitigation (continued)

Mitigation

In order to mitigate the 2025 Future traffic volumes and the 2035 Future traffic volumes plus Project generated traffic impacts to intersections and segments, the mitigation measures summarized below are needed for the roadway network in order to maintain acceptable Levels of Service. It is assumed that the *improvements* required for the roadway facilities at Existing, 2025 Future, and 2035 Future traffic will be in place prior to the addition of the project generated traffic at full build out. See Table 1 – "Summary of Impacts" for *improvements* required for existing and future projected traffic volumes without the addition of project traffic.

Facilities included in the "Summary of Impacts" table may require improvements beyond current standards. Most of these improvements beyond current standards are deemed infeasible and therefore the impacts to these intersections are identified as being "Significant and Unavoidable". Although some of the improvements identified as being beyond current standards may be feasible to construct in areas where adjacent properties have not been developed, it is unlikely that these facilities will be built, and unlikely that they will be required due to congestion relief resulting from future construction of regional facilities. In other areas where development is already occurring, where street segments and intersections have already been fully built to local agency standards, the additional expansion identified is deemed infeasible. This infeasibility is based on excessive costs and safety issues.

Expansion of these existing facilities would require condemnation of private property which has already been developed, and result in excessive costs for demolition and reconstruction of existing structures, pavement, embankments, bridges, culverts, utility lines, walls and landscaping. Safety hazards would be increased with the addition of more lanes creating line-of-sight issues, longer delays due to increased pedestrian crossing times, and greater accident rates with potential improper lane crossing for vehicles making left-turns from triple left-turn lanes.

Signalization

As a general note, intersection signalization should incorporate signal interconnect conduit in order to provide coordination along the arterial roadways and to facilitate the use of TSM measures during peak periods. If signalization is required by the addition of Project traffic, a mitigation measure is noted in Table 1. The following intersection(s) require signalization due to the addition of project generated traffic:

Houghton Road & SR 99 Southbound Ramp (Year 2035)

Houghton Road & SR 99 Northbound Ramp (Year 2035)

Houghton Road & Chevalier Road/Project Entrance #6 (Year 2025)

Houghton Road & South Union Avenue (Year 2035)

VII. Mitigation (continued)

Intersection Mitigation

The specific mitigation measures recommended for individual intersections are detailed on Table 6, "Intersection Improvement/Mitigation". Intersection *improvements* required for Existing, Year 2025 Future, and Year 2035 Future traffic are noted in Table 1 – "Summary of Impacts". If intersection mitigation is required by the addition of Project generated traffic, a mitigation measure is noted on Table 1. The following intersection(s) require mitigation due to the addition of project generated traffic:

Taft Highway & South H. Street (Year 2035)

Curnow Road & South Union Avenue (Year 2035)

DiGiorgio Road & Chevalier Road/Project Entrance #1 (Year 2025)

DiGiorgio Road & South Union Avenue (Year 2025)

South Union Avenue & Lamb Avenue (Year 2035)

South Union Avenue & Project Entrance #3 (Year 2025)

South Union Avenue & Mugsy Road/Project Entrance #4 (Year 2025)

Houghton Road & SR 99 Southbound Ramp (Year 2035)

Houghton Road & SR 99 Northbound Ramp (Year 2035)

Houghton Road & Project Entrance #7 (Year 2025 & Year 2035)

Houghton Road & Chevalier Road/Project Entrance #6 (Year 2025 & Year 2035)

Houghton Road & Project Entrance #5 (Year 2025)

Houghton Road & South Union Avenue (Year 2025 & Year 2035)

SR 99 Southbound Ramp & Bear Mountain Boulevard/Costajo Road (Year 2035)

Segment Mitigation

Table 9 "Roadway Segment Laneage" reflects the laneage recommended for Existing, 2025 & 2035 Future Traffic (both with and without the project generated traffic) in order to maintain existing or future projected service levels. If additional lanes are required for existing, 2025 or 2035 Future Traffic without project traffic, *improvements* are noted in Table 1 – "Summary of Impacts". If additional lanes are required by the addition of the project traffic, a mitigation measure is noted in Table 1. The following roadway segment(s) require mitigation due to the addition of project generated traffic:

DiGiorgio Road –West of Chevalier Road to South Union Avenue (Year 2025)

Houghton Road – SR 99 Southbound Ramp to South Union Avenue (Year 2025 & Year 2035)

Chevalier Road – Houghton Road to DiGiorgio Road (Year 2025 & Year 2035)

VIII. Findings

Project's share of Mitigation

The project's proportionate share of traffic mitigation for intersections has been determined as the ratio of the project's added peak hour traffic to the total projected future traffic volumes in the year 2035. Table 6 indicates the pro-rata share of necessary improvements and mitigation.

The project's share of the costs for improvements to mitigate their impacts to the transportation facilities included within the Metropolitan Bakersfield Regional Transportation Impact Fee Program shall be paid by the project through its contribution to the fee program. The City of Bakersfield in conjunction with the County of Kern and the Kern Council of Governments establishes these regional fees to be paid by the proposed project based on a fixed rate per average daily trip for commercial developments and per dwelling unit for residential developments. Required future improvements to local facilities not included in the regional fee program shall be paid for by the project proponent based on the pro-rata share of project related traffic identified herein. Both the "local" and "regional" fees will be paid at time of issuance of the various related building permits for the project.

Conclusions

If the projected growth within the study area is realized, many of the improvements identified in Table 1 – "Summary of Impacts" will be necessary even without the addition of project generated traffic. The project should contribute its proportionate share, as identified in Table 6 – "Pro-Rata/Mitigation", of the costs to construct necessary improvements required due to future traffic growth projections in the study area. Projections of future traffic growth, though determined with best available data, should be verified by actual counts during future years prior to actual construction of the required improvements identified in this study.

Construction of facilities within the Transportation Impact Fee Program should be in accordance with the County of Kern and City of Bakersfield's Capital Improvement Plan, at time of construction, for the Metropolitan Bakersfield Area.

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Panama Lane & SR99 Southbound Ramp - AM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic	4033	34	1.83%	5890	-
Panama Lane & SR99 Southbound Ramp - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements available for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic	5010	38	1.75%	7186	-
Panama Lane & SR99 Northbound Ramp - AM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic	2563	34	2.64%	3853	-
Panama Lane & SR99 Northbound Ramp - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic	4063	39	2.03%	5985	-
Panama Lane & South H Street - AM Peak [7] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic	2109	13	0.42%	3112	-
Panama Lane & South H Street - PM Peak [7] 2025: Add ET & NT 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic	2811	19	0.45%	4179	-
Panama Lane & South Union Avenue - AM Peak [7] 2025: Add EL 2025 + Proj: Add NL 2035: Add ET, WL, WT, WR & NL** 2035 + Proj: Add SR **NL needed at 2035 w/o only if Project is not built at 2025 + Project	1844	78	4.35%	3638	-
Panama Lane & South Union Avenue - PM Peak [7] 2025: Add EL, NL, SL, & SR 2025 + Proj: No mitigation required due to addition of project traffic 2035: Add ET, 2WT, WR, NT & ST 2035 + Proj: No mitigation required due to addition of project traffic	2174	100	4.61%	4345	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Panama Lane & Cottonwood Road - AM Peak [7] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: Add EL, WT, NR, & SR 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	634	63	4.06%	1552	-
Panama Lane & Cottonwood Road - PM Peak [7] 2025: Provide Signal, Add EL, ER, WL, WR, NL, NR, SL, & SR 2025 + Proj: No mitigation required due to addition of project traffic 2035: Add ET & WT 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	1122	55	2.10%	2615	-
Hosking Road & Hughes Lane - AM Peak [7] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: Provide Signal, Add WL & NR 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	293	19	0.63%	2993	-
Hosking Road & Hughes Lane - PM Peak [7] 2025: Provide Signal, Add ET & WT 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	263	132	3.90%	3384	-
Hosking Road & SR99 Southbound Ramp - AM Peak [7] 2025: Construct Intersection with SR99/Hosking Interchange 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	995	71	2.20%	4216	-
Hosking Road & SR99 Southbound Ramp - PM Peak [7] 2025: Construct Intersection with SR99/Hosking Interchange 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	884	132	5.24%	3403	-
Hosking Road & SR99 Northbound Ramp - AM Peak [7] 2025: Construct Intersection with SR99/Hosking Interchange 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	995	14	0.33%	5264	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Hosking Road & SR99 Northbound Ramp - PM Peak [7]					
2025: Construct Intersection with SR99/Hosking Interchange					
2025 + Proj: No mitigation required due to addition of project traffic	884	51	2.23%	3173	-
2035: No improvements required for future 2035 traffic increases					
2035 + Proj: No mitigation required due to addition of project traffic					
Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project					
Hosking Road & South H Street - AM Peak [7]					
2025: Add EL, ER, SL, & ST					
2025 + Proj: No mitigation required due to addition of project traffic	1643	30	0.59%	5077	-
2035: Add EL, ET, ER, WL, WT, NL, 2NT, NR, ST, & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Hosking Road & South H Street - PM Peak [7]					
2025: Add NT, SL, & ST					
2025 + Proj: No mitigation required due to addition of project traffic	1835	20	0.37%	5376	-
2035: Add EL, ET, ER WL, WT, NL, NT, NR, ST, & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Hosking Road & South Union Avenue - AM Peak [7]					
2025: Add EL SR & Overlapping SR					
2025 + Proj: No mitigation required due to addition of project traffic	1234	162	6.67%	3664	-
2035: Add 2ET, ER, WT, NL, NT, NR, ST, & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Hosking Road & South Union Avenue - PM Peak [7]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	968	161	9.49%	2665	-
2035: Add EL, NL, NR, & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Hosking Road & Cottonwood Road - AM Peak [5]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	253	59	4.61%	694	-
2035: No improvements required for future 2035 traffic increases					
2035 + Proj: No mitigation required due to addition of project traffic					
Warrants Satisfied: 1 Satisfied @ 2035 with Project					
Hosking Road & Cottonwood Road - PM Peak [5]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	421	52	4.06%	1109	-
2035: No improvements required for future 2035 traffic increases					
2035 + Proj: No mitigation required due to addition of project traffic					
Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project					

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Taft Highway & Wible Road - AM Peak [7]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	1087	69	5.90%	2257	-
2035: Add ET, WT, NL, & 2SL					
2035 + Proj: No mitigation required due to addition of project traffic					
Taft Highway & Wible Road - PM Peak [7]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	1743	101	5.36%	3627	-
2035: Add ET, 2SL, & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Taft Highway & Compagnoni Street/SR 99 SB Ramp - AM Peak [7]					
2025: Add ET					
2025 + Proj: No mitigation required due to addition of project traffic	1353	78	7.33%	2417	-
2035: No improvements required for future 2035 traffic increases					
2035 + Proj: No mitigation required due to addition of project traffic					
Taft Highway & Compagnoni Street/SR99 SB Ramp - PM Peak [7]					
2025: Add ET					
2025 + Proj: No mitigation required due to addition of project traffic	2175	146	9.10%	3780	-
2035: Add ET, 2WT, NR, Convert SL to ST/L & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Taft Highway & South H Street - AM Peak [7]					
2025: Add EL, ET, & WT					
2025 + Proj: No mitigation required due to addition of project traffic	1373	97	2.78%	3488	-
2035: Add ET, WT, & SR					
2035 + Proj: No mitigation required due to addition of project traffic					
Taft Highway & South H Street - PM Peak [7]					
2025: Add EL, ET, WT, & SR					
2025 + Proj: No mitigation required due to addition of project traffic	1646	154	3.58%	4301	NL
2035: Add ET, WT, & WR					
2035 + Proj: Add NL					
Taft Highway/Panama Road & South Union Avenue - AM Peak [7]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	944	363	31.70%	2089	-
2035: No improvements required for future 2035 traffic increases					
2035 + Proj: No mitigation required due to addition of project traffic					
Taft Highway/Panama Road & South Union Avenue - PM Peak [7]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	1327	440	27.88%	2905	-
2035: Add ET & WT					
2035 + Proj: No mitigation required due to addition of project traffic					

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Panama Road & Cottonwood Road - AM Peak [7] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: Provide Signal, Add 2EL, ET, ER, WL, WT, WR, NL, SL, & SR 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 without Project	625	124	5.96%	2079	NL
Panama Road & Cottonwood Road - PM Peak [7] 2025: Provide Signal, Add EL, ER, WL, WR, NL, NR, SL, & SR 2025 + Proj: No mitigation required due to addition of project traffic 2035: Add EL, 2ET, 2WT, WR, 2NT, SL, 2ST 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2025 without Project	1024	181	4.95%	3654	NL, 2NT, NR
Curnow Road & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	338	446	35.34%	1379	-
Curnow Road & South Union Avenue - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Add ER Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	615	547	24.25%	2256	ER
Curnow Road & Cottonwood Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	97	57	4.45%	166	-
Curnow Road & Cottonwood Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	236	115	8.98%	376	-
Di Giorgio Road & Chevalier Road/Project Entrance #1 - AM Peak [6] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct Intersection with ET/R, WT/L, & NL/R 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	0	256	100.00%	256	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Di Giorgio Road & Chevalier Road/Project Entrance #1 - PM Peak [6] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct Intersection with ET/R, WT/L, & NL/R 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	0	680	100.00%	680	-
Di Giorgio Road & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct EB Approach with EL/T/R, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	319	554	43.25%	1399	-
Di Giorgio Road & South Union Avenue - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct EB Approach with EL, ET/R, WL, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	620	1022	49.66%	2678	-
Di Giorgio Road & Cottonwood Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	253	98	7.66%	455	-
Di Giorgio Road & Cottonwood Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	500	173	13.52%	851	-
Lamb Avenue/Project Entrance #2 & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	177	430	30.22%	786	-
Lamb Avenue/Project Entrance #2 & South Union Avenue - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Add ER Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	377	900	70.26%	1658	ER

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Project Entrance #3 & South Union Avenue - AM Peak [6,5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct ER, & NL 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	171	242	16.93%	578	-
Project Entrance #3 & South Union Avenue - PM Peak [6,5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct ER, & NL 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	355	884	71.00%	1596	
Mugsy Road/Project Entrance #4 & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct East Approach 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	168	336	23.46%	674	-
Mugsy Road/Project Entrance #4 & South Union Avenue - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct East Approach 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	361	1058	73.47%	1784	-
Houghton Road & Stine Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	173	30	2.34%	166	-
Houghton Road & Stine Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	222	22	1.72%	223	
Houghton Road & Wible Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	224	35	2.73%	322	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Houghton Road & Wible Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	301	36	2.81%	421	-
Houghton Road & South H Street - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	235	49	3.83%	408	-
Houghton Road & South H Street - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	282	80	6.25%	514	-
Houghton Road & SR99 Southbound Ramp/Costajo Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Provide Signal, Add EL, WL, NL, & 2SL Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	356	1012	86.50%	1526	Signal EL, WL, NL & 2SL
Houghton Road & SR99 Southbound Ramp/Costajo Road - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Add SL Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	366	1294	87.43%	1846	SL
Houghton Road & SR 99 Northbound Ramp - AM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Provide Signal, Add ET, WL, WT, & NR Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	327	1767	89.70%	2297	Signal ET, WL, WT, & NR
Houghton Road & SR 99 Northbound Ramp - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Provide Signal, Add 2ET, 2WL, 2WT & Overlapping NR Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	408	2946	94.30%	3532	Signal 2ET, 2WL, 2WT, NR, & Overlapping NR

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Houghton Road & Project Entrance #7 - AM Peak [6] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct Entrance with WR, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	306	2042	100.00%	2650	WR, & SR
Houghton Road & Project Entrance #7 - PM Peak [6] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct Entrance with WR, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Add ET, WT, & SR Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project** **No Conflicting Movements, Intersection meets Warrants due to EB & WB Volumes	330	3212	100.00%	3862	ET, WT, WR, & SR
Houghton Road & Chevalier Road/Project Entrance #6 - AM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct EL, WL, NT, SL, ST, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Provide Signal, Add EL, ET, WT, & Overlapping SR Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	308	2114	100.00%	2742	Signal 2EL, ET, WL, WT, SL & Overlapping 2SR
Houghton Road & Chevalier Road/Project Entrance #6 - PM Peak 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Provide Signal, Construct 2EL, ET, WL, 2WT, WR, NT, SL, ST, 2SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Add ET, ER, SL, & Overlapping SR Warrants Satisfied: 1 & 3 Satisfied @ 2025 with Project	335	3136	100.00%	3818	Signal 2EL, 2ET, ER, WL, 2WT, WR, NT, SL & Overlapping 2SR
Houghton Road & Project Entrance #5 - AM Peak [6] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct EL, WR, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	300	533	100.00%	1141	EL, WR, & SR
Houghton Road & Project Entrance #5 - PM Peak [6] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Construct EL, WR, & SR 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	321	1482	100.00%	2132	EL, WR, & SR
Houghton Road & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	412	414	34.85%	1128	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Houghton Road & South Union Avenue - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: Add EL 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Provide Signal, Add EL, ET, WL, WT, NL, SL, & SR Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	656	1122	45.33%	2475	Signal 2EL, ET, WL, WT, NL, SL, & SR
Buena Vista Blvd & Cottonwood Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 without Project	242	60	4.69%	407	-
Buena Vista Blvd & Cottonwood Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 without Project	347	181	14.14%	702	-
Buena Vista Blvd & Adobe Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	233	37	2.89%	316	-
Buena Vista Blvd & Adobe Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	401	132	10.31%	608	-
Shafter Road & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	145	50	3.44%	334	-
Shafter Road & South Union Avenue - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	252	89	6.60%	584	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Bear Mountain Blvd/Costajo Road & SR99 Southbound Ramp - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	295	2	0.15%	874	-
Bear Mountain Blvd/Costajo Road & SR99 Southbound Ramp - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: Add NR Warrants Satisfied: None Satisfied @ 2035 with Project	406	19	2.98%	1044	NR
Bear Mountain Blvd & Costajo Road - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	392	8	0.66%	776	-
Bear Mountain Blvd & Costajo Road - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project	654	23	2.43%	1305	-
Bear Mountain Blvd & SR99 Northbound Ramp - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	512	13	1.19%	732	-
Bear Mountain Blvd & SR99 Northbound Ramp - PM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: None Satisfied @ 2035 with Project	788	6	0.74%	1118	-
Bear Mountain Blvd & South Union Avenue - AM Peak [5] 2025: No improvements required for future 2025 traffic increases 2025 + Proj: No mitigation required due to addition of project traffic 2035: No improvements required for future 2035 traffic increases 2035 + Proj: No mitigation required due to addition of project traffic Warrants Satisfied: 1 Satisfied @ 2035 with Project	560	52	5.00%	923	-

Table 6: Intersection Improvements/Mitigation/Pro-Rata Share - GPA/ZC 99/Houghton Industrial Park

Intersection/Mitigation [4]	Existing	Total Commercial Project Traffic @ Year 2035		Year 2035 Future Traffic + Project	Improvements not Covered by RTIF or other funding sources
	PHV	PHV	% [1, 2, 3]	PHV	
Bear Mountain Blvd & South Union Avenue - PM Peak [5]					
2025: No improvements required for future 2025 traffic increases					
2025 + Proj: No mitigation required due to addition of project traffic	751	62	7.30%	1318	-
2035: No improvements required for future 2035 traffic increases					
2035 + Proj: No mitigation required due to addition of project traffic					
Warrants Satisfied: 1 & 3 Satisfied @ 2035 with Project					

Notes:

PHV = Peak Hour Volume
NL = Northbound Left Lane, **NT** = Northbound Through Lane, **NR** = Northbound Right Lane
EL = Eastbound Left Lane, **ET** = Eastbound Through Lane, **ER** = Eastbound Right Lane
SL = Southbound Left Lane, **ST** = Southbound Through Lane, **SR** = Southbound Right Lane
WL = Westbound Left Lane, **WT** = Westbound Through Lane, **WR** = Westbound Right Lane
LOS = Level of Service, **Byd Std.** = Beyond City of Bakersfield Standard Detail T-4
RTIF = Regional Transportation Impact Fee, **s/v** = seconds per vehicle in delay

1 Percentages Based on Cal-Trans Formula: Project Volume/(Future Volume - Existing Volume)

2 For all non-Caltrans Facilities, Percentages Based on COK Formula: Project Volume/(Future Volume)

3 Project percentage of future traffic is shown in this column regardless of mitigation requirements.

4 Additional lanes required as shown are with reference to existing lanes at time of study survey. Since laneage configurations may have changed since time of survey, intersection analysis printouts contained in the appendix should be referred to for actual total laneage configurations required for mitigation.

5 Percentage share at this intersection is based on the project's contribution to the minimum threshold for signalization at this intersection (1280vph for 1 lane by 1 lane Approaches, 1440vph for 2 lane by 1 lane Approaches, and 1600vph for 2 lane by 2 lane Approaches).

6 Project created intersection. Developer shall be responsible for all improvement costs related to this intersection.

7 Improvements to this intersection are included in the Phase IV Metropolitan Bakersfield Regional Transportation Impact Fee Program and therefore paid for by project's contribution to that fee program.

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
PANAMA LN.	Existing	U		B			A					B		C	B	12.5
and	2025 Future w/o Project	U		B			A					B		C	B	17.4
99 SB RAMP	2025 Future with Project	U		B			A					B		C	B	17.4
AM PEAK	2035 Future w/o Project	U		B			A					C		F	C	29.8
	2035 Future with Project	U		B			A					C		F	C	29.6
PANAMA LN.	Existing	U		C			C					B		F	C	31.0
and	2025 Future w/o Project	U		F			C					B		F	E	56.2
99 SB RAMP	2025 Future with Project	U		F			C					B		F	E	56.2
PM PEAK	2035 Future w/o Project	U		F			D					C		F	F	100.4
	2035 Future with Project	U		F			D					C		F	F	100.6
PANAMA LN.	Existing	U		B			B		B		B				B	12.0
and	2025 Future w/o Project	U		B			B		B		B				B	13.4
99 NB RAMP	2025 Future with Project	U		B			B		B		B				B	13.4
AM PEAK	2035 Future w/o Project	U		B			B		B		B				B	14.0
	2035 Future with Project	U		B			B		B		B				B	14.0
PANAMA LN.	Existing	U		B			B		B		B				B	14.0
and	2025 Future w/o Project	U		B			B		C		C				B	15.5
99 NB RAMP	2025 Future with Project	U		B			B		C		C				B	15.6
PM PEAK	2035 Future w/o Project	U		C			B		C		C				B	14.0
	2035 Future with Project	U		C			B		C		C				C	20.7
PANAMA LN.	Existing	S	E	C	C	D	C	C	E	B	B	D	C	C	C	30.8
and	2025 Future w/o Project	S	F	C	C	D	C	D	E	C	B	D	C	C	C	34.8
SOUTH H	2025 Future with Project	S	F	C	C	D	C	D	E	C	B	C	C	C	C	34.8
AM PEAK	2035 Future w/o Project	S	F	C	C	D	D	D	F	C	C	D	D	D	D	42.8
	2035 Future with Project	S	F	C	C	D	D	D	F	C	C	D	D	D	D	42.9
PANAMA LN.	Existing	S	E	C	C	D	C	D	F	C	C	E	C	C	D	37.8
and	2025 Future w/o Project	S	E	D	C	E	D	E	E	C	C	E	D	D	D	47.0
SOUTH H	2025 Future w/o Project (Improved)	S	F	C	C	D	D	D	F	C	C	F	D	D	D	46.4
PM PEAK	2025 Future with Project	S	E	C	C	E	D	E	E	C	C	E	D	D	D	44.1
	2035 Future w/o Project	S	F	C	C	E	F	F	F	C	C	F	E	E	E	64.5
	2035 Future with Project	S	F	C	C	E	F	F	F	C	C	F	E	E	E	65.8

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
PANAMA LN.	Existing	S	C	C	C	C	C	C	C	B	B	C	C	C	C	24.0
and	2025 Future w/o Project	S	D	C	C	E	D	D	E	C	C	D	C	C	D	38.3
S. UNION	2025 Future w/o Project (Improved)	S	D	C	C	E	C	C	E	C	C	D	C	C	C	34.7
AM PEAK	2025 Future with Project	S	D	C	C	E	C	C	E	C	C	D	C	C	D	35.6
	2025 Future with Project (Mitigated)	S	C	C	C	D	C	C	D	C	C	D	C	C	C	31.1
	2035 Future w/o Project	S	E	F	D	F	E	E	F	C	C	E	E	E	E	65.7
	2035 Future w/o Project (Improved)	S	D	C	C	D	C	C	D	C	C	D	D	D	C	34.4
	2035 Future with Project	S	D	C	C	E	C	C	D	C	C	E	D	D	D	37.6
PANAMA LN.	Existing	S	D	C	B	D	D	D	D	C	C	E	C	C	D	36.7
and	2025 Future w/o Project	S	F	C	C	E	F	F	F	D	D	E	E	E	E	68.9
S. UNION	2025 Future w/o Project (Improved)	S	E	C	B	E	D	D	D	D	C	E	D	D	D	40.9
PM PEAK	2025 Future with Project	S	E	C	C	E	D	D	D	D	C	E	D	D	D	41.5
	2035 Future w/o Project	S	F	E	C	F	F	F	F	D	C	F	D	D	F	110.4
	2035 Future w/o Project (Improved)	S	D	C	C	E	C	C	D	C	C	E	C	D	C	33.0
	2035 Future with Project	S	D	C	C	F	C	C	D	C	C	E	C	D	C	33.9
PANAMA LN.	Existing	AWS	B	B	B	A	A	A	A	A	A	A	A	A	A	9.7
and	2025 Future w/o Project	AWS	C	C	C	B	B	B	B	B	B	B	B	B	B	15.0
COTTONWOOD	2025 Future with Project	AWS	C	C	C	B	B	B	B	B	B	B	B	B	C	15.8
AM PEAK	2035 Future w/o Project	AWS	F	F	F	E	E	E	C	C	C	C	C	C	E	47.6
	2035 Future w/o Project (Improved)	AWS	C	D	D	C	C	C	B	B	B	C	C	B	C	21.5
	2035 Future with Project	AWS	C	E	E	C	C	C	C	B	B	C	B	B	C	23.7
PANAMA LN.	Existing	AWS	C	C	C	C	C	C	C	C	C	C	C	C	C	18.8
and	2025 Future w/o Project	AWS	F	F	F	F	F	F	E	E	E	F	F	F	F	65.8
COTTONWOOD	2025 Future w/o Project (Improved)	S	D	B	B	D	C	B	D	C	C	D	C	C	C	28.0
PM PEAK	2025 Future with Project	S	E	B	B	D	D	B	D	C	C	D	C	C	C	28.4
	2035 Future w/o Project	S	F	D	B	D	F	C	D	C	C	F	C	C	F	106.5
	2035 Future w/o Project (Improved)	S	D	B	B	D	C	C	D	C	C	E	C	C	C	32.1
	2035 Future with Project	S	D	B	B	D	C	C	D	C	C	E	C	C	C	32.6

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOSKING and HUGHES AM PEAK	Existing	U		A	A	A	A		A		A				A	5.1
	2025 Future w/o Project	U		A	A	B	A		F		C				A	5.7
	2025 Future with Project	U		A	A	B	A		F		C				A	5.8
	2035 Future w/o Project	U		A	A	C	A		F		F				F	81.9
	2035 Future w/o Project (Improved)	S		D	B	D	A		C		D				D	29.1
	2035 Future with Project	S		D	B	D	A		C		D				D	30.5
HOSKING and HUGHES PM PEAK	Existing	U		A	A	A	A		A		A				A	4.7
	2025 Future w/o Project	U		A	A	A	A		F		B				F	76.4
	2025 Future w/o Project (Improved)	S		B	B	E	A		B		C				C	17.3
	2025 Future with Project	S		B	B	E	A		B		C				C	19.2
	2035 Future w/o Project	S		C	D	E	A		D		D				D	29.8
	2035 Future with Project	S		C	D	E	B		D		D				D	31.9
HOSKING and 99 SB RAMP AM PEAK	*FUTURE INTERSECTION*															
	2025 Future w/o Project	U		B	B		B	B				B		B	B	11.8
	2025 Future with Project	U		B	B		B	B				B		B	B	11.8
	2035 Future w/o Project	U		B	B		C	C				C		B	C	20.9
	2035 Future with Project	U		B	B		C	C				C		B	C	21.0
HOSKING and 99 SB RAMP PM PEAK	*FUTURE INTERSECTION*															
	2025 Future w/o Project	U		A	A		A	A				A		B	A	9.9
	2025 Future with Project	U		A	A		A	A				A		B	A	9.9
	2035 Future w/o Project	U		B	B		B	B				A		B	B	13.9
	2035 Future with Project	U		B	B		B	B				A		B	B	14.3
HOSKING and 99 NB RAMP AM PEAK	*FUTURE INTERSECTION*															
	2025 Future w/o Project	U		A	A		A	A				B		B	A	5.0
	2025 Future with Project	U		A	A		A	A				B		B	A	5.0
	2035 Future w/o Project	U		A	A		A	A				C		C	A	5.6
	2035 Future with Project	U		A	A		A	A				C		C	A	5.6

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOSKING	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U		A	A		A	A				B		B	A	6.3
99 NB RAMP	2025 Future with Project	U		A	A		A	A				B		B	A	6.5
PM PEAK	2035 Future w/o Project	U		A	A		A	A				B		B	A	7.5
	2035 Future with Project	U		A	A		A	A				B		B	A	7.8
HOSKING	Existing	S	D	C	C	D	C	C	D	C	C	D	C	C	C	29.4
and	2025 Future w/o Project	S	E	D	D	E	D	F	E	C	C	E	D	D	E	56.1
SOUTH H	2025 Future w/o Project (Improved)	S	D	C	B	D	C	D	D	C	C	C	C	C	C	30.5
AM PEAK	2025 Future with Project	S	D	C	B	D	C	D	D	C	C	C	C	C	C	30.7
	2035 Future w/o Project	S	E	F	C	F	D	E	F	D	D	E	F	F	F	81.3
	2035 Future w/o Project (Improved)	S	E	D	C	D	D	F	F	C	C	E	C	D	E	62.4
	2035 Future with Project	S	E	D	C	D	D	F	F	C	C	E	C	D	E	62.9
HOSKING	Existing	S	E	D	D	D	C	C	D	D	D	D	C	C	D	38.9
and	2025 Future w/o Project	S	F	E	E	F	D	F	F	F	F	F	D	D	F	80.4
SOUTH H	2025 Future w/o Project (Improved)	S	E	D	D	D	C	D	D	C	C	D	C	C	D	39.4
PM PEAK	2025 Future with Project	S	E	D	D	D	C	D	D	C	C	D	C	C	D	39.7
	2035 Future w/o Project	S	F	F	F	F	E	F	F	E	E	F	F	F	F	122.7
	2035 Future w/o Project (Improved)	S	F	D	E	D	C	F	D	C	C	F	C	F	E	69.8
	2035 Future with Project	S	F	D	E	D	C	F	D	C	C	F	C	F	E	70.2
HOSKING	Existing	S	D	B	B	C	C	C	C	B	B	C	B	C	C	24.5
and	2025 Future w/o Project	S	D	C	C	D	D	D	E	C	C	E	D	F	F	83.2
S. UNION	2025 Future w/o Project (Improved)	S	D	C	C	D	C	C	E	B	B	D	C	C	C	28.1
AM PEAK	2025 Future with Project	S	D	C	C	D	C	C	E	B	B	D	C	C	C	28.6
	2035 Future w/o Project	S	D	C	C	E	D	D	F	C	C	E	D	F	F	85.8
	2035 Future w/o Project (Improved)	S	F	B	C	D	C	C	D	C	C	E	C	B	C	34.1
	2035 Future with Project	S	F	B	C	D	C	C	E	C	C	E	C	B	C	34.5
HOSKING	Existing	S	C	B	B	C	B	B	C	B	B	C	B	B	B	17.0
and	2025 Future w/o Project	S	C	C	C	C	C	C	C	B	B	C	B	B	C	20.7
S. UNION	2025 Future with Project	S	D	C	C	C	C	C	D	B	B	C	B	B	C	21.3
PM PEAK	2035 Future w/o Project	S	E	C	C	D	D	D	E	C	C	D	D	D	D	41.3
	2035 Future w/o Project (Improved)	S	C	C	C	D	C	C	C	C	B	D	C	C	C	25.0
	2035 Future with Project	S	C	C	C	D	C	C	C	C	B	D	C	C	C	26.7

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOSKING and COTTONWOOD AM PEAK	Existing	U	A		A				A	A			A	A	A	2.9
	2025 Future w/o Project	U	B		B				A	A			A	A	A	3.3
	2025 Future with Project	U	B		B				A	A			A	A	A	3.2
	2035 Future w/o Project	U	B		B				A	A			A	A	A	4.1
	2035 Future with Project	U	C		C				A	A			A	A	A	4.1
HOSKING and COTTONWOOD PM PEAK	Existing	U	B		B				A	A			A	A	A	1.7
	2025 Future w/o Project	U	B		B				A	A			A	A	A	2.0
	2025 Future with Project	U	B		B				A	A			A	A	A	2.0
	2035 Future w/o Project	U	C		C				A	A			A	A	A	3.2
	2035 Future with Project	U	D		D				A	A			A	A	A	3.4
TAFT HWY. and WIBLE AM PEAK	Existing	S	C	B	B	C	B	B	B	B	B	B	B	B	B	15.7
	2025 Future w/o Project	S	D	C	B	D	C	B	B	B	B	C	C	C	C	24.3
	2025 Future with Project	S	D	C	B	D	C	B	B	B	B	C	C	C	C	25.4
	2035 Future w/o Project	S	F	F	C	F	D	C	C	C	C	E	E	E	E	68.4
	2035 Future w/o Project (Improved)	S	C	C	B	D	B	B	D	C	C	C	B	B	C	23.0
	2035 Future with Project	S	D	C	B	D	B	B	D	C	C	C	B	B	C	23.7
TAFT HWY. and WIBLE PM PEAK	Existing	S	C	B	A	D	B	C	B	B	B	B	B	B	B	19.0
	2025 Future w/o Project	S	E	D	A	D	C	C	C	C	C	D	D	D	C	32.4
	2025 Future with Project	S	E	D	B	D	C	C	C	C	C	D	D	D	C	34.3
	2035 Future w/o Project	S	F	F	B	F	D	D	D	D	D	F	F	F	F	126.4
	2035 Future w/o Project (Improved)	S	E	B	A	D	C	C	C	C	C	C	C	C	C	22.9
	2035 Future with Project	S	E	B	A	D	C	C	C	C	C	C	C	C	C	25.3
TAFT HWY. and COMPANGNONI 99 SB RAMP AM PEAK	Existing	S		C	B	D	A		D		D	D	C	C	C	22.8
	2025 Future w/o Project	S		D	B	E	A		D		D	E	C	D	D	35.7
	2025 Future w/o Project (Improved)	S		B	B	C	B		C		C	C	B	C	C	20.7
	2025 Future with Project	S		B	B	C	B		D		D	C	B	C	C	20.9
	2035 Future w/o Project	S		C	B	E	B		D		D	D	C	C	C	26.9
	2035 Future with Project	S		C	B	E	B		D		D	D	C	C	C	28.2

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
TAFT HWY.	Existing	S		D	B	E	B		E		E	D	C	D	E	36.1
and	2025 Future w/o Project	S		F	B	F	C		F		F	F	D	E	F	81.3
COMPANGNONI	2025 Future w/o Project (Improved)	S		C	C	E	C		D		D	D	C	C	D	34.6
99 SB RAMP	2025 Future with Project	S		C	C	E	C		D		D	D	C	D	D	33.7
PM PEAK	2035 Future w/o Project	S		E	C	F	D		F		F	E	C	E	F	59.4
	2035 Future w/o Project (Improved)	S		C	B	E	B		E		E	D	D	D	C	24.9
	2035 Future with Project	S		C	B	D	B		D		D	C	C	C	C	24.2
TAFT HWY.	Existing	S	E	B	B	F	D	C	E	B	B	D	C	D	D	39.3
and	2025 Future w/o Project	S	F	C	B	F	F	C	F	C	C	E	C	F	F	121.9
SOUTH H	2025 Future w/o Project (Improved)	S	D	C	B	F	C	C	E	B	B	D	C	D	C	34.3
AM PEAK	2025 Future with Project	S	D	C	B	F	C	C	E	B	B	D	C	D	C	34.7
	2035 Future w/o Project	S	D	C	B	F	F	C	F	C	C	E	C	F	F	82.6
	2035 Future w/o Project (Improved)	S	E	C	C	E	E	C	E	B	B	E	C	C	D	42.9
	2035 Future with Project	S	E	C	C	E	E	C	E	B	B	E	C	C	D	44.0
TAFT HWY.	Existing	S	D	B	B	F	D	B	D	C	C	D	C	D	C	32.0
and	2025 Future w/o Project	S	F	C	B	F	F	C	F	D	D	F	D	F	E	79.4
SOUTH H	2025 Future w/o Project (Improved)	S	D	C	B	F	C	C	D	C	C	D	C	C	C	30.9
PM PEAK	2025 Future with Project	S	D	C	B	F	C	C	E	C	C	D	C	C	C	32.3
	2035 Future w/o Project	S	F	D	C	F	F	C	F	D	C	E	D	F	E	67.3
	2035 Future w/o Project (Improved)	S	E	C	C	F	F	C	F	C	C	D	D	D	D	52.1
	2035 Future with Project	S	F	C	C	F	F	C	F	C	C	D	C	D	E	59.0
	2035 Future with Project (Mitigated)	S	D	C	B	E	D	C	E	C	C	D	C	D	D	35.8
TAFT HWY.	Existing	S	C	B	B	D	B	B	C	B	B	C	B	B	B	17.9
and	2025 Future w/o Project	S	D	B	B	D	B	B	C	B	B	C	B	C	C	21.0
S. UNION	2025 Future with Project	S	D	B	B	C	C	C	C	B	B	C	C	C	C	21.9
AM PEAK	2035 Future w/o Project	S	F	B	B	D	C	C	C	C	C	D	C	C	C	30.1
	2035 Future with Project	S	F	C	B	D	C	C	D	C	C	D	C	C	C	32.9

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
TAFT HWY.	Existing	S	D	B	B	D	B	B	C	C	C	C	C	C	C	21.5
and	2025 Future w/o Project	S	D	B	B	D	C	C	D	C	C	D	C	C	C	28.5
S. UNION	2025 Future with Project	S	D	C	B	D	C	C	D	C	C	D	C	C	C	29.4
PM PEAK	2035 Future w/o Project	S	E	C	B	E	D	D	E	C	C	E	C	C	D	38.8
	2035 Future w/o Project (Improved)	S	D	B	B	D	C	C	D	C	C	D	C	C	C	28.7
	2035 Future with Project	S	D	C	C	D	C	C	E	C	C	D	C	C	C	32.1
TAFT HWY.	Existing	AWS	B	B	B	A	A	A	A	A	A	A	A	A	A	9.8
and	2025 Future w/o Project	AWS	C	C	C	C	C	C	B	B	B	C	C	C	C	15.7
COTTONWOOD	2025 Future with Project	AWS	C	C	C	C	C	C	B	B	B	C	C	C	C	18.2
AM PEAK	2035 Future w/o Project	AWS	F	F	F	F	F	F	D	D	D	F	F	F	F	68.8
	2035 Future w/o Project (Improved)	S	D	C	B	E	C	D	D	C	C	D	B	B	D	31.3
	2035 Future with Project	S	D	C	C	D	C	D	D	C	C	E	B	B	D	31.9
TAFT HWY.	Existing	AWS	C	C	C	C	C	C	B	B	B	B	B	B	C	16.0
and	2025 Future w/o Project	AWS	F	F	F	F	F	F	E	E	E	F	F	F	F	69.3
COTTONWOOD	2025 Future w/o Project (Improved)	S	D	C	B	D	D	C	D	C	C	D	B	B	D	31.9
PM PEAK	2025 Future with Project	S	D	C	B	D	D	C	D	C	C	D	B	B	D	32.1
	2035 Future w/o Project	S	F	E	D	F	F	F	F	F	D	F	C	C	F	201.9
	2035 Future w/o Project (Improved)	S	E	C	B	D	C	E	D	C	C	D	B	B	E	36.6
	2035 Future with Project	S	D	C	B	D	C	E	D	C	C	E	B	C	E	35.9
CURNOW	Existing	U	A	A	A	B	B	B	A	A	A	A	A	A	A	2.9
and	2025 Future w/o Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	3.2
S. UNION	2025 Future with Project	U	B	B	B	C	C	C	A	A	A	A	A	A	A	3.0
AM PEAK	2035 Future w/o Project	U	C	C	C	C	C	C	A	A	A	A	A	A	A	4.3
	2035 Future with Project	U	D	D	D	F	F	F	B	B	B	A	A	A	A	6.9
CURNOW	Existing	U	B	B	B	B	B	B	A	A	A	A	A	A	A	2.9
and	2025 Future w/o Project	U	B	B	B	C	C	C	A	A	A	A	A	A	A	3.8
S. UNION	2025 Future with Project	U	C	C	C	D	D	D	A	A	A	A	A	A	A	4.6
PM PEAK	2035 Future w/o Project	U	F	F	F	F	F	F	A	A	A	A	A	A	C	21.3
	2035 Future with Project	U	F	F	F	F	F	F	A	A	A	B	B	B	F	104.3
	2035 Future with Project (Mitigated)	U	F	F	F	C	C	C	A	A	A	B	B	B	C	19.6

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
CURNOW	Existing	U	A		A				A	A			A	A	A	1.4
and	2025 Future w/o Project	U	A		A				A	A			A	A	A	1.8
COTTONWOOD	2025 Future with Project	U	A		A				A	A			A	A	A	1.5
AM PEAK	2035 Future w/o Project	U	A		A				A	A			A	A	A	2.3
	2035 Future with Project	U	A		A				A	A			A	A	A	1.7
CURNOW	Existing	U	A		A				A	A			A	A	A	1.3
and	2025 Future w/o Project	U	A		A				A	A			A	A	A	1..7
COTTONWOOD	2025 Future with Project	U	A		A				A	A			A	A	A	1.5
PM PEAK	2035 Future w/o Project	U	A		A				A	A			A	A	A	2.1
	2035 Future with Project	U	B		B				A	A			A	A	A	1.7
DIGIORGIO	*FUTURE INTERSECTION*															
and	2025 Future w/o Project															
CHEVALIER (#1)	2025 Future with Project	U				A			A		A				A	0.0
AM PEAK	2035 Future w/o Project															
	2035 Future with Project	U				A			A		A				A	0.0
DIGIORGIO	*FUTURE INTERSECTION*															
and	2025 Future w/o Project															
CHEVALIER (#1)	2025 Future with Project	U				A			A		A				A	8.1
PM PEAK	2035 Future w/o Project															
	2035 Future with Project	U				A			B		B				A	9.0
DIGIORGIO	Existing	U				A		A		A	A	A	A		A	3.4
and	2025 Future w/o Project	U				B		B		A	A	A	A		A	4.7
S. UNION	2025 Future with Project	U	C	C	C	C	B	B	B	A	A	A	A	A	A	4.0
AM PEAK	2035 Future w/o Project	U				B		B		A	A	A	A		A	4.2
	2035 Future with Project	U	F	F	F	E	E	E	A	A	A	A	A	A	B	13.4
DIGIORGIO	Existing	U				B		B		A	A	A	A		A	3.8
and	2025 Future w/o Project	U				B		B		A	A	A	A		A	4.7
S. UNION	2025 Future with Project	U	F	F	F	F	F	F	A	A	A	B	A	A	E	39.0
	2025 Future with Project (Mitigated)	U	F	E	E	F	D	D	A	A	A	B	A	A	C	15.0
PM PEAK	2035 Future w/o Project	U				F		F		A	A	B	B		B	14.2
	2035 Future with Project	U	F	F	F	F	F	F	A	A	A	C	A	A	A	2.6

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
DIGIORGIO	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.8
COTTONWOOD	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.0
AM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.1
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.6
DIGIORGIO	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.7
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	9.2
COTTONWOOD	2025 Future with Project	AWS	B	B	B	A	A	A	A	A	A	A	A	A	A	9.8
PM PEAK	2035 Future w/o Project	AWS	B	B	B	B	B	B	A	A	A	A	A	A	A	10.0
	2035 Future with Project	AWS	B	B	B	B	B	B	B	B	B	B	B	B	B	11.9
LAMB	Existing	U	A	A	A	A	A	A	A	A	A	A	A	A	A	0.4
and	2025 Future w/o Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	0.3
S. UNION (#2)	2025 Future with Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	1.2
AM PEAK	2035 Future w/o Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	0.4
	2035 Future with Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	1.9
LAMB	Existing	U	B	B	B	A	A	A	A	A	A	A	A	A	A	0.5
and	2025 Future w/o Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	0.5
S. UNION (#2)	2025 Future with Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	3.6
PM PEAK	2035 Future w/o Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	0.6
	2035 Future with Project	U	F	F	F	C	C	C	A	A	A	A	A	A	D	33.3
	2035 Future with Project (Mitigated)	U	D	D	D	C	C	C	A	A	A	A	A	A	A	7.2
S. UNION	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U														
ENTRANCE #3	2025 Future with Project	U			A				A	A			A	A	A	0.6
AM PEAK	2035 Future w/o Project	U														
	2035 Future with Project	U			A				A	A			A	A	A	0.8

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			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
S. UNION	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U														
ENTRANCE #3	2025 Future with Project	U			B				A	A			A	A	A	1.0
PM PEAK	2035 Future w/o Project	U														
	2035 Future with Project	U			B				A	A			A	A	A	1.5
S. UNION	Existing	U				A		A		A	A	A	A		A	0.1
and	2025 Future w/o Project	U				A		A		A	A	A	A		A	0.1
MUGSY (#4)	2025 Future with Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	1.5
AM PEAK	2035 Future w/o Project	U				A		A		A	A	A	A		A	0.1
	2035 Future with Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	2.0
S. UNION	Existing	U				B		B		A	A	A	A		A	0.2
and	2025 Future w/o Project	U				B		B		A	A	A	A		A	0.2
MUGSY (#4)	2025 Future with Project	U	B	B	B	C	C	C	A	A	A	A	A	A	A	1.3
PM PEAK	2035 Future w/o Project	U				B		B		A	A	A	A		A	0.2
	2035 Future with Project	U	B	B	B	F	F	F	B	B	B	A	A	A	A	2.1
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.5
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.4
STINE	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.4
AM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.3
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.4
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.5
STINE	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6
PM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.5
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6
WIBLE	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.7
AM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.8
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.9
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.8
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.0
WIBLE	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.1
PM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.2
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.4
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.6
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.8
SOUTH H	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.0
AM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.1
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.3
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	7.7
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.0
SOUTH H	2025 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.2
PM PEAK	2035 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.5
	2035 Future with Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.9
HOUGHTON	Existing	U	A	A	A	A	A	A	B	B	A	B	B	A	A	5.7
and	2025 Future w/o Project	U	A	A	A	A	A	A	B	B	A	B	B	A	A	5.8
99 SB RAMP	2025 Future with Project	U	A	A	A	A	A	A	B	B	A	E	E	A	C	23.1
AM PEAK	2035 Future w/o Project	U	A	A	A	A	A	A	B	B	A	B	B	A	A	6.0
	2035 Future with Project	U	A	A	A	A	A	A	B	B	A	F	F	A	F	245.3
	2035 Future with Project (Mitigated)	S	D	C	C	D	C	C	C	C	C	C	B	B	D	27.7

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			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOUGHTON	Existing	U	A	A	A	A	A	A	B	B	A	B	B	A	A	4.6
and	2025 Future w/o Project	U	A	A	A	A	A	A	B	B	A	B	B	A	A	4.7
99 SB RAMP	2025 Future with Project	U	A	A	A	A	A	A	B	B	A	C	C	A	A	5.4
PM PEAK	2035 Future w/o Project	U	A	A	A	A	A	A	B	B	A	B	B	A	A	4.7
	2035 Future with Project	U	A	A	A	A	A	A	B	B	A	F	F	A	D	25.8
	2035 Future with Project (Mitigated)	U	A	A	A	A	A	A	B	B	A	F	B	A	C	24.4
HOUGHTON	Existing	U		A	A	A	A		B		A				A	1.4
and	2025 Future w/o Project	U		A	A	A	A		B		A				A	1.6
99 NB RAMP	2025 Future with Project	U		A	A	A	A		D		D				A	7.3
AM PEAK	2035 Future w/o Project	U		A	A	A	A		B		A				A	1.7
	2035 Future with Project	U		A	A	C	A		F		F				F	180.8
	2035 Future with Project (Mitigated)	S		C	B	D	A		C		B				C	27.7
HOUGHTON	Existing	U		A	A	A	A		B		A				A	2.3
and	2025 Future w/o Project	U		A	A	A	A		B		A				A	2.5
99 NB RAMP	2025 Future with Project	U		A	A	B	B		F		B				B	12.9
PM PEAK	2035 Future w/o Project	U		A	A	A	A		B		A				A	2.9
	2035 Future with Project	U		A	A	F	F		F		F				F	516.9
	2035 Future with Project (Mitigated)	S		C	C	D	A		C		A				C	22.4
HOUGHTON	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U														
ENTRANCE #7	2025 Future with Project	U		A			A	A						B	A	0.1
AM PEAK	2035 Future w/o Project	U														
	2035 Future with Project	U		A			A	A						B	A	0.2

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			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOUGHTON	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U														
ENTRANCE #7	2025 Future with Project	U		A			A	A						F	A	4.5
PM PEAK	2035 Future w/o Project	U														
	2035 Future with Project	U		A			A	A						F	F	240.3
	2035 Future with Project (Mitigated)	U		A			A	A						F	A	30.0
HOUGHTON	Existing	U		A	A	A	A		B		A				A	0.3
and	2025 Future w/o Project	U		A	A	A	A		B		A				A	0.3
CHEVALIER (#6)	2025 Future with Project	U	B	B	B	A	A	A	F	F	B	F	F	B	C	15.5
AM PEAK	2035 Future w/o Project	U		A	A	A	A		B		B				A	0.3
	2035 Future with Project	U	A	A	A	A	A	A	F	F	B	F	F	B	F	69.5
	2035 Future with Project (Mitigated)	S	D	A	A	E	D	D	D	C	C	D	C	B	D	29.1
HOUGHTON	Existing	U		A	A	A	A		B		A				A	0.1
and	2025 Future w/o Project	U		A	A	A	A		B		A				A	0.0
CHEVALIER (#6)	2025 Future with Project	U	B	B	B	A	A	A	F	F	B	F	F	F	F	108.8
PM PEAK	2025 Future with Project (Mitigated)	S	F	B	B	E	C	B	E	B	B	D	B	C	C	33.8
	2035 Future w/o Project	U		A	A	A	A		B		B				A	0.1
	2035 Future with Project	S	F	B	B	F	F	C	E	C	C	F	C	F	F	126.9
	2035 Future with Project (Mitigated)	S	D	B	B	F	D	C	D	C	C	D	C	F	E	46.4
HOUGHTON	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U														
ENTRANCE #5	2025 Future with Project	U	A	A			A	A						A	A	0.5
AM PEAK	2035 Future w/o Project	U														
	2035 Future with Project	U	A	A			A	A						B	A	0.7

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			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
HOUGHTON	*FUTURE INTERSECTION*															
and	2025 Future w/o Project	U														
ENTRANCE #5	2025 Future with Project	U	A	A			A	A						C	A	2.0
PM PEAK	2035 Future w/o Project	U														
	2035 Future with Project	U	B	B			A	A						F	B	14.5
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	8.5
and	2025 Future w/o Project	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	9.2
S. UNION	2025 Future with Project	AWS	B	B	B	A	A	A	B	A	A	B	A	A	B	11.1
AM PEAK	2035 Future w/o Project	AWS	B	B	B	A	A	A	B	A	A	B	A	A	B	10.3
	2035 Future with Project	AWS	E	E	E	B	B	B	B	B	B	B	B	B	C	22.9
HOUGHTON	Existing	AWS	A	A	A	A	A	A	A	A	A	A	A	A	A	9.6
and	2025 Future w/o Project	AWS	B	B	B	B	B	B	B	B	B	B	A	A	B	11.7
S. UNION	2025 Future with Project	AWS	F	F	F	D	D	D	C	C	C	C	E	E	D	34.7
PM PEAK	2025 Future with Project (Mitigated)	AWS	C	C	C	D	D	D	C	C	C	C	D	D	C	24.6
	2035 Future w/o Project	AWS	C	C	C	C	C	C	C	C	C	B	B	B	C	19.1
	2035 Future with Project	AWS	F	D	D	F	F	F	F	F	F	D	F	F	F	68.2
	2035 Future with Project (Mitigated)	S	D	B	B	D	C	C	D	C	C	F	B	C	D	30.8
BUENA VISTA BLVD.	Existing	U	A	A			A	A				A		A	A	0.9
and	2025 Future w/o Project	U	A	A			A	A				A		A	A	1.3
COTTONWOOD	2025 Future with Project	U	A	A			A	A				A		A	A	1.4
AM PEAK	2035 Future w/o Project	U	A	A			A	A				A		A	A	1.7
	2035 Future with Project	U	A	A			A	A				B		B	A	1.9
BUENA VISTA BLVD	Existing	U	A	A			A	A				B		B	A	1.1
and	2025 Future w/o Project	U	A	A			A	A				B		B	A	1.4
COTTONWOOD	2025 Future with Project	U	A	A			A	A				B		B	A	1.6
PM PEAK	2035 Future w/o Project	U	A	A			A	A				B		B	A	2.0
	2035 Future with Project	U	A	A			A	A				C		C	A	2.2

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			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
BUENA VISTA BLVD	Existing	U		A	A	A	A		A		A				A	1.2
and	2025 Future w/o Project	U		A	A	A	A		A		A				A	1.2
ADOBE	2025 Future with Project	U		A	A	A	A		B		B				A	1.2
AM PEAK	2035 Future w/o Project	U		A	A	A	A		B		B				A	1.1
	2035 Future with Project	U		A	A	A	A		B		B				A	1.1
BUENA VISTA BLVD	Existing	U		A	A	A	A		B		B				A	3.0
and	2025 Future w/o Project	U		A	A	A	A		B		B				A	3.0
ADOBE	2025 Future with Project	U		A	A	A	A		B		B				A	2.8
PM PEAK	2035 Future w/o Project	U		A	A	A	A		B		B				A	3.1
	2035 Future with Project	U		A	A	A	A		B		B				A	2.7
SHAFTER	Existing	U	A	A	A	A	A	A	A	A	A	A	A	A	A	1.9
and	2025 Future w/o Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	2.0
S. UNION	2025 Future with Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	2.0
AM PEAK	2035 Future w/o Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	2.0
	2035 Future with Project	U	A	A	A	A	A	A	A	A	A	A	A	A	A	2.1
SHAFTER	Existing	U	A	A	A	A	A	A	A	A	A	A	A	A	A	0.5
and	2025 Future w/o Project	U	B	B	B	A	A	A	A	A	A	A	A	A	A	0.5
S. UNION	2025 Future with Project	U	B	B	B	A	A	A	A	A	A	A	A	A	A	0.9
PM PEAK	2035 Future w/o Project	U	B	B	B	A	A	A	A	A	A	A	A	A	A	0.5
	2035 Future with Project	U	B	B	B	B	B	B	A	A	A	A	A	A	A	1.2
COSTAJO RD.	Existing	U				B		A		A	A	A	A		A	7.7
and	2025 Future w/o Project	U				B		A		A	A	A	A		A	9.5
99 SB RAMP	2025 Future with Project	U				B		A		A	A	A	A		A	9.5
AM PEAK	2035 Future w/o Project	U				E		A		A	A	A	A		D	25.3
	2035 Future with Project	U				E		A		A	A	A	A		D	25.4

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
COSTAJO RD.	Existing	U				B		A		A	A	A	A		A	7.7
and	2025 Future w/o Project	U				C		A		A	A	A	A		B	11.8
99 SB RAMP	2025 Future with Project	U				C		A		A	A	A	A		B	12.1
PM PEAK	2035 Future w/o Project	U				F		A		A	A	A	A		F	79.2
	2035 Future with Project	U				F		A		A	A	A	A		F	87.8
	2035 Future with Project (Mitigated)	U				F		A		A	A	A	A		F	77.6
BEAR MTN.	Existing	U	A	A			A	A				B		A	A	6.1
and	2025 Future w/o Project	U	A	A			A	A				B		A	A	6.8
COSTAJO	2025 Future with Project	U	A	A			A	A				B		A	A	6.8
AM PEAK	2035 Future w/o Project	U	A	A			A	A				C		A	A	9.1
	2035 Future with Project	U	A	A			A	A				C		A	A	9.1
BEAR MTN.	Existing	U	A	A			A	A				C		A	A	6.2
and	2025 Future w/o Project	U	A	A			A	A				D		A	B	12.7
COSTAJO	2025 Future with Project	U	A	A			A	A				D		A	B	12.7
PM PEAK	2035 Future w/o Project	U	A	A			A	A				F		A	F	90.8
	2035 Future with Project	U	A	A			A	A				F		B	F	90.7
BEAR MTN.	Existing	U		A	A	A	A		C		A				A	3.2
and	2025 Future w/o Project	U		A	A	A	A		C		A				A	3.6
99 NB RAMP	2025 Future with Project	U		A	A	A	A		C		A				A	3.5
AM PEAK	2035 Future w/o Project	U		A	A	A	A		C		B				A	4.0
	2035 Future with Project	U		A	A	A	A		C		B				A	4.0

Table 7: Intersection Level of Service - GPA/ZC for 99/Houghton Industrial Park

			East Bound			West Bound			North Bound			South Bound			Intersection	Control
Intersection	**Scenario**	**Type**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Composite**	**Delay, sec**
BEAR MTN.	Existing	U		A	A	A	A		C		B				A	2.3
and	2025 Future w/o Project	U		A	A	A	A		C		B				A	2.9
99 NB RAMP	2025 Future with Project	U		A	A	A	A		C		B				A	2.9
PM PEAK	2035 Future w/o Project	U		A	A	A	A		E		B				A	4.5
	2035 Future with Project	U		A	A	A	A		E		B				A	4.5
BEAR MTN.	Existing	AWS	B	B	A	B	B	A	A	A	A	A	A	A	B	10.7
and	2025 Future w/o Project	AWS	B	B	A	B	B	A	B	A	A	B	A	A	B	12.3
S. UNION	2025 Future with Project	AWS	B	B	A	B	B	A	B	A	A	B	A	A	B	12.5
AM PEAK	2035 Future w/o Project	AWS	C	C	A	C	C	A	B	B	B	B	B	B	C	15.1
	2035 Future with Project	AWS	C	C	A	C	C	A	B	B	B	B	B	B	C	15.8
BEAR MTN.	Existing	AWS	C	C	A	B	B	A	B	B	A	B	A	A	B	13.8
and	2025 Future w/o Project	AWS	D	D	A	C	C	A	B	B	B	B	B	B	C	20.2
S. UNION	2025 Future with Project	AWS	D	D	A	C	C	A	B	B	B	B	B	B	C	21.3
PM PEAK	2035 Future w/o Project	AWS	F	F	A	D	D	B	B	B	B	B	B	B	E	37.8
	2035 Future with Project	AWS	F	F	B	D	D	B	B	C	C	C	B	B	E	38.1

NOTES:
U-Unsignalized Intersection
S-Signalized Intersection
AWS - All Way Stop

See Appendix for computer reports for each intersection.

Table 8: Roadway Segment Analysis, Year 2025/2035 - GPA/ZC for 99/Houghton Industrial Park

ROADWAY SEGMENT	Base Year 2006 ADT (1000 vpd)	Volume to Capacity Ratio for Existing		Year 2025 ADT w/o Project (1000vpd)	Volume to Capacity Ratio for 2025 without Project		Year 2025 ADT with Project (1000vpd)	Volume to Capacity Ratio for 2025 with Project		Year 2035 ADT w/o Project (1000 vpd)	Volume to Capacity Ratio for 2035 without Project		Project Traffic @ Full Buildout (1000 vpd)	Year 2035 ADT with Project (1000 vpd)	Volume to Capacity Ratio for 2035 with Project		Project Share [3]
		w/ Exist Laneage	Existing LOS		w/ Existing/ *Imprvd* lanes	w/ Imprvd Laneage		w/ Existing/ *Imprvd* lanes	w/ Mitig Laneage		w/ Existing/ *Imprvd* lanes	w/ Imprvd Laneage			w/ Existing/ *Imprvd* lanes	w/ Mitig Laneage	
Panama Lane																	
- West of 99 SB Ramp	31.91	0.53	A	46.36	0.77		46.74	0.78		56.44	0.94		0.38	56.8	0.95		0.67%
- 99 SB Ramp to 99 NB Ramp	18.40	0.31	A	27.87	0.46		28.25	0.47		34.68	0.58		0.38	35.1	0.58		1.08%
- 99 NB Ramp to South H St.	24.30	0.40	A	32.18	0.54		32.26	0.54		37.31	0.62		0.08	37.4	0.62		0.21%
- South H St. to South Union Ave.	10.88	0.27	A	19.38	0.48		19.57	0.49		26.25	0.66		0.19	26.4	0.66		0.72%
- South Union Ave. to Cottonwood Rd.	7.96	0.53	A	15.29	1.02	0.51	15.41	*0.51*		21.55	*0.72*		0.12	21.7	*0.72*		0.55%
- East of Cottonwood Rd.	8.35	0.56	A	11.70	0.78		11.91	0.79		13.98	0.93	0.47	0.21	14.2	*0.47*		1.48%
Hosking Ave.																	
- West of Hughes Ln.	2.80	0.07	A	8.98	0.22		9.78	0.24		16.57	0.41		0.80	17.4	0.43		4.61%
- Hughes Ln. to 99 SB Ramp	2.48	0.17	A	11.28	0.28		12.61	0.32		25.05	0.63		1.34	26.4	0.66		5.06%
- 99 SB Ramp to 99 NB Ramp	2.48	0.17	A	10.35	0.26		11.26	0.28		21.96	0.55		0.92	22.9	0.57		4.00%
- 99 NB Ramp to South H St.	2.48	0.17	A	12.25	0.31		12.33	0.31		28.43	0.71		0.08	28.5	0.71		0.28%
- South H St. to South Union Ave.	3.34	0.08	A	7.53	0.19		7.70	0.19		11.55	0.29		0.18	11.7	0.29		1.49%
- South Union Ave. to Cottonwood Rd.	0.01	0.00	A	0.61	0.04		0.75	0.05		4.90	0.33		0.14	5.0	0.34		2.68%
Taft Hwy.																	
- West of Wible Rd.	4.14	0.28	A	9.82	0.65		10.58	0.71		15.49	1.03	0.52	0.76	16.2	*0.54*		6.28%
- Wible Rd. to Compangnoni St./99 SB Ramp	2.94	0.20	A	9.00	0.60		10.00	0.67		16.22	1.08	0.54	1.00	17.2	*0.57*		7.00%
- Compagnoni St./99 SB Ramp to 99 NB Ramp	6.64	0.44	A	12.77	0.85	0.43	14.13	*0.47*		18.01	*0.60*		1.37	19.4	*0.65*		10.72%
- 99 NB Ramp to South H St. (2015)	14.70	0.98	E	17.56	1.17	0.59	19.05	*0.64*		20.99	*0.70*		1.49	22.5	*0.75*		19.16%
- South H St. to South Union Ave.	15.52	1.03	F	22.90	1.53	0.76	24.59	*0.82*		28.11	*0.94*	0.70	1.69	29.8	*0.74*		11.83%
- South Union Ave. to Cottonwood Rd.	13.35	0.89	D	18.07	1.20	0.60	19.10	*0.64*		21.20	*0.71*		1.03	22.2	*0.74*		11.55%
- East of Cottonwood Rd.	12.69	0.85	D	17.28	1.15	0.58	18.53	*0.62*		20.32	*0.68*		1.25	21.6	*0.72*		14.07%
Curnow Rd.																	
- West of South Union Ave.	0.24	0.02	A	1.02	0.07		1.49	0.10		2.20	0.15		0.47	2.7	0.18		17.64%
- South Union Ave. to Cottonwood Rd.	0.06	0.00	A	0.12	0.01		0.41	0.03		0.17	0.01		0.30	0.5	0.03		63.41%
Di Giorgio Rd.																	
- West of Chevalier Rd.(Entrance #1)	*Construct Segment With Project*						0.35	0.02		*N/A*	*N/A*		0.35	0.4	0.02		100.00%
- Chevalier Rd.(Entrance #1) to South Union Ave.	*Construct Segment With Project*						6.05	0.40		*N/A*	*N/A*		6.05	6.0	0.40		100.00%
- South Union Ave. to Cottonwood Rd.	0.02	0.00	A	0.06	0.00		1.83	0.12		0.11	0.01		1.77	1.9	0.13		94.11%
- East of Cottonwood Rd.	0.39	0.03	A	0.24	0.02		0.82	0.05		0.18	0.01		0.58	0.8	0.05		76.17%
Houghton Rd.																	
- West of Stine Rd.	1.66	0.11	A	1.35	0.09		1.47	0.10		1.21	0.08		0.12	1.3	0.09		9.00%
- Stine Rd. to Wible Rd.	0.97	0.06	A	0.93	0.06		1.15	0.08		0.91	0.06		0.23	1.1	0.08		19.90%
- Wible Rd. to South H St.	0.36	0.02	A	0.57	0.04		0.94	0.06		0.73	0.05		0.37	1.1	0.07		33.68%
- South H St. to 99 SB Ramp	1.11	0.07	A	1.67	0.11		2.47	0.16		2.08	0.14		0.80	2.9	0.19		27.79%
- 99 SB Ramp to 99 NB Ramp	2.67	0.18	A	3.57	0.24		16.51	1.10	0.55	4.17	0.28		12.94	17.1	*0.57*		75.62%
- 99 NB Ramp to Entrance #7	4.60	0.31	A	5.79	0.39		36.56	2.44	0.61	6.55	0.44		30.77	37.3	*0.62*		82.46%
- Entrance #7 to Chevalier Rd. (Entrance #6)	4.60	0.31	A	5.79	0.39		35.25	2.35	0.59	6.55	0.44		29.46	36.0	*0.60*		81.82%
- Chevalier Rd.(Entrance #6) to Entrance #5	4.58	0.31	A	5.72	0.38		20.28	1.35	0.68	6.43	0.43		14.56	21.0	*0.70*		69.36%
- Entrance #5 to South Union Ave.	4.58	0.31	A	5.72	0.38		16.28	1.09	0.54	6.43	0.43		10.56	17.0	*0.57*		62.15%
- South Union Ave. to Cottonwood Rd.	4.64	0.31	A	5.38	0.36		7.41	0.49		5.81	0.39		2.04	7.8	0.52		25.93%
- Cottonwood Rd. to Adobe Rd.	4.66	0.31	A	5.49	0.37		7.01	0.47		5.99	0.40		1.52	7.5	0.50		20.24%
- East of Adobe Rd.	4.53	0.30	A	5.38	0.36		6.50	0.43		5.89	0.39		1.12	7.0	0.47		15.97%
Shafter Rd.																	
- Chevalier Rd. to South Union Ave.	0.08	0.01	A	0.15	0.01		0.34	0.02		0.26	0.02		0.20	0.5	0.03		42.86%
- East of South Union Ave.	0.19	0.01	A	0.22	0.01		0.50	0.03		0.26	0.02		0.28	0.5	0.04		51.85%

Table 8: Roadway Segment Analysis, Year 2025/2035 - GPA/ZC for 99/Houghton Industrial Park

ROADWAY SEGMENT	Base Year 2006 ADT (1000 vpd)	Volume to Capacity Ratio for Existing		Year 2025 ADT w/o Project (1000vpd)	Volume to Capacity Ratio for 2025 without Project		Year 2025 ADT with Project (1000vpd)	Volume to Capacity Ratio for 2025 with Project		Year 2035 ADT w/o Project (1000 vpd)	Volume to Capacity Ratio for 2035 without Project		Project Traffic @ Full Buildout (1000 vpd)	Year 2035 ADT with Project (1000 vpd)	Volume to Capacity Ratio for 2035 with Project		Project Share [3]
		w/ Exist Laneage	Existing LOS		w/ Existing/ *Imprvd* lanes	w/ Imprvd Laneage		w/ Existing/ *Imprvd* lanes	w/ Mitig Laneage		w/ Existing/ *Imprvd* lanes	w/ Imprvd Laneage			w/ Existing/ *Imprvd* lanes	w/ Mitig Laneage	
Bear Mountain Blvd.																	
- West of Costajo Rd.	1.51	0.10	A	2.49	0.17		2.70	0.18		3.24	0.22		0.21	3.5	0.23		10.81%
- Costajo Rd. to 99 NB Ramp	7.39	0.49	A	9.70	0.65		9.75	0.65		11.20	0.75		0.06	11.3	0.75		1.42%
- 99 NB Ramp o South Union Ave.	13.91	0.93	E	17.86	1.19		17.92	0.60		20.38	1.36		0.06	20.4	1.36		0.92%
- East of South Union Ave.	14.18	0.95	E	18.58	1.24		18.71	0.62		21.42	1.43		0.13	21.5	1.44		1.76%
Stine Road																	
- North of Houghton Rd.	0.88	0.06	A	0.64	0.04		0.70	0.05		0.55	0.04		0.06	0.6	0.04		9.90%
- South of Houghton Rd.	0.60	0.04	A	0.63	0.04		0.67	0.04		0.66	0.04		0.04	0.7	0.05		5.71%
Wible Road																	
- North of Taft Hwy.	3.06	0.20	A	4.42	0.29		4.67	0.31		5.37	0.36		0.25	5.6	0.37		4.45%
- Taft Hwy to Houghton Rd.	2.54	0.17	A	2.00	0.13		2.05	0.14		1.76	0.12		0.06	1.8	0.12		3.03%
- South of Houghton Rd.	0.78	0.05	A	1.26	0.08		1.32	0.09		1.62	0.11		0.06	1.7	0.11		3.58%
Hughes Lane																	
- South of Hosking Ave.	2.46	0.16	A	3.89	0.26		4.41	0.29		6.14	0.41		0.52	6.7	0.44		7.81%
Compangnoni St.																	
- South of Taft Hwy.	0.85	0.06	A	1.18	0.08		1.22	0.08		1.40	0.09		0.04	1.4	0.10		2.77%
South H St.																	
- North of Panama Ln.	6.96	0.17	A	14.19	0.35		14.29	0.36		20.64	0.52		0.10	20.7	0.52		0.48%
- Panama Ln. to Berkshire Rd.	14.67	0.37	A	22.88	0.57		22.95	0.57		28.90	0.72		0.08	29.0	0.72		0.26%
- Berkshire Rd. to Hosking Ave.	14.67	0.49	A	22.88	0.76		22.95	0.77		28.90	0.96	0.72	0.08	29.0	*0.72*		0.26%
- Hosking Ave. to Taft Hwy.	4.71	0.31	A	10.67	0.71		10.89	0.73		16.41	1.09	0.55	0.22	16.6	*0.55*		1.29%
- South of Taft Hwy.	0.34	0.02	A	1.63	0.11		1.82	0.12		3.72	0.25		0.19	3.9	0.26		4.87%
- North of Houghton Rd. (2015)	0.58	0.04	A	0.64	0.04		0.82	0.05		0.70	0.05		0.18	0.9	0.06		20.45%
- South of Houghton Rd. (2015)	0.76	0.05	A	0.77	0.05		1.06	0.07		0.79	0.05		0.29	1.1	0.07		26.85%
Costajo Rd.																	
- South of 99 SB Ramp (2015)	3.00	0.20	A	4.71	0.31		4.90	0.33		7.39	0.49		0.19	7.6	0.51		2.50%
Chevalier Rd.																	
- Di Giorgio Rd. to Houghton Rd.	*Construct Segement with Project*						12.75	0.85		*N/A*	*N/A*	*N/A*	12.75	12.8	0.85	*0.43*	100.00%
- Houghton Rd. to Shafter Rd. (2015)	0.10	0.01	A	0.13	0.01		0.73	0.05		0.18	0.01		0.60	0.8	0.05		76.92%
South Union Ave.																	
- North of Panama Ln.	15.61	0.39	A	24.30	0.61		24.90	0.62		30.67	0.77		0.60	31.3	0.78		3.83%
- Panama Ln. to Hosking Ave.	8.12	0.20	A	16.47	0.41		17.53	0.44		23.90	0.60		1.07	25.0	0.62		6.32%
- Hosking Ave. to Taft Hwy.	4.28	0.11	A	9.27	0.23		10.92	0.27		13.93	0.35		1.65	15.6	0.39		14.57%
- Taft Hwy. to Curnow Rd.	1.76	0.04	A	4.65	0.12		9.23	0.23		7.74	0.19		4.58	12.3	0.31		43.41%
- Curnow Rd. to Di Giorgio Rd.	1.46	0.04	A	3.61	0.09		9.96	0.25		5.82	0.15		6.35	12.2	0.30		59.30%
- Di Giorgio Rd. to Lamb Ave.(Entrance #2)	1.36	0.03	A	3.25	0.08		8.97	0.22		5.16	0.13		5.72	10.9	0.27		60.03%
- Lamb. Ave.(Entrance #2) to Entrance #3	1.30	0.03	A	3.19	0.08		10.09	0.25		5.12	0.13		6.90	12.0	0.30		64.37%
- Entrance #3 to Mugsy Ave. (Entrance #4)	1.30	0.03	A	3.19	0.08		11.17	0.28		5.12	0.13		7.98	13.1	0.33		67.63%
- Mugsy Ave.(Entrance #4) to Houghton Rd.	1.30	0.03	A	3.18	0.08		13.02	0.33		5.10	0.13		9.84	14.9	0.37		72.13%
- Houghton Rd. to Shafter Rd.	1.05	0.03	A	3.30	0.08		4.14	0.10		6.03	0.15		0.84	6.9	0.17		14.35%
- Shafter Rd. to Bear Mountain Blvd.	0.81	0.02	A	2.63	0.07		3.24	0.08		4.91	0.12		0.61	5.5	0.14		12.85%
- South of Bear Mountain Blvd.	0.52	0.01	A	1.68	0.04		2.09	0.05		3.11	0.08		0.41	3.5	0.09		13.68%

Table 8: Roadway Segment Analysis, Year 2025/2035 - GPA/ZC for 99/Houghton Industrial Park

ROADWAY SEGMENT	Base Year 2006 ADT (1000 vpd)	Volume to Capacity Ratio for Existing		Year 2025 ADT w/o Project (1000vpd)	Volume to Capacity Ratio for 2025 without Project		Year 2025 ADT with Project (1000vpd)	Volume to Capacity Ratio for 2025 with Project		Year 2035 ADT w/o Project (1000 vpd)	Volume to Capacity Ratio for 2035 without Project		Project Traffic @ Full Buildout (1000 vpd)	Year 2035 ADT with Project (1000 vpd)	Volume to Capacity Ratio for 2035 with Project		Project Share [3]
		w/ Exist Laneage	Existing LOS		w/ Existing/ *Imprvd* lanes	w/ Imprvd Laneage		w/ Existing/ *Imprvd* lanes	w/ Mitig Laneage		w/ Existing/ *Imprvd* lanes	w/ Imprvd Laneage			w/ Existing/ *Imprvd* lanes	w/ Mitig Laneage	
Cottonwood Rd.																	
- North of Panama Ln.	1.77	0.12	A	6.23	0.42		6.54	0.44		12.10	0.81	0.40	0.31	12.4	*0.41*		2.50%
- Panama Ln. to Hosking Ave.	0.13	0.01	A	1.19	0.08		1.65	0.11		3.77	0.25		0.46	4.2	0.28		10.87%
- Hosking Ave. to Taft Hwy.	0.14	0.01	A	0.94	0.06		1.44	0.10		2.53	0.17		0.50	3.0	0.20		16.51%
- Taft Hwy. to Curnow Rd.	0.41	0.03	A	0.40	0.03		1.28	0.09		0.39	0.03		0.88	1.3	0.08		69.24%
- Curnow Rd. to Di Giorgio Rd.	0.44	0.03	A	0.44	0.03		1.13	0.08		0.45	0.03		0.69	1.1	0.08		60.55%
- Di Giorgio Rd. to Houghton Rd.	0.04	0.00	A	0.17	0.01		0.48	0.03		0.37	0.02		0.31	0.7	0.05		45.55%
Adobe Rd.																	
- North of Buena Vista Blvd.	0.04	0.00	A	0.09	0.01		0.30	0.02		0.15	0.01		0.21	0.4	0.02		58.01%
- South of Buena Vista Blvd.(2015)	1.27	0.08	A	1.42	0.09		1.54	0.10		1.50	0.10		0.12	1.6	0.11		7.41%

NOTES:

1) Year 2035 ADT volumes are segment volumes from KernCOG's RTIF model

2) Roadway Volume-to-Capacity Ratios are based on the below referenced Level-Of-Service "E" capacities for given roadway configurations.

3) *Percentages for State Facilities are based on Cal-Trans Formula: Project Volume/(Future Volume - Existing Volume)*
Remaining percentages are based on standard formula: Project Volume / Future Volume

ROADWAY TYPE	LEVEL OF SERVICE "E" ADT CAPACITY
2-lane Collector	15,000
4-Lane Collector	30,000
4-Lane Arterial	40,000
6-Lane Arterial	60,000
*8-Lane Arterial**	*80,000*
*4-Lane Expressway**	*72,000*
*6-Lane Expressway**	*100,000*
4-Lane Freeway	100,000
6-Lane Freeway	150,000
8-Lane Freeway	200,000

v/c Ratio	LOS	PHV
0.00-0.60	A	100
0.61-0.70	B	100
0.71-0.80	C	50
0.81-0.90	D	50
0.91-1.00	E	20
> 1.00	F	10

- Roadway capacities indicated are from the updated Traffic Section of the City of Bakersfield Subdivision & Engineering Design Manual

* Calculated from HCM Multilane Highway Worksheet

Table 9: Roadway Segment Laneage - GPA/ZC for 99/Houghton Industrial Park

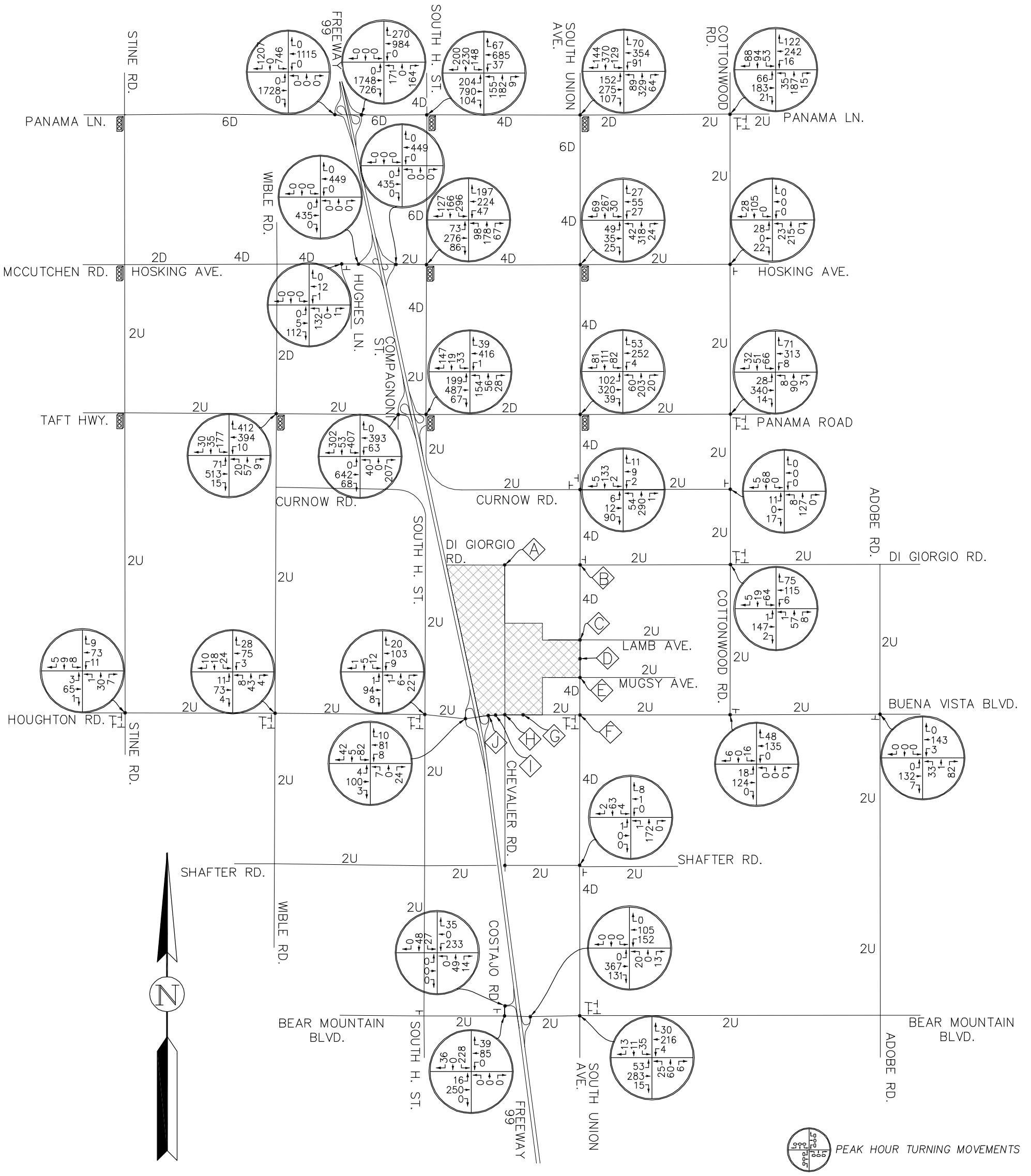
Roadway Segment	Existing Configuration	Current General Plan Configuration	Improved Laneage for 2025	Mitigated Laneage for 2025 + Project	Improved Laneage for 2035	Mitigated Laneage for 2035 + Project
Panama Lane						
- West of 99 SB Ramp	6-Lane Arterial	6-Lane Arterial				
- 99 SB Ramp to 99 NB Ramp	6-Lane Arterial	6-Lane Arterial				
- 99 NB Ramp to South H St.	6-Lane Arterial	6-Lane Arterial				
- South H St. to South Union Ave.	4-Lane Arterial	6-Lane Arterial				
- South Union Ave. to Cottonwood Rd.	2-Lane Collector	6-Lane Arterial	4-Lane Collector			
- East of Cottonwood Rd.	2-Lane Collector	6-Lane Arterial			4-Lane Collector	
Hosking Avenue						
- West of Hughes Ln.	4-Lane Arterial	6-Lane Arterial				
- Hughes Ln. to 99 SB Ramp	4-Lane Arterial	6-Lane Arterial				
- 99 SB Ramp to 99 NB Ramp	4-Lane Arterial	6-Lane Arterial				
- 99 NB Ramp to South H St.	4-Lane Arterial	6-Lane Arterial				
- South H St. to South Union Ave.	4-Lane Arterial	6-Lane Arterial				
- South Union Ave. to Cottonwood Rd.	2-Lane Collector	6-Lane Arterial				
Taft Highway.						
- West of Wible Rd.	2-Lane Expressway	6-Lane Expressway			4-Lane Collector	
- Wible Rd. to Compangnoni St./99 SB Ramp	2-Lane Expressway	6-Lane Expressway			4-Lane Collector	
- Compagnoni St./99 SB Ramp to 99 NB Ramp	2-Lane Collector	6-Lane Arterial	4-Lane Collector			
- 99 NB Ramp to South H St.	2-Lane Collector	6-Lane Arterial	4-Lane Collector			
- South H St. to South Union Ave.	2-Lane Collector	6-Lane Arterial	4-Lane Collector		4-Lane Arterial	
- South Union Ave. to Cottonwood Rd.	2-Lane Collector	6-Lane Arterial	4-Lane Collector			
- East of Cottonwood Rd.	2-Lane Collector	6-Lane Arterial	4-Lane Collector			
Curnow Road.						
- West of South Union Ave.	2-Lane Collector	4-Lane Collector				
- South Union Ave. to Cottonwood Rd.	2-Lane Collector	4-Lane Collector				
Di Giorgio Road.						
- West of Chevalier Rd.(Entrance #1)	*Future Segement*	4-Lane Collector		2-Lane Collector		
- Chevalier Rd.(Entrance #1) to South Union Ave.	*Future Segement*	4-Lane Collector		2-Lane Collector		
- South Union Ave. to Cottonwood Rd.	2-Lane Collector	4-Lane Collector				
- East of Cottonwood Rd.	2-Lane Collector	4-Lane Collector				

Table 9: Roadway Segment Laneage - GPA/ZC for 99/Houghton Industrial Park

Roadway Segment	Existing Configuration	Current General Plan Configuration	Improved Laneage for 2025	Mitigated Laneage for 2025 + Project	Improved Laneage for 2035	Mitigated Laneage for 2035 + Project
Houghton Rd.						
- West of Stine Rd.	2-Lane Collector	6-Lane Arterial				
- Stine Rd. to Wible Rd.	2-Lane Collector	6-Lane Arterial				
- Wible Rd. to South H St.	2-Lane Collector	6-Lane Arterial				
- South H St. to 99 SB Ramp	2-Lane Collector	6-Lane Arterial				
- 99 SB Ramp to 99 NB Ramp	2-Lane Collector	6-Lane Arterial		4-Lane Collector		
- 99 NB Ramp to Project Entrance #7	2-Lane Collector	6-Lane Arterial		6-Lane Arterial		
- 99 NB Ramp to Chevalier Rd (Entrance #6)	2-Lane Collector	6-Lane Arterial		6-Lane Arterial		
- Chevalier Rd. (Entrance #6) to Entrance #5	2-Lane Collector	6-Lane Arterial		4-Lane Collector		
- Entrance #5 to South Union Ave.	2-Lane Collector	6-Lane Arterial		4-Lane Collector		
- South Union Ave. to Cottonwood Rd.	2-Lane Collector	6-Lane Arterial				
- Cottonwood Rd. to Adobe Rd.	2-Lane Collector	6-Lane Arterial				
- East of Adobe Rd.	2-Lane Collector	6-Lane Arterial				
Shafter Rd.						
- Chevalier Rd. to South Union Ave.	2-Lane Collector	4-Lane Collector				
- East of South Union Ave.	2-Lane Collector	4-Lane Collector				
Bear Mountain Blvd.						
- West of Costajo Rd.	2-Lane Collector	4-Lane Collector				
- Costajo Rd. to 99 NB Ramp	2-Lane Collector	4-Lane Collector				
- 99 NB Ramp o South Union Ave.	2-Lane Collector	4-Lane Collector				
- East of South Union Ave.	2-Lane Collector	4-Lane Collector				
Stine Road						
- North of Houghton Rd.	2-Lane Collector	6-Lane Arterial				
- South of Houghton Rd.	2-Lane Collector	6-Lane Arterial				
Wible Road						
- North of Taft Hwy.	2-Lane Collector	6-Lane Arterial				
- Taft Hwy to Houghton Rd.	2-Lane Collector	6-Lane Arterial				
- South of Houghton Rd.	2-Lane Collector	6-Lane Arterial				
Hughes Lane						
- South of Hosking Ave.	2-Lane Collector	4-Lane Collector				
Compangnoni St.						
- South of Taft Hwy.	2-Lane Collector	4-Lane Collector				
South H St.						
- North of Panama Ln.	4-Lane Arterial	6-Lane Arterial				
- Panama Ln. to Berkshire Rd.	4-Lane Arterial	6-Lane Arterial				
- Berkshire Rd. to Hosking Ave.	4-Lane Collector	6-Lane Arterial			4-Lane Collector	
- Hosking Ave. to Taft Hwy.	2-Lane Collector	6-Lane Arterial			4-Lane Collector	
- South of Taft Hwy.	2-Lane Collector	6-Lane Arterial				
- North of Houghton Rd.	2-Lane Collector	6-Lane Arterial				
- South of Houghton Rd.	2-Lane Collector	6-Lane Arterial				

Table 9: Roadway Segment Laneage - GPA/ZC for 99/Houghton Industrial Park

Roadway Segment	Existing Configuration	Current General Plan Configuration	Improved Laneage for 2025	Mitigated Laneage for 2025 + Project	Improved Laneage for 2035	Mitigated Laneage for 2035 + Project
Costajo Rd.						
- South of 99 SB Ramp	2-Lane Collector	4-Lane Collector				
Chevalier Rd.						
- Di Giorgio Rd. to Houghton Rd.	*Future Segement*	4-Lane Collector				4-Lane Collector
- Houghton Rd. to Shafter Rd.	2-Lane Collector	4-Lane Collector				
South Union Ave.						
- North of Panama Ln.	4-Lane Arterial	6-Lane Arterial				
- Panama Ln. to Hosking Ave.	4-Lane Arterial	6-Lane Arterial				
- Hosking Ave. to Taft Hwy.	4-Lane Arterial	6-Lane Arterial				
- Taft Hwy. to Curnow Rd.	4-Lane Arterial	6-Lane Arterial				
- Curnow Rd. to Di Giorgio Rd.	4-Lane Arterial	6-Lane Arterial				
- Di Giorgio Rd. to Lamb Ave.(Entrance #2)	4-Lane Arterial	6-Lane Arterial				
- Lamb Ave. (Entrance #2) to Entrance #3	4-Lane Arterial	6-Lane Arterial				
- Entrance #3 to Mugsy Ave.(Entrance #4)	4-Lane Arterial	6-Lane Arterial				
- Mugsy Ave.(Entrance #4) to Houghton Rd.	4-Lane Arterial	6-Lane Arterial				
- Houghton Rd. to Shafter Rd.	4-Lane Arterial	6-Lane Arterial				
- Shafter Rd. to Bear Mountain Blvd.	4-Lane Arterial	6-Lane Arterial				
- South of Bear Mountain Blvd.	4-Lane Arterial	6-Lane Arterial				
Cottonwood Rd.						
- North of Panama Ln.	2-Lane Arterial	6-Lane Arterial			4-Lane Collector	
- Panama Ln. to Hosking Ave.	2-Lane Arterial	6-Lane Arterial				
- Hosking Ave. to Taft Hwy.	2-Lane Arterial	6-Lane Arterial				
- Taft Hwy. to Curnow Rd.	2-Lane Arterial	6-Lane Arterial				
- Curnow Rd. to Di Giorgio Rd.	2-Lane Arterial	6-Lane Arterial				
- Di Giorgio Rd. to Houghton Rd.	2-Lane Arterial	6-Lane Arterial				
Adobe Rd.						
- North of Buena Vista Blvd.	2-Lane Collector	4-Lane Collector				
- South of Buena Vista Blvd.	2-Lane Collector	4-Lane Collector				



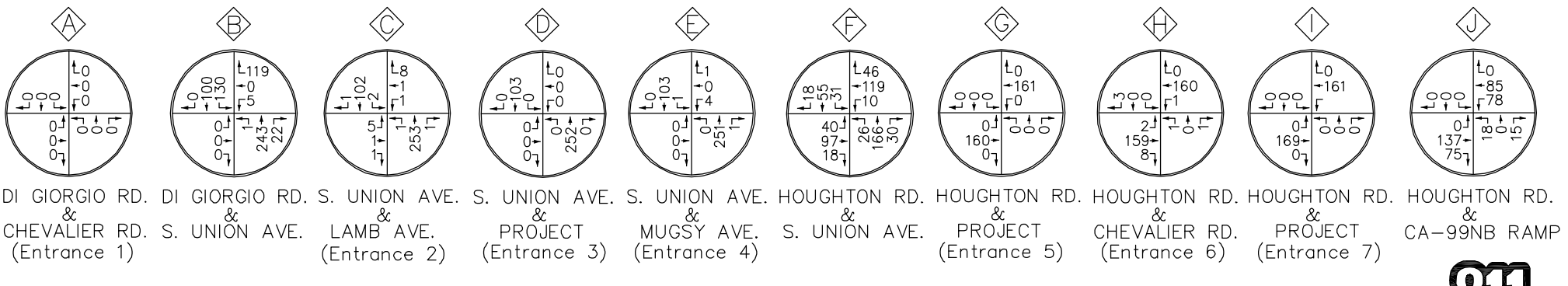


FIGURE 1 - EXISTING PEAK HOUR TURNING MOVEMENTS (PM)

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SHEET 1 OF 12 SHEETS	**99/Houghton INDUSTRIAL PARK** Houghton Road & CA-99 TRAFFIC DISPLAY MAP **P.M. EXISTING** AutoCAD FILE: 06012101DM	DATE / REVISIONS / BY	**PRELIMINARY NOT FOR CONSTRUCTION**	2001 WHEELAN COURT BAKERSFIELD, CALIFORNIA 93309 (661) 834 - 4814 DRAWN BY: JMN · JOB NO: 6012.01 CHECKED BY: · DATE: 3/2/16

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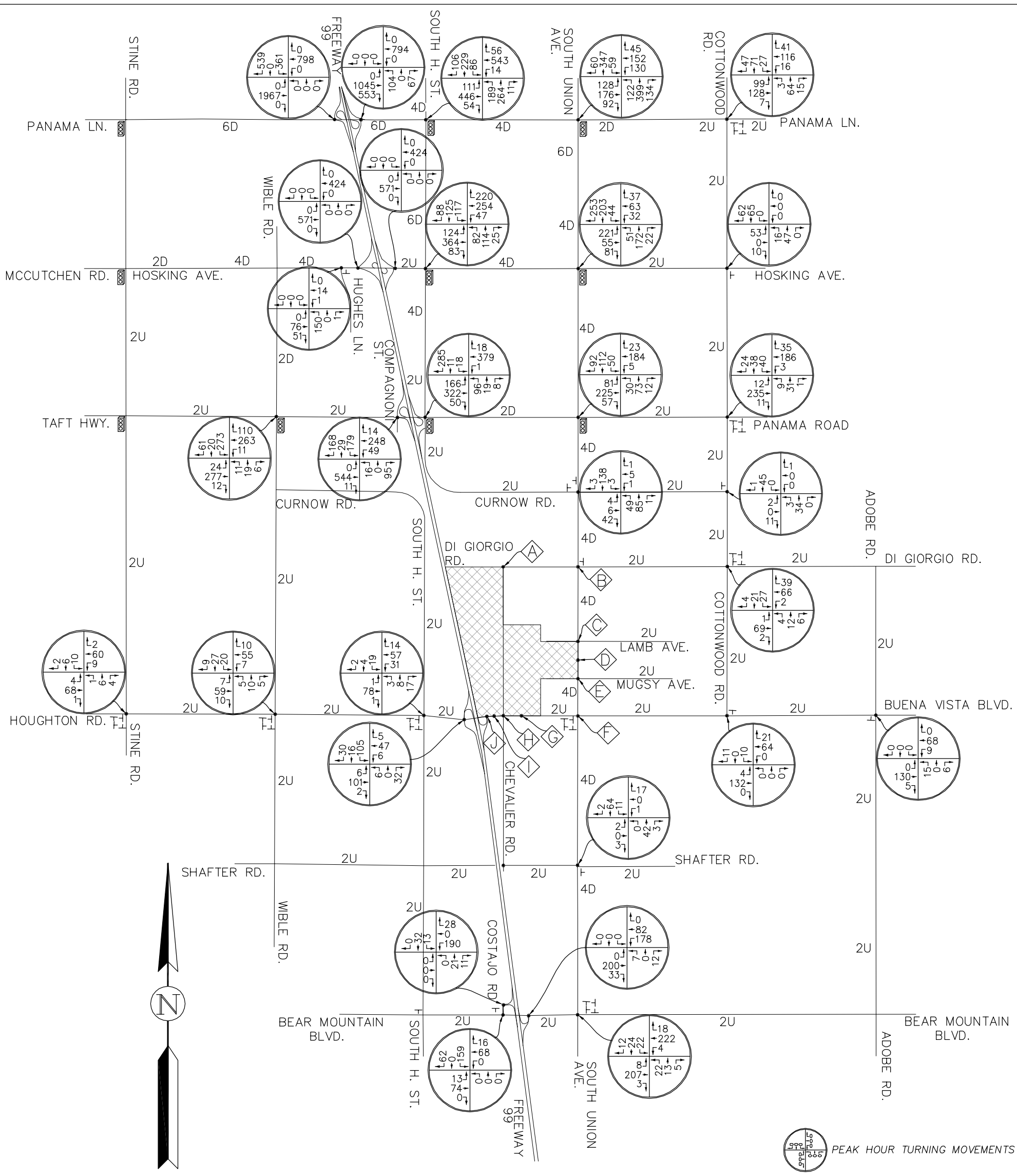


FIGURE 1A - EXISTING PEAK HOUR TURNING MOVEMENTS (AM)

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SHEET 2 OF 12 SHEETS	99/Houghton INDUSTRIAL PARK Houghton Road & CA-99 TRAFFIC DISPLAY MAP A.M. EXISTING AutoCAD FILE: 06012101DM	DATE / REVISIONS / BY	PRELIMINARY NOT FOR CONSTRUCTION	2001 WHEELAN COURT BAKERSFIELD, CALIFORNIA 93309 (661) 834 - 4814 DRAWN BY: JMN · JOB NO: 6012.01 CHECKED BY: · DATE: 3/2/16	McINTOSH & ASSOCIATES LAND SURVEYING - CIVIL ENGINEERING © 2016

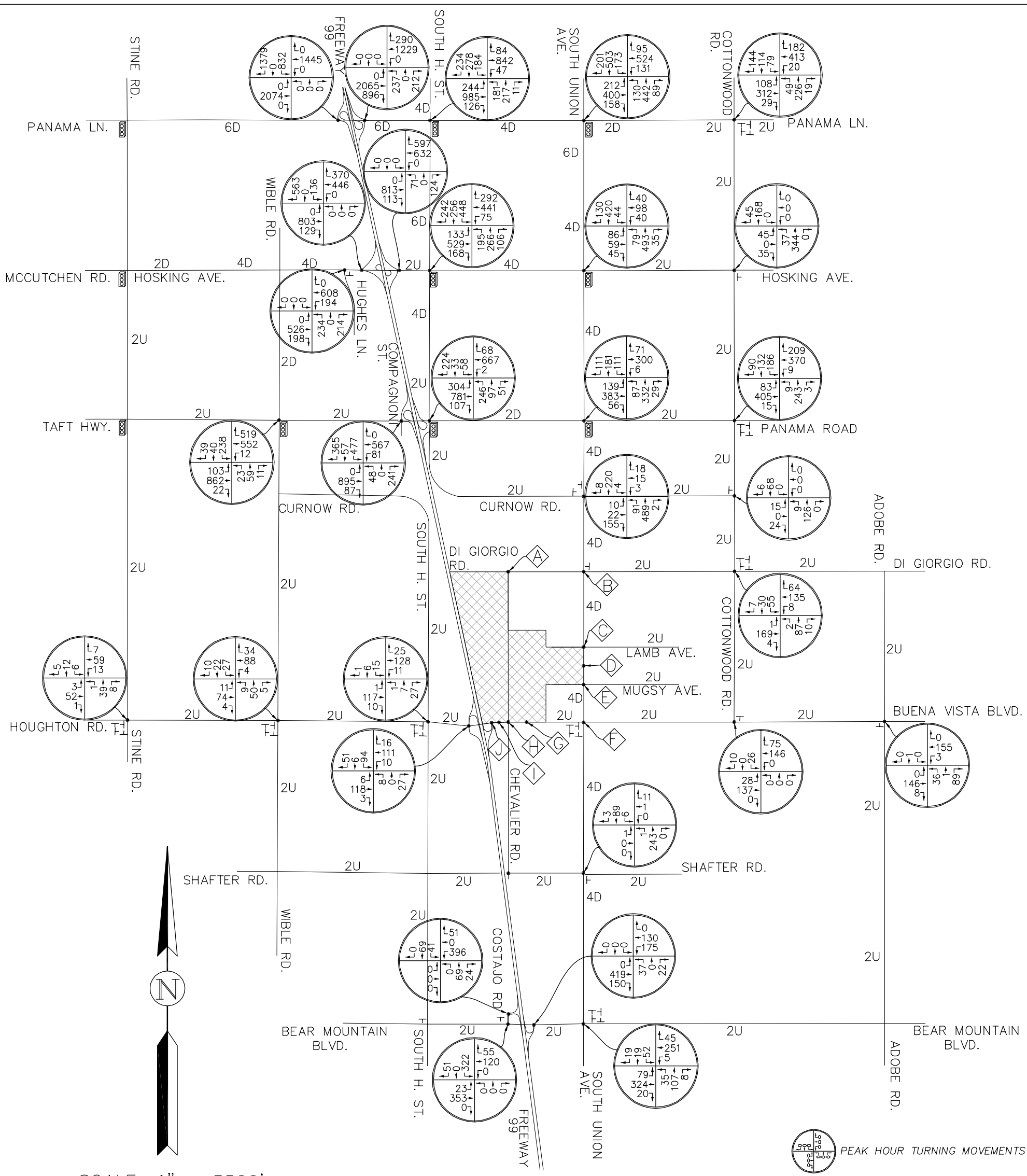


FIGURE 2 - YEAR 2025 FUTURE PEAK HOUR TURNING MOVEMENTS WITHOUT PROJECT (PM)

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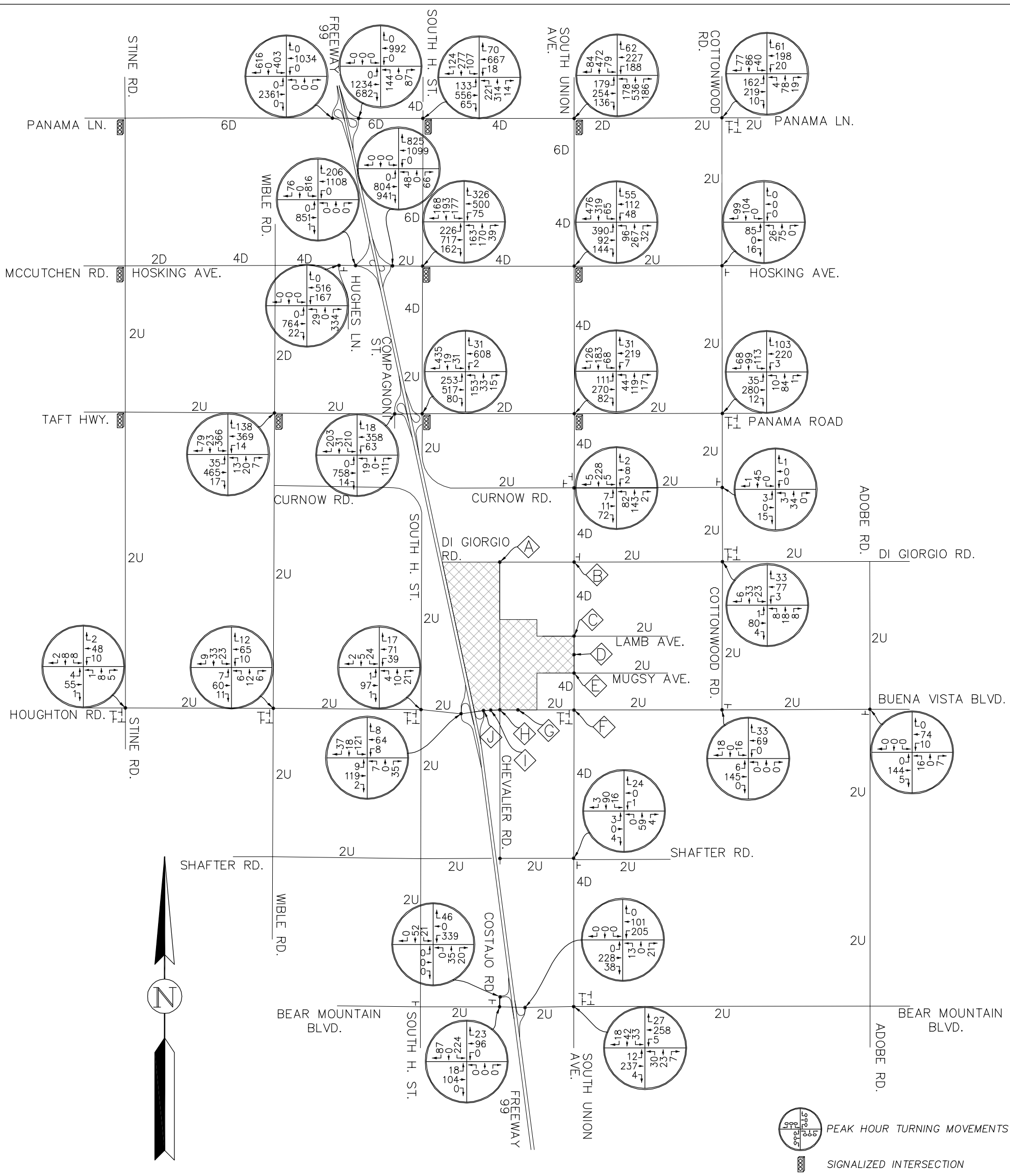


FIGURE 2A - YEAR 2025 FUTURE PEAK HOUR TURNING MOVEMENTS WITHOUT PROJECT (AM)

811 Know what's **below.** **Call** before you dig.

SHEET 4 OF 12 SHEETS	**99/Houghton INDUSTRIAL PARK** Houghton Road & CA-99 TRAFFIC DISPLAY MAP **A.M. 2025 W/OUT PROJECT** AutoCAD FILE: 06012101DM	DATE / REVISIONS / BY	**PRELIMINARY NOT FOR CONSTRUCTION**	2001 WHEELAN COURT, BAKERSFIELD, CALIFORNIA 93309, (661) 834 - 4814 DRAWN BY: JMN · JOB NO: 6012.01 CHECKED BY: · DATE: 3/2/16

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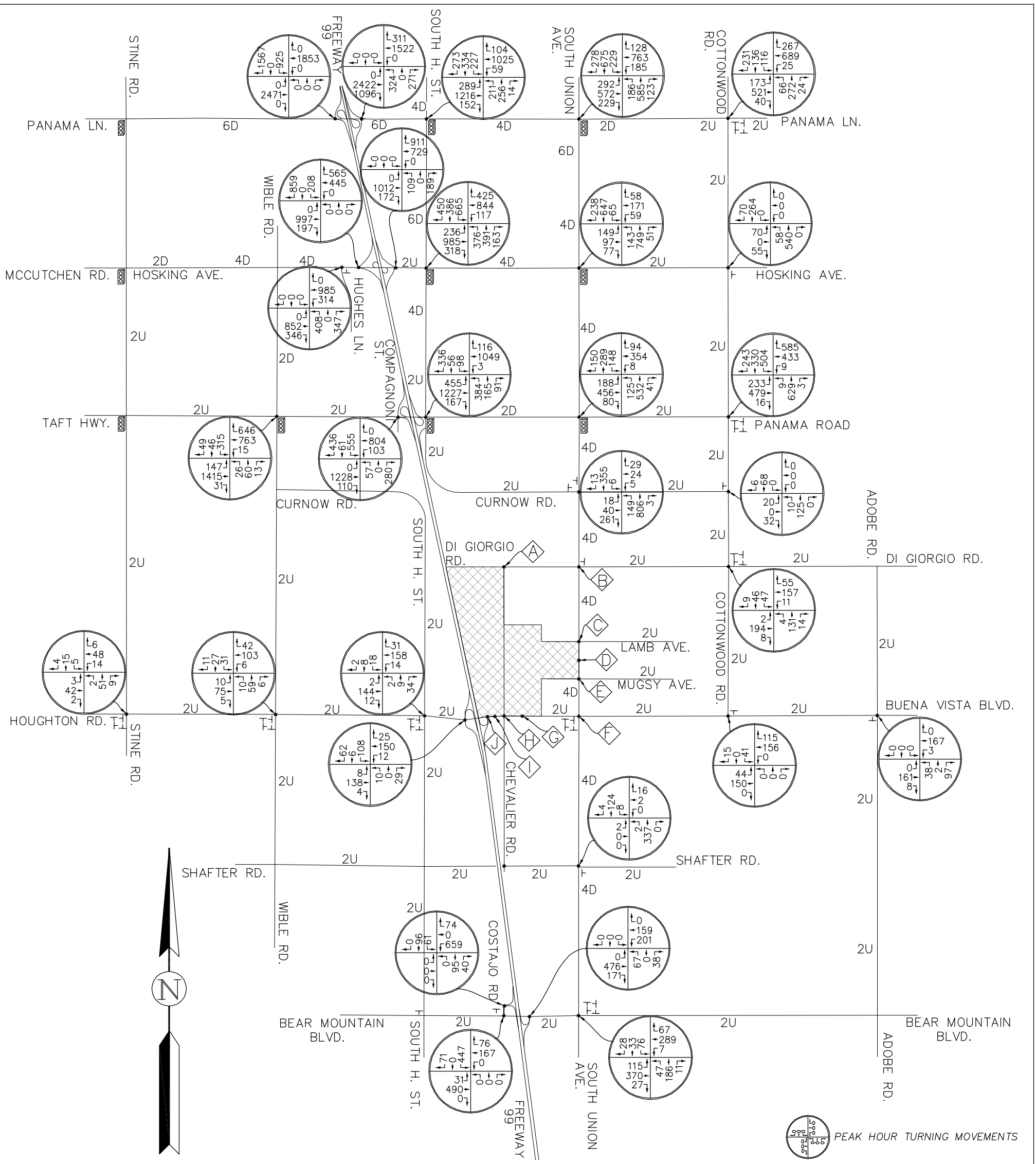


FIGURE 3 - YEAR 2035 FUTURE PEAK HOUR TURNING MOVEMENTS WITHOUT PROJECT (PM)

811 Know what's **below.** **Call** before you dig.

SHEET 5 OF 12 SHEETS

99/Houghton INDUSTRIAL PARK
Houghton Road & CA-99 TRAFFIC DISPLAY MAP
P.M. 2035 W/OUT PROJECT
AutoCAD FILE: 06012101DM

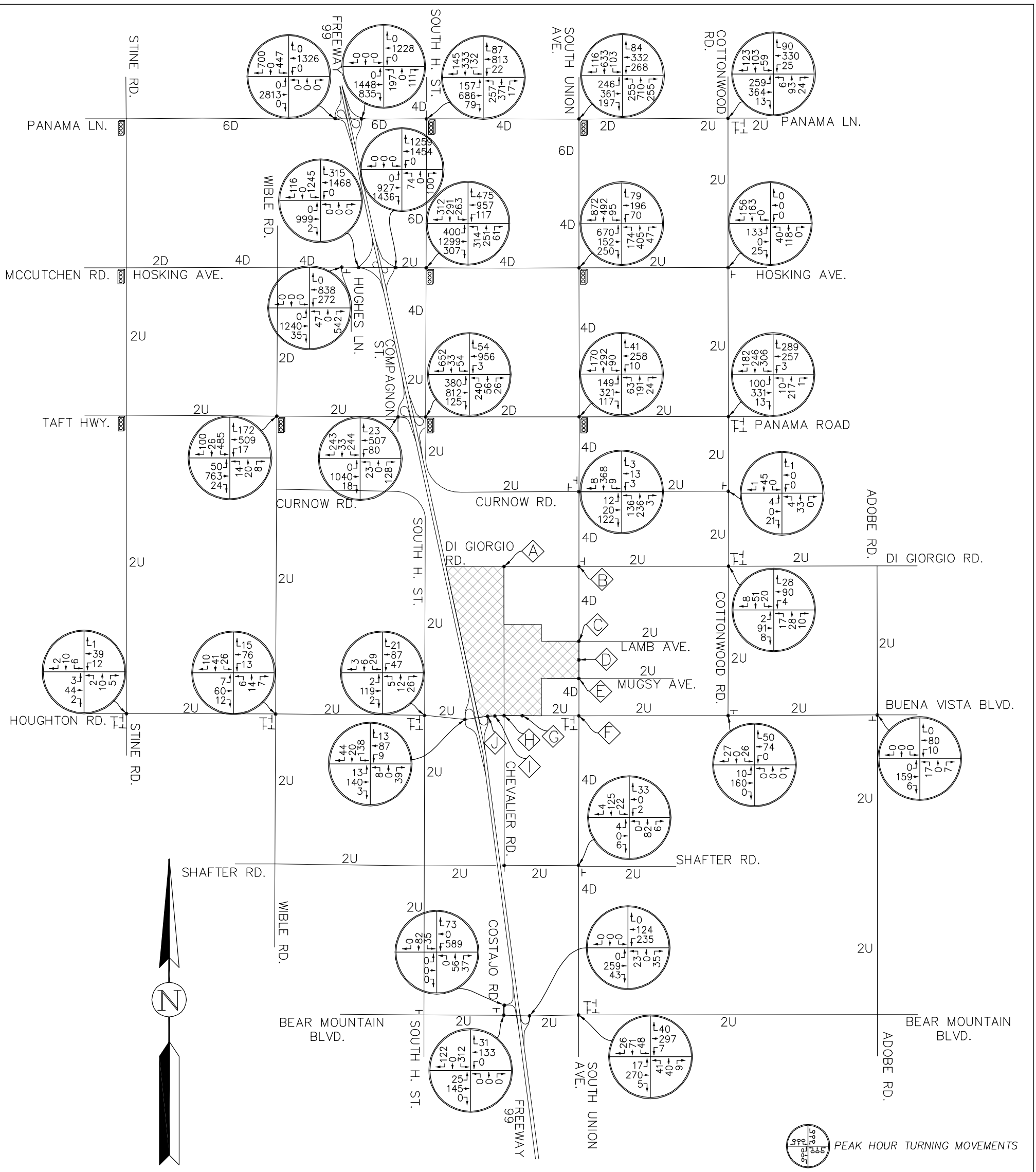
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A — DI GIORGIO RD. & CHEVALIER RD. (Entrance 1)

B — DI GIORGIO RD. & S. UNION AVE.

C — S. UNION AVE. & LAMB AVE. (Entrance 2)

D — S. UNION AVE. & PROJECT (Entrance 3)

E — S. UNION AVE. & MUGSY AVE. (Entrance 4)

F — HOUGHTON RD. & S. UNION AVE.

G — HOUGHTON RD. & PROJECT (Entrance 5)

H — HOUGHTON RD. & CHEVALIER RD. (Entrance 6)

I — HOUGHTON RD. & PROJECT (Entrance 7)

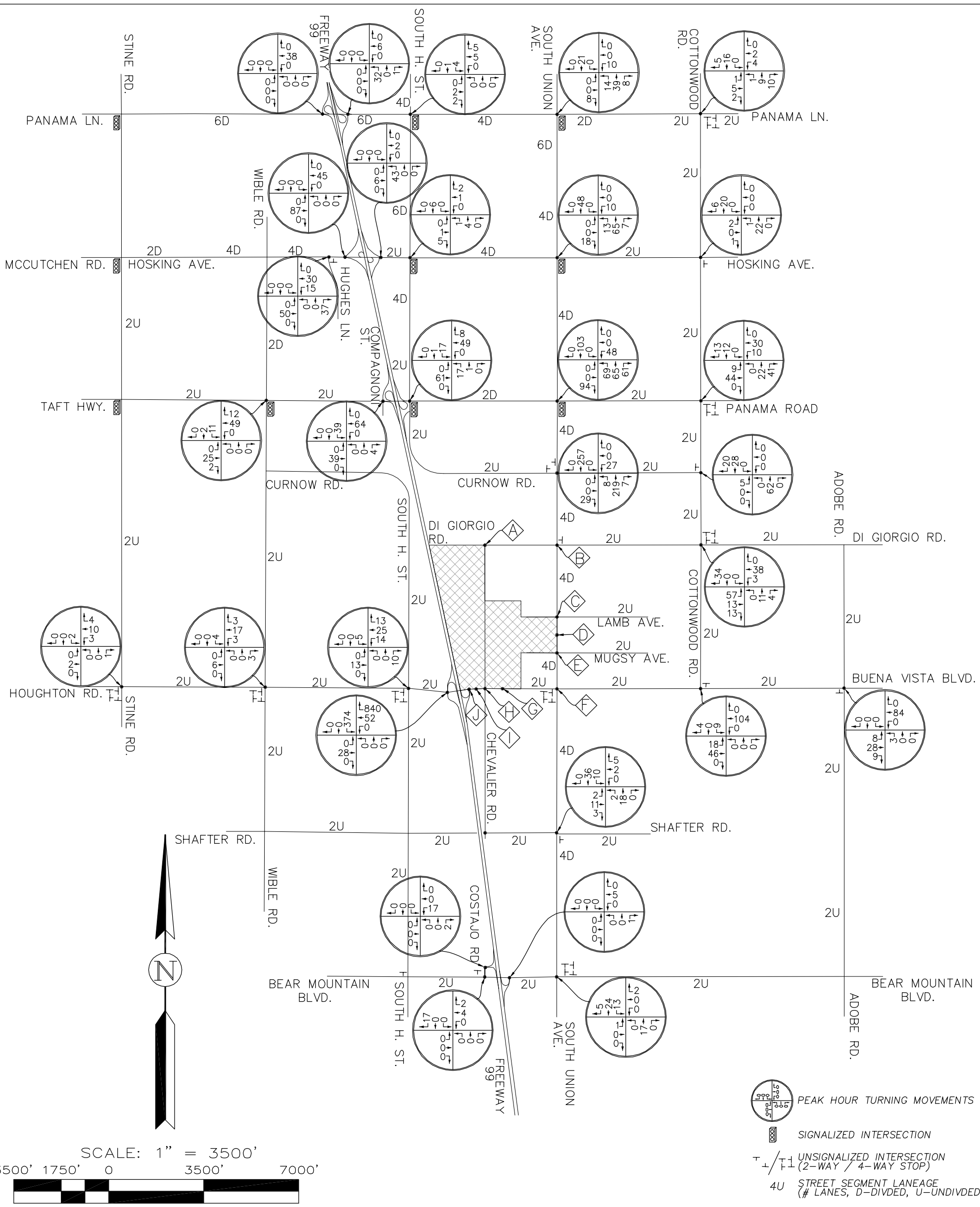
J — HOUGHTON RD. & CA-99NB RAMP

FIGURE 3A - YEAR 2035 FUTURE PEAK HOUR TURNING MOVEMENTS WITHOUT PROJECT (AM)

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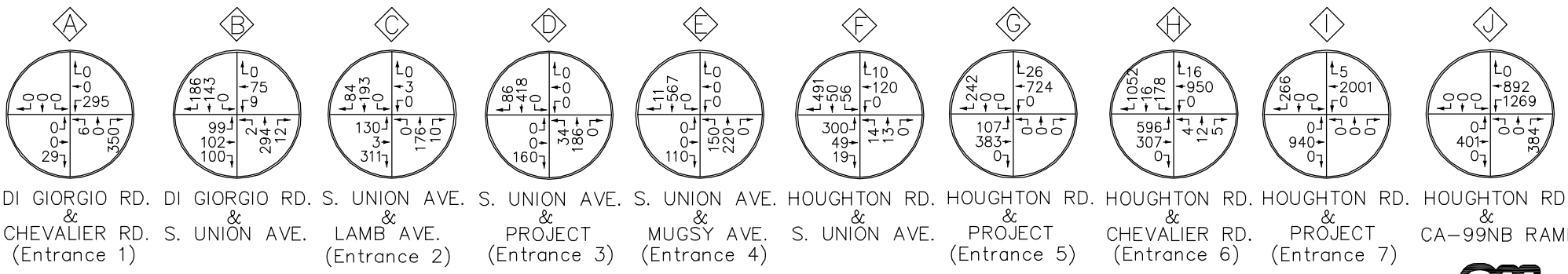
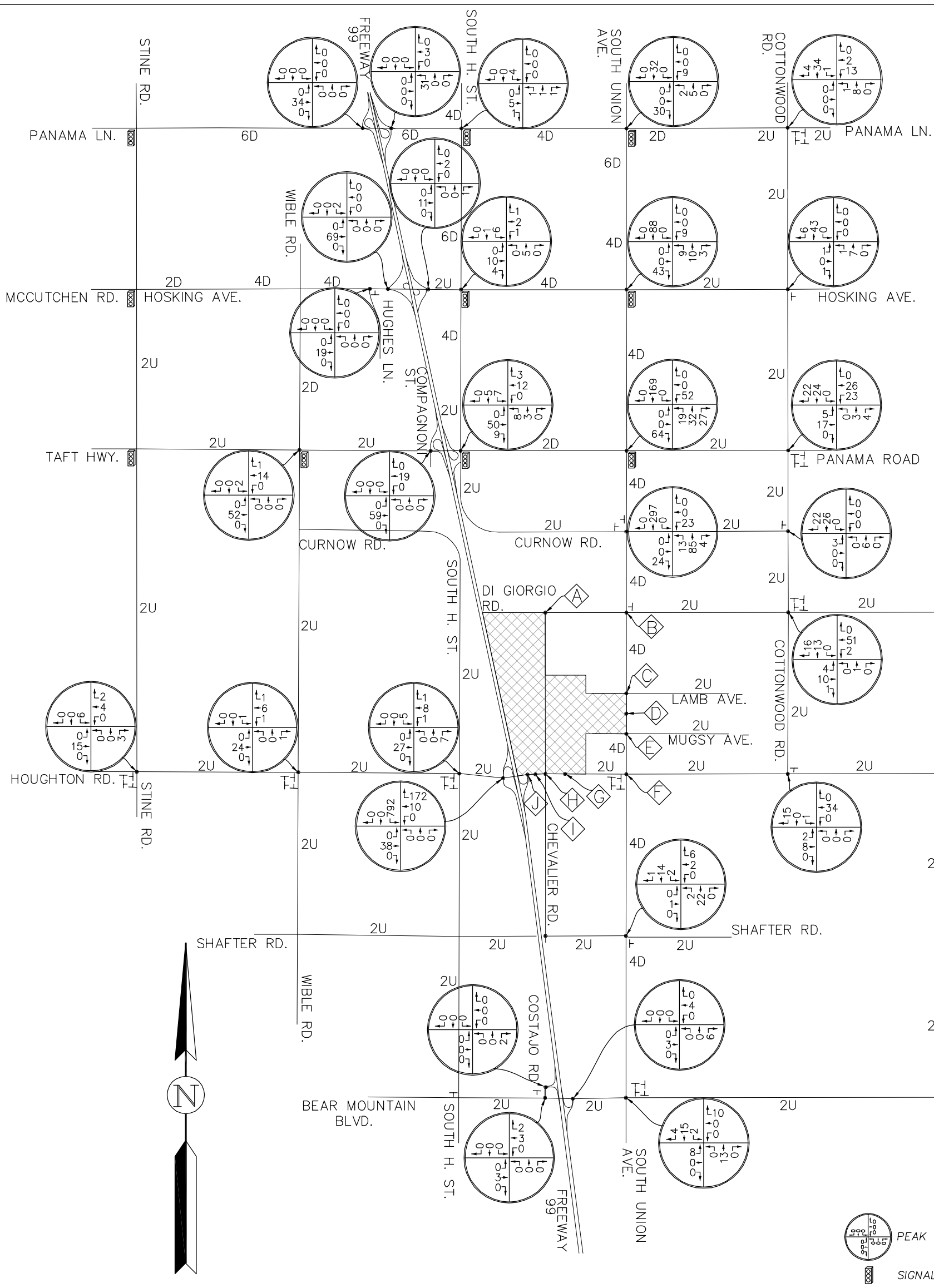


FIGURE 4P - PROJECT GENERATED TRIPS - YEAR 2035 (PM)

811 Know what's **below.** **Call** before you dig.

SHEET 7 OF 12 SHEETS	**99/Houghton INDUSTRIAL PARK** Houghton Road & CA-99 TRAFFIC DISPLAY MAP **P.M. 2035 GENERATED TRIPS** AutoCAD FILE: 06012101DM	DATE / REVISIONS / BY	**PRELIMINARY NOT FOR CONSTRUCTION**	2001 WHEELAN COURT BAKERSFIELD, CALIFORNIA 93309 (661) 834 - 4814 DRAWN BY: JMN · JOB NO: 6012.01 CHECKED BY: · DATE: 3/2/16

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A — DI GIORGIO RD. & CHEVALIER RD. (Entrance 1)

B — DI GIORGIO RD. & S. UNION AVE.

C — S. UNION AVE. & LAMB AVE. (Entrance 2)

D — S. UNION AVE. & PROJECT (Entrance 3)

E — S. UNION AVE. & MUGSY AVE. (Entrance 4)

F — HOUGHTON RD. & S. UNION AVE.

G — HOUGHTON RD. & PROJECT (Entrance 5)

H — HOUGHTON RD. & CHEVALIER RD. (Entrance 6)

I — HOUGHTON RD. & PROJECT (Entrance 7)

J — HOUGHTON RD. & CA-99NB RAMP

FIGURE 4A - PROJECT GENERATED TRIPS - YEAR 2035 (AM)

Know what's **below.** **Call** before you dig.

SHEET 8 OF 12 SHEETS	99/Houghton INDUSTRIAL PARK Houghton Road & CA-99 TRAFFIC DISPLAY MAP A.M. 2035 GENERATED TRIPS AutoCAD FILE: 06012101DM	DATE / REVISIONS / BY	PRELIMINARY NOT FOR CONSTRUCTION	2001 WHEELAN COURT BAKERSFIELD, CALIFORNIA 93309 (661) 834 - 4814 DRAWN BY: JMN · JOB NO: 6012.01 CHECKED BY: · DATE: 3/2/16

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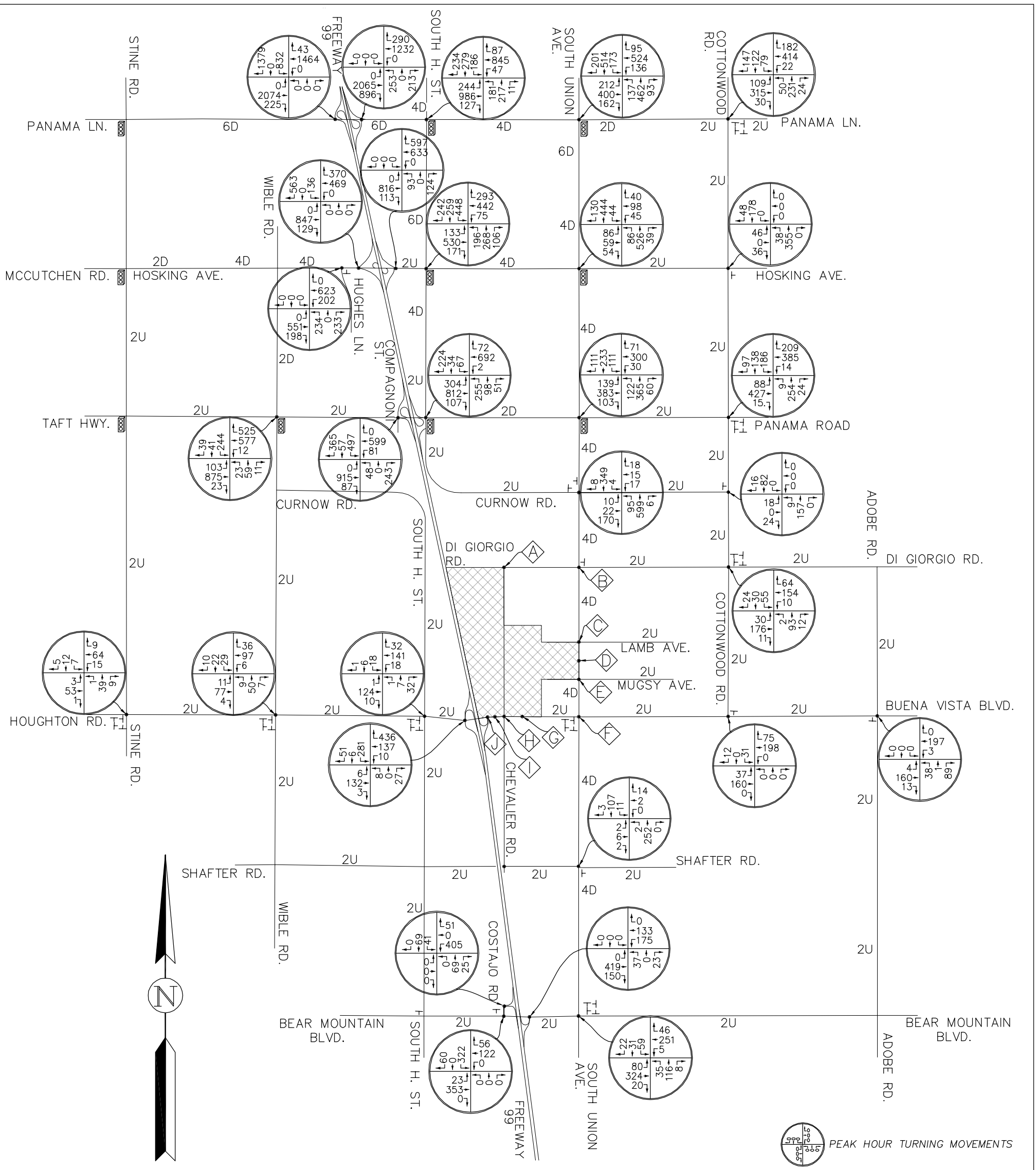


FIGURE 5P - YEAR 2025 FUTURE PEAK HOUR TURNING MOVEMENTS WITH PROJECT (PM)

811 Know what's **below.** **Call** before you dig.

SHEET 9 OF 12 SHEETS

99/Houghton INDUSTRIAL PARK
Houghton Road & CA-99 TRAFFIC DISPLAY MAP
P.M. 2025 + PROJECT
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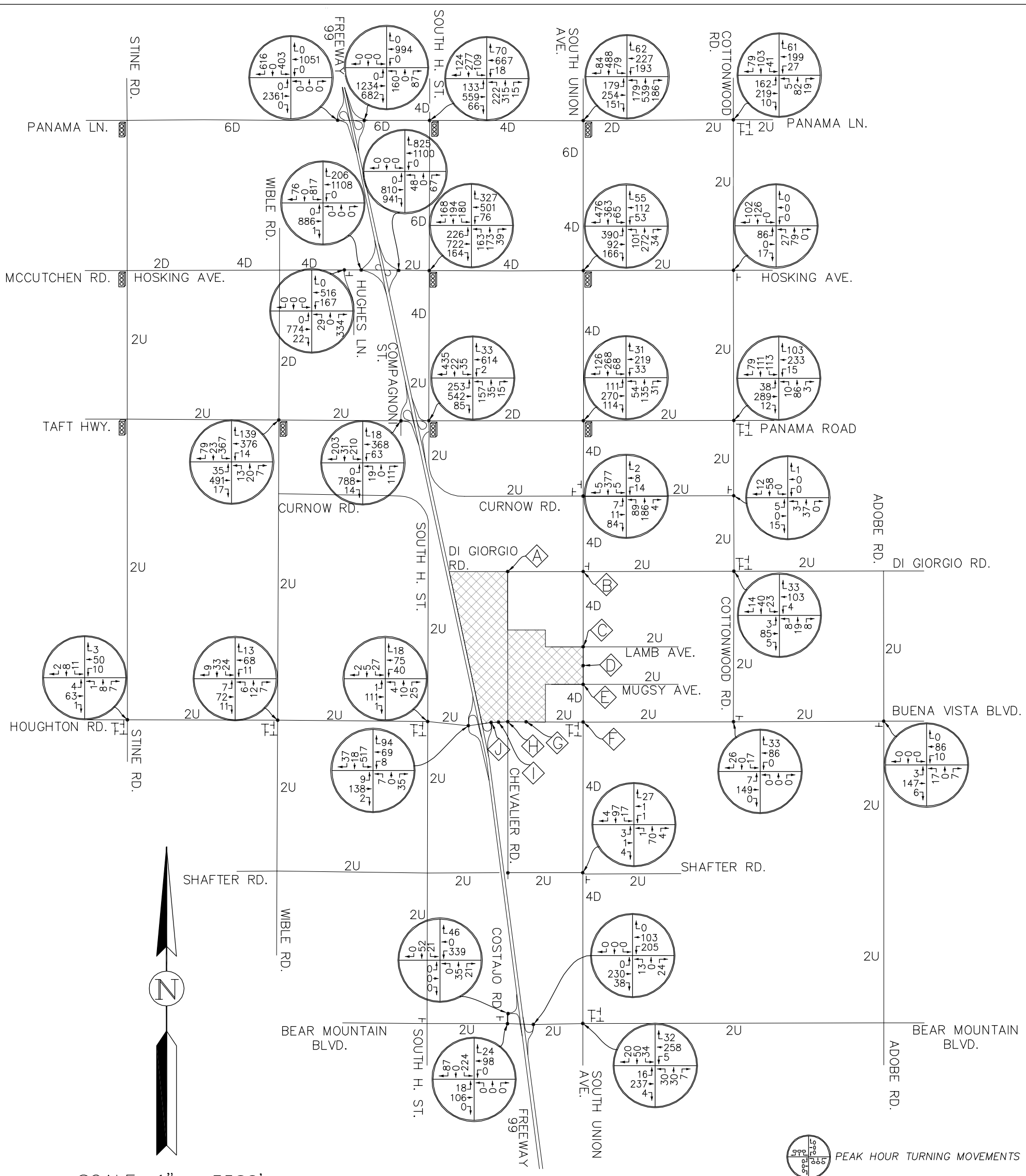


FIGURE 5A - YEAR 2025 FUTURE PEAK HOUR TURNING MOVEMENTS WITH PROJECT (AM)

811 Know what's **below.** **Call** before you dig.

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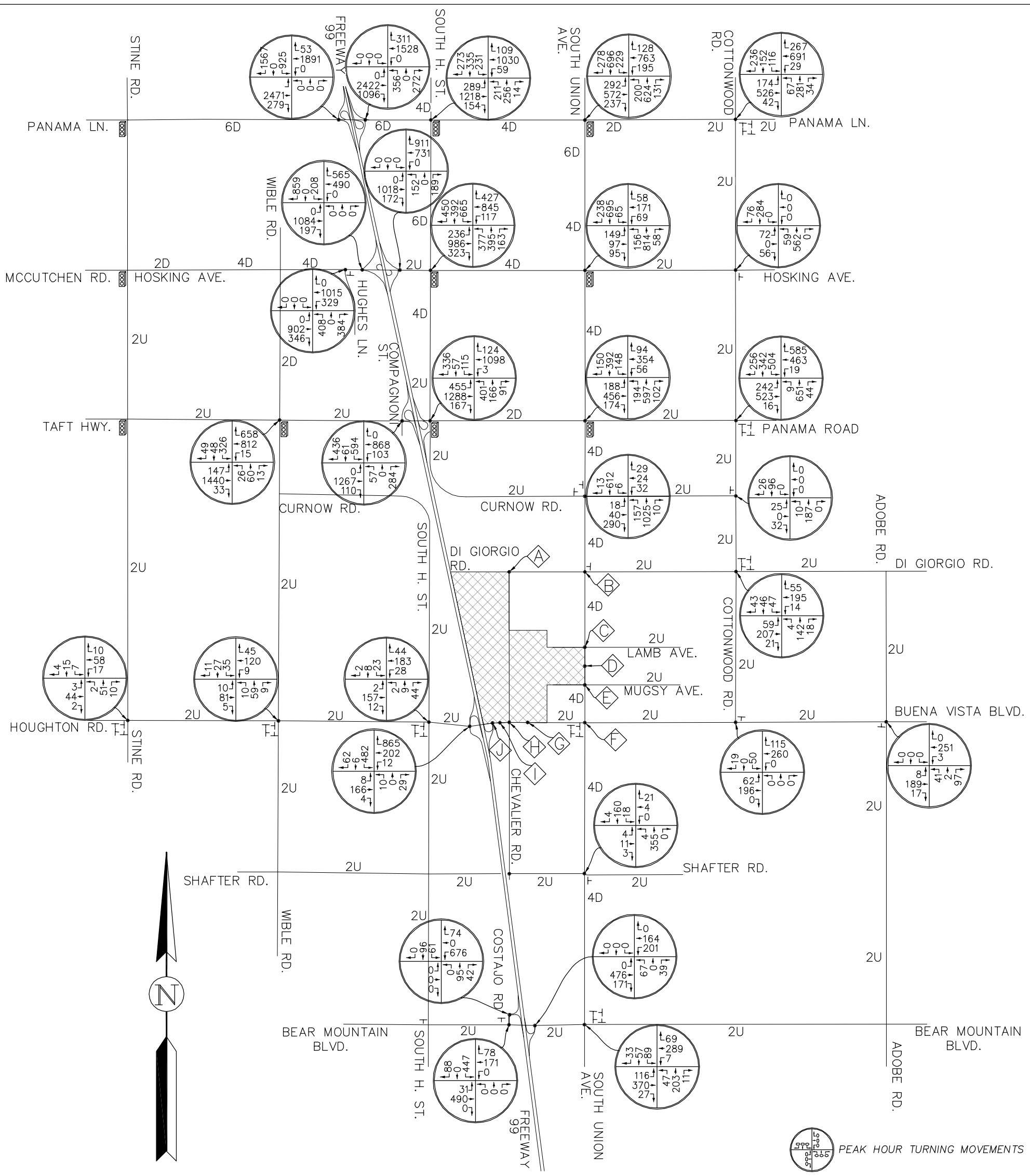


FIGURE 6P - YEAR 2035 FUTURE PEAK HOUR TURNING MOVEMENTS WITH PROJECT (PM)

811 Know what's below. Call before you dig.

SHEET 11 OF 12 SHEETS

99/Houghton INDUSTRIAL PARK
Houghton Road & CA-99 TRAFFIC DISPLAY MAP
P.M. 2035 + PROJECT
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DATE	REVISIONS	BY

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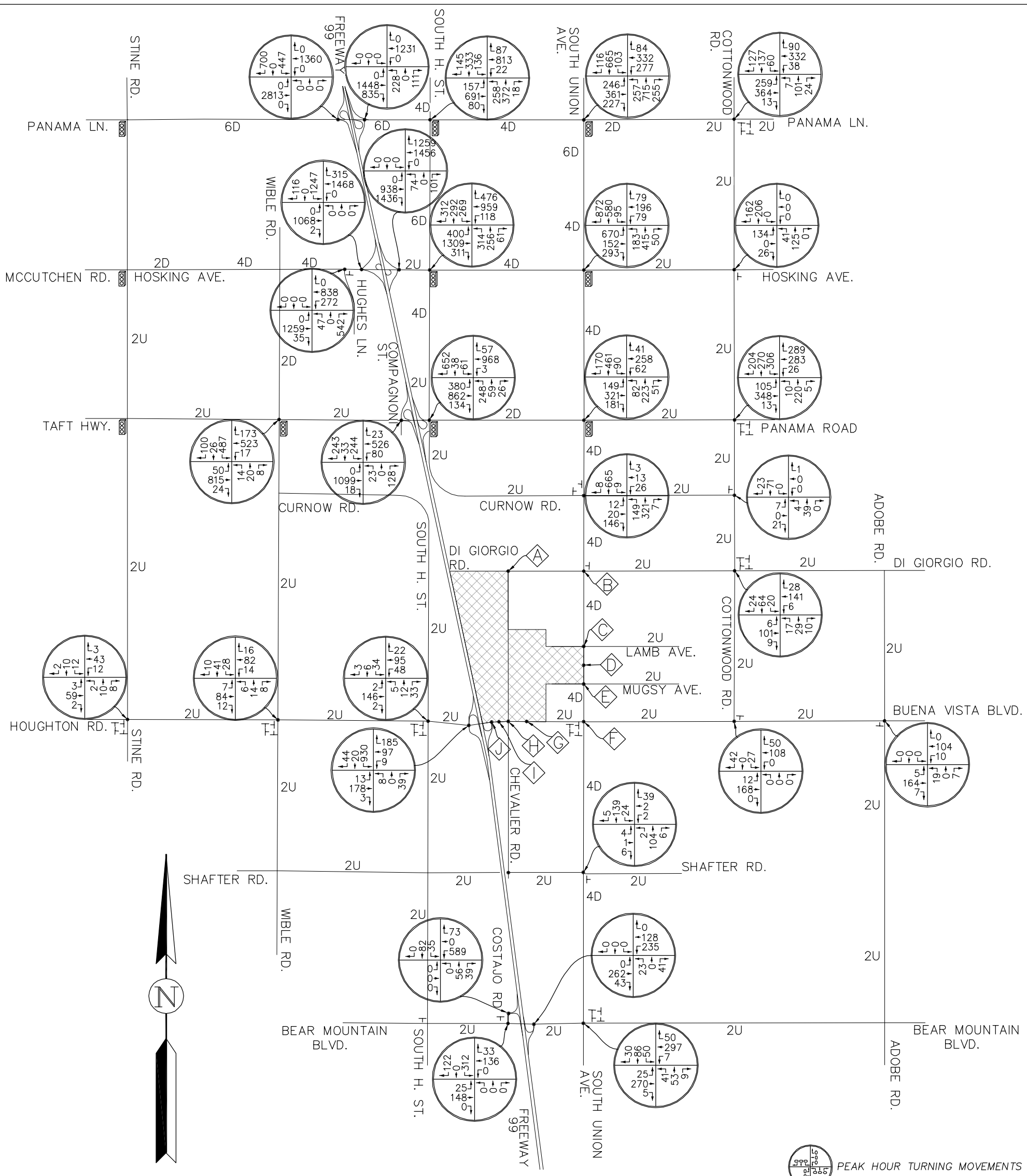


FIGURE 6A - YEAR 2035 FUTURE PEAK HOUR TURNING MOVEMENTS WITH PROJECT (AM)

Know what's **below.** **Call** before you dig.

SHEET 12 OF 12 SHEETS	**99/Houghton INDUSTRIAL PARK** Houghton Road & CA-99 TRAFFIC DISPLAY MAP **A.M. 2035 + PROJECT** AutoCAD FILE: 06012101DM	DATE / REVISIONS / BY	**PRELIMINARY NOT FOR CONSTRUCTION**	2001 WHEELAN COURT BAKERSFIELD, CALIFORNIA 93309 (661) 834 - 4814 DRAWN BY: JMN · JOB NO: 6012.01 CHECKED BY: · DATE: 3/2/16

McINTOSH & ASSOCIATES
LAND SURVEYING · CIVIL ENGINEERING © 2016

2006

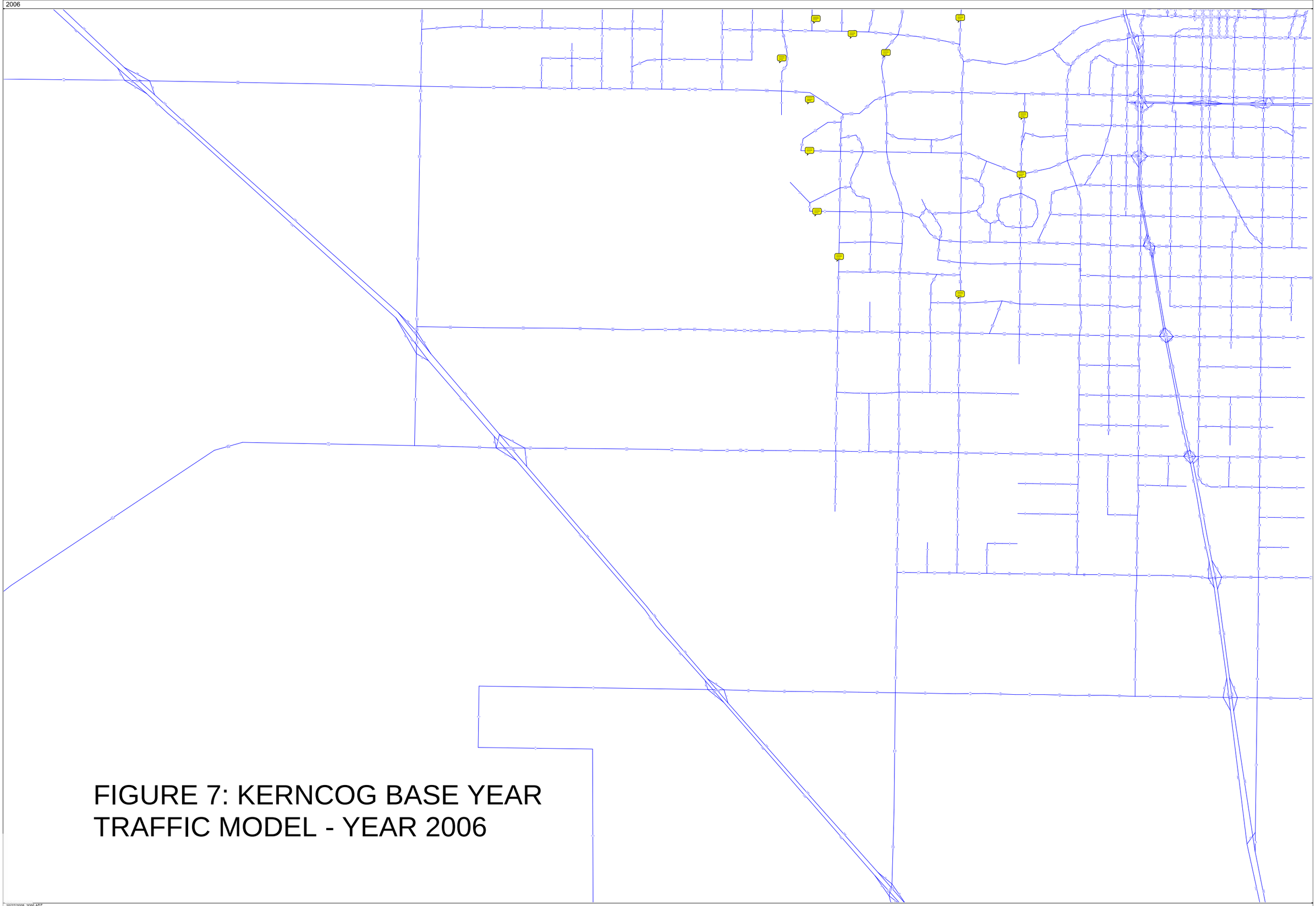


FIGURE 7: KERNCOG BASE YEAR TRAFFIC MODEL - YEAR 2006

10/27/2008 2006 ADT

Licensed to Kern Council of Governments

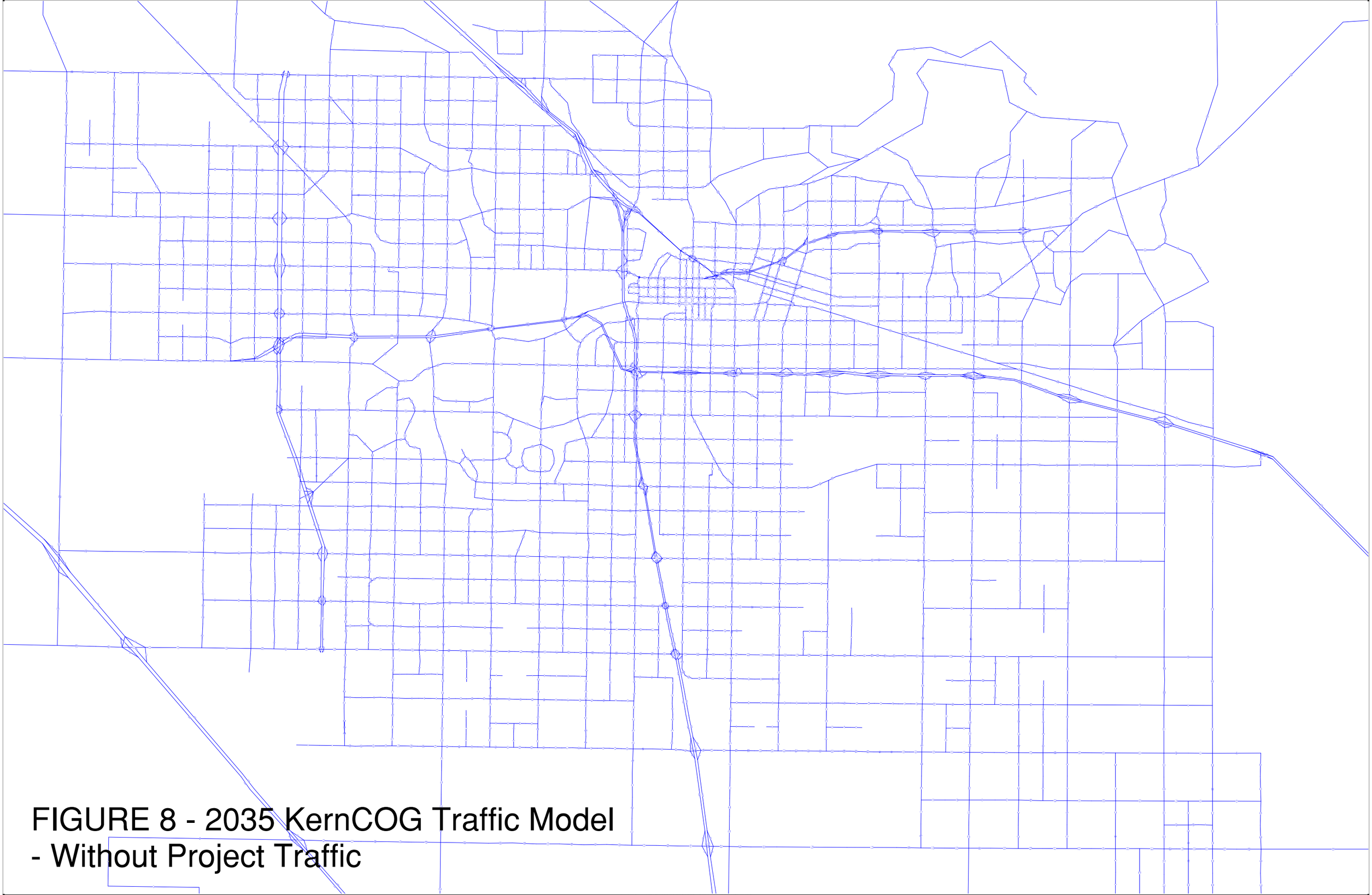
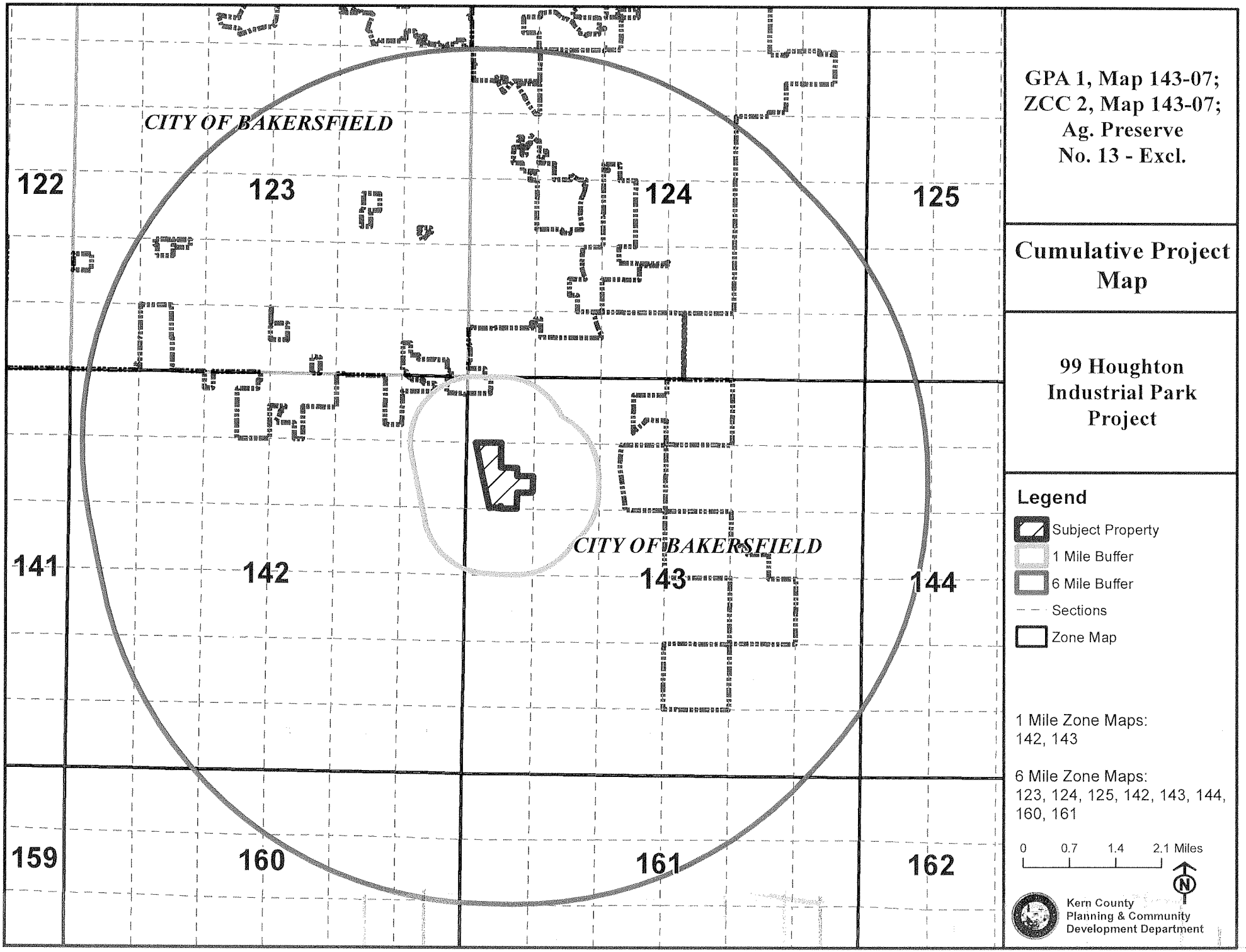


FIGURE 8 - 2035 KernCOG Traffic Model - Without Project Traffic

Appendix A

County of Kern 1 mile and 6 mile Cumulative Projects Map and List, 3/3/15


CITY OF BAKERSFIELD
122
123
124
125
CITY OF BAKERSFIELD
141
142
143
144
159
160
161
162
GPA 1, Map 143-07;
ZCC 2, Map 143-07;
Ag. Preserve
No. 13 - Excl.
Cumulative Project Map
99 Houghton Industrial Park Project
Legend
Subject Property
1 Mile Buffer
6 Mile Buffer
Sections
Zone Map
1 Mile Zone Maps:
142, 143
6 Mile Zone Maps:
123, 124, 125, 142, 143, 144, 160, 161
0
0.7
1.4
2.1 Miles
N
Kern County
Planning & Community
Development Department

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
10369	CRUZ, GABRIEL/B ANDERSON	W/S S "H" ST, N/BEAR MTN BLVD	AG TRUCKING, PRODUCTS & SERVICES	CUP		142		24	FALSE	COMP 12/17/04; REASSIGNED 4/11/05			
10856	ETCHISON LIVING TRUST/NORM ETCHISON	NEC FAIRFAX & DI GIORGIO	GPA TO LR	GPA		143	1	3	FALSE		31/28-01	186-200-01	,152.70
10917	LOMA VISTA REAL ESTATE/D&D	3130 DIGIORGIO RD	ZC TO E(2 1/2)RS	ZCC		143	4	38	FALSE	PM 11369	31/28-4	185-010-24	, 9.92
11490	GILL, PUNIT K BY GW WILSON	NE CORNER GOSFORD & CHAIDEZ	CHANGE TO E (2 1/2) RS	ZCC		142	21	53	FALSE	PM 11474 NEEDS WILL-SERVE OR SEWER EXEMPTION BEFORE PROCESSING	31/27-21	184-491-14	9.218
11608	NSR INVESTORS	SO SIDE SUCKOW; WEST OF FLINT	ZC TO 4-1 MP M-1	ZCC		143	27	39	FALSE	$ 10/17 ADDITIONAL APN: 233-550-15, 20	11/09-27	233-550-10	, 61.32
12198	COMMUNITY RECYCLING	1261 NO. WHEELER RIDGE RD.	CONCRETE CRUSHING & SCREENING OPERATION	CUP	27	143		62	FALSE	$ RECEIVED 8/15 SET FOR PARC	31/28-25	185-350-55	,160.00
12298	GUADALUPE JIMENEZ	17221 SOUTH UNION AVE.	ZCC TO M-1 OR M-2	ZCC		143	30	64	FALSE	SEE CASE ID 12297 FOR GPA REQUEST SUBMITTED ZCC APPLICATION ASKS FOR A COMMERCIAL DESIGNATION, HOWEVER INDUSTRIAL TRUCK STORAGE IS NOT ALLOWED WITHIN ANY COMMERCIAL ZONING CLASSIFICATION. AN INDUSTRIAL DESIGNATION WOULD BE REQUIRED. 7.1 IF THE TRUCKS WOULD BE COVERED, 7.2 IF THE TRUCKS WOULD NOT BE COVERED.	31/28-30	185-341-18	, 3.30
12309	JUAREZ, ETHEL	10604 SO. "H"	ZC TO C-2	ZCC		142		24	FALSE	$ RECEIVED 10/18	31/27-1	184-150-29	, 4.00
13265	RECURRENT ENERGY BY SETH ISRAEL	SHAFTER RD AND ASHE RD METRO AREA	28 MW SOLAR PROJECT	CUP		142		61	FALSE	184-490-05		184-490-04	,235.00
13621	SILVAS, LAURA	3509 MADRONA	ANIMAL SHELTER	CUP		143		71	FALSE	$ 3/16/11 APPLICATION WAS NOT LEGIBLE. OPERATIONAL STATEMENT NOT INCLUDED - EXISTING KENNEL/SHELTER ON SITE - VIOLATION	31/28-10	185-442-03	, 2.50
13801	OLDENKAMP TRUCKING	11314 WIBLE RD.	AG TRUCKING FACILITY	CUP		142		79	FALSE	Assigned to James Reassigned to Roque 12/16/2013 Requested fees 11/3/2014	31/27-12	184-150-42	, 19.09
14337	Jesus Reynaldo Portillo	De Harvey Avenue	CUP	CUP		143	18	79	FALSE	Code Compliance told applicant to submit for CUP, email correspondence in case file clarifies the requests of the applicant. Second prelim review letter should provide further clarification Originall assigned to Cassie Assigned to Ops 3/17/2014 Reassigned to Roque 3/18/2014	31/28-18	185-381-17	, 2.25
14643	Lian Xang Wang	11730 S. Union	ZCC from E (10) to A	ZCC		143		74	FALSE	Assigned to John 2/13/2015 Proposed use is Ag-related; recommend inclusion into Ag Preserve 13	31/28-08	185-170-18	, 28.08
10994, 10991	BAKERSFIELD LAND CO. BY JEAN LABORDE	W/S COSTAJO RD N/O BEAR MTN BLVD	RIA to LI; ZC TO M-1	GPA, ZCC	8, 14	143	19	63, 65	FALSE	REF ZC DATABASE NO. 10991; AIR QUALITY STUDY RECEIVED 9/10/07; LOOKING IF NEG DEC OR EIR. STUDIES HAVE BEEN STROLLING IN. LHO SAID TO DO EC AND SEE ABOUT NEG DEC. DELMARTER AND DIEFEL ARE ENGINEERS. ACCEPTED FEES. HAVE DRAFT NEG DEC TO REVIEW TED WANTED TO GO FOR DISAPPROVAL. HE SAID HE COULD SUPPORT 6.3 AND CH PD. JEAN WAS OKAY WITH THAT. GOING TO NOV 13 PC	31/28-19	185-321-20	, 20.00
12249, 12248	DOMINGUEZ/CUEVAS BY AFINAR CIVIL ENGINEERING	NEC OF DI GIORGIO RD & S. UNION AVE	ZCC FROM A TO C-2; GPA FROM RR TO GC	ZCC, GPA		143		65	FALSE	ADDATIONAL APN 185-050-04 POST PARC LETTER MAILED 11/27/07 SEE CASE ID 12248 FOR GPA REQUEST	31/28-05	185-050-03	, 17.89

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
12495, 12496	DELGADO BY JAIME SANDOVAL	W/S UNION AVE, 5/8 MILE S/O BEAR MT	8.1 TO 5.7/2.3; ZC TO E(5)	GPA, ZCC		143	31	64	FALSE	REF ZC DB#12496	31/28-31	185-342-08	, 21.18
12497, 12498	JOSE RAMOS BY JAIME SANDOVAL	W/S UNION AVE, 1/2 MI S/O BEAR MT	8.1 TO 5.7/2.3; ZC TO E(5)	GPA, ZCC		143	31	64	FALSE	REF ZC DB#12498	31/28-31	185-342-09	, 21.18
12626, 12859	99 HOUGHTON LLC BY MCINTOSH & ASSOC	NEC HOUGHTON AND 99	RI-A TO SI, LI, GC & HC	GPA, ZCC		143	7	64	FALSE	SEE CASE ID 12859 & 12860 FOR ZCC & AG. PRESERVE EXCLUSION	31/28-07	702-870-02	,306.00
12700, 12701	JON MOULE	NEC OF PROGRESS RD & SHAFTER RD.	GPA FROM R-IA TO RR; ZCC A TO E 2 1/2	GPA; ZCC		142	17	64	FALSE	SEE CASE ID 12701 FOR ZCC	31/27-17	184-420-04	, 20.00
13618, 13617	BAKERSFIELD LAND COMPANY LLC BY DELMARTER	COSTAJO AND BEAR MTN	RR TO HC; A-1 TO CH PD	GPA, ZCC	9, 15	143	19	55	FALSE	ADDENDUM NEG DEC ON PROJECT TO THE SOUTH? 3rd review complete 8/3/11; Changed request to M-1 PD prior to PC hearing.	31/28-19	185-321-16	, 20.00
14066, 14067	Nolan Campbell	13308 S Union Ave	Truck and Oil Related Equipment Storage. Metro Bakersfield GPA from ER to Mineral and Petroleum; ZC from E1 to NR	GPA; ZCC		143		74	FALSE	Also being processed with #14067 Assigned to Mike on 12/13/2012 This may be in violation unless a determination of legal nonconforming use can be made 14-Day termination letter sent on 2/24/2014 Contacted by applicant (Margaret Campbell) and wants to keep request going. She indicated there are no violations after they were cited by APCD for sandblasting equipment without permits. Conduct site visit to determine. 2/27/2014 Reassigned to John on 2/27/2014		185-220-12	, 0.00
14636, 14637	Dennis Rushing	SW corner of S. Union and Torro Cou	ZC and GPA, Gpa is 5.7/2.3 to 5.6/2.3; E (2 1/2) RS MH	GPA, ZCC		143	30	69	FALSE	Also Case ID 14636 and 14637 Assigned to Patty 2/13/2015	30/31-28	185-520-22	, 5.28

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
10219	RUDNICK FEEDLOT/PHILIP & DANIEL RUDNICK	OLD RIVER RD, 2 MI S/I - 5	FEEDLOT	CUP		160	19	23	FALSE	and 295-110-04, -19, -12, and 295-100-28	32/27-19	295-110-31	,320.00
10220	SILVER OAK/DAVID & DOUGLAS KAISER	NEC TEALE RD & ADOBE RD	DAIRY	CUP	20	161		23	FALSE	Dairy - 250 acres & Crop - 382 acres	32/28-15	445-041-01	,632.00
10221	BLOOMFIELD/TILLEMA, RICH/JOHN SCHAAP	BEAR MTN RD & COTTONWOOD RD	DAIRY	CUP	19	161	28	23	FALSE	Dairy - 193 acres & Crops - 1081 acres	31/28-28	185-340-12	1,274.00
10274	ROSA DAIRY/AGRICULTURAL MAN SYSTEMS	S/HERRING, W/WHEELER RIDGE RD (S14)	DAIRY	CUP	21	161	14	23	FALSE	Dairy - 80 acres & Crop - 560 acres	32/28-14	445-041-19	,640.00
10369	CRUZ, GABRIEL/B ANDERSON	W/S S "H" ST, N/BEAR MTN BLVD	AG TRUCKING, PRODUCTS & SERVICES	CUP		142		24	FALSE	COMP 12/17/04; REASSIGNED 4/11/05			
10732	VALDEZ, MARIA/SAN JOAQUIN ENG'G	170 & 180 BERKSHIRE RD	ZC TO C-2	ZCC		124	30	24	FALSE	$ 10/11		0 - -	, 0.00
10856	ETCHISON LIVING TRUST/NORM ETCHISON	NEC FAIRFAX & DI GIORGIO	GPA TO LR	GPA		143	1	3	FALSE		31/28-01	186-200-01	,152.70
10917	LOMA VISTA REAL ESTATE/D&D	3130 DIGIORGIO RD	ZC TO E(2 1/2)RS	ZCC		143	4	38	FALSE	PM 11369	31/28-4	185-010-24	, 9.92
11378	GRIMMWAY ENTERPRISES	COPUS RD. EAST OF I-5	ANIMAL WASTE COMPOSTING FACILITY	CUP	15	160		63	FALSE	THIS IS A DUPLICATE CUPS ENTRY PROJECT WILL REQUIRE CANCELLATION OF WAC; GPA AND POSSIBLE EIR; SENT TO SPECIAL PROJECTS WAC NOT NEEDED, JIM AMENDED UNIFORM RULES NEG Dec REQUIRED. ECORP DID EC AND DOING NEG DEC	32/27-36	295-120-48	,160.00
11416	SOLIS, LUIS MANUEL	6221 E. BRUNDANGE LANE	ZC TO M-1 PD	ZCC	26	124	2	24	FALSE	VIOLATION ALSO PROCESSING A P.D. PLAN FOR AUTO REPAIR	30/28-2	173-161-18	, 2.70
11490	GILL, PUNIT K BY GW WILSON	NE CORNER GOSFORD & CHAIDEZ	CHANGE TO E (2 1/2) RS	ZCC		142	21	53	FALSE	PM 11474 NEEDS WILL-SERVE OR SEWER EXEMPTION BEFORE PROCESSING	31/27-21	184-491-14	9.218
11608	NSR INVESTORS	SO SIDE SUCKOW; WEST OF FLINT	ZC TO 4-1 MP M-1	ZCC		143	27	39	FALSE	$ 10/17 ADDITIONAL APN: 233-550-15, 20	11/09-27	233-550-10	, 61.32
12198	COMMUNITY RECYCLING	1261 NO. WHEELER RIDGE RD.	CONCRETE CRUSHING & SCREENING OPERATION	CUP	27	143		62	FALSE	$ RECEIVED 8/15 SET FOR PARC	31/28-25	185-350-55	,160.00
12298	GUADALUPE JIMENEZ	17221 SOUTH UNION AVE.	ZCC TO M-1 OR M-2	ZCC		143	30	64	FALSE	SEE CASE ID 12297 FOR GPA REQUEST SUBMITTED ZCC APPLICATION ASKS FOR A COMMERCIAL DESIGNATION, HOWEVER INDUSTRIAL TRUCK STORAGE IS NOT ALLOWED WITHIN ANY COMMERCIAL ZONING CLASSIFICATION. AN INDUSTRIAL DESIGNATION WOULD BE REQUIRED. 7.1 IF THE TRUCKS WOULD BE COVERED, 7.2 IF THE TRUCKS WOULD NOT BE COVERED.	31/28-30	185-341-18	, 3.30
12309	JUAREZ, ETHEL	10604 SO. "H"	ZC TO C-2	ZCC		142		24	FALSE	$ RECEIVED 10/18	31/27-1	184-150-29	, 4.00

