



Date: April 16, 2012

Technical Memorandum

To: Ahnaray Bizjak, P.E.
City of Fitchburg
5520 Lacy Road
Fitchburg, WI 53711

From: Michael May, P.E., PTOE

cc List:

Subject: Nine Springs Neighborhood Planning Analysis

PART A – INTRODUCTION

The City of Fitchburg is allowing development plans to move forward within the Nine Springs Neighborhood (formerly Green Tech Village). A diagram of the Nine Springs Neighborhood is included in [Exhibit 1](#). The Wisconsin Department of Transportation (WisDOT) has asked the City to provide a traffic study for several major intersections along New Lacy Road for its review and acceptance prior to approving the Nine Springs Neighborhood plat.

Traffic Analysis & Design, Inc. (TADI) has been retained by the City of Fitchburg to estimate roadway improvements necessary to accommodate Year 2025 build traffic and Year 2035 build traffic forecasts. This technical memorandum provides a summary of the methods used to estimate forecasts, as well as the transportation improvements anticipated to be necessary to accommodate full build-out of the Nine Springs Neighborhood and other surrounding neighborhood plans.

PART B – DISCLAIMER ON FORECASTS

All peak hour forecasts have been estimated by TADI based on 1) numerous assumptions as outlined in the McGaw Park Neighborhood Plan, and 2) additional assumptions using newly provided daily traffic forecasts from the Madison Area MPO. None of the study area intersections currently exist. End users in the various neighborhood plans are not defined and area land use plans include largely vague development assumptions. Further, the development plans encompass large areas of land that are not likely to be fully built until well after the Year 2035 (Year 2035 volumes represent full build of the area) since the City has a 75-acre/year

limitation on development (total gross area included in this study is 2,399 acres). As such, the volumes and improvements provided herein are intended to be used for planning purposes only and are not intended for final roadway design.

The following statement has been provided by the City of Fitchburg to aid WisDOT in their review:

It should be noted that the Nine Springs neighborhood is being developed following the SmartCode zoning code, which places a strong emphasis on walking and biking as integral modes of transportation. The land use supports a higher density, mixed-use development and the transportation improvements are designed to encourage walking and biking. It should also be noted that the long-term vision for this neighborhood includes transit-oriented design, with the future provision of bus transit throughout the development and commuter rail along the abandoned Union Pacific railroad corridor. It is the goal that future residents will live and work in their neighborhood, and will choose to commute by walking, biking, or taking transit. This type of development may change commuting patterns, reducing the projected peak hour traffic volumes that have been provided by the MPO regional model. Should this development materialize as it is envisioned, we would not expect to see these same peak hour volumes. However, it is difficult to predict the actual mode split or how to apply transit-related discounts to the traffic forecasts. For that reason, the analysis was completed using the MPO values, representing a very conservative approach.

Given this conservative approach, the City does not want to over-design the road facility. Each additional lane that is provided at an intersection has a negative consequence to pedestrians and cyclists. At initial build-out of the Nine Springs Development, New Lacy Road will be a through street from the roundabout at E. Cheryl Parkway to the intersection with CTH MM. All intersecting side streets will be required to stop (Ninebark, SB-ramp, and NB-ramp) before entering the intersection with New Lacy Road by use of two-way stop control. Conduit will be installed at and between the Ninebark Road and ramp intersections for future signalization and coordination. The recommended lane configurations at initial build-out for each intersection are shown in [Appendix A](#).

PART C – STUDY AREA

The study area intersections include the following:

- New Lacy Road & Ninebark Road;
- New Lacy Road & USH 14 Southbound Ramps;
- New Lacy Road & USH 14 Northbound Ramps;
- New Lacy Road & North-South (N-S) Roadway; and
- New Lacy Road & CTH MM.

None of these intersections currently exist, though construction is currently underway for the New Lacy Road bridge over USH 14. A copy of the design plans for the USH 14 interchange ramps through CTH MM is included in [Appendix A](#).

For the purpose of this study, New Lacy Road was assumed to be posted at 30 mph from west of Ninebark Road to the USH 14 northbound ramps and 35 mph from the USH 14 northbound ramps to east of CTH MM. The approximate centerline-to-centerline intersection spacing is expected to be a quarter mile from Ninebark Road to the USH 14 southbound ramps, approximately 650-feet from the USH 14 southbound ramps to the USH 14 northbound ramps, a quarter mile from the USH 14 northbound ramps to the N-S roadway, and approximately 400-feet from the N-S Roadway to CTH MM.

PART D – TRAFFIC VOLUMES

Year 2025 and Year 2035 build traffic turning movement volumes for this study were estimated based on Year 2025 and Year 2035 build volumes estimated in the McGaw Park Neighborhood TIA, as well as recently-provided daily traffic forecasts from the Madison Area MPO. The TIA and MPO volumes are included in [Appendix A](#). More specifically:

1. *USH 14 Ramp Intersections:* Hold volumes at the USH 14 ramp intersections the same as those used in the McGaw Park Neighborhood TIA.
2. *Ninebark Road Intersection:* Shift traffic shown in the McGaw TIA as entering/exiting East Cheryl Parkway northeast to the Ninebark intersection in 10% increments. Document the improvements that would be necessary to mitigate traffic delays and queues under each alternative (10% shift, 20% shift, etc.). The purpose of this exercise is to see the sensitivity volumes have on necessary roadway improvements. A maximum 40% shift was used at the request of the City of Fitchburg because East Cheryl Parkway, which will be a collector roadway between Fish Hatchery Road and New Lacy Road, it is expected to carry more traffic than the shorter Ninebark Road. Additionally, the Nine Springs plat will include an underpass of New Lacy Road, allowing an internal north-south road connection within the development that does not conflict with New Lacy Road traffic. This internal street will draw traffic off of Ninebark Road and provide a convenient route, via Herman Road, to McCoy Road and the northbound on-ramp to USH 14.
3. *N-S Roadway, CTH MM Intersections:* Estimate peak hour turning movement volumes based on MPO-provided daily traffic turning movement volumes and maintaining a volume balance with USH 14 ramp intersections.

The Year 2025 build traffic volumes used in this technical memorandum are included in [Exhibit 2](#). The Year 2035 build traffic volumes used in this technical memorandum are included in [Exhibit 3](#).

Note that year 2025 build traffic volumes represent full build-out of Nine Springs Neighborhood, Northeast Neighborhood, Fitchburg Research Park, and partial build-out of the McGaw Park Neighborhood. Year 2035 build traffic volumes represent full build-out of all developable areas. In reality the development plans encompass large areas of land (see [Appendix D](#)) that are not likely to be fully built until well after Year 2035. The specific plat under review by WisDOT represents just 8.7% of the gross area that has been included in this analysis. The volumes identified as occurring in Year 2025 and Year 2035 are not expected to be realized until much later.

PART E – ANTICIPATED TRANSPORTATION IMPROVEMENTS

All traffic analysis was performed using the SYNCHRO 7 software (build 773, Rev 8). Improvements were sought which provided LOS D or better operating conditions for all movements and eliminated queue spillback into adjacent traffic signals. Analysis outputs and LOS tables are included in [Appendices B and C](#).

The transportation improvements anticipated to be necessary to accommodate Year 2025 and Year 2035 build traffic volumes are shown in [Exhibits 4 and 5](#), respectively. The primary difference in roadway layout between the two analysis years is length of turn-bay storage. The improvements shown are expected to accommodate all traffic shift scenarios investigated in this study.

The Year 2025 and Year 2035 build traffic expected maximum queue lengths are shown in [Exhibits 6A through 6D](#) and [Exhibits 7A through 7D](#). Queues are well managed between intersections and spillback is not expected to occur, regardless of what level of traffic is shifted to Ninebark Road.

The following is an outline of the transportation improvements:

General Considerations

- When the land to the east of the USH 14 interchange is platted, require dedication of additional right-of-way to accommodate a future four-lane divided cross-section of New Lacy Road from the interchange to CTH MM.
- Preserve right-of-way at intersections to accommodate the improvements shown in [Exhibit 5](#).
- Include right-turn islands where shown in [Exhibits 4 and 5](#) to reduce pedestrian crossing distances, which leads to more efficient vehicle and pedestrian operations.
- All studied intersections are expected to eventually require traffic signal installation. When installed, the traffic signals on the corridor should be coordinated.

New Lacy Road & Ninebark Road

- Provide four lanes on the New Lacy Road eastbound approach, including one left-turn lane, two through lanes and one right-turn lane.
- Provide four lanes on the New Lacy Road westbound approach, including one left-turn lane, two through lanes and one right-turn lane.
- Provide two lanes on the Ninebark Road northbound approach, including one left-turn lane and one through lane with slotted right-turn lane.
- Provide two lanes on the Ninebark Road southbound approach, including one left-turn lane and one through lane with slotted right-turn lane.
- Provide pedestrian crossings of the north, west and south approaches. Protected-permitted left-turn signal heads may be necessary for the eastbound, westbound and southbound left-turn movements depending on the volume of traffic realized.

New Lacy Road & USH 14 Southbound Ramps

- Provide four lanes on the New Lacy Road eastbound approach, including one pre-left-turn through lane, two through lanes and one right-turn lane. The two inside through lanes will drop downstream at the USH 14 northbound ramps as dual left-turn lanes.
- Provide three lanes on the New Lacy Road westbound approach, including one left-turn lane and two through lanes.
- Provide three lanes on the USH 14 southbound off-ramp approach, including one shared left-turn/through lane and two right-turn lanes. Note that the southbound left-turn movement is at the threshold of needing dual left-turn lanes rather than one under full build-out. Should the need for dual left-turn lanes be realized, an additional eastbound through lane on the bridge over USH 14 would necessitate widening to the bridge that is currently under construction. The one southbound left-turn lane and one eastbound through lane are expected to be sufficient for the projected life of the bridge that is currently under construction.
- Provide pedestrian crossings of the north, west and south approaches. Protected-permitted left-turn signal heads may be necessary for the westbound left-turn movement. Protected-only right-turns signals may be necessary for the southbound right-turn movement.

New Lacy Road & USH 14 Northbound Ramps

- Provide three lanes on the New Lacy Road eastbound approach, including two left-turn lanes and one through lane. The dual left-turn lanes will serve to drop two upstream through lanes.
- Provide three lanes on the New Lacy Road westbound approach, including two through lanes and one right-turn lane.
- Provide two lanes on the USH 14 northbound off-ramp approach, including one shared left-turn/through lane and one right-turn lane.
- Provide pedestrian crossings of the north, east and south approaches. Protected-only left-turn signal heads may be necessary for the eastbound left-turn movement.

New Lacy Road & N-S Roadway

- Provide four lanes on the New Lacy Road eastbound approach, including one left-turn lane, two through lanes and one right-turn lane.
- Provide four lanes on the New Lacy Road westbound approach, including one left-turn lane, two through lanes and one right-turn lane.
- Provide two lanes on the N-S Roadway northbound approach, including one left-turn lane and one through lane with slotted right-turn lane.
- Provide two lanes on the N-S Roadway southbound approach, including one left-turn lane and one through lane with slotted right-turn lane.
- Provide pedestrian crossings of all four approaches. Protected-permitted left-turn signal heads may be necessary for the eastbound left-turn movement.

- Should the N-S Roadway be constructed at the approximate 400-foot spacing with CTH MM, the width of New Lacy Road will need to be sufficiently wide to accommodate a westbound left-turn lane at the N-S Roadway, an eastbound left-turn lane at CTH MM, and a median area between the two lanes. The modeled signal cycle length of 90-seconds is expected to be efficient in metering queues and providing coordination between the N-S Roadway and CTH MM.

New Lacy Road & CTH MM

- Provide three lanes on the New Lacy Road eastbound approach, including one left-turn lane, one through lane and one right-turn lane. The right-turn lane will serve as a drop as an upstream through lane.
- Provide three lanes on the New Lacy Road westbound approach, including one left-turn lane, one through lane and one shared through/right-turn lane.
- Provide three lanes on the CTH MM northbound approach, including one left-turn lane, one through lane and one right-turn lane.
- Provide three lanes on the CTH MM southbound approach, including one left-turn lane, one through lane and one right-turn lane.
- Provide pedestrian crossings of all four approaches. Protected-permitted left-turn signal heads may be necessary for the eastbound and northbound left-turn movements.
- Should the N-S Roadway be constructed at the approximate 400-foot spacing with CTH MM, the width of New Lacy Road will need to be sufficiently wide to accommodate a westbound left-turn lane at the N-S Roadway, an eastbound left-turn lane at CTH MM, and a median area between the two lanes. The modeled signal cycle length of 90-seconds is expected to be efficient in metering queues and providing coordination between the N-S Roadway and CTH MM.

PART F – CONCLUSION

It is important to reiterate that all peak hour forecasts have been estimated by TADI based on 1) numerous assumptions as outlined in the McGaw Park Neighborhood Plan, and 2) additional assumptions using newly provided daily traffic forecasts from the Madison Area MPO. None of the study area intersections currently exist. End users in the various neighborhood plans are not defined and area land use plans include largely vague development assumptions. Further, the development plans encompass large areas of land that are not likely to be fully built until well after the Year 2035 (Year 2035 volumes represent full build of the area) since the City has a 75-acre/year limitation on development (total gross area included in this study is 2,399 acres). As such, the volumes and improvements provided herein are intended to be used for planning purposes only and are not intended for final roadway design.

The uncertain economy and SmartCode zoning code make it difficult to estimate when roadway and intersection improvements – including traffic signals – should be installed along New Lacy Road. It is recommended that the City of Fitchburg monitor operations as more defined parcel development occurs within the Nine Springs Neighborhood and surrounding planned areas to determine when improvements beyond the current New Lacy Road construction should occur.

This monitoring can include: requiring traffic impact analysis reports as specific development plans/end users are proposed; reviewing traffic signal warrants as development plans are proposed; and reviewing daily-traffic counts and crash reports every three years.

3.4 TRANSECT ZONES

3.4.1 Transect Zones shall be assigned and mapped on each New Community Regulating Plan according to the percentages allocated on Tables 2a and 3.

Tables 2 & 9 Requirements for a TOD:

T-zone	T3	T4	T5	SD1	Total
Acres	8.9	40.0	95.8	52.0	196.7*
Required	20% max.	20 - 50%	40 - 60%	30% max.	
Provided	4.5%	20.3%	48.7%	26.4%	100%

Avante Property Area:

T-zone	T3	T4	T5	SD1	Total
Acres	0	10.1	46.1	51.5	107.7*

* net site area

3.4.3 Transect zones shall, to the extent practical, be designed so that the same Transect zone designation is on opposite sides of a primary thoroughfare. Where this is not practicable, such arrangement shall be limited to no more than 15% of the respective Transect zone block perimeter, unless a greater level is allowed by Administrative Waiver.

* Administrative Waiver #1 (prior approval) for SD1 across from T5 along Lacy Road. More of this area is now matching.

* Administrative Waiver #3 requested for SD1 across from T5 along Greenmarket Place and Cheryl Parkway.

T-zone	Perimeter	Unmatched	%
SD1	20,173	3,081	15%
T5	40,941	1,722	4%

3.4.5 Where more than one type of Transect Zone of T3, T4, or T5 exists in a block, the Transect Zone with the greatest area in the block shall be used to determine the maximum block perimeter. If equal, the lower Transect Zone number shall control.

Block #	Total Area	T5	%	SD or T4	%
2	10.5	4.0	37.9%	6.5	62.1%
5	6.9	1.4	20.7%	5.5	79.3%
8	4.5	1.8	39.0%	2.8	61.0%
9	3.2	1.8	54.9%	1.4	45.1%
16	4.2	3.1	72.8%	1.2	27.2%
17	5.2	1.5	28.9%	3.7	71.1%
23	3.1	1.4	46.1%	1.7	53.9%



NINE SPRINGS FITCHBURG, WISCONSIN

SMARTCODE ARTICLE 3 APPLICATION - MARCH 16, 2011

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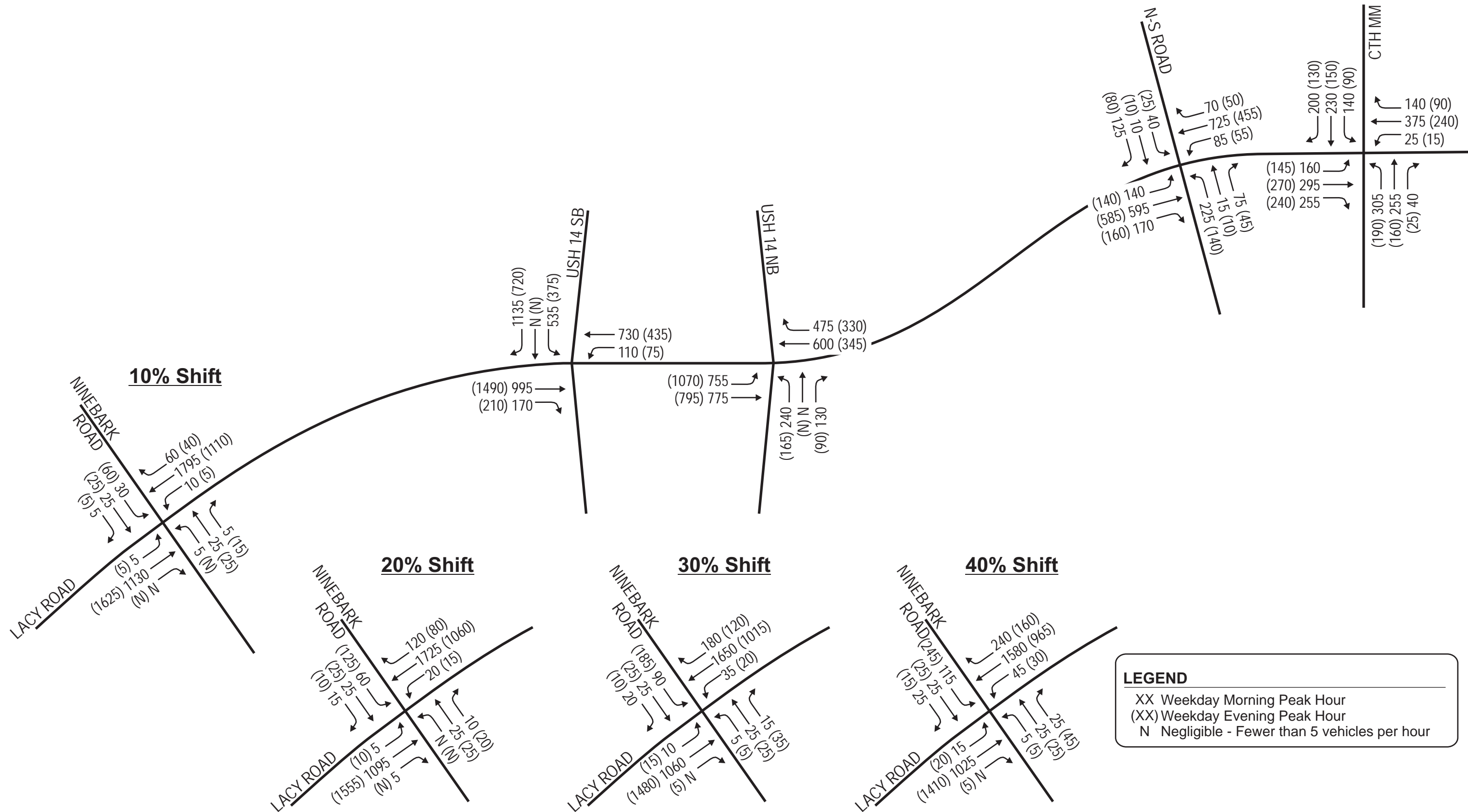
AMENDMENT ONE - Lands Controlled by Avante Properties - December 7, 2011 (Revision One - February 16, 2012)

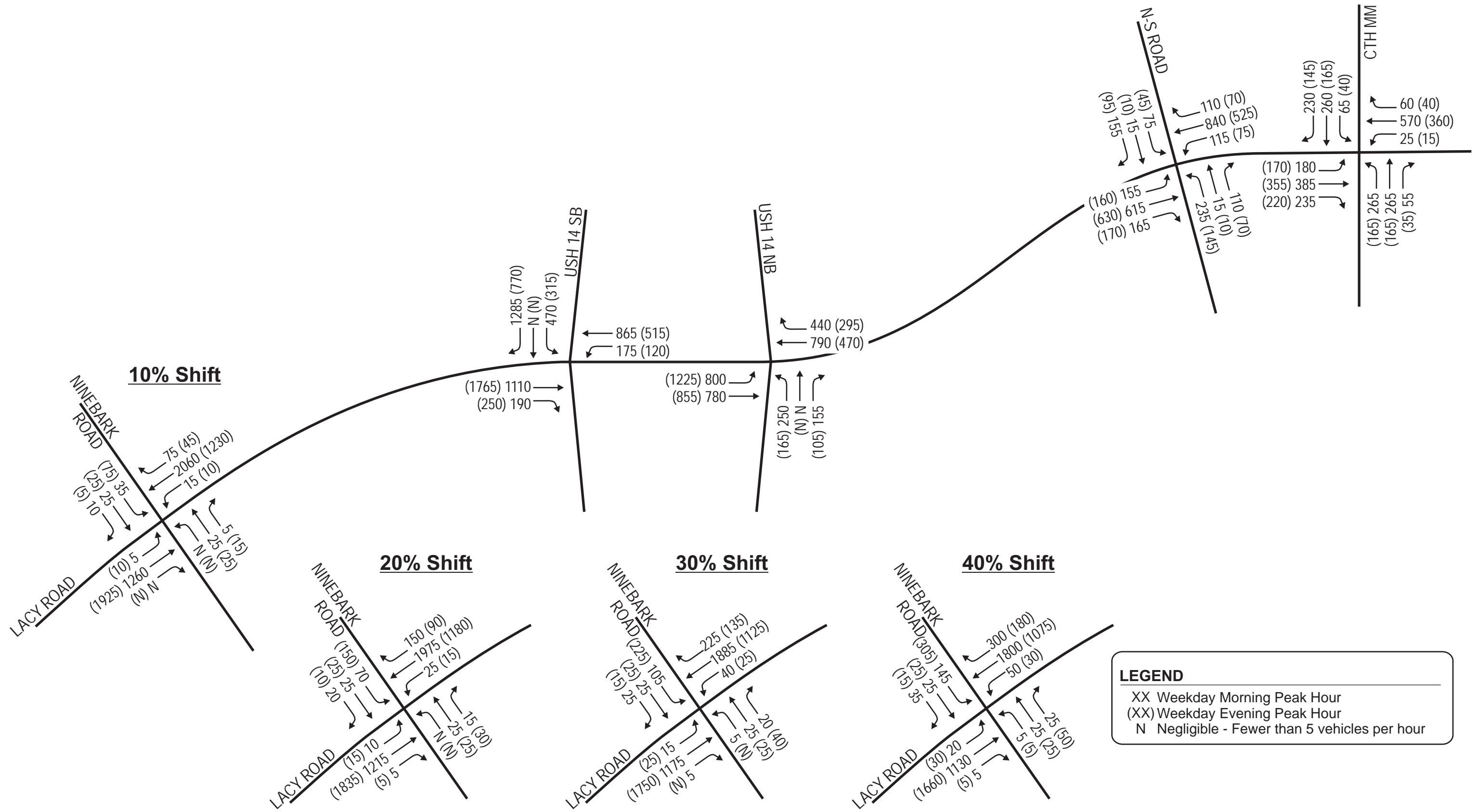
TRANSECT ZONE ALLOCATION

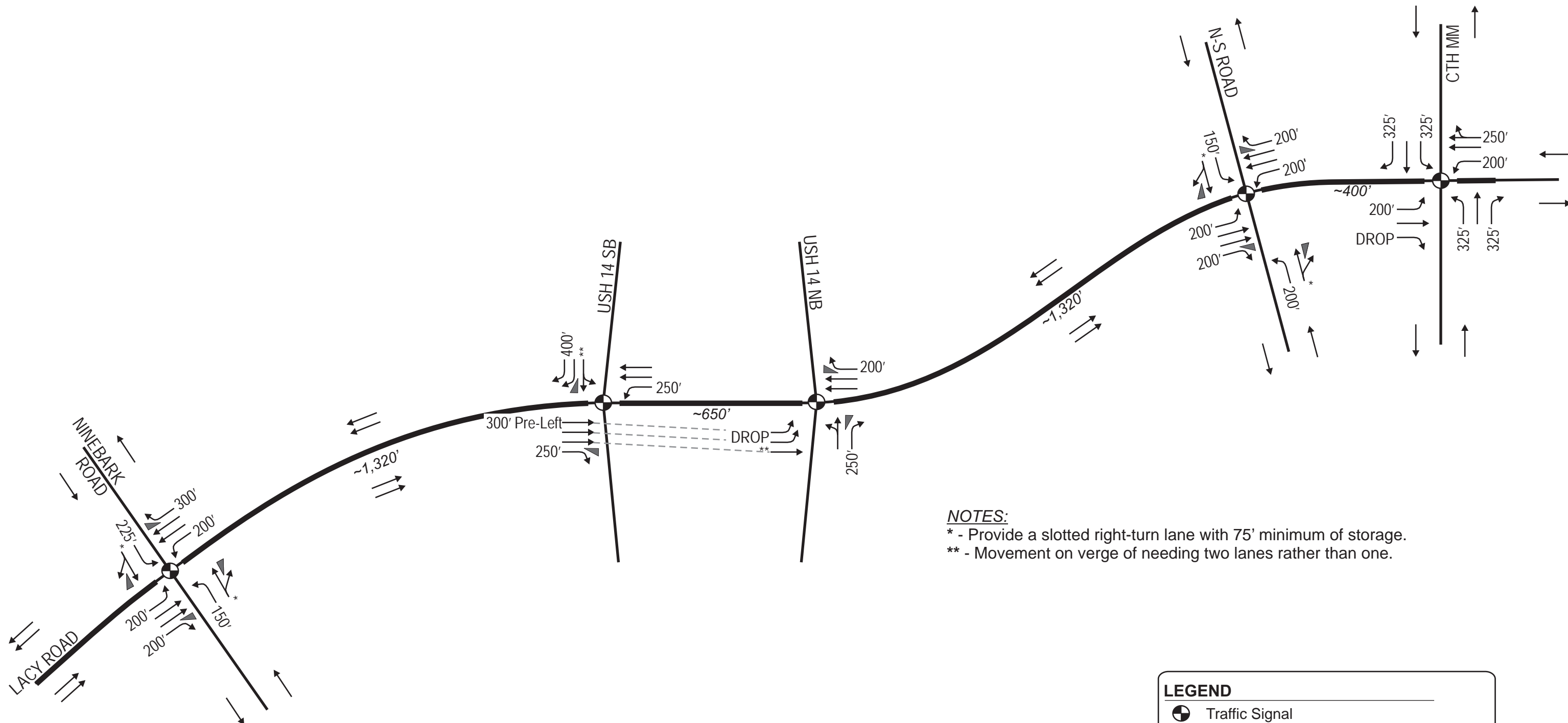
Scale 1" = 60'



