Bubaris Traffic
ASSOCIATES
Planning • Engineering • Design

James G. Bubaris, P.E.
Principal

January 27, 2024

Tenisha Victor
Vice President of New and Expanding Markets
Ayr Wellness
2601 South Bayshore Drive
Suite 900
Miami, FL 33133

Re: Site Traffic Assessment
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut

Dear Ms. Victor:

The site is located on the west side of Shippan Avenue in a multi-use shopping center, between Park Street to the north and Cummings Park Road to the south. The floor space that will be devoted to the subject use is on the first floor of the two-story building located at the south end of the subject parcel which currently houses the Bank of America. The site in the immediate vicinity of the subject building is served by three two-way site drives intersecting the west side of Shippan Avenue, with several rows of parking spaces, all of which may accommodate the patrons of the subject facility.

Please refer to Exhibit 1 of the Appendix which locates this site with respect to the surrounding roadway network.

Introduction

Please refer to Table A on the next page which summarizes the development parameters for the proposed cannabis dispensary.

The proposed space to be devoted to this use will be about 2,050 square feet and it is the size of the space that serves as the independent variable in estimating the trip generation potential for this use. As will be demonstrated later in this study, the proposed cannabis dispensary will generate about 39 trips per hour during the weekday pm peak and about 59 trips per hour during the Saturday midday peak. A trip is defined as a one-way vehicular movement traveling either to or from the site, wherein each patron will generate one inbound and one outbound trip. Therefore, the number of expected patrons would be half these two-way trip generation values.

The proposed dispensary will operate from 9:00 am to 8:00 pm daily.

766 Holden Avenue • Sebastian, FL 32958 • Phone: 203-265-8086 • Cell: 203-606-4742
• JimBubaris@hotmail.com •

Table A
Development Parameters
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut

Floor Space (SF):	
Total:	2,050
Hours of Operation:	
Monday thru Sunday:	9:00 am to 8:00 pm
Trip Generation (2-way):	
Weekday PM Peak Hour of Adjacent Street:	39
Saturday Peak Hour of Generator:	59

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Traffic Conditions

Shippan Avenue is a bi-directional city street running north-south in the vicinity of the subject site, with one northbound and one southbound lane, and on-street parking along its east edge.

Please refer to Exhibit 2 of the Appendix which shows a view of the site from Shippan Avenue, where there are three site drives serving rows of parking areas in the shopping center in which the subject building is located.

A review of Connecticut Department of Transportation (CTDOT) data for Shippan Avenue, which is limited in detail, indicates that Shippan Avenue in the vicinity of the subject site carries about 5,100 two-way vehicles per day, and that Shippan Avenue is posted at 25 miles per hour in both directions.

Site Plan

Please refer to Exhibit 3 in the Appendix which shows a copy of the proposed site plan.

The footprint of the existing building will essentially remain the same and is located along the south side of the parcel. The parking areas that will accommodate patrons to this site are located to the north of the building with three site drives located at the eastern end of the parcel which directly interface with the west side of Shippan Avenue.

Floor Plan Layout

Please refer to Exhibit 4 in the Appendix which shows a copy of the proposed floor plan for the space that will be devoted to the subject use. In all, the devoted space will consist of 2,050 square feet of gross floor area, wherein it is the gross floor area of the specific use that is typically utilized in calculating the estimated trip generation.

Trip Generation

In estimating the likely trip generation associated with the proposed cannabis dispensary use, we utilized the trip generation calculations that are made available to the traffic engineering profession by the Institute of Transportation Engineers (ITE) in its data source entitled Trip Generation Manual.

This document provides trip generation equations derived from sources from throughout the country for various land uses based on the size of an independent variable. For most land uses, as with the subject dispensary, that independent variable is typically the gross floor area of the space allotted to the use.

For this latest iteration of our evaluation of the subject proposal, we have opted to use the trip generation data from the latest edition of the Trip Generation Manual, version 11, versus the data that was used from the prior edition, version 10, previously presented in our preliminary Site Assessment dated December 11, 2023. The latest edition, which has a larger database for this relatively new use includes trip generation factors that are somewhat lower than the previous edition which had limited data for this use.

Please refer to Table B on the next page which summarizes the trip generation estimates for various time periods based on the latest trip generation factors for ITE Land Use Code No. 882, cannabis dispensaries, as follows:

- Weekday PM Peak: 18.92 trips per 1,000 square feet building area
- Saturday Midday Peak: 28.85 trips per 1,000 square feet building area

A review of Table B indicates that the expected trip generation for the proposed cannabis dispensary use would be about 39 trips per hour during the weekday pm commuter peak, and about 59 trips per hour during the Saturday midday retail peak, all of which are considered relatively low trip generation values, distributed 50/50 north and south of the site.

Note that Table B also includes a comparison of the trip generation associated with the current drive-in bank use of the subject space, wherein the existing trip generation for the bank is estimated at about 43 trips per hour during the weekday pm commuter peak, and about 54 trips per hour during the Saturday midday retail peak.

Existing Traffic Volumes

The subject study area has been defined as: (1) the three Shippan Avenue site drives serving the subject multi-use shopping center, and (2) the signalized intersection of Shippan Avenue at Harboursite and Cummings Park Road.

For the purpose of determining the existing traffic volumes traveling through the study area, manual turning movement counts were conducted at the three Shippan Avenue site drives in mid-December 2023, and at the signalized intersection to the south of Shippan Avenue at Harboursite and Cummings Park Road in mid-January 2024 during representative peak periods during the following traditional peak periods that are evaluated in the case of retail developments as follows:

Table B
Trip Generation Comparison
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut

	Existing Drive-Up Bank	Proposed Cannabis Dispensary	Change
Gross Building Area (SF)	2,050	2,050	None
Trip Generation (2-way **[1]**:			
Weekday PM Peak Hour of Adjacent Street:	43	39	4 less
Saturday Mid-Day Peak Hour:	54	59	5 more

[1] Note: Typical analysis peaks

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Peak Period	Time Interval
• Weekday PM Peak	4 pm to 6 pm
• Saturday Peak	11 am to 1 pm

Please refer to Exhibit 5 of the Appendix which graphically summarizes the existing 2024 peak hour traffic volumes for the weekday pm and Saturday midday peaks for the subject study area.

Note that the existing peak hour traffic volumes summarized in Exhibit 5 include the existing drive-in bank use of the subject space to be occupied by the proposed cannabis dispensary.

Background and Combined Traffic Volumes

Please refer to Exhibits 6 and 7 of the Appendix which graphically depict the background 2026 (no-build) and combined 2026 (build) peak hour traffic volumes, respectively, for the defined study intersections during the weekday pm and Saturday midday peaks.

The background (no-build) peak hour traffic volumes were derived by projecting the existing traffic volumes from Exhibit 5 two years forward assuming a 2 percent per year growth in the pass-by traffic volumes, which is a typical growth rate.

Note that the background peak hour traffic volumes summarized in Exhibit 6 of the Appendix also include the existing drive-in bank use.

The combined traffic volumes shown in Exhibit 7 of the Appendix were derived by making the adjustments shown in the right column of Table B to account for the change in use from the existing drive-in back to the proposed cannabis dispensary.

Please refer to Table C on the next page which summarizes the trip generation and trip distribution associated with changing the use from the existing drive-in bank use to the proposed cannabis dispensary use.

Traffic Operations Analyses

The three Shippan Avenue site drives are all unsignalized 3-way intersections with Shippan Avenue running north-south and the site drive of each as the west leg controlled by a Stop sign. All approaches to all three intersections are each one lane wide to accommodate the movements they serve.

Table C
Trip Generation and DistributionComparison
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut

	Difference in Trip Generation [1]	Trip Distribution To/From North via Shippan Avenue	Trip Distribution To/From South via Shippan Avenue
Weekday PM Peak Hour of Adjacent Street:			
Inbound	2 less	1 less	1 less
Outbound	2 less	1 less	1 less
Total	4 less	2 less	2 less
Saturday Mid-Day Peak Hour:			
Inbound	3 more	2 less	1 less
Outbound	2 more	1 less	1 less
Total	5 more	3 less	2 less

[1] Difference Between Existing and Proposed Use from Table B

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Please refer to Exhibit 8 of the Appendix which includes a copy of the traffic control signal plan for the adjacent intersection of Shippan Avenue at Harboursite and Cummings Park Road.

A review of Exhibit 8 of the Appendix shows that Shippan Avenue runs north-south through this intersection, Harboursite drive is the west leg, and Cummings Park Road is the east leg. The Shippan Avenue northbound approach is two lanes wide, with one combination left/through lane and one dedicated right turn lane. The Shippan Avenue southbound approach is two lanes wide, with one dedicated left turn lane and one combination through/right lane. Both the Harboursite eastbound and Cummings Park westbound approaches are one lane wide to accommodate combination left/through/right movements. There are sidewalks on both sides of Shippan Avenue and Cummings Park Road, and on the south side of Harboursite. There are also crosswalks and pedestrian signals across the north, east and south legs of the intersection. The traffic signal operates to basically provide four phases: the first phase moves the southbound approach in an advance phase to address the associated left turn, the second phase moves the northbound and southbound approaches, the third phase is an exclusive pedestrian phase, and the fourth phase moves the eastbound and westbound approaches.

Intersection traffic operational analyses were performed for the three Shippan Avenue unsignalized site drive intersections and the Cummings Park Road signalized intersection utilizing the methodology described in the latest edition of Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985, updated to 2010. Application of this methodology was facilitated by use of Synchro Analysis Software, developed by the Trafficware Corporation, Version 10, 2020. Operational analyses are utilized to determine a Level of Service (LOS) for a given intersection operating under either signalized or unsignalized control.

In the case of signalized intersections similar to the intersection of Shippan Avenue at Harboursite and Cummings Park Road, Level of Service (LOS) is defined in terms of control delay, which is a measure of driver discomfort, frustration, increased fuel consumption, and lost of travel time. The delay experienced by a motorist is comprised of several factors that relate to control, geometric, traffic, and incidents. Total delay is the difference between the travel time experienced and the reference travel time that would result during base conditions in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on several variables, including the quality of progression, the cycle length, the green ratio, and the volume-to-capacity (v/c) ratio for the lane group. In the case of signalized intersections, the Level of Service for each approach is computed, and an overall Level of Service for the entire intersection is determined.

In today's environment, Levels of Service C to D are considered acceptable, and Levels of Service A to B are seldom achieved at signalized intersections.

Please refer to Exhibit 9-A of the Appendix which provides the definitions of levels of service for signalized intersections.