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
12598	BABBY KURIAN	NWC UNION & BARTON STREET	GPA FROM LMR TO SI	GPA	5	124	31	63	FALSE	SITE CURRENTLY IN VIOLATION (5/8/08) PROPERTY CURRENTLY HAS SPLIT GENERAL PLAN DESIGANTION AND ZONE CLASSIFICATION. APPLICANT WANTS BACK HALF OF PROPERTY REDESIGNATED TO MATCH THE FRONT PORTION TO FACILITATE THE CONSTRUCTION OF A MINI-STORAGE FACILITY OVER THE ENTIRE SITE. SEE CASE ID 12599 FOR ZONE CHANGE. PARC 12/16/08; Post PARC 12/18/08 AYMIE HELPING WITH PD CONDITIONS - WROTE FOR DENIAL OF GPA FOR R-1, ONLY FRONT SI TO GC AND ZONE CHANGE TO C-2 PD AND PD FOR FRONT PART ONLY, NO OUTSIDE PARKING IN BACK, (NOT ALLOWED IN C-2 ANYWAY). BABBY REDID PD AT LAST MINUTE AND ADDED OUTSIDE PARKING AND ITS NOT ALLOWED IN c-2 EXCEPT WITH CUP	30/28-31	517-040-13	, 7.00
12599	BABY KURIAN	NWC UNION & BARTON STREET	ZCC FROM R-1 TO M-1	ZCC	26	124	31	63	FALSE	SITE CURRENTLY IN VIOLATION (5/8/08) PROPERTY CURRENTLY HAS SPLIT GENERAL PLAN DESIGNATION AND ZONE CLASSIFICATION. APPLICANT WANTS BACK HALF OF PROPERTY REDESIGNATED TO MATCH THE FRONT PROTION FO FACILITE THE CONSTRUCTION OF A MINI SOTRAGE FACILITY OVER THE ENTIRE SITE. SEE CASE ID 12598 FOR GPA. PARC 12/16/08; Post PARC 12/18/08 DEEMED COMPLETE - JOHN STARTED SB 18. THIS HAS PD ALSO - AND JOHN SAID BABY NEEDS TO DO BETTER PD PLAN MAP AYMIE HELPING WITH PD CONDITIONS - WROTE FOR DENIAL OF GPA FOR R-1, ONLY FRONT SI TO GC AND ZONE CHANGE TO C-2 PD AND PD FOR FRONT PART ONLY, NO OUTSIDE PARKING IN BACK, (NOT ALLOWED IN C-2 ANYWAY). BABBY REDID PD AT LAST MINUTE AND ADDED OUTSIDE PARKING AND ITS NOT ALLOWED IN c-2 EXCEPT WITH CUP	30/28-31	517-040-13	, 7.00
12644	ABDO FADHEL BY CORNERSTONE ENG.	NEC OF CAMANCHE DRIVE 7 HWY 58	R-IA TO HC	GPA		125	11	64	FALSE		30/29-11	177-220-16	, 5.00
13265	RECURRENT ENERGY BY SETH ISRAEL	SHAFTER RD AND ASHE RD METRO AREA	28 MW SOLAR PROJECT	CUP		142		61	FALSE	184-490-05		184-490-04	,235.00
13431	ROBLES, MARIA	BEAR MT. BLVD. WEST OF COMANCHE	AG TRUCKING	CUP		144		79	FALSE	Originally assigned to James G VIOLATION ON SITE PREVIOUS CUP (31) EXPIRED Termination letter sent on 11/21/2013 Applicant requested case remain open on 12/3/2013 and that new materials would be submitted No new materials as of 3/27/2014 Reassigned to Roque 3/27/2014 If no response by July 2014, then terminate case - be sure to include Code Compliance on correspondence	31/29-22	189-280-03	, 14.50
13596	MAYBERRY, DANNY	3125 SO. FAIRFAX	RETENTION OF TWO CARGO CONTAINERS	CUP		124	12	71	FALSE	$ 2/23/11	30/28-12	173-293-28	, 0.00

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
13621	SILVAS, LAURA	3509 MADRONA	ANIMAL SHELTER	CUP		143		71	FALSE	$ 3/16/11 APPLICATION WAS NOT LEGIBLE. OPERATIONAL STATEMENT NOT INCLUDED - EXISTING KENNEL/SHELTER ON SITE - VIOLATION	31/28-10	185-442-03	, 2.50
13639	DEL TORO, JOE	5516 WEEDPATCH	AG TRUCKING FACILITY	CUP		124		71	FALSE	VIOLATION ON SITE - PREVIOUS APPLICATION SUBMITTED 11/08; TERMINATED BY STAFF DUE TO INACTIVITY; APPLICANT CONTINUED TO OPERATE	30/28-24	174-011-05	, 5.00
13801	OLDENKAMP TRUCKING	11314 WIBLE RD.	AG TRUCKING FACILITY	CUP		142		79	FALSE	Assigned to James Reassigned to Roque 12/16/2013 Requested fees 11/3/2014	31/27-12	184-150-42	, 19.09
14004	Alice Powell	1313 Cheatam Ave	Womens Shelter	CUP		124	5	69	FALSE	Assigned to Patty 9/19/2012		168-253-03	, 0.00
14133	Estaban Calderon	3017 Belle Terrace	CUP for a Church	CUP		123	1	31	FALSE	Assigned to Randall 3/28/2013 No response as of 6/13/2014 Send termination letter Third review complete 01/09/2015		148-240-07	, 0.00
14148	Advanced Geomatices Engineering	Blackburn St	ZCC to NR (5)	ZCC		124	24	67	FALSE		30/28-24	174-011-32	, 19.80
14162	Ford, Pam by Jodi Jensen	4358 Weedpatch Hwy	CUP for a SFR in an M-2 PD district / Request was approved in 2008 but subsequently expired	CUP		124	13	69	FALSE	Assigned to Patty 5/10/2013 Used as a training case for new planner to write draft compliance letter	30/28-13	174-250-41	, 1.87
14244	Ashley Ross	Same	MH for Medical Hardship - house exists on site so CUP to allow additional single family dwelling	CUP		125	07	74	FALSE	Assigned to John D 9/18/2013 Check for code violations	30/29-07	177-182-32	, 2.06
14337	Jesus Reynaldo Portillo	De Harvey Avenue	CUP	CUP		143	18	79	FALSE	Code Compliance told applicant to submit for CUP, email correspondence in case file clarifies the requests of the applicant. Second prelim review letter should provide further clarification Originall assigned to Cassie Assigned to Ops 3/17/2014 Reassigned to Roque 3/18/2014	31/28-18	185-381-17	, 2.25
14355	Ana Maria Garay	6214 Kimber Avenue	CUP for firewood sales - Must establish an office and associated parking to comply with "sales"	CUP		124	02	74	FALSE	Assigned to John D 2/15/2014 Open code violation - applicant to abate or attend violation hearing	30/28-02	173-162-09	, 2.50
14541	Juan Carlos Herrera	3017 Belle Terrace, Bakersfield	CUP for a Church in the E Zone	CUP		123	1	69	FALSE	Assigned to Patty 9/25/2014 Ensure applicant is aware that if there are any existing buildings being used for the church, a change in occupancy is required..suggest to the applicant that they consult with BID to obtain a tentative cost for any building improvements. Although no environmental document is initally being considered, let's look at the detailed operations statement	30/27-01	148-240-0	, 0.56

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
14558	Douglas Escalante	7401 Reynolds Street, bakersfield	MH as Secondary Residential unit not architecturally similar	CUP		124		74	FALSE	Assigned to John 10/16/2014 ZO does not have provisions to allow a MH as a secondary residential unit with a stickbuilt as primary. Schedule a meeting to discuss other options.	30/28-25	174-211-01	, 1.00
14643	Lian Xang Wang	11730 S. Union	ZCC from E (10) to A	ZCC		143		74	FALSE	Assigned to John 2/13/2015 Proposed use is Ag-related; recommend inclusion into Ag Preserve 13	31/28-08	185-170-18	, 28.08
10550, 10572	LOPEZ, PABLO/FRANK SLINKARD	3018 WOOD LANE	ZC TO R-1; ADD'L DWELLINGS	ZCC, CUP	77, 53	123		40	FALSE				
10994, 10991	BAKERSFIELD LAND CO. BY JEAN LABORDE	W/S COSTAJO RD N/O BEAR MTN BLVD	RIA to LI; ZC TO M-1	GPA, ZCC	8, 14	143	19	63, 65	FALSE	REF ZC DATABASE NO. 10991; AIR QUALITY STUDY RECEIVED 9/10/07; LOOKING IF NEG DEC OR EIR. STUDIES HAVE BEEN STROLLING IN. LHO SAID TO DO EC AND SEE ABOUT NEG DEC. DELMARTER AND DIEFEL ARE ENGINEERS. ACCEPTED FEES. HAVE DRAFT NEG DEC TO REVIEW TED WANTED TO GO FOR DISAPPROVAL. HE SAID HE COULD SUPPORT 6.3 AND CH PD. JEAN WAS OKAY WITH THAT. GOING TO NOV 13 PC	31/28-19	185-321-20	, 20.00
11625, 11626	CARRIAGE HOMES/CARL MORELAND	SWC WEEDPATCH HW & MOUNTAIN VIEW RD	GPA to LR & GC; ZCC to R-1 FPS, E(1/4) FPS, E(1/2) FPS, & C-2 PD	GPA; ZCC		124	36	64	FALSE	PARC 4/25/06 PROJECT REASSIGNED FROM CRAIG TO SARA; Existing Zone Designation E (2.5) RS FPS to E (1) RS FPS in suspense, A to E(1) RS FPS in suspense, & C-2 PD FPS PARC 4/25/06. PROJECT WAS REASSIGNED TO SARA.	30/28-36	174-150-16	, 76.33
12220, 12221	AL GRAVES BY WILEY D. HUGHES SURVEYING	1/2 M. W OF HWY 84, END OF REYNOLDS	GPA FROM RR TO SR; ZCC FROM A TO E (1/2) RS	GPA, ZCC	20, 74	124		58	FALSE	SEE CASE ID 12221 FOR ZCC; EC ends 04/06/09; MND TO CIRCULATE 5-27 THRU 6-27 Subsequent discussions with applicant revealed that he does not want to withdraw request; however, no additional information has been provided to move forward 2/10/2014	30/28-25	174-141-14	, 30.14
12249, 12248	DOMINGUEZ/CUEVAS BY AFINAR CIVIL ENGINEERING	NEC OF DI GIORGIO RD & S. UNION AVE	ZCC FROM A TO C-2; GPA FROM RR TO GC	ZCC, GPA		143		65	FALSE	ADDATIONAL APN 185-050-04 POST PARC LETTER MAILED 11/27/07 SEE CASE ID 12248 FOR GPA REQUEST	31/28-05	185-050-03	, 17.89
12405, 12406	GRIMMWAY ENTERPRISES BY MCINTOSH	N/S COPUS RD E/S I-5	3.7/3.7.1 COMPOSTING FACILITY - CUP TOO; COMPOSTING FACILITY	GPA, CUP	2, 15	160	36	63	FALSE	SB 18 1/9/08 (INCLUDES GPA 2 TOO) ASKED FOR LEGAL FROM DARCIE AT DEC MEETING SEE CUP FOR FULL STORY OF THIS PROJECT REFERRED BACK TO STAFF ON 10/9/08 AT BOFS FOR APPLICANT TO DETERMINE COURSE OF ACTION	32/27-36	295-120-48	,160.00
12495, 12496	DELGADO BY JAIME SANDOVAL	W/S UNION AVE, 5/8 MILE S/O BEAR MT	8.1 TO 5.7/2.3; ZC TO E(5)	GPA, ZCC		143	31	64	FALSE	REF ZC DB#12496	31/28-31	185-342-08	, 21.18
12497, 12498	JOSE RAMOS BY JAIME SANDOVAL	W/S UNION AVE, 1/2 MI S/O BEAR MT	8.1 TO 5.7/2.3; ZC TO E(5)	GPA, ZCC		143	31	64	FALSE	REF ZC DB#12498	31/28-31	185-342-09	, 21.18
12626, 12859	99 HOUGHTON LLC BY MCINTOSH & ASSOC	NEC HOUGHTON AND 99	RI-A TO SI, LI, GC & HC	GPA, ZCC		143	7	64	FALSE	SEE CASE ID 12859 & 12860 FOR ZCC & AG. PRESERVE EXCLUSION	31/28-07	702-870-02	,306.00
12681, 12682	SANTOS GARCIA BY HANSEN ENGINEERING	8520 E PANAMA LANE	GPA FROM LMR TO LI; ZCC FROM A-1 TO M-1	GPA, ZCC		125	19	63	FALSE	SEE CASE ID 12682 FOR ZCC REQUEST PROJECT HAS MULTIPLE VIOLATIONS AND NEEDS TO BE SET FOR A VIOLATION HEARING.	30/29-19	178-050-07	, 5.00
12700, 12701	JON MOULE	NEC OF PROGRESS RD & SHAFTER RD.	GPA FROM R-IA TO RR; ZCC A TO E 2 1/2	GPA; ZCC		142	17	64	FALSE	SEE CASE ID 12701 FOR ZCC	31/27-17	184-420-04	, 20.00

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
13606, 13607, 13608	VARELA, MARIA/HANSEN ENGINEERING	5807 COTTONWOOD	GPA TO RR; ZC TO E(20) RS; CUP FOR SPORTING EVENTS	GPA, ZCC, CUP		124		70	FALSE	$ SUBMITTED 3/1/11 PROCESSING WITH ZCC (DATABASE 13607) AND CUP (DATABASE 13608) INITIALLY ASSIGNED TO LORINE; REASSIGNED TO ROB 4/13/12	30/28-21	414-210-16	, 20.00
13618, 13617	BAKERSFIELD LAND COMPANY LLC BY DELMARTER	COSTAJO AND BEAR MTN	RR TO HC; A-1 TO CH PD	GPA, ZCC	9, 15	143	19	55	FALSE	ADDENDUM NEG DEC ON PROJECT TO THE SOUTH? 3rd review complete 8/3/11; Changed request to M-1 PD prior to PC hearing.	31/28-19	185-321-16	, 20.00
13966, 13967	CEI Engineering Assoc INC	SR 184 and DiGiorgio Rd	Big Box Retail (Walmart). Includes: GPA, ZCC, PD Plan, Exclusion from Ag Preserve #13	GPA, ZCC		144	7	62	FALSE	Counter sent out EIR letter in summer 2012; Response from Application 11/12/12; 2nd Prelim Review Letter (by Paul S) sent out 12/4/12 requesting fees. Waiting for response.		188-270-11	, 0.00
14066, 14067	Nolan Campbell	13308 S Union Ave	Truck and Oil Related Equipment Storage. Metro Bakersfield GPA from ER to Mineral and Petroleum; ZC from E1 to NR	GPA; ZCC		143		74	FALSE	Also being processed with #14067 Assigned to Mike on 12/13/2012 This may be in violation unless a determination of legal nonconforming use can be made 14-Day termination letter sent on 2/24/2014 Contacted by applicant (Margaret Campbell) and wants to keep request going. She indicated there are no violations after they were cited by APCD for sandblasting equipment without permits. Conduct site visit to determine. 2/27/2014 Reassigned to John on 2/27/2014		185-220-12	, 0.00
14252, 14253, 14254, 14256, 14257	61LK 8ME, LLC	SEC of Muller and Tejon	Solar	CUP		125		75	FALSE	Also see Case ID# 14252, 14253, 14254, 14255, 14256, 14257, 14482	30/29-	177-230-33	,160.00
14268, 14269	Salvador Cruz	NWC of Taft Hwy and Cerro Dr	from GC to SI; C-2 to M-2 PD	GPA; ZCC		123	36, 23	31	FALSE	Code compliance violation C052111 for operating a MMD Assigned to James 10/4/2013 Reassigned to Randall 11/05/2013 No response as of 6/13/2014 Send termination letter	30/27-36	514-211-10	, 0.12
14314, 14315	Munn & Fong Chau	NW Corner of Taft Hwy & Michele Rd	GPA from SR to GC; ZCC from E(1) to C-2 PD	GPA, ZCC		123	36	31	FALSE	Assigned to Cassie See Case 14314 GPA related case Reassinged to Randall 2/27/2014	30/27-36	514-060-10	, 6.78
14329, 14330	Aurelio Reyna	3101 Weedpatch Highway	ZCC from E (2 1/2) to A-1; Ag. Trucking Facility	ZCC, CUP		125	07	74	FALSE	Assigned to John D on 01/07/2014 Also see Case ID No 14329 Spoke with applicant on 1/27/2014 informing that a new site plan was required No response as of 6/13/2014	30/29-07	177-182-30	, 2.55
14370, 14394, 14369	Gulzar Dhindsa	9500 Wible, Bakersfield	GPA for consistency, in conjunction with Ag Trucking CUP; ZCC from A-1 to M-1; Ag Trucking Facility	GPA, ZCC, CUP		123	36	79	FALSE	Also see Case ID #14370, 14394, 14369 CBM mailed prelim for GPA and CUP 5/22/2013 CVDZ mailed termination letter 12/11/2013 applicant responded 12/19/2013 to delay termination MND studies submitted 02/2014 Applicant added ZC request 3/25/2014 Assigned to Ops 5/8/2014 Assigned to Roque 5/8/2014	30/27-36	514-050-03	, 0.00
14384, 14383	Sadiem LLC	NE corner of Union and Fairview	GPA from SI to HI; ZCC to M-3 PD	GPA, ZCC		124	20	78	FALSE	ZCC for one of the three parcels processed in conjunction	30/28-20	414-140-02	, 4.60, 3.93

CaseID	Name	ProjectLocation	Request	CaseTypeCode	NUMBER	MAP	SECTION	PlannerID	CaseClosed	Notes	TownshipRangeSection	APN	Acreage
14430, 14431	Joshau Huff	113 Pepper Drive	GPA from 5.4 to 7.1; ZCC from A-1 to ?	SPA, ZCC		124, 125	11, 04	78	FALSE		30/29-04	388-290-24	, 2.11
14517, 14518	Gregory O. Black	Curtis Drive E. of Allens	ZCC R-1 to M-1, GPA HMR to SI, and ZM for 8 foot block wall where 6 ft the max	GPA, ZCC		124	7	74	FALSE	Also see Case ID 14517, 14518, 14519 Assigned to John 9/9/2014	30/28-07	166-291-07	, 0.28
14525, 14526	Felipe Laines Alfaro	1955 E. Panama Lane	GPA from ER to LI; ZCC to M-1 in conjunction with GPA to SI	GPA, ZCC		124		69	FALSE	Assigned to Patty 9/16/2014	30/28-28	518-010-06	, 10.43
14591, 14590	Thomas Buttgenbach, 61LK 8ME LLC	SE corner of Commanche & Panama; SE corner of Comanche & Panama;	Circulation Element- Remove midsection and section lines; 30 megawatt solar	GPA, CUP		125		51	FALSE		30/29-26	178-190-30	,158.00
14592, 14593	Thomas Buttgenbach, 61LK 8ME LLC	NW corner of Tower Line and Hermosa	Circulation Element- Remove designated section and midsections lines; 30 Megawatt Solar Farm	GPA, CUP		125		51	FALSE		30/29-13; 20/18-13	177-230-24	,161.00
14636, 14637	Dennis Rushing	SW corner of S. Union and Torro Cou	ZC and GPA, Gpa is 5.7/2.3 to 5.6/2.3; E (2 1/2) RS MH	GPA, ZCC		143	30	69	FALSE	Also Case ID 14636 and 14637 Assigned to Patty 2/13/2015	30/31-28	185-520-22	, 5.28

Appendix B

Intersection Levels of Service Calculations

Panama Lane and SR 99 Southbound Ramp – AM Peak

Panama Lane and SR 99 Southbound Ramp – PM Peak

Panama Lane and SR 99 Northbound Ramp – AM Peak

Panama Lane and SR 99 Northbound Ramp – PM Peak

Panama Lane and South H Street – AM Peak

Panama Lane and South H Street – PM Peak

Panama Lane and South Union Avenue – AM Peak

Panama Lane and South Union Avenue – PM Peak

Panama Lane and Cottonwood Road – AM Peak

Panama Lane and Cottonwood Road – PM Peak

Hosking Road and Hughes Lane – AM Peak

Hosking Road and Hughes Lane – PM Peak

Hosking Road and SR 99 Southbound Ramp – AM Peak

Hosking Road and SR 99 Southbound Ramp – PM Peak

Hosking Road and SR 99 Northbound Ramp – AM Peak

Hosking Road and SR 99 Northbound Ramp – PM Peak

Hosking Road and South H Street – AM Peak

Hosking Road and South H Street – PM Peak

Hosking Road and South Union Avenue – AM Peak

Hosking Road and South Union Avenue – PM Peak

Taft Highway and Wible Road – AM Peak

Taft Highway and Wible Road – PM Peak

Taft Highway and SR 99 Southbound Ramp/Compagnoni Street – AM Peak

Taft Highway and SR 99 Southbound Ramp/Compagnoni Street – PM Peak

Taft Highway and South H Street – AM Peak

Taft Highway and South H Street – PM Peak

Appendix B (continued)

Taft Highway and South Union Avenue – AM Peak

Taft Highway and South Union Avenue – PM Peak

Taft Highway/Panama Road and Cottonwood Road – AM Peak

Taft Highway/Panama Road and Cottonwood Road – PM Peak

Curnow Road and South Union Avenue – AM Peak

Curnow Road and South Union Avenue – PM Peak

Curnow Road and Cottonwood Road – AM Peak

Curnow Road and Cottonwood Road – PM Peak

DiGiorgio Road and Chevalier Road/Project Entrance #1 – AM Peak

DiGiorgio Road and Chevalier Road/Project Entrance #1 – PM Peak

DiGiorgio Road and South Union Avenue – AM Peak

DiGiorgio Road and South Union Avenue – PM Peak

DiGiorgio Road and Cottonwood Road – AM Peak

DiGiorgio Road and Cottonwood Road – PM Peak

South Union Avenue and Lamb Avenue/Project Entrance #2 – AM Peak

South Union Avenue and Lamb Avenue/Project Entrance #2 – PM Peak

South Union Avenue and Project Entrance #3 – AM Peak

South Union Avenue and Project Entrance #3 – PM Peak

South Union Avenue and Mugsy Road/Project Entrance #4 – AM Peak

South Union Avenue and Mugsy Road/Project Entrance #4 – PM Peak

Houghton Road and Stine Road – AM Peak

Houghton Road and Stine Road – PM Peak

Houghton Road and Wible Road – AM Peak

Houghton Road and Wible Road – PM Peak

Houghton Road and South H Street – AM Peak

Houghton Road and South H Street – PM Peak

Houghton Road and SR 99 Southbound Ramp/Costajo Road – AM Peak

Appendix B (continued)

Houghton Road and SR 99 Southbound Ramp/Costajo Road – PM Peak

Houghton Road and SR 99 Northbound Ramp – AM Peak

Houghton Road and SR 99 Northbound Ramp – PM Peak

Houghton Road and Project Entrance #7 – AM Peak

Houghton Road and Project Entrance #7 – PM Peak

Houghton Road and Chevalier Road/Project Entrance #6 – AM Peak

Houghton Road and Chevalier Road/Project Entrance #6 – PM Peak

Houghton Road and Project Entrance #5 – AM Peak

Houghton Road and Project Entrance #5 – PM Peak

Houghton Road and South Union Avenue – AM Peak

Houghton Road and South Union Avenue – PM Peak

Buena Vista Boulevard and Cottonwood Road – AM Peak

Buena Vista Boulevard and Cottonwood Road – PM Peak

Buena Vista Boulevard and Adobe Road – AM Peak

Buena Vista Boulevard and Adobe Road – PM Peak

South Union Avenue and Shafter Road – AM Peak

South Union Avenue and Shafter Road –PM Peak

Bear Mountain Boulevard/Costajo Road and SR 99 Southbound Ramp – AM Peak

Bear Mountain Boulevard/Costajo Road and SR 99 Southbound Ramp – PM Peak

Bear Mountain Boulevard and Costajo Road – AM Peak

Bear Mountain Boulevard and Costajo Road – PM Peak

Bear Mountain Boulevard and SR 99 Northbound Ramp – AM Peak

Bear Mountain Boulevard and SR 99 Northbound Ramp – PM Peak

Bear Mountain Boulevard and South Union Avenue – AM Peak

Bear Mountain Boulevard and South Union Avenue – PM Peak

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Panama Ln & SR 99 SB Off Ramp - AM Peak
Count Date: 1/29/2015

Ave Annual Growth: **1.70%**

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	798
0	WBR	0
0	EBL	0
3	EBT	1967
0	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
2	SBL	361
0	SBT	0
2	SBR	539
	TOTAL	3665

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	1326
WBR	0
EBL	0
EBT	2813
EBR	0
NBL	0
NBT	0
NBR	0
SBL	447
SBT	0
SBR	700
TOTAL	5286

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	1360
WBR	0
EBL	0
EBT	2813
EBR	0
NBL	0
NBT	0
NBR	0
SBL	447
SBT	0
SBR	700
TOTAL	5320

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	1034
WBR	0
EBL	0
EBT	2361
EBR	0
NBL	0
NBT	0
NBR	0
SBL	403
SBT	0
SBR	616
TOTAL	4414

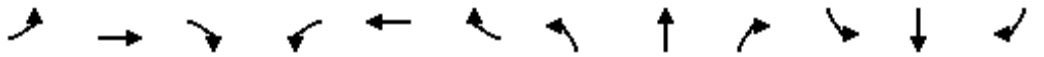
Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	1051
WBR	0
EBL	0
EBT	2361
EBR	0
NBL	0
NBT	0
NBR	0
SBL	403
SBT	0
SBR	616
TOTAL	4431

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	34
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	34

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Ln & SR 99 SB Off Ramp - AM Peak						
	Count Date:	1/29/2015						
2006	ADT							
WB Approach (To)	7.261							
WB Approach (Away)	11.139							
EB Approach (To)	18.569							
EB Approach (Away)	13.338							
NB Approach (To)	*1*							
NB Approach (Away)	2.727							
SB Approach (To)	11.479							
SB Approach (Away)	*10.106*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	17.026		WBL	2.16	WBT	2.07	WBR	1.94
WB Approach (Away)	17.65		2.69%	0	2.52%	1326	2.24%	0
EB Approach (To)	32.361		EBL	1.64	EBT	1.66	EBR	1.86
EB Approach (Away)	24.074		1.72%	0	1.77%	2813	2.16%	0
NB Approach (To)	*1.2*		NBL	1.50	NBT	1.37	NBR	1.39
NB Approach (Away)	5.413		1.34%	0	1.07%	0	1.11%	0
SB Approach (To)	13.317		SBL	1.37	SBT	1.57	SBR	1.48
SB Approach (Away)	15.567		1.06%	447	1.45%	0	1.28%	700



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰↰		↱↱
Traffic Volume (veh/h)	0	1967	0	0	798	0	0	0	0	361	0	539
Future Volume (veh/h)	0	1967	0	0	798	0	0	0	0	361	0	539
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2138	0	0	867	0				392	0	586
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2668	0	0	2668	0				933	0	755
Arrive On Green	0.00	0.52	0.00	0.00	0.52	0.00				0.27	0.00	0.27
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2138	0	0	867	0				392	0	586
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	17.7	0.0	0.0	5.0	0.0				4.8	0.0	10.0
Cycle Q Clear(g_c), s	0.0	17.7	0.0	0.0	5.0	0.0				4.8	0.0	10.0
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2668	0	0	2668	0				933	0	755
V/C Ratio(X)	0.00	0.80	0.00	0.00	0.32	0.00				0.42	0.00	0.78
Avail Cap(c_a), veh/h	0	2721	0	0	2721	0				1138	0	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.0	0.0	0.0	7.0	0.0				15.4	0.0	17.3
Incr Delay (d2), s/veh	0.0	1.8	0.0	0.0	0.1	0.0				0.3	0.0	3.4
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(50%),veh/ln	0.0	8.6	0.0	0.0	2.3	0.0				2.3	0.0	4.2
LnGrp Delay(d),s/veh	0.0	11.8	0.0	0.0	7.1	0.0				15.7	0.0	20.7
LnGrp LOS		B			A					B		C
Approach Vol, veh/h		2138			867						978	
Approach Delay, s/veh		11.8			7.1						18.7	
Approach LOS		B			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				31.5		19.9		31.5
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				27.5		17.0		27.5
Max Q Clear Time (g_c+I1), s				19.7		12.0		7.0
Green Ext Time (p_c), s				7.2		2.0		17.6

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2361	0	0	1034	0	0	0	0	403	0	616
Future Volume (veh/h)	0	2361	0	0	1034	0	0	0	0	403	0	616
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2566	0	0	1124	0				438	0	670
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2783	0	0	2783	0				949	0	768
Arrive On Green	0.00	0.55	0.00	0.00	0.55	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2566	0	0	1124	0				438	0	670
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	27.3	0.0	0.0	7.6	0.0				6.3	0.0	13.6
Cycle Q Clear(g_c), s	0.0	27.3	0.0	0.0	7.6	0.0				6.3	0.0	13.6
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2783	0	0	2783	0				949	0	768
V/C Ratio(X)	0.00	0.92	0.00	0.00	0.40	0.00				0.46	0.00	0.87
Avail Cap(c_a), veh/h	0	2787	0	0	2787	0				987	0	799
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.3	0.0	0.0	7.8	0.0				17.8	0.0	20.5
Incr Delay (d2), s/veh	0.0	5.8	0.0	0.0	0.1	0.0				0.4	0.0	10.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.1	0.0	0.0	3.6	0.0				3.0	0.0	6.3
LnGrp Delay(d),s/veh	0.0	18.0	0.0	0.0	7.9	0.0				18.2	0.0	30.6
LnGrp LOS		B			A					B		C
Approach Vol, veh/h		2566			1124						1108	
Approach Delay, s/veh		18.0			7.9						25.7	
Approach LOS		B			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				37.0		22.3		37.0
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				32.5		17.0		32.5
Max Q Clear Time (g_c+I1), s				29.3		15.6		9.6
Green Ext Time (p_c), s				3.1		0.7		21.4

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰↰		↱↱
Traffic Volume (veh/h)	0	2361	0	0	1051	0	0	0	0	403	0	616
Future Volume (veh/h)	0	2361	0	0	1051	0	0	0	0	403	0	616
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2566	0	0	1142	0				438	0	670
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2783	0	0	2783	0				949	0	768
Arrive On Green	0.00	0.55	0.00	0.00	0.55	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2566	0	0	1142	0				438	0	670
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	27.3	0.0	0.0	7.8	0.0				6.3	0.0	13.6
Cycle Q Clear(g_c), s	0.0	27.3	0.0	0.0	7.8	0.0				6.3	0.0	13.6
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2783	0	0	2783	0				949	0	768
V/C Ratio(X)	0.00	0.92	0.00	0.00	0.41	0.00				0.46	0.00	0.87
Avail Cap(c_a), veh/h	0	2787	0	0	2787	0				987	0	799
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.3	0.0	0.0	7.8	0.0				17.8	0.0	20.5
Incr Delay (d2), s/veh	0.0	5.8	0.0	0.0	0.1	0.0				0.4	0.0	10.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.1	0.0	0.0	3.6	0.0				3.0	0.0	6.3
LnGrp Delay(d),s/veh	0.0	18.0	0.0	0.0	7.9	0.0				18.2	0.0	30.6
LnGrp LOS		B			A					B		C
Approach Vol, veh/h		2566			1142						1108	
Approach Delay, s/veh		18.0			7.9						25.7	
Approach LOS		B			A						C	

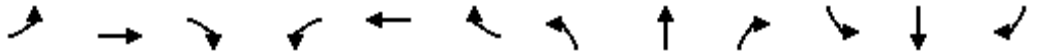
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				37.0		22.3		37.0
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				32.5		17.0		32.5
Max Q Clear Time (g_c+I1), s				29.3		15.6		9.8
Green Ext Time (p_c), s				3.1		0.7		21.3

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2813	0	0	1326	0	0	0	0	447	0	700
Future Volume (veh/h)	0	2813	0	0	1326	0	0	0	0	447	0	700
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	3058	0	0	1441	0				486	0	761
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	3146	0	0	3146	0				860	0	697
Arrive On Green	0.00	0.62	0.00	0.00	0.62	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	3058	0	0	1441	0				486	0	761
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	46.0	0.0	0.0	12.1	0.0				9.9	0.0	20.0
Cycle Q Clear(g_c), s	0.0	46.0	0.0	0.0	12.1	0.0				9.9	0.0	20.0
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3146	0	0	3146	0				860	0	697
V/C Ratio(X)	0.00	0.97	0.00	0.00	0.46	0.00				0.56	0.00	1.09
Avail Cap(c_a), veh/h	0	3147	0	0	3147	0				860	0	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.6	0.0	0.0	8.1	0.0				26.2	0.0	30.0
Incr Delay (d2), s/veh	0.0	10.4	0.0	0.0	0.1	0.0				0.9	0.0	62.0
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(50%),veh/ln	0.0	24.0	0.0	0.0	5.6	0.0				4.8	0.0	13.6
LnGrp Delay(d),s/veh	0.0	25.0	0.0	0.0	8.2	0.0				27.1	0.0	92.0
LnGrp LOS		C			A					C		F
Approach Vol, veh/h		3058			1441						1247	
Approach Delay, s/veh		25.0			8.2						66.7	
Approach LOS		C			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				54.0		26.0		54.0
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				49.5		20.0		49.5
Max Q Clear Time (g_c+I1), s				48.0		22.0		14.1
Green Ext Time (p_c), s				1.5		0.0		34.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰↰		↱↱
Traffic Volume (veh/h)	0	2813	0	0	1360	0	0	0	0	447	0	700
Future Volume (veh/h)	0	2813	0	0	1360	0	0	0	0	447	0	700
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	3058	0	0	1478	0				486	0	761
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	3134	0	0	3134	0				869	0	704
Arrive On Green	0.00	0.62	0.00	0.00	0.62	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	3058	0	0	1478	0				486	0	761
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	46.3	0.0	0.0	12.6	0.0				9.8	0.0	20.2
Cycle Q Clear(g_c), s	0.0	46.3	0.0	0.0	12.6	0.0				9.8	0.0	20.2
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3134	0	0	3134	0				869	0	704
V/C Ratio(X)	0.00	0.98	0.00	0.00	0.47	0.00				0.56	0.00	1.08
Avail Cap(c_a), veh/h	0	3134	0	0	3134	0				869	0	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.8	0.0	0.0	8.3	0.0				26.0	0.0	29.9
Incr Delay (d2), s/veh	0.0	11.1	0.0	0.0	0.1	0.0				0.8	0.0	58.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	24.4	0.0	0.0	5.9	0.0				4.8	0.0	13.4
LnGrp Delay(d),s/veh	0.0	25.8	0.0	0.0	8.4	0.0				26.8	0.0	88.0
LnGrp LOS		C			A					C		F
Approach Vol, veh/h		3058			1478						1247	
Approach Delay, s/veh		25.8			8.4						64.2	
Approach LOS		C			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				53.8		26.2		53.8
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				49.3		20.2		49.3
Max Q Clear Time (g_c+I1), s				48.3		22.2		14.6
Green Ext Time (p_c), s				1.0		0.0		33.8

Intersection Summary	
HCM 2010 Ctrl Delay	29.6
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Panama Ln & SR 99 SB Off Ramp - PM Peak

Count Date: 1/29/2015

Ave Annual Growth: **1.70%**

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	1115
0	WBR	0
0	EBL	0
3	EBT	1728
0	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
2	SBL	746
0	SBT	0
2	SBR	1207
	TOTAL	4796

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	1853
WBR	0
EBL	0
EBT	2471
EBR	0
NBL	0
NBT	0
NBR	0
SBL	925
SBT	0
SBR	1567
TOTAL	6816

Year 2035 Fut. Vol

+ Project Traffic

WBL	0
WBT	1891
WBR	0
EBL	0
EBT	2471
EBR	0
NBL	0
NBT	0
NBR	0
SBL	925
SBT	0
SBR	1567
TOTAL	6854

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	1445
WBR	0
EBL	0
EBT	2074
EBR	0
NBL	0
NBT	0
NBR	0
SBL	832
SBT	0
SBR	1379
TOTAL	5730

Year 2025 Fut. Vol

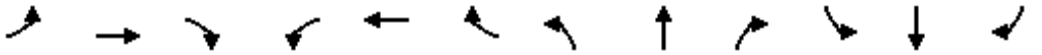
+ Project Traffic

WBL	0
WBT	1464
WBR	0
EBL	0
EBT	2074
EBR	0
NBL	0
NBT	0
NBR	0
SBL	832
SBT	0
SBR	1379
TOTAL	5749

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	38
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	38

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Ln & SR 99 SB Off Ramp - PM Peak						
	Count Date:	1/29/2015						
2006	ADT							
WB Approach (To)	7.261							
WB Approach (Away)	11.139							
EB Approach (To)	18.569							
EB Approach (Away)	13.338							
NB Approach (To)	*1*							
NB Approach (Away)	2.727							
SB Approach (To)	11.479							
SB Approach (Away)	*10.106*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	17.026		WBL	2.16	WBT	2.07	WBR	1.94
WB Approach (Away)	17.65		2.69%	0	2.52%	1853	2.24%	0
EB Approach (To)	32.361		EBL	1.64	EBT	1.66	EBR	1.86
EB Approach (Away)	24.074		1.72%	0	1.77%	2471	2.16%	0
NB Approach (To)	*1.2*		NBL	1.50	NBT	1.37	NBR	1.39
NB Approach (Away)	5.413		1.34%	0	1.07%	0	1.11%	0
SB Approach (To)	13.317		SBL	1.37	SBT	1.57	SBR	1.48
SB Approach (Away)	15.567		1.06%	925	1.45%	0	1.28%	1567



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1728	0	0	1115	0	0	0	0	746	0	1207
Future Volume (veh/h)	0	1728	0	0	1115	0	0	0	0	746	0	1207
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	1878	0	0	1212	0				811	0	1312
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2132	0	0	2132	0				1596	0	1292
Arrive On Green	0.00	0.42	0.00	0.00	0.42	0.00				0.46	0.00	0.46
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	1878	0	0	1212	0				811	0	1312
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	30.5	0.0	0.0	16.3	0.0				14.8	0.0	41.6
Cycle Q Clear(g_c), s	0.0	30.5	0.0	0.0	16.3	0.0				14.8	0.0	41.6
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2132	0	0	2132	0				1596	0	1292
V/C Ratio(X)	0.00	0.88	0.00	0.00	0.57	0.00				0.51	0.00	1.02
Avail Cap(c_a), veh/h	0	2148	0	0	2148	0				1596	0	1292
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	24.0	0.0	0.0	19.9	0.0				16.9	0.0	24.1
Incr Delay (d2), s/veh	0.0	4.6	0.0	0.0	0.4	0.0				0.3	0.0	28.9
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(50%),veh/ln	0.0	15.2	0.0	0.0	7.7	0.0				7.0	0.0	21.0
LnGrp Delay(d),s/veh	0.0	28.6	0.0	0.0	20.2	0.0				17.1	0.0	53.0
LnGrp LOS		C			C					B		F
Approach Vol, veh/h		1878			1212						2123	
Approach Delay, s/veh		28.6			20.2						39.3	
Approach LOS		C			C						D	

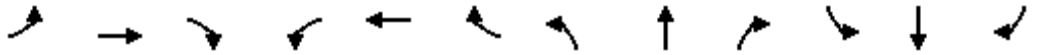
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				42.1		47.6		42.1
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				37.9		41.6		37.9
Max Q Clear Time (g_c+I1), s				32.5		43.6		18.3
Green Ext Time (p_c), s				5.1		0.0		17.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2074	0	0	1445	0	0	0	0	832	0	1379
Future Volume (veh/h)	0	2074	0	0	1445	0	0	0	0	832	0	1379
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2254	0	0	1571	0				904	0	1499
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2121	0	0	2121	0				1645	0	1332
Arrive On Green	0.00	0.42	0.00	0.00	0.42	0.00				0.48	0.00	0.48
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2254	0	0	1571	0				904	0	1499
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	41.7	0.0	0.0	26.1	0.0				18.6	0.0	47.8
Cycle Q Clear(g_c), s	0.0	41.7	0.0	0.0	26.1	0.0				18.6	0.0	47.8
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2121	0	0	2121	0				1645	0	1332
V/C Ratio(X)	0.00	1.06	0.00	0.00	0.74	0.00				0.55	0.00	1.13
Avail Cap(c_a), veh/h	0	2121	0	0	2121	0				1645	0	1332
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.1	0.0	0.0	24.6	0.0				18.5	0.0	26.1
Incr Delay (d2), s/veh	0.0	38.8	0.0	0.0	1.4	0.0				0.4	0.0	66.7
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(50%),veh/ln	0.0	27.1	0.0	0.0	12.4	0.0				8.9	0.0	30.7
LnGrp Delay(d),s/veh	0.0	67.9	0.0	0.0	26.0	0.0				18.9	0.0	92.8
LnGrp LOS		F			C					B		F
Approach Vol, veh/h		2254			1571						2403	
Approach Delay, s/veh		67.9			26.0						65.0	
Approach LOS		E			C						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				46.2		53.8		46.2
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				41.7		47.8		41.7
Max Q Clear Time (g_c+I1), s				43.7		49.8		28.1
Green Ext Time (p_c), s				0.0		0.0		13.1

Intersection Summary	
HCM 2010 Ctrl Delay	56.2
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰↑		↱↱
Traffic Volume (veh/h)	0	2074	0	0	1464	0	0	0	0	832	0	1379
Future Volume (veh/h)	0	2074	0	0	1464	0	0	0	0	832	0	1379
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2254	0	0	1591	0				904	0	1499
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2121	0	0	2121	0				1645	0	1332
Arrive On Green	0.00	0.42	0.00	0.00	0.42	0.00				0.48	0.00	0.48
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2254	0	0	1591	0				904	0	1499
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	41.7	0.0	0.0	26.5	0.0				18.6	0.0	47.8
Cycle Q Clear(g_c), s	0.0	41.7	0.0	0.0	26.5	0.0				18.6	0.0	47.8
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2121	0	0	2121	0				1645	0	1332
V/C Ratio(X)	0.00	1.06	0.00	0.00	0.75	0.00				0.55	0.00	1.13
Avail Cap(c_a), veh/h	0	2121	0	0	2121	0				1645	0	1332
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.1	0.0	0.0	24.7	0.0				18.5	0.0	26.1
Incr Delay (d2), s/veh	0.0	38.8	0.0	0.0	1.5	0.0				0.4	0.0	66.7
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(50%),veh/ln	0.0	27.1	0.0	0.0	12.7	0.0				8.9	0.0	30.7
LnGrp Delay(d),s/veh	0.0	67.9	0.0	0.0	26.3	0.0				18.9	0.0	92.8
LnGrp LOS		F			C					B		F
Approach Vol, veh/h		2254			1591						2403	
Approach Delay, s/veh		67.9			26.3						65.0	
Approach LOS		E			C						E	

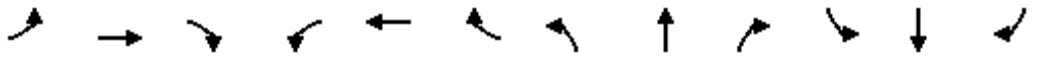
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				46.2		53.8		46.2
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				41.7		47.8		41.7
Max Q Clear Time (g_c+I1), s				43.7		49.8		28.5
Green Ext Time (p_c), s				0.0		0.0		12.7

Intersection Summary	
HCM 2010 Ctrl Delay	56.2
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2471	0	0	1853	0	0	0	0	925	0	1567
Future Volume (veh/h)	0	2471	0	0	1853	0	0	0	0	925	0	1567
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2686	0	0	2014	0				1005	0	1703
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2234	0	0	2234	0				1672	0	1354
Arrive On Green	0.00	0.44	0.00	0.00	0.44	0.00				0.49	0.00	0.49
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2686	0	0	2014	0				1005	0	1703
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	61.5	0.0	0.0	51.5	0.0				29.7	0.0	68.0
Cycle Q Clear(g_c), s	0.0	61.5	0.0	0.0	51.5	0.0				29.7	0.0	68.0
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2234	0	0	2234	0				1672	0	1354
V/C Ratio(X)	0.00	1.20	0.00	0.00	0.90	0.00				0.60	0.00	1.26
Avail Cap(c_a), veh/h	0	2234	0	0	2234	0				1672	0	1354
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	39.3	0.0	0.0	36.4	0.0				26.2	0.0	36.0
Incr Delay (d2), s/veh	0.0	95.6	0.0	0.0	5.5	0.0				0.6	0.0	122.3
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(50%),veh/ln	0.0	48.5	0.0	0.0	25.2	0.0				14.2	0.0	49.1
LnGrp Delay(d),s/veh	0.0	134.9	0.0	0.0	42.0	0.0				26.8	0.0	158.3
LnGrp LOS		F			D					C		F
Approach Vol, veh/h		2686			2014						2708	
Approach Delay, s/veh		134.9			42.0						109.5	
Approach LOS		F			D						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				66.0		74.0		66.0
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				61.5		68.0		61.5
Max Q Clear Time (g_c+I1), s				63.5		70.0		53.5
Green Ext Time (p_c), s				0.0		0.0		8.0

Intersection Summary	
HCM 2010 Ctrl Delay	100.4
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰↑		↱↱
Traffic Volume (veh/h)	0	2471	0	0	1891	0	0	0	0	925	0	1567
Future Volume (veh/h)	0	2471	0	0	1891	0	0	0	0	925	0	1567
Number	7	4	14	3	8	18				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	0	1863	0	0	1863	0				1863	0	1863
Adj Flow Rate, veh/h	0	2686	0	0	2055	0				1005	0	1703
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	0	0	2	0				2	0	2
Cap, veh/h	0	2254	0	0	2254	0				1675	0	1356
Arrive On Green	0.00	0.44	0.00	0.00	0.44	0.00				0.49	0.00	0.49
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	2686	0	0	2055	0				1005	0	1703
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	66.5	0.0	0.0	56.6	0.0				31.8	0.0	73.0
Cycle Q Clear(g_c), s	0.0	66.5	0.0	0.0	56.6	0.0				31.8	0.0	73.0
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2254	0	0	2254	0				1675	0	1356
V/C Ratio(X)	0.00	1.19	0.00	0.00	0.91	0.00				0.60	0.00	1.26
Avail Cap(c_a), veh/h	0	2254	0	0	2254	0				1675	0	1356
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	41.8	0.0	0.0	39.0	0.0				27.9	0.0	38.5
Incr Delay (d2), s/veh	0.0	90.8	0.0	0.0	6.1	0.0				0.6	0.0	121.3
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(50%),veh/ln	0.0	50.1	0.0	0.0	27.7	0.0				15.2	0.0	50.9
LnGrp Delay(d),s/veh	0.0	132.6	0.0	0.0	45.1	0.0				28.5	0.0	159.8
LnGrp LOS		F			D					C		F
Approach Vol, veh/h		2686			2055						2708	
Approach Delay, s/veh		132.6			45.1						111.1	
Approach LOS		F			D						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				71.0		79.0		71.0
Change Period (Y+Rc), s				4.5		6.0		4.5
Max Green Setting (Gmax), s				66.5		73.0		66.5
Max Q Clear Time (g_c+I1), s				68.5		75.0		58.6
Green Ext Time (p_c), s				0.0		0.0		7.8

Intersection Summary	
HCM 2010 Ctrl Delay	100.6
HCM 2010 LOS	F

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Panama Ln & SR 99 NB - AM Peak

Count Date: 1/29/2015

Ave Annual Growth: **1.76%**

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	794
1	WBR	0
0	EBL	0
3	EBT	1045
1	EBR	0
1	NBL	104
0	NBT	0
1	NBR	67
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	2010

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	1228
WBR	0
EBL	0
EBT	1448
EBR	0
NBL	197
NBT	0
NBR	111
SBL	0
SBT	0
SBR	0
TOTAL	2984

Year 2035 Fut. Vol

+ Project Traffic

WBL	0
WBT	1231
WBR	0
EBL	0
EBT	1448
EBR	0
NBL	228
NBT	0
NBR	111
SBL	0
SBT	0
SBR	0
TOTAL	3018

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	992
WBR	0
EBL	0
EBT	1234
EBR	0
NBL	144
NBT	0
NBR	87
SBL	0
SBT	0
SBR	0
TOTAL	2457

Year 2025 Fut. Vol

+ Project Traffic

WBL	0
WBT	994
WBR	0
EBL	0
EBT	1234
EBR	0
NBL	160
NBT	0
NBR	87
SBL	0
SBT	0
SBR	0
TOTAL	2475

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	3
WBR	0
EBL	0
EBT	0
EBR	0
NBL	31
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	34

	Project:	99 Houghton, LLC						
	Job No:	6012.01						
	Intersection:	Panama Ln & SR 99 NB - AM Peak						
	Count Date:	1/29/2015						
2006	ADT							
WB Approach (To)	13.689							
WB Approach (Away)	11.315							
EB Approach (To)	11.139							
EB Approach (Away)	7.261							
NB Approach (To)	2.393							
NB Approach (Away)	0.174							
SB Approach (To)	*1*							
SB Approach (Away)	8.47							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	20.124		WBL	1.75	WBT	1.91	WBR	1.24
WB Approach (Away)	18.044		1.91%	0	2.16%	1228	0.69%	0
EB Approach (To)	17.65		EBL	1.30	EBT	1.59	EBR	1.81
EB Approach (Away)	17.026		0.83%	0	1.61%	1448	2.04%	0
NB Approach (To)	6.252		NBL	2.48	NBT	1.81	NBR	2.10
NB Approach (Away)	0.354		3.17%	197	1.71%	0	2.49%	111
SB Approach (To)	*1.2*		SBL	1.40	SBT	1.62	SBR	1.77
SB Approach (Away)	8.601		1.13%	0	1.55%	0	1.81%	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1045	0	0	794	104	67
Future Volume (veh/h)	1045	0	0	794	104	67
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1136	0	0	863	113	73
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1883	0	0	1883	670	598
Arrive On Green	0.37	0.00	0.00	0.37	0.38	0.38
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	1136	0	0	863	113	73
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	8.6	0.0	0.0	6.1	2.0	1.4
Cycle Q Clear(g_c), s	8.6	0.0	0.0	6.1	2.0	1.4
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1883	0	0	1883	670	598
V/C Ratio(X)	0.60	0.00	0.00	0.46	0.17	0.12
Avail Cap(c_a), veh/h	2135	0	0	2135	670	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.2	0.0	0.0	11.4	9.8	9.7
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	0.0	2.8	1.1	0.7
LnGrp Delay(d),s/veh	12.5	0.0	0.0	11.6	10.4	10.1
LnGrp LOS	B			B	B	B
Approach Vol, veh/h	1136			863	186	
Approach Delay, s/veh	12.5			11.6	10.3	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		23.6				23.6
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		20.0				20.0
Max Q Clear Time (g_c+I1), s		4.0		10.6				8.1
Green Ext Time (p_c), s		0.4		7.0				8.5

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1234	0	0	992	144	87
Future Volume (veh/h)	1234	0	0	992	144	87
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1341	0	0	1078	157	95
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1885	0	0	1885	684	611
Arrive On Green	0.37	0.00	0.00	0.37	0.39	0.39
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	1341	0	0	1078	157	95
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	11.1	0.0	0.0	8.3	2.9	1.9
Cycle Q Clear(g_c), s	11.1	0.0	0.0	8.3	2.9	1.9
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1885	0	0	1885	684	611
V/C Ratio(X)	0.71	0.00	0.00	0.57	0.23	0.16
Avail Cap(c_a), veh/h	1962	0	0	1962	684	611
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	0.0	12.4	10.2	9.9
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.4	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.0	0.0	4.0	1.6	0.9
LnGrp Delay(d),s/veh	14.4	0.0	0.0	12.8	11.0	10.4
LnGrp LOS	B			B	B	B
Approach Vol, veh/h	1341			1078	252	
Approach Delay, s/veh	14.4			12.8	10.8	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		24.3				24.3
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		19.0		19.0				19.0
Max Q Clear Time (g_c+I1), s		4.9		13.1				10.3
Green Ext Time (p_c), s		0.6		5.1				7.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1234	0	0	994	160	87
Future Volume (veh/h)	1234	0	0	994	160	87
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1341	0	0	1080	174	95
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	1885	0	0	1885	684	611
Arrive On Green	0.37	0.00	0.00	0.37	0.39	0.39
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	1341	0	0	1080	174	95
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	11.1	0.0	0.0	8.4	3.3	1.9
Cycle Q Clear(g_c), s	11.1	0.0	0.0	8.4	3.3	1.9
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1885	0	0	1885	684	611
V/C Ratio(X)	0.71	0.00	0.00	0.57	0.25	0.16
Avail Cap(c_a), veh/h	1962	0	0	1962	684	611
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	12.4	10.3	9.9
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.4	0.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.0	0.0	4.0	1.8	0.9
LnGrp Delay(d),s/veh	14.4	0.0	0.0	12.8	11.2	10.4
LnGrp LOS	B			B	B	B
Approach Vol, veh/h	1341			1080	269	
Approach Delay, s/veh	14.4			12.8	10.9	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		24.3				24.3
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		19.0		19.0				19.0
Max Q Clear Time (g_c+I1), s		5.3		13.1				10.4
Green Ext Time (p_c), s		0.7		5.2				7.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1448	0	0	1228	197	111
Future Volume (veh/h)	1448	0	0	1228	197	111
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1574	0	0	1335	214	121
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2017	0	0	2017	642	573
Arrive On Green	0.40	0.00	0.00	0.40	0.36	0.36
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	1574	0	0	1335	214	121
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	13.4	0.0	0.0	10.7	4.4	2.6
Cycle Q Clear(g_c), s	13.4	0.0	0.0	10.7	4.4	2.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2017	0	0	2017	642	573
V/C Ratio(X)	0.78	0.00	0.00	0.66	0.33	0.21
Avail Cap(c_a), veh/h	2046	0	0	2046	642	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	0.0	12.3	11.5	11.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.8	1.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.0	0.0	5.1	2.4	1.3
LnGrp Delay(d),s/veh	15.1	0.0	0.0	13.1	12.9	11.8
LnGrp LOS	B			B	B	B
Approach Vol, veh/h	1574			1335	335	
Approach Delay, s/veh	15.1			13.1	12.5	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		25.7				25.7
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		20.0				20.0
Max Q Clear Time (g_c+I1), s		6.4		15.4				12.7
Green Ext Time (p_c), s		0.8		4.3				6.7

Intersection Summary	
HCM 2010 Ctrl Delay	14.0
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1448	0	0	1231	228	111
Future Volume (veh/h)	1448	0	0	1231	228	111
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1574	0	0	1338	248	121
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2017	0	0	2017	642	573
Arrive On Green	0.40	0.00	0.00	0.40	0.36	0.36
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	1574	0	0	1338	248	121
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	13.4	0.0	0.0	10.7	5.2	2.6
Cycle Q Clear(g_c), s	13.4	0.0	0.0	10.7	5.2	2.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2017	0	0	2017	642	573
V/C Ratio(X)	0.78	0.00	0.00	0.66	0.39	0.21
Avail Cap(c_a), veh/h	2046	0	0	2046	642	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	0.0	12.3	11.8	11.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.8	1.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.0	0.0	5.1	2.8	1.3
LnGrp Delay(d),s/veh	15.1	0.0	0.0	13.1	13.5	11.8
LnGrp LOS	B			B	B	B
Approach Vol, veh/h	1574			1338	369	
Approach Delay, s/veh	15.1			13.1	13.0	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		25.7				25.7
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		20.0				20.0
Max Q Clear Time (g_c+I1), s		7.2		15.4				12.7
Green Ext Time (p_c), s		0.9		4.3				6.7

Intersection Summary	
HCM 2010 Ctrl Delay	14.0
HCM 2010 LOS	B

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Panama Ln & SR 99 NB Off Ramp- PM Peak

Count Date: 1/29/2015

Ave Annual Growth: **1.76%**

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	984
1	WBR	
0	EBL	0
3	EBT	1748
1	EBR	
1	NBL	171
0	NBT	0
1	NBR	164
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	3067

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	1522
WBR	0
EBL	0
EBT	2422
EBR	0
NBL	324
NBT	0
NBR	271
SBL	0
SBT	0
SBR	0
TOTAL	4539

Year 2035 Fut. Vol

+ Project Traffic

WBL	0
WBT	1528
WBR	0
EBL	0
EBT	2422
EBR	0
NBL	356
NBT	0
NBR	272
SBL	0
SBT	0
SBR	0
TOTAL	4578

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	1229
WBR	0
EBL	0
EBT	2065
EBR	0
NBL	237
NBT	0
NBR	212
SBL	0
SBT	0
SBR	0
TOTAL	3743

Year 2025 Fut. Vol

+ Project Traffic

WBL	0
WBT	1232
WBR	0
EBL	0
EBT	2065
EBR	0
NBL	253
NBT	0
NBR	213
SBL	0
SBT	0
SBR	0
TOTAL	3763

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	6
WBR	0
EBL	0
EBT	0
EBR	0
NBL	32
NBT	0
NBR	1
SBL	0
SBT	0
SBR	0
TOTAL	39

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Ln & SR 99 NB Off Ramp- PM Peak						
	Count Date:	1/29/2015						
2006	ADT							
WB Approach (To)	13.689							
WB Approach (Away)	11.315							
EB Approach (To)	11.139							
EB Approach (Away)	7.261							
NB Approach (To)	2.393							
NB Approach (Away)	0.174							
SB Approach (To)	*1*							
SB Approach (Away)	8.47							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	20.124		WBL	1.75	WBT	1.91	WBR	1.24
WB Approach (Away)	18.044		1.91%	0	2.16%	1522	0.69%	0
EB Approach (To)	17.65		EBL	1.30	EBT	1.59	EBR	1.81
EB Approach (Away)	17.026		0.83%	0	1.61%	2422	2.04%	0
NB Approach (To)	6.252		NBL	2.48	NBT	1.81	NBR	2.10
NB Approach (Away)	0.354		3.17%	324	1.71%	0	2.49%	271
SB Approach (To)	*1.2*		SBL	1.40	SBT	1.62	SBR	1.77
SB Approach (Away)	8.601		1.13%	0	1.55%	0	1.81%	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1748	0	0	984	171	164
Future Volume (veh/h)	1748	0	0	984	171	164
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	1900	0	0	1070	186	178
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2296	0	0	2296	584	521
Arrive On Green	0.45	0.00	0.00	0.45	0.33	0.33
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	1900	0	0	1070	186	178
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	17.9	0.0	0.0	8.0	4.3	4.6
Cycle Q Clear(g_c), s	17.9	0.0	0.0	8.0	4.3	4.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2296	0	0	2296	584	521
V/C Ratio(X)	0.83	0.00	0.00	0.47	0.32	0.34
Avail Cap(c_a), veh/h	2324	0	0	2324	584	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	0.0	10.4	13.8	13.9
Incr Delay (d2), s/veh	2.6	0.0	0.0	0.1	1.4	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	0.0	0.0	3.7	2.3	2.3
LnGrp Delay(d),s/veh	15.7	0.0	0.0	10.6	15.2	15.7
LnGrp LOS	B			B	B	B
Approach Vol, veh/h	1900			1070	364	
Approach Delay, s/veh	15.7			10.6	15.4	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		30.7				30.7
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		6.6		19.9				10.0
Green Ext Time (p_c), s		0.9		4.8				13.2

Intersection Summary	
HCM 2010 Ctrl Delay	14.0
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2065	0	0	1229	237	212
Future Volume (veh/h)	2065	0	0	1229	237	212
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	2245	0	0	1336	258	230
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2538	0	0	2538	533	476
Arrive On Green	0.50	0.00	0.00	0.50	0.30	0.30
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	2245	0	0	1336	258	230
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	23.7	0.0	0.0	10.7	7.1	7.1
Cycle Q Clear(g_c), s	23.7	0.0	0.0	10.7	7.1	7.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2538	0	0	2538	533	476
V/C Ratio(X)	0.88	0.00	0.00	0.53	0.48	0.48
Avail Cap(c_a), veh/h	2547	0	0	2547	533	476
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	0.0	10.2	17.1	17.1
Incr Delay (d2), s/veh	4.1	0.0	0.0	0.2	3.1	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	0.0	0.0	5.0	3.9	3.5
LnGrp Delay(d),s/veh	17.5	0.0	0.0	10.4	20.3	20.6
LnGrp LOS	B			B	C	C
Approach Vol, veh/h	2245			1336	488	
Approach Delay, s/veh	17.5			10.4	20.4	
Approach LOS	B			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		35.9				35.9
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		9.1		25.7				12.7
Green Ext Time (p_c), s		1.1		4.2				16.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.5
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2065	0	0	1232	253	213
Future Volume (veh/h)	2065	0	0	1232	253	213
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	2245	0	0	1339	275	232
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2538	0	0	2538	533	476
Arrive On Green	0.50	0.00	0.00	0.50	0.30	0.30
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	2245	0	0	1339	275	232
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	23.7	0.0	0.0	10.7	7.7	7.2
Cycle Q Clear(g_c), s	23.7	0.0	0.0	10.7	7.7	7.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2538	0	0	2538	533	476
V/C Ratio(X)	0.88	0.00	0.00	0.53	0.52	0.49
Avail Cap(c_a), veh/h	2547	0	0	2547	533	476
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	0.0	10.2	17.3	17.2
Incr Delay (d2), s/veh	4.1	0.0	0.0	0.2	3.5	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	0.0	0.0	5.0	4.3	3.6
LnGrp Delay(d),s/veh	17.5	0.0	0.0	10.4	20.9	20.7
LnGrp LOS	B			B	C	C
Approach Vol, veh/h	2245			1339	507	
Approach Delay, s/veh	17.5			10.4	20.8	
Approach LOS	B			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		35.9				35.9
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		9.7		25.7				12.7
Green Ext Time (p_c), s		1.1		4.2				16.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2422	0	0	1522	324	271
Future Volume (veh/h)	2422	0	0	1522	324	271
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	2633	0	0	1654	352	295
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2738	0	0	2738	491	438
Arrive On Green	0.54	0.00	0.00	0.54	0.28	0.28
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	2633	0	0	1654	352	295
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	32.2	0.0	0.0	14.5	11.6	10.8
Cycle Q Clear(g_c), s	32.2	0.0	0.0	14.5	11.6	10.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2738	0	0	2738	491	438
V/C Ratio(X)	0.96	0.00	0.00	0.60	0.72	0.67
Avail Cap(c_a), veh/h	2738	0	0	2738	491	438
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	0.0	10.3	21.2	20.9
Incr Delay (d2), s/veh	9.9	0.0	0.0	0.4	8.7	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	0.0	0.0	6.7	6.9	5.6
LnGrp Delay(d),s/veh	24.2	0.0	0.0	10.6	29.9	28.9
LnGrp LOS	C			B	C	C
Approach Vol, veh/h	2633			1654	647	
Approach Delay, s/veh	24.2			10.6	29.4	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		41.0				41.0
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		35.0				35.0
Max Q Clear Time (g_c+I1), s		13.6		34.2				16.5
Green Ext Time (p_c), s		1.0		0.8				18.1

Intersection Summary	
HCM 2010 Ctrl Delay	20.3
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2422	0	0	1528	356	272
Future Volume (veh/h)	2422	0	0	1528	356	272
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	0	1863	1863	1863
Adj Flow Rate, veh/h	2633	0	0	1661	387	296
Adj No. of Lanes	3	0	0	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	0	2	2	2
Cap, veh/h	2738	0	0	2738	491	438
Arrive On Green	0.54	0.00	0.00	0.54	0.28	0.28
Sat Flow, veh/h	5421	0	0	5421	1774	1583
Grp Volume(v), veh/h	2633	0	0	1661	387	296
Grp Sat Flow(s),veh/h/ln	1695	0	0	1695	1774	1583
Q Serve(g_s), s	32.2	0.0	0.0	14.6	13.1	10.8
Cycle Q Clear(g_c), s	32.2	0.0	0.0	14.6	13.1	10.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2738	0	0	2738	491	438
V/C Ratio(X)	0.96	0.00	0.00	0.61	0.79	0.68
Avail Cap(c_a), veh/h	2738	0	0	2738	491	438
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	0.0	10.3	21.7	20.9
Incr Delay (d2), s/veh	9.9	0.0	0.0	0.4	12.1	8.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	0.0	0.0	6.9	8.0	5.7
LnGrp Delay(d),s/veh	24.2	0.0	0.0	10.7	33.8	29.0
LnGrp LOS	C			B	C	C
Approach Vol, veh/h	2633			1661	683	
Approach Delay, s/veh	24.2			10.7	31.7	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		24.0		41.0				41.0
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		35.0				35.0
Max Q Clear Time (g_c+I1), s		15.1		34.2				16.6
Green Ext Time (p_c), s		0.8		0.8				18.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Panama Ln. & South "H" - AM Peak
Count Date: 1/13/2015

Ave Annual Growth: **1.91%**

Exist Peak Hour Volumes

Signalized

1	WBL	14
3	WBT	543
<	WBR	56
1	EBL	111
2	EBT	446
<	EBR	54
1	NBL	189
2	NBT	264
1	NBR	11
1	SBL	86
2	SBT	229
<	SBR	106
	TOTAL	2109

Year 2035
Fut. Volumes w/o Proj

WBL	22
WBT	813
WBR	87
EBL	157
EBT	686
EBR	79
NBL	257
NBT	371
NBR	17
SBL	132
SBT	333
SBR	145
TOTAL	3099

Year 2035 Fut. Vol
+ Project Traffic

WBL	22
WBT	813
WBR	87
EBL	157
EBT	691
EBR	80
NBL	258
NBT	372
NBR	18
SBL	136
SBT	333
SBR	145
TOTAL	3112

Year 2025
Fut. Volumes w/o Proj

WBL	18
WBT	667
WBR	70
EBL	133
EBT	556
EBR	65
NBL	221
NBT	314
NBR	14
SBL	107
SBT	277
SBR	124
TOTAL	2566

Year 2025 Fut. Vol
+ Project Traffic

WBL	18
WBT	667
WBR	70
EBL	133
EBT	559
EBR	66
NBL	222
NBT	315
NBR	15
SBL	109
SBT	277
SBR	124
TOTAL	2575

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	5
EBR	1
NBL	1
NBT	1
NBR	1
SBL	4
SBT	0
SBR	0
TOTAL	13

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Ln. & South "H" - AM Peak						
	Count Date:	1/13/2015						
2006	ADT							
WB Approach (To)	7.768							
WB Approach (Away)	7.139							
EB Approach (To)	10.469							
EB Approach (Away)	12.419							
NB Approach (To)	9.126							
NB Approach (Away)	8.938							
SB Approach (To)	6.023							
SB Approach (Away)	4.89							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	16.271		WBL	1.94	WBT	1.80	WBR	1.87
WB Approach (Away)	14.895		2.30%	22	1.99%	813	2.16%	87
EB Approach (To)	17.012		EBL	1.64	EBT	1.86	EBR	1.71
EB Approach (Away)	18.579		1.71%	157	2.13%	686	1.86%	79
NB Approach (To)	14.526		NBL	1.54	NBT	1.62	NBR	1.84
NB Approach (Away)	15.986		1.51%	257	1.68%	371	2.09%	17
SB Approach (To)	9.708		SBL	1.85	SBT	1.70	SBR	1.55
SB Approach (Away)	8.057		2.11%	132	1.84%	333	1.53%	145

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	446	54	14	543	56	189	264	11	86	229	106
Future Volume (veh/h)	111	446	54	14	543	56	189	264	11	86	229	106
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	121	485	59	15	590	61	205	287	12	93	249	115
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	150	939	420	32	933	96	224	1104	494	120	602	270
Arrive On Green	0.08	0.27	0.27	0.02	0.20	0.20	0.13	0.31	0.31	0.07	0.25	0.25
Sat Flow, veh/h	1774	3539	1583	1774	4688	480	1774	3539	1583	1774	2378	1066
Grp Volume(v), veh/h	121	485	59	15	425	226	205	287	12	93	183	181
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1778	1774	1770	1583	1774	1770	1675
Q Serve(g_s), s	4.8	8.3	2.0	0.6	8.2	8.3	8.1	4.3	0.4	3.7	6.1	6.4
Cycle Q Clear(g_c), s	4.8	8.3	2.0	0.6	8.2	8.3	8.1	4.3	0.4	3.7	6.1	6.4
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.64
Lane Grp Cap(c), veh/h	150	939	420	32	675	354	224	1104	494	120	448	424
V/C Ratio(X)	0.81	0.52	0.14	0.47	0.63	0.64	0.91	0.26	0.02	0.78	0.41	0.43
Avail Cap(c_a), veh/h	150	945	423	125	857	450	224	1104	494	224	448	424
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	32.0	22.3	19.9	34.6	26.1	26.2	30.7	18.3	17.0	32.6	22.2	22.3
Incr Delay (d2), s/veh	27.1	0.5	0.2	10.3	1.0	2.0	37.4	0.6	0.1	10.2	2.8	3.1
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(50%),veh/ln	3.4	4.1	0.9	0.4	3.9	4.3	6.3	2.2	0.2	2.1	3.3	3.3
LnGrp Delay(d),s/veh	59.2	22.7	20.1	44.9	27.1	28.1	68.1	18.9	17.1	42.8	24.9	25.4
LnGrp LOS	E	C	C	D	C	C	E	B	B	D	C	C
Approach Vol, veh/h		665			666			504			457	
Approach Delay, s/veh		29.1			27.8			38.9			28.7	
Approach LOS		C			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	10.8	28.2	7.3	24.9	15.0	24.0	12.0	20.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	18.0	5.0	19.0	9.0	18.0	6.0	18.0
Max Q Clear Time (g_c+I1), s	5.7	6.3	2.6	10.3	10.1	8.4	6.8	10.3
Green Ext Time (p_c), s	0.0	2.7	0.0	4.2	0.0	2.4	0.0	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	559	66	18	667	70	222	314	14	109	277	124
Future Volume (veh/h)	133	559	66	18	667	70	222	314	14	109	277	124
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	145	608	72	20	725	76	241	341	15	118	301	135
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	160	954	427	40	945	98	274	911	408	251	586	257
Arrive On Green	0.09	0.27	0.27	0.02	0.20	0.20	0.15	0.26	0.26	0.14	0.24	0.24
Sat Flow, veh/h	1774	3539	1583	1774	4680	487	1774	3539	1583	1774	2396	1051
Grp Volume(v), veh/h	145	608	72	20	524	277	241	341	15	118	220	216
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1777	1774	1770	1583	1774	1770	1677
Q Serve(g_s), s	6.3	11.8	2.7	0.9	11.3	11.5	10.3	6.2	0.4	4.8	8.4	8.7
Cycle Q Clear(g_c), s	6.3	11.8	2.7	0.9	11.3	11.5	10.3	6.2	0.4	4.8	8.4	8.7
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.63
Lane Grp Cap(c), veh/h	160	954	427	40	685	359	274	911	408	251	433	410
V/C Ratio(X)	0.91	0.64	0.17	0.50	0.76	0.77	0.88	0.37	0.04	0.47	0.51	0.53
Avail Cap(c_a), veh/h	160	954	427	114	785	412	274	911	408	251	433	410
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	35.0	25.0	21.7	37.5	29.3	29.3	32.1	23.7	12.5	30.7	25.3	25.4
Incr Delay (d2), s/veh	45.2	1.4	0.2	9.3	3.9	7.7	26.2	1.2	0.2	1.4	4.2	4.8
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(50%),veh/ln	5.1	5.9	1.2	0.5	5.7	6.4	7.0	3.1	0.3	2.4	4.6	4.6
LnGrp Delay(d),s/veh	80.2	26.4	21.9	46.9	33.2	37.0	58.4	24.9	12.7	32.0	29.6	30.2
LnGrp LOS	F	C	C	D	C	D	E	C	B	C	C	C
Approach Vol, veh/h		825			821			597			554	
Approach Delay, s/veh		35.5			34.8			38.1			30.3	
Approach LOS		D			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	17.0	26.0	7.8	26.9	18.0	25.0	13.0	21.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	11.0	20.0	5.0	20.0	12.0	19.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	6.8	8.2	2.9	13.8	12.3	10.7	8.3	13.5
Green Ext Time (p_c), s	1.0	1.4	0.0	3.9	0.0	1.7	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	34.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	559	66	18	667	70	222	314	14	107	277	124
Future Volume (veh/h)	133	559	66	18	667	70	222	314	14	107	277	124
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	145	608	72	20	725	76	241	341	15	116	301	135
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	160	954	427	40	945	98	274	911	408	251	586	257
Arrive On Green	0.09	0.27	0.27	0.02	0.20	0.20	0.15	0.26	0.26	0.14	0.24	0.24
Sat Flow, veh/h	1774	3539	1583	1774	4680	487	1774	3539	1583	1774	2396	1051
Grp Volume(v), veh/h	145	608	72	20	524	277	241	341	15	116	220	216
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1777	1774	1770	1583	1774	1770	1677
Q Serve(g_s), s	6.3	11.8	2.7	0.9	11.3	11.5	10.3	6.2	0.4	4.7	8.4	8.7
Cycle Q Clear(g_c), s	6.3	11.8	2.7	0.9	11.3	11.5	10.3	6.2	0.4	4.7	8.4	8.7
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.63
Lane Grp Cap(c), veh/h	160	954	427	40	685	359	274	911	408	251	433	410
V/C Ratio(X)	0.91	0.64	0.17	0.50	0.76	0.77	0.88	0.37	0.04	0.46	0.51	0.53
Avail Cap(c_a), veh/h	160	954	427	114	785	412	274	911	408	251	433	410
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	35.0	25.0	21.7	37.5	29.3	29.3	32.1	23.7	12.5	30.6	25.3	25.4
Incr Delay (d2), s/veh	45.2	1.4	0.2	9.3	3.9	7.7	26.2	1.2	0.2	1.3	4.2	4.8
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(50%),veh/ln	5.1	5.9	1.2	0.5	5.7	6.4	7.0	3.1	0.3	2.4	4.6	4.6
LnGrp Delay(d),s/veh	80.2	26.4	21.9	46.9	33.2	37.0	58.4	24.9	12.7	31.9	29.6	30.2
LnGrp LOS	F	C	C	D	C	D	E	C	B	C	C	C
Approach Vol, veh/h		825			821			597			552	
Approach Delay, s/veh		35.5			34.8			38.1			30.3	
Approach LOS		D			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	17.0	26.0	7.8	26.9	18.0	25.0	13.0	21.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	11.0	20.0	5.0	20.0	12.0	19.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	6.7	8.2	2.9	13.8	12.3	10.7	8.3	13.5
Green Ext Time (p_c), s	1.1	1.4	0.0	3.9	0.0	1.7	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	34.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	686	79	22	813	87	257	371	17	132	333	145
Future Volume (veh/h)	157	686	79	22	813	87	257	371	17	132	333	145
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	171	746	86	24	884	95	279	403	18	143	362	158
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	179	1035	463	46	1013	108	269	984	440	179	548	236
Arrive On Green	0.10	0.29	0.29	0.03	0.22	0.22	0.15	0.28	0.28	0.10	0.23	0.23
Sat Flow, veh/h	1774	3539	1583	1774	4665	499	1774	3539	1583	1774	2413	1037
Grp Volume(v), veh/h	171	746	86	24	641	338	279	403	18	143	264	256
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1775	1774	1770	1583	1774	1770	1680
Q Serve(g_s), s	7.6	15.0	3.2	1.1	14.5	14.6	12.0	7.3	0.7	6.2	10.7	11.0
Cycle Q Clear(g_c), s	7.6	15.0	3.2	1.1	14.5	14.6	12.0	7.3	0.7	6.2	10.7	11.0
Prop In Lane	1.00		1.00	1.00		0.28	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	179	1035	463	46	736	385	269	984	440	179	402	382
V/C Ratio(X)	0.95	0.72	0.19	0.52	0.87	0.88	1.04	0.41	0.04	0.80	0.66	0.67
Avail Cap(c_a), veh/h	179	1035	463	112	770	403	269	984	440	269	402	382
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	35.4	25.1	21.0	38.1	29.9	30.0	33.6	23.3	20.9	34.8	27.8	27.9
Incr Delay (d2), s/veh	53.8	2.5	0.2	8.9	10.3	18.4	65.1	1.3	0.2	9.6	8.1	9.0
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(50%),veh/ln	6.4	7.6	1.4	0.6	7.8	9.1	10.7	3.8	0.3	3.5	6.1	6.1
LnGrp Delay(d),s/veh	89.2	27.6	21.2	47.0	40.3	48.4	98.7	24.6	21.1	44.4	35.9	36.9
LnGrp LOS	F	C	C	D	D	D	F	C	C	D	D	D
Approach Vol, veh/h		1003			1003			700			663	
Approach Delay, s/veh		37.6			43.2			54.0			38.2	
Approach LOS		D			D			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	14.0	28.0	8.1	29.2	18.0	24.0	14.0	23.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	18.0	5.0	21.0	12.0	18.0	8.0	18.0
Max Q Clear Time (g_c+I1), s	8.2	9.3	3.1	17.0	14.0	13.0	9.6	16.6
Green Ext Time (p_c), s	0.1	3.3	0.0	3.1	0.0	2.2	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	42.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	691	80	22	813	87	258	372	18	136	333	145
Future Volume (veh/h)	157	691	80	22	813	87	258	372	18	136	333	145
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	171	751	87	24	884	95	280	404	20	148	362	158
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	179	1034	463	46	1013	108	269	973	435	184	548	236
Arrive On Green	0.10	0.29	0.29	0.03	0.22	0.22	0.15	0.27	0.27	0.10	0.23	0.23
Sat Flow, veh/h	1774	3539	1583	1774	4665	499	1774	3539	1583	1774	2413	1037
Grp Volume(v), veh/h	171	751	87	24	641	338	280	404	20	148	264	256
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1775	1774	1770	1583	1774	1770	1680
Q Serve(g_s), s	7.6	15.1	3.3	1.1	14.5	14.6	12.0	7.4	0.7	6.5	10.7	11.0
Cycle Q Clear(g_c), s	7.6	15.1	3.3	1.1	14.5	14.6	12.0	7.4	0.7	6.5	10.7	11.0
Prop In Lane	1.00		1.00	1.00		0.28	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	179	1034	463	46	736	385	269	973	435	184	402	382
V/C Ratio(X)	0.95	0.73	0.19	0.52	0.87	0.88	1.04	0.42	0.05	0.80	0.66	0.67
Avail Cap(c_a), veh/h	179	1034	463	112	770	403	269	973	435	269	402	382
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	35.4	25.2	21.0	38.1	29.9	30.0	33.6	23.5	21.1	34.7	27.8	27.9
Incr Delay (d2), s/veh	53.8	2.6	0.2	8.9	10.4	18.4	66.2	1.3	0.2	10.5	8.1	9.0
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(50%),veh/ln	6.4	7.7	1.5	0.6	7.8	9.1	10.8	3.8	0.3	3.7	6.1	6.1
LnGrp Delay(d),s/veh	89.2	27.8	21.2	47.0	40.3	48.4	99.8	24.8	21.3	45.2	35.9	36.9
LnGrp LOS	F	C	C	D	D	D	F	C	C	D	D	D
Approach Vol, veh/h		1009			1003			704			668	
Approach Delay, s/veh		37.6			43.2			54.5			38.4	
Approach LOS		D			D			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	14.2	27.8	8.1	29.1	18.0	24.0	14.0	23.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	18.0	5.0	21.0	12.0	18.0	8.0	18.0
Max Q Clear Time (g_c+I1), s	8.5	9.4	3.1	17.1	14.0	13.0	9.6	16.6
Green Ext Time (p_c), s	0.1	3.3	0.0	3.0	0.0	2.3	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	42.9
HCM 2010 LOS	D

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Panama Ln. & South "H" - PM Peak
Count Date: 1/13/2015

Ave Annual Growth: **1.91%**

Exist Peak Hour Volumes

Signalized

1	WBL	37
3	WBT	685
<	WBR	67
1	EBL	204
2	EBT	790
<	EBR	104
1	NBL	155
2	NBT	182
1	NBR	9
1	SBL	148
2	SBT	230
<	SBR	200
	TOTAL	2811

Year 2035
Fut. Volumes w/o Proj

WBL	59
WBT	1025
WBR	104
EBL	289
EBT	1216
EBR	152
NBL	211
NBT	256
NBR	14
SBL	227
SBT	334
SBR	273
TOTAL	4160

Year 2035 Fut. Vol
+ Project Traffic

WBL	59
WBT	1030
WBR	109
EBL	289
EBT	1218
EBR	154
NBL	211
NBT	256
NBR	14
SBL	231
SBT	335
SBR	273
TOTAL	4179

Year 2025
Fut. Volumes w/o Proj

WBL	47
WBT	842
WBR	84
EBL	244
EBT	985
EBR	126
NBL	181
NBT	217
NBR	11
SBL	184
SBT	278
SBR	234
TOTAL	3433

Year 2025 Fut. Vol
+ Project Traffic

WBL	47
WBT	845
WBR	87
EBL	244
EBT	986
EBR	127
NBL	181
NBT	217
NBR	11
SBL	186
SBT	279
SBR	234
TOTAL	3444

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	5
WBR	5
EBL	0
EBT	2
EBR	2
NBL	0
NBT	0
NBR	0
SBL	4
SBT	1
SBR	0
TOTAL	19

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Ln. & South "H" - PM Peak						
	Count Date:	1/13/2015						
2006	ADT							
WB Approach (To)	7.768							
WB Approach (Away)	7.136							
EB Approach (To)	10.469							
EB Approach (Away)	12.419							
NB Approach (To)	9.126							
NB Approach (Away)	8.938							
SB Approach (To)	6.023							
SB Approach (Away)	4.89							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	16.271		WBL	1.94	WBT	1.80	WBR	1.87
WB Approach (Away)	14.895		2.30%	59	1.99%	1025	2.16%	104
EB Approach (To)	17.012		EBL	1.64	EBT	1.86	EBR	1.71
EB Approach (Away)	18.579		1.71%	289	2.13%	1216	1.86%	152
NB Approach (To)	14.526		NBL	1.54	NBT	1.62	NBR	1.84
NB Approach (Away)	15.986		1.51%	211	1.68%	256	2.09%	14
SB Approach (To)	9.708		SBL	1.85	SBT	1.70	SBR	1.55
SB Approach (Away)	8.057		2.11%	227	1.84%	334	1.53%	273

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	204	790	104	37	685	67	155	182	9	148	230	200
Future Volume (veh/h)	204	790	104	37	685	67	155	182	9	148	230	200
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	222	859	113	40	745	73	168	198	10	161	250	217
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	249	1105	495	66	985	96	181	858	384	181	444	371
Arrive On Green	0.14	0.31	0.31	0.04	0.21	0.21	0.10	0.24	0.24	0.10	0.24	0.24
Sat Flow, veh/h	1774	3539	1583	1774	4713	459	1774	3539	1583	1774	1832	1530
Grp Volume(v), veh/h	222	859	113	40	535	283	168	198	10	161	241	226
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1782	1774	1770	1583	1774	1770	1593
Q Serve(g_s), s	9.6	17.3	4.1	1.7	11.6	11.7	7.4	3.5	0.4	7.0	9.4	9.8
Cycle Q Clear(g_c), s	9.6	17.3	4.1	1.7	11.6	11.7	7.4	3.5	0.4	7.0	9.4	9.8
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		0.96
Lane Grp Cap(c), veh/h	249	1105	495	66	709	373	181	858	384	181	429	386
V/C Ratio(X)	0.89	0.78	0.23	0.61	0.75	0.76	0.93	0.23	0.03	0.89	0.56	0.59
Avail Cap(c_a), veh/h	249	1105	495	113	778	409	181	858	384	181	429	386
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	33.1	24.5	20.0	37.2	29.1	29.2	34.9	23.8	22.6	34.8	26.0	26.2
Incr Delay (d2), s/veh	30.4	3.6	0.2	8.7	3.8	7.4	46.6	0.6	0.1	37.6	5.2	6.4
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(50%),veh/ln	6.8	8.9	1.8	1.0	5.8	6.5	5.9	1.8	0.2	5.3	5.2	5.0
LnGrp Delay(d),s/veh	63.6	28.0	20.2	45.9	32.9	36.6	81.5	24.5	22.8	72.4	31.3	32.6
LnGrp LOS	E	C	C	D	C	D	F	C	C	E	C	C
Approach Vol, veh/h		1194			858			376			628	
Approach Delay, s/veh		33.9			34.8			49.9			42.3	
Approach LOS		C			C			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	14.0	25.0	8.9	30.5	14.0	25.0	17.0	22.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	19.0	5.0	24.0	8.0	19.0	11.0	18.0
Max Q Clear Time (g_c+I1), s	9.0	5.5	3.7	19.3	9.4	11.8	11.6	13.7
Green Ext Time (p_c), s	0.0	3.0	0.0	3.5	0.0	2.1	0.0	2.7

Intersection Summary	
HCM 2010 Ctrl Delay	37.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	244	985	126	47	842	84	181	217	11	184	278	234
Future Volume (veh/h)	244	985	126	47	842	84	181	217	11	184	278	234
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	265	1071	137	51	915	91	197	236	12	200	302	254
Adj No. of Lanes	1	2	1	1	3	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	2	2	2	2	2	2
Cap, veh/h	296	1198	536	71	995	99	231	788	352	234	415	340
Arrive On Green	0.17	0.34	0.34	0.04	0.21	0.21	0.13	0.22	0.22	0.13	0.22	0.22
Sat Flow, veh/h	1774	3539	1583	1774	4704	466	1774	3539	1583	1774	1849	1516
Grp Volume(v), veh/h	265	1071	137	51	659	347	197	236	12	200	289	267
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1695	1780	1774	1770	1583	1774	1770	1595
Q Serve(g_s), s	13.1	25.8	5.6	2.6	17.1	17.2	9.8	5.0	0.5	9.9	13.6	14.0
Cycle Q Clear(g_c), s	13.1	25.8	5.6	2.6	17.1	17.2	9.8	5.0	0.5	9.9	13.6	14.0
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		0.95
Lane Grp Cap(c), veh/h	296	1198	536	71	717	377	231	788	352	234	397	358
V/C Ratio(X)	0.89	0.89	0.26	0.72	0.92	0.92	0.85	0.30	0.03	0.86	0.73	0.75
Avail Cap(c_a), veh/h	296	1198	536	99	717	377	237	788	352	237	397	358
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	36.6	28.2	21.5	42.6	34.7	34.7	38.2	29.1	27.4	38.2	32.3	32.5
Incr Delay (d2), s/veh	27.3	8.9	0.2	14.0	16.9	27.8	24.4	1.0	0.2	24.9	11.1	13.3
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(50%),veh/ln	8.7	14.0	2.5	1.5	9.6	11.3	6.3	2.5	0.3	6.5	7.9	7.5
LnGrp Delay(d),s/veh	64.0	37.1	21.8	56.6	51.6	62.5	62.6	30.1	27.5	63.1	43.4	45.8
LnGrp LOS	E	D	C	E	D	E	E	C	C	E	D	D
Approach Vol, veh/h		1473			1057			445			756	
Approach Delay, s/veh		40.5			55.4			44.4			49.5	
Approach LOS		D			E			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	17.8	26.0	9.6	36.4	17.7	26.1	21.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	20.0	5.0	29.0	12.0	20.0	15.0	19.0
Max Q Clear Time (g_c+I1), s	11.9	7.0	4.6	27.8	11.8	16.0	15.1	19.2
Green Ext Time (p_c), s	0.0	3.6	0.0	1.1	0.0	1.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	47.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	244	985	126	47	842	84	181	217	11	184	278	234
Future Volume (veh/h)	244	985	126	47	842	84	181	217	11	184	278	234
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	265	1071	137	51	915	91	197	236	12	200	302	254
Adj No. of Lanes	1	3	1	1	3	0	1	3	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	2	2	2	2	2	2
Cap, veh/h	246	1604	499	75	1032	102	201	1152	359	201	419	344
Arrive On Green	0.14	0.32	0.32	0.04	0.22	0.22	0.11	0.23	0.23	0.11	0.23	0.23
Sat Flow, veh/h	1774	5085	1583	1774	4704	466	1774	5085	1583	1774	1849	1516
Grp Volume(v), veh/h	265	1071	137	51	659	347	197	236	12	200	289	267
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1780	1774	1695	1583	1774	1770	1595
Q Serve(g_s), s	11.0	14.5	5.2	2.3	14.9	15.0	8.8	3.0	0.5	8.9	12.0	12.4
Cycle Q Clear(g_c), s	11.0	14.5	5.2	2.3	14.9	15.0	8.8	3.0	0.5	8.9	12.0	12.4
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		0.95
Lane Grp Cap(c), veh/h	246	1604	499	75	744	391	201	1152	359	201	401	362
V/C Ratio(X)	1.08	0.67	0.27	0.68	0.89	0.89	0.98	0.20	0.03	0.99	0.72	0.74
Avail Cap(c_a), veh/h	246	1604	499	134	768	403	201	1152	359	201	401	362
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	34.2	23.6	20.4	37.5	30.0	30.1	35.1	24.9	23.9	35.2	28.4	28.5
Incr Delay (d2), s/veh	79.9	1.1	0.3	10.1	11.8	20.5	57.5	0.4	0.2	61.9	10.6	12.7
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(50%),veh/ln	10.8	6.9	2.3	1.3	8.2	9.6	7.5	1.4	0.2	7.8	7.0	6.7
LnGrp Delay(d),s/veh	114.1	24.7	20.7	47.6	41.8	50.6	92.6	25.3	24.1	97.1	39.0	41.3
LnGrp LOS	F	C	C	D	D	D	F	C	C	F	D	D
Approach Vol, veh/h		1473			1057			445			756	
Approach Delay, s/veh		40.4			45.0			55.1			55.2	
Approach LOS		D			D			E			E	

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	15.0	24.0	9.4	31.1	15.0	24.0	17.0	23.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	18.0	6.0	23.0	9.0	18.0	11.0	18.0
Max Q Clear Time (g_c+I1), s	10.9	5.0	4.3	16.5	10.8	14.4	13.0	17.0
Green Ext Time (p_c), s	0.0	3.6	0.0	5.3	0.0	1.5	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	244	986	127	47	845	87	181	217	11	186	279	234
Future Volume (veh/h)	244	986	127	47	845	87	181	217	11	186	279	234
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	265	1072	138	51	918	95	197	236	12	202	303	254
Adj No. of Lanes	1	3	1	1	3	0	1	3	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	2	2	2	2	2	2
Cap, veh/h	296	1719	535	71	990	102	231	1131	352	236	417	341
Arrive On Green	0.17	0.34	0.34	0.04	0.21	0.21	0.13	0.22	0.22	0.13	0.23	0.23
Sat Flow, veh/h	1774	5085	1583	1774	4684	483	1774	5085	1583	1774	1852	1513
Grp Volume(v), veh/h	265	1072	138	51	664	349	197	236	12	202	289	268
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1777	1774	1695	1583	1774	1770	1596
Q Serve(g_s), s	13.2	15.9	5.7	2.6	17.3	17.4	9.8	3.4	0.5	10.0	13.6	14.1
Cycle Q Clear(g_c), s	13.2	15.9	5.7	2.6	17.3	17.4	9.8	3.4	0.5	10.0	13.6	14.1
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.95
Lane Grp Cap(c), veh/h	296	1719	535	71	716	375	231	1131	352	236	398	359
V/C Ratio(X)	0.90	0.62	0.26	0.72	0.93	0.93	0.85	0.21	0.03	0.86	0.73	0.75
Avail Cap(c_a), veh/h	296	1719	535	118	716	375	237	1131	352	237	398	359
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	36.7	25.0	21.6	42.7	34.8	34.8	38.3	28.5	27.4	38.2	32.3	32.5
Incr Delay (d2), s/veh	27.5	0.7	0.3	12.7	18.1	29.5	24.5	0.4	0.2	25.4	11.0	13.2
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(50%),veh/ln	8.7	7.6	2.5	1.5	9.9	11.6	6.3	1.6	0.3	6.5	7.9	7.5
LnGrp Delay(d),s/veh	64.3	25.7	21.8	55.3	52.9	64.3	62.7	28.9	27.6	63.5	43.3	45.6
LnGrp LOS	E	C	C	E	D	E	E	C	C	E	D	D
Approach Vol, veh/h		1475			1064			445			759	
Approach Delay, s/veh		32.3			56.8			43.9			49.5	
Approach LOS		C			E			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	17.9	26.0	9.6	36.4	17.7	26.2	21.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	20.0	6.0	28.0	12.0	20.0	15.0	19.0
Max Q Clear Time (g_c+I1), s	12.0	5.4	4.6	17.9	11.8	16.1	15.2	19.4
Green Ext Time (p_c), s	0.0	3.8	0.0	7.7	0.0	1.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	44.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	289	1216	152	59	1025	104	211	256	14	227	334	273
Future Volume (veh/h)	289	1216	152	59	1025	104	211	256	14	227	334	273
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	314	1322	165	64	1114	113	229	278	15	247	363	297
Adj No. of Lanes	1	3	1	1	3	0	1	3	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	2	2	2	2	2	2
Cap, veh/h	296	1742	542	82	1043	106	237	1074	334	237	393	317
Arrive On Green	0.17	0.34	0.34	0.05	0.22	0.22	0.13	0.21	0.21	0.13	0.21	0.21
Sat Flow, veh/h	1774	5085	1583	1774	4693	476	1774	5085	1583	1774	1864	1503
Grp Volume(v), veh/h	314	1322	165	64	804	423	229	278	15	247	344	316
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1779	1774	1695	1583	1774	1770	1597
Q Serve(g_s), s	15.0	20.8	6.9	3.2	20.0	20.0	11.6	4.1	0.7	12.0	17.2	17.5
Cycle Q Clear(g_c), s	15.0	20.8	6.9	3.2	20.0	20.0	11.6	4.1	0.7	12.0	17.2	17.5
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	296	1742	542	82	753	395	237	1074	334	237	374	337
V/C Ratio(X)	1.06	0.76	0.30	0.78	1.07	1.07	0.97	0.26	0.04	1.04	0.92	0.94
Avail Cap(c_a), veh/h	296	1742	542	118	753	395	237	1074	334	237	374	337
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	37.5	26.3	21.7	42.5	35.0	35.0	38.8	29.6	28.3	39.0	34.8	34.9
Incr Delay (d2), s/veh	69.7	2.0	0.3	18.3	52.4	64.8	49.4	0.6	0.3	70.6	30.5	35.1
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(50%),veh/ln	13.0	10.0	3.0	2.0	14.8	16.9	8.9	2.0	0.3	10.5	11.5	11.0
LnGrp Delay(d),s/veh	107.2	28.3	22.0	60.8	87.4	99.8	88.2	30.2	28.5	109.6	65.2	70.0
LnGrp LOS	F	C	C	E	F	F	F	C	C	F	E	E
Approach Vol, veh/h		1801			1291			522			907	
Approach Delay, s/veh		41.4			90.2			55.6			79.0	
Approach LOS		D			F			E			E	

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	18.0	25.0	10.2	36.8	18.0	25.0	21.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	19.0	6.0	29.0	12.0	19.0	15.0	20.0
Max Q Clear Time (g_c+I1), s	14.0	6.1	5.2	22.8	13.6	19.5	17.0	22.0
Green Ext Time (p_c), s	0.0	4.3	0.0	5.6	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	64.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	289	1218	154	59	1030	109	211	256	14	231	335	273
Future Volume (veh/h)	289	1218	154	59	1030	109	211	256	14	231	335	273
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	314	1324	167	64	1120	118	229	278	15	251	364	297
Adj No. of Lanes	1	3	1	1	3	0	1	3	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	2	2	2	2	2	2
Cap, veh/h	296	1742	542	82	1039	109	237	1074	334	237	394	317
Arrive On Green	0.17	0.34	0.34	0.05	0.22	0.22	0.13	0.21	0.21	0.13	0.21	0.21
Sat Flow, veh/h	1774	5085	1583	1774	4674	492	1774	5085	1583	1774	1866	1501
Grp Volume(v), veh/h	314	1324	167	64	812	426	229	278	15	251	345	316
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1776	1774	1695	1583	1774	1770	1598
Q Serve(g_s), s	15.0	20.8	7.0	3.2	20.0	20.0	11.6	4.1	0.7	12.0	17.2	17.5
Cycle Q Clear(g_c), s	15.0	20.8	7.0	3.2	20.0	20.0	11.6	4.1	0.7	12.0	17.2	17.5
Prop In Lane	1.00		1.00	1.00		0.28	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	296	1742	542	82	753	395	237	1074	334	237	374	337
V/C Ratio(X)	1.06	0.76	0.31	0.78	1.08	1.08	0.97	0.26	0.04	1.06	0.92	0.94
Avail Cap(c_a), veh/h	296	1742	542	118	753	395	237	1074	334	237	374	337
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	37.5	26.3	21.7	42.5	35.0	35.0	38.8	29.6	28.3	39.0	34.8	34.9
Incr Delay (d2), s/veh	69.7	2.0	0.3	18.3	55.8	68.1	49.4	0.6	0.3	75.6	30.7	35.3
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(50%),veh/ln	13.0	10.0	3.1	2.0	15.2	17.2	8.9	2.0	0.3	10.8	11.5	11.0
LnGrp Delay(d),s/veh	107.2	28.3	22.1	60.8	90.8	103.1	88.2	30.2	28.5	114.6	65.5	70.2
LnGrp LOS	F	C	C	E	F	F	F	C	C	F	E	E
Approach Vol, veh/h		1805			1302			522			912	
Approach Delay, s/veh		41.4			93.4			55.6			80.6	
Approach LOS		D			F			E			F	

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	18.0	25.0	10.2	36.8	18.0	25.0	21.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	19.0	6.0	29.0	12.0	19.0	15.0	20.0
Max Q Clear Time (g_c+I1), s	14.0	6.1	5.2	22.8	13.6	19.5	17.0	22.0
Green Ext Time (p_c), s	0.0	4.3	0.0	5.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	65.8
HCM 2010 LOS	E

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Panama & S. Union - AM Peak
Count Date: 1/13/2015

Ave Annual Growth: **3.32%**

Exist Peak Hour Volumes

Signalized		
1	WBL	130
1	WBT	152
<	WBR	45
1	EBL	128
1	EBT	176
1	EBR	92
1	NBL	122
2	NBT	399
1	NBR	134
1	SBL	59
2	SBT	347
<	SBR	60
	TOTAL	1844

Year 2035
Fut. Volumes w/o Proj

WBL	268
WBT	332
WBR	84
EBL	246
EBT	361
EBR	197
NBL	255
NBT	710
NBR	255
SBL	103
SBT	633
SBR	116
TOTAL	3560

Year 2035 Fut. Vol
+ Project Traffic

WBL	277
WBT	332
WBR	84
EBL	246
EBT	361
EBR	227
NBL	257
NBT	715
NBR	255
SBL	103
SBT	665
SBR	116
TOTAL	3638

Year 2025
Fut. Volumes w/o Proj

WBL	188
WBT	227
WBR	62
EBL	179
EBT	254
EBR	136
NBL	178
NBT	536
NBR	186
SBL	79
SBT	472
SBR	84
TOTAL	2581

Year 2025 Fut. Vol
+ Project Traffic

WBL	193
WBT	227
WBR	62
EBL	179
EBT	254
EBR	151
NBL	179
NBT	539
NBR	186
SBL	79
SBT	488
SBR	84
TOTAL	2621

Project Generated Trips - Year 2035

	Total
WBL	9
WBT	0
WBR	0
EBL	0
EBT	0
EBR	30
NBL	2
NBT	5
NBR	0
SBL	0
SBT	32
SBR	0
TOTAL	78

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama & S. Union - AM Peak						
	Count Date:	1/13/2015						
2006	ADT							
WB Approach (To)	4.305							
WB Approach (Away)	4.463							
EB Approach (To)	3.434							
EB Approach (Away)	3.581							
NB Approach (To)	4.977							
NB Approach (Away)	5.302							
SB Approach (To)	7.059							
SB Approach (Away)	6.744							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	12.349		WBL	2.79	WBT	3.03	WBR	2.44
WB Approach (Away)	10.808		3.60%	268	3.88%	332	3.07%	84
EB Approach (To)	10.874		EBL	2.59	EBT	2.79	EBR	2.94
EB Approach (Away)	11.398		3.24%	246	3.57%	361	3.78%	197
NB Approach (To)	12.677		NBL	2.87	NBT	2.28	NBR	2.48
NB Approach (Away)	14.393		3.67%	255	2.85%	710	3.18%	255
SB Approach (To)	14.255		SBL	2.22	SBT	2.37	SBR	2.60
SB Approach (Away)	13.552		2.77%	103	2.98%	633	3.26%	116

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	176	92	130	152	45	122	399	134	59	347	60
Future Volume (veh/h)	128	176	92	130	152	45	122	399	134	59	347	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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	139	191	100	141	165	49	133	434	146	64	377	65
Adj No. of Lanes	1	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	179	323	275	181	242	72	171	892	399	99	638	109
Arrive On Green	0.10	0.17	0.17	0.10	0.17	0.17	0.10	0.25	0.25	0.06	0.21	0.21
Sat Flow, veh/h	1774	1863	1583	1774	1380	410	1774	3539	1583	1774	3024	517
Grp Volume(v), veh/h	139	191	100	141	0	214	133	434	146	64	219	223
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1790	1774	1770	1583	1774	1770	1772
Q Serve(g_s), s	4.4	5.4	3.2	4.5	0.0	6.4	4.2	6.0	4.4	2.0	6.4	6.5
Cycle Q Clear(g_c), s	4.4	5.4	3.2	4.5	0.0	6.4	4.2	6.0	4.4	2.0	6.4	6.5
Prop In Lane	1.00		1.00	1.00		0.23	1.00		1.00	1.00		0.29
Lane Grp Cap(c), veh/h	179	323	275	181	0	313	171	892	399	99	374	374
V/C Ratio(X)	0.78	0.59	0.36	0.78	0.00	0.68	0.78	0.49	0.37	0.65	0.59	0.60
Avail Cap(c_a), veh/h	308	582	495	308	0	560	308	1291	577	216	553	554
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	21.9	21.0	25.2	0.0	22.3	25.4	18.4	17.7	26.6	20.5	20.5
Incr Delay (d2), s/veh	7.1	1.7	0.8	7.1	0.0	2.6	7.4	0.4	0.6	7.0	1.5	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(50%),veh/ln	2.5	2.9	1.5	2.5	0.0	3.4	2.4	2.9	2.0	1.2	3.3	3.3
LnGrp Delay(d),s/veh	32.4	23.6	21.8	32.3	0.0	24.9	32.8	18.8	18.3	33.6	21.9	22.0
LnGrp LOS	C	C	C	C		C	C	B	B	C	C	C
Approach Vol, veh/h		430			355			713			506	
Approach Delay, s/veh		26.0			27.8			21.3			23.4	
Approach LOS		C			C			C			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	9.2	20.5	11.9	16.0	11.6	18.2	11.8	16.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	21.0	10.0	18.0	10.0	18.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	4.0	8.0	6.5	7.4	6.2	8.5	6.4	8.4
Green Ext Time (p_c), s	0.0	4.3	0.1	1.7	0.1	3.6	0.1	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	254	136	188	227	62	178	536	186	79	472	84
Future Volume (veh/h)	179	254	136	188	227	62	178	536	186	79	472	84
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	195	276	148	204	247	67	193	583	202	86	513	91
Adj No. of Lanes	1	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	233	390	331	233	296	80	210	996	446	110	677	120
Arrive On Green	0.13	0.21	0.21	0.13	0.21	0.21	0.12	0.28	0.28	0.06	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	1774	1412	383	1774	3539	1583	1774	3007	531
Grp Volume(v), veh/h	195	276	148	204	0	314	193	583	202	86	301	303
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1795	1774	1770	1583	1774	1770	1769
Q Serve(g_s), s	8.2	10.5	6.2	8.6	0.0	12.7	8.2	10.8	8.0	3.6	12.1	12.2
Cycle Q Clear(g_c), s	8.2	10.5	6.2	8.6	0.0	12.7	8.2	10.8	8.0	3.6	12.1	12.2
Prop In Lane	1.00		1.00	1.00		0.21	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	233	390	331	233	0	376	210	996	446	110	398	398
V/C Ratio(X)	0.84	0.71	0.45	0.87	0.00	0.84	0.92	0.59	0.45	0.78	0.76	0.76
Avail Cap(c_a), veh/h	233	441	375	233	0	425	210	1024	458	140	442	442
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	27.9	26.2	32.4	0.0	28.8	33.1	23.5	22.5	35.1	27.5	27.5
Incr Delay (d2), s/veh	22.5	4.5	0.9	28.6	0.0	12.3	40.2	0.8	0.7	19.2	6.6	6.9
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(50%),veh/ln	5.5	5.9	2.8	6.0	0.0	7.6	6.4	5.4	3.5	2.4	6.6	6.7
LnGrp Delay(d),s/veh	54.7	32.4	27.2	60.9	0.0	41.1	73.4	24.3	23.2	54.4	34.1	34.4
LnGrp LOS	D	C	C	E		D	E	C	C	D	C	C
Approach Vol, veh/h		619			518			978			690	
Approach Delay, s/veh		38.2			48.9			33.8			36.7	
Approach LOS		D			D			C			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	10.7	27.4	16.0	21.9	15.0	23.1	16.0	21.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	22.0	10.0	18.0	9.0	19.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	5.6	12.8	10.6	12.5	10.2	14.2	10.2	14.7
Green Ext Time (p_c), s	0.0	4.8	0.0	1.8	0.0	2.9	0.0	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	38.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	254	136	188	227	62	178	536	186	79	472	84
Future Volume (veh/h)	179	254	136	188	227	62	178	536	186	79	472	84
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	195	276	148	204	247	67	193	583	202	86	513	91
Adj No. of Lanes	2	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	278	357	303	239	347	94	215	1018	456	110	687	121
Arrive On Green	0.08	0.19	0.19	0.13	0.25	0.25	0.12	0.29	0.29	0.06	0.23	0.23
Sat Flow, veh/h	3442	1863	1583	1774	1412	383	1774	3539	1583	1774	3007	531
Grp Volume(v), veh/h	195	276	148	204	0	314	193	583	202	86	301	303
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1795	1774	1770	1583	1774	1770	1769
Q Serve(g_s), s	4.1	10.4	6.2	8.3	0.0	11.9	8.0	10.4	7.7	3.5	11.7	11.8
Cycle Q Clear(g_c), s	4.1	10.4	6.2	8.3	0.0	11.9	8.0	10.4	7.7	3.5	11.7	11.8
Prop In Lane	1.00		1.00	1.00		0.21	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	278	357	303	239	0	441	215	1018	456	110	404	404
V/C Ratio(X)	0.70	0.77	0.49	0.85	0.00	0.71	0.90	0.57	0.44	0.78	0.74	0.75
Avail Cap(c_a), veh/h	279	452	384	239	0	533	215	1050	470	144	454	453
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.2	28.4	26.7	31.3	0.0	25.6	32.1	22.5	21.6	34.3	26.6	26.6
Incr Delay (d2), s/veh	7.6	6.3	1.2	24.4	0.0	3.5	34.6	0.7	0.7	18.2	5.8	6.1
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(50%),veh/ln	2.2	6.0	2.8	5.7	0.0	6.3	6.0	5.2	3.4	2.3	6.3	6.4
LnGrp Delay(d),s/veh	40.9	34.8	27.9	55.8	0.0	29.1	66.7	23.2	22.2	52.5	32.4	32.7
LnGrp LOS	D	C	C	E		C	E	C	C	D	C	C
Approach Vol, veh/h		619			518			978			690	
Approach Delay, s/veh		35.0			39.6			31.6			35.0	
Approach LOS		D			D			C			D	

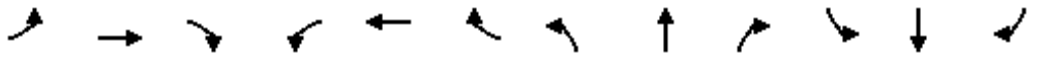
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	27.3	16.0	20.2	15.0	22.9	12.0	24.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	22.0	10.0	18.0	9.0	19.0	6.0	22.0
Max Q Clear Time (g_c+I1), s	5.5	12.4	10.3	12.4	10.0	13.8	6.1	13.9
Green Ext Time (p_c), s	0.0	4.9	0.0	1.8	0.0	3.1	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	254	151	193	227	62	179	539	186	79	488	84
Future Volume (veh/h)	179	254	151	193	227	62	179	539	186	79	488	84
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	195	276	164	210	247	67	195	586	202	86	530	91
Adj No. of Lanes	2	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	277	357	303	238	346	94	215	1025	458	110	698	119
Arrive On Green	0.08	0.19	0.19	0.13	0.25	0.25	0.12	0.29	0.29	0.06	0.23	0.23
Sat Flow, veh/h	3442	1863	1583	1774	1412	383	1774	3539	1583	1774	3024	517
Grp Volume(v), veh/h	195	276	164	210	0	314	195	586	202	86	309	312
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1795	1774	1770	1583	1774	1770	1771
Q Serve(g_s), s	4.1	10.5	7.0	8.7	0.0	11.9	8.1	10.5	7.7	3.6	12.1	12.2
Cycle Q Clear(g_c), s	4.1	10.5	7.0	8.7	0.0	11.9	8.1	10.5	7.7	3.6	12.1	12.2
Prop In Lane	1.00		1.00	1.00		0.21	1.00		1.00	1.00		0.29
Lane Grp Cap(c), veh/h	277	357	303	238	0	440	215	1025	458	110	408	409
V/C Ratio(X)	0.70	0.77	0.54	0.88	0.00	0.71	0.91	0.57	0.44	0.78	0.76	0.76
Avail Cap(c_a), veh/h	277	451	383	238	0	531	215	1046	468	143	452	452
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	28.6	27.1	31.6	0.0	25.7	32.3	22.5	21.5	34.4	26.7	26.7
Incr Delay (d2), s/veh	7.7	6.4	1.5	29.4	0.0	3.6	37.5	0.7	0.7	18.4	6.6	6.8
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(50%),veh/ln	2.2	6.0	3.1	6.2	0.0	6.3	6.2	5.2	3.4	2.3	6.7	6.7
LnGrp Delay(d),s/veh	41.1	34.9	28.6	61.0	0.0	29.2	69.8	23.2	22.2	52.8	33.3	33.5
LnGrp LOS	D	C	C	E		C	E	C	C	D	C	C
Approach Vol, veh/h		635			524			983			707	
Approach Delay, s/veh		35.2			42.0			32.3			35.8	
Approach LOS		D			D			C			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	10.6	27.5	16.0	20.3	15.0	23.2	12.0	24.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	22.0	10.0	18.0	9.0	19.0	6.0	22.0
Max Q Clear Time (g_c+I1), s	5.6	12.5	10.7	12.5	10.1	14.2	6.1	13.9
Green Ext Time (p_c), s	0.0	5.0	0.0	1.8	0.0	2.9	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	35.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	254	151	193	227	62	179	539	186	79	488	84
Future Volume (veh/h)	179	254	151	193	227	62	179	539	186	79	488	84
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	195	276	164	210	247	67	195	586	202	86	530	91
Adj No. of Lanes	2	1	1	1	1	0	2	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	2	2	2	2	2	2
Cap, veh/h	289	369	313	252	361	98	252	875	391	110	714	122
Arrive On Green	0.08	0.20	0.20	0.14	0.26	0.26	0.07	0.25	0.25	0.06	0.24	0.24
Sat Flow, veh/h	3442	1863	1583	1774	1412	383	3442	3539	1583	1774	3024	517
Grp Volume(v), veh/h	195	276	164	210	0	314	195	586	202	86	309	312
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1795	1721	1770	1583	1774	1770	1771
Q Serve(g_s), s	3.8	9.5	6.3	7.9	0.0	10.8	3.8	10.2	7.5	3.3	11.1	11.2
Cycle Q Clear(g_c), s	3.8	9.5	6.3	7.9	0.0	10.8	3.8	10.2	7.5	3.3	11.1	11.2
Prop In Lane	1.00		1.00	1.00		0.21	1.00		1.00	1.00		0.29
Lane Grp Cap(c), veh/h	289	369	313	252	0	459	252	875	391	110	418	418
V/C Ratio(X)	0.67	0.75	0.52	0.83	0.00	0.68	0.77	0.67	0.52	0.78	0.74	0.75
Avail Cap(c_a), veh/h	403	490	417	259	0	525	252	932	417	130	466	466
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	25.8	24.5	28.5	0.0	22.9	31.1	23.2	22.2	31.6	24.2	24.2
Incr Delay (d2), s/veh	2.7	4.4	1.4	19.9	0.0	3.1	14.0	1.7	1.1	22.5	5.6	5.8
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(50%),veh/ln	1.9	5.4	2.9	5.2	0.0	5.7	2.3	5.2	3.4	2.3	6.1	6.1
LnGrp Delay(d),s/veh	33.1	30.2	25.9	48.5	0.0	26.0	45.1	24.9	23.3	54.1	29.7	30.0
LnGrp LOS	C	C	C	D		C	D	C	C	D	C	C
Approach Vol, veh/h		635			524			983			707	
Approach Delay, s/veh		30.0			35.0			28.6			32.8	
Approach LOS		C			D			C			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	10.2	22.9	15.7	19.5	11.0	22.1	11.7	23.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	10.0	18.0	5.0	18.0	8.0	20.0
Max Q Clear Time (g_c+I1), s	5.3	12.2	9.9	11.5	5.8	13.2	5.8	12.8
Green Ext Time (p_c), s	0.0	3.4	0.0	2.0	0.0	3.0	0.1	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	246	361	197	268	332	84	255	710	255	103	633	116
Future Volume (veh/h)	246	361	197	268	332	84	255	710	255	103	633	116
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	267	392	214	291	361	91	277	772	277	112	688	126
Adj No. of Lanes	2	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	306	373	317	276	383	97	256	1057	473	141	697	128
Arrive On Green	0.09	0.20	0.20	0.16	0.27	0.27	0.14	0.30	0.30	0.08	0.23	0.23
Sat Flow, veh/h	3442	1863	1583	1774	1437	362	1774	3539	1583	1774	2989	547
Grp Volume(v), veh/h	267	392	214	291	0	452	277	772	277	112	407	407
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1799	1774	1770	1583	1774	1770	1766
Q Serve(g_s), s	6.9	18.0	11.3	14.0	0.0	22.1	13.0	17.6	13.4	5.6	20.6	20.7
Cycle Q Clear(g_c), s	6.9	18.0	11.3	14.0	0.0	22.1	13.0	17.6	13.4	5.6	20.6	20.7
Prop In Lane	1.00		1.00	1.00		0.20	1.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	306	373	317	276	0	480	256	1057	473	141	413	412
V/C Ratio(X)	0.87	1.05	0.68	1.05	0.00	0.94	1.08	0.73	0.59	0.80	0.99	0.99
Avail Cap(c_a), veh/h	306	373	317	276	0	480	256	1057	473	158	413	412
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	36.0	33.3	38.0	0.0	32.3	38.5	28.3	26.8	40.7	34.4	34.4
Incr Delay (d2), s/veh	23.0	61.0	5.6	69.2	0.0	27.2	79.4	2.6	1.9	22.1	40.4	40.8
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(50%),veh/ln	4.2	15.5	5.4	12.1	0.0	14.5	12.0	9.0	6.1	3.6	14.7	14.7
LnGrp Delay(d),s/veh	63.5	97.0	38.9	107.2	0.0	59.5	117.9	30.9	28.7	62.8	74.8	75.2
LnGrp LOS	E	F	D	F		E	F	C	C	E	E	E
Approach Vol, veh/h		873			743			1326			926	
Approach Delay, s/veh		72.5			78.2			48.6			73.5	
Approach LOS		E			E			D			E	

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	13.1	32.9	20.0	24.0	19.0	27.0	14.0	30.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	26.0	14.0	18.0	13.0	21.0	8.0	24.0
Max Q Clear Time (g_c+I1), s	7.6	19.6	16.0	20.0	15.0	22.7	8.9	24.1
Green Ext Time (p_c), s	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	65.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	246	361	197	268	332	84	255	710	255	103	633	116
Future Volume (veh/h)	246	361	197	268	332	84	255	710	255	103	633	116
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	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	267	392	214	291	361	91	277	772	277	112	688	126
Adj No. of Lanes	2	2	1	2	2	1	2	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	2	2	2	2	2	2
Cap, veh/h	341	698	312	341	698	312	341	1004	449	142	791	145
Arrive On Green	0.10	0.20	0.20	0.10	0.20	0.20	0.10	0.28	0.28	0.08	0.26	0.26
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	1774	2989	547
Grp Volume(v), veh/h	267	392	214	291	361	91	277	772	277	112	407	407
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1774	1770	1766
Q Serve(g_s), s	5.4	7.1	8.9	5.9	6.4	3.5	5.6	14.1	10.7	4.4	15.5	15.5
Cycle Q Clear(g_c), s	5.4	7.1	8.9	5.9	6.4	3.5	5.6	14.1	10.7	4.4	15.5	15.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	341	698	312	341	698	312	341	1004	449	142	469	468
V/C Ratio(X)	0.78	0.56	0.69	0.85	0.52	0.29	0.81	0.77	0.62	0.79	0.87	0.87
Avail Cap(c_a), veh/h	341	902	404	341	902	404	341	1004	449	151	476	475
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	31.1	25.6	26.3	31.3	25.3	24.1	31.2	23.2	22.0	31.9	24.8	24.8
Incr Delay (d2), s/veh	11.2	0.7	3.2	18.4	0.6	0.5	13.8	3.7	2.5	22.5	15.6	15.7
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(50%),veh/ln	3.1	3.5	4.1	3.7	3.2	1.6	3.3	7.4	5.0	3.0	9.6	9.6
LnGrp Delay(d),s/veh	42.3	26.3	29.6	49.7	25.9	24.7	45.0	26.9	24.5	54.4	40.4	40.5
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	D
Approach Vol, veh/h		873			743			1326			926	
Approach Delay, s/veh		32.0			35.1			30.1			42.1	
Approach LOS		C			D			C			D	

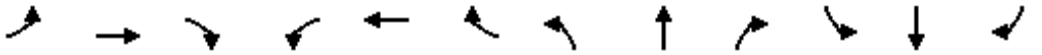
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	26.0	13.0	19.9	13.0	24.7	13.0	19.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	20.0	7.0	18.0	7.0	19.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	6.4	16.1	7.9	10.9	7.6	17.5	7.4	8.4
Green Ext Time (p_c), s	0.0	3.0	0.0	3.1	0.0	1.2	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	34.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	246	361	227	277	332	84	257	715	255	103	665	116
Future Volume (veh/h)	246	361	227	277	332	84	257	715	255	103	665	116
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	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	267	392	247	301	361	91	279	777	277	112	723	126
Adj No. of Lanes	2	2	1	2	2	1	2	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	2	2	2	2	2	2
Cap, veh/h	335	742	332	335	742	332	335	988	442	142	790	138
Arrive On Green	0.10	0.21	0.21	0.10	0.21	0.21	0.10	0.28	0.28	0.08	0.26	0.26
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	1774	3015	525
Grp Volume(v), veh/h	267	392	247	301	361	91	279	777	277	112	424	425
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1774	1770	1770
Q Serve(g_s), s	5.5	7.1	10.5	6.2	6.5	3.5	5.7	14.6	11.0	4.5	16.7	16.8
Cycle Q Clear(g_c), s	5.5	7.1	10.5	6.2	6.5	3.5	5.7	14.6	11.0	4.5	16.7	16.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	335	742	332	335	742	332	335	988	442	142	464	464
V/C Ratio(X)	0.80	0.53	0.74	0.90	0.49	0.27	0.83	0.79	0.63	0.79	0.91	0.92
Avail Cap(c_a), veh/h	335	885	396	335	885	396	335	988	442	148	467	467
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	31.8	25.3	26.6	32.1	25.0	23.8	31.9	24.0	22.7	32.5	25.8	25.8
Incr Delay (d2), s/veh	12.7	0.6	6.1	25.7	0.5	0.4	16.3	4.3	2.8	23.3	22.5	22.6
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(50%),veh/ln	3.2	3.5	5.2	4.2	3.2	1.6	3.5	7.7	5.1	3.1	11.0	11.1
LnGrp Delay(d),s/veh	44.5	25.8	32.7	57.8	25.5	24.3	48.2	28.2	25.4	55.8	48.2	48.4
LnGrp LOS	D	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		906			753			1333			961	
Approach Delay, s/veh		33.2			38.3			31.8			49.2	
Approach LOS		C			D			C			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	11.8	26.1	13.0	21.1	13.0	24.9	13.0	21.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	20.0	7.0	18.0	7.0	19.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	6.5	16.6	8.2	12.5	7.7	18.8	7.5	8.5
Green Ext Time (p_c), s	0.0	2.7	0.0	2.6	0.0	0.1	0.0	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	246	361	227	277	332	84	257	715	255	103	665	116
Future Volume (veh/h)	246	361	227	277	332	84	257	715	255	103	665	116
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	267	392	247	301	361	91	279	777	277	112	723	126
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	338	746	334	338	746	334	338	1007	450	124	907	406
Arrive On Green	0.10	0.21	0.21	0.10	0.21	0.21	0.10	0.28	0.28	0.07	0.26	0.26
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	267	392	247	301	361	91	279	777	277	112	723	126
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.4	7.0	10.4	6.2	6.4	3.4	5.7	14.4	10.8	4.5	13.6	4.6
Cycle Q Clear(g_c), s	5.4	7.0	10.4	6.2	6.4	3.4	5.7	14.4	10.8	4.5	13.6	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	338	746	334	338	746	334	338	1007	450	124	907	406
V/C Ratio(X)	0.79	0.53	0.74	0.89	0.48	0.27	0.83	0.77	0.62	0.90	0.80	0.31
Avail Cap(c_a), veh/h	338	893	400	338	893	400	338	1042	466	124	943	422
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	31.4	25.0	26.3	31.8	24.7	23.6	31.6	23.4	22.1	32.9	24.8	21.4
Incr Delay (d2), s/veh	12.0	0.6	5.9	24.2	0.5	0.4	15.4	3.5	2.3	51.4	4.7	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(50%),veh/ln	3.1	3.5	5.1	4.1	3.2	1.5	3.4	7.5	5.0	4.0	7.2	2.0
LnGrp Delay(d),s/veh	43.4	25.6	32.2	55.9	25.2	24.0	46.9	26.9	24.4	84.3	29.5	21.9
LnGrp LOS	D	C	C	E	C	C	D	C	C	F	C	C
Approach Vol, veh/h		906			753			1333			961	
Approach Delay, s/veh		32.6			37.4			30.6			34.9	
Approach LOS		C			D			C			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	11.0	26.3	13.0	21.0	13.0	24.3	13.0	21.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	21.0	7.0	18.0	7.0	19.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	6.5	16.4	8.2	12.4	7.7	15.6	7.4	8.4
Green Ext Time (p_c), s	0.0	3.5	0.0	2.6	0.0	2.7	0.0	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.4
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Panama Lane & S. Union - PM Peak

Count Date: 1/13/2015

Ave Annual Growth: **3.32%**

Exist Peak Hour Volumes

Signalized		
1	WBL	91
1	WBT	354
<	WBR	70
1	EBL	152
1	EBT	275
1	EBR	107
1	NBL	89
2	NBT	329
1	NBR	64
1	SBL	129
2	SBT	370
<	SBR	144
	TOTAL	2174

Year 2035
Fut. Volumes w/o Proj

WBL	185
WBT	763
WBR	128
EBL	292
EBT	572
EBR	229
NBL	186
NBT	585
NBR	123
SBL	229
SBT	675
SBR	278
TOTAL	4245

Year 2035 Fut. Vol
+ Project Traffic

WBL	195
WBT	763
WBR	128
EBL	292
EBT	572
EBR	237
NBL	200
NBT	624
NBR	131
SBL	229
SBT	696
SBR	278
TOTAL	4345

Year 2025
Fut. Volumes w/o Proj

WBL	131
WBT	524
WBR	95
EBL	212
EBT	400
EBR	158
NBL	130
NBT	442
NBR	89
SBL	173
SBT	503
SBR	201
TOTAL	3058

Year 2025 Fut. Vol
+ Project Traffic

WBL	136
WBT	524
WBR	95
EBL	212
EBT	400
EBR	162
NBL	137
NBT	462
NBR	93
SBL	173
SBT	514
SBR	201
TOTAL	3109

Project Generated Trips - Year 2035

	Total
WBL	10
WBT	0
WBR	0
EBL	0
EBT	0
EBR	8
NBL	14
NBT	39
NBR	8
SBL	0
SBT	21
SBR	0
TOTAL	100

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Lane & S. Union - PM Peak						
	Count Date:	1/13/2015						
2006	ADT							
WB Approach (To)	4.463							
WB Approach (Away)	4.305							
EB Approach (To)	3.434							
EB Approach (Away)	3.581							
NB Approach (To)	4.977							
NB Approach (Away)	5.302							
SB Approach (To)	7.059							
SB Approach (Away)	6.744							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	12.349		WBL	2.74	WBT	2.97	WBR	2.39
WB Approach (Away)	10.808		3.54%	185	3.82%	763	3.00%	128
EB Approach (To)	10.874		EBL	2.59	EBT	2.84	EBR	2.94
EB Approach (Away)	11.398		3.24%	292	3.64%	572	3.78%	229
NB Approach (To)	12.677		NBL	2.87	NBT	2.28	NBR	2.53
NB Approach (Away)	14.398		3.67%	186	2.85%	585	3.25%	123
SB Approach (To)	14.255		SBL	2.26	SBT	2.37	SBR	2.60
SB Approach (Away)	13.552		2.84%	229	2.98%	675	3.26%	278

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	152	275	107	91	354	70	89	329	64	129	370	144
Future Volume (veh/h)	152	275	107	91	354	70	89	329	64	129	370	144
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	165	299	116	99	385	76	97	358	70	140	402	157
Adj No. of Lanes	1	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	202	595	505	127	418	83	124	671	300	168	536	207
Arrive On Green	0.11	0.32	0.32	0.07	0.28	0.28	0.07	0.19	0.19	0.09	0.21	0.21
Sat Flow, veh/h	1774	1863	1583	1774	1512	298	1774	3539	1583	1774	2498	964
Grp Volume(v), veh/h	165	299	116	99	0	461	97	358	70	140	283	276
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1810	1774	1770	1583	1774	1770	1693
Q Serve(g_s), s	6.7	9.6	4.0	4.1	0.0	18.3	4.0	6.7	2.8	5.7	11.1	11.3
Cycle Q Clear(g_c), s	6.7	9.6	4.0	4.1	0.0	18.3	4.0	6.7	2.8	5.7	11.1	11.3
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	202	595	505	127	0	501	124	671	300	168	379	363
V/C Ratio(X)	0.82	0.50	0.23	0.78	0.00	0.92	0.78	0.53	0.23	0.83	0.75	0.76
Avail Cap(c_a), veh/h	216	595	505	216	0	514	168	910	407	168	455	435
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	20.4	18.5	33.7	0.0	25.9	33.8	27.0	25.4	32.9	27.2	27.2
Incr Delay (d2), s/veh	19.9	0.7	0.2	9.7	0.0	21.6	15.1	0.7	0.4	28.6	5.5	6.3
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(50%),veh/ln	4.4	5.0	1.8	2.3	0.0	12.1	2.5	3.3	1.2	4.1	5.9	5.9
LnGrp Delay(d),s/veh	51.9	21.1	18.7	43.5	0.0	47.5	48.9	27.7	25.8	61.5	32.6	33.5
LnGrp LOS	D	C	B	D		D	D	C	C	E	C	C
Approach Vol, veh/h		580			560			525			699	
Approach Delay, s/veh		29.4			46.8			31.3			38.8	
Approach LOS		C			D			C			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	13.0	20.0	11.3	29.6	11.2	21.8	14.4	26.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	19.0	9.0	21.0	7.0	19.0	9.0	21.0
Max Q Clear Time (g_c+I1), s	7.7	8.7	6.1	11.6	6.0	13.3	8.7	20.3
Green Ext Time (p_c), s	0.0	3.8	0.0	3.1	0.0	2.6	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	36.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	212	400	158	131	524	95	130	442	89	173	503	201
Future Volume (veh/h)	212	400	158	131	524	95	130	442	89	173	503	201
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	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	230	435	172	142	570	103	141	480	97	188	547	218
Adj No. of Lanes	1	1	1	1	1	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	2	2	2	2	2	2
Cap, veh/h	222	722	614	169	550	99	148	692	310	215	578	229
Arrive On Green	0.13	0.39	0.39	0.10	0.36	0.36	0.08	0.20	0.20	0.12	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	1774	1536	278	1774	3539	1583	1774	2475	983
Grp Volume(v), veh/h	230	435	172	142	0	673	141	480	97	188	391	374
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1814	1774	1770	1583	1774	1770	1689
Q Serve(g_s), s	15.0	22.4	9.0	9.4	0.0	43.0	9.5	15.1	6.3	12.5	26.1	26.2
Cycle Q Clear(g_c), s	15.0	22.4	9.0	9.4	0.0	43.0	9.5	15.1	6.3	12.5	26.1	26.2
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	222	722	614	169	0	650	148	692	310	215	413	394
V/C Ratio(X)	1.04	0.60	0.28	0.84	0.00	1.04	0.95	0.69	0.31	0.87	0.95	0.95
Avail Cap(c_a), veh/h	222	722	614	237	0	650	148	692	310	237	413	394
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	29.3	25.2	53.4	0.0	38.5	54.8	44.9	41.4	51.8	45.3	45.3
Incr Delay (d2), s/veh	70.5	1.4	0.2	16.7	0.0	44.8	60.0	3.0	0.6	26.8	30.8	32.6
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(50%),veh/ln	11.7	11.8	3.9	5.4	0.0	29.6	7.1	7.7	2.8	7.7	16.2	15.7
LnGrp Delay(d),s/veh	123.0	30.7	25.5	70.0	0.0	83.3	114.8	47.9	41.9	78.6	76.1	77.9
LnGrp LOS	F	C	C	E		F	F	D	D	E	E	E
Approach Vol, veh/h		837			815			718			953	
Approach Delay, s/veh		55.0			81.0			60.2			77.3	
Approach LOS		E			F			E			E	

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	20.5	29.5	17.5	52.5	16.0	34.0	21.0	49.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	16.0	22.0	16.0	42.0	10.0	28.0	15.0	43.0
Max Q Clear Time (g_c+I1), s	14.5	17.1	11.4	24.4	11.5	28.2	17.0	45.0
Green Ext Time (p_c), s	0.1	2.9	0.1	6.6	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	68.9
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	212	400	158	131	524	95	130	442	89	173	503	201
Future Volume (veh/h)	212	400	158	131	524	95	130	442	89	173	503	201
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	230	435	172	142	570	103	141	480	97	188	547	218
Adj No. of Lanes	2	1	1	1	1	0	2	2	1	2	2	1
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	2	2	2	2	2	2
Cap, veh/h	276	693	589	175	600	108	211	657	294	237	683	306
Arrive On Green	0.08	0.37	0.37	0.10	0.39	0.39	0.06	0.19	0.19	0.07	0.19	0.19
Sat Flow, veh/h	3442	1863	1583	1774	1536	278	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	230	435	172	142	0	673	141	480	97	188	547	218
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1814	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	5.7	16.7	6.7	6.8	0.0	31.4	3.5	11.2	4.6	4.7	12.9	11.2
Cycle Q Clear(g_c), s	5.7	16.7	6.7	6.8	0.0	31.4	3.5	11.2	4.6	4.7	12.9	11.2
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	693	589	175	0	708	211	657	294	237	683	306
V/C Ratio(X)	0.83	0.63	0.29	0.81	0.00	0.95	0.67	0.73	0.33	0.79	0.80	0.71
Avail Cap(c_a), veh/h	276	693	589	203	0	728	237	730	327	237	730	327
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	22.4	19.3	38.5	0.0	25.8	40.1	33.5	30.8	40.0	33.6	32.9
Incr Delay (d2), s/veh	19.1	1.8	0.3	19.2	0.0	21.8	6.1	3.4	0.7	16.8	6.0	6.7
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(50%),veh/ln	3.4	8.9	2.9	4.3	0.0	19.8	1.8	5.8	2.1	2.8	6.9	5.5
LnGrp Delay(d),s/veh	58.7	24.2	19.6	57.7	0.0	47.5	46.2	36.8	31.5	56.9	39.6	39.6
LnGrp LOS	E	C	B	E		D	D	D	C	E	D	D
Approach Vol, veh/h		837			815			718			953	
Approach Delay, s/veh		32.7			49.3			38.0			43.0	
Approach LOS		C			D			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	12.0	22.2	14.6	38.5	11.3	22.8	13.0	40.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	18.0	10.0	32.0	6.0	18.0	7.0	35.0
Max Q Clear Time (g_c+I1), s	6.7	13.2	8.8	18.7	5.5	14.9	7.7	33.4
Green Ext Time (p_c), s	0.0	2.9	0.0	5.7	0.0	2.0	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	40.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	212	400	162	136	524	95	137	462	93	173	514	201
Future Volume (veh/h)	212	400	162	136	524	95	137	462	93	173	514	201
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	230	435	176	148	570	103	149	502	101	188	559	218
Adj No. of Lanes	2	1	1	1	1	0	2	2	1	2	2	1
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	2	2	2	2	2	2
Cap, veh/h	274	682	580	182	597	108	219	671	300	235	688	308
Arrive On Green	0.08	0.37	0.37	0.10	0.39	0.39	0.06	0.19	0.19	0.07	0.19	0.19
Sat Flow, veh/h	3442	1863	1583	1774	1536	278	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	230	435	176	148	0	673	149	502	101	188	559	218
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1814	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	5.8	16.9	7.0	7.2	0.0	31.6	3.7	11.8	4.8	4.7	13.3	11.3
Cycle Q Clear(g_c), s	5.8	16.9	7.0	7.2	0.0	31.6	3.7	11.8	4.8	4.7	13.3	11.3
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	274	682	580	182	0	705	219	671	300	235	688	308
V/C Ratio(X)	0.84	0.64	0.30	0.82	0.00	0.95	0.68	0.75	0.34	0.80	0.81	0.71
Avail Cap(c_a), veh/h	274	682	580	222	0	723	235	726	325	235	726	325
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.8	23.0	19.8	38.6	0.0	26.1	40.2	33.6	30.8	40.3	33.8	33.0
Incr Delay (d2), s/veh	19.9	2.0	0.3	17.3	0.0	22.6	7.1	4.0	0.7	17.5	6.7	6.6
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(50%),veh/ln	3.5	9.1	3.1	4.4	0.0	20.1	2.0	6.1	2.2	2.8	7.1	5.5
LnGrp Delay(d),s/veh	59.7	25.0	20.1	55.8	0.0	48.6	47.3	37.6	31.4	57.8	40.6	39.6
LnGrp LOS	E	C	C	E		D	D	D	C	E	D	D
Approach Vol, veh/h		841			821			752			965	
Approach Delay, s/veh		33.5			49.9			38.7			43.7	
Approach LOS		C			D			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	12.0	22.6	15.0	38.2	11.6	23.1	13.0	40.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	18.0	11.0	31.0	6.0	18.0	7.0	35.0
Max Q Clear Time (g_c+I1), s	6.7	13.8	9.2	18.9	5.7	15.3	7.8	33.6
Green Ext Time (p_c), s	0.0	2.6	0.1	5.4	0.0	1.8	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	41.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	572	229	185	763	128	186	585	123	229	675	278
Future Volume (veh/h)	292	572	229	185	763	128	186	585	123	229	675	278
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	317	622	249	201	829	139	202	636	134	249	734	302
Adj No. of Lanes	2	1	1	1	1	0	2	2	1	2	2	1
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	2	2	2	2	2	2
Cap, veh/h	230	622	529	197	589	99	192	821	367	192	821	367
Arrive On Green	0.07	0.33	0.33	0.11	0.38	0.38	0.06	0.23	0.23	0.06	0.23	0.23
Sat Flow, veh/h	3442	1863	1583	1774	1556	261	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	317	622	249	201	0	968	202	636	134	249	734	302
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	0	1817	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	6.0	30.0	11.2	10.0	0.0	34.0	5.0	15.1	6.4	5.0	18.1	16.3
Cycle Q Clear(g_c), s	6.0	30.0	11.2	10.0	0.0	34.0	5.0	15.1	6.4	5.0	18.1	16.3
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	622	529	197	0	688	192	821	367	192	821	367
V/C Ratio(X)	1.38	1.00	0.47	1.02	0.00	1.41	1.05	0.78	0.37	1.30	0.89	0.82
Avail Cap(c_a), veh/h	230	622	529	197	0	688	192	827	370	192	827	370
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	29.9	23.6	39.9	0.0	27.9	42.4	32.3	29.0	42.4	33.4	32.7
Incr Delay (d2), s/veh	195.4	36.0	0.7	68.7	0.0	192.1	80.1	4.6	0.6	167.7	12.2	13.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	21.6	4.9	8.7	0.0	53.7	4.5	7.9	2.9	6.8	10.2	8.5
LnGrp Delay(d),s/veh	237.3	65.9	24.3	108.8	0.0	220.0	122.5	36.9	29.6	210.1	45.6	46.5
LnGrp LOS	F	E	C	F		F	F	D	C	F	D	D
Approach Vol, veh/h		1188			1169			972			1285	
Approach Delay, s/veh		102.9			200.9			53.7			77.7	
Approach LOS		F			F			D			E	

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	11.0	26.8	16.0	36.0	11.0	26.8	12.0	40.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	21.0	10.0	30.0	5.0	21.0	6.0	34.0
Max Q Clear Time (g_c+I1), s	7.0	17.1	12.0	32.0	7.0	20.1	8.0	36.0
Green Ext Time (p_c), s	0.0	2.9	0.0	0.0	0.0	0.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	110.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	572	229	185	763	128	186	585	123	229	675	278
Future Volume (veh/h)	292	572	229	185	763	128	186	585	123	229	675	278
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	317	622	249	201	829	139	202	636	134	249	734	302
Adj No. of Lanes	2	2	1	1	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	404	822	368	217	1208	376	281	1203	375	281	1203	375
Arrive On Green	0.12	0.23	0.23	0.12	0.24	0.24	0.08	0.24	0.24	0.08	0.24	0.24
Sat Flow, veh/h	3442	3539	1583	1774	5085	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	317	622	249	201	829	139	202	636	134	249	734	302
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1695	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	6.6	12.0	10.5	8.2	10.9	5.4	4.2	8.0	5.2	5.3	9.5	13.2
Cycle Q Clear(g_c), s	6.6	12.0	10.5	8.2	10.9	5.4	4.2	8.0	5.2	5.3	9.5	13.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	822	368	217	1208	376	281	1203	375	281	1203	375
V/C Ratio(X)	0.79	0.76	0.68	0.92	0.69	0.37	0.72	0.53	0.36	0.89	0.61	0.81
Avail Cap(c_a), veh/h	422	868	388	217	1247	388	281	1247	388	281	1247	388
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	31.5	26.3	25.7	31.9	25.5	23.4	32.9	24.5	23.4	33.4	25.0	26.4
Incr Delay (d2), s/veh	9.1	3.7	4.4	40.6	1.5	0.6	8.5	0.4	0.6	26.7	0.8	11.5
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(50%),veh/ln	3.6	6.3	5.0	6.5	5.2	2.4	2.3	3.8	2.3	3.5	4.5	6.9
LnGrp Delay(d),s/veh	40.6	29.9	30.0	72.5	27.0	24.0	41.4	24.8	23.9	60.1	25.8	37.9
LnGrp LOS	D	C	C	E	C	C	D	C	C	E	C	D
Approach Vol, veh/h		1188			1169			972			1285	
Approach Delay, s/veh		32.8			34.5			28.2			35.3	
Approach LOS		C			C			C			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	12.0	23.4	15.0	23.0	12.0	23.4	14.6	23.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	18.0	9.0	18.0	6.0	18.0	9.0	18.0
Max Q Clear Time (g_c+I1), s	7.3	10.0	10.2	14.0	6.2	15.2	8.6	12.9
Green Ext Time (p_c), s	0.0	5.4	0.0	3.0	0.0	2.2	0.1	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	572	237	195	763	128	200	624	131	229	696	278
Future Volume (veh/h)	292	572	237	195	763	128	200	624	131	229	696	278
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	317	622	258	212	829	139	217	678	142	249	757	302
Adj No. of Lanes	2	2	1	1	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	404	822	368	217	1207	376	281	1206	375	281	1206	375
Arrive On Green	0.12	0.23	0.23	0.12	0.24	0.24	0.08	0.24	0.24	0.08	0.24	0.24
Sat Flow, veh/h	3442	3539	1583	1774	5085	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	317	622	258	212	829	139	217	678	142	249	757	302
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1695	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	6.6	12.0	11.0	8.8	10.9	5.4	4.5	8.6	5.5	5.3	9.8	13.2
Cycle Q Clear(g_c), s	6.6	12.0	11.0	8.8	10.9	5.4	4.5	8.6	5.5	5.3	9.8	13.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	822	368	217	1207	376	281	1206	375	281	1206	375
V/C Ratio(X)	0.79	0.76	0.70	0.98	0.69	0.37	0.77	0.56	0.38	0.89	0.63	0.80
Avail Cap(c_a), veh/h	422	867	388	217	1246	388	281	1246	388	281	1246	388
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	31.5	26.3	25.9	32.1	25.5	23.4	33.1	24.7	23.5	33.4	25.1	26.4
Incr Delay (d2), s/veh	9.1	3.7	5.3	53.9	1.5	0.6	12.4	0.5	0.6	26.8	1.0	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(50%),veh/ln	3.6	6.3	5.3	7.5	5.2	2.4	2.6	4.1	2.5	3.5	4.7	6.9
LnGrp Delay(d),s/veh	40.6	30.0	31.1	86.0	27.1	24.0	45.5	25.2	24.1	60.2	26.1	37.8
LnGrp LOS	D	C	C	F	C	C	D	C	C	E	C	D
Approach Vol, veh/h		1197			1180			1037			1308	
Approach Delay, s/veh		33.0			37.3			29.3			35.3	
Approach LOS		C			D			C			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	12.0	23.4	15.0	23.1	12.0	23.4	14.6	23.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	18.0	9.0	18.0	6.0	18.0	9.0	18.0
Max Q Clear Time (g_c+I1), s	7.3	10.6	10.8	14.0	6.5	15.2	8.6	12.9
Green Ext Time (p_c), s	0.0	5.2	0.0	3.0	0.0	2.2	0.1	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Panama Lane & Cottonwood Road - AM Peak
Count Date: 1/6/2015

Ave Annual Growth: **3.54%**

Exist Peak Hour Volumes

AWS		
>	WBL	16
1	WBT	116
<	WBR	41
>	EBL	99
1	EBT	128
<	EBR	7
>	NBL	3
1	NBT	64
<	NBR	15
>	SBL	27
1	SBT	71
<	SBR	47
	TOTAL	634

Year 2035
Fut. Volumes w/o Proj

WBL	25
WBT	330
WBR	90
EBL	259
EBT	364
EBR	13
NBL	6
NBT	93
NBR	24
SBL	59
SBT	103
SBR	123
TOTAL	1489

Year 2035 Fut. Vol
+ Project Traffic

WBL	38
WBT	332
WBR	90
EBL	259
EBT	364
EBR	13
NBL	7
NBT	101
NBR	24
SBL	60
SBT	137
SBR	127
TOTAL	1552

Year 2025
Fut. Volumes w/o Proj

WBL	20
WBT	198
WBR	61
EBL	162
EBT	219
EBR	10
NBL	4
NBT	78
NBR	19
SBL	40
SBT	86
SBR	77
TOTAL	974

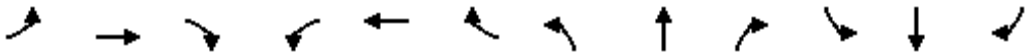
Year 2025 Fut. Vol
+ Project Traffic

WBL	27
WBT	199
WBR	61
EBL	162
EBT	219
EBR	10
NBL	5
NBT	82
NBR	19
SBL	41
SBT	103
SBR	79
TOTAL	1007

Project Generated Trips - Year 2035

	Total
WBL	13
WBT	2
WBR	0
EBL	0
EBT	0
EBR	0
NBL	1
NBT	8
NBR	0
SBL	1
SBT	34
SBR	4
TOTAL	63

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Lane & Cottonwood Road - AM Peak						
	Count Date:	1/6/2015						
2015	ADT							
WB Approach (To)	3.21							
WB Approach (Away)	3.1							
EB Approach (To)	3.01			Use PM Peak AADT Ratio and Growth Rate				
EB Approach (Away)	3.34							
NB Approach (To)	1.91							
NB Approach (Away)	1.77							
SB Approach (To)	3.23							
SB Approach (Away)	2.87							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	7.488		WBL	1.68	WBT	2.82	WBR	2.16
WB Approach (Away)	7.235		2.25%	25	5.24%	330	3.90%	90
EB Approach (To)	9.921		EBL	2.64	EBT	2.81	EBR	2.17
EB Approach (Away)	11.036		4.81%	259	5.23%	364	3.16%	13
NB Approach (To)	1.989		NBL	2.17	NBT	1.51	NBR	1.69
NB Approach (Away)	1.834		3.18%	6	1.84%	93	2.26%	24
SB Approach (To)	6.401		SBL	2.16	SBT	1.51	SBR	2.64
SB Approach (Away)	5.694		3.90%	59	1.83%	103	4.82%	123



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.968			0.976			0.956	
Flt Protected		0.979			0.995			0.998			0.991	
Satd. Flow (prot)	0	1816	0	0	1794	0	0	1814	0	0	1765	0
Flt Permitted		0.979			0.995			0.998			0.991	
Satd. Flow (perm)	0	1816	0	0	1794	0	0	1814	0	0	1765	0
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			451			5301			1394	
Travel Time (s)		65.3			10.3			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	99	128	7	0	16	116	41	0	3	64	15
Future Vol, veh/h	0	99	128	7	0	16	116	41	0	3	64	15
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	108	139	8	0	17	126	45	0	3	70	16
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.4	9.4	8.9
HCM LOS	B	A	A

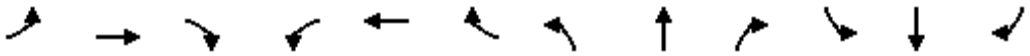
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	42%	9%	19%
Vol Thru, %	78%	55%	67%	49%
Vol Right, %	18%	3%	24%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	82	234	173	145
LT Vol	3	99	16	27
Through Vol	64	128	116	71
RT Vol	15	7	41	47
Lane Flow Rate	89	254	188	158
Geometry Grp	1	1	1	1
Degree of Util (X)	0.126	0.342	0.248	0.217
Departure Headway (Hd)	5.099	4.839	4.739	4.948
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	696	738	752	719
Service Time	3.183	2.905	2.808	3.021
HCM Lane V/C Ratio	0.128	0.344	0.25	0.22
HCM Control Delay	8.9	10.4	9.4	9.4
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.4	1.5	1	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	27	71	47
Future Vol, veh/h	0	27	71	47
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	77	51
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.971			0.974			0.948	
Flt Protected		0.980			0.996			0.998			0.990	
Satd. Flow (prot)	0	1820	0	0	1801	0	0	1811	0	0	1748	0
Flt Permitted		0.980			0.996			0.998			0.990	
Satd. Flow (perm)	0	1820	0	0	1801	0	0	1811	0	0	1748	0
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			451			5301			1394	
Travel Time (s)		65.3			10.3			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	162	219	10	0	20	198	61	0	4	78	19
Future Vol, veh/h	0	162	219	10	0	20	198	61	0	4	78	19
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	176	238	11	0	22	215	66	0	4	85	21
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	18.4	13.4	10.9
HCM LOS	C	B	B

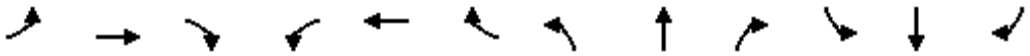
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	41%	7%	20%
Vol Thru, %	77%	56%	71%	42%
Vol Right, %	19%	3%	22%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	391	279	203
LT Vol	4	162	20	40
Through Vol	78	219	198	86
RT Vol	19	10	61	77
Lane Flow Rate	110	425	303	221
Geometry Grp	1	1	1	1
Degree of Util (X)	0.192	0.651	0.466	0.365
Departure Headway (Hd)	6.296	5.512	5.529	5.948
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	564	650	646	600
Service Time	4.395	3.579	3.603	4.032
HCM Lane V/C Ratio	0.195	0.654	0.469	0.368
HCM Control Delay	10.9	18.4	13.4	12.5
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	0.7	4.8	2.5	1.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	40	86	77
Future Vol, veh/h	0	40	86	77
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	43	93	84
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	12.5
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.971			0.975			0.952	
Flt Protected		0.980			0.995			0.998			0.991	
Satd. Flow (prot)	0	1820	0	0	1800	0	0	1813	0	0	1757	0
Flt Permitted		0.980			0.995			0.998			0.991	
Satd. Flow (perm)	0	1820	0	0	1800	0	0	1813	0	0	1757	0
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			451			5301			1394	
Travel Time (s)		65.3			10.3			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	162	219	10	0	27	199	61	0	5	82	19
Future Vol, veh/h	0	162	219	10	0	27	199	61	0	5	82	19
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	176	238	11	0	29	216	66	0	5	89	21
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	19.5	14.2	11.3
HCM LOS	C	B	B

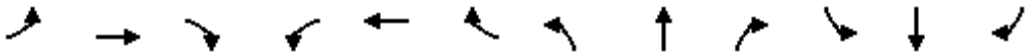
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	41%	9%	18%
Vol Thru, %	77%	56%	69%	46%
Vol Right, %	18%	3%	21%	35%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	391	287	223
LT Vol	5	162	27	41
Through Vol	82	219	199	103
RT Vol	19	10	61	79
Lane Flow Rate	115	425	312	242
Geometry Grp	1	1	1	1
Degree of Util (X)	0.21	0.667	0.491	0.407
Departure Headway (Hd)	6.55	5.646	5.764	6.146
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	552	633	630	589
Service Time	4.55	3.735	3.764	4.146
HCM Lane V/C Ratio	0.208	0.671	0.495	0.411
HCM Control Delay	11.3	19.5	14.2	13.3
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	0.8	5	2.7	2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	41	103	79
Future Vol, veh/h	0	41	103	79
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	45	112	86
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	13.3
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.973			0.974			0.942	
Flt Protected		0.980			0.997			0.997			0.990	
Satd. Flow (prot)	0	1820	0	0	1807	0	0	1809	0	0	1737	0
Flt Permitted		0.980			0.997			0.997			0.990	
Satd. Flow (perm)	0	1820	0	0	1807	0	0	1809	0	0	1737	0
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			451			5301			1394	
Travel Time (s)		65.3			10.3			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	47.6
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	259	364	13	0	25	330	90	0	6	93	24
Future Vol, veh/h	0	259	364	13	0	25	330	90	0	6	93	24
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	282	396	14	0	27	359	98	0	7	101	26
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	66.3	45.8	15.1
HCM LOS	F	E	C

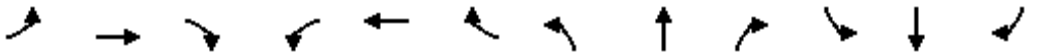
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	41%	6%	21%
Vol Thru, %	76%	57%	74%	36%
Vol Right, %	20%	2%	20%	43%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	636	445	285
LT Vol	6	259	25	59
Through Vol	93	364	330	103
RT Vol	24	13	90	123
Lane Flow Rate	134	691	484	310
Geometry Grp	1	1	1	1
Degree of Util (X)	0.311	1	0.906	0.642
Departure Headway (Hd)	8.377	7.002	6.882	7.456
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	431	518	532	486
Service Time	6.401	5.041	4.882	5.471
HCM Lane V/C Ratio	0.311	1.334	0.91	0.638
HCM Control Delay	15.1	66.3	45.8	22.9
HCM Lane LOS	C	F	E	C
HCM 95th-tile Q	1.3	13.8	10.6	4.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	59	103	123
Future Vol, veh/h	0	59	103	123
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	64	112	134
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	22.9
HCM LOS	C

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	0		0	0		200	0		200
Storage Lanes	1		0	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.970				0.850			0.850
Flt Protected	0.950				0.997			0.997			0.982	
Satd. Flow (prot)	1770	1853	0	0	3423	0	0	1857	1583	0	1829	1583
Flt Permitted	0.950				0.997			0.997			0.982	
Satd. Flow (perm)	1770	1853	0	0	3423	0	0	1857	1583	0	1829	1583
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			1128			5301			1394	
Travel Time (s)		65.3			25.6			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	21.5
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	259	364	13	0	25	330	90	0	6	93	24
Future Vol, veh/h	0	259	364	13	0	25	330	90	0	6	93	24
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	282	396	14	0	27	359	98	0	7	101	26
Number of Lanes	0	1	1	0	0	0	2	0	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	28.6	17.5	13.8
HCM LOS	D	C	B

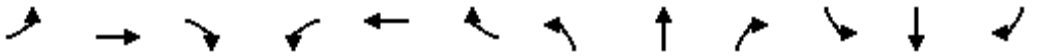
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	6%	0%	100%	0%	13%	0%	36%	0%
Vol Thru, %	94%	0%	0%	97%	87%	65%	64%	0%
Vol Right, %	0%	100%	0%	3%	0%	35%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	24	259	377	190	255	162	123
LT Vol	6	0	259	0	25	0	59	0
Through Vol	93	0	0	364	165	165	103	0
RT Vol	0	24	0	13	0	90	0	123
Lane Flow Rate	108	26	282	410	207	277	176	134
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.258	0.057	0.598	0.809	0.432	0.556	0.406	0.274
Departure Headway (Hd)	8.622	7.864	7.643	7.106	7.536	7.215	8.298	7.388
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	416	455	473	508	477	499	433	485
Service Time	6.384	5.625	5.395	4.858	5.292	4.971	6.052	5.142
HCM Lane V/C Ratio	0.26	0.057	0.596	0.807	0.434	0.555	0.406	0.276
HCM Control Delay	14.4	11.1	21.2	33.6	15.9	18.7	16.6	12.9
HCM Lane LOS	B	B	C	D	C	C	C	B
HCM 95th-tile Q	1	0.2	3.8	7.7	2.1	3.3	1.9	1.1

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	59	103	123
Future Vol, veh/h	0	59	103	123
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	64	112	134
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	15
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	0		0	0		200	0		200
Storage Lanes	1		0	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.971				0.850			0.850
Flt Protected	0.950				0.996			0.997			0.985	
Satd. Flow (prot)	1770	1853	0	0	3423	0	0	1857	1583	0	1835	1583
Flt Permitted	0.950				0.996			0.997			0.985	
Satd. Flow (perm)	1770	1853	0	0	3423	0	0	1857	1583	0	1835	1583
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			1128			5301			1394	
Travel Time (s)		65.3			25.6			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	23.7
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	259	364	13	0	38	332	90	0	7	101	24
Future Vol, veh/h	0	259	364	13	0	38	332	90	0	7	101	24
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	282	396	14	0	41	361	98	0	8	110	26
Number of Lanes	0	1	1	0	0	0	2	0	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	32.3	19.1	14.6
HCM LOS	D	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	6%	0%	100%	0%	19%	0%	30%	0%
Vol Thru, %	94%	0%	0%	97%	81%	65%	70%	0%
Vol Right, %	0%	100%	0%	3%	0%	35%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	24	259	377	204	256	197	127
LT Vol	7	0	259	0	38	0	60	0
Through Vol	101	0	0	364	166	166	137	0
RT Vol	0	24	0	13	0	90	0	127
Lane Flow Rate	117	26	282	410	222	278	214	138
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.29	0.059	0.621	0.843	0.483	0.579	0.501	0.289
Departure Headway (Hd)	8.879	8.117	7.941	7.403	7.842	7.493	8.427	7.546
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	404	440	453	488	459	481	428	475
Service Time	6.652	5.89	5.704	5.166	5.608	5.259	6.191	5.31
HCM Lane V/C Ratio	0.29	0.059	0.623	0.84	0.484	0.578	0.5	0.291
HCM Control Delay	15.3	11.4	22.9	38.7	17.8	20.1	19.4	13.4
HCM Lane LOS	C	B	C	E	C	C	C	B
HCM 95th-tile Q	1.2	0.2	4.1	8.5	2.6	3.6	2.7	1.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	60	137	127
Future Vol, veh/h	0	60	137	127
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	65	149	138
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	17
HCM LOS	C

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Panama Lane _____ Critical Approach Speed _____ mph

Minor St: Cottonwood Road _____ Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒
or
In built up area of isolated community of < 10,000 population..... ☐ } **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

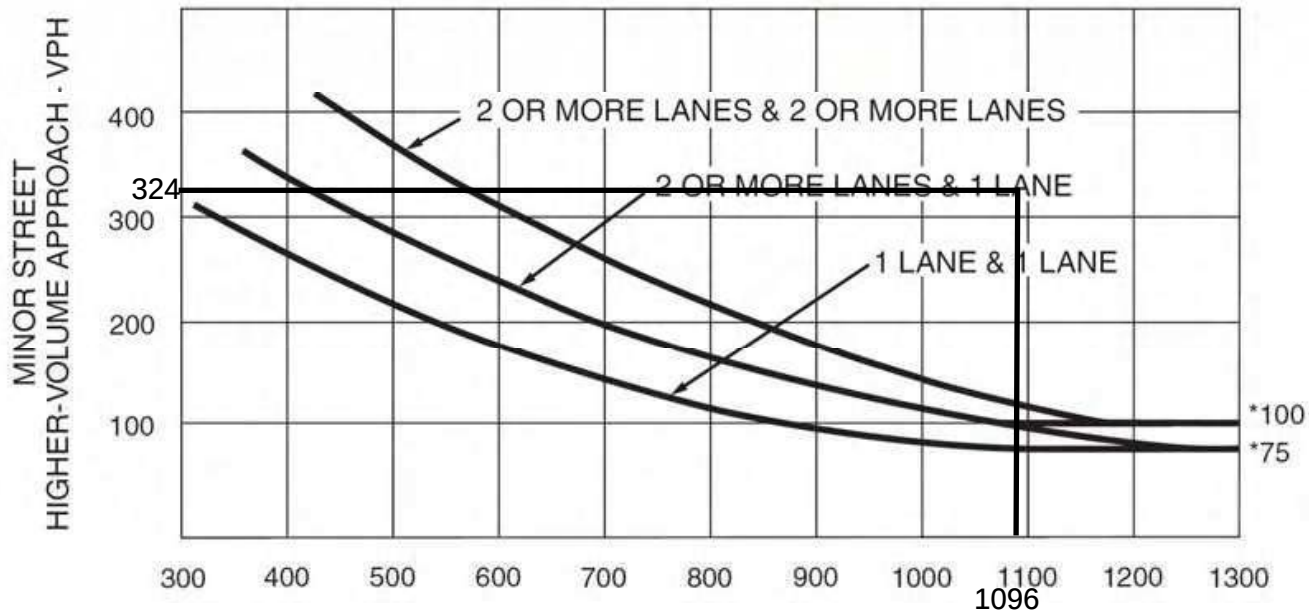
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... / 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... / 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 13152 ..... / 2 or More..... 3888	9,600 / 6,720	3,200 / 2,240
1..... / 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... / 1.....	12,000 / 8,400	1,200 / 850
2 or More..... / 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 13152 ..... / 2 or More..... 3888	14,400 / 10,080	1,600 / 1,120
1..... / 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Panama Lane & Cottonwood Rd. - PM Peak

Count Date: 1/6/2015

Ave Annual Growth: **3.54%**

Exist Peak Hour Volumes

AWS		
>	WBL	16
1	WBT	242
<	WBR	122
>	EBL	66
1	EBT	183
<	EBR	21
>	NBL	35
1	NBT	187
<	NBR	15
>	SBL	53
1	SBT	94
<	SBR	88
	TOTAL	1122

Year 2035
Fut. Volumes w/o Proj

WBL	25
WBT	689
WBR	267
EBL	173
EBT	521
EBR	40
NBL	66
NBT	272
NBR	24
SBL	116
SBT	136
SBR	231
TOTAL	2560

Year 2035 Fut. Vol
+ Project Traffic

WBL	29
WBT	691
WBR	267
EBL	174
EBT	526
EBR	42
NBL	67
NBT	281
NBR	34
SBL	116
SBT	152
SBR	236
TOTAL	2615

Year 2025
Fut. Volumes w/o Proj

WBL	20
WBT	413
WBR	182
EBL	108
EBT	312
EBR	29
NBL	49
NBT	226
NBR	19
SBL	79
SBT	114
SBR	144
TOTAL	1695

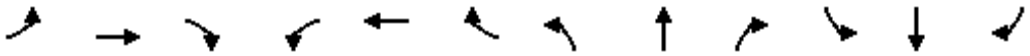
Year 2025 Fut. Vol
+ Project Traffic

WBL	22
WBT	414
WBR	182
EBL	109
EBT	315
EBR	30
NBL	50
NBT	231
NBR	24
SBL	79
SBT	122
SBR	147
TOTAL	1725

Project Generated Trips - Year 2035

	Total
WBL	4
WBT	2
WBR	0
EBL	1
EBT	5
EBR	2
NBL	1
NBT	9
NBR	10
SBL	0
SBT	16
SBR	5
TOTAL	55

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Lane & Cottonwood Rd. - PM Peak						
	Count Date:	1/6/2015						
2015	ADT							
WB Approach (To)	3.21							
WB Approach (Away)	3.1							
EB Approach (To)	3.01							
EB Approach (Away)	3.34							
NB Approach (To)	1.91							
NB Approach (Away)	1.77							
SB Approach (To)	3.23							
SB Approach (Away)	2.87							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	7.488		WBL	1.68	WBT	2.82	WBR	2.16
WB Approach (Away)	7.235		2.25%	25	5.24%	689	3.90%	267
EB Approach (To)	9.921		EBL	2.64	EBT	2.81	EBR	2.17
EB Approach (Away)	11.036		4.81%	173	5.23%	521	3.16%	40
NB Approach (To)	1.989		NBL	2.17	NBT	1.51	NBR	1.69
NB Approach (Away)	1.834		3.18%	66	1.84%	272	2.26%	24
SB Approach (To)	6.401		SBL	2.16	SBT	1.51	SBR	2.64
SB Approach (Away)	5.694		3.90%	116	1.83%	136	4.82%	231



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.957			0.992			0.949	
Flt Protected		0.988			0.998			0.993			0.989	
Satd. Flow (prot)	0	1820	0	0	1779	0	0	1835	0	0	1748	0
Flt Permitted		0.988			0.998			0.993			0.989	
Satd. Flow (perm)	0	1820	0	0	1779	0	0	1835	0	0	1748	0
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			451			5301			1394	
Travel Time (s)		65.3			10.3			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	18.8
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	66	183	21	0	16	242	122	0	35	187	15
Future Vol, veh/h	0	66	183	21	0	16	242	122	0	35	187	15
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	72	199	23	0	17	263	133	0	38	203	16
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	17.3	23.2	16.4
HCM LOS	C	C	C

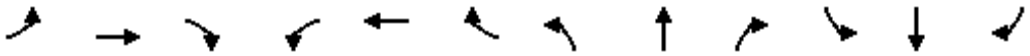
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	24%	4%	23%
Vol Thru, %	79%	68%	64%	40%
Vol Right, %	6%	8%	32%	37%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	237	270	380	235
LT Vol	35	66	16	53
Through Vol	187	183	242	94
RT Vol	15	21	122	88
Lane Flow Rate	258	293	413	255
Geometry Grp	1	1	1	1
Degree of Util (X)	0.49	0.54	0.711	0.475
Departure Headway (Hd)	6.848	6.625	6.194	6.698
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	523	540	578	534
Service Time	4.943	4.718	4.274	4.793
HCM Lane V/C Ratio	0.493	0.543	0.715	0.478
HCM Control Delay	16.4	17.3	23.2	15.8
HCM Lane LOS	C	C	C	C
HCM 95th-tile Q	2.7	3.2	5.8	2.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	53	94	88
Future Vol, veh/h	0	53	94	88
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	58	102	96
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	15.8
HCM LOS	C

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.960			0.991			0.942	
Flt Protected		0.988			0.998			0.992			0.988	
Satd. Flow (prot)	0	1824	0	0	1785	0	0	1831	0	0	1734	0
Flt Permitted		0.988			0.998			0.992			0.988	
Satd. Flow (perm)	0	1824	0	0	1785	0	0	1831	0	0	1734	0
Link Speed (mph)		55			30			55			55	
Link Distance (ft)		5264			451			5301			1394	
Travel Time (s)		65.3			10.3			65.7			17.3	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	65.8
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	108	312	29	0	20	413	182	0	49	226	19
Future Vol, veh/h	0	108	312	29	0	20	413	182	0	49	226	19
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	117	339	32	0	22	449	198	0	53	246	21
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	75.5	74.7	44.4
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	24%	3%	23%
Vol Thru, %	77%	69%	67%	34%
Vol Right, %	6%	6%	30%	43%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	294	449	615	337
LT Vol	49	108	20	79
Through Vol	226	312	413	114
RT Vol	19	29	182	144
Lane Flow Rate	320	488	668	366
Geometry Grp	1	1	1	1
Degree of Util (X)	0.828	1	1	0.908
Departure Headway (Hd)	9.33	8.977	8.796	8.923
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	390	410	421	407
Service Time	7.387	6.977	6.796	6.975
HCM Lane V/C Ratio	0.821	1.19	1.587	0.899
HCM Control Delay	44.4	75.5	74.7	55.3
HCM Lane LOS	E	F	F	F
HCM 95th-tile Q	7.5	12.3	12.4	9.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	79	114	144
Future Vol, veh/h	0	79	114	144
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	86	124	157
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	55.3
HCM LOS	F

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Panama Lane _____ Critical Approach Speed _____ mph

Minor St: Cottonwood Road _____ Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