NOT TO SCALE







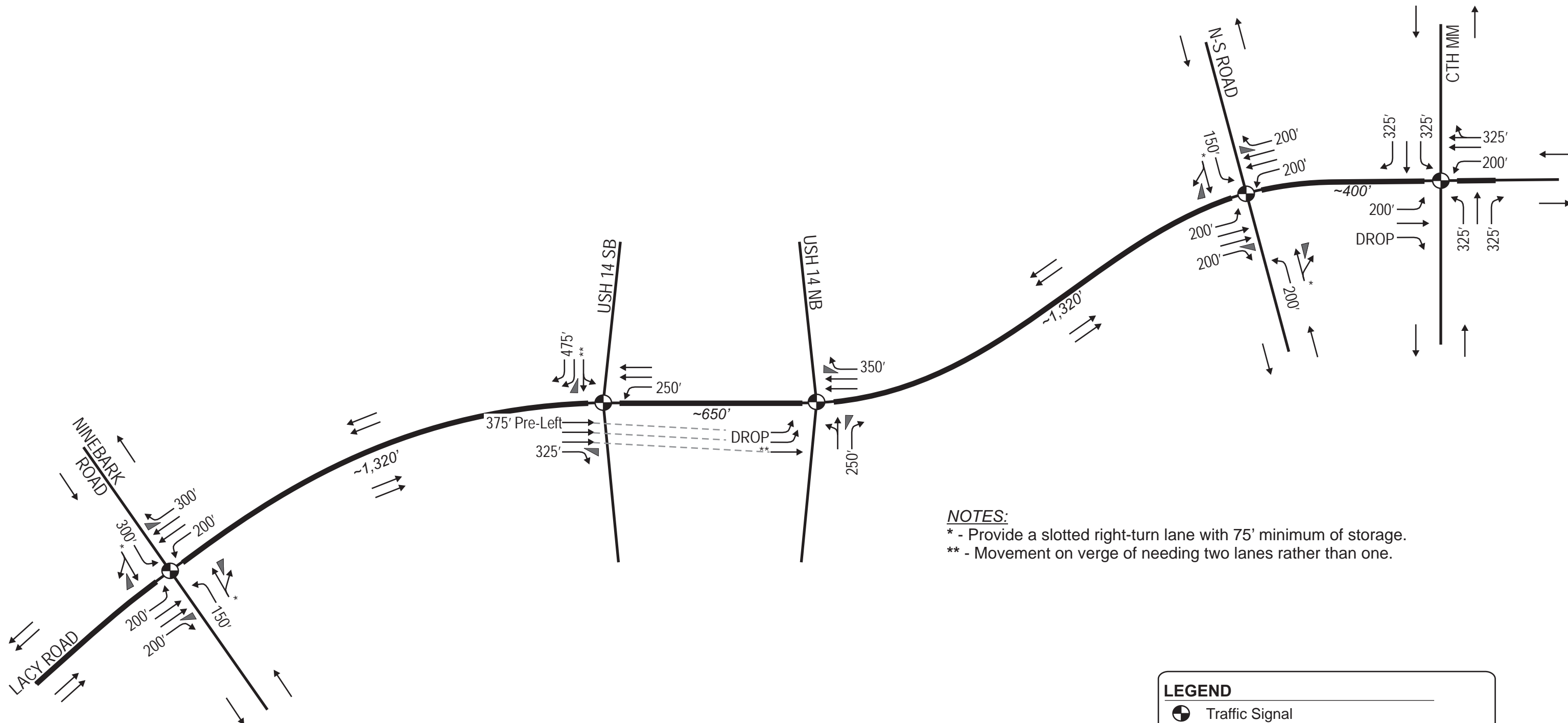
NOTES:
 * - Provide a slotted right-turn lane with 75' minimum of storage.
 ** - Movement on verge of needing two lanes rather than one.

LEGEND

- Traffic Signal
- Stop Sign
- XX' Recommended Turn Bay Storage (in Feet)
- Recommended Lane Configuration
- ~XX' Approximate Intersection Spacing



NOT TO SCALE



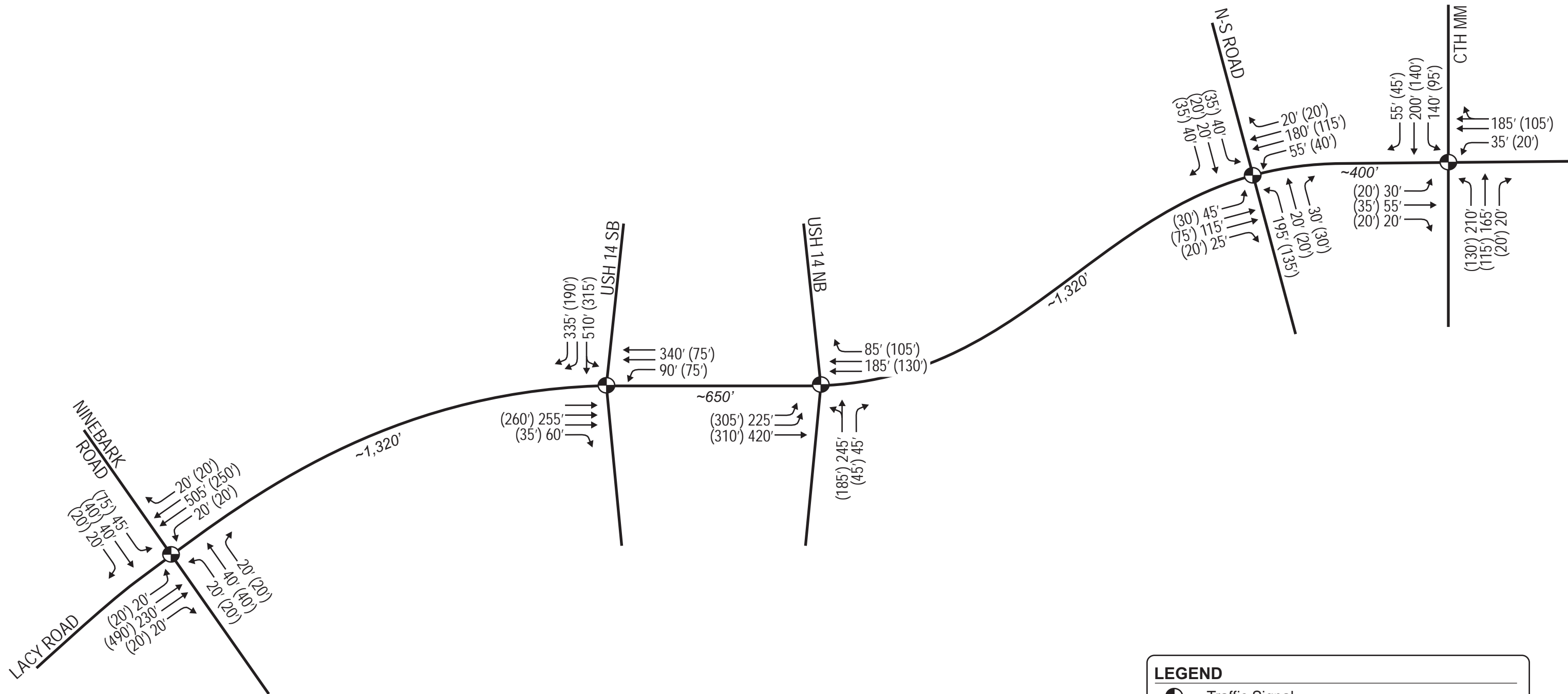
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- Stop Sign
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- Recommended Lane Configuration
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NOT TO SCALE

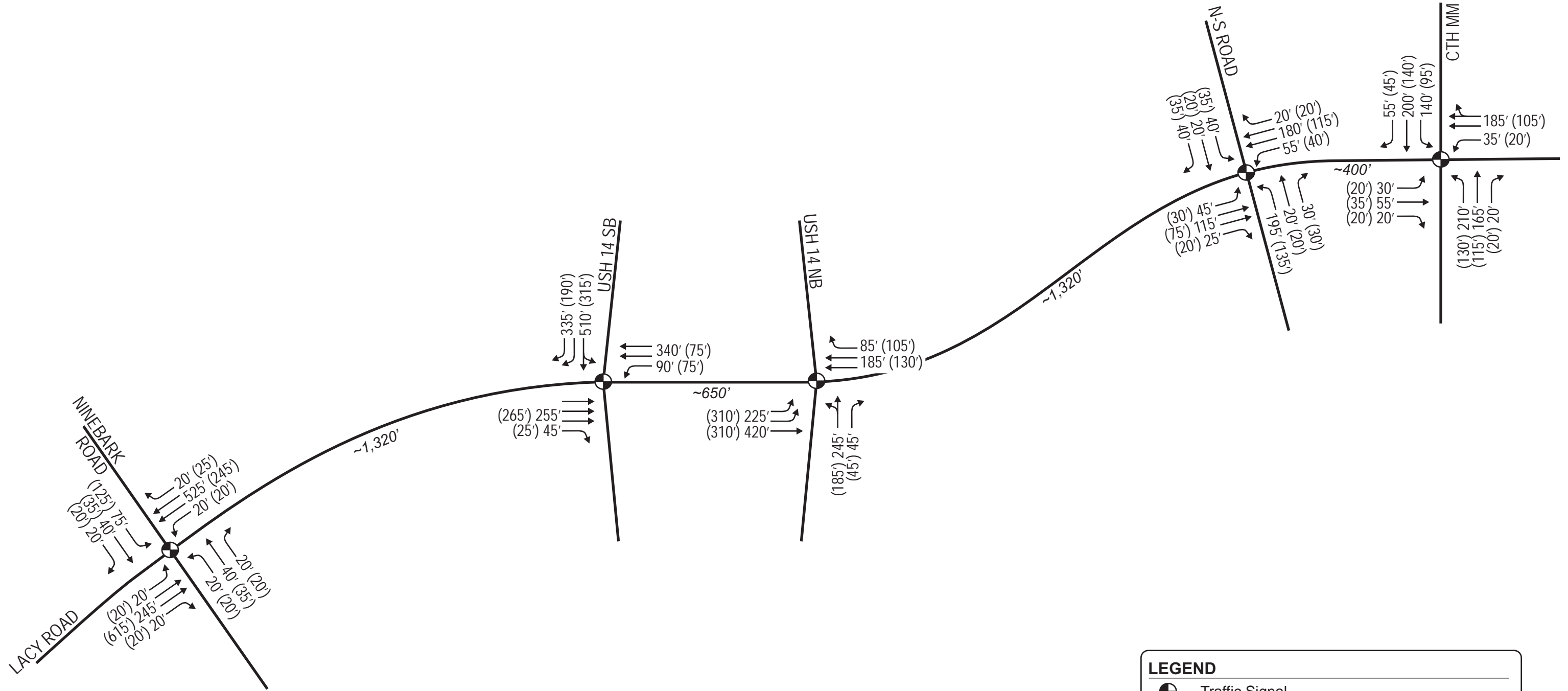


LEGEND

- Traffic Signal
- Recommended Lane Configuration
- XX' Morning Peak Hour Expected Maximum Queue
- (XX') Evening Peak Hour Expected Maximum Queue
- ~XX' Approximate Intersection Spacing



NOT TO SCALE

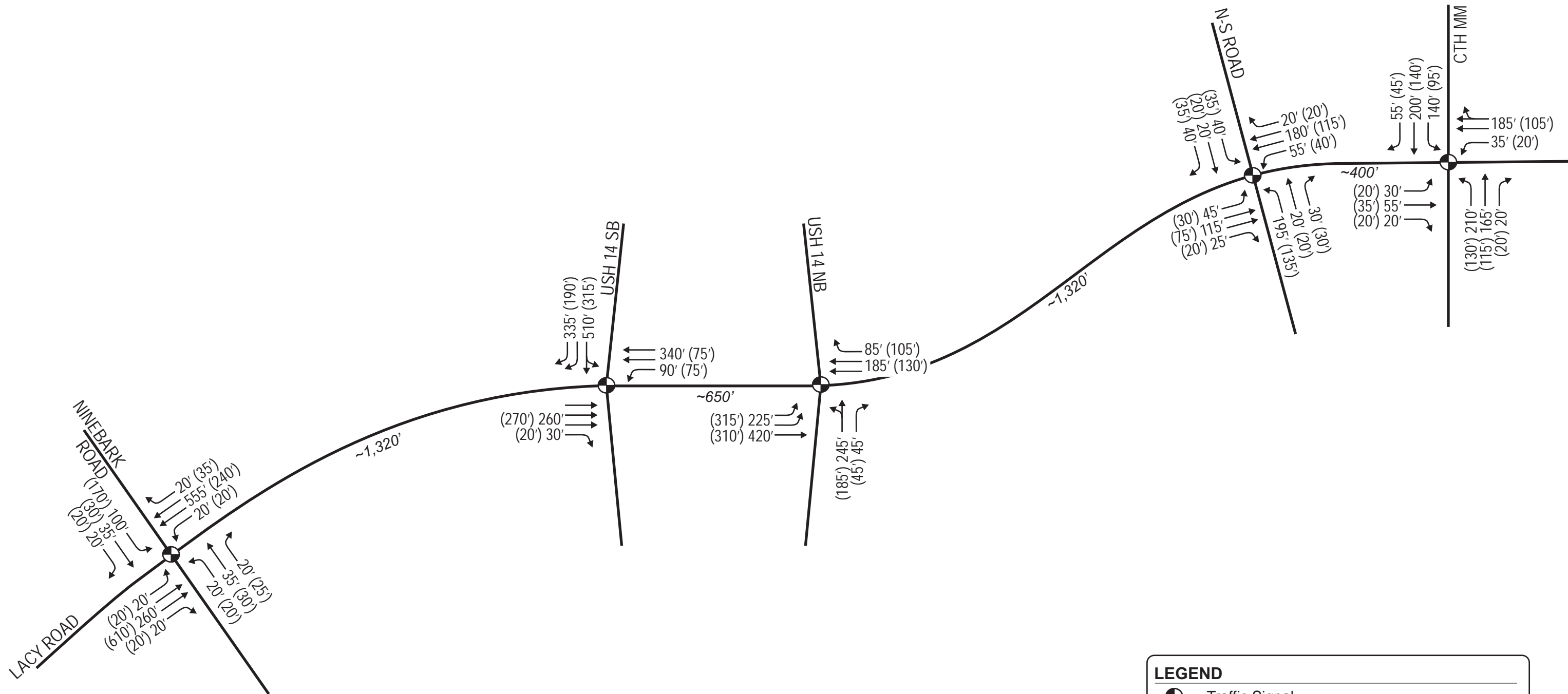


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- Traffic Signal
- Recommended Lane Configuration
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- ~XX' Approximate Intersection Spacing



NOT TO SCALE

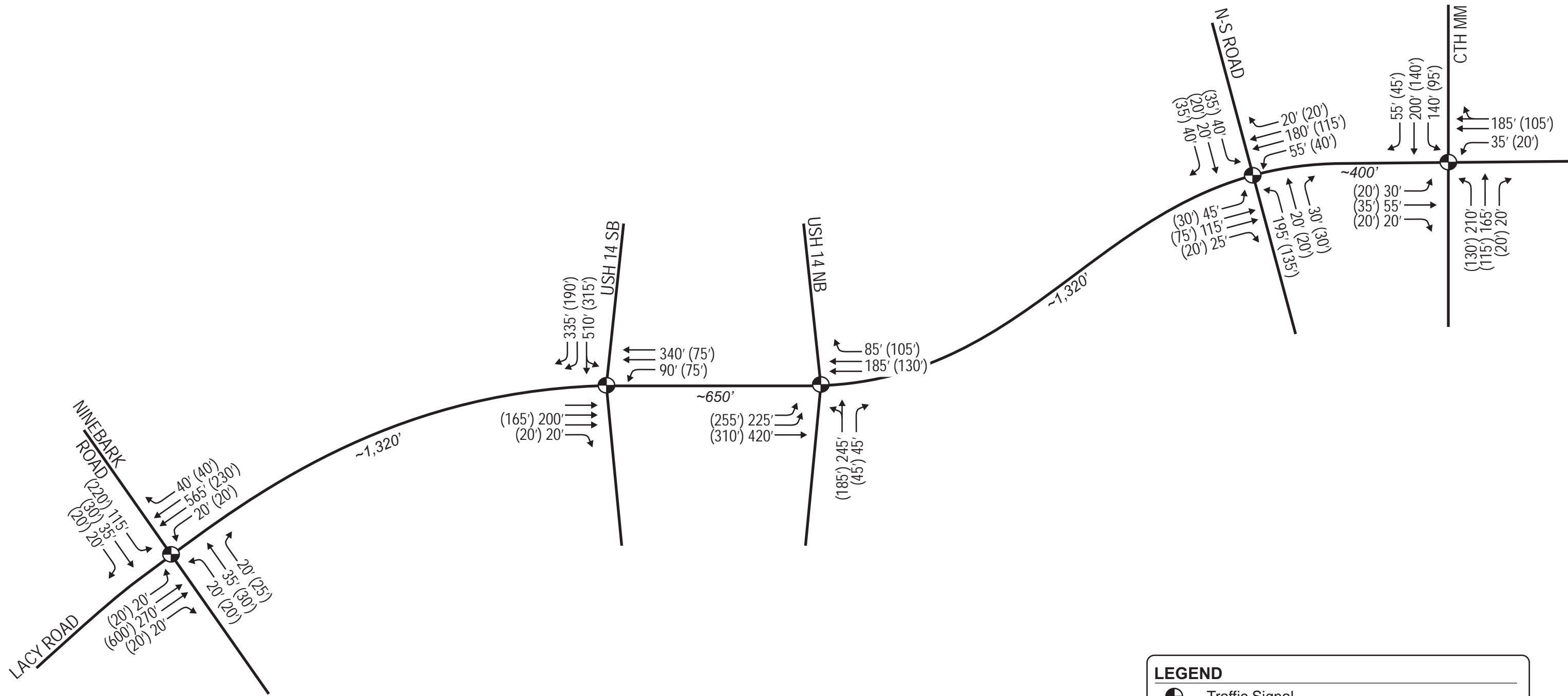


LEGEND

- Traffic Signal
- Recommended Lane Configuration
- XX' Morning Peak Hour Expected Maximum Queue
- (XX') Evening Peak Hour Expected Maximum Queue
- ~XX' Approximate Intersection Spacing



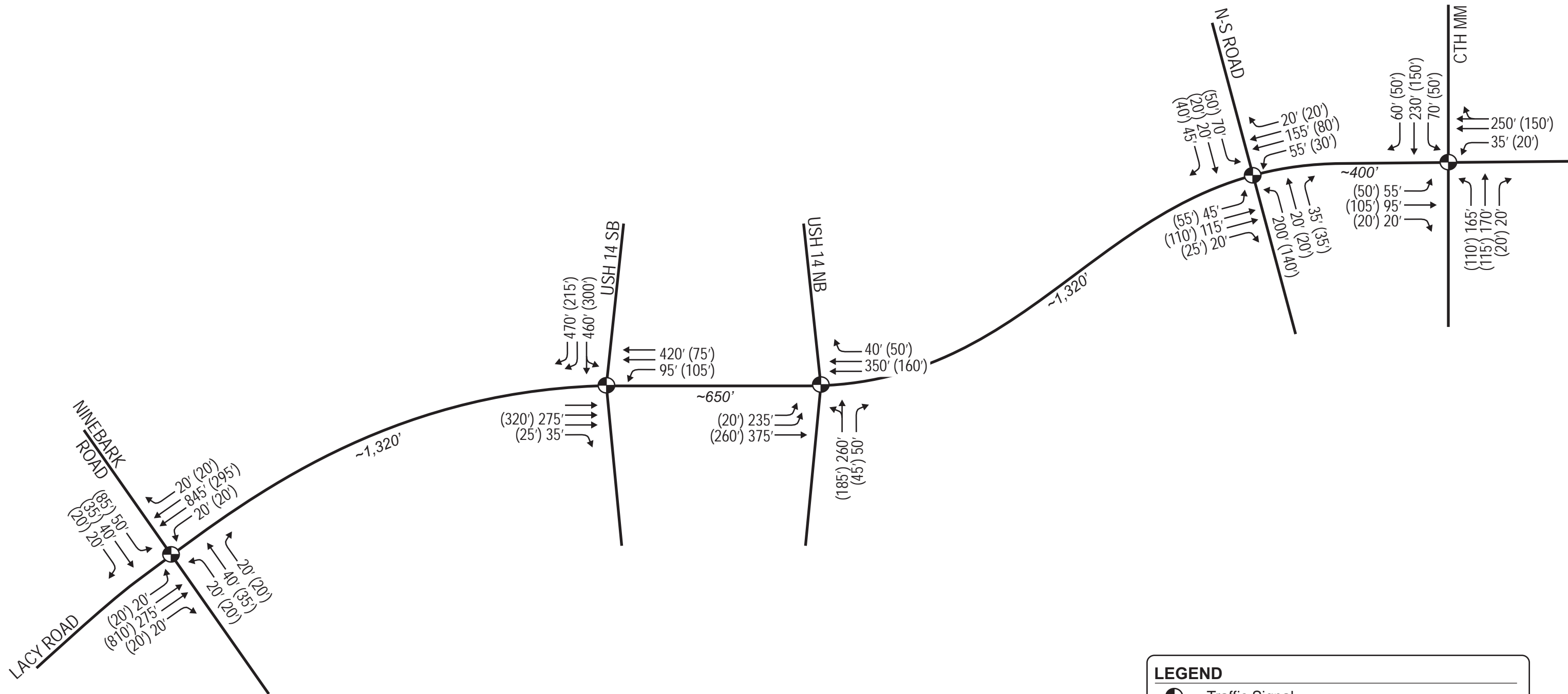
NOT TO SCALE



LEGEND

- ⊕ Traffic Signal
- Recommended Lane Configuration
- XX' Morning Peak Hour Expected Maximum Queue
- (XX') Evening Peak Hour Expected Maximum Queue
- ~XX' Approximate Intersection Spacing