In the case of unsignalized intersections similar to the proposed Shippan Avenue site drive intersections, Level of Service (LOS) is defined in terms of the average control delay for the approach or movement evaluated. Control delay involves movements at slower speeds and stops on intersection approaches as vehicles move up in the queue or slow down upstream of an intersection. The delay experienced by a motorist is comprised of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference time that would result during base conditions in the absence of incident, control, traffic, or geometric delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. At two-way stop-controlled and all-way stop-controlled intersections, control delay is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The control delay also includes the time required to decelerate to a stop and to accelerate to the free-flow speed. Level of Service for a one-way or two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS for a one-way or two-way stop-controlled intersection is **not defined** for the intersection as a whole. In today's environment, Levels of Service D to F are common and are often experienced on minor street approaches to major streets carrying relatively high traffic volumes.

Please refer to Exhibit 9-B in the Appendix, which provides details on the definitions of Levels of Service for unsignalized intersections.

The results of the operational analyses, which evaluate 2024 existing, 2026 background (no-build), and 2026 combined (build) peak hour traffic operations for the two peak hour scenarios defined above are summarized in Table D on the next page.

The computer-generated worksheets for these traffic operations analyses are included in the Appendix as follows:

- Exhibit 10 – Existing 2024 Peak Hours
- Exhibit 11 – Background 2026 (no-build) Peak Hours
- Exhibit 12 – Combined 2026 (build) Peak Hours

Table D
Summary of Traffic Operations Analysis
Levels of Service
Proposed Cannibas Dispensary Site
417 Shippan Avenue
Stamford, Connecticut

Intersection	Existing		Background (no-build) 2026		Combined (build) 2026	
	Weekday PM Peak	Saturday Midday Peak	Weekday PM Peak	Saturday Midday Peak	Weekday PM Peak	Saturday Midday Peak
Shippan Avenue at Dispensary north site drive						
Shippan northbound inbound left	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
Delay per vehicle (sec.)	8.1	8.1	8.1	8.1	8.1	8.1
North site drive eastbound outbound approach	LOS B	LOS B	LOS B	LOS B	LOS B	LOS B
Delay per vehicle (sec.)	12.7	13.0	13.1	13.4	13.1	13.3
Shippan Avenue at Dispensary middle site drive						
Shippan northbound inbound left	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
Delay per vehicle (sec.)	8.0	8.0	8.0	8.1	8.0	8.0
North site drive eastbound outbound approach	LOS B	LOS B	LOS B	LOS B	LOS B	LOS B
Delay per vehicle (sec.)	13.2	13.2	13.6	13.5	13.5	13.5
Shippan Avenue at Dispensary south site drive						
Shippan northbound inbound left	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
Delay per vehicle (sec.)	8.0	8.0	8.0	8.1	8.0	8.1
North site drive eastbound outbound approach	LOS B	LOS B	LOS B	LOS B	LOS B	LOS B
Delay per vehicle (sec.)	11.3	12.0	11.5	12.2	11.4	12.2
Shippan Avenue at Harboursite and Cummings Park Road						
Shippan Avenue northbound approach	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
Delay per vehicle (sec.)	8.5	9.5	8.7	9.6	8.7	9.6
Shippan Avenue southbound approach	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
Delay per vehicle (sec.)	3.9	3.3	4.0	3.4	4.0	3.4
Harboursite eastbound approach	LOS B	LOS B	LOS B	LOS B	LOS B	LOS B
Delay per vehicle (sec.)	13.8	11.9	14.0	12.2	13.8	12.2
Cummings Park Drive westbound approach	LOS B	LOS B	LOS B	LOS B	LOS B	LOS B
Delay per vehicle (sec.)	15.2	15.8	15.5	16.4	15.4	16.4
Overall Intersection	- LOS A -	- LOS A -	- LOS A -	- LOS A -	- LOS A -	- LOS A -
Delay per vehicle (sec.)	7.7	7.5	7.8	7.6	7.8	7.6
Maximum volume/capacity ratio	0.37	0.31	0.38	0.32	0.38	0.32

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A review of Table D shows that all of the Shippan Avenue unsignalized site drive intersections will continue to provide excellent level of service A for the inbound left turn and right turn movements, and very good level of service B for the outbound movements.

A review of Table D also shows that levels of service for the signalized intersection of Shippan Avenue at Harboursite and Cummings Park Road will continue to operate at excellent overall level of service A for the entire intersection taken as a whole, with the Shippan Avenue approaches operating at excellent level of service A, and the side street approaches operating at very good level of service B.

Therefore, the proposed development should not have an adverse impact on pass-by traffic travelling through this area.

Traffic Crash Analysis

Please refer to Table E on the next page for a summary of the following traffic crash review.

A review was made of the most recent available three-year (2020 thru 2022) traffic crash experience summary for the immediate study area as compiled in UConn's Traffic Crash Data Depository from information provided by CTDOT, and state and municipal police departments.

A review of the latest UConn records for subject Shippan Avenue site drive intersections showed no crashes recorded, and for the intersection of Shippan Avenue at Harboursite and Cummings Park Road only two crashes recorded during this 3-year period, with no recurring problems requiring correction, or that may be exacerbated by the proposed development.

Recommended Improvements

Given the foregoing favorable traffic operations and satisfactory traffic crash experience, traffic control and/or geometric improvements are neither deemed necessary nor recommended.

Table E
Summary of Traffic Crash Experience
Most Recent 3-Year Experience
2020 thru 2022
Immediate Study Area
Proposed Cannabis Dispensary, 417 Shippan Avenue
Stamford, Connecticut
Source: UConn Traffic Crash Data Depository

Intersection	Rear End Crashes					Right Angle Crashes					Head-On Crashes			Fixed Object					GRAND TOTAL
	EB / EB	WB / WB	NB / NB	SB / SB	Total	EB / NB	EB / SB	WB / NB	WB / SB	Total	EB / WB	NB / SB	Total	EB	WB	NB	SB	Total	
Shippan Avenue at no. 417 Site Drives					0					0			0					0	0
Shippan Avenue at Harboursite & Cummigs Park Road					0					0		2	2					0	2
Total	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2

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Parking Assessment

The sixth edition of Parking Generation by the Institute of Transportation Engineers (ITE) indicates from data collected at 11 different sites that for a 2,050 square foot cannabis dispensary similar to what is proposed, the maximum parking demand for a weekday is 13 spaces, and for a Saturday is 10 spaces.

Please refer to Exhibit 13 of the Appendix which shows the parking area that is available to the subject site, served by the forementioned three site drives. With the drive-in bank that will provide the space for the proposed dispensary still in place, field views recently conducted of this area revealed the following numbers of available parking spaces in this area on the following dates:

- Thursday, January 18, 2024, at 11:45 am: 93 open spaces
- Friday, January 19, 2024, at 10;45 am: 91 open spaces
- Saturday, January 20, 2024, at 12:00 noon: 85 open spaces

Therefore, comparing the estimated parking demand of about 10 to 13 spaces to the apparent parking supply of 85 to 93 spaces indicates that there is an adequate parking area to accommodate the estimated use of this space.

Conclusions

It is the professional opinion of Bubaris Traffic Associates that the proposed cannabis dispensary, to be located at the west side of Shippan Avenue at the building at no. 417, with access to/egress from the surrounding roadway network via the three existing drives serving the multi-use shopping center within which the building is located, should not adversely impact traffic operations on the surrounding roadway network in the year 2025-2026 when occupancy of the subject space and full operation is expected.

The proposed development will generate about 39 trips per hour during the weekday pm peak, and about 59 trips per hour during the Saturday middy peak, where each patron visiting the site will generate one inbound and one outbound vehicular trip. Therefore, the projected patron numbers would be HALF of these estimated trip generation estimates.

Traffic operational analyses indicate that the proposed development should not have an adverse impact on traffic operations with good to excellent levels of service.

The traffic crash experience for the subject study area is satisfactory, with no recurring problems that need to be corrected, or that may be exacerbated by the proposed development.

Field views have indicated that sufficient parking supply exists to conveniently support the proposed use.

Very truly yours,
Bubaris Traffic Associates

James G. Bubaris

James G. Bubaris, P.E.
President
Conn. Reg. No. 9203

Site Traffic Assessment
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut

APPENDIX

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Exhibit 1
Location Maps
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut

Google Maps 417 Shippan Ave

Imagery ©2023 Airbus, CNES / Airbus, Maxar Technologies, New York GIS, USDA/FPAC/GEO, Map data ©2023 50 ft

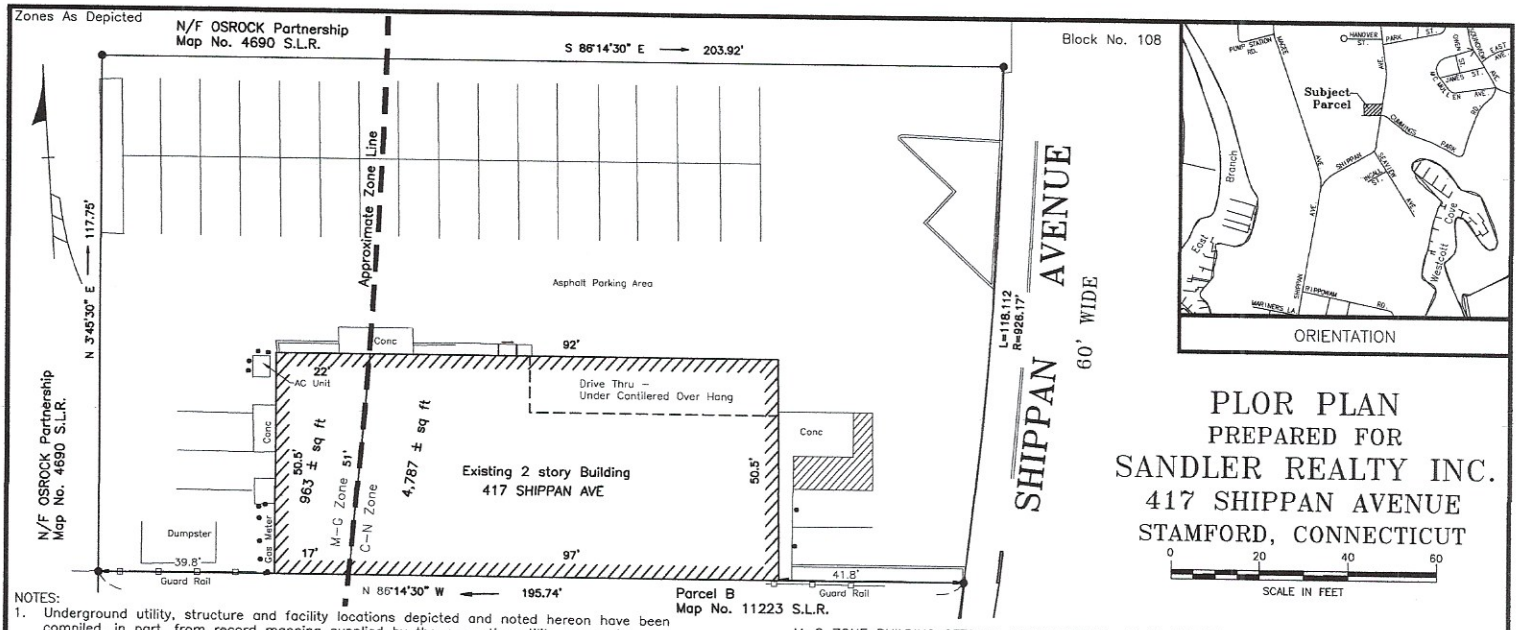
Exhibit 2
View of Site from Shippan Avenue
417 Shippan Avenue
Stamford, Connecticut