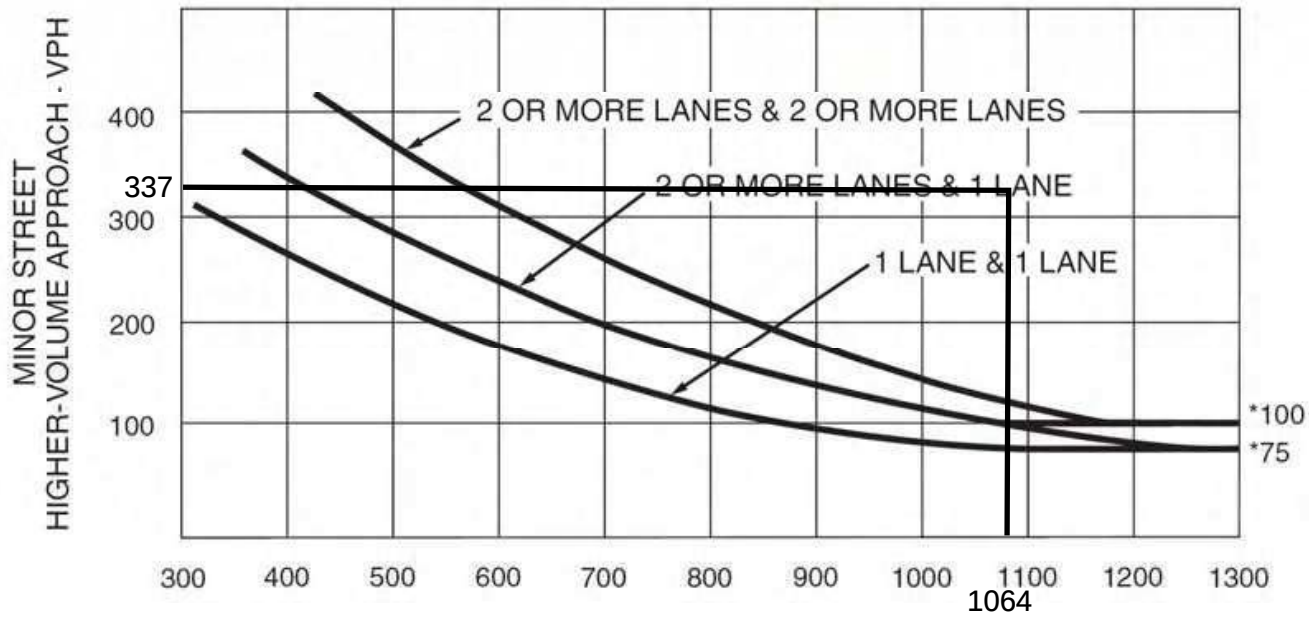
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More (10640) / 2 or More (3370)	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More (10640) / 2 or More (3370)	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B	2 CONDITIONS 80%	2 CONDITIONS 80%
Satisfied X Not Satisfied _____		
No one condition satisfied, but following conditions fulfilled 80% or more..... A: 100% B: 100%		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	312	29	20	413	182	49	226	19	79	114	144
Future Volume (veh/h)	108	312	29	20	413	182	49	226	19	79	114	144
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	117	339	32	22	449	198	53	246	21	86	124	157
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	146	619	526	45	512	436	86	341	290	112	368	313
Arrive On Green	0.08	0.33	0.33	0.03	0.28	0.28	0.05	0.18	0.18	0.06	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	117	339	32	22	449	198	53	246	21	86	124	157
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.9	9.0	0.8	0.7	14.0	6.3	1.8	7.5	0.7	2.9	3.5	5.4
Cycle Q Clear(g_c), s	3.9	9.0	0.8	0.7	14.0	6.3	1.8	7.5	0.7	2.9	3.5	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	146	619	526	45	512	436	86	341	290	112	368	313
V/C Ratio(X)	0.80	0.55	0.06	0.49	0.88	0.45	0.61	0.72	0.07	0.77	0.34	0.50
Avail Cap(c_a), veh/h	146	619	526	146	553	470	146	553	470	146	553	470
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	27.3	16.5	13.8	29.1	21.0	18.2	28.3	23.3	20.5	28.0	20.9	21.7
Incr Delay (d2), s/veh	26.1	1.0	0.0	7.8	14.0	0.7	6.9	2.9	0.1	16.3	0.5	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(50%),veh/ln	3.0	4.8	0.4	0.5	9.1	2.8	1.0	4.1	0.3	1.9	1.8	2.4
LnGrp Delay(d),s/veh	53.4	17.5	13.8	37.0	35.0	18.9	35.1	26.2	20.6	44.2	21.4	22.9
LnGrp LOS	D	B	B	D	C	B	D	C	C	D	C	C
Approach Vol, veh/h		488			669			320			367	
Approach Delay, s/veh		25.9			30.3			27.3			27.4	
Approach LOS		C			C			C			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	9.8	17.1	7.5	26.1	9.0	18.0	11.0	22.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.9	9.5	2.7	11.0	3.8	7.4	5.9	16.0
Green Ext Time (p_c), s	0.0	1.6	0.0	3.1	0.0	1.8	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	28.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	315	30	22	414	182	50	231	24	79	122	147
Future Volume (veh/h)	109	315	30	22	414	182	50	231	24	79	122	147
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	342	33	24	450	198	54	251	26	86	133	160
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	146	614	522	49	512	435	87	347	295	112	372	317
Arrive On Green	0.08	0.33	0.33	0.03	0.27	0.27	0.05	0.19	0.19	0.06	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	118	342	33	24	450	198	54	251	26	86	133	160
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.0	9.2	0.9	0.8	14.1	6.3	1.8	7.7	0.8	2.9	3.7	5.5
Cycle Q Clear(g_c), s	4.0	9.2	0.9	0.8	14.1	6.3	1.8	7.7	0.8	2.9	3.7	5.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	146	614	522	49	512	435	87	347	295	112	372	317
V/C Ratio(X)	0.81	0.56	0.06	0.49	0.88	0.45	0.62	0.72	0.09	0.77	0.36	0.51
Avail Cap(c_a), veh/h	146	614	522	146	550	468	146	550	468	146	550	468
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	27.5	16.8	14.0	29.2	21.1	18.3	28.4	23.3	20.5	28.1	21.0	21.7
Incr Delay (d2), s/veh	28.0	1.1	0.1	7.6	14.4	0.7	7.0	2.9	0.1	16.7	0.6	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(50%),veh/ln	3.1	4.8	0.4	0.5	9.2	2.8	1.1	4.3	0.4	1.9	2.0	2.5
LnGrp Delay(d),s/veh	55.5	17.9	14.0	36.8	35.5	19.0	35.4	26.2	20.6	44.8	21.6	22.9
LnGrp LOS	E	B	B	D	D	B	D	C	C	D	C	C
Approach Vol, veh/h		493			672			331			379	
Approach Delay, s/veh		26.6			30.7			27.3			27.4	
Approach LOS		C			C			C			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	9.8	17.3	7.7	26.1	9.0	18.2	11.0	22.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.9	9.7	2.8	11.2	3.8	7.5	6.0	16.1
Green Ext Time (p_c), s	0.0	1.6	0.0	3.0	0.0	1.8	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	521	40	25	689	267	66	272	24	116	136	231
Future Volume (veh/h)	173	521	40	25	689	267	66	272	24	116	136	231
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	188	566	43	27	749	290	72	296	26	126	148	251
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	135	598	509	53	511	435	99	385	327	135	423	360
Arrive On Green	0.08	0.32	0.32	0.03	0.27	0.27	0.06	0.21	0.21	0.08	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	188	566	43	27	749	290	72	296	26	126	148	251
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.0	19.4	1.2	1.0	18.0	10.7	2.6	9.8	0.9	4.6	4.4	9.5
Cycle Q Clear(g_c), s	5.0	19.4	1.2	1.0	18.0	10.7	2.6	9.8	0.9	4.6	4.4	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	135	598	509	53	511	435	99	385	327	135	423	360
V/C Ratio(X)	1.39	0.95	0.08	0.51	1.46	0.67	0.73	0.77	0.08	0.93	0.35	0.70
Avail Cap(c_a), veh/h	135	598	509	135	511	435	135	511	435	135	511	435
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	30.3	21.7	15.5	31.3	23.8	21.1	30.5	24.5	21.0	30.1	21.3	23.3
Incr Delay (d2), s/veh	214.1	24.1	0.1	7.6	219.5	3.9	11.9	5.0	0.1	56.7	0.5	3.8
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(50%),veh/ln	10.5	13.9	0.6	0.6	40.3	5.1	1.6	5.6	0.4	4.4	2.3	4.5
LnGrp Delay(d),s/veh	244.3	45.8	15.6	38.9	243.3	25.0	42.3	29.6	21.1	86.8	21.8	27.0
LnGrp LOS	F	D	B	D	F	C	D	C	C	F	C	C
Approach Vol, veh/h		797			1066			394			525	
Approach Delay, s/veh		91.0			178.7			31.3			39.9	
Approach LOS		F			F			C			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	11.0	19.6	7.9	27.1	9.7	20.9	11.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	6.6	11.8	3.0	21.4	4.6	11.5	7.0	20.0
Green Ext Time (p_c), s	0.0	1.7	0.0	0.0	0.0	1.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	106.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	521	40	25	689	267	66	272	24	116	136	231
Future Volume (veh/h)	173	521	40	25	689	267	66	272	24	116	136	231
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	188	566	43	27	749	290	72	296	26	126	148	251
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	227	1213	542	52	863	386	95	376	319	151	435	369
Arrive On Green	0.13	0.34	0.34	0.03	0.24	0.24	0.05	0.20	0.20	0.09	0.23	0.23
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	188	566	43	27	749	290	72	296	26	126	148	251
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	7.3	8.8	1.3	1.1	14.3	11.9	2.8	10.6	0.9	4.9	4.7	10.2
Cycle Q Clear(g_c), s	7.3	8.8	1.3	1.1	14.3	11.9	2.8	10.6	0.9	4.9	4.7	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	227	1213	542	52	863	386	95	376	319	151	435	369
V/C Ratio(X)	0.83	0.47	0.08	0.52	0.87	0.75	0.76	0.79	0.08	0.83	0.34	0.68
Avail Cap(c_a), veh/h	227	1213	542	126	906	405	126	477	405	151	503	428
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	29.9	18.1	15.6	33.7	25.5	24.6	32.8	26.6	22.8	31.7	22.5	24.6
Incr Delay (d2), s/veh	21.8	0.3	0.1	7.9	8.7	7.3	16.6	6.7	0.1	30.9	0.5	3.6
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(50%),veh/ln	4.9	4.3	0.6	0.6	8.0	6.0	1.8	6.1	0.4	3.7	2.4	4.8
LnGrp Delay(d),s/veh	51.7	18.4	15.7	41.6	34.2	31.9	49.5	33.4	22.9	62.6	22.9	28.1
LnGrp LOS	D	B	B	D	C	C	D	C	C	E	C	C
Approach Vol, veh/h		797			1066			394			525	
Approach Delay, s/veh		26.1			33.8			35.6			34.9	
Approach LOS		C			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	12.0	20.2	8.0	30.1	9.8	22.4	15.0	23.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	18.0	5.0	22.0	5.0	19.0	9.0	18.0
Max Q Clear Time (g_c+I1), s	6.9	12.6	3.1	10.8	4.8	12.2	9.3	16.3
Green Ext Time (p_c), s	0.0	1.6	0.0	6.9	0.0	1.8	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	174	526	42	29	691	267	67	281	34	116	152	236
Future Volume (veh/h)	174	526	42	29	691	267	67	281	34	116	152	236
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	189	572	46	32	751	290	73	305	37	126	165	257
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	225	1194	534	59	861	385	95	384	326	150	441	375
Arrive On Green	0.13	0.34	0.34	0.03	0.24	0.24	0.05	0.21	0.21	0.08	0.24	0.24
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	189	572	46	32	751	290	73	305	37	126	165	257
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	7.4	9.0	1.4	1.3	14.4	12.0	2.9	11.0	1.3	5.0	5.3	10.5
Cycle Q Clear(g_c), s	7.4	9.0	1.4	1.3	14.4	12.0	2.9	11.0	1.3	5.0	5.3	10.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	1194	534	59	861	385	95	384	326	150	441	375
V/C Ratio(X)	0.84	0.48	0.09	0.55	0.87	0.75	0.76	0.79	0.11	0.84	0.37	0.69
Avail Cap(c_a), veh/h	225	1194	534	125	900	402	125	473	402	150	500	425
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	30.2	18.5	16.0	33.7	25.7	24.8	33.1	26.7	22.9	31.9	22.6	24.6
Incr Delay (d2), s/veh	23.4	0.3	0.1	7.7	9.1	7.5	18.1	7.4	0.2	32.1	0.5	3.9
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(50%),veh/ln	5.1	4.4	0.6	0.7	8.1	6.0	1.9	6.5	0.6	3.8	2.8	5.0
LnGrp Delay(d),s/veh	53.6	18.8	16.1	41.4	34.9	32.3	51.2	34.1	23.0	64.1	23.1	28.5
LnGrp LOS	D	B	B	D	C	C	D	C	C	E	C	C
Approach Vol, veh/h		807			1073			415			548	
Approach Delay, s/veh		26.8			34.4			36.1			35.1	
Approach LOS		C			C			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	12.0	20.6	8.3	29.9	9.8	22.8	15.0	23.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	18.0	5.0	22.0	5.0	19.0	9.0	18.0
Max Q Clear Time (g_c+I1), s	7.0	13.0	3.3	11.0	4.9	12.5	9.4	16.4
Green Ext Time (p_c), s	0.0	1.6	0.0	6.8	0.0	1.9	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking Rd. & Hughes Ln.-AM Peak
Count Date: 5/21/2015

Ave Annual Growth: **4.97%**

Exist Peak Hour Volumes

Unsignalized

1	WBL	1
2	WBT	14
0	WBR	0
0	EBL	0
1	EBT	76
1	EBR	51
>	NBL	150
0	NBT	0
<	NBR	1
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	293

Year 2035
Fut. Volumes w/o Proj

WBL	272
WBT	838
WBR	0
EBL	0
EBT	1240
EBR	35
NBL	47
NBT	0
NBR	542
SBL	0
SBT	0
SBR	0
TOTAL	2974

Year 2035 Fut. Vol
+ Project Traffic

WBL	272
WBT	838
WBR	0
EBL	0
EBT	1259
EBR	35
NBL	47
NBT	0
NBR	542
SBL	0
SBT	0
SBR	0
TOTAL	2993

Year 2025
Fut. Volumes w/o Proj

WBL	167
WBT	516
WBR	0
EBL	0
EBT	764
EBR	22
NBL	29
NBT	0
NBR	334
SBL	0
SBT	0
SBR	0
TOTAL	1832

Year 2025 Fut. Vol
+ Project Traffic

WBL	167
WBT	516
WBR	0
EBL	0
EBT	774
EBR	22
NBL	29
NBT	0
NBR	334
SBL	0
SBT	0
SBR	0
TOTAL	1842

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	19
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	19

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Hosking Rd. & Hughes Ln.-AM Peak						
	Count Date:	5/21/2015						
2006	ADT							
WB Approach (To)	1.385							
WB Approach (Away)	1.091							
EB Approach (To)	1.373							
EB Approach (Away)	1.429							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	*0.01*							
SB Approach (Away)	*0.01*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	13.049		WBL	6.71	WBT	8.34	WBR	5.21
WB Approach (Away)	11.996		6.46%	4	7.55%	61	4.02%	0
EB Approach (To)	8.898		EBL	3.74	EBT	8.74	EBR	5.23
EB Approach (Away)	10.378		3.33%	0	7.63%	334	5.77%	158
NB Approach (To)	3.561		NBL	5.41	NBT	2.28	NBR	7.28
NB Approach (Away)	3.989		5.77%	464	2.24%	0	6.54%	4
SB Approach (To)	*0.01*		SBL	6.00	SBT	2.49	SBR	4.13
SB Approach (Away)	*0.01*		4.31%	0	2.44%	0	3.54%	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1863	1583	1770	3539	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1863	1583	1770	3539	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	827			3001	651	
Travel Time (s)	10.3			37.2	14.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	5.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	76	51	1	14	150	1
Future Vol, veh/h	76	51	1	14	150	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	55	1	15	163	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	83	0	93	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	10	-
Critical Hdwy	-	-	4.12	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.218	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1514	-	902	976
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	1012	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1514	-	901	976
Mov Cap-2 Maneuver	-	-	-	-	901	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	901	976	-	-	1514	-
HCM Lane V/C Ratio	0.181	0.001	-	-	0.001	-
HCM Control Delay (s)	9.9	8.7	-	-	7.4	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	827			790	651	
Travel Time (s)	10.3			9.8	14.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	764	22	167	516	29	334
Future Vol, veh/h	764	22	167	516	29	334
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	830	24	182	561	32	363

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	830	0	1473	415
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	798	-	118	586
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	485	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	798	-	91	586
Mov Cap-2 Maneuver	-	-	-	-	91	-
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	374	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	24.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	91	586	-	-	798	-
HCM Lane V/C Ratio	0.346	0.62	-	-	0.227	-
HCM Control Delay (s)	64.2	20.6	-	-	10.8	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	1.3	4.2	-	-	0.9	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	827			790	651	
Travel Time (s)	10.3			9.8	14.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	774	22	167	516	29	334
Future Vol, veh/h	774	22	167	516	29	334
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	841	24	182	561	32	363

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	841	0	1484	421
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	790	-	116	581
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	485	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	790	-	89	581
Mov Cap-2 Maneuver	-	-	-	-	89	-
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	373	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	24.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	89	581	-	-	790	-
HCM Lane V/C Ratio	0.354	0.625	-	-	0.23	-
HCM Control Delay (s)	66.2	21	-	-	10.9	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	1.4	4.3	-	-	0.9	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	827			790	651	
Travel Time (s)	10.3			9.8	14.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	81.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	1240	35	272	838	47	542
Future Vol, veh/h	1240	35	272	838	47	542
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1348	38	296	911	51	589

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1348	0	2395	674
Stage 1	-	-	-	-	1348	-
Stage 2	-	-	-	-	1047	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	507	-	~ 28	~ 397
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	299	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	507	-	~ 12	~ 397
Mov Cap-2 Maneuver	-	-	-	-	~ 12	-
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	124	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	$ 403.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	12	397	-	-	507	-
HCM Lane V/C Ratio	4.257	1.484	-	-	0.583	-
HCM Control Delay (s)	$ 2092.3	256.8	-	-	21.6	-
HCM Lane LOS	F	F	-	-	C	-
HCM 95th %tile Q(veh)	7.5	31.1	-	-	3.7	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 w/o Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road _____ Critical Approach Speed _____ mph

Minor St: Hughes Lane _____ Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

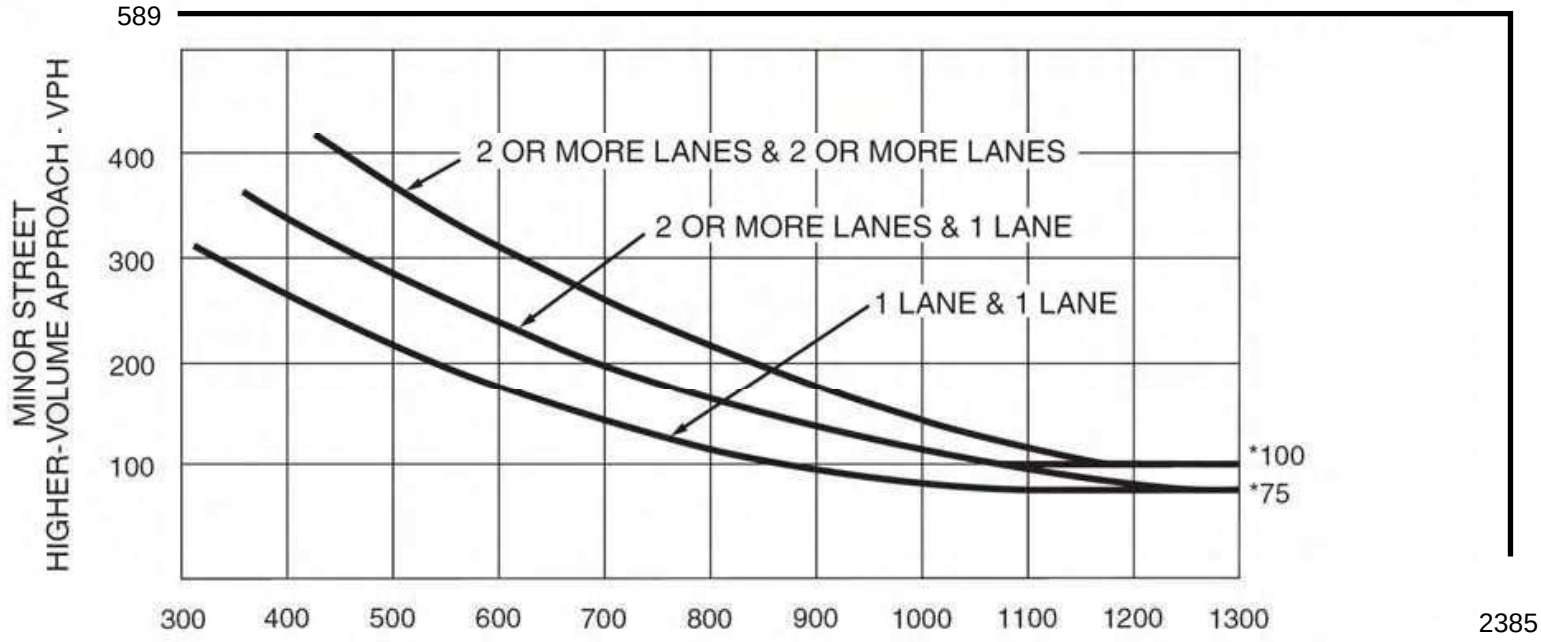
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... / 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... / 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 28620 / 2 or More..... 7068	9,600 / 6,720	3,200 / 2,240
1..... / 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... / 1.....	12,000 / 8,400	1,200 / 850
2 or More..... / 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 28620 / 2 or More..... 7068	14,400 / 10,080	1,600 / 1,120
1..... / 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1240	35	272	838	47	542
Future Volume (veh/h)	1240	35	272	838	47	542
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1348	38	296	911	51	589
Adj No. of Lanes	2	1	2	2	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1394	623	351	2065	429	673
Arrive On Green	0.39	0.39	0.10	0.58	0.24	0.24
Sat Flow, veh/h	3632	1583	3442	3632	1774	2787
Grp Volume(v), veh/h	1348	38	296	911	51	589
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1774	1393
Q Serve(g_s), s	25.6	1.0	5.8	9.9	1.5	13.9
Cycle Q Clear(g_c), s	25.6	1.0	5.8	9.9	1.5	13.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1394	623	351	2065	429	673
V/C Ratio(X)	0.97	0.06	0.84	0.44	0.12	0.87
Avail Cap(c_a), veh/h	1394	623	351	2065	466	732
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	20.4	12.9	30.2	8.0	20.3	25.0
Incr Delay (d2), s/veh	16.9	0.0	16.7	0.1	0.1	10.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.6	0.5	3.6	4.9	0.8	6.3
LnGrp Delay(d),s/veh	37.2	13.0	46.9	8.2	20.4	35.9
LnGrp LOS	D	B	D	A	C	D
Approach Vol, veh/h	1386			1207	640	
Approach Delay, s/veh	36.6			17.7	34.6	
Approach LOS	D			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		22.6	13.0	33.0				46.0
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		18.0	7.0	27.0				40.0
Max Q Clear Time (g_c+I1), s		15.9	7.8	27.6				11.9
Green Ext Time (p_c), s		0.6	0.0	0.0				18.0

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1259	35	272	838	47	542
Future Volume (veh/h)	1259	35	272	838	47	542
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1368	38	296	911	51	589
Adj No. of Lanes	2	1	2	2	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1394	623	351	2065	429	673
Arrive On Green	0.39	0.39	0.10	0.58	0.24	0.24
Sat Flow, veh/h	3632	1583	3442	3632	1774	2787
Grp Volume(v), veh/h	1368	38	296	911	51	589
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1774	1393
Q Serve(g_s), s	26.2	1.0	5.8	9.9	1.5	13.9
Cycle Q Clear(g_c), s	26.2	1.0	5.8	9.9	1.5	13.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1394	623	351	2065	429	673
V/C Ratio(X)	0.98	0.06	0.84	0.44	0.12	0.87
Avail Cap(c_a), veh/h	1394	623	351	2065	466	732
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	20.5	12.9	30.2	8.0	20.3	25.0
Incr Delay (d2), s/veh	19.8	0.0	16.7	0.1	0.1	10.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.6	0.5	3.6	4.9	0.8	6.3
LnGrp Delay(d),s/veh	40.3	13.0	46.9	8.2	20.4	35.9
LnGrp LOS	D	B	D	A	C	D
Approach Vol, veh/h	1406			1207	640	
Approach Delay, s/veh	39.6			17.7	34.6	
Approach LOS	D			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		22.6	13.0	33.0				46.0
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		18.0	7.0	27.0				40.0
Max Q Clear Time (g_c+I1), s		15.9	7.8	28.2				11.9
Green Ext Time (p_c), s		0.6	0.0	0.0				18.2

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking Rd. & Hughes Ln.-PM Peak
Count Date: 5/21/2015

Ave Annual Growth: **4.97%**

Exist Peak Hour Volumes

Unsignalized

1	WBL	1
2	WBT	12
0	WBR	0
0	EBL	0
1	EBT	5
1	EBR	112
>	NBL	132
0	NBT	0
<	NBR	1
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	263

Year 2035
Fut. Volumes w/o Proj

WBL	314
WBT	985
WBR	0
EBL	0
EBT	852
EBR	346
NBL	408
NBT	0
NBR	347
SBL	0
SBT	0
SBR	0
TOTAL	3252

Year 2035 Fut. Vol
+ Project Traffic

WBL	329
WBT	1015
WBR	0
EBL	0
EBT	902
EBR	346
NBL	408
NBT	0
NBR	384
SBL	0
SBT	0
SBR	0
TOTAL	3384

Year 2025
Fut. Volumes w/o Proj

WBL	194
WBT	608
WBR	0
EBL	0
EBT	526
EBR	198
NBL	234
NBT	0
NBR	214
SBL	0
SBT	0
SBR	0
TOTAL	1974

Year 2025 Fut. Vol
+ Project Traffic

WBL	202
WBT	623
WBR	0
EBL	0
EBT	551
EBR	198
NBL	234
NBT	0
NBR	233
SBL	0
SBT	0
SBR	0
TOTAL	2041

Project Generated Trips - Year 2035

	Total
WBL	15
WBT	30
WBR	0
EBL	0
EBT	50
EBR	0
NBL	0
NBT	0
NBR	37
SBL	0
SBT	0
SBR	0
TOTAL	132

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Hosking Rd. & Hughes Ln.-PM Peak						
	Count Date:	5/21/2015						
2006	ADT							
WB Approach (To)	1.385							
WB Approach (Away)	1.091							
EB Approach (To)	1.373							
EB Approach (Away)	1.429							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	*0.01*							
SB Approach (Away)	*0.01*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	13.049		WBL	6.71	WBT	8.34	WBR	5.21
WB Approach (Away)	11.996		6.46%	4	7.55%	52	4.02%	0
EB Approach (To)	8.898		EBL	3.74	EBT	8.74	EBR	5.23
EB Approach (Away)	10.378		3.33%	0	7.63%	22	5.77%	346
NB Approach (To)	3.561		NBL	5.41	NBT	2.28	NBR	7.28
NB Approach (Away)	3.989		5.77%	408	2.24%	0	6.54%	4
SB Approach (To)	*0.01*		SBL	6.00	SBT	2.49	SBR	4.13
SB Approach (Away)	*0.01*		4.31%	0	2.44%	0	3.54%	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1863	1583	1770	3539	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1863	1583	1770	3539	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	827			3001	651	
Travel Time (s)	10.3			37.2	14.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	5	112	1	12	132	1
Future Vol, veh/h	5	112	1	12	132	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	122	1	13	143	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	5	0	14	5
Stage 1	-	-	-	-	5	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	-	-	4.12	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.218	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1616	-	1004	1078
Stage 1	-	-	-	-	1018	-
Stage 2	-	-	-	-	1013	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1616	-	1003	1078
Mov Cap-2 Maneuver	-	-	-	-	1003	-
Stage 1	-	-	-	-	1018	-
Stage 2	-	-	-	-	1012	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	1003	1078	-	-	1616	-
HCM Lane V/C Ratio	0.143	0.001	-	-	0.001	-
HCM Control Delay (s)	9.2	8.3	-	-	7.2	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	526	198	194	608	234	214
Future Volume (vph)	526	198	194	608	234	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	827			790	651	
Travel Time (s)	10.3			9.8	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	572	215	211	661	254	233
Shared Lane Traffic (%)						
Lane Group Flow (vph)	572	215	211	661	254	233
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	76.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	526	198	194	608	234	214
Future Vol, veh/h	526	198	194	608	234	214
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	572	215	211	661	254	233

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	572	0	1324	286
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	752	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	997	-	~ 147	711
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	426	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	997	-	~ 116	711
Mov Cap-2 Maneuver	-	-	-	-	~ 116	-
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	336	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	$ 332.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	116	711	-	-	997	-
HCM Lane V/C Ratio	2.193	0.327	-	-	0.212	-
HCM Control Delay (s)	$ 624.7	12.5	-	-	9.6	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	21.7	1.4	-	-	0.8	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road

Minor St: Hughes Lane

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

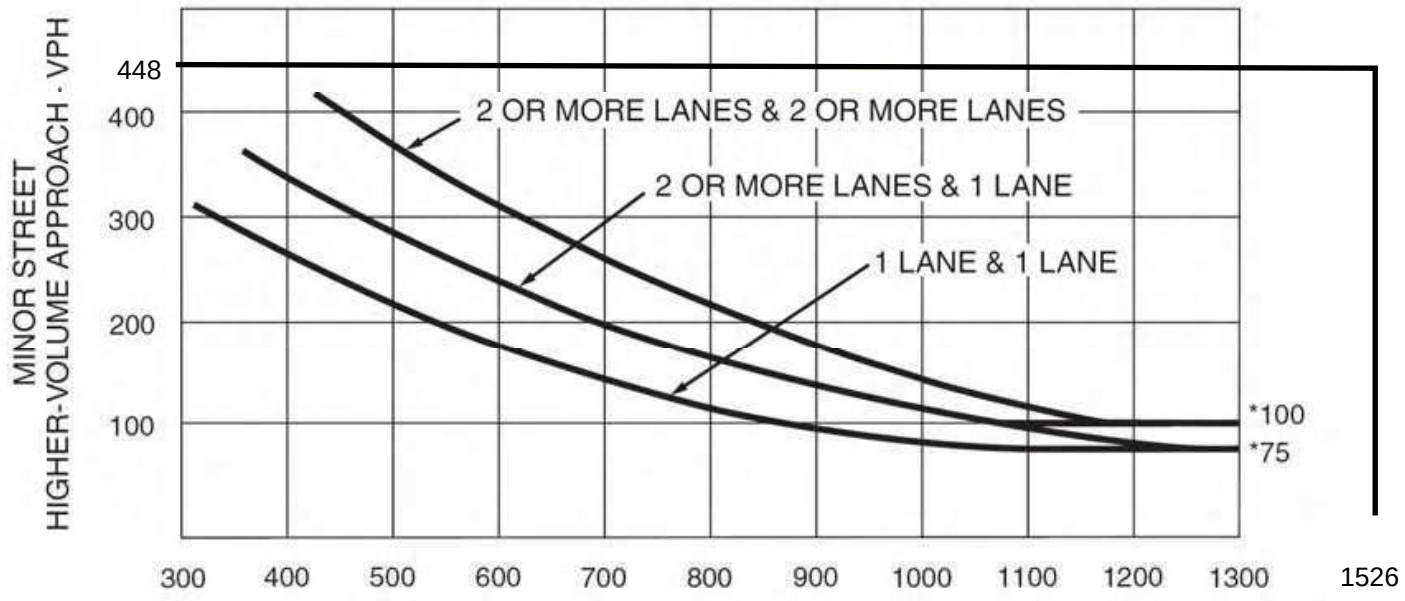
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 15260 ..... 2 or More..... 4480	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 15260 ..... 2 or More..... 4480	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	526	198	194	608	234	214
Future Volume (veh/h)	526	198	194	608	234	214
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	572	215	211	661	254	233
Adj No. of Lanes	3	1	1	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1421	442	229	2731	364	325
Arrive On Green	0.28	0.28	0.13	0.54	0.21	0.21
Sat Flow, veh/h	5253	1583	1774	5253	1774	1583
Grp Volume(v), veh/h	572	215	211	661	254	233
Grp Sat Flow(s),veh/h/ln	1695	1583	1774	1695	1774	1583
Q Serve(g_s), s	4.3	5.3	5.5	3.2	6.2	6.4
Cycle Q Clear(g_c), s	4.3	5.3	5.5	3.2	6.2	6.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1421	442	229	2731	364	325
V/C Ratio(X)	0.40	0.49	0.92	0.24	0.70	0.72
Avail Cap(c_a), veh/h	1965	612	229	3275	686	612
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.6	14.0	20.1	5.7	17.2	17.2
Incr Delay (d2), s/veh	0.2	0.8	39.1	0.0	2.4	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.4	5.1	1.5	3.3	3.1
LnGrp Delay(d),s/veh	13.8	14.8	59.2	5.8	19.6	20.2
LnGrp LOS	B	B	E	A	B	C
Approach Vol, veh/h	787			872	487	
Approach Delay, s/veh	14.1			18.7	19.9	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		15.6	12.0	19.0				31.0
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		18.0	6.0	18.0				30.0
Max Q Clear Time (g_c+I1), s		8.4	7.5	7.3				5.2
Green Ext Time (p_c), s		1.2	0.0	5.7				8.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	551	198	202	623	234	233
Future Volume (veh/h)	551	198	202	623	234	233
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	599	215	220	677	254	253
Adj No. of Lanes	3	1	1	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1417	441	224	2702	384	342
Arrive On Green	0.28	0.28	0.13	0.53	0.22	0.22
Sat Flow, veh/h	5253	1583	1774	5253	1774	1583
Grp Volume(v), veh/h	599	215	220	677	254	253
Grp Sat Flow(s),veh/h/ln	1695	1583	1774	1695	1774	1583
Q Serve(g_s), s	4.6	5.4	5.9	3.4	6.2	7.1
Cycle Q Clear(g_c), s	4.6	5.4	5.9	3.4	6.2	7.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1417	441	224	2702	384	342
V/C Ratio(X)	0.42	0.49	0.98	0.25	0.66	0.74
Avail Cap(c_a), veh/h	1926	600	224	3210	672	600
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.0	14.3	20.7	6.0	17.0	17.4
Incr Delay (d2), s/veh	0.2	0.8	54.9	0.0	2.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.4	6.2	1.6	3.2	3.3
LnGrp Delay(d),s/veh	14.2	15.1	75.6	6.1	19.0	20.5
LnGrp LOS	B	B	E	A	B	C
Approach Vol, veh/h	814			897	507	
Approach Delay, s/veh	14.5			23.1	19.7	
Approach LOS	B			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		16.3	12.0	19.2				31.2
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		18.0	6.0	18.0				30.0
Max Q Clear Time (g_c+I1), s		9.1	7.9	7.4				5.4
Green Ext Time (p_c), s		1.2	0.0	5.9				9.2

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	852	346	314	985	408	347
Future Volume (veh/h)	852	346	314	985	408	347
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	926	376	341	1071	443	377
Adj No. of Lanes	3	1	1	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1324	412	359	2795	491	438
Arrive On Green	0.26	0.26	0.20	0.55	0.28	0.28
Sat Flow, veh/h	5253	1583	1774	5253	1774	1583
Grp Volume(v), veh/h	926	376	341	1071	443	377
Grp Sat Flow(s),veh/h/ln	1695	1583	1774	1695	1774	1583
Q Serve(g_s), s	11.4	15.9	13.1	8.3	16.6	15.6
Cycle Q Clear(g_c), s	11.4	15.9	13.1	8.3	16.6	15.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1324	412	359	2795	491	438
V/C Ratio(X)	0.70	0.91	0.95	0.38	0.90	0.86
Avail Cap(c_a), veh/h	1324	412	359	2795	513	458
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	23.1	24.8	27.2	8.9	24.1	23.7
Incr Delay (d2), s/veh	1.7	24.3	34.4	0.1	18.6	14.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	9.7	9.9	3.9	10.7	8.6
LnGrp Delay(d),s/veh	24.8	49.1	61.6	9.0	42.7	38.5
LnGrp LOS	C	D	E	A	D	D
Approach Vol, veh/h	1302			1412	820	
Approach Delay, s/veh	31.8			21.7	40.8	
Approach LOS	C			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		25.1	20.0	24.0				44.0
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		20.0	14.0	18.0				38.0
Max Q Clear Time (g_c+I1), s		18.6	15.1	17.9				10.3
Green Ext Time (p_c), s		0.5	0.0	0.1				16.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	902	346	329	1015	408	384
Future Volume (veh/h)	902	346	329	1015	408	384
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	980	376	358	1103	443	417
Adj No. of Lanes	3	1	1	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1471	458	392	2941	506	451
Arrive On Green	0.29	0.29	0.22	0.58	0.29	0.29
Sat Flow, veh/h	5253	1583	1774	5253	1774	1583
Grp Volume(v), veh/h	980	376	358	1103	443	417
Grp Sat Flow(s),veh/h/ln	1695	1583	1774	1695	1774	1583
Q Serve(g_s), s	14.9	19.5	17.3	10.3	20.9	22.5
Cycle Q Clear(g_c), s	14.9	19.5	17.3	10.3	20.9	22.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1471	458	392	2941	506	451
V/C Ratio(X)	0.67	0.82	0.91	0.38	0.88	0.92
Avail Cap(c_a), veh/h	1504	468	404	3009	525	468
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	27.5	29.1	33.4	10.0	29.9	30.5
Incr Delay (d2), s/veh	1.1	10.9	24.6	0.1	15.0	23.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	9.9	11.1	4.8	12.3	12.8
LnGrp Delay(d),s/veh	28.6	40.0	58.0	10.1	44.9	54.2
LnGrp LOS	C	D	E	B	D	D
Approach Vol, veh/h	1356			1461	860	
Approach Delay, s/veh	31.8			21.8	49.4	
Approach LOS	C			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		31.1	25.4	31.4				56.8
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		26.0	20.0	26.0				52.0
Max Q Clear Time (g_c+I1), s		24.5	19.3	21.5				12.3
Green Ext Time (p_c), s		0.6	0.1	4.0				21.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: SR 99 SB Off Ramp & Hosking Rd. - AM Peak
Count Date: Future Intersection

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	424
1	WBR	0
0	EBL	0
3	EBT	571
1	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
2	SBL	0
0	SBT	0
2	SBR	0
	TOTAL	995

Year 2035
Fut. Volumes w/o Proj

WBL	0	
WBT	1468	
WBR	315	Uncontrolled
EBL	0	
EBT	999	
EBR	2	Uncontrolled
NBL	0	
NBT	0	
NBR	0	
SBL	1245	
SBT	0	
SBR	116	
TOTAL	4145	

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	1468
WBR	315
EBL	0
EBT	1068
EBR	2
NBL	0
NBT	0
NBR	0
SBL	1247
SBT	0
SBR	116
TOTAL	4216

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	1108
WBR	206
EBL	0
EBT	851
EBR	1
NBL	0
NBT	0
NBR	0
SBL	816
SBT	0
SBR	76
TOTAL	3059

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	1108
WBR	206
EBL	0
EBT	886
EBR	1
NBL	0
NBT	0
NBR	0
SBL	817
SBT	0
SBR	76
TOTAL	3095

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	69
EBR	0
NBL	0
NBT	0
NBR	0
SBL	2
SBT	0
SBR	0
TOTAL	71

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	851	1	0	1108	206	0	0	0	816	0	76
Future Volume (veh/h)	0	851	1	0	1108	206	0	0	0	816	0	76
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	925	0	0	1204	0				887	0	83
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1996	0	0	1996	0				1144	0	926
Arrive On Green	0.00	0.39	0.00	0.00	0.39	0.00				0.33	0.00	0.33
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	925	0	0	1204	0				887	0	83
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	5.9	0.0	0.0	8.2	0.0				10.1	0.0	0.9
Cycle Q Clear(g_c), s	0.0	5.9	0.0	0.0	8.2	0.0				10.1	0.0	0.9
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1996	0	0	1996	0				1144	0	926
V/C Ratio(X)	0.00	0.46	0.00	0.00	0.60	0.00				0.78	0.00	0.09
Avail Cap(c_a), veh/h	0	2215	0	0	2215	0				1499	0	1214
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.8	0.0	0.0	10.5	0.0				13.1	0.0	10.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.4	0.0				1.9	0.0	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(50%),veh/ln	0.0	2.8	0.0	0.0	3.9	0.0				5.0	0.0	0.4
LnGrp Delay(d),s/veh	0.0	10.0	0.0	0.0	10.9	0.0				15.0	0.0	10.1
LnGrp LOS		B			B					B		B
Approach Vol, veh/h		925			1204						970	
Approach Delay, s/veh		10.0			10.9						14.6	
Approach LOS		B			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				23.1		20.5		23.1
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				19.0		19.0		19.0
Max Q Clear Time (g_c+I1), s				7.9		12.1		10.2
Green Ext Time (p_c), s				8.4		2.4		6.9

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road

Minor St: SR 99 Southbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

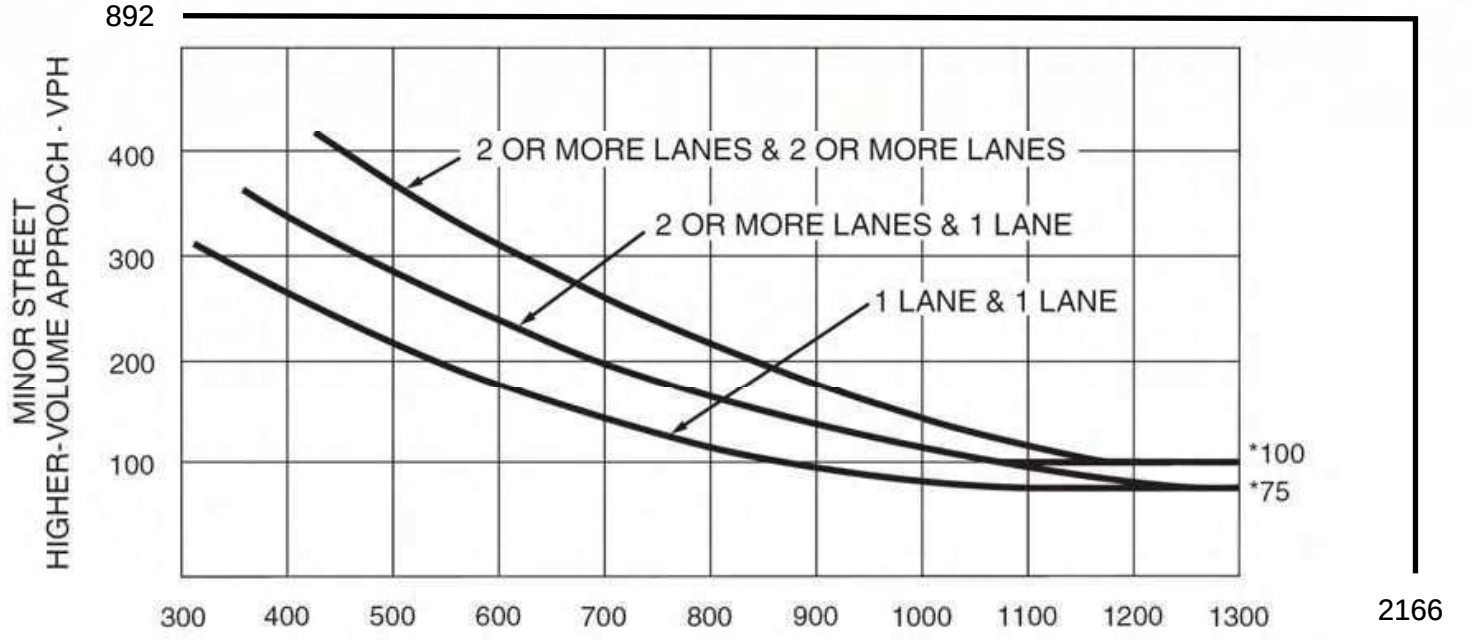
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 25992 ..... 2 or More..... 10704	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 25992 ..... 2 or More..... 10704	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B	2 CONDITIONS 80%	2 CONDITIONS 80%
Satisfied X Not Satisfied _____		
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	886	1	0	1108	206	0	0	0	817	0	76
Future Volume (veh/h)	0	886	1	0	1108	206	0	0	0	817	0	76
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	963	0	0	1204	0				888	0	83
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	2000	0	0	2000	0				1144	0	926
Arrive On Green	0.00	0.39	0.00	0.00	0.39	0.00				0.33	0.00	0.33
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	963	0	0	1204	0				888	0	83
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	6.2	0.0	0.0	8.2	0.0				10.2	0.0	0.9
Cycle Q Clear(g_c), s	0.0	6.2	0.0	0.0	8.2	0.0				10.2	0.0	0.9
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2000	0	0	2000	0				1144	0	926
V/C Ratio(X)	0.00	0.48	0.00	0.00	0.60	0.00				0.78	0.00	0.09
Avail Cap(c_a), veh/h	0	2210	0	0	2210	0				1496	0	1211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.9	0.0	0.0	10.5	0.0				13.1	0.0	10.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.4	0.0				1.9	0.0	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(50%),veh/ln	0.0	2.9	0.0	0.0	3.9	0.0				5.1	0.0	0.4
LnGrp Delay(d),s/veh	0.0	10.1	0.0	0.0	10.9	0.0				15.1	0.0	10.1
LnGrp LOS		B			B					B		B
Approach Vol, veh/h		963			1204						971	
Approach Delay, s/veh		10.1			10.9						14.7	
Approach LOS		B			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				23.2		20.5		23.2
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				19.0		19.0		19.0
Max Q Clear Time (g_c+I1), s				8.2		12.2		10.2
Green Ext Time (p_c), s				8.3		2.4		7.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	999	2	0	1468	315	0	0	0	1245	0	116
Future Volume (veh/h)	0	999	2	0	1468	315	0	0	0	1245	0	116
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	1086	0	0	1596	0				1353	0	126
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1960	0	0	1960	0				1468	0	1188
Arrive On Green	0.00	0.39	0.00	0.00	0.39	0.00				0.43	0.00	0.43
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	1086	0	0	1596	0				1353	0	126
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	10.6	0.0	0.0	17.9	0.0				23.7	0.0	1.7
Cycle Q Clear(g_c), s	0.0	10.6	0.0	0.0	17.9	0.0				23.7	0.0	1.7
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1960	0	0	1960	0				1468	0	1188
V/C Ratio(X)	0.00	0.55	0.00	0.00	0.81	0.00				0.92	0.00	0.11
Avail Cap(c_a), veh/h	0	1994	0	0	1994	0				1512	0	1224
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.3	0.0	0.0	17.6	0.0				17.3	0.0	11.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	2.7	0.0				9.5	0.0	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(50%),veh/ln	0.0	5.0	0.0	0.0	8.8	0.0				13.0	0.0	0.7
LnGrp Delay(d),s/veh	0.0	15.6	0.0	0.0	20.2	0.0				26.8	0.0	11.0
LnGrp LOS		B			C					C		B
Approach Vol, veh/h		1086			1596						1479	
Approach Delay, s/veh		15.6			20.2						25.5	
Approach LOS		B			C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				30.6		33.2		30.6
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				25.0		28.0		25.0
Max Q Clear Time (g_c+I1), s				12.6		25.7		19.9
Green Ext Time (p_c), s				10.5		1.5		4.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1068	2	0	1468	315	0	0	0	1247	0	116
Future Volume (veh/h)	0	1068	2	0	1468	315	0	0	0	1247	0	116
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	1161	0	0	1596	0				1355	0	126
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1960	0	0	1960	0				1468	0	1188
Arrive On Green	0.00	0.39	0.00	0.00	0.39	0.00				0.43	0.00	0.43
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	1161	0	0	1596	0				1355	0	126
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	11.6	0.0	0.0	17.9	0.0				23.8	0.0	1.7
Cycle Q Clear(g_c), s	0.0	11.6	0.0	0.0	17.9	0.0				23.8	0.0	1.7
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1960	0	0	1960	0				1468	0	1188
V/C Ratio(X)	0.00	0.59	0.00	0.00	0.81	0.00				0.92	0.00	0.11
Avail Cap(c_a), veh/h	0	1992	0	0	1992	0				1510	0	1223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.6	0.0	0.0	17.6	0.0				17.3	0.0	11.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	2.7	0.0				9.7	0.0	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(50%),veh/ln	0.0	5.5	0.0	0.0	8.8	0.0				13.1	0.0	0.7
LnGrp Delay(d),s/veh	0.0	16.1	0.0	0.0	20.2	0.0				27.0	0.0	11.0
LnGrp LOS		B			C					C		B
Approach Vol, veh/h		1161			1596						1481	
Approach Delay, s/veh		16.1			20.2						25.6	
Approach LOS		B			C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				30.6		33.2		30.6
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				25.0		28.0		25.0
Max Q Clear Time (g_c+I1), s				13.6		25.8		19.9
Green Ext Time (p_c), s				9.9		1.5		4.7

Intersection Summary	
HCM 2010 Ctrl Delay	21.0
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: SR 99 SB Off Ramp & Hosking Rd. - PM Peak

Count Date: Future Intersection

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	449
1	WBR	0
0	EBL	0
3	EBT	435
1	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
2	SBL	0
0	SBT	0
2	SBR	0
	TOTAL	884

Year 2035

Fut. Volumes w/o Proj

WBL	0	
WBT	445	
WBR	565	Uncontrolled
EBL	0	
EBT	997	
EBR	197	Uncontrolled
NBL	0	
NBT	0	
NBR	0	
SBL	208	
SBT	0	
SBR	859	
TOTAL	3271	

Year 2035 Fut. Vol

+ Project Traffic

WBL	0
WBT	490
WBR	565
EBL	0
EBT	1084
EBR	197
NBL	0
NBT	0
NBR	0
SBL	208
SBT	0
SBR	859
TOTAL	3403

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	446
WBR	370
EBL	0
EBT	803
EBR	129
NBL	0
NBT	0
NBR	0
SBL	136
SBT	0
SBR	563
TOTAL	2448

Year 2020 Fut. Vol

+ Project Traffic

WBL	0
WBT	469
WBR	370
EBL	0
EBT	847
EBR	129
NBL	0
NBT	0
NBR	0
SBL	136
SBT	0
SBR	563
TOTAL	2515

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	45
WBR	0
EBL	0
EBT	87
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	132

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	803	129	0	446	370	0	0	0	136	0	563
Future Volume (veh/h)	0	803	129	0	446	370	0	0	0	136	0	563
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	873	0	0	485	0				148	0	612
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1791	0	0	1791	0				1089	0	882
Arrive On Green	0.00	0.35	0.00	0.00	0.35	0.00				0.32	0.00	0.32
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	873	0	0	485	0				148	0	612
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	4.9	0.0	0.0	2.5	0.0				1.1	0.0	7.0
Cycle Q Clear(g_c), s	0.0	4.9	0.0	0.0	2.5	0.0				1.1	0.0	7.0
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1791	0	0	1791	0				1089	0	882
V/C Ratio(X)	0.00	0.49	0.00	0.00	0.27	0.00				0.14	0.00	0.69
Avail Cap(c_a), veh/h	0	2526	0	0	2526	0				1900	0	1538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	0.0	0.0	8.4	0.0				8.8	0.0	10.8
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.1	0.0				0.1	0.0	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(50%),veh/ln	0.0	2.3	0.0	0.0	1.1	0.0				0.5	0.0	2.8
LnGrp Delay(d),s/veh	0.0	9.4	0.0	0.0	8.5	0.0				8.9	0.0	11.8
LnGrp LOS		A			A					A		B
Approach Vol, veh/h		873			485						760	
Approach Delay, s/veh		9.4			8.5						11.3	
Approach LOS		A			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				18.8		17.5		18.8
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				18.0		20.0		18.0
Max Q Clear Time (g_c+I1), s				6.9		9.0		4.5
Green Ext Time (p_c), s				5.9		2.5		6.7

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 LOS	A

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road

Minor St: SR 99 Southbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

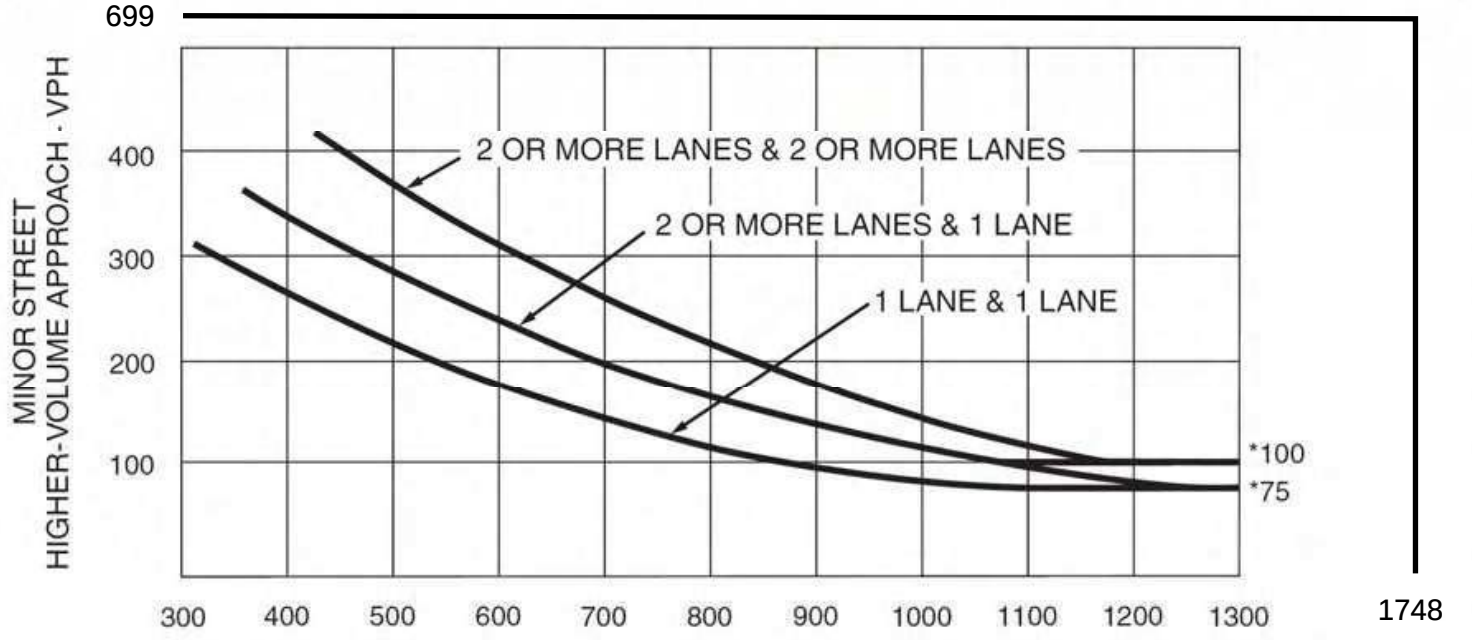
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 17480 ..... 2 or More..... 6990	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 17480 ..... 2 or More..... 6990	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B	2 CONDITIONS 80%	2 CONDITIONS 80%
Satisfied X Not Satisfied _____		
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	847	129	0	469	370	0	0	0	136	0	563
Future Volume (veh/h)	0	847	129	0	469	370	0	0	0	136	0	563
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	921	0	0	510	0				148	0	612
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1830	0	0	1830	0				1083	0	877
Arrive On Green	0.00	0.36	0.00	0.00	0.36	0.00				0.31	0.00	0.31
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	921	0	0	510	0				148	0	612
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	5.2	0.0	0.0	2.6	0.0				1.1	0.0	7.1
Cycle Q Clear(g_c), s	0.0	5.2	0.0	0.0	2.6	0.0				1.1	0.0	7.1
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1830	0	0	1830	0				1083	0	877
V/C Ratio(X)	0.00	0.50	0.00	0.00	0.28	0.00				0.14	0.00	0.70
Avail Cap(c_a), veh/h	0	2483	0	0	2483	0				1867	0	1512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	0.0	0.0	8.4	0.0				9.0	0.0	11.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.1	0.0				0.1	0.0	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(50%),veh/ln	0.0	2.4	0.0	0.0	1.2	0.0				0.5	0.0	2.8
LnGrp Delay(d),s/veh	0.0	9.4	0.0	0.0	8.5	0.0				9.1	0.0	12.1
LnGrp LOS		A			A					A		B
Approach Vol, veh/h		921			510						760	
Approach Delay, s/veh		9.4			8.5						11.5	
Approach LOS		A			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				19.3		17.6		19.3
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				18.0		20.0		18.0
Max Q Clear Time (g_c+I1), s				7.2		9.1		4.6
Green Ext Time (p_c), s				6.0		2.5		7.0

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 (veh/h)	0	997	197	0	445	565	0	0	0	208	0	859
Future Volume (veh/h)	0	997	197	0	445	565	0	0	0	208	0	859
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	1084	0	0	484	0				226	0	934
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1722	0	0	1722	0				1361	0	1102
Arrive On Green	0.00	0.34	0.00	0.00	0.34	0.00				0.40	0.00	0.40
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	1084	0	0	484	0				226	0	934
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	8.1	0.0	0.0	3.1	0.0				1.9	0.0	13.8
Cycle Q Clear(g_c), s	0.0	8.1	0.0	0.0	3.1	0.0				1.9	0.0	13.8
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1722	0	0	1722	0				1361	0	1102
V/C Ratio(X)	0.00	0.63	0.00	0.00	0.28	0.00				0.17	0.00	0.85
Avail Cap(c_a), veh/h	0	2028	0	0	2028	0				1525	0	1235
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.5	0.0	0.0	10.9	0.0				8.8	0.0	12.4
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.1	0.0				0.1	0.0	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.8	0.0	0.0	1.4	0.0				0.9	0.0	6.0
LnGrp Delay(d),s/veh	0.0	13.0	0.0	0.0	11.0	0.0				8.9	0.0	17.6
LnGrp LOS		B			B					A		B
Approach Vol, veh/h		1084			484						1160	
Approach Delay, s/veh		13.0			11.0						15.9	
Approach LOS		B			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				21.3		23.8		21.3
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				18.0		20.0		18.0
Max Q Clear Time (g_c+I1), s				10.1		15.8		5.1
Green Ext Time (p_c), s				5.2		2.1		7.4

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1084	197	0	490	565	0	0	0	208	0	859
Future Volume (veh/h)	0	1084	197	0	490	565	0	0	0	208	0	859
Number	7	4	14	3	8	18				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	0	1863	1900	0	1863	1900				1863	0	1863
Adj Flow Rate, veh/h	0	1178	0	0	533	0				226	0	934
Adj No. of Lanes	0	3	0	0	3	0				2	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1768	0	0	1768	0				1349	0	1093
Arrive On Green	0.00	0.35	0.00	0.00	0.35	0.00				0.39	0.00	0.39
Sat Flow, veh/h	0	5421	0	0	5421	0				3442	0	2787
Grp Volume(v), veh/h	0	1178	0	0	533	0				226	0	934
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0				1721	0	1393
Q Serve(g_s), s	0.0	9.1	0.0	0.0	3.5	0.0				2.0	0.0	14.1
Cycle Q Clear(g_c), s	0.0	9.1	0.0	0.0	3.5	0.0				2.0	0.0	14.1
Prop In Lane	0.00		0.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1768	0	0	1768	0				1349	0	1093
V/C Ratio(X)	0.00	0.67	0.00	0.00	0.30	0.00				0.17	0.00	0.85
Avail Cap(c_a), veh/h	0	1986	0	0	1986	0				1493	0	1209
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.8	0.0	0.0	11.0	0.0				9.1	0.0	12.8
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.1	0.0				0.1	0.0	5.7
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(50%),veh/ln	0.0	4.3	0.0	0.0	1.6	0.0				1.0	0.0	6.2
LnGrp Delay(d),s/veh	0.0	13.5	0.0	0.0	11.1	0.0				9.2	0.0	18.5
LnGrp LOS		B			B					A		B
Approach Vol, veh/h		1178			533						1160	
Approach Delay, s/veh		13.5			11.1						16.7	
Approach LOS		B			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				22.0		24.1		22.0
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				18.0		20.0		18.0
Max Q Clear Time (g_c+I1), s				11.1		16.1		5.5
Green Ext Time (p_c), s				5.0		1.9		7.8

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 LOS	B

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking Rd. & SR 99 NB Off Ramp - AM Peak
Count Date: Future Intersection

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	424
1	WBR	0
0	EBL	0
3	EBT	571
1	EBR	0
1	NBL	0
0	NBT	0
1	NBR	0
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	995

Year 2035
Fut. Volumes w/o Proj

WBL	0	
WBT	1454	
WBR	1259	Uncontrolled
EBL	0	
EBT	927	
EBR	1436	Uncontrolled
NBL	74	
NBT	0	
NBR	100	
SBL	0	
SBT	0	
SBR	0	
TOTAL	5250	

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	1456
WBR	1259
EBL	0
EBT	938
EBR	1436
NBL	74
NBT	0
NBR	101
SBL	0
SBT	0
SBR	0
TOTAL	5264

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	1099
WBR	825
EBL	0
EBT	804
EBR	941
NBL	48
NBT	0
NBR	66
SBL	0
SBT	0
SBR	0
TOTAL	3783

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	1100
WBR	825
EBL	0
EBT	810
EBR	941
NBL	48
NBT	0
NBR	67
SBL	0
SBT	0
SBR	0
TOTAL	3791

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	2
WBR	0
EBL	0
EBT	11
EBR	0
NBL	0
NBT	0
NBR	1
SBL	0
SBT	0
SBR	0
TOTAL	14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	804	941	0	1099	825	48	0	66	0	0	0
Future Volume (veh/h)	0	804	941	0	1099	825	48	0	66	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	874	0	0	1195	0	52	0	72			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	2911	0	0	2911	0	174	0	155			
Arrive On Green	0.00	0.57	0.00	0.00	0.57	0.00	0.10	0.00	0.10			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	874	0	0	1195	0	52	0	72			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	3.2	0.0	0.0	4.8	0.0	1.0	0.0	1.6			
Cycle Q Clear(g_c), s	0.0	3.2	0.0	0.0	4.8	0.0	1.0	0.0	1.6			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2911	0	0	2911	0	174	0	155			
V/C Ratio(X)	0.00	0.30	0.00	0.00	0.41	0.00	0.30	0.00	0.46			
Avail Cap(c_a), veh/h	0	4188	0	0	4188	0	877	0	782			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.0	0.0	0.0	4.4	0.0	15.3	0.0	15.5			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	0.9	0.0	2.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	1.5	0.0	0.0	2.2	0.0	0.5	0.0	0.8			
LnGrp Delay(d),s/veh	0.0	4.1	0.0	0.0	4.4	0.0	16.2	0.0	17.7			
LnGrp LOS		A			A		B		B			
Approach Vol, veh/h		874			1195			124				
Approach Delay, s/veh		4.1			4.4			17.1				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		9.6		26.9				26.9
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		3.6		5.2				6.8
Green Ext Time (p_c), s		0.3		14.6				14.1

Intersection Summary	
HCM 2010 Ctrl Delay	5.0
HCM 2010 LOS	A

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Hosking Road

Minor St: SR 99 Northbound Ramp

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied ____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More..... 44028	2 or More..... 1368
1.....	2 or More.....

Minimum Requirements EADT

Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
8,000	5,600	2,400	1,680
9,600	6,720	2,400	1,680
9,600	6,720	3,200	2,240
8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied X Not Satisfied ____

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More..... 44028	2 or More..... 1368
1.....	2 or More.....

Vehicles Per Day on Major Street (Total of Both Approaches) / Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)

Urban	Rural	Urban	Rural
12,000	8,400	1,200	850
14,400	10,080	1,200	850
14,400	10,080	1,600	1,120
12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied ____ Not Satisfied X

No one condition satisfied, but following conditions fulfilled 80% or more..... A: 61% B: 100%

2 CONDITIONS 80%

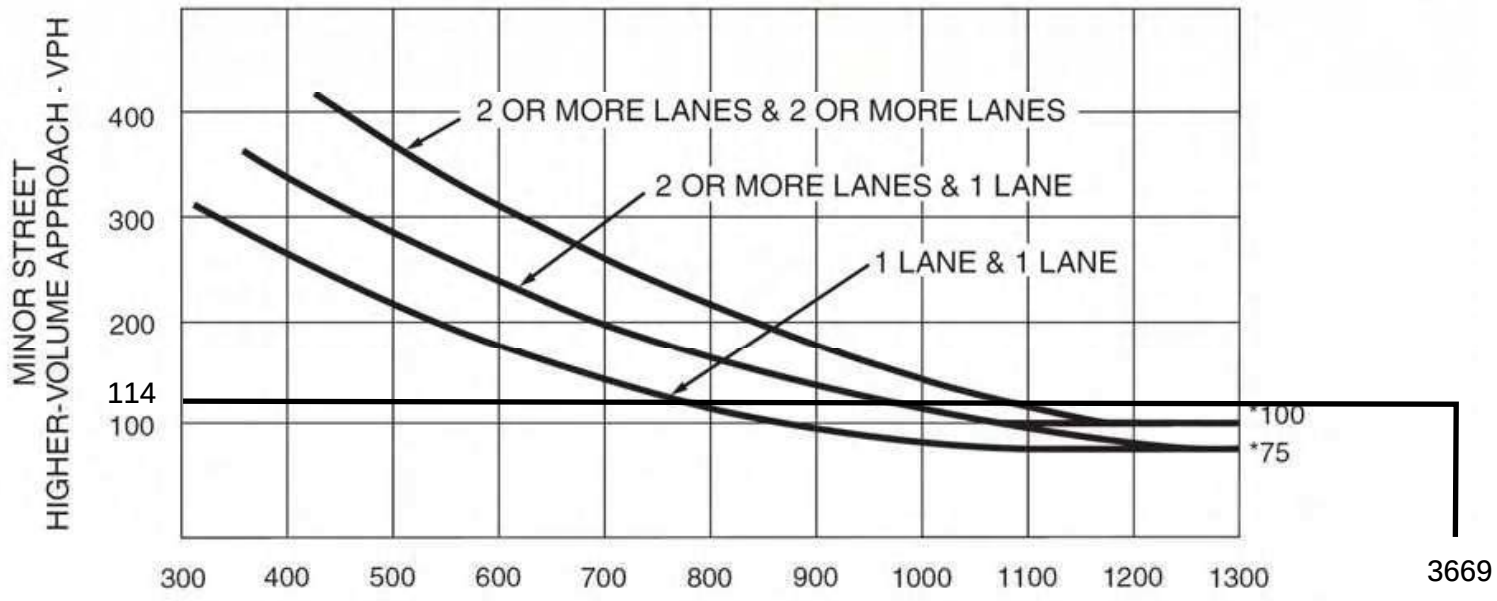
2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

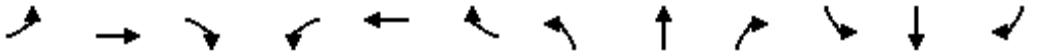


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	810	941	0	1100	825	48	0	67	0	0	0
Future Volume (veh/h)	0	810	941	0	1100	825	48	0	67	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	880	0	0	1196	0	52	0	73			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	2913	0	0	2913	0	175	0	156			
Arrive On Green	0.00	0.57	0.00	0.00	0.57	0.00	0.10	0.00	0.10			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	880	0	0	1196	0	52	0	73			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	3.3	0.0	0.0	4.8	0.0	1.0	0.0	1.6			
Cycle Q Clear(g_c), s	0.0	3.3	0.0	0.0	4.8	0.0	1.0	0.0	1.6			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2913	0	0	2913	0	175	0	156			
V/C Ratio(X)	0.00	0.30	0.00	0.00	0.41	0.00	0.30	0.00	0.47			
Avail Cap(c_a), veh/h	0	4180	0	0	4180	0	875	0	781			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.0	0.0	0.0	4.4	0.0	15.3	0.0	15.6			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	0.9	0.0	2.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	1.5	0.0	0.0	2.2	0.0	0.5	0.0	0.8			
LnGrp Delay(d),s/veh	0.0	4.1	0.0	0.0	4.4	0.0	16.2	0.0	17.7			
LnGrp LOS		A			A		B		B			
Approach Vol, veh/h		880			1196			125				
Approach Delay, s/veh		4.1			4.4			17.1				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		9.6		26.9				26.9
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		3.6		5.3				6.8
Green Ext Time (p_c), s		0.3		14.7				14.1

Intersection Summary	
HCM 2010 Ctrl Delay	5.0
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	927	1436	0	1454	1259	74	0	100	0	0	0
Future Volume (veh/h)	0	927	1436	0	1454	1259	74	0	100	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	1008	0	0	1580	0	80	0	109			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	3343	0	0	3343	0	188	0	168			
Arrive On Green	0.00	0.66	0.00	0.00	0.66	0.00	0.11	0.00	0.11			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	1008	0	0	1580	0	80	0	109			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	4.3	0.0	0.0	7.8	0.0	2.1	0.0	3.4			
Cycle Q Clear(g_c), s	0.0	4.3	0.0	0.0	7.8	0.0	2.1	0.0	3.4			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	3343	0	0	3343	0	188	0	168			
V/C Ratio(X)	0.00	0.30	0.00	0.00	0.47	0.00	0.43	0.00	0.65			
Avail Cap(c_a), veh/h	0	4514	0	0	4514	0	630	0	562			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	3.7	0.0	0.0	4.3	0.0	21.2	0.0	21.8			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	1.5	0.0	4.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.0	0.0	0.0	3.5	0.0	1.1	0.0	1.6			
LnGrp Delay(d),s/veh	0.0	3.8	0.0	0.0	4.4	0.0	22.7	0.0	25.9			
LnGrp LOS		A			A		C		C			
Approach Vol, veh/h		1008			1580			189				
Approach Delay, s/veh		3.8			4.4			24.6				
Approach LOS		A			A			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		11.4		39.3				39.3
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		45.0				45.0
Max Q Clear Time (g_c+I1), s		5.4		6.3				9.8
Green Ext Time (p_c), s		0.4		25.0				23.5

Intersection Summary	
HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	938	1436	0	1456	1259	74	0	101	0	0	0
Future Volume (veh/h)	0	938	1436	0	1456	1259	74	0	101	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	1020	0	0	1583	0	80	0	110			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	3345	0	0	3345	0	189	0	169			
Arrive On Green	0.00	0.66	0.00	0.00	0.66	0.00	0.11	0.00	0.11			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	1020	0	0	1583	0	80	0	110			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	4.4	0.0	0.0	7.9	0.0	2.1	0.0	3.4			
Cycle Q Clear(g_c), s	0.0	4.4	0.0	0.0	7.9	0.0	2.1	0.0	3.4			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	3345	0	0	3345	0	189	0	169			
V/C Ratio(X)	0.00	0.30	0.00	0.00	0.47	0.00	0.42	0.00	0.65			
Avail Cap(c_a), veh/h	0	4494	0	0	4494	0	627	0	560			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	3.7	0.0	0.0	4.3	0.0	21.3	0.0	21.8			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	1.5	0.0	4.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.0	0.0	0.0	3.6	0.0	1.1	0.0	1.7			
LnGrp Delay(d),s/veh	0.0	3.8	0.0	0.0	4.4	0.0	22.8	0.0	26.0			
LnGrp LOS		A			A		C		C			
Approach Vol, veh/h		1020			1583			190				
Approach Delay, s/veh		3.8			4.4			24.7				
Approach LOS		A			A			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		11.4		39.5				39.5
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		45.0				45.0
Max Q Clear Time (g_c+I1), s		5.4		6.4				9.9
Green Ext Time (p_c), s		0.4		25.1				23.6

Intersection Summary	
HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hoksing Rd. & SR 99 NB Off Ramp - PM Peak
Count Date: Future Intersection

Exist Peak Hour Volumes

Signalized

0	WBL	0
3	WBT	449
1	WBR	0
0	EBL	0
3	EBT	435
1	EBR	0
1	NBL	0
0	NBT	0
1	NBR	0
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	884

Year 2035
Fut. Volumes w/o Proj

WBL	0	
WBT	729	
WBR	911	Uncontrolled
EBL	0	
EBT	1012	
EBR	172	Uncontrolled
NBL	109	
NBT	0	
NBR	189	
SBL	0	
SBT	0	
SBR	0	
TOTAL	3122	

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	731
WBR	911
EBL	0
EBT	1018
EBR	172
NBL	152
NBT	0
NBR	189
SBL	0
SBT	0
SBR	0
TOTAL	3173

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	632
WBR	597
EBL	0
EBT	813
EBR	113
NBL	71
NBT	0
NBR	124
SBL	0
SBT	0
SBR	0
TOTAL	2350

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	633
WBR	597
EBL	0
EBT	816
EBR	113
NBL	93
NBT	0
NBR	124
SBL	0
SBT	0
SBR	0
TOTAL	2376

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	2
WBR	0
EBL	0
EBT	6
EBR	0
NBL	43
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	51

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	813	113	0	632	597	71	0	124	0	0	0
Future Volume (veh/h)	0	813	113	0	632	597	71	0	124	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	884	0	0	687	0	77	0	135			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	2276	0	0	2276	0	250	0	223			
Arrive On Green	0.00	0.45	0.00	0.00	0.45	0.00	0.14	0.00	0.14			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	884	0	0	687	0	77	0	135			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	3.4	0.0	0.0	2.5	0.0	1.1	0.0	2.3			
Cycle Q Clear(g_c), s	0.0	3.4	0.0	0.0	2.5	0.0	1.1	0.0	2.3			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2276	0	0	2276	0	250	0	223			
V/C Ratio(X)	0.00	0.39	0.00	0.00	0.30	0.00	0.31	0.00	0.61			
Avail Cap(c_a), veh/h	0	3314	0	0	3314	0	1156	0	1032			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	5.4	0.0	0.0	5.1	0.0	11.3	0.0	11.8			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	0.7	0.0	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			
%ile BackOfQ(50%),veh/ln	0.0	1.6	0.0	0.0	1.2	0.0	0.6	0.0	1.2			
LnGrp Delay(d),s/veh	0.0	5.5	0.0	0.0	5.2	0.0	11.9	0.0	14.4			
LnGrp LOS		A			A		B		B			
Approach Vol, veh/h		884			687			212				
Approach Delay, s/veh		5.5			5.2			13.5				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		10.1		19.0				19.0
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		19.0		19.0				19.0
Max Q Clear Time (g_c+I1), s		4.3		5.4				4.5
Green Ext Time (p_c), s		0.5		7.7				8.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.3
HCM 2010 LOS	A

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road

Minor St: SR 99 Northbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

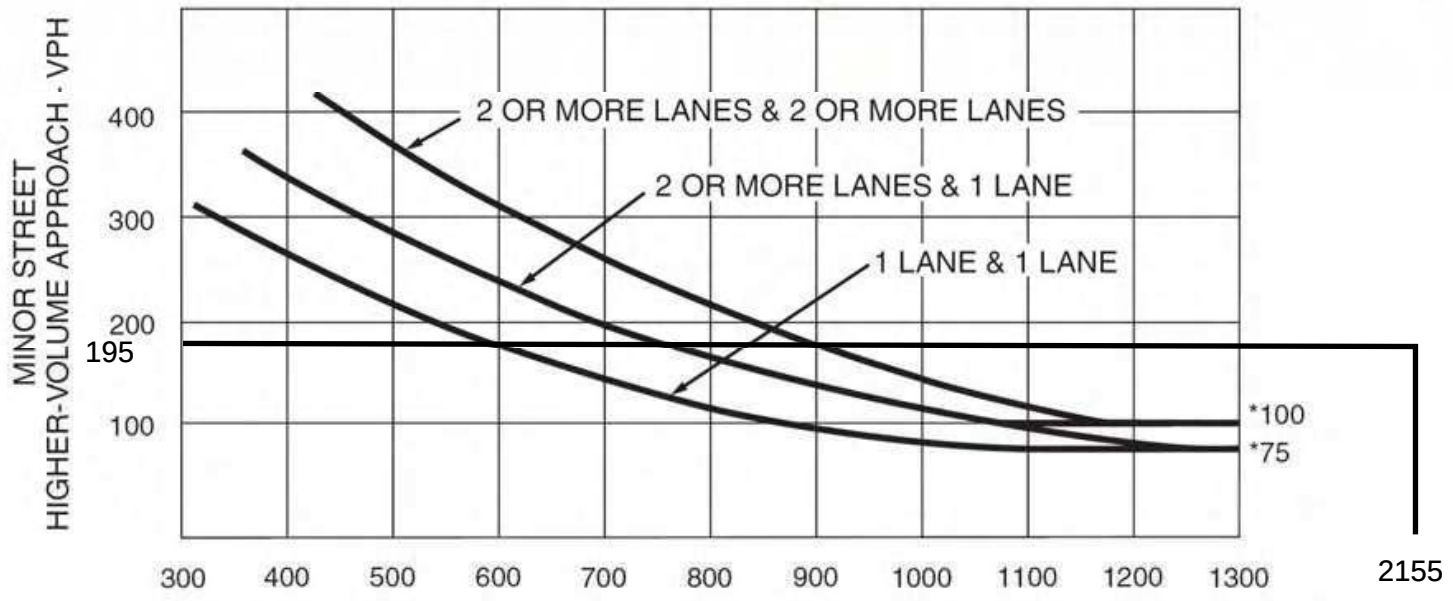
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 21550 ..... 2 or More..... 1950	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 21550 ..... 2 or More..... 1950	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 87% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	816	113	0	633	597	93	0	124	0	0	0
Future Volume (veh/h)	0	816	113	0	633	597	93	0	124	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	887	0	0	688	0	101	0	135			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	2268	0	0	2268	0	258	0	230			
Arrive On Green	0.00	0.45	0.00	0.00	0.45	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	887	0	0	688	0	101	0	135			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	3.4	0.0	0.0	2.5	0.0	1.5	0.0	2.3			
Cycle Q Clear(g_c), s	0.0	3.4	0.0	0.0	2.5	0.0	1.5	0.0	2.3			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2268	0	0	2268	0	258	0	230			
V/C Ratio(X)	0.00	0.39	0.00	0.00	0.30	0.00	0.39	0.00	0.59			
Avail Cap(c_a), veh/h	0	3290	0	0	3290	0	1148	0	1024			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	5.5	0.0	0.0	5.2	0.0	11.4	0.0	11.7			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	1.0	0.0	2.4			
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(50%),veh/ln	0.0	1.6	0.0	0.0	1.2	0.0	0.8	0.0	1.2			
LnGrp Delay(d),s/veh	0.0	5.6	0.0	0.0	5.3	0.0	12.3	0.0	14.1			
LnGrp LOS		A			A		B		B			
Approach Vol, veh/h		887			688			236				
Approach Delay, s/veh		5.6			5.3			13.3				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		10.3		19.1				19.1
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		19.0		19.0				19.0
Max Q Clear Time (g_c+I1), s		4.3		5.4				4.5
Green Ext Time (p_c), s		0.6		7.7				8.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.5
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1012	172	0	729	911	109	0	189	0	0	0
Future Volume (veh/h)	0	1012	172	0	729	911	109	0	189	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	1100	0	0	792	0	118	0	205			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	2333	0	0	2333	0	342	0	305			
Arrive On Green	0.00	0.46	0.00	0.00	0.46	0.00	0.19	0.00	0.19			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	1100	0	0	792	0	118	0	205			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	5.1	0.0	0.0	3.4	0.0	2.0	0.0	4.1			
Cycle Q Clear(g_c), s	0.0	5.1	0.0	0.0	3.4	0.0	2.0	0.0	4.1			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2333	0	0	2333	0	342	0	305			
V/C Ratio(X)	0.00	0.47	0.00	0.00	0.34	0.00	0.35	0.00	0.67			
Avail Cap(c_a), veh/h	0	2956	0	0	2956	0	928	0	828			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	6.4	0.0	0.0	6.0	0.0	12.0	0.0	12.9			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	0.6	0.0	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			
%ile BackOfQ(50%),veh/ln	0.0	2.4	0.0	0.0	1.6	0.0	1.0	0.0	2.0			
LnGrp Delay(d),s/veh	0.0	6.6	0.0	0.0	6.1	0.0	12.6	0.0	15.5			
LnGrp LOS		A			A		B		B			
Approach Vol, veh/h		1100			792			323				
Approach Delay, s/veh		6.6			6.1			14.4				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		12.6		21.8				21.8
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		20.0				20.0
Max Q Clear Time (g_c+I1), s		6.1		7.1				5.4
Green Ext Time (p_c), s		0.8		8.6				9.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.5
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1018	172	0	731	911	152	0	189	0	0	0
Future Volume (veh/h)	0	1018	172	0	731	911	152	0	189	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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	0	1863	1900	0	1863	1900	1863	0	1863			
Adj Flow Rate, veh/h	0	1107	0	0	795	0	165	0	205			
Adj No. of Lanes	0	3	0	0	3	0	1	0	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	2	0	2	2	2	0	2			
Cap, veh/h	0	2322	0	0	2322	0	352	0	314			
Arrive On Green	0.00	0.46	0.00	0.00	0.46	0.00	0.20	0.00	0.20			
Sat Flow, veh/h	0	5421	0	0	5421	0	1774	0	1583			
Grp Volume(v), veh/h	0	1107	0	0	795	0	165	0	205			
Grp Sat Flow(s),veh/h/ln	0	1695	0	0	1695	0	1774	0	1583			
Q Serve(g_s), s	0.0	5.3	0.0	0.0	3.5	0.0	2.9	0.0	4.1			
Cycle Q Clear(g_c), s	0.0	5.3	0.0	0.0	3.5	0.0	2.9	0.0	4.1			
Prop In Lane	0.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2322	0	0	2322	0	352	0	314			
V/C Ratio(X)	0.00	0.48	0.00	0.00	0.34	0.00	0.47	0.00	0.65			
Avail Cap(c_a), veh/h	0	2925	0	0	2925	0	919	0	820			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	6.6	0.0	0.0	6.1	0.0	12.3	0.0	12.8			
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.1	0.0	1.0	0.0	2.3			
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(50%),veh/ln	0.0	2.4	0.0	0.0	1.6	0.0	1.5	0.0	2.0			
LnGrp Delay(d),s/veh	0.0	6.7	0.0	0.0	6.2	0.0	13.3	0.0	15.1			
LnGrp LOS		A			A		B		B			
Approach Vol, veh/h		1107			795			370				
Approach Delay, s/veh		6.7			6.2			14.3				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		12.9		21.9				21.9
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		18.0		20.0				20.0
Max Q Clear Time (g_c+I1), s		6.1		7.3				5.5
Green Ext Time (p_c), s		0.9		8.6				9.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking & South "H" - AM Peak
Count Date: 1/15/2015

Ave Annual Growth: **5.31%**

Exist Peak Hour Volumes

Signalized		
1	WBL	47
1	WBT	254
1	WBR	220
1	EBL	124
1	EBT	364
<	EBR	83
1	NBL	82
1	NBT	114
<	NBR	25
1	SBL	117
1	SBT	125
<	SBR	88
	TOTAL	1643

Year 2035
Fut. Volumes w/o Proj

WBL	117
WBT	957
WBR	475
EBL	400
EBT	1299
EBR	307
NBL	314
NBT	251
NBR	61
SBL	263
SBT	291
SBR	312
TOTAL	5046

Year 2035 Fut. Vol
+ Project Traffic

WBL	118
WBT	959
WBR	476
EBL	400
EBT	1309
EBR	311
NBL	314
NBT	256
NBR	61
SBL	269
SBT	292
SBR	312
TOTAL	5077

Year 2025
Fut. Volumes w/o Proj

WBL	75
WBT	500
WBR	326
EBL	226
EBT	717
EBR	162
NBL	163
NBT	170
NBR	39
SBL	177
SBT	193
SBR	168
TOTAL	2916

Year 2025 Fut. Vol
+ Project Traffic

WBL	76
WBT	501
WBR	327
EBL	226
EBT	722
EBR	164
NBL	163
NBT	173
NBR	39
SBL	180
SBT	194
SBR	168
TOTAL	2933

Project Generated Trips - Year 2035

	Total
WBL	1
WBT	2
WBR	1
EBL	0
EBT	10
EBR	4
NBL	0
NBT	5
NBR	0
SBL	6
SBT	1
SBR	0
TOTAL	30

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Hosking & South "H" - AM Peak						
	Count Date:	1/15/2015						
2006	ADT							
WB Approach (To)	2.439							
WB Approach (Away)	2.324							
EB Approach (To)	1.091							
EB Approach (Away)	1.385							
NB Approach (To)	2.54							
NB Approach (Away)	2.344							
SB Approach (To)	4.521							
SB Approach (Away)	4.539							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	8.749		WBL	3.63	WBT	7.72	WBR	3.03
WB Approach (Away)	7.684		4.54%	117	6.70%	957	3.83%	475
EB Approach (To)	12.019		EBL	6.74	EBT	7.16	EBR	7.34
EB Approach (Away)	16.407		5.89%	400	6.41%	1299	6.60%	307
NB Approach (To)	9.573		NBL	7.81	NBT	3.12	NBR	3.54
NB Approach (Away)	8.587		6.79%	314	3.92%	251	4.44%	61
SB Approach (To)	13.549		SBL	3.15	SBT	3.33	SBR	7.42
SB Approach (Away)	11.212		4.03%	263	4.22%	291	6.37%	312

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	364	83	47	254	220	82	114	25	117	125	88
Future Volume (veh/h)	124	364	83	47	254	220	82	114	25	117	125	88
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	135	396	90	51	276	239	89	124	27	127	136	96
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	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	2	2	2	2	2	2
Cap, veh/h	171	461	105	84	493	419	114	228	50	161	184	130
Arrive On Green	0.10	0.31	0.31	0.05	0.26	0.26	0.06	0.15	0.15	0.09	0.18	0.18
Sat Flow, veh/h	1774	1470	334	1774	1863	1583	1774	1483	323	1774	1018	718
Grp Volume(v), veh/h	135	0	486	51	276	239	89	0	151	127	0	232
Grp Sat Flow(s),veh/h/ln	1774	0	1804	1774	1863	1583	1774	0	1806	1774	0	1736
Q Serve(g_s), s	4.5	0.0	15.4	1.7	7.8	8.0	3.0	0.0	4.7	4.3	0.0	7.7
Cycle Q Clear(g_c), s	4.5	0.0	15.4	1.7	7.8	8.0	3.0	0.0	4.7	4.3	0.0	7.7
Prop In Lane	1.00		0.19	1.00		1.00	1.00		0.18	1.00		0.41
Lane Grp Cap(c), veh/h	171	0	566	84	493	419	114	0	278	161	0	313
V/C Ratio(X)	0.79	0.00	0.86	0.61	0.56	0.57	0.78	0.00	0.54	0.79	0.00	0.74
Avail Cap(c_a), veh/h	204	0	622	146	581	494	175	0	563	175	0	542
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	19.6	28.5	19.3	19.4	28.1	0.0	23.8	27.1	0.0	23.6
Incr Delay (d2), s/veh	15.8	0.0	10.8	6.8	1.0	1.2	11.7	0.0	1.7	19.6	0.0	3.4
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(50%),veh/ln	3.0	0.0	9.3	1.0	4.1	3.6	1.8	0.0	2.5	3.0	0.0	4.0
LnGrp Delay(d),s/veh	42.7	0.0	30.4	35.3	20.3	20.6	39.7	0.0	25.5	46.7	0.0	27.1
LnGrp LOS	D		C	D	C	C	D		C	D		C
Approach Vol, veh/h		621			566			240			359	
Approach Delay, s/veh		33.1			21.8			30.8			34.0	
Approach LOS		C			C			C			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	11.5	15.4	8.9	25.1	9.9	17.0	11.9	22.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	19.0	5.0	21.0	6.0	19.0	7.0	19.0
Max Q Clear Time (g_c+I1), s	6.3	6.7	3.7	17.4	5.0	9.7	6.5	10.0
Green Ext Time (p_c), s	0.0	1.5	0.0	1.7	0.0	1.3	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	226	717	162	75	500	326	163	170	39	177	193	168
Future Volume (veh/h)	226	717	162	75	500	326	163	170	39	177	193	168
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	246	779	176	82	543	354	177	185	42	192	210	183
Adj No. of Lanes	1	2	0	1	2	1	1	1	0	1	1	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	2	2	2	2	2	2
Cap, veh/h	280	876	198	100	721	323	201	351	80	227	233	203
Arrive On Green	0.16	0.31	0.31	0.06	0.20	0.20	0.11	0.24	0.24	0.13	0.25	0.25
Sat Flow, veh/h	1774	2870	648	1774	3539	1583	1774	1470	334	1774	920	802
Grp Volume(v), veh/h	246	480	475	82	543	354	177	0	227	192	0	393
Grp Sat Flow(s),veh/h/ln	1774	1770	1748	1774	1770	1583	1774	0	1804	1774	0	1721
Q Serve(g_s), s	12.0	22.9	22.9	4.0	12.7	18.0	8.7	0.0	9.7	9.3	0.0	19.5
Cycle Q Clear(g_c), s	12.0	22.9	22.9	4.0	12.7	18.0	8.7	0.0	9.7	9.3	0.0	19.5
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.19	1.00		0.47
Lane Grp Cap(c), veh/h	280	540	533	100	721	323	201	0	431	227	0	436
V/C Ratio(X)	0.88	0.89	0.89	0.82	0.75	1.10	0.88	0.00	0.53	0.85	0.00	0.90
Avail Cap(c_a), veh/h	281	541	535	100	721	323	201	0	449	241	0	468
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.4	29.3	29.3	41.2	33.1	35.1	38.6	0.0	29.3	37.7	0.0	31.9
Incr Delay (d2), s/veh	25.4	16.6	16.8	38.6	4.5	78.6	33.3	0.0	1.0	22.6	0.0	19.6
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(50%),veh/ln	7.9	13.6	13.4	3.1	6.6	14.9	6.1	0.0	4.9	6.0	0.0	11.7
LnGrp Delay(d),s/veh	61.8	45.9	46.0	79.8	37.5	113.7	71.8	0.0	30.3	60.3	0.0	51.6
LnGrp LOS	E	D	D	E	D	F	E		C	E		D
Approach Vol, veh/h		1201			979			404			585	
Approach Delay, s/veh		49.2			68.6			48.5			54.4	
Approach LOS		D			E			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	17.3	27.1	11.0	32.9	16.0	28.4	19.9	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	22.0	5.0	27.0	10.0	24.0	14.0	18.0
Max Q Clear Time (g_c+I1), s	11.3	11.7	6.0	24.9	10.7	21.5	14.0	20.0
Green Ext Time (p_c), s	0.0	2.4	0.0	1.7	0.0	0.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.1
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	226	717	162	75	500	326	163	170	39	177	193	168
Future Volume (veh/h)	226	717	162	75	500	326	163	170	39	177	193	168
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	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	246	779	176	82	543	354	177	185	42	192	210	183
Adj No. of Lanes	2	2	1	1	2	1	1	1	0	2	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	2	2	2	2	2	2
Cap, veh/h	307	1018	456	105	912	408	218	313	71	287	319	265
Arrive On Green	0.09	0.29	0.29	0.06	0.26	0.26	0.12	0.21	0.21	0.08	0.17	0.17
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1470	334	3442	1840	1524
Grp Volume(v), veh/h	246	779	176	82	543	354	177	0	227	192	202	191
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	0	1804	1721	1770	1594
Q Serve(g_s), s	4.7	13.5	6.0	3.1	9.0	14.4	6.5	0.0	7.6	3.6	7.1	7.6
Cycle Q Clear(g_c), s	4.7	13.5	6.0	3.1	9.0	14.4	6.5	0.0	7.6	3.6	7.1	7.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		0.96
Lane Grp Cap(c), veh/h	307	1018	456	105	912	408	218	0	384	287	307	277
V/C Ratio(X)	0.80	0.76	0.39	0.78	0.60	0.87	0.81	0.00	0.59	0.67	0.66	0.69
Avail Cap(c_a), veh/h	307	1018	456	132	948	424	238	0	510	410	474	427
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	21.9	19.2	31.2	21.9	23.9	28.7	0.0	23.8	29.9	25.9	26.1
Incr Delay (d2), s/veh	14.0	3.5	0.5	20.8	1.0	16.8	17.9	0.0	1.5	2.7	2.4	3.1
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(50%),veh/ln	2.8	7.1	2.7	2.1	4.5	8.2	4.3	0.0	3.9	1.8	3.7	3.6
LnGrp Delay(d),s/veh	44.0	25.4	19.7	52.0	22.8	40.7	46.6	0.0	25.3	32.6	28.3	29.2
LnGrp LOS	D	C	B	D	C	D	D		C	C	C	C
Approach Vol, veh/h		1201			979			404			585	
Approach Delay, s/veh		28.4			31.7			34.6			30.0	
Approach LOS		C			C			C			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	11.6	20.3	10.0	25.3	14.2	17.7	12.0	23.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	19.0	5.0	19.0	9.0	18.0	6.0	18.0
Max Q Clear Time (g_c+I1), s	5.6	9.6	5.1	15.5	8.5	9.6	6.7	16.4
Green Ext Time (p_c), s	0.1	2.2	0.0	2.7	0.0	2.1	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	226	722	164	76	501	327	163	173	39	180	194	168
Future Volume (veh/h)	226	722	164	76	501	327	163	173	39	180	194	168
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	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	246	785	178	83	545	355	177	188	42	196	211	183
Adj No. of Lanes	2	2	1	1	2	1	1	1	0	2	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	2	2	2	2	2	2
Cap, veh/h	307	1016	455	106	912	408	218	312	70	291	321	264
Arrive On Green	0.09	0.29	0.29	0.06	0.26	0.26	0.12	0.21	0.21	0.08	0.17	0.17
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1475	330	3442	1843	1521
Grp Volume(v), veh/h	246	785	178	83	545	355	177	0	230	196	202	192
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	0	1805	1721	1770	1594
Q Serve(g_s), s	4.7	13.7	6.1	3.1	9.1	14.4	6.5	0.0	7.7	3.7	7.2	7.6
Cycle Q Clear(g_c), s	4.7	13.7	6.1	3.1	9.1	14.4	6.5	0.0	7.7	3.7	7.2	7.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.18	1.00		0.95
Lane Grp Cap(c), veh/h	307	1016	455	106	912	408	218	0	382	291	308	277
V/C Ratio(X)	0.80	0.77	0.39	0.78	0.60	0.87	0.81	0.00	0.60	0.67	0.66	0.69
Avail Cap(c_a), veh/h	307	1016	455	132	946	423	237	0	509	409	473	426
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	22.0	19.3	31.2	21.9	23.9	28.8	0.0	24.0	29.9	25.9	26.1
Incr Delay (d2), s/veh	14.1	3.7	0.5	21.1	1.0	17.0	17.9	0.0	1.5	2.7	2.4	3.1
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(50%),veh/ln	2.9	7.2	2.7	2.1	4.5	8.2	4.3	0.0	4.0	1.9	3.7	3.6
LnGrp Delay(d),s/veh	44.2	25.7	19.8	52.3	22.9	40.9	46.7	0.0	25.5	32.6	28.3	29.2
LnGrp LOS	D	C	B	D	C	D	D		C	C	C	C
Approach Vol, veh/h		1209			983			407			590	
Approach Delay, s/veh		28.6			31.9			34.7			30.0	
Approach LOS		C			C			C			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	11.7	20.3	10.0	25.3	14.3	17.7	12.0	23.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	19.0	5.0	19.0	9.0	18.0	6.0	18.0
Max Q Clear Time (g_c+I1), s	5.7	9.7	5.1	15.7	8.5	9.6	6.7	16.4
Green Ext Time (p_c), s	0.1	2.2	0.0	2.6	0.0	2.1	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	1299	307	117	957	475	314	251	61	263	291	312
Future Volume (veh/h)	400	1299	307	117	957	475	314	251	61	263	291	312
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	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	435	1412	334	127	1040	516	341	273	66	286	316	339
Adj No. of Lanes	2	2	1	1	2	1	1	1	0	2	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	2	2	2	2	2	2
Cap, veh/h	477	1388	621	136	1171	524	328	361	87	335	286	256
Arrive On Green	0.14	0.39	0.39	0.08	0.33	0.33	0.18	0.25	0.25	0.10	0.16	0.16
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1450	351	3442	1770	1583
Grp Volume(v), veh/h	435	1412	334	127	1040	516	341	0	339	286	316	339
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	0	1801	1721	1770	1583
Q Serve(g_s), s	16.2	51.0	21.1	9.3	36.2	42.1	24.0	0.0	22.6	10.6	21.0	21.0
Cycle Q Clear(g_c), s	16.2	51.0	21.1	9.3	36.2	42.1	24.0	0.0	22.6	10.6	21.0	21.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	477	1388	621	136	1171	524	328	0	448	335	286	256
V/C Ratio(X)	0.91	1.02	0.54	0.93	0.89	0.99	1.04	0.00	0.76	0.85	1.11	1.33
Avail Cap(c_a), veh/h	477	1388	621	136	1171	524	328	0	448	344	286	256
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.2	39.5	30.4	59.7	41.2	43.2	53.0	0.0	45.2	57.7	54.5	54.5
Incr Delay (d2), s/veh	21.9	28.5	0.9	56.3	8.6	35.4	60.8	0.0	7.3	17.9	84.5	171.0
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(50%),veh/ln	9.2	30.4	9.3	6.7	19.0	23.5	17.3	0.0	12.2	5.9	17.0	21.3
LnGrp Delay(d),s/veh	77.1	68.0	31.3	115.9	49.8	78.6	113.8	0.0	52.5	75.7	139.0	225.5
LnGrp LOS	E	F	C	F	D	E	F		D	E	F	F
Approach Vol, veh/h		2181			1683			680			941	
Approach Delay, s/veh		64.2			63.6			83.2			150.9	
Approach LOS		E			E			F			F	

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	18.7	38.3	16.0	57.0	30.0	27.0	24.0	49.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	13.0	32.0	10.0	51.0	24.0	21.0	18.0	43.0
Max Q Clear Time (g_c+I1), s	12.6	24.6	11.3	53.0	26.0	23.0	18.2	44.1
Green Ext Time (p_c), s	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	81.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	1299	307	117	957	475	314	251	61	263	291	312
Future Volume (veh/h)	400	1299	307	117	957	475	314	251	61	263	291	312
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	435	1412	334	127	1040	516	341	273	66	286	316	339
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	474	1548	482	203	1147	357	345	1263	393	302	1199	373
Arrive On Green	0.14	0.30	0.30	0.06	0.23	0.23	0.10	0.25	0.25	0.09	0.24	0.24
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	435	1412	334	127	1040	516	341	273	66	286	316	339
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	10.0	21.3	14.8	2.9	15.9	18.0	7.9	3.4	2.6	6.6	4.0	16.6
Cycle Q Clear(g_c), s	10.0	21.3	14.8	2.9	15.9	18.0	7.9	3.4	2.6	6.6	4.0	16.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	1548	482	203	1147	357	345	1263	393	302	1199	373
V/C Ratio(X)	0.92	0.91	0.69	0.63	0.91	1.45	0.99	0.22	0.17	0.95	0.26	0.91
Avail Cap(c_a), veh/h	474	1548	482	216	1147	357	345	1274	397	302	1210	377
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	34.0	26.7	24.5	36.7	30.1	30.9	35.9	23.8	23.5	36.2	24.9	29.7
Incr Delay (d2), s/veh	22.7	8.6	4.2	5.1	10.5	215.6	45.3	0.1	0.2	38.0	0.1	25.0
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(50%),veh/ln	6.2	11.2	7.0	1.5	8.5	29.2	5.9	1.6	1.2	4.7	1.9	9.8
LnGrp Delay(d),s/veh	56.7	35.3	28.7	41.9	40.6	246.5	81.1	23.9	23.7	74.2	25.0	54.6
LnGrp LOS	E	D	C	D	D	F	F	C	C	E	C	D
Approach Vol, veh/h		2181			1683			680			941	
Approach Delay, s/veh		38.6			103.8			52.6			50.6	
Approach LOS		D			F			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	13.0	25.8	10.7	30.3	14.0	24.8	17.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	20.0	5.0	24.0	8.0	19.0	11.0	18.0
Max Q Clear Time (g_c+I1), s	8.6	5.4	4.9	23.3	9.9	18.6	12.0	20.0
Green Ext Time (p_c), s	0.0	4.2	0.0	0.6	0.0	0.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	1309	311	118	959	476	314	256	61	269	292	312
Future Volume (veh/h)	400	1309	311	118	959	476	314	256	61	269	292	312
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	435	1423	338	128	1042	517	341	278	66	292	317	339
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	474	1547	482	203	1147	357	345	1263	393	302	1199	373
Arrive On Green	0.14	0.30	0.30	0.06	0.23	0.23	0.10	0.25	0.25	0.09	0.24	0.24
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	435	1423	338	128	1042	517	341	278	66	292	317	339
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	10.0	21.6	15.1	2.9	15.9	18.0	7.9	3.5	2.6	6.8	4.1	16.6
Cycle Q Clear(g_c), s	10.0	21.6	15.1	2.9	15.9	18.0	7.9	3.5	2.6	6.8	4.1	16.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	1547	482	203	1147	357	345	1263	393	302	1199	373
V/C Ratio(X)	0.92	0.92	0.70	0.63	0.91	1.45	0.99	0.22	0.17	0.97	0.26	0.91
Avail Cap(c_a), veh/h	474	1547	482	216	1147	357	345	1274	397	302	1210	377
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	34.0	26.8	24.6	36.7	30.1	30.9	35.9	23.9	23.5	36.3	24.9	29.7
Incr Delay (d2), s/veh	22.7	9.3	4.5	5.3	10.6	216.8	45.3	0.1	0.2	42.9	0.1	25.0
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(50%),veh/ln	6.2	11.3	7.1	1.5	8.6	29.3	5.9	1.6	1.2	5.0	1.9	9.8
LnGrp Delay(d),s/veh	56.7	36.1	29.1	42.0	40.8	247.7	81.2	23.9	23.7	79.2	25.0	54.6
LnGrp LOS	E	D	C	D	D	F	F	C	C	E	C	D
Approach Vol, veh/h		2196			1687			685			948	
Approach Delay, s/veh		39.1			104.3			52.4			52.3	
Approach LOS		D			F			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	13.0	25.8	10.7	30.3	14.0	24.8	17.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	20.0	5.0	24.0	8.0	19.0	11.0	18.0
Max Q Clear Time (g_c+I1), s	8.8	5.5	4.9	23.6	9.9	18.6	12.0	20.0
Green Ext Time (p_c), s	0.0	4.2	0.0	0.4	0.0	0.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.9
HCM 2010 LOS	E

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking & South "H" - PM Peak
Count Date: 1/15/2015

Ave Annual Growth: **5.31%**

Exist Peak Hour Volumes

Signalized

1	WBL	47
1	WBT	224
1	WBR	197
1	EBL	73
1	EBT	276
<	EBR	86
1	NBL	98
1	NBT	178
<	NBR	67
1	SBL	296
1	SBT	166
<	SBR	127
	TOTAL	1835

Year 2035
Fut. Volumes w/o Proj

WBL	117
WBT	844
WBR	425
EBL	236
EBT	985
EBR	318
NBL	376
NBT	391
NBR	163
SBL	665
SBT	386
SBR	450
TOTAL	5356

Year 2035 Fut. Vol
+ Project Traffic

WBL	117
WBT	845
WBR	427
EBL	236
EBT	986
EBR	323
NBL	377
NBT	395
NBR	163
SBL	665
SBT	392
SBR	450
TOTAL	5376

Year 2025
Fut. Volumes w/o Proj

WBL	75
WBT	441
WBR	292
EBL	133
EBT	529
EBR	168
NBL	195
NBT	266
NBR	106
SBL	448
SBT	256
SBR	242
TOTAL	3151

Year 2025 Fut. Vol
+ Project Traffic

WBL	75
WBT	442
WBR	293
EBL	133
EBT	530
EBR	171
NBL	196
NBT	268
NBR	106
SBL	448
SBT	259
SBR	242
TOTAL	3163

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	1
WBR	2
EBL	0
EBT	1
EBR	5
NBL	1
NBT	4
NBR	0
SBL	0
SBT	6
SBR	0
TOTAL	20

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Hosking & South "H" - PM Peak						
	Count Date:	1/15/2015						
2006	ADT							
WB Approach (To)	2.439							
WB Approach (Away)	2.324							
EB Approach (To)	1.091							
EB Approach (Away)	1.385							
NB Approach (To)	2.54							
NB Approach (Away)	2.344							
SB Approach (To)	4.521							
SB Approach (Away)	4.539							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	8.749		WBL	3.63	WBT	7.72	WBR	3.03
WB Approach (Away)	7.684		4.54%	117	6.70%	844	3.83%	425
EB Approach (To)	12.019		EBL	6.74	EBT	7.16	EBR	7.34
EB Approach (Away)	16.407		5.89%	236	6.41%	985	6.60%	318
NB Approach (To)	9.573		NBL	7.81	NBT	3.12	NBR	3.54
NB Approach (Away)	8.587		6.79%	376	3.92%	391	4.44%	163
SB Approach (To)	13.549		SBL	3.15	SBT	3.33	SBR	7.42
SB Approach (Away)	11.212		4.03%	665	4.22%	386	6.37%	450

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	276	86	47	224	197	98	178	67	296	166	127
Future Volume (veh/h)	73	276	86	47	224	197	98	178	67	296	166	127
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	79	300	93	51	243	214	107	193	73	322	180	138
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	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	2	2	2	2	2	2
Cap, veh/h	101	330	102	78	426	362	137	242	91	359	306	235
Arrive On Green	0.06	0.24	0.24	0.04	0.23	0.23	0.08	0.19	0.19	0.20	0.31	0.31
Sat Flow, veh/h	1774	1365	423	1774	1863	1583	1774	1289	488	1774	979	751
Grp Volume(v), veh/h	79	0	393	51	243	214	107	0	266	322	0	318
Grp Sat Flow(s),veh/h/ln	1774	0	1788	1774	1863	1583	1774	0	1777	1774	0	1730
Q Serve(g_s), s	3.3	0.0	15.8	2.1	8.6	8.9	4.4	0.0	10.6	13.1	0.0	11.5
Cycle Q Clear(g_c), s	3.3	0.0	15.8	2.1	8.6	8.9	4.4	0.0	10.6	13.1	0.0	11.5
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.27	1.00		0.43
Lane Grp Cap(c), veh/h	101	0	432	78	426	362	137	0	333	359	0	541
V/C Ratio(X)	0.78	0.00	0.91	0.66	0.57	0.59	0.78	0.00	0.80	0.90	0.00	0.59
Avail Cap(c_a), veh/h	120	0	435	120	453	385	240	0	432	359	0	541
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	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.5	0.0	27.3	34.8	25.3	25.5	33.5	0.0	28.7	28.8	0.0	21.4
Incr Delay (d2), s/veh	23.9	0.0	22.7	9.0	1.5	2.2	9.1	0.0	7.8	23.9	0.0	1.7
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(50%),veh/ln	2.3	0.0	10.5	1.2	4.6	4.1	2.5	0.0	5.9	8.7	0.0	5.7
LnGrp Delay(d),s/veh	58.3	0.0	50.0	43.8	26.8	27.6	42.6	0.0	36.6	52.7	0.0	23.1
LnGrp LOS	E		D	D	C	C	D		D	D		C
Approach Vol, veh/h		472			508			373			640	
Approach Delay, s/veh		51.4			28.9			38.3			38.0	
Approach LOS		D			C			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	21.0	19.9	9.2	23.9	11.7	29.2	10.2	22.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	15.0	18.0	5.0	18.0	10.0	23.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	15.1	12.6	4.1	17.8	6.4	13.5	5.3	10.9
Green Ext Time (p_c), s	0.0	1.3	0.0	0.1	0.1	2.2	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	38.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	529	168	75	441	292	195	266	106	448	256	242
Future Volume (veh/h)	133	529	168	75	441	292	195	266	106	448	256	242
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	145	575	183	82	479	317	212	289	115	487	278	263
Adj No. of Lanes	1	2	0	1	2	1	1	1	0	1	1	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	2	2	2	2	2	2
Cap, veh/h	138	588	187	99	708	317	217	254	101	453	294	278
Arrive On Green	0.08	0.22	0.22	0.06	0.20	0.20	0.12	0.20	0.20	0.26	0.33	0.33
Sat Flow, veh/h	1774	2645	840	1774	3539	1583	1774	1269	505	1774	882	834
Grp Volume(v), veh/h	145	384	374	82	479	317	212	0	404	487	0	541
Grp Sat Flow(s),veh/h/ln	1774	1770	1715	1774	1770	1583	1774	0	1774	1774	0	1716
Q Serve(g_s), s	7.0	19.4	19.5	4.1	11.3	18.0	10.7	0.0	18.0	23.0	0.0	27.6
Cycle Q Clear(g_c), s	7.0	19.4	19.5	4.1	11.3	18.0	10.7	0.0	18.0	23.0	0.0	27.6
Prop In Lane	1.00		0.49	1.00		1.00	1.00		0.28	1.00		0.49
Lane Grp Cap(c), veh/h	138	393	381	99	708	317	217	0	355	453	0	572
V/C Ratio(X)	1.05	0.98	0.98	0.83	0.68	1.00	0.98	0.00	1.14	1.07	0.00	0.95
Avail Cap(c_a), veh/h	138	393	381	99	708	317	217	0	355	453	0	572
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.5	34.8	34.8	42.1	33.3	36.0	39.4	0.0	36.0	33.5	0.0	29.2
Incr Delay (d2), s/veh	90.8	39.2	40.9	42.6	2.6	50.8	54.6	0.0	91.1	63.6	0.0	24.9
Initial Q Delay(d3),s/veh	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	13.8	13.6	3.2	5.8	12.3	8.5	0.0	17.7	19.2	0.0	17.0
LnGrp Delay(d),s/veh	132.5	74.0	75.7	84.7	35.9	86.8	94.0	0.0	127.1	97.1	0.0	54.1
LnGrp LOS	F	E	E	F	D	F	F		F	F		D
Approach Vol, veh/h		903			878			616			1028	
Approach Delay, s/veh		84.1			58.8			115.7			74.5	
Approach LOS		F			E			F			E	

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	29.0	24.0	11.0	26.0	17.0	36.0	13.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	23.0	18.0	5.0	20.0	11.0	30.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	25.0	20.0	6.1	21.5	12.7	29.6	9.0	20.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	80.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	529	168	75	441	292	195	266	106	448	256	242
Future Volume (veh/h)	133	529	168	75	441	292	195	266	106	448	256	242
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	145	575	183	82	479	317	212	289	115	487	278	263
Adj No. of Lanes	1	2	0	1	2	1	1	2	0	2	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	2	2	2	2	2	2
Cap, veh/h	165	691	219	105	805	360	251	497	193	550	386	345
Arrive On Green	0.09	0.26	0.26	0.06	0.23	0.23	0.14	0.20	0.20	0.16	0.22	0.22
Sat Flow, veh/h	1774	2645	840	1774	3539	1583	1774	2492	969	3442	1770	1583
Grp Volume(v), veh/h	145	384	374	82	479	317	212	203	201	487	278	263
Grp Sat Flow(s),veh/h/ln	1774	1770	1715	1774	1770	1583	1774	1770	1692	1721	1770	1583
Q Serve(g_s), s	6.1	15.4	15.4	3.4	9.1	14.5	8.7	7.8	8.1	10.4	10.9	11.7
Cycle Q Clear(g_c), s	6.1	15.4	15.4	3.4	9.1	14.5	8.7	7.8	8.1	10.4	10.9	11.7
Prop In Lane	1.00		0.49	1.00		1.00	1.00		0.57	1.00		1.00
Lane Grp Cap(c), veh/h	165	463	448	105	805	360	251	353	338	550	386	345
V/C Ratio(X)	0.88	0.83	0.83	0.78	0.60	0.88	0.84	0.58	0.59	0.88	0.72	0.76
Avail Cap(c_a), veh/h	165	463	448	142	849	380	260	448	428	550	472	422
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	33.6	26.1	26.2	34.8	25.9	28.0	31.4	27.2	27.3	30.8	27.2	27.5
Incr Delay (d2), s/veh	37.2	12.1	12.7	17.5	1.0	19.9	21.1	1.5	1.7	15.8	4.2	6.5
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(50%),veh/ln	4.7	9.0	8.9	2.2	4.5	8.3	5.8	3.9	3.9	6.1	5.8	5.7
LnGrp Delay(d),s/veh	70.8	38.2	38.9	52.3	26.9	47.9	52.5	28.6	28.9	46.6	31.4	34.0
LnGrp LOS	E	D	D	D	C	D	D	C	C	D	C	C
Approach Vol, veh/h		903			878			616			1028	
Approach Delay, s/veh		43.7			36.9			37.0			39.3	
Approach LOS		D			D			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	18.0	21.0	10.4	25.6	16.6	22.3	13.0	23.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	19.0	6.0	19.0	11.0	20.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	12.4	10.1	5.4	17.4	10.7	13.7	8.1	16.5
Green Ext Time (p_c), s	0.0	3.4	0.0	1.1	0.0	2.7	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	39.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	530	171	75	442	293	196	268	106	448	259	242
Future Volume (veh/h)	133	530	171	75	442	293	196	268	106	448	259	242
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	145	576	186	82	480	318	213	291	115	487	282	263
Adj No. of Lanes	1	2	0	1	2	1	1	2	0	2	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	2	2	2	2	2	2
Cap, veh/h	165	689	222	105	806	360	252	500	193	549	386	345
Arrive On Green	0.09	0.26	0.26	0.06	0.23	0.23	0.14	0.20	0.20	0.16	0.22	0.22
Sat Flow, veh/h	1774	2634	848	1774	3539	1583	1774	2497	965	3442	1770	1583
Grp Volume(v), veh/h	145	386	376	82	480	318	213	204	202	487	282	263
Grp Sat Flow(s),veh/h/ln	1774	1770	1713	1774	1770	1583	1774	1770	1692	1721	1770	1583
Q Serve(g_s), s	6.1	15.5	15.6	3.4	9.1	14.6	8.8	7.8	8.1	10.4	11.1	11.7
Cycle Q Clear(g_c), s	6.1	15.5	15.6	3.4	9.1	14.6	8.8	7.8	8.1	10.4	11.1	11.7
Prop In Lane	1.00		0.50	1.00		1.00	1.00		0.57	1.00		1.00
Lane Grp Cap(c), veh/h	165	463	448	105	806	360	252	355	339	549	386	345
V/C Ratio(X)	0.88	0.84	0.84	0.78	0.60	0.88	0.84	0.58	0.59	0.89	0.73	0.76
Avail Cap(c_a), veh/h	165	463	448	142	847	379	260	447	428	549	471	421
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	33.7	26.2	26.3	34.9	25.9	28.1	31.4	27.2	27.3	30.9	27.4	27.6
Incr Delay (d2), s/veh	37.6	12.5	13.2	17.6	1.0	20.2	21.4	1.5	1.7	16.0	4.6	6.5
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(50%),veh/ln	4.7	9.1	8.9	2.2	4.6	8.4	5.8	3.9	4.0	6.2	5.9	5.7
LnGrp Delay(d),s/veh	71.3	38.7	39.4	52.4	27.0	48.3	52.8	28.7	29.0	46.9	31.9	34.1
LnGrp LOS	E	D	D	D	C	D	D	C	C	D	C	C
Approach Vol, veh/h		907			880			619			1032	
Approach Delay, s/veh		44.2			37.1			37.1			39.6	
Approach LOS		D			D			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	18.0	21.1	10.5	25.7	16.7	22.4	13.0	23.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	19.0	6.0	19.0	11.0	20.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	12.4	10.1	5.4	17.6	10.8	13.7	8.1	16.6
Green Ext Time (p_c), s	0.0	3.4	0.0	1.0	0.0	2.7	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	985	318	117	844	425	376	391	163	665	386	450
Future Volume (veh/h)	236	985	318	117	844	425	376	391	163	665	386	450
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	1900	1863	1863	1900
Adj Flow Rate, veh/h	257	1071	346	127	917	462	409	425	177	723	420	489
Adj No. of Lanes	1	2	0	1	2	1	1	2	0	2	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	2	2	2	2	2	2
Cap, veh/h	260	950	304	106	967	433	367	505	208	734	378	338
Arrive On Green	0.15	0.36	0.36	0.06	0.27	0.27	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1774	2640	843	1774	3539	1583	1774	2446	1008	3442	1770	1583
Grp Volume(v), veh/h	257	714	703	127	917	462	409	306	296	723	420	489
Grp Sat Flow(s),veh/h/ln	1774	1770	1714	1774	1770	1583	1774	1770	1685	1721	1770	1583
Q Serve(g_s), s	21.7	54.0	54.0	9.0	38.1	41.0	31.0	24.9	25.3	31.4	32.0	32.0
Cycle Q Clear(g_c), s	21.7	54.0	54.0	9.0	38.1	41.0	31.0	24.9	25.3	31.4	32.0	32.0
Prop In Lane	1.00		0.49	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	260	637	617	106	967	433	367	366	348	734	378	338
V/C Ratio(X)	0.99	1.12	1.14	1.19	0.95	1.07	1.12	0.84	0.85	0.98	1.11	1.45
Avail Cap(c_a), veh/h	260	637	617	106	967	433	367	366	348	734	378	338
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	63.9	48.0	48.0	70.5	53.5	54.5	59.5	57.1	57.3	58.8	59.0	59.0
Incr Delay (d2), s/veh	52.2	73.6	81.2	148.2	17.7	62.4	82.0	15.6	17.7	29.3	80.3	217.4
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(50%),veh/ln	14.4	39.4	39.5	8.8	21.0	25.4	23.5	13.7	13.5	18.0	24.1	34.4
LnGrp Delay(d),s/veh	116.1	121.6	129.2	218.7	71.2	116.9	141.5	72.7	74.9	88.1	139.3	276.4
LnGrp LOS	F	F	F	F	E	F	F	E	E	F	F	F
Approach Vol, veh/h		1674			1506			1011			1632	
Approach Delay, s/veh		124.0			97.6			101.2			157.7	
Approach LOS		F			F			F			F	

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	38.0	37.0	15.0	60.0	37.0	38.0	28.0	47.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	32.0	31.0	9.0	54.0	31.0	32.0	22.0	41.0
Max Q Clear Time (g_c+I1), s	33.4	27.3	11.0	56.0	33.0	34.0	23.7	43.0
Green Ext Time (p_c), s	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	122.7
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	985	318	117	844	425	376	391	163	665	386	450
Future Volume (veh/h)	236	985	318	117	844	425	376	391	163	665	386	450
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	257	1071	346	127	917	462	409	425	177	723	420	489
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	215	1163	362	202	1144	356	473	1144	356	645	1398	435
Arrive On Green	0.06	0.23	0.23	0.06	0.22	0.22	0.14	0.22	0.22	0.19	0.28	0.28
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	257	1071	346	127	917	462	409	425	177	723	420	489
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	5.0	16.5	17.3	2.9	13.6	18.0	9.3	5.7	7.8	15.0	5.2	22.0
Cycle Q Clear(g_c), s	5.0	16.5	17.3	2.9	13.6	18.0	9.3	5.7	7.8	15.0	5.2	22.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	1163	362	202	1144	356	473	1144	356	645	1398	435
V/C Ratio(X)	1.19	0.92	0.96	0.63	0.80	1.30	0.86	0.37	0.50	1.12	0.30	1.12
Avail Cap(c_a), veh/h	215	1163	362	215	1144	356	473	1144	356	645	1398	435
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	37.5	30.1	30.4	36.8	29.3	31.0	33.8	26.2	27.0	32.5	22.9	29.0
Incr Delay (d2), s/veh	123.9	11.8	35.7	5.2	4.2	152.9	15.3	0.2	1.1	73.4	0.1	81.1
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(50%),veh/ln	6.1	9.0	11.1	1.5	6.8	22.9	5.4	2.7	3.5	13.7	2.5	19.4
LnGrp Delay(d),s/veh	161.4	42.0	66.1	42.0	33.5	183.9	49.0	26.4	28.1	105.9	23.0	110.1
LnGrp LOS	F	D	E	D	C	F	D	C	C	F	C	F
Approach Vol, veh/h		1674			1506			1011			1632	
Approach Delay, s/veh		65.3			80.3			35.9			85.8	
Approach LOS		E			F			D			F	

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	21.0	24.0	10.7	24.3	17.0	28.0	11.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	15.0	18.0	5.0	18.0	11.0	22.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	17.0	9.8	4.9	19.3	11.3	24.0	7.0	20.0
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	69.8
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	986	323	117	845	427	377	395	163	665	392	450
Future Volume (veh/h)	236	986	323	117	845	427	377	395	163	665	392	450
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	257	1072	351	127	918	464	410	429	177	723	426	489
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	215	1163	362	202	1144	356	473	1144	356	645	1398	435
Arrive On Green	0.06	0.23	0.23	0.06	0.22	0.22	0.14	0.22	0.22	0.19	0.28	0.28
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	257	1072	351	127	918	464	410	429	177	723	426	489
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	5.0	16.5	17.6	2.9	13.7	18.0	9.3	5.7	7.8	15.0	5.3	22.0
Cycle Q Clear(g_c), s	5.0	16.5	17.6	2.9	13.7	18.0	9.3	5.7	7.8	15.0	5.3	22.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	1163	362	202	1144	356	473	1144	356	645	1398	435
V/C Ratio(X)	1.19	0.92	0.97	0.63	0.80	1.30	0.87	0.37	0.50	1.12	0.30	1.12
Avail Cap(c_a), veh/h	215	1163	362	215	1144	356	473	1144	356	645	1398	435
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	37.5	30.2	30.6	36.8	29.3	31.0	33.8	26.2	27.0	32.5	22.9	29.0
Incr Delay (d2), s/veh	123.9	11.9	39.0	5.2	4.2	155.2	15.5	0.2	1.1	73.4	0.1	81.1
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(50%),veh/ln	6.1	9.0	11.6	1.5	6.8	23.2	5.5	2.7	3.5	13.7	2.5	19.4
LnGrp Delay(d),s/veh	161.4	42.1	69.6	42.0	33.5	186.2	49.3	26.4	28.1	105.9	23.1	110.1
LnGrp LOS	F	D	E	D	C	F	D	C	C	F	C	F
Approach Vol, veh/h		1680			1509			1016			1638	
Approach Delay, s/veh		66.1			81.2			36.0			85.6	
Approach LOS		E			F			D			F	

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	21.0	24.0	10.7	24.3	17.0	28.0	11.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	15.0	18.0	5.0	18.0	11.0	22.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	17.0	9.8	4.9	19.6	11.3	24.0	7.0	20.0
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	70.2
HCM 2010 LOS	E

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking & South Union - AM Peak
Count Date: 1/15/2015

Ave Annual Growth: **4.87%**

Exist Peak Hour Volumes

SIGNALIZED

1	WBL	32
1	WBT	63
<	WBR	37
1	EBL	221
1	EBT	55
<	EBR	81
1	NBL	51
2	NBT	172
<	NBR	22
1	SBL	44
2	SBT	203
<	SBR	253
	TOTAL	1234

Year 2035
Fut. Volumes w/o Proj

WBL	70
WBT	196
WBR	79
EBL	670
EBT	152
EBR	250
NBL	174
NBT	405
NBR	47
SBL	95
SBT	492
SBR	872
TOTAL	3502

Year 2035 Fut. Vol
+ Project Traffic

WBL	79
WBT	196
WBR	79
EBL	670
EBT	152
EBR	293
NBL	183
NBT	415
NBR	50
SBL	95
SBT	580
SBR	872
TOTAL	3664

Year 2025
Fut. Volumes w/o Proj

WBL	48
WBT	112
WBR	55
EBL	390
EBT	92
EBR	144
NBL	96
NBT	267
NBR	32
SBL	65
SBT	319
SBR	476
TOTAL	2096

Year 2025 Fut. Vol
+ Project Traffic

WBL	53
WBT	112
WBR	55
EBL	390
EBT	92
EBR	166
NBL	101
NBT	272
NBR	34
SBL	65
SBT	363
SBR	476
TOTAL	2179

Project Generated Trips - Year 2035

	Total
WBL	9
WBT	0
WBR	0
EBL	0
EBT	0
EBR	43
NBL	9
NBT	10
NBR	3
SBL	0
SBT	88
SBR	0
TOTAL	162

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Hosking & South Union - AM Peak						
	Count Date:	1/15/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	0.433							
EB Approach (Away)	0.441							
NB Approach (To)	2.725							
NB Approach (Away)	2.912							
SB Approach (To)	3.179							
SB Approach (Away)	3							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	2.634		WBL	3.05	WBT	5.96	WBR	2.95
WB Approach (Away)	2.49		3.88%	70	5.69%	196	3.78%	79
EB Approach (To)	3.061		EBL	5.17	EBT	4.78	EBR	5.26
EB Approach (Away)	4.098		5.57%	670	5.08%	152	5.67%	250
NB Approach (To)	9.464		NBL	6.38	NBT	3.37	NBR	2.98
NB Approach (Away)	10.071		6.18%	174	4.28%	405	3.79%	47
SB Approach (To)	11.322		SBL	3.03	SBT	3.51	SBR	6.43
SB Approach (Away)	9.821		3.83%	95	4.42%	492	6.23%	872

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	55	81	32	63	37	51	172	22	44	203	253
Future Volume (veh/h)	221	55	81	32	63	37	51	172	22	44	203	253
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	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	240	60	88	35	68	40	55	187	24	48	221	275
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	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	2	2	2	2	2	2
Cap, veh/h	291	162	238	67	122	72	92	762	96	84	419	375
Arrive On Green	0.16	0.24	0.24	0.04	0.11	0.11	0.05	0.24	0.24	0.05	0.24	0.24
Sat Flow, veh/h	1774	683	1002	1774	1101	648	1774	3161	400	1774	1770	1583
Grp Volume(v), veh/h	240	0	148	35	0	108	55	104	107	48	221	275
Grp Sat Flow(s),veh/h/ln	1774	0	1686	1774	0	1748	1774	1770	1792	1774	1770	1583
Q Serve(g_s), s	7.2	0.0	4.0	1.1	0.0	3.2	1.7	2.6	2.7	1.5	6.0	8.8
Cycle Q Clear(g_c), s	7.2	0.0	4.0	1.1	0.0	3.2	1.7	2.6	2.7	1.5	6.0	8.8
Prop In Lane	1.00		0.59	1.00		0.37	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	291	0	400	67	0	194	92	426	432	84	419	375
V/C Ratio(X)	0.83	0.00	0.37	0.52	0.00	0.56	0.60	0.24	0.25	0.57	0.53	0.73
Avail Cap(c_a), veh/h	323	0	706	161	0	573	161	580	587	161	580	519
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	22.2	0.0	17.5	26.0	0.0	23.1	25.5	16.8	16.8	25.6	18.3	19.4
Incr Delay (d2), s/veh	14.7	0.0	0.6	6.2	0.0	2.5	6.1	0.3	0.3	6.0	1.0	3.4
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(50%),veh/ln	4.7	0.0	1.9	0.6	0.0	1.7	1.0	1.3	1.3	0.8	3.0	4.2
LnGrp Delay(d),s/veh	36.9	0.0	18.1	32.2	0.0	25.6	31.6	17.1	17.1	31.7	19.3	22.8
LnGrp LOS	D		B	C		C	C	B	B	C	B	C
Approach Vol, veh/h		388			143			266			544	
Approach Delay, s/veh		29.7			27.2			20.1			22.2	
Approach LOS		C			C			C			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	8.6	19.2	8.1	19.0	8.8	19.0	15.0	12.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	23.0	5.0	18.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	3.5	4.7	3.1	6.0	3.7	10.8	9.2	5.2
Green Ext Time (p_c), s	0.0	3.1	0.0	1.1	0.0	2.2	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	92	144	48	112	55	96	267	32	65	319	476
Future Volume (veh/h)	390	92	144	48	112	55	96	267	32	65	319	476
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	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	424	100	157	52	122	60	104	290	35	71	347	517
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	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	2	2	2	2	2	2
Cap, veh/h	462	235	368	75	166	82	130	810	97	91	411	368
Arrive On Green	0.26	0.36	0.36	0.04	0.14	0.14	0.07	0.25	0.25	0.05	0.23	0.23
Sat Flow, veh/h	1774	654	1027	1774	1180	580	1774	3184	381	1774	1770	1583
Grp Volume(v), veh/h	424	0	257	52	0	182	104	160	165	71	347	517
Grp Sat Flow(s),veh/h/ln	1774	0	1681	1774	0	1760	1774	1770	1796	1774	1770	1583
Q Serve(g_s), s	19.0	0.0	9.5	2.4	0.0	8.1	4.7	6.1	6.2	3.2	15.3	19.0
Cycle Q Clear(g_c), s	19.0	0.0	9.5	2.4	0.0	8.1	4.7	6.1	6.2	3.2	15.3	19.0
Prop In Lane	1.00		0.61	1.00		0.33	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	462	0	603	75	0	248	130	450	457	91	411	368
V/C Ratio(X)	0.92	0.00	0.43	0.69	0.00	0.74	0.80	0.36	0.36	0.78	0.84	1.41
Avail Cap(c_a), veh/h	499	0	719	130	0	387	130	450	457	130	411	368
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	29.4	0.0	19.9	38.6	0.0	33.7	37.3	25.0	25.0	38.3	30.0	31.4
Incr Delay (d2), s/veh	21.2	0.0	0.5	10.8	0.0	4.2	28.7	0.5	0.5	17.2	14.8	198.3
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(50%),veh/ln	12.0	0.0	4.4	1.4	0.0	4.2	3.3	3.0	3.1	2.0	9.1	28.5
LnGrp Delay(d),s/veh	50.6	0.0	20.3	49.4	0.0	37.9	66.0	25.5	25.5	55.5	44.8	229.7
LnGrp LOS	D		C	D		D	E	C	C	E	D	F
Approach Vol, veh/h		681			234			429			935	
Approach Delay, s/veh		39.2			40.5			35.3			147.8	
Approach LOS		D			D			D			F	

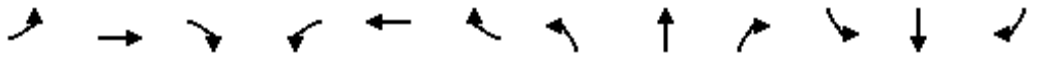
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	26.8	9.5	35.3	12.0	25.0	27.3	17.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	19.0	6.0	35.0	6.0	19.0	23.0	18.0
Max Q Clear Time (g_c+I1), s	5.2	8.2	4.4	11.5	6.7	21.0	21.0	10.1
Green Ext Time (p_c), s	0.0	4.9	0.0	2.3	0.0	0.0	0.3	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	83.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	92	144	48	112	55	96	267	32	65	319	476
Future Volume (veh/h)	390	92	144	48	112	55	96	267	32	65	319	476
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	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	424	100	157	52	122	60	104	290	35	71	347	517
Adj No. of Lanes	2	1	0	1	1	0	1	2	0	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	513	166	261	82	178	88	132	917	110	97	949	660
Arrive On Green	0.15	0.25	0.25	0.05	0.15	0.15	0.07	0.29	0.29	0.05	0.27	0.27
Sat Flow, veh/h	3442	654	1027	1774	1180	580	1774	3184	381	1774	3539	1583
Grp Volume(v), veh/h	424	0	257	52	0	182	104	160	165	71	347	517
Grp Sat Flow(s),veh/h/ln	1721	0	1681	1774	0	1760	1774	1770	1796	1774	1770	1583
Q Serve(g_s), s	8.0	0.0	9.0	1.9	0.0	6.6	3.9	4.8	4.8	2.6	5.3	18.0
Cycle Q Clear(g_c), s	8.0	0.0	9.0	1.9	0.0	6.6	3.9	4.8	4.8	2.6	5.3	18.0
Prop In Lane	1.00		0.61	1.00		0.33	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	513	0	427	82	0	266	132	510	517	97	949	660
V/C Ratio(X)	0.83	0.00	0.60	0.63	0.00	0.69	0.79	0.31	0.32	0.73	0.37	0.78
Avail Cap(c_a), veh/h	513	0	551	159	0	472	132	510	517	132	949	660
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	27.7	0.0	22.1	31.5	0.0	27.0	30.5	18.7	18.7	31.2	19.9	16.9
Incr Delay (d2), s/veh	10.8	0.0	1.4	7.8	0.0	3.1	26.3	0.3	0.4	12.6	0.2	6.1
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(50%),veh/ln	4.6	0.0	4.4	1.1	0.0	3.4	2.9	2.4	2.4	1.6	2.6	9.3
LnGrp Delay(d),s/veh	38.5	0.0	23.4	39.3	0.0	30.1	56.9	19.1	19.1	43.9	20.2	23.0
LnGrp LOS	D		C	D		C	E	B	B	D	C	C
Approach Vol, veh/h		681			234			429			935	
Approach Delay, s/veh		32.8			32.1			28.2			23.6	
Approach LOS		C			C			C			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	9.7	25.3	9.1	23.0	11.0	24.0	16.0	16.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	6.0	22.0	5.0	18.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	4.6	6.8	3.9	11.0	5.9	20.0	10.0	8.6
Green Ext Time (p_c), s	0.0	4.2	0.0	1.7	0.0	0.0	0.0	1.6

Intersection Summary		
HCM 2010 Ctrl Delay		28.1
HCM 2010 LOS		C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	92	166	53	112	55	101	272	34	65	363	476
Future Volume (veh/h)	390	92	166	53	112	55	101	272	34	65	363	476
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	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	424	100	180	58	122	60	110	296	37	71	395	517
Adj No. of Lanes	2	1	0	1	1	0	1	2	0	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	512	150	271	87	180	88	132	911	113	97	947	659
Arrive On Green	0.15	0.25	0.25	0.05	0.15	0.15	0.07	0.29	0.29	0.05	0.27	0.27
Sat Flow, veh/h	3442	597	1075	1774	1180	580	1774	3170	393	1774	3539	1583
Grp Volume(v), veh/h	424	0	280	58	0	182	110	164	169	71	395	517
Grp Sat Flow(s),veh/h/ln	1721	0	1673	1774	0	1760	1774	1770	1793	1774	1770	1583
Q Serve(g_s), s	8.0	0.0	10.1	2.2	0.0	6.6	4.1	4.9	5.0	2.6	6.2	18.0
Cycle Q Clear(g_c), s	8.0	0.0	10.1	2.2	0.0	6.6	4.1	4.9	5.0	2.6	6.2	18.0
Prop In Lane	1.00		0.64	1.00		0.33	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	512	0	421	87	0	268	132	509	516	97	947	659
V/C Ratio(X)	0.83	0.00	0.66	0.66	0.00	0.68	0.83	0.32	0.33	0.73	0.42	0.78
Avail Cap(c_a), veh/h	512	0	547	158	0	471	132	509	516	132	947	659
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	27.8	0.0	22.6	31.4	0.0	26.9	30.7	18.8	18.8	31.3	20.3	17.0
Incr Delay (d2), s/veh	10.9	0.0	2.0	8.4	0.0	3.0	34.6	0.4	0.4	12.7	0.3	6.2
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(50%),veh/ln	4.6	0.0	4.9	1.3	0.0	3.4	3.3	2.4	2.5	1.6	3.1	9.3
LnGrp Delay(d),s/veh	38.7	0.0	24.6	39.8	0.0	30.0	65.3	19.2	19.2	44.0	20.6	23.2
LnGrp LOS	D		C	D		C	E	B	B	D	C	C
Approach Vol, veh/h		704			240			443			983	
Approach Delay, s/veh		33.1			32.3			30.6			23.6	
Approach LOS		C			C			C			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	9.7	25.3	9.3	22.9	11.0	24.0	16.0	16.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	6.0	22.0	5.0	18.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	4.6	7.0	4.2	12.1	6.1	20.0	10.0	8.6
Green Ext Time (p_c), s	0.0	4.4	0.0	1.7	0.0	0.0	0.0	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	670	152	250	70	196	79	174	405	47	95	492	872
Future Volume (veh/h)	670	152	250	70	196	79	174	405	47	95	492	872
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	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	728	165	272	76	213	86	189	440	51	103	535	948
Adj No. of Lanes	2	1	0	1	1	0	1	2	0	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	797	235	387	97	244	99	180	738	85	130	718	688
Arrive On Green	0.23	0.37	0.37	0.05	0.19	0.19	0.10	0.23	0.23	0.07	0.20	0.20
Sat Flow, veh/h	3442	634	1045	1774	1263	510	1774	3198	369	1774	3539	1583
Grp Volume(v), veh/h	728	0	437	76	0	299	189	243	248	103	535	948
Grp Sat Flow(s),veh/h/ln	1721	0	1678	1774	0	1773	1774	1770	1798	1774	1770	1583
Q Serve(g_s), s	18.3	0.0	19.7	3.8	0.0	14.5	9.0	10.8	10.9	5.1	12.6	18.0
Cycle Q Clear(g_c), s	18.3	0.0	19.7	3.8	0.0	14.5	9.0	10.8	10.9	5.1	12.6	18.0
Prop In Lane	1.00		0.62	1.00		0.29	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	797	0	621	97	0	343	180	409	415	130	718	688
V/C Ratio(X)	0.91	0.00	0.70	0.78	0.00	0.87	1.05	0.59	0.60	0.79	0.74	1.38
Avail Cap(c_a), veh/h	815	0	624	120	0	360	180	409	415	160	718	688
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	33.2	0.0	23.8	41.4	0.0	34.7	39.8	30.4	30.4	40.4	33.2	25.1
Incr Delay (d2), s/veh	14.5	0.0	3.5	22.7	0.0	19.6	80.9	2.3	2.4	19.0	4.2	179.2
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(50%),veh/ln	10.3	0.0	9.7	2.5	0.0	8.9	8.4	5.5	5.7	3.2	6.6	50.9
LnGrp Delay(d),s/veh	47.7	0.0	27.3	64.1	0.0	54.3	120.7	32.7	32.8	59.4	37.4	204.3
LnGrp LOS	D		C	E		D	F	C	C	E	D	F
Approach Vol, veh/h		1165			375			680			1586	
Approach Delay, s/veh		40.1			56.3			57.2			138.6	
Approach LOS		D			E			E			F	

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	12.5	26.5	10.9	38.8	15.0	24.0	26.5	23.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	19.0	6.0	33.0	9.0	18.0	21.0	18.0
Max Q Clear Time (g_c+I1), s	7.1	12.9	5.8	21.7	11.0	20.0	20.3	16.5
Green Ext Time (p_c), s	0.0	4.4	0.0	3.1	0.0	0.0	0.2	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	85.8
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	670	152	250	70	196	79	174	405	47	95	492	872
Future Volume (veh/h)	670	152	250	70	196	79	174	405	47	95	492	872
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	728	165	272	76	213	86	189	440	51	103	535	948
Adj No. of Lanes	2	3	1	1	2	0	2	3	1	1	3	2
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	2	2	2	2	2	2
Cap, veh/h	712	1507	469	98	359	141	237	1263	393	122	1263	1269
Arrive On Green	0.21	0.30	0.30	0.06	0.14	0.14	0.07	0.25	0.25	0.07	0.25	0.25
Sat Flow, veh/h	3442	5085	1583	1774	2488	973	3442	5085	1583	1774	5085	2787
Grp Volume(v), veh/h	728	165	272	76	150	149	189	440	51	103	535	948
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1770	1691	1721	1695	1583	1774	1695	1393
Q Serve(g_s), s	15.0	1.7	10.6	3.1	5.7	6.0	3.9	5.2	1.8	4.2	6.4	18.0
Cycle Q Clear(g_c), s	15.0	1.7	10.6	3.1	5.7	6.0	3.9	5.2	1.8	4.2	6.4	18.0
Prop In Lane	1.00		1.00	1.00		0.58	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	712	1507	469	98	256	244	237	1263	393	122	1263	1269
V/C Ratio(X)	1.02	0.11	0.58	0.78	0.58	0.61	0.80	0.35	0.13	0.84	0.42	0.75
Avail Cap(c_a), veh/h	712	1684	524	220	440	420	237	1263	393	122	1263	1269
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	28.7	18.5	21.7	33.8	29.0	29.1	33.2	22.4	21.2	33.3	22.9	16.3
Incr Delay (d2), s/veh	39.4	0.0	1.3	12.3	2.1	2.5	17.0	0.2	0.1	38.2	0.2	2.5
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(50%),veh/ln	10.9	0.8	4.8	1.8	2.9	3.0	2.4	2.4	0.8	3.3	3.0	8.1
LnGrp Delay(d),s/veh	68.1	18.6	23.0	46.1	31.1	31.6	50.2	22.6	21.3	71.6	23.1	18.8
LnGrp LOS	F	B	C	D	C	C	D	C	C	E	C	B
Approach Vol, veh/h		1165			375			680			1586	
Approach Delay, s/veh		50.6			34.3			30.2			23.7	
Approach LOS		D			C			C			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	11.0	24.0	10.0	27.5	11.0	24.0	21.0	16.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	9.0	24.0	5.0	18.0	15.0	18.0
Max Q Clear Time (g_c+I1), s	6.2	7.2	5.1	12.6	5.9	20.0	17.0	8.0
Green Ext Time (p_c), s	0.0	7.0	0.0	2.6	0.0	0.0	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	670	152	293	79	196	79	183	415	50	95	580	872
Future Volume (veh/h)	670	152	293	79	196	79	183	415	50	95	580	872
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	728	165	318	86	213	86	199	451	54	103	630	948
Adj No. of Lanes	2	3	1	1	2	0	2	3	1	1	3	2
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	2	2	2	2	2	2
Cap, veh/h	711	1475	459	111	363	142	237	1261	393	122	1261	1267
Arrive On Green	0.21	0.29	0.29	0.06	0.15	0.15	0.07	0.25	0.25	0.07	0.25	0.25
Sat Flow, veh/h	3442	5085	1583	1774	2488	973	3442	5085	1583	1774	5085	2787
Grp Volume(v), veh/h	728	165	318	86	150	149	199	451	54	103	630	948
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1770	1691	1721	1695	1583	1774	1695	1393
Q Serve(g_s), s	15.0	1.7	13.0	3.5	5.7	6.0	4.1	5.3	1.9	4.2	7.7	18.0
Cycle Q Clear(g_c), s	15.0	1.7	13.0	3.5	5.7	6.0	4.1	5.3	1.9	4.2	7.7	18.0
Prop In Lane	1.00		1.00	1.00		0.58	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	711	1475	459	111	258	247	237	1261	393	122	1261	1267
V/C Ratio(X)	1.02	0.11	0.69	0.78	0.58	0.61	0.84	0.36	0.14	0.84	0.50	0.75
Avail Cap(c_a), veh/h	711	1681	523	220	439	419	237	1261	393	122	1261	1267
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	28.8	18.9	22.9	33.5	28.9	29.0	33.4	22.5	21.3	33.4	23.4	16.4
Incr Delay (d2), s/veh	39.9	0.0	3.3	10.9	2.0	2.4	22.6	0.2	0.2	38.6	0.3	2.5
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(50%),veh/ln	11.0	0.8	6.0	2.0	2.9	2.9	2.7	2.5	0.9	3.3	3.7	8.2
LnGrp Delay(d),s/veh	68.7	18.9	26.2	44.4	31.0	31.4	56.1	22.7	21.4	72.0	23.7	18.9
LnGrp LOS	F	B	C	D	C	C	E	C	C	E	C	B
Approach Vol, veh/h		1211			385			704			1681	
Approach Delay, s/veh		50.8			34.2			32.0			24.0	
Approach LOS		D			C			C			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	11.0	24.0	10.5	27.1	11.0	24.0	21.0	16.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	9.0	24.0	5.0	18.0	15.0	18.0
Max Q Clear Time (g_c+I1), s	6.2	7.3	5.5	15.0	6.1	20.0	17.0	8.0
Green Ext Time (p_c), s	0.0	7.3	0.0	2.5	0.0	0.0	0.0	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	34.5
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Hosking & S. Union - PM Peak

Count Date: 1/15/2015

Ave Annual Growth: **4.87%**

Exist Peak Hour Volumes

SIGNALIZED

1	WBL	27
1	WBT	55
<	WBR	27
1	EBL	49
1	EBT	35
<	EBR	25
1	NBL	42
2	NBT	318
<	NBR	24
1	SBL	30
2	SBT	267
<	SBR	69
	TOTAL	968

Year 2035

Fut. Volumes w/o Proj

WBL	59
WBT	171
WBR	58
EBL	149
EBT	97
EBR	77
NBL	143
NBT	749
NBR	51
SBL	65
SBT	647
SBR	238
TOTAL	2504

Year 2035 Fut. Vol

+ Project Traffic

WBL	69
WBT	171
WBR	58
EBL	149
EBT	97
EBR	95
NBL	156
NBT	814
NBR	58
SBL	65
SBT	695
SBR	238
TOTAL	2665

Year 2025

Fut. Volumes w/o Proj

WBL	40
WBT	98
WBR	40
EBL	86
EBT	59
EBR	45
NBL	79
NBT	493
NBR	35
SBL	44
SBT	420
SBR	130
TOTAL	1569

Year 2025 Fut. Vol

+ Project Traffic

WBL	45
WBT	98
WBR	40
EBL	86
EBT	59
EBR	54
NBL	86
NBT	526
NBR	39
SBL	44
SBT	444
SBR	130
TOTAL	1651

Project Generated Trips - Year 2035

	Total
WBL	10
WBT	0
WBR	0
EBL	0
EBT	0
EBR	18
NBL	13
NBT	65
NBR	7
SBL	0
SBT	48
SBR	0
TOTAL	161

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Hosking & S. Union - PM Peak						
	Count Date:	1/15/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	0.433							
EB Approach (Away)	0.441							
NB Approach (To)	2.725							
NB Approach (Away)	2.912							
SB Approach (To)	3.179							
SB Approach (Away)	3							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	2.634		WBL	3.05	WBT	5.96	WBR	2.95
WB Approach (Away)	2.49		3.88%	59	5.69%	171	3.78%	58
EB Approach (To)	3.061		EBL	5.17	EBT	4.78	EBR	5.26
EB Approach (Away)	4.098		5.57%	149	5.08%	97	5.67%	77
NB Approach (To)	9.464		NBL	6.38	NBT	3.37	NBR	2.98
NB Approach (Away)	10.071		6.18%	143	4.28%	749	3.79%	51
SB Approach (To)	11.322		SBL	3.03	SBT	3.51	SBR	6.43
SB Approach (Away)	9.821		3.83%	65	4.42%	647	6.23%	238

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	35	25	27	55	27	42	318	24	30	267	69
Future Volume (veh/h)	49	35	25	27	55	27	42	318	24	30	267	69
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	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	53	38	27	29	60	29	46	346	26	33	290	75
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	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	2	2	2	2	2	2
Cap, veh/h	98	128	91	61	126	61	88	747	56	68	593	151
Arrive On Green	0.06	0.13	0.13	0.03	0.11	0.11	0.05	0.22	0.22	0.04	0.21	0.21
Sat Flow, veh/h	1774	1015	721	1774	1188	574	1774	3339	250	1774	2796	711
Grp Volume(v), veh/h	53	0	65	29	0	89	46	183	189	33	182	183
Grp Sat Flow(s),veh/h/ln	1774	0	1736	1774	0	1761	1774	1770	1819	1774	1770	1737
Q Serve(g_s), s	1.2	0.0	1.4	0.7	0.0	2.0	1.1	3.7	3.8	0.8	3.7	3.9
Cycle Q Clear(g_c), s	1.2	0.0	1.4	0.7	0.0	2.0	1.1	3.7	3.8	0.8	3.7	3.9
Prop In Lane	1.00		0.42	1.00		0.33	1.00		0.14	1.00		0.41
Lane Grp Cap(c), veh/h	98	0	220	61	0	186	88	396	407	68	375	369
V/C Ratio(X)	0.54	0.00	0.30	0.48	0.00	0.48	0.52	0.46	0.47	0.49	0.48	0.50
Avail Cap(c_a), veh/h	213	0	752	213	0	763	213	766	788	213	766	752
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	19.1	0.0	16.5	19.7	0.0	17.5	19.3	14.0	14.0	19.6	14.4	14.4
Incr Delay (d2), s/veh	4.6	0.0	0.7	5.7	0.0	1.9	4.7	0.8	0.8	5.4	1.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.7	0.4	0.0	1.1	0.6	1.9	1.9	0.5	1.9	1.9
LnGrp Delay(d),s/veh	23.7	0.0	17.2	25.4	0.0	19.4	24.0	14.8	14.8	24.9	15.3	15.5
LnGrp LOS	C		B	C		B	C	B	B	C	B	B
Approach Vol, veh/h		118			118			418			398	
Approach Delay, s/veh		20.1			20.9			15.8			16.2	
Approach LOS		C			C			B			B	

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	7.6	15.3	7.4	11.3	8.1	14.8	8.3	10.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	2.8	5.8	2.7	3.4	3.1	5.9	3.2	4.0
Green Ext Time (p_c), s	0.0	3.0	0.0	0.5	0.0	3.0	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	17.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	59	45	40	98	40	79	493	35	44	420	130
Future Volume (veh/h)	86	59	45	40	98	40	79	493	35	44	420	130
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	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	64	49	43	107	43	86	536	38	48	457	141
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	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	2	2	2	2	2	2
Cap, veh/h	126	158	121	79	170	68	121	954	68	85	706	216
Arrive On Green	0.07	0.16	0.16	0.04	0.13	0.13	0.07	0.28	0.28	0.05	0.26	0.26
Sat Flow, veh/h	1774	980	750	1774	1265	508	1774	3353	237	1774	2670	818
Grp Volume(v), veh/h	93	0	113	43	0	150	86	282	292	48	302	296
Grp Sat Flow(s),veh/h/ln	1774	0	1730	1774	0	1773	1774	1770	1821	1774	1770	1718
Q Serve(g_s), s	2.7	0.0	3.0	1.2	0.0	4.2	2.5	7.1	7.1	1.4	7.9	8.0
Cycle Q Clear(g_c), s	2.7	0.0	3.0	1.2	0.0	4.2	2.5	7.1	7.1	1.4	7.9	8.0
Prop In Lane	1.00		0.43	1.00		0.29	1.00		0.13	1.00		0.48
Lane Grp Cap(c), veh/h	126	0	279	79	0	239	121	504	518	85	468	454
V/C Ratio(X)	0.74	0.00	0.40	0.54	0.00	0.63	0.71	0.56	0.56	0.56	0.64	0.65
Avail Cap(c_a), veh/h	171	0	599	171	0	614	171	613	630	171	613	595
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	23.7	0.0	19.6	24.3	0.0	21.3	23.7	15.8	15.8	24.2	17.0	17.0
Incr Delay (d2), s/veh	10.6	0.0	0.9	5.7	0.0	2.7	7.6	1.0	1.0	5.7	1.5	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(50%),veh/ln	1.7	0.0	1.5	0.7	0.0	2.2	1.5	3.6	3.7	0.8	4.0	4.0
LnGrp Delay(d),s/veh	34.3	0.0	20.5	30.1	0.0	24.0	31.3	16.8	16.8	29.9	18.5	18.6
LnGrp LOS	C		C	C		C	C	B	B	C	B	B
Approach Vol, veh/h		206			193			660			646	
Approach Delay, s/veh		26.7			25.3			18.7			19.4	
Approach LOS		C			C			B			B	

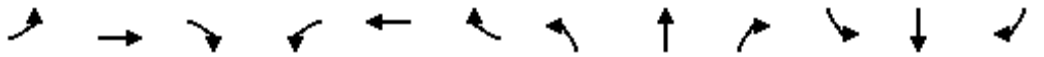
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	20.8	8.3	14.4	9.6	19.7	9.7	13.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.4	9.1	3.2	5.0	4.5	10.0	4.7	6.2
Green Ext Time (p_c), s	0.0	4.0	0.0	1.0	0.0	3.8	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	59	54	45	98	40	86	526	39	44	444	130
Future Volume (veh/h)	86	59	54	45	98	40	86	526	39	44	444	130
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	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	64	59	49	107	43	93	572	42	48	483	141
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	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	2	2	2	2	2	2
Cap, veh/h	125	140	129	86	171	69	125	977	72	85	730	212
Arrive On Green	0.07	0.16	0.16	0.05	0.14	0.14	0.07	0.29	0.29	0.05	0.27	0.27
Sat Flow, veh/h	1774	894	824	1774	1265	508	1774	3344	245	1774	2708	786
Grp Volume(v), veh/h	93	0	123	49	0	150	93	302	312	48	315	309
Grp Sat Flow(s),veh/h/ln	1774	0	1717	1774	0	1773	1774	1770	1819	1774	1770	1724
Q Serve(g_s), s	2.7	0.0	3.4	1.4	0.0	4.2	2.7	7.7	7.7	1.4	8.3	8.4
Cycle Q Clear(g_c), s	2.7	0.0	3.4	1.4	0.0	4.2	2.7	7.7	7.7	1.4	8.3	8.4
Prop In Lane	1.00		0.48	1.00		0.29	1.00		0.13	1.00		0.46
Lane Grp Cap(c), veh/h	125	0	270	86	0	240	125	517	532	85	477	465
V/C Ratio(X)	0.74	0.00	0.46	0.57	0.00	0.63	0.74	0.58	0.59	0.57	0.66	0.67
Avail Cap(c_a), veh/h	168	0	585	168	0	604	168	603	620	168	603	587
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	24.1	0.0	20.2	24.6	0.0	21.6	24.1	16.0	16.0	24.6	17.1	17.2
Incr Delay (d2), s/veh	11.4	0.0	1.2	5.8	0.0	2.7	11.4	1.1	1.1	5.8	1.8	2.0
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(50%),veh/ln	1.7	0.0	1.7	0.8	0.0	2.2	1.7	3.8	4.0	0.8	4.3	4.2
LnGrp Delay(d),s/veh	35.5	0.0	21.4	30.4	0.0	24.3	35.5	17.0	17.0	30.4	18.9	19.1
LnGrp LOS	D		C	C		C	D	B	B	C	B	B
Approach Vol, veh/h		216			199			707			672	
Approach Delay, s/veh		27.5			25.8			19.5			19.8	
Approach LOS		C			C			B			B	

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	8.5	21.4	8.6	14.3	9.7	20.2	9.7	13.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.4	9.7	3.4	5.4	4.7	10.4	4.7	6.2
Green Ext Time (p_c), s	0.0	4.1	0.0	1.0	0.0	3.8	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.3
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	97	77	59	171	58	143	749	51	65	647	238
Future Volume (veh/h)	149	97	77	59	171	58	143	749	51	65	647	238
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	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	162	105	84	64	186	63	155	814	55	71	703	259
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	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	2	2	2	2	2	2
Cap, veh/h	189	223	179	87	234	79	189	1170	79	91	741	273
Arrive On Green	0.11	0.23	0.23	0.05	0.18	0.18	0.11	0.35	0.35	0.05	0.29	0.29
Sat Flow, veh/h	1774	960	768	1774	1332	451	1774	3365	227	1774	2534	934
Grp Volume(v), veh/h	162	0	189	64	0	249	155	428	441	71	491	471
Grp Sat Flow(s),veh/h/ln	1774	0	1727	1774	0	1783	1774	1770	1823	1774	1770	1698
Q Serve(g_s), s	6.8	0.0	7.1	2.7	0.0	10.1	6.4	15.7	15.7	3.0	20.4	20.4
Cycle Q Clear(g_c), s	6.8	0.0	7.1	2.7	0.0	10.1	6.4	15.7	15.7	3.0	20.4	20.4
Prop In Lane	1.00		0.44	1.00		0.25	1.00		0.12	1.00		0.55
Lane Grp Cap(c), veh/h	189	0	402	87	0	313	189	615	633	91	518	497
V/C Ratio(X)	0.86	0.00	0.47	0.74	0.00	0.80	0.82	0.70	0.70	0.78	0.95	0.95
Avail Cap(c_a), veh/h	189	0	436	165	0	427	189	615	633	142	518	497
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	33.0	0.0	24.8	35.3	0.0	29.7	32.9	21.1	21.1	35.2	26.0	26.0
Incr Delay (d2), s/veh	30.4	0.0	0.9	11.4	0.0	7.2	24.2	3.4	3.3	13.4	27.1	27.8
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(50%),veh/ln	4.9	0.0	3.5	1.6	0.0	5.6	4.4	8.2	8.4	1.8	13.8	13.4
LnGrp Delay(d),s/veh	63.5	0.0	25.7	46.6	0.0	36.9	57.1	24.5	24.4	48.6	53.1	53.8
LnGrp LOS	E		C	D		D	E	C	C	D	D	D
Approach Vol, veh/h		351			313			1024			1033	
Approach Delay, s/veh		43.1			38.9			29.4			53.1	
Approach LOS		D			D			C			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	9.9	32.1	9.7	23.5	14.0	28.0	14.0	19.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	24.0	7.0	19.0	8.0	22.0	8.0	18.0
Max Q Clear Time (g_c+I1), s	5.0	17.7	4.7	9.1	8.4	22.4	8.8	12.1
Green Ext Time (p_c), s	0.0	4.6	0.0	1.6	0.0	0.0	0.0	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	41.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	97	77	59	171	58	143	749	51	65	647	238
Future Volume (veh/h)	149	97	77	59	171	58	143	749	51	65	647	238
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	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	162	105	84	64	186	63	155	814	55	71	703	259
Adj No. of Lanes	2	1	0	1	1	0	2	2	1	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	262	200	160	96	249	84	260	1028	460	101	963	431
Arrive On Green	0.08	0.21	0.21	0.05	0.19	0.19	0.08	0.29	0.29	0.06	0.27	0.27
Sat Flow, veh/h	3442	960	768	1774	1332	451	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	162	0	189	64	0	249	155	814	55	71	703	259
Grp Sat Flow(s),veh/h/ln	1721	0	1727	1774	0	1783	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	2.8	0.0	6.0	2.2	0.0	8.1	2.7	13.1	1.6	2.4	11.1	8.8
Cycle Q Clear(g_c), s	2.8	0.0	6.0	2.2	0.0	8.1	2.7	13.1	1.6	2.4	11.1	8.8
Prop In Lane	1.00		0.44	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	262	0	360	96	0	333	260	1028	460	101	963	431
V/C Ratio(X)	0.62	0.00	0.52	0.67	0.00	0.75	0.60	0.79	0.12	0.70	0.73	0.60
Avail Cap(c_a), veh/h	279	0	505	144	0	521	279	1034	463	144	1034	463
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	27.6	0.0	21.7	28.6	0.0	23.7	27.6	20.1	16.1	28.5	20.4	19.5
Incr Delay (d2), s/veh	3.7	0.0	1.2	7.8	0.0	3.4	3.0	4.2	0.1	8.5	2.5	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(50%),veh/ln	1.5	0.0	3.0	1.3	0.0	4.3	1.4	6.9	0.7	1.4	5.7	4.0
LnGrp Delay(d),s/veh	31.3	0.0	22.8	36.4	0.0	27.1	30.6	24.4	16.2	37.0	22.8	21.4
LnGrp LOS	C		C	D		C	C	C	B	D	C	C
Approach Vol, veh/h		351			313			1024			1033	
Approach Delay, s/veh		26.8			29.0			24.9			23.4	
Approach LOS		C			C			C			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	9.5	23.9	9.3	18.9	10.6	22.8	10.7	17.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.4	15.1	4.2	8.0	4.7	13.1	4.8	10.1
Green Ext Time (p_c), s	0.0	2.3	0.0	1.6	0.0	3.7	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	25.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	97	95	69	171	58	156	814	58	65	695	238
Future Volume (veh/h)	149	97	95	69	171	58	156	814	58	65	695	238
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	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	162	105	103	75	186	63	170	885	63	71	755	259
Adj No. of Lanes	2	1	0	1	1	0	2	2	1	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	260	177	173	104	249	84	262	1039	465	101	971	434
Arrive On Green	0.08	0.20	0.20	0.06	0.19	0.19	0.08	0.29	0.29	0.06	0.27	0.27
Sat Flow, veh/h	3442	865	848	1774	1332	451	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	162	0	208	75	0	249	170	885	63	71	755	259
Grp Sat Flow(s),veh/h/ln	1721	0	1713	1774	0	1783	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	2.8	0.0	6.8	2.6	0.0	8.2	3.0	14.6	1.8	2.4	12.2	8.8
Cycle Q Clear(g_c), s	2.8	0.0	6.8	2.6	0.0	8.2	3.0	14.6	1.8	2.4	12.2	8.8
Prop In Lane	1.00		0.50	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	260	0	350	104	0	334	262	1039	465	101	971	434
V/C Ratio(X)	0.62	0.00	0.59	0.72	0.00	0.75	0.65	0.85	0.14	0.70	0.78	0.60
Avail Cap(c_a), veh/h	277	0	497	143	0	517	277	1039	465	143	1026	459
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	27.8	0.0	22.4	28.7	0.0	23.8	27.9	20.6	16.1	28.8	20.8	19.5
Incr Delay (d2), s/veh	3.9	0.0	1.6	10.7	0.0	3.3	4.8	6.9	0.1	8.6	3.7	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(50%),veh/ln	1.5	0.0	3.4	1.6	0.0	4.3	1.6	8.1	0.8	1.4	6.5	4.0
LnGrp Delay(d),s/veh	31.7	0.0	24.0	39.4	0.0	27.2	32.7	27.5	16.3	37.4	24.4	21.5
LnGrp LOS	C		C	D		C	C	C	B	D	C	C
Approach Vol, veh/h		370			324			1118			1085	
Approach Delay, s/veh		27.4			30.0			27.7			24.6	
Approach LOS		C			C			C			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	9.5	24.2	9.6	18.7	10.7	23.0	10.7	17.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.4	16.6	4.6	8.8	5.0	14.2	4.8	10.2
Green Ext Time (p_c), s	0.0	1.2	0.0	1.6	0.0	2.8	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking & Cottonwood - AM Peak
Count Date: 1/15/2015

Ave Annual Growth: **4.60%**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	0
0	WBR	0
>	EBL	53
1	EBT	0
<	EBR	10
>	NBL	16
1	NBT	47
<	NBR	0
>	SBL	0
1	SBT	65
<	SBR	62
	TOTAL	253

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	133
EBT	0
EBR	25
NBL	40
NBT	118
NBR	0
SBL	0
SBT	163
SBR	156
TOTAL	635

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	134
EBT	0
EBR	26
NBL	41
NBT	125
NBR	0
SBL	0
SBT	206
SBR	162
TOTAL	694

Year 2025
Fut. Volumes w/o Proj

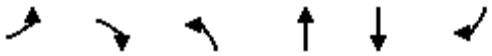
WBL	0
WBT	0
WBR	0
EBL	85
EBT	0
EBR	16
NBL	26
NBT	75
NBR	0
SBL	0
SBT	104
SBR	99
TOTAL	405

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	86
EBT	0
EBR	17
NBL	27
NBT	79
NBR	0
SBL	0
SBT	126
SBR	102
TOTAL	437

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	1
EBT	0
EBR	1
NBL	1
NBT	7
NBR	0
SBL	0
SBT	43
SBR	6
TOTAL	59



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.978				0.934	
Flt Protected	0.960			0.988		
Satd. Flow (prot)	1749	0	0	1840	1740	0
Flt Permitted	0.960			0.988		
Satd. Flow (perm)	1749	0	0	1840	1740	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

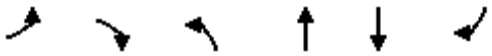
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	53	10	16	47	65	62
Future Vol, veh/h	53	10	16	47	65	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	11	17	51	71	67

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	190	104	138	0	-	0
Stage 1	104	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	799	951	1446	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	937	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	789	951	1446	-	-	-
Mov Cap-2 Maneuver	789	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1446	-	811	-	-
HCM Lane V/C Ratio	0.012	-	0.084	-	-
HCM Control Delay (s)	7.5	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.979				0.934	
Flt Protected	0.960			0.987		
Satd. Flow (prot)	1751	0	0	1839	1740	0
Flt Permitted	0.960			0.987		
Satd. Flow (perm)	1751	0	0	1839	1740	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

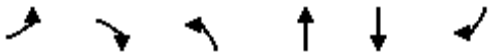
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	85	16	26	75	104	99
Future Vol, veh/h	85	16	26	75	104	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	17	28	82	113	108

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	305	167	221	0	-	0
Stage 1	167	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	687	877	1348	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	672	877	1348	-	-	-
Mov Cap-2 Maneuver	672	-	-	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1348	-	698	-	-
HCM Lane V/C Ratio	0.021	-	0.157	-	-
HCM Control Delay (s)	7.7	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.978				0.940	
Flt Protected	0.960			0.988		
Satd. Flow (prot)	1749	0	0	1840	1751	0
Flt Permitted	0.960			0.988		
Satd. Flow (perm)	1749	0	0	1840	1751	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

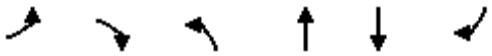
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	86	17	27	79	126	102
Future Vol, veh/h	86	17	27	79	126	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	93	18	29	86	137	111

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	337	192	248	0	-	0
Stage 1	192	-	-	-	-	-
Stage 2	145	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	658	850	1318	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	643	850	1318	-	-	-
Mov Cap-2 Maneuver	643	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	862	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1318	-	670	-	-
HCM Lane V/C Ratio	0.022	-	0.167	-	-
HCM Control Delay (s)	7.8	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.979				0.934	
Flt Protected	0.960			0.988		
Satd. Flow (prot)	1751	0	0	1840	1740	0
Flt Permitted	0.960			0.988		
Satd. Flow (perm)	1751	0	0	1840	1740	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

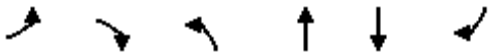
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	133	25	40	118	163	156
Future Vol, veh/h	133	25	40	118	163	156
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	27	43	128	177	170

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	477	262	347	0	-	0
Stage 1	262	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	547	777	1212	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	526	777	1212	-	-	-
Mov Cap-2 Maneuver	526	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	790	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.4	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1212	-	554	-	-
HCM Lane V/C Ratio	0.036	-	0.31	-	-
HCM Control Delay (s)	8.1	0	14.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.978				0.941	
Flt Protected	0.960			0.988		
Satd. Flow (prot)	1749	0	0	1840	1753	0
Flt Permitted	0.960			0.988		
Satd. Flow (perm)	1749	0	0	1840	1753	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	134	26	41	125	206	162
Future Vol, veh/h	134	26	41	125	206	162
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	28	45	136	224	176

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	537	312	400	0	-	0
Stage 1	312	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	505	728	1159	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	484	728	1159	-	-	-
Mov Cap-2 Maneuver	484	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.6	2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1159	-	512	-	-
HCM Lane V/C Ratio	0.038	-	0.34	-	-
HCM Control Delay (s)	8.2	0	15.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road