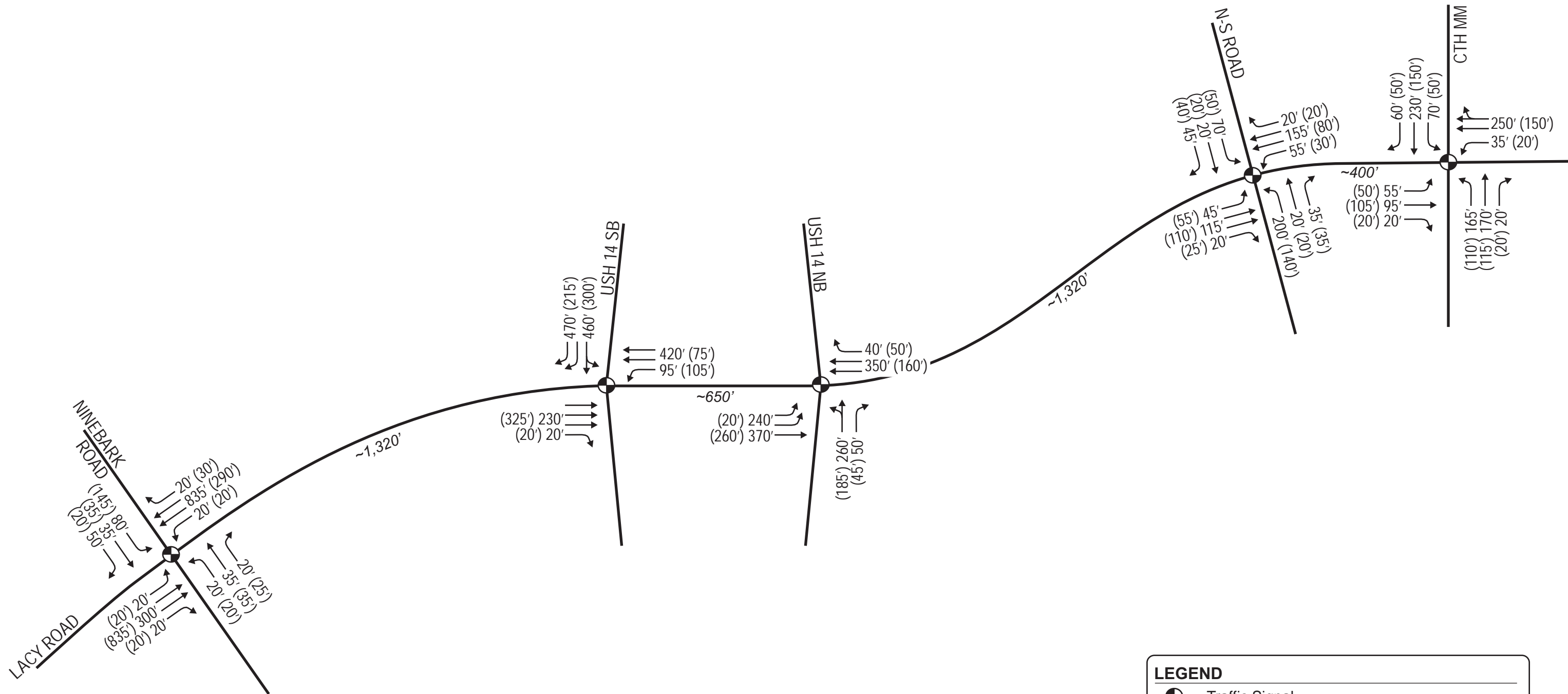


LEGEND

- Traffic Signal
- Recommended Lane Configuration
- XX' Morning Peak Hour Expected Maximum Queue
- (XX') Evening Peak Hour Expected Maximum Queue
- ~XX' Approximate Intersection Spacing



NOT TO SCALE

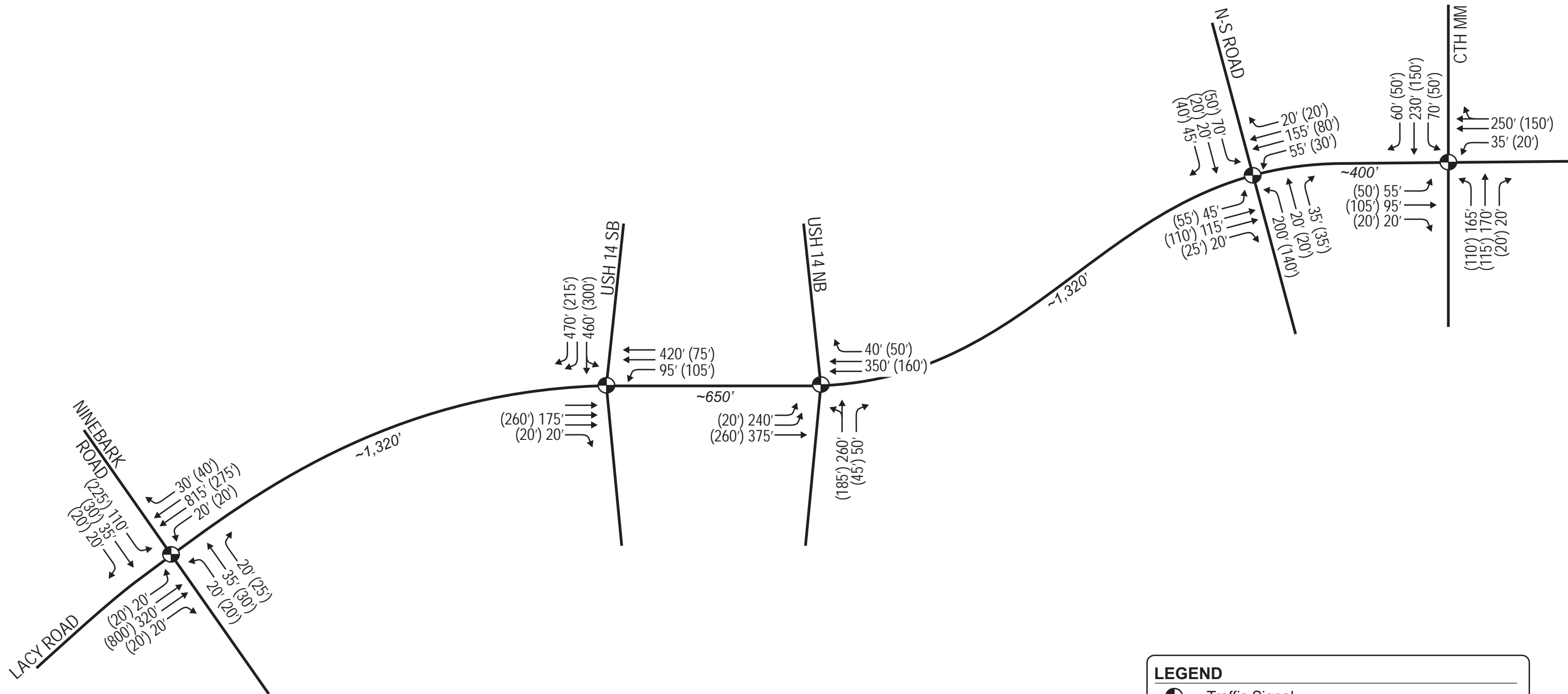


LEGEND

- Traffic Signal
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- (XX') Evening Peak Hour Expected Maximum Queue
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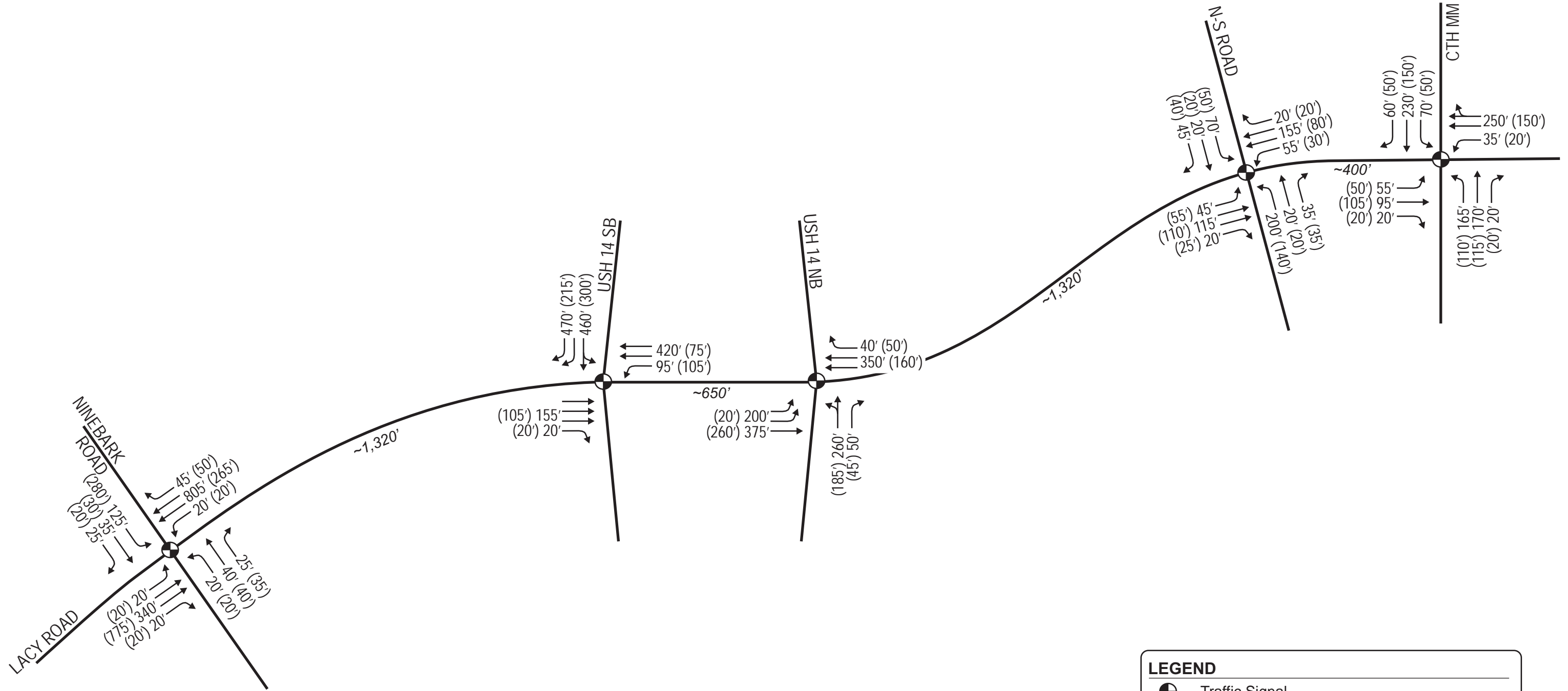


LEGEND

- Traffic Signal
- Recommended Lane Configuration
- XX' Morning Peak Hour Expected Maximum Queue
- (XX') Evening Peak Hour Expected Maximum Queue
- ~XX' Approximate Intersection Spacing



NOT TO SCALE



LEGEND

- Traffic Signal
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- (XX') Evening Peak Hour Expected Maximum Queue
- ~XX' Approximate Intersection Spacing



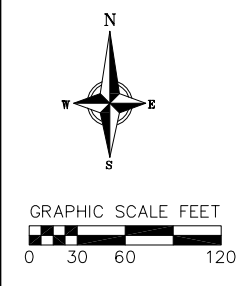
NOT TO SCALE

APPENDIX A

APPENDIX A

Lane Configurations at Initial Build

MARKING		MATERIAL	
ARW1	PAVEMENT MARKING ARROWS TYPE 1, WHITE	E	EPOXY - ALL PAVEMENT MARKINGS SHALL BE EPOXY UNLESS OTHERWISE STATED ON PLANS
ARW2	PAVEMENT MARKING ARROWS TYPE 2, WHITE		
ARW2R	PAVEMENT MARKING ARROWS TYPE 2R, WHITE		
ARW3	PAVEMENT MARKING ARROWS TYPE 3, WHITE		
ARW3R	PAVEMENT MARKING ARROWS TYPE 3R, WHITE		
ARW4	PAVEMENT MARKING ARROWS TYPE 4, WHITE		
ARW5	PAVEMENT MARKING ARROWS TYPE 5, WHITE		
ARW6	PAVEMENT MARKING ARROWS TYPE 6, WHITE		
ARW6R	PAVEMENT MARKING ARROWS TYPE 6R, WHITE		
ARW7	PAVEMENT MARKING ARROWS TYPE 7, WHITE		
ARW7R	PAVEMENT MARKING ARROWS TYPE 7R, WHITE		
WDW	PAVEMENT MARKING WORDS, WHITE		
CBY	PAVEMENT MARKING CURB, YELLOW		
INY	PAVEMENT MARKING ISLAND NOSE, YELLOW		
W4	PAVEMENT MARKING 4-INCH, WHITE		
Y4	PAVEMENT MARKING 4-INCH, YELLOW		
DY4	PAVEMENT MARKING 4-INCH, DOUBLE YELLOW		
W4-12.5	PAVEMENT MARKING 4-INCH, WHITE, 12.5' SEG., 37.5' GAP		
W4-1	PAVEMENT MARKING 4-INCH, WHITE, 1' SEG., 4' GAP		
W4-3	PAVEMENT MARKING 4-INCH, WHITE, 3' SEG., 9' GAP		
W4-6	PAVEMENT MARKING 4-INCH, WHITE, 6' SEG., 3' GAP		
W6	PAVEMENT MARKING 6-INCH, WHITE		
W8	PAVEMENT MARKING 8-INCH, WHITE		
W8-1	PAVEMENT MARKING 8-INCH, WHITE, 1' SEG., 4' GAP		
W8-3	PAVEMENT MARKING 8-INCH, WHITE, 3' SEG., 9' GAP		
W8-6	PAVEMENT MARKING 8-INCH, WHITE, 6' SEG., 6' GAP		
W18-1	PAVEMENT MARKING 18-INCH, WHITE, STOP BAR		
W18-2	PAVEMENT MARKING 18-INCH, WHITE, 2' SEG., 2' GAP		
DW12	PAVEMENT MARKING DIAGONAL, 12-INCH, WHITE		
DY12	PAVEMENT MARKING DIAGONAL, 12-INCH, YELLOW		
WCW6	PAVEMENT MARKING CROSSWALK, 6-INCH, WHITE		
WCW24	PAVEMENT MARKING CROSSWALK, 24-INCH, WHITE, 2' BAR, 2' GAP		

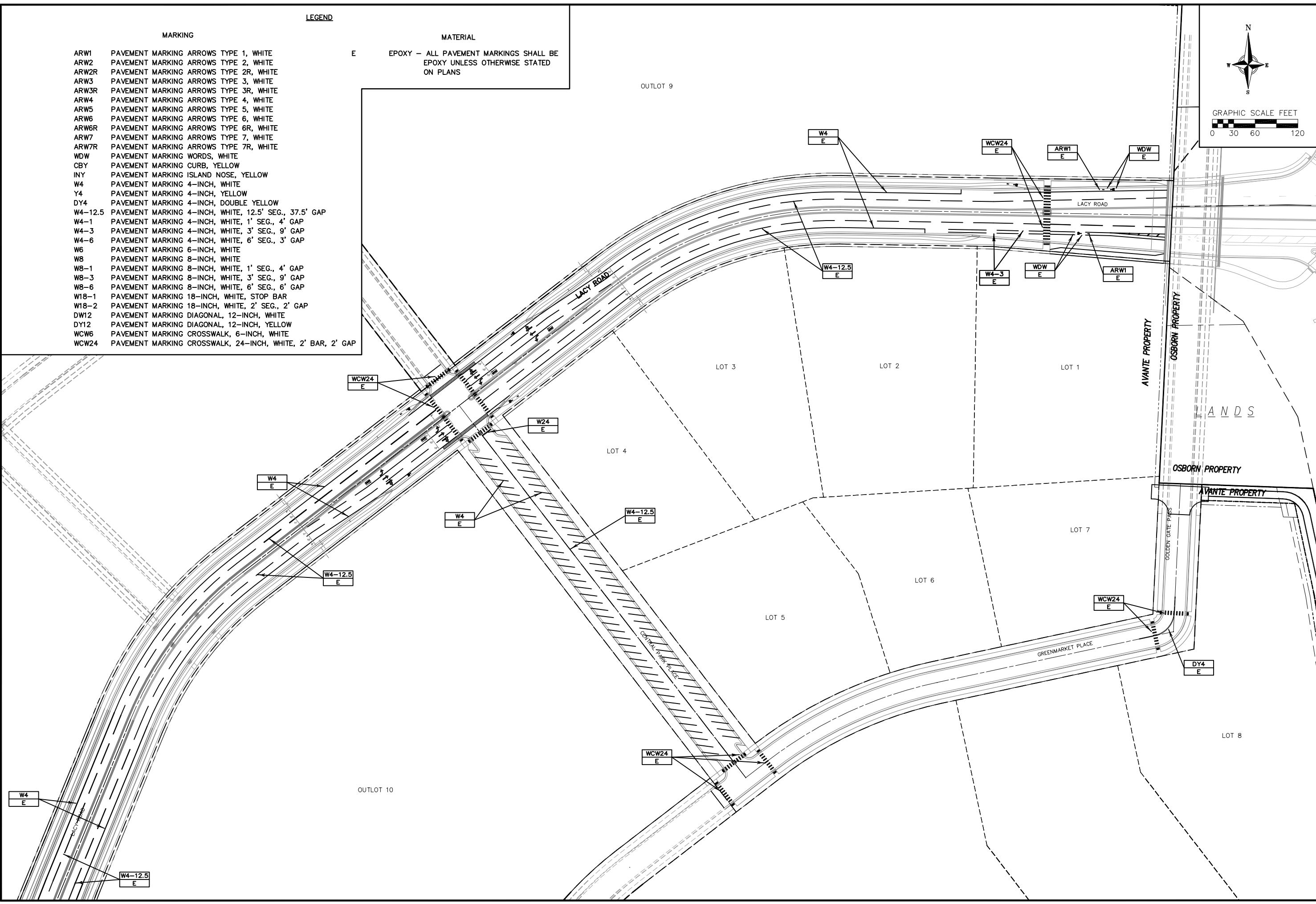


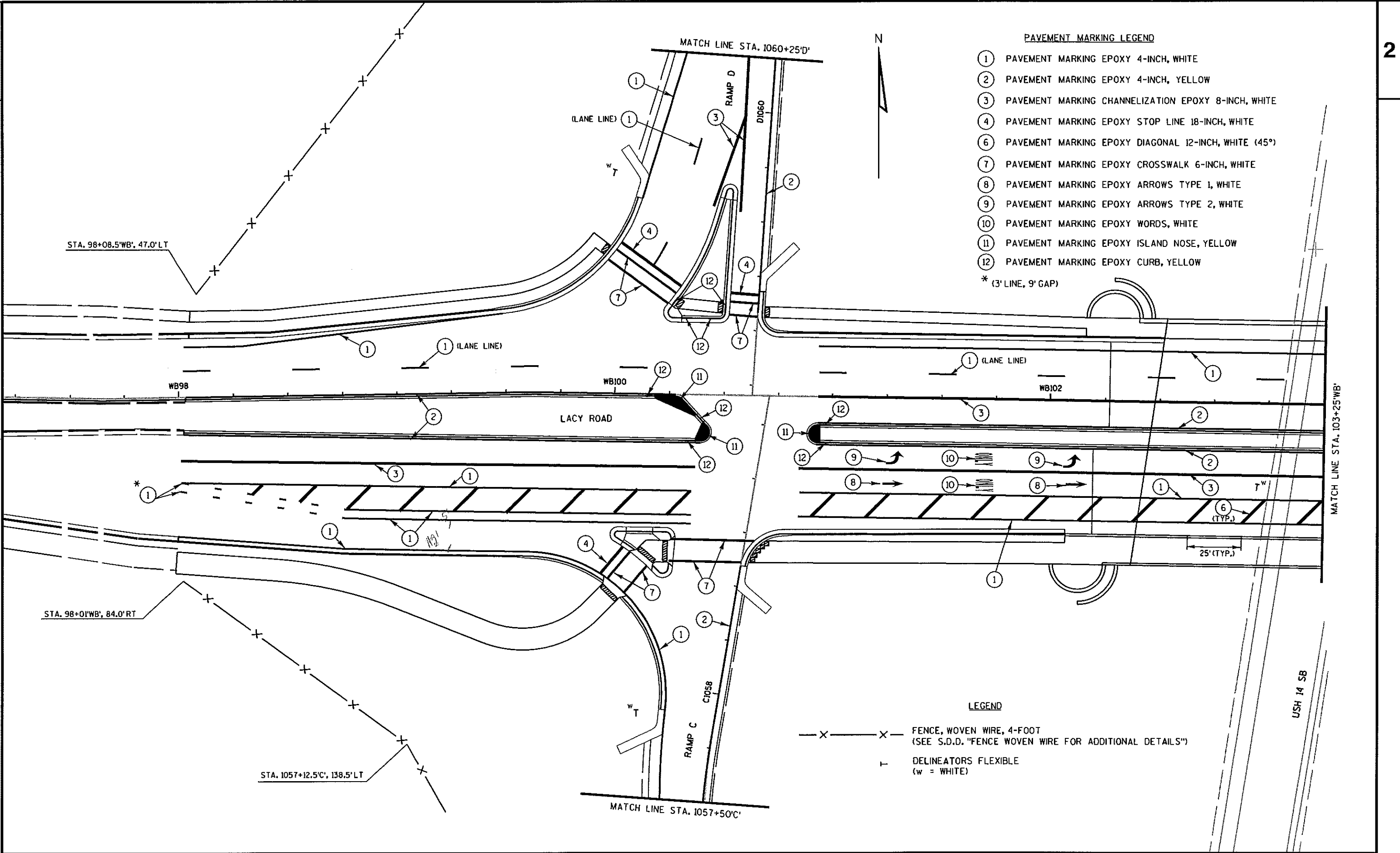
vierbicher
 planners | engineers | advisors
 REEDSBURG - MADISON - PRAIRIE DU CHIEN
 997 Foxglove Lane
 Phone: (608) 824-0332 Fax: (608) 824-5330

NINE SPRINGS DEVELOPMENT
 PAVEMENT MARKING PLAN - LACY RD
 CITY OF FITCHBURG
 DANE COUNTY, WISCONSIN

REVISIONS		REVISIONS	
NO.	DATE	NO.	DATE
1	3-14-12		

SCALE	AS SHOWN
DATE	3-14-12
DRAFTER	MMUC
CHECKED	JDOY
PROJECT NO.	33107427
SHEET	53 OF 94
DWG. NO.	