400 Shippan Ave

Site

N

Exhibit 3
Site Plan
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut



PLOR PLAN
PREPARED FOR
SANDLER REALTY INC.
417 SHIPPAN AVENUE
STAMFORD, CONNECTICUT

0 20 40 60
SCALE IN FEET

NOTES:

1. Underground utility, structure and facility locations depicted and noted hereon have been compiled, in part, from record mapping supplied by the respective utility companies or governmental agencies, from parol testimony and from other sources. These locations must be considered as approximate in nature. Additionally, other such features may exist on the site, the existence of which are unknown to Edward J. Frattaroli, Inc. The size, location and existence of all such features must be field determined and verified by the appropriate authorities prior to construction.
2. The contractor shall notify all public utility companies by calling Call–Before–You–Dig at 1–800–922–4455 at least 72 hours prior to crossing their lines.
3. Property Depicted is located in an Area that is shown as being protected from the 1% annua chance or greater flood hazard by a levee system. Overtopping of failure of any levee system is possible. for additional information see the "Accedited Levee Note" in notes for users. Refer to Fema FIRM 09001C0517G Map 517 of 626 FAIRFIELD COUNTY, Connecticut Effective Date July 8, 2013
4. The Subject Property is Subject to utility easements or Private Agreements if any, in addition to those Depicted and or referenced on this Map Property may have Substructures and/or their encroachments below grade, if any, in addition to those noted and or depicted. Reference is hereby made and subject parcel is subject to to all notes on Recorded Documents hereon referenced that pertain to this parcel.

Refer to Parcel A
Map No. 6461 S.L.R.
Lot Area = 23,676 sq ft
Existing Building Covers 24.3% of total Lot Area

14108(015)A.dwg B138–P48 B353–P140 B415–P98

M–G ZONE BUILDING SETBACK REQUIREMENTS

Front Street Line Setback	10'
Center Line Of Street Setback	35'
Rear Yard Setback	15'
Side Yard Setback	None Required But If Provided Must Be At Least 4 Feet
Max. Building Coverage	80% Of Lot Area

C–N ZONE BUILDING SETBACK REQUIREMENTS

Front Street Line Setback	15'
Center Line Of Street Setback	40'
Rear Yard Setback	20'
Side Yard Setback	6' W/ Total Of.... 12'
Max. Building Coverage	30% Of Lot Area

Zoning Information Is Subject To The Review And Approval By The Appropriate Governing Authority

This survey and map has been prepared in accordance with Section 20–300b–1 thru 20–300b–20 of the Regulation of Connecticut State Agencies–"Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a "ZONING LOCATION SURVEY – " based on a "DEPENDENT RESURVEY" conforming to horizontal Accuracy Class "A–2" and intended to be used for Compliance and Noncompliance with Existing Requirements and depict Zone Areas

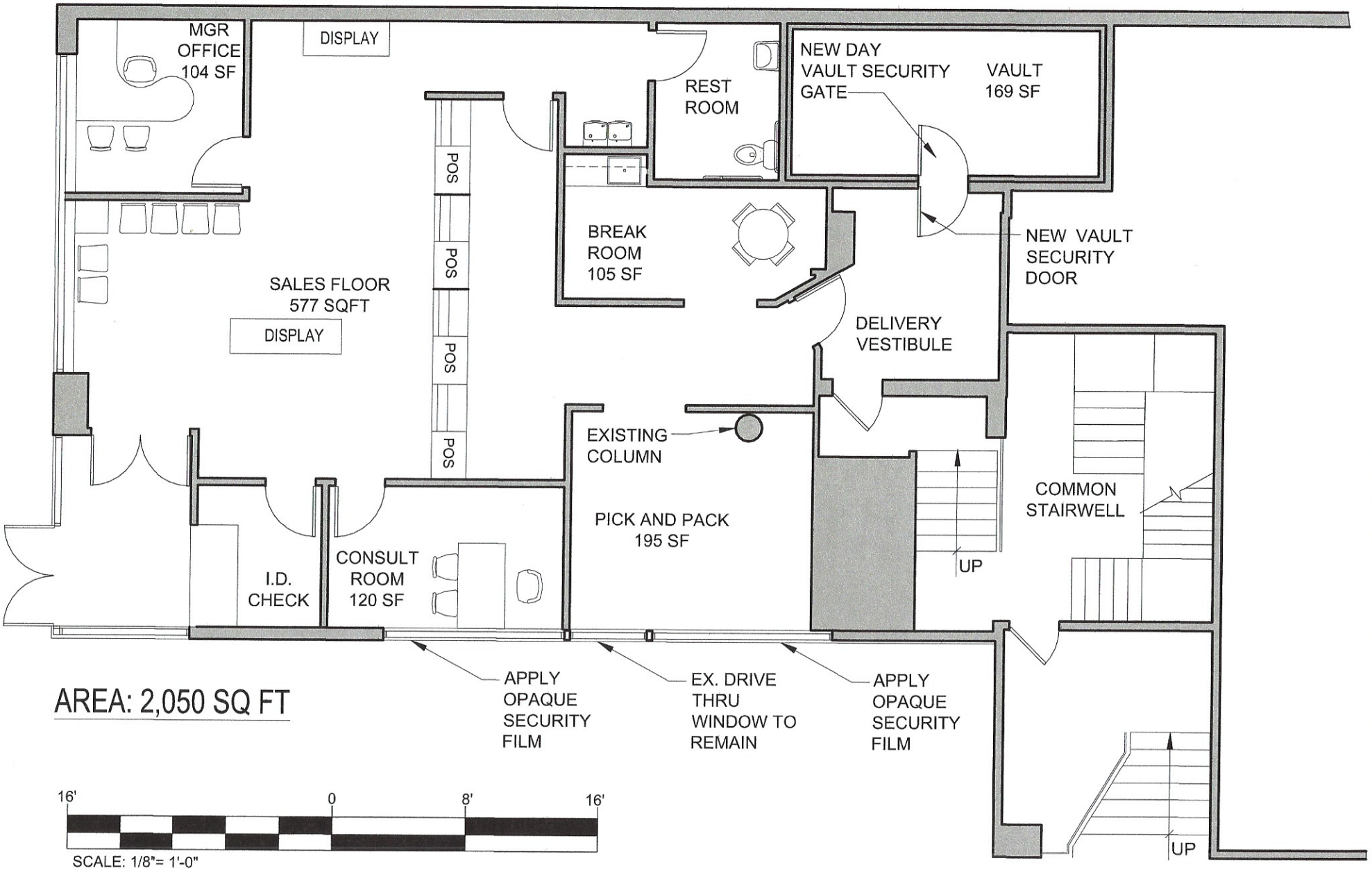
To my knowledge and belief this plan is substantially correct as noted hereon.

Property Lines Not Staked By Contractual Agreement
Soil Types Not Delineated By Contractual Agreement

This Document and Copies Thereof are Valid only if they bear the signature and embossed seal of the designated licensed professional. Unauthorized alterations render any declaration hereon null and void.

BY:
FOR: EDWARD J. FRATTAROLI, INC.
Land Surveyors Engineers Land Planners
STAMFORD, CONNECTICUT MARCH 21, 2014

Exhibit 4
Proposed Floor Plan
Proposed Cannabis Dispensary
417 Shippan Avenue
Stamford, Connecticut



AREA: 2,050 SQ FT

16' 0 8' 16'

SCALE: 1/8"= 1'-0"

Dean Associates
Architects Incorporated
Architecture & Interior Design

Project Number	2023.79
Scale	1/8"=1'-0"
Drawn By	JC
Checked By	WAM
Date	12/4/23

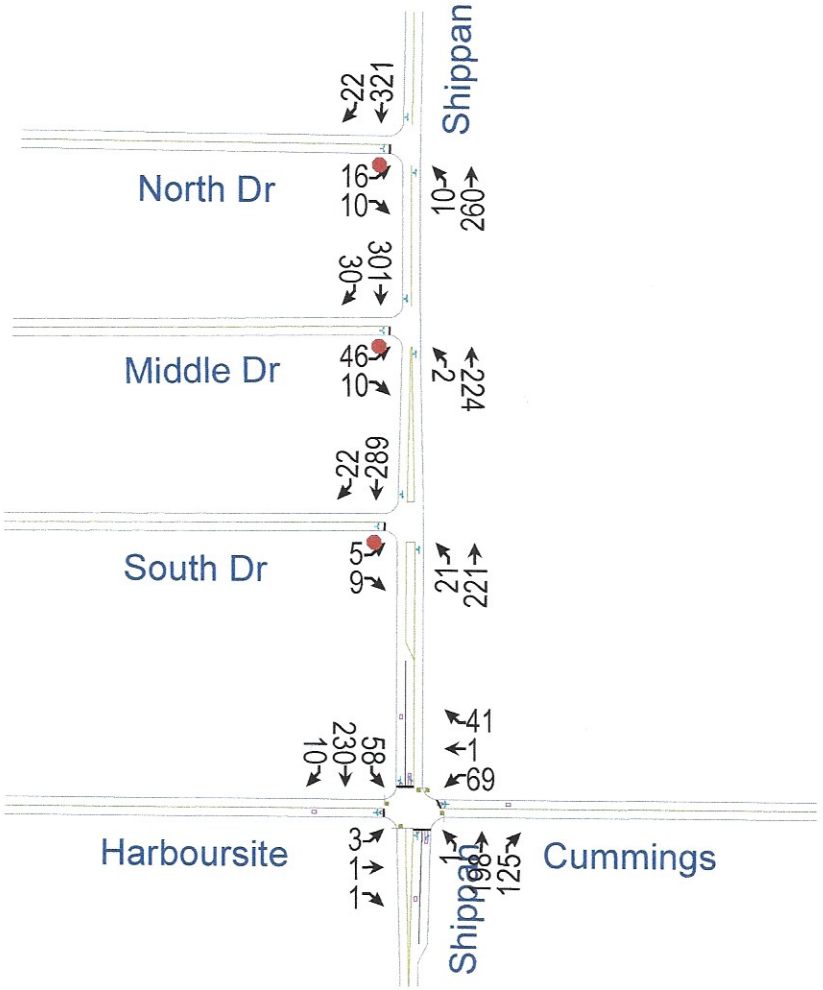
PROPOSED FLOOR PLAN

417 SHIPPAN AVE
STANFORD, CT 06002

AVR wellness

Exhibit 5
Existing Peak Hour Traffic Volumes
417 Shippan Avenue Study Area
Stamford, Connecticut