Minor St: Cottonwood Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

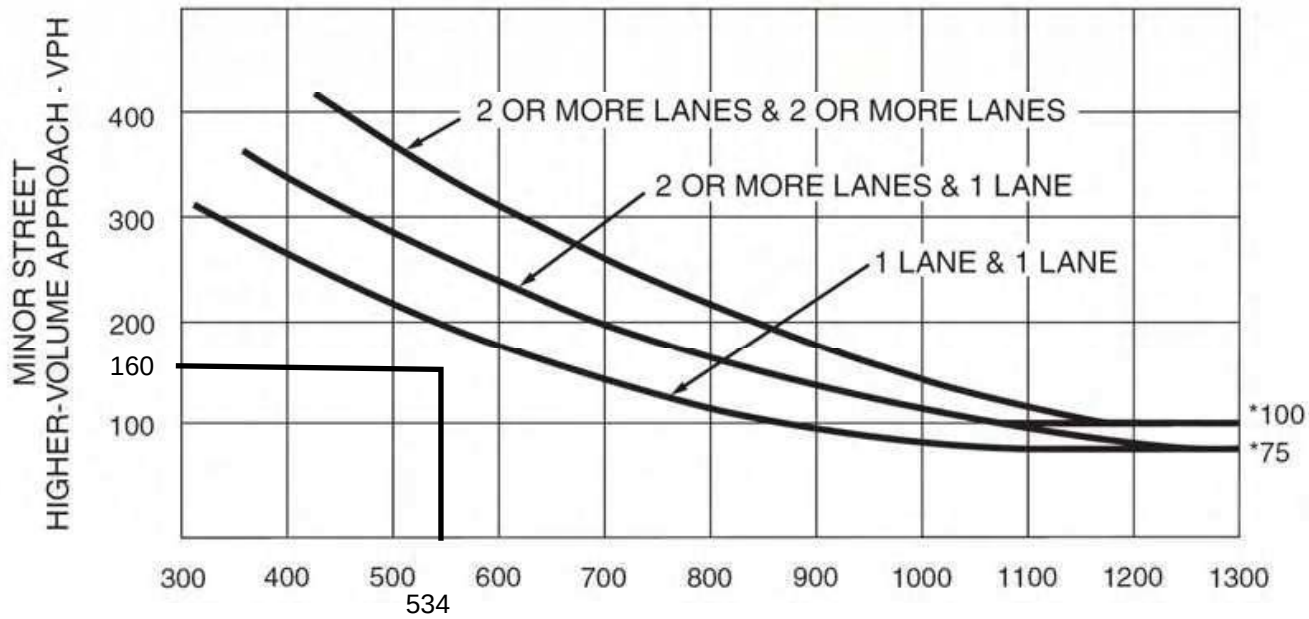
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 6480 / Minor Street 1280	Urban / Rural	Urban / Rural
1..... 1..... 2 or More..... 1..... 2 or More..... 2 or More..... 1..... 2 or More.....	8,000 / 5,600 9,600 / 6,720 9,600 / 6,720 8,000 / 5,600	2,400 / 1,680 2,400 / 1,680 3,200 / 2,240 3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 6480 / Minor Street 1280	Urban / Rural	Urban / Rural
1..... 1..... 2 or More..... 1..... 2 or More..... 2 or More..... 1..... 2 or More.....	12,000 / 8,400 14,400 / 10,080 14,400 / 10,080 12,000 / 8,400	1,200 / 850 1,200 / 850 1,600 / 1,120 1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 76% (A) 76% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Hosking & Cottonwood - PM Peak
Count Date: 1/15/2015

Ave Annual Growth: **4.60%**

Exist Peak Hour Volumes

Unsignalized

0	WBL	0
0	WBT	0
0	WBR	0
>	EBL	28
1	EBT	0
<	EBR	22
>	NBL	23
1	NBT	215
<	NBR	0
>	SBL	0
1	SBT	105
<	SBR	28
	TOTAL	421

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	70
EBT	0
EBR	55
NBL	58
NBT	540
NBR	0
SBL	0
SBT	264
SBR	70
TOTAL	1057

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	72
EBT	0
EBR	56
NBL	59
NBT	562
NBR	0
SBL	0
SBT	284
SBR	76
TOTAL	1109

Year 2025
Fut. Volumes w/o Proj

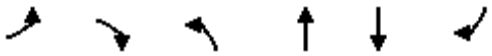
WBL	0
WBT	0
WBR	0
EBL	45
EBT	0
EBR	35
NBL	37
NBT	344
NBR	0
SBL	0
SBT	168
SBR	45
TOTAL	674

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	46
EBT	0
EBR	36
NBL	38
NBT	355
NBR	0
SBL	0
SBT	178
SBR	48
TOTAL	701

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	2
EBT	0
EBR	1
NBL	1
NBT	22
NBR	0
SBL	0
SBT	20
SBR	6
TOTAL	52



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.940				0.972	
Flt Protected	0.973			0.995		
Satd. Flow (prot)	1704	0	0	1853	1811	0
Flt Permitted	0.973			0.995		
Satd. Flow (perm)	1704	0	0	1853	1811	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

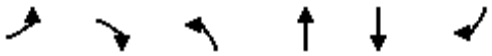
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	28	22	23	215	105	28
Future Vol, veh/h	28	22	23	215	105	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	24	25	234	114	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	413	129	145	0	-	0
Stage 1	129	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	595	921	1437	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	583	921	1437	-	-	-
Mov Cap-2 Maneuver	583	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	749	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1437	-	695	-	-
HCM Lane V/C Ratio	0.017	-	0.078	-	-
HCM Control Delay (s)	7.5	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941				0.971	
Flt Protected	0.973			0.995		
Satd. Flow (prot)	1706	0	0	1853	1809	0
Flt Permitted	0.973			0.995		
Satd. Flow (perm)	1706	0	0	1853	1809	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

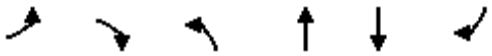
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	45	35	37	344	168	45
Future Vol, veh/h	45	35	37	344	168	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	38	40	374	183	49

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	661	207	232	0	-	0
Stage 1	207	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	427	833	1336	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	411	833	1336	-	-	-
Mov Cap-2 Maneuver	411	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	616	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1336	-	528	-	-
HCM Lane V/C Ratio	0.03	-	0.165	-	-
HCM Control Delay (s)	7.8	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941				0.971	
Flt Protected	0.973			0.995		
Satd. Flow (prot)	1706	0	0	1853	1809	0
Flt Permitted	0.973			0.995		
Satd. Flow (perm)	1706	0	0	1853	1809	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

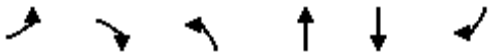
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	46	36	38	355	178	48
Future Vol, veh/h	46	36	38	355	178	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	39	41	386	193	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	688	220	246	0	-	0
Stage 1	220	-	-	-	-	-
Stage 2	468	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	412	820	1320	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	396	820	1320	-	-	-
Mov Cap-2 Maneuver	396	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	605	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1320	-	512	-	-
HCM Lane V/C Ratio	0.031	-	0.174	-	-
HCM Control Delay (s)	7.8	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.940				0.972	
Flt Protected	0.973			0.995		
Satd. Flow (prot)	1704	0	0	1853	1811	0
Flt Permitted	0.973			0.995		
Satd. Flow (perm)	1704	0	0	1853	1811	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			5300	5301	
Travel Time (s)	65.4			65.7	65.7	

Intersection Summary	
Area Type:	Other

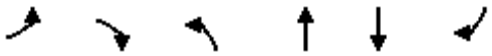
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	70	55	58	540	264	70
Future Vol, veh/h	70	55	58	540	264	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	60	63	587	287	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1038	325	363	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	256	716	1196	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	236	716	1196	-	-	-
Mov Cap-2 Maneuver	236	-	-	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	448	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.9	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1196	-	335	-	-
HCM Lane V/C Ratio	0.053	-	0.406	-	-
HCM Control Delay (s)	8.2	0	22.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.9	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941				0.971	
Flt Protected	0.973			0.995		
Satd. Flow (prot)	1706	0	0	1853	1809	0
Flt Permitted	0.973			0.995		
Satd. Flow (perm)	1706	0	0	1853	1809	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5276			4741	5301	
Travel Time (s)	65.4			58.8	65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	72	56	59	562	284	76
Future Vol, veh/h	72	56	59	562	284	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	61	64	611	309	83

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1089	350	391	0	-	0
Stage 1	350	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	238	693	1168	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	218	693	1168	-	-	-
Mov Cap-2 Maneuver	218	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.6	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1168	-	311	-	-
HCM Lane V/C Ratio	0.055	-	0.447	-	-
HCM Control Delay (s)	8.3	0	25.6	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	2.2	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Hosking Road _____ Critical Approach Speed _____ mph

Minor St: Cottonwood Road _____ Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

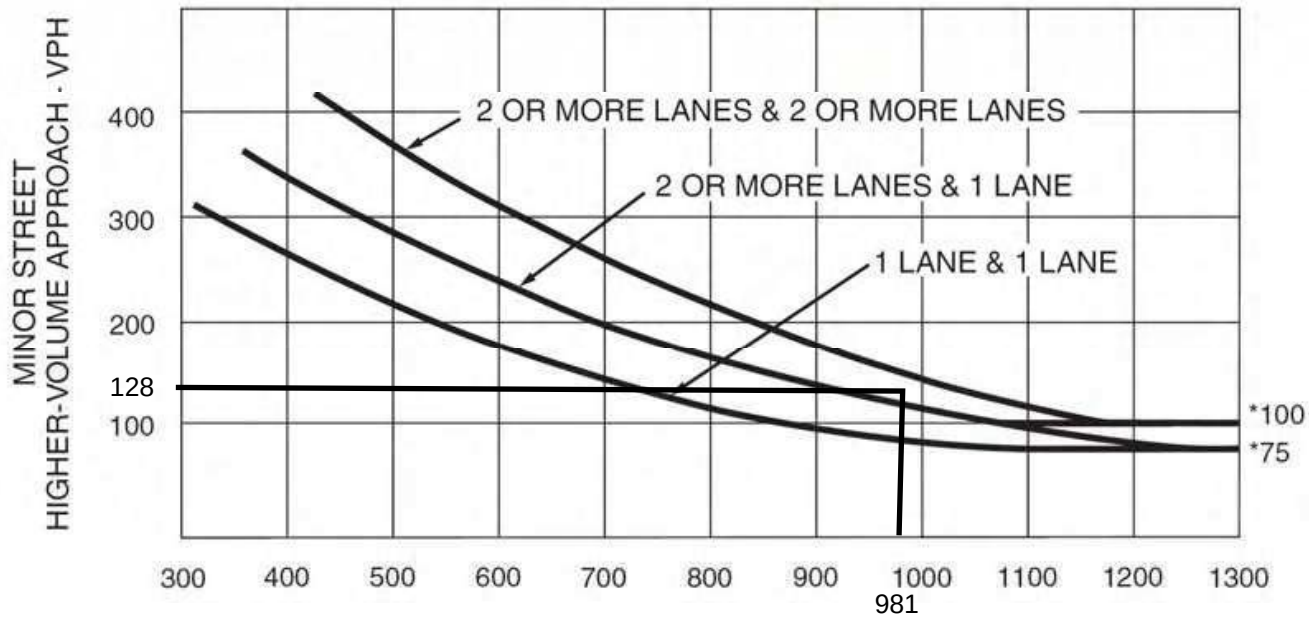
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street: 1..... 9810 / 2 or More..... / 2 or More..... / 1..... Minor Street: 1..... 1280 / 1..... / 2 or More..... / 2 or More.....	Urban / Rural 8,000 / 5,600 9,600 / 6,720 9,600 / 6,720 8,000 / 5,600	Urban / Rural 2,400 / 1,680 2,400 / 1,680 3,200 / 2,240 3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street: 1..... 9810 / 2 or More..... / 2 or More..... / 1..... Minor Street: 1..... 1280 / 1..... / 2 or More..... / 2 or More.....	Urban / Rural 12,000 / 8,400 14,400 / 10,080 14,400 / 10,080 12,000 / 8,400	Urban / Rural 1,200 / 850 1,200 / 850 1,600 / 1,120 1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... A: 76% B: 100%	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Taft Highway & Wible Road - AM Peak
Count Date: 1/20/2015

Ave Annual Growth: **2.48%**

Exist Peak Hour Volumes

Signalized

1	WBL	11
1	WBT	263
1	WBR	110
1	EBL	24
1	EBT	277
<	EBR	12
>	NBL	11
1	NBT	19
<	NBR	6
>	SBL	273
1	SBT	20
<	SBR	61
	TOTAL	1087

Year 2035
Fut. Volumes w/o Proj

WBL	17
WBT	509
WBR	172
EBL	50
EBT	763
EBR	24
NBL	14
NBT	20
NBR	8
SBL	485
SBT	26
SBR	100
TOTAL	2188

Year 2035 Fut. Vol
+ Project Traffic

WBL	17
WBT	523
WBR	173
EBL	50
EBT	815
EBR	24
NBL	14
NBT	20
NBR	8
SBL	487
SBT	26
SBR	100
TOTAL	2257

Year 2025
Fut. Volumes w/o Proj

WBL	14
WBT	369
WBR	138
EBL	35
EBT	465
EBR	17
NBL	13
NBT	20
NBR	7
SBL	366
SBT	23
SBR	79
TOTAL	1546

Year 2025 Fut. Vol
+ Project Traffic

WBL	14
WBT	376
WBR	139
EBL	35
EBT	491
EBR	17
NBL	13
NBT	20
NBR	7
SBL	367
SBT	23
SBR	79
TOTAL	1581

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	14
WBR	1
EBL	0
EBT	52
EBR	0
NBL	0
NBT	0
NBR	0
SBL	2
SBT	0
SBR	0
TOTAL	69

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Highway & Wible Road - AM Peak						
	Count Date:	1/20/2015						
2006	ADT							
WB Approach (To)	3.083							
WB Approach (Away)	2.432							
EB Approach (To)	1.671							
EB Approach (Away)	2.547							
NB Approach (To)	0.897							
NB Approach (Away)	0.616							
SB Approach (To)	1.039							
SB Approach (Away)	1.094							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	7.247		WBL	1.90	WBT	2.56	WBR	1.94
WB Approach (Away)	8.406		2.14%	17	3.28%	509	2.22%	172
EB Approach (To)	8.566		EBL	3.32	EBT	4.29	EBR	3.29
EB Approach (Away)	7.058		3.62%	50	5.08%	763	3.54%	24
NB Approach (To)	0.68		NBL	1.76	NBT	1.14	NBR	2.11
NB Approach (Away)	0.893		1.31%	14	0.25%	20	1.71%	8
SB Approach (To)	1.527		SBL	2.46	SBT	1.46	SBR	2.12
SB Approach (Away)	1.663		2.85%	485	1.31%	26	2.46%	100

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	277	12	11	263	110	11	19	6	273	20	61
Future Volume (veh/h)	24	277	12	11	263	110	11	19	6	273	20	61
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	26	301	13	12	286	120	12	21	7	297	22	66
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	55	476	404	28	447	380	220	343	97	500	27	79
Arrive On Green	0.03	0.26	0.26	0.02	0.24	0.24	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	355	1078	304	1114	85	248
Grp Volume(v), veh/h	26	301	13	12	286	120	40	0	0	385	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1737	0	0	1448	0	0
Q Serve(g_s), s	0.6	6.3	0.3	0.3	6.0	2.7	0.0	0.0	0.0	10.1	0.0	0.0
Cycle Q Clear(g_c), s	0.6	6.3	0.3	0.3	6.0	2.7	0.7	0.0	0.0	10.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.30		0.17	0.77		0.17
Lane Grp Cap(c), veh/h	55	476	404	28	447	380	660	0	0	606	0	0
V/C Ratio(X)	0.47	0.63	0.03	0.44	0.64	0.32	0.06	0.00	0.00	0.64	0.00	0.00
Avail Cap(c_a), veh/h	203	766	651	203	766	651	845	0	0	772	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.9	14.5	12.2	21.4	14.9	13.7	10.4	0.0	0.0	13.8	0.0	0.0
Incr Delay (d2), s/veh	6.2	1.4	0.0	10.5	1.5	0.5	0.0	0.0	0.0	1.1	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.4	0.1	0.2	3.3	1.2	0.3	0.0	0.0	4.5	0.0	0.0
LnGrp Delay(d),s/veh	27.1	15.9	12.3	31.9	16.5	14.2	10.4	0.0	0.0	14.9	0.0	0.0
LnGrp LOS	C	B	B	C	B	B	B			B		
Approach Vol, veh/h		340			418			40			385	
Approach Delay, s/veh		16.6			16.3			10.4			14.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		19.9	6.7	17.2		19.9	7.4	16.5
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		19.0	5.0	18.0		19.0	5.0	18.0
Max Q Clear Time (g_c+I1), s		2.7	2.3	8.3		12.8	2.6	8.0
Green Ext Time (p_c), s		2.0	0.0	2.4		1.2	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	465	17	14	369	138	13	20	7	366	23	79
Future Volume (veh/h)	35	465	17	14	369	138	13	20	7	366	23	79
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	38	505	18	15	401	150	14	22	8	398	25	86
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	66	613	521	32	577	490	247	372	123	537	28	96
Arrive On Green	0.04	0.33	0.33	0.02	0.31	0.31	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	454	940	310	1125	71	243
Grp Volume(v), veh/h	38	505	18	15	401	150	44	0	0	509	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1704	0	0	1438	0	0
Q Serve(g_s), s	1.5	17.5	0.5	0.6	13.2	5.1	0.0	0.0	0.0	22.0	0.0	0.0
Cycle Q Clear(g_c), s	1.5	17.5	0.5	0.6	13.2	5.1	1.1	0.0	0.0	23.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.32		0.18	0.78		0.17
Lane Grp Cap(c), veh/h	66	613	521	32	577	490	742	0	0	661	0	0
V/C Ratio(X)	0.57	0.82	0.03	0.47	0.70	0.31	0.06	0.00	0.00	0.77	0.00	0.00
Avail Cap(c_a), veh/h	127	746	634	127	746	634	998	0	0	891	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.1	21.6	15.9	34.0	21.2	18.4	13.1	0.0	0.0	19.6	0.0	0.0
Incr Delay (d2), s/veh	7.6	6.3	0.0	10.2	1.9	0.3	0.0	0.0	0.0	2.9	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	10.1	0.2	0.4	7.1	2.3	0.5	0.0	0.0	9.6	0.0	0.0
LnGrp Delay(d),s/veh	40.7	27.9	16.0	44.2	23.2	18.8	13.1	0.0	0.0	22.5	0.0	0.0
LnGrp LOS	D	C	B	D	C	B	B			C		
Approach Vol, veh/h		561			566			44			509	
Approach Delay, s/veh		28.4			22.6			13.1			22.5	
Approach LOS		C			C			B			C	

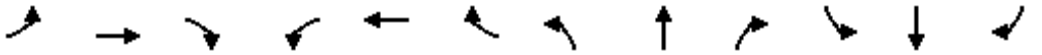
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		33.7	7.3	29.0		33.7	8.6	27.7
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		39.0	5.0	28.0		39.0	5.0	28.0
Max Q Clear Time (g_c+I1), s		3.1	2.6	19.5		25.1	3.5	15.2
Green Ext Time (p_c), s		3.3	0.0	3.5		2.6	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	491	17	14	376	139	13	20	7	367	23	79
Future Volume (veh/h)	35	491	17	14	376	139	13	20	7	367	23	79
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	38	534	18	15	409	151	14	22	8	399	25	86
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	65	634	539	32	599	509	245	369	122	531	28	95
Arrive On Green	0.04	0.34	0.34	0.02	0.32	0.32	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	457	939	310	1125	71	243
Grp Volume(v), veh/h	38	534	18	15	409	151	44	0	0	510	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1705	0	0	1438	0	0
Q Serve(g_s), s	1.5	19.2	0.5	0.6	13.8	5.2	0.0	0.0	0.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	1.5	19.2	0.5	0.6	13.8	5.2	1.1	0.0	0.0	24.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.32		0.18	0.78		0.17
Lane Grp Cap(c), veh/h	65	634	539	32	599	509	736	0	0	654	0	0
V/C Ratio(X)	0.58	0.84	0.03	0.47	0.68	0.30	0.06	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	122	745	633	122	745	633	943	0	0	841	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.4	22.1	16.0	35.3	21.4	18.4	13.7	0.0	0.0	20.5	0.0	0.0
Incr Delay (d2), s/veh	7.9	7.6	0.0	10.4	1.9	0.3	0.0	0.0	0.0	3.6	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	11.1	0.2	0.4	7.4	2.3	0.6	0.0	0.0	10.1	0.0	0.0
LnGrp Delay(d),s/veh	42.3	29.7	16.0	45.6	23.3	18.8	13.7	0.0	0.0	24.1	0.0	0.0
LnGrp LOS	D	C	B	D	C	B	B			C		
Approach Vol, veh/h		590			575			44			510	
Approach Delay, s/veh		30.1			22.7			13.7			24.1	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		34.5	7.3	30.7		34.5	8.7	29.3
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		38.0	5.0	29.0		38.0	5.0	29.0
Max Q Clear Time (g_c+I1), s		3.1	2.6	21.2		26.1	3.5	15.8
Green Ext Time (p_c), s		3.3	0.0	3.5		2.4	0.0	4.7

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	763	24	17	509	172	14	20	8	485	26	100
Future Volume (veh/h)	50	763	24	17	509	172	14	20	8	485	26	100
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	54	829	26	18	553	187	15	22	9	527	28	109
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	69	782	665	31	743	631	263	379	148	544	27	104
Arrive On Green	0.04	0.42	0.42	0.02	0.40	0.40	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	524	861	337	1136	60	235
Grp Volume(v), veh/h	54	829	26	18	553	187	46	0	0	664	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1722	0	0	1432	0	0
Q Serve(g_s), s	4.5	62.0	1.4	1.5	37.5	11.9	0.0	0.0	0.0	62.8	0.0	0.0
Cycle Q Clear(g_c), s	4.5	62.0	1.4	1.5	37.5	11.9	2.2	0.0	0.0	65.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.33		0.20	0.79		0.16
Lane Grp Cap(c), veh/h	69	782	665	31	743	631	791	0	0	674	0	0
V/C Ratio(X)	0.78	1.06	0.04	0.57	0.74	0.30	0.06	0.00	0.00	0.98	0.00	0.00
Avail Cap(c_a), veh/h	84	782	665	60	757	644	791	0	0	674	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	70.3	42.8	25.2	71.9	37.9	30.3	23.7	0.0	0.0	42.7	0.0	0.0
Incr Delay (d2), s/veh	31.0	49.1	0.0	15.5	3.9	0.3	0.0	0.0	0.0	30.7	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	42.4	0.6	0.9	20.0	5.2	1.1	0.0	0.0	32.7	0.0	0.0
LnGrp Delay(d),s/veh	101.3	91.9	25.3	87.4	41.9	30.5	23.8	0.0	0.0	73.4	0.0	0.0
LnGrp LOS	F	F	C	F	D	C	C			E		
Approach Vol, veh/h		909			758			46			664	
Approach Delay, s/veh		90.6			40.2			23.8			73.4	
Approach LOS		F			D			C			E	

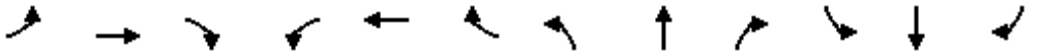
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		71.0	8.6	68.0		71.0	11.8	64.9
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		65.0	5.0	62.0		65.0	7.0	60.0
Max Q Clear Time (g_c+I1), s		4.2	3.5	64.0		67.0	6.5	39.5
Green Ext Time (p_c), s		4.8	0.0	0.0		0.0	0.0	9.4

Intersection Summary	
HCM 2010 Ctrl Delay	68.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	763	24	17	509	172	14	20	8	485	26	100
Future Volume (veh/h)	50	763	24	17	509	172	14	20	8	485	26	100
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	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	54	829	26	18	553	187	15	22	9	527	28	109
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	2	1	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	2	2	2	2	2	2
Cap, veh/h	88	1060	474	38	961	430	33	106	43	650	85	331
Arrive On Green	0.05	0.30	0.30	0.02	0.27	0.27	0.02	0.08	0.08	0.19	0.25	0.25
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	1258	514	3442	334	1300
Grp Volume(v), veh/h	54	829	26	18	553	187	15	0	31	527	0	137
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1772	1721	0	1633
Q Serve(g_s), s	1.8	12.7	0.7	0.6	8.0	5.8	0.5	0.0	1.0	8.7	0.0	4.0
Cycle Q Clear(g_c), s	1.8	12.7	0.7	0.6	8.0	5.8	0.5	0.0	1.0	8.7	0.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.80
Lane Grp Cap(c), veh/h	88	1060	474	38	961	430	33	0	150	650	0	416
V/C Ratio(X)	0.61	0.78	0.05	0.47	0.58	0.44	0.46	0.00	0.21	0.81	0.00	0.33
Avail Cap(c_a), veh/h	150	1136	508	150	1136	508	150	0	569	756	0	745
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.6	19.0	14.8	28.6	18.6	17.8	28.7	0.0	25.2	23.0	0.0	17.9
Incr Delay (d2), s/veh	6.7	3.4	0.0	8.6	0.5	0.7	9.6	0.0	0.7	5.8	0.0	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(50%),veh/ln	1.0	6.6	0.3	0.4	4.0	2.6	0.3	0.0	0.5	4.6	0.0	1.9
LnGrp Delay(d),s/veh	34.3	22.4	14.8	37.2	19.2	18.5	38.4	0.0	25.9	28.8	0.0	18.4
LnGrp LOS	C	C	B	D	B	B	D		C	C		B
Approach Vol, veh/h		909			758			46			664	
Approach Delay, s/veh		22.8			19.4			30.0			26.7	
Approach LOS		C			B			C			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	17.2	11.0	7.3	23.7	7.1	21.1	8.9	22.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	13.0	19.0	5.0	19.0	5.0	27.0	5.0	19.0
Max Q Clear Time (g_c+I1), s	10.7	3.0	2.6	14.7	2.5	6.0	3.8	10.0
Green Ext Time (p_c), s	0.5	0.7	0.0	3.0	0.0	0.7	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	23.0
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	815	24	17	523	173	14	20	8	487	26	100
Future Volume (veh/h)	50	815	24	17	523	173	14	20	8	487	26	100
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	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	54	886	26	18	568	188	15	22	9	529	28	109
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	2	1	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	2	2	2	2	2	2
Cap, veh/h	88	1107	495	38	1009	451	33	104	43	637	83	324
Arrive On Green	0.05	0.31	0.31	0.02	0.29	0.29	0.02	0.08	0.08	0.19	0.25	0.25
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	1258	514	3442	334	1300
Grp Volume(v), veh/h	54	886	26	18	568	188	15	0	31	529	0	137
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1772	1721	0	1633
Q Serve(g_s), s	1.8	13.9	0.7	0.6	8.3	5.8	0.5	0.0	1.0	8.9	0.0	4.1
Cycle Q Clear(g_c), s	1.8	13.9	0.7	0.6	8.3	5.8	0.5	0.0	1.0	8.9	0.0	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.80
Lane Grp Cap(c), veh/h	88	1107	495	38	1009	451	33	0	147	637	0	408
V/C Ratio(X)	0.62	0.80	0.05	0.47	0.56	0.42	0.46	0.00	0.21	0.83	0.00	0.34
Avail Cap(c_a), veh/h	176	1173	525	147	1114	498	147	0	558	684	0	704
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	19.0	14.5	29.2	18.4	17.5	29.3	0.0	25.8	23.7	0.0	18.5
Incr Delay (d2), s/veh	6.9	3.9	0.0	8.7	0.5	0.6	9.7	0.0	0.7	8.0	0.0	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(50%),veh/ln	1.1	7.4	0.3	0.4	4.1	2.6	0.3	0.0	0.5	4.9	0.0	1.9
LnGrp Delay(d),s/veh	35.0	22.9	14.5	37.9	18.9	18.1	39.0	0.0	26.5	31.7	0.0	19.0
LnGrp LOS	D	C	B	D	B	B	D		C	C		B
Approach Vol, veh/h		966			774			46			666	
Approach Delay, s/veh		23.3			19.2			30.6			29.1	
Approach LOS		C			B			C			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	17.2	11.0	7.3	24.9	7.1	21.1	9.0	23.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	19.0	5.0	20.0	5.0	26.0	6.0	19.0
Max Q Clear Time (g_c+I1), s	10.9	3.0	2.6	15.9	2.5	6.1	3.8	10.3
Green Ext Time (p_c), s	0.2	0.7	0.0	3.0	0.0	0.7	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Taft Highway & Wible - PM Peak

Count Date: 1/13/2015

Ave Annual Growth: **2.48%**

Exist Peak Hour Volumes

Signalized

1	WBL	10
1	WBT	394
1	WBR	412
1	EBL	71
1	EBT	513
1	EBR	15
>	NBL	20
1	NBT	57
<	NBR	9
>	SBL	177
1	SBT	35
<	SBR	30
	TOTAL	1743

Year 2035

Fut. Volumes w/o Proj

WBL	15
WBT	763
WBR	646
EBL	147
EBT	1415
EBR	31
NBL	26
NBT	60
NBR	13
SBL	315
SBT	46
SBR	49
TOTAL	3526

Year 2035 Fut. Vol

+ Project Traffic

WBL	15
WBT	812
WBR	658
EBL	147
EBT	1440
EBR	33
NBL	26
NBT	60
NBR	13
SBL	326
SBT	48
SBR	49
TOTAL	3627

Year 2025

Fut. Volumes w/o Proj

WBL	12
WBT	552
WBR	519
EBL	103
EBT	862
EBR	22
NBL	23
NBT	59
NBR	11
SBL	238
SBT	40
SBR	39
TOTAL	2480

Year 2025 Fut. Vol

+ Project Traffic

WBL	12
WBT	577
WBR	525
EBL	103
EBT	875
EBR	23
NBL	23
NBT	59
NBR	11
SBL	244
SBT	41
SBR	39
TOTAL	2532

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	49
WBR	12
EBL	0
EBT	25
EBR	2
NBL	0
NBT	0
NBR	0
SBL	11
SBT	2
SBR	0
TOTAL	101

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Highway & Wible - PM Peak						
	Count Date:	1/13/2015						
2006	ADT							
WB Approach (To)	3.083							
WB Approach (Away)	2.432							
EB Approach (To)	1.671							
EB Approach (Away)	2.547							
NB Approach (To)	0.897							
NB Approach (Away)	0.616							
SB Approach (To)	1.039							
SB Approach (Away)	1.094							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	7.247		WBL	1.90	WBT	2.56	WBR	1.94
WB Approach (Away)	8.406		2.14%	15	3.28%	763	2.22%	646
EB Approach (To)	8.566		EBL	3.32	EBT	4.29	EBR	3.29
EB Approach (Away)	7.058		3.62%	147	5.08%	1415	3.54%	31
NB Approach (To)	0.68		NBL	1.76	NBT	1.14	NBR	2.11
NB Approach (Away)	0.893		1.31%	26	0.25%	60	1.71%	13
SB Approach (To)	1.527		SBL	2.46	SBT	1.46	SBR	2.12
SB Approach (Away)	1.663		2.85%	315	1.31%	46	2.46%	49

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	513	15	10	394	412	20	57	9	177	35	30
Future Volume (veh/h)	71	513	15	10	394	412	20	57	9	177	35	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	1863	1863	1863	1863	1863	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	77	558	16	11	428	448	22	62	10	192	38	33
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	117	738	627	25	641	545	140	310	43	363	56	42
Arrive On Green	0.07	0.40	0.40	0.01	0.34	0.34	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	224	1374	190	1048	249	186
Grp Volume(v), veh/h	77	558	16	11	428	448	94	0	0	263	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1789	0	0	1483	0	0
Q Serve(g_s), s	2.1	12.8	0.3	0.3	9.7	12.8	0.0	0.0	0.0	6.0	0.0	0.0
Cycle Q Clear(g_c), s	2.1	12.8	0.3	0.3	9.7	12.8	2.1	0.0	0.0	8.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.23		0.11	0.73		0.13
Lane Grp Cap(c), veh/h	117	738	627	25	641	545	494	0	0	461	0	0
V/C Ratio(X)	0.66	0.76	0.03	0.44	0.67	0.82	0.19	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	179	738	627	179	716	609	725	0	0	656	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.5	12.9	9.1	24.2	13.8	14.8	15.6	0.0	0.0	17.8	0.0	0.0
Incr Delay (d2), s/veh	6.1	4.5	0.0	11.5	2.1	8.1	0.2	0.0	0.0	1.1	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	7.4	0.1	0.2	5.2	6.7	1.1	0.0	0.0	3.5	0.0	0.0
LnGrp Delay(d),s/veh	28.7	17.4	9.1	35.7	15.9	23.0	15.8	0.0	0.0	18.9	0.0	0.0
LnGrp LOS	C	B	A	D	B	C	B			B		
Approach Vol, veh/h		651			887			94			263	
Approach Delay, s/veh		18.5			19.7			15.8			18.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		17.2	6.7	25.6		17.2	9.3	23.0
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		18.0	5.0	19.0		18.0	5.0	19.0
Max Q Clear Time (g_c+I1), s		4.1	2.3	14.8		10.1	4.1	14.8
Green Ext Time (p_c), s		1.5	0.0	2.6		1.1	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	19.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	862	22	12	552	519	23	59	11	238	40	39
Future Volume (veh/h)	103	862	22	12	552	519	23	59	11	238	40	39
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	112	937	24	13	600	564	25	64	12	259	43	42
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	141	973	827	28	854	726	131	310	52	352	46	45
Arrive On Green	0.08	0.52	0.52	0.02	0.46	0.46	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	311	1227	207	1104	183	179
Grp Volume(v), veh/h	112	937	24	13	600	564	101	0	0	344	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1745	0	0	1467	0	0
Q Serve(g_s), s	5.3	41.5	0.6	0.6	22.1	25.7	0.0	0.0	0.0	15.8	0.0	0.0
Cycle Q Clear(g_c), s	5.3	41.5	0.6	0.6	22.1	25.7	3.8	0.0	0.0	19.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.25		0.12	0.75		0.12
Lane Grp Cap(c), veh/h	141	973	827	28	854	726	493	0	0	444	0	0
V/C Ratio(X)	0.79	0.96	0.03	0.47	0.70	0.78	0.21	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	165	977	831	103	912	775	499	0	0	449	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	38.8	19.7	9.9	41.9	18.6	19.6	25.4	0.0	0.0	30.9	0.0	0.0
Incr Delay (d2), s/veh	19.9	20.3	0.0	12.0	2.3	4.7	0.2	0.0	0.0	8.2	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	26.6	0.3	0.4	11.9	12.1	1.9	0.0	0.0	8.9	0.0	0.0
LnGrp Delay(d),s/veh	58.7	40.0	10.0	53.9	20.8	24.3	25.6	0.0	0.0	39.1	0.0	0.0
LnGrp LOS	E	D	A	D	C	C	C			D		
Approach Vol, veh/h		1073			1177			101			344	
Approach Delay, s/veh		41.3			22.9			25.6			39.1	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.6	7.3	50.8		27.6	12.8	45.3
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		22.0	5.0	45.0		22.0	8.0	42.0
Max Q Clear Time (g_c+I1), s		5.8	2.6	43.5		21.5	7.3	27.7
Green Ext Time (p_c), s		2.1	0.0	1.3		0.1	0.0	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	875	23	12	577	525	23	59	11	244	41	39
Future Volume (veh/h)	103	875	23	12	577	525	23	59	11	244	41	39
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	112	951	25	13	627	571	25	64	12	265	45	42
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	141	971	825	28	852	724	132	312	53	354	48	45
Arrive On Green	0.08	0.52	0.52	0.02	0.46	0.46	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	313	1225	207	1104	187	175
Grp Volume(v), veh/h	112	951	25	13	627	571	101	0	0	352	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1745	0	0	1466	0	0
Q Serve(g_s), s	5.4	43.1	0.7	0.6	23.8	26.4	0.0	0.0	0.0	16.4	0.0	0.0
Cycle Q Clear(g_c), s	5.4	43.1	0.7	0.6	23.8	26.4	3.8	0.0	0.0	20.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.25		0.12	0.75		0.12
Lane Grp Cap(c), veh/h	141	971	825	28	852	724	497	0	0	447	0	0
V/C Ratio(X)	0.79	0.98	0.03	0.47	0.74	0.79	0.20	0.00	0.00	0.79	0.00	0.00
Avail Cap(c_a), veh/h	164	971	825	103	906	770	497	0	0	447	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.0	20.2	10.1	42.1	19.2	19.9	25.4	0.0	0.0	31.1	0.0	0.0
Incr Delay (d2), s/veh	20.2	23.9	0.0	12.0	3.0	5.2	0.2	0.0	0.0	9.1	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	28.4	0.3	0.4	12.9	12.5	1.9	0.0	0.0	9.3	0.0	0.0
LnGrp Delay(d),s/veh	59.2	44.1	10.1	54.2	22.2	25.1	25.6	0.0	0.0	40.2	0.0	0.0
LnGrp LOS	E	D	B	D	C	C	C			D		
Approach Vol, veh/h		1088			1211			101			352	
Approach Delay, s/veh		44.9			23.9			25.6			40.2	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		28.0	7.3	51.0		28.0	12.9	45.5
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		22.0	5.0	45.0		22.0	8.0	42.0
Max Q Clear Time (g_c+I1), s		5.8	2.6	45.1		22.2	7.4	28.4
Green Ext Time (p_c), s		2.1	0.0	0.0		0.0	0.0	9.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	1415	31	15	763	646	26	60	13	315	46	49
Future Volume (veh/h)	147	1415	31	15	763	646	26	60	13	315	46	49
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	1863	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	160	1538	34	16	829	702	28	65	14	342	50	53
Adj No. of Lanes	1	1	1	1	1	1	0	1	0	0	1	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	2	2	2	2	2	2
Cap, veh/h	182	1087	924	29	926	787	139	312	63	335	43	45
Arrive On Green	0.10	0.58	0.58	0.02	0.50	0.50	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	390	1122	228	1049	153	163
Grp Volume(v), veh/h	160	1538	34	16	829	702	107	0	0	445	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1740	0	0	1365	0	0
Q Serve(g_s), s	13.1	86.0	1.3	1.3	59.5	59.1	0.0	0.0	0.0	34.3	0.0	0.0
Cycle Q Clear(g_c), s	13.1	86.0	1.3	1.3	59.5	59.1	6.7	0.0	0.0	41.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.26		0.13	0.77		0.12
Lane Grp Cap(c), veh/h	182	1087	924	29	926	787	515	0	0	423	0	0
V/C Ratio(X)	0.88	1.41	0.04	0.55	0.90	0.89	0.21	0.00	0.00	1.05	0.00	0.00
Avail Cap(c_a), veh/h	205	1087	924	60	935	795	515	0	0	423	0	0
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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	65.2	30.7	13.1	72.0	33.6	33.5	40.8	0.0	0.0	55.6	0.0	0.0
Incr Delay (d2), s/veh	30.1	192.2	0.0	15.5	11.1	12.3	0.2	0.0	0.0	58.4	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	102.1	0.6	0.8	33.2	28.4	3.4	0.0	0.0	24.0	0.0	0.0
LnGrp Delay(d),s/veh	95.3	222.9	13.1	87.5	44.7	45.8	41.0	0.0	0.0	114.0	0.0	0.0
LnGrp LOS	F	F	B	F	D	D	D			F		
Approach Vol, veh/h		1732			1547			107			445	
Approach Delay, s/veh		207.0			45.6			41.0			114.0	
Approach LOS		F			D			D			F	

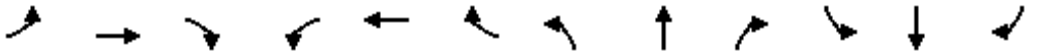
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		47.0	8.4	92.0		47.0	21.2	79.3
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		41.0	5.0	86.0		41.0	17.0	74.0
Max Q Clear Time (g_c+I1), s		8.7	3.3	88.0		43.0	15.1	61.5
Green Ext Time (p_c), s		3.2	0.0	0.0		0.0	0.1	11.8

Intersection Summary	
HCM 2010 Ctrl Delay	126.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	1415	31	15	763	646	26	60	13	315	46	49
Future Volume (veh/h)	147	1415	31	15	763	646	26	60	13	315	46	49
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	1863	1900	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	160	1538	34	16	829	702	28	65	14	342	50	53
Adj No. of Lanes	1	2	1	1	1	1	0	1	0	2	1	1
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	2	2	2	2	2	2
Cap, veh/h	195	2133	954	33	953	810	98	192	35	610	295	251
Arrive On Green	0.11	0.60	0.60	0.02	0.51	0.51	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	3539	1583	1774	1863	1583	270	1210	223	2550	1863	1583
Grp Volume(v), veh/h	160	1538	34	16	829	702	107	0	0	342	50	53
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1863	1583	1703	0	0	1275	1863	1583
Q Serve(g_s), s	7.2	25.0	0.7	0.7	32.0	31.8	0.0	0.0	0.0	5.3	1.9	2.4
Cycle Q Clear(g_c), s	7.2	25.0	0.7	0.7	32.0	31.8	4.3	0.0	0.0	9.6	1.9	2.4
Prop In Lane	1.00		1.00	1.00		1.00	0.26		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	195	2133	954	33	953	810	325	0	0	610	295	251
V/C Ratio(X)	0.82	0.72	0.04	0.48	0.87	0.87	0.33	0.00	0.00	0.56	0.17	0.21
Avail Cap(c_a), veh/h	195	2133	954	109	1003	852	446	0	0	798	433	368
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	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	11.4	6.6	39.7	17.6	17.5	30.8	0.0	0.0	32.7	29.7	29.9
Incr Delay (d2), s/veh	23.6	1.2	0.0	10.6	8.1	9.1	0.6	0.0	0.0	0.8	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(50%),veh/ln	4.8	12.3	0.3	0.5	18.5	15.9	2.2	0.0	0.0	3.8	1.0	1.1
LnGrp Delay(d),s/veh	59.2	12.6	6.6	50.3	25.7	26.6	31.3	0.0	0.0	33.6	30.0	30.4
LnGrp LOS	E	B	A	D	C	C	C			C	C	C
Approach Vol, veh/h		1732			1547			107			445	
Approach Delay, s/veh		16.8			26.3			31.3			32.8	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		19.0	7.5	55.3		19.0	15.0	47.8
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		19.0	5.0	48.0		19.0	9.0	44.0
Max Q Clear Time (g_c+I1), s		6.3	2.7	27.0		11.6	9.2	34.0
Green Ext Time (p_c), s		1.8	0.0	17.6		1.4	0.0	7.8

Intersection Summary	
HCM 2010 Ctrl Delay	22.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	1440	33	15	812	658	26	60	13	326	48	49
Future Volume (veh/h)	147	1440	33	15	812	658	26	60	13	326	48	49
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	1863	1900	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	160	1565	36	16	883	715	28	65	14	354	52	53
Adj No. of Lanes	1	2	1	1	1	1	0	1	0	2	1	1
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	2	2	2	2	2	2
Cap, veh/h	193	2126	951	33	951	808	99	196	36	618	303	258
Arrive On Green	0.11	0.60	0.60	0.02	0.51	0.51	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	3539	1583	1774	1863	1583	271	1207	223	2550	1863	1583
Grp Volume(v), veh/h	160	1565	36	16	883	715	107	0	0	354	52	53
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1863	1583	1701	0	0	1275	1863	1583
Q Serve(g_s), s	7.3	26.1	0.8	0.7	36.4	33.3	0.0	0.0	0.0	5.8	2.0	2.4
Cycle Q Clear(g_c), s	7.3	26.1	0.8	0.7	36.4	33.3	4.3	0.0	0.0	10.1	2.0	2.4
Prop In Lane	1.00		1.00	1.00		1.00	0.26		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	193	2126	951	33	951	808	332	0	0	618	303	258
V/C Ratio(X)	0.83	0.74	0.04	0.48	0.93	0.88	0.32	0.00	0.00	0.57	0.17	0.21
Avail Cap(c_a), veh/h	193	2126	951	107	992	843	442	0	0	790	428	364
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	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.0	11.8	6.7	40.1	18.8	18.1	30.8	0.0	0.0	32.9	29.8	30.0
Incr Delay (d2), s/veh	24.8	1.4	0.0	10.6	14.2	10.8	0.6	0.0	0.0	0.8	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(50%),veh/ln	4.9	13.0	0.3	0.5	22.4	16.9	2.2	0.0	0.0	4.0	1.0	1.1
LnGrp Delay(d),s/veh	60.8	13.2	6.8	50.8	33.0	28.8	31.3	0.0	0.0	33.8	30.1	30.4
LnGrp LOS	E	B	A	D	C	C	C			C	C	C
Approach Vol, veh/h		1761			1614			107			459	
Approach Delay, s/veh		17.4			31.3			31.3			33.0	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		19.4	7.5	55.6		19.4	15.0	48.2
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		19.0	5.0	48.0		19.0	9.0	44.0
Max Q Clear Time (g_c+I1), s		6.3	2.7	28.1		12.1	9.3	38.4
Green Ext Time (p_c), s		1.9	0.0	17.1		1.4	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Taft Hwy & Compagnoni Street/SR 99 SB Ramp - AM Peak

Count Date: 1/19/2015

Ave Annual Growth: **2.02%**

Exist Peak Hour Volumes

Signalized			
1	WBL	49	
1	WBT	248	
0	WBR	14	Uncontrolled
0	EBL	0	
1	EBT	544	
1	EBR	11	
1	NBL	16	
0	NBT	0	
1	NBR	95	
1	SBL	179	
1	SBT	29	
1	SBR	168	
	TOTAL	1353	

Year 2035
Fut. Volumes w/o Proj

WBL	80
WBT	507
WBR	23
EBL	0
EBT	1040
EBR	18
NBL	23
NBT	0
NBR	128
SBL	244
SBT	33
SBR	243
TOTAL	2339

Year 2035 Fut. Vol
+ Project Traffic

WBL	80
WBT	526
WBR	23
EBL	0
EBT	1099
EBR	18
NBL	23
NBT	0
NBR	128
SBL	244
SBT	33
SBR	243
TOTAL	2417

Year 2025
Fut. Volumes w/o Proj

WBL	63
WBT	358
WBR	18
EBL	0
EBT	758
EBR	14
NBL	19
NBT	0
NBR	111
SBL	210
SBT	31
SBR	203
TOTAL	1785

Year 2025 Fut. Vol
+ Project Traffic

WBL	63
WBT	368
WBR	18
EBL	0
EBT	788
EBR	14
NBL	19
NBT	0
NBR	111
SBL	210
SBT	31
SBR	203
TOTAL	1825

Project Generated Trips - Year 2035

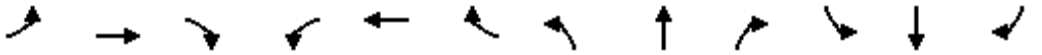
	Total
WBL	0
WBT	19
WBR	0
EBL	0
EBT	59
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	78

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Hwy & Compagnoni Street - AM Peak						
	Count Date:	1/19/2015						
2006	ADT							
WB Approach (To)	2.243							
WB Approach (Away)	3.006							
EB Approach (To)	2.985							
EB Approach (Away)	3.654							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	8.575							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	7.416		WBL	2.25	WBT	2.80	WBR	2.25
WB Approach (Away)	5.874		2.42%	80	3.56%	507	2.42%	23
EB Approach (To)	9.596		EBL	2.21	EBT	2.58	EBR	2.21
EB Approach (Away)	8.413		2.37%	0	3.22%	1040	2.37%	18
NB Approach (To)	*1.2*		NBL	1.75	NBT	1.20	NBR	1.58
NB Approach (Away)	*1.2*		1.77%	23	0.63%	0	1.48%	128
SB Approach (To)	10.539		SBL	1.59	SBT	1.21	SBR	1.77
SB Approach (Away)	*1.2*		1.52%	244	0.67%	33	1.81%	243

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	544	11	49	248	0	16	0	95	179	29	168
Future Volume (veh/h)	0	544	11	49	248	0	16	0	95	179	29	168
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	591	12	53	270	0	17	0	103	195	32	183
Adj No. of Lanes	0	1	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	710	603	86	985	0	36	0	0	242	287	244
Arrive On Green	0.00	0.38	0.38	0.05	0.53	0.00	0.02	0.00	0.00	0.14	0.15	0.15
Sat Flow, veh/h	0	1863	1583	1774	1863	0	1774	17		1774	1863	1583
Grp Volume(v), veh/h	0	591	12	53	270	0	17	38.4		195	32	183
Grp Sat Flow(s),veh/h/ln	0	1863	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	17.5	0.3	1.8	4.8	0.0	0.6			6.5	0.9	6.7
Cycle Q Clear(g_c), s	0.0	17.5	0.3	1.8	4.8	0.0	0.6			6.5	0.9	6.7
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	710	603	86	985	0	36			242	287	244
V/C Ratio(X)	0.00	0.83	0.02	0.61	0.27	0.00	0.47			0.81	0.11	0.75
Avail Cap(c_a), veh/h	0	951	809	146	1289	0	146			322	767	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	17.0	11.7	28.3	7.9	0.0	29.4			25.4	22.1	24.5
Incr Delay (d2), s/veh	0.0	4.8	0.0	6.9	0.1	0.0	9.0			10.5	0.2	4.6
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
%ile BackOfQ(50%),veh/ln	0.0	9.8	0.1	1.0	2.5	0.0	0.4			3.9	0.5	3.2
LnGrp Delay(d),s/veh	0.0	21.8	11.7	35.2	8.0	0.0	38.4			36.0	22.3	29.1
LnGrp LOS		C	B	D	A		D			D	C	C
Approach Vol, veh/h		603			323						410	
Approach Delay, s/veh		21.6			12.5						31.8	
Approach LOS		C			B						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	14.3		9.0	29.1	7.2	15.4		38.1
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	11.0		5.0	31.0	5.0	25.0		42.0
Max Q Clear Time (g_c+I1), s	8.5		3.8	19.5	2.6	8.7		6.8
Green Ext Time (p_c), s	0.1		0.0	3.7	0.0	0.7		5.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	758	14	63	358	0	19	0	111	210	31	203
Future Volume (veh/h)	0	758	14	63	358	0	19	0	111	210	31	203
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	824	15	68	389	0	21	0	121	228	34	221
Adj No. of Lanes	0	1	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	880	748	87	1106	0	41	0	0	255	312	265
Arrive On Green	0.00	0.47	0.47	0.05	0.59	0.00	0.02	0.00	0.00	0.14	0.17	0.17
Sat Flow, veh/h	0	1863	1583	1774	1863	0	1774	21		1774	1863	1583
Grp Volume(v), veh/h	0	824	15	68	389	0	21	49.8		228	34	221
Grp Sat Flow(s),veh/h/ln	0	1863	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	34.9	0.4	3.2	8.9	0.0	1.0			10.5	1.3	11.3
Cycle Q Clear(g_c), s	0.0	34.9	0.4	3.2	8.9	0.0	1.0			10.5	1.3	11.3
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	880	748	87	1106	0	41			255	312	265
V/C Ratio(X)	0.00	0.94	0.02	0.78	0.35	0.00	0.51			0.89	0.11	0.83
Avail Cap(c_a), veh/h	0	916	779	106	1162	0	106			255	559	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	20.8	11.7	39.2	8.7	0.0	40.3			35.1	29.4	33.6
Incr Delay (d2), s/veh	0.0	16.1	0.0	25.4	0.2	0.0	9.6			30.1	0.2	6.8
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
%ile BackOfQ(50%),veh/ln	0.0	21.8	0.2	2.2	4.6	0.0	0.6			7.3	0.7	5.4
LnGrp Delay(d),s/veh	0.0	36.9	11.7	64.6	8.9	0.0	49.8			65.2	29.6	40.4
LnGrp LOS		D	B	E	A		D			E	C	D
Approach Vol, veh/h		839			457						483	
Approach Delay, s/veh		36.5			17.2						51.3	
Approach LOS		D			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	18.0		10.1	45.4	7.9	20.0		55.5
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	12.0		5.0	41.0	5.0	25.0		52.0
Max Q Clear Time (g_c+I1), s	12.5		5.2	36.9	3.0	13.3		10.9
Green Ext Time (p_c), s	0.0		0.0	2.5	0.0	0.7		9.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	758	14	63	358	0	19	0	111	210	31	203
Future Volume (veh/h)	0	758	14	63	358	0	19	0	111	210	31	203
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	824	15	68	389	0	21	0	121	228	34	221
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1088	487	103	880	0	44	0	0	281	340	289
Arrive On Green	0.00	0.31	0.31	0.06	0.47	0.00	0.02	0.00	0.00	0.16	0.18	0.18
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	21		1774	1863	1583
Grp Volume(v), veh/h	0	824	15	68	389	0	21	34.8		228	34	221
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	C		1774	1863	1583
Q Serve(g_s), s	0.0	11.8	0.4	2.1	7.8	0.0	0.7			7.0	0.9	7.5
Cycle Q Clear(g_c), s	0.0	11.8	0.4	2.1	7.8	0.0	0.7			7.0	0.9	7.5
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1088	487	103	880	0	44			281	340	289
V/C Ratio(X)	0.00	0.76	0.03	0.66	0.44	0.00	0.48			0.81	0.10	0.76
Avail Cap(c_a), veh/h	0	1260	564	158	1028	0	158			379	862	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	17.6	13.6	25.9	9.9	0.0	27.0			22.8	19.1	21.8
Incr Delay (d2), s/veh	0.0	2.3	0.0	7.0	0.3	0.0	7.8			9.3	0.1	4.2
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
%ile BackOfQ(50%),veh/ln	0.0	6.1	0.2	1.2	4.1	0.0	0.4			4.1	0.4	3.6
LnGrp Delay(d),s/veh	0.0	19.9	13.6	32.9	10.2	0.0	34.8			32.1	19.3	26.0
LnGrp LOS		B	B	C	B		C			C	B	C
Approach Vol, veh/h		839			457						483	
Approach Delay, s/veh		19.8			13.6						28.4	
Approach LOS		B			B						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	14.9		9.3	23.3	7.4	16.3		32.5
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	12.0		5.0	20.0	5.0	26.0		31.0
Max Q Clear Time (g_c+I1), s	9.0		4.1	13.8	2.7	9.5		9.8
Green Ext Time (p_c), s	0.2		0.0	3.5	0.0	0.8		7.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	788	14	63	368	0	19	0	111	210	31	203
Future Volume (veh/h)	0	788	14	63	368	0	19	0	111	210	31	203
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	857	15	68	400	0	21	0	121	228	34	221
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1124	503	102	894	0	44	0	0	280	338	287
Arrive On Green	0.00	0.32	0.32	0.06	0.48	0.00	0.02	0.00	0.00	0.16	0.18	0.18
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	21		1774	1863	1583
Grp Volume(v), veh/h	0	857	15	68	400	0	21	35.4		228	34	221
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	12.5	0.4	2.2	8.2	0.0	0.7			7.1	0.9	7.6
Cycle Q Clear(g_c), s	0.0	12.5	0.4	2.2	8.2	0.0	0.7			7.1	0.9	7.6
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1124	503	102	894	0	44			280	338	287
V/C Ratio(X)	0.00	0.76	0.03	0.66	0.45	0.00	0.48			0.81	0.10	0.77
Avail Cap(c_a), veh/h	0	1297	580	155	1040	0	155			371	812	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	17.6	13.5	26.5	9.9	0.0	27.6			23.3	19.6	22.3
Incr Delay (d2), s/veh	0.0	2.4	0.0	7.2	0.4	0.0	7.8			9.9	0.1	4.3
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
%ile BackOfQ(50%),veh/ln	0.0	6.4	0.2	1.3	4.2	0.0	0.4			4.3	0.5	3.7
LnGrp Delay(d),s/veh	0.0	20.0	13.5	33.6	10.2	0.0	35.4			33.2	19.7	26.7
LnGrp LOS		B	B	C	B		D			C	B	C
Approach Vol, veh/h		872			468						483	
Approach Delay, s/veh		19.9			13.6						29.3	
Approach LOS		B			B						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	15.1		9.3	24.2	7.4	16.4		33.5
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	12.0		5.0	21.0	5.0	25.0		32.0
Max Q Clear Time (g_c+I1), s	9.1		4.2	14.5	2.7	9.6		10.2
Green Ext Time (p_c), s	0.2		0.0	3.7	0.0	0.8		7.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1040	18	80	507	0	23	0	128	244	33	243
Future Volume (veh/h)	0	1040	18	80	507	0	23	0	128	244	33	243
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1130	20	87	551	0	25	0	139	265	36	264
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1339	599	111	976	0	48	0	0	308	373	317
Arrive On Green	0.00	0.38	0.38	0.06	0.52	0.00	0.03	0.00	0.00	0.17	0.20	0.20
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	25		1774	1863	1583
Grp Volume(v), veh/h	0	1130	20	87	551	0	25	43.0		265	36	264
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	21.1	0.6	3.5	14.5	0.0	1.0			10.5	1.1	11.6
Cycle Q Clear(g_c), s	0.0	21.1	0.6	3.5	14.5	0.0	1.0			10.5	1.1	11.6
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1339	599	111	976	0	48			308	373	317
V/C Ratio(X)	0.00	0.84	0.03	0.78	0.56	0.00	0.52			0.86	0.10	0.83
Avail Cap(c_a), veh/h	0	1418	634	123	1029	0	123			343	695	591
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	20.5	14.2	33.4	11.6	0.0	34.7			29.1	23.6	27.8
Incr Delay (d2), s/veh	0.0	4.6	0.0	25.1	0.6	0.0	8.3			18.0	0.1	5.7
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
%ile BackOfQ(50%),veh/ln	0.0	11.1	0.3	2.5	7.5	0.0	0.6			6.7	0.6	5.6
LnGrp Delay(d),s/veh	0.0	25.2	14.2	58.5	12.3	0.0	43.0			47.0	23.7	33.5
LnGrp LOS		C	B	E	B		D			D	C	C
Approach Vol, veh/h		1150			638						565	
Approach Delay, s/veh		25.0			18.6						39.2	
Approach LOS		C			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	18.6		10.5	33.4	8.0	20.5		43.9
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	14.0		5.0	29.0	5.0	27.0		40.0
Max Q Clear Time (g_c+I1), s	12.5		5.5	23.1	3.0	13.6		16.5
Green Ext Time (p_c), s	0.1		0.0	4.3	0.0	0.9		11.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1099	18	80	526	0	23	0	128	244	33	243
Future Volume (veh/h)	0	1099	18	80	526	0	23	0	128	244	33	243
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1195	20	87	572	0	25	0	139	265	36	264
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1358	607	111	984	0	48	0	0	307	372	316
Arrive On Green	0.00	0.38	0.38	0.06	0.53	0.00	0.03	0.00	0.00	0.17	0.20	0.20
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	25		1774	1863	1583
Grp Volume(v), veh/h	0	1195	20	87	572	0	25	43.6		265	36	264
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	23.1	0.6	3.5	15.4	0.0	1.0			10.7	1.2	11.8
Cycle Q Clear(g_c), s	0.0	23.1	0.6	3.5	15.4	0.0	1.0			10.7	1.2	11.8
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1358	607	111	984	0	48			307	372	316
V/C Ratio(X)	0.00	0.88	0.03	0.78	0.58	0.00	0.52			0.86	0.10	0.84
Avail Cap(c_a), veh/h	0	1398	625	121	1015	0	121			338	685	582
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.1	14.1	33.9	11.8	0.0	35.2			29.5	24.0	28.2
Incr Delay (d2), s/veh	0.0	6.7	0.0	25.7	0.8	0.0	8.3			18.6	0.1	5.8
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
%ile BackOfQ(50%),veh/ln	0.0	12.4	0.3	2.5	8.0	0.0	0.6			6.8	0.6	5.6
LnGrp Delay(d),s/veh	0.0	27.7	14.1	59.6	12.6	0.0	43.6			48.1	24.1	34.0
LnGrp LOS		C	B	E	B		D			D	C	C
Approach Vol, veh/h		1215			659						565	
Approach Delay, s/veh		27.5			18.8						40.0	
Approach LOS		C			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	18.7		10.6	34.2	8.0	20.6		44.8
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	14.0		5.0	29.0	5.0	27.0		40.0
Max Q Clear Time (g_c+I1), s	12.7		5.5	25.1	3.0	13.8		17.4
Green Ext Time (p_c), s	0.1		0.0	3.1	0.0	0.9		11.9

Intersection Summary	
HCM 2010 Ctrl Delay	28.2
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Taft Hwy & Compagnoni Street/SR 99 SB Ramp- PM Peak

Count Date: 1/14/2015

Ave Annual Growth: **2.02%**

Exist Peak Hour Volumes

Signalized			
1	WBL	63	
1	WBT	393	
0	WBR	0	Uncontrolled
0	EBL	0	
1	EBT	642	
1	EBR	68	
1	NBL	40	
0	NBT	0	
1	NBR	207	
1	SBL	407	
1	SBT	53	
1	SBR	302	
	TOTAL	2175	

Year 2035
Fut. Volumes w/o Proj

WBL	103
WBT	804
WBR	0
EBL	0
EBT	1228
EBR	110
NBL	57
NBT	0
NBR	280
SBL	555
SBT	61
SBR	436
TOTAL	3634

Year 2035 Fut. Vol
+ Project Traffic

WBL	103
WBT	868
WBR	0
EBL	0
EBT	1267
EBR	110
NBL	57
NBT	0
NBR	284
SBL	594
SBT	61
SBR	436
TOTAL	3780

Year 2025
Fut. Volumes w/o Proj

WBL	81
WBT	567
WBR	0
EBL	0
EBT	895
EBR	87
NBL	48
NBT	0
NBR	241
SBL	477
SBT	57
SBR	365
TOTAL	2818

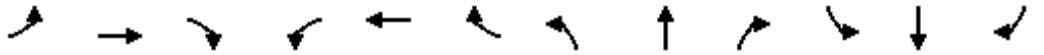
Year 2025 Fut. Vol
+ Project Traffic

WBL	81
WBT	599
WBR	0
EBL	0
EBT	915
EBR	87
NBL	48
NBT	0
NBR	243
SBL	497
SBT	57
SBR	365
TOTAL	2892

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	64
WBR	0
EBL	0
EBT	39
EBR	0
NBL	0
NBT	0
NBR	4
SBL	39
SBT	0
SBR	0
TOTAL	146

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Hwy & Compagnoni Street- PM Peak						
	Count Date:	1/14/2015						
2006	ADT							
WB Approach (To)	2.243							
WB Approach (Away)	3.006							
EB Approach (To)	2.985							
EB Approach (Away)	3.654							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	8.575							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	7.416		WBL	2.25	WBT	2.80	WBR	2.25
WB Approach (Away)	5.874		2.42%	103	3.56%	804	2.42%	0
EB Approach (To)	9.596		EBL	2.21	EBT	2.58	EBR	2.21
EB Approach (Away)	8.413		2.37%	0	3.22%	1228	2.37%	110
NB Approach (To)	*1.2*		NBL	1.75	NBT	1.20	NBR	1.58
NB Approach (Away)	*1.2*		1.77%	57	0.63%	0	1.48%	280
SB Approach (To)	10.539		SBL	1.59	SBT	1.21	SBR	1.77
SB Approach (Away)	*1.2*		1.52%	555	0.67%	61	1.81%	436



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	642	68	63	393	0	40	0	207	407	53	302
Future Volume (veh/h)	0	642	68	63	393	0	40	0	207	407	53	302
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	698	74	68	427	0	43	0	225	442	58	328
Adj No. of Lanes	0	1	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	778	661	87	991	0	64	0	0	481	441	375
Arrive On Green	0.00	0.42	0.42	0.05	0.53	0.00	0.04	0.00	0.00	0.27	0.24	0.24
Sat Flow, veh/h	0	1863	1583	1774	1863	0	1774	43		1774	1863	1583
Grp Volume(v), veh/h	0	698	74	68	427	0	43	55.2		442	58	328
Grp Sat Flow(s),veh/h/ln	0	1863	1583	1774	1863	0	1774	E		1774	1863	1583
Q Serve(g_s), s	0.0	32.1	2.6	3.5	12.8	0.0	2.2			22.3	2.3	18.4
Cycle Q Clear(g_c), s	0.0	32.1	2.6	3.5	12.8	0.0	2.2			22.3	2.3	18.4
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	778	661	87	991	0	64			481	441	375
V/C Ratio(X)	0.00	0.90	0.11	0.78	0.43	0.00	0.67			0.92	0.13	0.88
Avail Cap(c_a), veh/h	0	870	739	96	1092	0	135			559	829	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	25.0	16.4	43.3	13.1	0.0	43.8			32.6	27.7	33.8
Incr Delay (d2), s/veh	0.0	11.3	0.1	30.2	0.3	0.0	11.4			18.9	0.1	6.5
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
%ile BackOfQ(50%),veh/ln	0.0	18.9	1.2	2.5	6.6	0.0	1.3			13.5	1.2	8.7
LnGrp Delay(d),s/veh	0.0	36.2	16.5	73.5	13.4	0.0	55.2			51.5	27.8	40.4
LnGrp LOS		D	B	E	B		E			D	C	D
Approach Vol, veh/h		772			495						828	
Approach Delay, s/veh		34.4			21.7						45.4	
Approach LOS		C			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	31.0		10.5	44.4	9.3	27.8		55.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	29.0		5.0	43.0	7.0	41.0		54.0
Max Q Clear Time (g_c+I1), s	24.3		5.5	34.1	4.2	20.4		14.8
Green Ext Time (p_c), s	0.7		0.0	4.3	0.0	1.4		7.9

Intersection Summary	
HCM 2010 Ctrl Delay	36.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	895	87	81	567	0	48	0	241	477	57	365
Future Volume (veh/h)	0	895	87	81	567	0	48	0	241	477	57	365
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	973	95	88	616	0	52	0	262	518	62	397
Adj No. of Lanes	0	1	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	892	759	65	1043	0	67	0	0	471	502	427
Arrive On Green	0.00	0.48	0.48	0.04	0.56	0.00	0.04	0.00	0.00	0.27	0.27	0.27
Sat Flow, veh/h	0	1863	1583	1774	1863	0	1774	52		1774	1863	1583
Grp Volume(v), veh/h	0	973	95	88	616	0	52	81.9		518	62	397
Grp Sat Flow(s),veh/h/ln	0	1863	1583	1774	1863	0	1774	F		1774	1863	1583
Q Serve(g_s), s	0.0	65.0	4.5	5.0	29.5	0.0	3.9			36.0	3.4	33.2
Cycle Q Clear(g_c), s	0.0	65.0	4.5	5.0	29.5	0.0	3.9			36.0	3.4	33.2
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	892	759	65	1043	0	67			471	502	427
V/C Ratio(X)	0.00	1.09	0.13	1.35	0.59	0.00	0.78			1.10	0.12	0.93
Avail Cap(c_a), veh/h	0	892	759	65	1043	0	131			471	632	537
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	35.3	19.6	65.3	19.6	0.0	64.7			49.8	37.5	48.3
Incr Delay (d2), s/veh	0.0	57.8	0.1	228.6	0.9	0.0	17.2			71.6	0.1	20.3
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
%ile BackOfQ(50%),veh/ln	0.0	47.5	2.0	6.6	15.3	0.0	2.3			26.9	1.8	17.0
LnGrp Delay(d),s/veh	0.0	93.1	19.7	294.0	20.5	0.0	81.9			121.5	37.6	68.6
LnGrp LOS		F	B	F	C		F			F	D	E
Approach Vol, veh/h		1068			704						977	
Approach Delay, s/veh		86.6			54.7						94.7	
Approach LOS		F			D						F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	42.0		11.0	71.0	11.1	42.5		82.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	36.0		5.0	65.0	10.0	46.0		76.0
Max Q Clear Time (g_c+I1), s	38.0		7.0	67.0	5.9	35.2		31.5
Green Ext Time (p_c), s	0.0		0.0	0.0	0.0	1.4		15.0

Intersection Summary	
HCM 2010 Ctrl Delay	81.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	895	87	81	567	0	48	0	241	477	57	365
Future Volume (veh/h)	0	895	87	81	567	0	48	0	241	477	57	365
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	973	95	88	616	0	52	0	262	518	62	397
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1110	496	110	838	0	76	0	0	556	530	450
Arrive On Green	0.00	0.31	0.31	0.06	0.45	0.00	0.04	0.00	0.00	0.31	0.28	0.28
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	52		1774	1863	1583
Grp Volume(v), veh/h	0	973	95	88	616	0	52	48.6		518	62	397
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	21.0	3.5	4.0	21.9	0.0	2.3			22.9	2.0	19.3
Cycle Q Clear(g_c), s	0.0	21.0	3.5	4.0	21.9	0.0	2.3			22.9	2.0	19.3
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1110	496	110	838	0	76			556	530	450
V/C Ratio(X)	0.00	0.88	0.19	0.80	0.74	0.00	0.69			0.93	0.12	0.88
Avail Cap(c_a), veh/h	0	1140	510	110	854	0	154			593	877	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	26.2	20.2	37.4	18.2	0.0	38.1			26.9	21.4	27.6
Incr Delay (d2), s/veh	0.0	7.8	0.2	33.1	3.3	0.0	10.5			21.0	0.1	7.0
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
%ile BackOfQ(50%),veh/ln	0.0	11.5	1.6	2.9	11.9	0.0	1.4			14.3	1.0	9.3
LnGrp Delay(d),s/veh	0.0	34.0	20.4	70.4	21.5	0.0	48.6			47.8	21.5	34.6
LnGrp LOS		C	C	E	C		D			D	C	C
Approach Vol, veh/h		1068			704						977	
Approach Delay, s/veh		32.8			27.6						40.8	
Approach LOS		C			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	31.3		11.0	31.3	9.4	29.0		42.3
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	27.0		5.0	26.0	7.0	38.0		37.0
Max Q Clear Time (g_c+I1), s	24.9		6.0	23.0	4.3	21.3		23.9
Green Ext Time (p_c), s	0.4		0.0	2.3	0.0	1.6		7.7

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 (veh/h)	0	915	87	81	599	0	48	0	243	497	57	365
Future Volume (veh/h)	0	915	87	81	599	0	48	0	243	497	57	365
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	995	95	88	651	0	52	0	264	540	62	397
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1176	526	112	867	0	73	0	0	582	527	448
Arrive On Green	0.00	0.33	0.33	0.06	0.47	0.00	0.04	0.00	0.00	0.33	0.28	0.28
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	52		1774	1863	1583
Grp Volume(v), veh/h	0	995	95	88	651	0	52	52.4		540	62	397
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	D		1774	1863	1583
Q Serve(g_s), s	0.0	22.4	3.7	4.2	24.6	0.0	2.5			25.2	2.1	20.6
Cycle Q Clear(g_c), s	0.0	22.4	3.7	4.2	24.6	0.0	2.5			25.2	2.1	20.6
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1176	526	112	867	0	73			582	527	448
V/C Ratio(X)	0.00	0.85	0.18	0.78	0.75	0.00	0.71			0.93	0.12	0.89
Avail Cap(c_a), veh/h	0	1238	554	124	912	0	165			662	912	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	26.6	20.3	39.6	18.8	0.0	40.6			27.9	22.8	29.4
Incr Delay (d2), s/veh	0.0	5.4	0.2	25.1	3.3	0.0	11.8			18.2	0.1	6.5
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
%ile BackOfQ(50%),veh/ln	0.0	11.8	1.6	2.8	13.5	0.0	1.5			15.2	1.1	9.7
LnGrp Delay(d),s/veh	0.0	32.0	20.5	64.6	22.2	0.0	52.4			46.1	22.9	35.9
LnGrp LOS		C	C	E	C		D			D	C	D
Approach Vol, veh/h		1090			739						999	
Approach Delay, s/veh		31.0			27.2						40.6	
Approach LOS		C			C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	34.1		11.4	34.5	9.6	30.3		45.9
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	32.0		6.0	30.0	8.0	42.0		42.0
Max Q Clear Time (g_c+I1), s	27.2		6.2	24.4	4.5	22.6		26.6
Green Ext Time (p_c), s	0.9		0.0	4.1	0.0	1.7		8.9

Intersection Summary	
HCM 2010 Ctrl Delay	33.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1228	110	103	804	0	57	0	280	555	61	436
Future Volume (veh/h)	0	1228	110	103	804	0	57	0	280	555	61	436
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1335	120	112	874	0	62	0	304	603	66	474
Adj No. of Lanes	0	2	1	1	1	0	1	0	1	1	1	1
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1364	610	121	929	0	79	0	0	623	597	508
Arrive On Green	0.00	0.39	0.39	0.07	0.50	0.00	0.04	0.00	0.00	0.35	0.32	0.32
Sat Flow, veh/h	0	3632	1583	1774	1863	0	1774	62		1774	1863	1583
Grp Volume(v), veh/h	0	1335	120	112	874	0	62	85.0		603	66	474
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0	1774	F		1774	1863	1583
Q Serve(g_s), s	0.0	49.3	6.7	8.3	58.7	0.0	4.6			44.2	3.3	38.4
Cycle Q Clear(g_c), s	0.0	49.3	6.7	8.3	58.7	0.0	4.6			44.2	3.3	38.4
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1364	610	121	929	0	79			623	597	508
V/C Ratio(X)	0.00	0.98	0.20	0.93	0.94	0.00	0.78			0.97	0.11	0.93
Avail Cap(c_a), veh/h	0	1364	610	121	929	0	107			630	816	694
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	40.1	27.1	61.4	31.3	0.0	62.6			42.2	31.7	43.6
Incr Delay (d2), s/veh	0.0	19.4	0.2	60.0	17.1	0.0	22.4			27.9	0.1	16.3
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
%ile BackOfQ(50%),veh/ln	0.0	27.8	2.9	6.1	34.5	0.0	2.7			26.4	1.7	19.1
LnGrp Delay(d),s/veh	0.0	59.6	27.2	121.4	48.4	0.0	85.0			70.2	31.7	59.9
LnGrp LOS		E	C	F	D		F			E	C	E
Approach Vol, veh/h		1455			986						1143	
Approach Delay, s/veh		56.9			56.7						63.7	
Approach LOS		E			E						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	52.4		15.0	57.0	11.9	48.4		72.0
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	47.0		9.0	51.0	8.0	58.0		66.0
Max Q Clear Time (g_c+I1), s	46.2		10.3	51.3	6.6	40.4		60.7
Green Ext Time (p_c), s	0.2		0.0	0.0	0.0	2.0		4.7

Intersection Summary	
HCM 2010 Ctrl Delay	59.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1228	110	103	804	0	57	0	280	555	61	436
Future Volume (veh/h)	0	1228	110	103	804	0	57	0	280	555	61	436
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1335	120	112	874	0	62	0	304	650	0	474
Adj No. of Lanes	0	3	1	1	3	0	1	0	2	2	0	2
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	2170	676	141	2906	0	80	0	0	794	0	593
Arrive On Green	0.00	0.43	0.43	0.08	0.57	0.00	0.04	0.00	0.00	0.22	0.00	0.19
Sat Flow, veh/h	0	5253	1583	1774	5253	0	1774	62		3548	0	3167
Grp Volume(v), veh/h	0	1335	120	112	874	0	62	58.1		650	0	474
Grp Sat Flow(s),veh/h/ln	0	1695	1583	1774	1695	0	1774	E		1774	0	1583
Q Serve(g_s), s	0.0	18.7	4.3	5.7	8.2	0.0	3.2			16.0	0.0	13.1
Cycle Q Clear(g_c), s	0.0	18.7	4.3	5.7	8.2	0.0	3.2			16.0	0.0	13.1
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	2170	676	141	2906	0	80			794	0	593
V/C Ratio(X)	0.00	0.62	0.18	0.80	0.30	0.00	0.78			0.82	0.00	0.80
Avail Cap(c_a), veh/h	0	2828	881	174	3660	0	155			1819	0	2003
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	20.4	16.3	41.5	10.2	0.0	43.3			33.8	0.0	35.6
Incr Delay (d2), s/veh	0.0	0.3	0.1	18.3	0.1	0.0	14.8			2.2	0.0	2.5
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
%ile BackOfQ(50%),veh/ln	0.0	8.7	1.9	3.5	3.8	0.0	1.9			8.0	0.0	5.9
LnGrp Delay(d),s/veh	0.0	20.7	16.4	59.8	10.2	0.0	58.1			36.0	0.0	38.1
LnGrp LOS		C	B	E	B		E			D		D
Approach Vol, veh/h		1455			986						1124	
Approach Delay, s/veh		20.4			15.9						36.9	
Approach LOS		C			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	26.5		13.3	45.1	10.1	23.2		58.4
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	47.0		9.0	51.0	8.0	58.0		66.0
Max Q Clear Time (g_c+I1), s	18.0		7.7	20.7	5.2	15.1		10.2
Green Ext Time (p_c), s	2.5		0.0	18.4	0.0	2.1		25.0

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 (veh/h)	0	1267	110	103	868	0	57	0	284	594	61	436
Future Volume (veh/h)	0	1267	110	103	868	0	57	0	284	594	61	436
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	0	1863	1863	1863	1863	0	1863	0	1863	1863	1863	1863
Adj Flow Rate, veh/h	0	1377	120	112	943	0	62	0	309	693	0	474
Adj No. of Lanes	0	3	1	1	3	0	1	0	2	2	0	2
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, %	0	2	2	2	2	0	2	0	2	2	2	2
Cap, veh/h	0	1660	517	142	2509	0	89	0	0	813	0	622
Arrive On Green	0.00	0.33	0.33	0.08	0.49	0.00	0.05	0.00	0.00	0.23	0.00	0.20
Sat Flow, veh/h	0	5253	1583	1774	5253	0	1774	62		3548	0	3167
Grp Volume(v), veh/h	0	1377	120	112	943	0	62	41.7		693	0	474
Grp Sat Flow(s),veh/h/ln	0	1695	1583	1774	1695	0	1774	D		1774	0	1583
Q Serve(g_s), s	0.0	17.3	3.8	4.3	8.0	0.0	2.4			13.0	0.0	9.8
Cycle Q Clear(g_c), s	0.0	17.3	3.8	4.3	8.0	0.0	2.4			13.0	0.0	9.8
Prop In Lane	0.00		1.00	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1660	517	142	2509	0	89			813	0	622
V/C Ratio(X)	0.00	0.83	0.23	0.79	0.38	0.00	0.69			0.85	0.00	0.76
Avail Cap(c_a), veh/h	0	1688	526	154	2569	0	205			922	0	1326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	21.5	17.0	31.3	10.9	0.0	32.4			25.6	0.0	26.3
Incr Delay (d2), s/veh	0.0	3.6	0.2	21.8	0.1	0.0	9.3			7.1	0.0	2.0
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
%ile BackOfQ(50%),veh/ln	0.0	8.6	1.7	3.0	3.7	0.0	1.4			7.2	0.0	4.4
LnGrp Delay(d),s/veh	0.0	25.1	17.2	53.0	11.0	0.0	41.7			32.6	0.0	28.3
LnGrp LOS		C	B	D	B		D			C		C
Approach Vol, veh/h		1497			1055						1167	
Approach Delay, s/veh		24.5			15.5						30.9	
Approach LOS		C			B						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1		3	4	5	6		8
Phs Duration (G+Y+Rc), s	21.9		11.6	28.6	9.5	19.6		40.2
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	18.0		6.0	23.0	8.0	29.0		35.0
Max Q Clear Time (g_c+I1), s	15.0		6.3	19.3	4.4	11.8		10.0
Green Ext Time (p_c), s	0.9		0.0	3.3	0.0	1.8		17.1

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Notes

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Taft Hwy & South H - AM Peak
Count Date: 1/20/2015

Ave Annual Growth: **5.03%**

Exist Peak Hour Volumes

Signalized		
1	WBL	1
1	WBT	379
1	WBR	18
1	EBL	166
1	EBT	322
<	EBR	50
1	NBL	96
1	NBT	19
1	NBR	8
1	SBL	18
1	SBT	11
1	SBR	285
	TOTAL	1373

Year 2035
Fut. Volumes w/o Proj

WBL	3
WBT	956
WBR	54
EBL	380
EBT	812
EBR	125
NBL	240
NBT	56
NBR	26
SBL	54
SBT	33
SBR	652
TOTAL	3391

Year 2035 Fut. Vol
+ Project Traffic

WBL	3
WBT	968
WBR	57
EBL	380
EBT	862
EBR	134
NBL	248
NBT	59
NBR	26
SBL	61
SBT	38
SBR	652
TOTAL	3488

Year 2025
Fut. Volumes w/o Proj

WBL	2
WBT	608
WBR	31
EBL	253
EBT	517
EBR	80
NBL	153
NBT	33
NBR	15
SBL	31
SBT	19
SBR	435
TOTAL	2177

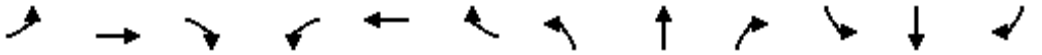
Year 2025 Fut. Vol
+ Project Traffic

WBL	2
WBT	614
WBR	33
EBL	253
EBT	542
EBR	85
NBL	157
NBT	35
NBR	15
SBL	35
SBT	22
SBR	435
TOTAL	2228

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	12
WBR	3
EBL	0
EBT	50
EBR	9
NBL	8
NBT	3
NBR	0
SBL	7
SBT	5
SBR	0
TOTAL	97

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Hwy & South H - AM Peak						
	Count Date:	1/20/2015						
2015	ADT							
WB Approach (To)	5.1							
WB Approach (Away)	4.93			**Use PM Peak AADT for Growth Rate**				
EB Approach (To)	8.96							
EB Approach (Away)	5.74							
NB Approach (To)	2.66							
NB Approach (Away)	0.58							
SB Approach (To)	2.31							
SB Approach (Away)	2.62							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	16.316		WBL	3.17	WBT	2.55	WBR	2.93
WB Approach (Away)	15.791		5.94%	3	4.63%	956	5.49%	54
EB Approach (To)	17.039		EBL	2.28	EBT	2.55	EBR	2.52
EB Approach (Away)	10.93		4.13%	380	4.63%	812	4.58%	125
NB Approach (To)	8.349		NBL	2.52	NBT	2.90	NBR	3.17
NB Approach (Away)	1.826		4.58%	240	5.44%	56	5.94%	26
SB Approach (To)	6.124		SBL	2.93	SBT	2.90	SBR	2.28
SB Approach (Away)	6.95		5.49%	54	5.44%	33	4.13%	652



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	322	50	1	379	18	96	19	8	18	11	285
Future Volume (veh/h)	166	322	50	1	379	18	96	19	8	18	11	285
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	180	350	54	1	412	20	104	21	9	20	12	310
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	203	669	569	3	459	390	127	509	433	41	419	356
Arrive On Green	0.11	0.36	0.36	0.00	0.25	0.25	0.07	0.27	0.27	0.02	0.22	0.22
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	180	350	54	1	412	20	104	21	9	20	12	310
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	7.0	10.4	1.6	0.0	15.0	0.7	4.0	0.6	0.3	0.8	0.4	13.2
Cycle Q Clear(g_c), s	7.0	10.4	1.6	0.0	15.0	0.7	4.0	0.6	0.3	0.8	0.4	13.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	669	569	3	459	390	127	509	433	41	419	356
V/C Ratio(X)	0.89	0.52	0.09	0.39	0.90	0.05	0.82	0.04	0.02	0.49	0.03	0.87
Avail Cap(c_a), veh/h	203	669	569	127	479	407	127	533	453	127	533	453
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	30.5	17.7	14.9	34.9	25.5	20.1	32.0	18.7	18.6	33.8	21.2	26.1
Incr Delay (d2), s/veh	34.3	0.7	0.1	77.7	19.1	0.1	33.0	0.0	0.0	8.8	0.0	13.9
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(50%),veh/ln	5.3	5.5	0.7	0.1	10.1	0.3	3.1	0.3	0.1	0.5	0.2	7.1
LnGrp Delay(d),s/veh	64.8	18.4	14.9	112.6	44.6	20.2	65.1	18.7	18.6	42.6	21.2	40.0
LnGrp LOS	E	B	B	F	D	C	E	B	B	D	C	D
Approach Vol, veh/h		584			433			134			342	
Approach Delay, s/veh		32.4			43.6			54.7			39.5	
Approach LOS		C			D			D			D	

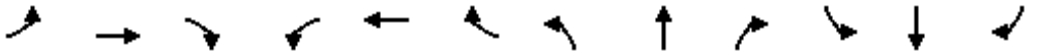
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	25.1	6.1	31.1	11.0	21.7	14.0	23.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	20.0	5.0	21.0	5.0	20.0	8.0	18.0
Max Q Clear Time (g_c+I1), s	2.8	2.6	2.0	12.4	6.0	15.2	9.0	17.0
Green Ext Time (p_c), s	0.0	1.1	0.0	2.8	0.0	0.5	0.0	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	39.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	517	80	2	608	31	153	33	15	31	19	435
Future Volume (veh/h)	253	517	80	2	608	31	153	33	15	31	19	435
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	275	562	87	2	661	34	166	36	16	34	21	473
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	266	908	772	5	633	538	160	446	379	54	335	285
Arrive On Green	0.15	0.49	0.49	0.00	0.34	0.34	0.09	0.24	0.24	0.03	0.18	0.18
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	275	562	87	2	661	34	166	36	16	34	21	473
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	15.0	22.2	3.0	0.1	34.0	1.4	9.0	1.5	0.8	1.9	0.9	18.0
Cycle Q Clear(g_c), s	15.0	22.2	3.0	0.1	34.0	1.4	9.0	1.5	0.8	1.9	0.9	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	266	908	772	5	633	538	160	446	379	54	335	285
V/C Ratio(X)	1.03	0.62	0.11	0.42	1.04	0.06	1.04	0.08	0.04	0.63	0.06	1.66
Avail Cap(c_a), veh/h	266	908	772	89	633	538	160	446	379	106	335	285
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	42.5	18.8	13.9	49.8	33.0	22.3	45.5	29.5	29.2	47.9	34.0	41.0
Incr Delay (d2), s/veh	64.1	1.3	0.1	48.9	47.7	0.0	82.1	0.1	0.0	11.3	0.1	312.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	11.7	1.3	0.1	25.8	0.6	8.0	0.8	0.3	1.1	0.5	32.5
LnGrp Delay(d),s/veh	106.6	20.1	14.0	98.7	80.7	22.3	127.8	29.6	29.3	59.2	34.1	353.0
LnGrp LOS	F	C	B	F	F	C	F	C	C	E	C	F
Approach Vol, veh/h		924			697			218			528	
Approach Delay, s/veh		45.3			77.9			104.4			321.4	
Approach LOS		D			E			F			F	

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	9.1	29.9	6.3	54.7	15.0	24.0	21.0	40.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	21.0	5.0	44.0	9.0	18.0	15.0	34.0
Max Q Clear Time (g_c+I1), s	3.9	3.5	2.1	24.2	11.0	20.0	17.0	36.0
Green Ext Time (p_c), s	0.0	1.8	0.0	7.5	0.0	0.0	0.0	0.0

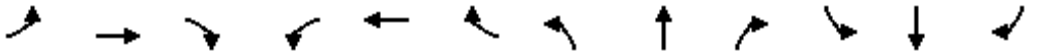
Intersection Summary	
HCM 2010 Ctrl Delay	121.9
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	517	80	2	608	31	153	33	15	31	19	435
Future Volume (veh/h)	253	517	80	2	608	31	153	33	15	31	19	435
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	275	562	87	2	661	34	166	36	16	34	21	473
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	330	1109	496	5	779	349	194	599	509	61	459	542
Arrive On Green	0.10	0.31	0.31	0.00	0.22	0.22	0.11	0.32	0.32	0.03	0.25	0.25
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	275	562	87	2	661	34	166	36	16	34	21	473
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.7	9.5	2.9	0.1	13.1	1.3	6.7	1.0	0.5	1.4	0.6	18.0
Cycle Q Clear(g_c), s	5.7	9.5	2.9	0.1	13.1	1.3	6.7	1.0	0.5	1.4	0.6	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	1109	496	5	779	349	194	599	509	61	459	542
V/C Ratio(X)	0.83	0.51	0.18	0.41	0.85	0.10	0.85	0.06	0.03	0.56	0.05	0.87
Avail Cap(c_a), veh/h	330	1109	496	121	872	390	194	599	509	121	459	542
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	32.5	20.5	18.2	36.4	27.3	22.7	32.0	17.2	17.0	34.8	21.0	22.6
Incr Delay (d2), s/veh	16.6	0.4	0.2	48.1	7.3	0.1	29.2	0.0	0.0	7.9	0.0	14.6
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(50%),veh/ln	3.5	4.7	1.3	0.1	7.1	0.6	4.8	0.5	0.2	0.8	0.3	11.1
LnGrp Delay(d),s/veh	49.1	20.9	18.4	84.5	34.6	22.8	61.1	17.2	17.0	42.7	21.0	37.2
LnGrp LOS	D	C	B	F	C	C	E	B	B	D	C	D
Approach Vol, veh/h		924			697			218			528	
Approach Delay, s/veh		29.0			34.2			50.6			36.9	
Approach LOS		C			C			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	8.5	29.5	6.2	28.9	14.0	24.0	13.0	22.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	21.0	5.0	20.0	8.0	18.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	3.4	3.0	2.1	11.5	8.7	20.0	7.7	15.1
Green Ext Time (p_c), s	0.0	1.8	0.0	4.6	0.0	0.0	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	542	85	2	614	33	157	35	15	35	22	435
Future Volume (veh/h)	253	542	85	2	614	33	157	35	15	35	22	435
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	275	589	92	2	667	36	171	38	16	38	24	473
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	329	1112	497	5	783	350	194	593	504	65	458	541
Arrive On Green	0.10	0.31	0.31	0.00	0.22	0.22	0.11	0.32	0.32	0.04	0.25	0.25
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	275	589	92	2	667	36	171	38	16	38	24	473
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.7	10.0	3.1	0.1	13.2	1.3	7.0	1.0	0.5	1.5	0.7	18.0
Cycle Q Clear(g_c), s	5.7	10.0	3.1	0.1	13.2	1.3	7.0	1.0	0.5	1.5	0.7	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	1112	497	5	783	350	194	593	504	65	458	541
V/C Ratio(X)	0.84	0.53	0.18	0.41	0.85	0.10	0.88	0.06	0.03	0.58	0.05	0.87
Avail Cap(c_a), veh/h	329	1112	497	121	870	389	194	593	504	121	458	541
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	32.5	20.7	18.3	36.4	27.3	22.7	32.1	17.4	17.2	34.7	21.1	22.6
Incr Delay (d2), s/veh	16.8	0.5	0.2	48.1	7.5	0.1	34.3	0.0	0.0	8.0	0.0	14.8
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(50%),veh/ln	3.5	5.0	1.4	0.1	7.3	0.6	5.3	0.5	0.2	0.9	0.4	11.2
LnGrp Delay(d),s/veh	49.3	21.1	18.5	84.6	34.9	22.8	66.5	17.4	17.2	42.7	21.1	37.4
LnGrp LOS	D	C	B	F	C	C	E	B	B	D	C	D
Approach Vol, veh/h		956			705			225			535	
Approach Delay, s/veh		29.0			34.4			54.7			37.1	
Approach LOS		C			C			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	8.7	29.3	6.2	29.0	14.0	24.0	13.0	22.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	21.0	5.0	20.0	8.0	18.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	3.5	3.0	2.1	12.0	9.0	20.0	7.7	15.2
Green Ext Time (p_c), s	0.0	1.8	0.0	4.5	0.0	0.0	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	812	125	3	956	54	240	56	26	54	33	652
Future Volume (veh/h)	380	812	125	3	956	54	240	56	26	54	33	652
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	413	883	136	3	1039	59	261	61	28	59	36	709
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	487	1499	671	7	1013	453	254	529	450	76	343	515
Arrive On Green	0.14	0.42	0.42	0.00	0.29	0.29	0.14	0.28	0.28	0.04	0.18	0.18
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	413	883	136	3	1039	59	261	61	28	59	36	709
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	11.5	18.7	5.3	0.2	28.0	2.7	14.0	2.4	1.3	3.2	1.6	18.0
Cycle Q Clear(g_c), s	11.5	18.7	5.3	0.2	28.0	2.7	14.0	2.4	1.3	3.2	1.6	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	487	1499	671	7	1013	453	254	529	450	76	343	515
V/C Ratio(X)	0.85	0.59	0.20	0.42	1.03	0.13	1.03	0.12	0.06	0.78	0.11	1.38
Avail Cap(c_a), veh/h	563	1499	671	91	1013	453	254	529	450	145	343	515
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	41.0	21.7	17.8	48.6	34.9	25.9	41.9	25.9	25.5	46.4	33.2	33.0
Incr Delay (d2), s/veh	10.4	0.6	0.1	35.3	35.1	0.1	64.0	0.1	0.1	15.5	0.1	181.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	9.2	2.3	0.2	18.6	1.2	11.4	1.2	0.6	1.9	0.8	39.8
LnGrp Delay(d),s/veh	51.4	22.3	17.9	83.9	70.0	26.0	106.0	26.0	25.6	61.8	33.4	214.1
LnGrp LOS	D	C	B	F	F	C	F	C	C	E	C	F
Approach Vol, veh/h		1432			1101			350			804	
Approach Delay, s/veh		30.3			67.7			85.6			194.8	
Approach LOS		C			E			F			F	

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	10.2	33.8	6.4	47.5	20.0	24.0	19.8	34.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	24.0	5.0	39.0	14.0	18.0	16.0	28.0
Max Q Clear Time (g_c+I1), s	5.2	4.4	2.2	20.7	16.0	20.0	13.5	30.0
Green Ext Time (p_c), s	0.0	3.2	0.0	11.9	0.0	0.0	0.4	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	82.6
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	812	125	3	956	54	240	56	26	54	33	652
Future Volume (veh/h)	380	812	125	3	956	54	240	56	26	54	33	652
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	413	883	136	3	1039	59	261	61	28	59	36	709
Adj No. of Lanes	2	3	1	1	3	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	421	1676	522	7	1075	335	294	664	565	76	435	992
Arrive On Green	0.12	0.33	0.33	0.00	0.21	0.21	0.17	0.36	0.36	0.04	0.23	0.23
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	413	883	136	3	1039	59	261	61	28	59	36	709
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	10.8	12.7	5.7	0.2	18.2	2.7	12.9	2.0	1.0	3.0	1.4	19.8
Cycle Q Clear(g_c), s	10.8	12.7	5.7	0.2	18.2	2.7	12.9	2.0	1.0	3.0	1.4	19.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	421	1676	522	7	1075	335	294	664	565	76	435	992
V/C Ratio(X)	0.98	0.53	0.26	0.42	0.97	0.18	0.89	0.09	0.05	0.78	0.08	0.71
Avail Cap(c_a), veh/h	421	1676	522	99	1075	335	296	664	565	138	435	992
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	39.4	24.5	22.1	44.7	35.1	29.1	36.7	19.2	18.9	42.6	26.9	25.0
Incr Delay (d2), s/veh	38.7	0.3	0.3	35.0	19.9	0.2	25.9	0.1	0.0	15.4	0.1	2.5
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(50%),veh/ln	7.4	5.9	2.5	0.1	10.4	1.2	8.4	1.0	0.5	1.8	0.7	7.9
LnGrp Delay(d),s/veh	78.1	24.8	22.4	79.7	55.0	29.3	62.5	19.3	19.0	58.0	27.0	27.5
LnGrp LOS	E	C	C	E	E	C	E	B	B	E	C	C
Approach Vol, veh/h		1432			1101			350			804	
Approach Delay, s/veh		39.9			53.7			51.5			29.7	
Approach LOS		D			D			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	9.9	38.1	6.4	35.6	20.9	27.0	17.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0	5.0	25.0	15.0	21.0	11.0	19.0
Max Q Clear Time (g_c+I1), s	5.0	4.0	2.2	14.7	14.9	21.8	12.8	20.2
Green Ext Time (p_c), s	0.0	3.5	0.0	7.7	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	862	134	3	968	57	248	59	26	61	38	652
Future Volume (veh/h)	380	862	134	3	968	57	248	59	26	61	38	652
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	413	937	146	3	1052	62	270	64	28	66	41	709
Adj No. of Lanes	2	3	1	1	3	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	421	1675	521	7	1074	334	296	656	558	85	435	991
Arrive On Green	0.12	0.33	0.33	0.00	0.21	0.21	0.17	0.35	0.35	0.05	0.23	0.23
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	413	937	146	3	1052	62	270	64	28	66	41	709
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	10.8	13.6	6.1	0.2	18.5	2.9	13.5	2.1	1.0	3.3	1.6	19.8
Cycle Q Clear(g_c), s	10.8	13.6	6.1	0.2	18.5	2.9	13.5	2.1	1.0	3.3	1.6	19.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	421	1675	521	7	1074	334	296	656	558	85	435	991
V/C Ratio(X)	0.98	0.56	0.28	0.42	0.98	0.19	0.91	0.10	0.05	0.78	0.09	0.72
Avail Cap(c_a), veh/h	421	1675	521	99	1074	334	296	656	558	138	435	991
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	39.4	24.8	22.3	44.7	35.3	29.1	36.9	19.6	19.2	42.4	27.0	25.1
Incr Delay (d2), s/veh	39.0	0.4	0.3	35.0	22.6	0.3	30.9	0.1	0.0	14.1	0.1	2.5
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(50%),veh/ln	7.4	6.4	2.7	0.1	10.9	1.3	9.1	1.1	0.5	1.9	0.8	7.9
LnGrp Delay(d),s/veh	78.4	25.2	22.6	79.8	57.9	29.4	67.7	19.6	19.3	56.5	27.1	27.6
LnGrp LOS	E	C	C	E	E	C	E	B	B	E	C	C
Approach Vol, veh/h		1496			1117			362			816	
Approach Delay, s/veh		39.6			56.4			55.5			29.9	
Approach LOS		D			E			E			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	10.3	37.7	6.4	35.6	21.0	27.0	17.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0	5.0	25.0	15.0	21.0	11.0	19.0
Max Q Clear Time (g_c+I1), s	5.3	4.1	2.2	15.6	15.5	21.8	12.8	20.5
Green Ext Time (p_c), s	0.0	3.5	0.0	7.2	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	44.0
HCM 2010 LOS	D

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Taft Hwy & South H - PM Peak
Count Date: 1/20/2015

Ave Annual Growth: **5.03%**

Exist Peak Hour Volumes

Signalized		
1	WBL	1
1	WBT	416
1	WBR	39
1	EBL	199
1	EBT	487
1	EBR	67
1	NBL	154
1	NBT	56
1	NBR	28
1	SBL	33
1	SBT	19
1	SBR	147
	TOTAL	1646

Year 2035
Fut. Volumes w/o Proj

WBL	3
WBT	1049
WBR	116
EBL	455
EBT	1227
EBR	167
NBL	384
NBT	165
NBR	91
SBL	98
SBT	56
SBR	336
TOTAL	4147

Year 2035 Fut. Vol
+ Project Traffic

WBL	3
WBT	1098
WBR	124
EBL	455
EBT	1288
EBR	167
NBL	401
NBT	166
NBR	91
SBL	115
SBT	57
SBR	336
TOTAL	4301

Year 2025
Fut. Volumes w/o Proj

WBL	2
WBT	667
WBR	68
EBL	304
EBT	781
EBR	107
NBL	246
NBT	97
NBR	51
SBL	58
SBT	33
SBR	224
TOTAL	2638

Year 2025 Fut. Vol
+ Project Traffic

WBL	2
WBT	692
WBR	72
EBL	304
EBT	812
EBR	107
NBL	255
NBT	98
NBR	51
SBL	67
SBT	34
SBR	224
TOTAL	2718

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	49
WBR	8
EBL	0
EBT	61
EBR	0
NBL	17
NBT	1
NBR	0
SBL	17
SBT	1
SBR	0
TOTAL	154

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Hwy & South H - PM Peak						
	Count Date:	1/20/2015						
2015	ADT							
WB Approach (To)	5.1							
WB Approach (Away)	4.94							
EB Approach (To)	8.96							
EB Approach (Away)	5.74							
NB Approach (To)	2.67							
NB Approach (Away)	0.58							
SB Approach (To)	2.31							
SB Approach (Away)	2.62							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	16.316		WBL	3.17	WBT	2.55	WBR	2.93
WB Approach (Away)	15.791		5.94%	3	4.63%	1049	5.49%	116
EB Approach (To)	17.039		EBL	2.28	EBT	2.55	EBR	2.52
EB Approach (Away)	10.93		4.13%	455	4.62%	1227	4.58%	167
NB Approach (To)	8.349		NBL	2.52	NBT	2.89	NBR	3.16
NB Approach (Away)	1.826		4.57%	384	5.43%	165	5.92%	91
SB Approach (To)	6.124		SBL	2.92	SBT	2.90	SBR	2.28
SB Approach (Away)	6.95		5.49%	98	5.44%	56	4.13%	336

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	487	67	1	416	39	154	56	28	33	19	147
Future Volume (veh/h)	199	487	67	1	416	39	154	56	28	33	19	147
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	216	529	73	1	452	42	167	61	30	36	21	160
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	257	793	674	2	525	447	205	398	339	63	249	211
Arrive On Green	0.14	0.43	0.43	0.00	0.28	0.28	0.12	0.21	0.21	0.04	0.13	0.13
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	216	529	73	1	452	42	167	61	30	36	21	160
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	8.8	16.9	2.1	0.0	17.0	1.4	6.8	2.0	1.1	1.5	0.7	7.2
Cycle Q Clear(g_c), s	8.8	16.9	2.1	0.0	17.0	1.4	6.8	2.0	1.1	1.5	0.7	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	793	674	2	525	447	205	398	339	63	249	211
V/C Ratio(X)	0.84	0.67	0.11	0.41	0.86	0.09	0.81	0.15	0.09	0.57	0.08	0.76
Avail Cap(c_a), veh/h	287	793	674	120	603	513	239	603	513	144	503	427
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	30.8	17.1	12.8	37.0	25.2	19.6	32.0	23.7	23.3	35.2	28.1	30.9
Incr Delay (d2), s/veh	18.1	2.2	0.1	84.2	10.9	0.1	16.8	0.2	0.1	8.0	0.1	5.5
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(50%),veh/ln	5.6	9.1	0.9	0.1	10.3	0.6	4.3	1.0	0.5	0.9	0.4	3.5
LnGrp Delay(d),s/veh	48.9	19.2	12.9	121.1	36.1	19.7	48.8	23.8	23.4	43.2	28.3	36.4
LnGrp LOS	D	B	B	F	D	B	D	C	C	D	C	D
Approach Vol, veh/h		818			495			258			217	
Approach Delay, s/veh		26.5			34.9			39.9			36.7	
Approach LOS		C			C			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	8.6	21.8	6.1	37.5	14.6	15.9	16.7	26.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	24.0	5.0	31.0	10.0	20.0	12.0	24.0
Max Q Clear Time (g_c+I1), s	3.5	4.0	2.0	18.9	8.8	9.2	10.8	19.0
Green Ext Time (p_c), s	0.0	0.9	0.0	4.6	0.0	0.7	0.1	1.9

Intersection Summary	
HCM 2010 Ctrl Delay	32.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	304	781	107	2	667	68	246	97	51	58	33	224
Future Volume (veh/h)	304	781	107	2	667	68	246	97	51	58	33	224
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	330	849	116	2	725	74	267	105	55	63	36	243
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	317	1020	867	5	692	588	266	434	369	80	239	204
Arrive On Green	0.18	0.55	0.55	0.00	0.37	0.37	0.15	0.23	0.23	0.05	0.13	0.13
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	330	849	116	2	725	74	267	105	55	63	36	243
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	25.0	53.1	5.0	0.2	52.0	4.3	21.0	6.4	3.9	4.9	2.4	18.0
Cycle Q Clear(g_c), s	25.0	53.1	5.0	0.2	52.0	4.3	21.0	6.4	3.9	4.9	2.4	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	317	1020	867	5	692	588	266	434	369	80	239	204
V/C Ratio(X)	1.04	0.83	0.13	0.42	1.05	0.13	1.00	0.24	0.15	0.78	0.15	1.19
Avail Cap(c_a), veh/h	317	1020	867	63	692	588	266	434	369	127	239	204
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	57.5	26.4	15.5	69.7	44.0	29.0	59.5	43.6	42.6	66.1	54.2	61.0
Incr Delay (d2), s/veh	61.8	6.0	0.1	50.2	47.4	0.1	56.0	0.3	0.2	15.1	0.3	125.1
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(50%),veh/ln	17.7	28.8	2.2	0.1	35.8	1.9	14.4	3.3	1.7	2.8	1.3	14.9
LnGrp Delay(d),s/veh	119.3	32.4	15.5	119.9	91.4	29.1	115.5	43.9	42.8	81.3	54.5	186.1
LnGrp LOS	F	C	B	F	F	C	F	D	D	F	D	F
Approach Vol, veh/h		1295			801			427			342	
Approach Delay, s/veh		53.0			85.7			88.5			153.0	
Approach LOS		D			F			F			F	

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	12.3	38.7	6.4	82.6	27.0	24.0	31.0	58.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	29.0	5.0	72.0	21.0	18.0	25.0	52.0
Max Q Clear Time (g_c+I1), s	6.9	8.4	2.2	55.1	23.0	20.0	27.0	54.0
Green Ext Time (p_c), s	0.0	1.5	0.0	9.6	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	79.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	304	781	107	2	667	68	246	97	51	58	33	224
Future Volume (veh/h)	304	781	107	2	667	68	246	97	51	58	33	224
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	330	849	116	2	725	74	267	105	55	63	36	243
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	396	1237	553	5	840	376	306	470	399	90	242	363
Arrive On Green	0.12	0.35	0.35	0.00	0.24	0.24	0.17	0.25	0.25	0.05	0.13	0.13
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	330	849	116	2	725	74	267	105	55	63	36	243
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	6.5	14.3	3.6	0.1	13.7	2.6	10.2	3.1	1.9	2.4	1.2	5.8
Cycle Q Clear(g_c), s	6.5	14.3	3.6	0.1	13.7	2.6	10.2	3.1	1.9	2.4	1.2	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	396	1237	553	5	840	376	306	470	399	90	242	363
V/C Ratio(X)	0.83	0.69	0.21	0.41	0.86	0.20	0.87	0.22	0.14	0.70	0.15	0.67
Avail Cap(c_a), veh/h	396	1237	553	128	916	410	306	616	524	179	482	721
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	30.1	19.4	15.9	34.6	25.4	21.2	28.0	20.6	20.2	32.5	26.8	28.8
Incr Delay (d2), s/veh	14.2	1.6	0.2	48.0	8.1	0.3	23.0	0.2	0.2	9.5	0.3	2.1
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(50%),veh/ln	3.9	7.2	1.6	0.1	7.6	1.2	6.9	1.6	0.8	1.4	0.6	2.3
LnGrp Delay(d),s/veh	44.3	21.0	16.1	82.7	33.5	21.5	51.0	20.9	20.3	42.0	27.1	31.0
LnGrp LOS	D	C	B	F	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1295			801			427			342	
Approach Delay, s/veh		26.5			32.5			39.6			32.6	
Approach LOS		C			C			D			C	

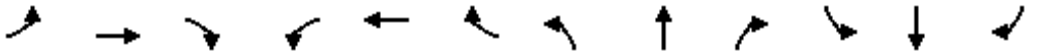
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	23.5	6.2	30.3	18.0	15.1	14.0	22.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	23.0	5.0	21.0	12.0	18.0	8.0	18.0
Max Q Clear Time (g_c+I1), s	4.4	5.1	2.1	16.3	12.2	7.8	8.5	15.7
Green Ext Time (p_c), s	0.0	1.6	0.0	3.5	0.0	1.3	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	304	812	107	2	692	72	255	98	51	67	34	224
Future Volume (veh/h)	304	812	107	2	692	72	255	98	51	67	34	224
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	330	883	116	2	752	78	277	107	55	73	37	243
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	393	1251	560	5	856	383	304	460	391	96	242	362
Arrive On Green	0.11	0.35	0.35	0.00	0.24	0.24	0.17	0.25	0.25	0.05	0.13	0.13
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	330	883	116	2	752	78	277	107	55	73	37	243
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	6.6	15.1	3.6	0.1	14.3	2.8	10.7	3.2	1.9	2.8	1.2	5.8
Cycle Q Clear(g_c), s	6.6	15.1	3.6	0.1	14.3	2.8	10.7	3.2	1.9	2.8	1.2	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	393	1251	560	5	856	383	304	460	391	96	242	362
V/C Ratio(X)	0.84	0.71	0.21	0.41	0.88	0.20	0.91	0.23	0.14	0.76	0.15	0.67
Avail Cap(c_a), veh/h	393	1251	560	127	909	407	304	585	497	203	479	716
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	30.4	19.5	15.8	34.9	25.6	21.2	28.5	21.1	20.6	32.7	27.1	29.0
Incr Delay (d2), s/veh	14.9	1.8	0.2	48.0	9.4	0.3	30.0	0.3	0.2	11.6	0.3	2.2
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(50%),veh/ln	3.9	7.7	1.6	0.1	8.1	1.2	7.8	1.7	0.8	1.7	0.7	2.3
LnGrp Delay(d),s/veh	45.3	21.3	16.0	82.9	35.0	21.4	58.5	21.3	20.7	44.3	27.3	31.2
LnGrp LOS	D	C	B	F	C	C	E	C	C	D	C	C
Approach Vol, veh/h		1329			832			439			353	
Approach Delay, s/veh		26.8			33.8			44.7			33.5	
Approach LOS		C			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	9.8	23.3	6.2	30.8	18.0	15.1	14.0	22.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	22.0	5.0	21.0	12.0	18.0	8.0	18.0
Max Q Clear Time (g_c+I1), s	4.8	5.2	2.1	17.1	12.7	7.8	8.6	16.3
Green Ext Time (p_c), s	0.0	1.6	0.0	3.1	0.0	1.3	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1227	167	3	1049	116	384	165	91	98	56	336
Future Volume (veh/h)	455	1227	167	3	1049	116	384	165	91	98	56	336
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1334	182	3	1140	126	417	179	99	107	61	365
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	477	1565	700	7	1089	487	409	550	468	131	258	386
Arrive On Green	0.14	0.44	0.44	0.00	0.31	0.31	0.23	0.30	0.30	0.07	0.14	0.14
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	495	1334	182	3	1140	126	417	179	99	107	61	365
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	18.0	43.9	9.4	0.2	40.0	7.8	30.0	9.7	6.1	7.7	3.8	16.9
Cycle Q Clear(g_c), s	18.0	43.9	9.4	0.2	40.0	7.8	30.0	9.7	6.1	7.7	3.8	16.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	477	1565	700	7	1089	487	409	550	468	131	258	386
V/C Ratio(X)	1.04	0.85	0.26	0.43	1.05	0.26	1.02	0.33	0.21	0.82	0.24	0.95
Avail Cap(c_a), veh/h	477	1565	700	68	1089	487	409	550	468	205	258	386
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	56.0	32.5	22.9	64.6	45.0	33.8	50.0	35.7	34.4	59.3	49.9	55.5
Incr Delay (d2), s/veh	51.6	4.8	0.2	36.4	40.4	0.3	49.3	0.3	0.2	13.2	0.5	32.2
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(50%),veh/ln	12.0	22.3	4.2	0.2	25.6	3.4	20.3	5.1	2.7	4.3	2.0	8.2
LnGrp Delay(d),s/veh	107.6	37.2	23.0	101.0	85.4	34.1	99.3	36.1	34.7	72.5	50.3	87.7
LnGrp LOS	F	D	C	F	F	C	F	D	C	E	D	F
Approach Vol, veh/h		2011			1269			695			533	
Approach Delay, s/veh		53.3			80.3			73.8			80.4	
Approach LOS		D			F			E			F	

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	15.6	44.4	6.5	63.5	36.0	24.0	24.0	46.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	15.0	33.0	5.0	53.0	30.0	18.0	18.0	40.0
Max Q Clear Time (g_c+I1), s	9.7	11.7	2.2	45.9	32.0	18.9	20.0	42.0
Green Ext Time (p_c), s	0.1	2.8	0.0	6.4	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	67.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1227	167	3	1049	116	384	165	91	98	56	336
Future Volume (veh/h)	455	1227	167	3	1049	116	384	165	91	98	56	336
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1334	182	3	1140	126	417	179	99	107	61	365
Adj No. of Lanes	2	3	1	1	3	2	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	502	1832	570	7	1112	609	406	577	490	135	292	437
Arrive On Green	0.15	0.36	0.36	0.00	0.22	0.22	0.23	0.31	0.31	0.08	0.16	0.16
Sat Flow, veh/h	3442	5085	1583	1774	5085	2787	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	495	1334	182	3	1140	126	417	179	99	107	61	365
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1393	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	13.8	21.9	8.0	0.2	21.0	3.6	22.0	7.1	4.4	5.7	2.7	12.2
Cycle Q Clear(g_c), s	13.8	21.9	8.0	0.2	21.0	3.6	22.0	7.1	4.4	5.7	2.7	12.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	502	1832	570	7	1112	609	406	577	490	135	292	437
V/C Ratio(X)	0.99	0.73	0.32	0.42	1.03	0.21	1.03	0.31	0.20	0.79	0.21	0.83
Avail Cap(c_a), veh/h	502	1832	570	92	1112	609	406	577	490	222	368	551
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	40.9	26.6	22.2	47.7	37.5	30.7	37.0	25.3	24.4	43.6	35.3	39.3
Incr Delay (d2), s/veh	36.7	1.5	0.3	35.2	33.7	0.2	51.6	0.3	0.2	9.9	0.4	8.8
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(50%),veh/ln	9.1	10.5	3.5	0.1	13.2	1.4	16.5	3.7	2.0	3.2	1.4	5.2
LnGrp Delay(d),s/veh	77.7	28.1	22.5	83.0	71.2	30.9	88.6	25.6	24.6	53.5	35.7	48.0
LnGrp LOS	E	C	C	F	F	C	F	C	C	D	D	D
Approach Vol, veh/h		2011			1269			695			533	
Approach Delay, s/veh		39.8			67.3			63.3			47.7	
Approach LOS		D			E			E			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	13.3	35.8	6.4	40.6	28.0	21.1	20.0	27.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	29.0	5.0	30.0	22.0	19.0	14.0	21.0
Max Q Clear Time (g_c+I1), s	7.7	9.1	2.2	23.9	24.0	14.2	15.8	23.0
Green Ext Time (p_c), s	0.1	2.8	0.0	5.5	0.0	0.9	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1288	167	3	1098	124	401	166	91	115	57	336
Future Volume (veh/h)	455	1288	167	3	1098	124	401	166	91	115	57	336
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1400	182	3	1193	135	436	180	99	125	62	365
Adj No. of Lanes	2	3	1	1	3	2	2	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	562	2101	654	7	1291	708	481	399	339	157	304	455
Arrive On Green	0.16	0.41	0.41	0.00	0.25	0.25	0.14	0.21	0.21	0.09	0.16	0.16
Sat Flow, veh/h	3442	5085	1583	1774	5085	2787	3442	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	495	1400	182	3	1193	135	436	180	99	125	62	365
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1393	1721	1863	1583	1774	1863	1393
Q Serve(g_s), s	12.1	19.1	6.5	0.1	19.6	3.3	10.7	7.2	4.5	5.9	2.5	10.8
Cycle Q Clear(g_c), s	12.1	19.1	6.5	0.1	19.6	3.3	10.7	7.2	4.5	5.9	2.5	10.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	562	2101	654	7	1291	708	481	399	339	157	304	455
V/C Ratio(X)	0.88	0.67	0.28	0.42	0.92	0.19	0.91	0.45	0.29	0.79	0.20	0.80
Avail Cap(c_a), veh/h	562	2101	654	103	1304	715	481	399	339	248	391	585
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	35.1	20.4	16.7	42.6	31.2	25.1	36.3	29.3	28.2	38.3	31.1	34.6
Incr Delay (d2), s/veh	15.1	0.8	0.2	34.9	11.1	0.1	20.6	0.8	0.5	8.9	0.3	6.2
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(50%),veh/ln	6.9	9.1	2.9	0.1	10.5	1.3	6.5	3.8	2.0	3.3	1.3	4.5
LnGrp Delay(d),s/veh	50.2	21.2	16.9	77.5	42.3	25.2	56.9	30.1	28.7	47.3	31.4	40.7
LnGrp LOS	D	C	B	E	D	C	E	C	C	D	C	D
Approach Vol, veh/h		2077			1331			715			552	
Approach Delay, s/veh		27.7			40.6			46.3			41.2	
Approach LOS		C			D			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	13.6	24.4	6.3	41.4	18.0	20.0	20.0	27.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	18.0	5.0	31.0	12.0	18.0	14.0	22.0
Max Q Clear Time (g_c+I1), s	7.9	9.2	2.1	21.1	12.7	12.8	14.1	21.6
Green Ext Time (p_c), s	0.1	2.0	0.0	8.7	0.0	1.2	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1288	167	3	1098	124	401	166	91	115	57	336
Future Volume (veh/h)	455	1288	167	3	1098	124	401	166	91	115	57	336
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1400	182	3	1193	135	436	180	99	125	62	365
Adj No. of Lanes	2	3	1	1	3	2	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	468	1789	557	7	1118	612	408	568	483	156	303	453
Arrive On Green	0.14	0.35	0.35	0.00	0.22	0.22	0.23	0.31	0.31	0.09	0.16	0.16
Sat Flow, veh/h	3442	5085	1583	1774	5085	2787	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	495	1400	182	3	1193	135	436	180	99	125	62	365
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1393	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	13.0	23.5	8.0	0.2	21.0	3.8	22.0	7.1	4.4	6.6	2.8	12.1
Cycle Q Clear(g_c), s	13.0	23.5	8.0	0.2	21.0	3.8	22.0	7.1	4.4	6.6	2.8	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	468	1789	557	7	1118	612	408	568	483	156	303	453
V/C Ratio(X)	1.06	0.78	0.33	0.42	1.07	0.22	1.07	0.32	0.20	0.80	0.20	0.81
Avail Cap(c_a), veh/h	468	1789	557	93	1118	612	408	568	483	241	390	583
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	41.3	27.7	22.7	47.5	37.3	30.6	36.8	25.5	24.6	42.8	34.6	38.5
Incr Delay (d2), s/veh	57.5	2.3	0.3	35.2	46.8	0.2	63.6	0.3	0.2	10.3	0.3	6.3
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(50%),veh/ln	9.9	11.4	3.5	0.1	14.6	1.5	17.9	3.7	2.0	3.7	1.4	5.0
LnGrp Delay(d),s/veh	98.8	30.0	23.0	82.7	84.1	30.7	100.4	25.8	24.8	53.0	35.0	44.9
LnGrp LOS	F	C	C	F	F	C	F	C	C	D	C	D
Approach Vol, veh/h		2077			1331			715			552	
Approach Delay, s/veh		45.8			78.7			71.1			45.6	
Approach LOS		D			E			E			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	14.4	35.2	6.4	39.6	28.0	21.5	19.0	27.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	13.0	29.0	5.0	29.0	22.0	20.0	13.0	21.0
Max Q Clear Time (g_c+I1), s	8.6	9.1	2.2	25.5	24.0	14.1	15.0	23.0
Green Ext Time (p_c), s	0.1	2.8	0.0	3.3	0.0	1.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	59.0
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1288	167	3	1098	124	401	166	91	115	57	336
Future Volume (veh/h)	455	1288	167	3	1098	124	401	166	91	115	57	336
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1400	182	3	1193	135	436	180	99	125	62	365
Adj No. of Lanes	2	3	1	1	3	2	2	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	562	2101	654	7	1291	708	481	399	339	157	304	455
Arrive On Green	0.16	0.41	0.41	0.00	0.25	0.25	0.14	0.21	0.21	0.09	0.16	0.16
Sat Flow, veh/h	3442	5085	1583	1774	5085	2787	3442	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	495	1400	182	3	1193	135	436	180	99	125	62	365
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1393	1721	1863	1583	1774	1863	1393
Q Serve(g_s), s	12.1	19.1	6.5	0.1	19.6	3.3	10.7	7.2	4.5	5.9	2.5	10.8
Cycle Q Clear(g_c), s	12.1	19.1	6.5	0.1	19.6	3.3	10.7	7.2	4.5	5.9	2.5	10.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	562	2101	654	7	1291	708	481	399	339	157	304	455
V/C Ratio(X)	0.88	0.67	0.28	0.42	0.92	0.19	0.91	0.45	0.29	0.79	0.20	0.80
Avail Cap(c_a), veh/h	562	2101	654	103	1304	715	481	399	339	248	391	585
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	35.1	20.4	16.7	42.6	31.2	25.1	36.3	29.3	28.2	38.3	31.1	34.6
Incr Delay (d2), s/veh	15.1	0.8	0.2	34.9	11.1	0.1	20.6	0.8	0.5	8.9	0.3	6.2
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(50%),veh/ln	6.9	9.1	2.9	0.1	10.5	1.3	6.5	3.8	2.0	3.3	1.3	4.5
LnGrp Delay(d),s/veh	50.2	21.2	16.9	77.5	42.3	25.2	56.9	30.1	28.7	47.3	31.4	40.7
LnGrp LOS	D	C	B	E	D	C	E	C	C	D	C	D
Approach Vol, veh/h		2077			1331			715			552	
Approach Delay, s/veh		27.7			40.6			46.3			41.2	
Approach LOS		C			D			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	13.6	24.4	6.3	41.4	18.0	20.0	20.0	27.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	12.0	18.0	5.0	31.0	12.0	18.0	14.0	22.0
Max Q Clear Time (g_c+I1), s	7.9	9.2	2.1	21.1	12.7	12.8	14.1	21.6
Green Ext Time (p_c), s	0.1	2.0	0.0	8.7	0.0	1.2	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Taft Highway & South Union - AM Peak
Count Date: 1/20/2015

Ave Annual Growth: **3.26%**

Exist Peak Hour Volumes

SIGNALIZED

1	WBL	5
1	WBT	184
<	WBR	23
1	EBL	81
1	EBT	225
<	EBR	57
1	NBL	30
3	NBT	73
<	NBR	12
1	SBL	50
3	SBT	112
<	SBR	92
	TOTAL	944

Year 2035
Fut. Volumes w/o Proj

WBL	10
WBT	258
WBR	41
EBL	149
EBT	321
EBR	117
NBL	63
NBT	191
NBR	24
SBL	90
SBT	292
SBR	170
TOTAL	1726

Year 2035 Fut. Vol
+ Project Traffic

WBL	62
WBT	258
WBR	41
EBL	149
EBT	321
EBR	181
NBL	82
NBT	223
NBR	51
SBL	90
SBT	461
SBR	170
TOTAL	2089

Year 2025
Fut. Volumes w/o Proj

WBL	7
WBT	219
WBR	31
EBL	111
EBT	270
EBR	82
NBL	44
NBT	119
NBR	17
SBL	68
SBT	183
SBR	126
TOTAL	1277

Year 2025 Fut. Vol
+ Project Traffic

WBL	33
WBT	219
WBR	31
EBL	111
EBT	270
EBR	114
NBL	54
NBT	135
NBR	31
SBL	68
SBT	268
SBR	126
TOTAL	1460

Project Generated Trips - Year 2035

	Total
WBL	52
WBT	0
WBR	0
EBL	0
EBT	0
EBR	64
NBL	19
NBT	32
NBR	27
SBL	0
SBT	169
SBR	0
TOTAL	363

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Highway & South Union - AM Peak						
	Count Date:	1/20/2015						
2006	ADT							
WB Approach (To)	7.002							
WB Approach (Away)	6.638							
EB Approach (To)	6.58							
EB Approach (Away)	7.007							
NB Approach (To)	1.005							
NB Approach (Away)	1.074							
SB Approach (To)	1.873							
SB Approach (Away)	1.741							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	10.768		WBL	3.02	WBT	1.62	WBR	2.41
WB Approach (Away)	10.581		3.41%	10	1.67%	258	2.84%	41
EB Approach (To)	11.274		EBL	2.50	EBT	1.65	EBR	3.11
EB Approach (Away)	11.909		3.03%	149	1.75%	321	3.60%	117
NB Approach (To)	4.705		NBL	3.19	NBT	3.98	NBR	3.14
NB Approach (Away)	4.831		3.65%	63	4.82%	191	3.54%	24
SB Approach (To)	6.284		SBL	2.47	SBT	3.93	SBR	2.53
SB Approach (Away)	5.712		2.94%	90	4.79%	292	3.05%	170

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	225	57	5	184	23	30	73	12	50	112	92
Future Volume (veh/h)	81	225	57	5	184	23	30	73	12	50	112	92
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	88	245	62	5	200	25	33	79	13	54	122	100
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	133	509	432	12	333	42	67	517	81	98	454	212
Arrive On Green	0.08	0.27	0.27	0.01	0.20	0.20	0.04	0.12	0.12	0.05	0.13	0.13
Sat Flow, veh/h	1774	1863	1583	1774	1624	203	1774	4433	697	1774	3390	1583
Grp Volume(v), veh/h	88	245	62	5	0	225	33	60	32	54	122	100
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1827	1774	1695	1740	1774	1695	1583
Q Serve(g_s), s	2.1	4.8	1.3	0.1	0.0	4.9	0.8	0.7	0.7	1.3	1.4	2.6
Cycle Q Clear(g_c), s	2.1	4.8	1.3	0.1	0.0	4.9	0.8	0.7	0.7	1.3	1.4	2.6
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	133	509	432	12	0	374	67	396	203	98	454	212
V/C Ratio(X)	0.66	0.48	0.14	0.42	0.00	0.60	0.49	0.15	0.16	0.55	0.27	0.47
Avail Cap(c_a), veh/h	203	766	651	203	0	752	203	1395	716	203	1395	651
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	13.3	12.0	21.6	0.0	15.8	20.6	17.4	17.4	20.2	17.0	17.5
Incr Delay (d2), s/veh	5.5	0.7	0.2	21.6	0.0	1.6	5.5	0.2	0.4	4.8	0.3	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(50%),veh/ln	1.2	2.6	0.6	0.1	0.0	2.6	0.5	0.3	0.4	0.8	0.7	1.2
LnGrp Delay(d),s/veh	25.2	14.0	12.2	43.3	0.0	17.3	26.1	17.5	17.8	25.0	17.3	19.1
LnGrp LOS	C	B	B	D		B	C	B	B	C	B	B
Approach Vol, veh/h		395			230			125			276	
Approach Delay, s/veh		16.2			17.9			19.9			19.5	
Approach LOS		B			B			B			B	

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	8.4	11.1	6.3	17.9	7.7	11.9	9.3	15.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.3	2.7	2.1	6.8	2.8	4.6	4.1	6.9
Green Ext Time (p_c), s	0.0	1.4	0.0	2.1	0.0	1.3	0.0	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	270	82	7	219	31	44	119	17	68	183	126
Future Volume (veh/h)	111	270	82	7	219	31	44	119	17	68	183	126
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	121	293	89	8	238	34	48	129	18	74	199	137
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	154	559	475	19	356	51	86	656	88	114	543	254
Arrive On Green	0.09	0.30	0.30	0.01	0.22	0.22	0.05	0.14	0.14	0.06	0.16	0.16
Sat Flow, veh/h	1774	1863	1583	1774	1595	228	1774	4535	611	1774	3390	1583
Grp Volume(v), veh/h	121	293	89	8	0	272	48	95	52	74	199	137
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1823	1774	1695	1755	1774	1695	1583
Q Serve(g_s), s	3.3	6.5	2.1	0.2	0.0	6.8	1.3	1.2	1.3	2.0	2.6	4.0
Cycle Q Clear(g_c), s	3.3	6.5	2.1	0.2	0.0	6.8	1.3	1.2	1.3	2.0	2.6	4.0
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	154	559	475	19	0	407	86	490	254	114	543	254
V/C Ratio(X)	0.78	0.52	0.19	0.43	0.00	0.67	0.56	0.19	0.20	0.65	0.37	0.54
Avail Cap(c_a), veh/h	178	672	571	178	0	657	178	1222	633	178	1222	571
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	14.5	13.0	24.5	0.0	17.7	23.2	18.8	18.8	22.8	18.7	19.3
Incr Delay (d2), s/veh	17.9	0.8	0.2	14.8	0.0	1.9	5.5	0.2	0.4	6.1	0.4	1.8
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(50%),veh/ln	2.4	3.5	0.9	0.2	0.0	3.6	0.8	0.6	0.7	1.2	1.2	1.8
LnGrp Delay(d),s/veh	40.3	15.3	13.2	39.3	0.0	19.6	28.7	19.0	19.2	28.9	19.1	21.1
LnGrp LOS	D	B	B	D		B	C	B	B	C	B	C
Approach Vol, veh/h		503			280			195			410	
Approach Delay, s/veh		20.9			20.2			21.4			21.5	
Approach LOS		C			C			C			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	9.2	13.2	6.5	21.0	8.4	14.0	10.3	17.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.0	3.3	2.2	8.5	3.3	6.0	5.3	8.8
Green Ext Time (p_c), s	0.0	2.2	0.0	2.4	0.0	2.0	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	21.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	270	114	33	219	31	54	135	31	68	268	126
Future Volume (veh/h)	111	270	114	33	219	31	54	135	31	68	268	126
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	121	293	124	36	238	34	59	147	34	74	291	137
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	154	502	427	69	354	51	98	681	149	112	593	260
Arrive On Green	0.09	0.27	0.27	0.04	0.22	0.22	0.06	0.16	0.16	0.06	0.17	0.17
Sat Flow, veh/h	1774	1863	1583	1774	1595	228	1774	4178	914	1774	3467	1518
Grp Volume(v), veh/h	121	293	124	36	0	272	59	118	63	74	284	144
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1823	1774	1695	1701	1774	1695	1595
Q Serve(g_s), s	3.5	7.0	3.2	1.0	0.0	7.0	1.7	1.6	1.7	2.1	3.9	4.2
Cycle Q Clear(g_c), s	3.5	7.0	3.2	1.0	0.0	7.0	1.7	1.6	1.7	2.1	3.9	4.2
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.54	1.00		0.95
Lane Grp Cap(c), veh/h	154	502	427	69	0	404	98	553	277	112	580	273
V/C Ratio(X)	0.78	0.58	0.29	0.52	0.00	0.67	0.60	0.21	0.23	0.66	0.49	0.53
Avail Cap(c_a), veh/h	172	649	552	172	0	635	172	1182	593	172	1182	556
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.1	16.3	14.9	24.3	0.0	18.4	23.8	18.7	18.8	23.6	19.4	19.5
Incr Delay (d2), s/veh	19.0	1.1	0.4	5.9	0.0	2.0	5.8	0.2	0.4	6.4	0.6	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(50%),veh/ln	2.5	3.7	1.4	0.6	0.0	3.8	1.0	0.7	0.8	1.2	1.9	2.0
LnGrp Delay(d),s/veh	42.1	17.4	15.3	30.2	0.0	20.3	29.6	18.9	19.2	30.0	20.0	21.1
LnGrp LOS	D	B	B	C		C	C	B	B	C	C	C
Approach Vol, veh/h		538			308			240			502	
Approach Delay, s/veh		22.5			21.5			21.6			21.8	
Approach LOS		C			C			C			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	9.3	14.4	8.0	19.9	8.9	14.8	10.5	17.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.1	3.7	3.0	9.0	3.7	6.2	5.5	9.0
Green Ext Time (p_c), s	0.0	2.8	0.0	2.4	0.0	2.6	0.0	2.4

Intersection Summary		
HCM 2010 Ctrl Delay		21.9
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	321	117	10	258	41	63	191	24	90	292	170
Future Volume (veh/h)	149	321	117	10	258	41	63	191	24	90	292	170
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	162	349	127	11	280	45	68	208	26	98	317	185
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	155	587	499	25	378	61	103	826	100	125	653	305
Arrive On Green	0.09	0.31	0.31	0.01	0.24	0.24	0.06	0.18	0.18	0.07	0.19	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1567	252	1774	4596	559	1774	3390	1583
Grp Volume(v), veh/h	162	349	127	11	0	325	68	152	82	98	317	185
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1818	1774	1695	1764	1774	1695	1583
Q Serve(g_s), s	5.0	9.0	3.4	0.4	0.0	9.4	2.1	2.2	2.3	3.1	4.8	6.1
Cycle Q Clear(g_c), s	5.0	9.0	3.4	0.4	0.0	9.4	2.1	2.2	2.3	3.1	4.8	6.1
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	155	587	499	25	0	439	103	610	317	125	653	305
V/C Ratio(X)	1.04	0.59	0.25	0.44	0.00	0.74	0.66	0.25	0.26	0.78	0.49	0.61
Avail Cap(c_a), veh/h	155	588	500	155	0	574	155	1070	557	155	1070	500
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	16.5	14.6	27.9	0.0	20.0	26.3	20.1	20.1	26.1	20.5	21.1
Incr Delay (d2), s/veh	83.7	1.6	0.3	11.8	0.0	3.6	7.1	0.2	0.4	18.4	0.6	1.9
Initial Q Delay(d3),s/veh	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	4.8	1.5	0.3	0.0	5.1	1.2	1.0	1.2	2.2	2.3	2.8
LnGrp Delay(d),s/veh	109.9	18.1	14.8	39.7	0.0	23.6	33.5	20.3	20.6	44.5	21.1	23.0
LnGrp LOS	F	B	B	D		C	C	C	C	D	C	C
Approach Vol, veh/h		638			336			302			600	
Approach Delay, s/veh		40.8			24.2			23.3			25.5	
Approach LOS		D			C			C			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	10.0	16.3	6.8	24.0	9.3	17.0	11.0	19.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	5.1	4.3	2.4	11.0	4.1	8.1	7.0	11.4
Green Ext Time (p_c), s	0.0	3.4	0.0	2.4	0.0	2.9	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	321	181	62	258	41	82	223	51	90	461	170
Future Volume (veh/h)	149	321	181	62	258	41	82	223	51	90	461	170
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	162	349	197	67	280	45	89	242	55	98	501	185
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	147	493	419	99	372	60	114	885	192	125	806	288
Arrive On Green	0.08	0.26	0.26	0.06	0.24	0.24	0.06	0.21	0.21	0.07	0.22	0.22
Sat Flow, veh/h	1774	1863	1583	1774	1567	252	1774	4184	909	1774	3698	1322
Grp Volume(v), veh/h	162	349	197	67	0	325	89	194	103	98	458	228
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1818	1774	1695	1702	1774	1695	1630
Q Serve(g_s), s	5.0	10.2	6.3	2.2	0.0	10.0	3.0	2.9	3.1	3.3	7.4	7.7
Cycle Q Clear(g_c), s	5.0	10.2	6.3	2.2	0.0	10.0	3.0	2.9	3.1	3.3	7.4	7.7
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.53	1.00		0.81
Lane Grp Cap(c), veh/h	147	493	419	99	0	432	114	717	360	125	739	355
V/C Ratio(X)	1.10	0.71	0.47	0.68	0.00	0.75	0.78	0.27	0.29	0.78	0.62	0.64
Avail Cap(c_a), veh/h	147	555	472	147	0	542	147	1011	508	147	1011	486
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.7	20.1	18.7	28.0	0.0	21.4	27.8	19.9	20.0	27.6	21.3	21.5
Incr Delay (d2), s/veh	104.4	3.6	0.8	7.8	0.0	4.5	18.2	0.2	0.4	20.5	0.9	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(50%),veh/ln	6.7	5.7	2.9	1.3	0.0	5.5	2.0	1.4	1.5	2.3	3.5	3.6
LnGrp Delay(d),s/veh	132.1	23.7	19.5	35.7	0.0	25.9	46.0	20.1	20.4	48.1	22.2	23.4
LnGrp LOS	F	C	B	D		C	D	C	C	D	C	C
Approach Vol, veh/h		708			392			386			784	
Approach Delay, s/veh		47.3			27.6			26.2			25.8	
Approach LOS		D			C			C			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	10.3	18.8	9.4	22.0	9.9	19.2	11.0	20.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	5.3	5.1	4.2	12.2	5.0	9.7	7.0	12.0
Green Ext Time (p_c), s	0.0	4.5	0.0	2.3	0.0	3.5	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.9
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Taft Highway & South Union - PM Peak
Count Date: 1/20/2015

Ave Annual Growth: **3.26%**

Exist Peak Hour Volumes

SIGNALIZED

1	WBL	4
1	WBT	252
<	WBR	53
1	EBL	102
1	EBT	320
1	EBR	39
1	NBL	60
3	NBT	203
<	NBR	20
1	SBL	82
3	SBT	111
<	SBR	81
	TOTAL	1327

Year 2035
Fut. Volumes w/o Proj

WBL	8
WBT	354
WBR	94
EBL	188
EBT	456
EBR	80
NBL	125
NBT	532
NBR	41
SBL	148
SBT	289
SBR	150
TOTAL	2465

Year 2035 Fut. Vol
+ Project Traffic

WBL	56
WBT	354
WBR	94
EBL	188
EBT	456
EBR	174
NBL	194
NBT	597
NBR	102
SBL	148
SBT	392
SBR	150
TOTAL	2905

Year 2025
Fut. Volumes w/o Proj

WBL	6
WBT	300
WBR	71
EBL	139
EBT	383
EBR	56
NBL	87
NBT	332
NBR	29
SBL	111
SBT	181
SBR	111
TOTAL	1806

Year 2025 Fut. Vol
+ Project Traffic

WBL	30
WBT	300
WBR	71
EBL	139
EBT	383
EBR	103
NBL	122
NBT	365
NBR	60
SBL	111
SBT	233
SBR	111
TOTAL	2028

Project Generated Trips - Year 2035

	Total
WBL	48
WBT	0
WBR	0
EBL	0
EBT	0
EBR	94
NBL	69
NBT	65
NBR	61
SBL	0
SBT	103
SBR	0
TOTAL	440

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Taft Highway & South Union - PM Peak						
	Count Date:	1/20/2015						
2006	ADT							
WB Approach (To)	7.002							
WB Approach (Away)	6.638							
EB Approach (To)	6.58							
EB Approach (Away)	7.007							
NB Approach (To)	1.005							
NB Approach (Away)	1.074							
SB Approach (To)	1.873							
SB Approach (Away)	1.741							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	10.768		WBL	3.02	WBT	1.62	WBR	2.41
WB Approach (Away)	10.581		3.41%	8	1.67%	354	2.84%	94
EB Approach (To)	11.274		EBL	2.50	EBT	1.65	EBR	3.11
EB Approach (Away)	11.909		3.03%	188	1.75%	456	3.60%	80
NB Approach (To)	4.705		NBL	3.19	NBT	3.98	NBR	3.14
NB Approach (Away)	4.831		3.65%	125	4.82%	532	3.54%	41
SB Approach (To)	6.284		SBL	2.47	SBT	3.93	SBR	2.53
SB Approach (Away)	5.712		2.94%	148	4.79%	289	3.05%	150

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	320	39	4	252	53	60	203	20	82	111	81
Future Volume (veh/h)	102	320	39	4	252	53	60	203	20	82	111	81
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	111	348	42	4	274	58	65	221	22	89	121	88
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	141	613	521	10	380	80	105	578	56	125	454	212
Arrive On Green	0.08	0.33	0.33	0.01	0.25	0.25	0.06	0.12	0.12	0.07	0.13	0.13
Sat Flow, veh/h	1774	1863	1583	1774	1491	316	1774	4713	459	1774	3390	1583
Grp Volume(v), veh/h	111	348	42	4	0	332	65	158	85	89	121	88
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1807	1774	1695	1782	1774	1695	1583
Q Serve(g_s), s	3.1	7.8	0.9	0.1	0.0	8.5	1.8	2.2	2.2	2.5	1.6	2.6
Cycle Q Clear(g_c), s	3.1	7.8	0.9	0.1	0.0	8.5	1.8	2.2	2.2	2.5	1.6	2.6
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	141	613	521	10	0	460	105	415	218	125	454	212
V/C Ratio(X)	0.78	0.57	0.08	0.42	0.00	0.72	0.62	0.38	0.39	0.71	0.27	0.42
Avail Cap(c_a), veh/h	175	660	561	175	0	641	175	1202	632	175	1202	561
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	14.1	11.7	25.2	0.0	17.3	23.3	20.5	20.5	23.1	19.7	20.2
Incr Delay (d2), s/veh	16.9	1.0	0.1	26.4	0.0	2.4	5.8	0.6	1.1	7.8	0.3	1.3
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(50%),veh/ln	2.2	4.1	0.4	0.1	0.0	4.6	1.1	1.0	1.2	1.5	0.8	1.2
LnGrp Delay(d),s/veh	39.8	15.1	11.8	51.6	0.0	19.7	29.2	21.1	21.7	30.9	20.1	21.5
LnGrp LOS	D	B	B	D		B	C	C	C	C	C	C
Approach Vol, veh/h		501			336			308			298	
Approach Delay, s/veh		20.3			20.1			22.9			23.7	
Approach LOS		C			C			C			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	9.6	12.2	6.3	22.7	9.0	12.8	10.0	18.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.5	4.2	2.1	9.8	3.8	4.6	5.1	10.5
Green Ext Time (p_c), s	0.0	2.0	0.0	2.5	0.0	2.0	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	21.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	383	56	6	300	71	87	332	29	111	181	111
Future Volume (veh/h)	139	383	56	6	300	71	87	332	29	111	181	111
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	151	416	61	7	326	77	95	361	32	121	197	121
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	190	661	562	16	375	89	122	744	65	154	591	276
Arrive On Green	0.11	0.36	0.36	0.01	0.26	0.26	0.07	0.16	0.16	0.09	0.17	0.17
Sat Flow, veh/h	1774	1863	1583	1774	1458	344	1774	4764	416	1774	3390	1583
Grp Volume(v), veh/h	151	416	61	7	0	403	95	255	138	121	197	121
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1802	1774	1695	1789	1774	1695	1583
Q Serve(g_s), s	5.1	11.3	1.6	0.2	0.0	13.1	3.2	4.2	4.3	4.1	3.1	4.2
Cycle Q Clear(g_c), s	5.1	11.3	1.6	0.2	0.0	13.1	3.2	4.2	4.3	4.1	3.1	4.2
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	190	661	562	16	0	464	122	530	280	154	591	276
V/C Ratio(X)	0.80	0.63	0.11	0.43	0.00	0.87	0.78	0.48	0.49	0.79	0.33	0.44
Avail Cap(c_a), veh/h	203	661	562	145	0	531	174	1110	586	174	1110	518
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	16.4	13.2	30.1	0.0	21.7	28.0	23.5	23.6	27.3	22.1	22.5
Incr Delay (d2), s/veh	18.4	1.9	0.1	17.0	0.0	13.1	13.3	0.7	1.3	18.7	0.3	1.1
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(50%),veh/ln	3.4	6.1	0.7	0.2	0.0	8.2	2.0	2.0	2.2	2.8	1.5	1.9
LnGrp Delay(d),s/veh	45.1	18.3	13.3	47.1	0.0	34.8	41.4	24.2	24.9	46.1	22.4	23.6
LnGrp LOS	D	B	B	D		C	D	C	C	D	C	C
Approach Vol, veh/h		628			410			488			439	
Approach Delay, s/veh		24.2			35.0			27.7			29.3	
Approach LOS		C			D			C			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	11.3	15.5	6.6	27.7	10.2	16.7	12.5	21.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	20.0	5.0	20.0	6.0	20.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	6.1	6.3	2.2	13.3	5.2	6.2	7.1	15.1
Green Ext Time (p_c), s	0.0	3.2	0.0	2.7	0.0	3.3	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	28.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	383	103	30	300	71	122	365	60	111	233	111
Future Volume (veh/h)	139	383	103	30	300	71	122	365	60	111	233	111
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	151	416	112	33	326	77	133	397	65	121	253	121
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	189	638	542	61	394	93	168	763	122	154	569	251
Arrive On Green	0.11	0.34	0.34	0.03	0.27	0.27	0.09	0.17	0.17	0.09	0.16	0.16
Sat Flow, veh/h	1774	1863	1583	1774	1458	344	1774	4422	707	1774	3459	1525
Grp Volume(v), veh/h	151	416	112	33	0	403	133	302	160	121	248	126
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1802	1774	1695	1738	1774	1695	1594
Q Serve(g_s), s	5.5	12.5	3.3	1.2	0.0	13.9	4.8	5.3	5.5	4.4	4.3	4.7
Cycle Q Clear(g_c), s	5.5	12.5	3.3	1.2	0.0	13.9	4.8	5.3	5.5	4.4	4.3	4.7
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.41	1.00		0.96
Lane Grp Cap(c), veh/h	189	638	542	61	0	487	168	585	300	154	558	262
V/C Ratio(X)	0.80	0.65	0.21	0.54	0.00	0.83	0.79	0.52	0.53	0.79	0.44	0.48
Avail Cap(c_a), veh/h	215	650	552	135	0	546	188	1080	553	188	1080	507
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	18.4	15.3	31.3	0.0	22.6	29.2	24.8	24.9	29.5	24.8	25.0
Incr Delay (d2), s/veh	16.9	2.3	0.2	7.3	0.0	9.3	18.4	0.7	1.5	16.2	0.6	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(50%),veh/ln	3.6	6.8	1.5	0.7	0.0	8.1	3.2	2.5	2.8	2.8	2.1	2.2
LnGrp Delay(d),s/veh	45.7	20.6	15.5	38.6	0.0	31.9	47.6	25.5	26.3	45.7	25.4	26.4
LnGrp LOS	D	C	B	D		C	D	C	C	D	C	C
Approach Vol, veh/h		679			436			595			495	
Approach Delay, s/veh		25.4			32.4			30.7			30.6	
Approach LOS		C			C			C			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	11.7	17.4	8.3	28.6	12.2	16.9	13.0	23.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	21.0	5.0	23.0	7.0	21.0	8.0	20.0
Max Q Clear Time (g_c+I1), s	6.4	7.5	3.2	14.5	6.8	6.7	7.5	15.9
Green Ext Time (p_c), s	0.0	3.8	0.0	3.3	0.0	3.9	0.0	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	456	80	8	354	94	125	532	41	148	289	150
Future Volume (veh/h)	188	456	80	8	354	94	125	532	41	148	289	150
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	496	87	9	385	102	136	578	45	161	314	163
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	240	772	656	20	412	109	169	879	68	190	659	308
Arrive On Green	0.14	0.41	0.41	0.01	0.29	0.29	0.10	0.18	0.18	0.11	0.19	0.19
Sat Flow, veh/h	1774	1863	1583	1774	1420	376	1774	4815	372	1774	3390	1583
Grp Volume(v), veh/h	204	496	87	9	0	487	136	406	217	161	314	163
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1796	1774	1695	1797	1774	1695	1583
Q Serve(g_s), s	9.5	17.9	2.9	0.4	0.0	22.2	6.3	9.4	9.5	7.5	6.9	7.8
Cycle Q Clear(g_c), s	9.5	17.9	2.9	0.4	0.0	22.2	6.3	9.4	9.5	7.5	6.9	7.8
Prop In Lane	1.00		1.00	1.00		0.21	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	240	772	656	20	0	522	169	619	328	190	659	308
V/C Ratio(X)	0.85	0.64	0.13	0.45	0.00	0.93	0.81	0.66	0.66	0.85	0.48	0.53
Avail Cap(c_a), veh/h	253	772	656	105	0	533	190	805	427	190	805	376
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	19.7	15.3	41.4	0.0	29.1	37.3	32.0	32.0	36.9	30.1	30.5
Incr Delay (d2), s/veh	22.3	1.8	0.1	15.0	0.0	23.5	20.2	1.2	2.5	28.7	0.5	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(50%),veh/ln	6.1	9.5	1.3	0.3	0.0	14.4	4.0	4.5	4.9	5.2	3.3	3.5
LnGrp Delay(d),s/veh	57.8	21.5	15.4	56.4	0.0	52.6	57.5	33.2	34.5	65.6	30.7	31.9
LnGrp LOS	E	C	B	E		D	E	C	C	E	C	C
Approach Vol, veh/h		787			496			759			638	
Approach Delay, s/veh		30.2			52.7			37.9			39.8	
Approach LOS		C			D			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	15.0	21.4	6.9	40.9	14.0	22.4	17.4	30.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	20.0	5.0	32.0	9.0	20.0	12.0	25.0
Max Q Clear Time (g_c+I1), s	9.5	11.5	2.4	19.9	8.3	9.8	11.5	24.2
Green Ext Time (p_c), s	0.0	3.9	0.0	4.9	0.0	4.4	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	38.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	456	80	8	354	94	125	532	41	148	289	150
Future Volume (veh/h)	188	456	80	8	354	94	125	532	41	148	289	150
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	496	87	9	385	102	136	578	45	161	314	163
Adj No. of Lanes	1	2	1	1	2	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	246	1182	529	20	574	150	171	954	74	199	724	338
Arrive On Green	0.14	0.33	0.33	0.01	0.21	0.21	0.10	0.20	0.20	0.11	0.21	0.21
Sat Flow, veh/h	1774	3539	1583	1774	2776	728	1774	4815	372	1774	3390	1583
Grp Volume(v), veh/h	204	496	87	9	244	243	136	406	217	161	314	163
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1734	1774	1695	1797	1774	1695	1583
Q Serve(g_s), s	7.8	7.6	2.7	0.4	8.8	9.0	5.2	7.6	7.7	6.2	5.6	6.3
Cycle Q Clear(g_c), s	7.8	7.6	2.7	0.4	8.8	9.0	5.2	7.6	7.7	6.2	5.6	6.3
Prop In Lane	1.00		1.00	1.00		0.42	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	246	1182	529	20	366	358	171	672	356	199	724	338
V/C Ratio(X)	0.83	0.42	0.16	0.44	0.67	0.68	0.79	0.60	0.61	0.81	0.43	0.48
Avail Cap(c_a), veh/h	280	1219	545	127	457	448	204	924	490	204	924	432
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	29.2	18.0	16.4	34.2	25.4	25.5	30.8	25.5	25.5	30.2	23.7	24.0
Incr Delay (d2), s/veh	16.7	0.2	0.1	14.3	2.6	2.9	16.5	0.9	1.7	20.8	0.4	1.1
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(50%),veh/ln	4.9	3.7	1.2	0.3	4.6	4.6	3.4	3.6	4.0	4.1	2.7	2.9
LnGrp Delay(d),s/veh	45.9	18.2	16.5	48.6	28.0	28.5	47.3	26.3	27.2	51.0	24.2	25.1
LnGrp LOS	D	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		787			496			759			638	
Approach Delay, s/veh		25.2			28.6			30.3			31.2	
Approach LOS		C			C			C			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	13.8	19.8	6.8	29.3	12.7	20.9	15.7	20.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	19.0	5.0	24.0	8.0	19.0	11.0	18.0
Max Q Clear Time (g_c+I1), s	8.2	9.7	2.4	9.6	7.2	8.3	9.8	11.0
Green Ext Time (p_c), s	0.0	4.1	0.0	5.3	0.0	4.5	0.1	3.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	456	174	56	354	94	194	597	102	148	392	150
Future Volume (veh/h)	188	456	174	56	354	94	194	597	102	148	392	150
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	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	204	496	189	61	385	102	211	649	111	161	426	163
Adj No. of Lanes	1	2	1	1	2	0	1	3	0	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	2	2	2	2	2	2
Cap, veh/h	242	1022	457	86	557	146	242	976	165	199	728	267
Arrive On Green	0.14	0.29	0.29	0.05	0.20	0.20	0.14	0.22	0.22	0.11	0.20	0.20
Sat Flow, veh/h	1774	3539	1583	1774	2776	728	1774	4382	740	1774	3670	1345
Grp Volume(v), veh/h	204	496	189	61	244	243	211	500	260	161	392	197
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1734	1774	1695	1732	1774	1695	1625
Q Serve(g_s), s	8.2	8.5	7.1	2.5	9.4	9.5	8.5	9.9	10.0	6.5	7.7	8.1
Cycle Q Clear(g_c), s	8.2	8.5	7.1	2.5	9.4	9.5	8.5	9.9	10.0	6.5	7.7	8.1
Prop In Lane	1.00		1.00	1.00		0.42	1.00		0.43	1.00		0.83
Lane Grp Cap(c), veh/h	242	1022	457	86	355	348	242	755	386	199	672	322
V/C Ratio(X)	0.84	0.49	0.41	0.71	0.69	0.70	0.87	0.66	0.67	0.81	0.58	0.61
Avail Cap(c_a), veh/h	242	1022	457	170	435	426	242	833	426	242	833	400
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	30.8	21.5	21.0	34.3	27.1	27.2	31.0	26.0	26.0	31.7	26.6	26.8
Incr Delay (d2), s/veh	22.6	0.4	0.6	10.2	3.4	3.8	27.2	1.7	3.7	15.3	0.8	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(50%),veh/ln	5.5	4.2	3.1	1.5	4.9	4.9	6.0	4.8	5.2	4.0	3.7	3.8
LnGrp Delay(d),s/veh	53.4	21.9	21.6	44.5	30.5	31.0	58.2	27.7	29.7	47.1	27.4	28.6
LnGrp LOS	D	C	C	D	C	C	E	C	C	D	C	C
Approach Vol, veh/h		889			548			971			750	
Approach Delay, s/veh		29.1			32.3			34.9			32.0	
Approach LOS		C			C			C			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	14.2	22.3	9.6	27.1	16.0	20.5	16.0	20.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	18.0	7.0	21.0	10.0	18.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	8.5	12.0	4.5	10.5	10.5	10.1	10.2	11.5
Green Ext Time (p_c), s	0.1	3.6	0.0	4.7	0.0	4.4	0.0	3.2

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Panama Road & Cottonwood - AM Peak
Count Date: 1/21/2015

Ave Annual Growth: **5.70%**

Exist Peak Hour Volumes

AWS		
>	WBL	3
1	WBT	186
<	WBR	35
>	EBL	12
1	EBT	235
<	EBR	11
>	NBL	9
1	NBT	31
<	NBR	1
>	SBL	40
1	SBT	38
<	SBR	24
	TOTAL	625

Year 2035
Fut. Volumes w/o Proj

WBL	3
WBT	257
WBR	289
EBL	100
EBT	331
EBR	13
NBL	10
NBT	217
NBR	1
SBL	306
SBT	246
SBR	182
TOTAL	1955

Year 2035 Fut. Vol
+ Project Traffic

WBL	26
WBT	283
WBR	289
EBL	105
EBT	348
EBR	13
NBL	10
NBT	220
NBR	5
SBL	306
SBT	270
SBR	204
TOTAL	2079

Year 2025
Fut. Volumes w/o Proj

WBL	3
WBT	220
WBR	103
EBL	35
EBT	280
EBR	12
NBL	10
NBT	84
NBR	1
SBL	113
SBT	99
SBR	68
TOTAL	1028

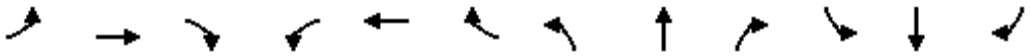
Year 2025 Fut. Vol
+ Project Traffic

WBL	15
WBT	233
WBR	103
EBL	38
EBT	289
EBR	12
NBL	10
NBT	86
NBR	3
SBL	113
SBT	111
SBR	79
TOTAL	1092

Project Generated Trips - Year 2035

	Total
WBL	23
WBT	26
WBR	0
EBL	5
EBT	17
EBR	0
NBL	0
NBT	3
NBR	4
SBL	0
SBT	24
SBR	22
TOTAL	124

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Road & Cottonwood - AM Peak						
	Count Date:	1/21/2015						
2006	ADT							
WB Approach (To)	6.536							
WB Approach (Away)	6.152							
EB Approach (To)	6.343							
EB Approach (Away)	6.711							
NB Approach (To)	0.197							
NB Approach (Away)	0.215							
SB Approach (To)	0.072							
SB Approach (Away)	0.07							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	10.399		WBL	1.28	WBT	1.59	WBR	102.94
WB Approach (Away)	9.925		0.74%	3	1.60%	257	10.87%	289
EB Approach (To)	10.397		EBL	102.96	EBT	1.63	EBR	1.30
EB Approach (Away)	10.609		10.92%	100	1.69%	331	0.79%	13
NB Approach (To)	0.187		NBL	1.27	NBT	102.62	NBR	1.28
NB Approach (Away)	0.207		0.71%	10	9.97%	217	0.74%	1
SB Approach (To)	11.89		SBL	83.38	SBT	83.05	SBR	83.36
SB Approach (Away)	14.3		10.45%	306	9.56%	246	10.42%	182



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.979			0.997			0.968	
Flt Protected		0.998			0.999			0.989			0.981	
Satd. Flow (prot)	0	1848	0	0	1822	0	0	1837	0	0	1769	0
Flt Permitted		0.998			0.999			0.989			0.981	
Satd. Flow (perm)	0	1848	0	0	1822	0	0	1837	0	0	1769	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5277			405			2634			5300	
Travel Time (s)		65.4			5.0			32.7			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	12	235	11	0	3	186	35	0	9	31	1
Future Vol, veh/h	0	12	235	11	0	3	186	35	0	9	31	1
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	255	12	0	3	202	38	0	10	34	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.2	9.7	8.8
HCM LOS	B	A	A

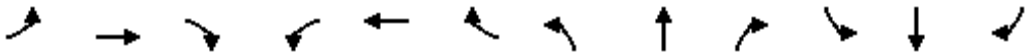
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	5%	1%	39%
Vol Thru, %	76%	91%	83%	37%
Vol Right, %	2%	4%	16%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	258	224	102
LT Vol	9	12	3	40
Through Vol	31	235	186	38
RT Vol	1	11	35	24
Lane Flow Rate	45	280	243	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.066	0.358	0.309	0.158
Departure Headway (Hd)	5.315	4.592	4.562	5.118
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	668	780	784	696
Service Time	3.389	2.64	2.611	3.183
HCM Lane V/C Ratio	0.067	0.359	0.31	0.159
HCM Control Delay	8.8	10.2	9.7	9.2
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.2	1.6	1.3	0.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	40	38	24
Future Vol, veh/h	0	40	38	24
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	43	41	26
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.2
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.957			0.999			0.967	
Flt Protected		0.995						0.995			0.980	
Satd. Flow (prot)	0	1844	0	0	1783	0	0	1852	0	0	1765	0
Flt Permitted		0.995						0.995			0.980	
Satd. Flow (perm)	0	1844	0	0	1783	0	0	1852	0	0	1765	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5277			405			2634			5300	
Travel Time (s)		65.4			5.0			32.7			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	35	280	12	0	3	220	103	0	10	84	1
Future Vol, veh/h	0	35	280	12	0	3	220	103	0	10	84	1
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	38	304	13	0	3	239	112	0	11	91	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	16.8	15.9	11.4
HCM LOS	C	C	B

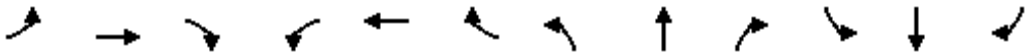
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	11%	1%	40%
Vol Thru, %	88%	86%	67%	35%
Vol Right, %	1%	4%	32%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	327	326	280
LT Vol	10	35	3	113
Through Vol	84	280	220	99
RT Vol	1	12	103	68
Lane Flow Rate	103	355	354	304
Geometry Grp	1	1	1	1
Degree of Util (X)	0.195	0.576	0.558	0.523
Departure Headway (Hd)	6.791	5.965	5.797	6.182
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	531	608	627	587
Service Time	4.806	3.965	3.797	4.188
HCM Lane V/C Ratio	0.194	0.584	0.565	0.518
HCM Control Delay	11.4	16.8	15.9	15.8
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	0.7	3.7	3.4	3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	113	99	68
Future Vol, veh/h	0	113	99	68
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	123	108	74
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	15.8
HCM LOS	C

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.960			0.996			0.965	
Flt Protected		0.994			0.998			0.995			0.982	
Satd. Flow (prot)	0	1842	0	0	1785	0	0	1846	0	0	1765	0
Flt Permitted		0.994			0.998			0.995			0.982	
Satd. Flow (perm)	0	1842	0	0	1785	0	0	1846	0	0	1765	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5277			405			2634			5300	
Travel Time (s)		65.4			5.0			32.7			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	18.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	38	289	12	0	15	233	103	0	10	86	3
Future Vol, veh/h	0	38	289	12	0	15	233	103	0	10	86	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	41	314	13	0	16	253	112	0	11	93	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	19.4	19	12.1
HCM LOS	C	C	B

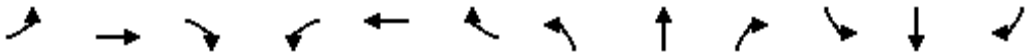
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	11%	4%	37%
Vol Thru, %	87%	85%	66%	37%
Vol Right, %	3%	4%	29%	26%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	339	351	303
LT Vol	10	38	15	113
Through Vol	86	289	233	111
RT Vol	3	12	103	79
Lane Flow Rate	108	368	382	329
Geometry Grp	1	1	1	1
Degree of Util (X)	0.212	0.633	0.636	0.584
Departure Headway (Hd)	7.103	6.182	6.005	6.38
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	503	582	599	563
Service Time	5.181	4.237	4.06	4.436
HCM Lane V/C Ratio	0.215	0.632	0.638	0.584
HCM Control Delay	12.1	19.4	19	18.1
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	0.8	4.4	4.5	3.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	113	111	79
Future Vol, veh/h	0	113	111	79
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	123	121	86
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	18.1
HCM LOS	C

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.929			0.999			0.967	
Flt Protected		0.989						0.998			0.980	
Satd. Flow (prot)	0	1835	0	0	1730	0	0	1857	0	0	1765	0
Flt Permitted		0.989						0.998			0.980	
Satd. Flow (perm)	0	1835	0	0	1730	0	0	1857	0	0	1765	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5277			405			2634			5300	
Travel Time (s)		65.4			5.0			32.7			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	68.8
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	100	331	13	0	3	257	289	0	10	217	1
Future Vol, veh/h	0	100	331	13	0	3	257	289	0	10	217	1
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	360	14	0	3	279	314	0	11	236	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	74.7	73.1	29.7
HCM LOS	F	F	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	23%	1%	42%
Vol Thru, %	95%	75%	47%	34%
Vol Right, %	0%	3%	53%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	228	444	549	734
LT Vol	10	100	3	306
Through Vol	217	331	257	246
RT Vol	1	13	289	182
Lane Flow Rate	248	483	597	798
Geometry Grp	1	1	1	1
Degree of Util (X)	0.663	1	1	1
Departure Headway (Hd)	9.637	8.715	8.373	8.622
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	377	415	436	423
Service Time	7.637	6.783	6.441	6.69
HCM Lane V/C Ratio	0.658	1.164	1.369	1.887
HCM Control Delay	29.7	74.7	73.1	74.2
HCM Lane LOS	D	F	F	F
HCM 95th-tile Q	4.6	12.4	12.6	12.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	306	246	182
Future Vol, veh/h	0	306	246	182
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	333	267	198
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	74.2
HCM LOS	F

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 w/o Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Taft Highway

Minor St: Cottonwood Road

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

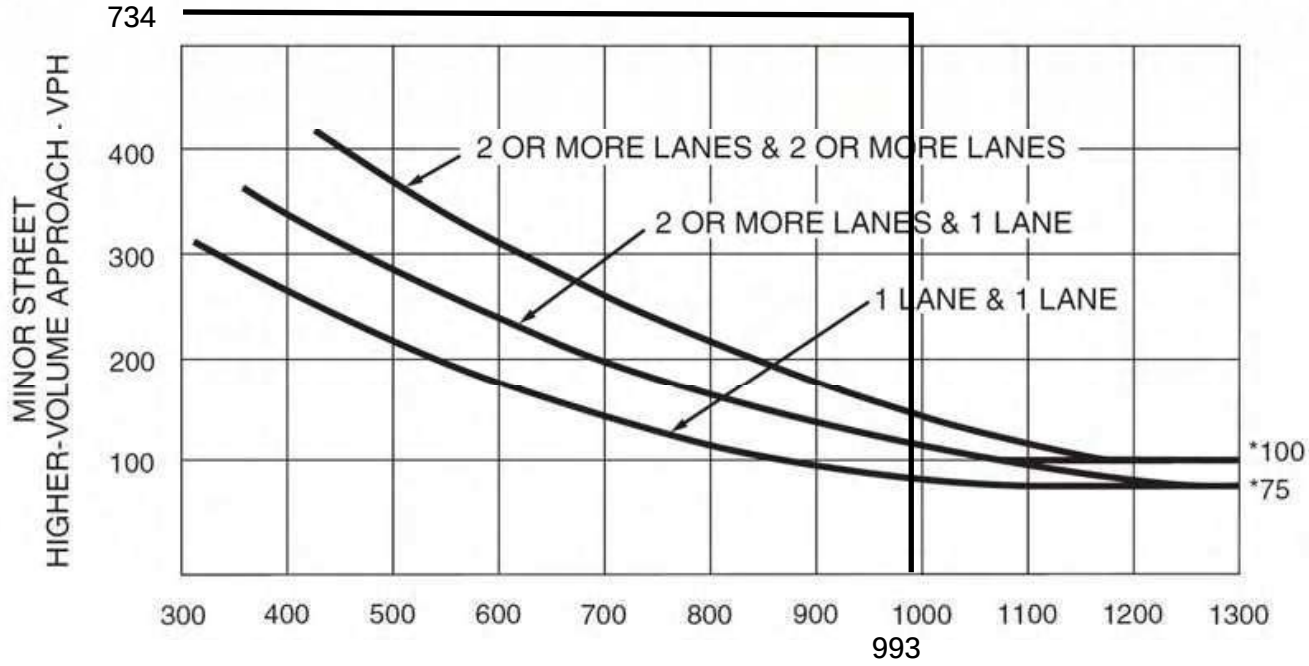
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 11916 / Minor Street 8808	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 11916 / Minor Street 8808	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied ____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

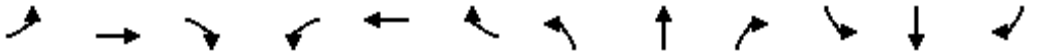
The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