PAVEMENT MARKING LEGEND

- ① PAVEMENT MARKING EPOXY 4-INCH, WHITE
 - ② PAVEMENT MARKING EPOXY 4-INCH, YELLOW
 - ③ PAVEMENT MARKING CHANNELIZATION EPOXY 8-INCH, WHITE
 - ④ PAVEMENT MARKING EPOXY STOP LINE 18-INCH, WHITE
 - ⑥ PAVEMENT MARKING EPOXY DIAGONAL 12-INCH, WHITE (45°)
 - ⑦ PAVEMENT MARKING EPOXY CROSSWALK 6-INCH, WHITE
 - ⑧ PAVEMENT MARKING EPOXY ARROWS TYPE 1, WHITE
 - ⑨ PAVEMENT MARKING EPOXY ARROWS TYPE 2, WHITE
 - ⑩ PAVEMENT MARKING EPOXY WORDS, WHITE
 - ⑪ PAVEMENT MARKING EPOXY ISLAND NOSE, YELLOW
 - ⑫ PAVEMENT MARKING EPOXY CURB, YELLOW
- * (3' LINE, 9' GAP)

LEGEND

- X — X — FENCE, WOVEN WIRE, 4-FOOT (SEE S.D.D. "FENCE WOVEN WIRE FOR ADDITIONAL DETAILS")
- T — DELINEATORS FLEXIBLE (w = WHITE)

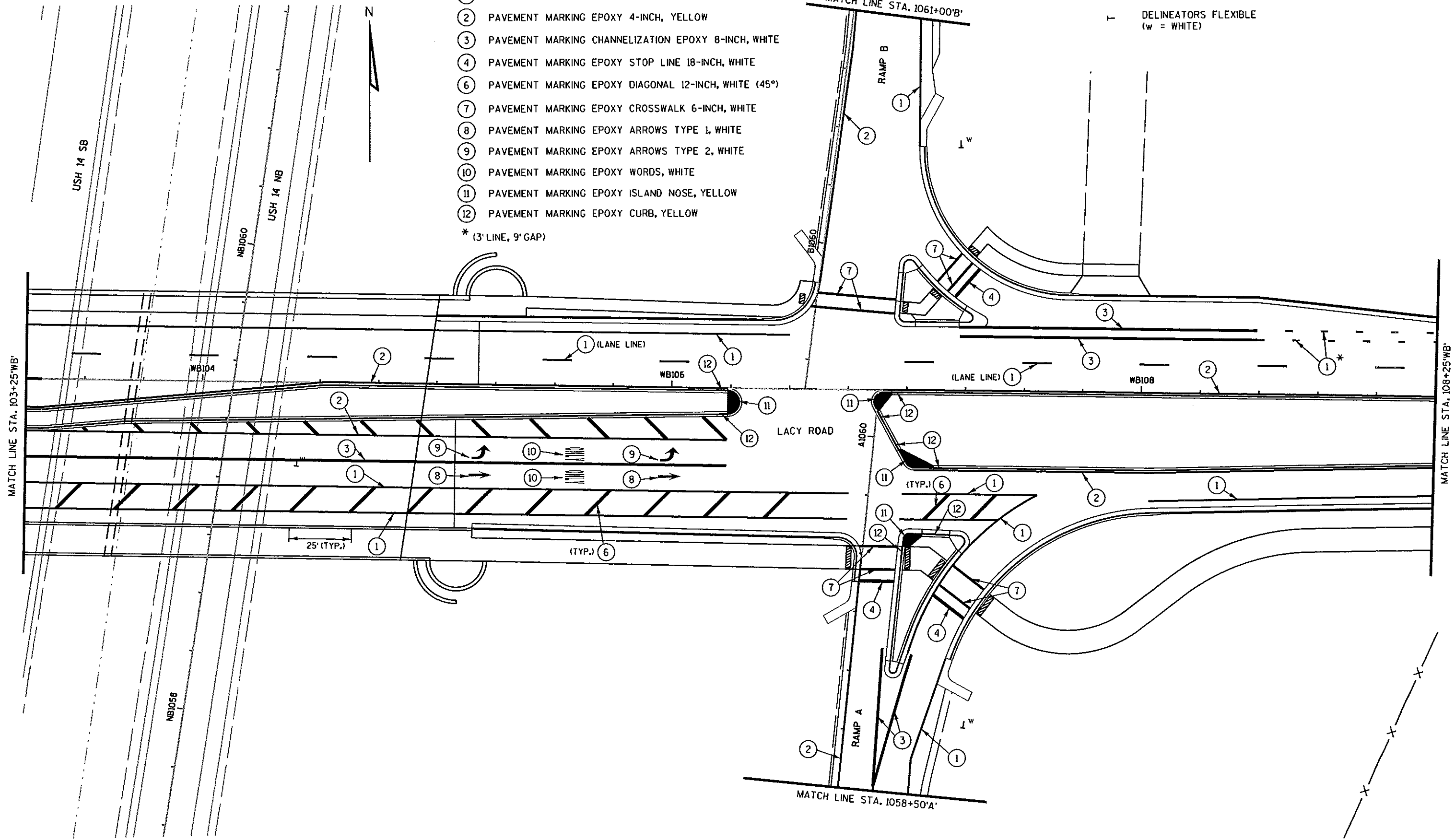
PAVEMENT MARKING LEGEND

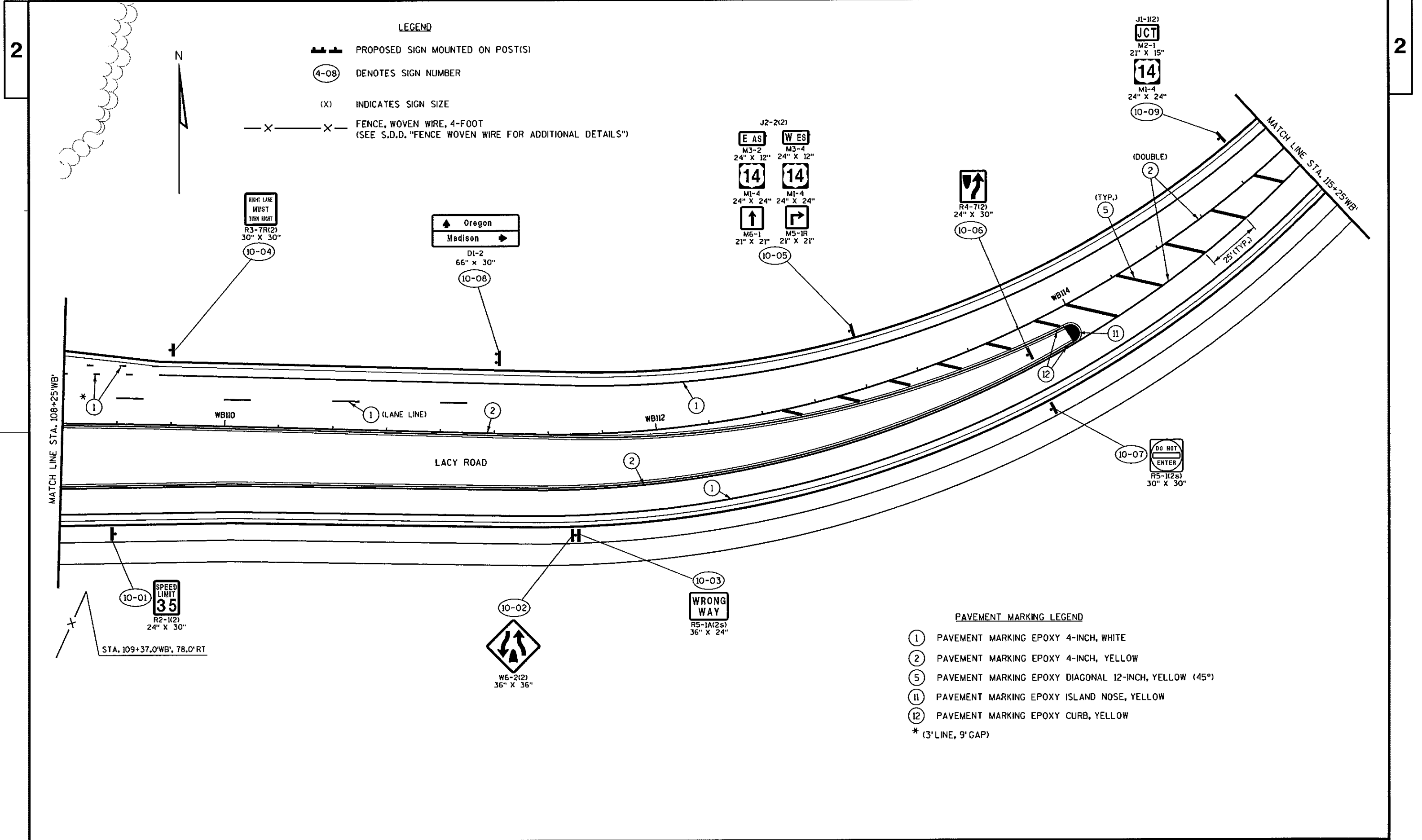
- ① PAVEMENT MARKING EPOXY 4-INCH, WHITE
- ② PAVEMENT MARKING EPOXY 4-INCH, YELLOW
- ③ PAVEMENT MARKING CHANNELIZATION EPOXY 8-INCH, WHITE
- ④ PAVEMENT MARKING EPOXY STOP LINE 18-INCH, WHITE
- ⑥ PAVEMENT MARKING EPOXY DIAGONAL 12-INCH, WHITE (45°)
- ⑦ PAVEMENT MARKING EPOXY CROSSWALK 6-INCH, WHITE
- ⑧ PAVEMENT MARKING EPOXY ARROWS TYPE 1, WHITE
- ⑨ PAVEMENT MARKING EPOXY ARROWS TYPE 2, WHITE
- ⑩ PAVEMENT MARKING EPOXY WORDS, WHITE
- ⑪ PAVEMENT MARKING EPOXY ISLAND NOSE, YELLOW
- ⑫ PAVEMENT MARKING EPOXY CURB, YELLOW

* (3' LINE, 9' GAP)

LEGEND

- X — X — FENCE, WOVEN WIRE, 4-FOOT (SEE S.D.D. "FENCE WOVEN WIRE FOR ADDITIONAL DETAILS")
- T - DELINEATORS FLEXIBLE (w = WHITE)





LEGEND

- PROPOSED SIGN MOUNTED ON POST(S)
- DENOTES SIGN NUMBER
- INDICATES SIGN SIZE
- FENCE, WOVEN WIRE, 4-FOOT
(SEE S.D.D. "FENCE WOVEN WIRE FOR ADDITIONAL DETAILS")

J2-2(2)

E AS M3-2 24" X 12"	W ES M3-4 24" X 12"
14 M1-4 24" X 24"	14 M1-4 24" X 24"
↑ M5-1 21" X 21"	→ M5-1R 21" X 21"

J1-K2)

JCT
M2-1
21" X 15"

14
M1-4
24" X 24"

10-09

R4-7(2)
24" X 30"

10-06

DO NOT ENTER
R5-1(2s)
30" X 30"

10-07

PAVEMENT MARKING LEGEND

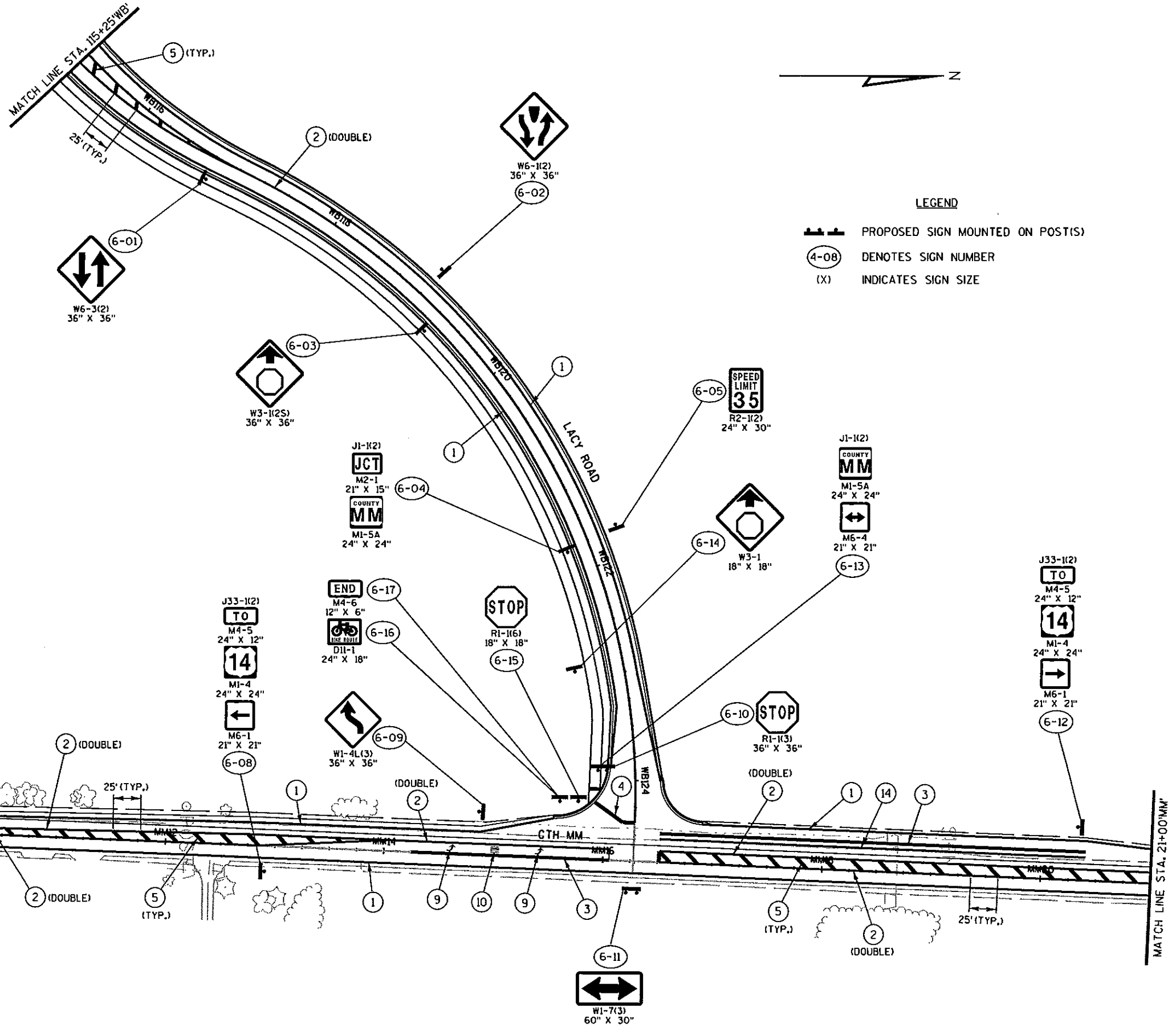
- ① PAVEMENT MARKING EPOXY 4-INCH, WHITE
 - ② PAVEMENT MARKING EPOXY 4-INCH, YELLOW
 - ⑤ PAVEMENT MARKING EPOXY DIAGONAL 12-INCH, YELLOW (45°)
 - ⑪ PAVEMENT MARKING EPOXY ISLAND NOSE, YELLOW
 - ⑫ PAVEMENT MARKING EPOXY CURB, YELLOW
- * (3' LINE, 9' GAP)

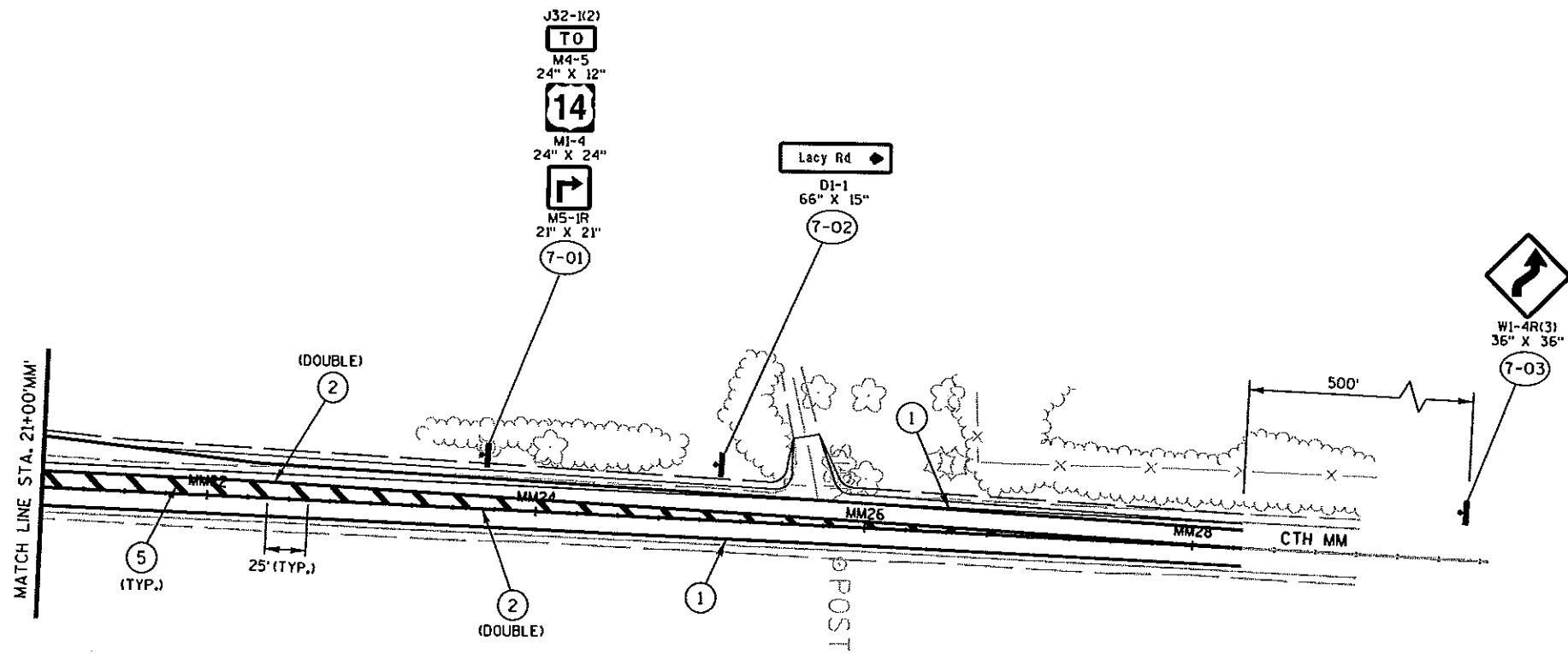
PAVEMENT MARKING LEGEND

- ① PAVEMENT MARKING EPOXY 4-INCH, WHITE
- ② PAVEMENT MARKING EPOXY 4-INCH, YELLOW
- ③ PAVEMENT MARKING CHANNELIZATION EPOXY 8-INCH, WHITE
- ④ PAVEMENT MARKING EPOXY STOP LINE 18-INCH, WHITE
- ⑤ PAVEMENT MARKING EPOXY DIAGONAL 12-INCH, YELLOW (45°)
- ⑨ PAVEMENT MARKING EPOXY ARROWS TYPE 2, WHITE
- ⑩ PAVEMENT MARKING EPOXY WORDS, WHITE
- ⑭ PAVEMENT MARKING EPOXY 6-INCH, WHITE

LEGEND

- PROPOSED SIGN MOUNTED ON POST(S)
- DENOTES SIGN NUMBER
- INDICATES SIGN SIZE





LEGEND

- PROPOSED SIGN MOUNTED ON POST(S)
- DENOTES SIGN NUMBER
- INDICATES SIGN SIZE

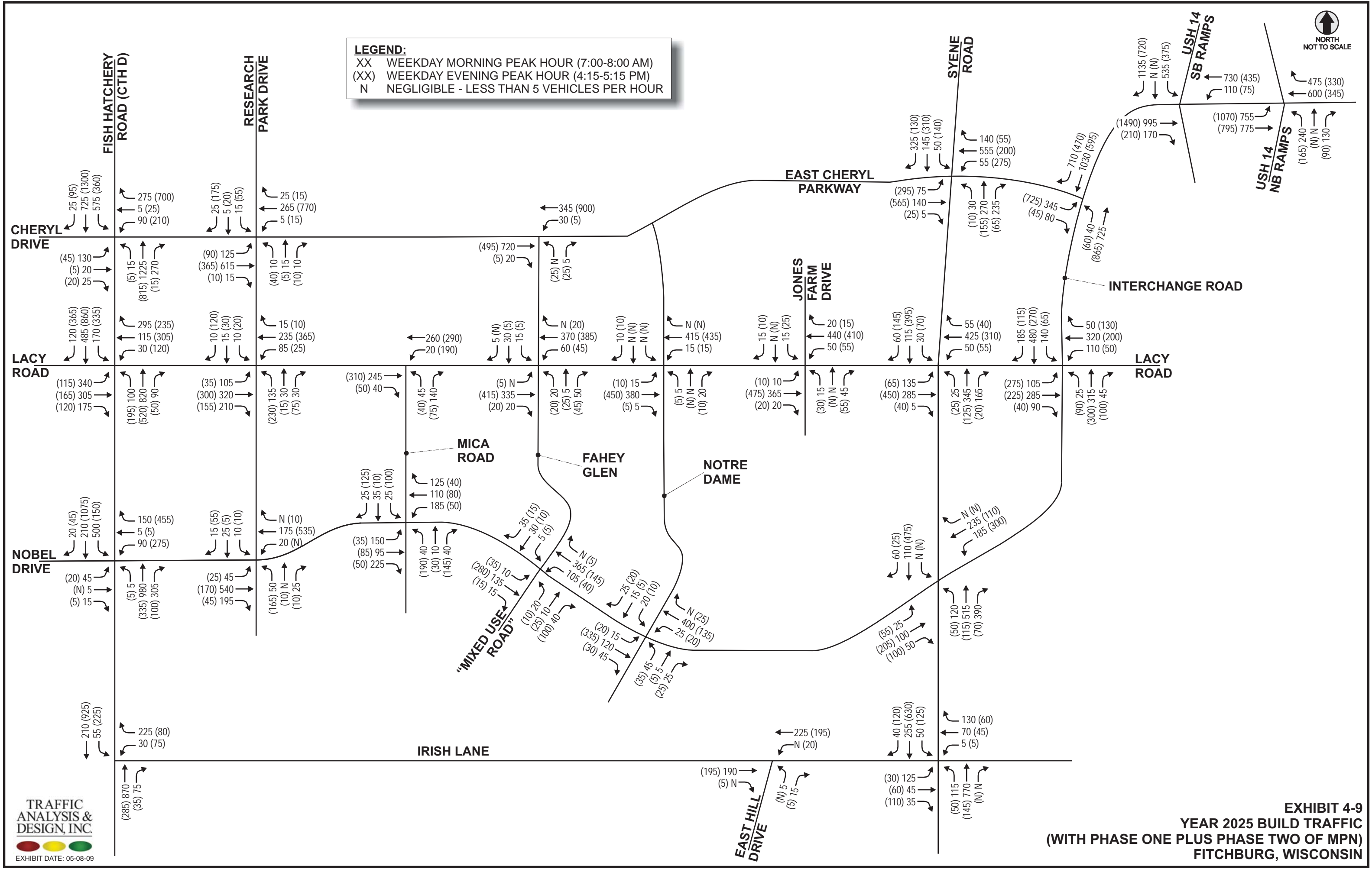
PAVEMENT MARKING LEGEND

- ① PAVEMENT MARKING EPOXY 4-INCH, WHITE
- ② PAVEMENT MARKING EPOXY 4-INCH, YELLOW
- ⑤ PAVEMENT MARKING EPOXY DIAGONAL 12-INCH YELLOW (45°)

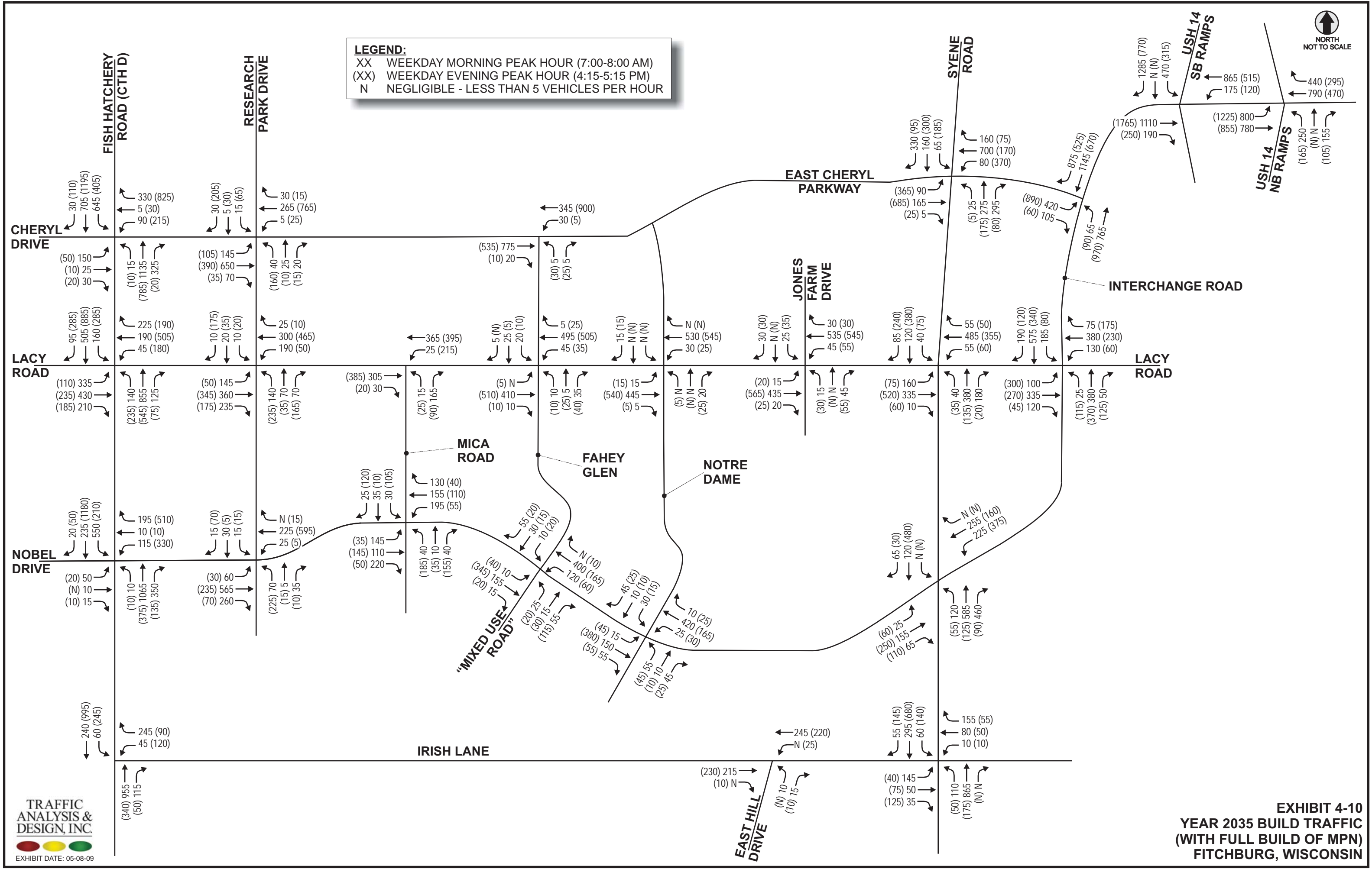
APPENDIX A

Volumes from McGaw Park Neighborhood TIA

LEGEND:
 XX WEEKDAY MORNING PEAK HOUR (7:00-8:00 AM)
 (XX) WEEKDAY EVENING PEAK HOUR (4:15-5:15 PM)
 N NEGLIGIBLE - LESS THAN 5 VEHICLES PER HOUR