417 Shippan Avenue, Stamford, CT
Existing Weekday PM Peak



417 Shippan Avenue, Stamford, CT
Existing Saturday Midday Peak

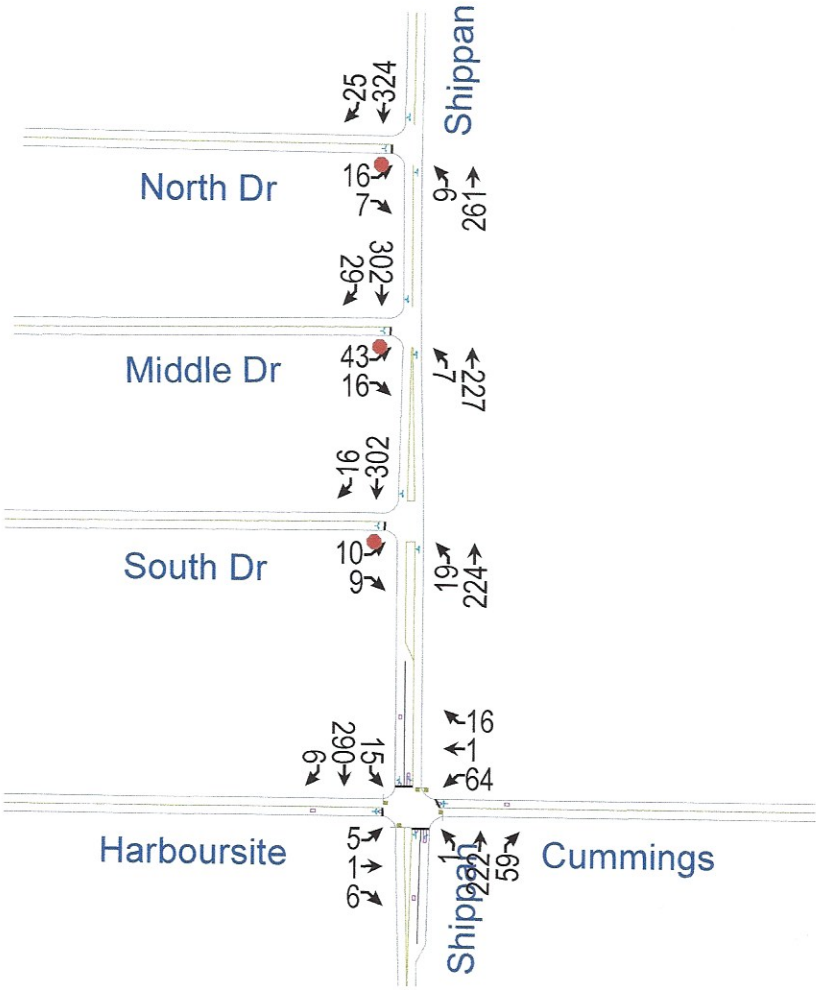
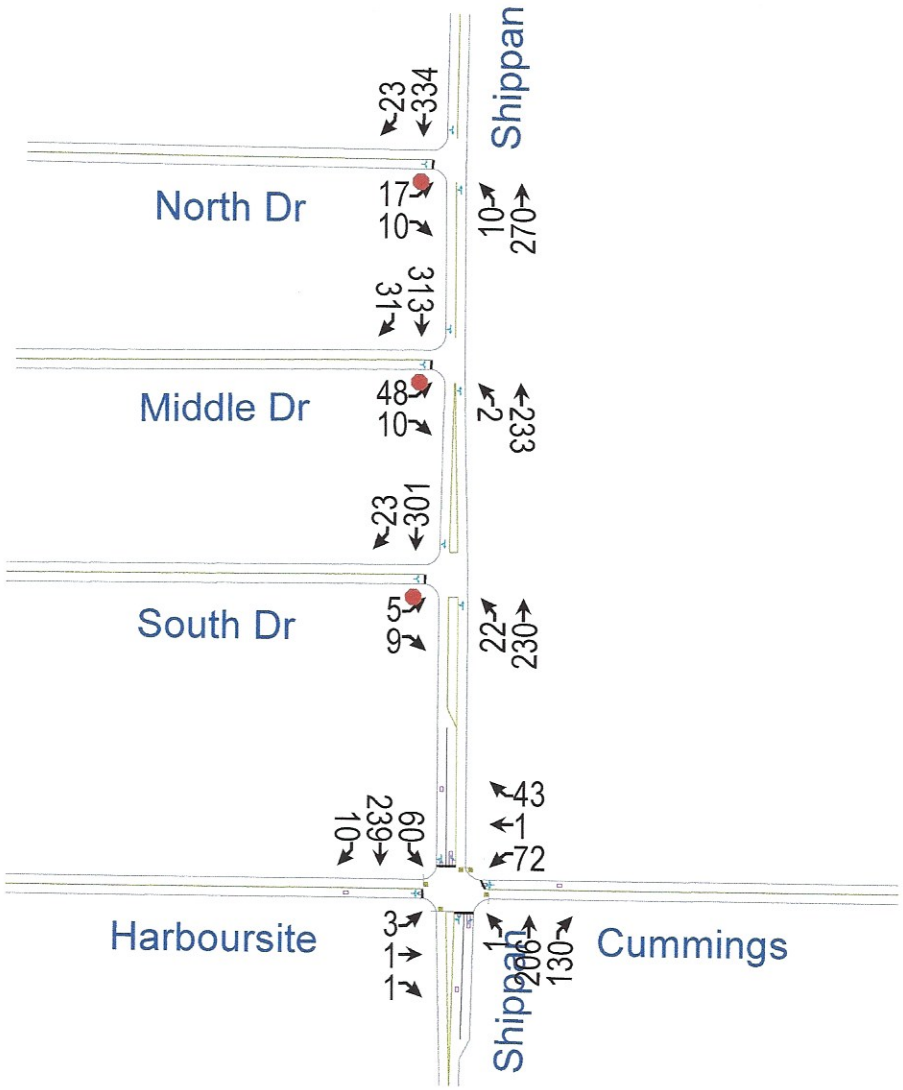


Exhibit 6
Background (no-build) Peak Hour Traffic Volumes
417 Shippan Avenue Study Area
Stamford, Connecticut

417 Shippan Avenue, Stamford, CT
Background Weekday PM Peak



417 Shippan Avenue, Stamford, CT
Background Saturday Midday Peak

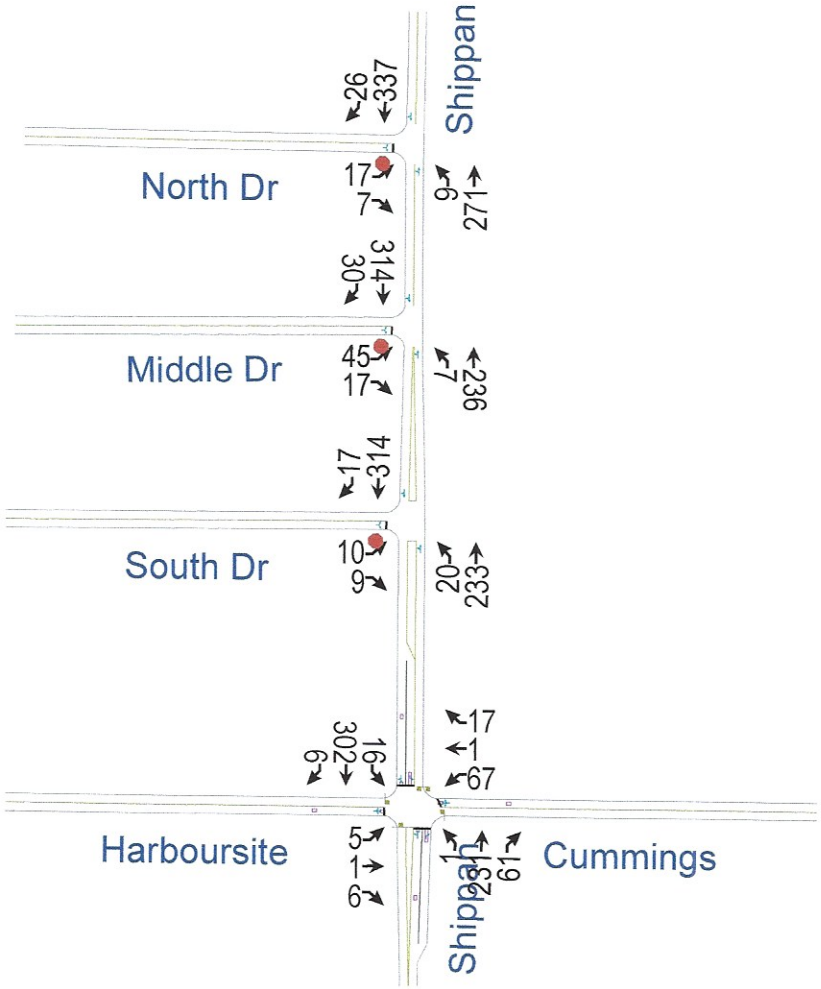
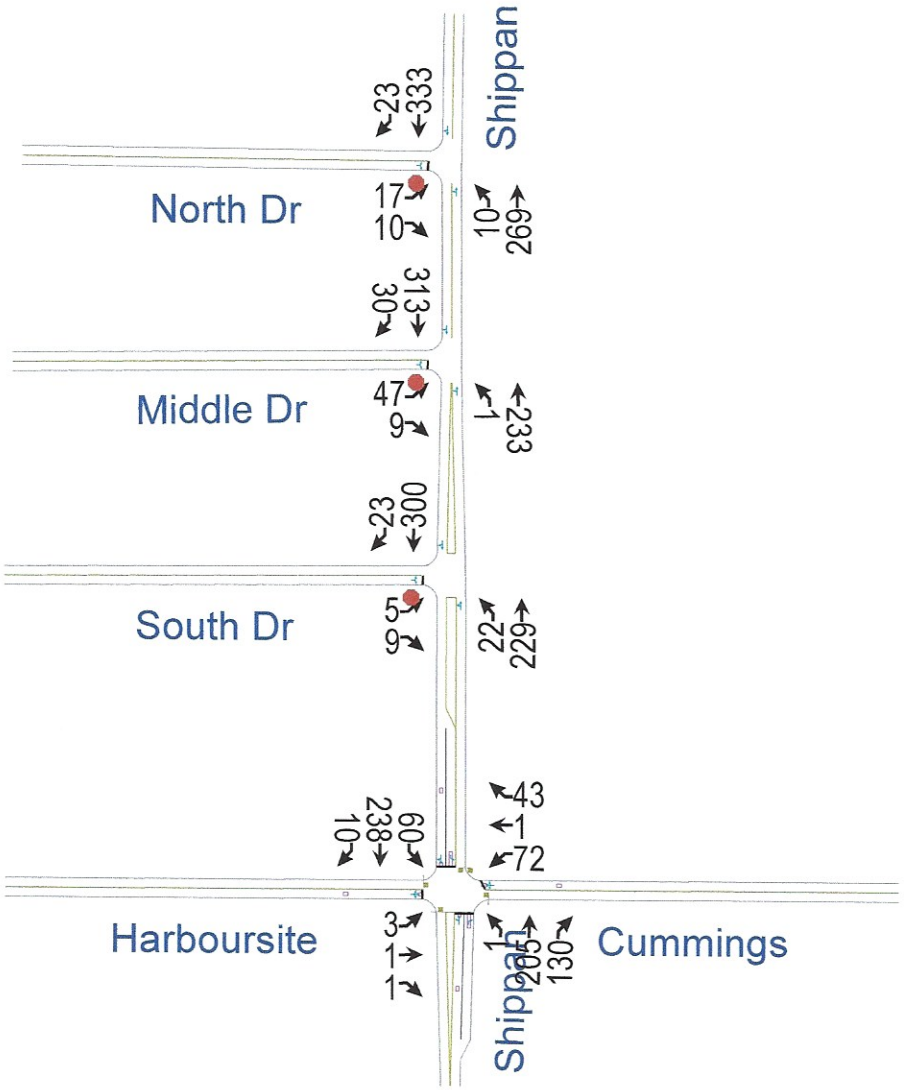