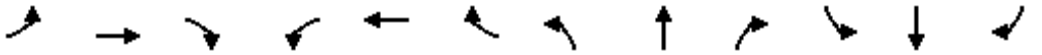
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	331	13	3	257	289	10	217	1	306	246	182
Future Volume (veh/h)	100	331	13	3	257	289	10	217	1	306	246	182
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	109	360	14	3	279	314	11	236	1	333	267	198
Adj No. of Lanes	2	2	1	1	2	1	1	1	0	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	211	1008	451	7	805	360	24	323	1	366	684	581
Arrive On Green	0.06	0.28	0.28	0.00	0.23	0.23	0.01	0.17	0.17	0.21	0.37	0.37
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1854	8	1774	1863	1583
Grp Volume(v), veh/h	109	360	14	3	279	314	11	0	237	333	267	198
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	0	1861	1774	1863	1583
Q Serve(g_s), s	2.2	5.9	0.5	0.1	4.8	13.9	0.4	0.0	8.8	13.3	7.7	6.6
Cycle Q Clear(g_c), s	2.2	5.9	0.5	0.1	4.8	13.9	0.4	0.0	8.8	13.3	7.7	6.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	211	1008	451	7	805	360	24	0	325	366	684	581
V/C Ratio(X)	0.52	0.36	0.03	0.42	0.35	0.87	0.45	0.00	0.73	0.91	0.39	0.34
Avail Cap(c_a), veh/h	237	1008	451	122	877	392	122	0	461	366	718	610
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	20.7	18.8	36.1	23.5	27.0	35.6	0.0	28.4	28.2	17.0	16.6
Incr Delay (d2), s/veh	2.0	0.2	0.0	34.5	0.3	17.8	12.6	0.0	3.5	25.8	0.4	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(50%),veh/ln	1.1	2.9	0.2	0.1	2.4	7.8	0.3	0.0	4.8	9.1	4.0	2.9
LnGrp Delay(d),s/veh	35.0	20.9	18.8	70.5	23.8	44.9	48.1	0.0	31.8	54.0	17.3	17.0
LnGrp LOS	D	C	B	E	C	D	D		C	D	B	B
Approach Vol, veh/h		483			596			248			798	
Approach Delay, s/veh		24.0			35.1			32.6			32.5	
Approach LOS		C			D			C			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	21.0	18.7	6.3	26.7	7.0	32.7	10.4	22.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	15.0	18.0	5.0	18.0	5.0	28.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	15.3	10.8	2.1	7.9	2.4	9.7	4.2	15.9
Green Ext Time (p_c), s	0.0	1.9	0.0	3.4	0.0	3.0	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	348	13	26	283	289	10	220	5	306	270	204
Future Volume (veh/h)	105	348	13	26	283	289	10	220	5	306	270	204
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	114	378	14	28	308	314	11	239	5	333	293	222
Adj No. of Lanes	2	2	1	1	2	1	1	1	0	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	212	917	410	53	804	360	24	326	7	363	689	586
Arrive On Green	0.06	0.26	0.26	0.03	0.23	0.23	0.01	0.18	0.18	0.20	0.37	0.37
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	1818	38	1774	1863	1583
Grp Volume(v), veh/h	114	378	14	28	308	314	11	0	244	333	293	222
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	0	1856	1774	1863	1583
Q Serve(g_s), s	2.4	6.5	0.5	1.1	5.4	14.0	0.5	0.0	9.1	13.5	8.6	7.5
Cycle Q Clear(g_c), s	2.4	6.5	0.5	1.1	5.4	14.0	0.5	0.0	9.1	13.5	8.6	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	212	917	410	53	804	360	24	0	332	363	689	586
V/C Ratio(X)	0.54	0.41	0.03	0.53	0.38	0.87	0.45	0.00	0.73	0.92	0.42	0.38
Avail Cap(c_a), veh/h	235	917	410	121	869	389	121	0	456	363	712	605
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.4	22.5	20.3	35.1	24.0	27.3	35.9	0.0	28.4	28.5	17.3	16.9
Incr Delay (d2), s/veh	2.1	0.3	0.0	8.1	0.3	18.2	12.6	0.0	3.9	27.5	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(50%),veh/ln	1.2	3.2	0.2	0.7	2.7	7.9	0.3	0.0	5.0	9.3	4.5	3.3
LnGrp Delay(d),s/veh	35.5	22.8	20.3	43.2	24.3	45.5	48.5	0.0	32.3	56.0	17.7	17.3
LnGrp LOS	D	C	C	D	C	D	D		C	E	B	B
Approach Vol, veh/h		506			650			255			848	
Approach Delay, s/veh		25.6			35.3			33.0			32.6	
Approach LOS		C			D			C			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	21.0	19.1	8.2	25.0	7.0	33.1	10.5	22.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	15.0	18.0	5.0	18.0	5.0	28.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	15.5	11.1	3.1	8.5	2.5	10.6	4.4	16.0
Green Ext Time (p_c), s	0.0	2.0	0.0	3.5	0.0	3.2	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Panama Road & Cottonwood Rd. - PM Peak

Count Date: 1/21/2015

Ave Annual Growth: **5.70%**

Exist Peak Hour Volumes

AWS		
>	WBL	8
1	WBT	313
<	WBR	71
>	EBL	28
1	EBT	340
<	EBR	14
>	NBL	8
1	NBT	90
<	NBR	3
>	SBL	66
1	SBT	51
<	SBR	32
	TOTAL	1024

Year 2035
Fut. Volumes w/o Proj

WBL	9
WBT	433
WBR	585
EBL	233
EBT	479
EBR	16
NBL	9
NBT	629
NBR	3
SBL	504
SBT	330
SBR	243
TOTAL	3473

Year 2035 Fut. Vol
+ Project Traffic

WBL	19
WBT	463
WBR	585
EBL	242
EBT	523
EBR	16
NBL	9
NBT	651
NBR	44
SBL	504
SBT	342
SBR	256
TOTAL	3654

Year 2025
Fut. Volumes w/o Proj

WBL	9
WBT	370
WBR	209
EBL	83
EBT	405
EBR	15
NBL	9
NBT	243
NBR	3
SBL	186
SBT	132
SBR	90
TOTAL	1754

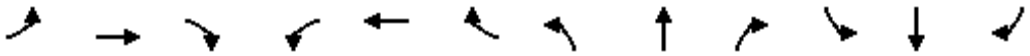
Year 2025 Fut. Vol
+ Project Traffic

WBL	14
WBT	385
WBR	209
EBL	88
EBT	427
EBR	15
NBL	9
NBT	254
NBR	24
SBL	186
SBT	138
SBR	97
TOTAL	1846

Project Generated Trips - Year 2035

	Total
WBL	10
WBT	30
WBR	0
EBL	9
EBT	44
EBR	0
NBL	0
NBT	22
NBR	41
SBL	0
SBT	12
SBR	13
TOTAL	181

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Panama Road & Cottonwood Rd. - PM Peak						
	Count Date:	1/21/2015						
2006	ADT							
WB Approach (To)	6.536							
WB Approach (Away)	6.152							
EB Approach (To)	6.343							
EB Approach (Away)	6.711							
NB Approach (To)	0.197							
NB Approach (Away)	0.215							
SB Approach (To)	0.072							
SB Approach (Away)	0.07							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	10.399		WBL	1.28	WBT	1.59	WBR	102.94
WB Approach (Away)	9.925		0.74%	9	1.60%	433	10.87%	585
EB Approach (To)	10.397		EBL	102.96	EBT	1.63	EBR	1.30
EB Approach (Away)	10.609		10.92%	233	1.69%	479	0.79%	16
NB Approach (To)	0.187		NBL	1.27	NBT	102.62	NBR	1.28
NB Approach (Away)	0.207		0.71%	9	9.97%	629	0.74%	3
SB Approach (To)	11.89		SBL	83.38	SBT	83.05	SBR	83.36
SB Approach (Away)	14.3		10.45%	504	9.56%	330	10.42%	243



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.976			0.996			0.971	
Flt Protected		0.996			0.999			0.996			0.978	
Satd. Flow (prot)	0	1846	0	0	1816	0	0	1848	0	0	1769	0
Flt Permitted		0.996			0.999			0.996			0.978	
Satd. Flow (perm)	0	1846	0	0	1816	0	0	1848	0	0	1769	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5277			405			2634			5300	
Travel Time (s)		65.4			5.0			32.7			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	28	340	14	0	8	313	71	0	8	90	3
Future Vol, veh/h	0	28	340	14	0	8	313	71	0	8	90	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	30	370	15	0	9	340	77	0	9	98	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	17.5	17.4	11.3
HCM LOS	C	C	B

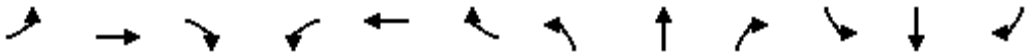
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	7%	2%	44%
Vol Thru, %	89%	89%	80%	34%
Vol Right, %	3%	4%	18%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	382	392	149
LT Vol	8	28	8	66
Through Vol	90	340	313	51
RT Vol	3	14	71	32
Lane Flow Rate	110	415	426	162
Geometry Grp	1	1	1	1
Degree of Util (X)	0.2	0.631	0.635	0.286
Departure Headway (Hd)	6.544	5.47	5.367	6.36
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	543	656	669	560
Service Time	4.644	3.538	3.435	4.452
HCM Lane V/C Ratio	0.203	0.633	0.637	0.289
HCM Control Delay	11.3	17.5	17.4	12
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	0.7	4.5	4.5	1.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	66	51	32
Future Vol, veh/h	0	66	51	32
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	72	55	35
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	12
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.952			0.999			0.970	
Flt Protected		0.992			0.999			0.998			0.978	
Satd. Flow (prot)	0	1840	0	0	1772	0	0	1857	0	0	1767	0
Flt Permitted		0.992			0.999			0.998			0.978	
Satd. Flow (perm)	0	1840	0	0	1772	0	0	1857	0	0	1767	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5277			405			2634			5300	
Travel Time (s)		65.4			5.0			32.7			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	69.3
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	83	405	15	0	9	370	209	0	9	243	3
Future Vol, veh/h	0	83	405	15	0	9	370	209	0	9	243	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	90	440	16	0	10	402	227	0	10	264	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	75.5	74.5	35.7
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	17%	2%	46%
Vol Thru, %	95%	81%	63%	32%
Vol Right, %	1%	3%	36%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	255	503	588	408
LT Vol	9	83	9	186
Through Vol	243	405	370	132
RT Vol	3	15	209	90
Lane Flow Rate	277	547	639	443
Geometry Grp	1	1	1	1
Degree of Util (X)	0.742	1	1	1
Departure Headway (Hd)	9.631	8.976	8.751	8.92
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	377	410	422	412
Service Time	7.631	6.976	6.751	6.92
HCM Lane V/C Ratio	0.735	1.334	1.514	1.075
HCM Control Delay	35.7	75.5	74.5	75.3
HCM Lane LOS	E	F	F	F
HCM 95th-tile Q	5.8	12.3	12.4	12.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	186	132	90
Future Vol, veh/h	0	186	132	90
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	202	143	98
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	75.3
HCM LOS	F

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 w/o Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Taft Highway

Minor St: Cottonwood Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

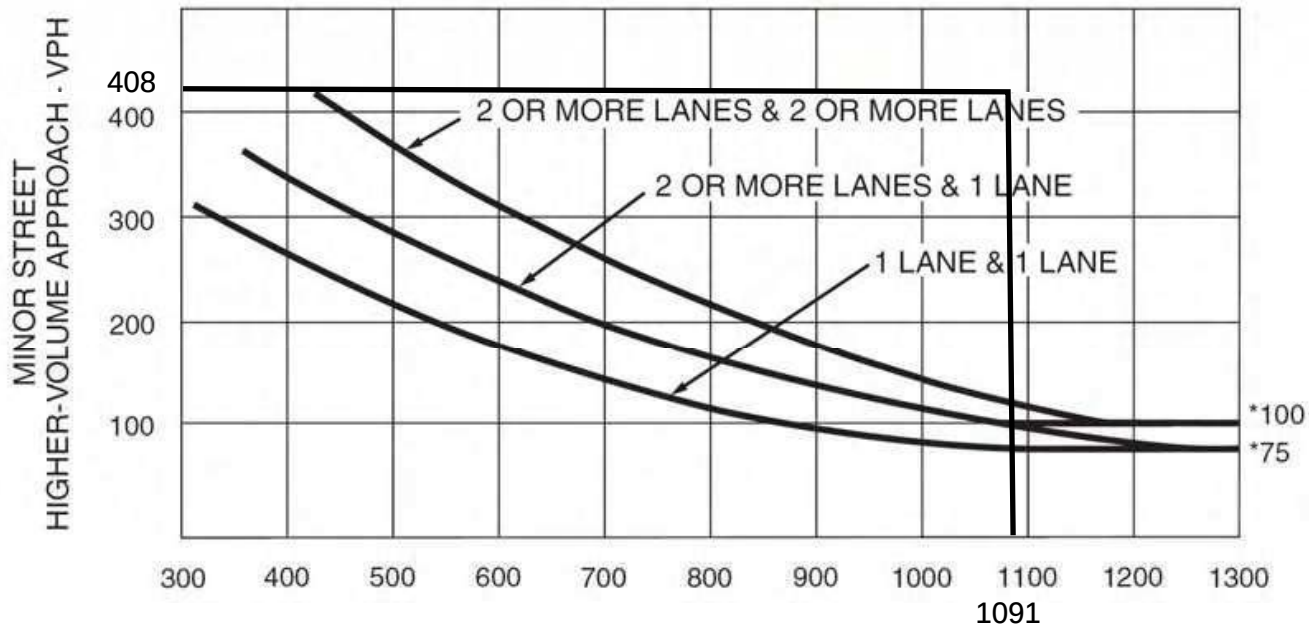
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 10910 / Minor Street 4080	Urban / Rural	Urban / Rural
1..... 1..... 2 or More..... 1..... 2 or More..... 2 or More..... 1..... 2 or More.....	8,000 / 5,600 9,600 / 6,720 9,600 / 6,720 8,000 / 5,600	2,400 / 1,680 2,400 / 1,680 3,200 / 2,240 3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 10910 / Minor Street 4080	Urban / Rural	Urban / Rural
1..... 1..... 2 or More..... 1..... 2 or More..... 2 or More..... 1..... 2 or More.....	12,000 / 8,400 14,400 / 10,080 14,400 / 10,080 12,000 / 8,400	1,200 / 850 1,200 / 850 1,600 / 1,120 1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	405	15	9	370	209	9	243	3	186	132	90
Future Volume (veh/h)	83	405	15	9	370	209	9	243	3	186	132	90
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	90	440	16	10	402	227	10	264	3	202	143	98
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	115	560	476	23	462	393	23	348	296	242	579	492
Arrive On Green	0.06	0.30	0.30	0.01	0.25	0.25	0.01	0.19	0.19	0.14	0.31	0.31
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	90	440	16	10	402	227	10	264	3	202	143	98
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.3	14.3	0.5	0.4	13.7	8.3	0.4	8.9	0.1	7.3	3.8	3.0
Cycle Q Clear(g_c), s	3.3	14.3	0.5	0.4	13.7	8.3	0.4	8.9	0.1	7.3	3.8	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	560	476	23	462	393	23	348	296	242	579	492
V/C Ratio(X)	0.78	0.79	0.03	0.44	0.87	0.58	0.44	0.76	0.01	0.84	0.25	0.20
Avail Cap(c_a), veh/h	134	560	476	134	508	432	134	536	456	242	649	552
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	30.4	21.1	16.3	32.4	23.8	21.8	32.4	25.4	21.9	27.8	17.0	16.7
Incr Delay (d2), s/veh	22.1	7.3	0.0	13.1	14.1	1.6	13.1	3.4	0.0	21.6	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(50%),veh/ln	2.3	8.5	0.2	0.3	8.8	3.8	0.3	4.9	0.0	5.0	2.0	1.3
LnGrp Delay(d),s/veh	52.5	28.5	16.3	45.5	37.9	23.4	45.5	28.8	21.9	49.4	17.2	16.9
LnGrp LOS	D	C	B	D	D	C	D	C	C	D	B	B
Approach Vol, veh/h		546			639			277			443	
Approach Delay, s/veh		32.1			32.8			29.3			31.8	
Approach LOS		C			C			C			C	

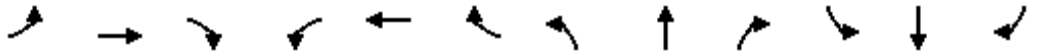
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	18.3	6.8	25.8	6.8	26.5	10.3	22.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	19.0	5.0	18.0	5.0	23.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	9.3	10.9	2.4	16.3	2.4	5.8	5.3	15.7
Green Ext Time (p_c), s	0.0	1.5	0.0	1.0	0.0	2.1	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	427	15	14	385	209	9	254	24	186	138	97
Future Volume (veh/h)	88	427	15	14	385	209	9	254	24	186	138	97
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	96	464	16	15	418	227	10	276	26	202	150	105
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	123	589	501	32	494	420	22	354	301	242	585	497
Arrive On Green	0.07	0.32	0.32	0.02	0.27	0.27	0.01	0.19	0.19	0.14	0.31	0.31
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	96	464	16	15	418	227	10	276	26	202	150	105
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.8	16.1	0.5	0.6	15.1	8.7	0.4	10.0	1.0	7.9	4.3	3.5
Cycle Q Clear(g_c), s	3.8	16.1	0.5	0.6	15.1	8.7	0.4	10.0	1.0	7.9	4.3	3.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	123	589	501	32	494	420	22	354	301	242	585	497
V/C Ratio(X)	0.78	0.79	0.03	0.47	0.85	0.54	0.45	0.78	0.09	0.83	0.26	0.21
Avail Cap(c_a), veh/h	150	589	501	125	552	469	125	500	425	250	631	537
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	32.4	22.0	16.7	34.4	24.6	22.3	34.7	27.3	23.6	29.8	18.1	17.8
Incr Delay (d2), s/veh	19.1	7.0	0.0	10.3	10.7	1.1	13.3	5.1	0.1	20.3	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(50%),veh/ln	2.5	9.4	0.2	0.4	9.1	3.9	0.3	5.6	0.4	5.2	2.2	1.5
LnGrp Delay(d),s/veh	51.5	29.1	16.7	44.7	35.4	23.4	48.1	32.4	23.7	50.1	18.3	18.1
LnGrp LOS	D	C	B	D	D	C	D	C	C	D	B	B
Approach Vol, veh/h		576			660			312			457	
Approach Delay, s/veh		32.5			31.5			32.2			32.3	
Approach LOS		C			C			C			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	15.7	19.5	7.3	28.4	6.9	28.2	10.9	24.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	19.0	5.0	22.0	5.0	24.0	6.0	21.0
Max Q Clear Time (g_c+I1), s	9.9	12.0	2.6	18.1	2.4	6.3	5.8	17.1
Green Ext Time (p_c), s	0.0	1.5	0.0	2.0	0.0	2.3	0.0	1.7

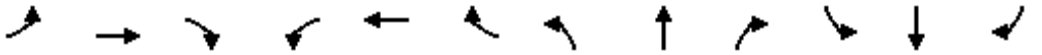
Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	479	16	9	433	585	9	629	3	504	330	243
Future Volume (veh/h)	233	479	16	9	433	585	9	629	3	504	330	243
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	253	521	17	10	471	636	10	684	3	548	359	264
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
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	2	2	2	2	2	2
Cap, veh/h	189	563	478	20	385	327	20	559	475	402	960	816
Arrive On Green	0.11	0.30	0.30	0.01	0.21	0.21	0.01	0.30	0.30	0.23	0.52	0.52
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	253	521	17	10	471	636	10	684	3	548	359	264
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	16.0	40.7	1.1	0.8	31.0	31.0	0.8	45.0	0.2	34.0	17.4	14.5
Cycle Q Clear(g_c), s	16.0	40.7	1.1	0.8	31.0	31.0	0.8	45.0	0.2	34.0	17.4	14.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	189	563	478	20	385	327	20	559	475	402	960	816
V/C Ratio(X)	1.34	0.93	0.04	0.50	1.22	1.94	0.50	1.22	0.01	1.36	0.37	0.32
Avail Cap(c_a), veh/h	189	563	478	59	385	327	59	559	475	402	960	816
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	67.0	50.7	36.9	73.7	59.5	59.5	73.7	52.5	36.8	58.0	21.8	21.1
Incr Delay (d2), s/veh	182.9	21.5	0.0	17.6	121.7	435.7	17.6	116.1	0.0	178.6	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(50%),veh/ln	17.4	24.4	0.5	0.5	28.9	53.1	0.5	41.1	0.1	36.6	8.9	6.4
LnGrp Delay(d),s/veh	249.9	72.3	37.0	91.4	181.2	495.2	91.4	168.6	36.8	236.6	22.1	21.4
LnGrp LOS	F	E	D	F	F	F	F	F	D	F	C	C
Approach Vol, veh/h		791			1117			697			1171	
Approach Delay, s/veh		128.3			359.2			166.9			122.3	
Approach LOS		F			F			F			F	

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	40.0	51.0	7.7	51.3	7.7	83.3	22.0	37.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	34.0	45.0	5.0	42.0	5.0	74.0	16.0	31.0
Max Q Clear Time (g_c+I1), s	36.0	47.0	2.8	42.7	2.8	19.4	18.0	33.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0

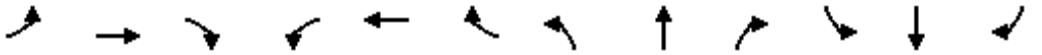
Intersection Summary	
HCM 2010 Ctrl Delay	201.9
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	479	16	9	433	585	9	629	3	504	330	243
Future Volume (veh/h)	233	479	16	9	433	585	9	629	3	504	330	243
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	253	521	17	10	471	636	10	684	3	548	359	264
Adj No. of Lanes	2	3	1	1	3	2	1	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	271	1537	479	22	1200	658	22	1017	317	587	1820	567
Arrive On Green	0.08	0.30	0.30	0.01	0.24	0.24	0.01	0.20	0.20	0.17	0.36	0.36
Sat Flow, veh/h	3442	5085	1583	1774	5085	2787	1774	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	253	521	17	10	471	636	10	684	3	548	359	264
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1393	1774	1695	1583	1721	1695	1583
Q Serve(g_s), s	5.6	6.1	0.6	0.4	5.9	17.2	0.4	9.5	0.1	12.0	3.7	9.8
Cycle Q Clear(g_c), s	5.6	6.1	0.6	0.4	5.9	17.2	0.4	9.5	0.1	12.0	3.7	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	1537	479	22	1200	658	22	1017	317	587	1820	567
V/C Ratio(X)	0.93	0.34	0.04	0.45	0.39	0.97	0.45	0.67	0.01	0.93	0.20	0.47
Avail Cap(c_a), veh/h	271	1537	479	116	1200	658	116	1267	395	587	1820	567
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	34.9	20.7	18.8	37.4	24.5	28.8	37.4	28.2	24.4	31.2	16.9	18.9
Incr Delay (d2), s/veh	37.4	0.1	0.0	13.6	0.2	26.9	13.6	1.0	0.0	22.2	0.1	0.6
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(50%),veh/ln	4.0	2.9	0.3	0.3	2.8	9.0	0.3	4.5	0.1	7.5	1.7	4.3
LnGrp Delay(d),s/veh	72.3	20.8	18.8	51.0	24.7	55.8	51.0	29.2	24.5	53.4	17.0	19.5
LnGrp LOS	E	C	B	D	C	E	D	C	C	D	B	B
Approach Vol, veh/h		791			1117			697			1171	
Approach Delay, s/veh		37.2			42.6			29.5			34.6	
Approach LOS		D			D			C			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	19.0	21.3	7.0	29.0	7.0	33.3	12.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	13.0	19.0	5.0	19.0	5.0	27.0	6.0	18.0
Max Q Clear Time (g_c+I1), s	14.0	11.5	2.4	8.1	2.4	11.8	7.6	19.2
Green Ext Time (p_c), s	0.0	3.8	0.0	6.2	0.0	6.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	36.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	242	523	16	19	463	585	9	651	44	504	342	256
Future Volume (veh/h)	242	523	16	19	463	585	9	651	44	504	342	256
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	263	568	17	21	503	636	10	708	48	548	372	278
Adj No. of Lanes	2	3	1	1	3	2	1	3	1	2	3	1
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	2	2	2	2	2	2
Cap, veh/h	314	1535	478	42	1191	653	22	982	306	582	1779	554
Arrive On Green	0.09	0.30	0.30	0.02	0.23	0.23	0.01	0.19	0.19	0.17	0.35	0.35
Sat Flow, veh/h	3442	5085	1583	1774	5085	2787	1774	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	263	568	17	21	503	636	10	708	48	548	372	278
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1393	1774	1695	1583	1721	1695	1583
Q Serve(g_s), s	5.8	6.7	0.6	0.9	6.5	17.4	0.4	10.0	1.9	12.1	3.9	10.6
Cycle Q Clear(g_c), s	5.8	6.7	0.6	0.9	6.5	17.4	0.4	10.0	1.9	12.1	3.9	10.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	314	1535	478	42	1191	653	22	982	306	582	1779	554
V/C Ratio(X)	0.84	0.37	0.04	0.50	0.42	0.97	0.45	0.72	0.16	0.94	0.21	0.50
Avail Cap(c_a), veh/h	314	1535	478	115	1191	653	115	1191	371	582	1779	554
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	34.4	21.1	18.9	37.1	25.0	29.2	37.7	29.1	25.8	31.5	17.5	19.7
Incr Delay (d2), s/veh	17.9	0.1	0.0	9.1	0.2	28.7	13.6	1.7	0.2	23.7	0.1	0.7
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(50%),veh/ln	3.5	3.2	0.3	0.5	3.1	9.3	0.3	4.8	0.9	7.6	1.8	4.7
LnGrp Delay(d),s/veh	52.3	21.2	19.0	46.2	25.2	57.9	51.3	30.8	26.0	55.2	17.6	20.4
LnGrp LOS	D	C	B	D	C	E	D	C	C	E	B	C
Approach Vol, veh/h		848			1160			766			1198	
Approach Delay, s/veh		30.8			43.5			30.7			35.5	
Approach LOS		C			D			C			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	19.0	20.8	7.8	29.2	7.0	32.9	13.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	13.0	18.0	5.0	20.0	5.0	26.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	14.1	12.0	2.9	8.7	2.4	12.6	7.8	19.4
Green Ext Time (p_c), s	0.0	2.8	0.0	6.6	0.0	6.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Curnow & South Union - AM Peak
Count Date: 1/21/2015

Ave Annual Growth: **5.24%**

Exist Peak Hour Volumes

	U	
>	WBL	1
1	WBT	5
<	WBR	1
>	EBL	4
1	EBT	6
<	EBR	42
1	NBL	49
2	NBT	85
<	NBR	1
1	SBL	3
2	SBT	138
<	SBR	3
	TOTAL	338

Year 2035
Fut. Volumes w/o Proj

WBL	3
WBT	13
WBR	3
EBL	12
EBT	20
EBR	122
NBL	136
NBT	236
NBR	3
SBL	9
SBT	368
SBR	8
TOTAL	933

Year 2035 Fut. Vol
+ Project Traffic

WBL	26
WBT	13
WBR	3
EBL	12
EBT	20
EBR	146
NBL	149
NBT	321
NBR	7
SBL	9
SBT	665
SBR	8
TOTAL	1379

Year 2025
Fut. Volumes w/o Proj

WBL	2
WBT	8
WBR	2
EBL	7
EBT	11
EBR	72
NBL	82
NBT	143
NBR	2
SBL	5
SBT	228
SBR	5
TOTAL	567

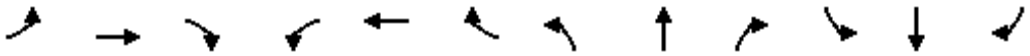
Year 2025 Fut. Vol
+ Project Traffic

WBL	14
WBT	8
WBR	2
EBL	7
EBT	11
EBR	84
NBL	89
NBT	186
NBR	4
SBL	5
SBT	377
SBR	5
TOTAL	792

Project Generated Trips - Year 2035

	Total
WBL	23
WBT	0
WBR	0
EBL	0
EBT	0
EBR	24
NBL	13
NBT	85
NBR	4
SBL	0
SBT	297
SBR	0
TOTAL	446

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Curnow & South Union - AM Peak						
	Count Date:	1/21/2015						
2006	ADT							
WB Approach (To)	0.043							
WB Approach (Away)	0.024							
EB Approach (To)	0.05							
EB Approach (Away)	0.059							
NB Approach (To)	0.724							
NB Approach (Away)	0.794							
SB Approach (To)	0.755							
SB Approach (Away)	0.694							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.158		WBL	3.87	WBT	3.92	WBR	3.94
WB Approach (Away)	0.149		4.77%	3	4.81%	13	4.83%	3
EB Approach (To)	0.253		EBL	4.64	EBT	5.63	EBR	4.56
EB Approach (Away)	0.246		5.41%	12	6.12%	20	5.35%	122
NB Approach (To)	3.123		NBL	4.24	NBT	4.26	NBR	5.26
NB Approach (Away)	3.227		5.10%	136	5.12%	236	5.83%	3
SB Approach (To)	3.012		SBL	5.10	SBT	4.03	SBR	4.08
SB Approach (Away)	2.923		5.69%	9	4.92%	368	4.96%	8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.891			0.981			0.998			0.997	
Flt Protected		0.997			0.993		0.950			0.950		
Satd. Flow (prot)	0	1655	0	0	1815	0	1770	3532	0	1770	3529	0
Flt Permitted		0.997			0.993		0.950			0.950		
Satd. Flow (perm)	0	1655	0	0	1815	0	1770	3532	0	1770	3529	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	6	42	1	5	1	49	85	1	3	138	3
Future Vol, veh/h	4	6	42	1	5	1	49	85	1	3	138	3
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	7	46	1	5	1	53	92	1	3	150	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	313	358	77	284	359	47	153	0	0	93	0	0
Stage 1	158	158	-	199	199	-	-	-	-	-	-	-
Stage 2	155	200	-	85	160	-	-	-	-	-	-	-
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	616	567	968	646	566	1012	1425	-	-	1499	-	-
Stage 1	828	766	-	784	735	-	-	-	-	-	-	-
Stage 2	832	735	-	913	764	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	592	545	968	592	544	1012	1425	-	-	1499	-	-
Mov Cap-2 Maneuver	592	545	-	592	544	-	-	-	-	-	-	-
Stage 1	797	764	-	755	708	-	-	-	-	-	-	-
Stage 2	794	708	-	861	762	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	11.2	2.8	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1425	-	-	850	590	1499	-	-
HCM Lane V/C Ratio	0.037	-	-	0.066	0.013	0.002	-	-
HCM Control Delay (s)	7.6	-	-	9.5	11.2	7.4	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.893			0.979			0.998			0.997	
Flt Protected		0.996			0.992		0.950			0.950		
Satd. Flow (prot)	0	1657	0	0	1809	0	1770	3532	0	1770	3529	0
Flt Permitted		0.996			0.992		0.950			0.950		
Satd. Flow (perm)	0	1657	0	0	1809	0	1770	3532	0	1770	3529	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

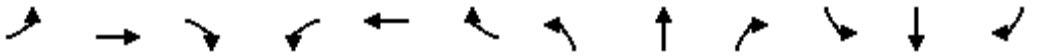
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	11	72	2	8	2	82	143	2	5	228	5
Future Vol, veh/h	7	11	72	2	8	2	82	143	2	5	228	5
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	12	78	2	9	2	89	155	2	5	248	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	521	597	127	476	599	79	253	0	0	158	0	0
Stage 1	261	261	-	335	335	-	-	-	-	-	-	-
Stage 2	260	336	-	141	264	-	-	-	-	-	-	-
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	438	415	900	472	414	965	1309	-	-	1419	-	-
Stage 1	721	691	-	653	641	-	-	-	-	-	-	-
Stage 2	722	640	-	847	689	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	406	385	900	398	384	965	1309	-	-	1419	-	-
Mov Cap-2 Maneuver	406	385	-	398	384	-	-	-	-	-	-	-
Stage 1	672	689	-	609	597	-	-	-	-	-	-	-
Stage 2	662	596	-	757	687	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.8	13.6	2.9	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	715	430	1419	-	-
HCM Lane V/C Ratio	0.068	-	-	0.137	0.03	0.004	-	-
HCM Control Delay (s)	8	-	-	10.8	13.6	7.5	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	11	84	14	8	2	89	186	4	5	377	5
Future Volume (vph)	7	11	84	14	8	2	89	186	4	5	377	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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		0.889			0.990			0.997			0.998	
Flt Protected		0.996			0.972		0.950			0.950		
Satd. Flow (prot)	0	1649	0	0	1792	0	1770	3529	0	1770	3532	0
Flt Permitted		0.996			0.972		0.950			0.950		
Satd. Flow (perm)	0	1649	0	0	1792	0	1770	3529	0	1770	3532	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	
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
Adj. Flow (vph)	8	12	91	15	9	2	97	202	4	5	410	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	111	0	0	26	0	97	206	0	5	415	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
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	11	84	14	8	2	89	186	4	5	377	5
Future Vol, veh/h	7	11	84	14	8	2	89	186	4	5	377	5
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	12	91	15	9	2	97	202	4	5	410	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	722	823	208	620	824	103	415	0	0	207	0	0
Stage 1	423	423	-	398	398	-	-	-	-	-	-	-
Stage 2	299	400	-	222	426	-	-	-	-	-	-	-
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	314	307	798	372	307	932	1140	-	-	1361	-	-
Stage 1	579	586	-	599	601	-	-	-	-	-	-	-
Stage 2	685	600	-	760	584	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	285	280	798	297	280	932	1140	-	-	1361	-	-
Mov Cap-2 Maneuver	285	280	-	297	280	-	-	-	-	-	-	-
Stage 1	530	584	-	548	550	-	-	-	-	-	-	-
Stage 2	615	549	-	657	582	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	17.8	2.7	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1140	-	-	603	308	1361	-	-
HCM Lane V/C Ratio	0.085	-	-	0.184	0.085	0.004	-	-
HCM Control Delay (s)	8.5	-	-	12.3	17.8	7.7	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	0.3	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.893			0.980			0.998			0.997	
Flt Protected		0.996			0.993		0.950			0.950		
Satd. Flow (prot)	0	1657	0	0	1813	0	1770	3532	0	1770	3529	0
Flt Permitted		0.996			0.993		0.950			0.950		
Satd. Flow (perm)	0	1657	0	0	1813	0	1770	3532	0	1770	3529	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

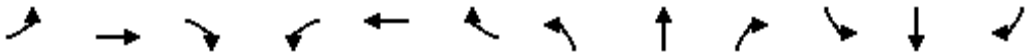
Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	12	20	122	3	13	3	136	236	3	9	368	8
Future Vol, veh/h	12	20	122	3	13	3	136	236	3	9	368	8
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	22	133	3	14	3	148	257	3	10	400	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	855	979	204	784	982	130	409	0	0	260	0	0
Stage 1	424	424	-	554	554	-	-	-	-	-	-	-
Stage 2	431	555	-	230	428	-	-	-	-	-	-	-
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	252	249	803	283	248	896	1146	-	-	1302	-	-
Stage 1	578	585	-	484	512	-	-	-	-	-	-	-
Stage 2	573	511	-	752	583	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	214	215	803	196	214	896	1146	-	-	1302	-	-
Mov Cap-2 Maneuver	214	215	-	196	214	-	-	-	-	-	-	-
Stage 1	503	581	-	421	446	-	-	-	-	-	-	-
Stage 2	481	445	-	600	579	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	21.5	3.1	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	512	239	1302	-	-
HCM Lane V/C Ratio	0.129	-	-	0.327	0.086	0.008	-	-
HCM Control Delay (s)	8.6	-	-	15.4	21.5	7.8	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1.4	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.889			0.991			0.997			0.998	
Flt Protected		0.997			0.970		0.950			0.950		
Satd. Flow (prot)	0	1651	0	0	1791	0	1770	3529	0	1770	3532	0
Flt Permitted		0.997			0.970		0.950			0.950		
Satd. Flow (perm)	0	1651	0	0	1791	0	1770	3529	0	1770	3532	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	12	20	146	26	13	3	149	321	7	9	665	8
Future Vol, veh/h	12	20	146	26	13	3	149	321	7	9	665	8
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	22	159	28	14	3	162	349	8	10	723	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1252	1427	366	1069	1428	178	732	0	0	357	0	0
Stage 1	747	747	-	677	677	-	-	-	-	-	-	-
Stage 2	505	680	-	392	751	-	-	-	-	-	-	-
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	129	134	631	176	134	834	868	-	-	1198	-	-
Stage 1	371	418	-	409	450	-	-	-	-	-	-	-
Stage 2	518	449	-	604	416	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	99	108	631	95	108	834	868	-	-	1198	-	-
Mov Cap-2 Maneuver	99	108	-	95	108	-	-	-	-	-	-	-
Stage 1	302	415	-	333	366	-	-	-	-	-	-	-
Stage 2	403	365	-	425	413	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.1	62.5	3.2	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	868	-	-	331	106	1198	-	-
HCM Lane V/C Ratio	0.187	-	-	0.585	0.431	0.008	-	-
HCM Control Delay (s)	10.1	-	-	30.1	62.5	8	-	-
HCM Lane LOS	B	-	-	D	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	3.5	1.8	0	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: South Union Avenue — Critical Approach Speed ____ mph

Minor St: Curnow Road — Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒
or
In built up area of isolated community of < 10,000 population..... ☐
} **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

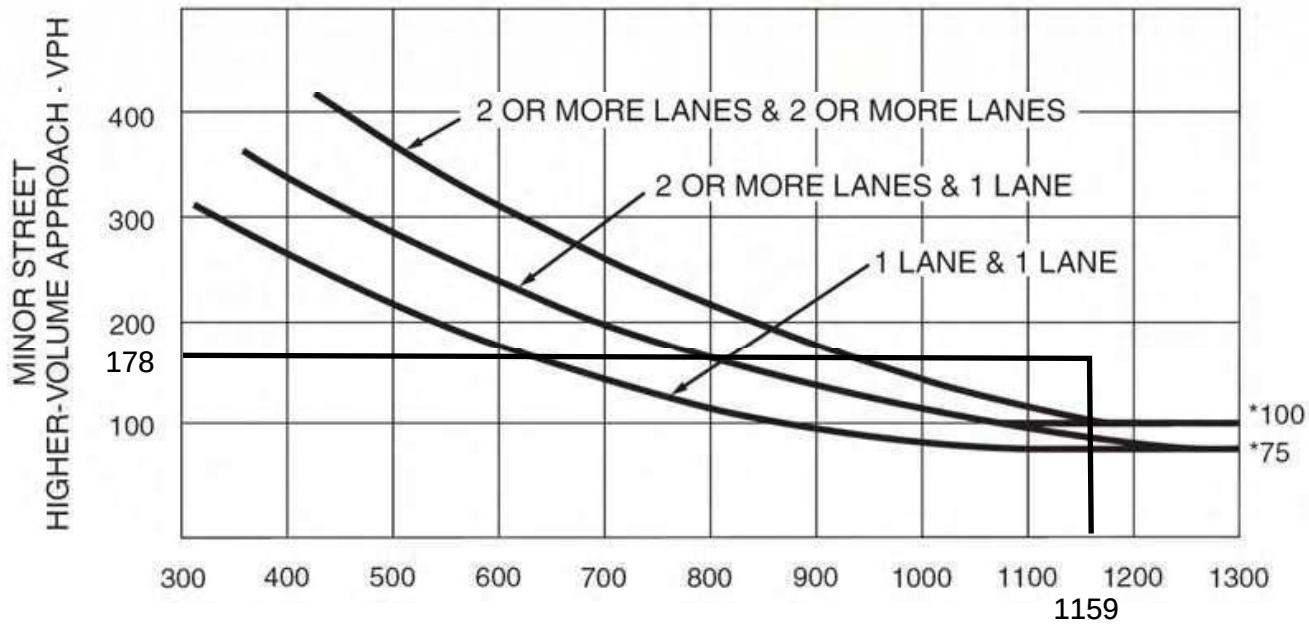
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More (13908) / 1 (2136)	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More (13908) / 1 (2136)	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied ____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Curnow & South Union - PM Peak
Count Date: 1/21/2015

Ave Annual Growth: **5.24%**

Exist Peak Hour Volumes

U

>	WBL	2
1	WBT	9
<	WBR	11
>	EBL	6
1	EBT	12
<	EBR	90
1	NBL	54
2	NBT	290
<	NBR	1
1	SBL	2
2	SBT	133
<	SBR	5
	TOTAL	615

Year 2035
Fut. Volumes w/o Proj

WBL	5
WBT	24
WBR	29
EBL	18
EBT	40
EBR	261
NBL	149
NBT	806
NBR	3
SBL	6
SBT	355
SBR	13
TOTAL	1709

Year 2035 Fut. Vol
+ Project Traffic

WBL	32
WBT	24
WBR	29
EBL	18
EBT	40
EBR	290
NBL	157
NBT	1025
NBR	10
SBL	6
SBT	612
SBR	13
TOTAL	2256

Year 2025
Fut. Volumes w/o Proj

WBL	3
WBT	15
WBR	18
EBL	10
EBT	22
EBR	155
NBL	91
NBT	489
NBR	2
SBL	4
SBT	220
SBR	8
TOTAL	1037

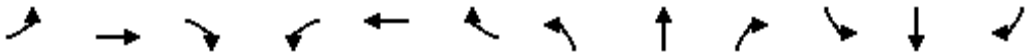
Year 2025 Fut. Vol
+ Project Traffic

WBL	17
WBT	15
WBR	18
EBL	10
EBT	22
EBR	170
NBL	95
NBT	599
NBR	6
SBL	4
SBT	349
SBR	8
TOTAL	1313

Project Generated Trips - Year 2035

	Total
WBL	27
WBT	0
WBR	0
EBL	0
EBT	0
EBR	29
NBL	8
NBT	219
NBR	7
SBL	0
SBT	257
SBR	0
TOTAL	547

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Curnow & South Union - PM Peak						
	Count Date:	1/21/2015						
2006	ADT							
WB Approach (To)	0.043							
WB Approach (Away)	0.024							
EB Approach (To)	0.05							
EB Approach (Away)	0.059							
NB Approach (To)	0.724							
NB Approach (Away)	0.794							
SB Approach (To)	0.755							
SB Approach (Away)	0.694							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.158		WBL	3.87	WBT	3.92	WBR	3.94
WB Approach (Away)	0.149		4.77%	5	4.81%	24	4.83%	29
EB Approach (To)	0.253		EBL	4.64	EBT	5.63	EBR	4.56
EB Approach (Away)	0.246		5.41%	18	6.12%	40	5.35%	261
NB Approach (To)	3.123		NBL	4.24	NBT	4.26	NBR	5.26
NB Approach (Away)	3.227		5.10%	149	5.12%	806	5.83%	3
SB Approach (To)	3.012		SBL	5.10	SBT	4.03	SBR	4.08
SB Approach (Away)	2.923		5.69%	6	4.92%	355	4.96%	13



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.888			0.932						0.995	
Flt Protected		0.997			0.996		0.950			0.950		
Satd. Flow (prot)	0	1649	0	0	1729	0	1770	3539	0	1770	3522	0
Flt Permitted		0.997			0.996		0.950			0.950		
Satd. Flow (perm)	0	1649	0	0	1729	0	1770	3539	0	1770	3522	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

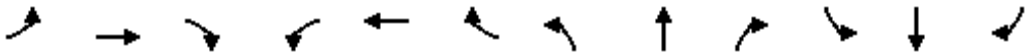
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	6	12	90	2	9	11	54	290	1	2	133	5
Future Vol, veh/h	6	12	90	2	9	11	54	290	1	2	133	5
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	13	98	2	10	12	59	315	1	2	145	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	432	586	75	516	587	158	150	0	0	316	0	0
Stage 1	152	152	-	433	433	-	-	-	-	-	-	-
Stage 2	280	434	-	83	154	-	-	-	-	-	-	-
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	507	421	971	442	420	859	1429	-	-	1241	-	-
Stage 1	835	771	-	571	580	-	-	-	-	-	-	-
Stage 2	703	579	-	916	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	475	403	971	375	402	859	1429	-	-	1241	-	-
Mov Cap-2 Maneuver	475	403	-	375	402	-	-	-	-	-	-	-
Stage 1	801	770	-	547	556	-	-	-	-	-	-	-
Stage 2	653	555	-	808	768	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	11.9	1.2	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1429	-	-	799	543	1241	-	-
HCM Lane V/C Ratio	0.041	-	-	0.147	0.044	0.002	-	-
HCM Control Delay (s)	7.6	-	-	10.3	11.9	7.9	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.888			0.931			0.999			0.995	
Flt Protected		0.997			0.996		0.950			0.950		
Satd. Flow (prot)	0	1649	0	0	1727	0	1770	3536	0	1770	3522	0
Flt Permitted		0.997			0.996		0.950			0.950		
Satd. Flow (perm)	0	1649	0	0	1727	0	1770	3536	0	1770	3522	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

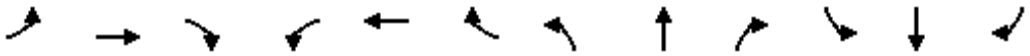
Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	22	155	3	15	18	91	489	2	4	220	8
Future Vol, veh/h	10	22	155	3	15	18	91	489	2	4	220	8
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	24	168	3	16	20	99	532	2	4	239	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	724	984	124	870	987	267	248	0	0	534	0	0
Stage 1	252	252	-	730	730	-	-	-	-	-	-	-
Stage 2	472	732	-	140	257	-	-	-	-	-	-	-
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	313	247	904	246	246	731	1315	-	-	1030	-	-
Stage 1	730	697	-	380	426	-	-	-	-	-	-	-
Stage 2	542	425	-	849	694	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	271	228	904	173	227	731	1315	-	-	1030	-	-
Mov Cap-2 Maneuver	271	228	-	173	227	-	-	-	-	-	-	-
Stage 1	675	694	-	351	394	-	-	-	-	-	-	-
Stage 2	468	393	-	664	691	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	17.2	1.2	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1315	-	-	613	333	1030	-	-
HCM Lane V/C Ratio	0.075	-	-	0.332	0.118	0.004	-	-
HCM Control Delay (s)	8	-	-	13.8	17.2	8.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1.4	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.886			0.950			0.998			0.997	
Flt Protected		0.998			0.984		0.950			0.950		
Satd. Flow (prot)	0	1647	0	0	1741	0	1770	3532	0	1770	3529	0
Flt Permitted		0.998			0.984		0.950			0.950		
Satd. Flow (perm)	0	1647	0	0	1741	0	1770	3532	0	1770	3529	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

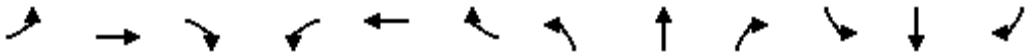
Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	22	170	17	15	18	95	599	6	4	349	8
Future Vol, veh/h	10	22	170	17	15	18	95	599	6	4	349	8
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	24	185	18	16	20	103	651	7	4	379	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	932	1256	194	1071	1258	329	388	0	0	658	0	0
Stage 1	392	392	-	861	861	-	-	-	-	-	-	-
Stage 2	540	864	-	210	397	-	-	-	-	-	-	-
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	221	170	815	175	170	667	1167	-	-	926	-	-
Stage 1	604	605	-	317	371	-	-	-	-	-	-	-
Stage 2	494	369	-	773	602	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	183	154	815	111	154	667	1167	-	-	926	-	-
Mov Cap-2 Maneuver	183	154	-	111	154	-	-	-	-	-	-	-
Stage 1	551	602	-	289	338	-	-	-	-	-	-	-
Stage 2	416	336	-	572	599	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.9	33.4	1.1	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	497	180	926	-	-
HCM Lane V/C Ratio	0.088	-	-	0.442	0.302	0.005	-	-
HCM Control Delay (s)	8.4	-	-	17.9	33.4	8.9	-	-
HCM Lane LOS	A	-	-	C	D	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.2	1.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.890			0.931			0.999			0.995	
Flt Protected		0.997			0.996		0.950			0.950		
Satd. Flow (prot)	0	1653	0	0	1727	0	1770	3536	0	1770	3522	0
Flt Permitted		0.997			0.996		0.950			0.950		
Satd. Flow (perm)	0	1653	0	0	1727	0	1770	3536	0	1770	3522	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

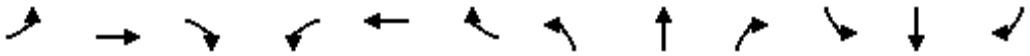
Intersection	
Int Delay, s/veh	21.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	18	40	261	5	24	29	149	806	3	6	355	13
Future Vol, veh/h	18	40	261	5	24	29	149	806	3	6	355	13
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	43	284	5	26	32	162	876	3	7	386	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1181	1609	200	1430	1615	440	400	0	0	879	0	0
Stage 1	406	406	-	1202	1202	-	-	-	-	-	-	-
Stage 2	775	1203	-	228	413	-	-	-	-	-	-	-
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	145	104	808	95	103	565	1155	-	-	764	-	-
Stage 1	593	596	-	196	256	-	-	-	-	-	-	-
Stage 2	357	256	-	754	592	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	94	89	808	34	88	565	1155	-	-	764	-	-
Mov Cap-2 Maneuver	94	89	-	34	88	-	-	-	-	-	-	-
Stage 1	510	591	-	169	220	-	-	-	-	-	-	-
Stage 2	255	220	-	449	587	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	99	61.6	1.3	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1155	-	-	331	123	764	-	-
HCM Lane V/C Ratio	0.14	-	-	1.048	0.513	0.009	-	-
HCM Control Delay (s)	8.6	-	-	99	61.6	9.8	-	-
HCM Lane LOS	A	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	12.4	2.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.887			0.954			0.999			0.997	
Flt Protected		0.997			0.982		0.950			0.950		
Satd. Flow (prot)	0	1647	0	0	1745	0	1770	3536	0	1770	3529	0
Flt Permitted		0.997			0.982		0.950			0.950		
Satd. Flow (perm)	0	1647	0	0	1745	0	1770	3536	0	1770	3529	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	104.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	18	40	290	32	24	29	157	1025	10	6	612	13
Future Vol, veh/h	18	40	290	32	24	29	157	1025	10	6	612	13
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	43	315	35	26	32	171	1114	11	7	665	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1596	2151	340	1828	2153	563	679	0	0	1125	0	0
Stage 1	685	685	-	1461	1461	-	-	-	-	-	-	-
Stage 2	911	1466	-	367	692	-	-	-	-	-	-	-
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	71	48	656	48	47	470	909	-	-	617	-	-
Stage 1	404	447	-	135	192	-	-	-	-	-	-	-
Stage 2	295	191	-	625	443	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	26	~ 39	656	-	38	470	909	-	-	617	-	-
Mov Cap-2 Maneuver	26	~ 39	-	-	38	-	-	-	-	-	-	-
Stage 1	328	442	-	110	156	-	-	-	-	-	-	-
Stage 2	186	155	-	289	438	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 671.3		1.3	0.1
HCM LOS	F	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	909	-	-	161	-	617	-	-
HCM Lane V/C Ratio	0.188	-	-	2.349	-	0.011	-	-
HCM Control Delay (s)	9.9	-	-	$ 671.3	-	10.9	-	-
HCM Lane LOS	A	-	-	F	-	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-	31.6	-	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												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		200	0		0	100		0	100		0
Storage Lanes	0		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
Ped Bike Factor												
Frt			0.850		0.954			0.999			0.997	
Flt Protected		0.984			0.982		0.950			0.950		
Satd. Flow (prot)	0	1833	1583	0	1745	0	1770	3536	0	1770	3529	0
Flt Permitted		0.984			0.982		0.950			0.950		
Satd. Flow (perm)	0	1833	1583	0	1745	0	1770	3536	0	1770	3529	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4124			5274			2671			1513	
Travel Time (s)		62.5			79.9			33.1			18.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	19.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	18	40	290	32	24	29	157	1025	10	6	612	13
Future Vol, veh/h	18	40	290	32	24	29	157	1025	10	6	612	13
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	-	-	200	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	43	315	35	26	32	171	1114	11	7	665	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1596	2151	340	1828	2153	563	679	0	0	1125	0	0
Stage 1	685	685	-	1461	1461	-	-	-	-	-	-	-
Stage 2	911	1466	-	367	692	-	-	-	-	-	-	-
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	71	48	656	48	47	470	909	-	-	617	-	-
Stage 1	404	447	-	135	192	-	-	-	-	-	-	-
Stage 2	295	191	-	625	443	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	26	~ 39	656	-	38	470	909	-	-	617	-	-
Mov Cap-2 Maneuver	26	~ 39	-	-	38	-	-	-	-	-	-	-
Stage 1	328	442	-	110	156	-	-	-	-	-	-	-
Stage 2	186	155	-	289	438	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	122.4		1.3	0.1
HCM LOS	F	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	909	-	-	34	656	-	617	-	-
HCM Lane V/C Ratio	0.188	-	-	1.854	0.481	-	0.011	-	-
HCM Control Delay (s)	9.9	-	-	$ 657	15.5	-	10.9	-	-
HCM Lane LOS	A	-	-	F	C	-	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-	7	2.6	-	0	-	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: South Union Avenue — Critical Approach Speed ____ mph

Minor St: Curnow Road — Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

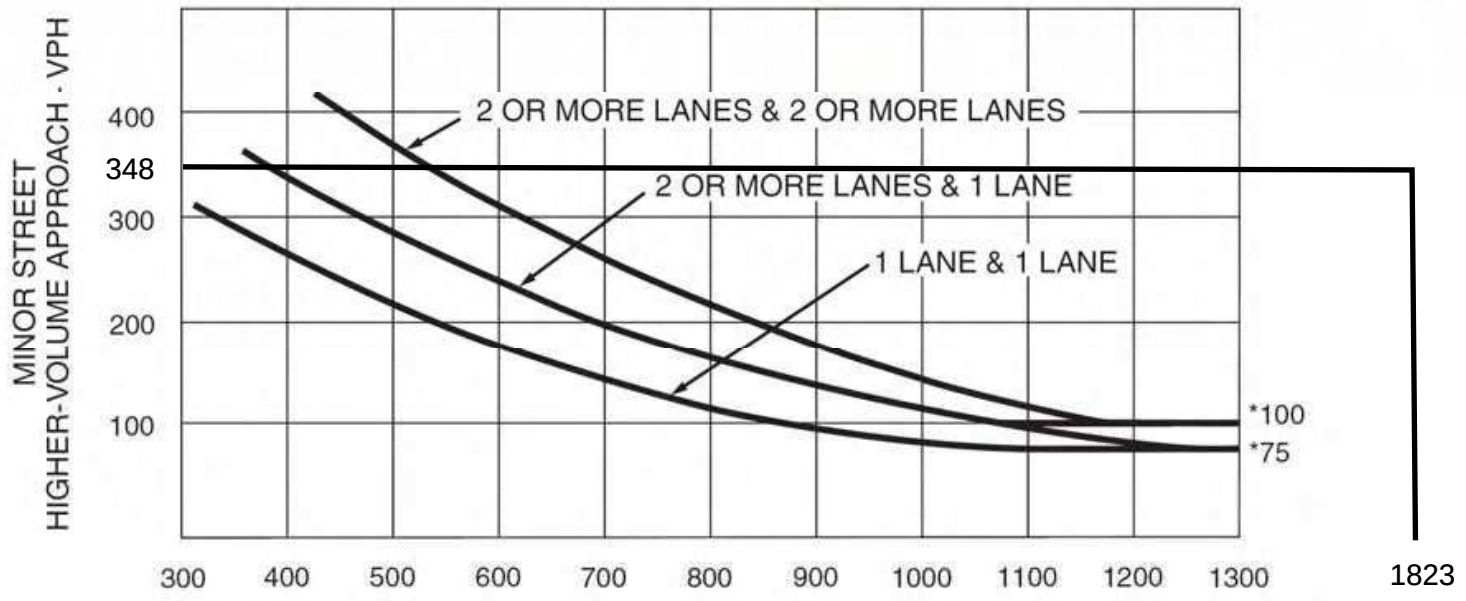
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street: 1 / 2 or More (18230) / 2 or More / 1 — Minor Street: 1 / 1 (3480) / 2 or More / 2 or More	8,000 / 5,600 9,600 / 6,720 9,600 / 6,720 8,000 / 5,600	2,400 / 1,680 2,400 / 1,680 3,200 / 2,240 3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street: 1 / 2 or More (18230) / 2 or More / 1 — Minor Street: 1 / 1 (3480) / 2 or More / 2 or More	12,000 / 8,400 14,400 / 10,080 14,400 / 10,080 12,000 / 8,400	1,200 / 850 1,200 / 850 1,600 / 1,120 1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied ____	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... A: 100% B: 100%		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Curnow & Cottonwood - AM Peak
Count Date: 1/21/2015

Ave Annual Growth: **1.24%**

Exist Peak Hour Volumes

Unsignalized

0	WBL	0
0	WBT	0
0	WBR	1
>	EBL	2
0	EBT	0
<	EBR	11
>	NBL	3
1	NBT	34
0	NBR	0
0	SBL	0
1	SBT	45
<	SBR	1
	TOTAL	97

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	1
EBL	4
EBT	0
EBR	21
NBL	4
NBT	33
NBR	0
SBL	0
SBT	45
SBR	1
TOTAL	109

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	1
EBL	7
EBT	0
EBR	21
NBL	4
NBT	39
NBR	0
SBL	0
SBT	71
SBR	23
TOTAL	166

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	1
EBL	3
EBT	0
EBR	15
NBL	3
NBT	34
NBR	0
SBL	0
SBT	45
SBR	1
TOTAL	102

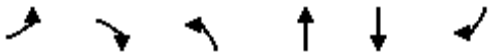
Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	1
EBL	5
EBT	0
EBR	15
NBL	3
NBT	37
NBR	0
SBL	0
SBT	58
SBR	12
TOTAL	131

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	3
EBT	0
EBR	0
NBL	0
NBT	6
NBR	0
SBL	0
SBT	26
SBR	22
TOTAL	57

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Curnow & Cottonwood - AM Peak						
	Count Date:	1/21/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	0.008							
EB Approach (Away)	0.027							
NB Approach (To)	0.219							
NB Approach (Away)	0.218							
SB Approach (To)	0.213							
SB Approach (Away)	0.195							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	1.13	WBT	1.64	WBR	1.07
WB Approach (Away)	*1.2*		0.42%	0	1.59%	0	0.22%	1
EB Approach (To)	0.046		EBL	3.35	EBT	3.48	EBR	3.41
EB Approach (Away)	0.056		3.01%	4	3.42%	0	3.21%	21
NB Approach (To)	0.222		NBL	1.54	NBT	0.98	NBR	1.11
NB Approach (Away)	0.232		1.30%	4	-0.08%	33	0.34%	0
SB Approach (To)	0.204		SBL	1.08	SBT	1.01	SBR	1.52
SB Approach (Away)	0.184		0.24%	0	0.03%	45	1.20%	1



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.884				0.997	
Flt Protected	0.993			0.996		
Satd. Flow (prot)	1635	0	0	1855	1857	0
Flt Permitted	0.993			0.996		
Satd. Flow (perm)	1635	0	0	1855	1857	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

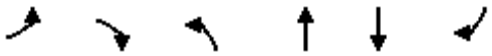
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	2	11	3	34	45	1
Future Vol, veh/h	2	11	3	34	45	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	12	3	37	49	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	92	49	50	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	43	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	908	1020	1557	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	906	1020	1557	-	-	-
Mov Cap-2 Maneuver	906	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	977	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1557	-	1001	-	-
HCM Lane V/C Ratio	0.002	-	0.014	-	-
HCM Control Delay (s)	7.3	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.886				0.997	
Flt Protected	0.992			0.996		
Satd. Flow (prot)	1637	0	0	1855	1857	0
Flt Permitted	0.992			0.996		
Satd. Flow (perm)	1637	0	0	1855	1857	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

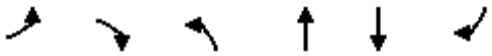
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	3	15	3	34	45	1
Future Vol, veh/h	3	15	3	34	45	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	16	3	37	49	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	92	49	50	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	43	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	908	1020	1557	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	906	1020	1557	-	-	-
Mov Cap-2 Maneuver	906	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	977	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1557	-	999	-	-
HCM Lane V/C Ratio	0.002	-	0.02	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.897				0.977	
Flt Protected	0.988			0.997		
Satd. Flow (prot)	1651	0	0	1857	1820	0
Flt Permitted	0.988			0.997		
Satd. Flow (perm)	1651	0	0	1857	1820	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

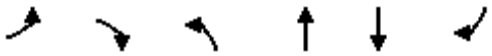
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	5	15	3	37	58	12
Future Vol, veh/h	5	15	3	37	58	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	16	3	40	63	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	117	70	76	0	-	0
Stage 1	70	-	-	-	-	-
Stage 2	47	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	879	993	1523	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	975	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	877	993	1523	-	-	-
Mov Cap-2 Maneuver	877	-	-	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	973	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1523	-	961	-	-
HCM Lane V/C Ratio	0.002	-	0.023	-	-
HCM Control Delay (s)	7.4	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.885				0.997	
Flt Protected	0.993			0.995		
Satd. Flow (prot)	1637	0	0	1853	1857	0
Flt Permitted	0.993			0.995		
Satd. Flow (perm)	1637	0	0	1853	1857	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

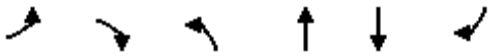
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	4	21	4	33	45	1
Future Vol, veh/h	4	21	4	33	45	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	23	4	36	49	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	94	49	50	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	45	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	906	1020	1557	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	977	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	903	1020	1557	-	-	-
Mov Cap-2 Maneuver	903	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	974	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1557	-	999	-	-
HCM Lane V/C Ratio	0.003	-	0.027	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.900				0.967	
Flt Protected	0.987			0.996		
Satd. Flow (prot)	1655	0	0	1855	1801	0
Flt Permitted	0.987			0.996		
Satd. Flow (perm)	1655	0	0	1855	1801	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	7	21	4	39	71	23
Future Vol, veh/h	7	21	4	39	71	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	23	4	42	77	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	141	90	102	0	-	0
Stage 1	90	-	-	-	-	-
Stage 2	51	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	852	968	1490	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	971	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	849	968	1490	-	-	-
Mov Cap-2 Maneuver	849	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	968	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1490	-	935	-	-
HCM Lane V/C Ratio	0.003	-	0.033	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Cottonwood Road

Minor St: Curnow Road

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

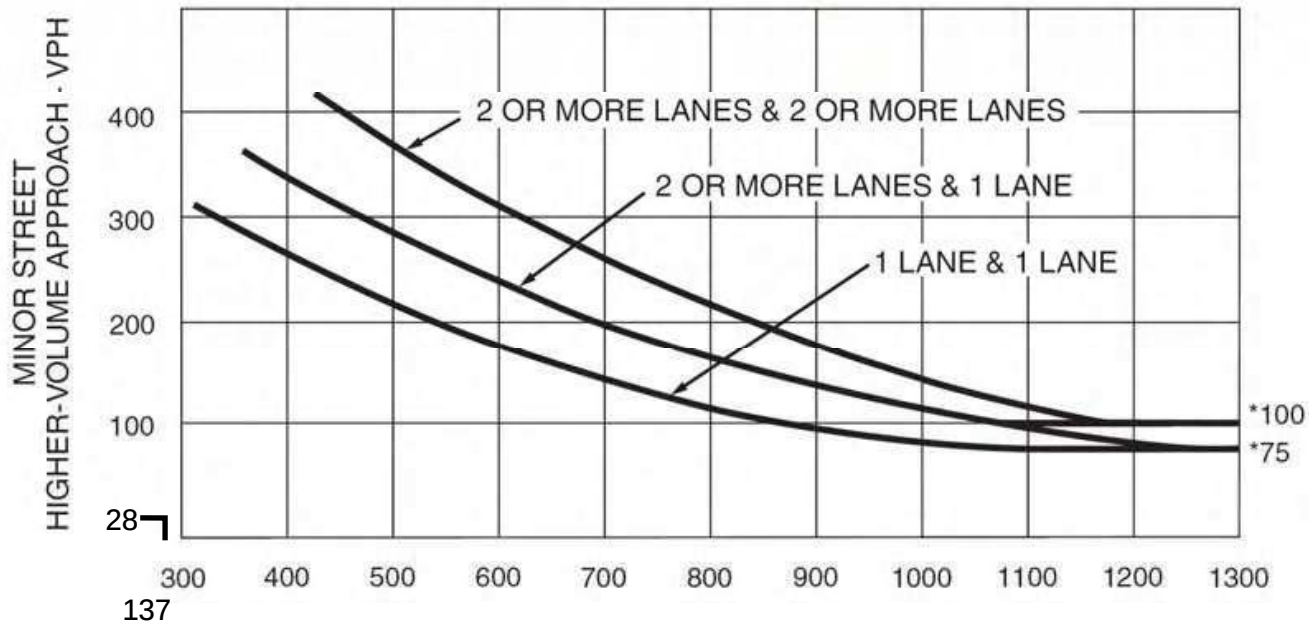
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 1644 / Minor Street 336	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 1644 / Minor Street 336	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied ____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 29% (A) 40% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Curnow & Cottonwood - PM Peak
Count Date: 1/20/2015

Ave Annual Growth: **1.24%**

Exist Peak Hour Volumes

Unsignalized

0	WBL	0
0	WBT	0
0	WBR	0
>	EBL	11
0	EBT	0
<	EBR	17
>	NBL	8
1	NBT	127
0	NBR	0
0	SBL	0
1	SBT	68
<	SBR	5
	TOTAL	236

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	20
EBT	0
EBR	32
NBL	10
NBT	125
NBR	0
SBL	0
SBT	68
SBR	6
TOTAL	261

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	25
EBT	0
EBR	32
NBL	10
NBT	187
NBR	0
SBL	0
SBT	96
SBR	26
TOTAL	376

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	15
EBT	0
EBR	24
NBL	9
NBT	126
NBR	0
SBL	0
SBT	68
SBR	6
TOTAL	248

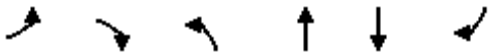
Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	18
EBT	0
EBR	24
NBL	9
NBT	157
NBR	0
SBL	0
SBT	82
SBR	16
TOTAL	306

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	5
EBT	0
EBR	0
NBL	0
NBT	62
NBR	0
SBL	0
SBT	28
SBR	20
TOTAL	115

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Curnow & Cottonwood - PM Peak						
	Count Date:	1/20/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	0.008							
EB Approach (Away)	0.027							
NB Approach (To)	0.219							
NB Approach (Away)	0.218							
SB Approach (To)	0.213							
SB Approach (Away)	0.195							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	1.13	WBT	1.64	WBR	1.07
WB Approach (Away)	*1.2*		0.42%	0	1.59%	0	0.22%	0
EB Approach (To)	0.046		EBL	3.35	EBT	3.48	EBR	3.41
EB Approach (Away)	0.056		3.01%	20	3.42%	0	3.21%	32
NB Approach (To)	0.222		NBL	1.54	NBT	0.98	NBR	1.11
NB Approach (Away)	0.232		1.30%	10	-0.08%	125	0.34%	0
SB Approach (To)	0.204		SBL	1.08	SBT	1.01	SBR	1.52
SB Approach (Away)	0.184		0.24%	0	0.03%	68	1.20%	6



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919				0.991	
Flt Protected	0.980			0.997		
Satd. Flow (prot)	1678	0	0	1857	1846	0
Flt Permitted	0.980			0.997		
Satd. Flow (perm)	1678	0	0	1857	1846	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

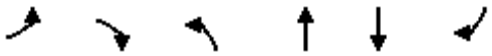
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	11	17	8	127	68	5
Future Vol, veh/h	11	17	8	127	68	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	18	9	138	74	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	232	77	79	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	155	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	756	984	1519	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	751	984	1519	-	-	-
Mov Cap-2 Maneuver	751	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	868	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1519	-	877	-	-
HCM Lane V/C Ratio	0.006	-	0.035	-	-
HCM Control Delay (s)	7.4	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.916				0.988	
Flt Protected	0.981			0.997		
Satd. Flow (prot)	1674	0	0	1857	1840	0
Flt Permitted	0.981			0.997		
Satd. Flow (perm)	1674	0	0	1857	1840	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

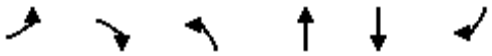
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	15	24	9	126	68	6
Future Vol, veh/h	15	24	9	126	68	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	26	10	137	74	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	234	77	80	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	754	984	1518	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	749	984	1518	-	-	-
Mov Cap-2 Maneuver	749	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1518	-	878	-	-
HCM Lane V/C Ratio	0.006	-	0.048	-	-
HCM Control Delay (s)	7.4	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.924				0.978	
Flt Protected	0.979			0.997		
Satd. Flow (prot)	1685	0	0	1857	1822	0
Flt Permitted	0.979			0.997		
Satd. Flow (perm)	1685	0	0	1857	1822	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

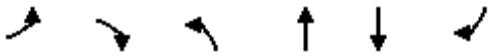
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	18	24	9	157	82	16
Future Vol, veh/h	18	24	9	157	82	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	26	10	171	89	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	288	98	107	0	-	0
Stage 1	98	-	-	-	-	-
Stage 2	190	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	702	958	1484	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	842	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	697	958	1484	-	-	-
Mov Cap-2 Maneuver	697	-	-	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	836	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1484	-	826	-	-
HCM Lane V/C Ratio	0.007	-	0.055	-	-
HCM Control Delay (s)	7.4	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.917				0.988	
Flt Protected	0.981			0.996		
Satd. Flow (prot)	1676	0	0	1855	1840	0
Flt Permitted	0.981			0.996		
Satd. Flow (perm)	1676	0	0	1855	1840	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	2634	
Travel Time (s)	79.9			32.9	32.7	

Intersection Summary	
Area Type:	Other

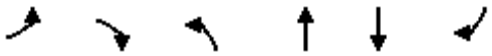
Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	20	32	10	125	68	6
Future Vol, veh/h	20	32	10	125	68	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	35	11	136	74	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	235	77	80	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	753	984	1518	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	747	984	1518	-	-	-
Mov Cap-2 Maneuver	747	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	864	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1518	-	877	-	-
HCM Lane V/C Ratio	0.007	-	0.064	-	-
HCM Control Delay (s)	7.4	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.924				0.971	
Flt Protected	0.979			0.997		
Satd. Flow (prot)	1685	0	0	1857	1809	0
Flt Permitted	0.979			0.997		
Satd. Flow (perm)	1685	0	0	1857	1809	0
Link Speed (mph)	45			55	55	
Link Distance (ft)	5274			2654	1947	
Travel Time (s)	79.9			32.9	24.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	25	32	10	187	96	26
Future Vol, veh/h	25	32	10	187	96	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	35	11	203	104	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	343	118	133	0	-	0
Stage 1	118	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	653	934	1452	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	647	934	1452	-	-	-
Mov Cap-2 Maneuver	647	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1452	-	782	-	-
HCM Lane V/C Ratio	0.007	-	0.079	-	-
HCM Control Delay (s)	7.5	0	10	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Cottonwood Road

Minor St: Curnow Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street 3190 / Minor Street 570

Major Street	Minor Street	Minimum Requirements EADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 or More	1	9,600	6,720	2,400	1,680
2 or More	2 or More	9,600	6,720	3,200	2,240
1	2 or More	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street 3190 / Minor Street 570

Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1	1	12,000	8,400	1,200	850
2 or More	1	14,400	10,080	1,200	850
2 or More	2 or More	14,400	10,080	1,600	1,120
1	2 or More	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied _____ Not Satisfied X

No one condition satisfied, but following conditions fulfilled 80% or more..... 57% (A) 67% (B)

2 CONDITIONS 80%

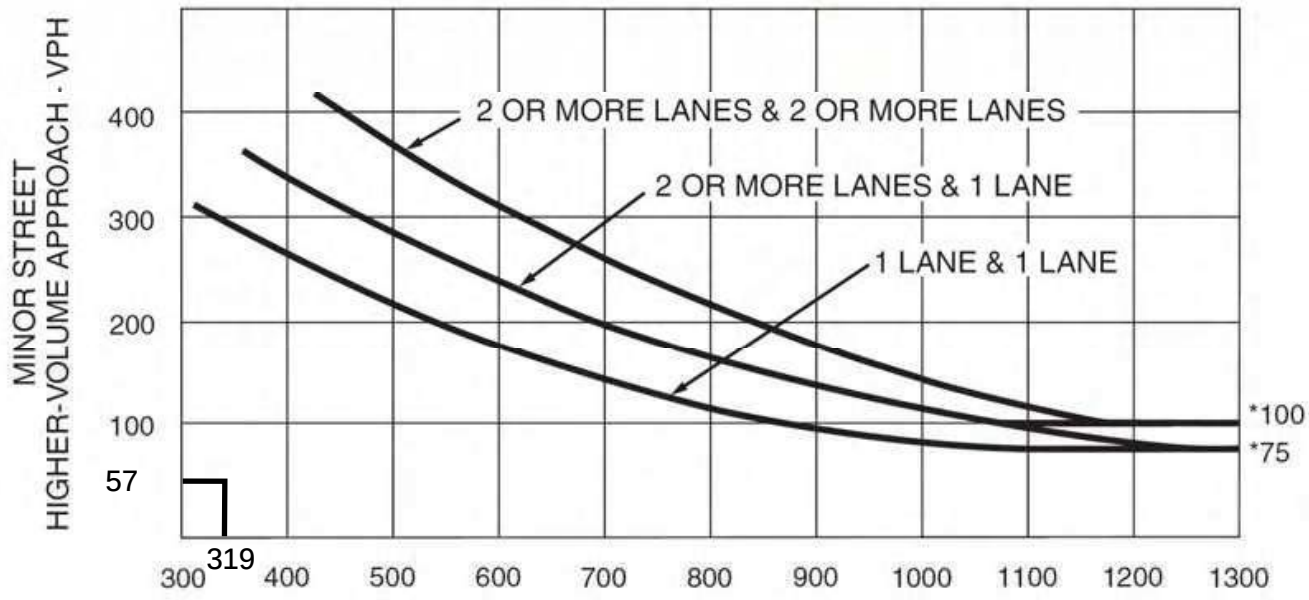
2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: DiGiorgio Road & Chevalier Road/Entrance # 1 - AM Peak

Count Date: 1/20/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

	U	
>	WBL	0
1	WBT	0
<	WBR	0
>	EBL	0
1	EBT	0
<	EBR	0
>	NBL	0
2	NBT	0
<	NBR	0
>	SBL	0
2	SBT	0
<	SBR	0
	TOTAL	0

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	0

Year 2035 Fut. Vol

+ Project Traffic

WBL	206
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	50
SBL	0
SBT	0
SBR	0
TOTAL	256

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	0

Year 2025 Fut. Vol

+ Project Traffic

WBL	103
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	25
SBL	0
SBT	0
SBR	0
TOTAL	128

Project Generated Trips - Year 2035

	Total
WBL	206
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	50
SBL	0
SBT	0
SBR	0
TOTAL	256



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	103	0	0	25
Future Volume (vph)	0	0	103	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	150		0	200
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	1003			2659	5295	
Travel Time (s)	22.8			60.4	120.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	112	0	0	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	112	27	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	0	0	103	0	0	25
Future Vol, veh/h	0	0	103	0	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	112	0	0	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	0	0	224	0
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	224	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	-	-	764	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	813	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	764	-
Mov Cap-2 Maneuver	-	-	-	-	764	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	813	-

Approach	EB	WB	NB
HCM Control Delay, s	0		
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	-	-	-
HCM Lane LOS	-	-	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	206	0	0	50
Future Volume (vph)	0	0	206	0	0	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	200		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	576			2651	5300	
Travel Time (s)	13.1			60.3	120.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	224	0	0	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	224	54	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	0	0	206	0	0	50
Future Vol, veh/h	0	0	206	0	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	224	0	0	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	0	0	448	0
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	448	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	644	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	568	-
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	644	-

Approach	EB	WB	NB
HCM Control Delay, s	0		
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	-	-	-
HCM Lane LOS	-	-	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Di Giorgio Road

Minor St: Chevalier Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

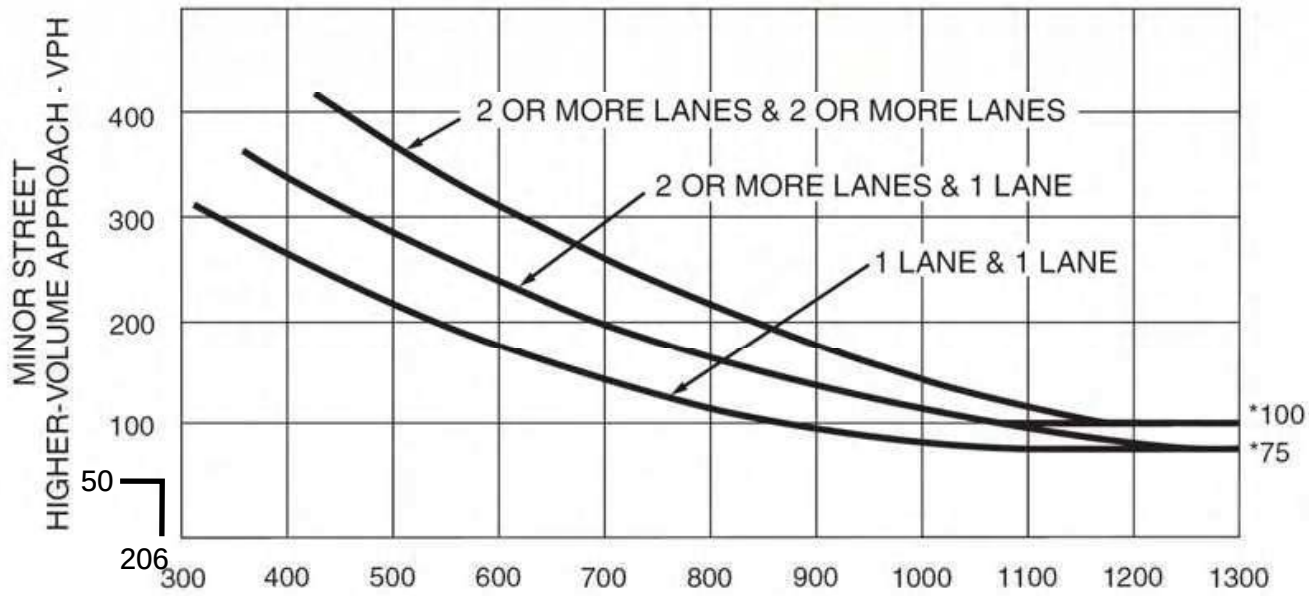
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2472 ..... 2 or More..... 600	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2472 ..... 2 or More..... 600	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 37% (A) 54% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: DiGiorgio Road & Chevalier Road/Entrance # 1 - PM Peak

Count Date: 1/20/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

	U	
>	WBL	0
1	WBT	0
<	WBR	0
>	EBL	0
1	EBT	0
<	EBR	0
>	NBL	0
2	NBT	0
<	NBR	0
>	SBL	0
2	SBT	0
<	SBR	0
	TOTAL	0

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	0

Year 2035 Fut. Vol

+ Project Traffic

WBL	295
WBT	0
WBR	0
EBL	0
EBT	0
EBR	29
NBL	6
NBT	0
NBR	350
SBL	0
SBT	0
SBR	0
TOTAL	680

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	0

Year 2025 Fut. Vol

+ Project Traffic

WBL	148
WBT	0
WBR	0
EBL	0
EBT	0
EBR	15
NBL	3
NBT	0
NBR	175
SBL	0
SBT	0
SBR	0
TOTAL	341

Project Generated Trips - Year 2035

	Total
WBL	295
WBT	0
WBR	0
EBL	0
EBT	0
EBR	29
NBL	6
NBT	0
NBR	350
SBL	0
SBT	0
SBR	0
TOTAL	680



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	15	148	0	3	175
Future Volume (vph)	0	15	148	0	3	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	200		0	200
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865				0.867	
Flt Protected				0.950	0.999	
Satd. Flow (prot)	1611	0	0	1770	1613	0
Flt Permitted				0.950	0.999	
Satd. Flow (perm)	1611	0	0	1770	1613	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	730			2661	5308	
Travel Time (s)	16.6			60.5	120.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	16	161	0	3	190
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	161	193	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	8.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	0	15	148	0	3	175
Future Vol, veh/h	0	15	148	0	3	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	161	0	3	190

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	16	0	330	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	322	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1602	-	665	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1602	-	599	1074
Mov Cap-2 Maneuver	-	-	-	-	599	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	662	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.5	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1060	-	-	1602	-
HCM Lane V/C Ratio	0.183	-	-	0.1	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	29	295	0	6	350
Future Volume (vph)	0	29	295	0	6	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	200		0	200
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865				0.867	
Flt Protected				0.950	0.999	
Satd. Flow (prot)	1611	0	0	1770	1613	0
Flt Permitted				0.950	0.999	
Satd. Flow (perm)	1611	0	0	1770	1613	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	927			2677	5297	
Travel Time (s)	21.1			60.8	120.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	32	321	0	7	380
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	0	0	321	387	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	0	29	295	0	6	350
Future Vol, veh/h	0	29	295	0	6	350
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	32	321	0	7	380

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	657	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	641	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1580	-	430	1063
Stage 1	-	-	-	-	1007	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1580	-	343	1063
Mov Cap-2 Maneuver	-	-	-	-	343	-
Stage 1	-	-	-	-	1007	-
Stage 2	-	-	-	-	418	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.9	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1027	-	-	1580	-
HCM Lane V/C Ratio	0.377	-	-	0.203	-
HCM Control Delay (s)	10.6	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.8	-	-	0.8	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Di Giorgio Road

Minor St: Chevalier Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More.....3560.....	2 or More.....2950.....
1.....	2 or More.....

Minimum Requirements EADT			
Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
8,000	5,600	2,400	1,680
9,600	6,720	2,400	1,680
9,600	6,720	3,200	2,240
8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More.....3560.....	2 or More.....2950.....
1.....	2 or More.....

Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
12,000	8,400	1,200	850
14,400	10,080	1,200	850
14,400	10,080	1,600	1,120
12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied _____ Not Satisfied X

No one condition satisfied, but following conditions fulfilled 80% or more..... 53% (A) 35% (B)

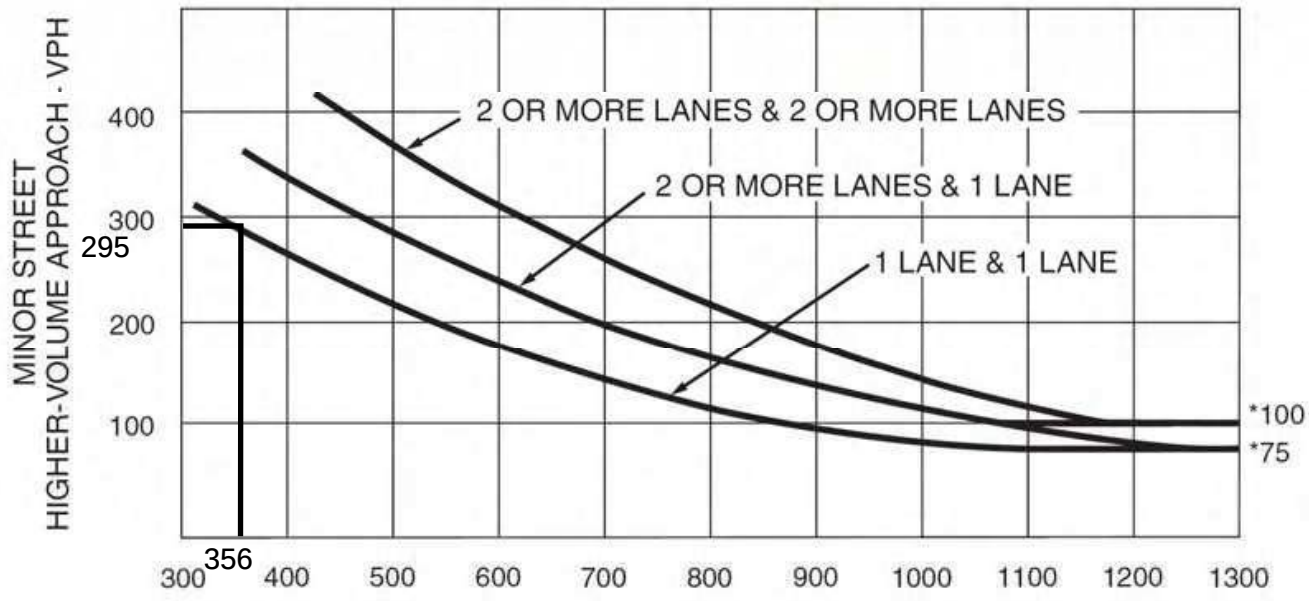
2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: DiGiorgio & South Union - AM Peak
Count Date: 1/20/2015

Ave Annual Growth: **3.90%**

Exist Peak Hour Volumes

	U	
>	WBL	5
1	WBT	0
<	WBR	63
>	EBL	0
1	EBT	0
<	EBR	0
1	NBL	0
2	NBT	85
1	NBR	5
>	SBL	61
2	SBT	100
<	SBR	0
	TOTAL	319

Year 2035
Fut. Volumes w/o Proj

WBL	14
WBT	0
WBR	178
EBL	0
EBT	0
EBR	0
NBL	0
NBT	221
NBR	14
SBL	170
SBT	248
SBR	0
TOTAL	845

Year 2035 Fut. Vol
+ Project Traffic

WBL	14
WBT	66
WBR	191
EBL	40
EBT	5
EBR	5
NBL	2
NBT	282
NBR	18
SBL	170
SBT	486
SBR	120
TOTAL	1399

Year 2025
Fut. Volumes w/o Proj

WBL	8
WBT	0
WBR	107
EBL	0
EBT	0
EBR	0
NBL	0
NBT	139
NBR	9
SBL	103
SBT	159
SBR	0
TOTAL	525

Year 2025 Fut. Vol
+ Project Traffic

WBL	8
WBT	33
WBR	114
EBL	20
EBT	3
EBR	3
NBL	1
NBT	170
NBR	11
SBL	103
SBT	278
SBR	60
TOTAL	804

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	66
WBR	13
EBL	40
EBT	5
EBR	5
NBL	2
NBT	61
NBR	4
SBL	0
SBT	238
SBR	120
TOTAL	554

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	DiGiorgio & South Union - AM Peak						
	Count Date:	1/20/2015						
2006	ADT							
WB Approach (To)	0.011							
WB Approach (Away)	0.011							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.66							
NB Approach (Away)	0.73							
SB Approach (To)	0.738							
SB Approach (Away)	0.667							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.054		WBL	4.26	WBT	3.05	WBR	4.40
WB Approach (Away)	0.055		5.08%	14	3.13%	0	5.22%	178
EB Approach (To)	*1.2*		EBL	2.55	EBT	3.10	EBR	2.40
EB Approach (Away)	*1.2*		2.72%	0	3.17%	0	2.57%	0
NB Approach (To)	2.552		NBL	2.53	NBT	3.88	NBR	4.43
NB Approach (Away)	2.631		2.70%	0	4.79%	221	5.24%	14
SB Approach (To)	2.681		SBL	4.32	SBT	3.62	SBR	2.42
SB Approach (Away)	2.601		5.12%	170	4.53%	248	2.59%	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	63	85	5	61	100
Future Volume (vph)	5	63	85	5	61	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.874		0.992			
Flt Protected	0.997				0.950	
Satd. Flow (prot)	1623	0	3511	0	1770	3539
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1623	0	3511	0	1770	3539
Link Speed (mph)	45		55			55
Link Distance (ft)	5280		2649			2671
Travel Time (s)	80.0		32.8			33.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	68	92	5	66	109
Shared Lane Traffic (%)						
Lane Group Flow (vph)	73	0	97	0	66	109
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	5	63	85	5	61	100
Future Vol, veh/h	5	63	85	5	61	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	68	92	5	66	109

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	282	49	0	0	98	0
Stage 1	95	-	-	-	-	-
Stage 2	187	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	685	1009	-	-	1493	-
Stage 1	918	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	655	1009	-	-	1493	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	2.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	970	1493	-
HCM Lane V/C Ratio	-	-	0.076	0.044	-
HCM Control Delay (s)	-	-	9	7.5	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	202	396	37	219	159
Future Volume (vph)	8	202	396	37	219	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.870		0.987			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1617	0	3493	0	1770	3539
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1617	0	3493	0	1770	3539
Link Speed (mph)	45		55			55
Link Distance (ft)	5280		2649			2671
Travel Time (s)	80.0		32.8			33.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	220	430	40	238	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	470	0	238	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

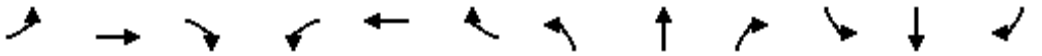
Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	8	202	396	37	219	159
Future Vol, veh/h	8	202	396	37	219	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	220	430	40	238	173

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1014	235	0	0	471	0
Stage 1	451	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	235	767	-	-	1087	-
Stage 1	609	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	184	767	-	-	1087	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	417	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	5.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	684	1087	-
HCM Lane V/C Ratio	-	-	0.334	0.219	-
HCM Control Delay (s)	-	-	12.9	9.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.5	0.8	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	3	3	8	33	114	1	170	11	103	278	60
Future Volume (vph)	20	3	3	8	33	114	1	170	11	103	278	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		100	100		200
Storage Lanes	0		0	0		0	1		0	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	0.95	1.00	0.95	1.00
Frt		0.986			0.901			0.991				0.850
Flt Protected		0.962			0.997		0.950			0.950		
Satd. Flow (prot)	0	1767	0	0	1673	0	1770	3507	0	1770	3539	1583
Flt Permitted		0.962			0.997		0.950			0.950		
Satd. Flow (perm)	0	1767	0	0	1673	0	1770	3507	0	1770	3539	1583
Link Speed (mph)		30			45			55			55	
Link Distance (ft)		2659			5280			2649			2671	
Travel Time (s)		60.4			80.0			32.8			33.1	
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
Adj. Flow (vph)	22	3	3	9	36	124	1	185	12	112	302	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	169	0	1	197	0	112	302	65
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
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	20	3	3	8	33	114	1	170	11	103	278	60
Future Vol, veh/h	20	3	3	8	33	114	1	170	11	103	278	60
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	-	-	-	-	-	-	200	-	-	100	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	3	3	9	36	124	1	185	12	112	302	65

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	639	725	151	570	719	98	302	0	0	197	0	0
Stage 1	526	526	-	193	193	-	-	-	-	-	-	-
Stage 2	113	199	-	377	526	-	-	-	-	-	-	-
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	361	350	868	404	353	939	1256	-	-	1373	-	-
Stage 1	503	527	-	790	740	-	-	-	-	-	-	-
Stage 2	880	735	-	616	527	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	269	321	868	374	324	939	1256	-	-	1373	-	-
Mov Cap-2 Maneuver	269	321	-	374	324	-	-	-	-	-	-	-
Stage 1	503	484	-	789	739	-	-	-	-	-	-	-
Stage 2	726	734	-	560	484	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	12.7	0	1.8
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1256	-	-	298	634	1373	-	-
HCM Lane V/C Ratio	0.001	-	-	0.095	0.266	0.082	-	-
HCM Control Delay (s)	7.9	-	-	18.3	12.7	7.9	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	1.1	0.3	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	178	221	14	170	248
Future Volume (vph)	14	178	221	14	170	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.875		0.991			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1623	0	3507	0	1770	3539
Flt Permitted	0.996				0.950	
Satd. Flow (perm)	1623	0	3507	0	1770	3539
Link Speed (mph)	45		55			55
Link Distance (ft)	5280		2649			2671
Travel Time (s)	80.0		32.8			33.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	193	240	15	185	270
Shared Lane Traffic (%)						
Lane Group Flow (vph)	208	0	255	0	185	270
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

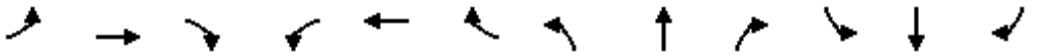
Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	14	178	221	14	170	248
Future Vol, veh/h	14	178	221	14	170	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	193	240	15	185	270

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	752	128	0	0	255	0
Stage 1	248	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	346	898	-	-	1307	-
Stage 1	770	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	297	898	-	-	1307	-
Mov Cap-2 Maneuver	297	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	491	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	3.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	783	1307	-
HCM Lane V/C Ratio	-	-	0.267	0.141	-
HCM Control Delay (s)	-	-	11.3	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0.5	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	5	5	14	66	191	2	282	18	170	486	120
Future Volume (vph)	40	5	5	14	66	191	2	282	18	170	486	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	100		100	100		100
Storage Lanes	0		0	0		0	1		0	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	0.95	1.00	0.95	1.00
Frt		0.987			0.905			0.991				0.850
Flt Protected		0.961			0.997		0.950			0.950		
Satd. Flow (prot)	0	1767	0	0	1681	0	1770	3507	0	1770	3539	1583
Flt Permitted		0.961			0.997		0.950			0.950		
Satd. Flow (perm)	0	1767	0	0	1681	0	1770	3507	0	1770	3539	1583
Link Speed (mph)		30			45			55			55	
Link Distance (ft)		2651			5280			2649			2671	
Travel Time (s)		60.3			80.0			32.8			33.1	
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
Adj. Flow (vph)	43	5	5	15	72	208	2	307	20	185	528	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	0	0	295	0	2	327	0	185	528	130
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
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	13.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	40	5	5	14	66	191	2	282	18	170	486	120
Future Vol, veh/h	40	5	5	14	66	191	2	282	18	170	486	120
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	-	-	-	-	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	5	5	15	72	208	2	307	20	185	528	130

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1091	1228	264	957	1219	163	528	0	0	326	0	0
Stage 1	898	898	-	321	321	-	-	-	-	-	-	-
Stage 2	193	330	-	636	898	-	-	-	-	-	-	-
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	169	177	734	212	179	853	1035	-	-	1230	-	-
Stage 1	301	356	-	665	650	-	-	-	-	-	-	-
Stage 2	790	644	-	433	356	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	72	150	734	181	152	853	1035	-	-	1230	-	-
Mov Cap-2 Maneuver	72	150	-	181	152	-	-	-	-	-	-	-
Stage 1	300	302	-	664	649	-	-	-	-	-	-	-
Stage 2	531	643	-	359	302	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	105.5	44.3	0.1	1.8
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1035	-	-	84	368	1230	-	-
HCM Lane V/C Ratio	0.002	-	-	0.647	0.8	0.15	-	-
HCM Control Delay (s)	8.5	-	-	105.5	44.3	8.4	-	-
HCM Lane LOS	A	-	-	F	E	A	-	-
HCM 95th %tile Q(veh)	0	-	-	3	6.9	0.5	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Di Giorgio Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

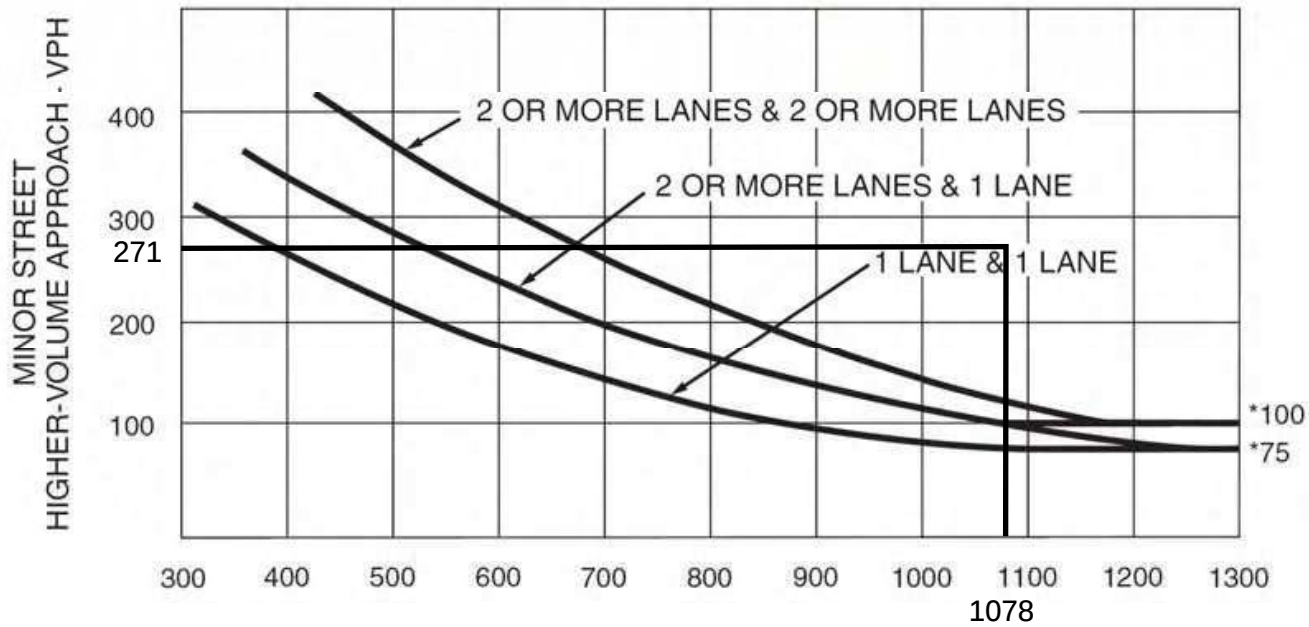
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 12936 ..... 2 or More..... 3252	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 12936 ..... 2 or More..... 3252	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B	2 CONDITIONS 80%	2 CONDITIONS 80%
Satisfied X Not Satisfied _____		
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: DiGiorgio & South Union - PM Peak
Count Date: 1/22/2015

Ave Annual Growth: **3.90%**

Exist Peak Hour Volumes

U

>	WBL	5
1	WBT	0
<	WBR	119
>	EBL	0
1	EBT	0
<	EBR	0
1	NBL	1
2	NBT	243
<	NBR	22
1	SBL	130
2	SBT	100
<	SBR	0
	TOTAL	620

Year 2035
Fut. Volumes w/o Proj

WBL	14
WBT	0
WBR	337
EBL	0
EBT	0
EBR	0
NBL	2
NBT	632
NBR	62
SBL	361
SBT	248
SBR	0
TOTAL	1656

Year 2035 Fut. Vol
+ Project Traffic

WBL	23
WBT	75
WBR	337
EBL	99
EBT	102
EBR	100
NBL	4
NBT	926
NBR	74
SBL	361
SBT	391
SBR	186
TOTAL	2678

Year 2025
Fut. Volumes w/o Proj

WBL	8
WBT	0
WBR	202
EBL	0
EBT	0
EBR	0
NBL	1
NBT	396
NBR	37
SBL	219
SBT	159
SBR	0
TOTAL	1022

Year 2025 Fut. Vol
+ Project Traffic

WBL	13
WBT	38
WBR	202
EBL	50
EBT	51
EBR	50
NBL	2
NBT	543
NBR	43
SBL	219
SBT	231
SBR	93
TOTAL	1535

Project Generated Trips - Year 2035

	Total
WBL	9
WBT	75
WBR	0
EBL	99
EBT	102
EBR	100
NBL	2
NBT	294
NBR	12
SBL	0
SBT	143
SBR	186
TOTAL	1022

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	DiGiorgio & South Union - PM Peak						
	Count Date:	1/22/2015						
2006	ADT							
WB Approach (To)	0.011							
WB Approach (Away)	0.011							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.66							
NB Approach (Away)	0.73							
SB Approach (To)	0.738							
SB Approach (Away)	0.667							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.054		WBL	4.26	WBT	3.05	WBR	4.40
WB Approach (Away)	0.055		5.08%	14	3.13%	0	5.22%	337
EB Approach (To)	*1.2*		EBL	2.55	EBT	3.10	EBR	2.40
EB Approach (Away)	*1.2*		2.72%	0	3.17%	0	2.57%	0
NB Approach (To)	2.552		NBL	2.53	NBT	3.88	NBR	4.43
NB Approach (Away)	2.631		2.70%	2	4.79%	632	5.24%	62
SB Approach (To)	2.681		SBL	4.32	SBT	3.62	SBR	2.42
SB Approach (Away)	2.601		5.12%	361	4.53%	248	2.59%	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	119	243	22	130	100
Future Volume (vph)	5	119	243	22	130	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.870		0.987			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1617	0	3493	0	1770	3539
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1617	0	3493	0	1770	3539
Link Speed (mph)	45		55			55
Link Distance (ft)	5280		2649			2671
Travel Time (s)	80.0		32.8			33.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	129	264	24	141	109
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	0	288	0	141	109
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	3.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	5	119	243	22	130	100
Future Vol, veh/h	5	119	243	22	130	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	129	264	24	141	109

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	613	144	0	0	288	0
Stage 1	276	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	424	877	-	-	1271	-
Stage 1	746	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	377	877	-	-	1271	-
Mov Cap-2 Maneuver	377	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	4.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	832	1271	-
HCM Lane V/C Ratio	-	-	0.162	0.111	-
HCM Control Delay (s)	-	-	10.2	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.4	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	202	396	37	219	159
Future Volume (vph)	8	202	396	37	219	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.870		0.987			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1617	0	3493	0	1770	3539
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1617	0	3493	0	1770	3539
Link Speed (mph)	45		55			55
Link Distance (ft)	5280		2649			2671
Travel Time (s)	80.0		32.8			33.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	220	430	40	238	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	470	0	238	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	8	202	396	37	219	159
Future Vol, veh/h	8	202	396	37	219	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	220	430	40	238	173

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1014	235	0	0	471	0
Stage 1	451	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	235	767	-	-	1087	-
Stage 1	609	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	184	767	-	-	1087	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	417	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	5.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	684	1087	-
HCM Lane V/C Ratio	-	-	0.334	0.219	-
HCM Control Delay (s)	-	-	12.9	9.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.5	0.8	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	51	50	13	38	202	2	543	43	219	231	93
Future Volume (vph)	50	51	50	13	38	202	2	543	43	219	231	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	100		100	100		100
Storage Lanes	0		0	0		0	1		0	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	0.95	1.00	0.95	1.00
Frt		0.955			0.892			0.989				0.850
Flt Protected		0.984			0.997		0.950			0.950		
Satd. Flow (prot)	0	1750	0	0	1657	0	1770	3500	0	1770	3539	1583
Flt Permitted		0.984			0.997		0.950			0.950		
Satd. Flow (perm)	0	1750	0	0	1657	0	1770	3500	0	1770	3539	1583
Link Speed (mph)		30			45			55			55	
Link Distance (ft)		2661			5280			2649			2671	
Travel Time (s)		60.5			80.0			32.8			33.1	
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
Adj. Flow (vph)	54	55	54	14	41	220	2	590	47	238	251	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	163	0	0	275	0	2	637	0	238	251	101
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
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

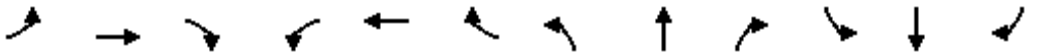
Intersection	
Int Delay, s/veh	39

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	50	51	50	13	38	202	2	543	43	219	231	93
Future Vol, veh/h	50	51	50	13	38	202	2	543	43	219	231	93
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	-	-	-	-	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	55	54	14	41	220	2	590	47	238	251	101

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1047	1368	126	1247	1345	318	251	0	0	637	0	0
Stage 1	727	727	-	618	618	-	-	-	-	-	-	-
Stage 2	320	641	-	629	727	-	-	-	-	-	-	-
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	182	146	901	130	150	678	1311	-	-	943	-	-
Stage 1	381	427	-	443	479	-	-	-	-	-	-	-
Stage 2	666	468	-	437	427	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	72	109	901	60	112	678	1311	-	-	943	-	-
Mov Cap-2 Maneuver	72	109	-	60	112	-	-	-	-	-	-	-
Stage 1	380	319	-	442	478	-	-	-	-	-	-	-
Stage 2	411	467	-	254	319	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	257.2	74.3	0	4.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1311	-	-	124	296	943	-	-
HCM Lane V/C Ratio	0.002	-	-	1.324	0.929	0.252	-	-
HCM Control Delay (s)	7.8	-	-	257.2	74.3	10.1	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0	-	-	10.7	8.9	1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	51	50	13	38	202	2	543	43	219	231	93
Future Volume (vph)	50	51	50	13	38	202	2	543	43	219	231	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	100		100	100		100
Storage Lanes	1		0	1		0	1		0	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	0.95	1.00	0.95	1.00
Frt		0.926			0.874			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1725	0	1770	1628	0	1770	3500	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1725	0	1770	1628	0	1770	3500	0	1770	3539	1583
Link Speed (mph)		30			45			55			55	
Link Distance (ft)		2661			5280			2649			2671	
Travel Time (s)		60.5			80.0			32.8			33.1	
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
Adj. Flow (vph)	54	55	54	14	41	220	2	590	47	238	251	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	109	0	14	261	0	2	637	0	238	251	101
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 59.6%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	50	51	50	13	38	202	2	543	43	219	231	93
Future Vol, veh/h	50	51	50	13	38	202	2	543	43	219	231	93
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	200	-	-	200	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	55	54	14	41	220	2	590	47	238	251	101

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1047	1368	126	1247	1345	318	251	0	0	637	0	0
Stage 1	727	727	-	618	618	-	-	-	-	-	-	-
Stage 2	320	641	-	629	727	-	-	-	-	-	-	-
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	182	146	901	130	150	678	1311	-	-	943	-	-
Stage 1	381	427	-	443	479	-	-	-	-	-	-	-
Stage 2	666	468	-	437	427	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	72	109	901	60	112	678	1311	-	-	943	-	-
Mov Cap-2 Maneuver	72	109	-	60	112	-	-	-	-	-	-	-
Stage 1	380	319	-	442	478	-	-	-	-	-	-	-
Stage 2	411	467	-	254	319	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	77.4	35.9	0	4.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1311	-	-	72	193	60	377	943	-	-
HCM Lane V/C Ratio	0.002	-	-	0.755	0.569	0.236	0.692	0.252	-	-
HCM Control Delay (s)	7.8	-	-	141.4	45.7	82.6	33.4	10.1	-	-
HCM Lane LOS	A	-	-	F	E	F	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	3.5	3.1	0.8	5	1	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	337	632	62	361	248
Future Volume (vph)	14	337	632	62	361	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.870		0.987			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1617	0	3493	0	1770	3539
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1617	0	3493	0	1770	3539
Link Speed (mph)	45		55			55
Link Distance (ft)	5280		2649			2671
Travel Time (s)	80.0		32.8			33.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	366	687	67	392	270
Shared Lane Traffic (%)						
Lane Group Flow (vph)	381	0	754	0	392	270
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

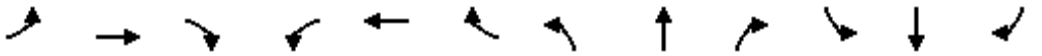
Intersection	
Int Delay, s/veh	14.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	14	337	632	62	361	248
Future Vol, veh/h	14	337	632	62	361	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	366	687	67	392	270

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1641	377	0	0	754	0
Stage 1	721	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	91	621	-	-	852	-
Stage 1	443	-	-	-	-	-
Stage 2	349	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	49	621	-	-	852	-
Mov Cap-2 Maneuver	49	-	-	-	-	-
Stage 1	443	-	-	-	-	-
Stage 2	188	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	53.8	0	7.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	424	852	-
HCM Lane V/C Ratio	-	-	0.9	0.461	-
HCM Control Delay (s)	-	-	53.8	12.8	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	9.6	2.5	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	102	100	23	75	337	4	926	74	361	391	186
Future Volume (vph)	99	102	100	23	75	337	4	926	74	361	391	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		100	100		200
Storage Lanes	1		0	1		0	1		0	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	0.95	1.00	0.95	1.00
Frt		0.926			0.877			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1725	0	1770	1634	0	1770	3500	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1725	0	1770	1634	0	1770	3500	0	1770	3539	1583
Link Speed (mph)		30			45			55			55	
Link Distance (ft)		2677			5280			2649			2671	
Travel Time (s)		60.8			80.0			32.8			33.1	
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
Adj. Flow (vph)	108	111	109	25	82	366	4	1007	80	392	425	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	220	0	25	448	0	4	1087	0	392	425	202
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	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	99	102	100	23	75	337	4	926	74	361	391	186
Future Vol, veh/h	99	102	100	23	75	337	4	926	74	361	391	186
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	200	-	-	200	-	-	200	-	-	100	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	108	111	109	25	82	366	4	1007	80	392	425	202

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1763	2306	213	2108	2265	543	425	0	0	1087	0	0
Stage 1	1210	1210	-	1055	1055	-	-	-	-	-	-	-
Stage 2	553	1096	-	1053	1210	-	-	-	-	-	-	-
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	~ 53	~ 38	792	29	~ 40	484	1131	-	-	638	-	-
Stage 1	194	254	-	241	301	-	-	-	-	-	-	-
Stage 2	485	287	-	242	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 15	792	-	~ 15	484	1131	-	-	638	-	-
Mov Cap-2 Maneuver	-	~ 15	-	-	~ 15	-	-	-	-	-	-	-
Stage 1	193	~ 98	-	240	300	-	-	-	-	-	-	-
Stage 2	~ 86	286	-	-	98	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	7.4
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	-	29	-	72	638	-	-
HCM Lane V/C Ratio	0.004	-	-	-	7.571	-	6.22	0.615	-	-
HCM Control Delay (s)	8.2	-	-	-	$ 3222.9	-	$ 2462.1	19.2	-	-
HCM Lane LOS	A	-	-	-	F	-	F	C	-	-
HCM 95th %tile Q(veh)	0	-	-	-	26.9	-	50.3	4.2	-	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Di Giorgio Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

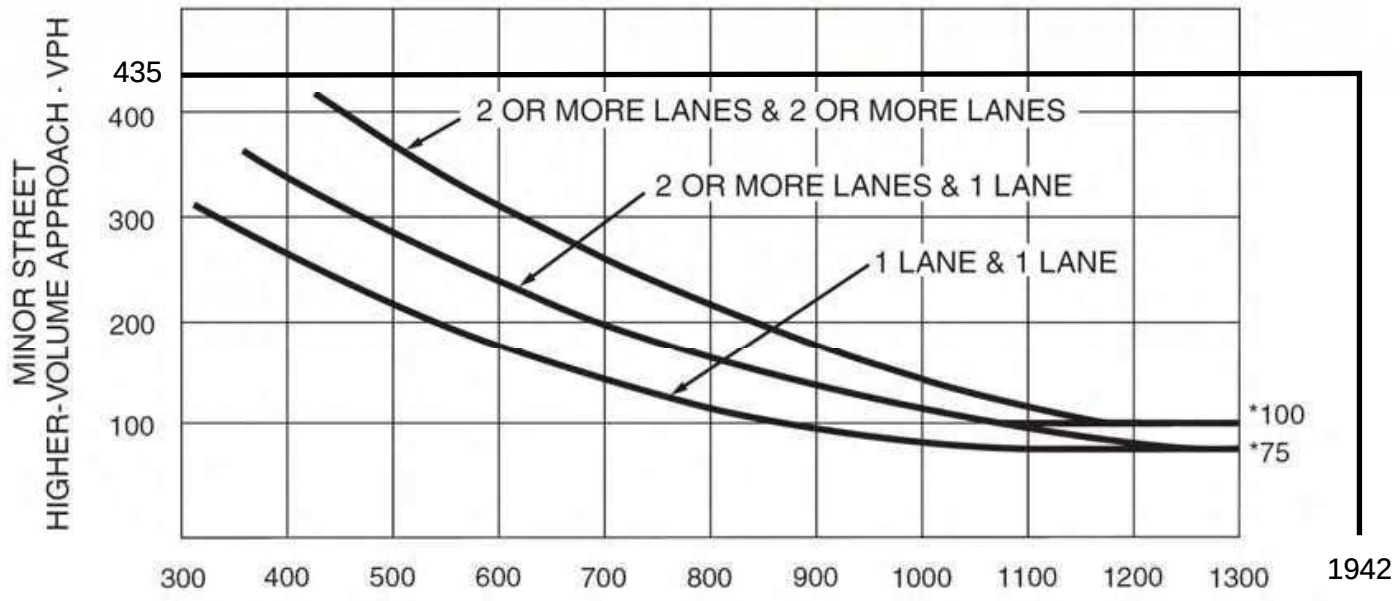
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More (19420) / 2 or More (4350)	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More (19420) / 2 or More (4350)	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... A: 100% B: 100%	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: DiGiorgio & Cottonwood - AM Peak

Count Date: 1/22/2015

Ave Annual Growth: **2.86%**

Exist Peak Hour Volumes

AWS		
>	WBL	2
1	WBT	66
<	WBR	39
>	EBL	1
1	EBT	69
<	EBR	2
>	NBL	4
1	NBT	12
<	NBR	6
>	SBL	27
1	SBT	21
<	SBR	4
	TOTAL	253

Year 2035

Fut. Volumes w/o Proj

WBL	4
WBT	90
WBR	28
EBL	2
EBT	91
EBR	8
NBL	17
NBT	28
NBR	10
SBL	20
SBT	51
SBR	8
TOTAL	357

Year 2035 Fut. Vol

+ Project Traffic

WBL	6
WBT	141
WBR	28
EBL	6
EBT	101
EBR	9
NBL	17
NBT	29
NBR	10
SBL	20
SBT	64
SBR	24
TOTAL	455

Year 2025

Fut. Volumes w/o Proj

WBL	3
WBT	77
WBR	33
EBL	1
EBT	80
EBR	4
NBL	8
NBT	18
NBR	8
SBL	23
SBT	33
SBR	6
TOTAL	294

Year 2025 Fut. Vol

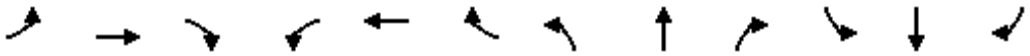
+ Project Traffic

WBL	4
WBT	103
WBR	33
EBL	3
EBT	85
EBR	5
NBL	8
NBT	19
NBR	8
SBL	23
SBT	40
SBR	14
TOTAL	345

Project Generated Trips - Year 2035

	Total
WBL	2
WBT	51
WBR	0
EBL	4
EBT	10
EBR	1
NBL	0
NBT	1
NBR	0
SBL	0
SBT	13
SBR	16
TOTAL	98

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	DiGiorgio & Cottonwood - AM Peak						
	Count Date:	1/22/2015						
2006	ADT							
WB Approach (To)	0.206							
WB Approach (Away)	0.207							
EB Approach (To)	0.01							
EB Approach (Away)	0.009							
NB Approach (To)	0.021							
NB Approach (Away)	0.02							
SB Approach (To)	0.218							
SB Approach (Away)	0.218							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.083		WBL	5.78	WBT	3.03	WBR	0.70
WB Approach (Away)	0.083		2.79%	4	1.54%	90	-1.54%	28
EB Approach (To)	0.052		EBL	3.10	EBT	2.80	EBR	8.18
EB Approach (Away)	0.051		2.92%	2	1.37%	91	7.26%	8
NB Approach (To)	0.212		NBL	7.88	NBT	5.55	NBR	5.25
NB Approach (Away)	0.223		7.23%	17	4.15%	28	2.60%	10
SB Approach (To)	0.227		SBL	0.72	SBT	6.10	SBR	3.35
SB Approach (Away)	0.218		-1.48%	20	4.40%	51	3.15%	8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.951			0.961			0.990	
Flt Protected		0.999			0.999			0.992			0.975	
Satd. Flow (prot)	0	1855	0	0	1770	0	0	1776	0	0	1798	0
Flt Permitted		0.999			0.999			0.992			0.975	
Satd. Flow (perm)	0	1855	0	0	1770	0	0	1776	0	0	1798	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	69	2	0	2	66	39	0	4	12	6
Future Vol, veh/h	0	1	69	2	0	2	66	39	0	4	12	6
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	75	2	0	2	72	42	0	4	13	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	7.6	7.4
HCM LOS	A	A	A

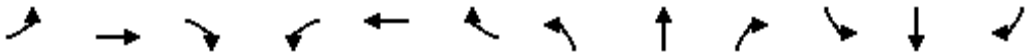
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	1%	2%	52%
Vol Thru, %	55%	96%	62%	40%
Vol Right, %	27%	3%	36%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	72	107	52
LT Vol	4	1	2	27
Through Vol	12	69	66	21
RT Vol	6	2	39	4
Lane Flow Rate	24	78	116	57
Geometry Grp	1	1	1	1
Degree of Util (X)	0.028	0.09	0.127	0.068
Departure Headway (Hd)	4.288	4.148	3.918	4.345
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	840	855	905	812
Service Time	2.288	2.218	1.984	2.436
HCM Lane V/C Ratio	0.029	0.091	0.128	0.07
HCM Control Delay	7.4	7.6	7.6	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.4	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	27	21	4
Future Vol, veh/h	0	27	21	4
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	23	4
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.960			0.968			0.986	
Flt Protected		0.999			0.999			0.988			0.982	
Satd. Flow (prot)	0	1850	0	0	1786	0	0	1781	0	0	1804	0
Flt Permitted		0.999			0.999			0.988			0.982	
Satd. Flow (perm)	0	1850	0	0	1786	0	0	1781	0	0	1804	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	80	4	0	3	77	33	0	8	18	8
Future Vol, veh/h	0	1	80	4	0	3	77	33	0	8	18	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	87	4	0	3	84	36	0	9	20	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.8	7.8	7.6
HCM LOS	A	A	A

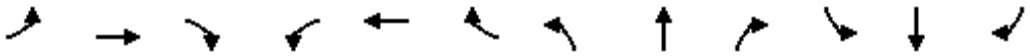
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	24%	1%	3%	37%
Vol Thru, %	53%	94%	68%	53%
Vol Right, %	24%	5%	29%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	85	113	62
LT Vol	8	1	3	23
Through Vol	18	80	77	33
RT Vol	8	4	33	6
Lane Flow Rate	37	92	123	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.045	0.107	0.137	0.083
Departure Headway (Hd)	4.385	4.184	4.016	4.46
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	821	843	878	808
Service Time	2.387	2.279	2.107	2.461
HCM Lane V/C Ratio	0.045	0.109	0.14	0.083
HCM Control Delay	7.6	7.8	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.4	0.5	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	33	6
Future Vol, veh/h	0	23	33	6
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	25	36	7
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.968			0.969			0.976	
Flt Protected		0.999			0.999			0.989			0.985	
Satd. Flow (prot)	0	1848	0	0	1801	0	0	1785	0	0	1791	0
Flt Permitted		0.999			0.999			0.989			0.985	
Satd. Flow (perm)	0	1848	0	0	1801	0	0	1785	0	0	1791	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	85	5	0	4	103	33	0	8	19	8
Future Vol, veh/h	0	3	85	5	0	4	103	33	0	8	19	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	92	5	0	4	112	36	0	9	21	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8	8.1	7.7
HCM LOS	A	A	A

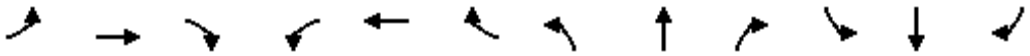
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	3%	3%	30%
Vol Thru, %	54%	91%	74%	52%
Vol Right, %	23%	5%	24%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	93	140	77
LT Vol	8	3	4	23
Through Vol	19	85	103	40
RT Vol	8	5	33	14
Lane Flow Rate	38	101	152	84
Geometry Grp	1	1	1	1
Degree of Util (X)	0.048	0.122	0.177	0.104
Departure Headway (Hd)	4.499	4.349	4.19	4.488
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	798	827	858	801
Service Time	2.516	2.363	2.203	2.503
HCM Lane V/C Ratio	0.048	0.122	0.177	0.105
HCM Control Delay	7.7	8	8.1	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.4	0.6	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	40	14
Future Vol, veh/h	0	23	40	14
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	25	43	15
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.969			0.975			0.986	
Flt Protected		0.999			0.998			0.985			0.987	
Satd. Flow (prot)	0	1840	0	0	1801	0	0	1789	0	0	1813	0
Flt Permitted		0.999			0.998			0.985			0.987	
Satd. Flow (perm)	0	1840	0	0	1801	0	0	1789	0	0	1813	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	2	91	8	0	4	90	28	0	17	28	10
Future Vol, veh/h	0	2	91	8	0	4	90	28	0	17	28	10
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	99	9	0	4	98	30	0	18	30	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	8.1	7.9
HCM LOS	A	A	A

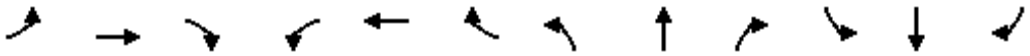
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	31%	2%	3%	25%
Vol Thru, %	51%	90%	74%	65%
Vol Right, %	18%	8%	23%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	101	122	79
LT Vol	17	2	4	20
Through Vol	28	91	90	51
RT Vol	10	8	28	8
Lane Flow Rate	60	110	133	86
Geometry Grp	1	1	1	1
Degree of Util (X)	0.075	0.133	0.157	0.108
Departure Headway (Hd)	4.526	4.373	4.264	4.532
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	793	822	843	793
Service Time	2.546	2.388	2.278	2.551
HCM Lane V/C Ratio	0.076	0.134	0.158	0.108
HCM Control Delay	7.9	8.1	8.1	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.5	0.6	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	20	51	8
Future Vol, veh/h	0	20	51	8
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	22	55	9
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.1
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.979			0.976			0.970	
Flt Protected		0.997			0.998			0.985			0.991	
Satd. Flow (prot)	0	1837	0	0	1820	0	0	1791	0	0	1791	0
Flt Permitted		0.997			0.998			0.985			0.991	
Satd. Flow (perm)	0	1837	0	0	1820	0	0	1791	0	0	1791	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	6	101	9	0	6	141	28	0	17	29	10
Future Vol, veh/h	0	6	101	9	0	6	141	28	0	17	29	10
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	110	10	0	7	153	30	0	18	32	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.4	8.8	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	5%	3%	19%
Vol Thru, %	52%	87%	81%	59%
Vol Right, %	18%	8%	16%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	56	116	175	108
LT Vol	17	6	6	20
Through Vol	29	101	141	64
RT Vol	10	9	28	24
Lane Flow Rate	61	126	190	117
Geometry Grp	1	1	1	1
Degree of Util (X)	0.08	0.159	0.233	0.151
Departure Headway (Hd)	4.753	4.535	4.414	4.634
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	753	791	814	774
Service Time	2.787	2.562	2.439	2.663
HCM Lane V/C Ratio	0.081	0.159	0.233	0.151
HCM Control Delay	8.2	8.4	8.8	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.6	0.9	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	20	64	24
Future Vol, veh/h	0	20	64	24
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	22	70	26
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.5
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Cottonwood Road

Minor St: Di Giorgio Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

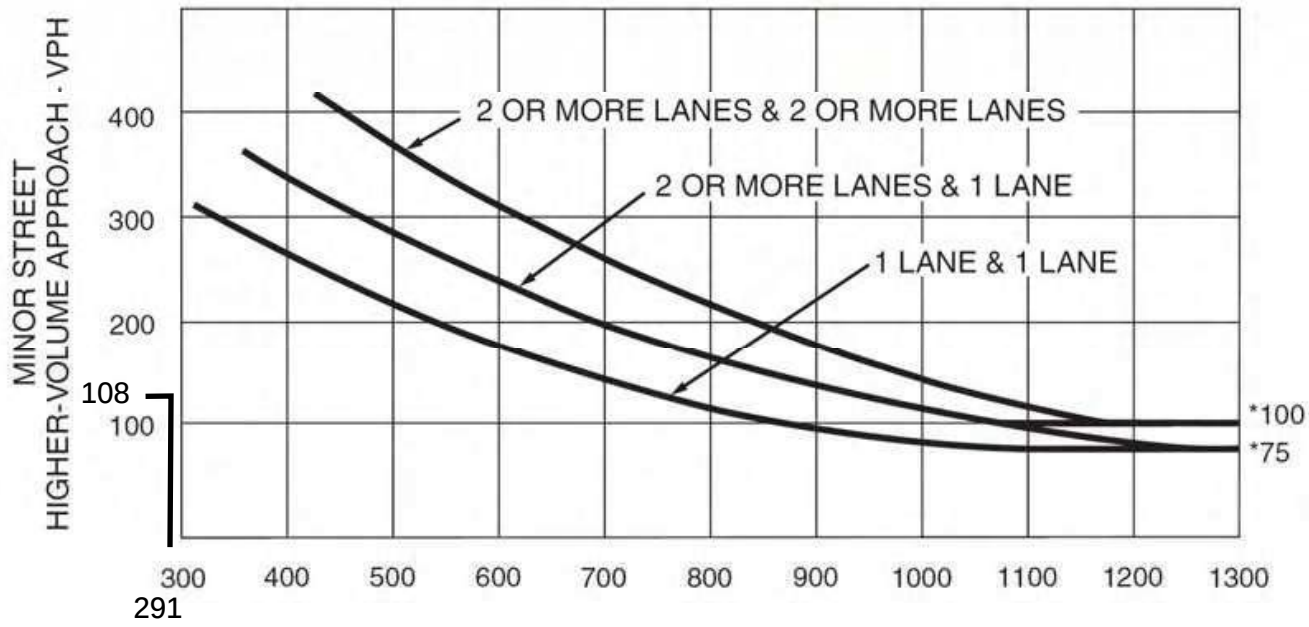
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 3492 / Minor Street 1296	Urban / Rural	Urban / Rural
1 ..... 1	8,000 / 5,600	2,400 / 1,680
2 or More 1	9,600 / 6,720	2,400 / 1,680
2 or More ..... 2 or More	9,600 / 6,720	3,200 / 2,240
1 ..... 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 3492 / Minor Street 1296	Urban / Rural	Urban / Rural
1 ..... 1	12,000 / 8,400	1,200 / 850
2 or More 1	14,400 / 10,080	1,200 / 850
2 or More ..... 2 or More	14,400 / 10,080	1,600 / 1,120
1 ..... 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 77% (A) 42% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: DiGiorgio & Cottonwood - PM Peak
Count Date: 1/22/2015

Ave Annual Growth: **2.86%**

Exist Peak Hour Volumes

AWS		
>	WBL	6
1	WBT	115
<	WBR	75
>	EBL	1
1	EBT	147
<	EBR	2
>	NBL	1
1	NBT	57
<	NBR	8
>	SBL	64
1	SBT	19
<	SBR	5
	TOTAL	500

Year 2035
Fut. Volumes w/o Proj

WBL	11
WBT	157
WBR	55
EBL	2
EBT	194
EBR	8
NBL	4
NBT	131
NBR	14
SBL	47
SBT	46
SBR	9
TOTAL	678

Year 2035 Fut. Vol
+ Project Traffic

WBL	14
WBT	195
WBR	55
EBL	59
EBT	207
EBR	21
NBL	4
NBT	142
NBR	18
SBL	47
SBT	46
SBR	43
TOTAL	851

Year 2025
Fut. Volumes w/o Proj

WBL	8
WBT	135
WBR	64
EBL	1
EBT	169
EBR	4
NBL	2
NBT	87
NBR	10
SBL	55
SBT	30
SBR	7
TOTAL	572

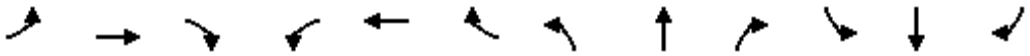
Year 2025 Fut. Vol
+ Project Traffic

WBL	10
WBT	154
WBR	64
EBL	30
EBT	176
EBR	11
NBL	2
NBT	93
NBR	12
SBL	55
SBT	30
SBR	24
TOTAL	661

Project Generated Trips - Year 2035

	Total
WBL	3
WBT	38
WBR	0
EBL	57
EBT	13
EBR	13
NBL	0
NBT	11
NBR	4
SBL	0
SBT	0
SBR	34
TOTAL	173

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	DiGiorgio & Cottonwood - PM Peak						
	Count Date:	1/22/2015						
2006	ADT							
WB Approach (To)	0.206							
WB Approach (Away)	0.207							
EB Approach (To)	0.01							
EB Approach (Away)	0.009							
NB Approach (To)	0.021							
NB Approach (Away)	0.02							
SB Approach (To)	0.218							
SB Approach (Away)	0.218							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.083		WBL	5.78	WBT	3.03	WBR	0.70
WB Approach (Away)	0.083		2.79%	11	1.54%	157	-1.54%	55
EB Approach (To)	0.052		EBL	3.10	EBT	2.80	EBR	8.18
EB Approach (Away)	0.051		2.92%	2	1.37%	194	7.26%	8
NB Approach (To)	0.212		NBL	7.88	NBT	5.55	NBR	5.25
NB Approach (Away)	0.223		7.23%	4	4.15%	131	2.60%	14
SB Approach (To)	0.227		SBL	0.72	SBT	6.10	SBR	3.35
SB Approach (Away)	0.218		-1.48%	47	4.40%	46	3.15%	9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.948			0.983			0.993	
Flt Protected					0.998			0.999			0.965	
Satd. Flow (prot)	0	1859	0	0	1762	0	0	1829	0	0	1785	0
Flt Permitted					0.998			0.999			0.965	
Satd. Flow (perm)	0	1859	0	0	1762	0	0	1829	0	0	1785	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	147	2	0	6	115	75	0	1	57	8
Future Vol, veh/h	0	1	147	2	0	6	115	75	0	1	57	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	160	2	0	7	125	82	0	1	62	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.8	8.8	8.4
HCM LOS	A	A	A

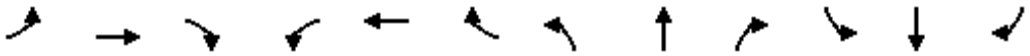
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	1%	3%	73%
Vol Thru, %	86%	98%	59%	22%
Vol Right, %	12%	1%	38%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	66	150	196	88
LT Vol	1	1	6	64
Through Vol	57	147	115	19
RT Vol	8	2	75	5
Lane Flow Rate	72	163	213	96
Geometry Grp	1	1	1	1
Degree of Util (X)	0.096	0.207	0.255	0.132
Departure Headway (Hd)	4.834	4.574	4.314	4.979
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	740	784	833	718
Service Time	2.876	2.606	2.343	3.02
HCM Lane V/C Ratio	0.097	0.208	0.256	0.134
HCM Control Delay	8.4	8.8	8.8	8.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.8	1	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	64	19	5
Future Vol, veh/h	0	64	19	5
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	70	21	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.958			0.986			0.989	
Flt Protected					0.998			0.999			0.971	
Satd. Flow (prot)	0	1857	0	0	1781	0	0	1835	0	0	1789	0
Flt Permitted					0.998			0.999			0.971	
Satd. Flow (perm)	0	1857	0	0	1781	0	0	1835	0	0	1789	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	169	4	0	8	135	64	0	2	87	10
Future Vol, veh/h	0	1	169	4	0	8	135	64	0	2	87	10
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	184	4	0	9	147	70	0	2	95	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.3	9.3	8.9
HCM LOS	A	A	A

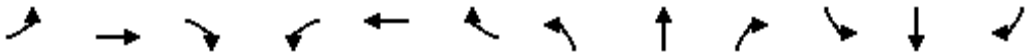
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	1%	4%	60%
Vol Thru, %	88%	97%	65%	33%
Vol Right, %	10%	2%	31%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	174	207	92
LT Vol	2	1	8	55
Through Vol	87	169	135	30
RT Vol	10	4	64	7
Lane Flow Rate	108	189	225	100
Geometry Grp	1	1	1	1
Degree of Util (X)	0.148	0.247	0.282	0.142
Departure Headway (Hd)	4.964	4.703	4.504	5.103
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	718	760	794	698
Service Time	3.026	2.752	2.551	3.165
HCM Lane V/C Ratio	0.15	0.249	0.283	0.143
HCM Control Delay	8.9	9.3	9.3	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1	1.2	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	55	30	7
Future Vol, veh/h	0	55	30	7
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	60	33	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.962			0.985			0.971	
Flt Protected		0.993			0.998			0.999			0.975	
Satd. Flow (prot)	0	1837	0	0	1788	0	0	1833	0	0	1764	0
Flt Permitted		0.993			0.998			0.999			0.975	
Satd. Flow (perm)	0	1837	0	0	1788	0	0	1833	0	0	1764	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	30	176	11	0	10	154	64	0	2	93	12
Future Vol, veh/h	0	30	176	11	0	10	154	64	0	2	93	12
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	33	191	12	0	11	167	70	0	2	101	13
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.1	10	9.3
HCM LOS	B	A	A

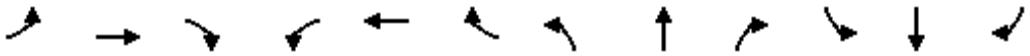
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	14%	4%	50%
Vol Thru, %	87%	81%	68%	28%
Vol Right, %	11%	5%	28%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	217	228	109
LT Vol	2	30	10	55
Through Vol	93	176	154	30
RT Vol	12	11	64	24
Lane Flow Rate	116	236	248	118
Geometry Grp	1	1	1	1
Degree of Util (X)	0.167	0.316	0.321	0.171
Departure Headway (Hd)	5.168	4.829	4.667	5.196
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	687	738	763	684
Service Time	3.255	2.898	2.734	3.283
HCM Lane V/C Ratio	0.169	0.32	0.325	0.173
HCM Control Delay	9.3	10.1	10	9.4
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.6	1.4	1.4	0.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	55	30	24
Future Vol, veh/h	0	55	30	24
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	60	33	26
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.967			0.987			0.988	
Flt Protected					0.998			0.999			0.978	
Satd. Flow (prot)	0	1853	0	0	1798	0	0	1837	0	0	1800	0
Flt Permitted					0.998			0.999			0.978	
Satd. Flow (perm)	0	1853	0	0	1798	0	0	1837	0	0	1800	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	2	194	8	0	11	157	55	0	4	131	14
Future Vol, veh/h	0	2	194	8	0	11	157	55	0	4	131	14
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	211	9	0	12	171	60	0	4	142	15
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.2	10.2	9.8
HCM LOS	B	B	A

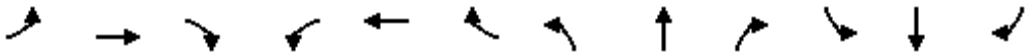
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	1%	5%	46%
Vol Thru, %	88%	95%	70%	45%
Vol Right, %	9%	4%	25%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	204	223	102
LT Vol	4	2	11	47
Through Vol	131	194	157	46
RT Vol	14	8	55	9
Lane Flow Rate	162	222	242	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.231	0.303	0.322	0.167
Departure Headway (Hd)	5.241	4.912	4.776	5.409
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	690	723	744	667
Service Time	3.241	3.002	2.864	3.409
HCM Lane V/C Ratio	0.235	0.307	0.325	0.166
HCM Control Delay	9.8	10.2	10.2	9.5
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.9	1.3	1.4	0.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	47	46	9
Future Vol, veh/h	0	47	46	9
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	51	50	10
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.5
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.972			0.985			0.957	
Flt Protected		0.990			0.997			0.999			0.983	
Satd. Flow (prot)	0	1826	0	0	1805	0	0	1833	0	0	1752	0
Flt Permitted		0.990			0.997			0.999			0.983	
Satd. Flow (perm)	0	1826	0	0	1805	0	0	1833	0	0	1752	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		5280			5879			5342			2654	
Travel Time (s)		80.0			89.1			66.2			32.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	59	207	21	0	14	195	55	0	4	142	18
Future Vol, veh/h	0	59	207	21	0	14	195	55	0	4	142	18
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	64	225	23	0	15	212	60	0	4	154	20
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	12.9	12.1	11.1
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	5%	35%
Vol Thru, %	87%	72%	74%	34%
Vol Right, %	11%	7%	21%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	164	287	264	136
LT Vol	4	59	14	47
Through Vol	142	207	195	46
RT Vol	18	21	55	43
Lane Flow Rate	178	312	287	148
Geometry Grp	1	1	1	1
Degree of Util (X)	0.284	0.462	0.42	0.236
Departure Headway (Hd)	5.741	5.33	5.263	5.747
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	624	674	683	622
Service Time	3.799	3.377	3.311	3.805
HCM Lane V/C Ratio	0.285	0.463	0.42	0.238
HCM Control Delay	11.1	12.9	12.1	10.6
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.2	2.4	2.1	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	47	46	43
Future Vol, veh/h	0	47	46	43
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	51	50	47
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.6
HCM LOS	B

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Cottonwood Road

Minor St: Di Giorgio Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

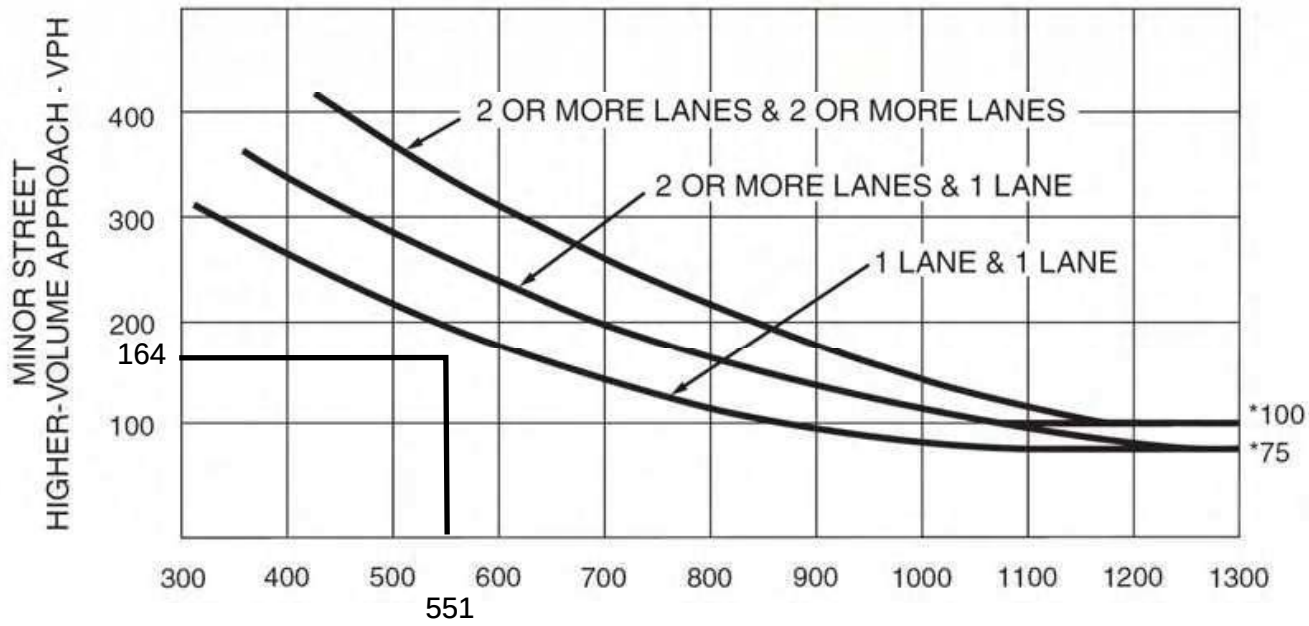
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 5510 / Minor Street 1640	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 5510 / Minor Street 1640	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 98% (A) 66% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: S. Union & Lamb Entrance #2- AM Peak
Count Date: 1/27/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

U		
0	WBL	1
0	WBT	1
0	WBR	1
>	EBL	1
0	EBT	1
<	EBR	1
0	NBL	1
2	NBT	63
0	NBR	1
0	SBL	1
2	SBT	104
<	SBR	1
	TOTAL	177

Year 2035
Fut. Volumes w/o Proj

WBL	2
WBT	2
WBR	2
EBL	2
EBT	2
EBR	2
NBL	2
NBT	127
NBR	2
SBL	2
SBT	209
SBR	2
TOTAL	356

Year 2035 Fut. Vol
+ Project Traffic

WBL	2
WBT	3
WBR	2
EBL	60
EBT	4
EBR	30
NBL	2
NBT	210
NBR	2
SBL	2
SBT	289
SBR	180
TOTAL	786

Year 2025
Fut. Volumes w/o Proj

WBL	1
WBT	1
WBR	1
EBL	1
EBT	1
EBR	1
NBL	1
NBT	90
NBR	1
SBL	1
SBT	149
SBR	1
TOTAL	249

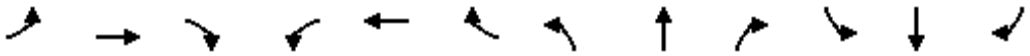
Year 2025 Fut. Vol
+ Project Traffic

WBL	1
WBT	2
WBR	1
EBL	30
EBT	2
EBR	15
NBL	1
NBT	132
NBR	1
SBL	1
SBT	189
SBR	90
TOTAL	465

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	1
WBR	0
EBL	58
EBT	2
EBR	28
NBL	0
NBT	83
NBR	0
SBL	0
SBT	80
SBR	178
TOTAL	430

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	S. Union & Lamb Entrance #2- AM Peak						
	Count Date:	1/27/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.625							
NB Approach (Away)	0.695							
SB Approach (To)	0.695							
SB Approach (Away)	0.625							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	2.48	WBT	1.20	WBR	2.62
WB Approach (Away)	*1.2*		2.65%	2	0.63%	1	2.78%	2
EB Approach (To)	*1.2*		EBL	2.62	EBT	1.20	EBR	2.48
EB Approach (Away)	*1.2*		2.78%	2	0.63%	1	2.65%	2
NB Approach (To)	2.529		NBL	2.62	NBT	4.05	NBR	2.62
NB Approach (Away)	2.608		2.78%	2	4.93%	169	2.78%	2
SB Approach (To)	2.608		SBL	2.48	SBT	3.75	SBR	2.48
SB Approach (Away)	2.529		2.65%	2	4.66%	264	2.65%	2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.955			0.955			0.998			0.999	
Flt Protected		0.984			0.984		0.950			0.950		
Satd. Flow (prot)	0	1750	0	0	1750	0	1770	3532	0	1770	3536	0
Flt Permitted		0.984			0.984		0.950			0.950		
Satd. Flow (perm)	0	1750	0	0	1750	0	1770	3532	0	1770	3536	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			1332			2649	
Travel Time (s)		18.8			20.6			16.5			32.8	

Intersection Summary	
Area Type:	Other

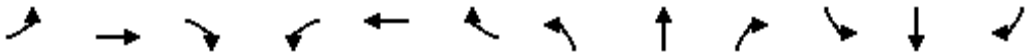
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	1	1	1	1	1	1	1	63	1	1	104	1
Future Vol, veh/h	1	1	1	1	1	1	1	63	1	1	104	1
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	1	1	1	1	68	1	1	113	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	188	57	130	187	35	114	0	0	70	0	0
Stage 1	116	116	-	71	71	-	-	-	-	-	-	-
Stage 2	37	72	-	59	116	-	-	-	-	-	-	-
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	799	706	997	830	706	1030	1473	-	-	1529	-	-
Stage 1	876	799	-	931	835	-	-	-	-	-	-	-
Stage 2	974	834	-	946	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	796	705	997	827	705	1030	1473	-	-	1529	-	-
Mov Cap-2 Maneuver	796	705	-	827	705	-	-	-	-	-	-	-
Stage 1	875	798	-	930	834	-	-	-	-	-	-	-
Stage 2	971	833	-	943	798	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9.3	0.1	0.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1473	-	-	816	834	1529	-	-
HCM Lane V/C Ratio	0.001	-	-	0.004	0.004	0.001	-	-
HCM Control Delay (s)	7.4	-	-	9.4	9.3	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.955			0.955			0.998			0.999	
Flt Protected		0.984			0.984		0.950			0.950		
Satd. Flow (prot)	0	1750	0	0	1750	0	1770	3532	0	1770	3536	0
Flt Permitted		0.984			0.984		0.950			0.950		
Satd. Flow (perm)	0	1750	0	0	1750	0	1770	3532	0	1770	3536	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			1332			2649	
Travel Time (s)		18.8			20.6			16.5			32.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	1	1	1	1	1	1	1	90	1	1	149	1
Future Vol, veh/h	1	1	1	1	1	1	1	90	1	1	149	1
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	1	1	1	1	98	1	1	162	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	217	266	82	185	266	49	163	0	0	99	0	0
Stage 1	165	165	-	101	101	-	-	-	-	-	-	-
Stage 2	52	101	-	84	165	-	-	-	-	-	-	-
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	721	638	961	759	638	1009	1413	-	-	1492	-	-
Stage 1	821	761	-	894	811	-	-	-	-	-	-	-
Stage 2	954	811	-	915	761	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	719	637	961	756	637	1009	1413	-	-	1492	-	-
Mov Cap-2 Maneuver	719	637	-	756	637	-	-	-	-	-	-	-
Stage 1	820	760	-	893	810	-	-	-	-	-	-	-
Stage 2	951	810	-	912	760	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.7	0.1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1413	-	-	750	772	1492	-	-
HCM Lane V/C Ratio	0.001	-	-	0.004	0.004	0.001	-	-
HCM Control Delay (s)	7.5	-	-	9.8	9.7	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.958			0.966			0.999			0.951	
Flt Protected		0.969			0.988		0.950			0.950		
Satd. Flow (prot)	0	1729	0	0	1778	0	1770	3536	0	1770	3366	0
Flt Permitted		0.969			0.988		0.950			0.950		
Satd. Flow (perm)	0	1729	0	0	1778	0	1770	3536	0	1770	3366	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			665			2649	
Travel Time (s)		18.8			20.6			8.2			32.8	

Intersection Summary	
Area Type:	Other

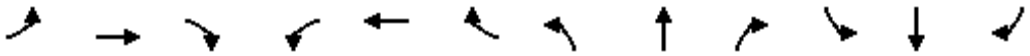
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	30	2	15	1	2	1	1	132	1	1	189	90
Future Vol, veh/h	30	2	15	1	2	1	1	132	1	1	189	90
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	2	16	1	2	1	1	143	1	1	205	98

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	332	404	152	252	451	72	303	0	0	145	0	0
Stage 1	257	257	-	146	146	-	-	-	-	-	-	-
Stage 2	75	147	-	106	305	-	-	-	-	-	-	-
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	598	534	867	681	502	975	1255	-	-	1435	-	-
Stage 1	725	694	-	842	775	-	-	-	-	-	-	-
Stage 2	926	774	-	888	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	595	533	867	665	501	975	1255	-	-	1435	-	-
Mov Cap-2 Maneuver	595	533	-	665	501	-	-	-	-	-	-	-
Stage 1	724	694	-	841	774	-	-	-	-	-	-	-
Stage 2	922	773	-	868	661	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	10.9	0.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1255	-	-	658	613	1435	-	-
HCM Lane V/C Ratio	0.001	-	-	0.078	0.007	0.001	-	-
HCM Control Delay (s)	7.9	-	-	10.9	10.9	7.5	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.955			0.955			0.998			0.999	
Flt Protected		0.984			0.984		0.950			0.950		
Satd. Flow (prot)	0	1750	0	0	1750	0	1770	3532	0	1770	3536	0
Flt Permitted		0.984			0.984		0.950			0.950		
Satd. Flow (perm)	0	1750	0	0	1750	0	1770	3532	0	1770	3536	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			1332			2649	
Travel Time (s)		18.8			20.6			16.5			32.8	

Intersection Summary	
Area Type:	Other

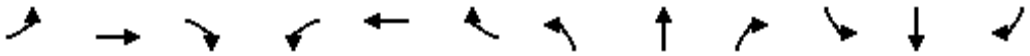
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	2	2	2	2	2	2	2	127	2	2	209	2
Future Vol, veh/h	2	2	2	2	2	2	2	127	2	2	209	2
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	2	2	2	2	2	2	138	2	2	227	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	307	378	115	262	377	70	229	0	0	140	0	0
Stage 1	233	233	-	143	143	-	-	-	-	-	-	-
Stage 2	74	145	-	119	234	-	-	-	-	-	-	-
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	622	552	916	670	553	978	1336	-	-	1441	-	-
Stage 1	749	711	-	845	778	-	-	-	-	-	-	-
Stage 2	927	776	-	873	710	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	617	550	916	665	551	978	1336	-	-	1441	-	-
Mov Cap-2 Maneuver	617	550	-	665	551	-	-	-	-	-	-	-
Stage 1	748	710	-	844	777	-	-	-	-	-	-	-
Stage 2	921	775	-	867	709	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	10.3	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1336	-	-	662	691	1441	-	-
HCM Lane V/C Ratio	0.002	-	-	0.01	0.009	0.002	-	-
HCM Control Delay (s)	7.7	-	-	10.5	10.3	7.5	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.956			0.961			0.999			0.942	
Flt Protected		0.969			0.986		0.950			0.950		
Satd. Flow (prot)	0	1726	0	0	1765	0	1770	3536	0	1770	3334	0
Flt Permitted		0.969			0.986		0.950			0.950		
Satd. Flow (perm)	0	1726	0	0	1765	0	1770	3536	0	1770	3334	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			645			2649	
Travel Time (s)		18.8			20.6			8.0			32.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	60	4	30	2	3	2	2	210	2	2	289	180
Future Vol, veh/h	60	4	30	2	3	2	2	210	2	2	289	180
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	4	33	2	3	2	2	228	2	2	314	196

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	536	651	255	398	748	115	510	0	0	230	0	0
Stage 1	416	416	-	234	234	-	-	-	-	-	-	-
Stage 2	120	235	-	164	514	-	-	-	-	-	-	-
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	428	386	744	536	339	916	1051	-	-	1335	-	-
Stage 1	585	590	-	748	710	-	-	-	-	-	-	-
Stage 2	872	709	-	822	534	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	423	385	744	507	338	916	1051	-	-	1335	-	-
Mov Cap-2 Maneuver	423	385	-	507	338	-	-	-	-	-	-	-
Stage 1	584	589	-	747	709	-	-	-	-	-	-	-
Stage 2	864	708	-	779	533	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	12.8	0.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1051	-	-	488	467	1335	-	-
HCM Lane V/C Ratio	0.002	-	-	0.209	0.016	0.002	-	-
HCM Control Delay (s)	8.4	-	-	14.3	12.8	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.8	0.1	0	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Lamb Avenue

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

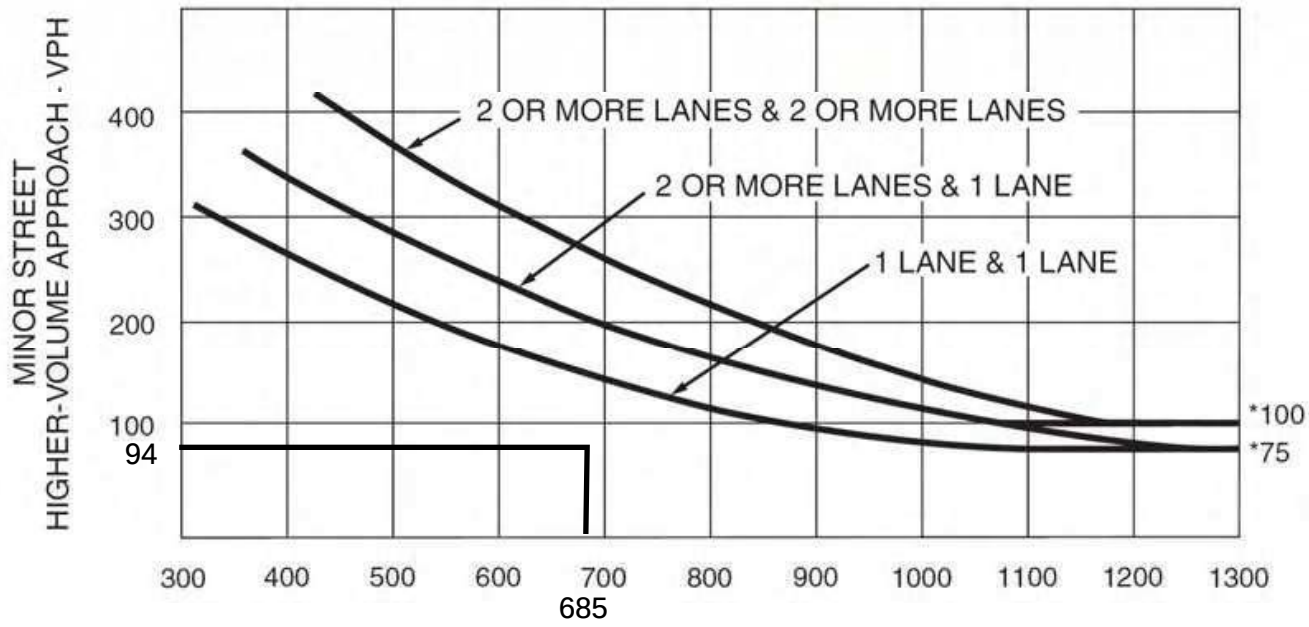
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied _____ Not Satisfied X	Urban / Rural	Urban / Rural
Number of lanes for moving traffic on each approach Major Street / Minor Street 1 / 1 2 or More (8220) / 1 (1128) 2 or More / 2 or More 1 / 2 or More	8,000 / 5,600 9,600 / 6,720 9,600 / 6,720 8,000 / 5,600	2,400 / 1,680 2,400 / 1,680 3,200 / 2,240 3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied _____ Not Satisfied X	Urban / Rural	Urban / Rural
Number of lanes for moving traffic on each approach Major Street / Minor Street 1 / 1 2 or More (8220) / 1 (1128) 2 or More / 2 or More 1 / 2 or More	12,000 / 8,400 14,400 / 10,080 14,400 / 10,080 12,000 / 8,400	1,200 / 850 1,200 / 850 1,600 / 1,120 1,600 / 1,120
Combination of CONDITIONS A + B		
Satisfied _____ Not Satisfied X	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 67% (A) 82% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: S. Union & Lamb Entrance #2 - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

U		
0	WBL	1
0	WBT	1
0	WBR	8
>	EBL	5
0	EBT	1
<	EBR	1
0	NBL	1
2	NBT	253
0	NBR	1
0	SBL	2
2	SBT	102
<	SBR	1
	TOTAL	377

Year 2035
Fut. Volumes w/o Proj

WBL	2
WBT	2
WBR	16
EBL	10
EBT	2
EBR	2
NBL	2
NBT	509
NBR	2
SBL	4
SBT	205
SBR	2
TOTAL	758

Year 2035 Fut. Vol
+ Project Traffic

WBL	2
WBT	5
WBR	16
EBL	140
EBT	5
EBR	313
NBL	2
NBT	685
NBR	2
SBL	4
SBT	398
SBR	86
TOTAL	1658

Year 2025
Fut. Volumes w/o Proj

WBL	1
WBT	1
WBR	11
EBL	7
EBT	1
EBR	1
NBL	1
NBT	361
NBR	1
SBL	3
SBT	146
SBR	1
TOTAL	535

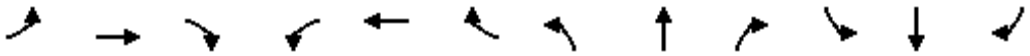
Year 2025 Fut. Vol
+ Project Traffic

WBL	1
WBT	3
WBR	11
EBL	72
EBT	3
EBR	157
NBL	1
NBT	449
NBR	1
SBL	3
SBT	243
SBR	43
TOTAL	987

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	3
WBR	0
EBL	130
EBT	3
EBR	311
NBL	0
NBT	176
NBR	0
SBL	0
SBT	193
SBR	84
TOTAL	900

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	S. Union & Lamb Entrance #2 - PM Peak						
	Count Date:	1/27/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.625							
NB Approach (Away)	0.695							
SB Approach (To)	0.695							
SB Approach (Away)	0.625							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	2.48	WBT	1.20	WBR	2.62
WB Approach (Away)	*1.2*		2.65%	2	0.63%	1	2.78%	14
EB Approach (To)	*1.2*		EBL	2.62	EBT	1.20	EBR	2.48
EB Approach (Away)	*1.2*		2.78%	9	0.63%	1	2.65%	2
NB Approach (To)	2.529		NBL	2.62	NBT	4.05	NBR	2.62
NB Approach (Away)	2.608		2.78%	2	4.93%	677	2.78%	2
SB Approach (To)	2.608		SBL	2.48	SBT	3.75	SBR	2.48
SB Approach (Away)	2.529		2.65%	3	4.66%	259	2.65%	2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.981			0.890			0.999			0.999	
Flt Protected		0.966			0.995		0.950			0.950		
Satd. Flow (prot)	0	1765	0	0	1650	0	1770	3536	0	1770	3536	0
Flt Permitted		0.966			0.995		0.950			0.950		
Satd. Flow (perm)	0	1765	0	0	1650	0	1770	3536	0	1770	3536	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			1332			2649	
Travel Time (s)		18.8			20.6			16.5			32.8	

Intersection Summary	
Area Type:	Other

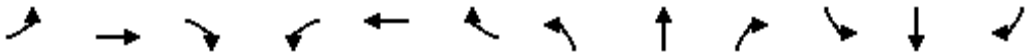
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	5	1	1	1	1	8	1	253	1	2	102	1
Future Vol, veh/h	5	1	1	1	1	8	1	253	1	2	102	1
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	1	1	1	9	1	275	1	2	111	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	256	394	56	338	394	138	112	0	0	276	0	0
Stage 1	116	116	-	278	278	-	-	-	-	-	-	-
Stage 2	140	278	-	60	116	-	-	-	-	-	-	-
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	676	541	999	592	541	885	1475	-	-	1284	-	-
Stage 1	876	799	-	705	679	-	-	-	-	-	-	-
Stage 2	849	679	-	944	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	667	540	999	589	540	885	1475	-	-	1284	-	-
Mov Cap-2 Maneuver	667	540	-	589	540	-	-	-	-	-	-	-
Stage 1	875	798	-	705	679	-	-	-	-	-	-	-
Stage 2	839	679	-	940	798	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	9.6	0	0.1
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1475	-	-	676	794	1284	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.014	0.002	-	-
HCM Control Delay (s)	7.4	-	-	10.4	9.6	7.8	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.986			0.884						0.999	
Flt Protected		0.962			0.996		0.950			0.950		
Satd. Flow (prot)	0	1767	0	0	1640	0	1770	3539	0	1770	3536	0
Flt Permitted		0.962			0.996		0.950			0.950		
Satd. Flow (perm)	0	1767	0	0	1640	0	1770	3539	0	1770	3536	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			1332			2649	
Travel Time (s)		18.8			20.6			16.5			32.8	

Intersection Summary	
Area Type:	Other

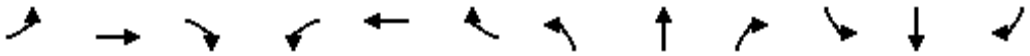
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	1	1	1	1	11	1	361	1	3	146	1
Future Vol, veh/h	7	1	1	1	1	11	1	361	1	3	146	1
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	1	1	1	1	12	1	392	1	3	159	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	365	562	80	481	561	197	160	0	0	393	0	0
Stage 1	166	166	-	395	395	-	-	-	-	-	-	-
Stage 2	199	396	-	86	166	-	-	-	-	-	-	-
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	566	434	964	468	435	811	1417	-	-	1162	-	-
Stage 1	820	760	-	602	603	-	-	-	-	-	-	-
Stage 2	784	602	-	912	760	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	555	433	964	465	434	811	1417	-	-	1162	-	-
Mov Cap-2 Maneuver	555	433	-	465	434	-	-	-	-	-	-	-
Stage 1	819	758	-	602	603	-	-	-	-	-	-	-
Stage 2	771	602	-	907	758	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	10.1	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1417	-	-	564	721	1162	-	-
HCM Lane V/C Ratio	0.001	-	-	0.017	0.02	0.003	-	-
HCM Control Delay (s)	7.5	-	-	11.5	10.1	8.1	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.908			0.899			0.998			0.977	
Flt Protected		0.985			0.997		0.950			0.950		
Satd. Flow (prot)	0	1666	0	0	1670	0	1770	3532	0	1770	3458	0
Flt Permitted		0.985			0.997		0.950			0.950		
Satd. Flow (perm)	0	1666	0	0	1670	0	1770	3532	0	1770	3458	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			645			2649	
Travel Time (s)		18.8			20.6			8.0			32.8	

Intersection Summary	
Area Type:	Other

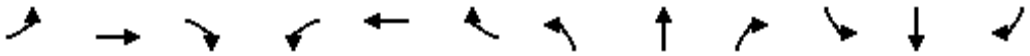
Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	72	3	157	1	3	11	1	449	6	3	243	43
Future Vol, veh/h	72	3	157	1	3	11	1	449	6	3	243	43
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	78	3	171	1	3	12	1	488	7	3	264	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	542	791	155	633	810	247	311	0	0	495	0	0
Stage 1	294	294	-	493	493	-	-	-	-	-	-	-
Stage 2	248	497	-	140	317	-	-	-	-	-	-	-
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	423	320	863	364	312	753	1246	-	-	1065	-	-
Stage 1	690	668	-	526	545	-	-	-	-	-	-	-
Stage 2	734	543	-	849	653	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	412	319	863	289	311	753	1246	-	-	1065	-	-
Mov Cap-2 Maneuver	412	319	-	289	311	-	-	-	-	-	-	-
Stage 1	689	666	-	526	545	-	-	-	-	-	-	-
Stage 2	717	543	-	676	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	11.9	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	634	541	1065	-	-
HCM Lane V/C Ratio	0.001	-	-	0.398	0.03	0.003	-	-
HCM Control Delay (s)	7.9	-	-	14.4	11.9	8.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.9	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.982			0.891			0.999			0.999	
Flt Protected		0.965			0.995		0.950			0.950		
Satd. Flow (prot)	0	1765	0	0	1651	0	1770	3536	0	1770	3536	0
Flt Permitted		0.965			0.995		0.950			0.950		
Satd. Flow (perm)	0	1765	0	0	1651	0	1770	3536	0	1770	3536	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			1332			2649	
Travel Time (s)		18.8			20.6			16.5			32.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	2	2	2	2	16	2	509	2	4	205	2
Future Vol, veh/h	10	2	2	2	2	16	2	509	2	4	205	2
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	2	2	2	2	17	2	553	2	4	223	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	515	793	112	680	793	278	225	0	0	555	0	0
Stage 1	233	233	-	559	559	-	-	-	-	-	-	-
Stage 2	282	560	-	121	234	-	-	-	-	-	-	-
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	443	320	920	337	320	719	1341	-	-	1011	-	-
Stage 1	749	711	-	481	509	-	-	-	-	-	-	-
Stage 2	701	509	-	870	710	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	428	318	920	333	318	719	1341	-	-	1011	-	-
Mov Cap-2 Maneuver	428	318	-	333	318	-	-	-	-	-	-	-
Stage 1	748	708	-	480	508	-	-	-	-	-	-	-
Stage 2	680	508	-	862	707	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.5	11.5	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1341	-	-	440	579	1011	-	-
HCM Lane V/C Ratio	0.002	-	-	0.035	0.038	0.004	-	-
HCM Control Delay (s)	7.7	-	-	13.5	11.5	8.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.908			0.904						0.973	
Flt Protected		0.985			0.996		0.950			0.950		
Satd. Flow (prot)	0	1666	0	0	1677	0	1770	3539	0	1770	3444	0
Flt Permitted		0.985			0.996		0.950			0.950		
Satd. Flow (perm)	0	1666	0	0	1677	0	1770	3539	0	1770	3444	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			625			2649	
Travel Time (s)		18.8			20.6			7.7			32.8	

Intersection Summary	
Area Type:	Other

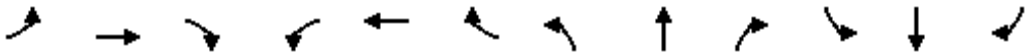
Intersection	
Int Delay, s/veh	33.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	140	5	313	2	5	16	2	685	2	4	398	86
Future Vol, veh/h	140	5	313	2	5	16	2	685	2	4	398	86
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	152	5	340	2	5	17	2	745	2	4	433	93

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	867	1239	263	978	1285	373	526	0	0	747	0	0
Stage 1	488	488	-	750	750	-	-	-	-	-	-	-
Stage 2	379	751	-	228	535	-	-	-	-	-	-	-
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	247	174	735	205	163	624	1037	-	-	857	-	-
Stage 1	530	548	-	369	417	-	-	-	-	-	-	-
Stage 2	615	416	-	754	522	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	233	173	735	107	162	624	1037	-	-	857	-	-
Mov Cap-2 Maneuver	233	173	-	107	162	-	-	-	-	-	-	-
Stage 1	529	545	-	368	416	-	-	-	-	-	-	-
Stage 2	589	415	-	399	520	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	119.7	17.8	0	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1037	-	-	434	306	857	-	-
HCM Lane V/C Ratio	0.002	-	-	1.147	0.082	0.005	-	-
HCM Control Delay (s)	8.5	-	-	119.7	17.8	9.2	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	18.2	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		200	0		0	100		0	100		0
Storage Lanes	0		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
Ped Bike Factor												
Frt			0.850		0.904						0.973	
Flt Protected		0.954			0.996		0.950			0.950		
Satd. Flow (prot)	0	1777	1583	0	1677	0	1770	3539	0	1770	3444	0
Flt Permitted		0.954			0.996		0.950			0.950		
Satd. Flow (perm)	0	1777	1583	0	1677	0	1770	3539	0	1770	3444	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		826			907			625			2649	
Travel Time (s)		18.8			20.6			7.7			32.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	140	5	313	2	5	16	2	685	2	4	398	86
Future Vol, veh/h	140	5	313	2	5	16	2	685	2	4	398	86
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	-	-	200	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	152	5	340	2	5	17	2	745	2	4	433	93

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	867	1239	263	978	1285	373	526	0	0	747	0	0
Stage 1	488	488	-	750	750	-	-	-	-	-	-	-
Stage 2	379	751	-	228	535	-	-	-	-	-	-	-
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	247	174	735	205	163	624	1037	-	-	857	-	-
Stage 1	530	548	-	369	417	-	-	-	-	-	-	-
Stage 2	615	416	-	754	522	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	233	173	735	107	162	624	1037	-	-	857	-	-
Mov Cap-2 Maneuver	233	173	-	107	162	-	-	-	-	-	-	-
Stage 1	529	545	-	368	416	-	-	-	-	-	-	-
Stage 2	589	415	-	399	520	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.1	17.8	0	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1037	-	-	230	735	306	857	-	-
HCM Lane V/C Ratio	0.002	-	-	0.685	0.463	0.082	0.005	-	-
HCM Control Delay (s)	8.5	-	-	49	14	17.8	9.2	-	-
HCM Lane LOS	A	-	-	E	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	4.4	2.5	0.3	0	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Lamb Avenue

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

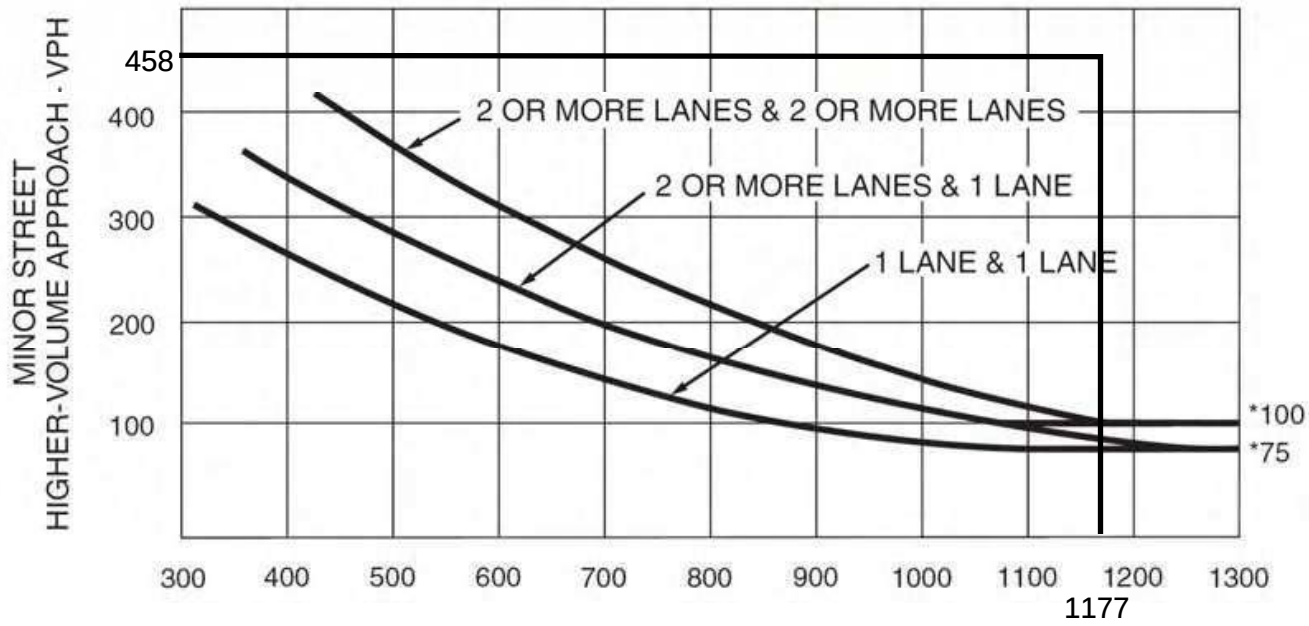
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... / 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 11770 / 1..... 4580	9,600 / 6,720	2,400 / 1,680
2 or More..... / 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... / 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... / 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 11770 / 1..... 4580	14,400 / 10,080	1,200 / 850
2 or More..... / 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... / 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B	2 CONDITIONS 80%	2 CONDITIONS 80%
Satisfied X Not Satisfied _____		
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: S. Union & Entrance #3 - AM Peak
Count Date: 1/27/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	0
0	WBR	0
>	EBL	0
0	EBT	0
<	EBR	0
0	NBL	0
2	NBT	65
0	NBR	0
0	SBL	0
2	SBT	106
<	SBR	0
	TOTAL	171