LEGEND:
 XX WEEKDAY MORNING PEAK HOUR (7:00-8:00 AM)
 (XX) WEEKDAY EVENING PEAK HOUR (4:15-5:15 PM)
 N NEGLIGIBLE - LESS THAN 5 VEHICLES PER HOUR



APPENDIX A

Recently-Provided Madison Area MPO Daily Traffic Forecasts

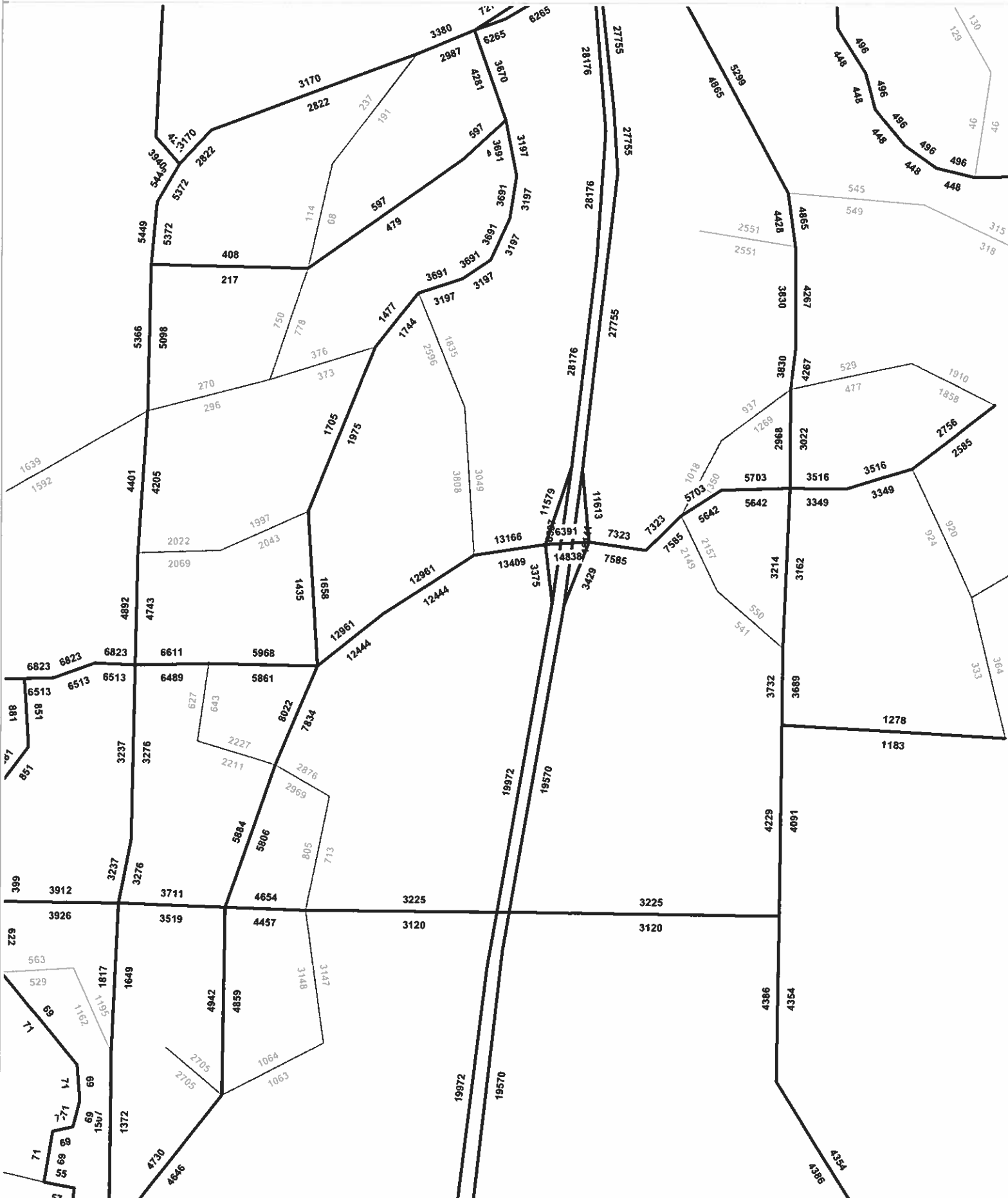
**Madison MPO Model
Raw Model Assignments
Daily Turn Volumes**

	Lacy & N-S Road		Lacy & CTH MM	
	Alt B	Alt D	Alt B	Alt D
NBL	1,279	1,402	1,608	1,429
NBT	72	99	1,355	1,428
NBR	413	657	207	305
SBL	11	3	751	344
SBT	72	99	1,243	1,398
SBR	731	916	1,076	1,226
EBL	1,014	1,249	1,042	1,271
EBT	4,255	4,982	1,943	2,700
EBR	1,187	1,354	1,693	1,670
WBL	500	696	145	145
WBT	4,173	5,006	1,992	3,048
WBR	3	2	746	322

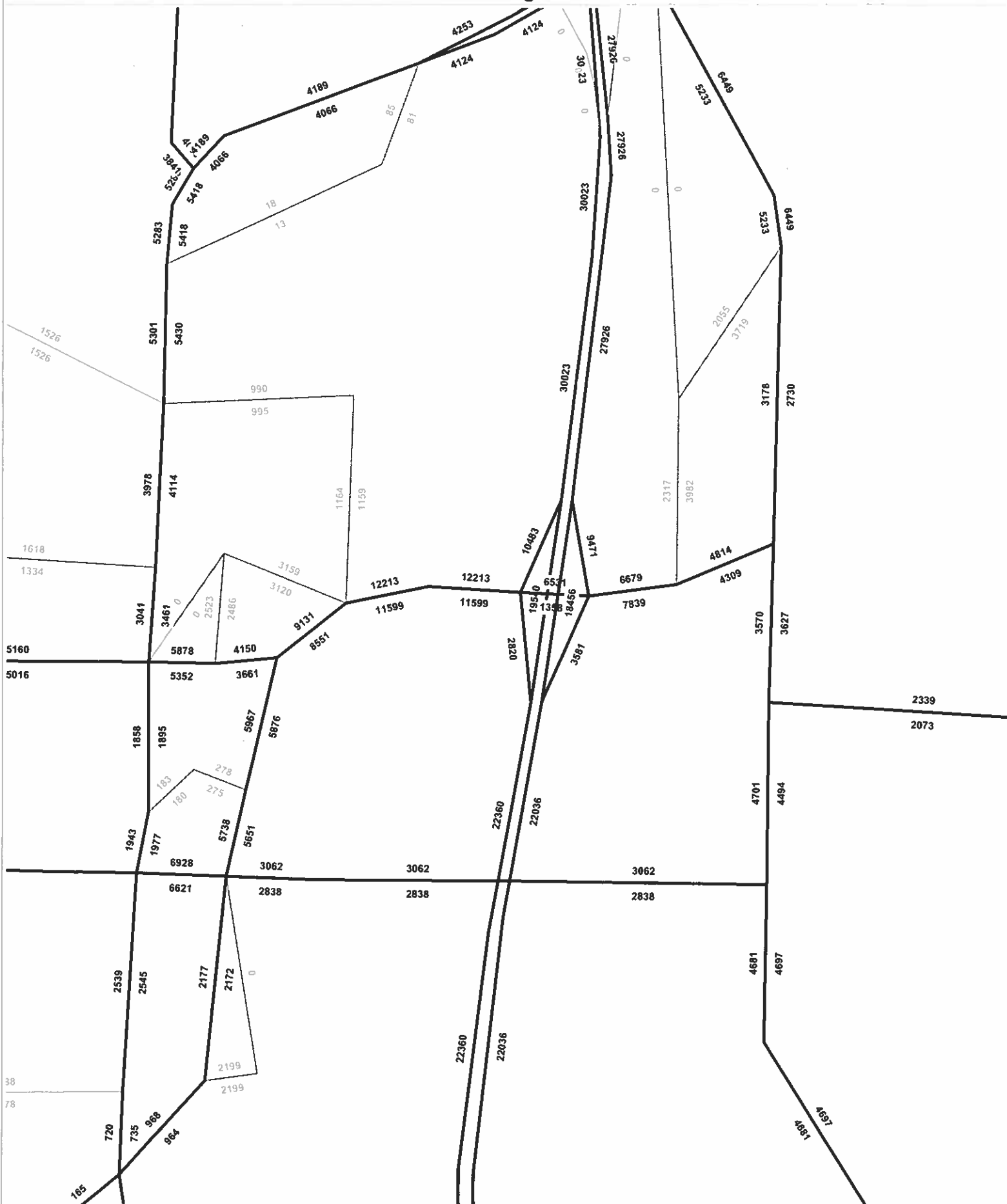
Madison MPO Travel Demand Model Alternative B Model Assignments



Madison MPO Travel Demand Model Alternative D Model Assignments



**Madison MPO Travel Demand Model
Planned Scenario
Model Assignments**



APPENDIX B

2025 BUILD TRAFFIC PEAK HOUR ANALYSIS OUTPUTS

APPENDIX B

Year 2025 Build Traffic – 10% Shift Peak Hour Analysis Outputs

**Year 2025 Build Traffic - 10% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	A	A	A	A	A	A	D	D	D	D	D	D
		PM	A	A	A	A	A	A	D	D	D	D	D	D
USH 14 Southbound Ramps	Traffic Signal	AM	-	C	C	C	B	-	-	-	-	D	D	C
		PM	-	B	B	D	A	-	-	-	-	D	D	C
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	C	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	B	B	B	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	D	C	B	D	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	5	1130	1	10	1795	60	5	25	5	30	25	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		815			1320			437			462	
Travel Time (s)		18.5			30.0			9.9			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
Adj. Flow (vph)	5	1228	1	11	1951	65	5	27	5	33	27	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1228	1	11	1951	65	5	27	5	33	27	5
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.02	0.43	0.00	0.03	0.68	0.05	0.03	0.13	0.03	0.22	0.13	0.03
Control Delay	2.4	4.7	4.0	1.7	6.3	1.2	36.4	37.9	22.8	40.6	37.9	22.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	4.7	4.0	1.7	6.3	1.2	36.4	37.9	22.8	40.6	37.9	22.8
90th %ile Green (s)	6.0	58.5	58.5	6.0	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Min	Min	Min	Min	Min	Min
70th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
70th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
50th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	112	0	1	314	0	3	14	0	17	14	0
Queue Length 95th (ft)	2	230	2	m1	504	m4	13	39	10	46	39	10
Internal Link Dist (ft)		735			1240			357			382	

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TADI

Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	222	2861	1280	412	2861	1288	327	442	380	327	442	380
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.43	0.00	0.03	0.68	0.05	0.02	0.06	0.01	0.10	0.06	0.01
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	12 (13%), Referenced to phase 2:WBL and 6:EBTL, Start of 1st Green											
Natural Cycle:	80											
Control Type:	Actuated-Coordinated											
m Volume for 95th percentile queue is metered by upstream signal.												
Splits and Phases: 175: New Lacy Road & Ninebark Road												
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
10 s	52 s						28 s					
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
10 s	52 s						28 s					

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	1130	1	10	1795	60	5	25	5	30	25	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.07	1.00	1.00	0.21	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	127	3438	1538	372	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1228	1	11	1951	65	5	27	5	33	27	5
RTOR Reduction (vph)	0	0	0	0	0	12	0	0	5	0	0	5
Lane Group Flow (vph)	5	1228	1	11	1951	53	5	27	0	33	27	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4	4	4
Actuated Green, G (s)	68.5	67.3	67.3	68.5	67.3	67.3	6.0	6.0	6.0	6.0	6.0	6.0
Effective Green, g (s)	68.5	67.3	67.3	68.5	67.3	67.3	6.0	6.0	6.0	6.0	6.0	6.0
Actuated g/C Ratio	0.76	0.75	0.75	0.76	0.75	0.75	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	118	2571	1150	301	2571	1150	89	121	103	89	121	103
v/s Ratio Prot	c0.00	0.36		0.00	c0.57			0.01			0.01	
v/s Ratio Perm	0.03		0.00	0.03		0.03	0.00		0.00	c0.02		0.00
v/c Ratio	0.04	0.48	0.00	0.04	0.76	0.05	0.06	0.22	0.00	0.37	0.22	0.00
Uniform Delay, d1	5.9	4.5	2.9	2.8	6.6	3.0	39.3	39.8	39.2	40.2	39.8	39.2
Progression Factor	1.00	1.00	1.00	0.75	0.78	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.6	0.0	0.0	1.4	0.1	0.1	0.3	0.0	1.0	0.3	0.0
Delay (s)	6.0	5.1	2.9	2.2	6.6	1.7	39.4	40.1	39.2	41.1	40.1	39.2
Level of Service	A	A	A	A	A	A	D	D	D	D	D	D
Approach Delay (s)		5.1			6.5			39.9			40.6	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1082	185	120	793	0	0	0	0	583	1234	
Turn Type			Perm	pm+pt						Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2							4	4
Detector Phase		6	6	5	2						4	4
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	35.0	35.0	15.0	30.0	0.0	0.0	0.0	0.0	40.0	40.0	20.0
Total Split (%)	0.0%	38.9%	38.9%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	44.4%	44.4%	22.2%
Maximum Green (s)		29.0	29.0	11.5	24.0					34.0	34.0	15.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio	0.60	0.26	0.44	0.69						0.94	0.82	
Control Delay	21.3	4.8	28.0	17.6						52.7	21.0	
Queue Delay	0.0	0.0	0.0	0.0						0.0	0.0	
Total Delay	21.3	4.8	28.0	17.6						52.7	21.0	
90th %ile Green (s)	30.0	30.0	10.5	24.0						34.0	34.0	15.5
90th %ile Term Code	Coord	Coord	Gap	Coord						Max	Max	Max
70th %ile Green (s)	31.7	31.7	8.8	24.2						34.0	34.0	15.3
70th %ile Term Code	Coord	Coord	Gap	Coord						Max	Max	Gap
50th %ile Green (s)	32.8	32.8	7.7	30.4						34.0	34.0	9.1
50th %ile Term Code	Coord	Coord	Gap	Coord						Max	Max	Gap
30th %ile Green (s)	35.1	35.1	6.6	32.2						32.8	32.8	8.5
30th %ile Term Code	Coord	Coord	Gap	Coord						Gap	Gap	Gap
10th %ile Green (s)	41.2	41.2	6.0	39.4						27.3	27.3	6.8
10th %ile Term Code	Coord	Coord	Min	Coord						Gap	Gap	Gap
Queue Length 50th (ft)		193	17	28	201						306	303
Queue Length 95th (ft)		254	58	m90	#341						#509	336
Internal Link Dist (ft)		1240			570			622			1008	

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

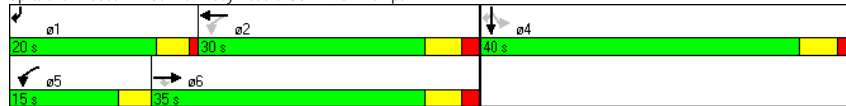


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1793	699	342	1147						651	1635
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		27	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.26	0.35	0.69						0.90	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 49 (54%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↑↑
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		*0.87	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4723	1538	1719	3438						1723	2707
Flt Permitted		1.00	1.00	0.19	1.00						0.95	1.00
Satd. Flow (perm)		4723	1538	338	3438						1723	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
RTOR Reduction (vph)	0	0	115	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	0	1082	70	120	793	0	0	0	0	0	583	1217
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		34.2	34.2	38.0	30.1						32.4	43.4
Effective Green, g (s)		34.2	34.2	38.0	30.1						32.4	43.4
Actuated g/C Ratio		0.38	0.38	0.42	0.33						0.36	0.48
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1795	584	264	1150						620	1305
v/s Ratio Prot		c0.23		0.04	c0.23							c0.11
v/s Ratio Perm			0.05	0.15							0.34	0.34
v/c Ratio		0.60	0.12	0.45	0.69						0.94	0.93
Uniform Delay, d1		22.4	18.1	16.5	25.9						27.9	21.9
Progression Factor		0.85	1.12	1.95	0.50						1.00	1.00
Incremental Delay, d2		1.4	0.4	0.4	2.7						22.3	12.0
Delay (s)		20.4	20.8	32.6	15.7						50.2	33.9
Level of Service		C	C	C	B						D	C
Approach Delay (s)		20.5			17.9			0.0			39.1	
Approach LOS		C			B			A			D	

Intersection Summary

HCM Average Control Delay: 28.4 HCM Level of Service: C
 HCM Volume to Capacity ratio: 0.90
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 22.5
 Intersection Capacity Utilization: 102.1% ICU Level of Service: G
 Analysis Period (min): 15
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 c Critical Lane Group

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	821	842	0	0	652	516	261	1	141	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	821	842	0	0	652	516	0	262	141	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.87	0.68			0.57	0.63	0.82	0.35				
Control Delay	16.2	16.8			21.3	7.2	56.0	8.1				
Queue Delay	0.0	0.5			0.0	0.0	0.0	0.0				
Total Delay	16.2	17.3			21.3	7.2	56.0	8.1				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	26.4	59.8			27.4	27.4	18.2	18.2	18.2			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	24.1	62.5			32.4	32.4	15.5	15.5	15.5			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	20.5	66.4			39.9	39.9	11.6	11.6	11.6			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	223	366			154	85	141	0				
Queue Length 95th (ft)	0	m422			183	34	#245	47				
Internal Link Dist (ft)		570			1240		666					712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1234			1144	816			364			436
Starvation Cap Reductn	0	111			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	0.79	0.75			0.57	0.63			0.72			0.32

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Natural Cycle: 60

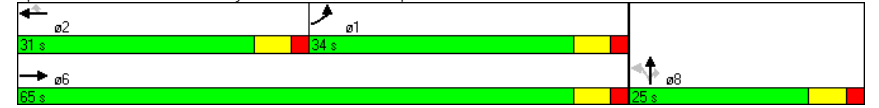
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↕		↕	↕			
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	821	842	0	0	652	516	261	1	141	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	305	0	0	115	0	0	0
Lane Group Flow (vph)	821	842	0	0	652	211	0	262	26	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2				8			
Permitted Phases						2		8				
Actuated Green, G (s)	25.4	61.3			29.9	29.9		16.7	16.7			
Effective Green, g (s)	25.4	61.3			29.9	29.9		16.7	16.7			
Actuated g/C Ratio	0.28	0.68			0.33	0.33		0.19	0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0		2.0	2.0			
Lane Grp Cap (vph)	941	1233			1142	511		320	285			
v/s Ratio Prot	c0.25	c0.47			0.19							
v/s Ratio Perm						0.14		0.15	0.02			
v/c Ratio	0.87	0.68			0.57	0.41		0.82	0.09			
Uniform Delay, d1	30.8	8.6			24.8	23.3		35.2	30.4			
Progression Factor	0.23	1.56			0.73	0.81		1.00	1.00			
Incremental Delay, d2	7.2	1.7			1.9	2.2		14.2	0.1			
Delay (s)	14.3	15.1			20.1	21.1		49.4	30.4			
Level of Service	B	B			C	C		D	C			
Approach Delay (s)		14.7			20.5			42.8		0.0		
Approach LOS		B			C			D		A		

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Volume

200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↕	↔	↕	↕	↔	↕	↕	↔	↕	↕
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2			8				4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.35	0.30	0.18	0.24	0.45	0.09	0.79	0.04	0.20	0.14	0.03	0.30
Control Delay	6.1	6.6	1.9	17.1	16.3	6.1	49.6	23.7	6.8	25.9	23.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	6.6	1.9	17.1	16.5	6.1	49.6	23.7	6.8	25.9	23.2	6.2
90th %ile Green (s)	11.0	49.3	49.3	34.8	34.8	34.8	28.7	28.7	28.7	28.7	28.7	28.7
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.7	53.9	53.9	41.7	41.7	41.7	24.1	24.1	24.1	24.1	24.1	24.1
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.4	57.2	57.2	46.3	46.3	46.3	20.8	20.8	20.8	20.8	20.8	20.8
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.3	60.7	60.7	50.9	50.9	50.9	17.3	17.3	17.3	17.3	17.3	17.3
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.7	65.7	56.2	56.2	56.2	12.3	12.3	12.3	12.3	12.3	12.3
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	24	73	12	27	129	4	131	7	0	20	5	0
Queue Length 95th (ft)	m46	115	m26	m53	178	m19	193	21	31	41	16	39
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

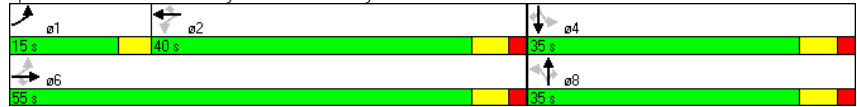


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	489	2191	1047	376	1756	823	437	583	551	436	583	588
Starvation Cap Reductn	0	0	0	0	260	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.30	0.18	0.24	0.53	0.09	0.56	0.03	0.15	0.10	0.02	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 80 (89%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.28	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	502	3438	1538	735	3438	1538	1358	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
RTOR Reduction (vph)	0	0	67	0	0	37	0	0	63	0	0	105
Lane Group Flow (vph)	152	647	118	92	788	39	245	16	19	43	11	31
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2		8		4		4
Actuated Green, G (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.64	0.64	0.64	0.51	0.51	0.51	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	427	2193	981	376	1757	786	311	414	352	309	414	352
v/s Ratio Prot	c0.03	0.19			c0.23		0.01		0.01		0.01	
v/s Ratio Perm	0.20		0.08	0.13		0.03	c0.18		0.01	0.03		0.02
w/c Ratio	0.36	0.30	0.12	0.24	0.45	0.05	0.79	0.04	0.05	0.14	0.03	0.09
Uniform Delay, d1	7.3	7.3	6.4	12.3	14.0	11.0	32.6	27.0	27.1	27.6	26.9	27.3
Progression Factor	0.65	0.76	1.07	0.98	0.99	1.37	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	1.3	0.7	0.1	11.5	0.0	0.0	0.1	0.0	0.0
Delay (s)	4.9	5.8	7.0	13.3	14.5	15.2	44.1	27.0	27.1	27.7	26.9	27.4
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		5.9			14.4		39.3				27.4	
Approach LOS		A			B		D				C	

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	174	321	277	27	408	152	332	277	43	152	250	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	321	277	27	560	0	332	277	43	152	250	217
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.41	0.36	0.31	0.08	0.47		0.81	0.41	0.07	0.75	0.72	0.46
Control Delay	7.3	6.2	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	6.5	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.4	39.7	39.7	24.8	24.8		13.5	38.3	38.3	21.3	21.3	21.3
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.5	43.0	43.0	30.0	30.0		13.5	35.0	35.0	18.0	18.0	18.0
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.8	46.8	46.8	35.5	35.5		13.5	31.2	31.2	14.2	14.2	14.2
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	52.0	52.0	42.5	42.5		12.1	26.0	26.0	10.4	10.4	10.4
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	13	26	0	10	117		133	111	0	81	133	0
Queue Length 95th (ft)	31	54	0	33	185		#209	163	19	142	202	54
Internal Link Dist (ft)		320			387			197				364

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	451	887	895	357	1187		412	784	691	261	442	540
Starvation Cap Reductn	0	174	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.45	0.31	0.08	0.47		0.81	0.35	0.06	0.58	0.57	0.40