Exhibit 7
Combined (build) Peak Hour Traffic Volumes
417 Shippan Avenue Study Area
Stamford, Connecticut

417 Shippan Avenue, Stamford, CT
Combined Weekday PM Peak



417 Shippan Avenue, Stamford, CT
Combined Saturday Midday Peak

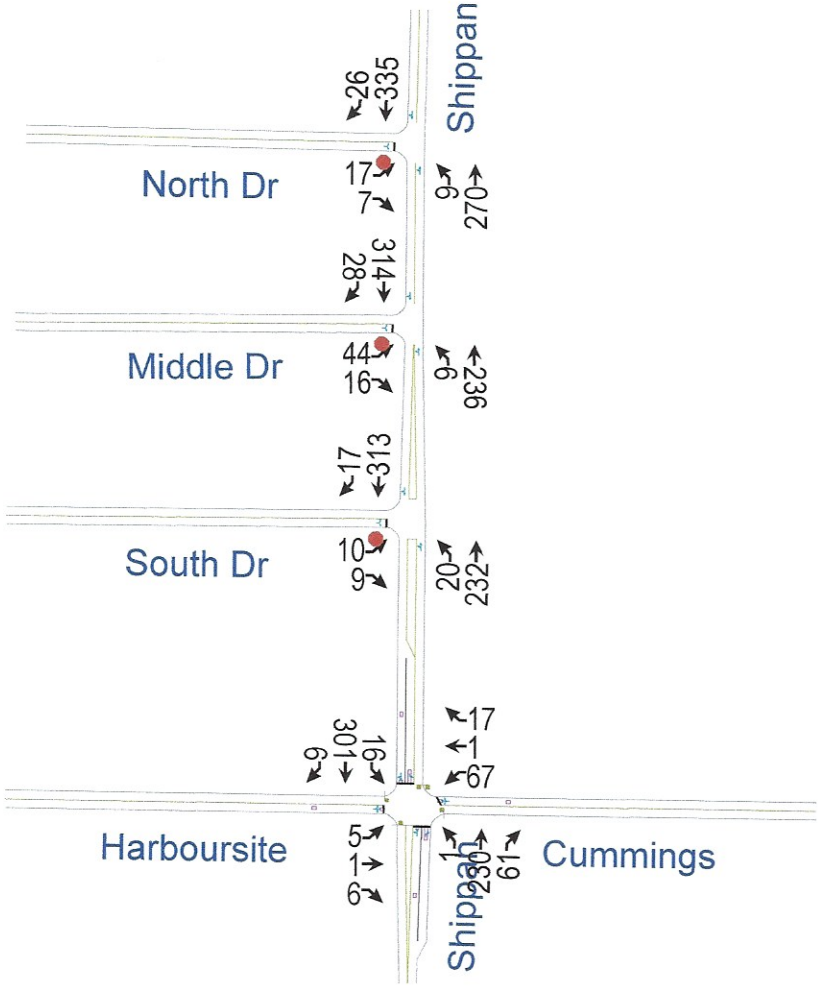


Exhibit 8
Traffic Control Signal Plan
Shippan Avenue at Harboursite and Cummings Park Road
Stamford, Connecticut

		PRE-EMPT 1		MOVEMENT DIAGRAM			
NTOR	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7 / PHASE 8

NTOR	FLASH	P1 GRN	P1 CL	P1 CL	P2 GRN	P2 CL	P2 CL	P3 GRN	P3 CL	P3 CL	P4 GRN	P4 CL	P4 CL	P5 GRN	P5 CL	P5 CL	P6 GRN	P6 CL	P6 CL	P7 GRN	P7 CL	P7 CL	P8 GRN	P8 CL	P8 CL
FACE 1	Y	G←	G◄Y	G	G	Y	R	R	R	R	R	R	R												
2	Y	G	G	G	G	Y	R	R	R	R	R	R	R												
3	Y	R	R	R	G	Y	R	R	R	R	R	R	R												
4	R	R	R	R	R	R	R	R	R	R	G	Y	R												
5	R	R	R	R	R	R	R	R	R	R	G	Y	R												
P	OFF	DW	DW	DW	DW	DW	DW	WØ	DW	DW	DW	DW	DW												
						←YIELD																			
# MIN.		2	3	0	10	3	1	7/15	0	0	5	3	1												
# MAX.		10	5	3	60	5	3	10/15	1	1	30	5	3												

INTERVALS	P1 GRN	P1 CL	P1 CL	P2 GRN	P2 CL	P2 CL	P3 GRN	P3 CL	P3 CL	P4 GRN	P4 CL	P4 CL	P5	P6	P7	P8
MIN GRN	4			15						7						
WALK							10									
PED CLR							15									
VEH EXT	1									3						
MAX 1	12			35						25						
MAX 2	12			35						25						
YELLOW		3			3			0.1			3					
RED			0.1			1			0			1				
ADD INI																
MAX INT																
TBR																
TTR																
MIN GAP																
MODE	MIN. RECALL			MIN. RECALL			LOCK			LOCK			OFF	OFF	OFF	OFF
INI START				THIS PHASE												

DETECTORS			
IDENT	SIZE (WXL)	TURNS	MODE
D4	15'x6'	3	PRESENCE
D4A	20'x6'	3	PRESENCE
D4B	15'x6'	3	PRESENCE
D1	10'x6'	3	PRESENCE
SD1,SD2	6'x6'	3	PULSE
SD3,SD4	6'x6'	3	PULSE

PLAN FLASH	PROGRAM TIME FUTURE	DAYS
1	0000–0630	M–F
2	0630–0930	M–F
3	0930–1530	M–F
4	1530–1830	M–F
3	1830–2200	M–F
1	2200–2400	M–F
1	0000–0930	WKEND
3	0930–2200	WKEND
1	2200–2400	WKEND

COORDINATION PLANS (Off. Ref.= 2)

NO.	PERIOD	CYCLE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	OFFSET (Secs)
1	Off Pk	80	9	75	0	16					28
2	AM Pk	80	11	63	0	26					9
3	Midday	80	10	69	0	21					29
4	PM Pk	100	7	59	0	34					56

PERMIS PERIOD: Ø SEC

SYSTEM LOC: MASTER UTCS

TECHNICAL NOTES

STANDARD OVERLAP SKIP FEATURES APPLY

PRE-EMPTION TO BE INOPERATIVE DURING FLASHING OPERATION.

PHASE 2 ON TO OMIT PHASE 1

ENERGY BY– CITY | METER # –

MAINT 24hr ☒ Norm ☐ | SERVICE POLE– SNET 7554

NORMAL 0.999 kW 730 hr/mo 729 kWh/mo

FLASH kW hr/mo kWh/mo

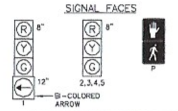
INTERSECTION # 128

PREVIOUS OFFICE RECORD SEE REVISION # 1

STC # | SM #

SIGNAL REVISED: INSTALL NEW CONTROLLER, EMERGENCY VEHICLE PRE-EMPTION, COMMUNICATION CABLE, SYSTEM DETECTORS, CONDUIT AND CABLE. UNDER PROJECT 135-257

SIGNAL FACES



PLAN SEALED FOR REVISION NO. 1 ONLY

PRE-EMPTION SETTINGS

	PRE-EMPT 1
PRIORITY	NO
DET. LOCK	YES
DELAY	0
ALT. MIN. GRN.	5
ALT. YELLOW	PARENT
ALT. RED	PARENT
ALT. PED. CLR.	15
HOLD GREEN	10
HOLD YELLOW	3
HOLD RED	1
HOLD PHASE	2
EXIT PHASE	4
EXIT CALL	NONE

TOWN SIGNAL

LEGEND

R RED; Y YELLOW; G GREEN; RED ARROW; YELLOW ARROW; GREEN ARROW; W/ WALK/ FL. D.W.; D.W. DON'T WALK; FL. FLASHING; PROPOSED WOOD SPAN POLE; EXISTING WOOD SPAN POLE; PROPOSED STEEL SPAN POLE; EXISTING STEEL SPAN POLE; PROPOSED UTILITY POLE; EXISTING UTILITY POLE; PEDESTAL MOUNTING; PEDESTRIAN PUSH BUTTON & SIGN; TRAFFIC SIGNAL FACE; PEDESTRIAN SIGNAL FACE; LOOP DETECTOR; MAGNETIC DETECTOR; SD SYSTEM DETECTOR; OPTICAL DETECTOR; PROPOSED CONTROLLER; EXISTING CONTROLLER; PROPOSED HANDHOLE; EXISTING HANDHOLE; PROPOSED (R.M.C.) RIGID METAL CONDUIT; EXISTING (R.M.C.) RIGID METAL CONDUIT; CABLE CLOSURE; DET. LEADS IN SAW CUT; AUXILIARY TERMINATION CABINET; AUXILIARY EQUIPMENT CABINET; AUDIBLE PEDESTRIAN SIGNAL