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	127
NBR	0
SBL	0
SBT	209
SBR	0
TOTAL	336

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	26
NBL	25
NBT	210
NBR	0
SBL	0
SBT	273
SBR	44
TOTAL	578

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	90
NBR	0
SBL	0
SBT	149
SBR	0
TOTAL	239

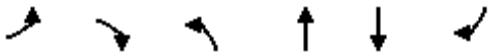
Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	13
NBL	13
NBT	132
NBR	0
SBL	0
SBT	181
SBR	22
TOTAL	361

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	26
NBL	25
NBT	83
NBR	0
SBL	0
SBT	64
SBR	44
TOTAL	242

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	S. Union & Entrance #3 - AM Peak						
	Count Date:	1/27/2015						
2015	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	*1*							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	1.90	WBT	1.20	WBR	1.86
WB Approach (Away)	*1.2*		2.91%	0	0.92%	0	2.83%	0
EB Approach (To)	*1.2*		EBL	1.86	EBT	1.20	EBR	1.90
EB Approach (Away)	*1.2*		2.83%	0	0.92%	0	2.91%	0
NB Approach (To)	2.529		NBL	1.86	NBT	2.53	NBR	1.86
NB Approach (Away)	2.608		2.83%	0	4.75%	0	2.83%	0
SB Approach (To)	2.608		SBL	1.90	SBT	2.61	SBR	1.90
SB Approach (Away)	2.529		2.91%	0	4.91%	0	2.91%	0



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	13	13	132	181	22
Future Volume (vph)	0	13	13	132	181	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	150			150
Storage Lanes	0	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.984	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3483	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3483	0
Link Speed (mph)	30			55	55	
Link Distance (ft)	475			667	665	
Travel Time (s)	10.8			8.3	8.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	14	14	143	197	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	14	14	143	221	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.7%	ICU Level of Service	A
Analysis Period (min)	15		

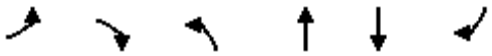
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	0	13	13	132	181	22
Future Vol, veh/h	0	13	13	132	181	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	14	14	143	197	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	309	110	221	0	-	0
Stage 1	209	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	659	922	1345	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	652	922	1345	-	-	-
Mov Cap-2 Maneuver	652	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	903	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1345	-	922	-	-
HCM Lane V/C Ratio	0.011	-	0.015	-	-
HCM Control Delay (s)	7.7	-	9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	26	25	210	273	44
Future Volume (vph)	0	26	25	210	273	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			100
Storage Lanes	0	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.979	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3465	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3465	0
Link Speed (mph)	30			55	55	
Link Distance (ft)	651			687	645	
Travel Time (s)	14.8			8.5	8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	28	27	228	297	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	28	27	228	345	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	0	26	25	210	273	44
Future Vol, veh/h	0	26	25	210	273	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	27	228	297	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	489	172	345	0	-	0
Stage 1	321	-	-	-	-	-
Stage 2	168	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	508	842	1211	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	844	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	497	842	1211	-	-	-
Mov Cap-2 Maneuver	497	-	-	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	825	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1211	-	842	-	-
HCM Lane V/C Ratio	0.022	-	0.034	-	-
HCM Control Delay (s)	8	-	9.4	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Project Entrance #3

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

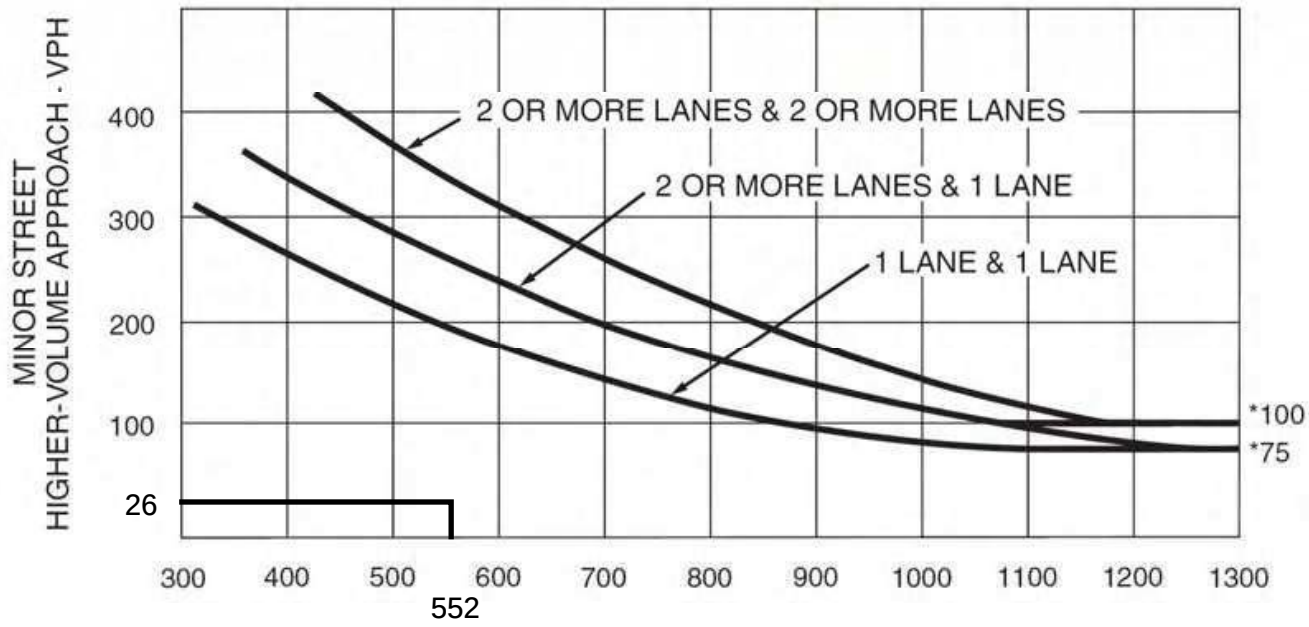
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied _____ Not Satisfied X		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More.....6624..... 1.....312.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied _____ Not Satisfied X		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More.....6624..... 1.....312.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B		
Satisfied _____ Not Satisfied X	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 99% (A) 66% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: S. Union & Entrance #3 - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	0
0	WBR	0
>	EBL	0
0	EBT	0
<	EBR	0
0	NBL	0
2	NBT	252
0	NBR	0
0	SBL	0
2	SBT	103
<	SBR	0
	TOTAL	355

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	505
NBR	0
SBL	0
SBT	207
SBR	0
TOTAL	712

Year 2035 Fut. Vol

+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	160
NBL	34
NBT	691
NBR	0
SBL	0
SBT	625
SBR	86
TOTAL	1596

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	359
NBR	0
SBL	0
SBT	147
SBR	0
TOTAL	506

Year 2025 Fut. Vol

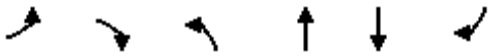
+ Project Traffic

WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	80
NBL	17
NBT	452
NBR	0
SBL	0
SBT	356
SBR	43
TOTAL	948

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	160
NBL	34
NBT	186
NBR	0
SBL	0
SBT	418
SBR	86
TOTAL	884

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	S. Union & Entrance #3 - PM Peak						
	Count Date:	1/27/2015						
2015	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	*1*							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	1.90	WBT	1.20	WBR	1.86
WB Approach (Away)	*1.2*		2.89%	0	0.92%	0	2.83%	0
EB Approach (To)	*1.2*		EBL	1.86	EBT	1.20	EBR	1.90
EB Approach (Away)	*1.2*		2.83%	0	0.92%	0	2.89%	0
NB Approach (To)	2.511		NBL	1.86	NBT	2.52	NBR	1.86
NB Approach (Away)	2.59		2.81%	0	4.73%	648	2.81%	0
SB Approach (To)	2.608		SBL	1.90	SBT	2.60	SBR	1.90
SB Approach (Away)	2.529		2.91%	0	4.89%	273	2.91%	0



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	80	17	452	356	43
Future Volume (vph)	0	80	17	452	356	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	150			150
Storage Lanes	0	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.984	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3483	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3483	0
Link Speed (mph)	30			55	55	
Link Distance (ft)	658			687	645	
Travel Time (s)	15.0			8.5	8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	87	18	491	387	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	87	18	491	434	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

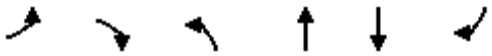
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	0	80	17	452	356	43
Future Vol, veh/h	0	80	17	452	356	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	87	18	491	387	47

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	693	217	434	0	-	0
Stage 1	410	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	377	787	1122	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	740	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	371	787	1122	-	-	-
Mov Cap-2 Maneuver	371	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1122	-	787	-	-
HCM Lane V/C Ratio	0.016	-	0.11	-	-
HCM Control Delay (s)	8.3	-	10.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	160	34	691	625	86
Future Volume (vph)	0	160	34	691	625	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			200
Storage Lanes	0	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.982	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3476	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3476	0
Link Speed (mph)	30			55	55	
Link Distance (ft)	772			707	625	
Travel Time (s)	17.5			8.8	7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	174	37	751	679	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	174	37	751	772	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	0	160	34	691	625	86
Future Vol, veh/h	0	160	34	691	625	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	174	37	751	679	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1175	386	773	0	-	0
Stage 1	726	-	-	-	-	-
Stage 2	449	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	185	612	838	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	610	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	177	612	838	-	-	-
Mov Cap-2 Maneuver	177	-	-	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	583	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	838	-	612	-	-
HCM Lane V/C Ratio	0.044	-	0.284	-	-
HCM Control Delay (s)	9.5	-	13.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Project Entrance #3

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

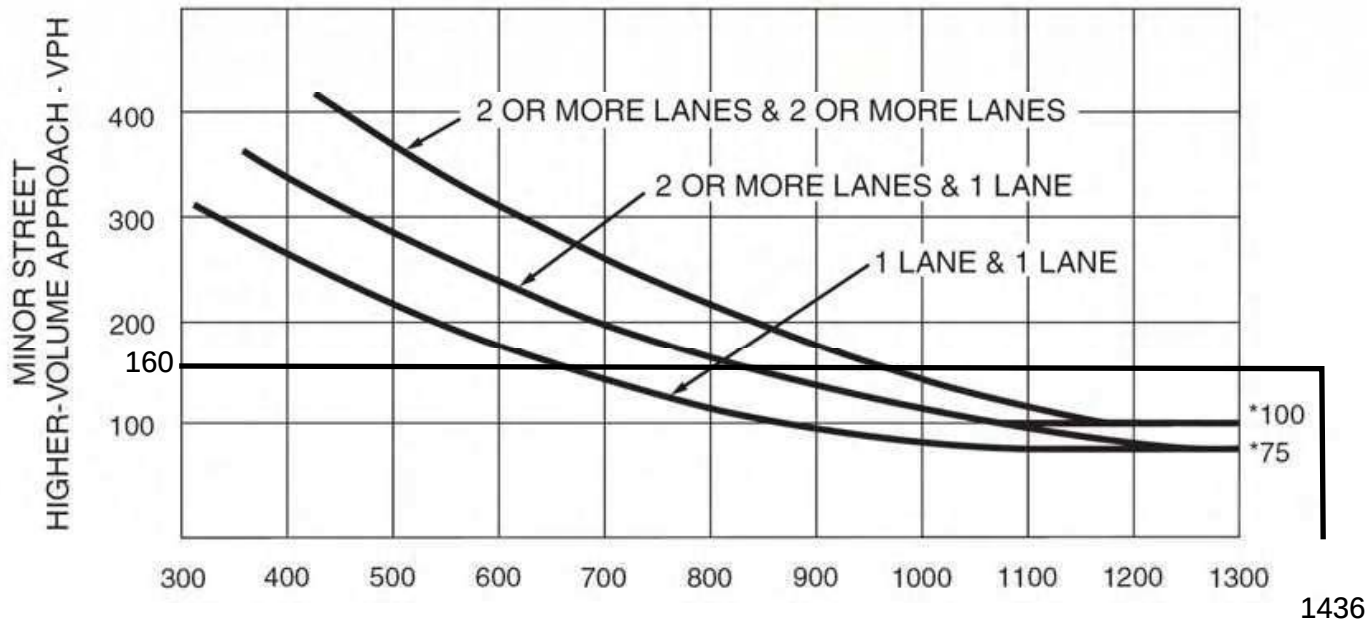
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1..... 2 or More..... 14360 1..... 1600 2 or More..... 2 or More..... 1..... 2 or More.....	8,000 5,600 9,600 6,720 9,600 6,720 8,000 5,600	2,400 1,680 2,400 1,680 3,200 2,240 3,200 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1..... 2 or More..... 14360 1..... 1600 2 or More..... 2 or More..... 1..... 2 or More.....	12,000 8,400 14,400 10,080 14,400 10,080 12,000 8,400	1,200 850 1,200 850 1,600 1,120 1,600 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 95% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: S. Union & Mugsy Entrance #4 - AM Peak
Count Date: 1/27/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	0
0	WBR	1
>	EBL	0
0	EBT	0
<	EBR	0
1	NBL	0
2	NBT	62
0	NBR	1
1	SBL	1
2	SBT	102
<	SBR	1
	TOTAL	168

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	2
EBL	0
EBT	0
EBR	0
NBL	0
NBT	125
NBR	2
SBL	2
SBT	205
SBR	2
TOTAL	338

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	11
EBL	0
EBT	0
EBR	40
NBL	98
NBT	224
NBR	2
SBL	2
SBT	263
SBR	34
TOTAL	674

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	0
WBR	1
EBL	0
EBT	0
EBR	0
NBL	0
NBT	89
NBR	1
SBL	1
SBT	146
SBR	1
TOTAL	239

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	0
WBR	6
EBL	0
EBT	0
EBR	20
NBL	49
NBT	139
NBR	1
SBL	1
SBT	175
SBR	17
TOTAL	408

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	9
EBL	0
EBT	0
EBR	40
NBL	98
NBT	99
NBR	0
SBL	0
SBT	58
SBR	32
TOTAL	336

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	S. Union & Mugsy Entrance #4 - AM Peak						
	Count Date:	1/27/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.605							
NB Approach (Away)	0.675							
SB Approach (To)	0.695							
SB Approach (Away)	0.625							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	2.52	WBT	1.20	WBR	2.62
WB Approach (Away)	*1.2*		2.69%	0	0.63%	0	2.78%	2
EB Approach (To)	*1.2*		EBL	2.62	EBT	1.20	EBR	2.52
EB Approach (Away)	*1.2*		2.78%	0	0.63%	0	2.69%	0
NB Approach (To)	2.511		NBL	2.68	NBT	4.10	NBR	2.68
NB Approach (Away)	2.59		2.83%	0	4.98%	167	2.83%	2
SB Approach (To)	2.608		SBL	2.48	SBT	3.79	SBR	2.48
SB Approach (Away)	2.529		2.65%	2	4.70%	261	2.65%	2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt	0.865		0.998			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	3532	0	1770	3539
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	3532	0	1770	3539
Link Speed (mph)	30		55			55
Link Distance (ft)	326		1323			1332
Travel Time (s)	7.4		16.4			16.5

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	1	62	1	1	103
Future Vol, veh/h	0	1	62	1	1	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	67	1	1	112

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	126	34	0	0	68	0
Stage 1	68	-	-	-	-	-
Stage 2	58	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	856	1032	-	-	1531	-
Stage 1	947	-	-	-	-	-
Stage 2	958	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	855	1032	-	-	1531	-
Mov Cap-2 Maneuver	855	-	-	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	957	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.5	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1032	1531	-
HCM Lane V/C Ratio	-	-	0.001	0.001	-
HCM Control Delay (s)	-	-	8.5	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt	0.865		0.998			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	3532	0	1770	3539
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	3532	0	1770	3539
Link Speed (mph)	30		55			55
Link Distance (ft)	326		1323			1332
Travel Time (s)	7.4		16.4			16.5

Intersection Summary	
Area Type:	Other

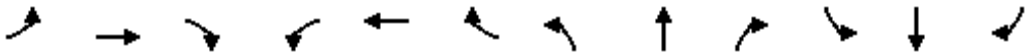
Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	1	89	1	1	146
Future Vol, veh/h	0	1	89	1	1	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	97	1	1	159

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	179	49	0	0	98	0
Stage 1	97	-	-	-	-	-
Stage 2	82	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	793	1009	-	-	1493	-
Stage 1	916	-	-	-	-	-
Stage 2	932	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	792	1009	-	-	1493	-
Mov Cap-2 Maneuver	792	-	-	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	931	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1009	1493	-
HCM Lane V/C Ratio	-	-	0.001	0.001	-
HCM Control Delay (s)	-	-	8.6	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.865			0.865			0.999			0.987	
Flt Protected							0.950			0.950		
Satd. Flow (prot)	0	1611	0	0	1611	0	1770	3536	0	1770	3493	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1611	0	0	1611	0	1770	3536	0	1770	3493	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		465			326			1323			667	
Travel Time (s)		10.6			7.4			16.4			8.3	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	20	0	0	6	49	139	1	1	175	17
Future Vol, veh/h	0	0	20	0	0	6	49	139	1	1	175	17
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	22	0	0	7	53	151	1	1	190	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	384	461	104	355	469	76	209	0	0	152	0	0
Stage 1	202	202	-	258	258	-	-	-	-	-	-	-
Stage 2	182	259	-	97	211	-	-	-	-	-	-	-
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	549	496	931	576	491	970	1359	-	-	1426	-	-
Stage 1	781	733	-	724	693	-	-	-	-	-	-	-
Stage 2	802	692	-	899	726	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	529	476	931	546	472	970	1359	-	-	1426	-	-
Mov Cap-2 Maneuver	529	476	-	546	472	-	-	-	-	-	-	-
Stage 1	751	732	-	696	666	-	-	-	-	-	-	-
Stage 2	766	665	-	877	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	8.7	2	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1359	-	-	931	970	1426	-	-
HCM Lane V/C Ratio	0.039	-	-	0.023	0.007	0.001	-	-
HCM Control Delay (s)	7.8	-	-	9	8.7	7.5	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt	0.865		0.998			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	3532	0	1770	3539
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	3532	0	1770	3539
Link Speed (mph)	30		55			55
Link Distance (ft)	326		1323			1332
Travel Time (s)	7.4		16.4			16.5

Intersection Summary	
Area Type:	Other

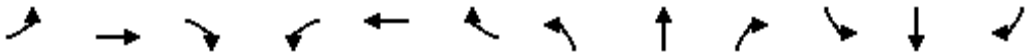
Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	2	125	2	2	205
Future Vol, veh/h	0	2	125	2	2	205
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	136	2	2	223

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	253	69	0	0	138	0
Stage 1	137	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	714	980	-	-	1443	-
Stage 1	875	-	-	-	-	-
Stage 2	896	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	713	980	-	-	1443	-
Mov Cap-2 Maneuver	713	-	-	-	-	-
Stage 1	875	-	-	-	-	-
Stage 2	895	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	980	1443	-
HCM Lane V/C Ratio	-	-	0.002	0.002	-
HCM Control Delay (s)	-	-	8.7	7.5	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.865			0.865			0.999			0.983	
Flt Protected							0.950			0.950		
Satd. Flow (prot)	0	1611	0	0	1611	0	1770	3536	0	1770	3479	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1611	0	0	1611	0	1770	3536	0	1770	3479	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1165			326			1323			687	
Travel Time (s)		26.5			7.4			16.4			8.5	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	40	0	0	11	98	224	2	2	263	34
Future Vol, veh/h	0	0	40	0	0	11	98	224	2	2	263	34
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	43	0	0	12	107	243	2	2	286	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	644	768	161	605	785	123	323	0	0	246	0	0
Stage 1	309	309	-	458	458	-	-	-	-	-	-	-
Stage 2	335	459	-	147	327	-	-	-	-	-	-	-
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	358	330	855	382	323	905	1234	-	-	1317	-	-
Stage 1	676	658	-	552	565	-	-	-	-	-	-	-
Stage 2	653	565	-	841	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	329	301	855	338	295	905	1234	-	-	1317	-	-
Mov Cap-2 Maneuver	329	301	-	338	295	-	-	-	-	-	-	-
Stage 1	617	657	-	504	516	-	-	-	-	-	-	-
Stage 2	588	516	-	797	645	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9	2.5	0.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1234	-	-	855	905	1317	-	-
HCM Lane V/C Ratio	0.086	-	-	0.051	0.013	0.002	-	-
HCM Control Delay (s)	8.2	-	-	9.4	9	7.7	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	0	0	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Mugsy Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

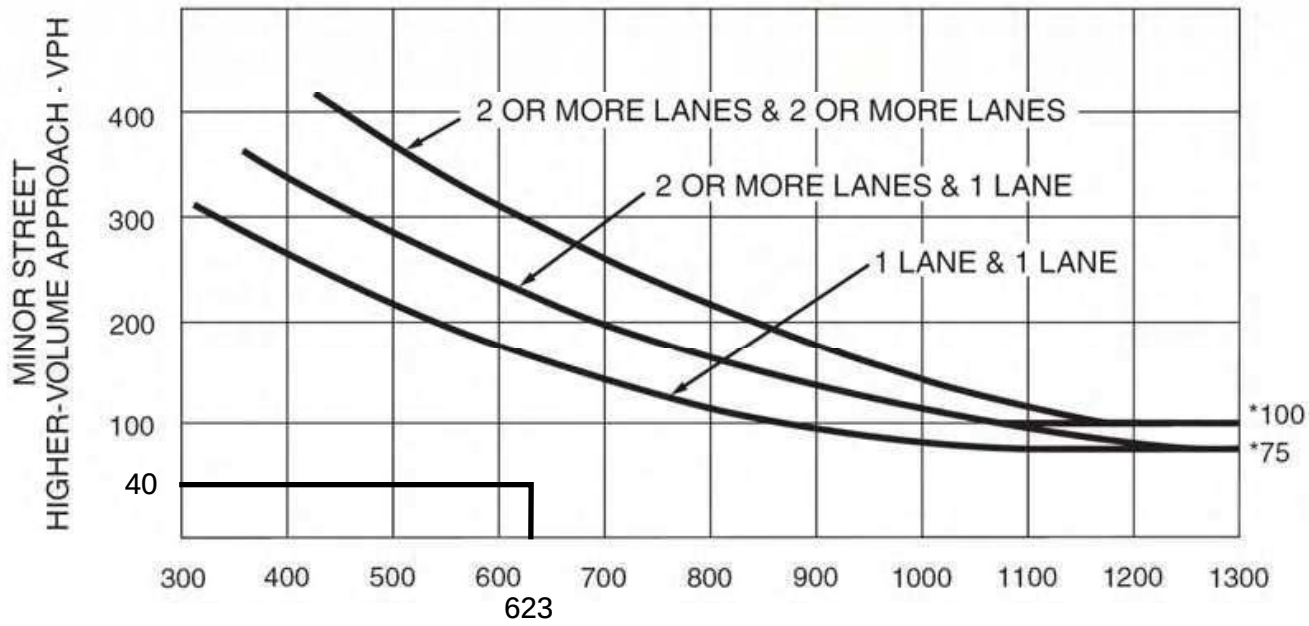
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... / 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 7476 / 1..... 480	9,600 / 6,720	2,400 / 1,680
2 or More..... / 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... / 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... / 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 7476 / 1..... 480	14,400 / 10,080	1,200 / 850
2 or More..... / 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... / 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 29% (A) 74% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: S. Union & Mugsy Entrance #4 - PM Peak
Count Date: 1/27/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

U		
0	WBL	4
0	WBT	0
0	WBR	1
>	EBL	0
0	EBT	0
<	EBR	0
1	NBL	0
2	NBT	251
0	NBR	1
1	SBL	1
2	SBT	103
<	SBR	0
	TOTAL	361

Year 2035
Fut. Volumes w/o Proj

WBL	8
WBT	0
WBR	2
EBL	0
EBT	0
EBR	0
NBL	0
NBT	505
NBR	2
SBL	2
SBT	207
SBR	0
TOTAL	726

Year 2035 Fut. Vol
+ Project Traffic

WBL	8
WBT	0
WBR	2
EBL	0
EBT	0
EBR	110
NBL	150
NBT	725
NBR	2
SBL	2
SBT	774
SBR	11
TOTAL	1784

Year 2025
Fut. Volumes w/o Proj

WBL	6
WBT	0
WBR	1
EBL	0
EBT	0
EBR	0
NBL	0
NBT	359
NBR	1
SBL	1
SBT	147
SBR	0
TOTAL	515

Year 2025 Fut. Vol
+ Project Traffic

WBL	6
WBT	0
WBR	1
EBL	0
EBT	0
EBR	55
NBL	75
NBT	469
NBR	1
SBL	1
SBT	431
SBR	6
TOTAL	1045

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	110
NBL	150
NBT	220
NBR	0
SBL	0
SBT	567
SBR	11
TOTAL	1058

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	S. Union & Mugsy Entrance #4 - PM Peak						
	Count Date:	1/27/2015						
2006	ADT							
WB Approach (To)	*1*							
WB Approach (Away)	*1*							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.605							
NB Approach (Away)	0.675							
SB Approach (To)	0.695							
SB Approach (Away)	0.625							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	*1.2*		WBL	2.52	WBT	1.20	WBR	2.62
WB Approach (Away)	*1.2*		2.69%	7	0.63%	0	2.78%	2
EB Approach (To)	*1.2*		EBL	2.62	EBT	1.20	EBR	2.52
EB Approach (Away)	*1.2*		2.78%	0	0.63%	0	2.69%	0
NB Approach (To)	2.511		NBL	2.68	NBT	4.10	NBR	2.68
NB Approach (Away)	2.59		2.83%	0	4.98%	678	2.83%	2
SB Approach (To)	2.608		SBL	2.48	SBT	3.79	SBR	2.48
SB Approach (Away)	2.529		2.65%	2	4.70%	263	2.65%	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt	0.973		0.999			
Flt Protected	0.962				0.950	
Satd. Flow (prot)	1744	0	3536	0	1770	3539
Flt Permitted	0.962				0.950	
Satd. Flow (perm)	1744	0	3536	0	1770	3539
Link Speed (mph)	30		55			55
Link Distance (ft)	326		1323			1332
Travel Time (s)	7.4		16.4			16.5

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	4	1	251	1	1	103
Future Vol, veh/h	4	1	251	1	1	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	1	273	1	1	112

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	331	137	0	0	274	0
Stage 1	273	-	-	-	-	-
Stage 2	58	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	638	886	-	-	1286	-
Stage 1	748	-	-	-	-	-
Stage 2	958	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	638	886	-	-	1286	-
Mov Cap-2 Maneuver	638	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	957	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	676	1286	-
HCM Lane V/C Ratio	-	-	0.008	0.001	-
HCM Control Delay (s)	-	-	10.4	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt	0.983					
Flt Protected	0.958				0.950	
Satd. Flow (prot)	1754	0	3539	0	1770	3539
Flt Permitted	0.958				0.950	
Satd. Flow (perm)	1754	0	3539	0	1770	3539
Link Speed (mph)	30		55			55
Link Distance (ft)	326		1323			1332
Travel Time (s)	7.4		16.4			16.5

Intersection Summary	
Area Type:	Other

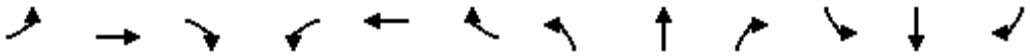
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	6	1	359	1	1	147
Future Vol, veh/h	6	1	359	1	1	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	1	390	1	1	160

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	473	196	0	0	391	0
Stage 1	391	-	-	-	-	-
Stage 2	82	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	520	812	-	-	1164	-
Stage 1	653	-	-	-	-	-
Stage 2	932	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	520	812	-	-	1164	-
Mov Cap-2 Maneuver	520	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	931	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	548	1164	-
HCM Lane V/C Ratio	-	-	0.014	0.001	-
HCM Control Delay (s)	-	-	11.7	8.1	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.865			0.983						0.998	
Flt Protected					0.958		0.950			0.950		
Satd. Flow (prot)	0	1611	0	0	1754	0	1770	3539	0	1770	3532	0
Flt Permitted					0.958		0.950			0.950		
Satd. Flow (perm)	0	1611	0	0	1754	0	1770	3539	0	1770	3532	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		414			326			1323			687	
Travel Time (s)		9.4			7.4			16.4			8.5	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	55	6	0	1	75	469	1	1	431	6
Future Vol, veh/h	0	0	55	6	0	1	75	469	1	1	431	6
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	60	7	0	1	82	510	1	1	468	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	892	1148	238	909	1150	255	475	0	0	511	0	0
Stage 1	474	474	-	673	673	-	-	-	-	-	-	-
Stage 2	418	674	-	236	477	-	-	-	-	-	-	-
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	237	197	763	230	197	744	1083	-	-	1050	-	-
Stage 1	540	556	-	411	452	-	-	-	-	-	-	-
Stage 2	583	452	-	746	554	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	182	763	200	182	744	1083	-	-	1050	-	-
Mov Cap-2 Maneuver	223	182	-	200	182	-	-	-	-	-	-	-
Stage 1	499	555	-	380	418	-	-	-	-	-	-	-
Stage 2	538	418	-	687	553	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	21.7	1.2	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1083	-	-	763	223	1050	-	-
HCM Lane V/C Ratio	0.075	-	-	0.078	0.034	0.001	-	-
HCM Control Delay (s)	8.6	-	-	10.1	21.7	8.4	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.1	0	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt	0.975		0.999			
Flt Protected	0.961				0.950	
Satd. Flow (prot)	1745	0	3536	0	1770	3539
Flt Permitted	0.961				0.950	
Satd. Flow (perm)	1745	0	3536	0	1770	3539
Link Speed (mph)	30		55			55
Link Distance (ft)	326		1323			1332
Travel Time (s)	7.4		16.4			16.5

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	8	2	505	2	2	207
Future Vol, veh/h	8	2	505	2	2	207
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	2	549	2	2	225

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	667	276	0	0	551	0
Stage 1	550	-	-	-	-	-
Stage 2	117	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	392	721	-	-	1015	-
Stage 1	542	-	-	-	-	-
Stage 2	895	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	391	721	-	-	1015	-
Mov Cap-2 Maneuver	391	-	-	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	893	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	430	1015	-
HCM Lane V/C Ratio	-	-	0.025	0.002	-
HCM Control Delay (s)	-	-	13.6	8.6	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.865			0.975						0.998	
Flt Protected					0.961		0.950			0.950		
Satd. Flow (prot)	0	1611	0	0	1745	0	1770	3539	0	1770	3532	0
Flt Permitted					0.961		0.950			0.950		
Satd. Flow (perm)	0	1611	0	0	1745	0	1770	3539	0	1770	3532	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1217			326			1323			707	
Travel Time (s)		27.7			7.4			16.4			8.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	110	8	0	2	150	725	2	2	774	11
Future Vol, veh/h	0	0	110	8	0	2	150	725	2	2	774	11
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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	120	9	0	2	163	788	2	2	841	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1572	1968	427	1540	1973	395	853	0	0	790	0	0
Stage 1	852	852	-	1115	1115	-	-	-	-	-	-	-
Stage 2	720	1116	-	425	858	-	-	-	-	-	-	-
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	74	62	576	79	62	604	782	-	-	826	-	-
Stage 1	321	374	-	222	282	-	-	-	-	-	-	-
Stage 2	385	281	-	578	372	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	62	49	576	52	49	604	782	-	-	826	-	-
Mov Cap-2 Maneuver	62	49	-	52	49	-	-	-	-	-	-	-
Stage 1	254	373	-	176	223	-	-	-	-	-	-	-
Stage 2	304	222	-	457	371	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	72.4	1.8	0
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	782	-	-	576	64	826	-	-
HCM Lane V/C Ratio	0.208	-	-	0.208	0.17	0.003	-	-
HCM Control Delay (s)	10.8	-	-	12.9	72.4	9.4	-	-
HCM Lane LOS	B	-	-	B	F	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	0.8	0.6	0	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Mugsy Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

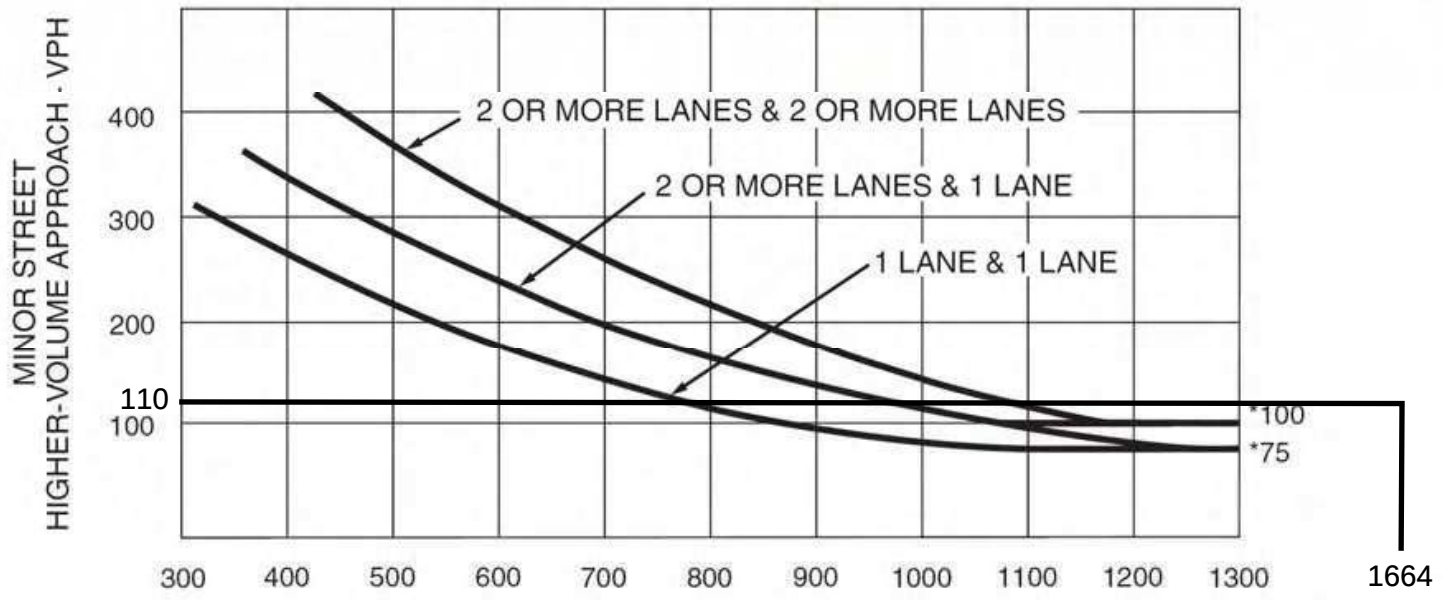
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More (16640) / 1 (1100)	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More (16640) / 1 (1100)	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 65% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton Road & Stine Rd. - AM Peak
Count Date: 1/6/2015

Ave Annual Growth: **0.31%**

Exist Peak Hour Volumes

AWS		
>	WBL	9
1	WBT	60
<	WBR	2
>	EBL	4
1	EBT	68
<	EBR	1
>	NBL	1
1	NBT	6
<	NBR	4
>	SBL	10
1	SBT	6
<	SBR	2
	TOTAL	173

Year 2035
Fut. Volumes w/o Proj

WBL	12
WBT	39
WBR	1
EBL	3
EBT	44
EBR	2
NBL	2
NBT	10
NBR	5
SBL	6
SBT	10
SBR	2
TOTAL	136

Year 2035 Fut. Vol
+ Project Traffic

WBL	12
WBT	43
WBR	3
EBL	3
EBT	59
EBR	2
NBL	2
NBT	10
NBR	8
SBL	12
SBT	10
SBR	2
TOTAL	166

Year 2025
Fut. Volumes w/o Proj

WBL	10
WBT	48
WBR	2
EBL	4
EBT	55
EBR	1
NBL	1
NBT	8
NBR	5
SBL	8
SBT	8
SBR	2
TOTAL	152

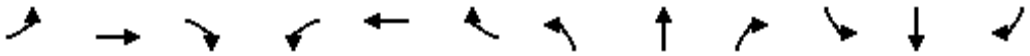
Year 2025 Fut. Vol
+ Project Traffic

WBL	10
WBT	50
WBR	3
EBL	4
EBT	63
EBR	1
NBL	1
NBT	8
NBR	7
SBL	11
SBT	8
SBR	2
TOTAL	168

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	4
WBR	2
EBL	0
EBT	15
EBR	0
NBL	0
NBT	0
NBR	3
SBL	6
SBT	0
SBR	0
TOTAL	30

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Houghton Road & Stine Rd. - AM Peak						
	Count Date:	1/6/2015						
2015	ADT							
WB Approach (To)	1.13							
WB Approach (Away)	0.6							
EB Approach (To)	0.69		**Use AADT Growth Rate from PM Peak**					
EB Approach (Away)	0.79							
NB Approach (To)	0.3							
NB Approach (Away)	0.3							
SB Approach (To)	0.22							
SB Approach (Away)	0.42							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.55		WBL	1.91	WBT	0.69	WBR	0.66
WB Approach (Away)	0.291		1.33%	12	-2.03%	39	-2.21%	1
EB Approach (To)	0.615		EBL	0.86	EBT	0.69	EBR	2.11
EB Approach (Away)	0.71		-0.73%	3	-2.06%	44	2.81%	2
NB Approach (To)	*1*		NBL	2.12	NBT	2.08	NBR	1.91
NB Approach (Away)	*1*		2.83%	2	2.65%	10	1.32%	5
SB Approach (To)	0.186		SBL	0.67	SBT	2.09	SBR	0.87
SB Approach (Away)	0.351		-2.19%	6	2.68%	10	-0.68%	2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.996			0.955			0.986	
Flt Protected		0.997			0.994			0.996			0.973	
Satd. Flow (prot)	0	1853	0	0	1844	0	0	1772	0	0	1787	0
Flt Permitted		0.997			0.994			0.996			0.973	
Satd. Flow (perm)	0	1853	0	0	1844	0	0	1772	0	0	1787	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	4	68	1	0	9	60	2	0	1	6	4
Future Vol, veh/h	0	4	68	1	0	9	60	2	0	1	6	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	74	1	0	10	65	2	0	1	7	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	7.5	7.1
HCM LOS	A	A	A

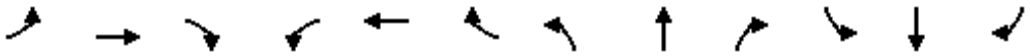
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	5%	13%	56%
Vol Thru, %	55%	93%	85%	33%
Vol Right, %	36%	1%	3%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	73	71	18
LT Vol	1	4	9	10
Through Vol	6	68	60	6
RT Vol	4	1	2	2
Lane Flow Rate	12	79	77	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.013	0.089	0.087	0.023
Departure Headway (Hd)	4.02	4.05	4.057	4.26
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	880	883	882	832
Service Time	2.094	2.081	2.088	2.33
HCM Lane V/C Ratio	0.014	0.089	0.087	0.024
HCM Control Delay	7.1	7.5	7.5	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.3	0.3	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	10	6	2
Future Vol, veh/h	0	10	6	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	11	7	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.996			0.955			0.986	
Flt Protected		0.997			0.992			0.997			0.978	
Satd. Flow (prot)	0	1853	0	0	1840	0	0	1774	0	0	1796	0
Flt Permitted		0.997			0.992			0.997			0.978	
Satd. Flow (perm)	0	1853	0	0	1840	0	0	1774	0	0	1796	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	4	55	1	0	10	48	2	0	1	8	5
Future Vol, veh/h	0	4	55	1	0	10	48	2	0	1	8	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	60	1	0	11	52	2	0	1	9	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	7.4	7.1
HCM LOS	A	A	A

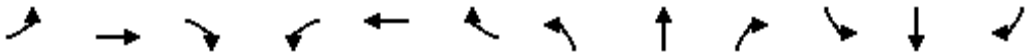
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	7%	17%	44%
Vol Thru, %	57%	92%	80%	44%
Vol Right, %	36%	2%	3%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	60	60	18
LT Vol	1	4	10	8
Through Vol	8	55	48	8
RT Vol	5	1	2	2
Lane Flow Rate	15	65	65	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.017	0.073	0.073	0.023
Departure Headway (Hd)	3.974	4.047	4.057	4.194
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	892	884	882	847
Service Time	2.037	2.078	2.088	2.254
HCM Lane V/C Ratio	0.017	0.074	0.074	0.024
HCM Control Delay	7.1	7.4	7.4	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	8	8	2
Future Vol, veh/h	0	8	8	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	9	9	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.994			0.940			0.988	
Flt Protected		0.997			0.992			0.997			0.975	
Satd. Flow (prot)	0	1853	0	0	1837	0	0	1746	0	0	1794	0
Flt Permitted		0.997			0.992			0.997			0.975	
Satd. Flow (perm)	0	1853	0	0	1837	0	0	1746	0	0	1794	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	4	63	1	0	10	50	3	0	1	8	7
Future Vol, veh/h	0	4	63	1	0	10	50	3	0	1	8	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	68	1	0	11	54	3	0	1	9	8
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	7.4	7.1
HCM LOS	A	A	A

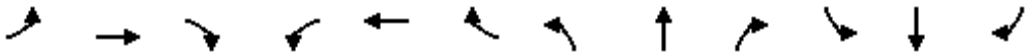
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	6%	16%	52%
Vol Thru, %	50%	93%	79%	38%
Vol Right, %	44%	1%	5%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	16	68	63	21
LT Vol	1	4	10	11
Through Vol	8	63	50	8
RT Vol	7	1	3	2
Lane Flow Rate	17	74	68	23
Geometry Grp	1	1	1	1
Degree of Util (X)	0.019	0.083	0.077	0.027
Departure Headway (Hd)	3.947	4.057	4.062	4.241
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	897	881	879	836
Service Time	2.017	2.092	2.098	2.308
HCM Lane V/C Ratio	0.019	0.084	0.077	0.028
HCM Control Delay	7.1	7.5	7.4	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	11	8	2
Future Vol, veh/h	0	11	8	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	12	9	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.998			0.962			0.986	
Flt Protected		0.997			0.989			0.994			0.983	
Satd. Flow (prot)	0	1848	0	0	1839	0	0	1781	0	0	1805	0
Flt Permitted		0.997			0.989			0.994			0.983	
Satd. Flow (perm)	0	1848	0	0	1839	0	0	1781	0	0	1805	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	44	2	0	12	39	1	0	2	10	5
Future Vol, veh/h	0	3	44	2	0	12	39	1	0	2	10	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	48	2	0	13	42	1	0	2	11	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.3	7.4	7.1
HCM LOS	A	A	A

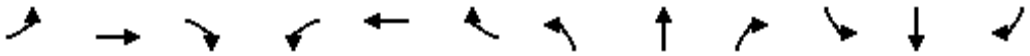
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	6%	23%	33%
Vol Thru, %	59%	90%	75%	56%
Vol Right, %	29%	4%	2%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	17	49	52	18
LT Vol	2	3	12	6
Through Vol	10	44	39	10
RT Vol	5	2	1	2
Lane Flow Rate	18	53	57	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.02	0.06	0.064	0.022
Departure Headway (Hd)	3.984	4.029	4.073	4.137
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	891	888	878	859
Service Time	2.041	2.058	2.102	2.192
HCM Lane V/C Ratio	0.02	0.06	0.065	0.023
HCM Control Delay	7.1	7.3	7.4	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	6	10	2
Future Vol, veh/h	0	6	10	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	7	11	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.3
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.994			0.945			0.990	
Flt Protected		0.998			0.990			0.995			0.976	
Satd. Flow (prot)	0	1852	0	0	1833	0	0	1751	0	0	1800	0
Flt Permitted		0.998			0.990			0.995			0.976	
Satd. Flow (perm)	0	1852	0	0	1833	0	0	1751	0	0	1800	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	59	2	0	12	43	3	0	2	10	8
Future Vol, veh/h	0	3	59	2	0	12	43	3	0	2	10	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	64	2	0	13	47	3	0	2	11	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	7.4	7.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	5%	21%	50%
Vol Thru, %	50%	92%	74%	42%
Vol Right, %	40%	3%	5%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	64	58	24
LT Vol	2	3	12	12
Through Vol	10	59	43	10
RT Vol	8	2	3	2
Lane Flow Rate	22	70	63	26
Geometry Grp	1	1	1	1
Degree of Util (X)	0.024	0.078	0.071	0.031
Departure Headway (Hd)	3.963	4.054	4.079	4.23
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	894	881	875	839
Service Time	2.03	2.093	2.119	2.294
HCM Lane V/C Ratio	0.025	0.079	0.072	0.031
HCM Control Delay	7.1	7.4	7.4	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	12	10	2
Future Vol, veh/h	0	12	10	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	13	11	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Stine Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

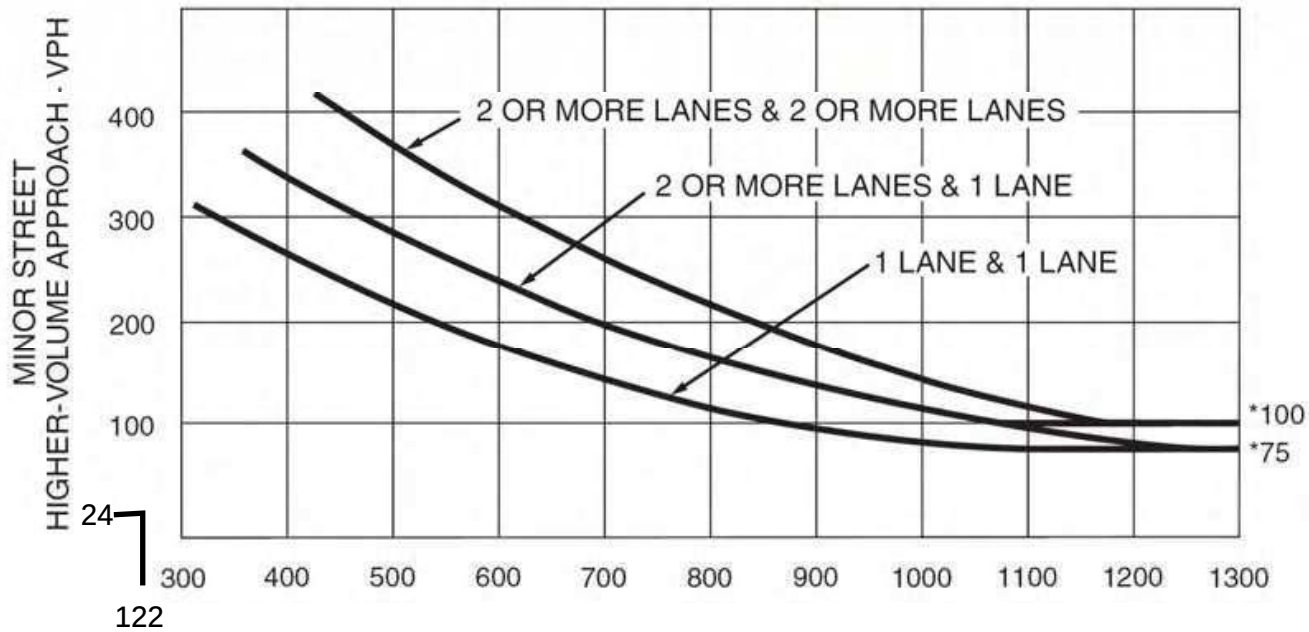
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 1464 / Minor Street 288	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 1464 / Minor Street 288	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 26% (A) 34% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton Rd. & Stine Rd. - PM Peak
Count Date: 1/6/2015

Ave Annual Growth: **0.31%**

Exist Peak Hour Volumes

AWS		
>	WBL	11
1	WBT	73
<	WBR	9
>	EBL	3
1	EBT	65
<	EBR	1
>	NBL	1
1	NBT	30
<	NBR	7
>	SBL	8
1	SBT	9
<	SBR	5
	TOTAL	222

Year 2035
Fut. Volumes w/o Proj

WBL	14
WBT	48
WBR	6
EBL	3
EBT	42
EBR	2
NBL	2
NBT	51
NBR	9
SBL	5
SBT	15
SBR	4
TOTAL	201

Year 2035 Fut. Vol
+ Project Traffic

WBL	17
WBT	58
WBR	10
EBL	3
EBT	44
EBR	2
NBL	2
NBT	51
NBR	10
SBL	7
SBT	15
SBR	4
TOTAL	223

Year 2025
Fut. Volumes w/o Proj

WBL	13
WBT	59
WBR	7
EBL	3
EBT	52
EBR	1
NBL	1
NBT	39
NBR	8
SBL	6
SBT	12
SBR	5
TOTAL	206

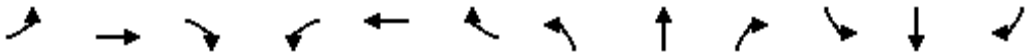
Year 2025 Fut. Vol
+ Project Traffic

WBL	15
WBT	64
WBR	9
EBL	3
EBT	53
EBR	1
NBL	1
NBT	39
NBR	9
SBL	7
SBT	12
SBR	5
TOTAL	218

Project Generated Trips - Year 2035

	Total
WBL	3
WBT	10
WBR	4
EBL	0
EBT	2
EBR	0
NBL	0
NBT	0
NBR	1
SBL	2
SBT	0
SBR	0
TOTAL	22

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Houghton Rd. & Stine Rd. - PM Peak						
	Count Date:	1/6/2015						
2015	ADT							
WB Approach (To)	1.13							
WB Approach (Away)	0.6							
EB Approach (To)	0.69							
EB Approach (Away)	0.79							
NB Approach (To)	0.3							
NB Approach (Away)	0.3							
SB Approach (To)	0.22							
SB Approach (Away)	0.42							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.55		WBL	1.91	WBT	0.69	WBR	0.66
WB Approach (Away)	0.291		1.33%	14	-2.03%	48	-2.21%	6
EB Approach (To)	0.615		EBL	0.86	EBT	0.69	EBR	2.11
EB Approach (Away)	0.71		-0.73%	3	-2.06%	42	2.81%	2
NB Approach (To)	*1*		NBL	2.12	NBT	2.08	NBR	1.91
NB Approach (Away)	*1*		2.83%	2	2.65%	51	1.32%	9
SB Approach (To)	0.186		SBL	0.67	SBT	2.09	SBR	0.87
SB Approach (Away)	0.351		-2.19%	5	2.68%	15	-0.68%	4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.987			0.974			0.972	
Flt Protected		0.998			0.994			0.999			0.982	
Satd. Flow (prot)	0	1855	0	0	1827	0	0	1812	0	0	1778	0
Flt Permitted		0.998			0.994			0.999			0.982	
Satd. Flow (perm)	0	1855	0	0	1827	0	0	1812	0	0	1778	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	65	1	0	11	73	9	0	1	30	7
Future Vol, veh/h	0	3	65	1	0	11	73	9	0	1	30	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	71	1	0	12	79	10	0	1	33	8
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	7.7	7.5
HCM LOS	A	A	A

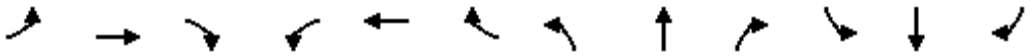
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	4%	12%	36%
Vol Thru, %	79%	94%	78%	41%
Vol Right, %	18%	1%	10%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	38	69	93	22
LT Vol	1	3	11	8
Through Vol	30	65	73	9
RT Vol	7	1	9	5
Lane Flow Rate	41	75	101	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.048	0.086	0.114	0.028
Departure Headway (Hd)	4.151	4.124	4.07	4.207
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	850	862	874	838
Service Time	2.24	2.181	2.122	2.3
HCM Lane V/C Ratio	0.048	0.087	0.116	0.029
HCM Control Delay	7.5	7.6	7.7	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	8	9	5
Future Vol, veh/h	0	8	9	5
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	9	10	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.987			0.977			0.973	
Flt Protected		0.998			0.992			0.999			0.986	
Satd. Flow (prot)	0	1855	0	0	1824	0	0	1818	0	0	1787	0
Flt Permitted		0.998			0.992			0.999			0.986	
Satd. Flow (perm)	0	1855	0	0	1824	0	0	1818	0	0	1787	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	52	1	0	13	59	7	0	1	39	8
Future Vol, veh/h	0	3	52	1	0	13	59	7	0	1	39	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	57	1	0	14	64	8	0	1	42	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	7.6	7.5
HCM LOS	A	A	A

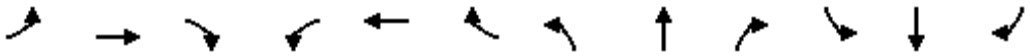
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	5%	16%	26%
Vol Thru, %	81%	93%	75%	52%
Vol Right, %	17%	2%	9%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	56	79	23
LT Vol	1	3	13	6
Through Vol	39	52	59	12
RT Vol	8	1	7	5
Lane Flow Rate	52	61	86	25
Geometry Grp	1	1	1	1
Degree of Util (X)	0.06	0.07	0.098	0.029
Departure Headway (Hd)	4.11	4.132	4.093	4.149
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	860	859	869	851
Service Time	2.189	2.193	2.148	2.235
HCM Lane V/C Ratio	0.06	0.071	0.099	0.029
HCM Control Delay	7.5	7.5	7.6	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.3	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	6	12	5
Future Vol, veh/h	0	6	12	5
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	7	13	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.986			0.975			0.974	
Flt Protected		0.998			0.992			0.999			0.985	
Satd. Flow (prot)	0	1855	0	0	1822	0	0	1814	0	0	1787	0
Flt Permitted		0.998			0.992			0.999			0.985	
Satd. Flow (perm)	0	1855	0	0	1822	0	0	1814	0	0	1787	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	53	1	0	15	64	9	0	1	39	9
Future Vol, veh/h	0	3	53	1	0	15	64	9	0	1	39	9
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	58	1	0	16	70	10	0	1	42	10
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	7.7	7.5
HCM LOS	A	A	A

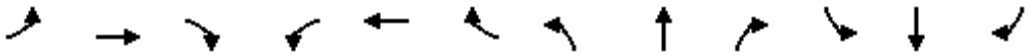
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	5%	17%	29%
Vol Thru, %	80%	93%	73%	50%
Vol Right, %	18%	2%	10%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	57	88	24
LT Vol	1	3	15	7
Through Vol	39	53	64	12
RT Vol	9	1	9	5
Lane Flow Rate	53	62	96	26
Geometry Grp	1	1	1	1
Degree of Util (X)	0.061	0.071	0.109	0.03
Departure Headway (Hd)	4.12	4.144	4.091	4.181
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	858	857	869	843
Service Time	2.203	2.206	2.146	2.271
HCM Lane V/C Ratio	0.062	0.072	0.11	0.031
HCM Control Delay	7.5	7.5	7.7	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.4	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	7	12	5
Future Vol, veh/h	0	7	12	5
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	8	13	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.987			0.980			0.978	
Flt Protected		0.997			0.990			0.999			0.990	
Satd. Flow (prot)	0	1848	0	0	1820	0	0	1824	0	0	1804	0
Flt Permitted		0.997			0.990			0.999			0.990	
Satd. Flow (perm)	0	1848	0	0	1820	0	0	1824	0	0	1804	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	42	2	0	14	48	6	0	2	51	9
Future Vol, veh/h	0	3	42	2	0	14	48	6	0	2	51	9
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	46	2	0	15	52	7	0	2	55	10
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	7.6	7.5
HCM LOS	A	A	A

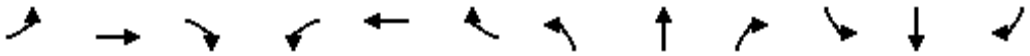
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	6%	21%	21%
Vol Thru, %	82%	89%	71%	62%
Vol Right, %	15%	4%	9%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	47	68	24
LT Vol	2	3	14	5
Through Vol	51	42	48	15
RT Vol	9	2	6	4
Lane Flow Rate	67	51	74	26
Geometry Grp	1	1	1	1
Degree of Util (X)	0.077	0.059	0.085	0.03
Departure Headway (Hd)	4.089	4.14	4.123	4.144
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	867	857	862	853
Service Time	2.159	2.204	2.182	2.224
HCM Lane V/C Ratio	0.077	0.06	0.086	0.03
HCM Control Delay	7.5	7.5	7.6	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.3	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	5	15	4
Future Vol, veh/h	0	5	15	4
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	5	16	4
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.984			0.978			0.981	
Flt Protected		0.997			0.990			0.999			0.986	
Satd. Flow (prot)	0	1848	0	0	1815	0	0	1820	0	0	1802	0
Flt Permitted		0.997			0.990			0.999			0.986	
Satd. Flow (perm)	0	1848	0	0	1815	0	0	1820	0	0	1802	0
Link Speed (mph)		30			55			55			55	
Link Distance (ft)		103			5179			270			223	
Travel Time (s)		2.3			64.2			3.3			2.8	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	3	44	2	0	17	58	10	0	2	51	10
Future Vol, veh/h	0	3	44	2	0	17	58	10	0	2	51	10
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	48	2	0	18	63	11	0	2	55	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	7.7	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	6%	20%	27%
Vol Thru, %	81%	90%	68%	58%
Vol Right, %	16%	4%	12%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	49	85	26
LT Vol	2	3	17	7
Through Vol	51	44	58	15
RT Vol	10	2	10	4
Lane Flow Rate	68	53	92	28
Geometry Grp	1	1	1	1
Degree of Util (X)	0.078	0.062	0.106	0.033
Departure Headway (Hd)	4.117	4.161	4.112	4.2
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	858	852	864	839
Service Time	2.2	2.231	2.174	2.291
HCM Lane V/C Ratio	0.079	0.062	0.106	0.033
HCM Control Delay	7.6	7.5	7.7	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.4	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	7	15	4
Future Vol, veh/h	0	7	15	4
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	8	16	4
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Houghton Road

Minor St: Stine Road

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

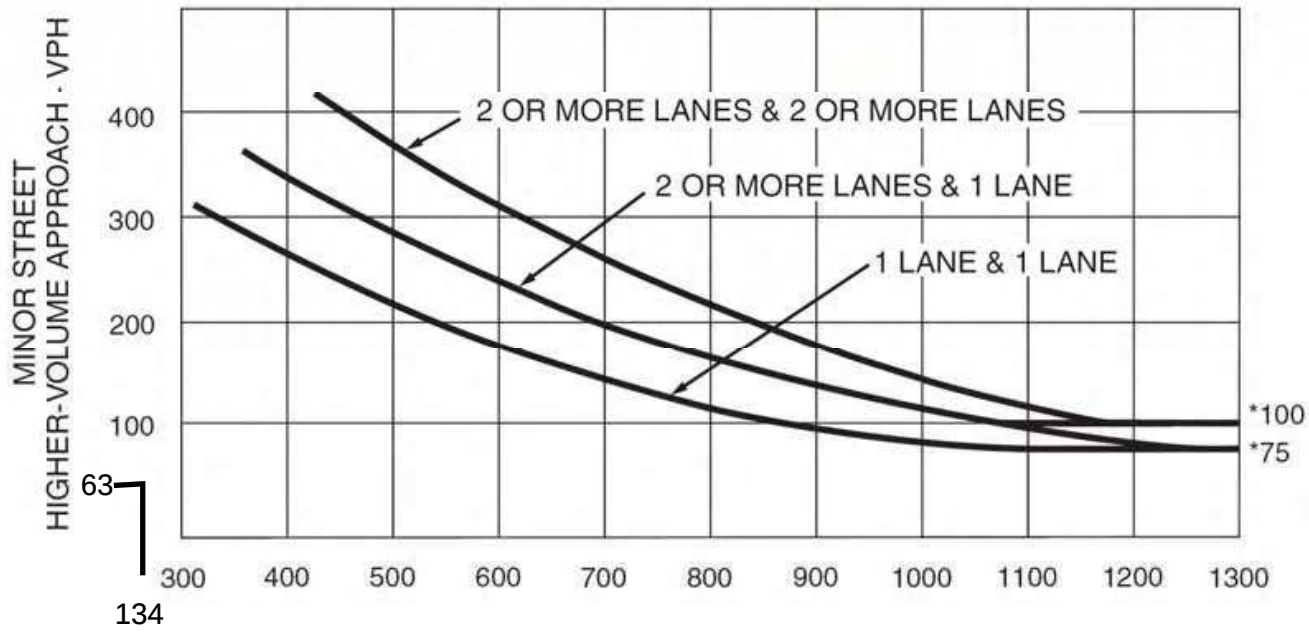
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 1340 / Minor Street 630	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 1340 / Minor Street 630	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied ____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... A: 38% B: 74%	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton Road & Wible Road - AM Peak
Count Date: 1/6/2015

Ave Annual Growth: **1.31%**

Exist Peak Hour Volumes

AWS		
>	WBL	7
1	WBT	55
<	WBR	10
>	EBL	7
1	EBT	59
<	EBR	10
>	NBL	5
1	NBT	10
<	NBR	5
>	SBL	20
1	SBT	27
<	SBR	9
	TOTAL	224

Year 2035
Fut. Volumes w/o Proj

WBL	13
WBT	76
WBR	15
EBL	7
EBT	60
EBR	12
NBL	6
NBT	14
NBR	7
SBL	26
SBT	41
SBR	10
TOTAL	287

Year 2035 Fut. Vol
+ Project Traffic

WBL	14
WBT	82
WBR	16
EBL	7
EBT	84
EBR	12
NBL	6
NBT	14
NBR	8
SBL	28
SBT	41
SBR	10
TOTAL	322

Year 2025
Fut. Volumes w/o Proj

WBL	10
WBT	65
WBR	12
EBL	7
EBT	60
EBR	11
NBL	6
NBT	12
NBR	6
SBL	23
SBT	33
SBR	9
TOTAL	254

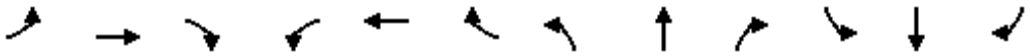
Year 2025 Fut. Vol
+ Project Traffic

WBL	11
WBT	68
WBR	13
EBL	7
EBT	72
EBR	11
NBL	6
NBT	12
NBR	7
SBL	24
SBT	33
SBR	9
TOTAL	273

Project Generated Trips - Year 2035

	Total
WBL	1
WBT	6
WBR	1
EBL	0
EBT	24
EBR	0
NBL	0
NBT	0
NBR	1
SBL	2
SBT	0
SBR	0
TOTAL	35

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Houghton Road & Wible Road - AM Peak						
	Count Date:	1/6/2015						
2006	ADT							
WB Approach (To)	0.197							
WB Approach (Away)	0.159							
EB Approach (To)	0.429							
EB Approach (Away)	0.524							
NB Approach (To)	0.623							
NB Approach (Away)	0.287							
SB Approach (To)	0.605							
SB Approach (Away)	0.884							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.469		WBL	2.44	WBT	1.71	WBR	1.84
WB Approach (Away)	0.259		3.13%	13	1.57%	76	1.97%	15
EB Approach (To)	0.28		EBL	0.98	EBT	1.14	EBR	1.58
EB Approach (Away)	0.54		-0.28%	7	0.12%	60	0.88%	12
NB Approach (To)	1.158		NBL	1.44	NBT	1.58	NBR	1.74
NB Approach (Away)	0.72		1.13%	6	1.53%	14	1.93%	7
SB Approach (To)	0.76		SBL	1.44	SBT	1.88	SBR	1.14
SB Approach (Away)	1.148		1.24%	26	2.00%	41	0.45%	10



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.982			0.981			0.968			0.978	
Flt Protected		0.995			0.995			0.988			0.982	
Satd. Flow (prot)	0	1820	0	0	1818	0	0	1781	0	0	1789	0
Flt Permitted		0.995			0.995			0.988			0.982	
Satd. Flow (perm)	0	1820	0	0	1818	0	0	1781	0	0	1789	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			1982			7979	
Travel Time (s)		64.2			65.3			24.6			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	7	59	10	0	7	55	10	0	5	10	5
Future Vol, veh/h	0	7	59	10	0	7	55	10	0	5	10	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	64	11	0	8	60	11	0	5	11	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	7.5	7.4
HCM LOS	A	A	A

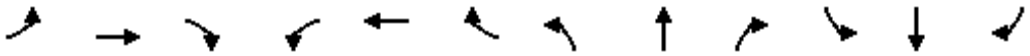
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	25%	9%	10%	36%
Vol Thru, %	50%	78%	76%	48%
Vol Right, %	25%	13%	14%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	76	72	56
LT Vol	5	7	7	20
Through Vol	10	59	55	27
RT Vol	5	10	10	9
Lane Flow Rate	22	83	78	61
Geometry Grp	1	1	1	1
Degree of Util (X)	0.025	0.094	0.089	0.071
Departure Headway (Hd)	4.159	4.076	4.076	4.203
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	847	872	871	841
Service Time	2.252	2.138	2.139	2.285
HCM Lane V/C Ratio	0.026	0.095	0.09	0.073
HCM Control Delay	7.4	7.6	7.5	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.3	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	20	27	9
Future Vol, veh/h	0	20	27	9
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	22	29	10
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.981			0.982			0.965			0.981	
Flt Protected		0.995			0.994			0.987			0.983	
Satd. Flow (prot)	0	1818	0	0	1818	0	0	1774	0	0	1796	0
Flt Permitted		0.995			0.994			0.987			0.983	
Satd. Flow (perm)	0	1818	0	0	1818	0	0	1774	0	0	1796	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	7	60	11	0	10	65	12	0	6	12	6
Future Vol, veh/h	0	7	60	11	0	10	65	12	0	6	12	6
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	65	12	0	11	71	13	0	7	13	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	7.7	7.4
HCM LOS	A	A	A

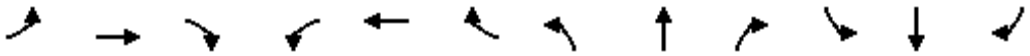
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	25%	9%	11%	35%
Vol Thru, %	50%	77%	75%	51%
Vol Right, %	25%	14%	14%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	78	87	65
LT Vol	6	7	10	23
Through Vol	12	60	65	33
RT Vol	6	11	12	9
Lane Flow Rate	26	85	95	71
Geometry Grp	1	1	1	1
Degree of Util (X)	0.031	0.097	0.108	0.083
Departure Headway (Hd)	4.306	4.108	4.107	4.25
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	836	861	862	829
Service Time	2.306	2.184	2.182	2.345
HCM Lane V/C Ratio	0.031	0.099	0.11	0.086
HCM Control Delay	7.4	7.6	7.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.4	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	33	9
Future Vol, veh/h	0	23	33	9
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	25	36	10
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.981			0.961			0.981	
Flt Protected		0.996			0.994			0.988			0.982	
Satd. Flow (prot)	0	1824	0	0	1816	0	0	1769	0	0	1794	0
Flt Permitted		0.996			0.994			0.988			0.982	
Satd. Flow (perm)	0	1824	0	0	1816	0	0	1769	0	0	1794	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	7	72	11	0	11	68	13	0	6	12	7
Future Vol, veh/h	0	7	72	11	0	11	68	13	0	6	12	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	78	12	0	12	74	14	0	7	13	8
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.7	7.7	7.5
HCM LOS	A	A	A

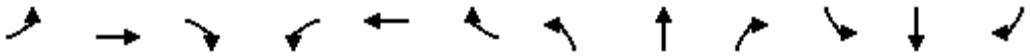
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	24%	8%	12%	36%
Vol Thru, %	48%	80%	74%	50%
Vol Right, %	28%	12%	14%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	90	92	66
LT Vol	6	7	11	24
Through Vol	12	72	68	33
RT Vol	7	11	13	9
Lane Flow Rate	27	98	100	72
Geometry Grp	1	1	1	1
Degree of Util (X)	0.033	0.112	0.114	0.087
Departure Headway (Hd)	4.328	4.125	4.12	4.389
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	832	856	857	821
Service Time	2.33	2.211	2.206	2.39
HCM Lane V/C Ratio	0.032	0.114	0.117	0.088
HCM Control Delay	7.5	7.7	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.4	0.4	0.3

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	24	33	9
Future Vol, veh/h	0	24	33	9
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	36	10
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.980			0.981			0.964			0.982	
Flt Protected		0.995			0.994			0.988			0.984	
Satd. Flow (prot)	0	1816	0	0	1816	0	0	1774	0	0	1800	0
Flt Permitted		0.995			0.994			0.988			0.984	
Satd. Flow (perm)	0	1816	0	0	1816	0	0	1774	0	0	1800	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	7	60	12	0	13	76	15	0	6	14	7
Future Vol, veh/h	0	7	60	12	0	13	76	15	0	6	14	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	65	13	0	14	83	16	0	7	15	8
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.7	7.9	7.5
HCM LOS	A	A	A

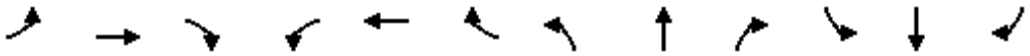
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	9%	12%	34%
Vol Thru, %	52%	76%	73%	53%
Vol Right, %	26%	15%	14%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	79	104	77
LT Vol	6	7	13	26
Through Vol	14	60	76	41
RT Vol	7	12	15	10
Lane Flow Rate	29	86	113	84
Geometry Grp	1	1	1	1
Degree of Util (X)	0.036	0.099	0.13	0.102
Departure Headway (Hd)	4.357	4.245	4.134	4.396
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	826	849	853	820
Service Time	2.359	2.245	2.229	2.398
HCM Lane V/C Ratio	0.035	0.101	0.132	0.102
HCM Control Delay	7.5	7.7	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.4	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	26	41	10
Future Vol, veh/h	0	26	41	10
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	28	45	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.981			0.961			0.983	
Flt Protected		0.996			0.994			0.989			0.983	
Satd. Flow (prot)	0	1826	0	0	1816	0	0	1770	0	0	1800	0
Flt Permitted		0.996			0.994			0.989			0.983	
Satd. Flow (perm)	0	1826	0	0	1816	0	0	1770	0	0	1800	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	7	84	12	0	14	82	16	0	6	14	8
Future Vol, veh/h	0	7	84	12	0	14	82	16	0	6	14	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	91	13	0	15	89	17	0	7	15	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.9	8	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	21%	7%	12%	35%
Vol Thru, %	50%	82%	73%	52%
Vol Right, %	29%	12%	14%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	103	112	79
LT Vol	6	7	14	28
Through Vol	14	84	82	41
RT Vol	8	12	16	10
Lane Flow Rate	30	112	122	86
Geometry Grp	1	1	1	1
Degree of Util (X)	0.037	0.133	0.144	0.107
Departure Headway (Hd)	4.424	4.276	4.262	4.482
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	811	842	845	802
Service Time	2.439	2.287	2.272	2.495
HCM Lane V/C Ratio	0.037	0.133	0.144	0.107
HCM Control Delay	7.6	7.9	8	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.5	0.5	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	28	41	10
Future Vol, veh/h	0	28	41	10
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	30	45	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Wible Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

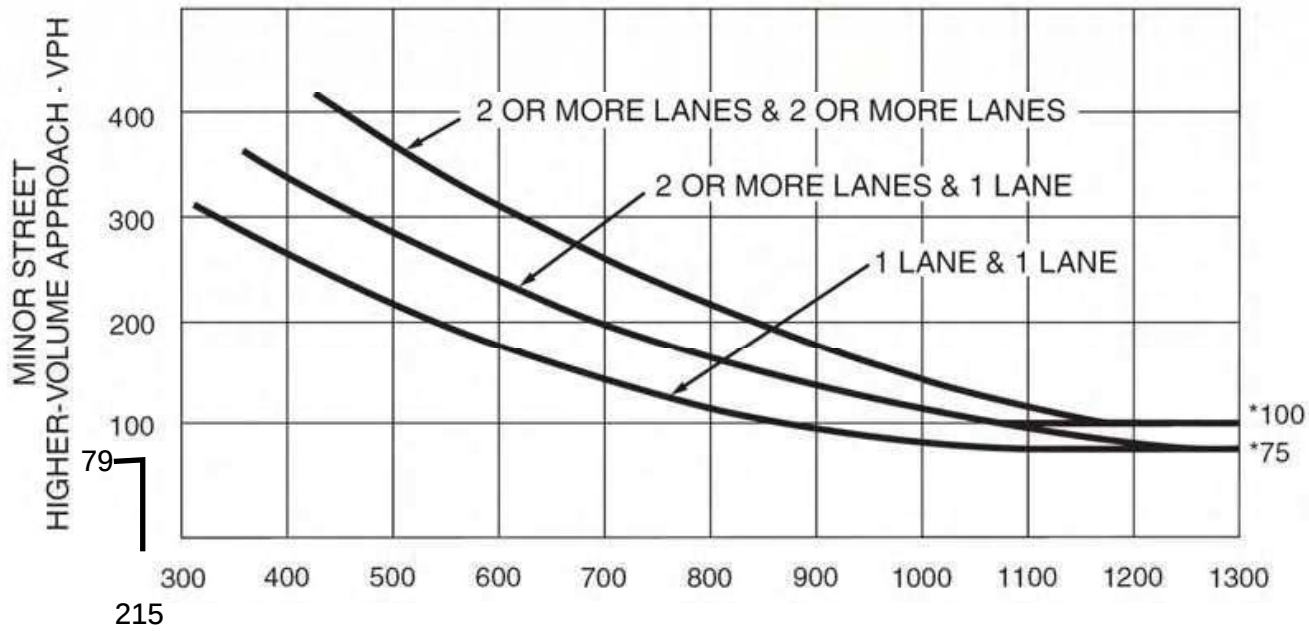
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 2580 / Minor Street 948	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 2580 / Minor Street 948	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 56% (A) 31% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Houghton Rd. & Wible Rd. - PM Peak

Count Date: 1/6/2015

Ave Annual Growth: **1.31%**

Exist Peak Hour Volumes

AWS		
>	WBL	3
1	WBT	75
<	WBR	28
>	EBL	11
1	EBT	73
<	EBR	4
>	NBL	8
1	NBT	43
<	NBR	4
>	SBL	24
1	SBT	18
<	SBR	10
	TOTAL	301

Year 2035

Fut. Volumes w/o Proj

WBL	6
WBT	103
WBR	42
EBL	10
EBT	75
EBR	5
NBL	10
NBT	59
NBR	6
SBL	31
SBT	27
SBR	11
TOTAL	385

Year 2035 Fut. Vol

+ Project Traffic

WBL	9
WBT	120
WBR	45
EBL	10
EBT	81
EBR	5
NBL	10
NBT	59
NBR	9
SBL	35
SBT	27
SBR	11
TOTAL	421

Year 2025

Fut. Volumes w/o Proj

WBL	4
WBT	88
WBR	34
EBL	11
EBT	74
EBR	4
NBL	9
NBT	50
NBR	5
SBL	27
SBT	22
SBR	10
TOTAL	338

Year 2025 Fut. Vol

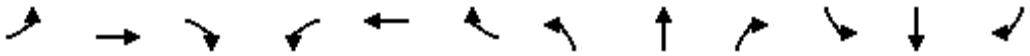
+ Project Traffic

WBL	6
WBT	97
WBR	36
EBL	11
EBT	77
EBR	4
NBL	9
NBT	50
NBR	7
SBL	29
SBT	22
SBR	10
TOTAL	358

Project Generated Trips - Year 2035

	Total
WBL	3
WBT	17
WBR	3
EBL	0
EBT	6
EBR	0
NBL	0
NBT	0
NBR	3
SBL	4
SBT	0
SBR	0
TOTAL	36

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Houghton Rd. & Wible Rd. - PM Peak						
	Count Date:	1/6/2015						
2006	ADT							
WB Approach (To)	0.197							
WB Approach (Away)	0.159							
EB Approach (To)	0.429							
EB Approach (Away)	0.524							
NB Approach (To)	0.623							
NB Approach (Away)	0.287							
SB Approach (To)	0.605							
SB Approach (Away)	0.884							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.469		WBL	2.44	WBT	1.71	WBR	1.84
WB Approach (Away)	0.259		3.13%	6	1.57%	103	1.97%	42
EB Approach (To)	0.28		EBL	0.98	EBT	1.14	EBR	1.58
EB Approach (Away)	0.54		-0.28%	10	0.12%	75	0.88%	5
NB Approach (To)	1.158		NBL	1.44	NBT	1.58	NBR	1.74
NB Approach (Away)	0.72		1.13%	10	1.53%	59	1.93%	6
SB Approach (To)	0.76		SBL	1.44	SBT	1.88	SBR	1.14
SB Approach (Away)	1.148		1.24%	31	2.00%	27	0.45%	11



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.965			0.991			0.974	
Flt Protected		0.994			0.999			0.993			0.978	
Satd. Flow (prot)	0	1840	0	0	1796	0	0	1833	0	0	1774	0
Flt Permitted		0.994			0.999			0.993			0.978	
Satd. Flow (perm)	0	1840	0	0	1796	0	0	1833	0	0	1774	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	73	4	0	3	75	28	0	8	43	4
Future Vol, veh/h	0	11	73	4	0	3	75	28	0	8	43	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	79	4	0	3	82	30	0	9	47	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.9	7.8	7.8
HCM LOS	A	A	A

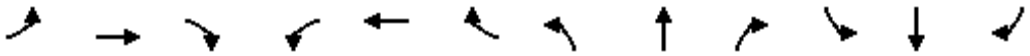
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	12%	3%	46%
Vol Thru, %	78%	83%	71%	35%
Vol Right, %	7%	5%	26%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	88	106	52
LT Vol	8	11	3	24
Through Vol	43	73	75	18
RT Vol	4	4	28	10
Lane Flow Rate	60	96	115	57
Geometry Grp	1	1	1	1
Degree of Util (X)	0.074	0.112	0.13	0.07
Departure Headway (Hd)	4.449	4.328	4.16	4.444
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	810	833	868	811
Service Time	2.45	2.328	2.16	2.446
HCM Lane V/C Ratio	0.074	0.115	0.132	0.07
HCM Control Delay	7.8	7.9	7.8	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.4	0.4	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	24	18	10
Future Vol, veh/h	0	24	18	10
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	20	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.964			0.990			0.977	
Flt Protected		0.994			0.999			0.993			0.978	
Satd. Flow (prot)	0	1840	0	0	1794	0	0	1831	0	0	1780	0
Flt Permitted		0.994			0.999			0.993			0.978	
Satd. Flow (perm)	0	1840	0	0	1794	0	0	1831	0	0	1780	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	74	4	0	4	88	34	0	9	50	5
Future Vol, veh/h	0	11	74	4	0	4	88	34	0	9	50	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	80	4	0	4	96	37	0	10	54	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8	8	8
HCM LOS	A	A	A

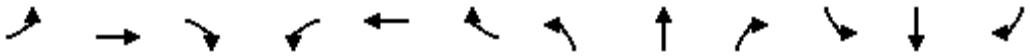
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	12%	3%	46%
Vol Thru, %	78%	83%	70%	37%
Vol Right, %	8%	4%	27%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	89	126	59
LT Vol	9	11	4	27
Through Vol	50	74	88	22
RT Vol	5	4	34	10
Lane Flow Rate	70	97	137	64
Geometry Grp	1	1	1	1
Degree of Util (X)	0.087	0.118	0.16	0.081
Departure Headway (Hd)	4.508	4.386	4.196	4.522
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	797	819	857	794
Service Time	2.526	2.402	2.21	2.54
HCM Lane V/C Ratio	0.088	0.118	0.16	0.081
HCM Control Delay	8	8	8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.4	0.6	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	27	22	10
Future Vol, veh/h	0	27	22	10
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	24	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.965			0.985			0.978	
Flt Protected		0.994			0.998			0.993			0.977	
Satd. Flow (prot)	0	1842	0	0	1794	0	0	1822	0	0	1780	0
Flt Permitted		0.994			0.998			0.993			0.977	
Satd. Flow (perm)	0	1842	0	0	1794	0	0	1822	0	0	1780	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	77	4	0	6	97	36	0	9	50	7
Future Vol, veh/h	0	11	77	4	0	6	97	36	0	9	50	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	84	4	0	7	105	39	0	10	54	8
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	8.1	8
HCM LOS	A	A	A

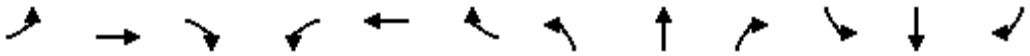
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	12%	4%	48%
Vol Thru, %	76%	84%	70%	36%
Vol Right, %	11%	4%	26%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	66	92	139	61
LT Vol	9	11	6	29
Through Vol	50	77	97	22
RT Vol	7	4	36	10
Lane Flow Rate	72	100	151	66
Geometry Grp	1	1	1	1
Degree of Util (X)	0.09	0.123	0.177	0.084
Departure Headway (Hd)	4.533	4.413	4.22	4.572
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	792	814	852	785
Service Time	2.553	2.43	2.235	2.592
HCM Lane V/C Ratio	0.091	0.123	0.177	0.084
HCM Control Delay	8	8.1	8.1	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.4	0.6	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	29	22	10
Future Vol, veh/h	0	29	22	10
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	32	24	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.962			0.988			0.978	
Flt Protected		0.994			0.998			0.993			0.978	
Satd. Flow (prot)	0	1839	0	0	1788	0	0	1828	0	0	1782	0
Flt Permitted		0.994			0.998			0.993			0.978	
Satd. Flow (perm)	0	1839	0	0	1788	0	0	1828	0	0	1782	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	10	75	5	0	6	103	42	0	10	59	6
Future Vol, veh/h	0	10	75	5	0	6	103	42	0	10	59	6
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	82	5	0	7	112	46	0	11	64	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	8.3	8.1
HCM LOS	A	A	A

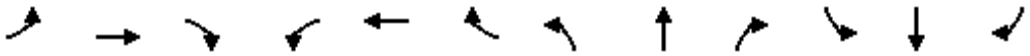
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	11%	4%	45%
Vol Thru, %	79%	83%	68%	39%
Vol Right, %	8%	6%	28%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	90	151	69
LT Vol	10	10	6	31
Through Vol	59	75	103	27
RT Vol	6	5	42	11
Lane Flow Rate	82	98	164	75
Geometry Grp	1	1	1	1
Degree of Util (X)	0.104	0.121	0.194	0.096
Departure Headway (Hd)	4.587	4.469	4.255	4.61
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	783	803	845	779
Service Time	2.609	2.488	2.272	2.633
HCM Lane V/C Ratio	0.105	0.122	0.194	0.096
HCM Control Delay	8.1	8.1	8.3	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.4	0.7	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	31	27	11
Future Vol, veh/h	0	31	27	11
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	34	29	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.1
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.965			0.984			0.979	
Flt Protected		0.995			0.997			0.994			0.977	
Satd. Flow (prot)	0	1842	0	0	1792	0	0	1822	0	0	1782	0
Flt Permitted		0.995			0.997			0.994			0.977	
Satd. Flow (perm)	0	1842	0	0	1792	0	0	1822	0	0	1782	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5179			5264			10972			7979	
Travel Time (s)		64.2			65.3			136.0			98.9	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	10	81	5	0	9	120	45	0	10	59	9
Future Vol, veh/h	0	10	81	5	0	9	120	45	0	10	59	9
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	88	5	0	10	130	49	0	11	64	10
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.2	8.6	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	10%	5%	48%
Vol Thru, %	76%	84%	69%	37%
Vol Right, %	12%	5%	26%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	78	96	174	73
LT Vol	10	10	9	35
Through Vol	59	81	120	27
RT Vol	9	5	45	11
Lane Flow Rate	85	104	189	79
Geometry Grp	1	1	1	1
Degree of Util (X)	0.109	0.131	0.226	0.104
Departure Headway (Hd)	4.645	4.519	4.299	4.701
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	772	794	836	763
Service Time	2.675	2.545	2.321	2.73
HCM Lane V/C Ratio	0.11	0.131	0.226	0.104
HCM Control Delay	8.2	8.2	8.6	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.4	0.9	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	35	27	11
Future Vol, veh/h	0	35	27	11
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	38	29	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.3
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Wible Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

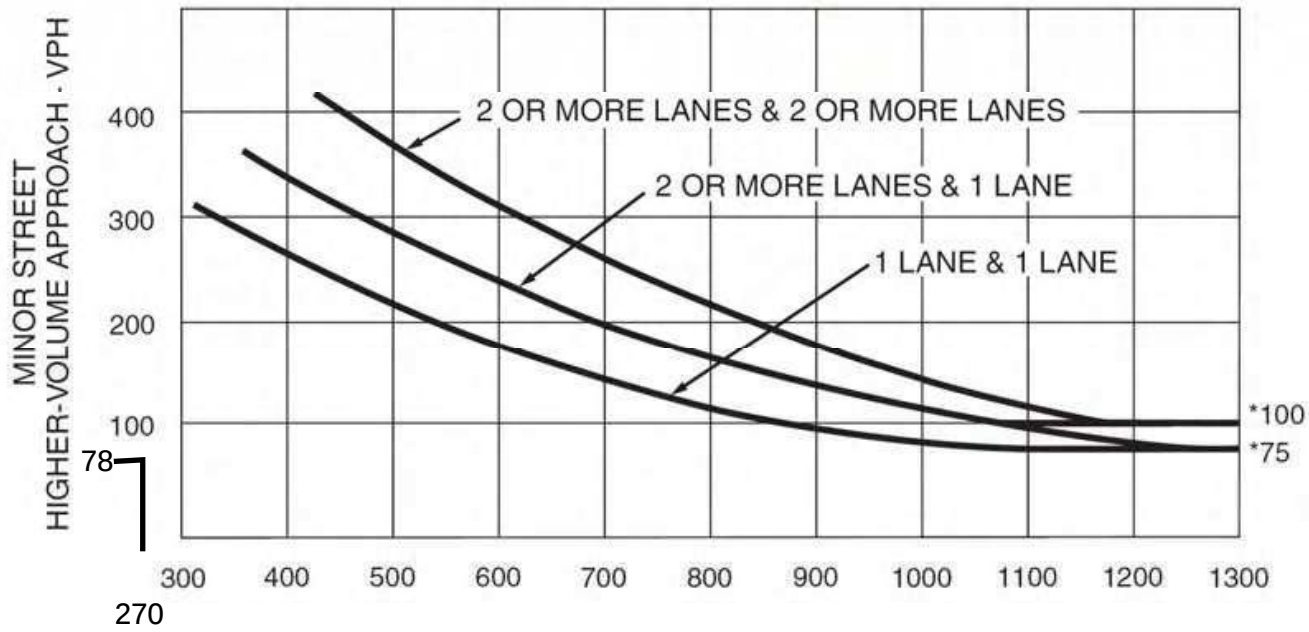
URBAN..... RURAL.....	Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street 2700 / Minor Street 780	Urban	Rural	Urban	Rural
1..... 1.....	8,000	5,600	2,400	1,680
2 or More..... 1.....	9,600	6,720	2,400	1,680
2 or More..... 2 or More.....	9,600	6,720	3,200	2,240
1..... 2 or More.....	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street 2700 / Minor Street 780	Urban	Rural	Urban	Rural
1..... 1.....	12,000	8,400	1,200	850
2 or More..... 1.....	14,400	10,080	1,200	850
2 or More..... 2 or More.....	14,400	10,080	1,600	1,120
1..... 2 or More.....	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 48% (A) 92% (B)	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton & Souh "H" - AM Peak
Count Date: 1/6/2015

Ave Annual Growth: **2.10%**

Exist Peak Hour Volumes

AWS		
>	WBL	31
1	WBT	57
<	WBR	14
>	EBL	1
1	EBT	78
<	EBR	1
>	NBL	3
1	NBT	8
<	NBR	17
>	SBL	19
1	SBT	4
<	SBR	2
	TOTAL	235

Year 2035
Fut. Volumes w/o Proj

WBL	47
WBT	87
WBR	21
EBL	2
EBT	119
EBR	2
NBL	5
NBT	12
NBR	26
SBL	29
SBT	6
SBR	3
TOTAL	359

Year 2035 Fut. Vol
+ Project Traffic

WBL	48
WBT	95
WBR	22
EBL	2
EBT	146
EBR	2
NBL	5
NBT	12
NBR	33
SBL	34
SBT	6
SBR	3
TOTAL	408

Year 2025
Fut. Volumes w/o Proj

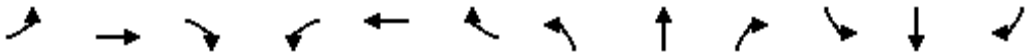
WBL	39
WBT	71
WBR	17
EBL	1
EBT	97
EBR	1
NBL	4
NBT	10
NBR	21
SBL	24
SBT	5
SBR	2
TOTAL	292

Year 2025 Fut. Vol
+ Project Traffic

WBL	40
WBT	75
WBR	18
EBL	1
EBT	111
EBR	1
NBL	4
NBT	10
NBR	25
SBL	27
SBT	5
SBR	2
TOTAL	319

Project Generated Trips - Year 2035

	Total
WBL	1
WBT	8
WBR	1
EBL	0
EBT	27
EBR	0
NBL	0
NBT	0
NBR	7
SBL	5
SBT	0
SBR	0
TOTAL	49



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.982			0.919			0.990	
Flt Protected		0.999			0.985			0.995			0.963	
Satd. Flow (prot)	0	1857	0	0	1802	0	0	1703	0	0	1776	0
Flt Permitted		0.999			0.985			0.995			0.963	
Satd. Flow (perm)	0	1857	0	0	1802	0	0	1703	0	0	1776	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	78	1	0	31	57	14	0	3	8	17
Future Vol, veh/h	0	1	78	1	0	31	57	14	0	3	8	17
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	85	1	0	34	62	15	0	3	9	18
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	7.7	7.2
HCM LOS	A	A	A

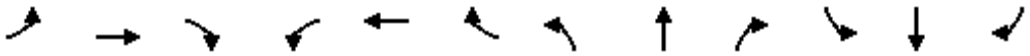
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	1%	30%	76%
Vol Thru, %	29%	97%	56%	16%
Vol Right, %	61%	1%	14%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	80	102	25
LT Vol	3	1	31	19
Through Vol	8	78	57	4
RT Vol	17	1	14	2
Lane Flow Rate	30	87	111	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.034	0.099	0.126	0.033
Departure Headway (Hd)	4.053	4.113	4.078	4.403
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	889	865	874	800
Service Time	2.053	2.168	2.128	2.503
HCM Lane V/C Ratio	0.034	0.101	0.127	0.034
HCM Control Delay	7.2	7.6	7.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.4	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	19	4	2
Future Vol, veh/h	0	19	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	4	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.982			0.918			0.992	
Flt Protected					0.985			0.995			0.962	
Satd. Flow (prot)	0	1861	0	0	1802	0	0	1701	0	0	1778	0
Flt Permitted					0.985			0.995			0.962	
Satd. Flow (perm)	0	1861	0	0	1802	0	0	1701	0	0	1778	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	97	1	0	39	71	17	0	4	10	21
Future Vol, veh/h	0	1	97	1	0	39	71	17	0	4	10	21
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	105	1	0	42	77	18	0	4	11	23
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.8	8	7.4
HCM LOS	A	A	A

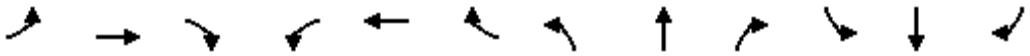
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	1%	31%	77%
Vol Thru, %	29%	98%	56%	16%
Vol Right, %	60%	1%	13%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	99	127	31
LT Vol	4	1	39	24
Through Vol	10	97	71	5
RT Vol	21	1	17	2
Lane Flow Rate	38	108	138	34
Geometry Grp	1	1	1	1
Degree of Util (X)	0.044	0.124	0.158	0.043
Departure Headway (Hd)	4.175	4.161	4.123	4.632
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	863	851	861	778
Service Time	2.176	2.237	2.192	2.633
HCM Lane V/C Ratio	0.044	0.127	0.16	0.044
HCM Control Delay	7.4	7.8	8	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.4	0.6	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	24	5	2
Future Vol, veh/h	0	24	5	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	5	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.981			0.913			0.992	
Flt Protected					0.985			0.995			0.961	
Satd. Flow (prot)	0	1861	0	0	1800	0	0	1692	0	0	1776	0
Flt Permitted					0.985			0.995			0.961	
Satd. Flow (perm)	0	1861	0	0	1800	0	0	1692	0	0	1776	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	111	1	0	40	75	18	0	4	10	25
Future Vol, veh/h	0	1	111	1	0	40	75	18	0	4	10	25
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	121	1	0	43	82	20	0	4	11	27
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8	8.1	7.4
HCM LOS	A	A	A

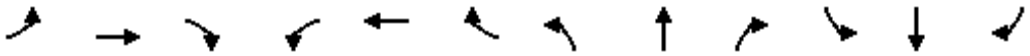
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	1%	30%	79%
Vol Thru, %	26%	98%	56%	15%
Vol Right, %	64%	1%	14%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	113	133	34
LT Vol	4	1	40	27
Through Vol	10	111	75	5
RT Vol	25	1	18	2
Lane Flow Rate	42	123	145	37
Geometry Grp	1	1	1	1
Degree of Util (X)	0.05	0.143	0.166	0.048
Departure Headway (Hd)	4.204	4.18	4.146	4.695
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	857	845	853	767
Service Time	2.205	2.267	2.229	2.697
HCM Lane V/C Ratio	0.049	0.146	0.17	0.048
HCM Control Delay	7.4	8	8.1	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.5	0.6	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	27	5	2
Future Vol, veh/h	0	27	5	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	5	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.982			0.918			0.990	
Flt Protected		0.999			0.985			0.995			0.963	
Satd. Flow (prot)	0	1857	0	0	1802	0	0	1701	0	0	1776	0
Flt Permitted		0.999			0.985			0.995			0.963	
Satd. Flow (perm)	0	1857	0	0	1802	0	0	1701	0	0	1776	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	2	119	2	0	47	87	21	0	5	12	26
Future Vol, veh/h	0	2	119	2	0	47	87	21	0	5	12	26
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	129	2	0	51	95	23	0	5	13	28
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	8.3	7.6
HCM LOS	A	A	A

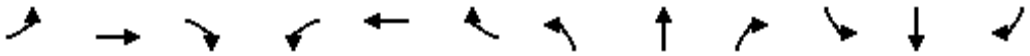
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	2%	30%	76%
Vol Thru, %	28%	97%	56%	16%
Vol Right, %	60%	2%	14%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	123	155	38
LT Vol	5	2	47	29
Through Vol	12	119	87	6
RT Vol	26	2	21	3
Lane Flow Rate	47	134	168	41
Geometry Grp	1	1	1	1
Degree of Util (X)	0.056	0.156	0.195	0.055
Departure Headway (Hd)	4.313	4.315	4.17	4.762
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	835	837	846	756
Service Time	2.315	2.315	2.267	2.764
HCM Lane V/C Ratio	0.056	0.16	0.199	0.054
HCM Control Delay	7.6	8.1	8.3	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.6	0.7	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	29	6	3
Future Vol, veh/h	0	29	6	3
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	32	7	3
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.982			0.910			0.991	
Flt Protected		0.999			0.986			0.995			0.962	
Satd. Flow (prot)	0	1857	0	0	1804	0	0	1687	0	0	1776	0
Flt Permitted		0.999			0.986			0.995			0.962	
Satd. Flow (perm)	0	1857	0	0	1804	0	0	1687	0	0	1776	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	2	146	2	0	48	95	22	0	5	12	33
Future Vol, veh/h	0	2	146	2	0	48	95	22	0	5	12	33
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	159	2	0	52	103	24	0	5	13	36
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.4	8.5	7.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	1%	29%	79%
Vol Thru, %	24%	97%	58%	14%
Vol Right, %	66%	1%	13%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	150	165	43
LT Vol	5	2	48	34
Through Vol	12	146	95	6
RT Vol	33	2	22	3
Lane Flow Rate	54	163	179	47
Geometry Grp	1	1	1	1
Degree of Util (X)	0.066	0.197	0.215	0.063
Departure Headway (Hd)	4.379	4.356	4.324	4.877
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	819	827	832	736
Service Time	2.4	2.371	2.338	2.899
HCM Lane V/C Ratio	0.066	0.197	0.215	0.064
HCM Control Delay	7.7	8.4	8.5	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.7	0.8	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	34	6	3
Future Vol, veh/h	0	34	6	3
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	37	7	3
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.2
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: South H Street

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

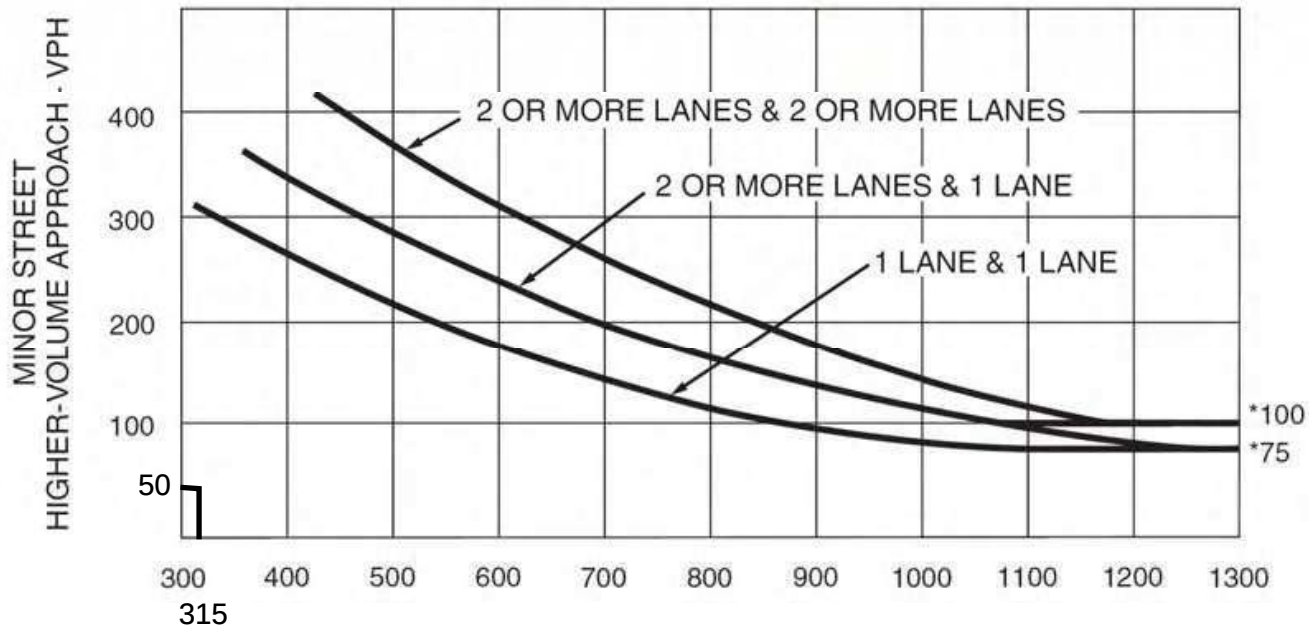
URBAN..... RURAL.....	Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street: 1 (3780) / 2 or More / 2 or More / 1 Minor Street: 1 (600) / 1 / 2 or More / 2 or More	Urban	Rural	Urban	Rural
	8,000	5,600	2,400	1,680
	9,600	6,720	2,400	1,680
	9,600	6,720	3,200	2,240
	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street: 1 (3780) / 2 or More / 2 or More / 1 Minor Street: 1 (600) / 1 / 2 or More / 2 or More	Urban	Rural	Urban	Rural
	12,000	8,400	1,200	850
	14,400	10,080	1,200	850
	14,400	10,080	1,600	1,120
	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... A: 67% B: 71%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton & South "H" - PM Peak
Count Date: 1/6/2015

Ave Annual Growth: **2.10%**

Exist Peak Hour Volumes

AWS		
>	WBL	9
1	WBT	103
<	WBR	20
>	EBL	1
1	EBT	94
<	EBR	8
>	NBL	1
1	NBT	6
<	NBR	22
>	SBL	12
1	SBT	5
<	SBR	1
	TOTAL	282

Year 2035
Fut. Volumes w/o Proj

WBL	14
WBT	158
WBR	31
EBL	2
EBT	144
EBR	12
NBL	2
NBT	9
NBR	34
SBL	18
SBT	8
SBR	2
TOTAL	434

Year 2035 Fut. Vol
+ Project Traffic

WBL	28
WBT	183
WBR	44
EBL	2
EBT	157
EBR	12
NBL	2
NBT	9
NBR	44
SBL	23
SBT	8
SBR	2
TOTAL	514

Year 2025
Fut. Volumes w/o Proj

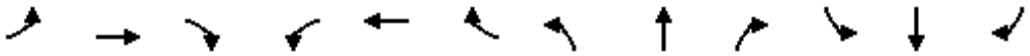
WBL	11
WBT	128
WBR	25
EBL	1
EBT	117
EBR	10
NBL	1
NBT	7
NBR	27
SBL	15
SBT	6
SBR	1
TOTAL	349

Year 2025 Fut. Vol
+ Project Traffic

WBL	18
WBT	141
WBR	32
EBL	1
EBT	124
EBR	10
NBL	1
NBT	7
NBR	32
SBL	18
SBT	6
SBR	1
TOTAL	391

Project Generated Trips - Year 2035

	Total
WBL	14
WBT	25
WBR	13
EBL	0
EBT	13
EBR	0
NBL	0
NBT	0
NBR	10
SBL	5
SBT	0
SBR	0
TOTAL	80



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.979			0.899			0.993	
Flt Protected					0.997			0.998			0.967	
Satd. Flow (prot)	0	1842	0	0	1818	0	0	1671	0	0	1789	0
Flt Permitted					0.997			0.998			0.967	
Satd. Flow (perm)	0	1842	0	0	1818	0	0	1671	0	0	1789	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			5375			6911	
Travel Time (s)		65.3			17.9			66.6			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	94	8	0	9	103	20	0	1	6	22
Future Vol, veh/h	0	1	94	8	0	9	103	20	0	1	6	22
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	102	9	0	10	112	22	0	1	7	24
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.7	7.9	7.2
HCM LOS	A	A	A

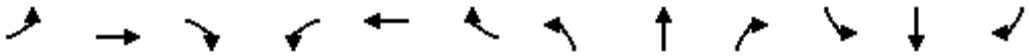
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	1%	7%	67%
Vol Thru, %	21%	91%	78%	28%
Vol Right, %	76%	8%	15%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	103	132	18
LT Vol	1	1	9	12
Through Vol	6	94	103	5
RT Vol	22	8	20	1
Lane Flow Rate	32	112	143	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.036	0.127	0.161	0.025
Departure Headway (Hd)	4.057	4.086	4.03	4.618
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	888	870	884	779
Service Time	2.058	2.147	2.085	2.62
HCM Lane V/C Ratio	0.036	0.129	0.162	0.026
HCM Control Delay	7.2	7.7	7.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.4	0.6	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	12	5	1
Future Vol, veh/h	0	12	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	13	5	1
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.980			0.897			0.994	
Flt Protected					0.997			0.999			0.968	
Satd. Flow (prot)	0	1842	0	0	1820	0	0	1669	0	0	1792	0
Flt Permitted					0.997			0.999			0.968	
Satd. Flow (perm)	0	1842	0	0	1820	0	0	1669	0	0	1792	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	117	10	0	11	128	25	0	1	7	27
Future Vol, veh/h	0	1	117	10	0	11	128	25	0	1	7	27
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	127	11	0	12	139	27	0	1	8	29
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8	8.2	7.4
HCM LOS	A	A	A

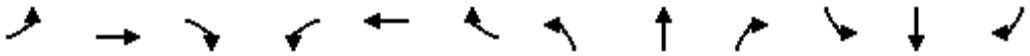
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	1%	7%	68%
Vol Thru, %	20%	91%	78%	27%
Vol Right, %	77%	8%	15%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	128	164	22
LT Vol	1	1	11	15
Through Vol	7	117	128	6
RT Vol	27	10	25	1
Lane Flow Rate	38	139	178	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.044	0.16	0.201	0.032
Departure Headway (Hd)	4.191	4.131	4.069	4.773
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	859	857	872	754
Service Time	2.192	2.211	2.143	2.774
HCM Lane V/C Ratio	0.044	0.162	0.204	0.032
HCM Control Delay	7.4	8	8.2	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.6	0.7	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	15	6	1
Future Vol, veh/h	0	15	6	1
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	16	7	1
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.977			0.893			0.995	
Flt Protected					0.995			0.999			0.966	
Satd. Flow (prot)	0	1844	0	0	1811	0	0	1662	0	0	1790	0
Flt Permitted					0.995			0.999			0.966	
Satd. Flow (perm)	0	1844	0	0	1811	0	0	1662	0	0	1790	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	1	124	10	0	18	141	32	0	1	7	32
Future Vol, veh/h	0	1	124	10	0	18	141	32	0	1	7	32
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	135	11	0	20	153	35	0	1	8	35
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	8.5	7.5
HCM LOS	A	A	A

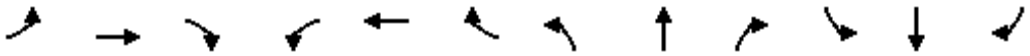
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	1%	9%	72%
Vol Thru, %	17%	92%	74%	24%
Vol Right, %	80%	7%	17%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	40	135	191	25
LT Vol	1	1	18	18
Through Vol	7	124	141	6
RT Vol	32	10	32	1
Lane Flow Rate	43	147	208	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.051	0.17	0.236	0.037
Departure Headway (Hd)	4.261	4.173	4.087	4.875
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	845	845	866	739
Service Time	2.263	2.268	2.172	2.877
HCM Lane V/C Ratio	0.051	0.174	0.24	0.037
HCM Control Delay	7.5	8.1	8.5	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.6	0.9	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	18	6	1
Future Vol, veh/h	0	18	6	1
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	20	7	1
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.1
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.979			0.898			0.991	
Flt Protected		0.999			0.997			0.998			0.969	
Satd. Flow (prot)	0	1842	0	0	1818	0	0	1669	0	0	1789	0
Flt Permitted		0.999			0.997			0.998			0.969	
Satd. Flow (perm)	0	1842	0	0	1818	0	0	1669	0	0	1789	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	2	144	12	0	14	158	31	0	2	9	34
Future Vol, veh/h	0	2	144	12	0	14	158	31	0	2	9	34
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	157	13	0	15	172	34	0	2	10	37
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.4	8.7	7.7
HCM LOS	A	A	A

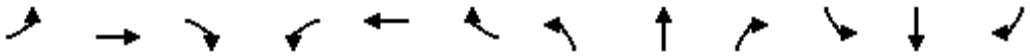
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	1%	7%	64%
Vol Thru, %	20%	91%	78%	29%
Vol Right, %	76%	8%	15%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	158	203	28
LT Vol	2	2	14	18
Through Vol	9	144	158	8
RT Vol	34	12	31	2
Lane Flow Rate	49	172	221	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.06	0.205	0.253	0.042
Departure Headway (Hd)	4.382	4.301	4.234	4.935
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	820	838	854	728
Service Time	2.393	2.312	2.234	2.948
HCM Lane V/C Ratio	0.06	0.205	0.259	0.041
HCM Control Delay	7.7	8.4	8.7	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.8	1	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	18	8	2
Future Vol, veh/h	0	18	8	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	20	9	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.2
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.977			0.892			0.992	
Flt Protected		0.999			0.995			0.998			0.966	
Satd. Flow (prot)	0	1844	0	0	1811	0	0	1658	0	0	1785	0
Flt Permitted		0.999			0.995			0.998			0.966	
Satd. Flow (perm)	0	1844	0	0	1811	0	0	1658	0	0	1785	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		5264			1446			840			6911	
Travel Time (s)		65.3			17.9			10.4			85.7	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	2	157	12	0	28	183	44	0	2	9	44
Future Vol, veh/h	0	2	157	12	0	28	183	44	0	2	9	44
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	171	13	0	30	199	48	0	2	10	48
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.7	9.4	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	1%	11%	70%
Vol Thru, %	16%	92%	72%	24%
Vol Right, %	80%	7%	17%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	171	255	33
LT Vol	2	2	28	23
Through Vol	9	157	183	8
RT Vol	44	12	44	2
Lane Flow Rate	60	186	277	36
Geometry Grp	1	1	1	1
Degree of Util (X)	0.075	0.228	0.33	0.051
Departure Headway (Hd)	4.524	4.411	4.281	5.131
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	791	814	843	697
Service Time	2.557	2.433	2.3	3.166
HCM Lane V/C Ratio	0.076	0.229	0.329	0.052
HCM Control Delay	7.9	8.7	9.4	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.9	1.4	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	23	8	2
Future Vol, veh/h	0	23	8	2
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	25	9	2
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.4
HCM LOS	A

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: South H Street

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

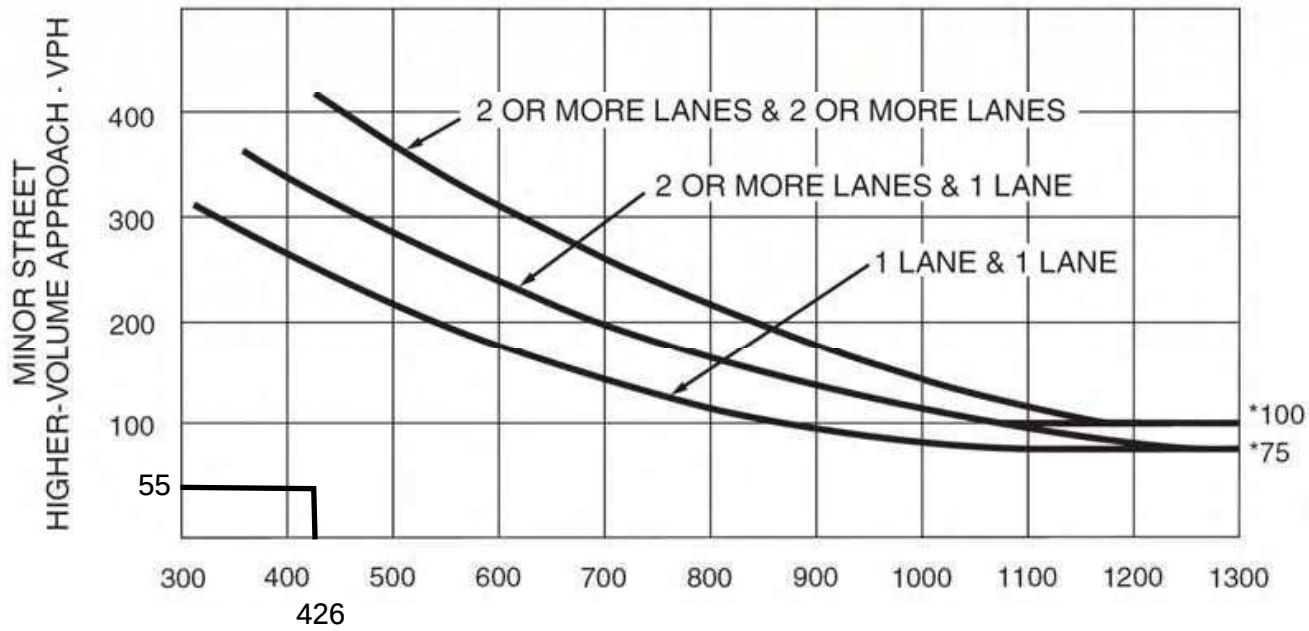
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 4260 / Minor Street 550 1 / 1 2 or More / 1 2 or More / 2 or More 1 / 2 or More	Urban / Rural 8,000 / 5,600 9,600 / 6,720 9,600 / 6,720 8,000 / 5,600	Urban / Rural 2,400 / 1,680 2,400 / 1,680 3,200 / 2,240 3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 4260 / Minor Street 550 1 / 1 2 or More / 1 2 or More / 2 or More 1 / 2 or More	Urban / Rural 12,000 / 8,400 14,400 / 10,080 14,400 / 10,080 12,000 / 8,400	Urban / Rural 1,200 / 850 1,200 / 850 1,600 / 1,120 1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 76% (A) 65% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: SR99 SB & Houghton/Costajo - AM Peak
Count Date: 1/8/2015

Ave Annual Growth: **2.19%**

Exist Peak Hour Volumes

U		
>	WBL	6
1	WBT	47
<	WBR	5
>	EBL	6
1	EBT	101
<	EBR	2
>	NBL	6
1	NBT	0
<	NBR	32
>	SBL	105
1	SBT	16
<	SBR	30
	TOTAL	356

Year 2035
Fut. Volumes w/o Proj

WBL	9
WBT	87
WBR	13
EBL	13
EBT	140
EBR	3
NBL	8
NBT	0
NBR	39
SBL	138
SBT	20
SBR	44
TOTAL	514

Year 2035 Fut. Vol
+ Project Traffic

WBL	9
WBT	97
WBR	185
EBL	13
EBT	178
EBR	3
NBL	8
NBT	0
NBR	39
SBL	930
SBT	20
SBR	44
TOTAL	1526

Year 2025
Fut. Volumes w/o Proj

WBL	8
WBT	64
WBR	8
EBL	9
EBT	119
EBR	2
NBL	7
NBT	0
NBR	35
SBL	121
SBT	18
SBR	37
TOTAL	428

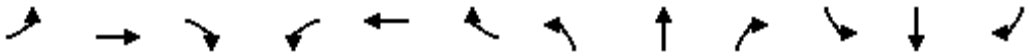
Year 2025 Fut. Vol
+ Project Traffic

WBL	8
WBT	69
WBR	94
EBL	9
EBT	138
EBR	2
NBL	7
NBT	0
NBR	35
SBL	517
SBT	18
SBR	37
TOTAL	934

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	10
WBR	172
EBL	0
EBT	38
EBR	0
NBL	0
NBT	0
NBR	0
SBL	792
SBT	0
SBR	0
TOTAL	1012

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	SR99 SB & Houghton/Costajo - AM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	0.225							
WB Approach (Away)	2.44							
EB Approach (To)	0.501							
EB Approach (Away)	0.604							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	2.388							
SB Approach (Away)	0.069							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.641		WBL	2.02	WBT	2.43	WBR	3.82
WB Approach (Away)	3.529		2.15%	9	3.06%	87	4.61%	13
EB Approach (To)	0.865		EBL	3.26	EBT	1.59	EBR	1.46
EB Approach (Away)	1.218		3.73%	13	1.59%	140	1.27%	3
NB Approach (To)	*1.2*		NBL	1.61	NBT	3.00	NBR	1.32
NB Approach (Away)	*1.2*		1.54%	8	3.09%	0	0.96%	39
SB Approach (To)	3.571		SBL	1.47	SBT	1.35	SBR	1.76
SB Approach (Away)	0.331		1.34%	138	1.01%	20	1.92%	44



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.997			0.994			0.950			0.958	
Satd. Flow (prot)	0	1857	1583	0	1852	1583	0	1770	1583	0	1785	1583
Flt Permitted		0.997			0.994			0.950			0.958	
Satd. Flow (perm)	0	1857	1583	0	1852	1583	0	1770	1583	0	1785	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

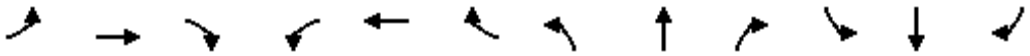
Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	6	100	2	6	47	5	6	0	32	105	16	30
Future Vol, veh/h	6	100	2	6	47	5	6	0	32	105	16	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	109	2	7	51	5	7	0	35	114	17	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	51	0	0	109	0	0	195	186	109	186	186	51
Stage 1	-	-	-	-	-	-	122	122	-	64	64	-
Stage 2	-	-	-	-	-	-	73	64	-	122	122	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1555	-	-	1481	-	-	764	708	945	775	708	1017
Stage 1	-	-	-	-	-	-	882	795	-	947	842	-
Stage 2	-	-	-	-	-	-	937	842	-	882	795	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1555	-	-	1481	-	-	720	701	945	741	701	1017
Mov Cap-2 Maneuver	-	-	-	-	-	-	720	701	-	741	701	-
Stage 1	-	-	-	-	-	-	878	791	-	942	838	-
Stage 2	-	-	-	-	-	-	884	838	-	845	791	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.8	9.2	10.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	720	945	1555	-	-	1481	-	-	735	1017
HCM Lane V/C Ratio	0.009	0.037	0.004	-	-	0.004	-	-	0.179	0.032
HCM Control Delay (s)	10	9	7.3	0	-	7.4	0	-	11	8.7
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	0.6	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.996			0.994			0.950			0.958	
Satd. Flow (prot)	0	1855	1583	0	1852	1583	0	1770	1583	0	1785	1583
Flt Permitted		0.996			0.994			0.950			0.958	
Satd. Flow (perm)	0	1855	1583	0	1852	1583	0	1770	1583	0	1785	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

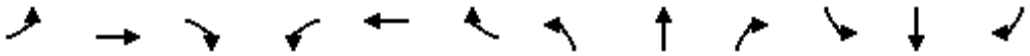
Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	9	119	2	8	64	8	7	0	35	121	18	37
Future Vol, veh/h	9	119	2	8	64	8	7	0	35	121	18	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	129	2	9	70	9	8	0	38	132	20	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	70	0	0	129	0	0	246	236	129	236	236	70
Stage 1	-	-	-	-	-	-	149	149	-	87	87	-
Stage 2	-	-	-	-	-	-	97	87	-	149	149	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1531	-	-	1457	-	-	708	665	921	718	665	993
Stage 1	-	-	-	-	-	-	854	774	-	921	823	-
Stage 2	-	-	-	-	-	-	910	823	-	854	774	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1531	-	-	1457	-	-	657	656	921	682	656	993
Mov Cap-2 Maneuver	-	-	-	-	-	-	657	656	-	682	656	-
Stage 1	-	-	-	-	-	-	848	769	-	915	818	-
Stage 2	-	-	-	-	-	-	847	818	-	813	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.7	9.3	11.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	657	921	1531	-	-	1457	-	-	679	993
HCM Lane V/C Ratio	0.012	0.041	0.006	-	-	0.006	-	-	0.223	0.041
HCM Control Delay (s)	10.5	9.1	7.4	0	-	7.5	0	-	11.8	8.8
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	0.8	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.997			0.995			0.950			0.954	
Satd. Flow (prot)	0	1857	1583	0	1853	1583	0	1770	1583	0	1777	1583
Flt Permitted		0.997			0.995			0.950			0.954	
Satd. Flow (perm)	0	1857	1583	0	1853	1583	0	1770	1583	0	1777	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

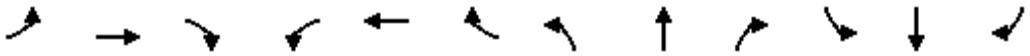
Intersection	
Int Delay, s/veh	23.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	9	138	2	8	69	94	7	0	35	517	18	37
Future Vol, veh/h	9	138	2	8	69	94	7	0	35	517	18	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	150	2	9	75	102	8	0	38	562	20	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	75	0	0	150	0	0	272	262	150	262	262	75
Stage 1	-	-	-	-	-	-	170	170	-	92	92	-
Stage 2	-	-	-	-	-	-	102	92	-	170	170	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1524	-	-	1431	-	-	680	643	896	691	643	986
Stage 1	-	-	-	-	-	-	832	758	-	915	819	-
Stage 2	-	-	-	-	-	-	904	819	-	832	758	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1524	-	-	1431	-	-	630	634	896	655	634	986
Mov Cap-2 Maneuver	-	-	-	-	-	-	630	634	-	655	634	-
Stage 1	-	-	-	-	-	-	826	753	-	909	813	-
Stage 2	-	-	-	-	-	-	840	813	-	791	753	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	9.5	36.8
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	630	896	1524	-	-	1431	-	-	654	986
HCM Lane V/C Ratio	0.012	0.042	0.006	-	-	0.006	-	-	0.889	0.041
HCM Control Delay (s)	10.8	9.2	7.4	0	-	7.5	0	-	38.7	8.8
HCM Lane LOS	B	A	A	A	-	A	A	-	E	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	10.9	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.996			0.995			0.950			0.958	
Satd. Flow (prot)	0	1855	1583	0	1853	1583	0	1770	1583	0	1785	1583
Flt Permitted		0.996			0.995			0.950			0.958	
Satd. Flow (perm)	0	1855	1583	0	1853	1583	0	1770	1583	0	1785	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

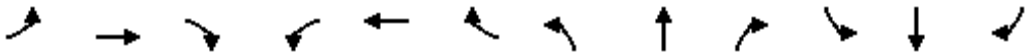
Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	13	140	3	9	87	13	8	0	39	138	20	44
Future Vol, veh/h	13	140	3	9	87	13	8	0	39	138	20	44
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	152	3	10	95	14	9	0	42	150	22	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	95	0	0	152	0	0	305	294	152	294	294	95
Stage 1	-	-	-	-	-	-	180	180	-	114	114	-
Stage 2	-	-	-	-	-	-	125	114	-	180	180	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1499	-	-	1429	-	-	647	617	894	658	617	962
Stage 1	-	-	-	-	-	-	822	750	-	891	801	-
Stage 2	-	-	-	-	-	-	879	801	-	822	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1499	-	-	1429	-	-	590	607	894	619	607	962
Mov Cap-2 Maneuver	-	-	-	-	-	-	590	607	-	619	607	-
Stage 1	-	-	-	-	-	-	814	743	-	882	795	-
Stage 2	-	-	-	-	-	-	807	795	-	775	743	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.6	9.5	12.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	590	894	1499	-	-	1429	-	-	617	962
HCM Lane V/C Ratio	0.015	0.047	0.009	-	-	0.007	-	-	0.278	0.05
HCM Control Delay (s)	11.2	9.2	7.4	0	-	7.5	0	-	13.1	8.9
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	1.1	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.997			0.996			0.950			0.953	
Satd. Flow (prot)	0	1857	1583	0	1855	1583	0	1770	1583	0	1775	1583
Flt Permitted		0.997			0.996			0.950			0.953	
Satd. Flow (perm)	0	1857	1583	0	1855	1583	0	1770	1583	0	1775	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	245.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	13	178	3	9	97	185	8	0	39	930	20	44
Future Vol, veh/h	13	178	3	9	97	185	8	0	39	930	20	44
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	193	3	10	105	201	9	0	42	1011	22	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	193	0	0	358	347	193	347	347	105
Stage 1	-	-	-	-	-	-	222	222	-	125	125	-
Stage 2	-	-	-	-	-	-	136	125	-	222	222	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1486	-	-	1380	-	-	597	576	849	~ 607	576	949
Stage 1	-	-	-	-	-	-	780	720	-	~ 879	792	-
Stage 2	-	-	-	-	-	-	867	792	-	~ 780	720	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1486	-	-	1380	-	-	542	565	849	~ 568	565	949
Mov Cap-2 Maneuver	-	-	-	-	-	-	542	565	-	~ 568	565	-
Stage 1	-	-	-	-	-	-	771	712	-	~ 869	785	-
Stage 2	-	-	-	-	-	-	793	785	-	~ 733	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.2	9.9	$ 376
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	542	849	1486	-	-	1380	-	-	568	949
HCM Lane V/C Ratio	0.016	0.05	0.01	-	-	0.007	-	-	1.818	0.05
HCM Control Delay (s)	11.8	9.5	7.4	0	-	7.6	0	-	$ 393	9
HCM Lane LOS	B	A	A	A	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0	0.2	0	-	-	0	-	-	64.1	0.2

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: SR 99 Southbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More.....12492.....	2 or More.....3492.....
1.....	2 or More.....

Minimum Requirements EADT

Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
8,000	5,600	2,400	1,680
9,600	6,720	2,400	1,680
9,600	6,720	3,200	2,240
8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More.....12492.....	2 or More.....3492.....
1.....	2 or More.....

Vehicles Per Day on Major Street (Total of Both Approaches) / Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)

Urban	Rural	Urban	Rural
12,000	8,400	1,200	850
14,400	10,080	1,200	850
14,400	10,080	1,600	1,120
12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied X Not Satisfied _____

No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)

2 CONDITIONS 80%

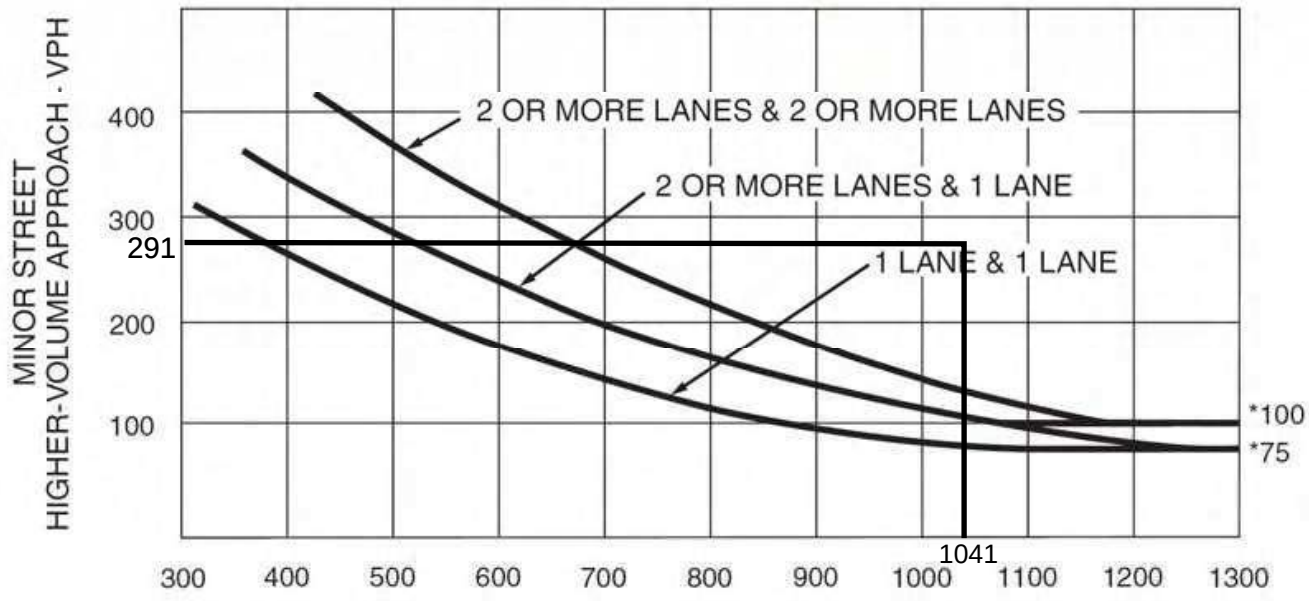
2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	178	3	9	97	185	8	0	39	930	20	44
Future Volume (veh/h)	13	178	3	9	97	185	8	0	39	930	20	44
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	14	193	3	10	105	201	9	0	42	1011	22	48
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	2	1	1
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	2	2	2	2	2	2
Cap, veh/h	31	337	287	23	329	279	148	155	132	1114	603	512
Arrive On Green	0.02	0.18	0.18	0.01	0.18	0.18	0.08	0.00	0.08	0.32	0.32	0.32
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	14	193	3	10	105	201	9	0	42	1011	22	48
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1721	1863	1583
Q Serve(g_s), s	0.5	5.7	0.1	0.3	3.0	7.2	0.3	0.0	1.5	16.9	0.5	1.3
Cycle Q Clear(g_c), s	0.5	5.7	0.1	0.3	3.0	7.2	0.3	0.0	1.5	16.9	0.5	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	31	337	287	23	329	279	148	155	132	1114	603	512
V/C Ratio(X)	0.46	0.57	0.01	0.44	0.32	0.72	0.06	0.00	0.32	0.91	0.04	0.09
Avail Cap(c_a), veh/h	148	558	474	148	558	474	531	558	474	1145	620	527
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.2	22.5	20.2	29.5	21.6	23.3	25.4	0.0	25.9	19.5	13.9	14.2
Incr Delay (d2), s/veh	10.1	1.5	0.0	12.8	0.6	3.5	0.2	0.0	1.4	10.4	0.0	0.1
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(50%),veh/ln	0.3	3.0	0.0	0.2	1.6	3.4	0.1	0.0	0.7	9.6	0.3	0.6
LnGrp Delay(d),s/veh	39.4	24.0	20.2	42.3	22.2	26.8	25.6	0.0	27.3	29.8	13.9	14.3
LnGrp LOS	D	C	C	D	C	C	C		C	C	B	B
Approach Vol, veh/h		210			316			51			1081	
Approach Delay, s/veh		25.0			25.8			27.0			28.8	
Approach LOS		C			C			C			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	25.5	11.0	6.8	16.9	11.0	25.5	7.0	16.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	20.0	18.0	5.0	18.0	18.0	20.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	18.9	3.5	2.3	7.7	2.3	3.3	2.5	9.2
Green Ext Time (p_c), s	0.5	0.3	0.0	1.5	0.0	0.3	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: SR99 SB & Houghton/Costajo - PM Peak
Count Date: 1/8/2015

Ave Annual Growth: **2.19%**

Exist Peak Hour Volumes

U		
>	WBL	8
1	WBT	81
1	WBR	10
>	EBL	4
1	EBT	100
1	EBR	3
>	NBL	7
1	NBT	0
<	NBR	24
>	SBL	82
1	SBT	5
<	SBR	42
	TOTAL	366

Year 2035
Fut. Volumes w/o Proj

WBL	12
WBT	150
WBR	25
EBL	8
EBT	138
EBR	4
NBL	10
NBT	0
NBR	29
SBL	108
SBT	6
SBR	62
TOTAL	552

Year 2035 Fut. Vol
+ Project Traffic

WBL	12
WBT	202
WBR	865
EBL	8
EBT	166
EBR	4
NBL	10
NBT	0
NBR	29
SBL	482
SBT	6
SBR	62
TOTAL	1846

Year 2025
Fut. Volumes w/o Proj

WBL	10
WBT	111
WBR	16
EBL	6
EBT	118
EBR	3
NBL	8
NBT	0
NBR	27
SBL	94
SBT	6
SBR	51
TOTAL	450

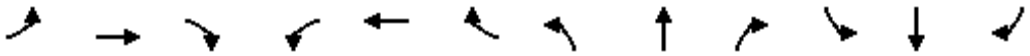
Year 2025 Fut. Vol
+ Project Traffic

WBL	10
WBT	137
WBR	436
EBL	6
EBT	132
EBR	3
NBL	8
NBT	0
NBR	27
SBL	281
SBT	6
SBR	51
TOTAL	1097

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	52
WBR	840
EBL	0
EBT	28
EBR	0
NBL	0
NBT	0
NBR	0
SBL	374
SBT	0
SBR	0
TOTAL	1294

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	SR99 SB & Houghton/Costajo - PM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	0.225							
WB Approach (Away)	2.44							
EB Approach (To)	0.501							
EB Approach (Away)	0.604							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	2.388							
SB Approach (Away)	0.069							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	0.641		WBL	2.02	WBT	2.43	WBR	3.82
WB Approach (Away)	3.529		2.15%	12	3.06%	150	4.61%	25
EB Approach (To)	0.865		EBL	3.26	EBT	1.59	EBR	1.46
EB Approach (Away)	1.218		3.73%	8	1.59%	138	1.27%	4
NB Approach (To)	*1.2*		NBL	1.61	NBT	3.00	NBR	1.32
NB Approach (Away)	*1.2*		1.54%	10	3.09%	0	0.96%	29
SB Approach (To)	3.571		SBL	1.47	SBT	1.35	SBR	1.76
SB Approach (Away)	0.331		1.34%	108	1.01%	6	1.92%	62



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.998			0.995			0.950			0.955	
Satd. Flow (prot)	0	1859	1583	0	1853	1583	0	1770	1583	0	1779	1583
Flt Permitted		0.998			0.995			0.950			0.955	
Satd. Flow (perm)	0	1859	1583	0	1853	1583	0	1770	1583	0	1779	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

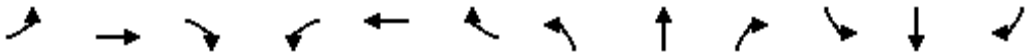
Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	100	3	8	81	10	7	0	24	82	5	42
Future Vol, veh/h	4	100	3	8	81	10	7	0	24	82	5	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	109	3	9	88	11	8	0	26	89	5	46

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	88	0	0	109	0	0	225	222	109	222	222	88
Stage 1	-	-	-	-	-	-	117	117	-	105	105	-
Stage 2	-	-	-	-	-	-	108	105	-	117	117	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1508	-	-	1481	-	-	730	677	945	734	677	970
Stage 1	-	-	-	-	-	-	888	799	-	901	808	-
Stage 2	-	-	-	-	-	-	897	808	-	888	799	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1508	-	-	1481	-	-	687	671	945	709	671	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	687	671	-	709	671	-
Stage 1	-	-	-	-	-	-	885	797	-	898	803	-
Stage 2	-	-	-	-	-	-	844	803	-	861	797	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.6	9.2	10.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	687	945	1508	-	-	1481	-	-	707	970
HCM Lane V/C Ratio	0.011	0.028	0.003	-	-	0.006	-	-	0.134	0.047
HCM Control Delay (s)	10.3	8.9	7.4	0	-	7.4	0	-	10.9	8.9
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	0.5	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.997			0.996			0.950			0.955	
Satd. Flow (prot)	0	1857	1583	0	1855	1583	0	1770	1583	0	1779	1583
Flt Permitted		0.997			0.996			0.950			0.955	
Satd. Flow (perm)	0	1857	1583	0	1855	1583	0	1770	1583	0	1779	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

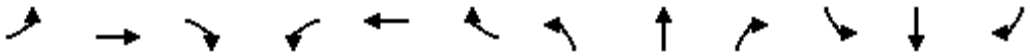
Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	6	118	3	10	111	16	8	0	27	94	6	51
Future Vol, veh/h	6	118	3	10	111	16	8	0	27	94	6	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	128	3	11	121	17	9	0	29	102	7	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	128	0	0	287	283	128	283	283	121
Stage 1	-	-	-	-	-	-	141	141	-	142	142	-
Stage 2	-	-	-	-	-	-	146	142	-	141	141	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1467	-	-	1458	-	-	665	626	922	669	626	930
Stage 1	-	-	-	-	-	-	862	780	-	861	779	-
Stage 2	-	-	-	-	-	-	857	779	-	862	780	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1467	-	-	1458	-	-	614	618	922	641	618	930
Mov Cap-2 Maneuver	-	-	-	-	-	-	614	618	-	641	618	-
Stage 1	-	-	-	-	-	-	858	776	-	857	773	-
Stage 2	-	-	-	-	-	-	793	773	-	830	776	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	9.4	10.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	614	922	1467	-	-	1458	-	-	640	930
HCM Lane V/C Ratio	0.014	0.032	0.004	-	-	0.007	-	-	0.17	0.06
HCM Control Delay (s)	10.9	9	7.5	0	-	7.5	0	-	11.8	9.1
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	0.6	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.998			0.997			0.950			0.953	
Satd. Flow (prot)	0	1859	1583	0	1857	1583	0	1770	1583	0	1775	1583
Flt Permitted		0.998			0.997			0.950			0.953	
Satd. Flow (perm)	0	1859	1583	0	1857	1583	0	1770	1583	0	1775	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

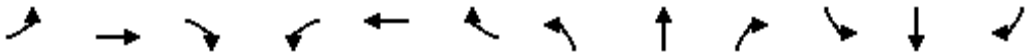
Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	6	132	3	10	137	436	8	0	27	281	6	51
Future Vol, veh/h	6	132	3	10	137	436	8	0	27	281	6	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	143	3	11	149	474	9	0	29	305	7	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	149	0	0	143	0	0	331	328	143	328	328	149
Stage 1	-	-	-	-	-	-	157	157	-	171	171	-
Stage 2	-	-	-	-	-	-	174	171	-	157	157	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1432	-	-	1440	-	-	622	591	905	625	591	898
Stage 1	-	-	-	-	-	-	845	768	-	831	757	-
Stage 2	-	-	-	-	-	-	828	757	-	845	768	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1432	-	-	1440	-	-	571	580	905	596	580	898
Mov Cap-2 Maneuver	-	-	-	-	-	-	571	580	-	596	580	-
Stage 1	-	-	-	-	-	-	841	764	-	827	747	-
Stage 2	-	-	-	-	-	-	760	747	-	814	764	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	9.6	16.3
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	571	905	1432	-	-	1440	-	-	596	898
HCM Lane V/C Ratio	0.015	0.032	0.005	-	-	0.008	-	-	0.523	0.062
HCM Control Delay (s)	11.4	9.1	7.5	0	-	7.5	0	-	17.5	9.3
HCM Lane LOS	B	A	A	A	-	A	A	-	C	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	3	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.997			0.996			0.950			0.955	
Satd. Flow (prot)	0	1857	1583	0	1855	1583	0	1770	1583	0	1779	1583
Flt Permitted		0.997			0.996			0.950			0.955	
Satd. Flow (perm)	0	1857	1583	0	1855	1583	0	1770	1583	0	1779	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

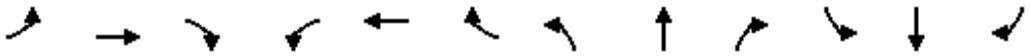
Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	138	4	12	150	25	10	0	29	108	6	62
Future Vol, veh/h	8	138	4	12	150	25	10	0	29	108	6	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	150	4	13	163	27	11	0	32	117	7	67

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	163	0	0	150	0	0	359	356	150	356	356	163
Stage 1	-	-	-	-	-	-	167	167	-	189	189	-
Stage 2	-	-	-	-	-	-	192	189	-	167	167	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1416	-	-	1431	-	-	596	570	896	599	570	882
Stage 1	-	-	-	-	-	-	835	760	-	813	744	-
Stage 2	-	-	-	-	-	-	810	744	-	835	760	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1416	-	-	1431	-	-	539	560	896	570	560	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	539	560	-	570	560	-
Stage 1	-	-	-	-	-	-	829	755	-	807	737	-
Stage 2	-	-	-	-	-	-	734	737	-	800	755	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	9.9	11.8
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	539	896	1416	-	-	1431	-	-	569	882
HCM Lane V/C Ratio	0.02	0.035	0.006	-	-	0.009	-	-	0.218	0.076
HCM Control Delay (s)	11.8	9.2	7.6	0	-	7.5	0	-	13.1	9.4
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0.1	0.1	0	-	-	0	-	-	0.8	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	0		150
Storage Lanes	0		1	0		1	0		1	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.998			0.997			0.950			0.953	
Satd. Flow (prot)	0	1859	1583	0	1857	1583	0	1770	1583	0	1775	1583
Flt Permitted		0.998			0.997			0.950			0.953	
Satd. Flow (perm)	0	1859	1583	0	1857	1583	0	1770	1583	0	1775	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	25.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	166	4	12	202	865	10	0	29	482	6	62
Future Vol, veh/h	8	166	4	12	202	865	10	0	29	482	6	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	180	4	13	220	940	11	0	32	524	7	67

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	220	0	0	180	0	0	447	444	180	444	444	220
Stage 1	-	-	-	-	-	-	198	198	-	246	246	-
Stage 2	-	-	-	-	-	-	249	246	-	198	198	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1349	-	-	1396	-	-	522	508	863	524	508	820
Stage 1	-	-	-	-	-	-	804	737	-	758	703	-
Stage 2	-	-	-	-	-	-	755	703	-	804	737	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1396	-	-	458	486	863	~ 488	486	820
Mov Cap-2 Maneuver	-	-	-	-	-	-	458	486	-	~ 488	486	-
Stage 1	-	-	-	-	-	-	798	732	-	753	677	-
Stage 2	-	-	-	-	-	-	661	677	-	769	732	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	10.3	85.5
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	458	863	1349	-	-	1396	-	-	488	820
HCM Lane V/C Ratio	0.024	0.037	0.006	-	-	0.009	-	-	1.087	0.082
HCM Control Delay (s)	13.1	9.3	7.7	0	-	7.6	0	-	95.1	9.8
HCM Lane LOS	B	A	A	A	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0.1	0.1	0	-	-	0	-	-	17	0.3

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												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		150	0		150	0		150	150		150
Storage Lanes	0		1	0		1	0		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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.998			0.997			0.950		0.950		
Satd. Flow (prot)	0	1859	1583	0	1857	1583	0	1770	1583	1770	1863	1583
Flt Permitted		0.998			0.997			0.950		0.950		
Satd. Flow (perm)	0	1859	1583	0	1857	1583	0	1770	1583	1770	1863	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		1446			798			177			213	
Travel Time (s)		17.9			9.9			4.0			4.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	24.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	166	4	12	202	865	10	0	29	482	6	62
Future Vol, veh/h	8	166	4	12	202	865	10	0	29	482	6	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	150	-	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	180	4	13	220	940	11	0	32	524	7	67

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	220	0	0	180	0	0	447	444	180	444	444	220
Stage 1	-	-	-	-	-	-	198	198	-	246	246	-
Stage 2	-	-	-	-	-	-	249	246	-	198	198	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1349	-	-	1396	-	-	522	508	863	524	508	820
Stage 1	-	-	-	-	-	-	804	737	-	758	703	-
Stage 2	-	-	-	-	-	-	755	703	-	804	737	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1396	-	-	458	486	863	~ 488	486	820
Mov Cap-2 Maneuver	-	-	-	-	-	-	458	486	-	~ 488	486	-
Stage 1	-	-	-	-	-	-	798	732	-	753	677	-
Stage 2	-	-	-	-	-	-	661	677	-	769	732	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	10.3	80.9
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	458	863	1349	-	-	1396	-	-	488	486	820
HCM Lane V/C Ratio	0.024	0.037	0.006	-	-	0.009	-	-	1.074	0.013	0.082
HCM Control Delay (s)	13.1	9.3	7.7	0	-	7.6	0	-	90.9	12.5	9.8
HCM Lane LOS	B	A	A	A	-	A	A	-	F	B	A
HCM 95th %tile Q(veh)	0.1	0.1	0	-	-	0	-	-	16.4	0	0.3

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: SR 99 Southbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

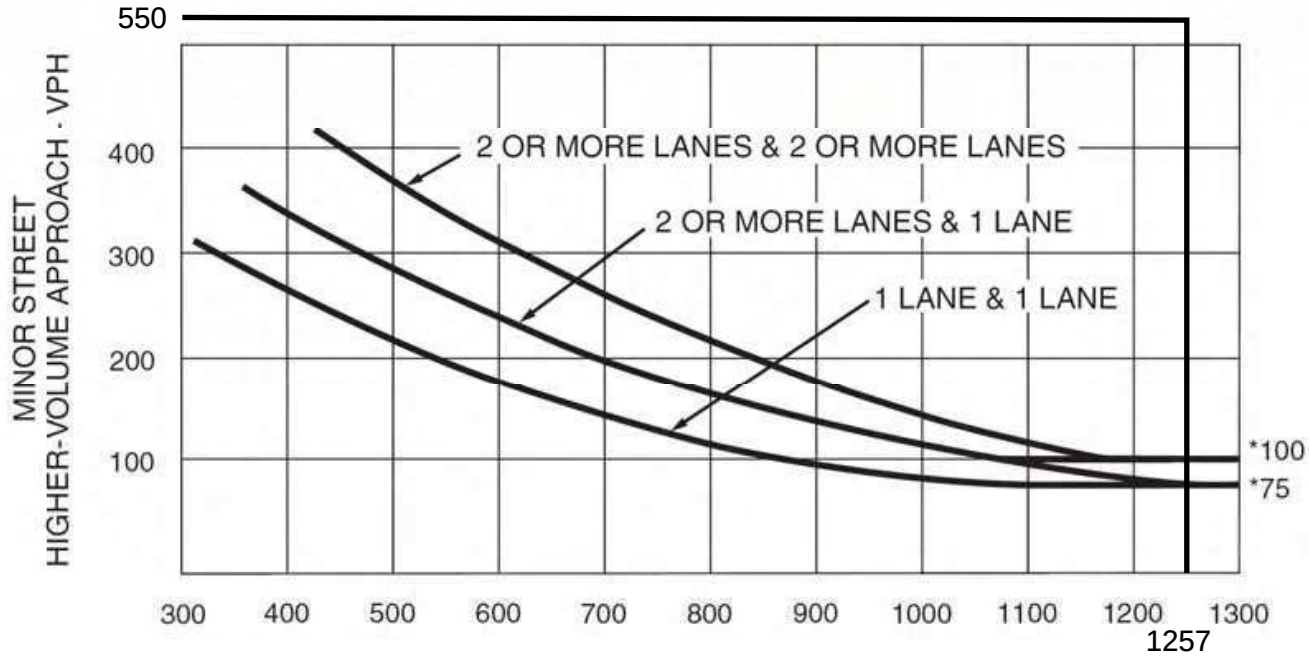
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 12570 ..... 2 or More..... 5500	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 12570 ..... 2 or More..... 5500	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: SR99 Northbound & Houghton Road - AM Peak

Count Date: 1/8/2015

Ave Annual Growth: **1.95%**

Exist Peak Hour Volumes

U			
>	WBL	47	
1	WBT	39	
0	WBR	0	
0	EBL	0	
1	EBT	161	
<	EBR	69	Uncontrolled
>	NBL	3	
1	NBT	0	
<	NBR	8	
0	SBL	0	
0	SBT	0	
0	SBR	0	
	TOTAL	327	

Year 2035

Fut. Volumes w/o Proj

WBL	96
WBT	63
WBR	0
EBL	0
EBT	212
EBR	144
NBL	5
NBT	0
NBR	10
SBL	0
SBT	0
SBR	0
TOTAL	530

Year 2035 Fut. Vol

+ Project Traffic

WBL	293
WBT	244
WBR	0
EBL	0
EBT	1042
EBR	144
NBL	5
NBT	0
NBR	569
SBL	0
SBT	0
SBR	0
TOTAL	2297

Year 2025

Fut. Volumes w/o Proj

WBL	68
WBT	50
WBR	0
EBL	0
EBT	185
EBR	101
NBL	4
NBT	0
NBR	9
SBL	0
SBT	0
SBR	0
TOTAL	417

Year 2025 Fut. Vol

+ Project Traffic

WBL	167
WBT	141
WBR	0
EBL	0
EBT	600
EBR	101
NBL	4
NBT	0
NBR	289
SBL	0
SBT	0
SBR	0
TOTAL	1302

Project Generated Trips - Year 2035

	Total
WBL	197
WBT	181
WBR	0
EBL	0
EBT	830
EBR	0
NBL	0
NBT	0
NBR	559
SBL	0
SBT	0
SBR	0
TOTAL	1767

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	SR99 Northbound & Houghton Road - AM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	2.421							
WB Approach (Away)	2.174							
EB Approach (To)	2.44							
EB Approach (Away)	0.225							
NB Approach (To)	2.529							
NB Approach (Away)	0.066							
SB Approach (To)	*1*							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	3.283		WBL	3.41	WBT	2.10	WBR	1.28
WB Approach (Away)	3.263		3.54%	96	2.36%	63	0.84%	0
EB Approach (To)	3.529		EBL	1.32	EBT	1.47	EBR	3.46
EB Approach (Away)	0.641		0.96%	0	1.34%	212	3.66%	144
NB Approach (To)	3.268		NBL	2.07	NBT	1.25	NBR	1.40
NB Approach (Away)	0.361		2.28%	5	0.76%	0	1.15%	10
SB Approach (To)	*1.2*		SBL	1.35	SBT	3.33	SBR	2.02
SB Approach (Away)	*1.2*		1.02%	0	3.33%	0	2.15%	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.973	0.950	
Satd. Flow (prot)	1863	1583	0	1812	1770	1583
Flt Permitted				0.973	0.950	
Satd. Flow (perm)	1863	1583	0	1812	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			591	445	
Travel Time (s)	9.9			7.3	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	161	69	47	39	3	8
Future Vol, veh/h	161	69	47	39	3	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	175	75	51	42	3	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	175	0	320	175
Stage 1	-	-	-	-	175	-
Stage 2	-	-	-	-	145	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1401	-	673	868
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1401	-	648	868
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	849	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	648	868	-	-	1401	-
HCM Lane V/C Ratio	0.005	0.01	-	-	0.036	-
HCM Control Delay (s)	10.6	9.2	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.972	0.950	
Satd. Flow (prot)	1863	1583	0	1811	1770	1583
Flt Permitted				0.972	0.950	
Satd. Flow (perm)	1863	1583	0	1811	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			591	445	
Travel Time (s)	9.9			7.3	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	185	101	68	50	4	9
Future Vol, veh/h	185	101	68	50	4	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	201	110	74	54	4	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	201	0	403	201
Stage 1	-	-	-	-	201	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1371	-	603	840
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	832	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1371	-	569	840
Mov Cap-2 Maneuver	-	-	-	-	569	-
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	785	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	569	840	-	-	1371	-
HCM Lane V/C Ratio	0.008	0.012	-	-	0.054	-
HCM Control Delay (s)	11.4	9.3	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0.2	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	600	101	167	141	4	289
Future Volume (vph)	600	101	167	141	4	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected				0.974	0.950	
Satd. Flow (prot)	1863	1583	0	1814	1770	1583
Flt Permitted				0.974	0.950	
Satd. Flow (perm)	1863	1583	0	1814	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			319	445	
Travel Time (s)	9.9			4.0	10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	652	110	182	153	4	314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	652	110	0	335	4	314
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	7.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	600	101	167	141	4	289
Future Vol, veh/h	600	101	167	141	4	289
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	652	110	182	153	4	314

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	652	0	1168	652
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	516	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	935	-	214	468
Stage 1	-	-	-	-	518	-
Stage 2	-	-	-	-	599	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	935	-	168	468
Mov Cap-2 Maneuver	-	-	-	-	168	-
Stage 1	-	-	-	-	518	-
Stage 2	-	-	-	-	471	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	27
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	168	468	-	-	935	-
HCM Lane V/C Ratio	0.026	0.671	-	-	0.194	-
HCM Control Delay (s)	27	27	-	-	9.8	0
HCM Lane LOS	D	D	-	-	A	A
HCM 95th %tile Q(veh)	0.1	4.9	-	-	0.7	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.971	0.950	
Satd. Flow (prot)	1863	1583	0	1809	1770	1583
Flt Permitted				0.971	0.950	
Satd. Flow (perm)	1863	1583	0	1809	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			591	445	
Travel Time (s)	9.9			7.3	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	212	144	96	63	5	10
Future Vol, veh/h	212	144	96	63	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	230	157	104	68	5	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	230	0	507	230
Stage 1	-	-	-	-	230	-
Stage 2	-	-	-	-	277	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1338	-	525	809
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1338	-	482	809
Mov Cap-2 Maneuver	-	-	-	-	482	-
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	708	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	482	809	-	-	1338	-
HCM Lane V/C Ratio	0.011	0.013	-	-	0.078	-
HCM Control Delay (s)	12.6	9.5	-	-	7.9	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0.3	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1042	144	293	244	5	569
Future Volume (vph)	1042	144	293	244	5	569
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected				0.973	0.950	
Satd. Flow (prot)	1863	1583	0	1812	1770	1583
Flt Permitted				0.973	0.950	
Satd. Flow (perm)	1863	1583	0	1812	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			290	445	
Travel Time (s)	9.9			3.6	10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1133	157	318	265	5	618
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1133	157	0	583	5	618
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	180.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	1042	144	293	244	5	569
Future Vol, veh/h	1042	144	293	244	5	569
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1133	157	318	265	5	618

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1133	0	2035	1133
Stage 1	-	-	-	-	1133	-
Stage 2	-	-	-	-	902	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	617	-	63	~ 247
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	396	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	617	-	25	~ 247
Mov Cap-2 Maneuver	-	-	-	-	25	-
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	157	-

Approach	EB	WB	NB
HCM Control Delay, s	0	9.2	$ 715.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	25	247	-	-	617	-
HCM Lane V/C Ratio	0.217	2.504	-	-	0.516	-
HCM Control Delay (s)	185.3	$ 719.8	-	-	16.9	0
HCM Lane LOS	F	F	-	-	C	A
HCM 95th %tile Q(veh)	0.7	51	-	-	3	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: SR 99 Northhbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

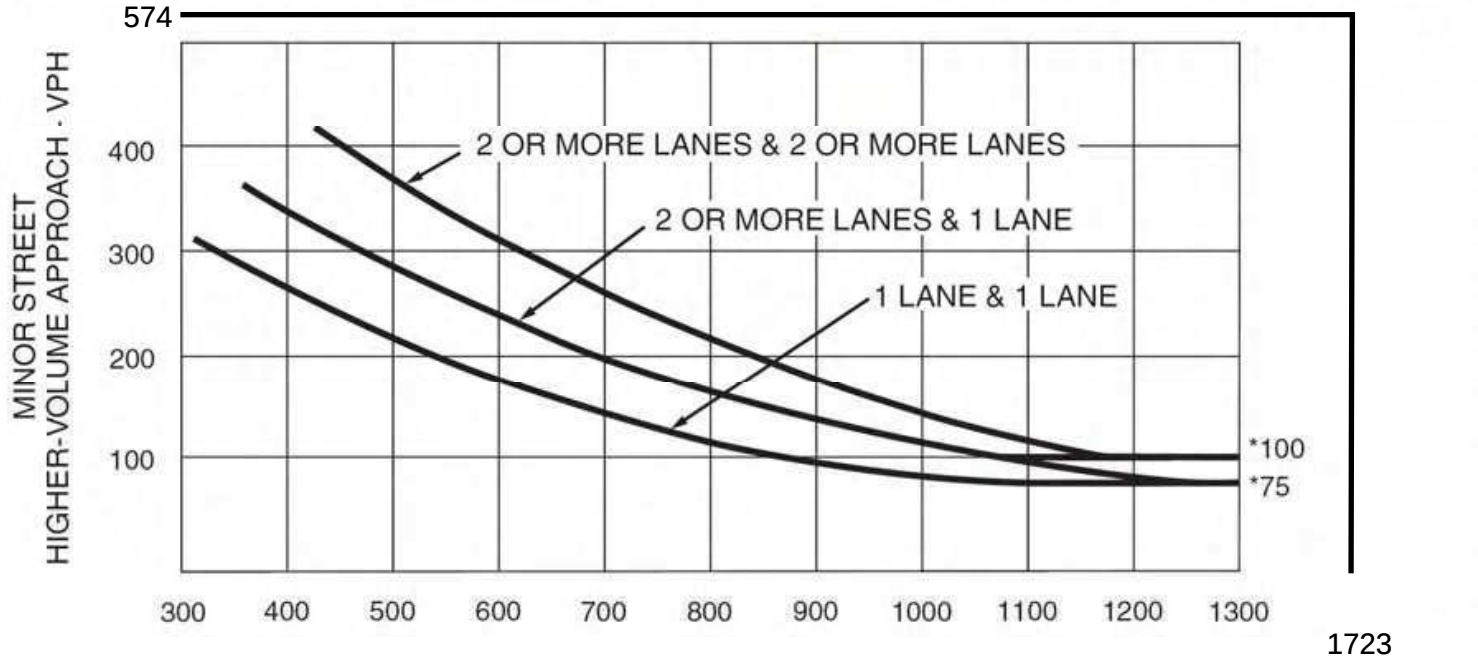
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 20676 ..... 2 or More..... 6888	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 20676 ..... 2 or More..... 6888	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1042	144	293	244	5	569
Future Volume (veh/h)	1042	144	293	244	5	569
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1133	157	318	265	5	618
Adj No. of Lanes	2	1	1	2	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1242	556	358	2237	372	1146
Arrive On Green	0.35	0.35	0.20	0.63	0.21	0.21
Sat Flow, veh/h	3632	1583	1774	3632	1774	2787
Grp Volume(v), veh/h	1133	157	318	265	5	618
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1393
Q Serve(g_s), s	23.1	5.4	13.2	2.3	0.2	12.7
Cycle Q Clear(g_c), s	23.1	5.4	13.2	2.3	0.2	12.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1242	556	358	2237	372	1146
V/C Ratio(X)	0.91	0.28	0.89	0.12	0.01	0.54
Avail Cap(c_a), veh/h	1263	565	375	2292	446	1262
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	23.4	17.7	29.4	5.5	23.7	16.9
Incr Delay (d2), s/veh	10.1	0.3	21.4	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	2.4	8.6	1.1	0.1	4.9
LnGrp Delay(d),s/veh	33.5	18.0	50.8	5.6	23.7	17.3
LnGrp LOS	C	B	D	A	C	B
Approach Vol, veh/h	1290			583	623	
Approach Delay, s/veh	31.6			30.2	17.3	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		21.8	21.3	32.6				53.8
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		19.0	16.0	27.0				49.0
Max Q Clear Time (g_c+I1), s		14.7	15.2	25.1				4.3
Green Ext Time (p_c), s		1.1	0.1	1.4				12.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: SR99 Northbound & Houghton Road - PM Peak

Count Date: 1/8/2015

Ave Annual Growth: **1.95%**

Exist Peak Hour Volumes

U			
>	WBL	78	
1	WBT	85	
0	WBR	0	
0	EBL	0	
1	EBT	137	
<	EBR	75	Uncontrolled
>	NBL	18	
1	NBT	0	
<	NBR	15	
0	SBL	0	
0	SBT	0	
0	SBR	0	
	TOTAL	408	

Year 2035
Fut. Volumes w/o Proj

WBL	95
WBT	137
WBR	0
EBL	0
EBT	180
EBR	94
NBL	48
NBT	0
NBR	32
SBL	0
SBT	0
SBR	0
TOTAL	586

Year 2035 Fut. Vol
+ Project Traffic

WBL	1364
WBT	1029
WBR	0
EBL	0
EBT	581
EBR	94
NBL	48
NBT	0
NBR	416
SBL	0
SBT	0
SBR	0
TOTAL	3532

Year 2025
Fut. Volumes w/o Proj

WBL	86
WBT	109
WBR	0
EBL	0
EBT	158
EBR	84
NBL	30
NBT	0
NBR	22
SBL	0
SBT	0
SBR	0
TOTAL	489

Year 2025 Fut. Vol
+ Project Traffic

WBL	721
WBT	555
WBR	0
EBL	0
EBT	359
EBR	84
NBL	30
NBT	0
NBR	214
SBL	0
SBT	0
SBR	0
TOTAL	1963

Project Generated Trips - Year 2035

	Total
WBL	1269
WBT	892
WBR	0
EBL	0
EBT	401
EBR	0
NBL	0
NBT	0
NBR	384
SBL	0
SBT	0
SBR	0
TOTAL	2946

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	SR99 Northbound & Houghton Road - PM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	2.421							
WB Approach (Away)	2.174							
EB Approach (To)	2.44							
EB Approach (Away)	0.225							
NB Approach (To)	0.066							
NB Approach (Away)	2.529							
SB Approach (To)	*1*							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	3.283		WBL	1.32	WBT	2.10	WBR	1.28
WB Approach (Away)	3.263		0.97%	95	2.36%	137	0.84%	0
EB Approach (To)	3.529		EBL	1.32	EBT	1.47	EBR	1.37
EB Approach (Away)	0.641		0.96%	0	1.34%	180	1.08%	94
NB Approach (To)	0.361		NBL	4.16	NBT	3.33	NBR	3.49
NB Approach (Away)	3.268		4.85%	48	3.33%	0	3.72%	32
SB Approach (To)	*1.2*		SBL	1.35	SBT	1.25	SBR	2.02
SB Approach (Away)	*1.2*		1.02%	0	0.76%	0	2.15%	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.977	0.950	
Satd. Flow (prot)	1863	1583	0	1820	1770	1583
Flt Permitted				0.977	0.950	
Satd. Flow (perm)	1863	1583	0	1820	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			591	445	
Travel Time (s)	9.9			7.3	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	137	75	78	85	18	15
Future Vol, veh/h	137	75	78	85	18	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	149	82	85	92	20	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	149	0	411	149
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1432	-	597	898
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1432	-	559	898
Mov Cap-2 Maneuver	-	-	-	-	559	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	733	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	559	898	-	-	1432	-
HCM Lane V/C Ratio	0.035	0.018	-	-	0.059	-
HCM Control Delay (s)	11.7	9.1	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.2	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.978	0.950	
Satd. Flow (prot)	1863	1583	0	1822	1770	1583
Flt Permitted				0.978	0.950	
Satd. Flow (perm)	1863	1583	0	1822	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			591	445	
Travel Time (s)	9.9			7.3	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	158	84	86	109	30	22
Future Vol, veh/h	158	84	86	109	30	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	91	93	118	33	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	172	0	477	172
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	305	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1405	-	547	872
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1405	-	508	872
Mov Cap-2 Maneuver	-	-	-	-	508	-
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	508	872	-	-	1405	-
HCM Lane V/C Ratio	0.064	0.027	-	-	0.067	-
HCM Control Delay (s)	12.6	9.2	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.2	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.973	0.950	
Satd. Flow (prot)	1863	1583	0	1812	1770	1583
Flt Permitted				0.973	0.950	
Satd. Flow (perm)	1863	1583	0	1812	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			310	445	
Travel Time (s)	9.9			3.8	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	12.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	359	84	721	555	30	214
Future Vol, veh/h	359	84	721	555	30	214
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	91	784	603	33	233

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	390	0	2561	390
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	2171	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1169	-	~ 29	658
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	94	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1169	-	~ 29	658
Mov Cap-2 Maneuver	-	-	-	-	~ 29	-
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	94	-

Approach	EB	WB	NB
HCM Control Delay, s	0	8	62.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	29	658	-	-	1169	-
HCM Lane V/C Ratio	1.124	0.354	-	-	0.67	-
HCM Control Delay (s)	$ 409.3	13.4	-	-	14.1	0
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	3.7	1.6	-	-	5.5	-

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.980	0.950	
Satd. Flow (prot)	1863	1583	0	1825	1770	1583
Flt Permitted				0.980	0.950	
Satd. Flow (perm)	1863	1583	0	1825	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			591	445	
Travel Time (s)	9.9			7.3	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	180	94	95	137	48	32
Future Vol, veh/h	180	94	95	137	48	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	196	102	103	149	52	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	196	0	551	196
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	355	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1377	-	495	845
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	710	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1377	-	454	845
Mov Cap-2 Maneuver	-	-	-	-	454	-
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	652	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.2	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	454	845	-	-	1377	-
HCM Lane V/C Ratio	0.115	0.041	-	-	0.075	-
HCM Control Delay (s)	14	9.4	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.2	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	0
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.972	0.950	
Satd. Flow (prot)	1863	1583	0	1811	1770	1583
Flt Permitted				0.972	0.950	
Satd. Flow (perm)	1863	1583	0	1811	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	798			310	445	
Travel Time (s)	9.9			3.8	10.1	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	516.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	581	94	1364	1029	48	416
Future Vol, veh/h	581	94	1364	1029	48	416
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	632	102	1483	1118	52	452

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	632	0	4716	632
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	4084	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	~ 951	-	~ 1	480
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	~ 9	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	~ 951	-	~ 1	480
Mov Cap-2 Maneuver	-	-	-	-	~ 1	-
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	~ 9	-

Approach	EB	WB	NB
HCM Control Delay, s	0	154.2	$ 3139.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	1	480	-	-	~ 951	-
HCM Lane V/C Ratio	52.174	0.942	-	-	1.559	-
HCM Control Delay (s)	$ 29853.3	57.3	-	-	270.5	0
HCM Lane LOS	F	F	-	-	F	A
HCM 95th %tile Q(veh)	8.7	11.4	-	-	74	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: SR 99 Northhbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Minimum Requirements EADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,680
2 or More.....	1.....	9,600	6,720	2,400	1,680
2 or More..... 30680	2 or More..... 4640	9,600	6,720	3,200	2,240
1.....	2 or More.....	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or More.....	1.....	14,400	10,080	1,200	850
2 or More..... 30680	2 or More..... 4640	14,400	10,080	1,600	1,120
1.....	2 or More.....	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied X Not Satisfied _____

No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)

2 CONDITIONS 80%

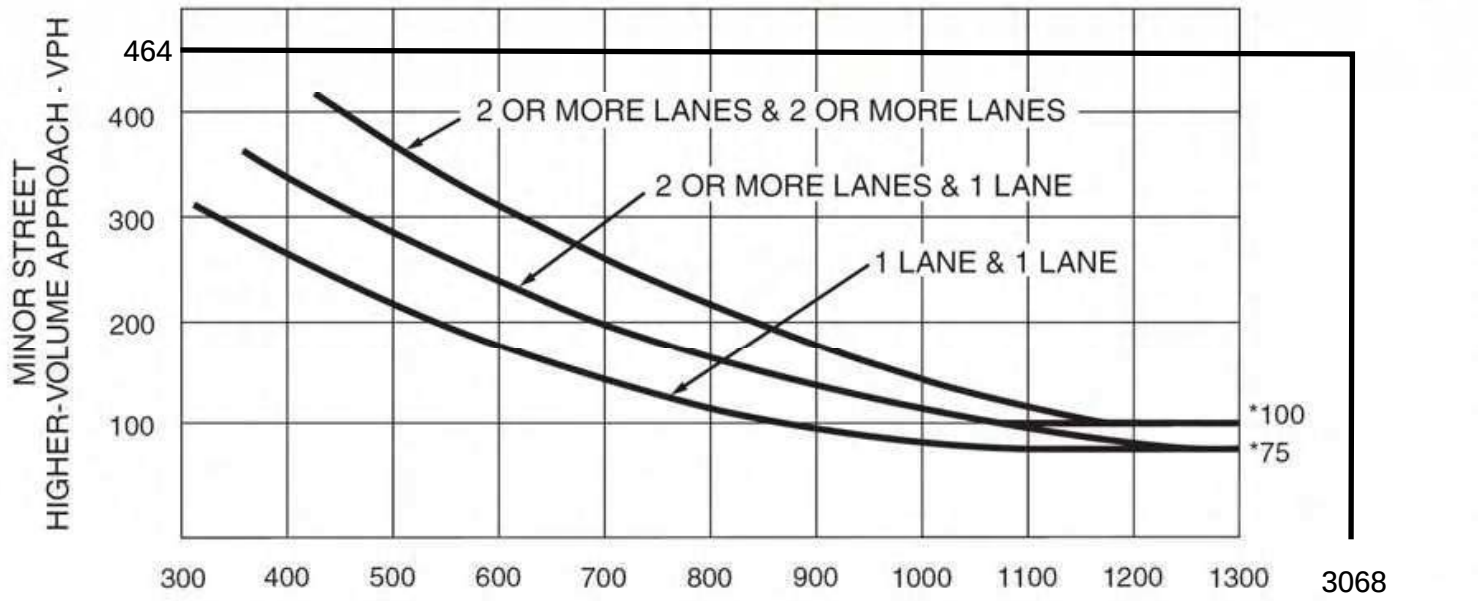
2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	581	94	1364	1029	48	416
Future Volume (veh/h)	581	94	1364	1029	48	416
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	632	102	1483	1118	52	452
Adj No. of Lanes	3	1	2	3	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	968	301	1428	3429	332	953
Arrive On Green	0.19	0.19	0.41	0.67	0.19	0.19
Sat Flow, veh/h	5253	1583	3442	5253	1774	1583
Grp Volume(v), veh/h	632	102	1483	1118	52	452
Grp Sat Flow(s),veh/h/ln	1695	1583	1721	1695	1774	1583
Q Serve(g_s), s	10.0	4.8	36.0	8.0	2.1	13.8
Cycle Q Clear(g_c), s	10.0	4.8	36.0	8.0	2.1	13.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	968	301	1428	3429	332	953
V/C Ratio(X)	0.65	0.34	1.04	0.33	0.16	0.47
Avail Cap(c_a), veh/h	1055	328	1428	3516	368	985
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	32.5	30.4	25.4	5.9	29.5	9.6
Incr Delay (d2), s/veh	1.3	0.7	34.5	0.1	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	2.2	23.7	3.6	1.1	6.1
LnGrp Delay(d),s/veh	33.8	31.1	59.9	6.0	29.7	10.0
LnGrp LOS	C	C	F	A	C	A
Approach Vol, veh/h	734			2601	504	
Approach Delay, s/veh	33.4			36.7	12.0	
Approach LOS	C			D	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		22.3	42.0	22.5				64.5
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		18.0	36.0	18.0				60.0
Max Q Clear Time (g_c+I1), s		15.8	38.0	12.0				10.0
Green Ext Time (p_c), s		0.5	0.0	4.6				16.5