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 84 (93%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green

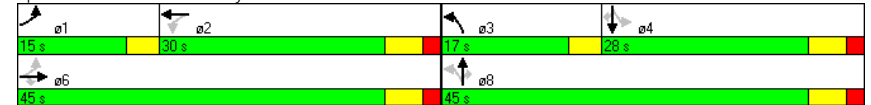
Natural Cycle: 60

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 210: New Lacy Road & CTH MM



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3298		1719	1810	1538	1719	1810	1538
Flt Permitted	0.33	1.00	1.00	0.57	1.00		0.33	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	594	1810	1538	1024	3298		605	1810	1538	1066	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	321	277	27	408	152	332	277	43	152	250	217
RTOR Reduction (vph)	0	0	141	0	38	0	0	0	27	0	0	176
Lane Group Flow (vph)	174	321	136	27	522	0	332	277	16	152	250	41
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Effective Green, g (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Actuated g/C Ratio	0.49	0.49	0.49	0.35	0.35		0.38	0.38	0.38	0.19	0.19	0.19
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	406	887	754	357	1151		391	682	579	204	346	294
v/s Ratio Prot	c0.04	0.18			0.16		c0.12	0.15			0.14	
v/s Ratio Perm	c0.17		0.09	0.03			c0.20		0.01	0.14		0.03
v/c Ratio	0.43	0.36	0.18	0.08	0.45		0.85	0.41	0.03	0.75	0.72	0.14
Uniform Delay, d1	13.6	14.2	12.8	19.6	22.7		22.5	20.6	17.7	34.3	34.2	30.3
Progression Factor	0.33	0.32	0.08	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.5	0.4	1.3		15.1	0.1	0.0	12.1	6.2	0.1
Delay (s)	4.8	5.7	1.5	20.0	24.0		37.6	20.8	17.7	46.5	40.4	30.3
Level of Service	A	A	A	C	C		D	C	B	D	D	C
Approach Delay (s)		4.0			23.8			29.1				38.3
Approach LOS		A			C			C				D

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	72.9%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	1625	1	5	1110	40	1	25	15	60	25	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		815			1320			437			462	
Travel Time (s)		18.5			30.0			9.9			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
Adj. Flow (vph)	5	1766	1	5	1207	43	1	27	16	65	27	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1766	1	5	1207	43	1	27	16	65	27	5
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.5	44.0	44.0	6.5	44.0	44.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.01	0.66	0.00	0.02	0.45	0.04	0.01	0.13	0.09	0.43	0.13	0.03
Control Delay	2.6	8.6	4.0	1.8	5.2	1.0	34.0	36.7	16.9	45.9	36.7	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.6	8.6	4.0	1.8	5.2	1.0	34.0	36.7	16.9	45.9	36.7	21.4
90th %ile Green (s)	6.0	55.4	55.4	6.0	55.4	55.4	13.1	13.1	13.1	13.1	13.1	13.1
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	67.4	67.4	0.0	67.4	67.4	10.6	10.6	10.6	10.6	10.6	10.6
70th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	69.0	69.0	0.0	69.0	69.0	9.0	9.0	9.0	9.0	9.0	9.0
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	69.0	69.0	0.0	69.0	69.0	9.0	9.0	9.0	9.0	9.0	9.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	198	0	1	99	0	1	14	0	36	14	0
Queue Length 95th (ft)	3	490	2	m1	252	m7	5	38	18	73	38	10
Internal Link Dist (ft)		735			1240			357			382	

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	399	2680	1199	244	2680	1208	357	483	422	357	483	414
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.66	0.00	0.02	0.45	0.04	0.00	0.06	0.04	0.18	0.06	0.01
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	88 (98%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	1625	1	5	1110	40	1	25	15	60	25	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.21	1.00	1.00	0.09	1.00	1.00	0.74	1.00	0.74	1.00	1.00	1.00
Satd. Flow (perm)	372	3438	1538	163	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1766	1	5	1207	43	1	27	16	65	27	5
RTOR Reduction (vph)	0	0	0	0	0	12	0	0	15	0	0	5
Lane Group Flow (vph)	5	1766	1	5	1207	31	1	27	1	65	27	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4	4	
Actuated Green, G (s)	66.2	65.0	65.0	66.2	65.0	65.0	8.3	8.3	8.3	8.3	8.3	8.3
Effective Green, g (s)	66.2	65.0	65.0	66.2	65.0	65.0	8.3	8.3	8.3	8.3	8.3	8.3
Actuated g/C Ratio	0.74	0.72	0.72	0.74	0.72	0.72	0.09	0.09	0.09	0.09	0.09	0.09
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	292	2483	1111	141	2483	1111	123	167	142	123	167	142
v/s Ratio Prot	0.00	c0.51		c0.00	0.35			0.01			0.01	
v/s Ratio Perm	0.01		0.00	0.03		0.02	0.00		0.00	c0.05		0.00
v/c Ratio	0.02	0.71	0.00	0.04	0.49	0.03	0.01	0.16	0.01	0.53	0.16	0.00
Uniform Delay, d1	3.5	7.1	3.5	5.6	5.4	3.5	37.1	37.6	37.1	39.0	37.6	37.1
Progression Factor	1.00	1.00	1.00	0.61	0.89	0.49	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.8	0.0	0.0	0.6	0.0	0.0	0.2	0.0	1.9	0.2	0.0
Delay (s)	3.5	8.9	3.5	3.4	5.4	1.8	37.1	37.8	37.1	40.9	37.8	37.1
Level of Service	A	A	A	A	A	A	D	D	D	D	D	D
Approach Delay (s)		8.9			5.3			37.5			39.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔					↔	↔
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1620	228	82	473	0	0	0	0	0	409	783
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases		6	6	2						4	4	4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	40.0	40.0	15.0	30.0	0.0	0.0	0.0	0.0	35.0	35.0	25.0
Total Split (%)	0.0%	44.4%	44.4%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	38.9%	38.9%	27.8%
Maximum Green (s)		34.0	34.0	11.5	24.0					29.0	29.0	20.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.66	0.26	0.38	0.29					0.86	0.64	
Control Delay		13.8	3.6	35.8	5.1					49.0	17.8	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		13.8	3.6	35.8	5.1					49.0	17.8	
90th %ile Green (s)		37.2	37.2	8.3	36.9					29.0	29.0	7.6
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
70th %ile Green (s)		38.4	38.4	7.1	38.3					29.0	29.0	6.2
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		42.4	42.4	6.2	41.6					25.9	25.9	6.0
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
30th %ile Green (s)		45.9	45.9	6.0	44.9					22.6	22.6	6.0
30th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Min
10th %ile Green (s)		60.5	60.5	0.0	50.0					17.5	17.5	6.0
10th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Min
Queue Length 50th (ft)		260	26	19	56					216	147	
Queue Length 95th (ft)		254	m34	77	77					#316	192	
Internal Link Dist (ft)		1240			570			622			1008	

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

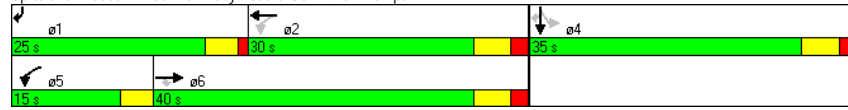


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2463	878	304	1617						555	1622
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.66	0.26	0.27	0.29						0.74	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑	↑↑					↓	↓
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	171	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
RTOR Reduction (vph)	0	0	113	0	0	0	0	0	0	0	0	120
Lane Group Flow (vph)	0	1620	115	82	473	0	0	0	0	0	409	663

Turn Type	Perm	pm+pt	Perm	custom
Protected Phases	6	5	2	4
Permitted Phases		6	2	4
Actuated Green, G (s)	44.2	44.2	47.8	24.8
Effective Green, g (s)	44.2	44.2	47.8	24.8
Actuated g/C Ratio	0.49	0.49	0.53	0.28
Clearance Time (s)	6.0	6.0	3.5	6.0
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	2426	755	185	475
v/s Ratio Prot	c0.33	0.03	0.14	c0.05
v/s Ratio Perm		0.07	0.21	0.24
v/c Ratio	0.67	0.15	0.44	0.86
Uniform Delay, d1	17.3	12.6	12.1	31.0
Progression Factor	0.68	1.13	3.64	1.00
Incremental Delay, d2	1.1	0.3	0.6	14.3
Delay (s)	12.9	14.5	44.6	45.3
Level of Service	B	B	D	A
Approach Delay (s)	13.1		10.7	0.0
Approach LOS	B		B	A

Intersection Summary

HCM Average Control Delay: 19.5 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.70
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 10.5
 Intersection Capacity Utilization: 75.2% ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	1163	864	0	0	375	359	179	1	98	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1163	864	0	0	375	359	0	180	98	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	45.0	70.0	0.0	0.0	25.0	25.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	50.0%	77.8%	0.0%	0.0%	27.8%	27.8%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.88	0.66			0.41	0.57	0.74	0.74	0.32			
Control Delay	13.9	10.2			24.6	10.1		55.7	10.6			
Queue Delay	0.0	0.3			0.0	0.0		0.0	0.0			
Total Delay	13.9	10.5			24.6	10.1		55.7	10.6			
90th %ile Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	38.9	63.9			19.0	19.0	14.1	14.1	14.1			
70th %ile Term Code	Gap	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	36.7	64.1			21.4	21.4	13.9	13.9	13.9			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	34.2	66.4			26.2	26.2	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	29.3	68.0			32.7	32.7	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	306	254			95	53		98	0			
Queue Length 95th (ft)	0	309			128	107		#184	43			
Internal Link Dist (ft)		570			1240			666				712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1445	1313			904	631		268	322			
Starvation Cap Reductn	0	98			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	0.80	0.71			0.41	0.57		0.67	0.30			
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	25 (28%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green											
Natural Cycle:	65											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps												

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↗		↗	↗			
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1163	864	0	0	375	359	179	1	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	226	0	0	84	0	0	0
Lane Group Flow (vph)	1163	864	0	0	375	133	0	180	14	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8					
Permitted Phases					2		8		8			
Actuated Green, G (s)	35.6	65.3			23.7	23.7	12.7	12.7				
Effective Green, g (s)	35.6	65.3			23.7	23.7	12.7	12.7				
Actuated g/C Ratio	0.40	0.73			0.26	0.26	0.14	0.14				
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0				
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0				
Lane Grp Cap (vph)	1319	1313			905	405	243	217				
v/s Ratio Prot	c0.35	c0.48			0.11							
v/s Ratio Perm						0.09	0.10	0.01				
v/c Ratio	0.88	0.66			0.41	0.33	0.74	0.06				
Uniform Delay, d1	25.2	6.5			27.4	26.7	37.1	33.5				
Progression Factor	0.29	1.16			0.80	0.98	1.00	1.00				
Incremental Delay, d2	5.4	1.8			1.4	2.1	10.1	0.0				
Delay (s)	12.6	9.4			23.2	28.3	47.2	33.5				
Level of Service	B	A			C	C	D	C				
Approach Delay (s)		11.3			25.7		42.4			0.0		
Approach LOS		B			C		D			A		

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↗		↗	↗			
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	150	50	150	50	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8					4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.23	0.26	0.15	0.14	0.25	0.06	0.68	0.04	0.17	0.12	0.04	0.27
Control Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
90th %ile Green (s)	9.7	57.0	57.0	43.8	43.8	43.8	21.0	21.0	21.0	21.0	21.0	21.0
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	7.8	60.8	60.8	49.5	49.5	49.5	17.2	17.2	17.2	17.2	17.2	17.2
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	6.8	63.5	63.5	53.2	53.2	53.2	14.5	14.5	14.5	14.5	14.5	14.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.0	66.3	66.3	56.8	56.8	56.8	11.7	11.7	11.7	11.7	11.7	11.7
30th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	12	37	6	17	75	2	83	5	0	13	5	0
Queue Length 95th (ft)	m30	77	m16	m42	117	m22	135	18	28	34	18	37
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	697	2411	1131	432	2000	917	362	483	446	362	483	474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.26	0.15	0.14	0.25	0.06	0.42	0.02	0.11	0.07	0.02	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 68 (76%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	793	3438	1538	743	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
RTOR Reduction (vph)	0	0	52	0	0	23	0	0	41	0	0	73
Lane Group Flow (vph)	152	636	122	60	495	31	152	11	8	27	11	14
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.70	0.70	0.70	0.58	0.58	0.58	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	631	2410	1078	432	1998	894	225	300	255	225	300	255
v/s Ratio Prot	0.02	c0.18			0.14			0.01				0.01
v/s Ratio Perm	0.15		0.08	0.08		0.02	c0.11		0.01	0.02		0.01
w/c Ratio	0.24	0.26	0.11	0.14	0.25	0.04	0.68	0.04	0.03	0.12	0.04	0.06
Uniform Delay, d1	4.5	4.9	4.4	8.6	9.2	8.1	35.3	31.5	31.5	32.0	31.5	31.6
Progression Factor	0.59	0.75	0.86	1.16	1.21	1.76	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.6	0.3	0.1	6.2	0.0	0.0	0.1	0.0	0.0
Delay (s)	2.7	3.9	3.9	10.6	11.4	14.3	41.4	31.5	31.5	32.1	31.5	31.7
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		3.7			11.6			38.6				31.7
Approach LOS		A			B			D				C

Intersection Summary

HCM Average Control Delay: 11.9 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.34
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 55.6% ICU Level of Service: B
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		400			467			277			444	
Travel Time (s)		7.8			9.1			6.3			10.1	
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)	158	293	261	16	261	98	207	174	27	98	163	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	293	261	16	359	0	207	174	27	98	163	141
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.26	0.29	0.27	0.04	0.25		0.53	0.31	0.05	0.57	0.61	0.41
Control Delay	3.5	4.3	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	4.3	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
90th %ile Green (s)	12.3	43.2	43.2	27.4	27.4		12.5	34.8	34.8	18.8	18.8	18.8
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	9.7	47.5	47.5	34.3	34.3		12.5	30.5	30.5	14.5	14.5	14.5
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	8.3	49.5	49.5	37.7	37.7		12.5	28.5	28.5	12.5	12.5	12.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	6.9	53.1	53.1	42.7	42.7		11.0	24.9	24.9	10.4	10.4	10.4
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	56.4	56.4	46.9	46.9		8.1	21.6	21.6	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	8	17	0	5	55		87	74	0	53	89	0
Queue Length 95th (ft)	18	35	1	22	105		128	113	16	97	141	47
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	632	1004	969	442	1419		404	764	665	286	442	482
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.29	0.27	0.04	0.25		0.51	0.23	0.04	0.34	0.37	0.29
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↔	↕	↗	↔	↕	↗	↔	↕	↗
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3297		1719	1810	1538	1719	1810	1538
Flt Permitted	0.49	1.00	1.00	0.58	1.00		0.45	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	887	1810	1538	1051	3297		821	1810	1538	1171	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	293	261	16	261	98	207	174	27	98	163	141
RTOR Reduction (vph)	0	0	116	0	34	0	0	0	19	0	0	120
Lane Group Flow (vph)	158	293	145	16	325	0	207	174	8	98	163	21
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Effective Green, g (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Actuated g/C Ratio	0.55	0.55	0.55	0.42	0.42		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	571	1004	853	441	1385		369	565	480	173	267	227
v/s Ratio Prot	0.03	c0.16			0.10		c0.07	0.10				0.09
v/s Ratio Perm	0.13		0.09	0.02			c0.10		0.01	0.08		0.01
v/c Ratio	0.28	0.29	0.17	0.04	0.23		0.56	0.31	0.02	0.57	0.61	0.09
Uniform Delay, d1	9.9	10.7	9.9	15.4	16.8		24.4	23.6	21.4	35.7	35.9	33.1
Progression Factor	0.25	0.30	0.11	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	0.4	0.2	0.4		1.2	0.1	0.0	2.5	2.9	0.1
Delay (s)	2.5	3.9	1.5	15.5	17.2		25.5	23.7	21.4	38.2	38.8	33.2
Level of Service	A	A	A	B	B		C	C	C	D	D	C
Approach Delay (s)		2.7			17.1			24.5				36.7
Approach LOS		A			B			C				D

Intersection Summary				
HCM Average Control Delay		17.4	HCM Level of Service	B
HCM Volume to Capacity ratio		0.37		
Actuated Cycle Length (s)		90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization		61.4%	ICU Level of Service	B
Analysis Period (min)		15		
c Critical Lane Group				

APPENDIX B

Year 2025 Build Traffic – 20% Shift Peak Hour Analysis Outputs

**Year 2025 Build Traffic - 20% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	A	A	A	A	A	A	D	D	D	D	D	D
		PM	A	B	A	A	A	A	C	C	C	D	C	C
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	B	C	B	-	-	-	-	D	D	C
		PM	-	B	A	D	A	-	-	-	-	D	D	C
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	C	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	B	B	B	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	D	C	B	D	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	1095	5	20	1725	120	1	25	10	60	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	5	1190	5	22	1875	130	1	27	11	65	27	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1190	5	22	1875	130	1	27	11	65	27	16
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.02	0.46	0.00	0.06	0.70	0.11	0.01	0.13	0.06	0.41	0.13	0.08
Control Delay	2.8	7.0	4.0	2.0	7.8	1.1	34.0	36.3	18.7	44.5	36.3	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	7.0	4.0	2.0	7.8	1.1	34.0	36.3	18.7	44.5	36.3	16.8
90th %ile Green (s)	6.0	55.4	55.4	6.0	55.4	55.4	13.1	13.1	13.1	13.1	13.1	13.1
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	58.0	58.0	6.0	67.5	67.5	10.5	10.5	10.5	10.5	10.5	10.5
70th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	106	0	1	301	0	1	14	0	35	14	0
Queue Length 95th (ft)	3	244	4	m3	527	m7	5	38	15	73	38	18
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	221	2593	1161	393	2666	1214	327	442	384	327	442	388
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.46	0.00	0.06	0.70	0.11	0.00	0.06	0.03	0.20	0.06	0.04
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	12 (13%), Referenced to phase 2:WBL and 6:EBTL, Start of 1st Green											
Natural Cycle:	75											
Control Type:	Actuated-Coordinated											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases:	175: New Lacy Road & Ninebark Road											

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	1095	5	20	1725	120	1	25	10	60	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.07	1.00	1.00	0.20	1.00	1.00	1.00	0.74	1.00	0.74	1.00	1.00
Satd. Flow (perm)	134	3438	1538	367	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1190	5	22	1875	130	1	27	11	65	27	16
RTOR Reduction (vph)	0	0	1	0	0	27	0	0	10	0	0	14
Lane Group Flow (vph)	5	1190	4	22	1875	103	1	27	1	65	27	2
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4	4	4
Actuated Green, G (s)	64.6	63.4	63.4	67.0	64.6	64.6	8.7	8.7	8.7	8.7	8.7	8.7
Effective Green, g (s)	64.6	63.4	63.4	67.0	64.6	64.6	8.7	8.7	8.7	8.7	8.7	8.7
Actuated g/C Ratio	0.72	0.70	0.70	0.74	0.72	0.72	0.10	0.10	0.10	0.10	0.10	0.10
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	117	2422	1083	309	2468	1104	129	175	149	129	175	149
v/s Ratio Prot	0.00	0.35		c0.00	c0.55			0.01			0.01	
v/s Ratio Perm	0.03		0.00	0.05		0.07	0.00		0.00	c0.05		0.00
v/c Ratio	0.04	0.49	0.00	0.07	0.76	0.09	0.01	0.15	0.01	0.50	0.15	0.01
Uniform Delay, d1	6.8	6.0	3.9	3.5	7.9	3.8	36.7	37.3	36.7	38.6	37.3	36.8
Progression Factor	1.00	1.00	1.00	0.72	0.80	0.55	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	0.0	0.0	1.5	0.1	0.0	0.2	0.0	1.1	0.2	0.0
Delay (s)	6.8	6.7	3.9	2.5	7.8	2.2	36.8	37.4	36.8	39.7	37.4	36.8
Level of Service	A	A	A	A	A	A	D	D	D	D	D	D
Approach Delay (s)		6.7			7.4			37.2			38.7	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔	↔		↔↔						↔	↔↔
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1082	185	120	793	0	0	0	0	583	1234	
Turn Type			Perm	pm+pt						Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4	4	4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	35.0	35.0	15.0	30.0	0.0	0.0	0.0	0.0	40.0	40.0	20.0
Total Split (%)	0.0%	38.9%	38.9%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	44.4%	44.4%	22.2%
Maximum Green (s)		29.0	29.0	11.5	24.0					34.0	34.0	15.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio	0.60	0.26	0.44	0.69						0.94	0.82	
Control Delay	19.9	4.2	28.0	17.6						52.7	21.0	
Queue Delay	0.0	0.0	0.0	0.0						0.0	0.0	
Total Delay	19.9	4.2	28.0	17.6						52.7	21.0	
90th %ile Green (s)	30.0	30.0	10.5	24.0						34.0	34.0	15.5
90th %ile Term Code	Coord	Coord	Gap	Coord						Max	Max	Max
70th %ile Green (s)	31.7	31.7	8.8	24.2						34.0	34.0	15.3
70th %ile Term Code	Coord	Coord	Gap	Coord						Max	Max	Gap
50th %ile Green (s)	32.8	32.8	7.7	30.4						34.0	34.0	9.1
50th %ile Term Code	Coord	Coord	Gap	Coord						Max	Max	Gap
30th %ile Green (s)	35.1	35.1	6.6	32.2						32.8	32.8	8.5
30th %ile Term Code	Coord	Coord	Gap	Coord						Gap	Gap	Gap
10th %ile Green (s)	41.2	41.2	6.0	39.4						27.3	27.3	6.8
10th %ile Term Code	Coord	Coord	Min	Coord						Gap	Gap	Gap
Queue Length 50th (ft)		195	16	28	201						306	303
Queue Length 95th (ft)		256	44	m90	#341						#509	336
Internal Link Dist (ft)		1240			570			622			1008	

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

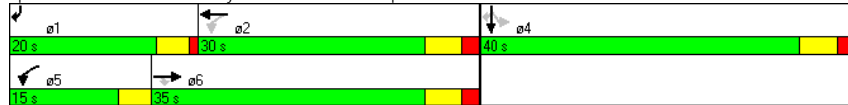


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1793	699	342	1147						651	1635
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		28	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.26	0.35	0.69						0.90	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 49 (54%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↑↑
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.87	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4723	1538	1719	3438						1723	2707
Flt Permitted		1.00	1.00	0.19	1.00						0.95	1.00
Satd. Flow (perm)		4723	1538	338	3438						1723	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
RTOR Reduction (vph)	0	0	115	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	0	1082	70	120	793	0	0	0	0	583	1217	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		34.2	34.2	38.0	30.1						32.4	43.4
Effective Green, g (s)		34.2	34.2	38.0	30.1						32.4	43.4
Actuated g/C Ratio		0.38	0.38	0.42	0.33						0.36	0.48
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1795	584	264	1150						620	1305
v/s Ratio Prot		c0.23		0.04	c0.23							c0.11
v/s Ratio Perm			0.05	0.15							0.34	0.34
v/c Ratio		0.60	0.12	0.45	0.69						0.94	0.93
Uniform Delay, d1		22.4	18.1	16.5	25.9						27.9	21.9
Progression Factor		0.79	0.95	1.95	0.50						1.00	1.00
Incremental Delay, d2		1.4	0.4	0.4	2.7						22.3	12.0
Delay (s)		19.1	17.6	32.6	15.7						50.2	33.9
Level of Service		B	B	C	B						D	C
Approach Delay (s)		18.9			17.9			0.0			39.1	
Approach LOS		B			B			A			D	

Intersection Summary

HCM Average Control Delay: 27.8, HCM Level of Service: C
 HCM Volume to Capacity ratio: 0.90
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 22.5
 Intersection Capacity Utilization: 102.1%, ICU Level of Service: G
 Analysis Period (min): 15
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 c Critical Lane Group

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	821	842	0	0	652	516	261	1	141	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	821	842	0	0	652	516	0	262	141	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.87	0.68			0.57	0.63	0.82	0.35				
Control Delay	16.2	16.8			21.3	7.2	56.0	8.1				
Queue Delay	0.0	0.5			0.0	0.0	0.0	0.0				
Total Delay	16.2	17.3			21.3	7.2	56.0	8.1				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	26.4	59.8			27.4	27.4	18.2	18.2	18.2			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	24.1	62.5			32.4	32.4	15.5	15.5	15.5			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	20.5	66.4			39.9	39.9	11.6	11.6	11.6			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	224	366			154	85	141	0				
Queue Length 95th (ft)	0	m422			183	34	#245	47				
Internal Link Dist (ft)		570			1240		666					712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1234			1144	816		364	436			
Starvation Cap Reductn	0	111			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	0.79	0.75			0.57	0.63		0.72	0.32			