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUR. OF ENGINEERING & HWY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL SIGNAL

CITY OF STAMFORD
SHIPPAN AVENUE AT CUMMINGS PARK ROAD

1	TRAFFIC DATE	ELECTRICAL DATE
ENGINEER		
DRAFTER	FUSS & O'NEILL, INC.	
CHECKED BY	MAY 1997	
SUBMITTED BY		
APPROVED BY		
DATE		

F.H.W.A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STAMFORD	STPO-000S(636)	135-257	1997		25	81

CONSTRUCTION NOTES FOR REVISION NO. 1

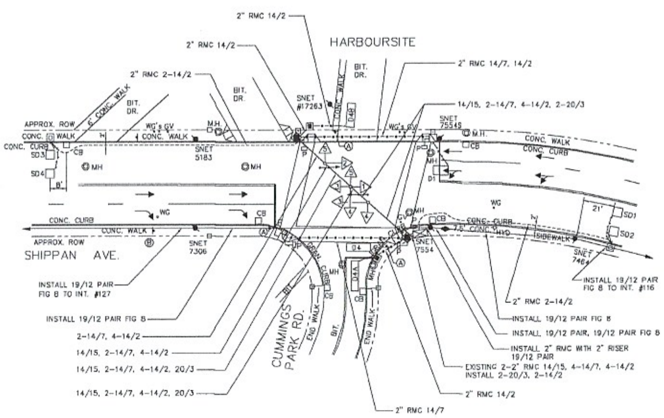
1. ALL TRAFFIC SIGNAL EQUIPMENT IS EXISTING EXCEPT AS NOTED
2. ALL WORK, EQUIPMENT AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARD DETAILS AND SPECIFICATIONS OF THE CITY OF STAMFORD AND CONNDOT.
3. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES.
4. THE CONTRACTOR SHALL CONTACT THE CITY OF STAMFORD PUBLIC WORKS DEPARTMENT AT (203)977-4863 IN ORDER TO MARK OUT THE LOCATION OF EXISTING SANITARY SEWER AND LATERALS.
5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF STAMFORD PRIOR TO COMMENCING CONSTRUCTION.
6. WORK AT THIS INTERSECTION INVOLVES THE INSTALLATION OF A NEW CONTROLLER AND CABINET (TYPE M), SYSTEM DETECTORS, CONDUIT, CABLE, (14/12), COMMUNICATION CABLE, PRE-EMPTION EQUIPMENT, DETECTORS, HARNESS, AND THE REMOVAL OF UNUSED/ABANDONED CABLE.
7. ALL 20/3 CABLE SHOWN ON THE PLAN SHALL BE CONTINUOUS OPTICAL CABLE.
8. OPTICAL DETECTOR LOCATIONS ARE FOR ILLUSTRATION ONLY. EXACT LOCATIONS SHALL BE DETERMINED BY THE MANUFACTURER OR HIS DESIGNATED REPRESENTATIVE.
9. PRE-EMPTION IS TO OPERATE THROUGH THE INTERNAL PRE-EMPTION OF THE SIGNAL CONTROLLER.
10. THE REMOVED CONTROLLER AND CABINET SHALL REMAIN THE PROPERTY OF THE CITY OF STAMFORD. CONTACT MR. JOSEPH ANDREWS OF THE STAMFORD DEPARTMENT OF TRAFFIC AND PARKING AT (203)977-4704 TO COORDINATE THE RETURN OF THE EQUIPMENT.
11. THE NEW CONTROLLER SHALL BE A TRANSYT MODEL 3000 SERIES.
12. INSTALL THE NEW CONTROLLER AND CABINET ONTO THE EXISTING FOUNDATION.
13. THE CHANGEOVER SHALL OCCUR BETWEEN THE HOURS OF 9:00 AM AND 3:00 PM DAILY WITH THE INTERSECTION UNDER POLICE CONTROL DURING THIS PERIOD.

REV. # 1 | INTERSECTION # 128

SIGN LEGEND

(A) 31-0818 (NTOR)

(B) INSTALL 31-0327 (RLMTR)



TOWN SIGNAL

DETECTOR CHART		
DETECTOR	LOCAL DETECTOR	SYSTEM DETECTOR
D1	LD 1	–
D4	LD 4	–
D4A	LD 4A	–
D4B	LD 4B	–
SD1	LD –	SD1
SD2	LD –	SD2
SD3	LD –	SD3
SD4	LD –	SD4

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUR. OF ENGINEERING & HWY. OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL SIGNAL LAYOUT

CITY OF STAMFORD
SHIPPAN AVENUE AT CUMMINGS PARK ROAD

SCALE 1" = 40'

REV. # 1 | INTERSECTION # 128

RELEASED FOR CONSTRUCTION

PROJ. MANAGER:		
CHIEF DESIGNER:		
REVIEWED	BY	DATE
LAYOUT		
TIMINGS		
WIRING		
DRAFTING		
FINAL		
STRUCTURAL		
REVISION DATE:		
DATUM: H:	V:	
SCALE:	1" = 40'	

FILENAME: J:94230S13 MS: MSVIEW PS: PSPLOT UCS: WRLD PPP: xxx

FUSS & O'NEILL INC. Consulting Engineers
146 HARTFORD ROAD, MANCHESTER, CONNECTICUT 06040
(203) 646-2469

CITY OF STAMFORD
SIGNAL PLAN
INTERSECTION IMPROVEMENTS

SHIPPAN AVE. AT CUMMINGS PARK RD. STAMFORD, CT.

JOB NUMBER	PHASE	DATE	
94-230A1	4700	5/1/97	SHEET NO. 25 OF 81

EXHIBIT 9-A
LEVEL OF SERVICE CRITERIA
SIGNALIZED INTERSECTIONS

SOURCE: HIGHWAY CAPACITY MANUAL (HCM), 2010
TRANSPORTATION RESEARCH BOARD (1)

Level of Service for **signalized intersections** is defined in terms of control delay, which is a measure of driver discomfort, frustration, increased fuel consumption, and lost travel time. The delay experienced by a motorist is comprised of a number of factors that relate to control, geometric, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the volume-to-capacity (v/c) ratio for the lane group.

In the case of **signalized intersections**, the Level of Service for each approach is computed, and an overall Level of Service for the entire intersection is determined.

Levels of Service (LOS) for **signalized intersections** are defined as follows:

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SECONDS)	CONDITION
LOS A	≤ 10	LOW DELAY
LOS B	> 10 TO 20	SHORT DELAY
LOS C	> 20 TO 35	AVERAGE DELAY
LOS D	> 35 TO 55	CONGESTION NOTICEABLE
LOS E	> 55 TO 80	LIMIT OF ACCEPTABLE DELAY
LOS F	> 80	UNACCEPTABLE

In today's environment, Levels of Service C to D are considered acceptable, and Levels of Service A to B are seldomly achieved at signalized intersections.

(1) **HCM**, Exhibit 16-2.

EXHIBIT 9-B
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED INTERSECTIONS

SOURCE: HIGHWAY CAPACITY MANUAL (HCM), 2010 TRANSPORTATION RESEARCH BOARD (1)

Level of Service for **unsignalized intersections** similar to the study intersections is defined in terms of the average control delay for the approach or movement evaluated. Control delay involves movements at slower speeds and stops on intersection approaches as vehicles move up in the queue or slow down upstream of an intersection.

The delay experienced by a motorist is comprised of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference time that would result during base conditions in the absence of incident, control, traffic, or geometric delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

At two-way stop-controlled and all-way stop-controlled intersections, control delay is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The control delay also includes the time required to decelerate to a stop and to accelerate to the free-flow speed.

Level of Service (LOS) for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS is **not defined** for the intersection as a whole.

Level of Service (LOS) for an all-way stop-controlled intersection is determined by the computed or measured control delay and is defined for all movements. A LOS **is then defined** for the intersection as a whole.

Levels of Service (LOS) for **unsignalized intersections** are defined as follows:

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	CONDITION
LOS A	0 TO 10	LITTLE OR NO DELAY
LOS B	> 10 TO 15	SHORT DELAY
LOS C	> 15 TO 25	AVERAGE DELAY
LOS D	> 25 TO 35	LONG DELAY
LOS E	> 35 TO 50	VERY LONG DELAY
LOS F	> 50	EXTREME DELAY

In today's environment, Levels of Service D to F are common and are often experienced on minor street approaches to major streets carrying relatively high traffic volumes.

(1) **HCM**, Exhibits 17-2 and 17-22.

Exhibit 10
Traffic Operations Analyses
Existing Peak Hour Traffic Volumes
417 Shippan Avenue Study Area
Stamford, Connecticut