Intersection Summary	
HCM 2010 Ctrl Delay	32.8
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton & Entrance #7 - AM Peak
Count Date: 1/27/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	128
0	WBR	0
>	EBL	0
0	EBT	178
<	EBR	0
0	NBL	0
2	NBT	0
0	NBR	0
0	SBL	0
2	SBT	0
<	SBR	0
	TOTAL	306

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	249
WBR	0
EBL	0
EBT	359
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	608

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	570
WBR	18
EBL	0
EBT	2025
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	37
TOTAL	2650

Year 2025
Fut. Volumes w/o Proj

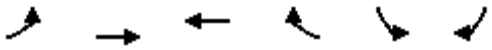
WBL	0
WBT	176
WBR	0
EBL	0
EBT	253
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	429

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	337
WBR	9
EBL	0
EBT	1086
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	19
TOTAL	1451

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	321
WBR	18
EBL	0
EBT	1666
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	37
TOTAL	2042



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			150	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected						
Satd. Flow (prot)	1863	1863	1863	1583	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		319	272		831	
Travel Time (s)		4.0	3.4		18.9	

Intersection Summary	
Area Type:	Other

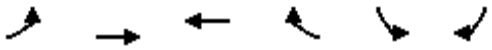
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	0	1086	337	9	0	19
Future Vol, veh/h	0	1086	337	9	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1180	366	10	0	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	366	0	-	0	1546	366
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	1180	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1193	-	-	-	126	679
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	292	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1193	-	-	-	126	679
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	292	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1193	-	-	-	679
HCM Lane V/C Ratio	-	-	-	-	0.03
HCM Control Delay (s)	0	-	-	-	10.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			100	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected						
Satd. Flow (prot)	1863	1863	1863	1583	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		290	301		704	
Travel Time (s)		3.6	3.7		16.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	0	2025	570	18	0	37
Future Vol, veh/h	0	2025	570	18	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	100	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2201	620	20	0	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	620	0	-	0	2821	620
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	2201	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	960	-	-	-	20	488
Stage 1	-	-	-	-	536	-
Stage 2	-	-	-	-	91	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	960	-	-	-	20	488
Mov Cap-2 Maneuver	-	-	-	-	20	-
Stage 1	-	-	-	-	536	-
Stage 2	-	-	-	-	91	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	960	-	-	-	488
HCM Lane V/C Ratio	-	-	-	-	0.082
HCM Control Delay (s)	0	-	-	-	13
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Project Entrance #7

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

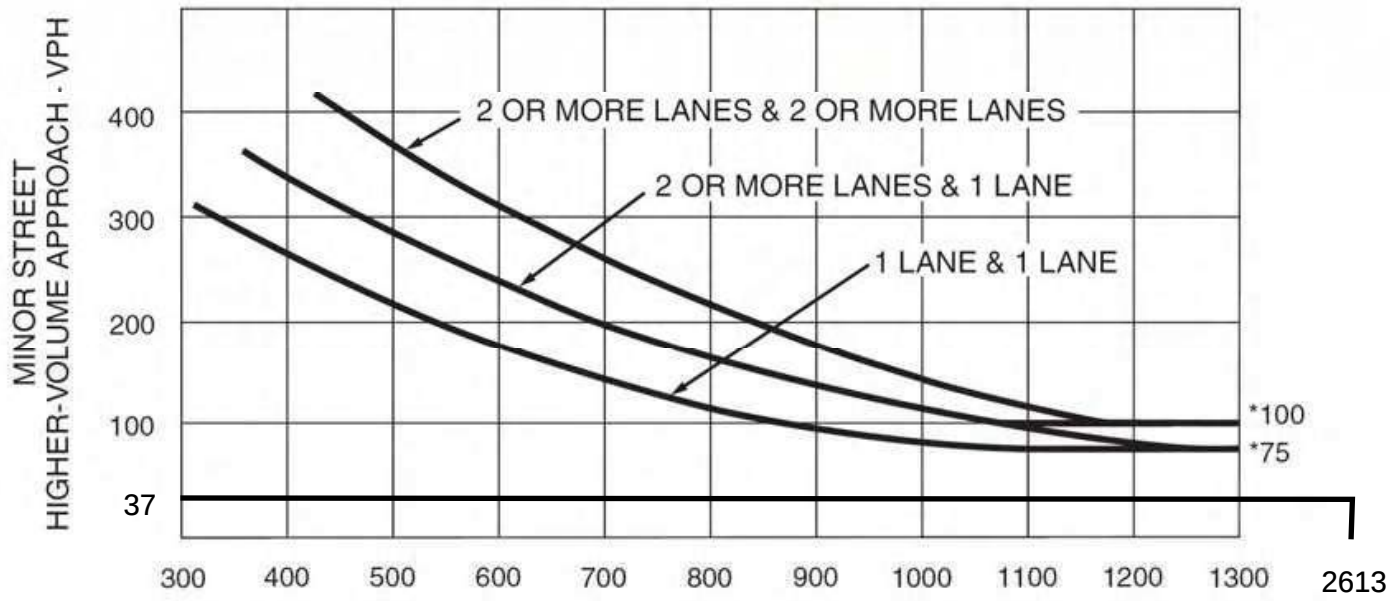
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied _____ Not Satisfied X		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street: 1 ..... / 2 or More ..... 31356 / 2 or More ..... / 1	Urban: 8,000 / 9,600 / 9,600 / 8,000 — Rural: 5,600 / 6,720 / 6,720 / 5,600	Urban: 2,400 / 2,400 / 3,200 / 3,200 — Rural: 1,680 / 1,680 / 2,240 / 2,240
Minor Street: 1 ..... / 1 ..... 444 / 2 or More ..... / 2 or More		
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied _____ Not Satisfied X		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street: 1 ..... / 2 or More ..... 31356 / 2 or More ..... / 1	Urban: 12,000 / 14,400 / 14,400 / 12,000 — Rural: 8,400 / 10,080 / 10,080 / 8,400	Urban: 1,200 / 1,200 / 1,600 / 1,600 — Rural: 850 / 850 / 1,120 / 1,120
Minor Street: 1 ..... / 1 ..... 444 / 2 or More ..... / 2 or More		
Combination of CONDITIONS A + B	2 CONDITIONS 80%	2 CONDITIONS 80%
Satisfied _____ Not Satisfied X		
No one condition satisfied, but following conditions fulfilled 80% or more..... 26% (A) 52% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton Road & Entrance #7 - PM Peak
Count Date: 1/27/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	161
0	WBR	0
>	EBL	0
0	EBT	169
<	EBR	0
0	NBL	0
2	NBT	0
0	NBR	0
0	SBL	0
2	SBT	0
<	SBR	0
	TOTAL	330

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	326
WBR	0
EBL	0
EBT	324
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	650

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	2327
WBR	5
EBL	0
EBT	1264
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	266
TOTAL	3862

Year 2025
Fut. Volumes w/o Proj

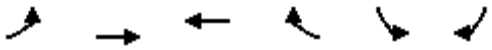
WBL	0
WBT	230
WBR	0
EBL	0
EBT	229
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	459

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	1231
WBR	3
EBL	0
EBT	699
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	133
TOTAL	2066

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	2001
WBR	5
EBL	0
EBT	940
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	266
TOTAL	3212



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			150	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected						
Satd. Flow (prot)	1863	1863	1863	1583	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		310	281		466	
Travel Time (s)		3.8	3.5		10.6	

Intersection Summary	
Area Type:	Other

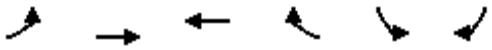
Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	0	699	1231	3	0	133
Future Vol, veh/h	0	699	1231	3	0	133
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	760	1338	3	0	145

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1338	0	-	0	2098	1338
Stage 1	-	-	-	-	1338	-
Stage 2	-	-	-	-	760	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	515	-	-	-	57	187
Stage 1	-	-	-	-	245	-
Stage 2	-	-	-	-	462	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	515	-	-	-	57	187
Mov Cap-2 Maneuver	-	-	-	-	57	-
Stage 1	-	-	-	-	245	-
Stage 2	-	-	-	-	462	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	69.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	515	-	-	-	187
HCM Lane V/C Ratio	-	-	-	-	0.773
HCM Control Delay (s)	0	-	-	-	69.7
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	5.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	200			200	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected						
Satd. Flow (prot)	1863	1863	1863	1583	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		310	281		874	
Travel Time (s)		3.8	3.5		19.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	240.3

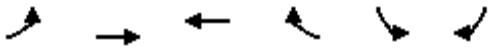
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	0	1264	2327	5	0	266
Future Vol, veh/h	0	1264	2327	5	0	266
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1374	2529	5	0	289

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2529	0	-	0	3903	2529
Stage 1	-	-	-	-	2529	-
Stage 2	-	-	-	-	1374	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	177	-	-	-	4	~ 35
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	235	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	177	-	-	-	4	~ 35
Mov Cap-2 Maneuver	-	-	-	-	4	-
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	235	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	$ 3488.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	177	-	-	-	35
HCM Lane V/C Ratio	-	-	-	-	8.261
HCM Control Delay (s)	0	-	-	-	$ 3488.4
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	34.9

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



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Volume (vph)	0	1264	2327	5	0	266
Future Volume (vph)	0	1264	2327	5	0	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			150	200	0
Storage Lanes	0			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.865
Flt Protected						
Satd. Flow (prot)	0	3539	3539	1583	0	1611
Flt Permitted						
Satd. Flow (perm)	0	3539	3539	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		310	281		874	
Travel Time (s)		3.8	3.5		19.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1374	2529	5	0	289
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1374	2529	5	0	289
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	30

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	0	1264	2327	5	0	266
Future Vol, veh/h	0	1264	2327	5	0	266
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1374	2529	5	0	289

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2529	0	-	0	3216	1265
Stage 1	-	-	-	-	2529	-
Stage 2	-	-	-	-	687	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	175	-	-	-	7	~ 160
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	461	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	175	-	-	-	7	~ 160
Mov Cap-2 Maneuver	-	-	-	-	7	-
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	$ 435.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	175	-	-	-	160
HCM Lane V/C Ratio	-	-	-	-	1.807
HCM Control Delay (s)	0	-	-	-	$ 435.5
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	21.2

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Project Entrance #7

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

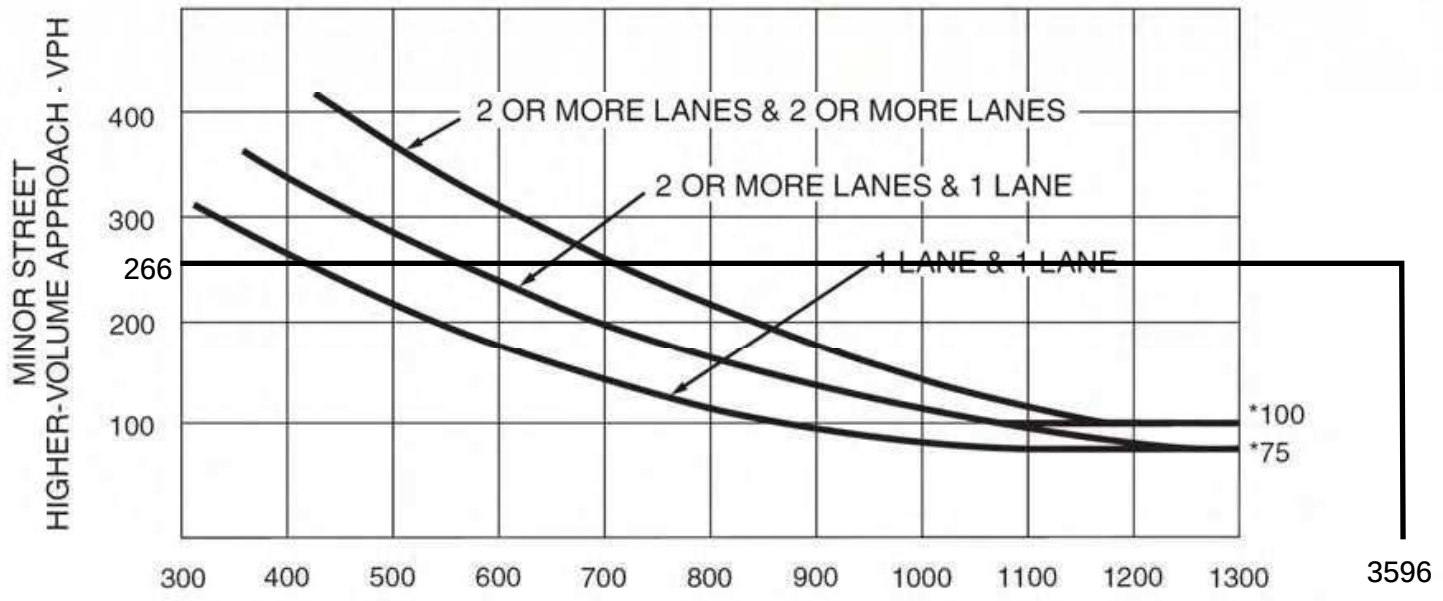
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More (35960) / 1 (2660)	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	12,000 / 8,400	1,200 / 850
2 or More (35960) / 1 (2660)	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B		
Satisfied X Not Satisfied _____	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton & Chevalier Entrance #6 - AM Peak
Count Date: 1/7/2015

Ave Annual Growth: **3.54%**

Exist Peak Hour Volumes

U		
>	WBL	1
1	WBT	122
<	WBR	0
>	EBL	0
1	EBT	176
<	EBR	2
>	NBL	6
1	NBT	0
<	NBR	1
>	SBL	0
1	SBT	0
<	SBR	0
	TOTAL	308

Year 2035
Fut. Volumes w/o Proj

WBL	2
WBT	249
WBR	0
EBL	0
EBT	359
EBR	4
NBL	12
NBT	0
NBR	2
SBL	0
SBT	0
SBR	0
TOTAL	628

Year 2035 Fut. Vol
+ Project Traffic

WBL	3
WBT	334
WBR	68
EBL	1316
EBT	706
EBR	4
NBL	18
NBT	23
NBR	7
SBL	11
SBT	4
SBR	248
TOTAL	2742

Year 2025
Fut. Volumes w/o Proj

WBL	1
WBT	176
WBR	0
EBL	0
EBT	253
EBR	3
NBL	9
NBT	0
NBR	1
SBL	0
SBT	0
SBR	0
TOTAL	443

Year 2025 Fut. Vol
+ Project Traffic

WBL	2
WBT	219
WBR	34
EBL	658
EBT	427
EBR	3
NBL	12
NBT	12
NBR	4
SBL	6
SBT	2
SBR	124
TOTAL	1503

Project Generated Trips - Year 2035

	Total
WBL	1
WBT	85
WBR	68
EBL	1316
EBT	347
EBR	0
NBL	6
NBT	23
NBR	5
SBL	11
SBT	4
SBR	248
TOTAL	2114



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		200	0
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.999					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1861	0	0	1863	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	1861	0	0	1863	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	591			2652	1275	
Travel Time (s)	7.3			32.9	29.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	176	2	1	122	6	1
Future Vol, veh/h	176	2	1	122	6	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	191	2	1	133	7	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	193	0	327	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	135	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1380	-	667	850
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	891	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1380	-	666	850
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	890	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	666	850	-	-	1380	-
HCM Lane V/C Ratio	0.01	0.001	-	-	0.001	-
HCM Control Delay (s)	10.5	9.2	-	-	7.6	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		200	0
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.999					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1861	0	0	1863	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	1861	0	0	1863	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	591			2652	4279	
Travel Time (s)	7.3			32.9	97.3	

Intersection Summary	
Area Type:	Other

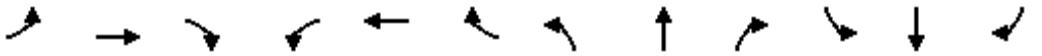
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	253	3	1	176	9	1
Future Vol, veh/h	253	3	1	176	9	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	275	3	1	191	10	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	278	0	470	277
Stage 1	-	-	-	-	277	-
Stage 2	-	-	-	-	193	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1285	-	552	762
Stage 1	-	-	-	-	770	-
Stage 2	-	-	-	-	840	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1285	-	551	762
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	770	-
Stage 2	-	-	-	-	839	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	551	762	-	-	1285	-
HCM Lane V/C Ratio	0.018	0.001	-	-	0.001	-
HCM Control Delay (s)	11.7	9.7	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	1		0	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.980				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1861	0	1770	1825	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1861	0	1770	1825	0	1770	1863	1583	1770	1863	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		272			979			4279			5295	
Travel Time (s)		3.4			12.1			97.3			120.3	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	15.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	658	427	3	2	219	34	12	12	4	6	2	124
Future Vol, veh/h	658	427	3	2	219	34	12	12	4	6	2	124
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	715	464	3	2	238	37	13	13	4	7	2	135

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	275	0	0	467	0	0	2158	2175	466	2164	2159	257
Stage 1	-	-	-	-	-	-	1896	1896	-	261	261	-
Stage 2	-	-	-	-	-	-	262	279	-	1903	1898	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1288	-	-	1094	-	-	34	46	597	34	48	782
Stage 1	-	-	-	-	-	-	90	118	-	744	692	-
Stage 2	-	-	-	-	-	-	743	680	-	89	117	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1288	-	-	1094	-	-	15	20	597	10	21	782
Mov Cap-2 Maneuver	-	-	-	-	-	-	15	20	-	10	21	-
Stage 1	-	-	-	-	-	-	40	52	-	331	691	-
Stage 2	-	-	-	-	-	-	612	679	-	29	52	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.8	0.1	$ 375.7	41.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	15	20	597	1288	-	-	1094	-	-	10	21	782
HCM Lane V/C Ratio	0.87	0.652	0.007	0.555	-	-	0.002	-	-	0.652	0.104	0.172
HCM Control Delay (s)	$ 523.5	$ 349.5	11.1	11.2	-	-	8.3	-	-	$ 621.1	195.3	10.6
HCM Lane LOS	F	F	B	B	-	-	A	-	-	F	F	B
HCM 95th %tile Q(veh)	2.1	1.8	0	3.6	-	-	0	-	-	1.4	0.3	0.6

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		200	0
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.999					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1861	0	0	1863	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	1861	0	0	1863	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	591			2652	4279	
Travel Time (s)	7.3			32.9	97.3	

Intersection Summary	
Area Type:	Other

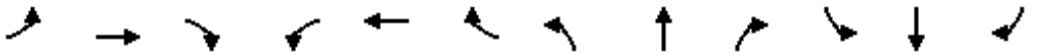
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	359	4	2	249	12	2
Future Vol, veh/h	359	4	2	249	12	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	4	2	271	13	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	395	0	667	392
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	275	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1164	-	424	657
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1164	-	423	657
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	769	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	423	657	-	-	1164	-
HCM Lane V/C Ratio	0.031	0.003	-	-	0.002	-
HCM Control Delay (s)	13.8	10.5	-	-	8.1	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	100		0	100		0	200		200	200		200
Storage Lanes	1		0	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.975				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1861	0	1770	1816	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1861	0	1770	1816	0	1770	1863	1583	1770	1863	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		301			919			4279			5300	
Travel Time (s)		3.7			11.4			97.3			120.5	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	69.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	1316	706	4	3	334	68	18	23	7	11	4	248
Future Vol, veh/h	1316	706	4	3	334	68	18	23	7	11	4	248
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	200	-	200	200	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1430	767	4	3	363	74	20	25	8	12	4	270

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	437	0	0	772	0	0	4039	4073	770	4050	4040	400
Stage 1	-	-	-	-	-	-	3630	3630	-	407	407	-
Stage 2	-	-	-	-	-	-	409	443	-	3643	3633	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	~ 1123	-	-	843	-	-	~ 1	~ 3	401	~ 1	~ 3	650
Stage 1	-	-	-	-	-	-	~ 8	~ 14	-	621	597	-
Stage 2	-	-	-	-	-	-	619	576	-	~ 8	14	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	~ 1123	-	-	843	-	-	-	~ 3	401	-	~ 3	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 3	-	-	~ 3	-
Stage 1	-	-	-	-	-	-	~ 8	~ 14	-	621	595	-
Stage 2	-	-	-	-	-	-	358	574	-	-	14	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	94.1	0.1		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	-	3	401	~ 1123	-	-	843	-	-	-	3	650
HCM Lane V/C Ratio	-	8.333	0.019	1.274	-	-	0.004	-	-	-	1.449	0.415
HCM Control Delay (s)		$ 5542.5	14.2	144.8	-	-	9.3	-	-		$ 2196.5	14.4
HCM Lane LOS	-	F	B	F	-	-	A	-	-	-	F	B
HCM 95th %tile Q(veh)	-	4.7	0.1	49.3	-	-	0	-	-	-	1.4	2

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Chevalier Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒ or ☐ **RURAL (R)**

In built up area of isolated community of < 10,000 population..... ☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Minimum Requirements EADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,680
2 or More.....	1.....	9,600	6,720	2,400	1,680
2 or More..... 29172	2 or More..... 3156	9,600	6,720	3,200	2,240
1.....	2 or More.....	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or More.....	1.....	14,400	10,080	1,200	850
2 or More..... 29172	2 or More..... 3156	14,400	10,080	1,600	1,120
1.....	2 or More.....	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied X Not Satisfied _____

No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)

2 CONDITIONS 80%

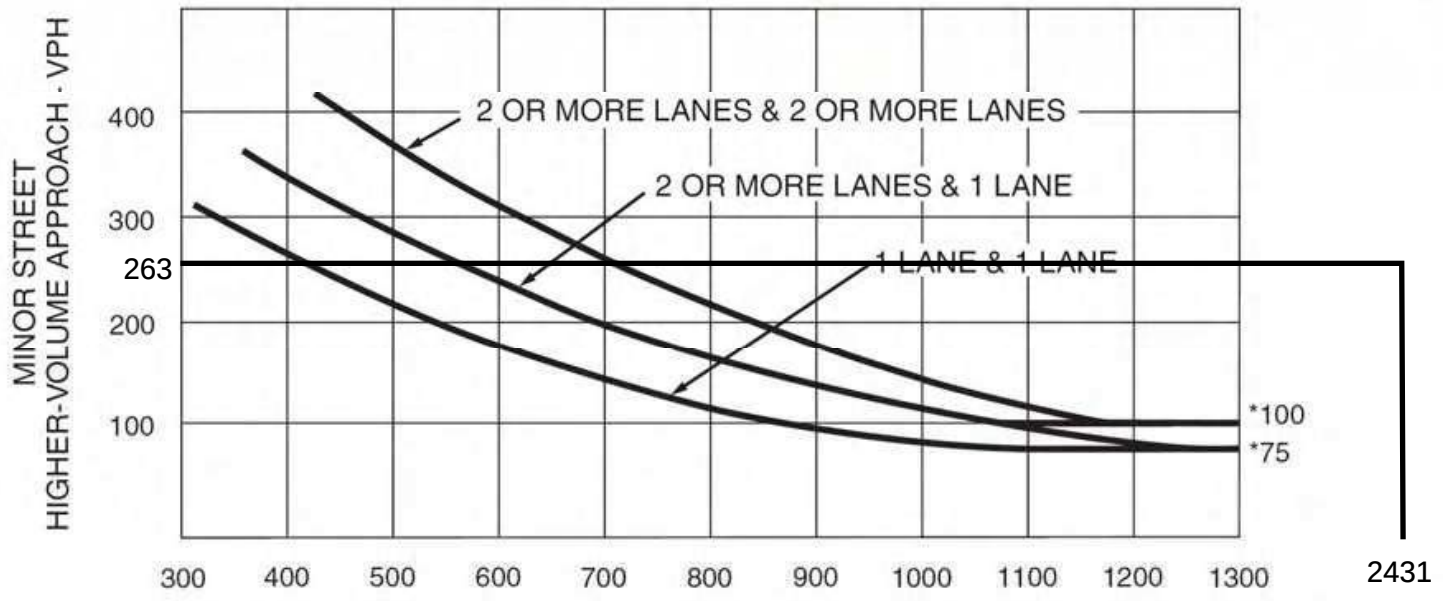
2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1316	706	4	3	334	68	18	23	7	11	4	248
Future Volume (veh/h)	1316	706	4	3	334	68	18	23	7	11	4	248
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	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1430	767	4	3	363	74	20	25	8	12	4	270
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	1470	2140	11	7	498	101	40	178	152	26	164	1436
Arrive On Green	0.43	0.59	0.59	0.00	0.17	0.17	0.02	0.10	0.10	0.01	0.09	0.09
Sat Flow, veh/h	3442	3610	19	1774	2936	592	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	1430	376	395	3	217	220	20	25	8	12	4	270
Grp Sat Flow(s),veh/h/ln	1721	1770	1859	1774	1770	1758	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	33.4	9.0	9.0	0.1	9.5	9.7	0.9	1.0	0.4	0.5	0.2	4.3
Cycle Q Clear(g_c), s	33.4	9.0	9.0	0.1	9.5	9.7	0.9	1.0	0.4	0.5	0.2	4.3
Prop In Lane	1.00		0.01	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1470	1049	1102	7	300	298	40	178	152	26	164	1436
V/C Ratio(X)	0.97	0.36	0.36	0.42	0.72	0.74	0.51	0.14	0.05	0.46	0.02	0.19
Avail Cap(c_a), veh/h	1470	1049	1102	108	389	386	108	409	348	108	409	1802
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	23.0	8.6	8.6	40.7	32.2	32.3	39.6	34.0	33.7	40.1	34.2	10.7
Incr Delay (d2), s/veh	17.4	0.2	0.2	34.8	4.7	5.2	9.6	0.4	0.1	12.4	0.1	0.1
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(50%),veh/ln	19.2	4.4	4.7	0.1	5.0	5.1	0.6	0.5	0.2	0.4	0.1	1.7
LnGrp Delay(d),s/veh	40.4	8.8	8.8	75.5	36.9	37.5	49.2	34.3	33.8	52.4	34.2	10.7
LnGrp LOS	D	A	A	E	D	D	D	C	C	D	C	B
Approach Vol, veh/h		2201			440			53			286	
Approach Delay, s/veh		29.3			37.5			39.9			12.8	
Approach LOS		C			D			D			B	

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	7.2	13.8	6.3	54.6	7.8	13.2	41.0	19.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	48.0	5.0	18.0	35.0	18.0
Max Q Clear Time (g_c+I1), s	2.5	3.0	2.1	11.0	2.9	6.3	35.4	11.7
Green Ext Time (p_c), s	0.0	1.1	0.0	7.3	0.0	1.0	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Houghton Rd. & Chevalier St. Entrance #6 - PM Peak

Count Date: 1/7/2015

Ave Annual Growth: **3.54%**

Exist Peak Hour Volumes

U		
>	WBL	1
1	WBT	160
<	WBR	0
>	EBL	2
1	EBT	159
<	EBR	8
>	NBL	1
1	NBT	0
<	NBR	1
>	SBL	0
1	SBT	0
<	SBR	3
	TOTAL	335

Year 2035
Fut. Volumes w/o Proj

WBL	2
WBT	326
WBR	0
EBL	4
EBT	324
EBR	16
NBL	2
NBT	0
NBR	2
SBL	0
SBT	0
SBR	6
TOTAL	682

Year 2035 Fut. Vol
+ Project Traffic

WBL	2
WBT	1276
WBR	16
EBL	600
EBT	631
EBR	16
NBL	6
NBT	12
NBR	7
SBL	178
SBT	16
SBR	1058
TOTAL	3818

Year 2025
Fut. Volumes w/o Proj

WBL	1
WBT	230
WBR	0
EBL	3
EBT	229
EBR	12
NBL	1
NBT	0
NBR	1
SBL	0
SBT	0
SBR	4
TOTAL	481

Year 2025 Fut. Vol
+ Project Traffic

WBL	1
WBT	705
WBR	8
EBL	301
EBT	383
EBR	12
NBL	3
NBT	6
NBR	4
SBL	89
SBT	8
SBR	530
TOTAL	2050

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	950
WBR	16
EBL	596
EBT	307
EBR	0
NBL	4
NBT	12
NBR	5
SBL	178
SBT	16
SBR	1052
TOTAL	3136



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		200	0
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1850	0	0	1863	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	1850	0	0	1863	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	591			2652	5323	
Travel Time (s)	7.3			32.9	121.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	159	8	1	160	1	1
Future Vol, veh/h	159	8	1	160	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	9	1	174	1	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	182	0	353	177
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	176	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1393	-	645	866
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1393	-	644	866
Mov Cap-2 Maneuver	-	-	-	-	644	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	854	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	644	866	-	-	1393	-
HCM Lane V/C Ratio	0.002	0.001	-	-	0.001	-
HCM Control Delay (s)	10.6	9.2	-	-	7.6	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		200	0
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1850	0	0	1863	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	1850	0	0	1863	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	591			2652	4279	
Travel Time (s)	7.3			32.9	97.3	

Intersection Summary	
Area Type:	Other

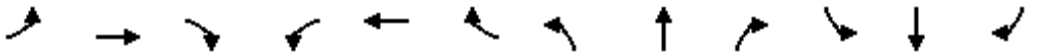
Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	229	12	1	230	1	1
Future Vol, veh/h	229	12	1	230	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	13	1	250	1	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	262	0	507	255
Stage 1	-	-	-	-	255	-
Stage 2	-	-	-	-	252	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1302	-	525	784
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1302	-	524	784
Mov Cap-2 Maneuver	-	-	-	-	524	-
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	789	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	524	784	-	-	1302	-
HCM Lane V/C Ratio	0.002	0.001	-	-	0.001	-
HCM Control Delay (s)	11.9	9.6	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	200		200	200		200	200		200
Storage Lanes	1		0	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.998				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1853	0	1770	1859	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1853	0	1770	1859	0	1770	1863	1583	1770	1863	1583
Link Speed (mph)		55			55			30			30	
Link Distance (ft)		281			919			4279			5308	
Travel Time (s)		3.5			11.4			97.3			120.6	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	108.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	301	383	12	1	705	8	3	6	4	89	8	530
Future Vol, veh/h	301	383	12	1	705	8	3	6	4	89	8	530
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	200	-	200	200	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	327	416	13	1	766	9	3	7	4	97	9	576

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	775	0	0	429	0	0	1854	1854	423	1853	1857	771
Stage 1	-	-	-	-	-	-	1077	1077	-	773	773	-
Stage 2	-	-	-	-	-	-	777	777	-	1080	1084	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	841	-	-	1130	-	-	57	74	631	~ 57	74	~ 400
Stage 1	-	-	-	-	-	-	265	295	-	392	409	-
Stage 2	-	-	-	-	-	-	390	407	-	264	293	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	841	-	-	1130	-	-	-	45	631	~ 35	45	~ 400
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	45	-	~ 35	45	-
Stage 1	-	-	-	-	-	-	162	180	-	240	409	-
Stage 2	-	-	-	-	-	-	-	407	-	154	179	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.2	0		$ 350.1
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	-	45	631	841	-	-	1130	-	-	35	45	400
HCM Lane V/C Ratio	-	0.145	0.007	0.389	-	-	0.001	-	-	2.764	0.193	1.44
HCM Control Delay (s)	-	98.1	10.7	12	-	-	8.2	-	-	$ 1039	103.2	238.1
HCM Lane LOS	-	F	B	B	-	-	A	-	-	F	F	F
HCM 95th %tile Q(veh)	-	0.5	0	1.9	-	-	0	-	-	11	0.6	29.4

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2025 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Chevalier Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More..... 14100	2 or More..... 6270 .....
1.....	2 or More.....

Minimum Requirements EADT			
Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
8,000	5,600	2,400	1,680
9,600	6,720	2,400	1,680
9,600	6,720	3,200	2,240
8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied X Not Satisfied _____

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More..... 14100	2 or More..... 6270 .....
1.....	2 or More.....

Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
12,000	8,400	1,200	850
14,400	10,080	1,200	850
14,400	10,080	1,600	1,120
12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied X Not Satisfied _____

No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)

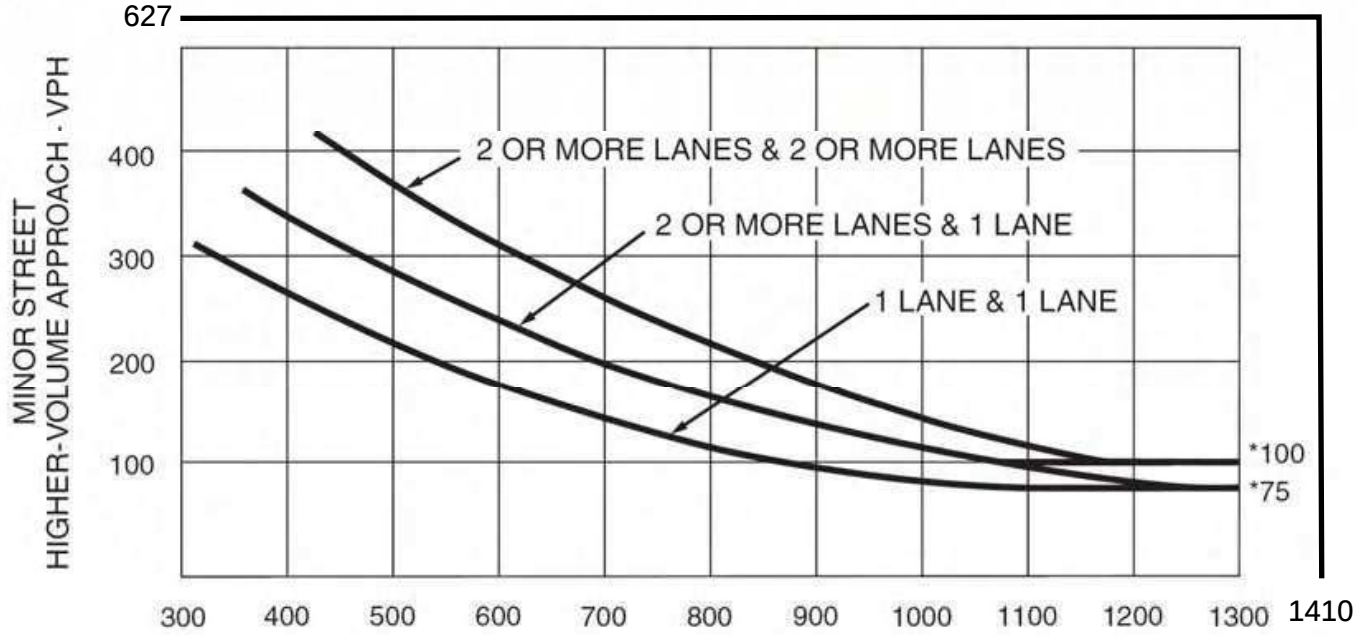
2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	301	383	12	1	705	8	3	6	4	89	8	530
Future Volume (veh/h)	301	383	12	1	705	8	3	6	4	89	8	530
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	1863
Adj Flow Rate, veh/h	327	416	13	1	766	9	3	7	4	97	9	576
Adj No. of Lanes	2	2	0	1	3	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	301	1134	35	3	1209	376	7	345	294	124	468	700
Arrive On Green	0.09	0.32	0.32	0.00	0.24	0.24	0.00	0.19	0.19	0.07	0.25	0.25
Sat Flow, veh/h	3442	3504	109	1774	5085	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	327	210	219	1	766	9	3	7	4	97	9	576
Grp Sat Flow(s),veh/h/ln	1721	1770	1843	1774	1695	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	5.0	5.2	5.2	0.0	7.7	0.2	0.1	0.2	0.1	3.1	0.2	11.2
Cycle Q Clear(g_c), s	5.0	5.2	5.2	0.0	7.7	0.2	0.1	0.2	0.1	3.1	0.2	11.2
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	301	573	597	3	1209	376	7	345	294	124	468	700
V/C Ratio(X)	1.09	0.37	0.37	0.32	0.63	0.02	0.42	0.02	0.01	0.78	0.02	0.82
Avail Cap(c_a), veh/h	301	573	597	155	1601	498	155	586	498	155	586	877
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	26.1	14.8	14.8	28.5	19.6	16.7	28.4	19.0	19.0	26.2	16.1	20.2
Incr Delay (d2), s/veh	77.0	0.4	0.4	51.1	0.6	0.0	33.9	0.0	0.0	18.3	0.0	5.2
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(50%),veh/ln	5.6	2.6	2.7	0.1	3.7	0.1	0.1	0.1	0.1	2.1	0.1	4.7
LnGrp Delay(d),s/veh	103.1	15.2	15.2	79.6	20.1	16.7	62.3	19.1	19.0	44.5	16.1	25.4
LnGrp LOS	F	B	B	E	C	B	E	B	B	D	B	C
Approach Vol, veh/h		756			776			14			682	
Approach Delay, s/veh		53.2			20.2			28.3			28.0	
Approach LOS		D			C			C			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	10.0	16.6	6.1	24.5	6.2	20.4	11.0	19.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	5.1	2.2	2.0	7.2	2.1	13.2	7.0	9.7
Green Ext Time (p_c), s	0.0	2.3	0.0	4.9	0.0	1.2	0.0	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		200	0
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.994					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1852	0	0	1863	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	1852	0	0	1863	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	591			2652	4279	
Travel Time (s)	7.3			32.9	97.3	

Intersection Summary	
Area Type:	Other

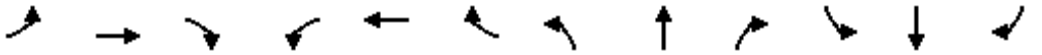
Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	324	16	2	326	2	2
Future Vol, veh/h	324	16	2	326	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	352	17	2	354	2	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	370	0	720	361
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	359	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1189	-	395	684
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1189	-	394	684
Mov Cap-2 Maneuver	-	-	-	-	394	-
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	706	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	394	684	-	-	1189	-
HCM Lane V/C Ratio	0.006	0.003	-	-	0.002	-
HCM Control Delay (s)	14.2	10.3	-	-	8	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	600	631	16	2	1276	16	6	12	7	178	16	1058
Future Volume (veh/h)	600	631	16	2	1276	16	6	12	7	178	16	1058
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	1863
Adj Flow Rate, veh/h	652	686	17	2	1387	17	7	13	8	193	17	1150
Adj No. of Lanes	2	2	0	1	3	1	1	1	1	1	1	2
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	2	2	2	2	2	2
Cap, veh/h	642	1595	40	5	1364	425	16	299	254	186	478	715
Arrive On Green	0.19	0.45	0.45	0.00	0.27	0.27	0.01	0.16	0.16	0.10	0.26	0.26
Sat Flow, veh/h	3442	3529	87	1774	5085	1583	1774	1863	1583	1774	1863	2787
Grp Volume(v), veh/h	652	344	359	2	1387	17	7	13	8	193	17	1150
Grp Sat Flow(s),veh/h/ln	1721	1770	1847	1774	1695	1583	1774	1863	1583	1774	1863	1393
Q Serve(g_s), s	16.0	11.3	11.3	0.1	23.0	0.7	0.3	0.5	0.4	9.0	0.6	22.0
Cycle Q Clear(g_c), s	16.0	11.3	11.3	0.1	23.0	0.7	0.3	0.5	0.4	9.0	0.6	22.0
Prop In Lane	1.00		0.05	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	642	800	835	5	1364	425	16	299	254	186	478	715
V/C Ratio(X)	1.02	0.43	0.43	0.42	1.02	0.04	0.44	0.04	0.03	1.04	0.04	1.61
Avail Cap(c_a), veh/h	642	800	835	103	1364	425	103	391	332	186	478	715
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	34.9	16.0	16.0	42.7	31.4	23.2	42.3	30.4	30.4	38.4	23.9	31.9
Incr Delay (d2), s/veh	39.5	0.4	0.4	48.5	28.7	0.0	18.0	0.1	0.0	75.9	0.0	280.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	5.6	5.9	0.1	14.2	0.3	0.2	0.3	0.2	8.3	0.3	36.3
LnGrp Delay(d),s/veh	74.3	16.3	16.3	91.2	60.1	23.3	60.3	30.5	30.4	114.4	24.0	312.4
LnGrp LOS	F	B	B	F	F	C	E	C	C	F	C	F
Approach Vol, veh/h		1355			1406			28			1360	
Approach Delay, s/veh		44.2			59.7			37.9			280.7	
Approach LOS		D			E			D			F	

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	15.0	19.8	6.2	44.8	6.8	28.0	22.0	29.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	18.0	5.0	34.0	5.0	22.0	16.0	23.0
Max Q Clear Time (g_c+I1), s	11.0	2.5	2.1	13.3	2.3	24.0	18.0	25.0
Green Ext Time (p_c), s	0.0	5.2	0.0	12.9	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	126.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	600	631	16	2	1276	16	6	12	7	178	16	1058
Future Volume (veh/h)	600	631	16	2	1276	16	6	12	7	178	16	1058
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	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	652	686	17	2	1387	17	7	13	8	193	17	1150
Adj No. of Lanes	2	3	1	1	3	1	1	1	1	2	1	2
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	2	2	2	2	2	2
Cap, veh/h	711	2474	770	5	1437	447	96	314	267	279	364	1121
Arrive On Green	0.21	0.49	0.49	0.00	0.28	0.28	0.05	0.17	0.17	0.08	0.20	0.20
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	1774	1863	1583	3442	1863	2787
Grp Volume(v), veh/h	652	686	17	2	1387	17	7	13	8	193	17	1150
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1774	1863	1583	1721	1863	1393
Q Serve(g_s), s	17.1	7.4	0.5	0.1	24.8	0.7	0.3	0.5	0.4	5.0	0.7	18.0
Cycle Q Clear(g_c), s	17.1	7.4	0.5	0.1	24.8	0.7	0.3	0.5	0.4	5.0	0.7	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	711	2474	770	5	1437	447	96	314	267	279	364	1121
V/C Ratio(X)	0.92	0.28	0.02	0.42	0.97	0.04	0.07	0.04	0.03	0.69	0.05	1.03
Avail Cap(c_a), veh/h	711	2474	770	96	1437	447	347	364	310	673	364	1121
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	35.7	14.0	12.3	45.8	32.6	23.9	41.3	32.0	31.9	41.1	30.0	27.5
Incr Delay (d2), s/veh	16.8	0.1	0.0	48.7	16.1	0.0	0.3	0.1	0.0	3.0	0.1	33.7
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(50%),veh/ln	9.7	3.4	0.2	0.1	13.7	0.3	0.2	0.3	0.2	2.5	0.4	19.4
LnGrp Delay(d),s/veh	52.6	14.1	12.3	94.5	48.7	24.0	41.6	32.1	32.0	44.2	30.1	61.2
LnGrp LOS	D	B	B	F	D	C	D	C	C	D	C	F
Approach Vol, veh/h		1355			1406			28			1360	
Approach Delay, s/veh		32.6			48.5			34.4			58.4	
Approach LOS		C			D			C			E	

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	13.5	21.5	6.2	50.8	11.0	24.0	25.0	32.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	18.0	18.0	5.0	40.0	18.0	18.0	19.0	26.0
Max Q Clear Time (g_c+I1), s	7.0	2.5	2.1	9.4	2.3	20.0	19.1	26.8
Green Ext Time (p_c), s	0.4	5.2	0.0	16.9	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

Notes

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton & Entrance #5 - AM Peak
Count Date: 1/27/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	123
0	WBR	0
>	EBL	0
0	EBT	177
<	EBR	0
0	NBL	0
2	NBT	0
0	NBR	0
0	SBL	0
2	SBT	0
<	SBR	0
	TOTAL	300

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	249
WBR	0
EBL	0
EBT	359
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	608

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	389
WBR	16
EBL	81
EBT	641
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	14
TOTAL	1141

Year 2025
Fut. Volumes w/o Proj

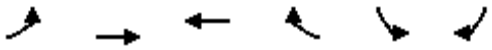
WBL	0
WBT	176
WBR	0
EBL	0
EBT	253
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	429

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	246
WBR	8
EBL	41
EBT	394
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	7
TOTAL	696

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	140
WBR	16
EBL	81
EBT	282
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	14
TOTAL	533



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			150	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1863	1583	0	1611
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		979	1673		739	
Travel Time (s)		12.1	20.7		16.8	

Intersection Summary	
Area Type:	Other

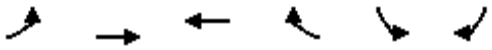
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	41	394	246	8	0	7
Future Vol, veh/h	41	394	246	8	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	428	267	9	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	267	0	-	0	784	267
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	517	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1297	-	-	-	362	772
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	598	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1297	-	-	-	349	772
Mov Cap-2 Maneuver	-	-	-	-	349	-
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	577	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1297	-	-	-	772
HCM Lane V/C Ratio	0.034	-	-	-	0.01
HCM Control Delay (s)	7.9	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			150	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1863	1583	0	1611
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		919	1733		645	
Travel Time (s)		11.4	21.5		14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	81	641	389	16	0	14
Future Vol, veh/h	81	641	389	16	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	697	423	17	0	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	423	0	-	0	1296	423
Stage 1	-	-	-	-	423	-
Stage 2	-	-	-	-	873	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1136	-	-	-	179	631
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	409	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1136	-	-	-	165	631
Mov Cap-2 Maneuver	-	-	-	-	165	-
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	377	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1136	-	-	-	631
HCM Lane V/C Ratio	0.078	-	-	-	0.024
HCM Control Delay (s)	8.4	-	-	-	10.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Project Entrance #5

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

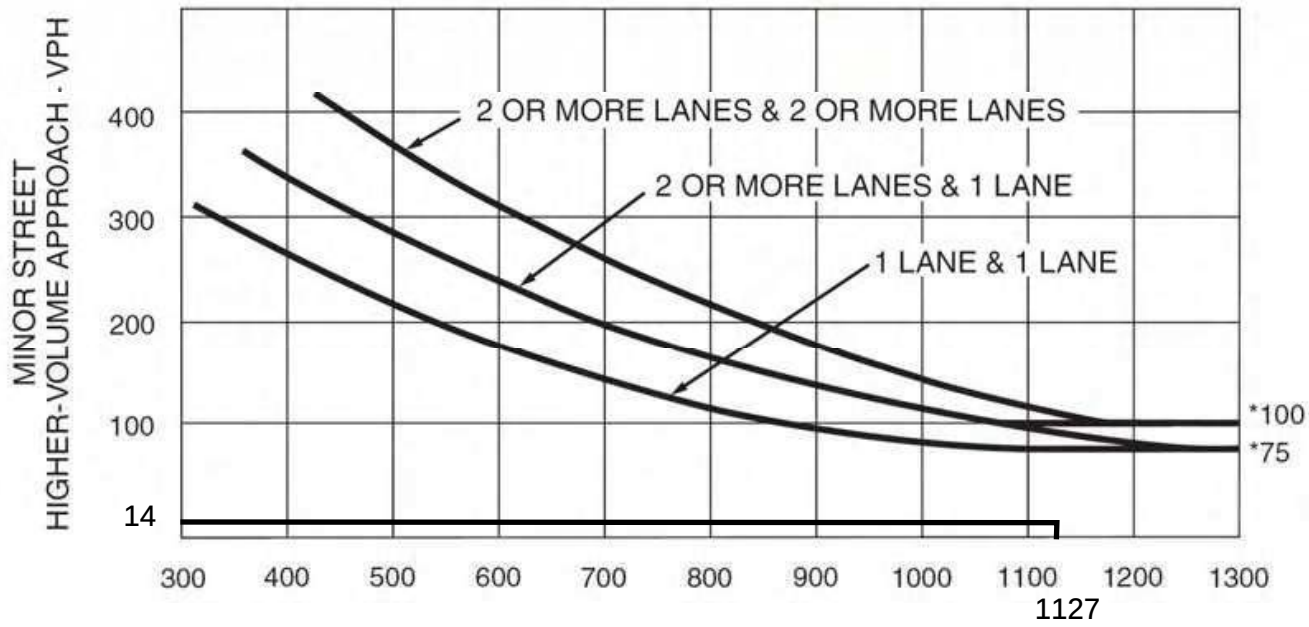
URBAN..... RURAL.....	Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied _____ Not Satisfied X	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1..... 1.....	8,000	5,600	2,400	1,680
2 or More 13524 ..... 1 168	9,600	6,720	2,400	1,680
2 or More..... 2 or More.....	9,600	6,720	3,200	2,240
1..... 2 or More.....	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied _____ Not Satisfied X	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1..... 1.....	12,000	8,400	1,200	850
2 or More 13524 ..... 1 168	14,400	10,080	1,200	850
2 or More..... 2 or More.....	14,400	10,080	1,600	1,120
1..... 2 or More.....	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B	2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied _____ Not Satisfied X				
No one condition satisfied, but following conditions fulfilled 80% or more..... 10% (A) 20% (B)				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Houghton Road & Entrance #5 - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **Project Intersection**

Exist Peak Hour Volumes

U		
0	WBL	0
0	WBT	161
0	WBR	0
>	EBL	0
0	EBT	160
<	EBR	0
0	NBL	0
2	NBT	0
0	NBR	0
0	SBL	0
2	SBT	0
<	SBR	0
	TOTAL	321

Year 2035

Fut. Volumes w/o Proj

WBL	0
WBT	324
WBR	0
EBL	0
EBT	326
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	650

Year 2035 Fut. Vol

+ Project Traffic

WBL	0
WBT	1048
WBR	26
EBL	107
EBT	709
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	242
TOTAL	2132

Year 2025

Fut. Volumes w/o Proj

WBL	0
WBT	229
WBR	0
EBL	0
EBT	230
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	459

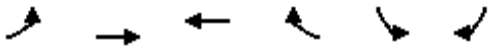
Year 2025 Fut. Vol

+ Project Traffic

WBL	0
WBT	591
WBR	13
EBL	54
EBT	422
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	121
TOTAL	1201

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	724
WBR	26
EBL	107
EBT	383
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	242
TOTAL	1482



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			150	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1863	1583	0	1611
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		919	1733		395	
Travel Time (s)		11.4	21.5		9.0	

Intersection Summary	
Area Type:	Other

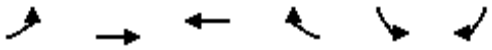
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	54	422	591	13	0	121
Future Vol, veh/h	54	422	591	13	0	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	459	642	14	0	132

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	642	0	-	0	1218	642
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	576	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	943	-	-	-	199	474
Stage 1	-	-	-	-	524	-
Stage 2	-	-	-	-	562	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	943	-	-	-	187	474
Mov Cap-2 Maneuver	-	-	-	-	187	-
Stage 1	-	-	-	-	524	-
Stage 2	-	-	-	-	527	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	943	-	-	-	474
HCM Lane V/C Ratio	0.062	-	-	-	0.277
HCM Control Delay (s)	9.1	-	-	-	15.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	200			200	0	0
Storage Lanes	1			1	0	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt				0.850		0.865
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1863	1583	0	1611
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1863	1583	0	1611
Link Speed (mph)		55	55		30	
Link Distance (ft)		859	1793		552	
Travel Time (s)		10.6	22.2		12.5	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	14.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	107	709	1048	26	0	242
Future Vol, veh/h	107	709	1048	26	0	242
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	771	1139	28	0	263

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1139	0	-	0	2142	1139
Stage 1	-	-	-	-	1139	-
Stage 2	-	-	-	-	1003	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	613	-	-	-	54	~ 245
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	355	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	613	-	-	-	44	~ 245
Mov Cap-2 Maneuver	-	-	-	-	44	-
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	288	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	122.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	613	-	-	-	245
HCM Lane V/C Ratio	0.19	-	-	-	1.074
HCM Control Delay (s)	12.2	-	-	-	122.1
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	11.1

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Project Entrance #5

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

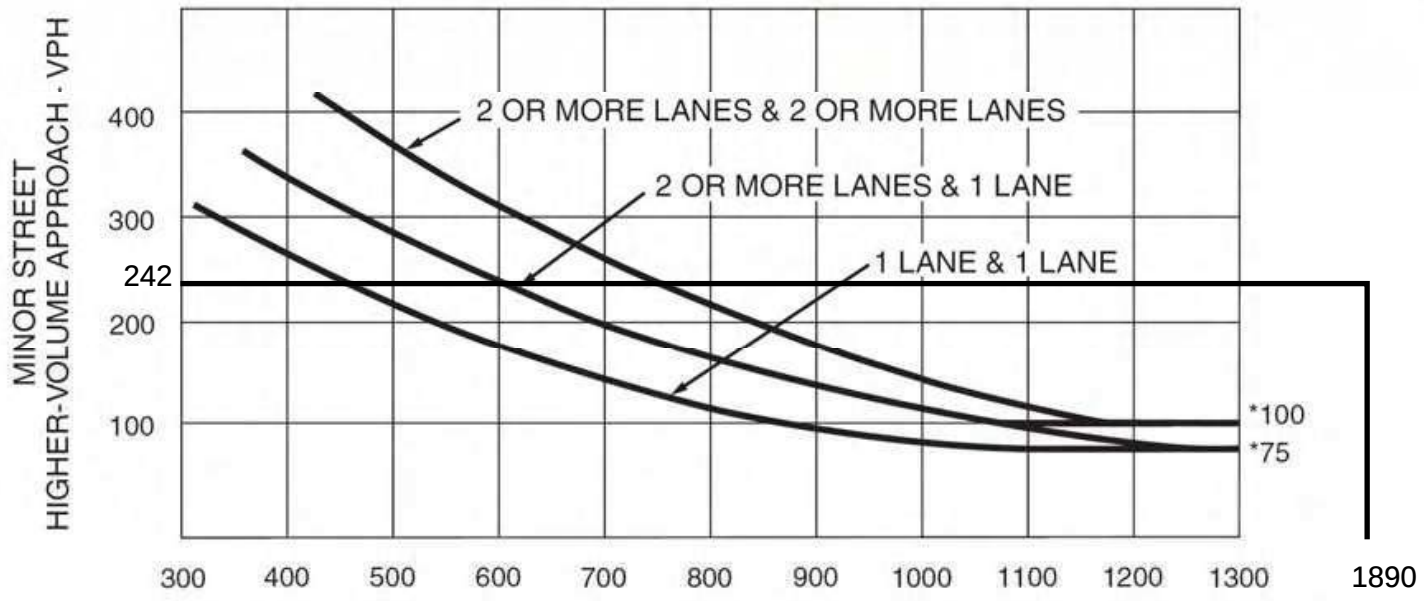
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More (18900) / 1 (2420)	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied X Not Satisfied _____		
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	12,000 / 8,400	1,200 / 850
2 or More (18900) / 1 (2420)	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B		
Satisfied X Not Satisfied _____	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Houghton Road & S. Union Ave. - AM Peak
Count Date: 1/7/2015

Ave Annual Growth: **3.26%**

Exist Peak Hour Volumes

AWS		
>	WBL	12
1	WBT	88
<	WBR	11
>	EBL	19
1	EBT	134
<	EBR	17
>	NBL	23
2	NBT	32
<	NBR	2
1	SBL	27
2	SBT	36
<	SBR	11
	TOTAL	412

Year 2035
Fut. Volumes w/o Proj

WBL	24
WBT	105
WBR	20
EBL	36
EBT	168
EBR	36
NBL	48
NBT	98
NBR	4
SBL	48
SBT	107
SBR	20
TOTAL	714

Year 2035 Fut. Vol
+ Project Traffic

WBL	24
WBT	142
WBR	42
EBL	253
EBT	171
EBR	42
NBL	76
NBT	106
NBR	4
SBL	56
SBT	121
SBR	91
TOTAL	1128

Year 2025
Fut. Volumes w/o Proj

WBL	17
WBT	96
WBR	15
EBL	26
EBT	151
EBR	25
NBL	33
NBT	57
NBR	3
SBL	36
SBT	63
SBR	15
TOTAL	537

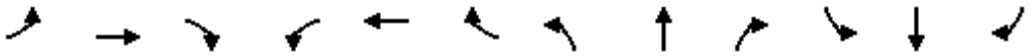
Year 2025 Fut. Vol
+ Project Traffic

WBL	17
WBT	115
WBR	26
EBL	135
EBT	153
EBR	28
NBL	47
NBT	61
NBR	3
SBL	40
SBT	70
SBR	51
TOTAL	746

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	37
WBR	22
EBL	217
EBT	3
EBR	6
NBL	28
NBT	8
NBR	0
SBL	8
SBT	14
SBR	71
TOTAL	414

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Houghton Road & S. Union Ave. - AM Peak						
	Count Date:	1/7/2015						
2006	ADT							
WB Approach (To)	2.435							
WB Approach (Away)	2.226							
EB Approach (To)	2.158							
EB Approach (Away)	2.404							
NB Approach (To)	0.508							
NB Approach (Away)	0.54							
SB Approach (To)	0.675							
SB Approach (Away)	0.605							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	2.962		WBL	3.45	WBT	1.28	WBR	2.68
WB Approach (Away)	2.871		3.43%	24	0.84%	105	2.85%	20
EB Approach (To)	3.2		EBL	2.82	EBT	1.39	EBR	3.58
EB Approach (Away)	3.216		3.20%	36	1.12%	168	3.77%	36
NB Approach (To)	2.917		NBL	3.54	NBT	4.95	NBR	3.52
NB Approach (Away)	3.071		3.61%	48	5.62%	98	3.54%	4
SB Approach (To)	2.59		SBL	2.56	SBT	4.76	SBR	2.59
SB Approach (Away)	2.511		2.81%	48	5.46%	107	2.88%	20



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.987			0.987			0.995			0.977	
Flt Protected		0.994			0.995			0.980			0.982	
Satd. Flow (prot)	0	1827	0	0	1829	0	0	3451	0	0	3396	0
Flt Permitted		0.994			0.995			0.980			0.982	
Satd. Flow (perm)	0	1827	0	0	1829	0	0	3451	0	0	3396	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2652			5264			5300			1323	
Travel Time (s)		32.9			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	19	134	17	0	12	88	11	0	23	32	2
Future Vol, veh/h	0	19	134	17	0	12	88	11	0	23	32	2
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	21	146	18	0	13	96	12	0	25	35	2
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	8.7	8.3	8.6
HCM LOS	A	A	A

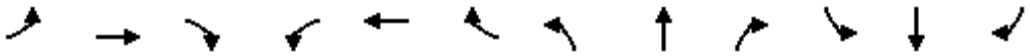
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	59%	0%	11%	11%	60%	0%
Vol Thru, %	41%	89%	79%	79%	40%	62%
Vol Right, %	0%	11%	10%	10%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	18	170	111	45	29
LT Vol	23	0	19	12	27	0
Through Vol	16	16	134	88	18	18
RT Vol	0	2	17	11	0	11
Lane Flow Rate	42	20	185	121	49	32
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.066	0.028	0.226	0.15	0.076	0.044
Departure Headway (Hd)	5.617	5.241	4.408	4.478	5.603	5.033
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	638	683	815	801	639	711
Service Time	3.352	2.976	2.43	2.501	3.336	2.766
HCM Lane V/C Ratio	0.066	0.029	0.227	0.151	0.077	0.045
HCM Control Delay	8.8	8.1	8.7	8.3	8.8	8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.9	0.5	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	27	36	11
Future Vol, veh/h	0	27	36	11
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	39	12
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.5
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.983			0.984			0.996			0.980	
Flt Protected		0.994			0.994			0.982			0.984	
Satd. Flow (prot)	0	1820	0	0	1822	0	0	3462	0	0	3413	0
Flt Permitted		0.994			0.994			0.982			0.984	
Satd. Flow (perm)	0	1820	0	0	1822	0	0	3462	0	0	3413	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2652			5264			5300			1323	
Travel Time (s)		32.9			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	26	151	25	0	17	96	15	0	33	57	3
Future Vol, veh/h	0	26	151	25	0	17	96	15	0	33	57	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	164	27	0	18	104	16	0	36	62	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.6	8.9	9
HCM LOS	A	A	A

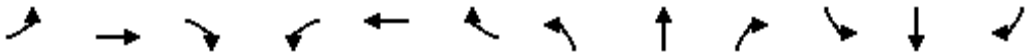
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	54%	0%	13%	13%	53%	0%
Vol Thru, %	46%	90%	75%	75%	47%	68%
Vol Right, %	0%	10%	12%	12%	0%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	32	202	128	68	47
LT Vol	33	0	26	17	36	0
Through Vol	29	29	151	96	32	32
RT Vol	0	3	25	15	0	15
Lane Flow Rate	67	34	220	139	73	51
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.108	0.052	0.284	0.184	0.118	0.074
Departure Headway (Hd)	5.797	5.459	4.654	4.754	5.769	5.272
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	614	652	768	751	618	675
Service Time	3.567	3.229	2.7	2.807	3.538	3.04
HCM Lane V/C Ratio	0.109	0.052	0.286	0.185	0.118	0.076
HCM Control Delay	9.3	8.5	9.6	8.9	9.3	8.5
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.4	0.2	1.2	0.7	0.4	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	36	63	15
Future Vol, veh/h	0	36	63	15
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	39	68	16
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.988			0.978			0.996			0.953	
Flt Protected		0.979			0.995			0.979			0.988	
Satd. Flow (prot)	0	1802	0	0	1813	0	0	3451	0	0	3332	0
Flt Permitted		0.979			0.995			0.979			0.988	
Satd. Flow (perm)	0	1802	0	0	1813	0	0	3451	0	0	3332	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1673			5264			5300			1323	
Travel Time (s)		20.7			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	135	153	28	0	17	115	26	0	47	61	3
Future Vol, veh/h	0	135	153	28	0	17	115	26	0	47	61	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	147	166	30	0	18	125	28	0	51	66	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	12.7	10	10
HCM LOS	B	A	A

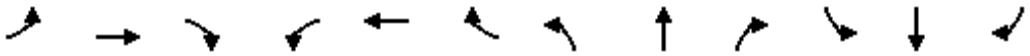
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	61%	0%	43%	11%	53%	0%
Vol Thru, %	39%	91%	48%	73%	47%	41%
Vol Right, %	0%	9%	9%	16%	0%	59%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	78	34	316	158	75	86
LT Vol	47	0	135	17	40	0
Through Vol	31	31	153	115	35	35
RT Vol	0	3	28	26	0	51
Lane Flow Rate	84	36	343	172	82	93
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.152	0.062	0.477	0.25	0.144	0.148
Departure Headway (Hd)	6.493	6.12	5.118	5.236	6.378	5.685
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	554	587	708	687	564	633
Service Time	4.211	3.839	3.118	3.258	4.094	3.401
HCM Lane V/C Ratio	0.152	0.061	0.484	0.25	0.145	0.147
HCM Control Delay	10.4	9.2	12.7	10	10.2	9.4
HCM Lane LOS	B	A	B	A	B	A
HCM 95th-tile Q	0.5	0.2	2.6	1	0.5	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	40	70	51
Future Vol, veh/h	0	40	70	51
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	43	76	55
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.980			0.982			0.996			0.983	
Flt Protected		0.993			0.992			0.984			0.987	
Satd. Flow (prot)	0	1813	0	0	1815	0	0	3469	0	0	3434	0
Flt Permitted		0.993			0.992			0.984			0.987	
Satd. Flow (perm)	0	1813	0	0	1815	0	0	3469	0	0	3434	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2652			5264			5300			1323	
Travel Time (s)		32.9			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	36	168	36	0	24	105	20	0	48	98	4
Future Vol, veh/h	0	36	168	36	0	24	105	20	0	48	98	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	39	183	39	0	26	114	22	0	52	107	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	11.1	10	9.9
HCM LOS	B	A	A

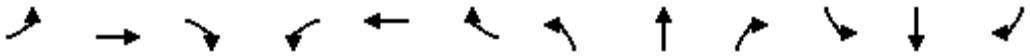
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	49%	0%	15%	16%	47%	0%
Vol Thru, %	51%	92%	70%	70%	53%	73%
Vol Right, %	0%	8%	15%	13%	0%	27%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	97	53	240	149	102	74
LT Vol	48	0	36	24	48	0
Through Vol	49	49	168	105	54	54
RT Vol	0	4	36	20	0	20
Lane Flow Rate	105	58	261	162	110	80
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.182	0.095	0.365	0.238	0.189	0.127
Departure Headway (Hd)	6.212	5.907	5.158	5.293	6.164	5.731
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	580	609	702	680	585	628
Service Time	3.928	3.623	3.158	3.317	3.88	3.447
HCM Lane V/C Ratio	0.181	0.095	0.372	0.238	0.188	0.127
HCM Control Delay	10.3	9.2	11.1	10	10.3	9.3
HCM Lane LOS	B	A	B	A	B	A
HCM 95th-tile Q	0.7	0.3	1.7	0.9	0.7	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	48	107	20
Future Vol, veh/h	0	48	107	20
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	52	116	22
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.9
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.988			0.973			0.997			0.949	
Flt Protected		0.974			0.994			0.980			0.990	
Satd. Flow (prot)	0	1793	0	0	1802	0	0	3458	0	0	3325	0
Flt Permitted		0.974			0.994			0.980			0.990	
Satd. Flow (perm)	0	1793	0	0	1802	0	0	3458	0	0	3325	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1733			5264			5300			1323	
Travel Time (s)		21.5			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	22.9
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	253	171	42	0	24	142	42	0	76	106	4
Future Vol, veh/h	0	253	171	42	0	24	142	42	0	76	106	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	275	186	46	0	26	154	46	0	83	115	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	36.2	14.3	13.3
HCM LOS	E	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	59%	0%	54%	12%	48%	0%
Vol Thru, %	41%	93%	37%	68%	52%	40%
Vol Right, %	0%	7%	9%	20%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	129	57	466	208	117	152
LT Vol	76	0	253	24	56	0
Through Vol	53	53	171	142	61	61
RT Vol	0	4	42	42	0	91
Lane Flow Rate	140	62	507	226	127	165
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.306	0.129	0.863	0.415	0.268	0.318
Departure Headway (Hd)	7.852	7.497	6.132	6.603	7.627	6.946
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	457	477	593	543	470	515
Service Time	5.618	5.264	4.178	4.666	5.39	4.708
HCM Lane V/C Ratio	0.306	0.13	0.855	0.416	0.27	0.32
HCM Control Delay	14.1	11.4	36.2	14.3	13.2	12.9
HCM Lane LOS	B	B	E	B	B	B
HCM 95th-tile Q	1.3	0.4	9.6	2	1.1	1.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	56	121	91
Future Vol, veh/h	0	56	121	91
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	61	132	99
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	13
HCM LOS	B

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: South Union Avenue

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

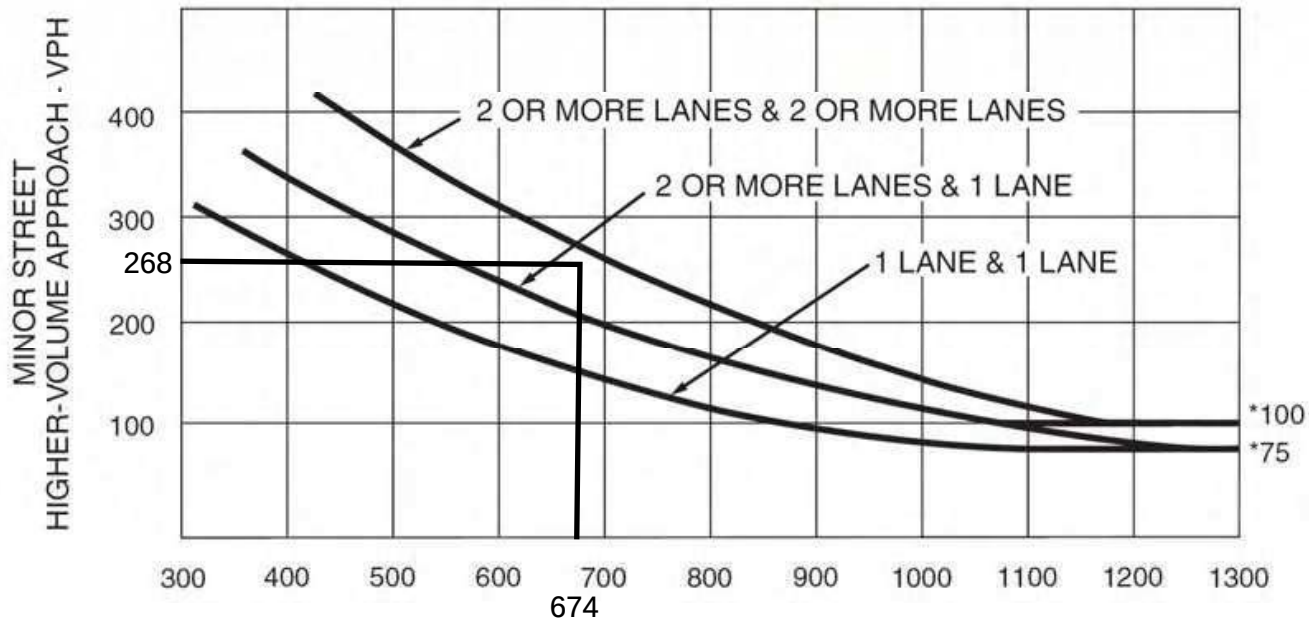
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 8088 / 2 or More 3216	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 8088 / 2 or More 3216	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 96% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Houghton Road & S. Union Ave. - PM Peak

Count Date: 1/7/2015

Ave Annual Growth: **3.26%**

Exist Peak Hour Volumes

AWS		
>	WBL	10
1	WBT	119
<	WBR	46
>	EBL	40
1	EBT	97
<	EBR	18
>	NBL	26
2	NBT	166
<	NBR	30
1	SBL	31
2	SBT	55
<	SBR	18
	TOTAL	656

Year 2035
Fut. Volumes w/o Proj

WBL	20
WBT	141
WBR	82
EBL	76
EBT	122
EBR	38
NBL	54
NBT	509
NBR	61
SBL	55
SBT	163
SBR	32
TOTAL	1353

Year 2035 Fut. Vol
+ Project Traffic

WBL	20
WBT	261
WBR	92
EBL	376
EBT	171
EBR	57
NBL	68
NBT	522
NBR	61
SBL	111
SBT	213
SBR	523
TOTAL	2475

Year 2025
Fut. Volumes w/o Proj

WBL	14
WBT	130
WBR	62
EBL	56
EBT	109
EBR	27
NBL	38
NBT	294
NBR	43
SBL	41
SBT	96
SBR	24
TOTAL	934

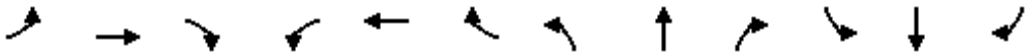
Year 2025 Fut. Vol
+ Project Traffic

WBL	14
WBT	190
WBR	67
EBL	206
EBT	134
EBR	37
NBL	45
NBT	301
NBR	43
SBL	69
SBT	121
SBR	270
TOTAL	1497

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	120
WBR	10
EBL	300
EBT	49
EBR	19
NBL	14
NBT	13
NBR	0
SBL	56
SBT	50
SBR	491
TOTAL	1122

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Houghton Road & S. Union Ave. - PM Peak						
	Count Date:	1/7/2015						
2006	ADT							
WB Approach (To)	2.435							
WB Approach (Away)	2.226							
EB Approach (To)	2.158							
EB Approach (Away)	2.404							
NB Approach (To)	0.508							
NB Approach (Away)	0.54							
SB Approach (To)	0.675							
SB Approach (Away)	0.605							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	2.962		WBL	3.45	WBT	1.28	WBR	2.68
WB Approach (Away)	2.871		3.43%	20	0.84%	141	2.85%	82
EB Approach (To)	3.2		EBL	2.82	EBT	1.39	EBR	3.58
EB Approach (Away)	3.216		3.20%	76	1.12%	122	3.77%	38
NB Approach (To)	2.917		NBL	3.54	NBT	4.95	NBR	3.52
NB Approach (Away)	3.071		3.61%	54	5.62%	509	3.54%	61
SB Approach (To)	2.59		SBL	2.56	SBT	4.76	SBR	2.59
SB Approach (Away)	2.511		2.81%	55	5.46%	163	2.88%	32



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	97	18	10	119	46	26	166	30	31	55	18
Future Volume (vph)	40	97	18	10	119	46	26	166	30	31	55	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.984			0.964			0.979			0.974	
Flt Protected		0.987			0.997			0.994			0.985	
Satd. Flow (prot)	0	1809	0	0	1790	0	0	3444	0	0	3395	0
Flt Permitted		0.987			0.997			0.994			0.985	
Satd. Flow (perm)	0	1809	0	0	1790	0	0	3444	0	0	3395	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2652			5264			5300			1323	
Travel Time (s)		32.9			65.3			65.7			16.4	
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
Adj. Flow (vph)	43	105	20	11	129	50	28	180	33	34	60	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	0	0	190	0	0	241	0	0	114	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
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	40	97	18	0	10	119	46	0	26	166	30
Future Vol, veh/h	0	40	97	18	0	10	119	46	0	26	166	30
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	43	105	20	0	11	129	50	0	28	180	33
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.7	9.7	9.6
HCM LOS	A	A	A

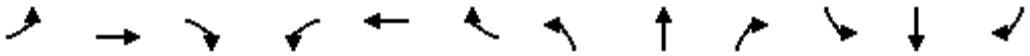
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	24%	0%	26%	6%	53%	0%
Vol Thru, %	76%	73%	63%	68%	47%	60%
Vol Right, %	0%	27%	12%	26%	0%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	109	113	155	175	59	46
LT Vol	26	0	40	10	31	0
Through Vol	83	83	97	119	28	28
RT Vol	0	30	18	46	0	18
Lane Flow Rate	118	123	168	190	64	49
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.187	0.183	0.237	0.259	0.107	0.076
Departure Headway (Hd)	5.669	5.36	5.063	4.91	6.076	5.526
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	627	662	703	725	593	652
Service Time	3.462	3.153	3.148	2.993	3.776	3.226
HCM Lane V/C Ratio	0.188	0.186	0.239	0.262	0.108	0.075
HCM Control Delay	9.8	9.4	9.7	9.7	9.5	8.7
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.7	0.7	0.9	1	0.4	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	31	55	18
Future Vol, veh/h	0	31	55	18
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	34	60	20
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.2
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.981			0.959			0.983			0.978	
Flt Protected		0.986			0.997			0.995			0.987	
Satd. Flow (prot)	0	1802	0	0	1781	0	0	3462	0	0	3416	0
Flt Permitted		0.986			0.997			0.995			0.987	
Satd. Flow (perm)	0	1802	0	0	1781	0	0	3462	0	0	3416	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2652			5264			5300			1323	
Travel Time (s)		32.9			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	56	109	27	0	14	130	62	0	38	294	43
Future Vol, veh/h	0	56	109	27	0	14	130	62	0	38	294	43
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	61	118	29	0	15	141	67	0	41	320	47
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	12	11.9	12
HCM LOS	B	B	B

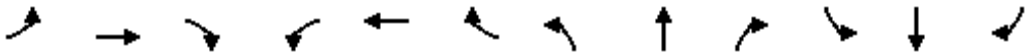
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	21%	0%	29%	7%	46%	0%
Vol Thru, %	79%	77%	57%	63%	54%	67%
Vol Right, %	0%	23%	14%	30%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	185	190	192	206	89	72
LT Vol	38	0	56	14	41	0
Through Vol	147	147	109	130	48	48
RT Vol	0	43	27	62	0	24
Lane Flow Rate	201	207	209	224	97	78
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.347	0.341	0.341	0.356	0.18	0.135
Departure Headway (Hd)	6.206	5.941	5.88	5.718	6.68	6.208
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	577	603	609	627	535	574
Service Time	3.964	3.698	3.946	3.782	4.449	3.976
HCM Lane V/C Ratio	0.348	0.343	0.343	0.357	0.181	0.136
HCM Control Delay	12.3	11.8	12	11.9	10.9	10
HCM Lane LOS	B	B	B	B	B	A
HCM 95th-tile Q	1.5	1.5	1.5	1.6	0.7	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	41	96	24
Future Vol, veh/h	0	41	96	24
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	45	104	26
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.5
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.987			0.967			0.983			0.912	
Flt Protected		0.973			0.997			0.994			0.993	
Satd. Flow (prot)	0	1789	0	0	1796	0	0	3458	0	0	3205	0
Flt Permitted		0.973			0.997			0.994			0.993	
Satd. Flow (perm)	0	1789	0	0	1796	0	0	3458	0	0	3205	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1733			5264			5300			1323	
Travel Time (s)		21.5			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	34.7
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	206	134	37	0	14	190	67	0	45	301	43
Future Vol, veh/h	0	206	134	37	0	14	190	67	0	45	301	43
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	224	146	40	0	15	207	73	0	49	327	47
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	56.2	29.5	21.1
HCM LOS	F	D	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	23%	0%	55%	5%	53%	0%
Vol Thru, %	77%	78%	36%	70%	47%	18%
Vol Right, %	0%	22%	10%	25%	0%	82%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	196	194	377	271	130	331
LT Vol	45	0	206	14	69	0
Through Vol	151	151	134	190	61	61
RT Vol	0	43	37	67	0	270
Lane Flow Rate	212	210	410	295	141	359
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.535	0.513	0.928	0.702	0.353	0.813
Departure Headway (Hd)	9.064	8.781	8.301	8.577	9.028	8.152
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	400	412	438	421	400	445
Service Time	6.796	6.513	6.301	6.61	6.757	5.881
HCM Lane V/C Ratio	0.53	0.51	0.936	0.701	0.352	0.807
HCM Control Delay	21.8	20.4	56.2	29.5	16.6	37.8
HCM Lane LOS	C	C	F	D	C	E
HCM 95th-tile Q	3	2.8	10.5	5.3	1.6	7.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	69	121	270
Future Vol, veh/h	0	69	121	270
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	75	132	293
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	31.8
HCM LOS	D

Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.968			0.967			0.983			0.912	
Flt Protected	0.950				0.997			0.994			0.993	
Satd. Flow (prot)	1770	1803	0	0	1796	0	0	3458	0	0	3205	0
Flt Permitted	0.950				0.997			0.994			0.993	
Satd. Flow (perm)	1770	1803	0	0	1796	0	0	3458	0	0	3205	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1733			5264			5300			1323	
Travel Time (s)		21.5			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	24.6
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	206	134	37	0	14	190	67	0	45	301	43
Future Vol, veh/h	0	206	134	37	0	14	190	67	0	45	301	43
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	224	146	40	0	15	207	73	0	49	327	47
Number of Lanes	0	1	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	20.7	30.5	19.8
HCM LOS	C	D	C

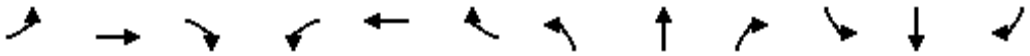
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	23%	0%	100%	0%	5%	53%	0%
Vol Thru, %	77%	78%	0%	78%	70%	47%	18%
Vol Right, %	0%	22%	0%	22%	25%	0%	82%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	196	194	206	171	271	130	331
LT Vol	45	0	206	0	14	69	0
Through Vol	151	151	0	134	190	61	61
RT Vol	0	43	0	37	67	0	270
Lane Flow Rate	212	210	224	186	295	141	359
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.514	0.492	0.567	0.436	0.711	0.34	0.78
Departure Headway (Hd)	8.7	8.418	9.114	8.438	8.687	8.688	7.817
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	414	427	396	427	415	414	463
Service Time	6.456	6.174	6.868	6.192	6.741	6.441	5.569
HCM Lane V/C Ratio	0.512	0.492	0.566	0.436	0.711	0.341	0.775
HCM Control Delay	20.4	19.1	23.2	17.6	30.5	15.9	33.3
HCM Lane LOS	C	C	C	C	D	C	D
HCM 95th-tile Q	2.8	2.6	3.4	2.2	5.4	1.5	6.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	69	121	270
Future Vol, veh/h	0	69	121	270
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	75	132	293
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	28.4
HCM LOS	D

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.978			0.954			0.985			0.981	
Flt Protected		0.984			0.996			0.996			0.989	
Satd. Flow (prot)	0	1793	0	0	1770	0	0	3472	0	0	3434	0
Flt Permitted		0.984			0.996			0.996			0.989	
Satd. Flow (perm)	0	1793	0	0	1770	0	0	3472	0	0	3434	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2652			5264			5300			1323	
Travel Time (s)		32.9			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	19.1
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	76	122	38	0	20	141	82	0	54	509	61
Future Vol, veh/h	0	76	122	38	0	20	141	82	0	54	509	61
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	83	133	41	0	22	153	89	0	59	553	66
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	17.6	17.4	22.4
HCM LOS	C	C	C

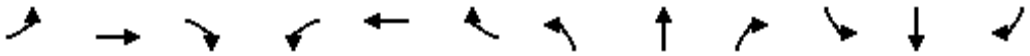
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	18%	0%	32%	8%	40%	0%
Vol Thru, %	82%	81%	52%	58%	60%	72%
Vol Right, %	0%	19%	16%	34%	0%	28%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	309	316	236	243	137	114
LT Vol	54	0	76	20	55	0
Through Vol	255	255	122	141	82	82
RT Vol	0	61	38	82	0	32
Lane Flow Rate	335	343	257	264	148	123
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.663	0.656	0.512	0.515	0.325	0.256
Departure Headway (Hd)	7.116	6.888	7.183	7.019	7.881	7.469
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	506	525	500	512	455	480
Service Time	4.879	4.65	5.246	5.082	5.652	5.24
HCM Lane V/C Ratio	0.662	0.653	0.514	0.516	0.325	0.256
HCM Control Delay	22.9	21.9	17.6	17.4	14.4	12.8
HCM Lane LOS	C	C	C	C	B	B
HCM 95th-tile Q	4.8	4.7	2.9	2.9	1.4	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	55	163	32
Future Vol, veh/h	0	55	163	32
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	60	177	35
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	13.7
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.962			0.967			0.986			0.907	
Flt Protected	0.950				0.997			0.995			0.993	
Satd. Flow (prot)	1770	1792	0	0	1796	0	0	3472	0	0	3188	0
Flt Permitted	0.950				0.997			0.995			0.993	
Satd. Flow (perm)	1770	1792	0	0	1796	0	0	3472	0	0	3188	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1793			5264			5300			1323	
Travel Time (s)		22.2			65.3			65.7			16.4	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	68.2
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	376	171	57	0	20	261	92	0	68	522	61
Future Vol, veh/h	0	376	171	57	0	20	261	92	0	68	522	61
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	409	186	62	0	22	284	100	0	74	567	66
Number of Lanes	0	1	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	62	80.4	71
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	21%	0%	100%	0%	5%	51%	0%
Vol Thru, %	79%	81%	0%	75%	70%	49%	17%
Vol Right, %	0%	19%	0%	25%	25%	0%	83%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	329	322	376	228	373	218	630
LT Vol	68	0	376	0	20	111	0
Through Vol	261	261	0	171	261	107	107
RT Vol	0	61	0	57	92	0	523
Lane Flow Rate	358	350	409	248	405	236	684
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.988	0.944	1	0.667	1	0.665	1
Departure Headway (Hd)	9.946	9.711	10.37	9.696	10.05	10.123	9.288
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	368	374	351	374	365	357	397
Service Time	7.659	7.423	8.102	7.428	8.062	7.858	7.023
HCM Lane V/C Ratio	0.973	0.936	1.165	0.663	1.11	0.661	1.723
HCM Control Delay	76.6	65.3	81.5	29.9	80.4	30.9	76.8
HCM Lane LOS	F	F	F	D	F	D	F
HCM 95th-tile Q	11.3	10.2	11.4	4.6	11.6	4.6	12

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	111	213	523
Future Vol, veh/h	0	111	213	523
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	121	232	568
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	65
HCM LOS	F

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Houghton Road

Minor St: South Union Avenue

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

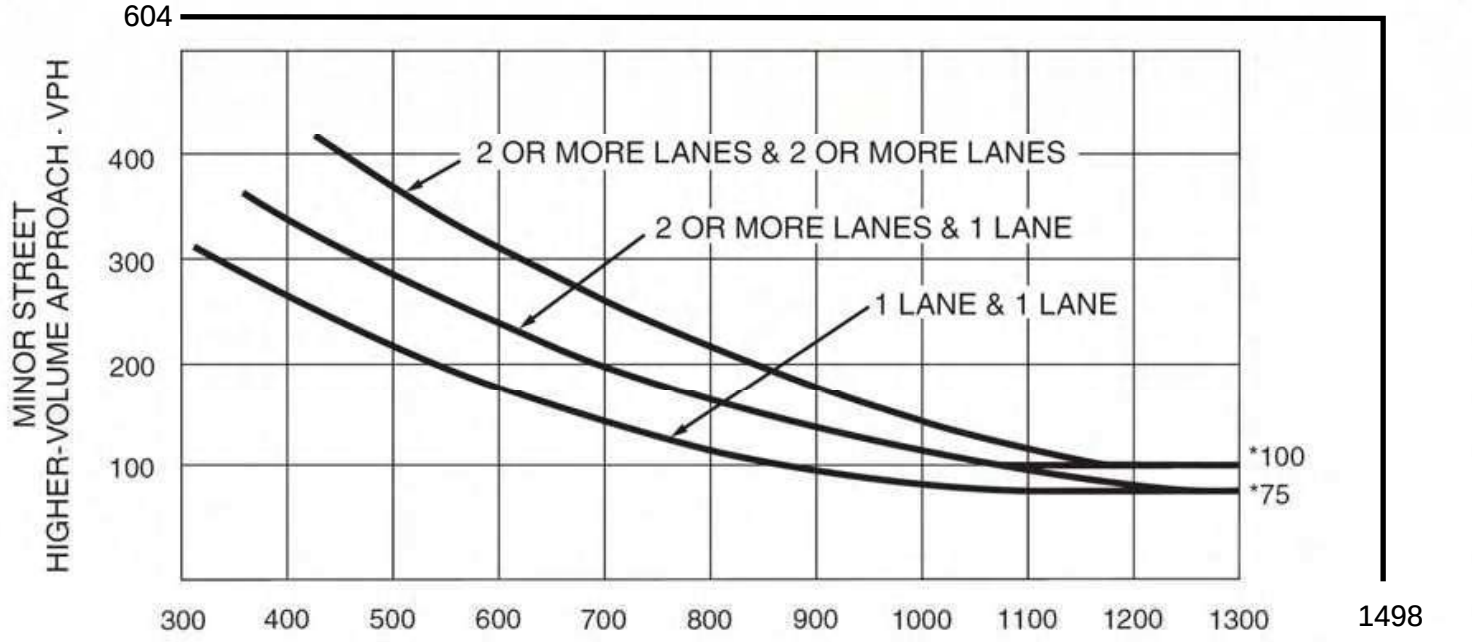
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 14980 / 2 or More 6040	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 14980 / 2 or More 6040	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied ____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 100% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	171	57	20	261	92	68	522	61	111	213	523
Future Volume (veh/h)	376	171	57	20	261	92	68	522	61	111	213	523
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	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	409	186	62	22	284	100	74	567	66	121	232	568
Adj No. of Lanes	2	2	0	1	2	0	1	2	0	1	2	1
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	2	2	2	2	2	2
Cap, veh/h	502	760	246	45	434	149	99	802	93	133	956	659
Arrive On Green	0.15	0.29	0.29	0.03	0.17	0.17	0.06	0.25	0.25	0.08	0.27	0.27
Sat Flow, veh/h	3442	2631	851	1774	2584	891	1774	3196	371	1774	3539	1583
Grp Volume(v), veh/h	409	123	125	22	193	191	74	313	320	121	232	568
Grp Sat Flow(s),veh/h/ln	1721	1770	1713	1774	1770	1706	1774	1770	1797	1774	1770	1583
Q Serve(g_s), s	7.7	3.5	3.7	0.8	6.8	7.0	2.7	10.7	10.8	4.5	3.4	18.0
Cycle Q Clear(g_c), s	7.7	3.5	3.7	0.8	6.8	7.0	2.7	10.7	10.8	4.5	3.4	18.0
Prop In Lane	1.00		0.50	1.00		0.52	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	502	511	494	45	297	286	99	444	451	133	956	659
V/C Ratio(X)	0.81	0.24	0.25	0.49	0.65	0.67	0.75	0.71	0.71	0.91	0.24	0.86
Avail Cap(c_a), veh/h	516	611	591	133	478	461	133	478	485	133	956	659
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	27.6	18.1	18.2	32.1	25.9	26.0	31.0	22.7	22.7	30.6	19.0	17.7
Incr Delay (d2), s/veh	9.5	0.2	0.3	8.2	2.4	2.7	14.3	4.3	4.4	51.4	0.1	11.3
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(50%),veh/ln	4.3	1.7	1.8	0.5	3.5	3.5	1.7	5.8	5.9	4.1	1.7	11.5
LnGrp Delay(d),s/veh	37.1	18.4	18.5	40.3	28.3	28.7	45.3	27.0	27.1	81.9	19.1	29.0
LnGrp LOS	D	B	B	D	C	C	D	C	C	F	B	C
Approach Vol, veh/h		657			406			707			921	
Approach Delay, s/veh		30.0			29.1			29.0			33.5	
Approach LOS		C			C			C			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	11.0	22.7	7.7	25.2	9.7	24.0	15.7	17.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	18.0	5.0	23.0	5.0	18.0	10.0	18.0
Max Q Clear Time (g_c+I1), s	6.5	12.8	2.8	5.7	4.7	20.0	9.7	9.0
Green Ext Time (p_c), s	0.0	3.0	0.0	2.9	0.0	0.0	0.1	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Buena Vista Blvd & Cottonwood Road - AM Peak

Count Date: 1/8/2015

Ave Annual Growth: **2.62%**

Exist Peak Hour Volumes

U		
0	WBL	0
1	WBT	64
<	WBR	21
>	EBL	4
1	EBT	132
0	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
>	SBL	10
0	SBT	0
<	SBR	11
	TOTAL	242

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	74
WBR	50
EBL	10
EBT	160
EBR	0
NBL	0
NBT	0
NBR	0
SBL	26
SBT	0
SBR	27
TOTAL	347

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	108
WBR	50
EBL	12
EBT	168
EBR	0
NBL	0
NBT	0
NBR	0
SBL	27
SBT	0
SBR	42
TOTAL	407

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	69
WBR	33
EBL	6
EBT	145
EBR	0
NBL	0
NBT	0
NBR	0
SBL	16
SBT	0
SBR	18
TOTAL	287

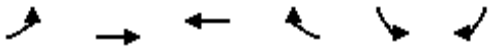
Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	86
WBR	33
EBL	7
EBT	149
EBR	0
NBL	0
NBT	0
NBR	0
SBL	17
SBT	0
SBR	26
TOTAL	318

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	34
WBR	0
EBL	2
EBT	8
EBR	0
NBL	0
NBT	0
NBR	0
SBL	1
SBT	0
SBR	15
TOTAL	60

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Buena Vista Blvd & Cottonwood Road - AM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	2.437							
WB Approach (Away)	2.228							
EB Approach (To)	2.213							
EB Approach (Away)	2.422							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	0.015							
SB Approach (Away)	0.016							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	3.036		WBL	1.22	WBT	1.23	WBR	5.25
WB Approach (Away)	2.954		0.70%	0	0.72%	74	4.36%	50
EB Approach (To)	2.858		EBL	5.27	EBT	1.31	EBR	1.25
EB Approach (Away)	2.949		4.43%	10	0.93%	160	0.76%	0
NB Approach (To)	*1.2*		NBL	1.21	NBT	5.23	NBR	1.26
NB Approach (Away)	*1.2*		0.66%	0	4.30%	0	0.80%	0
SB Approach (To)	0.157		SBL	5.90	SBT	5.83	SBR	5.84
SB Approach (Away)	0.148		4.70%	26	4.53%	0	4.55%	27



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	132	64	21	10	11
Future Volume (vph)	4	132	64	21	10	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.967		0.930	
Flt Protected		0.999			0.977	
Satd. Flow (prot)	0	1861	1801	0	1693	0
Flt Permitted		0.999			0.977	
Satd. Flow (perm)	0	1861	1801	0	1693	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	143	70	23	11	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	147	93	0	23	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.2%		ICU Level of Service A	
Analysis Period (min) 15			

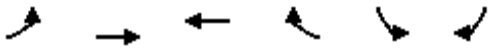
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	132	64	21	10	11
Future Vol, veh/h	4	132	64	21	10	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	143	70	23	11	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	92	0	-	0	233	81
Stage 1	-	-	-	-	81	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1503	-	-	-	755	979
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1503	-	-	-	753	979
Mov Cap-2 Maneuver	-	-	-	-	753	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	873	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1503	-	-	-	857
HCM Lane V/C Ratio	0.003	-	-	-	0.027
HCM Control Delay (s)	7.4	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	137	146	75	26	10
Future Volume (vph)	28	137	146	75	26	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.954		0.962	
Flt Protected		0.992			0.965	
Satd. Flow (prot)	0	1848	1777	0	1729	0
Flt Permitted		0.992			0.965	
Satd. Flow (perm)	0	1848	1777	0	1729	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	149	159	82	28	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	179	241	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.3%		ICU Level of Service A	
Analysis Period (min) 15			

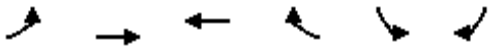
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	28	137	146	75	26	10
Future Vol, veh/h	28	137	146	75	26	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	149	159	82	28	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	240	0	-	0	409	199
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	210	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1327	-	-	-	599	842
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1327	-	-	-	584	842
Mov Cap-2 Maneuver	-	-	-	-	584	-
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	804	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1327	-	-	-	638
HCM Lane V/C Ratio	0.023	-	-	-	0.061
HCM Control Delay (s)	7.8	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	149	86	33	17	26
Future Volume (vph)	7	149	86	33	17	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.962		0.918	
Flt Protected		0.998			0.981	
Satd. Flow (prot)	0	1859	1792	0	1678	0
Flt Permitted		0.998			0.981	
Satd. Flow (perm)	0	1859	1792	0	1678	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	162	93	36	18	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	170	129	0	46	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.5%		ICU Level of Service A	
Analysis Period (min) 15			

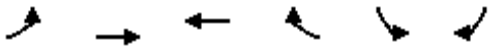
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	7	149	86	33	17	26
Future Vol, veh/h	7	149	86	33	17	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	162	93	36	18	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	129	0	-	0	288	111
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	177	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1457	-	-	-	702	942
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	854	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1457	-	-	-	698	942
Mov Cap-2 Maneuver	-	-	-	-	698	-
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	849	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1457	-	-	-	828
HCM Lane V/C Ratio	0.005	-	-	-	0.056
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	160	74	50	26	27
Future Volume (vph)	10	160	74	50	26	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.946		0.931	
Flt Protected		0.997			0.976	
Satd. Flow (prot)	0	1857	1762	0	1693	0
Flt Permitted		0.997			0.976	
Satd. Flow (perm)	0	1857	1762	0	1693	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	174	80	54	28	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	185	134	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.6%		ICU Level of Service A	
Analysis Period (min) 15			

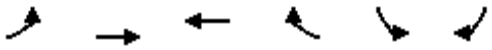
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	10	160	74	50	26	27
Future Vol, veh/h	10	160	74	50	26	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	174	80	54	28	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	135	0	-	0	304	108
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	196	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1449	-	-	-	688	946
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	837	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1449	-	-	-	682	946
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	830	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1449	-	-	-	795
HCM Lane V/C Ratio	0.008	-	-	-	0.072
HCM Control Delay (s)	7.5	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	168	108	50	27	42
Future Volume (vph)	12	168	108	50	27	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.957		0.917	
Flt Protected		0.997			0.981	
Satd. Flow (prot)	0	1857	1783	0	1676	0
Flt Permitted		0.997			0.981	
Satd. Flow (perm)	0	1857	1783	0	1676	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	183	117	54	29	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	196	171	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	12	168	108	50	27	42
Future Vol, veh/h	12	168	108	50	27	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	183	117	54	29	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	172	0	-	0	354	145
Stage 1	-	-	-	-	145	-
Stage 2	-	-	-	-	209	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1405	-	-	-	644	902
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	826	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1405	-	-	-	638	902
Mov Cap-2 Maneuver	-	-	-	-	638	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	818	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1405	-	-	-	776
HCM Lane V/C Ratio	0.009	-	-	-	0.097
HCM Control Delay (s)	7.6	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Buena Vista Road

Minor St: Cottonwood Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

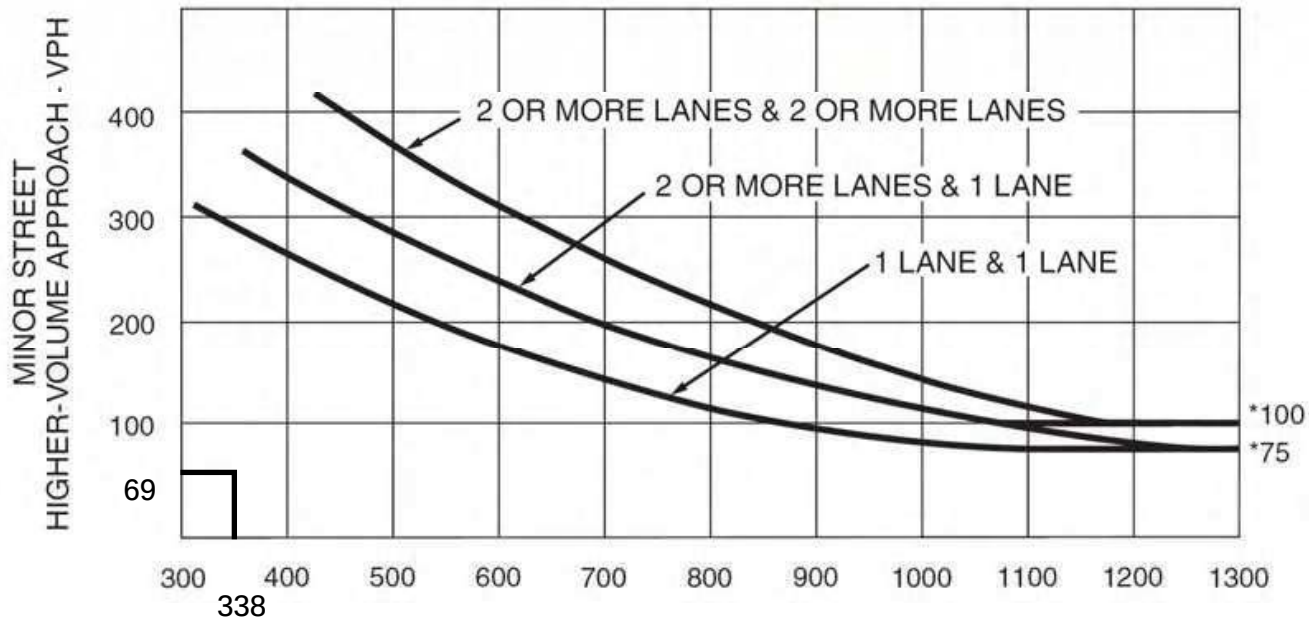
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 4056 / Minor Street 828	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 4056 / Minor Street 828	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 67% (A) 53% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Buena Vista Blvd & Cottonwood Rd. - PM Peak

Count Date: 1/8/2015

Ave Annual Growth: **2.62%**

Exist Peak Hour Volumes

U		
0	WBL	0
1	WBT	135
<	WBR	48
>	EBL	18
1	EBT	124
0	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
>	SBL	16
0	SBT	0
<	SBR	6
	TOTAL	347

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	156
WBR	115
EBL	44
EBT	150
EBR	0
NBL	0
NBT	0
NBR	0
SBL	41
SBT	0
SBR	15
TOTAL	521

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	260
WBR	115
EBL	62
EBT	196
EBR	0
NBL	0
NBT	0
NBR	0
SBL	50
SBT	0
SBR	19
TOTAL	702

Year 2025
Fut. Volumes w/o Proj

WBL	0
WBT	146
WBR	75
EBL	28
EBT	137
EBR	0
NBL	0
NBT	0
NBR	0
SBL	26
SBT	0
SBR	10
TOTAL	422

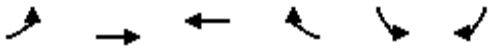
Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	198
WBR	75
EBL	37
EBT	160
EBR	0
NBL	0
NBT	0
NBR	0
SBL	31
SBT	0
SBR	12
TOTAL	513

Project Generated Trips - Year 2035

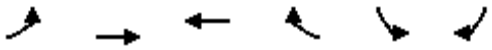
	Total
WBL	0
WBT	104
WBR	0
EBL	18
EBT	46
EBR	0
NBL	0
NBT	0
NBR	0
SBL	9
SBT	0
SBR	4
TOTAL	181

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Buena Vista Blvd & Cottonwood Rd. - PM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	2.437							
WB Approach (Away)	2.228							
EB Approach (To)	2.213							
EB Approach (Away)	2.422							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	0.015							
SB Approach (Away)	0.016							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	3.036		WBL	1.22	WBT	1.23	WBR	5.25
WB Approach (Away)	2.954		0.70%	0	0.72%	156	4.36%	115
EB Approach (To)	2.858		EBL	5.27	EBT	1.31	EBR	1.25
EB Approach (Away)	2.949		4.43%	44	0.93%	150	0.76%	0
NB Approach (To)	*1.2*		NBL	1.21	NBT	5.23	NBR	1.26
NB Approach (Away)	*1.2*		0.66%	0	4.30%	0	0.80%	0
SB Approach (To)	0.157		SBL	5.90	SBT	5.83	SBR	5.84
SB Approach (Away)	0.148		4.70%	41	4.53%	0	4.55%	15



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	18	124	135	48	16	6
Future Volume (vph)	18	124	135	48	16	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.965		0.961	
Flt Protected		0.994			0.966	
Satd. Flow (prot)	0	1852	1798	0	1729	0
Flt Permitted		0.994			0.966	
Satd. Flow (perm)	0	1852	1798	0	1729	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	135	147	52	17	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	155	199	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.9%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	137	146	75	26	10
Future Volume (vph)	28	137	146	75	26	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.954		0.962	
Flt Protected		0.992			0.965	
Satd. Flow (prot)	0	1848	1777	0	1729	0
Flt Permitted		0.992			0.965	
Satd. Flow (perm)	0	1848	1777	0	1729	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	149	159	82	28	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	179	241	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.3%		ICU Level of Service A	
Analysis Period (min) 15			

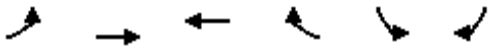
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	28	137	146	75	26	10
Future Vol, veh/h	28	137	146	75	26	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	149	159	82	28	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	240	0	-	0	409	199
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	210	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1327	-	-	-	599	842
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1327	-	-	-	584	842
Mov Cap-2 Maneuver	-	-	-	-	584	-
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	804	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1327	-	-	-	638
HCM Lane V/C Ratio	0.023	-	-	-	0.061
HCM Control Delay (s)	7.8	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	37	160	198	75	31	12
Future Volume (vph)	37	160	198	75	31	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.963		0.963	
Flt Protected		0.991			0.965	
Satd. Flow (prot)	0	1846	1794	0	1731	0
Flt Permitted		0.991			0.965	
Satd. Flow (perm)	0	1846	1794	0	1731	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	174	215	82	34	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	214	297	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.8%		ICU Level of Service A	
Analysis Period (min) 15			

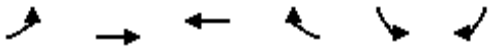
Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	37	160	198	75	31	12
Future Vol, veh/h	37	160	198	75	31	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	174	215	82	34	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	297	0	-	0	510	256
Stage 1	-	-	-	-	256	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1264	-	-	-	523	783
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1264	-	-	-	505	783
Mov Cap-2 Maneuver	-	-	-	-	505	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	760	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1264	-	-	-	561
HCM Lane V/C Ratio	0.032	-	-	-	0.083
HCM Control Delay (s)	7.9	0	-	-	12
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	44	150	156	115	41	15
Future Volume (vph)	44	150	156	115	41	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.943		0.965	
Flt Protected		0.989			0.964	
Satd. Flow (prot)	0	1842	1757	0	1733	0
Flt Permitted		0.989			0.964	
Satd. Flow (perm)	0	1842	1757	0	1733	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	163	170	125	45	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	211	295	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.9%		ICU Level of Service A	
Analysis Period (min) 15			

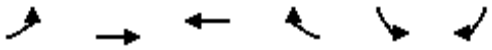
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	44	150	156	115	41	15
Future Vol, veh/h	44	150	156	115	41	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	163	170	125	45	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	295	0	-	0	491	232
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	259	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1266	-	-	-	537	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1266	-	-	-	514	807
Mov Cap-2 Maneuver	-	-	-	-	514	-
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	751	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1266	-	-	-	569
HCM Lane V/C Ratio	0.038	-	-	-	0.107
HCM Control Delay (s)	8	0	-	-	12.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	62	196	260	115	50	19
Future Volume (vph)	62	196	260	115	50	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.959		0.962	
Flt Protected		0.988			0.965	
Satd. Flow (prot)	0	1840	1786	0	1729	0
Flt Permitted		0.988			0.965	
Satd. Flow (perm)	0	1840	1786	0	1729	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		5264	5273		5342	
Travel Time (s)		65.3	65.4		66.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	213	283	125	54	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	280	408	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	62	196	260	115	50	19
Future Vol, veh/h	62	196	260	115	50	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	213	283	125	54	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	408	0	-	0	693	345
Stage 1	-	-	-	-	345	-
Stage 2	-	-	-	-	348	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1151	-	-	-	409	698
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	715	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1151	-	-	-	382	698
Mov Cap-2 Maneuver	-	-	-	-	382	-
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	668	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	15
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1151	-	-	-	436
HCM Lane V/C Ratio	0.059	-	-	-	0.172
HCM Control Delay (s)	8.3	0	-	-	15
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Cottonwood Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

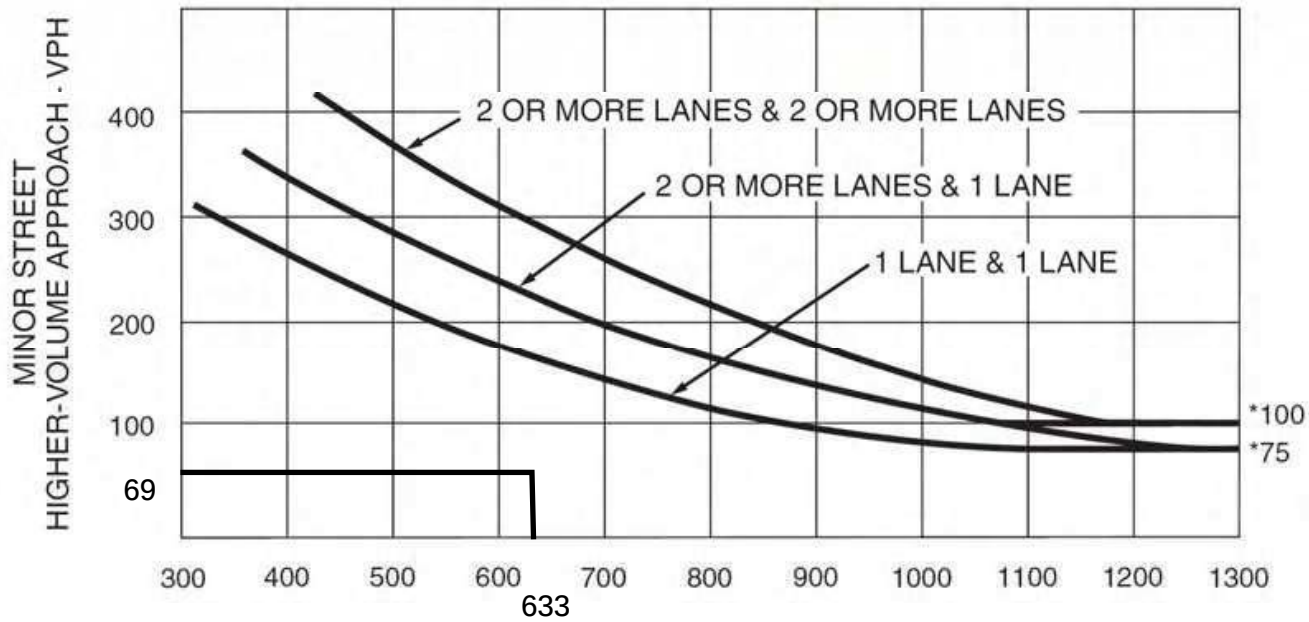
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 6330 / Minor Street 690	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 6330 / Minor Street 690	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X	2 CONDITIONS 80%	2 CONDITIONS 80%
No one condition satisfied, but following conditions fulfilled 80% or more..... 41% (A) 81% (B)		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Buena Vista & Adobe - AM Peak
Count Date: 1/8/2015

Ave Annual Growth: **1.89%**

Exist Peak Hour Volumes

U		
>	WBL	9
1	WBT	68
0	WBR	0
0	EBL	0
1	EBT	130
<	EBR	5
>	NBL	15
0	NBT	0
<	NBR	6
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	233

Year 2035
Fut. Volumes w/o Proj

WBL	10
WBT	80
WBR	0
EBL	0
EBT	159
EBR	6
NBL	17
NBT	0
NBR	7
SBL	0
SBT	0
SBR	0
TOTAL	279

Year 2035 Fut. Vol
+ Project Traffic

WBL	10
WBT	104
WBR	0
EBL	5
EBT	164
EBR	7
NBL	19
NBT	0
NBR	7
SBL	0
SBT	0
SBR	0
TOTAL	316

Year 2025
Fut. Volumes w/o Proj

WBL	10
WBT	74
WBR	0
EBL	0
EBT	144
EBR	5
NBL	16
NBT	0
NBR	7
SBL	0
SBT	0
SBR	0
TOTAL	256

Year 2025 Fut. Vol
+ Project Traffic

WBL	10
WBT	86
WBR	0
EBL	3
EBT	147
EBR	6
NBL	17
NBT	0
NBR	7
SBL	0
SBT	0
SBR	0
TOTAL	276

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	24
WBR	0
EBL	5
EBT	5
EBR	1
NBL	2
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	37

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Buena Vista & Adobe - AM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	2.441							
WB Approach (Away)	2.234							
EB Approach (To)	2.227							
EB Approach (Away)	2.435							
NB Approach (To)	1							
NB Approach (Away)	1							
SB Approach (To)	0.018							
SB Approach (Away)	0.017							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	3.046		WBL	1.22	WBT	1.25	WBR	2.89
WB Approach (Away)	2.963		0.70%	10	0.77%	80	3.05%	0
EB Approach (To)	2.964		EBL	2.93	EBT	1.33	EBR	1.27
EB Approach (Away)	3.046		3.17%	0	0.98%	159	0.81%	6
NB Approach (To)	1.2		NBL	1.23	NBT	2.86	NBR	1.26
NB Approach (Away)	1.2		0.70%	17	2.99%	0	0.80%	7
SB Approach (To)	0.075		SBL	2.75	SBT	2.68	SBR	2.71
SB Approach (Away)	0.077		3.01%	0	2.84%	0	2.91%	0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	130	5	9	68	15	6
Future Volume (vph)	130	5	9	68	15	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995				0.959	
Flt Protected				0.994	0.966	
Satd. Flow (prot)	1853	0	0	1852	1726	0
Flt Permitted				0.994	0.966	
Satd. Flow (perm)	1853	0	0	1852	1726	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	5	10	74	16	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	146	0	0	84	23	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	130	5	9	68	15	6
Future Vol, veh/h	130	5	9	68	15	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	141	5	10	74	16	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	147	0	237	144
Stage 1	-	-	-	-	144	-
Stage 2	-	-	-	-	93	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1435	-	751	903
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	931	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1435	-	746	903
Mov Cap-2 Maneuver	-	-	-	-	746	-
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	924	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	785	-	-	1435	-
HCM Lane V/C Ratio	0.029	-	-	0.007	-
HCM Control Delay (s)	9.7	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	146	8	3	155	36	89
Future Volume (vph)	146	8	3	155	36	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.904	
Flt Protected				0.999	0.986	
Satd. Flow (prot)	1850	0	0	1861	1660	0
Flt Permitted				0.999	0.986	
Satd. Flow (perm)	1850	0	0	1861	1660	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	9	3	168	39	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	168	0	0	171	136	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	146	8	3	155	36	89
Future Vol, veh/h	146	8	3	155	36	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	9	3	168	39	97

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	338	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1411	-	658	882
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1411	-	657	882
Mov Cap-2 Maneuver	-	-	-	-	657	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	853	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1411	-
HCM Lane V/C Ratio	0.169	-	-	0.002	-
HCM Control Delay (s)	10.4	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	147	6	10	86	17	7
Future Volume (vph)	147	6	10	86	17	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.958	
Flt Protected				0.995	0.967	
Satd. Flow (prot)	1852	0	0	1853	1726	0
Flt Permitted				0.995	0.967	
Satd. Flow (perm)	1852	0	0	1853	1726	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	7	11	93	18	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	167	0	0	104	26	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	147	6	10	86	17	7
Future Vol, veh/h	147	6	10	86	17	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	160	7	11	93	18	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	166	0	278	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	115	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1412	-	712	882
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	910	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	706	882
Mov Cap-2 Maneuver	-	-	-	-	706	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	903	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	750	-	-	1412	-
HCM Lane V/C Ratio	0.035	-	-	0.008	-
HCM Control Delay (s)	10	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	159	6	10	80	17	7
Future Volume (vph)	159	6	10	80	17	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995				0.958	
Flt Protected				0.994	0.967	
Satd. Flow (prot)	1853	0	0	1852	1726	0
Flt Permitted				0.994	0.967	
Satd. Flow (perm)	1853	0	0	1852	1726	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	7	11	87	18	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	0	0	98	26	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	159	6	10	80	17	7
Future Vol, veh/h	159	6	10	80	17	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	7	11	87	18	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	179	0	285	176
Stage 1	-	-	-	-	176	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1397	-	705	867
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1397	-	699	867
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	909	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	741	-	-	1397	-
HCM Lane V/C Ratio	0.035	-	-	0.008	-
HCM Control Delay (s)	10	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	164	7	10	104	19	7
Future Volume (vph)	164	7	10	104	19	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.963	
Flt Protected				0.996	0.965	
Satd. Flow (prot)	1852	0	0	1855	1731	0
Flt Permitted				0.996	0.965	
Satd. Flow (perm)	1852	0	0	1855	1731	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	8	11	113	21	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	186	0	0	124	29	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	164	7	10	104	19	7
Future Vol, veh/h	164	7	10	104	19	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	178	8	11	113	21	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	186	0	317	182
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	135	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1388	-	676	861
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	891	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1388	-	671	861
Mov Cap-2 Maneuver	-	-	-	-	671	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	884	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	713	-	-	1388	-
HCM Lane V/C Ratio	0.04	-	-	0.008	-
HCM Control Delay (s)	10.3	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Buena Vista Road

Minor St: Adobe Road

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

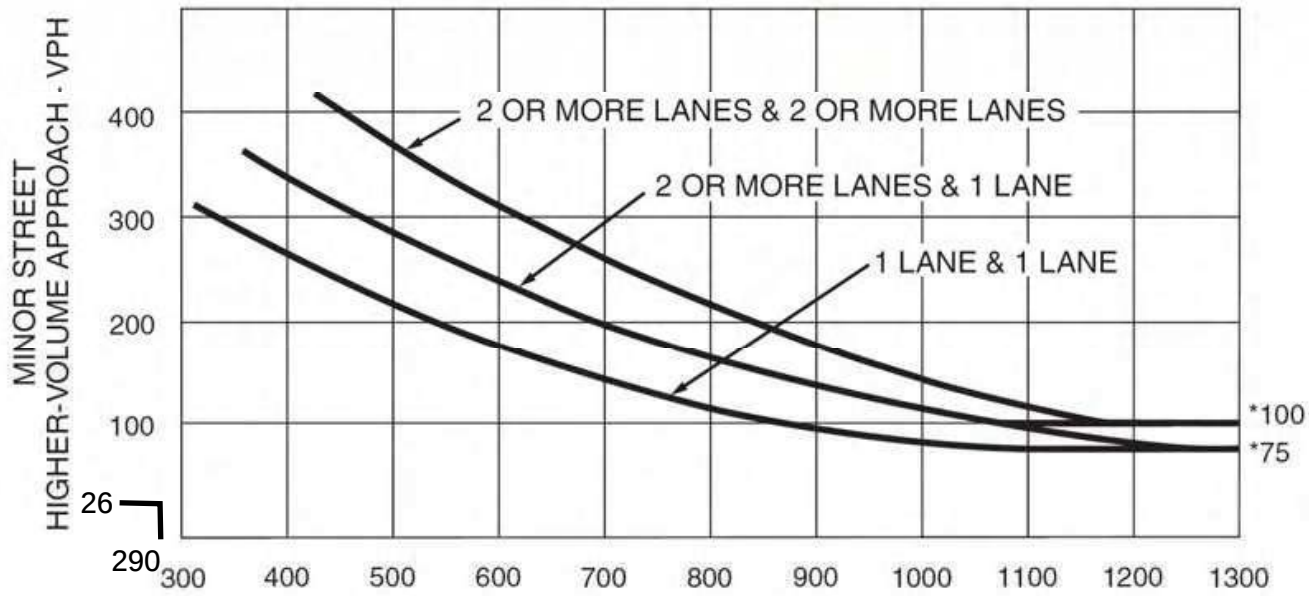
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 3480 / Minor Street 312	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 3480 / Minor Street 312	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied ____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 62% (A) 41% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Buena Vista & Adobe - PM Peak
Count Date: 1/8/2015

Ave Annual Growth: **1.89%**

Exist Peak Hour Volumes

U		
>	WBL	3
1	WBT	143
0	WBR	0
>	EBL	0
1	EBT	132
<	EBR	7
>	NBL	33
0	NBT	1
<	NBR	82
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	401

Year 2035
Fut. Volumes w/o Proj

WBL	3
WBT	167
WBR	0
EBL	0
EBT	161
EBR	8
NBL	38
NBT	2
NBR	97
SBL	0
SBT	0
SBR	0
TOTAL	476

Year 2035 Fut. Vol
+ Project Traffic

WBL	3
WBT	251
WBR	0
EBL	8
EBT	189
EBR	17
NBL	41
NBT	2
NBR	97
SBL	0
SBT	0
SBR	0
TOTAL	608

Year 2025
Fut. Volumes w/o Proj

WBL	3
WBT	155
WBR	0
EBL	0
EBT	146
EBR	8
NBL	36
NBT	1
NBR	89
SBL	0
SBT	0
SBR	0
TOTAL	438

Year 2025 Fut. Vol
+ Project Traffic

WBL	3
WBT	197
WBR	0
EBL	4
EBT	160
EBR	13
NBL	38
NBT	1
NBR	89
SBL	0
SBT	0
SBR	0
TOTAL	505

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	84
WBR	0
EBL	8
EBT	28
EBR	9
NBL	3
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	132

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Buena Vista & Adobe - PM Peak						
	Count Date:	1/8/2015						
2006	ADT							
WB Approach (To)	2.441							
WB Approach (Away)	2.234							
EB Approach (To)	2.227							
EB Approach (Away)	2.435							
NB Approach (To)	*1*							
NB Approach (Away)	*1*							
SB Approach (To)	0.018							
SB Approach (Away)	0.017							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	3.046		WBL	1.22	WBT	1.25	WBR	2.89
WB Approach (Away)	2.963		0.70%	3	0.77%	167	3.05%	0
EB Approach (To)	2.964		EBL	2.93	EBT	1.33	EBR	1.27
EB Approach (Away)	3.046		3.17%	0	0.98%	161	0.81%	8
NB Approach (To)	*1.2*		NBL	1.23	NBT	2.86	NBR	1.26
NB Approach (Away)	*1.2*		0.70%	38	2.99%	2	0.80%	97
SB Approach (To)	0.075		SBL	2.75	SBT	2.68	SBR	2.71
SB Approach (Away)	0.077		3.01%	0	2.84%	0	2.91%	0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	132	7	3	143	33	82
Future Volume (vph)	132	7	3	143	33	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.904	
Flt Protected				0.999	0.986	
Satd. Flow (prot)	1850	0	0	1861	1660	0
Flt Permitted				0.999	0.986	
Satd. Flow (perm)	1850	0	0	1861	1660	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	8	3	155	36	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	0	158	125	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	132	7	3	143	33	82
Future Vol, veh/h	132	7	3	143	33	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	8	3	155	36	89

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	151	0	309	147
Stage 1	-	-	-	-	147	-
Stage 2	-	-	-	-	162	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1430	-	683	900
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	867	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1430	-	682	900
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	865	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	824	-	-	1430	-
HCM Lane V/C Ratio	0.152	-	-	0.002	-
HCM Control Delay (s)	10.1	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	146	8	3	155	36	89
Future Volume (vph)	146	8	3	155	36	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.904	
Flt Protected				0.999	0.986	
Satd. Flow (prot)	1850	0	0	1861	1660	0
Flt Permitted				0.999	0.986	
Satd. Flow (perm)	1850	0	0	1861	1660	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	9	3	168	39	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	168	0	0	171	136	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	146	8	3	155	36	89
Future Vol, veh/h	146	8	3	155	36	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	9	3	168	39	97

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	338	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1411	-	658	882
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1411	-	657	882
Mov Cap-2 Maneuver	-	-	-	-	657	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	853	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1411	-
HCM Lane V/C Ratio	0.169	-	-	0.002	-
HCM Control Delay (s)	10.4	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	160	13	3	197	38	89
Future Volume (vph)	160	13	3	197	38	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990				0.905	
Flt Protected				0.999	0.985	
Satd. Flow (prot)	1844	0	0	1861	1660	0
Flt Permitted				0.999	0.985	
Satd. Flow (perm)	1844	0	0	1861	1660	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	14	3	214	41	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	0	217	138	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	160	13	3	197	38	89
Future Vol, veh/h	160	13	3	197	38	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	174	14	3	214	41	97

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	188	0	402	181
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	221	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1386	-	604	862
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	816	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1386	-	603	862
Mov Cap-2 Maneuver	-	-	-	-	603	-
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	814	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	764	-	-	1386	-
HCM Lane V/C Ratio	0.181	-	-	0.002	-
HCM Control Delay (s)	10.7	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	161	8	3	167	38	97
Future Volume (vph)	161	8	3	167	38	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.903	
Flt Protected				0.999	0.986	
Satd. Flow (prot)	1850	0	0	1861	1659	0
Flt Permitted				0.999	0.986	
Satd. Flow (perm)	1850	0	0	1861	1659	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	9	3	182	41	105
Shared Lane Traffic (%)						
Lane Group Flow (vph)	184	0	0	185	146	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	161	8	3	167	38	97
Future Vol, veh/h	161	8	3	167	38	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	175	9	3	182	41	105

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	184	0	367	179
Stage 1	-	-	-	-	179	-
Stage 2	-	-	-	-	188	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1391	-	633	864
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	844	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1391	-	632	864
Mov Cap-2 Maneuver	-	-	-	-	632	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	842	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	783	-	-	1391	-
HCM Lane V/C Ratio	0.187	-	-	0.002	-
HCM Control Delay (s)	10.7	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	189	17	3	251	41	97
Future Volume (vph)	189	17	3	251	41	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989				0.905	
Flt Protected				0.999	0.985	
Satd. Flow (prot)	1842	0	0	1861	1660	0
Flt Permitted				0.999	0.985	
Satd. Flow (perm)	1842	0	0	1861	1660	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	5273			472	757	
Travel Time (s)	65.4			5.9	9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	205	18	3	273	45	105
Shared Lane Traffic (%)						
Lane Group Flow (vph)	223	0	0	276	150	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	189	17	3	251	41	97
Future Vol, veh/h	189	17	3	251	41	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	205	18	3	273	45	105

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	224	0	494	215
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	279	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1345	-	535	825
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	768	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1345	-	533	825
Mov Cap-2 Maneuver	-	-	-	-	533	-
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	766	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	710	-	-	1345	-
HCM Lane V/C Ratio	0.211	-	-	0.002	-
HCM Control Delay (s)	11.4	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Houghton Road

Minor St: Adobe Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

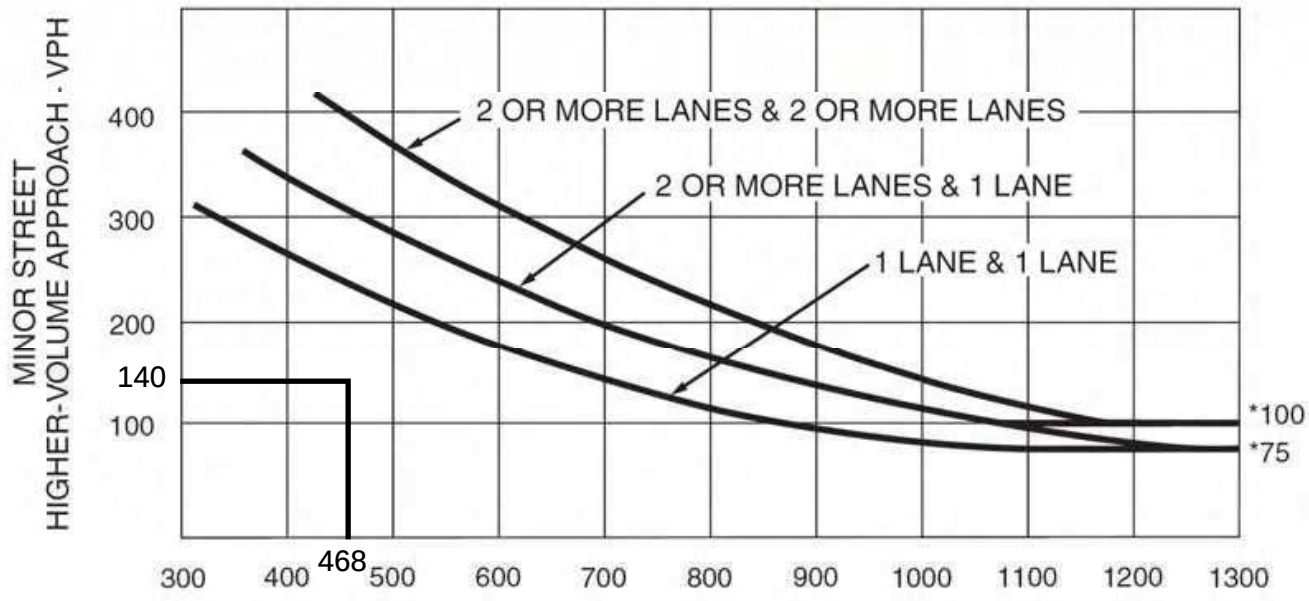
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 4680 / Minor Street 1400	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street 4680 / Minor Street 1400	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 84% (A) 56% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park
Job No: 6012.01
Intersection: Shafter & South Union - AM Peak
Count Date: 1/27/2015

Ave Annual Growth: **3.35%**

Exist Peak Hour Volumes

U		
>	WBL	1
1	WBT	0
<	WBR	17
>	EBL	2
1	EBT	0
<	EBR	3
1	NBL	0
2	NBT	42
<	NBR	3
>	SBL	11
2	SBT	64
<	SBR	2
	TOTAL	145

Year 2035 Fut. Volumes w/o Proj

WBL	2
WBT	0
WBR	33
EBL	4
EBT	0
EBR	6
NBL	0
NBT	82
NBR	6
SBL	22
SBT	125
SBR	4
TOTAL	284

Year 2035 Fut. Vol + Project Traffic

WBL	2
WBT	2
WBR	39
EBL	4
EBT	1
EBR	6
NBL	2
NBT	104
NBR	6
SBL	24
SBT	139
SBR	5
TOTAL	334

Year 2025 Fut. Volumes w/o Proj

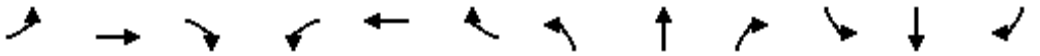
WBL	1
WBT	0
WBR	24
EBL	3
EBT	0
EBR	4
NBL	0
NBT	59
NBR	4
SBL	16
SBT	90
SBR	3
TOTAL	204

Year 2025 Fut. Vol + Project Traffic

WBL	1
WBT	1
WBR	27
EBL	3
EBT	1
EBR	4
NBL	1
NBT	70
NBR	4
SBL	17
SBT	97
SBR	4
TOTAL	230

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	2
WBR	6
EBL	0
EBT	1
EBR	0
NBL	2
NBT	22
NBR	0
SBL	2
SBT	14
SBR	1
TOTAL	50



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.919			0.872			0.991			0.996	
Flt Protected		0.980			0.997					0.950		
Satd. Flow (prot)	0	1678	0	0	1619	0	1863	3507	0	1770	3525	0
Flt Permitted		0.980			0.997					0.950		
Satd. Flow (perm)	0	1678	0	0	1619	0	1863	3507	0	1770	3525	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		666			225			5322			5300	
Travel Time (s)		15.1			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	2	0	3	1	0	17	0	42	3	11	64	2
Future Vol, veh/h	2	0	3	1	0	17	0	42	3	11	64	2
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	3	1	0	18	0	46	3	12	70	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	118	144	36	106	143	24	72	0	0	49	0	0
Stage 1	95	95	-	47	47	-	-	-	-	-	-	-
Stage 2	23	49	-	59	96	-	-	-	-	-	-	-
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	846	746	1029	862	747	1047	1526	-	-	1556	-	-
Stage 1	901	815	-	961	855	-	-	-	-	-	-	-
Stage 2	992	853	-	946	815	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	826	740	1029	854	741	1047	1526	-	-	1556	-	-
Mov Cap-2 Maneuver	826	740	-	854	741	-	-	-	-	-	-	-
Stage 1	901	809	-	961	855	-	-	-	-	-	-	-
Stage 2	974	853	-	936	809	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	8.5	0	1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1526	-	-	937	1034	1556	-	-
HCM Lane V/C Ratio	-	-	-	0.006	0.019	0.008	-	-
HCM Control Delay (s)	0	-	-	8.9	8.5	7.3	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.923			0.870			0.991			0.996	
Flt Protected		0.979			0.998					0.950		
Satd. Flow (prot)	0	1683	0	0	1617	0	1863	3507	0	1770	3525	0
Flt Permitted		0.979			0.998					0.950		
Satd. Flow (perm)	0	1683	0	0	1617	0	1863	3507	0	1770	3525	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

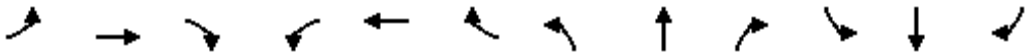
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	0	4	1	0	24	0	59	4	16	90	3
Future Vol, veh/h	3	0	4	1	0	24	0	59	4	16	90	3
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	4	1	0	26	0	64	4	17	98	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	166	202	51	150	202	34	101	0	0	68	0	0
Stage 1	134	134	-	66	66	-	-	-	-	-	-	-
Stage 2	32	68	-	84	136	-	-	-	-	-	-	-
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	783	693	1006	803	693	1032	1489	-	-	1531	-	-
Stage 1	855	785	-	937	839	-	-	-	-	-	-	-
Stage 2	980	838	-	915	783	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	757	685	1006	793	685	1032	1489	-	-	1531	-	-
Mov Cap-2 Maneuver	757	685	-	793	685	-	-	-	-	-	-	-
Stage 1	855	776	-	937	839	-	-	-	-	-	-	-
Stage 2	955	838	-	901	774	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	8.6	0	1.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1489	-	-	882	1020	1531	-	-
HCM Lane V/C Ratio	-	-	-	0.009	0.027	0.011	-	-
HCM Control Delay (s)	0	-	-	9.1	8.6	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.932			0.874			0.992			0.994	
Flt Protected		0.982			0.998		0.950			0.950		
Satd. Flow (prot)	0	1705	0	0	1625	0	1770	3511	0	1770	3518	0
Flt Permitted		0.982			0.998		0.950			0.950		
Satd. Flow (perm)	0	1705	0	0	1625	0	1770	3511	0	1770	3518	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

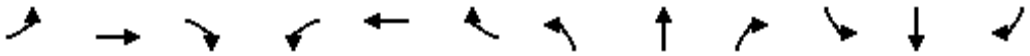
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	1	4	1	1	27	1	70	4	17	97	4
Future Vol, veh/h	3	1	4	1	1	27	1	70	4	17	97	4
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	1	4	1	1	29	1	76	4	18	105	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	186	228	55	170	227	40	110	0	0	80	0	0
Stage 1	145	145	-	80	80	-	-	-	-	-	-	-
Stage 2	41	83	-	90	147	-	-	-	-	-	-	-
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	758	670	1000	778	671	1022	1478	-	-	1516	-	-
Stage 1	843	776	-	919	828	-	-	-	-	-	-	-
Stage 2	968	825	-	907	774	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	728	662	1000	766	663	1022	1478	-	-	1516	-	-
Mov Cap-2 Maneuver	728	662	-	766	663	-	-	-	-	-	-	-
Stage 1	842	767	-	918	827	-	-	-	-	-	-	-
Stage 2	938	824	-	891	765	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	8.7	0.1	1.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1478	-	-	831	992	1516	-	-
HCM Lane V/C Ratio	0.001	-	-	0.01	0.032	0.012	-	-
HCM Control Delay (s)	7.4	-	-	9.4	8.7	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.914			0.872			0.989			0.996	
Flt Protected		0.982			0.997					0.950		
Satd. Flow (prot)	0	1672	0	0	1619	0	1863	3500	0	1770	3525	0
Flt Permitted		0.982			0.997					0.950		
Satd. Flow (perm)	0	1672	0	0	1619	0	1863	3500	0	1770	3525	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

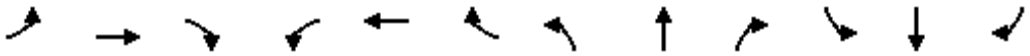
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	0	6	2	0	33	0	82	6	22	125	4
Future Vol, veh/h	4	0	6	2	0	33	0	82	6	22	125	4
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	7	2	0	36	0	89	7	24	136	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	231	282	70	208	280	48	140	0	0	96	0	0
Stage 1	186	186	-	92	92	-	-	-	-	-	-	-
Stage 2	45	96	-	116	188	-	-	-	-	-	-	-
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	704	625	978	731	627	1011	1441	-	-	1496	-	-
Stage 1	798	745	-	905	818	-	-	-	-	-	-	-
Stage 2	963	815	-	876	743	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	671	615	978	717	617	1011	1441	-	-	1496	-	-
Mov Cap-2 Maneuver	671	615	-	717	617	-	-	-	-	-	-	-
Stage 1	798	733	-	905	818	-	-	-	-	-	-	-
Stage 2	929	815	-	856	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	8.8	0	1.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1441	-	-	827	988	1496	-	-
HCM Lane V/C Ratio	-	-	-	0.013	0.039	0.016	-	-
HCM Control Delay (s)	0	-	-	9.4	8.8	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.921			0.877			0.991			0.995	
Flt Protected		0.984			0.998		0.950			0.950		
Satd. Flow (prot)	0	1688	0	0	1630	0	1770	3507	0	1770	3522	0
Flt Permitted		0.984			0.998		0.950			0.950		
Satd. Flow (perm)	0	1688	0	0	1630	0	1770	3507	0	1770	3522	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	1	6	2	2	39	2	104	6	24	139	5
Future Vol, veh/h	4	1	6	2	2	39	2	104	6	24	139	5
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	1	7	2	2	42	2	113	7	26	151	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	268	330	78	249	330	60	157	0	0	120	0	0
Stage 1	206	206	-	121	121	-	-	-	-	-	-	-
Stage 2	62	124	-	128	209	-	-	-	-	-	-	-
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	663	588	967	684	588	993	1420	-	-	1466	-	-
Stage 1	777	730	-	870	795	-	-	-	-	-	-	-
Stage 2	942	792	-	862	728	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	624	577	967	669	577	993	1420	-	-	1466	-	-
Mov Cap-2 Maneuver	624	577	-	669	577	-	-	-	-	-	-	-
Stage 1	776	717	-	869	794	-	-	-	-	-	-	-
Stage 2	898	791	-	840	715	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9	0.1	1.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1420	-	-	767	940	1466	-	-
HCM Lane V/C Ratio	0.002	-	-	0.016	0.05	0.018	-	-
HCM Control Delay (s)	7.5	-	-	9.8	9	7.5	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: South Union Avenue

Minor St: Shafter Road

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

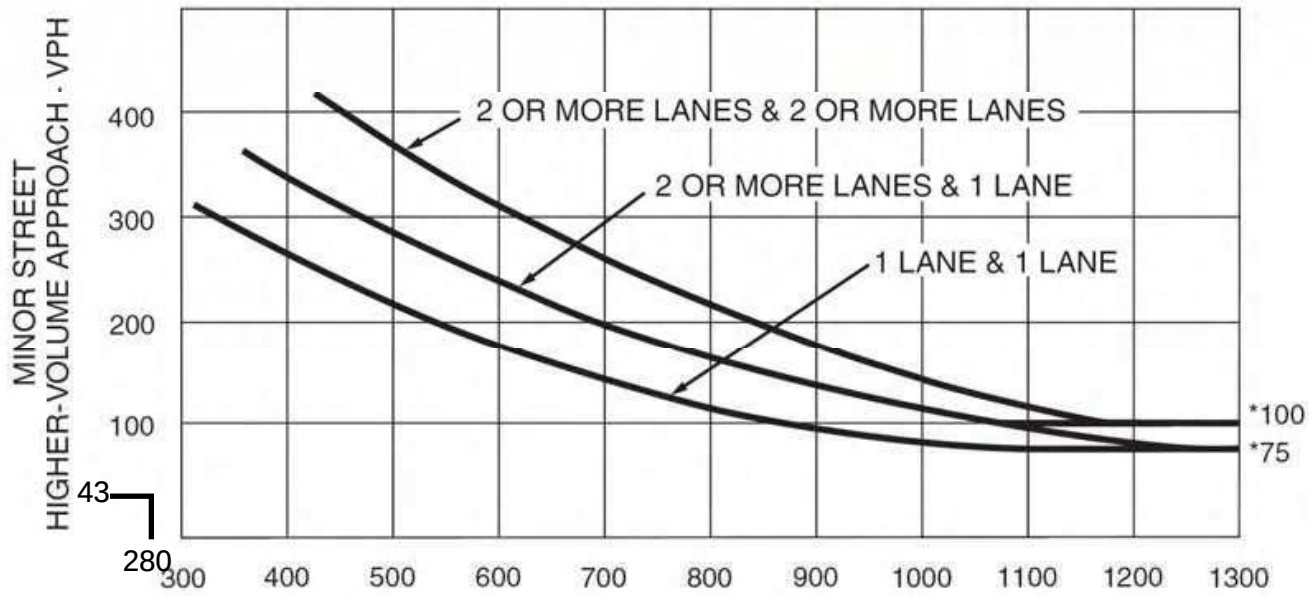
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 3360 1..... 516	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 3360 1..... 516	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied ____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 50% (A) 61% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Shafter Road & South Union Ave - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **3.35%**

Exist Peak Hour Volumes

U		
>	WBL	0
0	WBT	1
<	WBR	8
0	EBL	1
0	EBT	0
0	EBR	0
0	NBL	1
1	NBT	172
<	NBR	0
>	SBL	4
1	SBT	63
0	SBR	2
	TOTAL	252

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	2
WBR	16
EBL	2
EBT	0
EBR	0
NBL	2
NBT	337
NBR	0
SBL	8
SBT	124
SBR	4
TOTAL	495

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	4
WBR	21
EBL	4
EBT	11
EBR	3
NBL	4
NBT	355
NBR	0
SBL	18
SBT	160
SBR	4
TOTAL	584

Year 2025
Fut. Volumes w/o Proj

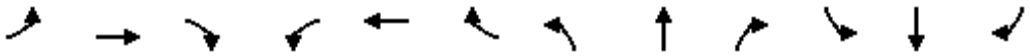
WBL	0
WBT	1
WBR	11
EBL	1
EBT	0
EBR	0
NBL	1
NBT	243
NBR	0
SBL	6
SBT	89
SBR	3
TOTAL	355

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	2
WBR	14
EBL	2
EBT	6
EBR	2
NBL	2
NBT	252
NBR	0
SBL	11
SBT	107
SBR	3
TOTAL	401

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	2
WBR	5
EBL	2
EBT	11
EBR	3
NBL	2
NBT	18
NBR	0
SBL	10
SBT	36
SBR	0
TOTAL	89



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt					0.878						0.996	
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1770	0	0	1635	0	1770	3539	0	1770	3525	0
Flt Permitted		0.950					0.950			0.950		
Satd. Flow (perm)	0	1770	0	0	1635	0	1770	3539	0	1770	3525	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		2650			225			5322			5300	
Travel Time (s)		60.2			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

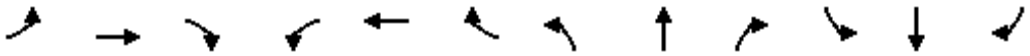
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	1	0	0	0	1	8	1	172	0	4	63	2
Future Vol, veh/h	1	0	0	0	1	8	1	172	0	4	63	2
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	1	9	1	187	0	4	68	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	174	267	35	232	268	93	71	0	0	187	0	0
Stage 1	78	78	-	189	189	-	-	-	-	-	-	-
Stage 2	96	189	-	43	79	-	-	-	-	-	-	-
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	773	638	1030	703	637	946	1527	-	-	1385	-	-
Stage 1	922	829	-	795	743	-	-	-	-	-	-	-
Stage 2	900	743	-	966	829	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	763	636	1030	701	635	946	1527	-	-	1385	-	-
Mov Cap-2 Maneuver	763	636	-	701	635	-	-	-	-	-	-	-
Stage 1	921	827	-	794	743	-	-	-	-	-	-	-
Stage 2	890	743	-	963	827	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.1	0	0.4
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1527	-	-	763	897	1385	-	-
HCM Lane V/C Ratio	0.001	-	-	0.001	0.011	0.003	-	-
HCM Control Delay (s)	7.4	-	-	9.7	9.1	7.6	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt					0.875						0.995	
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1770	0	0	1630	0	1770	3539	0	1770	3522	0
Flt Permitted		0.950					0.950			0.950		
Satd. Flow (perm)	0	1770	0	0	1630	0	1770	3539	0	1770	3522	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

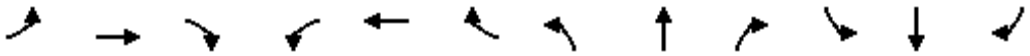
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	1	0	0	0	1	11	1	243	0	6	89	3
Future Vol, veh/h	1	0	0	0	1	11	1	243	0	6	89	3
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	1	12	1	264	0	7	97	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	246	377	50	327	379	132	100	0	0	264	0	0
Stage 1	111	111	-	266	266	-	-	-	-	-	-	-
Stage 2	135	266	-	61	113	-	-	-	-	-	-	-
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	687	553	1008	602	552	893	1490	-	-	1297	-	-
Stage 1	882	803	-	716	687	-	-	-	-	-	-	-
Stage 2	854	687	-	943	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	674	550	1008	599	549	893	1490	-	-	1297	-	-
Mov Cap-2 Maneuver	674	550	-	599	549	-	-	-	-	-	-	-
Stage 1	881	799	-	716	687	-	-	-	-	-	-	-
Stage 2	841	687	-	938	797	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	9.3	0	0.5
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1490	-	-	674	849	1297	-	-
HCM Lane V/C Ratio	0.001	-	-	0.002	0.015	0.005	-	-
HCM Control Delay (s)	7.4	-	-	10.4	9.3	7.8	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.975			0.881						0.996	
Flt Protected		0.991					0.950			0.950		
Satd. Flow (prot)	0	1800	0	0	1641	0	1770	3539	0	1770	3525	0
Flt Permitted		0.991					0.950			0.950		
Satd. Flow (perm)	0	1800	0	0	1641	0	1770	3539	0	1770	3525	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

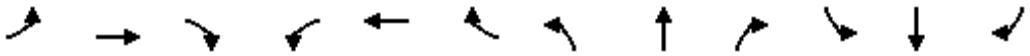
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	2	6	2	0	2	14	2	252	0	11	107	3
Future Vol, veh/h	2	6	2	0	2	14	2	252	0	11	107	3
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	7	2	0	2	15	2	274	0	12	116	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	284	420	60	363	421	137	120	0	0	274	0	0
Stage 1	142	142	-	278	278	-	-	-	-	-	-	-
Stage 2	142	278	-	85	143	-	-	-	-	-	-	-
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	646	523	993	568	522	886	1466	-	-	1286	-	-
Stage 1	846	778	-	705	679	-	-	-	-	-	-	-
Stage 2	846	679	-	913	778	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	628	517	993	557	516	886	1466	-	-	1286	-	-
Mov Cap-2 Maneuver	628	517	-	557	516	-	-	-	-	-	-	-
Stage 1	845	771	-	704	678	-	-	-	-	-	-	-
Stage 2	828	678	-	895	771	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	9.5	0.1	0.7
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1466	-	-	595	813	1286	-	-
HCM Lane V/C Ratio	0.001	-	-	0.018	0.021	0.009	-	-
HCM Control Delay (s)	7.5	-	-	11.2	9.5	7.8	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt					0.879						0.996	
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1770	0	0	1637	0	1770	3539	0	1770	3525	0
Flt Permitted		0.950					0.950			0.950		
Satd. Flow (perm)	0	1770	0	0	1637	0	1770	3539	0	1770	3525	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	2	0	0	0	2	16	2	337	0	8	124	4
Future Vol, veh/h	2	0	0	0	2	16	2	337	0	8	124	4
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	0	0	2	17	2	366	0	9	135	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	343	525	70	456	528	183	139	0	0	366	0	0
Stage 1	154	154	-	371	371	-	-	-	-	-	-	-
Stage 2	189	371	-	85	157	-	-	-	-	-	-	-
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	587	456	978	488	454	828	1442	-	-	1189	-	-
Stage 1	833	769	-	622	618	-	-	-	-	-	-	-
Stage 2	795	618	-	913	767	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	569	452	978	485	450	828	1442	-	-	1189	-	-
Mov Cap-2 Maneuver	569	452	-	485	450	-	-	-	-	-	-	-
Stage 1	832	763	-	621	617	-	-	-	-	-	-	-
Stage 2	774	617	-	906	761	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	9.9	0	0.5
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1442	-	-	569	757	1189	-	-
HCM Lane V/C Ratio	0.002	-	-	0.004	0.026	0.007	-	-
HCM Control Delay (s)	7.5	-	-	11.4	9.9	8.1	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	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
Ped Bike Factor												
Frt		0.979			0.885						0.997	
Flt Protected		0.990					0.950			0.950		
Satd. Flow (prot)	0	1805	0	0	1649	0	1770	3539	0	1770	3529	0
Flt Permitted		0.990					0.950			0.950		
Satd. Flow (perm)	0	1805	0	0	1649	0	1770	3539	0	1770	3529	0
Link Speed (mph)		30			30			55			55	
Link Distance (ft)		1174			225			5322			5300	
Travel Time (s)		26.7			5.1			66.0			65.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	11	3	0	4	21	4	355	0	18	160	4
Future Vol, veh/h	4	11	3	0	4	21	4	355	0	18	160	4
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	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	12	3	0	4	23	4	386	0	20	174	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	419	610	89	527	612	193	178	0	0	386	0	0
Stage 1	215	215	-	395	395	-	-	-	-	-	-	-
Stage 2	204	395	-	132	217	-	-	-	-	-	-	-
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	518	408	951	434	407	816	1395	-	-	1169	-	-
Stage 1	767	724	-	602	603	-	-	-	-	-	-	-
Stage 2	779	603	-	858	722	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	492	400	951	416	399	816	1395	-	-	1169	-	-
Mov Cap-2 Maneuver	492	400	-	416	399	-	-	-	-	-	-	-
Stage 1	765	712	-	600	601	-	-	-	-	-	-	-
Stage 2	750	601	-	826	710	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	10.4	0.1	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1395	-	-	464	699	1169	-	-
HCM Lane V/C Ratio	0.003	-	-	0.042	0.039	0.017	-	-
HCM Control Delay (s)	7.6	-	-	13.1	10.4	8.1	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	-	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: South Union Avenue

Minor St: Shafter Road

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

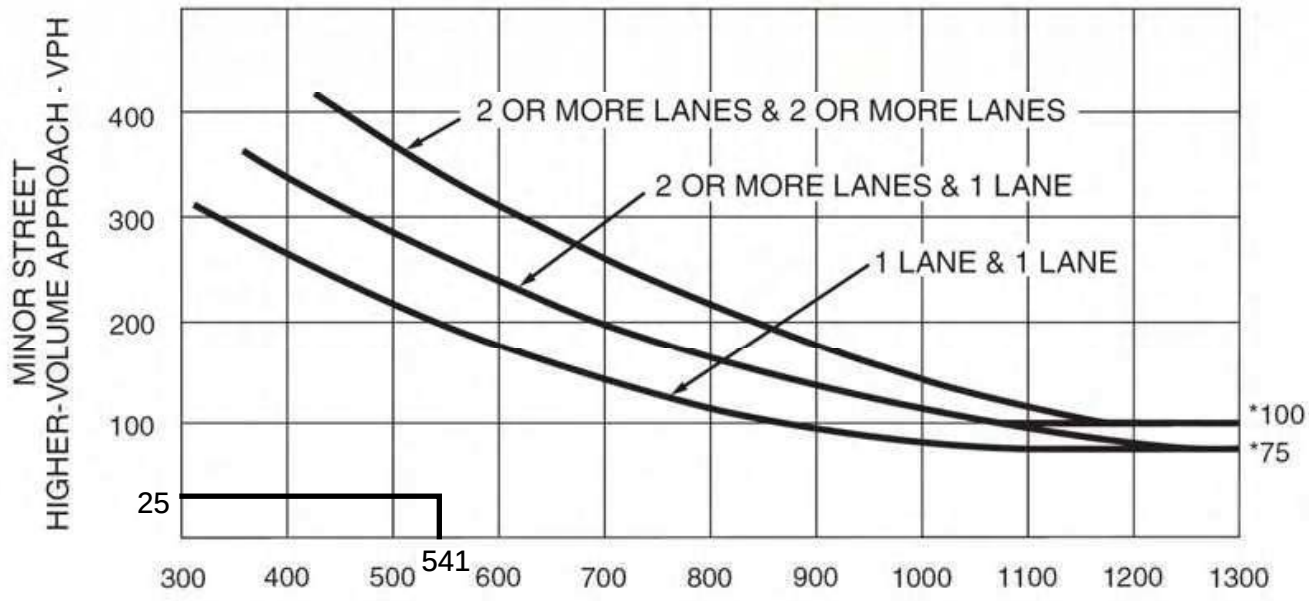
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More 5410 1 250	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More 5410 1 250	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 81% (A) 54% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & SR 99 SB On/Off Ramp @ Costajo - AM Peak

Count Date: 1/28/2015

Ave Annual Growth: **3.36%**

Exist Peak Hour Volumes

U		
1	WBL	190
0	WBT	0
1	WBR	28
0	EBL	0
0	EBT	0
0	EBR	0
0	NBL	0
1	NBT	21
<	NBR	11
>	SBL	13
1	SBT	32
0	SBR	0
	TOTAL	295

Year 2035
Fut. Volumes w/o Proj

WBL	589
WBT	0
WBR	73
EBL	0
EBT	0
EBR	0
NBL	0
NBT	56
NBR	37
SBL	35
SBT	82
SBR	0
TOTAL	872

Year 2035 Fut. Vol
+ Project Traffic

WBL	589
WBT	0
WBR	73
EBL	0
EBT	0
EBR	0
NBL	0
NBT	56
NBR	39
SBL	35
SBT	82
SBR	0
TOTAL	874

Year 2025
Fut. Volumes w/o Proj

WBL	339
WBT	0
WBR	46
EBL	0
EBT	0
EBR	0
NBL	0
NBT	35
NBR	20
SBL	21
SBT	52
SBR	0
TOTAL	513

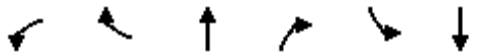
Year 2025 Fut. Vol
+ Project Traffic

WBL	339
WBT	0
WBR	46
EBL	0
EBT	0
EBR	0
NBL	0
NBT	35
NBR	21
SBL	21
SBT	52
SBR	0
TOTAL	514

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	2
SBL	0
SBT	0
SBR	0
TOTAL	2

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Bear Mountain Blvd & SR 99 SB On/Off Ramp @ Costajo - AM Peak						
	Count Date:	1/28/2015						
2015	ADT							
WB Approach (To)	2.87							
WB Approach (Away)	0.03							
EB Approach (To)	*1*							
EB Approach (Away)	*1*		**Use Growth Rate from PM Peak**					
NB Approach (To)	0.03							
NB Approach (Away)	3.01							
SB Approach (To)	0.56							
SB Approach (Away)	0.56							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	9.118		WBL	3.10	WBT	2.19	WBR	2.66
WB Approach (Away)	0.1		5.70%	589	3.36%	0	4.81%	73
EB Approach (To)	*1.2*		EBL	1.67	EBT	2.27	EBR	2.11
EB Approach (Away)	*1.2*		2.35%	0	3.48%	0	3.24%	0
NB Approach (To)	0.1		NBL	2.27	NBT	2.74	NBR	3.33
NB Approach (Away)	9.118		3.48%	0	4.93%	56	6.07%	37
SB Approach (To)	*1.2*		SBL	2.74	SBT	2.59	SBR	1.67
SB Approach (Away)	*1.2*		4.93%	35	4.69%	82	2.35%	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.954			
Flt Protected	0.950					0.986
Satd. Flow (prot)	1770	1583	1777	0	0	1837
Flt Permitted	0.950					0.986
Satd. Flow (perm)	1770	1583	1777	0	0	1837
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	7.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	190	28	21	11	13	32
Future Vol, veh/h	190	28	21	11	13	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	207	30	23	12	14	35

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	92	29	0	0	35	0
Stage 1	29	-	-	-	-	-
Stage 2	63	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	908	1046	-	-	1576	-
Stage 1	994	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	900	1046	-	-	1576	-
Mov Cap-2 Maneuver	900	-	-	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	951	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	900	1046	1576	-
HCM Lane V/C Ratio	-	-	0.229	0.029	0.009	-
HCM Control Delay (s)	-	-	10.2	8.5	7.3	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.950			
Flt Protected	0.950					0.986
Satd. Flow (prot)	1770	1583	1770	0	0	1837
Flt Permitted	0.950					0.986
Satd. Flow (perm)	1770	1583	1770	0	0	1837
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	9.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	339	46	35	20	21	52
Future Vol, veh/h	339	46	35	20	21	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	368	50	38	22	23	57

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	151	49	0	0	60	0
Stage 1	49	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	841	1020	-	-	1544	-
Stage 1	973	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	828	1020	-	-	1544	-
Mov Cap-2 Maneuver	828	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	908	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	828	1020	1544	-
HCM Lane V/C Ratio	-	-	0.445	0.049	0.015	-
HCM Control Delay (s)	-	-	12.8	8.7	7.4	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	2.3	0.2	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.949			
Flt Protected	0.950					0.986
Satd. Flow (prot)	1770	1583	1768	0	0	1837
Flt Permitted	0.950					0.986
Satd. Flow (perm)	1770	1583	1768	0	0	1837
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

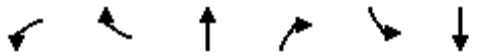
Intersection	
Int Delay, s/veh	9.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	339	46	35	21	21	52
Future Vol, veh/h	339	46	35	21	21	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	368	50	38	23	23	57

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	151	49	0	0	61	0
Stage 1	49	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	841	1020	-	-	1542	-
Stage 1	973	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	828	1020	-	-	1542	-
Mov Cap-2 Maneuver	828	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	908	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	828	1020	1542	-
HCM Lane V/C Ratio	-	-	0.445	0.049	0.015	-
HCM Control Delay (s)	-	-	12.8	8.7	7.4	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	2.3	0.2	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.947			
Flt Protected	0.950					0.985
Satd. Flow (prot)	1770	1583	1764	0	0	1835
Flt Permitted	0.950					0.985
Satd. Flow (perm)	1770	1583	1764	0	0	1835
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	25.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	589	73	56	37	35	82
Future Vol, veh/h	589	73	56	37	35	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	640	79	61	40	38	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	246	81	0	0	101	0
Stage 1	81	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	742	979	-	-	1491	-
Stage 1	942	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	979	-	-	1491	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.9	0	2.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	722	979	1491	-
HCM Lane V/C Ratio	-	-	0.887	0.081	0.026	-
HCM Control Delay (s)	-	-	35.9	9	7.5	0
HCM Lane LOS	-	-	E	A	A	A
HCM 95th %tile Q(veh)	-	-	11.2	0.3	0.1	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.945			
Flt Protected	0.950					0.985
Satd. Flow (prot)	1770	1583	1760	0	0	1835
Flt Permitted	0.950					0.985
Satd. Flow (perm)	1770	1583	1760	0	0	1835
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	25.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	589	73	56	39	35	82
Future Vol, veh/h	589	73	56	39	35	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	640	79	61	42	38	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	247	82	0	0	103	0
Stage 1	82	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	741	978	-	-	1489	-
Stage 1	941	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	721	978	-	-	1489	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	33.1	0	2.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	721	978	1489	-
HCM Lane V/C Ratio	-	-	0.888	0.081	0.026	-
HCM Control Delay (s)	-	-	36.1	9	7.5	0
HCM Lane LOS	-	-	E	A	A	A
HCM 95th %tile Q(veh)	-	-	11.2	0.3	0.1	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: SR 99 Southbound Ramp

Minor St: Costajo Road

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

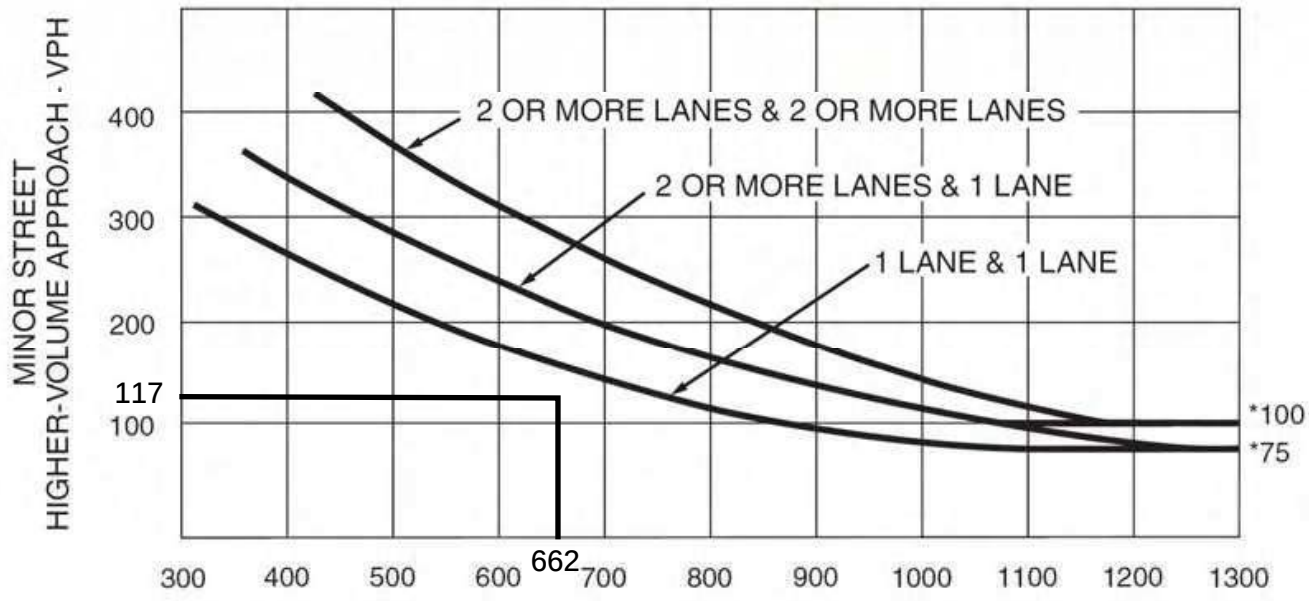
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 2 or More.....	9,600 / 6,720	3,200 / 2,240
1.....7944..... 2 or More.....1404.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 2 or More.....	14,400 / 10,080	1,600 / 1,120
1.....7944..... 2 or More.....1404.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied ____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 62% (A) 95% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & SR 99 SB On/Off Ramp @ Costajo - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **3.36%**

Exist Peak Hour Volumes

U		
>	WBL	233
0	WBT	0
1	WBR	35
0	EBL	0
0	EBT	0
0	EBR	0
0	NBL	0
1	NBT	49
<	NBR	14
>	SBL	27
1	SBT	48
0	SBR	0
	TOTAL	406

Year 2035
Fut. Volumes w/o Proj

WBL	659
WBT	0
WBR	74
EBL	0
EBT	0
EBR	0
NBL	0
NBT	95
NBR	40
SBL	61
SBT	96
SBR	0
TOTAL	1025

Year 2035 Fut. Vol
+ Project Traffic

WBL	676
WBT	0
WBR	74
EBL	0
EBT	0
EBR	0
NBL	0
NBT	95
NBR	42
SBL	61
SBT	96
SBR	0
TOTAL	1044

Year 2025
Fut. Volumes w/o Proj

WBL	396
WBT	0
WBR	51
EBL	0
EBT	0
EBR	0
NBL	0
NBT	69
NBR	24
SBL	41
SBT	69
SBR	0
TOTAL	650

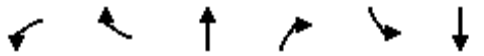
Year 2025 Fut. Vol
+ Project Traffic

WBL	405
WBT	0
WBR	51
EBL	0
EBT	0
EBR	0
NBL	0
NBT	69
NBR	25
SBL	41
SBT	69
SBR	0
TOTAL	660

Project Generated Trips - Year 2035

	Total
WBL	17
WBT	0
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	2
SBL	0
SBT	0
SBR	0
TOTAL	19

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Bear Mountain Blvd & SR 99 SB On/Off Ramp @ Costajo - PM Peak						
	Count Date:	1/27/2015						
2015	ADT							
WB Approach (To)	3.06							
WB Approach (Away)	0.03							
EB Approach (To)	*1*							
EB Approach (Away)	*1*							
NB Approach (To)	0.04							
NB Approach (Away)	3.4							
SB Approach (To)	0.8							
SB Approach (Away)	0.8							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	9.118		WBL	2.83	WBT	2.09	WBR	2.24
WB Approach (Away)	0.1		5.22%	659	3.19%	0	3.75%	74
EB Approach (To)	*1.2*		EBL	1.35	EBT	2.27	EBR	1.94
EB Approach (Away)	*1.2*		1.45%	0	3.48%	0	2.92%	0
NB Approach (To)	0.1		NBL	1.85	NBT	2.00	NBR	2.92
NB Approach (Away)	9.118		2.74%	0	3.29%	95	5.33%	40
SB Approach (To)	*1.2*		SBL	2.42	SBT	2.09	SBR	1.35
SB Approach (Away)	*1.2*		4.04%	61	3.47%	96	1.45%	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.970			
Flt Protected	0.950					0.982
Satd. Flow (prot)	1770	1583	1807	0	0	1829
Flt Permitted	0.950					0.982
Satd. Flow (perm)	1770	1583	1807	0	0	1829
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

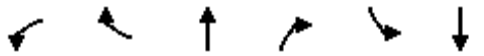
Intersection	
Int Delay, s/veh	7.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	223	35	49	14	27	48
Future Vol, veh/h	223	35	49	14	27	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	242	38	53	15	29	52

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	172	61	0	0	68	0
Stage 1	61	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	818	1004	-	-	1533	-
Stage 1	962	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	802	1004	-	-	1533	-
Mov Cap-2 Maneuver	802	-	-	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	897	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	802	1004	1533	-
HCM Lane V/C Ratio	-	-	0.302	0.038	0.019	-
HCM Control Delay (s)	-	-	11.4	8.7	7.4	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.1	0.1	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.965			
Flt Protected	0.950					0.982
Satd. Flow (prot)	1770	1583	1798	0	0	1829
Flt Permitted	0.950					0.982
Satd. Flow (perm)	1770	1583	1798	0	0	1829
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	11.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	396	51	69	24	41	69
Future Vol, veh/h	396	51	69	24	41	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	430	55	75	26	45	75

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	252	88	0	0	101	0
Stage 1	88	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	737	970	-	-	1491	-
Stage 1	935	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	714	970	-	-	1491	-
Mov Cap-2 Maneuver	714	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	2.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	714	970	1491	-
HCM Lane V/C Ratio	-	-	0.603	0.057	0.03	-
HCM Control Delay (s)	-	-	17.4	8.9	7.5	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	4.1	0.2	0.1	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.964			
Flt Protected	0.950					0.982
Satd. Flow (prot)	1770	1583	1796	0	0	1829
Flt Permitted	0.950					0.982
Satd. Flow (perm)	1770	1583	1796	0	0	1829
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	12.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	405	51	69	25	41	69
Future Vol, veh/h	405	51	69	25	41	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	440	55	75	27	45	75

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	253	89	0	0	102	0
Stage 1	89	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	736	969	-	-	1490	-
Stage 1	934	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	712	969	-	-	1490	-
Mov Cap-2 Maneuver	712	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	837	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.9	0	2.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	712	969	1490	-
HCM Lane V/C Ratio	-	-	0.618	0.057	0.03	-
HCM Control Delay (s)	-	-	17.9	8.9	7.5	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	4.3	0.2	0.1	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.960			
Flt Protected	0.950					0.981
Satd. Flow (prot)	1770	1583	1788	0	0	1827
Flt Permitted	0.950					0.981
Satd. Flow (perm)	1770	1583	1788	0	0	1827
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	79.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	659	74	95	40	61	96
Future Vol, veh/h	659	74	95	40	61	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	716	80	103	43	66	104

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	362	125	0	0	147	0
Stage 1	125	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 637	926	-	-	1435	-
Stage 1	901	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 606	926	-	-	1435	-
Mov Cap-2 Maneuver	~ 606	-	-	-	-	-
Stage 1	901	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	110.1	0	3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	606	926	1435	-
HCM Lane V/C Ratio	-	-	1.182	0.087	0.046	-
HCM Control Delay (s)	-	-	121.4	9.3	7.6	0
HCM Lane LOS	-	-	F	A	A	A
HCM 95th %tile Q(veh)	-	-	24.7	0.3	0.1	-

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



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850	0.958			
Flt Protected	0.950					0.981
Satd. Flow (prot)	1770	1583	1785	0	0	1827
Flt Permitted	0.950					0.981
Satd. Flow (perm)	1770	1583	1785	0	0	1827
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	87.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	676	74	95	42	61	96
Future Vol, veh/h	676	74	95	42	61	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	735	80	103	46	66	104