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Natural Cycle: 60

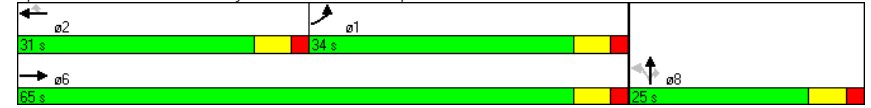
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	821	842	0	0	652	516	261	1	141	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	305	0	0	115	0	0	0
Lane Group Flow (vph)	821	842	0	0	652	211	0	262	26	0	0	0
Turn Type	Prot		Perm				Perm		Perm			
Protected Phases	1	6	2				8		8			
Permitted Phases							8		8			
Actuated Green, G (s)	25.4	61.3	29.9				29.9		16.7		16.7	
Effective Green, g (s)	25.4	61.3	29.9				29.9		16.7		16.7	
Actuated g/C Ratio	0.28	0.68	0.33				0.33		0.19		0.19	
Clearance Time (s)	6.0	6.0	6.0				6.0		6.0		6.0	
Vehicle Extension (s)	2.0	5.0	5.0				5.0		2.0		2.0	
Lane Grp Cap (vph)	941	1233	1142				511		320		285	
v/s Ratio Prot	c0.25	c0.47	0.19									
v/s Ratio Perm							0.14		0.15		0.02	
v/c Ratio	0.87	0.68	0.57				0.41		0.82		0.09	
Uniform Delay, d1	30.8	8.6	24.8				23.3		35.2		30.4	
Progression Factor	0.23	1.56	0.73				0.81		1.00		1.00	
Incremental Delay, d2	7.2	1.7	1.9				2.2		14.2		0.1	
Delay (s)	14.3	15.1	20.1				21.1		49.4		30.4	
Level of Service	B		C				C		D		C	
Approach Delay (s)	14.7		20.5				42.8		0.0			
Approach LOS	B		C				D		A			

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	
HCM Volume to Capacity ratio	0.81	C	
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	102.1%	ICU Level of Service	
Analysis Period (min)	15	G	
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red	Yes			Yes			Yes			Yes		
Link Speed (mph)	35			35			30			30		
Link Distance (ft)	1320			400			279			455		
Travel Time (s)	25.7			7.8			6.3			10.3		
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
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Turn Type	pm+pt		Perm		Perm		Perm		Perm		Perm	
Protected Phases	1	6	2				8		4			
Permitted Phases	6	6	6	2	2	8	8	8	4	4	4	4
Detector Phase	1	6	6	2	2	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag		Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.35	0.30	0.18	0.24	0.45	0.09	0.79	0.04	0.20	0.14	0.03	0.30
Control Delay	6.1	6.6	1.9	17.1	16.3	6.1	49.6	23.7	6.8	25.9	23.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	6.6	1.9	17.1	16.5	6.1	49.6	23.7	6.8	25.9	23.2	6.2
90th %ile Green (s)	11.0	49.3	49.3	34.8	34.8	34.8	28.7	28.7	28.7	28.7	28.7	28.7
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.7	53.9	53.9	41.7	41.7	41.7	24.1	24.1	24.1	24.1	24.1	24.1
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.4	57.2	57.2	46.3	46.3	46.3	20.8	20.8	20.8	20.8	20.8	20.8
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.3	60.7	60.7	50.9	50.9	50.9	17.3	17.3	17.3	17.3	17.3	17.3
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.7	65.7	56.2	56.2	56.2	12.3	12.3	12.3	12.3	12.3	12.3
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	24	73	12	27	129	4	131	7	0	20	5	0
Queue Length 95th (ft)	m46	115	m26	m53	178	m19	193	21	31	41	16	39
Internal Link Dist (ft)	1240			320			199			375		

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

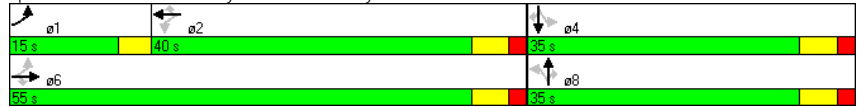


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	489	2191	1047	376	1756	823	437	583	551	436	583	588
Starvation Cap Reductn	0	0	0	0	260	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.30	0.18	0.24	0.53	0.09	0.56	0.03	0.15	0.10	0.02	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 80 (89%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.28	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	502	3438	1538	735	3438	1538	1358	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
RTOR Reduction (vph)	0	0	67	0	0	37	0	0	63	0	0	105
Lane Group Flow (vph)	152	647	118	92	788	39	245	16	19	43	11	31
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2		8		4		4
Actuated Green, G (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.64	0.64	0.64	0.51	0.51	0.51	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	427	2193	981	376	1757	786	311	414	352	309	414	352
v/s Ratio Prot	c0.03	0.19			c0.23		0.01		0.01		0.01	
v/s Ratio Perm	0.20		0.08	0.13		0.03	c0.18		0.01	0.03		0.02
w/c Ratio	0.36	0.30	0.12	0.24	0.45	0.05	0.79	0.04	0.05	0.14	0.03	0.09
Uniform Delay, d1	7.3	7.3	6.4	12.3	14.0	11.0	32.6	27.0	27.1	27.6	26.9	27.3
Progression Factor	0.65	0.76	1.07	0.98	0.99	1.37	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	1.3	0.7	0.1	11.5	0.0	0.0	0.1	0.0	0.0
Delay (s)	4.9	5.8	7.0	13.3	14.5	15.2	44.1	27.0	27.1	27.7	26.9	27.4
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		5.9			14.4		39.3				27.4	
Approach LOS		A			B		D				C	

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	174	321	277	27	408	152	332	277	43	152	250	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	321	277	27	560	0	332	277	43	152	250	217
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.41	0.36	0.31	0.08	0.47		0.81	0.41	0.07	0.75	0.72	0.46
Control Delay	7.2	6.2	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	6.5	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.4	39.7	39.7	24.8	24.8		13.5	38.3	38.3	21.3	21.3	21.3
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.5	43.0	43.0	30.0	30.0		13.5	35.0	35.0	18.0	18.0	18.0
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.8	46.8	46.8	35.5	35.5		13.5	31.2	31.2	14.2	14.2	14.2
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	52.0	52.0	42.5	42.5		12.1	26.0	26.0	10.4	10.4	10.4
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	13	26	0	10	117		133	111	0	81	133	0
Queue Length 95th (ft)	31	54	0	33	185		#209	163	19	142	202	54
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	451	887	895	357	1187		412	784	691	261	442	540
Starvation Cap Reductn	0	174	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.45	0.31	0.08	0.47		0.81	0.35	0.06	0.58	0.57	0.40
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	84 (93%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3298		1719	1810	1538	1719	1810	1538
Flt Permitted	0.33	1.00	1.00	0.57	1.00		0.33	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	594	1810	1538	1024	3298		605	1810	1538	1066	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	321	277	27	408	152	332	277	43	152	250	217
RTOR Reduction (vph)	0	0	141	0	38	0	0	0	27	0	0	176
Lane Group Flow (vph)	174	321	136	27	522	0	332	277	16	152	250	41
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Effective Green, g (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Actuated g/C Ratio	0.49	0.49	0.49	0.35	0.35		0.38	0.38	0.38	0.19	0.19	0.19
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	406	887	754	357	1151		391	682	579	204	346	294
v/s Ratio Prot	c0.04	0.18			0.16		c0.12	0.15			0.14	
v/s Ratio Perm	c0.17		0.09	0.03			c0.20		0.01	0.14		0.03
v/c Ratio	0.43	0.36	0.18	0.08	0.45		0.85	0.41	0.03	0.75	0.72	0.14
Uniform Delay, d1	13.6	14.2	12.8	19.6	22.7		22.5	20.6	17.7	34.3	34.2	30.3
Progression Factor	0.33	0.32	0.08	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.5	0.4	1.3		15.1	0.1	0.0	12.1	6.2	0.1
Delay (s)	4.8	5.7	1.5	20.0	24.0		37.6	20.8	17.7	46.5	40.4	30.3
Level of Service	A	A	A	C	C		D	C	B	D	D	C
Approach Delay (s)		4.0			23.8			29.1				38.3
Approach LOS		A			C			C				D

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1555	1	15	1060	80	1	25	20	125	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	11	1690	1	16	1152	87	1	27	22	136	27	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1690	1	16	1152	87	1	27	22	136	27	11
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.5	44.0	44.0	6.5	44.0	44.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.03	0.71	0.00	0.07	0.48	0.08	0.00	0.10	0.09	0.66	0.10	0.04
Control Delay	4.4	12.6	6.0	3.6	8.2	1.7	29.0	31.2	13.0	50.4	31.2	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	12.6	6.0	3.6	8.2	1.7	29.0	31.2	13.0	50.4	31.2	15.7
90th %ile Green (s)	6.0	48.7	48.7	6.0	48.7	48.7	19.8	19.8	19.8	19.8	19.8	19.8
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	61.9	61.9	0.0	61.9	61.9	16.1	16.1	16.1	16.1	16.1	16.1
70th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	64.5	64.5	0.0	64.5	64.5	13.5	13.5	13.5	13.5	13.5	13.5
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	67.1	67.1	0.0	67.1	67.1	10.9	10.9	10.9	10.9	10.9	10.9
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	0.0	69.0	69.0	0.0	69.0	69.0	9.0	9.0	9.0	9.0	9.0	9.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	1	236	0	1	179	0	1	13	0	74	13	0
Queue Length 95th (ft)	7	#613	2	m5	245	25	5	34	19	125	34	14
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	372	2378	1064	226	2378	1090	357	483	426	357	483	418
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.71	0.00	0.07	0.48	0.08	0.00	0.06	0.05	0.38	0.06	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	88 (98%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	65											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1555	1	15	1060	80	1	25	20	125	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.21	1.00	1.00	0.09	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	374	3438	1538	155	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1690	1	16	1152	87	1	27	22	136	27	11
RTOR Reduction (vph)	0	0	0	0	0	30	0	0	19	0	0	9
Lane Group Flow (vph)	11	1690	1	16	1152	57	1	27	3	136	27	2
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4	4	4
Actuated Green, G (s)	60.6	59.4	59.4	60.6	59.4	59.4	13.9	13.9	13.9	13.9	13.9	13.9
Effective Green, g (s)	60.6	59.4	59.4	60.6	59.4	59.4	13.9	13.9	13.9	13.9	13.9	13.9
Actuated g/C Ratio	0.67	0.66	0.66	0.67	0.66	0.66	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	270	2269	1015	125	2269	1015	207	280	238	207	280	238
v/s Ratio Prot	0.00	c0.49		c0.00	0.34			0.01			0.01	
v/s Ratio Perm	0.03		0.00	0.08		0.04	0.00		0.00	c0.10		0.00
v/c Ratio	0.04	0.74	0.00	0.13	0.51	0.06	0.00	0.10	0.01	0.66	0.10	0.01
Uniform Delay, d1	5.4	10.2	5.2	8.2	7.8	5.4	32.2	32.7	32.2	35.8	32.7	32.2
Progression Factor	1.00	1.00	1.00	0.71	0.96	0.75	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	2.3	0.0	0.2	0.8	0.1	0.0	0.1	0.0	5.6	0.1	0.0
Delay (s)	5.4	12.5	5.2	6.0	8.3	4.1	32.2	32.7	32.3	41.4	32.7	32.2
Level of Service	A	B	A	A	A	A	C	C	C	D	C	C
Approach Delay (s)		12.5			8.0			32.5			39.5	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1620	228	82	473	0	0	0	0	409	783	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	40.0	40.0	15.0	30.0	0.0	0.0	0.0	0.0	35.0	35.0	25.0
Total Split (%)	0.0%	44.4%	44.4%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	38.9%	38.9%	27.8%
Maximum Green (s)		34.0	34.0	11.5	24.0					29.0	29.0	20.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.66	0.26	0.38	0.29					0.86	0.64	
Control Delay		12.9	2.6	35.8	5.1					49.0	17.8	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		12.9	2.6	35.8	5.1					49.0	17.8	
90th %ile Green (s)		37.2	37.2	8.3	36.9					29.0	29.0	7.6
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
70th %ile Green (s)		38.4	38.4	7.1	38.3					29.0	29.0	6.2
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		42.4	42.4	6.2	41.6					25.9	25.9	6.0
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
30th %ile Green (s)		45.9	45.9	6.0	44.9					22.6	22.6	6.0
30th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Min
10th %ile Green (s)		60.5	60.5	0.0	50.0					17.5	17.5	6.0
10th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Min
Queue Length 50th (ft)		267	27	19	56						216	147
Queue Length 95th (ft)		212	m16	77	77						#316	192
Internal Link Dist (ft)		1240			570			622				1008

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

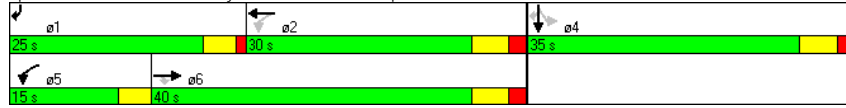


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2463	878	304	1617						555	1622
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.66	0.26	0.27	0.29						0.74	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↓
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	171	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
RTOR Reduction (vph)	0	0	113	0	0	0	0	0	0	0	0	120
Lane Group Flow (vph)	0	1620	115	82	473	0	0	0	0	0	409	663
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		44.2	44.2	47.8	42.3						24.8	31.2
Effective Green, g (s)		44.2	44.2	47.8	42.3						24.8	31.2
Actuated g/C Ratio		0.49	0.49	0.53	0.47						0.28	0.35
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		2426	755	185	1616						475	938
v/s Ratio Prot			c0.33	0.03	0.14							c0.05
v/s Ratio Perm				0.07	0.21						0.24	0.19
v/c Ratio		0.67	0.15	0.44	0.29						0.86	0.71
Uniform Delay, d1		17.3	12.6	12.1	14.7						31.0	25.4
Progression Factor		0.64	0.77	3.64	0.30						1.00	1.00
Incremental Delay, d2		1.1	0.3	0.6	0.4						14.3	2.0
Delay (s)		12.1	10.0	44.6	4.8						45.3	27.5
Level of Service		B	A	D	A						D	C
Approach Delay (s)		11.8			10.7		0.0				33.6	
Approach LOS		B			B		A				C	

Intersection Summary

HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		650			1320			746			792	
Travel Time (s)		14.8			25.7			17.0			18.0	
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)	1163	864	0	0	375	359	179	1	98	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1163	864	0	0	375	359	0	180	98	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	45.0	70.0	0.0	0.0	25.0	25.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	50.0%	77.8%	0.0%	0.0%	27.8%	27.8%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.88	0.66			0.41	0.57	0.74	0.74	0.32			
Control Delay	13.9	10.2			24.6	10.1		55.7	10.6			
Queue Delay	0.0	0.3			0.0	0.0		0.0	0.0			
Total Delay	13.9	10.5			24.6	10.1		55.7	10.6			
90th %ile Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	38.9	63.9			19.0	19.0	14.1	14.1	14.1			
70th %ile Term Code	Gap	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	36.7	64.1			21.4	21.4	13.9	13.9	13.9			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	34.2	66.4			26.2	26.2	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	29.3	68.0			32.7	32.7	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	310	254			95	53		98	0			
Queue Length 95th (ft)	0	309			128	107		#184	43			
Internal Link Dist (ft)		570				1240			666			712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1445	1313			904	631		268	322			
Starvation Cap Reductn	0	98			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	0.80	0.71			0.41	0.57		0.67	0.30			

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 25 (28%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

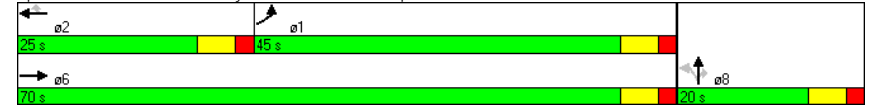
Natural Cycle: 65

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗			
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1163	864	0	0	375	359	179	1	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	226	0	0	84	0	0	0
Lane Group Flow (vph)	1163	864	0	0	375	133	0	180	14	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2				8			
Permitted Phases						2		8				
Actuated Green, G (s)	35.6	65.3			23.7	23.7		12.7	12.7			
Effective Green, g (s)	35.6	65.3			23.7	23.7		12.7	12.7			
Actuated g/C Ratio	0.40	0.73			0.26	0.26		0.14	0.14			
Clearance Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0		2.0	2.0			
Lane Grp Cap (vph)	1319	1313			905	405		243	217			
v/s Ratio Prot	c0.35	c0.48			0.11							
v/s Ratio Perm						0.09		0.10	0.01			
v/c Ratio	0.88	0.66			0.41	0.33		0.74	0.06			
Uniform Delay, d1	25.2	6.5			27.4	26.7		37.1	33.5			
Progression Factor	0.29	1.16			0.80	0.98		1.00	1.00			
Incremental Delay, d2	5.4	1.8			1.4	2.1		10.1	0.0			
Delay (s)	12.7	9.3			23.2	28.3		47.2	33.5			
Level of Service	B	A			C	C		D	C			
Approach Delay (s)		11.3			25.7			42.4			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	150	50	150	50	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2				8			4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.23	0.26	0.15	0.14	0.25	0.06	0.68	0.04	0.17	0.12	0.04	0.27
Control Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
90th %ile Green (s)	9.7	57.0	57.0	43.8	43.8	43.8	21.0	21.0	21.0	21.0	21.0	21.0
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	7.8	60.8	60.8	49.5	49.5	49.5	17.2	17.2	17.2	17.2	17.2	17.2
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	6.8	63.5	63.5	53.2	53.2	53.2	14.5	14.5	14.5	14.5	14.5	14.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.0	66.3	66.3	56.8	56.8	56.8	11.7	11.7	11.7	11.7	11.7	11.7
30th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	12	37	6	17	75	2	83	5	0	13	5	0
Queue Length 95th (ft)	m30	77	m16	m42	117	m22	135	18	28	34	18	37
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	697	2411	1131	432	2000	917	362	483	446	362	483	474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.26	0.15	0.14	0.25	0.06	0.42	0.02	0.11	0.07	0.02	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 68 (76%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	793	3438	1538	743	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
RTOR Reduction (vph)	0	0	52	0	0	23	0	0	41	0	0	73
Lane Group Flow (vph)	152	636	122	60	495	31	152	11	8	27	11	14
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.70	0.70	0.70	0.58	0.58	0.58	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	631	2410	1078	432	1998	894	225	300	255	225	300	255
v/s Ratio Prot	0.02	c0.18			0.14		0.01		0.01		0.01	
v/s Ratio Perm	0.15		0.08	0.08		0.02	c0.11		0.01	0.02		0.01
w/c Ratio	0.24	0.26	0.11	0.14	0.25	0.04	0.68	0.04	0.03	0.12	0.04	0.06
Uniform Delay, d1	4.5	4.9	4.4	8.6	9.2	8.1	35.3	31.5	31.5	32.0	31.5	31.6
Progression Factor	0.59	0.74	0.86	1.16	1.21	1.76	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.6	0.3	0.1	6.2	0.0	0.0	0.1	0.0	0.0
Delay (s)	2.7	3.9	3.9	10.6	11.4	14.3	41.4	31.5	31.5	32.1	31.5	31.7
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		3.7			11.6		38.6				31.7	
Approach LOS		A			B		D				C	

Intersection Summary

HCM Average Control Delay: 11.9 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.34
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 55.6% ICU Level of Service: B
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	158	293	261	16	261	98	207	174	27	98	163	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	293	261	16	359	0	207	174	27	98	163	141
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.26	0.29	0.27	0.04	0.25		0.53	0.31	0.05	0.57	0.61	0.41
Control Delay	3.5	4.4	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	4.4	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
90th %ile Green (s)	12.3	43.2	43.2	27.4	27.4		12.5	34.8	34.8	18.8	18.8	18.8
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	9.7	47.5	47.5	34.3	34.3		12.5	30.5	30.5	14.5	14.5	14.5
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	8.3	49.5	49.5	37.7	37.7		12.5	28.5	28.5	12.5	12.5	12.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	6.9	53.1	53.1	42.7	42.7		11.0	24.9	24.9	10.4	10.4	10.4
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	56.4	56.4	46.9	46.9		8.1	21.6	21.6	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	8	17	0	5	55		87	74	0	53	89	0
Queue Length 95th (ft)	18	36	1	22	105		128	113	16	97	141	47
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	632	1004	969	442	1419		404	764	665	286	442	482
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.29	0.27	0.04	0.25		0.51	0.23	0.04	0.34	0.37	0.29
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset: 77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green												
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘	↔	↑	↘	↔	↑	↘	↔	↑	↘
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3297		1719	1810	1538	1719	1810	1538
Flt Permitted	0.49	1.00	1.00	0.58	1.00		0.45	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	887	1810	1538	1051	3297		821	1810	1538	1171	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	293	261	16	261	98	207	174	27	98	163	141
RTOR Reduction (vph)	0	0	116	0	34	0	0	0	19	0	0	120
Lane Group Flow (vph)	158	293	145	16	325	0	207	174	8	98	163	21
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Effective Green, g (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Actuated g/C Ratio	0.55	0.55	0.55	0.42	0.42		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	571	1004	853	441	1385		369	565	480	173	267	227
v/s Ratio Prot	0.03	c0.16			0.10		c0.07	0.10			0.09	
v/s Ratio Perm	0.13		0.09	0.02			c0.10		0.01	0.08		0.01
v/c Ratio	0.28	0.29	0.17	0.04	0.23		0.56	0.31	0.02	0.57	0.61	0.09
Uniform Delay, d1	9.9	10.7	9.9	15.4	16.8		24.4	23.6	21.4	35.7	35.9	33.1
Progression Factor	0.25	0.31	0.11	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	0.4	0.2	0.4		1.2	0.1	0.0	2.5	2.9	0.1
Delay (s)	2.6	4.0	1.5	15.5	17.2		25.5	23.7	21.4	38.2	38.8	33.2
Level of Service	A	A	A	B	B		C	C	C	D	D	C
Approach Delay (s)		2.8			17.1			24.5				36.7
Approach LOS		A			B			C				D

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX B

Year 2025 Build Traffic – 30% Shift Peak Hour Analysis Outputs

**Year 2025 Build Traffic - 30% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	A	A	A	A	A	A	D	D	D	D	D	D
		PM	A	B	A	A	B	A	C	C	C	D	C	C
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	B	C	B	-	-	-	-	D	D	C
		PM	-	B	A	D	A	-	-	-	-	D	D	C
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	C	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	B	B	B	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	D	C	B	D	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1060	1	35	1650	180	5	25	15	90	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		815			1320			437			462	
Travel Time (s)		18.5			30.0			9.9			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
Adj. Flow (vph)	11	1152	1	38	1793	196	5	27	16	98	27	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1152	1	38	1793	196	5	27	16	98	27	22
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.05	0.47	0.00	0.10	0.69	0.16	0.03	0.11	0.07	0.54	0.11	0.10
Control Delay	3.8	8.8	6.0	2.6	8.5	1.2	32.2	33.9	15.3	47.4	33.9	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	8.8	6.0	2.6	8.5	1.2	32.2	33.9	15.3	47.4	33.9	14.4
90th %ile Green (s)	6.0	52.2	52.2	6.0	52.2	52.2	16.3	16.3	16.3	16.3	16.3	16.3
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	55.3	55.3	6.0	64.8	64.8	13.2	13.2	13.2	13.2	13.2	13.2
70th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	57.5	57.5	6.0	67.0	67.0	11.0	11.0	11.0	11.0	11.0	11.0
50th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	167	0	2	287	0	3	14	0	54	14	0
Queue Length 95th (ft)	6	260	2	m5	#556	m16	12	36	17	99	36	20
Internal Link Dist (ft)		735			1240			357			382	

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	231	2468	1104	387	2613	1205	327	442	388	327	442	393
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.47	0.00	0.10	0.69	0.16	0.02	0.06	0.04	0.30	0.06	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	12 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