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	10	10	260	321	22
Future Vol, veh/h	16	10	10	260	321	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	-	-	-	-	-
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	11	11	283	349	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	666	361	373	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	305	-	-	-	-	-
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	425	684	1185	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	420	684	1185	-	-	-
Mov Cap-2 Maneuver	420	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	748	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1185	-	493	-	-
HCM Lane V/C Ratio	0.009	-	0.057	-	-
HCM Control Delay (s)	8.1	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	46	10	2	224	301	30
Future Vol, veh/h	46	10	2	224	301	30
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	11	2	243	327	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	591	344	360	0	-	0
Stage 1	344	-	-	-	-	-
Stage 2	247	-	-	-	-	-
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	470	699	1199	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	469	699	1199	-	-	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	794	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1199	-	498	-	-
HCM Lane V/C Ratio	0.002	-	0.122	-	-
HCM Control Delay (s)	8	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	9	21	221	289	22
Future Vol, veh/h	5	9	21	221	289	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	-	-	-	-	-
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	10	23	240	314	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	612	326	338	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	286	-	-	-	-	-
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	456	715	1221	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	715	1221	-	-	-
Mov Cap-2 Maneuver	446	-	-	-	-	-
Stage 1	715	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1221	-	588	-	-
HCM Lane V/C Ratio	0.019	-	0.026	-	-
HCM Control Delay (s)	8	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	1	69	1	41	1	198	125	58	230	10
Future Volume (vph)	3	1	1	69	1	41	1	198	125	58	230	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		160	175		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.950				0.850		0.994	
Flt Protected		0.971			0.970					0.950		
Satd. Flow (prot)	0	1760	0	0	1717	0	0	1863	1583	1770	1852	0
Flt Permitted		0.820			0.808			0.999		0.374		
Satd. Flow (perm)	0	1486	0	0	1430	0	0	1861	1583	697	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			37				136		8	
Link Speed (mph)		20			20			35			35	
Link Distance (ft)		555			558			246			389	
Travel Time (s)		18.9			19.0			4.8			7.6	
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
Adj. Flow (vph)	3	1	1	75	1	45	1	215	136	63	250	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	121	0	0	216	136	63	261	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
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			1 2	
Permitted Phases	4	4		4	4		2	2	2	1 2	1 2	
Detector Phase	4	4		4	4		2	2	2	1 2	1 2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		15.0	15.0	15.0			
Minimum Split (s)	11.0	11.0		11.0	11.0		19.0	19.0	19.0			
Total Split (s)	17.0	17.0		17.0	17.0		41.0	41.0	41.0			
Total Split (%)	24.3%	24.3%		24.3%	24.3%		58.6%	58.6%	58.6%			
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0			
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.0			4.0			4.0	4.0			
Lead/Lag							Lag	Lag	Lag			
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min			
Act Effct Green (s)		8.6			8.6			16.2	16.2	29.1	29.1	
Actuated g/C Ratio		0.21			0.21			0.40	0.40	0.71	0.71	
v/c Ratio		0.02			0.37			0.29	0.19	0.13	0.20	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		13.8			15.2			11.7	3.5	4.3	3.8	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		13.8			15.2			11.7	3.5	4.3	3.8	
LOS		B			B			B	A	A	A	
Approach Delay		13.8			15.2			8.5			3.9	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			17			36	0	4	18	
Queue Length 95th (ft)		7			56			85	26	18	50	
Internal Link Dist (ft)		475			478			166			309	
Turn Bay Length (ft)									160	175		
Base Capacity (vph)		492			498			1629	1402	684	1817	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.01			0.24			0.13	0.10	0.09	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 40.9			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 43.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Shippan & Harboursite/Cummings

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	7	9	261	324	25
Future Vol, veh/h	16	7	9	261	324	25
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	17	8	10	284	352	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	670	366	379	0	-	0
Stage 1	366	-	-	-	-	-
Stage 2	304	-	-	-	-	-
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	422	679	1179	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	418	679	1179	-	-	-
Mov Cap-2 Maneuver	418	-	-	-	-	-
Stage 1	695	-	-	-	-	-
Stage 2	748	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1179	-	473	-	-
HCM Lane V/C Ratio	0.008	-	0.053	-	-
HCM Control Delay (s)	8.1	0	13	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	16	7	227	302	29
Future Vol, veh/h	43	16	7	227	302	29
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	47	17	8	247	328	32

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	607	344	360	0	-	0
Stage 1	344	-	-	-	-	-
Stage 2	263	-	-	-	-	-
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	460	699	1199	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	456	699	1199	-	-	-
Mov Cap-2 Maneuver	456	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1199	-	503	-	-
HCM Lane V/C Ratio	0.006	-	0.127	-	-
HCM Control Delay (s)	8	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	9	19	224	302	16
Future Vol, veh/h	10	9	19	224	302	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	11	10	21	243	328	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	622	337	345	0	-	0
Stage 1	337	-	-	-	-	-
Stage 2	285	-	-	-	-	-
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	450	705	1214	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	441	705	1214	-	-	-
Mov Cap-2 Maneuver	441	-	-	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1214	-	536	-	-
HCM Lane V/C Ratio	0.017	-	0.039	-	-
HCM Control Delay (s)	8	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	6	64	1	16	1	222	59	15	290	6
Future Volume (vph)	5	1	6	64	1	16	1	222	59	15	290	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		160	175		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.927			0.974				0.850		0.997	
Flt Protected		0.981			0.962					0.950		
Satd. Flow (prot)	0	1694	0	0	1745	0	0	1863	1583	1770	1857	0
Flt Permitted		0.871			0.781			0.999		0.362		
Satd. Flow (perm)	0	1504	0	0	1417	0	0	1861	1583	674	1857	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			15				64		4	
Link Speed (mph)		20			20			35			35	
Link Distance (ft)		555			558			246			389	
Travel Time (s)		18.9			19.0			4.8			7.6	
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
Adj. Flow (vph)	5	1	7	70	1	17	1	241	64	16	315	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	88	0	0	242	64	16	322	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			1 2	
Permitted Phases	4	4		4	4		2	2	2	1 2	1 2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		4	4		2	2	2	1 2	1 2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		15.0	15.0	15.0			
Minimum Split (s)	11.0	11.0		11.0	11.0		19.0	19.0	19.0			
Total Split (s)	17.0	17.0		17.0	17.0		41.0	41.0	41.0			
Total Split (%)	24.3%	24.3%		24.3%	24.3%		58.6%	58.6%	58.6%			
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0			
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.0			4.0			4.0	4.0			
Lead/Lag							Lag	Lag	Lag			
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min			
Act Effct Green (s)		8.3			8.3			16.4	16.4	30.4	30.4	
Actuated g/C Ratio		0.22			0.22			0.42	0.42	0.79	0.79	
v/c Ratio		0.04			0.28			0.31	0.09	0.03	0.22	
Control Delay		11.9			15.8			11.0	3.9	3.3	3.3	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		11.9			15.8			11.0	3.9	3.3	3.3	
LOS		B			B			B	A	A	A	
Approach Delay		11.9			15.8			9.5			3.3	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			15			41	0	1	23	
Queue Length 95th (ft)		12			48			92	17	6	59	
Internal Link Dist (ft)		475			478			166			309	
Turn Bay Length (ft)									160	175		
Base Capacity (vph)		537			511			1664	1422	665	1831	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.02			0.17			0.15	0.05	0.02	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 38.6			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 44.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Shippan & Harboursite/Cummings

Exhibit 11
Traffic Operations Analyses
Background (no-build) Peak Hour Traffic Volumes
417 Shippan Avenue Study Area
Stamford, Connecticut

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	10	10	270	334	23
Future Vol, veh/h	17	10	10	270	334	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	18	11	11	293	363	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	691	376	388	0	-	0
Stage 1	376	-	-	-	-	-
Stage 2	315	-	-	-	-	-
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	410	670	1170	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	740	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	405	670	1170	-	-	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1170	-	475	-	-
HCM Lane V/C Ratio	0.009	-	0.062	-	-
HCM Control Delay (s)	8.1	0	13.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	10	2	233	313	31
Future Vol, veh/h	48	10	2	233	313	31
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	52	11	2	253	340	34

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	614	357	374	0	-	0
Stage 1	357	-	-	-	-	-
Stage 2	257	-	-	-	-	-
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	455	687	1184	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	454	687	1184	-	-	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	482	-	-
HCM Lane V/C Ratio	0.002	-	0.131	-	-
HCM Control Delay (s)	8	0	13.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	9	22	230	301	23
Future Vol, veh/h	5	9	22	230	301	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	5	10	24	250	327	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	638	340	352	0	-	0
Stage 1	340	-	-	-	-	-
Stage 2	298	-	-	-	-	-
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	441	702	1207	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	431	702	1207	-	-	-
Mov Cap-2 Maneuver	431	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1207	-	573	-	-
HCM Lane V/C Ratio	0.02	-	0.027	-	-
HCM Control Delay (s)	8	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	1	72	1	43	1	206	130	60	239	10
Future Volume (vph)	3	1	1	72	1	43	1	206	130	60	239	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		160	175		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.950				0.850		0.994	
Flt Protected		0.971			0.970					0.950		
Satd. Flow (prot)	0	1760	0	0	1717	0	0	1863	1583	1770	1852	0
Flt Permitted		0.820			0.809			0.999		0.370		
Satd. Flow (perm)	0	1486	0	0	1432	0	0	1861	1583	689	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			38				141		8	
Link Speed (mph)		20			20			35			35	
Link Distance (ft)		555			558			246			389	
Travel Time (s)		18.9			19.0			4.8			7.6	
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
Adj. Flow (vph)	3	1	1	78	1	47	1	224	141	65	260	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	126	0	0	225	141	65	271	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
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			1 2	
Permitted Phases	4	4		4	4		2	2	2	1 2	1 2	
Detector Phase	4	4		4	4		2	2	2	1 2	1 2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		15.0	15.0	15.0			
Minimum Split (s)	11.0	11.0		11.0	11.0		19.0	19.0	19.0			
Total Split (s)	17.0	17.0		17.0	17.0		41.0	41.0	41.0			
Total Split (%)	24.3%	24.3%		24.3%	24.3%		58.6%	58.6%	58.6%			
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0			
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.0			4.0			4.0	4.0			
Lead/Lag							Lag	Lag	Lag			
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min			
Act Effct Green (s)		8.7			8.7			16.3	16.3	29.2	29.2	
Actuated g/C Ratio		0.21			0.21			0.40	0.40	0.71	0.71	
v/c Ratio		0.02			0.38			0.31	0.20	0.13	0.21	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		14.0			15.5			11.9	3.5	4.4	3.9	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		14.0			15.5			11.9	3.5	4.4	3.9	
LOS		B			B			B	A	A	A	
Approach Delay		14.0			15.5			8.7			4.0	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			18			38	0	5	20	
Queue Length 95th (ft)		7			58			89	27	19	52	
Internal Link Dist (ft)		475			478			166			309	
Turn Bay Length (ft)									160	175		
Base Capacity (vph)		489			496			1619	1396	673	1809	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.01			0.25			0.14	0.10	0.10	0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 41.2			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 7.8		Intersection LOS: A	
Intersection Capacity Utilization 43.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Shippan & Harboursite/Cummings