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	363	126	0	0	149	0
Stage 1	126	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 636	924	-	-	1432	-
Stage 1	900	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 605	924	-	-	1432	-
Mov Cap-2 Maneuver	~ 605	-	-	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	121.6	0	3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	605	924	1432	-
HCM Lane V/C Ratio	-	-	1.215	0.087	0.046	-
HCM Control Delay (s)	-	-	133.9	9.3	7.6	0
HCM Lane LOS	-	-	F	A	A	A
HCM 95th %tile Q(veh)	-	-	26.6	0.3	0.1	-

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



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950					0.981
Satd. Flow (prot)	1770	1583	1863	1583	0	1827
Flt Permitted	0.950					0.981
Satd. Flow (perm)	1770	1583	1863	1583	0	1827
Link Speed (mph)	30		30			30
Link Distance (ft)	283		392			310
Travel Time (s)	6.4		8.9			7.0

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	77.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	676	74	95	42	61	96
Future Vol, veh/h	676	74	95	42	61	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	735	80	103	46	66	104

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	340	103	0	0	103	0
Stage 1	103	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 656	952	-	-	1489	-
Stage 1	921	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 625	952	-	-	1489	-
Mov Cap-2 Maneuver	~ 625	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	764	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	107.4	0	2.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	625	952	1489	-
HCM Lane V/C Ratio	-	-	1.176	0.084	0.045	-
HCM Control Delay (s)	-	-	118.2	9.1	7.5	0
HCM Lane LOS	-	-	F	A	A	A
HCM 95th %tile Q(veh)	-	-	24.8	0.3	0.1	-

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: SR 99 Southbound Ramp — Critical Approach Speed _____ mph

Minor St: Costajo Road — Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐ } **RURAL (R)**

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

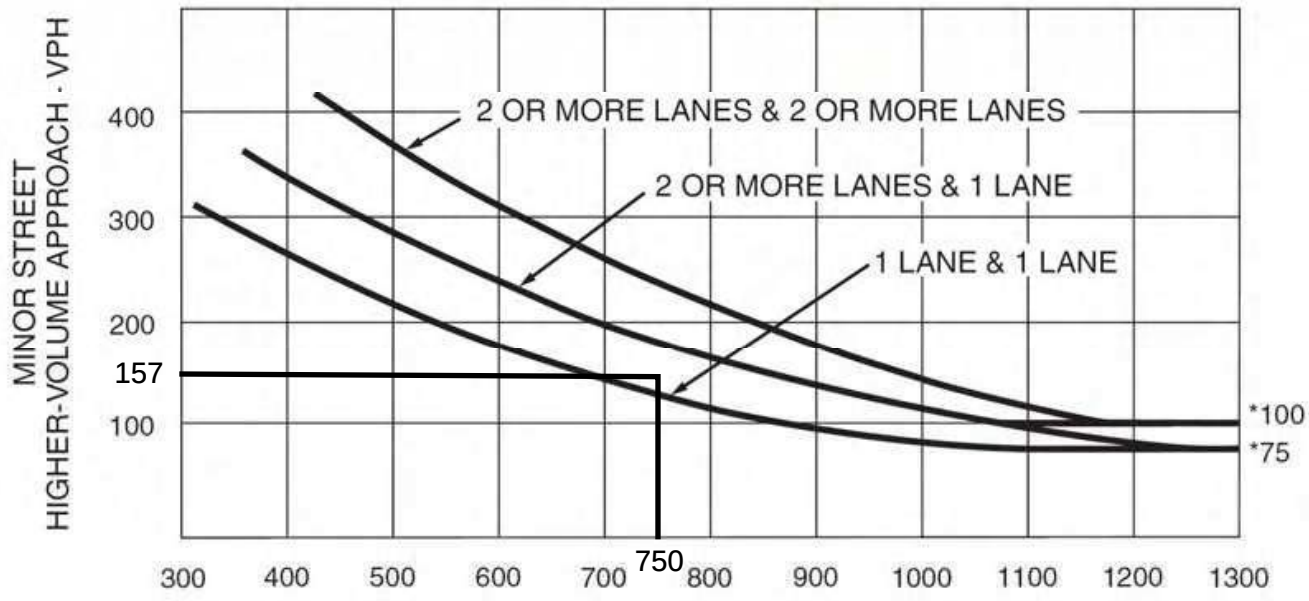
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 7500 ..... 2 or More..... 1570	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 7500 ..... 2 or More..... 1570	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 93% (A) 74% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & Costajo - AM Peak

Count Date: 1/27/2015

Ave Annual Growth: **3.35%**

Exist Peak Hour Volumes

U		
0	WBL	0
1	WBT	68
<	WBR	16
>	EBL	13
1	EBT	74
0	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
>	SBL	159
0	SBT	0
<	SBR	62
	TOTAL	392

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	133
WBR	31
EBL	25
EBT	145
EBR	0
NBL	0
NBT	0
NBR	0
SBL	312
SBT	0
SBR	122
TOTAL	768

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	136
WBR	33
EBL	25
EBT	148
EBR	0
NBL	0
NBT	0
NBR	0
SBL	312
SBT	0
SBR	122
TOTAL	776

Year 2025
Fut. Volumes w/o Proj

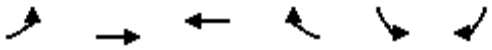
WBL	0
WBT	96
WBR	23
EBL	18
EBT	104
EBR	0
NBL	0
NBT	0
NBR	0
SBL	224
SBT	0
SBR	87
TOTAL	552

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	98
WBR	24
EBL	18
EBT	106
EBR	0
NBL	0
NBT	0
NBR	0
SBL	224
SBT	0
SBR	87
TOTAL	557

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	3
WBR	2
EBL	0
EBT	3
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	0
TOTAL	8



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.975			0.850
Flt Protected		0.993			0.950	
Satd. Flow (prot)	0	1850	1816	0	1770	1583
Flt Permitted		0.993			0.950	
Satd. Flow (perm)	0	1850	1816	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

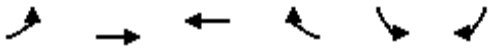
Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	13	74	68	16	159	62
Future Vol, veh/h	13	74	68	16	159	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	80	74	17	173	67

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	91	0	-	0	192	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1504	-	-	-	797	976
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1504	-	-	-	789	976
Mov Cap-2 Maneuver	-	-	-	-	789	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	907	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1504	-	-	-	789	976
HCM Lane V/C Ratio	0.009	-	-	-	0.219	0.069
HCM Control Delay (s)	7.4	0	-	-	10.8	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.8	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.974			0.850
Flt Protected		0.993			0.950	
Satd. Flow (prot)	0	1850	1814	0	1770	1583
Flt Permitted		0.993			0.950	
Satd. Flow (perm)	0	1850	1814	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

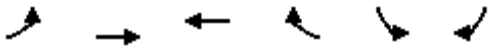
Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	18	104	96	23	224	87
Future Vol, veh/h	18	104	96	23	224	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	113	104	25	243	95

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	129	0	-	0	269	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1457	-	-	-	720	935
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1457	-	-	-	709	935
Mov Cap-2 Maneuver	-	-	-	-	709	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1457	-	-	-	709	935
HCM Lane V/C Ratio	0.013	-	-	-	0.343	0.101
HCM Control Delay (s)	7.5	0	-	-	12.7	9.3
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	1.5	0.3



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.974			0.850
Flt Protected		0.993			0.950	
Satd. Flow (prot)	0	1850	1814	0	1770	1583
Flt Permitted		0.993			0.950	
Satd. Flow (perm)	0	1850	1814	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

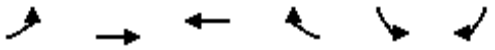
Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	18	106	98	24	224	87
Future Vol, veh/h	18	106	98	24	224	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	115	107	26	243	95

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	133	0	-	0	274	120
Stage 1	-	-	-	-	120	-
Stage 2	-	-	-	-	154	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1452	-	-	-	716	931
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	874	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1452	-	-	-	705	931
Mov Cap-2 Maneuver	-	-	-	-	705	-
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1452	-	-	-	705	931
HCM Lane V/C Ratio	0.013	-	-	-	0.345	0.102
HCM Control Delay (s)	7.5	0	-	-	12.8	9.3
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	1.5	0.3



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.974			0.850
Flt Protected		0.993			0.950	
Satd. Flow (prot)	0	1850	1814	0	1770	1583
Flt Permitted		0.993			0.950	
Satd. Flow (perm)	0	1850	1814	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

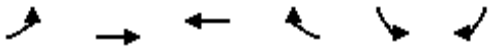
Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	25	145	133	31	312	122
Future Vol, veh/h	25	145	133	31	312	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	158	145	34	339	133

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	178	0	-	0	373	161
Stage 1	-	-	-	-	161	-
Stage 2	-	-	-	-	212	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1398	-	-	-	628	884
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	823	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1398	-	-	-	615	884
Mov Cap-2 Maneuver	-	-	-	-	615	-
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	806	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1398	-	-	-	615	884
HCM Lane V/C Ratio	0.019	-	-	-	0.551	0.15
HCM Control Delay (s)	7.6	0	-	-	17.8	9.8
HCM Lane LOS	A	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	-	-	-	3.4	0.5



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.974			0.850
Flt Protected		0.993			0.950	
Satd. Flow (prot)	0	1850	1814	0	1770	1583
Flt Permitted		0.993			0.950	
Satd. Flow (perm)	0	1850	1814	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	25	148	136	33	312	122
Future Vol, veh/h	25	148	136	33	312	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	161	148	36	339	133

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	381	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	215	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1391	-	-	-	621	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	821	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	608	878
Mov Cap-2 Maneuver	-	-	-	-	608	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	804	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1391	-	-	-	608	878
HCM Lane V/C Ratio	0.02	-	-	-	0.558	0.151
HCM Control Delay (s)	7.6	0	-	-	18.1	9.8
HCM Lane LOS	A	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	-	-	-	3.4	0.5

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Costajo Road

Minor St: Bear Mountain Boulevard

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

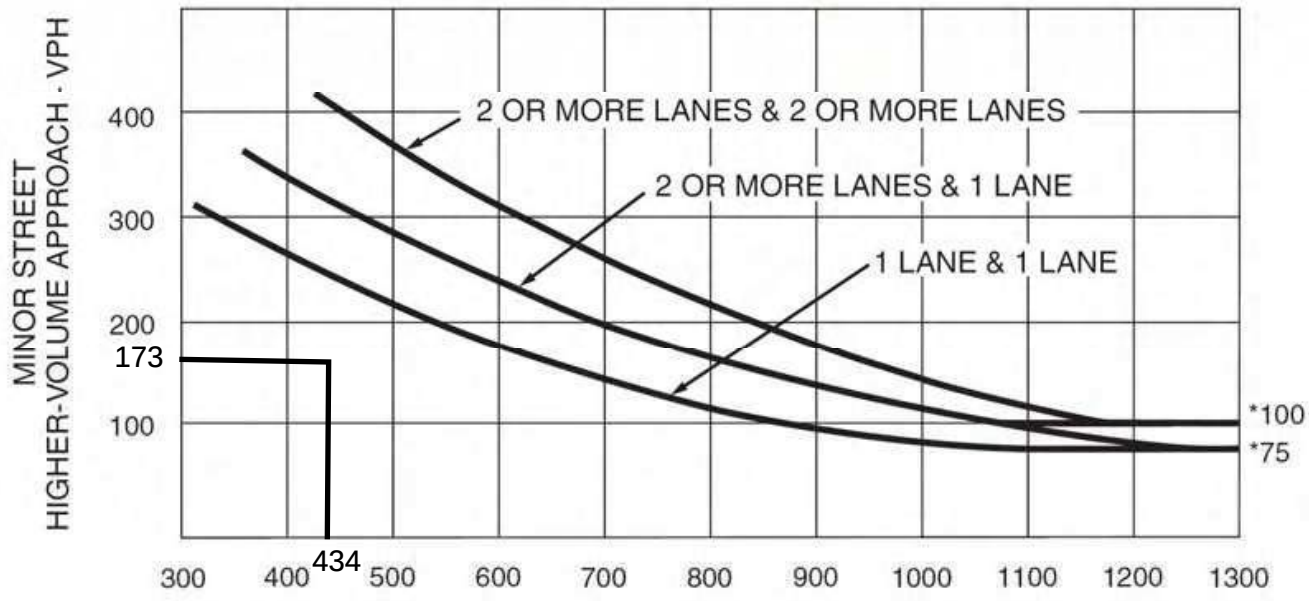
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 (5208) / 2 or More (2076)	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach	Urban / Rural	Urban / Rural
Major Street / Minor Street		
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 (5208) / 2 or More (2076)	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... A: 93% B: 62%	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & Costajo - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **3.35%**

Exist Peak Hour Volumes

U		
0	WBL	0
1	WBT	85
<	WBR	39
>	EBL	16
1	EBT	250
0	EBR	0
0	NBL	0
0	NBT	0
0	NBR	0
>	SBL	228
0	SBT	0
<	SBR	36
	TOTAL	654

Year 2035
Fut. Volumes w/o Proj

WBL	0
WBT	167
WBR	76
EBL	31
EBT	490
EBR	0
NBL	0
NBT	0
NBR	0
SBL	447
SBT	0
SBR	71
TOTAL	1282

Year 2035 Fut. Vol
+ Project Traffic

WBL	0
WBT	171
WBR	78
EBL	31
EBT	490
EBR	0
NBL	0
NBT	0
NBR	0
SBL	447
SBT	0
SBR	88
TOTAL	1305

Year 2025
Fut. Volumes w/o Proj

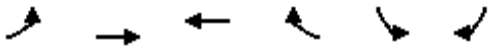
WBL	0
WBT	120
WBR	55
EBL	23
EBT	353
EBR	0
NBL	0
NBT	0
NBR	0
SBL	322
SBT	0
SBR	51
TOTAL	924

Year 2025 Fut. Vol
+ Project Traffic

WBL	0
WBT	122
WBR	56
EBL	23
EBT	353
EBR	0
NBL	0
NBT	0
NBR	0
SBL	322
SBT	0
SBR	60
TOTAL	936

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	4
WBR	2
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	0
SBL	0
SBT	0
SBR	17
TOTAL	23



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1857	1785	0	1770	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1857	1785	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

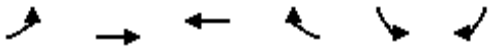
Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	16	250	85	39	228	36
Future Vol, veh/h	16	250	85	39	228	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	272	92	42	248	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	135	0	-	0	421	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	307	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1449	-	-	-	589	939
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	746	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1449	-	-	-	581	939
Mov Cap-2 Maneuver	-	-	-	-	581	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	736	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1449	-	-	-	581	939
HCM Lane V/C Ratio	0.012	-	-	-	0.427	0.042
HCM Control Delay (s)	7.5	0	-	-	15.7	9
HCM Lane LOS	A	A	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	2.1	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.957			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1857	1783	0	1770	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1857	1783	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

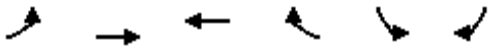
Intersection	
Int Delay, s/veh	12.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	23	353	120	55	322	51
Future Vol, veh/h	23	353	120	55	322	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	384	130	60	350	55

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	190	0	-	0	594	160
Stage 1	-	-	-	-	160	-
Stage 2	-	-	-	-	434	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1384	-	-	-	468	885
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	653	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1384	-	-	-	457	885
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	638	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	30.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1384	-	-	-	457	885
HCM Lane V/C Ratio	0.018	-	-	-	0.766	0.063
HCM Control Delay (s)	7.6	0	-	-	34.3	9.3
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0.1	-	-	-	6.6	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1857	1785	0	1770	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1857	1785	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

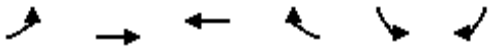
Intersection	
Int Delay, s/veh	12.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	23	353	122	56	322	60
Future Vol, veh/h	23	353	122	56	322	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	384	133	61	350	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	193	0	-	0	597	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	434	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1380	-	-	-	466	882
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	653	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1380	-	-	-	455	882
Mov Cap-2 Maneuver	-	-	-	-	455	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	638	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	30.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1380	-	-	-	455	882
HCM Lane V/C Ratio	0.018	-	-	-	0.769	0.074
HCM Control Delay (s)	7.7	0	-	-	34.7	9.4
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0.1	-	-	-	6.6	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1857	1785	0	1770	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1857	1785	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	90.8

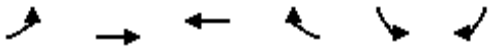
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	31	490	167	76	447	71
Future Vol, veh/h	31	490	167	76	447	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	533	182	83	486	77

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	264	0	-	0	823	223
Stage 1	-	-	-	-	223	-
Stage 2	-	-	-	-	600	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1300	-	-	-	~ 343	817
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	548	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1300	-	-	-	~ 330	817
Mov Cap-2 Maneuver	-	-	-	-	~ 330	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	528	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	224.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1300	-	-	-	330	817
HCM Lane V/C Ratio	0.026	-	-	-	1.472	0.094
HCM Control Delay (s)	7.8	0	-	-	258.3	9.9
HCM Lane LOS	A	A	-	-	F	A
HCM 95th %tile Q(veh)	0.1	-	-	-	26.4	0.3

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



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1857	1785	0	1770	1583
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1857	1785	0	1770	1583
Link Speed (mph)		55	55		30	
Link Distance (ft)		1000	921		392	
Travel Time (s)		12.4	11.4		8.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	90.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	31	490	171	78	447	88
Future Vol, veh/h	31	490	171	78	447	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	533	186	85	486	96

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	271	0	-	0	828	228
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	600	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1292	-	-	-	~ 341	811
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	548	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1292	-	-	-	~ 328	811
Mov Cap-2 Maneuver	-	-	-	-	~ 328	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	528	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	220.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1292	-	-	-	328	811
HCM Lane V/C Ratio	0.026	-	-	-	1.481	0.118
HCM Control Delay (s)	7.9	0	-	-	262.3	10
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	26.6	0.4

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

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST ____ CO ____ RTE ____ PM ____

CALC ____ DATE ____

CHK ____ DATE ____

Major St: Costajo Road

Minor St: Bear Mountain Boulevard

Critical Approach Speed ____ mph

Critical Approach Speed ____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

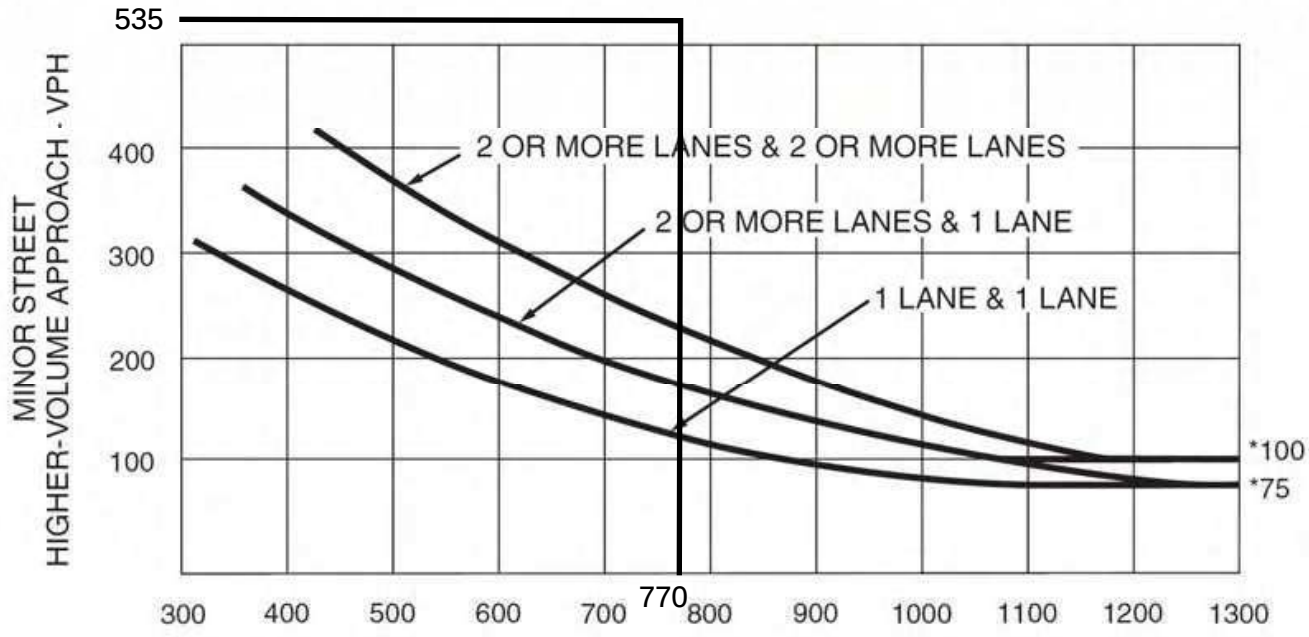
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 7700 / 2 or More 5350	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 7700 / 2 or More 5350	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied ____ No one condition satisfied, but following conditions fulfilled 80% or more..... A: 100% B: 92%	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & SR 99 NB On/Off Ramp - AM Peak

Count Date: 1/28/2015

Ave Annual Growth: **2.34%**

Exist Peak Hour Volumes

U		
>	WBL	178
1	WBT	82
0	WBR	0
0	EBL	0
1	EBT	200
<	EBR	33
1	NBL	7
0	NBT	0
1	NBR	12
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	512

Year 2035
Fut. Volumes w/o Proj

WBL	235
WBT	124
WBR	0
EBL	0
EBT	259
EBR	43
NBL	23
NBT	0
NBR	35
SBL	0
SBT	0
SBR	0
TOTAL	719

Year 2035 Fut. Vol
+ Project Traffic

WBL	235
WBT	128
WBR	0
EBL	0
EBT	262
EBR	43
NBL	23
NBT	0
NBR	41
SBL	0
SBT	0
SBR	0
TOTAL	732

Year 2025
Fut. Volumes w/o Proj

WBL	205
WBT	101
WBR	0
EBL	0
EBT	228
EBR	38
NBL	13
NBT	0
NBR	21
SBL	0
SBT	0
SBR	0
TOTAL	606

Year 2025 Fut. Vol
+ Project Traffic

WBL	205
WBT	103
WBR	0
EBL	0
EBT	230
EBR	38
NBL	13
NBT	0
NBR	24
SBL	0
SBT	0
SBR	0
TOTAL	613

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	4
WBR	0
EBL	0
EBT	3
EBR	0
NBL	0
NBT	0
NBR	6
SBL	0
SBT	0
SBR	0
TOTAL	13

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Bear Mountain Blvd & SR 99 NB On/Off Ramp - AM Peak						
	Count Date:	1/28/2015						
2006	ADT							
WB Approach (To)	7.15							
WB Approach (Away)	6.761							
EB Approach (To)	6.806							
EB Approach (Away)	0.579							
NB Approach (To)	0.007							
NB Approach (Away)	6.623							
SB Approach (To)	*1*							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	10.679		WBL	1.48	WBT	1.84	WBR	1.35
WB Approach (Away)	9.699		1.37%	235	2.06%	124	1.01%	0
EB Approach (To)	9.934		EBL	1.33	EBT	1.45	EBR	1.47
EB Approach (Away)	1.262		0.97%	0	1.28%	259	1.33%	43
NB Approach (To)	0.095		NBL	7.88	NBT	7.39	NBR	7.50
NB Approach (Away)	9.747		6.06%	23	5.02%	0	5.33%	35
SB Approach (To)	*1.2*		SBL	1.32	SBT	1.34	SBR	1.69
SB Approach (Away)	*1.2*		0.94%	0	0.99%	0	1.68%	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.967	0.950	
Satd. Flow (prot)	1863	1583	0	1801	1770	1583
Flt Permitted				0.967	0.950	
Satd. Flow (perm)	1863	1583	0	1801	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	200	33	178	82	7	12
Future Vol, veh/h	200	33	178	82	7	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	217	36	193	89	8	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	217	0	693	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	476	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1353	-	409	823
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	625	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1353	-	348	823
Mov Cap-2 Maneuver	-	-	-	-	348	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	531	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	348	823	-	-	1353	-
HCM Lane V/C Ratio	0.022	0.016	-	-	0.143	-
HCM Control Delay (s)	15.6	9.4	-	-	8.1	0
HCM Lane LOS	C	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.5	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.968	0.950	
Satd. Flow (prot)	1863	1583	0	1803	1770	1583
Flt Permitted				0.968	0.950	
Satd. Flow (perm)	1863	1583	0	1803	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	228	38	205	101	13	21
Future Vol, veh/h	228	38	205	101	13	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	248	41	223	110	14	23

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	248	0	803	248
Stage 1	-	-	-	-	248	-
Stage 2	-	-	-	-	555	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1318	-	353	791
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	575	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1318	-	289	791
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	472	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	289	791	-	-	1318	-
HCM Lane V/C Ratio	0.049	0.029	-	-	0.169	-
HCM Control Delay (s)	18.1	9.7	-	-	8.3	0
HCM Lane LOS	C	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.6	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.968	0.950	
Satd. Flow (prot)	1863	1583	0	1803	1770	1583
Flt Permitted				0.968	0.950	
Satd. Flow (perm)	1863	1583	0	1803	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	230	38	205	103	13	24
Future Vol, veh/h	230	38	205	103	13	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	250	41	223	112	14	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	250	0	808	250
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	558	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1316	-	350	789
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	573	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1316	-	287	789
Mov Cap-2 Maneuver	-	-	-	-	287	-
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	469	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	287	789	-	-	1316	-
HCM Lane V/C Ratio	0.049	0.033	-	-	0.169	-
HCM Control Delay (s)	18.2	9.7	-	-	8.3	0
HCM Lane LOS	C	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.6	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.968	0.950	
Satd. Flow (prot)	1863	1583	0	1803	1770	1583
Flt Permitted				0.968	0.950	
Satd. Flow (perm)	1863	1583	0	1803	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	259	43	235	124	23	35
Future Vol, veh/h	259	43	235	124	23	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	282	47	255	135	25	38

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	282	0	928	282
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	646	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1280	-	297	757
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	522	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1280	-	233	757
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	410	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	233	757	-	-	1280	-
HCM Lane V/C Ratio	0.107	0.05	-	-	0.2	-
HCM Control Delay (s)	22.3	10	-	-	8.5	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0.7	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.969	0.950	
Satd. Flow (prot)	1863	1583	0	1805	1770	1583
Flt Permitted				0.969	0.950	
Satd. Flow (perm)	1863	1583	0	1805	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	262	43	235	128	23	41
Future Vol, veh/h	262	43	235	128	23	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	285	47	255	139	25	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	285	0	935	285
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	650	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1277	-	295	754
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	520	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1277	-	231	754
Mov Cap-2 Maneuver	-	-	-	-	231	-
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	408	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	231	754	-	-	1277	-
HCM Lane V/C Ratio	0.108	0.059	-	-	0.2	-
HCM Control Delay (s)	22.5	10.1	-	-	8.5	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0.7	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Bear Mountain Boulevard

Minor St: SR 99 Northbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

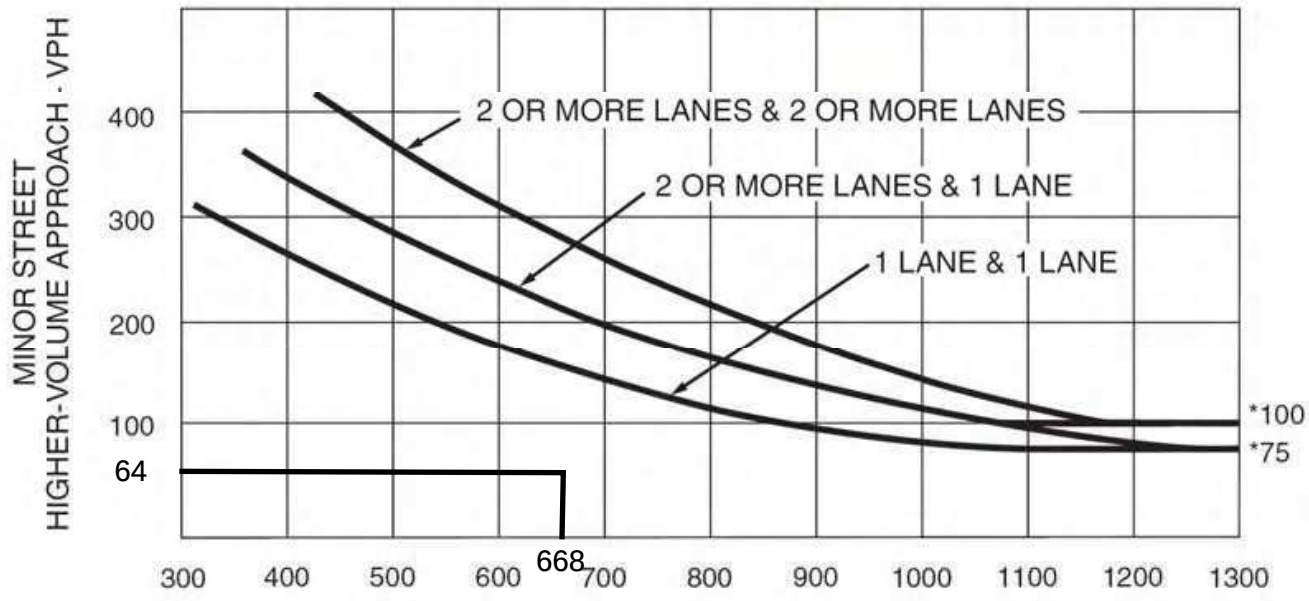
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 8016 ..... 2 or More..... 768	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 8016 ..... 2 or More..... 768	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 34% (A) 79% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & SR 99 NB On/Off Ramp - PM Peak

Count Date: 1/27/2015

Ave Annual Growth: **2.34%**

Exist Peak Hour Volumes

U		
>	WBL	152
1	WBT	105
0	WBR	0
0	EBL	0
1	EBT	367
<	EBR	131
1	NBL	20
0	NBT	0
1	NBR	13
0	SBL	0
0	SBT	0
0	SBR	0
	TOTAL	788

Year 2035
Fut. Volumes w/o Proj

WBL	201
WBT	159
WBR	0
EBL	0
EBT	476
EBR	171
NBL	67
NBT	0
NBR	38
SBL	0
SBT	0
SBR	0
TOTAL	1112

Year 2035 Fut. Vol
+ Project Traffic

WBL	201
WBT	164
WBR	0
EBL	0
EBT	476
EBR	171
NBL	67
NBT	0
NBR	39
SBL	0
SBT	0
SBR	0
TOTAL	1118

Year 2025
Fut. Volumes w/o Proj

WBL	175
WBT	130
WBR	0
EBL	0
EBT	419
EBR	150
NBL	37
NBT	0
NBR	22
SBL	0
SBT	0
SBR	0
TOTAL	933

Year 2025 Fut. Vol
+ Project Traffic

WBL	175
WBT	133
WBR	0
EBL	0
EBT	419
EBR	150
NBL	37
NBT	0
NBR	23
SBL	0
SBT	0
SBR	0
TOTAL	937

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	5
WBR	0
EBL	0
EBT	0
EBR	0
NBL	0
NBT	0
NBR	1
SBL	0
SBT	0
SBR	0
TOTAL	6

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Bear Mountain Blvd & SR 99 NB On/Off Ramp - PM Peak						
	Count Date:	1/27/2015						
2006	ADT							
WB Approach (To)	7.15							
WB Approach (Away)	6.761							
EB Approach (To)	6.806							
EB Approach (Away)	0.579							
NB Approach (To)	0.007							
NB Approach (Away)	6.623							
SB Approach (To)	*1*							
SB Approach (Away)	*1*							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	10.679		WBL	1.48	WBT	1.84	WBR	1.35
WB Approach (Away)	9.699		1.37%	201	2.06%	159	1.01%	0
EB Approach (To)	9.934		EBL	1.33	EBT	1.45	EBR	1.47
EB Approach (Away)	1.262		0.97%	0	1.28%	476	1.33%	171
NB Approach (To)	0.095		NBL	7.88	NBT	7.39	NBR	7.50
NB Approach (Away)	9.747		6.06%	67	5.02%	0	5.33%	38
SB Approach (To)	*1.2*		SBL	1.32	SBT	1.34	SBR	1.69
SB Approach (Away)	*1.2*		0.94%	0	0.99%	0	1.68%	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.971	0.950	
Satd. Flow (prot)	1863	1583	0	1809	1770	1583
Flt Permitted				0.971	0.950	
Satd. Flow (perm)	1863	1583	0	1809	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	367	131	152	105	20	13
Future Vol, veh/h	367	131	152	105	20	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	399	142	165	114	22	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	399	0	844	399
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1160	-	334	651
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1160	-	283	651
Mov Cap-2 Maneuver	-	-	-	-	283	-
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	548	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	15.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	283	651	-	-	1160	-
HCM Lane V/C Ratio	0.077	0.022	-	-	0.142	-
HCM Control Delay (s)	18.8	10.7	-	-	8.6	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.5	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.972	0.950	
Satd. Flow (prot)	1863	1583	0	1811	1770	1583
Flt Permitted				0.972	0.950	
Satd. Flow (perm)	1863	1583	0	1811	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	419	150	175	130	37	22
Future Vol, veh/h	419	150	175	130	37	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	455	163	190	141	40	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	455	0	977	455
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	522	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1106	-	278	605
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1106	-	226	605
Mov Cap-2 Maneuver	-	-	-	-	226	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	484	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	19.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	226	605	-	-	1106	-
HCM Lane V/C Ratio	0.178	0.04	-	-	0.172	-
HCM Control Delay (s)	24.3	11.2	-	-	8.9	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.6	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.972	0.950	
Satd. Flow (prot)	1863	1583	0	1811	1770	1583
Flt Permitted				0.972	0.950	
Satd. Flow (perm)	1863	1583	0	1811	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	419	150	175	133	37	23
Future Vol, veh/h	419	150	175	133	37	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	455	163	190	145	40	25

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	455	0	980	455
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	525	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1106	-	277	605
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	593	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1106	-	225	605
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	482	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	19.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	225	605	-	-	1106	-
HCM Lane V/C Ratio	0.179	0.041	-	-	0.172	-
HCM Control Delay (s)	24.5	11.2	-	-	8.9	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.6	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.973	0.950	
Satd. Flow (prot)	1863	1583	0	1812	1770	1583
Flt Permitted				0.973	0.950	
Satd. Flow (perm)	1863	1583	0	1812	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	476	171	201	159	67	38
Future Vol, veh/h	476	171	201	159	67	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	517	186	218	173	73	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	517	0	1127	517
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	610	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1049	-	226	558
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	174	558
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	417	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.2	29.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	174	558	-	-	1049	-
HCM Lane V/C Ratio	0.419	0.074	-	-	0.208	-
HCM Control Delay (s)	39.8	12	-	-	9.3	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	1.9	0.2	-	-	0.8	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		100	0		0	100
Storage Lanes		1	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected				0.973	0.950	
Satd. Flow (prot)	1863	1583	0	1812	1770	1583
Flt Permitted				0.973	0.950	
Satd. Flow (perm)	1863	1583	0	1812	1770	1583
Link Speed (mph)	55			55	30	
Link Distance (ft)	921			1760	521	
Travel Time (s)	11.4			21.8	11.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	476	171	201	164	67	39
Future Vol, veh/h	476	171	201	164	67	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	517	186	218	178	73	42

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	517	0	1132	517
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	615	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1049	-	225	558
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	173	558
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	414	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	29.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	173	558	-	-	1049	-
HCM Lane V/C Ratio	0.421	0.076	-	-	0.208	-
HCM Control Delay (s)	40.1	12	-	-	9.3	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	1.9	0.2	-	-	0.8	-

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Bear Mountain Boulevard

Minor St: SR 99 Northbound Ramp

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... RURAL.....

CONDITION A - Minimum Vehicular Volume

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More.....10120.....	2 or More.....1060.....
1.....	2 or More.....

Minimum Requirements EADT

Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Urban	Rural	Urban	Rural
8,000	5,600	2,400	1,680
9,600	6,720	2,400	1,680
9,600	6,720	3,200	2,240
8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street
1.....	1.....
2 or More.....	1.....
2 or More.....10120.....	2 or More.....1060.....
1.....	2 or More.....

Vehicles Per Day on Major Street (Total of Both Approaches) / Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)

Urban	Rural	Urban	Rural
12,000	8,400	1,200	850
14,400	10,080	1,200	850
14,400	10,080	1,600	1,120
12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied _____ Not Satisfied X

No one condition satisfied, but following conditions fulfilled 80% or more..... 47% (A) 95% (B)

2 CONDITIONS 80%

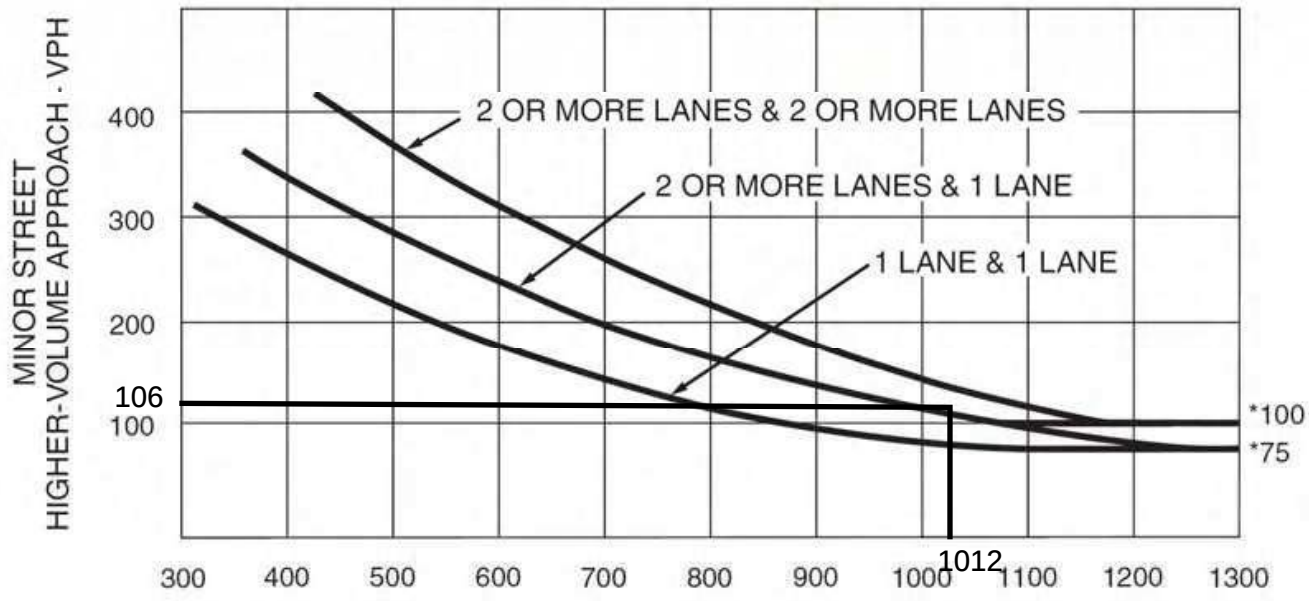
2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & South Union - AM Peak

Count Date: 1/28/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

AWS		
>	WBL	4
1	WBT	222
<	WBR	18
>	EBL	8
1	EBT	207
<	EBR	3
1	NBL	22
2	NBT	13
<	NBR	5
1	SBL	22
2	SBT	24
<	SBR	12
	TOTAL	560

Year 2035
Fut. Volumes w/o Proj

WBL	7
WBT	297
WBR	40
EBL	17
EBT	270
EBR	5
NBL	41
NBT	40
NBR	9
SBL	48
SBT	71
SBR	26
TOTAL	871

Year 2035 Fut. Vol
+ Project Traffic

WBL	7
WBT	297
WBR	50
EBL	25
EBT	270
EBR	5
NBL	41
NBT	53
NBR	9
SBL	50
SBT	86
SBR	30
TOTAL	923

Year 2025
Fut. Volumes w/o Proj

WBL	5
WBT	258
WBR	27
EBL	12
EBT	237
EBR	4
NBL	30
NBT	23
NBR	7
SBL	33
SBT	42
SBR	18
TOTAL	696

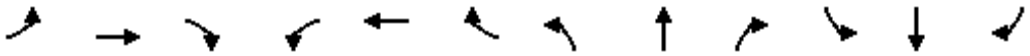
Year 2025 Fut. Vol
+ Project Traffic

WBL	5
WBT	258
WBR	32
EBL	16
EBT	237
EBR	4
NBL	30
NBT	30
NBR	7
SBL	34
SBT	50
SBR	20
TOTAL	723

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	10
EBL	8
EBT	0
EBR	0
NBL	0
NBT	13
NBR	0
SBL	2
SBT	15
SBR	4
TOTAL	52

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Bear Mountain Blvd & South Union - AM Peak						
	Count Date:	1/28/2015						
2006	ADT							
WB Approach (To)	7.265							
WB Approach (Away)	6.883							
EB Approach (To)	6.761							
EB Approach (Away)	7.15							
NB Approach (To)	0.249							
NB Approach (Away)	0.273							
SB Approach (To)	0.418							
SB Approach (Away)	0.387							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	11.145		WBL	2.60	WBT	1.51	WBR	3.85
WB Approach (Away)	10.249		3.03%	7	1.44%	297	3.98%	40
EB Approach (To)	9.699		EBL	3.80	EBT	1.46	EBR	2.55
EB Approach (Away)	10.679		3.86%	17	1.32%	270	2.91%	5
NB Approach (To)	*1*		NBL	2.75	NBT	5.09	NBR	2.75
NB Approach (Away)	*1*		3.15%	41	5.69%	40	3.14%	9
SB Approach (To)	2.521		SBL	3.76	SBT	4.85	SBR	3.76
SB Approach (Away)	2.386		3.88%	48	5.48%	71	3.89%	26



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.961			0.945	
Flt Protected		0.998			0.999		0.950			0.950		
Satd. Flow (prot)	0	1859	1583	0	1861	1583	1770	3401	0	1770	3345	0
Flt Permitted		0.998			0.999		0.950			0.950		
Satd. Flow (perm)	0	1859	1583	0	1861	1583	1770	3401	0	1770	3345	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	8	207	3	0	4	222	18	0	22	13	5
Future Vol, veh/h	0	8	207	3	0	4	222	18	0	22	13	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	225	3	0	4	241	20	0	24	14	5
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	11.1	11	9.3
HCM LOS	B	B	A

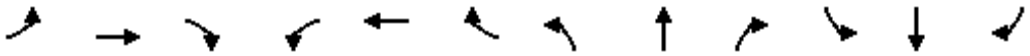
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	4%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	46%	96%	0%	98%	0%	0%	100%	36%
Vol Right, %	0%	0%	54%	0%	100%	0%	100%	0%	0%	64%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	9	9	215	3	226	18	22	16	22
LT Vol	22	0	0	8	0	4	0	22	0	0
Through Vol	0	9	4	207	0	222	0	0	16	8
RT Vol	0	0	5	0	3	0	18	0	0	14
Lane Flow Rate	24	9	10	234	3	246	20	24	17	24
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.045	0.016	0.016	0.353	0.004	0.367	0.025	0.044	0.029	0.037
Departure Headway (Hd)	6.735	6.228	5.748	5.441	4.721	5.384	4.674	6.586	6.08	5.629
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	535	578	616	657	752	663	760	539	583	629
Service Time	4.435	3.928	3.548	3.206	2.485	3.148	2.438	4.385	3.878	3.427
HCM Lane V/C Ratio	0.045	0.016	0.016	0.356	0.004	0.371	0.026	0.045	0.029	0.038
HCM Control Delay	9.8	9	8.6	11.2	7.5	11.3	7.6	9.7	9.1	8.6
HCM Lane LOS	A	A	A	B	A	B	A	A	A	A
HCM 95th-tile Q	0.1	0	0	1.6	0	1.7	0.1	0.1	0.1	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	22	24	14
Future Vol, veh/h	0	22	24	14
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	24	26	15
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	9.1
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.964			0.955	
Flt Protected		0.998			0.999		0.950			0.950		
Satd. Flow (prot)	0	1859	1583	0	1861	1583	1770	3412	0	1770	3380	0
Flt Permitted		0.998			0.999		0.950			0.950		
Satd. Flow (perm)	0	1859	1583	0	1861	1583	1770	3412	0	1770	3380	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	12	237	4	0	5	258	27	0	30	23	7
Future Vol, veh/h	0	12	237	4	0	5	258	27	0	30	23	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	258	4	0	5	280	29	0	33	25	8
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	13.1	12.9	9.9
HCM LOS	B	B	A

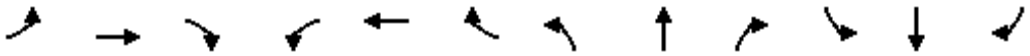
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	5%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	52%	95%	0%	98%	0%	0%	100%	44%
Vol Right, %	0%	0%	48%	0%	100%	0%	100%	0%	0%	56%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	15	15	249	4	263	27	33	28	32
LT Vol	30	0	0	12	0	5	0	33	0	0
Through Vol	0	15	8	237	0	258	0	0	28	14
RT Vol	0	0	7	0	4	0	27	0	0	18
Lane Flow Rate	33	17	16	271	4	286	29	36	30	35
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.065	0.031	0.028	0.441	0.006	0.459	0.041	0.071	0.056	0.06
Departure Headway (Hd)	7.182	6.673	6.333	5.866	5.14	5.784	5.072	7.087	6.579	6.178
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	499	536	565	614	696	623	706	505	544	579
Service Time	4.927	4.417	4.077	3.599	2.872	3.516	2.804	4.829	4.32	3.92
HCM Lane V/C Ratio	0.066	0.032	0.028	0.441	0.006	0.459	0.041	0.071	0.055	0.06
HCM Control Delay	10.4	9.6	9.3	13.2	7.9	13.4	8	10.4	9.7	9.3
HCM Lane LOS	B	A	A	B	A	B	A	B	A	A
HCM 95th-tile Q	0.2	0.1	0.1	2.2	0	2.4	0.1	0.2	0.2	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	33	42	18
Future Vol, veh/h	0	33	42	18
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	36	46	20
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	9.8
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.971			0.957	
Flt Protected		0.997			0.999		0.950			0.950		
Satd. Flow (prot)	0	1857	1583	0	1861	1583	1770	3437	0	1770	3387	0
Flt Permitted		0.997			0.999		0.950			0.950		
Satd. Flow (perm)	0	1857	1583	0	1861	1583	1770	3437	0	1770	3387	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	16	237	4	0	5	258	32	0	30	30	7
Future Vol, veh/h	0	16	237	4	0	5	258	32	0	30	30	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	17	258	4	0	5	280	35	0	33	33	8
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	13.5	13.1	10
HCM LOS	B	B	A

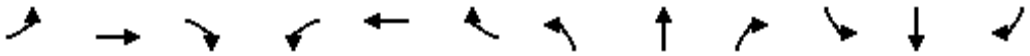
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	6%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	59%	94%	0%	98%	0%	0%	100%	45%
Vol Right, %	0%	0%	41%	0%	100%	0%	100%	0%	0%	55%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	20	17	253	4	263	32	34	33	37
LT Vol	30	0	0	16	0	5	0	34	0	0
Through Vol	0	20	10	237	0	258	0	0	33	17
RT Vol	0	0	7	0	4	0	32	0	0	20
Lane Flow Rate	33	22	18	275	4	286	35	37	36	40
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.066	0.041	0.033	0.456	0.006	0.466	0.05	0.074	0.067	0.069
Departure Headway (Hd)	7.266	6.756	6.463	5.964	5.23	5.874	5.163	7.161	6.652	6.263
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	493	529	553	605	684	615	693	500	538	571
Service Time	5.016	4.507	4.213	3.698	2.964	3.609	2.898	4.908	4.399	4.01
HCM Lane V/C Ratio	0.067	0.042	0.033	0.455	0.006	0.465	0.051	0.074	0.067	0.07
HCM Control Delay	10.5	9.8	9.4	13.6	8	13.7	8.2	10.5	9.9	9.5
HCM Lane LOS	B	A	A	B	A	B	A	B	A	A
HCM 95th-tile Q	0.2	0.1	0.1	2.4	0	2.5	0.2	0.2	0.2	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	34	50	20
Future Vol, veh/h	0	34	50	20
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	37	54	22
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10
HCM LOS	A

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.972			0.960	
Flt Protected		0.997			0.999		0.950			0.950		
Satd. Flow (prot)	0	1857	1583	0	1861	1583	1770	3440	0	1770	3398	0
Flt Permitted		0.997			0.999		0.950			0.950		
Satd. Flow (perm)	0	1857	1583	0	1861	1583	1770	3440	0	1770	3398	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	17	270	5	0	7	297	40	0	41	40	9
Future Vol, veh/h	0	17	270	5	0	7	297	40	0	41	40	9
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	293	5	0	8	323	43	0	45	43	10
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	16.9	16.4	10.8
HCM LOS	C	C	B

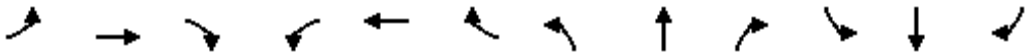
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	6%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	60%	94%	0%	98%	0%	0%	100%	48%
Vol Right, %	0%	0%	40%	0%	100%	0%	100%	0%	0%	52%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	27	22	287	5	304	40	48	47	50
LT Vol	41	0	0	17	0	7	0	48	0	0
Through Vol	0	27	13	270	0	297	0	0	47	24
RT Vol	0	0	9	0	5	0	40	0	0	26
Lane Flow Rate	45	29	24	312	5	330	43	52	51	54
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.097	0.059	0.047	0.556	0.009	0.578	0.067	0.111	0.102	0.101
Departure Headway (Hd)	7.807	7.295	7.006	6.411	5.678	6.297	5.582	7.639	7.128	6.753
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	456	488	508	562	627	572	638	466	500	527
Service Time	5.6	5.088	4.799	4.178	3.445	4.063	3.349	5.427	4.915	4.54
HCM Lane V/C Ratio	0.099	0.059	0.047	0.555	0.008	0.577	0.067	0.112	0.102	0.102
HCM Control Delay	11.4	10.6	10.1	17	8.5	17.4	8.8	11.4	10.7	10.3
HCM Lane LOS	B	B	B	C	A	C	A	B	B	B
HCM 95th-tile Q	0.3	0.2	0.1	3.4	0	3.7	0.2	0.4	0.3	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	48	71	26
Future Vol, veh/h	0	48	71	26
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	52	77	28
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10.8
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.978			0.961	
Flt Protected		0.996			0.999		0.950			0.950		
Satd. Flow (prot)	0	1855	1583	0	1861	1583	1770	3461	0	1770	3401	0
Flt Permitted		0.996			0.999		0.950			0.950		
Satd. Flow (perm)	0	1855	1583	0	1861	1583	1770	3461	0	1770	3401	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	25	270	5	0	7	297	50	0	41	53	9
Future Vol, veh/h	0	25	270	5	0	7	297	50	0	41	53	9
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	27	293	5	0	8	323	54	0	45	58	10
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	18.3	17.1	11.1
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	8%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	66%	92%	0%	98%	0%	0%	100%	49%
Vol Right, %	0%	0%	34%	0%	100%	0%	100%	0%	0%	51%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	35	27	295	5	304	50	50	57	59
LT Vol	41	0	0	25	0	7	0	50	0	0
Through Vol	0	35	18	270	0	297	0	0	57	29
RT Vol	0	0	9	0	5	0	50	0	0	30
Lane Flow Rate	45	38	29	321	5	330	54	54	62	64
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.1	0.081	0.059	0.588	0.009	0.594	0.087	0.119	0.128	0.124
Departure Headway (Hd)	8.094	7.581	7.338	6.599	5.853	6.476	5.76	7.893	7.38	7.013
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	445	475	490	542	605	552	615	457	489	514
Service Time	5.802	5.288	5.046	4.398	3.651	4.274	3.558	5.597	5.085	4.718
HCM Lane V/C Ratio	0.101	0.08	0.059	0.592	0.008	0.598	0.088	0.118	0.127	0.125
HCM Control Delay	11.7	11	10.5	18.5	8.7	18.4	9.1	11.7	11.2	10.7
HCM Lane LOS	B	B	B	C	A	C	A	B	B	B
HCM 95th-tile Q	0.3	0.3	0.2	3.8	0	3.9	0.3	0.4	0.4	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	50	86	30
Future Vol, veh/h	0	50	86	30
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	54	93	33
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.2
HCM LOS	B

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-AM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Bear Mountain Boulevard

Minor St: South Union Avenue

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

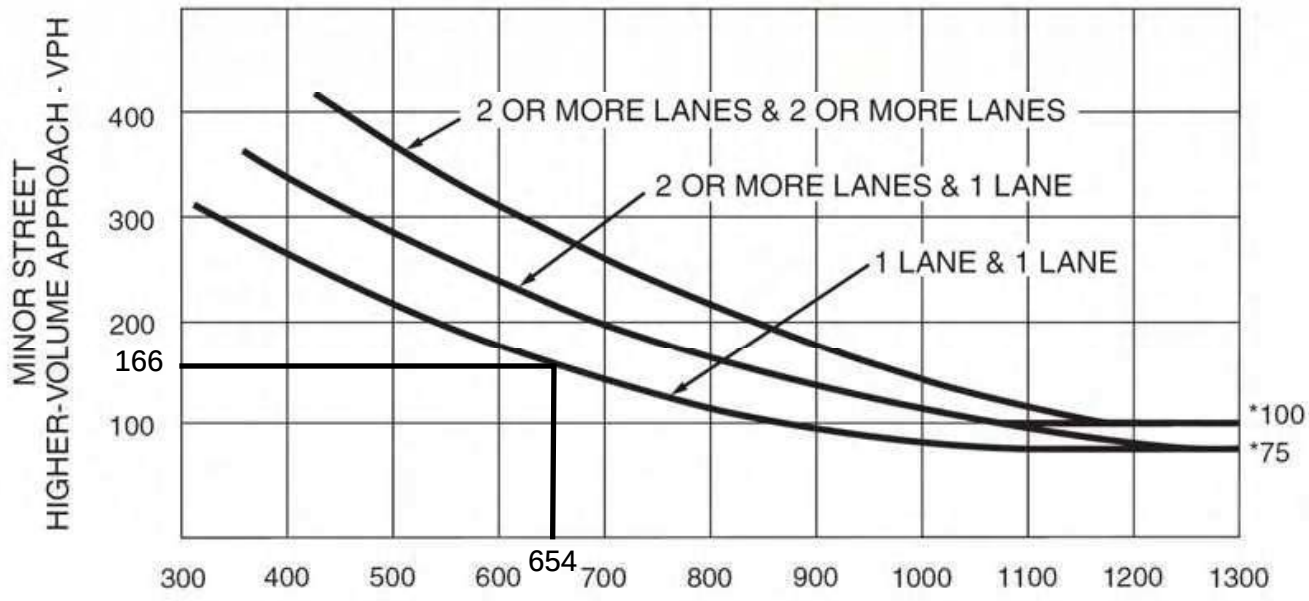
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 7848 ..... 2 or More..... 1992	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 7848 ..... 2 or More..... 1992	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied _____ Not Satisfied X No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 78% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Project: 99/Houghton Industrial Park

Job No: 6012.01

Intersection: Bear Mountain Blvd & South Union - PM Peak

Count Date: 1/28/2015

Ave Annual Growth: **3.48%**

Exist Peak Hour Volumes

AWS		
>	WBL	4
1	WBT	216
<	WBR	30
>	EBL	53
1	EBT	283
<	EBR	15
1	NBL	25
2	NBT	60
<	NBR	6
1	SBL	35
2	SBT	11
<	SBR	13
	TOTAL	751

Year 2035
Fut. Volumes w/o Proj

WBL	7
WBT	289
WBR	67
EBL	115
EBT	370
EBR	27
NBL	47
NBT	186
NBR	11
SBL	76
SBT	33
SBR	28
TOTAL	1256

Year 2035 Fut. Vol
+ Project Traffic

WBL	7
WBT	289
WBR	69
EBL	116
EBT	370
EBR	27
NBL	47
NBT	203
NBR	11
SBL	89
SBT	57
SBR	33
TOTAL	1318

Year 2025
Fut. Volumes w/o Proj

WBL	5
WBT	251
WBR	45
EBL	79
EBT	324
EBR	20
NBL	35
NBT	107
NBR	8
SBL	52
SBT	19
SBR	19
TOTAL	964

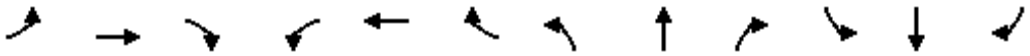
Year 2025 Fut. Vol
+ Project Traffic

WBL	5
WBT	251
WBR	46
EBL	80
EBT	324
EBR	20
NBL	35
NBT	116
NBR	8
SBL	59
SBT	31
SBR	22
TOTAL	997

Project Generated Trips - Year 2035

	Total
WBL	0
WBT	0
WBR	2
EBL	1
EBT	0
EBR	0
NBL	0
NBT	17
NBR	0
SBL	13
SBT	24
SBR	5
TOTAL	62

	Project:	99/Houghton Industrial Park						
	Job No:	6012.01						
	Intersection:	Bear Mountain Blvd & South Union - PM Peak						
	Count Date:	1/28/2015						
2006	ADT							
WB Approach (To)	7.265							
WB Approach (Away)	6.883							
EB Approach (To)	6.761							
EB Approach (Away)	7.15							
NB Approach (To)	0.249							
NB Approach (Away)	0.273							
SB Approach (To)	0.418							
SB Approach (Away)	0.387							
2035	ADT per RTIF		2015	TO	2035		ADJUSTMENTS	
WB Approach (To)	11.145		WBL	2.60	WBT	1.51	WBR	3.85
WB Approach (Away)	10.249		3.03%	7	1.44%	289	3.98%	67
EB Approach (To)	9.699		EBL	3.80	EBT	1.46	EBR	2.55
EB Approach (Away)	10.679		3.86%	115	1.32%	370	2.91%	27
NB Approach (To)	*1*		NBL	2.75	NBT	5.09	NBR	2.75
NB Approach (Away)	*1*		3.15%	47	5.69%	186	3.14%	11
SB Approach (To)	2.521		SBL	3.76	SBT	4.85	SBR	3.76
SB Approach (Away)	2.386		3.88%	76	5.48%	33	3.89%	28



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.985			0.919	
Flt Protected		0.992			0.999		0.950			0.950		
Satd. Flow (prot)	0	1848	1583	0	1861	1583	1770	3486	0	1770	3253	0
Flt Permitted		0.992			0.999		0.950			0.950		
Satd. Flow (perm)	0	1848	1583	0	1861	1583	1770	3486	0	1770	3253	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	53	283	15	0	4	216	30	0	25	60	6
Future Vol, veh/h	0	53	283	15	0	4	216	30	0	25	60	6
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	58	308	16	0	4	235	33	0	27	65	7
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	16.4	12.3	10.1
HCM LOS	C	B	B

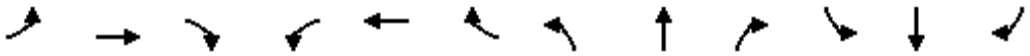
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	16%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	77%	84%	0%	98%	0%	0%	100%	22%
Vol Right, %	0%	0%	23%	0%	100%	0%	100%	0%	0%	78%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	40	26	336	15	220	30	35	7	17
LT Vol	25	0	0	53	0	4	0	35	0	0
Through Vol	0	40	20	283	0	216	0	0	7	4
RT Vol	0	0	6	0	15	0	30	0	0	13
Lane Flow Rate	27	43	28	365	16	239	33	38	8	18
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.055	0.082	0.052	0.594	0.023	0.401	0.048	0.078	0.015	0.032
Departure Headway (Hd)	7.299	6.79	6.625	5.855	5.074	6.039	5.327	7.398	6.888	6.331
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	490	527	540	617	706	595	672	484	519	564
Service Time	5.048	4.538	4.373	3.582	2.801	3.773	3.061	5.148	4.638	4.081
HCM Lane V/C Ratio	0.055	0.082	0.052	0.592	0.023	0.402	0.049	0.079	0.015	0.032
HCM Control Delay	10.5	10.1	9.7	16.8	7.9	12.8	8.3	10.8	9.7	9.3
HCM Lane LOS	B	B	A	C	A	B	A	B	A	A
HCM 95th-tile Q	0.2	0.3	0.2	3.9	0.1	1.9	0.2	0.3	0	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	35	11	13
Future Vol, veh/h	0	35	11	13
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	38	12	14
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10.2
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.989			0.925	
Flt Protected		0.990			0.999		0.950			0.950		
Satd. Flow (prot)	0	1844	1583	0	1861	1583	1770	3500	0	1770	3274	0
Flt Permitted		0.990			0.999		0.950			0.950		
Satd. Flow (perm)	0	1844	1583	0	1861	1583	1770	3500	0	1770	3274	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	20.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	79	324	20	0	5	251	45	0	35	107	8
Future Vol, veh/h	0	79	324	20	0	5	251	45	0	35	107	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	86	352	22	0	5	273	49	0	38	116	9
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	28.3	15.6	11.5
HCM LOS	D	C	B

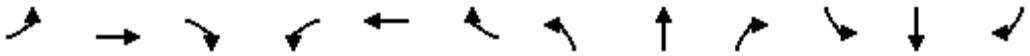
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	20%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	82%	80%	0%	98%	0%	0%	100%	25%
Vol Right, %	0%	0%	18%	0%	100%	0%	100%	0%	0%	75%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	71	44	403	20	256	45	52	13	25
LT Vol	35	0	0	79	0	5	0	52	0	0
Through Vol	0	71	36	324	0	251	0	0	13	6
RT Vol	0	0	8	0	20	0	45	0	0	19
Lane Flow Rate	38	78	47	438	22	278	49	57	14	28
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.086	0.164	0.098	0.787	0.034	0.519	0.082	0.131	0.03	0.056
Departure Headway (Hd)	8.115	7.602	7.47	6.466	5.665	6.827	6.112	8.325	7.81	7.27
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	444	475	482	556	625	531	590	433	461	495
Service Time	5.822	5.308	5.177	4.263	3.461	4.527	3.812	6.033	5.518	4.978
HCM Lane V/C Ratio	0.086	0.164	0.098	0.788	0.035	0.524	0.083	0.132	0.03	0.057
HCM Control Delay	11.6	11.8	11	29.3	8.7	16.7	9.4	12.3	10.8	10.4
HCM Lane LOS	B	B	B	D	A	C	A	B	B	B
HCM 95th-tile Q	0.3	0.6	0.3	7.4	0.1	3	0.3	0.4	0.1	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	52	19	19
Future Vol, veh/h	0	52	19	19
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	57	21	21
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.6
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.990			0.938	
Flt Protected		0.990			0.999		0.950			0.950		
Satd. Flow (prot)	0	1844	1583	0	1861	1583	1770	3504	0	1770	3320	0
Flt Permitted		0.990			0.999		0.950			0.950		
Satd. Flow (perm)	0	1844	1583	0	1861	1583	1770	3504	0	1770	3320	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	21.3
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	80	324	20	0	5	251	46	0	35	116	8
Future Vol, veh/h	0	80	324	20	0	5	251	46	0	35	116	8
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	87	352	22	0	5	273	50	0	38	126	9
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	30.8	16.4	11.8
HCM LOS	D	C	B

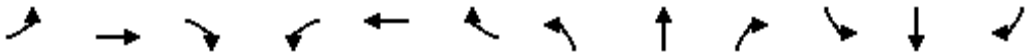
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	20%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	83%	80%	0%	98%	0%	0%	100%	32%
Vol Right, %	0%	0%	17%	0%	100%	0%	100%	0%	0%	68%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	77	47	404	20	256	46	59	21	32
LT Vol	35	0	0	80	0	5	0	59	0	0
Through Vol	0	77	39	324	0	251	0	0	21	10
RT Vol	0	0	8	0	20	0	46	0	0	22
Lane Flow Rate	38	84	51	439	22	278	50	64	22	35
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.087	0.181	0.108	0.807	0.035	0.54	0.087	0.15	0.049	0.073
Departure Headway (Hd)	8.269	7.755	7.631	6.744	5.94	6.986	6.271	8.433	7.917	7.427
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	435	464	471	540	606	518	574	426	454	484
Service Time	5.992	5.478	5.354	4.444	3.64	4.704	3.988	6.159	5.644	5.153
HCM Lane V/C Ratio	0.087	0.181	0.108	0.813	0.036	0.537	0.087	0.15	0.048	0.072
HCM Control Delay	11.8	12.2	11.3	31.9	8.9	17.6	9.6	12.6	11.1	10.7
HCM Lane LOS	B	B	B	D	A	C	A	B	B	B
HCM 95th-tile Q	0.3	0.7	0.4	7.8	0.1	3.2	0.3	0.5	0.2	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	59	31	22
Future Vol, veh/h	0	59	31	22
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	64	34	24
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.8
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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
Ped Bike Factor												
Frt			0.850			0.850		0.992			0.932	
Flt Protected		0.988			0.999		0.950			0.950		
Satd. Flow (prot)	0	1840	1583	0	1861	1583	1770	3511	0	1770	3299	0
Flt Permitted		0.988			0.999		0.950			0.950		
Satd. Flow (perm)	0	1840	1583	0	1861	1583	1770	3511	0	1770	3299	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	

Intersection Summary	
Area Type:	Other

Intersection	
Intersection Delay, s/veh	37.8
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	115	370	27	0	7	289	67	0	47	186	11
Future Vol, veh/h	0	115	370	27	0	7	289	67	0	47	186	11
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	125	402	29	0	8	314	73	0	51	202	12
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	65.8	23.6	13.9
HCM LOS	F	C	B

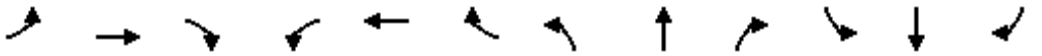
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	24%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	85%	76%	0%	98%	0%	0%	100%	28%
Vol Right, %	0%	0%	15%	0%	100%	0%	100%	0%	0%	72%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	47	124	73	485	27	296	67	76	22	39
LT Vol	47	0	0	115	0	7	0	76	0	0
Through Vol	0	124	62	370	0	289	0	0	22	11
RT Vol	0	0	11	0	27	0	67	0	0	28
Lane Flow Rate	51	135	79	527	29	322	73	83	24	42
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.126	0.315	0.183	1	0.055	0.693	0.143	0.213	0.058	0.098
Departure Headway (Hd)	8.902	8.406	8.301	7.597	6.77	7.756	7.049	9.291	8.794	8.295
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	405	430	434	480	531	463	505	388	409	434
Service Time	6.611	6.115	6.01	5.316	4.49	5.553	4.846	7.002	6.505	6.006
HCM Lane V/C Ratio	0.126	0.314	0.182	1.098	0.055	0.695	0.145	0.214	0.059	0.097
HCM Control Delay	12.9	14.9	12.9	68.9	9.9	26.5	11	14.5	12	11.9
HCM Lane LOS	B	B	B	F	A	D	B	B	B	B
HCM 95th-tile Q	0.4	1.3	0.7	13.3	0.2	5.2	0.5	0.8	0.2	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	76	33	28
Future Vol, veh/h	0	76	33	28
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	83	36	30
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	13.4
HCM LOS	B

Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	370	27	7	289	69	47	203	11	89	57	33
Future Volume (vph)	116	370	27	7	289	69	47	203	11	89	57	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		100	100		0	100		0
Storage Lanes	0		1	0		1	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		0.992			0.945	
Flt Protected		0.988			0.999		0.950			0.950		
Satd. Flow (prot)	0	1840	1583	0	1861	1583	1770	3511	0	1770	3345	0
Flt Permitted		0.988			0.999		0.950			0.950		
Satd. Flow (perm)	0	1840	1583	0	1861	1583	1770	3511	0	1770	3345	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1760			1107			919			5322	
Travel Time (s)		21.8			13.7			11.4			66.0	
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
Adj. Flow (vph)	126	402	29	8	314	75	51	221	12	97	62	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	29	0	322	75	51	233	0	97	98	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
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 65.7%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	38.1
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	116	370	27	0	7	289	69	0	47	203	11
Future Vol, veh/h	0	116	370	27	0	7	289	69	0	47	203	11
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	126	402	29	0	8	314	75	0	51	221	12
Number of Lanes	0	0	1	1	0	0	1	1	0	1	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	2
HCM Control Delay	67.3	25.6	14.7
HCM LOS	F	D	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	24%	0%	2%	0%	100%	0%	0%
Vol Thru, %	0%	100%	86%	76%	0%	98%	0%	0%	100%	37%
Vol Right, %	0%	0%	14%	0%	100%	0%	100%	0%	0%	63%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	47	135	79	486	27	296	69	89	38	52
LT Vol	47	0	0	116	0	7	0	89	0	0
Through Vol	0	135	68	370	0	289	0	0	38	19
RT Vol	0	0	11	0	27	0	69	0	0	33
Lane Flow Rate	51	147	86	528	29	322	75	97	41	57
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.13	0.353	0.203	1	0.058	0.717	0.152	0.253	0.102	0.133
Departure Headway (Hd)	9.135	8.638	8.541	7.928	7.099	8.143	7.437	9.429	8.932	8.491
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	394	418	422	460	506	447	485	383	403	424
Service Time	6.845	6.348	6.251	5.653	4.824	5.843	5.137	7.144	6.648	6.207
HCM Lane V/C Ratio	0.129	0.352	0.204	1.148	0.057	0.72	0.155	0.253	0.102	0.134
HCM Control Delay	13.2	16	13.4	70.5	10.3	28.9	11.5	15.3	12.7	12.5
HCM Lane LOS	B	C	B	F	B	D	B	C	B	B
HCM 95th-tile Q	0.4	1.6	0.8	13	0.2	5.6	0.5	1	0.3	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	89	57	33
Future Vol, veh/h	0	89	57	33
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	97	62	36
Number of Lanes	0	1	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	13.9
HCM LOS	B

Lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

COUNT DATE 2035 with Project-PM Peak

DIST _____ CO _____ RTE _____ PM _____

CALC _____ DATE _____

CHK _____ DATE _____

Major St: Bear Mountain Boulevard

Minor St: South Union Avenue

Critical Approach Speed _____ mph

Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 64 km/h (40 mph)..... ☒

or

In built up area of isolated community of < 10,000 population..... ☐

RURAL (R)

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

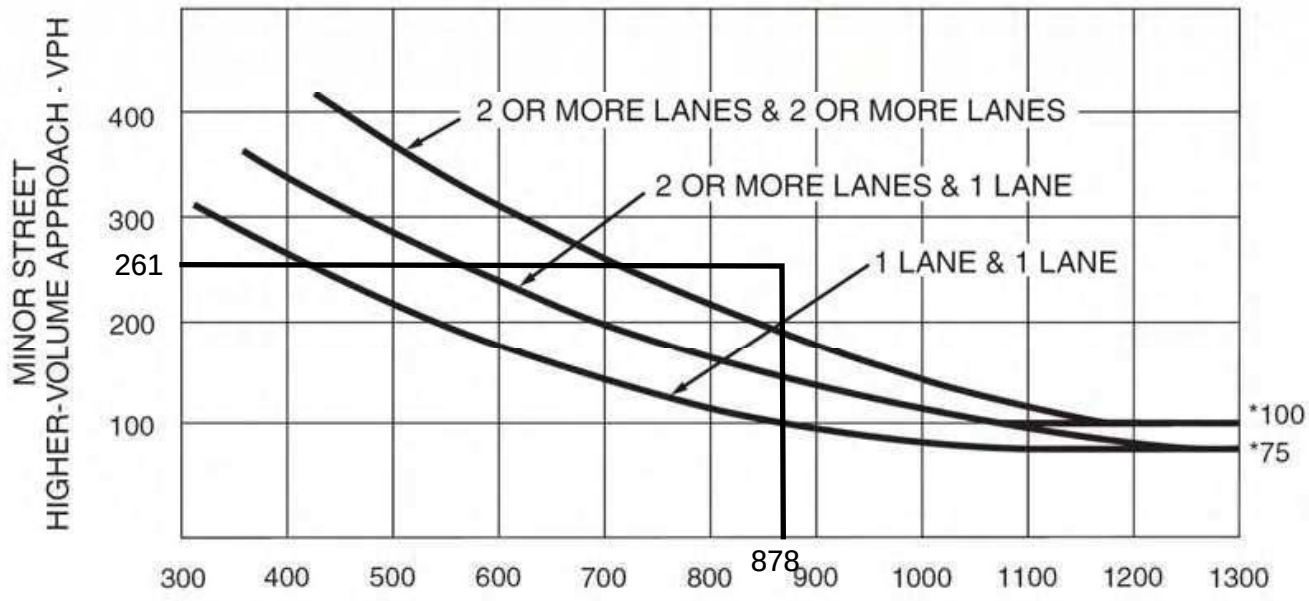
URBAN..... RURAL.....	Minimum Requirements EADT	
CONDITION A - Minimum Vehicular Volume Satisfied X Not Satisfied _____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	8,000 / 5,600	2,400 / 1,680
2 or More..... 1.....	9,600 / 6,720	2,400 / 1,680
2 or More..... 8780 ..... 2 or More..... 2610	9,600 / 6,720	3,200 / 2,240
1..... 2 or More.....	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied _____ Not Satisfied X	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1..... 1.....	12,000 / 8,400	1,200 / 850
2 or More..... 1.....	14,400 / 10,080	1,200 / 850
2 or More..... 8780 ..... 2 or More..... 2610	14,400 / 10,080	1,600 / 1,120
1..... 2 or More.....	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied X Not Satisfied _____ No one condition satisfied, but following conditions fulfilled 80% or more..... 100% (A) 87% (B)	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix C

Transportation Impact Fee Ordinance

RESOLUTION NO. 084-09

A RESOLUTION OF THE COUNCIL OF THE CITY OF BAKERSFIELD ADOPTING THE 2007-2035 REGIONAL TRANSPORTATION IMPACT FEE FACILITIES LIST AND FEE SCHEDULE, PHASE IV AND ADOPTING THE NEXUS REPORT.

WHEREAS, Chapter 15.84 of the Bakersfield Municipal Code implemented a Transportation Impact Fee program for new development in order for new development to bear a proportionate share of the cost of the new or expanded transportation facilities required by such development; and

WHEREAS, Chapter 15.84 of the Bakersfield Municipal Code requires that the Fee schedule be evaluated to account for changes in the Regional Transportation Facilities List, changes in cost estimates for the various projects on the list, and any other items which would change new developments' proportionate share of the cost of the Regional Transportation Facilities List; and

WHEREAS, Chapter 15.84 of the Bakersfield Municipal Code further requires that the fee schedule adopted by the City Council be adjusted annually by the Construction Cost Index; and

WHEREAS, both the Facilities List and the Fee Schedule of the Transportation Impact Fee Program have been re-evaluated to include a new planning horizon year of 2035; and

WHEREAS, the transportation network has been updated to include the latest development and land use trends through December of 2007; and

WHEREAS, all developments which vest after the effective date of this Resolution will be subject to the Phase IV Transportation Impact Fee; and

WHEREAS, this change to the Transportation Impact Fee is statutorily exempt from CEQA pursuant to section 15276 of the State CEQA Guidelines; and

WHEREAS, the fees collected do not involve the commitment to any specific project which may result in a potentially significant physical impact on the environment; and

WHEREAS, a public hearing before the City Council was advertised and held June 24, 2009 and the City Council finds as follows:

1. All required public notices have been given. Hearing notice was published per Government Code Sections 66018 and 6062 (a).

CITY OF BAKERSFIELD ORIGINAL

2. The provisions of CEQA and City of Bakersfield CEQA Implementation Procedures have been followed. This change to the Transportation Impact Fee program is statutorily exempt from CEQA pursuant to section 15276 of the State CEQA Guidelines.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Bakersfield as follows:

1. The above recitals are true and correct and incorporated herein.

2. The Transportation Impact Fee Facilities List, Phase IV set forth as Exhibit "A," is hereby approved and adopted.

3. The fee schedule for Phase IV set forth as Exhibit "B" is hereby approved and adopted.

4. The nexus report for Phase IV set forth as Exhibit "C" is hereby approved and adopted.

5. This Resolution shall become effective 60 days after its adoption.

----------oOo----------

CITY OF BAKERSFIELD
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I HEREBY CERTIFY that the foregoing Resolution was passed and adopted by the Council of the City of Bakersfield at a regular meeting thereof held on JUL 07 2009, by the following vote:

AYES:	COUNCILMEMBER	CARSON, BENHAM, WEIR, COUCH, HANSON, SULLIVAN, SCRIVNER
NOES:	COUNCILMEMBER	none
ABSTAIN:	COUNCILMEMBER	none
ABSENT:	COUNCILMEMBER	none

Pamela A. McCarthy
CITY CLERK and Ex Officio Clerk of the Council of the City of Bakersfield

APPROVED JUL 07 2009

By _____
HARVEY L. HALL
Mayor

APPROVED AS TO FORM:
VIRGINIA GENNARO
City Attorney

By Robert M. Sherfy
ROBERT M. SHERFY
Deputy City Attorney

Attachments: Exhibit "A"
Exhibit "B"
Exhibit "C"

mps

CITY OF BAKERSFIELD ORIGINAL

Appendix D

Metropolitan Bakersfield Transportation Impact Facilities List

1.97 REGIONAL TRANSPORTATION FACILITIES LIST - FY 2008-2035 Metropolitan Bakersfield Transportation Impact Fee Program

8/5/2009

Exhibit "A"

Global Project Number	Street Name	LIMITS From	LIMITS To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
BAKERSFIELD RTIF FACILITY LIST (NON-CORE)*																	
B303	7th Standard Road	Airport Drive								Traffic Signals	Install Signal	$0	$0	$161,400		$161,400	$161,400
B595	7th Standard Road	Chester Avenue								Modified Traffic Signals	Signal Modification	$0	$0	$58,400		$58,400	$58,400
B307	7th Standard Road	McCray Street								Traffic Signals	Install Signal	$0	$0	$148,400		$148,400	$148,400
E125	7th Standard Road	Greeley Road	Santa Fe Way	1.50		2	4	2	3.0	2 Lane Additions	Add 2 lanes		$1,561,696			$1,561,696	$1,561,696
E267	7th Standard Road	SR 43/Enos Lane		1.00		2	6	4	4.0	Expand Intersection	Expand Intersection		$1,267,200			$1,267,200	$1,267,200
B311	7th Standard Road	SR 99	I-5	3.00						Freeway Projects	Advance Planning	$0	$0		$5,500,000	$5,500,000	$5,500,000
B309	7th Standard Road	SR 99								State Hwy Bridges, Interchanges	Replace EB Bridge: add WB-SB ramp	$0	$0		$7,000,000	$7,000,000	$7,000,000
E159	7th Standard Road	Wings Way	Airport Drive	0.50		2	4	2	1.0	2 Lane Additions	Add 2 Lanes		$520,565			$520,565	$520,565
E340	7th Standard Road	Quail Creek Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E336	7th Standard Road	Zachary Road	Coffee Road							2 Lane Additions	Add 2 Lanes, 4 to 6 Lane widening		$0		$3,437,500	$3,437,500	$3,437,500
E337	7th Standard Road	UPRR/SR 99								Railroad Grade Separations	Grade Separation		$0		$27,021,000	$27,021,000	10,361,000
E338	7th Standard Road	Santa Fe Way	Coffee Road							2 Lane Additions	Add 2 lanes, 4 Lane Widening		$0		$45,154,000	$45,154,000	1,203,500
E160	Airport Drive	Norris Road	Olive Drive	2.00		4	6	2	4.0	2 Lane Additions	Add 2 lanes, BORDER		$2,082,262			$2,082,262	$1,041,131
B1	Airport Drive	Norris Road								Expand Intersection	Expand Intersection, BORDER	$687,656	$687,656		$0	1,375,311	$687,656
E185	Airport Drive	Olive Drive			0.50					Expand Intersection	BORDER		$500,000			$500,000	$250,000
B2	Airport Drive	Olive Drive n/o	State Road	0.60		4	6	2	1.2	2 Lane Additions	Add 2 lanes/Expand Intersection, BORDER	$0	$5,000,000		$0	5,000,000	$2,500,000
B3	Airport Drive	UP RR								Railroad Grade Separations	Widen RR Bridge, BORDER	$0	$0		$1,222,498	$1,222,498	$611,249
B450	Akers Road	Pacheco Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E302	Alfred Harrell Highway	China Grade Loop	Fairfax Road	0.50		4	6	2	1.0	2 Lane Additions	Add 2 Lanes	$0	$520,565		$0	$520,565	$520,565
B577	Alfred Harrell Highway	Lake Ming Road								Traffic Signals	Install traffic signal	$0	$0	$190,000	$0	$190,000	$190,000
B540	Alfred Harrell Highway	West End Hart Park	SR 178	5.50		2	4	2	11.0	2 Lane Additions	Add 2 lanes	$0	$5,726,220		$611,249	$6,337,469	$6,337,469
B158	Allen Road	Ming Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E4	Allen Road	Panama Lane	SR 119/Taft Highway	2.00		0	2	2	4.0	2 Lane Additions	Construct 2 lanes		$2,082,262			$2,082,262	$2,082,262
E344	Allen Road	SR 58/Rosedale Highway	Brimhall Road	1.00	0.75	4	6	1	0.3	1 Lane Additions	Add 1 lanes		$130,141			$130,141	$130,141
E186	Allen Road	SR 58/Rosedale Highway								Expand Intersection	Widen to 6 lanes		$500,000			$500,000	$500,000
B4	Allen Road	Brimhall Road	Stockdale Highway	1.00	0.75	2	6	2	0.5	2 Lane Additions	Add 2 lanes	$0	$260,283		$0	$260,283	$260,283
B5	Allen Road	Campus Park								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B6	Allen Road	Chamber Boulevard								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B8	Allen Road	Goose Lake Slough								Canal Culverts	Construct new Culvert @ Sta. 236+60 (Goose Lake)	$0	$220,050		$0	$220,050	$220,050
B9	Allen Road	Harris Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B11	Allen Road	Kern River Canal								Canal Bridges	Construct canal bridge at Sta. 150+00 (River Canal)	$0	$0		$611,249	$611,249	$611,249
B13	Allen Road	Meacham Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B15	Allen Road	Noriega Road	Hageman Road	0.38		2	2	1	0.4	1 Lane Additions	NB only	$36,122	$121,723		$611,249	$769,094	$769,094
B16	Allen Road	Noriega Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B18	Allen Road	Panama Lane	Ming Avenue	3.00		0	2	2	6.0	2 Lane Additions	Construct 2 lanes	$0	$3,123,393		$0	$3,123,393	$3,123,393
B19	Allen Road	Reina Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B20	Allen Road	Snow Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B21	Allen Road	UP RR								Improve Railroad Grade Crossings	Improve grade crossing	$0	$1,000,000		$0	$1,000,000	$1,000,000
E342	Allen Road	N/o Rosedale Hwy								Relocate Obstruction	PG&E Tower Relocation, 2 Towers 1165ft North of Rosedale	$0	$0		$200,000	$200,000	$200,000
E341	Allen Road	N/o Rosedale Hwy	Meacham Road + .36miles	0.60		2	4	1	0.6	1 Lane Additions	Road widening	$0	$312,339		$0	$312,339	$312,339
B574	Ashe Road	Harris Road								Traffic Signals	Install traffic signal	$0	$0	$190,000	$0	$190,000	$190,000
B541	Ashe Road	Panama Lane	Taft Highway	2.00		2	6	2	4.0	2 Lane Additions	Add 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
E6	Ashe Road	SR 119/Taft Highway	Curnow Road	0.50		2	4	2	1.0	2 Lane Additions	Construct 2 lanes		$520,565			$520,565	$520,565
B24	Ashe Road	Berkshire Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B25	Ashe Road	Hosking Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B26	Ashe Road	McKee Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B454	Berkshire Road	Akers Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B455	Berkshire Road	Buena Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B456	Berkshire Road	Mountain Ridge Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B457	Berkshire Road	Mountain Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B458	Berkshire Road	Reliance Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B29	Berkshire Road	South H Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B30	Berkshire Road	South Union Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B615	Berkshire Road (Star Lake Pkwy)	Sunset Spur								Improve Railroad Grade Crossings	New at-grade crossing	$0	$800,000		$0	$800,000	$800,000
B32	Breckenridge Road	SR 184/Morning Drive	Vineland Road	1.00		2	4	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B37	Brimhall Road	Jenkins Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B41	Brimhall Road	Renfro Road	Allen Road	0.50	0.25	2	4	2	0.5	2 Lane Additions	Add 2 lanes (excluding Westdale Avenue to Jenkins Road KEN664)	$0	$260,283		$0	$260,283	$260,283
E172	Brimhall Road	Rudd Road	Renfro Road	0.50		0	2	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565			$520,565	$520,565
B43	Brimhall Road	Verdugo Lane								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B613	Buena Vista Road	Campus Park Drive								Relocate Obstruction	Relocate PG&E Tower	$0	$0		$273,456	$273,456	$273,456
B48	Buena Vista Road	Campus Park Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B49	Buena Vista Road	Harris Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B51	Buena Vista Road	Pacheco Road	Panama Lane	1.00	0.70	2	4	2	0.6	2 Lane Additions	Construct 2 Lanes	$0	$312,339		$0	$312,339	$312,339
B614	Buena Vista Road	Pacheco Road	White Lane	1.00				1	1.0	1 Lane Additions	Add one lane	$0	$520,565		$0	$520,565	$520,565
B542	Buena Vista Road	Panama Lane	SR 119/Taft Highway	2.00		2	4	2	4.0	2 Lane Additions	Construct 2 Lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
B53	Buena Vista Road	SJ RR								Improve Railroad Grade Crossings	Improve grade crossing at Sta. 52+80	$0	$0		$122,250	$122,250	$122,250
B61	Calloway Drive	7th Standard Road	Snow Road	1.00		2	4	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
E227	Calloway Drive	Etchard Road 100' s/o								Canal Bridges	Widen Canal Crossing		$300,000			$300,000	$300,000
B60	Calloway Drive	Norris Road	Lake Superior Drive	0.20		3	6	1	0.2	1 Lane Additions	Add 1 lanes	$20,000	$104,113		$0	$124,113	$124,113
B62	Calloway Drive	SR 58/Rosedale Highway	Holland Street	0.25		4	6	2	0.5	2 Lane Additions	Widen roadway and intersection	$0	$0		$5,586,000	$5,586,000	$5,586,000
B64.1	Casa Loma Drive	Washington Street	Fairfax Road	2.50		0	2	2	5.0	2 Lane Additions	Construct 2 lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
E249	Centennial Corridor (TRIP)	Westside Parkway Terminus	SR 99/SR 58							Freeway Projects	Construct Freeway - TRIP, REGIONAL		$0		$644,586,000	$644,586,000	$123,187,000
B461	Chamber Boulevard	Windermere Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E170	Chase Avenue	Masterson Street	Comanche Drive	1.00		0	4	2	2.0	2 Lane Additions	Construct 2 lanes		$640,647			$640,647	$640,647
B71	China Grade Loop	Manor Street	Round Mountain Road	2.40		2	4	2	4.8	2 Lane Additions	Add 2 lanes	$497,908	$2,498,714		$0	$2,996,622	$2,996,622
E307	China Grade Loop	Round Mountain Road	Alfred Harrell Hwy	1.10		2	4	4	4.4	2 Lane Additions	Add 2 lanes	$0	$2,290,488		$20,000,000	$22,290,488	$22,290,488
B72	China Grade Loop	Round Mountain Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B75	Coffee Road	7th Standard Road	Norris Road	1.50		2	6	2	3.0	2 Lane Additions	Add 2 lanes	$61,125	$1,561,696		$0	$1,622,821	$1,622,821

1.97 REGIONAL TRANSPORTATION FACILITIES LIST - FY 2008-2035 Metropolitan Bakersfield Transportation Impact Fee Program

8/5/2009

Exhibit "A"

Global Project Number	Street Name	LIMITS From	To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
E209	Coffee Road	7th Standard Road 320' s/o								Canal Bridges	from 2 to 6 lanes, Widen Canal Crossing		$600,000			$600,000	$600,000
E339	Coffee Road	Rosedale Highway								Expand Intersection	Expand Intersection		$0		$9,000,000	$9,000,000	$9,000,000
E342	Coffee Road	Truxtun Ave								Expand Intersection	Expand Intersection		$0		$3,000,000	$3,000,000	$3,000,000
E343	Coffee Road	Stockdale Highway								Expand Intersection	Expand Intersection		$0		$3,200,000	$3,200,000	$3,200,000
B571	Coffee Road	Norris Road								Relocate Obstruction	Relocate PG&E transmission tower	$0	$0		$273,457	$273,457	$273,457
E16	Comanche Drive	Alfred Harrell Highway	SR 58	6.00		2	4	2	12.0	2 Lane Additions	Add 2 lanes		$6,246,786			$6,246,786	$6,246,786
E189	Comanche Drive	SR 58								State Hwy Bridges, Interchanges	Widen overpass		$5,000,000			$5,000,000	$5,000,000
E304	Comanche Drive	SR 58								Traffic Signals	Install Signal, State	$0	$0	$250,000	$250,000	$500,000	$500,000
E17	Comanche Drive	UPRR								Railroad Grade Separations	Grade Separation		$0		$20,000,000	$20,000,000	$15,000,000
E217	Cottonwood Road	Hosking Avenue 1700' s/o								Canal Bridges	pictures, Widen Canal Crossing		$300,000			$300,000	$300,000
E218	Cottonwood Road	Hosking Avenue 3200' s/o								Canal Bridges	Widen Canal Crossing		$300,000			$300,000	$300,000
E216	Cottonwood Road	Panama Lane 1500' s/o								Canal Bridges	Widen Canal Crossing		$300,000			$300,000	$300,000
E163.1	Cottonwood Road	SR 58	Panama Lane	4.00		2	4	2	8.0	2 Lane Additions	Add 2 lanes		$2,133,516			$2,133,516	$2,133,516
B80	Day Avenue	Airport Drive								Traffic Signals	Install Signal	$0	$0	$155,100		$155,100	$155,100
B81	Day Avenue	Chester Avenue								Traffic Signals	Install Signal	$0	$0	$147,800		$147,800	$147,800
B82	Day Avenue	Manor Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B83	Day Avenue	McCray Street								Traffic Signals	Install Signal	$0	$0	$143,200		$143,200	$143,200
B85	Edison Road	Breckenridge Road	Edison Highway	1.25		0	4	2	2.5	2 Lane Additions	Construct 2 lanes	$0	$1,301,414		$0	$1,301,414	$1,301,414
B86	Edison Road	SR 178	Breckenridge Road	2.50		0	4	2	5.0	2 Lane Additions	Construct 2 lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
B148	El Toro Viejo Road	BNSF RR								Railroad Grade Separations	Grade Separation	$0	$0		$10,000,000	$10,000,000	$10,000,000
B464	Etchart Road	Calloway Drive	Borel Street	0.50		2	4	1	0.5	1 Lane Additions	Add 1 eastbound lane & move ditch	$0	$160,162		$177,507	$337,668	$337,668
B465	Etchart Road	Calloway Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B468	Etchart Road	Jenkins Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B466	Etchart Road	Old Farm Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B87	Fairfax Road	Alfred Harrell Highway	Paladino Drive	1.00		2	6	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
E203	Fairfax Road	Alfred Harrell Highway								State Hwy Bridges, Interchanges	Expand Underpass, Widen Intersection		$5,000,000			$5,000,000	$5,000,000
B92	Fairfax Road	Highland Knolls Drive s/o	Niles Street	0.26		4	6	1	0.3	Construct Medians	Westside and Median, BORDER	$20,139	$135,347		$0	$155,486	$77,743
E167	Fairfax Road	Redbank Road	Panama Lane	3.00		2	4	2	6.0	2 Lane Additions	Construct 2 lanes		$3,123,393			$3,123,393	$3,123,393
B90	Fairfax Road	Redbank Road	SR 58	0.75		2	4	2	1.5	2 Lane Additions	Add 2 lanes	$0	$780,848		$0	$780,848	$780,848
B91	Fairfax Road	Redbank Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B95	Fairfax Road	SR 58								State Hwy Bridges, Interchanges	Widen SR 58 bridge at Sta. 45+75, REGIONAL	$0	$0		$1,222,498	$1,222,498	$1,068,463
B96	Fairfax Road	SR 58 Off Ramps								Traffic Signals	Install Signals (2nd signal cost in Additional costs), State, REGIONAL		$0	$250,000	$250,000	$500,000	$437,000
B97	Fairview Road	Monitor Street	South Union Avenue	0.50		2	4	2	1.0	2 Lane Additions	Add 2 lanes	$13,797	$320,323		$0	$334,121	$334,121
B99	Fruitvale Avenue	Downing Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B100	Fruitvale Avenue	Hageman Road	SR 58/Rosedale Highway	1.25		2	6	2	2.5	2 Lane Additions	Add 2 lanes	$1,008,561	$1,301,414		$0	$2,309,975	$2,309,975
E206	Fruitvale Avenue	Hageman Road								Expand Intersection	S.E. Corner		$500,000			$500,000	$500,000
B101	Fruitvale Avenue	Meany Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B102	Fruitvale Avenue	Snow Road	Norris Road	0.50		2	4	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565		$0	$520,565	$520,565
B98	Fruitvale Avenue	Snow Road 600' s/o								Canal Culverts	Widen Culvert @ Beardsley Canal	$0	$0		$250,000	$250,000	$250,000
E207	Fruitvale Avenue	SR 58/Rosedale Highway								Canal Bridges	Widen canal 20' n/o Rosedale Highway, Widen Canal Crossing		$300,000			$300,000	$300,000
E300	Gilmore Avenue	Calloway Canal								Canal Bridges	Construct Calloway Canal Bridge	$0	$0		$611,249	$611,249	$611,249
E164	Gilmore Avenue	Fruitvale Avenue	Landco Drive	0.86		0	2	2	1.7	2 Lane Additions	Construct 2 lanes		$550,956		$1,000,000	$1,550,956	$1,550,956
B489	Gilmore Avenue	Landco Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E301	Gilmore Avenue	RR								Railroad Grade Separations	New at grade crossing	$0	$0		$500,000	$500,000	$500,000
B103	Gosford Road	Berkshire Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B105	Gosford Road	Hosking Avenue/McCutchen Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E210	Gosford Road	McCutchen Road 1500' n/o		4.00		2	4			Canal Bridges	Widen Canal Crossing		$400,000			$400,000	$400,000
B106	Gosford Road	McKee Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B543	Gosford Road	Panama Lane	SR 119/Taft Highway	2.00		2	6	2	4.0	2 Lane Additions	Add 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
B107	Hageman Road	Allen Road		0.25		2	6	4	1.0	Expand Intersection	Install Signal, Expand Intersection	$0	$520,565	$190,000	$0	$710,565	$710,565
E38	Hageman Road	Heath Road	Rudd Road	0.50		2	3	2	1.0	2 Lane Additions	Construct 2 additional lanes		$520,565			$520,565	$520,565
E45	Hageman Road	Heath Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B109	Hageman Road	Jenkins Road	Allen Road	0.53	0.20	2	6	4	1.3	2 Lane Additions	partial - only along non-residential frontage	$16,987	$680,900		$305,625	$1,003,511	$1,003,511
B110	Hageman Road	Jenkins Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B111	Hageman Road	Jewetta Avenue	Verdugo Lane	0.20		2	6	4	0.8	1 Lane Additions	only additional RW and improvements	$43,735	$416,452		$305,625	$765,812	$765,812
B112	Hageman Road	Jewetta Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B473	Hageman Road	Landco Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B114	Hageman Road	Mohawk Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E40	Hageman Road	Nord Road	Wegis Avenue	0.50		2	4	2	1.0	2 Lane Additions	Construct 2 additional lanes		$520,565			$520,565	$520,565
B115	Hageman Road	Old Farm Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B117	Hageman Road	Renfro Road	Jenkins Road	0.50		2	4	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565		$0	$520,565	$520,565
B118	Hageman Road	Renfro Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B119	Hageman Road	Santa Fe Way	Old Farm Road	0.50		2	6	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565		$0	$520,565	$520,565
B581	Hageman Road	Santa Fe Way								Railroad Grade Separations	Grade Separation	$0	$0		$37,600,000	$37,600,000	6,000,000
E39	Hageman Road	Wegis Avenue	Heath Road	0.50		2	4	2	1.0	2 Lane Additions	Construct 2 additional lanes		$520,565			$520,565	$520,565
E46	Hageman Road	Wegis Avenue								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E335	Hageman Road	Knudsen Road	SR 204/Golden State Highway							State Hwy Bridges, Interchanges	Hageman flyover		$0		$68,894,000	$68,894,000	65,512,000
B125	Heath Road	Brimhall Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E53	Heath Road	Hageman Road	SR 58/Rosedale Highway	1.00		2	4	2	2.0	2 Lane Additions	Construct 2 additional lanes (recontruct existing)		$1,041,131			$1,041,131	$1,041,131
E57	Heath Road	Johnson Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E59	Heath Road	Kratzmeyer Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B477	Heath Road	Palm Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B126	Heath Road	SR 58/Rosedale Highway	Stockdale Highway	2.50	1.50	2	4	2	2.0	2 Lane Additions	Construct 2 Lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B127	Heath Road	Stockdale Highway								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B550	Highland Knolls Drive	Monica Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B479	Highland Knolls Drive	Morning Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B128	Hosking Avenue	Akers Road	Wible Road	0.50	0.40	2	4	2	0.2	2 Lane Additions	Construct 4 lanes	$0	$104,113		$0	$104,113	$104,113
B570	Hosking Avenue	Hughes Lane								Traffic Signals	Install traffic signal	$0	$0	$190,000	$0	$190,000	$190,000
B130	Hosking Avenue	Monitor Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000

1.97 REGIONAL TRANSPORTATION FACILITIES LIST - FY 2008-2035 Metropolitan Bakersfield Transportation Impact Fee Program

8/5/2009

Exhibit "A"

Global Project Number	Street Name	LIMITS From	To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
B131	Hosking Avenue	South H Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B133	Hosking Avenue	South Union Avenue	South H Street	0.30		2	4	2	0.6	2 Lane Additions	Add 2 lanes	$0	$312,339		$0	$312,339	$312,339
B335	Hosking Avenue	South Union Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B134	Hosking Avenue	SR 99								State Hwy Bridges, Interchanges	Construct Interchange	$0	$0		$35,000,000	$35,000,000	$35,000,000
B135	Hosking Avenue	Stine Road	Akers Road	0.50	0.25	0	4	2	0.5	2 Lane Additions	Construct 2 lanes	$0	$260,283		$0	$260,283	$260,283
B136	Hosking Avenue	Wible Road	South H Street	0.80	0.10	2	6	4	2.8	4 Lane Additions	Add 4 lanes	$0	$1,457,583		$0	$1,457,583	$1,457,583
B437	Hosking Avenue	Wible Road								Traffic Signals	Install SIgnal	$0	$0	$190,000	$0	$190,000	$190,000
B480	Hosking Avenue/McCutchen Road	Akers Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E72	Hosking Avenue/McCutchen Road	Allen Road	Buena Vista Road	1.00		0	2	2	2.0	2 Lane Additions	Construct 2 lanes		$1,041,131			$1,041,131	$1,041,131
E73	Hosking Avenue/McCutchen Road	Allen Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B484	Hosking Avenue/McCutchen Road	Buena Vista Road	Gosford Road	2.00		2	4	2	4.0	2 Lane Additions	Add 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
B481	Hosking Avenue/McCutchen Road	Buena Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B482	Hosking Avenue/McCutchen Road	Gosford Road	Stine Road	2.00		0	4	2	4.0	2 Lane Additions	Construct 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
B129	Hosking Avenue/McCutchen Road	Mountain Ridge Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B483	Hosking Avenue/McCutchen Road	Mountain Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B154	Hosking Avenue/McCutchen Road	Progress Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B616	Hosking Avenue/McCutchen Road	Sunset Spur								Improve Railroad Grade Crossings	New at-grade crossing	$0	$1,000,000		$0	$1,000,000	$1,000,000
E215	Jewetta Avenue	Hageman Road								Expand Intersection	Expand Intersection	$100,000	$500,000			$600,000	$350,000
B141	Jewetta Avenue	Meacham Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B142	Jewetta Avenue	Noriega Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B143	Jewetta Avenue	Reina Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B144	Jewetta Avenue	Hageman Road	Meacham Road	0.50	0.30	3	4	1	0.2	1 Lane Additions	Add 1 lanes	$0	$104,113		$0	$104,113	$104,113
B145	Jewetta Avenue	Snow Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E61	Kratzmeyer Road	Nord Road	Santa Fe Way	1.50		2	4	2	3.0	2 Lane Additions	Construct 2 additional lanes (recontruct existing)		$1,561,696			$1,561,696	$1,561,696
E65	Kratzmeyer Road	Nord Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B295	Kratzmeyer Road	Olive Drive/Santa Fe Way								Railroad Grade Separations	Railroad Grade Separation	$0	$0		$20,000,000	$20,000,000	15,000,000
E268	Kratzmeyer Road	SR 43/Enos Lane		0.75		2	6	4	3.0	Expand Intersection	Expand Intersection		$1,561,696			$1,561,696	$1,561,696
E69	Kratzmeyer Road	SR 43/Enos Lane								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E64	Kratzmeyer Road	Wegis Avenue								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E345	Knudsen Drive	Olive Drive	Hageman Road	0.75		4	6	2	1.5	2 Lane Additions	Construct 2 Lanes	$385,784	$480,485		$0	$866,269	$866,269
B151	Masterson Street	Paladino Drive	Alfred Harrell Highway	1.20		0	4	4	4.8	4 Lane Additions	Construct 4 lanes	$0	$2,498,714		$0	$2,498,714	$2,498,714
B518	Masterson Street	Panorama Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B152	Masterson Street	SR 178	Alfred Harrell Highway							Canal Bridges	4 box culverts & 2 bridges	$0	$3,227,273		$0	$3,227,273	$3,227,273
B153	Masterson Street	SR 178	Paladino Drive	0.95		2	4	2	1.9	2 Lane Additions	Add 2 lanes	$328,148	$989,074		$0	$1,317,223	$1,317,223
E71	Masterson Street/Edison Road	UPRR								Railroad Grade Separations	Grade Separation		$20,000,000			$20,000,000	15,000,000
B490	McKee Road	Akers Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B492	McKee Road	Buena Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B493	McKee Road	Mountain Ridge Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B494	McKee Road	Mountain Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B155	McKee Road	South H Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B156	McKee Road	South Union Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B157	McKee Road	SR 99								State Hwy Bridges, Interchanges	Construct Overpass	$0	$11,000,000		$0	$11,000,000	$11,000,000
B617	McKee Road	Sunset Spur								Improve Railroad Grade Crossings	New at-grade crossing	$0	$800,000		$0	$800,000	$800,000
B440	McKee Road	Wible Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B496	Meacham Road	Allen Road	Jenkins Road	0.50		2	4	1	0.5	2 Lane Additions	Construct 2 lanes	$0	$160,162		$0	$160,162	$160,162
B140	Meacham Road	Jenkins Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B498	Meacham Road	Renfro Road	Jenkins Road	0.50		2	4	1	0.5	2 Lane Additions	Construct 2 lanes	$0	$160,162		$122,250	$282,412	$282,412
B161	Ming Avenue	West Beltway	Allen Road	1.50	0.00	4	5	4	6.0	4 Lane Additions	Construct 4 lanes - north half 2 Lanes adjacent to Berrenda Mesa	$0	$3,123,393		$0	$3,123,393	$3,123,393
B164	Mohawk Avenue	Calloway Canal								Canal Bridges	Construct Calloway Canal Bridge	$0	$0		$1,000,000	$1,000,000	$1,000,000
B166	Mohawk Avenue	Hageman Road	SR 58/Rosedale Highway	1.25		0	6	4	5.0	4 Lane Additions	Construct 4 Lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
B172	Morning Drive	Alfred Harrell Highway	Paladino Drive	1.80		0	6	2	3.6	2 Lane Additions	Construct 2 lanes	$0	$1,874,036		$0	$1,874,036	$1,874,036
B173	Morning Drive	Alfred Harrell Highway	Paladino Drive							Canal Bridges	Construct 3 Culverts/Bridges	$0	$0		$4,034,244	$4,034,244	$4,034,244
B175	Morning Drive	Auburn Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B463	Morning Drive	College Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B176	Morning Drive	Paladino Drive	SR 178	1.00		2	6	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
E346	SR 184	Edison Highway	SR 58	0.50		4	6	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565		$0	$520,565	$520,565
B274	Morning Drive	Panorama Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B177	Morning Drive	SR 178	College Avenue	0.90		0	6	4	3.6	4 Lane Additions	Construct 4 lanes	$0	$1,874,036		$0	$1,874,036	$1,874,036
B501	Morningside Drive	Juniper Ridge Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B502	Morningside Drive	Masterson Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B503	Morningside Drive	Morning Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B504	Morningside Drive	Panorama Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B611	Mount Vernon Avenue	Arvin Edison Canal								Canal Bridges	Construct Canal Bridge	$0	$0		$611,249	$611,249	$611,249
B179	Mount Vernon Avenue	Casa Loma Drive	Belle Terrace	0.50		2	4	2	1.0	2 Lane Additions	Construct 2 lanes	$0	$520,565		$0	$520,565	$520,565
B610	Mount Vernon Avenue	White Lane/Muller Road	Panama Lane	1.50		0	6	2	3.0	2 Lane Additions	Add 2 lanes	$0	$1,561,696		$0	$1,561,696	$1,561,696
E83	Nord Avenue	Noriega Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E84	Nord Avenue	Palm Avenue								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E82	Nord Avenue	Reina Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B185	Norris Road	Calloway Drive	Coffee Road	1.00	0.80	2	4	0		R/W Only	Only additional RW and improvements	$5,232	$0		$1,222,498	$1,227,730	$1,227,730
B184	Norris Road	Calloway Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B186	Norris Road	Chester Avenue	Manor Street	0.50		2	4	2	1.0	2 Lane Additions	Add 2 lanes	$100,000	$320,323		$0	$420,323	$420,323
B187	Norris Road	Coffee Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B188	Norris Road	Fruitvale Avenue	Knudsen Drive	0.84		2	4	0		R/W Only	only additional RW and improvements	$92,054	$0		$305,625	$397,679	$397,679
B588	Norris Road	Manor Street								Modified Traffic Signals	Signal Modification	$0	$0	$95,000	$0	$95,000	$95,000
B191	Norris Road	Riverlakes Drive/Quail Creek Road								Traffic Signals	Install Signal (50% Funded)	$0	$0	$190,000	$0	$190,000	$95,000
B192	Norris Road	SR 99	Airport Drive	1.50		2	4	2	3.0	2 Lane Additions	Add 2 lanes	$337,191	$960,970		$0	$1,298,161	$1,298,161
B193	Oak Street	California Avenue	SR 178/24th Street	1.00		4	6	2	2.0	2 Lane Additions	Add 2 lanes, BORDER	$1,290,958	$1,041,131		$0	$2,332,089	$1,166,044
B195	Old Farm Road	Noriega Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B196	Old Farm Road	Reina Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000

Global Project Number	Street Name	LIMITS From	To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
B197	Old River Road	Berkshire Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B198	Old River Road	Campus Park Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B199	Old River Road	Harris Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B200	Old River Road	Hosking Avenue/McCutchen Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B201	Old River Road	McKee Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B203	Old River Road	Pacheco Road	Campus Park Drive	0.50		2	4	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565		$0	$520,565	$520,565
B204	Old River Road	Panama Lane	Pacheco Road	1.00		2	4	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B206	Old River Road	SR 119/Taft Highway	Panama Lane	2.00		2	4	2	4.0	2 Lane Additions	Add 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
E316	Old River Road	SR 119/Taft Highway								Canal Culverts	Canal Crossing	$0	$600,000		$0	$600,000	$600,000
E305	Old River Road	SR 119/Taft Highway		0.17						Relocate Canals	Relocate Canal	$0	$225,000		$0	$225,000	$225,000
E264	Old River Road	SR 119/Taft Highway								Canal Bridges	Realign Old River Road and Canal Crossing	$500,000	$3,000,000		$500,000	$4,000,000	$4,000,000
B510	Olive Drive	Old Farm Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B511	Olive Drive	Renfro Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B214	Olive Drive	Rudd Road (West Beltway)	Allen Road	1.50		2	4	2	3.0	2 Lane Additions	Construct 2 Lanes	$0	$1,561,696		$645,479	$2,207,175	$2,207,175
B221	Olive Drive	SR 99	Beardsley Canal	0.80		4	6	2	1.6	State Hwy Bridges, Interchanges	Widen SR 99 Interchange; Widen Beardsley Canal Culvert	$1,613,697	$832,905		$3,602,303	$6,048,905	$6,048,905
B220	Olive Drive	UP RR w/o Roberts Lane								Railroad Grade Separations	Grade Separation	$0	$0		$20,000,000	$20,000,000	15,000,000
E347	Olive Drive	Knudsen Road								Expand Intersection	Expand Intersection	$0	$1,000,000		$0	$1,000,000	$1,000,000
B512	Olive Drive	Verdugo Lane								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B609	Oswell Street	White Lane	Panama Lane	2.00		0	6	2	4.0	2 Lane Additions	Add 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
B235	Paladino Drive	Fairfax Road	Morning Drive	1.25		0	6	4	5.0	4 Lane Additions	Construct 4 lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
B578	Paladino Drive	Fairfax Road	Morning Drive							Relocate Obstruction	Relocate PG&E transmission tower	$0	$0		$273,457	$273,457	$273,457
B236	Paladino Drive	Fairfax Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B237	Paladino Drive	Masterson Street	Alfred Harrell Highway	1.00		0	4	2	2.0	2 Lane Additions	Construct 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B238	Paladino Drive	Masterson Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B239	Paladino Drive	Morning Drive	Masterson Street	1.50		0	4	2	3.0	2 Lane Additions	Construct 2 lanes (Excluding Morning Drive to Cosmo KEN648)	$0	$1,561,696		$0	$1,561,696	$1,561,696
B240	Paladino Drive	Morning Drive	Masterson Street							Canal Culverts	Construct 5 Culverts	$0	$0		$124,695	$124,695	$124,695
B241	Paladino Drive	Morning Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B242	Palm Avenue	Heath Road	Renfro Road	0.25		2	4	2	0.5	2 Lane Additions	Only at undeveloped SR area	$0	$160,162		$0	$160,162	$160,162
E165	Panama Lane	Cottonwood Road	SR 184/Weedpatch Highway	4.00		2	4	2	8.0	2 Lane Additions	Construct 2 additional lanes		$4,164,524			$4,164,524	$4,164,524
E89	Panama Lane	Heath Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B516	Panama Lane	Mountain Vista Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E88	Panama Lane	Renfro Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
E87	Panama Lane	SR 43/Enos Lane	Allen Road	6.00		2	4	2	12.0	2 Lane Additions	Construct 2 additional lanes		$6,246,786			$6,246,786	$6,246,786
E179	Panama Lane	SR 43/Enos Lane								Traffic Signals	Install Signal, State		$0	$250,000		$250,000	$250,000
E271	Panama Lane	SR 43/Enos Lane		0.75		2	6	4	3.0	Expand Intersection	Expand Intersection		$1,561,696			$1,561,696	$1,561,696
E182	Panama Lane	West Beltway								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B517	Panama Lane	Windermere Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B591	Panama Lane	Oswell Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B245	Panama Lane	Allen Road	Gosford Road	3.00	0.70	2	6	2	4.6	2 Lane Additions	Add 2 lanes	$0	$2,394,601		$0	$2,394,601	$2,394,601
B257	Panama Lane	Allen Road	Windermere Street							Relocate Canals	Relocate canal parallel w/so. r/w ~ 2165'	$0	$0		$695,601	$695,601	$695,601
B246	Panama Lane	Allen Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B250	Panama Lane	Cottonwood Road								Traffic Signals	Install Signal/Expand Intersection	$0	$611,249	$190,000	$0	$801,249	$801,249
B251	Panama Lane	Fairfax Road								Traffic Signals	Install Signal/Expand Intersection	$0	$611,249	$190,000	$0	$801,249	$801,249
B253	Panama Lane	Gosford Road	Stine Road	1.00		3	6	1	1.0	1 Lane Additions	Add 1 lanes	$0	$520,565		$0	$520,565	$520,565
B252	Panama Lane	Mountain Ridge Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B255	Panama Lane	Old River Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B256	Panama Lane	Reliance Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B258	Panama Lane	South Union Avenue	Cottonwood Road	1.00		2	4	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B244	Panama Lane	South Union Avenue 1200' w/o	South Union Avenue	1.00		4	6	2	2.0	1 Lane Additions	Widen deficient section only	$0	$1,041,131		$0	$1,041,131	$1,041,131
B261	Panama Lane	Sunset RR								Improve Railroad Grade Crossings	Improve grade crossing at Sta. 186+70 (Sunset)	$0	$0		$500,000	$500,000	$500,000
B266	Panama Road	Cottonwood Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B267	Panama Road	Fairfax Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B268	Panama Road	South Union Avenue	SP RR	4.50		2	4	2	9.0	2 Lane Additions	Add 2 lanes	$0	$4,685,089		$0	$4,685,089	$4,685,089
B269	Panama Road	South Union Avenue								Modified Traffic Signals	Signal Modification	$0	$0	$95,000	$0	$95,000	$95,000
B263	Panama Road	South Union Avenue 0.4 mi e/o	South Union Avenue 0.9 mi e/o							Relocate Canals	Relocate Parallel Canal, So./side rdwy. @ Sta. 21+40 - 48+50	$0	$0		$248,473	$248,473	$248,473
B264	Panama Road	South Union Avenue 0.95 mi e/o								Canal Culverts	Widen canal culvert at Sta. 50+30, Imp Gr Xing @ RR	$0	$0		$171,150	$171,150	$171,150
B265	Panama Road	South Union Avenue 2.0 mi e/o	SR 184/Weedpatch Highway 0.3 mi w/o							Relocate Canals	Relocate parallel canal from Sta. 106+66 - 247+10	$0	$0		$1,287,657	$1,287,657	$1,287,657
B270	Panama Road	SP RR	SR 184/Weedpatch Highway 0.2 mi w/o	0.30		2	4	2	0.6	2 Lane Additions	Add 2 lanes	$0	$312,339		$0	$312,339	$312,339
B271	Panama Road	SR 184/Weedpatch Highway								Modified Traffic Signals	Signal Modification, State	$0	$0	$125,000	$0	$125,000	$125,000
B262	Panama Road	SR 184/Weedpatch Highway 0.2 mi w/o	SR 184/Weedpatch Highway	0.20		2	4	2	0.4	2 Lane Additions	Add 2 lanes	$0	$208,226		$0	$208,226	$208,226
B554	Panorama Drive	Queen Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B277	Patton Way	Downing Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B520	Patton Way	Meany Avenue	SR 58/Rosedale Highway	0.75		2	4	2	1.5	2 Lane Additions	Add 2 lanes	$167,552	$480,485		$764,061	$1,412,098	$1,412,098
B279	Patton Way	Meany Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B476	Pensinger Road	Windermere Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B521	Quail Creek Road	Norris Road	7th Standard Road	1.50		0	4	4	6.0	2 Lane Additions	Construct 2 lanes	$0	$1,921,941		$0	$1,921,941	$1,921,941
E168	Redbank Road	Fairfax Avenue	SR 184/Weedpatch Highway	1.00		2	4	2	2.0	2 Lane Additions	Construct 2 additional lanes		$640,647		$171,150	$811,797	$811,797
B525	Renfro Road	7th Standard Road	Olive Drive	1.50		0	4	2	3.0	2 Lane Additions	Construct 2 lanes	$0	$1,561,696		$122,250	$1,683,946	$1,683,946
B283	Renfro Road	Brimhall Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E315	Renfro Road	Goose Lake Slough								Canal Culverts	Widen Canal Culvert South of Brimhall Road	$0	$400,000			$400,000	$400,000
B284	Renfro Road	Johnson Road	Stockdale Highway	0.50	0.30	2	4	2	0.4	2 Lane Additions	Add 2 lanes	$0	$208,226		$0	$208,226	$208,226
B285	Renfro Road	Johnson Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B287	Renfro Road	Meacham Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B524	Renfro Road	Olive Drive	Reina Road	0.50		0	4	2	1.0	2 Lane Additions	Construct 2 lanes	$0	$520,565		$0	$520,565	$520,565
B289	Renfro Road	Palm Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B290	Renfro Road	Reina Road	Johnson Road	3.70	1.20	2	4	2	5.0	2 Lane Additions	Add 2 lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
B560	Renfro Road	Santa Fe Way/BNSF RR								Railroad Grade Separations	Railroad Grade Separation	$0	$0		$18,000,000	$18,000,000	13,000,000
B544	Santa Fe Way	Rudd Road (West Beltway)	Hageman Road	2.00		2	4	2	4.0	2 Lane Additions	Add 2 lanes	$0	$2,082,262		$0	$2,082,262	$2,082,262
B594	Sante Fe Way	Reina Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000

1.97 REGIONAL TRANSPORTATION FACILITIES LIST - FY 2008-2035 Metropolitan Bakersfield Transportation Impact Fee Program

8/5/2009

Exhibit "A"

Global Project Number	Street Name	LIMITS From	To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
B313	Snow Road	Allen Road	Old Farm Road	0.50		3	4	1	0.5	1 Lane Additions	1 on north side	$0	$260,283		$0	$260,283	$260,283
B316	Snow Road	Calloway Drive	Quail Creek Road	0.50	0.40	2	6	2	0.2	2 Lane Additions	Add 2 Lanes	$0	$104,113		$426,652	$530,765	$530,765
B317	Snow Road	Calloway Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B318	Snow Road	Coffee Road	Fruitvale Avenue	1.00		3	6	1	1.0	1 Lane Additions	Add 1 lane	$0	$520,565		$500,000	$1,020,565	$1,020,565
B319	Snow Road	Coffee Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B320	Snow Road	Fruitvale Avenue	Golden State Highway	0.35		2	6	2	0.7	2 Lane Additions	Add 2 lanes	$0	$364,396		$0	$364,396	$364,396
B321	Snow Road	Fruitvale Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B323	Snow Road	Jenkins Road	Allen Road	0.50		0	4	4	2.0	2 Lane Additions	Construct 2 lanes	$0	$1,041,131		$274,382	$1,315,513	$1,315,513
B324	Snow Road	Jewetta Avenue	Calloway Drive	1.00		3	6	1	1.0	1 Lane Additions	1 on north side	$0	$520,565		$305,625	$826,190	$826,190
B325	Snow Road	Old Farm Road	Jewetta Avenue	0.50		3	6	1	0.5	1 Lane Additions	1 on north side	$0	$260,283		$0	$260,283	$260,283
B530	Snow Road	Old Farm Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B326	Snow Road	Patton Way								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B327	Snow Road	Quail Creek Road	Coffee Road	0.50		2	6	2	1.0	2 Lane Additions	Add 2 lanes	$0	$520,565		$611,249	$1,131,815	$1,131,815
B596	Snow Road	Quail Creek Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B314	Snow Road	Renfro Road/Jenkins Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B322	Snow Road	SR 204/Golden State Highway								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B331	Snow Road	Verdugo Lane								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B700	South Beltway	I-5	SR 58	25.00		0	2	2	50.0	R/W Only	Acquisition of Right-of-way	$20,000,000	$0			$20,000,000	$20,000,000
B333	South H Street	Arvin-Edison Canal	Hosking Avenue	0.75		2	4	2	1.5	2 Lane Additions	Add 2 lanes	$0	$780,848		$0	$780,848	$780,848
B334	South H Street	Hosking Avenue	Taft Highway	1.00		2	4	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B332	South H Street	Taft Highway	White Lane							Relocate Canals	Relocate Canal	$0	$1,500,000		$1,936,437	$3,436,437	$3,436,437
B338.1	South Union Avenue	Taft Highway	White Lane	3.50		4	6	2	7.0	2 Lane Additions	Add 2 lanes	$0	$3,643,958		$0	$3,643,958	$3,643,958
B607	SR 119/Taft Highway	Akers Road								Traffic Signals	Install signals, State	$0	$0	$250,000		$250,000	$250,000
E112	SR 119/Taft Highway	Allen Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B339	SR 119/Taft Highway	Ashe Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B341	SR 119/Taft Highway	Buena Vista Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B342	SR 119/Taft Highway	Mountain Ridge Drive								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B532	SR 119/Taft Highway	Mountain Vista Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B344	SR 119/Taft Highway	Old River Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B533	SR 119/Taft Highway	Reliance Drive								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B346	SR 119/Taft Highway	Stine Road								Modified Traffic Signals	Signal Modification, State			$125,000		$125,000	$125,000
B347	SR 119/Taft Highway	Wible Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B340	SR 119/Taft Highway	Buena Vista Road	SR 99	5.90		2	4	2	11.8	2 Lane Additions	R/W & Constr. Cost Based on Program Unit Costs	$0	$0		$16,800,000	$16,800,000	$16,800,000
E111	SR 119/Taft Highway	I-5	Buena Vista Road	5.50		2	4	2	11.0	2 Lane Additions	Construct 2 additional lanes		$0		$12,500,000	$12,500,000	$12,500,000
E330	SR 119/Taft Highway	I-5								State Hwy Bridges, Interchanges	Improve Interchange	$0	$0		$7,000,000	$7,000,000	$7,000,000
B410	SR 119/Taft Highway	SR 99	South Union Avenue	1.10		2	4	2	2.2	2 Lane Additions	Add 2 lanes	$0	$1,145,244		$0	$1,145,244	$1,145,244
B345	SR 119/Taft Highway	SR 99								State Hwy Bridges, Interchanges	Improve Interchange	$0	$0		$7,334,988	$7,334,988	$7,334,988
E313	SR 119/Taft Highway	Stine Canal								Canal Culverts	Construct Canal Culvert East of Gosford Road	$0	$1,200,000			$1,200,000	$1,200,000
B350	SR 178	Edison Road								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
E118	SR 178	M Street	Fairfax Road	5.25		6	8	2	10.5	Freeway Projects	Construct freeway with interchanges , REGIONAL		$0		$82,500,000	$82,500,000	$72,105,000
E278	SR 178	Miramonte Drive	Rancheria Drive	0.80		2	6	4	3.2	4 Lane Additions	add 4 lanes		$0		$8,000,000	$8,000,000	$8,000,000
E261	SR 178	SR 204/Golden State Avenue								State Hwy Bridges, Interchanges	Improve Connection , REGIONAL		$0		$20,000,000	$20,000,000	$17,480,000
E233	SR 178	Various								State Hwy Bridges, Interchanges	Ramp Improvements - Various Locations, REGIONAL		$0		$20,000,000	$20,000,000	$17,480,000
B422	SR 178	Vineland Road								State Hwy Bridges, Interchanges	Construct Interchange	$0	$16,962,161		$13,037,839	$30,000,000	$30,000,000
E253	SR 178	Vineland Road	Miramonte Drive							4 Lane Additions	Widening - add 2 Lanes, 4 to 6		$0		$86,630,000	$86,630,000	$86,630,000
E333	SR 178 (TRIP)	Vineland Road	Miramonte Drive							2 Lane Additions	Widening - TRIP add 2 Lanes, 2 to 4		$0		$36,512,000	$36,512,000	$19,075,000
E251	SR 178 (TRIP)	Morning Drive								State Hwy Bridges, Interchanges	Construct interchanges - TRIP		$0		$58,787,000	$58,787,000	$6,743,000
E259	SR 178/24th Street (TRIP)	Buck Owens Boulevard	M Street							Freeway Projects	Roadway Widening - TRIP , REGIONAL		$0		$34,040,000	$34,040,000	$13,965,646
E258	SR 178/24th Street (TRIP)	Oak Street	SR 99							Expand Intersection	Interchange Improvements - TRIP		$0		$19,025,000	$19,025,000	$2,182,000
B369	SR 184/Kern Canyon Road	Chase Avenue								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
B587	SR 184/Kern Canyon Road	Mesa Marin Drive								Traffic Signals	Install Signal, STATE	$0	$0	$250,000	$0	$250,000	$250,000
B555	SR 184/Kern Canyon Road	Monica Street								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
B370	SR 184/Kern Canyon Road	Morning Drive	SR 178	2.50		2	6	2	5.0	2 Lane Additions	Add 2 lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
B371	SR 184/Kern Canyon Road	Vineland Road								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
B358	SR 184/Morning Drive	Breckenridge Road								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
B359	SR 184/Morning Drive	Edison Highway	Niles Street	1.25		2	6	4	5.0	4 Lane Additions	Add 4 lanes	$0	$2,602,827		$0	$2,602,827	$2,602,827
B361	SR 184/Morning Drive	Eucalyptus Drive								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
B357	SR 184/Weedpatch Highway	Hermosa Road 0.54 mi n/o								Canal Culverts	Widen canal box culvert at Sta. 187+00	$0	$0		$134,475	$134,475	$134,475
B363	SR 184/Weedpatch Highway	Panama Road	SR 58	5.80		2	4	2	11.6	2 Lane Additions	Add 2 lanes	$0	$6,038,560		$0	$6,038,560	$6,038,560
B282	SR 184/Weedpatch Highway	Redbank Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B366	SR 184/Weedpatch Highway	SR 58 E/B & W/B Ramps								Traffic Signals	Install Signal, State 2 Signals	$0	$0	$250,000	$250,000	$500,000	$500,000
B364	SR 184/Weedpatch Highway	UP RR								Railroad Grade Separations	Construct grade separation at Sta. 335+40	$0	$0		$20,000,000	$20,000,000	15,000,000
B367	SR 184/Weedpatch Highway	White Lane/Muller Road								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
B368	SR 184/Weedpatch Highway	Wilson Road								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
E235	SR 204/Golden State Avenue	Airport Drive	SR 178							2 Lane Additions	Add 2 lanes, REGIONAL		$0		$30,000,000	$30,000,000	$26,220,000
E310	SR 204/Golden State Avenue	Calloway Canal								Canal Bridges	Widen Canal Bridge, REGIONAL	$0	$0		$600,000	$600,000	$524,400
E309	SR 204/Golden State Avenue	Carrier Canal								Canal Bridges	Widen Canal Bridge, REGIONAL	$0	$0		$600,000	$600,000	$524,400
E312	SR 204/Golden State Avenue	Chester Avenue								State Hwy Bridges, Interchanges	Bridge Widening, REGIONAL	$0	$0		$6,000,000	$6,000,000	$5,244,000
E311	SR 204/Golden State Avenue	Kern River								Kern River Bridges	Widen River Bridge 2 lanes .2 Miles, REGIONAL	$0	$0		$8,000,000	$8,000,000	$6,992,000
E236	SR 204/Golden State Highway	F Street								State Hwy Bridges, Interchanges	Construct interchange, REGIONAL		$0		$20,000,000	$20,000,000	$17,480,000
E266	SR 43/Enos Lane	I-5 EB								Traffic Signals	Install Signal, State		$0	$250,000		$250,000	$250,000
E269	SR 43/Enos Lane	I-5 EB		0.25		2	6	4	1.0	Expand Intersection	Expand Intersection		$520,565			$520,565	$520,565
E265	SR 43/Enos Lane	I-5 WB								Traffic Signals	Install Signal, State		$0	$250,000		$250,000	$250,000
E270	SR 43/Enos Lane	I-5 WB		0.25		2	6	4	1.0	Expand Intersection	Expand Intersection		$520,565			$520,565	$520,565
E273	SR 43/Enos Lane	SR 58/Rosedale Highway		1.00		2	6	4	4.0	Expand Intersection	Expand Intersection		$2,082,262			$2,082,262	$2,082,262
E272	SR 43/Enos Lane	Stockdale Highway		1.00		2	6	4	4.0	Expand Intersection	Expand Intersection		$2,082,262			$2,082,262	$2,082,262
E142	SR 43/Enos Lane	Stockdale Highway								Traffic Signals	Install Signal, State		$0	$250,000		$250,000	$250,000
E107	SR 58	Cottonwood Road	Fairfax Road	2.00		6	8	2	4.0	Freeway Projects	Construct freeway with interchanges, REGIONAL		$16,000,000			$16,000,000	$12,920,000
B373	SR 58	Real Road	Cottonwood Road	3.00	0.50	4	8	4	10.0	Freeway Projects	Add 2 lanes, REGIONAL	$0	$40,000,000		$40,000,000	$80,000,000	$64,600,000
E234	SR 58	Various								State Hwy Bridges, Interchanges	Ramp Improvements - Various Locations, REGIONAL		$20,000,000			$20,000,000	$17,480,000

1.97 REGIONAL TRANSPORTATION FACILITIES LIST - FY 2008-2035 Metropolitan Bakersfield Transportation Impact Fee Program

8/5/2009

Exhibit "A"

Global Project Number	Street Name	LIMITS From	To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
B379	SR 58/Rosedale Highway	Enos Lane	Gibson Road							Modified Traffic Signals	Signal Modification	$0	$0	$95,000	$124,988	$219,988	$219,988
E102	SR 58/Rosedale Highway	Driver Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B382	SR 58/Rosedale Highway	Enos Lane								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B383	SR 58/Rosedale Highway	Fruitvale Avenue								Modified Traffic Signals	Signal Modification, State			$125,000		$125,000	$125,000
B385	SR 58/Rosedale Highway	Gibson Street								Modified Traffic Signals	Signal Modification, State			$125,000		$125,000	$125,000
E103	SR 58/Rosedale Highway	Greeley Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B386	SR 58/Rosedale Highway	Heath Road								Traffic Signals	Install Signal			$190,000		$190,000	$190,000
B389	SR 58/Rosedale Highway	Landco Drive								Traffic Signals	Signal Modification, State			$125,000		$125,000	$125,000
B390	SR 58/Rosedale Highway	Mohawk Street								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B391	SR 58/Rosedale Highway	Nord Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B394	SR 58/Rosedale Highway	Renfro Road								Modified Traffic Signals	Signal Modification, State			$125,000		$125,000	$125,000
E105	SR 58/Rosedale Highway	Superior Road								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B601	SR 58/Rosedale Highway	Verdugo Lane								Modified Traffic Signals	Signal Modification, State			$125,000		$125,000	$125,000
E104	SR 58/Rosedale Highway	Wegis Avenue								Traffic Signals	Install Signal, State			$250,000		$250,000	$250,000
B375	SR 58/Rosedale Highway	Allen Road	Calloway Drive	2.00		4	6	2	4.0	2 Lane Additions	R/W & Constr. - Future		$8,819,000		$0	$8,819,000	$8,819,000
B381	SR 58/Rosedale Highway	Enos Lane (SR 43)	Allen Road	6.00		2	4	2	12.0	2 Lane Additions	R/W & Constr. Future		$0		$40,000,000	$40,000,000	$40,000,000
E256	SR 58/Rosedale Highway (TRIP)	Gibson Street	Calloway Drive	3.26		4	6	2	6.5	2 Lane Additions	add 2 lanes Widen Roadway - TRIP		$0		$20,840,000	$20,840,000	$2,390,000
B377	SR 58/Rosedale Highway (TRIP)	SJVRR								Railroad Grade Separations	Grade Separation @ Landco (W/o Landco Drive) - Future TRIP	$0	$0		$20,000,000	$20,000,000	$15,000,000
B395	SR 65/Porterville Highway	James Road	7th Standard Road	2.25		2	4	2	4.5	2 Lane Additions	Add 2 lanes	$0	$2,205,000		$0	$2,205,000	$2,205,000
E110	SR 99	7th Standard Road	Rosedale Highway 1.25 mi n/o	3.50		6	8	2	7.0	Freeway Projects	Freeway widening				$49,000,000	$49,000,000	$34,300,000
B396	SR 99	Olive Drive	SR 204/Golden State Highway	0.50		6	8	2	1.0	Freeway Projects	Widen for additional ramp lanes at Olive Drive		$0		$5,500,000	$5,500,000	$5,500,000
B397	SR 99	South H Street N/B Off Ramp								Traffic Signals	Install Signal, State	$0	$0	$250,000	$0	$250,000	$250,000
E334	SR 99	Snow Road								State Hwy Bridges, Interchanges	Construct Interchange, UPRR Grade Separation	$0	$0		$75,000,000	$75,000,000	$70,000,000
E232	SR 99	Various								State Hwy Bridges, Interchanges	Ramp Improvements - Various Locations, REGIONAL		$0		$20,000,000	$20,000,000	$17,480,000
B398.2	SR 99	Wilson Road	White Lane	1.00		6	8	2	2.0	Freeway Projects	Add 2 lanes, REGIONAL	$0	$10,000,000		$0	$10,000,000	$6,650,000
E178	SR 99	White Lane	SR 119/Taft Highway	3.60		6	8	2	7.2	Freeway Projects	Freeway widening		$36,000,000			$36,000,000	$25,200,000
B399	Stine Road	Berkshire Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B400	Stine Road	Hosking Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B401	Stine Road	McKee Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E94	Stine Road	SR 119/Taft Highway	Curnow Road	0.50		2	4	2	1.0	2 Lane Additions	Construct 2 lanes		$520,565			$520,565	$520,565
B403	Stine Road	Taft Highway	Panama Lane	2.00	0.75	2	4	2	2.5	2 Lane Additions	Add 2 lanes	$0	$1,301,414		$0	$1,301,414	$1,301,414
E181	Stockdale Highway	Greeley Road								Traffic Signals	Install Signal		$0	$190,000		$190,000	$190,000
B404	Stockdale Highway	Heath Road	Renfro Road	1.00		2	4	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B405	Stockdale Highway	Nord Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B406.1	Stockdale Highway	Renfro Road	New Stine Road	5.75		4	6	2	11.5	Construct Medians	Re-construct Median	$0	$700,000		$0	$700,000	$700,000
B408	Stockdale Highway	SP RR								Improve Railroad Grade Crossings	Improve RRX @ Buttonwillow	$0	$0		$122,250	$122,250	$122,250
B409	Stockdale Highway	West Metro Boundary	Heath Road	4.50		2	4	2	9.0	2 Lane Additions	Add 2 lanes	$0	$4,685,089		$0	$4,685,089	$4,685,089
E318	Truxtun Avenue	BNSF RR	Chester Avenue	2.00		4	6	6	12.0	2 Lane Additions	add 2 lanes, REGIONAL	$0	$40,000,000		$0	$40,000,000	$34,960,000
B414	Verdugo Lane	Meacham Road	Rosedale Highway	0.50		2	4	0		1 Lane Additions	East side	$0	$0		$305,625	$305,625	$305,625
B415	Verdugo Lane	Meacham Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B416	Verdugo Lane	Noriega Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B418	Verdugo Lane	Reina Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B419	Vineland Road	Edison Highway	Eucalyptus Drive	0.75		2	4	2	1.5	2 Lane Additions	Add 2 lanes	$0	$780,848		$0	$780,848	$780,848
B420	Vineland Road	Eucalyptus Drive	Pioneer Drive	0.25		2	4	2	0.5	2 Lane Additions	Add 2 lanes	$0	$260,283		$0	$260,283	$260,283
B556	Vineland Road	Highland Knolls Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B557	Vineland Road	Paladino Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B580	Vineland Road	SR 178	Paladino Drive	1.00		0	6	2	2.0	2 Lane Additions	Arterial	$0	$1,041,131		$0	$1,041,131	$1,041,131
B424	Vineland Road	SR 184/Kern Canyon Road	SR 178	1.00		0	4	2	2.0	2 Lane Additions	Construct 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B423	Vineland Road	SR 184/Morning Drive	Pioneer Drive	1.00		0	2	2	2.0	2 Lane Additions	Construct 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B425	Vineland Road	SR 58	Edison Highway	0.20		2	4	2	0.4	2 Lane Additions	Add 2 lanes	$0	$208,226		$0	$208,226	$208,226
B421	Vineland Road	UP RR								Railroad Grade Separations	Grade Separation	$0	$18,000,000			$18,000,000	$13,000,000
E231	West Beltway (TRIP)	7th Standard Road	SR 58/Rosedale Highway	4.00		0	4	4	16.0	Freeway Projects	Construct expressway - Future Trip		$0		$77,980,000	$77,980,000	$75,510,000
E245	West Beltway	Pacheco Road	Westside Parkway	4.00		0	4	4	16.0	Freeway Projects	Construct Expressway		$0		$88,680,000	$88,680,000	$88,680,000
E243	West Beltway	Taft Highway	Pacheco Road	1.00		0	4	4	4.0	Freeway Projects	Construct Expressway		$0		$54,750,000	$54,750,000	$54,750,000
E151	West Beltway	SR 58/Rosedale Highway	WSPW							Freeway Projects	Construct Expressway		$0		$52,760,000	$52,760,000	$52,760,000
E260	West Beltway	Westside Parkway								State Hwy Bridges, Interchanges	Construct local interchanges		$30,000,000			$30,000,000	$30,000,000
B514	West Ming Collector	Windermere Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B162	Westside Parkway Phase 1	SR 58/Rosedale Highway	Truxtun Avenue	1.25		0	6	4	5.0	Freeway Projects	Construct 6 lanes, River/Canal/RR & Widening	$0	$0		$40,690,000	$40,690,000	$0
E331	Westside Parkway Phase 2	Mohawk Street	Coffee Road							Freeway Projects	Construct freeway with interchanges	$0	$0		$100,580,000	$100,580,000	$0
B426	Westside Parkway Phase 3 (TRIP)	Coffee Road	Calloway Drive							Freeway Projects	Construct Freeway	$0	$0		$47,060,000	$47,060,000	$15,000,000
E177	Westside Parkway Phase 4 (Future TRIP)	Mohawk Street	Truxtun Avenue							Future Freeway Alignment	Construct freeway with interchanges - Future Trip , REGIONAL		$0		$33,820,000	$33,820,000	$0
E319	Westside Parkway Phase 5&6	Heath Road / Stockdale Hwy	Calloway Drive							Freeway Projects	Construct Fwy	$0	$0		$111,620,000	$111,620,000	$37,000,000
B536	White Lane	Allen Road	West Beltway	1.00		0	4	2	2.0	2 Lane Additions	Construct 2 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B536.1	White Lane	Buena Vista Road	Windermere Street	0.50		0	4	1	0.5	1 Lane Additions	Construct 1 lane	$0	$260,283		$0	$260,283	$260,283
B427	White Lane	Allen Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B575	White Lane	Lily Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B538	White Lane	Windermere Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B432	White Lane/Muller Road	Cottonwood Road	Fairfax Road	3.20		0	4	2	6.4	2 Lane Additions	Construct 2 lanes (S 1/2 Cottonwood Road to Washington Street)	$0	$3,331,619		$0	$3,331,619	$3,331,619
B604	White Lane/Muller Road	Cottonwood Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B435	White Lane/Muller Road	Fairfax Road								Traffic Signals	Install SIgnal	$0	$0	$190,000	$0	$190,000	$190,000
B605	White Lane/Muller Road	Oswell Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B442	Wible Road	SR 119/Taft Highway	Panama Lane	2.00	0.70	2	6	2	2.6	2 Lane Additions	Add 2 lanes	$0	$1,353,470		$0	$1,353,470	$1,353,470
B446	Administration									Computer Tracking System	Computer Tracking System (City & County)	$0	$0		$244,500	$244,500	$244,500
B444	Beltway Planning									Advance Planning/Studies	Advance Planning/Studies	$0	$0		$2,444,996	$2,444,996	$2,444,996
B447	Freeways									Freeway Projects	Freeway R/W	$11,202,044	$0		$0	$11,202,044	$11,202,044
B445.1	Gap projects											$0			$16,596,329	$16,596,329	$16,596,329
B448	Transit Costs											$0			$0	$0	$0
	Total								**581.1**			**Total Cost/Fee Funding**			*	**$3,008,065,239**	**$1,849,029,327**

1.97 REGIONAL TRANSPORTATION FACILITIES LIST - FY 2008-2035 Metropolitan Bakersfield Transportation Impact Fee Program

8/5/2009

Exhibit "A"

Global Project Number	Street Name	LIMITS From	LIMITS To	Improvement Length Miles	Completed Improvement Length Miles	Number of Lanes Striped	Number of Lanes Proposed	Lanes Funded by Fee	Number of Lane-Miles	Cat_desc	Notes	Cost R/W	Cost Construct.	Signal Cost	Additional/ Undifferent-iated Cost	Total Cost	Fee Funding
BAKERSFIELD RTIF FACILITY LIST (CORE)*																	
E160	Airport Drive	Norris Road	Olive Drive	2.00		4	6	2	4.0	2 Lane Additions	Add 2 lanes, BORDER		$2,082,262			*	$1,041,131
B1	Airport Drive	Norris Road								Expand Intersection	Expand Intersection, BORDER	$687,656	$687,656		$0	*	$687,656
E185	Airport Drive	Olive Drive								Expand Intersection	BORDER		$500,000			*	$250,000
E237	34th Street Extension	Chester Avenue	F Street	0.28		0	4	4	1.1	4 Lane Additions	Construct 4 Lanes, REGIONAL		$30,000,000			*	$3,780,000
E306	34th Street Extension	UPRR								Railroad Grade Separations	Grade Separation, REGIONAL	$0	$0		$20,000,000	*	$2,520,000
B2	Airport Drive	Olive Drive n/o	State Road	0.60		4	6	2	1.2	2 Lane Additions	Add 2 lanes/Expand Intersection, BORDER	$0	$5,000,000		$0	*	$2,500,000
B3	Airport Drive	UP RR								Railroad Grade Separations	Widen RR Bridge, BORDER	$0	$0		$1,222,498	*	$611,249
B31	Bernard Street	Haley Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B44	Brundage Lane	Quantico Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B45	Brundage Lane	SR 58 W/B Off Ramp to Cottonwood Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B46	Brundage Lane	Sterling Road								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B54	California Avenue	Edison Highway								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B55	California Avenue	Oak Street	A Street	0.50		2	3	1	0.5	1 Lane Additions	Widening south side	$64,548	$260,283		$0	$324,831	$324,831
B64,2	Casa Loma Drive	Cottonwood Road	Washington Street	0.50		0	4	4	2.0	4 Lane Additions	Construct 4 lanes	$0	$1,041,131		$0	$1,041,131	$1,041,131
B65	Casa Loma Drive	Cottonwood Road								Traffic Signals	Install Signal/Construct Expanded Intersection	$0	$1,833,747	$190,000	$0	$2,023,747	$2,023,747
B63	Casa Loma Drive	Madison Street 0.25 mi e/o								Canal Culverts	Widen canal culvert at Sta. 38+50	$0	$0		$48,900	$48,900	$48,900
B66	Casa Loma Drive	South Union Avenue	Cottonwood Road	1.00		2	4	2	2.0	Improve Railroad Grade Crossings	Improve grade crossing at Sta. 1+42	$0	$1,041,131		$122,250	$1,163,381	$1,163,381
B582	Casa Loma Drive	Union Avenue								Modified Traffic Signals	Signal Modification	$0	$0	$95,000	$0	$95,000	$95,000
E249	Centennial Corridor (TRIP)	Westside Parkway Terminus	SR 99/SR 58							Freeway Projects	Construct Freeway - TRIP , REGIONAL		$0		$644,586,000	*	$0
B77	Columbus Street	Alta Vista Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B281	Cottonwood Road	Planz Road								Traffic Signals	Install Signal/Expand Intersection	$0	$611,249	$190,000	$0	$801,249	$801,249
E163.2	Cottonwood Road	SR 58	Panama Road	6.00		2	4	2	12.0	2 Lane Additions	Add 2 lanes		$1,097,751			$1,097,751	$1,097,751
B79	Cottonwood Road	SR 58 E/B Off Ramp								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B84	East Belle Terrace	Cottonwood Road								Traffic Signals	Install Signal/Expand Intersection	$0	$305,625	$190,000	$0	$495,625	$495,625
B92	Fairfax Road	Highland Knolls Drive s/o	Niles Street	0.26		4	6	1	0.3	Construct Medians	Westside and Median, BORDER	$20,139	$135,347		$0	*	$77,743
B95	Fairfax Road	SR 58								State Hwy Bridges, Interchanges	Widen SR 58 bridge at Sta. 45+75, REGIONAL	$0	$0		$1,222,498	*	$154,035
B96	Fairfax Road	SR 58 Off Ramps								Traffic Signals	Install Signals (2nd signal cost in Additional costs), State, REGIONAL		$0	$250,000	$250,000	*	$63,000
B137	Hughes Lane	Ming Avenue	Terrace Way	0.75		0	2	2	1.5	2 Lane Additions	Construct 2 lanes	$1,633,869	$480,485		$0	$2,114,354	$2,114,354
E400	Madison Street	Arvin-Edison Intake canal								Canal Bridges	Construct canal bridge		$611,249		$0	$611,249	$611,249
B171	Monterey Street	Alta Vista Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B180	Mount Vernon Avenue	SR 58 W/B Ramp								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B183	Niles Street	Brentwood Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E224	Oak Street	21st Street		2.50						Expand Intersection	Expand Intersection		$500,000			$500,000	$500,000
B193	Oak Street	California Avenue	SR 178/24th Street	1.00		4	6	2	2.0	2 Lane Additions	Add 2 lanes, BORDER	$1,290,958	$1,041,131		$0	*	$1,166,044
E226	Oak Street/Wible Road	Ming Avenue		2.50						Expand Intersection			$500,000			$500,000	$500,000
B208	Old Stine Road	Ming Avenue	Belle Terrace	0.50		2	4	2	1.0	2 Lane Additions	Add 2 lanes	$403,424	$320,323		$0	$723,748	$723,748
B209	Old Stine Road	Stine Canal								Canal Culverts	Widen canal culvert (Stine Road)	$0	$0		$97,800	$97,800	$97,800
B222	Oswell Street	SR 178	Brundage Lane	2.00		4	6	2	4.0	Construct Medians	Median Reconstruction	$0	$2,082,262		$0	$2,082,262	$2,082,262
B223	Oswell Street	SR 58 Ramps								Traffic Signals	Install Signals, State	$0	$500,000	$250,000	$0	$750,000	$750,000
B272	Panorama Drive	Alta Vista Drive								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B593	Panorama Drive	Columbus Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B413	Panorama Drive	University Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B276	Panorama Drive	Wenatchee Avenue								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
B337	South Union Avenue	SJ RR								Improve Railroad Grade Crossings	Improve grade crossing at Sta. 265+16 (SJ RR)	$0	$0		$122,250	$122,250	$122,250
B338.2	South Union Avenue	White Lane	Casa Loma Drive	1.50		4	6	2	3.0	2 Lane Additions	Add 2 lanes	$0	$1,561,696		$0	$1,561,696	$1,561,696
E118	SR 178	M Street	Fairfax Road	5.25		6	8	2	10.5	Freeway Projects	Construct freeway with interchanges , REGIONAL		$0		$82,500,000	*	$10,395,000
E261	SR 178	SR 204/Golden State Avenue								State Hwy Bridges, Interchanges	Improve Connection , REGIONAL		$0		$20,000,000	*	$2,520,000
E233	SR 178	Various								State Hwy Bridges, Interchanges	Ramp Improvements - Various Locations, REGIONAL		$0		$20,000,000	*	$2,520,000
E259	SR 178/24th Street (TRIP)	Buck Owens Boulevard	M Street							Freeway Projects	Roadway Widening - TRIP , REGIONAL		$0		$34,040,000	*	$2,013,354
E235	SR 204/Golden State Avenue	Airport Drive	SR 178							2 Lane Additions	Add 2 lanes, REGIONAL		$0		$30,000,000	*	$3,780,000
E310	SR 204/Golden State Avenue	Calloway Canal								Canal Bridges	Widen Canal Bridge, REGIONAL	$0	$0		$600,000	*	$75,600
E309	SR 204/Golden State Avenue	Carrier Canal								Canal Bridges	Widen Canal Bridge, REGIONAL	$0	$0		$600,000	*	$75,600
E312	SR 204/Golden State Avenue	Chester Avenue								State Hwy Bridges, Interchanges	Bridge Widening, REGIONAL	$0	$0		$6,000,000	*	$756,000
E236	SR 204/Golden State Avenue	F Street								State Hwy Bridges, Interchanges	Construct interchange, REGIONAL		$0		$20,000,000	*	$2,520,000
E311	SR 204/Golden State Avenue	Kern River								Kern River Bridges	Widen River Bridge 2 lanes .2 Miles, REGIONAL	$0	$0		$8,000,000	*	$1,008,000
B372	SR 204/Union Avenue	Brundage Lane								Expand Intersection	Signal Modification/Expand Intersection	$0	$0	$95,000	$1,833,747	$1,928,747	$1,928,747
E107	SR 58	Cottonwood Road	Fairfax Road	2.00		6	8	2	4.0	Freeway Projects	Construct freeway with interchanges, REGIONAL		$16,000,000			*	$1,088,000
B373	SR 58	Real Road	Cottonwood Road	3.00	0.50	4	8	4	10.0	Freeway Projects	Add 2 lanes, REGIONAL	$0	$40,000,000		$40,000,000	*	$3,400,000
E234	SR 58	Various								State Hwy Bridges, Interchanges	Ramp Improvements - Various Locations, REGIONAL		$0		$20,000,000	*	$2,520,000
E232	SR 99	Various								State Hwy Bridges, Interchanges	Ramp Improvements - Various Locations, REGIONAL		$0		$20,000,000	*	$2,520,000
B398.2	SR 99	Wilson Road	White Lane	1.00		6	8	2	2.0	Freeway Projects	Add 2 lanes, REGIONAL	$0	$10,000,000		$0	*	$350,000
B406.2	Stockdale Highway	New Stine Road	Oak Street	1.25		4	6	2	2.5	Construct Medians	Median reconstruction	$0	$1,301,414		$0	$1,301,414	$1,301,414
E318	Truxtun Avenue	BNSF RR	Chester Avenue	2.00		4	6	6	12.0	2 Lane Additions	add 2 lanes, REGIONAL	$0			$40,000,000	*	$5,040,000
B412	University Avenue	Haley Street								Traffic Signals	Install Signal	$0	$0	$190,000	$0	$190,000	$190,000
E320	Westside Parkway Phase 4 (Future TRIP)	Mohawk Street	Truxtun Avenue							Freeway Projects	Construct Tie-in from WSPW to Truxtun Avenue, REGIONAL	$0	$0		$33,820,000	*	$0
B441	Wible Road	Ming Avenue	Brundage Lane	1.00		4	6	2	2.0	2 Lane Additions	Add 2 lanes	$0	$1,041,131		$1,222,498	$2,263,629	$2,263,629
B445.2	Gap projects											$0			$6,627,350	$6,627,350	$6,627,350
	Total								77.6 658.7			**Total Cost/Fee Funding**			*	**$31,126,112**	**$84,558,525**

*Note: Total cost for all REGIONAL projects shown in Non-Core section.

Grand Totals:	**$3039191352***	**$1,933,587,852**

Appendix N

Original Technical Studies
(Provided on CD)

Farmland Conversion Study (2009)
Air Quality Impact Analysis (2009)
Biota Report (2009)
Phase I Cultural Resource Survey (2009)
Hazardous Materials Evaluation (2008)
Environmental Noise Assessment (2009)
Public Services Report (2008)
Urban Decay Study (2010)
Traffic Impact Study (2009)
Water Supply Assessment (2010)

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Appendix O

Energy Mitigation Study

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Energy Mitigation

FOR

99 Houghton Industrial Park

GPA No. 1, Map 143-07
ZC No. 2, Map 143-07
Exclusion from Agricultural Preserve No. 13

Portion of Section 7
Township 31 South, Range 28 East, MDB&M
County of Kern, State of California

1.1 Purpose

This report is prepared as a recommendation for proposed mitigation to satisfy the Energy Section of Appendix G of CEQA.

1.2 Proposed Mitigation

Following is a non-inclusive list of potential mitigation actions that may be considered by the developer(s) to be included in the construction of the various uses at the proposed project.

1. Solar photovoltaics (PV) mounted on proposed structure's roofs to provide a portion of the future electrical demand and offset emissions from fossil fuel fired power plants. Encourage green building measures that contribute to reducing energy use to 25% less than Title 24 requirements.
2. Solar water heating to provide non-industrial water heating.
3. Ground mounted solar PV arrays to provide a portion of the estimated electrical demand for the proposed Wastewater Treatment and Recycle Facility.
4. Commercial buildings shall be designed to meet LEED Silver standards.
5. Roofs on all buildings shall be of a light color to reduce heat generation.
6. Portions of parking lots (drive aisles) may be paved with concrete versus asphalt to reduce initial solar reflectance.
7. Depending on the usage, portions of parking lots may be covered and the parking lot roofs contain solar PV.
8. Use LED lighting fixtures on all public streets and site lighting.
9. Include dedicated EV parking at a rate more than required by current codes.
10. Include EV charging facilities to encourage the usage of electric vehicles.
11. Encourage the utilization of electric forklifts and other material handling vehicles to reduce usage of fossil fuels.
12. Design circulation features into the public street improvements to include bus stops and/or other public transportation.
13. Include bicycle friendly features to reduce Vehicle Miles Traveled (VMT) and to encourage non-vehicular transportation.
14. Encourage the usage of high efficiency electric motors for the industrial uses and the wastewater treatment plant.

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Appendix P

Wildfire Assessment

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Wildfire Assessment

FOR

99 Houghton Industrial Park

Portion of Section 7
Township 31 South, Range 28 East, MDB&M
County of Kern, State of California

Prepared for:

Mitchell Property Management, LP

April 2019

Prepared by:

McIntosh & Associates
McIntosh & Associates Engineering, Inc.

2001 Wheelan Court
Bakersfield, California 93309
(661) 834-4814

Project No. 06-012.01

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1.2 Project Description Page 1

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2.2 CEQA Page 2

2.3 California Building Standards Codes Page 2

2.4 Local Wildland Fire Management Page 4

3.0 Conclusion

3.1 Findings Page 5

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Figures

Figure 1: CalFire FRAP FHSZ Viewer Page 3

Figure 2: Kern County Fire Hazard Severity Zones Page 4

1.0 Introduction

1.1 Purpose

This report is prepared as a technical study in support of the Environmental Impact Report (EIR) being prepared for the 99 Houghton Industrial Park (proposed project) under the California Environmental Quality Act (CEQA), as updated in 2018. Impacts regarding wildland fires were identified as "Less than Significant" in Section 4.8 "Hazards" of previous Draft Environmental Impact Reports for the proposed project.

1.2 Project Description

The proposed project is the development of Highway Commercial (25 acres), General Commercial (22 acres), Light Industrial (107.72 acres) and Service Industrial (159.58 acres). The proposed project is generally located between Houghton Road to the south and DiGiorgio Road to the north with State Route 99 along the western edge and South Union Avenue along the eastern frontage. The site is further described as a portion of Section 7, Township 31 South, Range 28 East, M.D.M.; Kern County. The County Assessor's Parcel Numbers (APN) for the proposed project are 185-140-08 and 185-160-08.

According to the U.S. Geological Survey (USGS) Gosford and Conner, 7.5-minute quadrangle maps along with visual inspection of the property, the site is relatively flat and approximately 333 feet above mean sea level.

The existing land use of the proposed project is designated by the County of Kern as Highway Commercial (HC) and Resource Intensive Agriculture (R-IA). A General Plan Amendment is requested to designate the R-IA portion as 22 acres of General Commercial (GC), 9.01 acres of Highway Commercial (HC), 107.72 acres of Light Industrial (LI) and 159.58 acres of Service Industrial (SI) with a concurrent zone change from Exclusive Agriculture (A) to 25 acres of Highway Commercial (CH PD), 22 acres of General Commercial (C-2 PD) 107.72 acres of Light Industrial (M-1 PD) and 159.58 acres of Medium Industrial (M-2 PD). Table 1 below is a summary of the proposed entitlement request. A mixture of existing land use surrounds the proposed project. The majority of the existing land use is designated by the Metropolitan Bakersfield General Plan as Low Medium Density Residential (LMR), Rural Residential (RR), Resource Intensive Agriculture (R-1A), Service Industrial (SI), Highway Commercial (HC) and Public Transportation Corridor (PT). The proposed project will allow for the development of an industrial park and commercial areas with the maximum yield of 4,416,069 square feet on the cumulative 314.30 acres.

Table 1 - Proposed Land Use and Zoning

Existing and Proposed Land Use		
General Plan Amendment		
From	To	Acres
R-IA (Resource Intensive Agriculture)	GC (General Commercial)	22.00
	HC (Highway Commercial)	9.01
	LI (Light Industrial)	107.72
	SI (Service Industrial)	159.58
HC (Highway Commercial)	N/A	15.99
Total:		**314.30**
Zone Change		
From	To	Acres
A (Exclusive Agriculture)	CH PD (Highway Commercial)	25.00
	C-2 PD (General Commercial)	22.00
	M-1 PD (Light Industrial)	107.72
	M-2 PD (Medium Industrial)	159.58
Total:		**314.30**

PD - with Precise Development Combining

2.0 Regulatory Settings

2.1 Applicability of SB 1241

SB 1241 as approved by the Governor of California 9/13/2012 requires all county or city legislative bodies upon adoption of a revised housing element of the General Plan after January 1, 2014 to also revise the safety element requirements for state responsibility areas (SRA's), as defined in California Resources Code (PRC) §4102, and very high fire hazard severity zones (FHSZ), as defined in California Government Code (CGC) §51177 & 51178 that is not a SRA, to be updated as necessary to address the risk of fire in these areas pursuant to CGC §65302(g)(3).

2.2 CEQA

CEQA, PRC §21000, et seq., was amended in 2018 to address numerous legislative changes to CEQA, to clarify certain portions of existing CEQA Guidelines, and to update the CEQA Guidelines to be consistent with recent court decisions.

Impacts of wildfire to development and a development's contribution to the potential creation of wildfire risk at the Wildland-Urban Interface (WUI), are now addressed as a separate "Environmental Factor" to be addressed in the initial study checklist in Appendix G. The Natural Resources Agency expanded the requirements of SB 1241 to also include development projects "near" the SRA and very high fire hazard severity zones.

2.3 California Building Standards Codes

All development and construction within California must comply with the Building Standards that have been adopted by the California Building Standards Commission, including modifications to the national standards to address particular California concerns. The primary codes with respect to development in or near the WUI include the California Building Code, Chapter 7A "Materials and Construction Methods for Exterior Wildfire Exposure", and the California Fire Code, Chapter 49 "Requirements for Wildland-Urban Interface Fire Areas". These codes specify what materials are required to be used for construction for any Building Permit submitted after January 1, 2008 within the geographical areas with Fire Hazard Severity Zones designated as Very High, High or Moderate in SRA's, and Very High within Local Response Areas (LRA's).

Maps of these area were developed in 2007 for the State of California and each county. The Cal Fire (California Department of Forestry and Fire Prevention) Fire and Resources Assessment Program (FRAP) Maps for SRA and Draft LRA areas adopted for Kern County are accessible at http://www.fire.ca.gov/fire_prevention/fhsz_maps_kern. The FRAP continues to update the SRA & LRA designations with a FHSZ Viewer map accessible at http://egis.fire.ca.gov/FHSZ/. A FHSZ map of the proposed project vicinity is included on the next page as Figure 1.

2.0 Regulatory Settings (Cont'd)

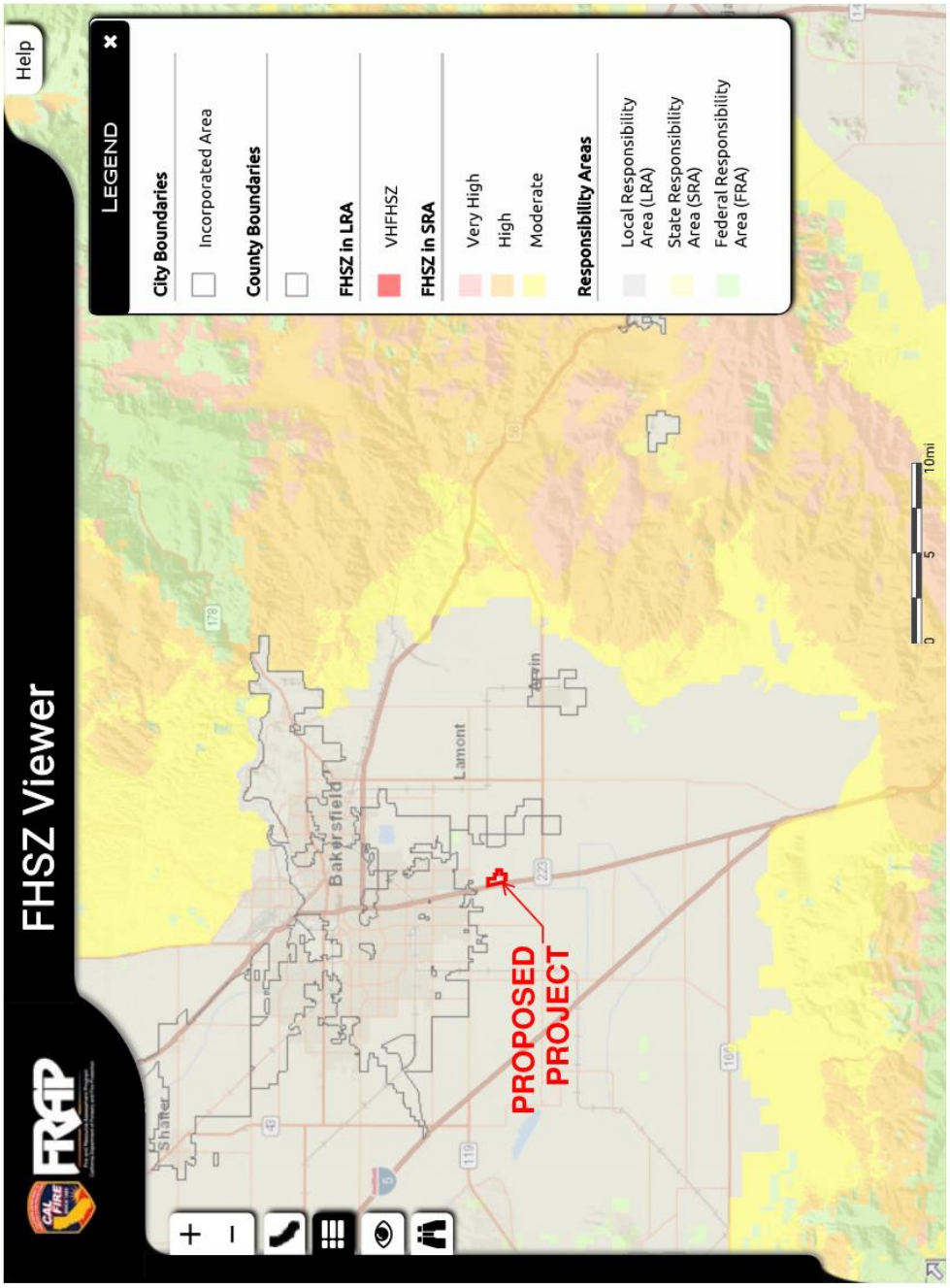


Figure 1

2.0 Regulatory Settings (Cont'd)

2.4 Local Wildland Fire Management

Through the development of, and adoption in 2009, the Kern County Wildland Fire Management Plan (KCWFMP) prepared by the Kern County Fire Department, Air & Wildland Division, the Plan documents the assessment of the wildland fire situation and the existing levels of wildland protection services in the SRA'S of the County. The goal of the plan is to reduce costs and losses from wildfire by protecting assets at risk through focused pre-fire management prescriptions and increasing initial attack success. The Plan is intended as a dynamic document to will be updated continuously.

According to the Plan, the proposed project is located within the "Valley" Fuel Plan Management Area (KCWFMP, page 10), and the "Agricultural, non-wildland" classification for FHSZ (KCWFMP, page 25), as shown below.

Fire Hazard Severity Zones in Kern County

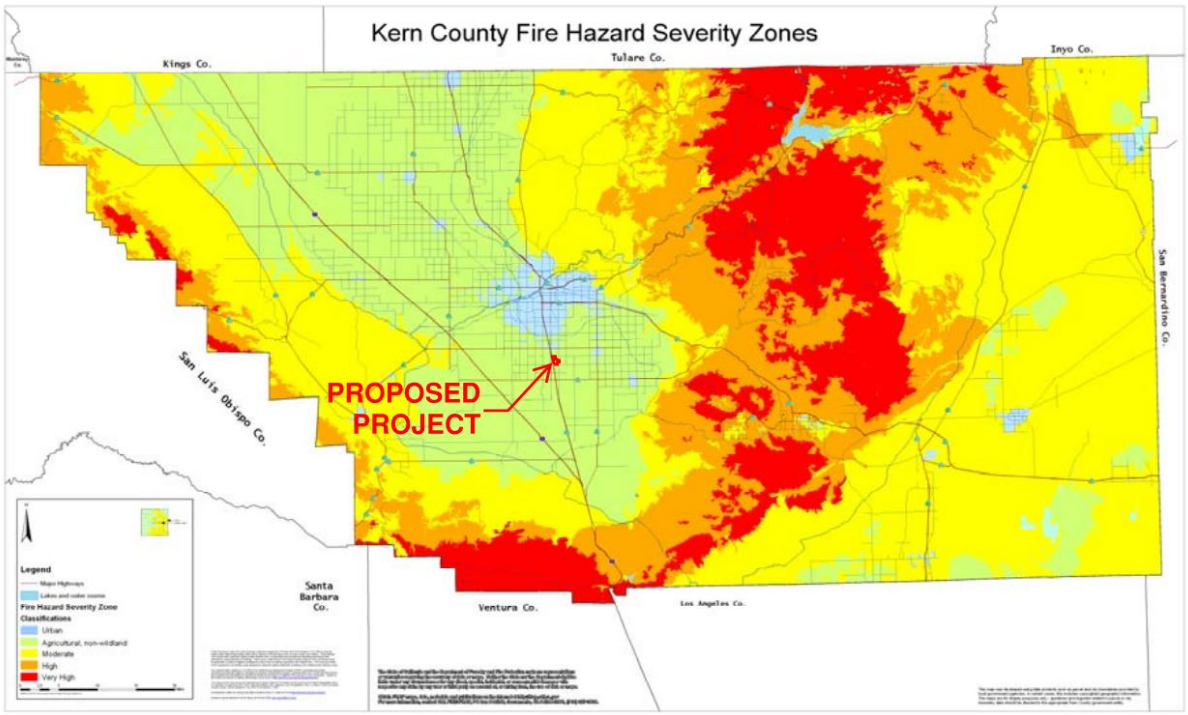


Figure 2

3.0 Conclusion

3.1 Findings

The Wildfire Assessment for 99 Houghton Industrial Park shows that the proposed project is not located within or adjacent a SRA or a Very High FHSZ, therefore there is no wildfire impact of significance with respect to CEQA, and further analysis is not required. The proposed project is located within existing fire service areas and will not create a need for additional fire services. Fiscal impacts of the proposed development will be paid for by the new property tax revenues generated by the proposed project.

4.0 Resources

State of California – Department of Forestry and Fire Protection (CalFire)

- SRA & LRA Maps, Kern County, http://www.fire.ca.gov/fire_prevention/fhsz_maps_kern – 2007.
- FRAP Fire Hazard Severity Zone Map Viewer, http://egis.fire.ca.gov/FHSZ/ – current.
- 2018 Strategic Fire Plan for California - 8/22/2018.

State of California – Building Standards Commission

- 2016 California Building Code.
- 2016 California Fire Code.

State of California

- California Government Code § 51177, 51178, 65302, 65040 and 66474.02.
- California Public Resources Code § 4102, 21000 and 21083.
- Senate Bill 1241, "Land use: general plan: safety element: fire hazard impacts."

Kern County

- 2010 General Plan.
- Wildfire Fire Management Plan, Kern County Fire Department - Air & Wildland Division – 2009.
- 2016 Code of Building Regulations, Kern County Public Works Department, Building Inspection Division, Jan 1, 2017.

Association of Environmental Professionals

- 2019 CEQA, California Environmental Quality Act, Statute & Guidelines, eff 1/1/2019.