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	7	9	271	337	26
Future Vol, veh/h	17	7	9	271	337	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	18	8	10	295	366	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	695	380	394	0	-	0
Stage 1	380	-	-	-	-	-
Stage 2	315	-	-	-	-	-
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	408	667	1165	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	740	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	404	667	1165	-	-	-
Mov Cap-2 Maneuver	404	-	-	-	-	-
Stage 1	684	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1165	-	456	-	-
HCM Lane V/C Ratio	0.008	-	0.057	-	-
HCM Control Delay (s)	8.1	0	13.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	45	17	7	236	314	30
Future Vol, veh/h	45	17	7	236	314	30
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	18	8	257	341	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	631	358	374	0	-	0
Stage 1	358	-	-	-	-	-
Stage 2	273	-	-	-	-	-
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	445	686	1184	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	773	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	441	686	1184	-	-	-
Mov Cap-2 Maneuver	441	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	773	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	489	-	-
HCM Lane V/C Ratio	0.006	-	0.138	-	-
HCM Control Delay (s)	8.1	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	9	20	233	314	17
Future Vol, veh/h	10	9	20	233	314	17
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	11	10	22	253	341	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	647	350	359	0	-	0
Stage 1	350	-	-	-	-	-
Stage 2	297	-	-	-	-	-
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	436	693	1200	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	754	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	427	693	1200	-	-	-
Mov Cap-2 Maneuver	427	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	754	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1200	-	522	-	-
HCM Lane V/C Ratio	0.018	-	0.04	-	-
HCM Control Delay (s)	8.1	0	12.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	6	67	1	17	1	231	61	16	302	6
Future Volume (vph)	5	1	6	67	1	17	1	231	61	16	302	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		160	175		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.927			0.974				0.850		0.997	
Flt Protected		0.981			0.962					0.950		
Satd. Flow (prot)	0	1694	0	0	1745	0	0	1863	1583	1770	1857	0
Flt Permitted		0.879			0.763			0.999		0.360		
Satd. Flow (perm)	0	1518	0	0	1384	0	0	1861	1583	671	1857	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			15				66		4	
Link Speed (mph)		20			20			35			35	
Link Distance (ft)		555			558			246			389	
Travel Time (s)		18.9			19.0			4.8			7.6	
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
Adj. Flow (vph)	5	1	7	73	1	18	1	251	66	17	328	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	92	0	0	252	66	17	335	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			1 2	
Permitted Phases	4	4		4	4		2	2	2	1 2	1 2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		4	4		2	2	2	1 2	1 2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		15.0	15.0	15.0			
Minimum Split (s)	11.0	11.0		11.0	11.0		19.0	19.0	19.0			
Total Split (s)	17.0	17.0		17.0	17.0		41.0	41.0	41.0			
Total Split (%)	24.3%	24.3%		24.3%	24.3%		58.6%	58.6%	58.6%			
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0			
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.0			4.0			4.0	4.0			
Lead/Lag							Lag	Lag	Lag			
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min			
Act Effct Green (s)		8.5			8.5			16.6	16.6	30.8	30.8	
Actuated g/C Ratio		0.22			0.22			0.42	0.42	0.79	0.79	
v/c Ratio		0.04			0.30			0.32	0.09	0.03	0.23	
Control Delay		12.2			16.4			11.1	3.8	3.4	3.4	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		12.2			16.4			11.1	3.8	3.4	3.4	
LOS		B			B			B	A	A	A	
Approach Delay		12.2			16.4			9.6			3.4	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			16			44	0	1	25	
Queue Length 95th (ft)		12			51			96	18	6	62	
Internal Link Dist (ft)		475			478			166			309	
Turn Bay Length (ft)									160	175		
Base Capacity (vph)		537			495			1649	1410	667	1847	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.02			0.19			0.15	0.05	0.03	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 39.1			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 7.6		Intersection LOS: A	
Intersection Capacity Utilization 44.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Shippan & Harboursite/Cummings

Exhibit 12
Traffic Operations Analyses
Combined (build) Peak Hour Traffic Volumes
Stamford, Connecticut

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	10	10	269	333	23
Future Vol, veh/h	17	10	10	269	333	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	18	11	11	292	362	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	689	375	387	0	-	0
Stage 1	375	-	-	-	-	-
Stage 2	314	-	-	-	-	-
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	671	1171	-	-	-
Stage 1	695	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	407	671	1171	-	-	-
Mov Cap-2 Maneuver	407	-	-	-	-	-
Stage 1	687	-	-	-	-	-
Stage 2	741	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1171	-	476	-	-
HCM Lane V/C Ratio	0.009	-	0.062	-	-
HCM Control Delay (s)	8.1	0	13.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	47	9	1	233	313	30
Future Vol, veh/h	47	9	1	233	313	30
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	51	10	1	253	340	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	612	357	373	0	-	0
Stage 1	357	-	-	-	-	-
Stage 2	255	-	-	-	-	-
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	456	687	1185	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	456	687	1185	-	-	-
Mov Cap-2 Maneuver	456	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	788	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1185	-	482	-	-
HCM Lane V/C Ratio	0.001	-	0.126	-	-
HCM Control Delay (s)	8	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	9	22	229	300	23
Future Vol, veh/h	5	9	22	229	300	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	5	10	24	249	326	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	636	339	351	0	-	0
Stage 1	339	-	-	-	-	-
Stage 2	297	-	-	-	-	-
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	442	703	1208	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	754	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	432	703	1208	-	-	-
Mov Cap-2 Maneuver	432	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	754	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1208	-	574	-	-
HCM Lane V/C Ratio	0.02	-	0.027	-	-
HCM Control Delay (s)	8	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	1	1	72	1	43	1	205	130	60	238	10
Future Volume (vph)	3	1	1	72	1	43	1	205	130	60	238	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		160	175		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.950				0.850		0.994	
Flt Protected		0.971			0.970					0.950		
Satd. Flow (prot)	0	1760	0	0	1717	0	0	1863	1583	1770	1852	0
Flt Permitted		0.820			0.809			0.999		0.371		
Satd. Flow (perm)	0	1486	0	0	1432	0	0	1861	1583	691	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			38				141		8	
Link Speed (mph)		20			20			35			35	
Link Distance (ft)		555			558			246			389	
Travel Time (s)		18.9			19.0			4.8			7.6	
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
Adj. Flow (vph)	3	1	1	78	1	47	1	223	141	65	259	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	126	0	0	224	141	65	270	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			1 2	
Permitted Phases	4	4		4	4		2	2	2	1 2	1 2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		4	4		2	2	2	1 2	1 2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		15.0	15.0	15.0			
Minimum Split (s)	11.0	11.0		11.0	11.0		19.0	19.0	19.0			
Total Split (s)	17.0	17.0		17.0	17.0		41.0	41.0	41.0			
Total Split (%)	24.3%	24.3%		24.3%	24.3%		58.6%	58.6%	58.6%			
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0			
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.0			4.0			4.0	4.0			
Lead/Lag							Lag	Lag	Lag			
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min			
Act Effct Green (s)		8.7			8.7			16.3	16.3	29.2	29.2	
Actuated g/C Ratio		0.21			0.21			0.40	0.40	0.71	0.71	
v/c Ratio		0.02			0.38			0.30	0.20	0.13	0.21	
Control Delay		13.8			15.4			11.9	3.5	4.4	3.9	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		13.8			15.4			11.9	3.5	4.4	3.9	
LOS		B			B			B	A	A	A	
Approach Delay		13.8			15.4			8.7			4.0	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			18			38	0	5	19	
Queue Length 95th (ft)		7			58			89	27	19	53	
Internal Link Dist (ft)		475			478			166			309	
Turn Bay Length (ft)									160	175		
Base Capacity (vph)		490			497			1620	1396	675	1810	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.01			0.25			0.14	0.10	0.10	0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 41.1			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 7.8		Intersection LOS: A	
Intersection Capacity Utilization 43.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Shippan & Harboursite/Cummings

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	7	9	270	335	26
Future Vol, veh/h	17	7	9	270	335	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	18	8	10	293	364	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	691	378	392	0	-	0
Stage 1	378	-	-	-	-	-
Stage 2	313	-	-	-	-	-
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	410	669	1167	-	-	-
Stage 1	693	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	406	669	1167	-	-	-
Mov Cap-2 Maneuver	406	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	741	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1167	-	459	-	-
HCM Lane V/C Ratio	0.008	-	0.057	-	-
HCM Control Delay (s)	8.1	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	44	16	6	236	314	28
Future Vol, veh/h	44	16	6	236	314	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	48	17	7	257	341	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	627	356	371	0	-	0
Stage 1	356	-	-	-	-	-
Stage 2	271	-	-	-	-	-
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	447	688	1188	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	444	688	1188	-	-	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1188	-	490	-	-
HCM Lane V/C Ratio	0.005	-	0.133	-	-
HCM Control Delay (s)	8	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	9	20	232	313	17
Future Vol, veh/h	10	9	20	232	313	17
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	11	10	22	252	340	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	645	349	358	0	-	0
Stage 1	349	-	-	-	-	-
Stage 2	296	-	-	-	-	-
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	437	694	1201	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	428	694	1201	-	-	-
Mov Cap-2 Maneuver	428	-	-	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1201	-	523	-	-
HCM Lane V/C Ratio	0.018	-	0.039	-	-
HCM Control Delay (s)	8.1	0	12.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	6	67	1	17	1	230	61	16	301	6
Future Volume (vph)	5	1	6	67	1	17	1	230	61	16	301	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		160	175		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.927			0.974				0.850		0.997	
Flt Protected		0.981			0.962					0.950		
Satd. Flow (prot)	0	1694	0	0	1745	0	0	1863	1583	1770	1857	0
Flt Permitted		0.879			0.763			0.999		0.360		
Satd. Flow (perm)	0	1518	0	0	1384	0	0	1861	1583	671	1857	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			15				66		4	
Link Speed (mph)		20			20			35			35	
Link Distance (ft)		555			558			246			389	
Travel Time (s)		18.9			19.0			4.8			7.6	
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
Adj. Flow (vph)	5	1	7	73	1	18	1	250	66	17	327	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	92	0	0	251	66	17	334	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			1 2	
Permitted Phases	4	4		4	4		2	2	2	1 2	1 2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		4	4		2	2	2	1 2	1 2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		15.0	15.0	15.0			
Minimum Split (s)	11.0	11.0		11.0	11.0		19.0	19.0	19.0			
Total Split (s)	17.0	17.0		17.0	17.0		41.0	41.0	41.0			
Total Split (%)	24.3%	24.3%		24.3%	24.3%		58.6%	58.6%	58.6%			
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0			
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.0			4.0			4.0	4.0			
Lead/Lag							Lag	Lag	Lag			
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min			
Act Effct Green (s)		8.5			8.5			16.6	16.6	30.8	30.8	
Actuated g/C Ratio		0.22			0.22			0.42	0.42	0.79	0.79	
v/c Ratio		0.04			0.30			0.32	0.09	0.03	0.23	
Control Delay		12.2			16.4			11.1	3.8	3.4	3.4	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		12.2			16.4			11.1	3.8	3.4	3.4	
LOS		B			B			B	A	A	A	
Approach Delay		12.2			16.4			9.6			3.4	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			16			44	0	1	25	
Queue Length 95th (ft)		12			51			96	18	6	62	
Internal Link Dist (ft)		475			478			166			309	
Turn Bay Length (ft)									160	175		
Base Capacity (vph)		537			495			1649	1410	667	1847	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.02			0.19			0.15	0.05	0.03	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 39.1			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 7.6		Intersection LOS: A	
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Shippan & Harboursite/Cummings

Exhibit 13
Parking Assessment
417 Shippan Avenue
Stamford, Connecticut

Google Maps 417 Shippan Ave