	←		→		↙		↘		↑		↓	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1060	1	35	1650	180	5	25	15	90	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.08	1.00	1.00	0.20	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	152	3438	1538	366	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1152	1	38	1793	196	5	27	16	98	27	22
RTOR Reduction (vph)	0	0	0	0	46	0	0	14	0	0	0	20
Lane Group Flow (vph)	11	1152	1	38	1793	150	5	27	2	98	27	2
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		2	8		8	4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	62.0	60.8	60.8	66.8	63.2	63.2	10.1	10.1	10.1	10.1	10.1	10.1
Effective Green, g (s)	62.0	60.8	60.8	66.8	63.2	63.2	10.1	10.1	10.1	10.1	10.1	10.1
Actuated g/C Ratio	0.69	0.68	0.68	0.74	0.70	0.70	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	126	2323	1039	326	2414	1080	150	203	173	150	203	173
v/s Ratio Prot	0.00	0.34		c0.00	c0.52			0.01			0.01	
v/s Ratio Perm	0.06		0.00	0.08		0.10	0.00		0.00	c0.07		0.00
v/c Ratio	0.09	0.50	0.00	0.12	0.74	0.14	0.03	0.13	0.01	0.65	0.13	0.01
Uniform Delay, d1	7.0	7.1	4.7	3.8	8.3	4.4	35.6	36.0	35.5	38.3	36.0	35.5
Progression Factor	1.00	1.00	1.00	0.70	0.81	0.55	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	0.0	0.0	1.4	0.2	0.0	0.1	0.0	7.5	0.1	0.0
Delay (s)	7.1	7.9	4.7	2.7	8.2	2.6	35.6	36.1	35.5	45.8	36.1	35.5
Level of Service	A	A	A	A	A	A	D	D	D	D	D	D
Approach Delay (s)		7.9			7.5			35.9			42.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

	←		→		↙		↘		↑		↓	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1082	185	120	793	0	0	0	0	583	1234	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases		6	6	2						4	4	4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	35.0	35.0	15.0	30.0	0.0	0.0	0.0	0.0	40.0	40.0	20.0
Total Split (%)	0.0%	38.9%	38.9%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	44.4%	44.4%	22.2%
Maximum Green (s)		29.0	29.0	11.5	24.0					34.0	34.0	15.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.60	0.26	0.44	0.69					0.94	0.82	
Control Delay		19.3	3.2	28.0	17.6					52.7	21.0	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		19.3	3.2	28.0	17.6					52.7	21.0	
90th %ile Green (s)		30.0	30.0	10.5	24.0					34.0	34.0	15.5
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Max
70th %ile Green (s)		31.7	31.7	8.8	24.2					34.0	34.0	15.3
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		32.8	32.8	7.7	30.4					34.0	34.0	9.1
50th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
30th %ile Green (s)		35.1	35.1	6.6	32.2					32.8	32.8	8.5
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
10th %ile Green (s)		41.2	41.2	6.0	39.4					27.3	27.3	6.8
10th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		198	25	28	201					306	303	
Queue Length 95th (ft)		259	29	m90	#341					#509	336	
Internal Link Dist (ft)		1240			570			622			1008	

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

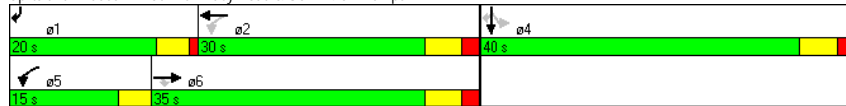


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1793	699	342	1147						651	1635
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		27	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.26	0.35	0.69						0.90	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 49 (54%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑						↓	↓↑
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.87	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4723	1538	1719	3438						1723	2707
Flt Permitted		1.00	1.00	0.19	1.00						0.95	1.00
Satd. Flow (perm)		4723	1538	338	3438						1723	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
RTOR Reduction (vph)	0	0	115	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	0	1082	70	120	793	0	0	0	0	583	1217	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		34.2	34.2	38.0	30.1						32.4	43.4
Effective Green, g (s)		34.2	34.2	38.0	30.1						32.4	43.4
Actuated g/C Ratio		0.38	0.38	0.42	0.33						0.36	0.48
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1795	584	264	1150						620	1305
v/s Ratio Prot		c0.23		0.04	c0.23							c0.11
v/s Ratio Perm			0.05	0.15							0.34	0.34
v/c Ratio		0.60	0.12	0.45	0.69						0.94	0.93
Uniform Delay, d1		22.4	18.1	16.5	25.9						27.9	21.9
Progression Factor		0.76	0.66	1.95	0.50						1.00	1.00
Incremental Delay, d2		1.4	0.4	0.4	2.7						22.3	12.0
Delay (s)		18.5	12.3	32.6	15.7						50.2	33.9
Level of Service		B	B	C	B						D	C
Approach Delay (s)		17.6			17.9		0.0				39.1	
Approach LOS		B			B		A				D	

Intersection Summary

HCM Average Control Delay: 27.4, HCM Level of Service: C
 HCM Volume to Capacity ratio: 0.90
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 22.5
 Intersection Capacity Utilization: 102.1%, ICU Level of Service: G
 Analysis Period (min): 15
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 c Critical Lane Group

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	821	842	0	0	652	516	261	1	141	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	821	842	0	0	652	516	0	262	141	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.87	0.68			0.57	0.63	0.82	0.35				
Control Delay	16.2	16.8			21.3	7.2	56.0	8.1				
Queue Delay	0.0	0.5			0.0	0.0	0.0	0.0				
Total Delay	16.2	17.3			21.3	7.2	56.0	8.1				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	26.4	59.8			27.4	27.4	18.2	18.2	18.2			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	24.1	62.5			32.4	32.4	15.5	15.5	15.5			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	20.5	66.4			39.9	39.9	11.6	11.6	11.6			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	225	366			154	85	141	0				
Queue Length 95th (ft)	0	m422			183	34	#245	47				
Internal Link Dist (ft)		570			1240		666					712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1234			1144	816		364	436			
Starvation Cap Reductn	0	111			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	0.79	0.75			0.57	0.63		0.72	0.32			

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Natural Cycle: 60

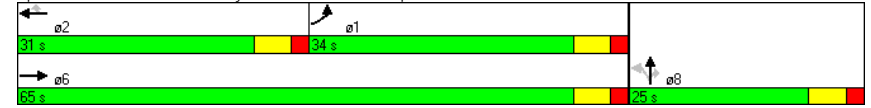
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↖	↗	↔	↖	↗	↔	↖	↗	↔	↖	↗
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	821	842	0	0	652	516	261	1	141	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	305	0	0	115	0	0	0
Lane Group Flow (vph)	821	842	0	0	652	211	0	262	26	0	0	0
Turn Type	Prot				Perm	Perm	Perm	Perm				
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Actuated Green, G (s)	25.4	61.3			29.9	29.9		16.7	16.7			
Effective Green, g (s)	25.4	61.3			29.9	29.9		16.7	16.7			
Actuated g/C Ratio	0.28	0.68			0.33	0.33		0.19	0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0		2.0	2.0			
Lane Grp Cap (vph)	941	1233			1142	511		320	285			
v/s Ratio Prot	c0.25	c0.47			0.19							
v/s Ratio Perm						0.14		0.15	0.02			
v/c Ratio	0.87	0.68			0.57	0.41		0.82	0.09			
Uniform Delay, d1	30.8	8.6			24.8	23.3		35.2	30.4			
Progression Factor	0.23	1.56			0.73	0.81		1.00	1.00			
Incremental Delay, d2	7.2	1.7			1.9	2.2		14.2	0.1			
Delay (s)	14.3	15.1			20.1	21.1		49.4	30.4			
Level of Service	B	B			C	C		D	C			
Approach Delay (s)		14.7			20.5			42.8		0.0		
Approach LOS		B			C			D		A		

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	102.1%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

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Synchro 7 - Report

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↖	↗	↔	↖	↗	↔	↖	↗	↔	↖	↗
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2			8				4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.35	0.30	0.18	0.24	0.45	0.09	0.79	0.04	0.20	0.14	0.03	0.30
Control Delay	6.1	6.6	1.9	17.1	16.3	6.1	49.6	23.7	6.8	25.9	23.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	6.6	1.9	17.1	16.5	6.1	49.6	23.7	6.8	25.9	23.2	6.2
90th %ile Green (s)	11.0	49.3	49.3	34.8	34.8	34.8	28.7	28.7	28.7	28.7	28.7	28.7
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.7	53.9	53.9	41.7	41.7	41.7	24.1	24.1	24.1	24.1	24.1	24.1
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.4	57.2	57.2	46.3	46.3	46.3	20.8	20.8	20.8	20.8	20.8	20.8
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.3	60.7	60.7	50.9	50.9	50.9	17.3	17.3	17.3	17.3	17.3	17.3
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.7	65.7	56.2	56.2	56.2	12.3	12.3	12.3	12.3	12.3	12.3
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	24	73	12	27	129	4	131	7	0	20	5	0
Queue Length 95th (ft)	m46	115	m26	m53	178	m19	193	21	31	41	16	39
Internal Link Dist (ft)		1240			320			199				375

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Synchro 7 - Report

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

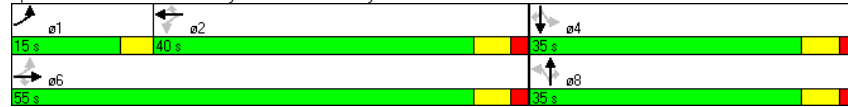


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	489	2191	1047	376	1756	823	437	583	551	436	583	588
Starvation Cap Reductn	0	0	0	0	260	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.30	0.18	0.24	0.53	0.09	0.56	0.03	0.15	0.10	0.02	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 80 (89%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.28	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	502	3438	1538	735	3438	1538	1358	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
RTOR Reduction (vph)	0	0	67	0	0	37	0	0	63	0	0	105
Lane Group Flow (vph)	152	647	118	92	788	39	245	16	19	43	11	31
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2			8	4		4
Actuated Green, G (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.64	0.64	0.64	0.51	0.51	0.51	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	427	2193	981	376	1757	786	311	414	352	309	414	352
v/s Ratio Prot	c0.03	0.19			c0.23		0.01		0.01		0.01	
v/s Ratio Perm	0.20		0.08	0.13		0.03	c0.18		0.01	0.03		0.02
w/c Ratio	0.36	0.30	0.12	0.24	0.45	0.05	0.79	0.04	0.05	0.14	0.03	0.09
Uniform Delay, d1	7.3	7.3	6.4	12.3	14.0	11.0	32.6	27.0	27.1	27.6	26.9	27.3
Progression Factor	0.65	0.76	1.07	0.98	0.99	1.37	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	1.3	0.7	0.1	11.5	0.0	0.0	0.1	0.0	0.0
Delay (s)	4.9	5.8	7.0	13.3	14.5	15.2	44.1	27.0	27.1	27.7	26.9	27.4
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		5.9			14.4		39.3				27.4	
Approach LOS		A			B		D				C	

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	174	321	277	27	408	152	332	277	43	152	250	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	321	277	27	560	0	332	277	43	152	250	217
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.41	0.36	0.31	0.08	0.47		0.81	0.41	0.07	0.75	0.72	0.46
Control Delay	7.3	6.2	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	6.5	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.4	39.7	39.7	24.8	24.8		13.5	38.3	38.3	21.3	21.3	21.3
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.5	43.0	43.0	30.0	30.0		13.5	35.0	35.0	18.0	18.0	18.0
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.8	46.8	46.8	35.5	35.5		13.5	31.2	31.2	14.2	14.2	14.2
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	52.0	52.0	42.5	42.5		12.1	26.0	26.0	10.4	10.4	10.4
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	13	26	0	10	117		133	111	0	81	133	0
Queue Length 95th (ft)	31	54	0	33	185		#209	163	19	142	202	54
Internal Link Dist (ft)		320			387			197				364

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	451	887	895	357	1187		412	784	691	261	442	540
Starvation Cap Reductn	0	174	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.45	0.31	0.08	0.47		0.81	0.35	0.06	0.58	0.57	0.40
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	84 (93%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
Splits and Phases: 210: New Lacy Road & CTH MM												
Phase	ø1	ø2	ø3	ø4	ø6	ø8						
Duration	15 s	30 s	17 s	28 s	45 s	45 s						

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3298		1719	1810	1538	1719	1810	1538
Flt Permitted	0.33	1.00	1.00	0.57	1.00		0.33	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	594	1810	1538	1024	3298		605	1810	1538	1066	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	321	277	27	408	152	332	277	43	152	250	217
RTOR Reduction (vph)	0	0	141	0	38	0	0	0	27	0	0	176
Lane Group Flow (vph)	174	321	136	27	522	0	332	277	16	152	250	41
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Effective Green, g (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Actuated g/C Ratio	0.49	0.49	0.49	0.35	0.35		0.38	0.38	0.38	0.19	0.19	0.19
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	406	887	754	357	1151		391	682	579	204	346	294
v/s Ratio Prot	c0.04	0.18			0.16		c0.12	0.15			0.14	
v/s Ratio Perm	c0.17		0.09	0.03			c0.20		0.01	0.14		0.03
v/c Ratio	0.43	0.36	0.18	0.08	0.45		0.85	0.41	0.03	0.75	0.72	0.14
Uniform Delay, d1	13.6	14.2	12.8	19.6	22.7		22.5	20.6	17.7	34.3	34.2	30.3
Progression Factor	0.33	0.32	0.08	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.5	0.4	1.3		15.1	0.1	0.0	12.1	6.2	0.1
Delay (s)	4.8	5.7	1.5	20.0	24.0		37.6	20.8	17.7	46.5	40.4	30.3
Level of Service	A	A	A	C	C		D	C	B	D	D	C
Approach Delay (s)		4.0			23.8			29.1				38.3
Approach LOS		A			C			C				D

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1480	5	20	1015	120	5	25	35	185	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	16	1609	5	22	1103	130	5	27	38	201	27	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1609	5	22	1103	130	5	27	38	201	27	11
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.5	44.0	44.0	6.5	44.0	44.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.04	0.74	0.01	0.11	0.49	0.12	0.02	0.08	0.12	0.77	0.08	0.04
Control Delay	5.9	17.1	7.0	5.5	10.2	2.4	26.0	27.4	9.5	52.9	27.4	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	17.1	7.0	5.5	10.2	2.4	26.0	27.4	9.5	52.9	27.4	13.7
90th %ile Green (s)	6.0	44.5	44.5	6.0	44.5	44.5	24.0	24.0	24.0	24.0	24.0	24.0
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Max	Max	Max
70th %ile Green (s)	0.0	47.6	47.6	6.0	57.1	57.1	20.9	20.9	20.9	20.9	20.9	20.9
70th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	60.1	60.1	0.0	60.1	60.1	17.9	17.9	17.9	17.9	17.9	17.9
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	63.3	63.3	0.0	63.3	63.3	14.7	14.7	14.7	14.7	14.7	14.7
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	0.0	67.8	67.8	0.0	67.8	67.8	10.2	10.2	10.2	10.2	10.2	10.2
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	2	264	0	3	181	0	2	13	0	109	13	0
Queue Length 95th (ft)	10	#612	6	m10	238	36	11	32	23	171	32	13
Internal Link Dist (ft)	735			1240			357			382		

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	364	2164	970	215	2237	1046	357	483	438	357	483	418
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.74	0.01	0.10	0.49	0.12	0.01	0.06	0.09	0.56	0.06	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	88 (98%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	75											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	15	1480	5	20	1015	120	5	25	35	185	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.22	1.00	1.00	0.08	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	390	3438	1538	147	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	1609	5	22	1103	130	5	27	38	201	27	11
RTOR Reduction (vph)	0	0	2	0	0	49	0	0	31	0	0	9
Lane Group Flow (vph)	16	1609	3	22	1103	81	5	27	7	201	27	2
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	55.8	54.6	54.6	58.2	55.8	55.8	17.5	17.5	17.5	17.5	17.5	17.5
Effective Green, g (s)	55.8	54.6	54.6	58.2	55.8	55.8	17.5	17.5	17.5	17.5	17.5	17.5
Actuated g/C Ratio	0.62	0.61	0.61	0.65	0.62	0.62	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	260	2086	933	137	2132	954	260	352	299	260	352	299
v/s Ratio Prot	0.00	c0.47		c0.00	0.32			0.01			0.01	
v/s Ratio Perm	0.04		0.00	0.10		0.05	0.00		0.00	c0.15		0.00
v/c Ratio	0.06	0.77	0.00	0.16	0.52	0.08	0.02	0.08	0.02	0.77	0.08	0.01
Uniform Delay, d1	7.0	13.1	7.0	10.0	9.6	6.9	29.3	29.6	29.3	34.4	29.6	29.2
Progression Factor	1.00	1.00	1.00	0.81	0.96	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	2.8	0.0	0.2	0.8	0.2	0.0	0.0	0.0	12.2	0.0	0.0
Delay (s)	7.1	15.9	7.0	8.2	10.0	7.4	29.3	29.7	29.4	46.6	29.7	29.2
Level of Service	A	B	A	A	B	A	C	C	C	D	C	C
Approach Delay (s)		15.8			9.7			29.5			43.9	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗	↘		↗	↘		↗	↘		↗	↘
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0			0	225	350
Storage Lanes	1		1	1		0	0			0	1	1
Taper Length (ft)	100		100	100		100	100			100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1620	228	82	473	0	0	0	0	409	783	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	40.0	40.0	15.0	30.0	0.0	0.0	0.0	0.0	35.0	35.0	25.0
Total Split (%)	0.0%	44.4%	44.4%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	38.9%	38.9%	27.8%
Maximum Green (s)		34.0	34.0	11.5	24.0					29.0	29.0	20.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.66	0.26	0.38	0.29					0.86	0.64	
Control Delay		11.1	1.4	35.8	5.1					49.0	17.8	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		11.1	1.4	35.8	5.1					49.0	17.8	
90th %ile Green (s)		37.2	37.2	8.3	36.9					29.0	29.0	7.6
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
70th %ile Green (s)		38.4	38.4	7.1	38.3					29.0	29.0	6.2
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		42.4	42.4	6.2	41.6					25.9	25.9	6.0
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
30th %ile Green (s)		45.9	45.9	6.0	44.9					22.6	22.6	6.0
30th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Min
10th %ile Green (s)		60.5	60.5	0.0	50.0					17.5	17.5	6.0
10th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Min
Queue Length 50th (ft)		272	20	19	56						216	147
Queue Length 95th (ft)		186	m4	77	77						#316	192
Internal Link Dist (ft)		1240			570			622			1008	

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

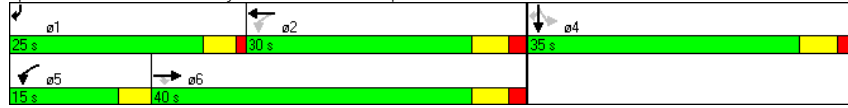


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2463	878	304	1617						555	1622
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.66	0.26	0.27	0.29						0.74	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↓
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	171	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
RTOR Reduction (vph)	0	0	113	0	0	0	0	0	0	0	0	120
Lane Group Flow (vph)	0	1620	115	82	473	0	0	0	0	0	409	663

Turn Type	Perm	pm+pt	Perm	custom
Protected Phases	6	5	2	4
Permitted Phases		6	2	4
Actuated Green, G (s)	44.2	44.2	47.8	24.8
Effective Green, g (s)	44.2	44.2	47.8	24.8
Actuated g/C Ratio	0.49	0.49	0.53	0.28
Clearance Time (s)	6.0	6.0	3.5	6.0
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	2426	755	185	475
v/s Ratio Prot	c0.33	0.03	0.14	c0.05
v/s Ratio Perm		0.07	0.21	0.24
v/c Ratio	0.67	0.15	0.44	0.86
Uniform Delay, d1	17.3	12.6	12.1	31.0
Progression Factor	0.54	0.33	3.64	1.00
Incremental Delay, d2	1.0	0.3	0.6	14.3
Delay (s)	10.4	4.4	44.6	45.3
Level of Service	B	A	D	A
Approach Delay (s)	9.7		10.7	0.0
Approach LOS	A		B	A

Intersection Summary

HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)	30			35			30			30		
Link Distance (ft)	650			1320			746			792		
Travel Time (s)	14.8			25.7			17.0			18.0		
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)	1163	864	0	0	375	359	179	1	98	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1163	864	0	0	375	359	0	180	98	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8					
Permitted Phases					2		8		8			
Detector Phase	1	6			2		8		8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	45.0	70.0	0.0	0.0	25.0	25.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	50.0%	77.8%	0.0%	0.0%	27.8%	27.8%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.88	0.66			0.41	0.57	0.74	0.32				
Control Delay	13.9	10.2			24.6	10.1	55.7		10.6			
Queue Delay	0.0	0.3			0.0	0.0	0.0		0.0			
Total Delay	13.9	10.5			24.6	10.1	55.7		10.6			
90th %ile Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	38.9	63.9			19.0	19.0	14.1	14.1	14.1			
70th %ile Term Code	Gap	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	36.7	64.1			21.4	21.4	13.9	13.9	13.9			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	34.2	66.4			26.2	26.2	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	29.3	68.0			32.7	32.7	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	313	254			95	53	98		0			
Queue Length 95th (ft)	0	309			128	107	#184		43			
Internal Link Dist (ft)	570				1240		666		712			

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	225						150					
Base Capacity (vph)	1445	1313			904	631	268		322			
Starvation Cap Reductn	0	98			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	0.80	0.71			0.41	0.57	0.67		0.30			

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 25 (28%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

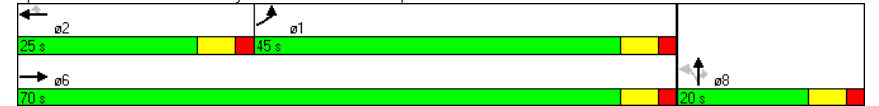
Natural Cycle: 65

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗		↔	↘
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1163	864	0	0	375	359	179	1	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	226	0	0	84	0	0	0
Lane Group Flow (vph)	1163	864	0	0	375	133	0	180	14	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8		8			
Permitted Phases					2		8		8			
Actuated Green, G (s)	35.6	65.3			23.7	23.7	12.7		12.7			
Effective Green, g (s)	35.6	65.3			23.7	23.7	12.7		12.7			
Actuated g/C Ratio	0.40	0.73			0.26	0.26	0.14		0.14			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0		2.0			
Lane Grp Cap (vph)	1319	1313			905	405	243		217			
v/s Ratio Prot	c0.35	c0.48			0.11							
v/s Ratio Perm					0.09		0.10		0.01			
v/c Ratio	0.88	0.66			0.41	0.33	0.74		0.06			
Uniform Delay, d1	25.2	6.5			27.4	26.7	37.1		33.5			
Progression Factor	0.29	1.15			0.80	0.98	1.00		1.00			
Incremental Delay, d2	5.4	1.8			1.4	2.1	10.1		0.0			
Delay (s)	12.6	9.3			23.2	28.3	47.2		33.5			
Level of Service	B	A			C	C	D		C			
Approach Delay (s)		11.2			25.7		42.4			0.0		
Approach LOS		B			C		D			A		

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	150	50	150	50	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)	35				35			30				30
Link Distance (ft)	1320				400			279				455
Travel Time (s)	25.7				7.8			6.3				10.3
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
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8			4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.23	0.26	0.15	0.14	0.25	0.06	0.68	0.04	0.17	0.12	0.04	0.27
Control Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
90th %ile Green (s)	9.7	57.0	57.0	43.8	43.8	43.8	21.0	21.0	21.0	21.0	21.0	21.0
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	7.8	60.8	60.8	49.5	49.5	49.5	17.2	17.2	17.2	17.2	17.2	17.2
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	6.8	63.5	63.5	53.2	53.2	53.2	14.5	14.5	14.5	14.5	14.5	14.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.0	66.3	66.3	56.8	56.8	56.8	11.7	11.7	11.7	11.7	11.7	11.7
30th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	12	37	6	17	75	2	83	5	0	13	5	0
Queue Length 95th (ft)	m30	77	m16	m42	117	m22	135	18	28	34	18	37
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	697	2411	1131	432	2000	917	362	483	446	362	483	474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.26	0.15	0.14	0.25	0.06	0.42	0.02	0.11	0.07	0.02	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 68 (76%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	793	3438	1538	743	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
RTOR Reduction (vph)	0	0	52	0	0	23	0	0	41	0	0	73
Lane Group Flow (vph)	152	636	122	60	495	31	152	11	8	27	11	14
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.70	0.70	0.70	0.58	0.58	0.58	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	631	2410	1078	432	1998	894	225	300	255	225	300	255
v/s Ratio Prot	0.02	c0.18			0.14			0.01				0.01
v/s Ratio Perm	0.15		0.08	0.08		0.02	c0.11		0.01	0.02		0.01
w/c Ratio	0.24	0.26	0.11	0.14	0.25	0.04	0.68	0.04	0.03	0.12	0.04	0.06
Uniform Delay, d1	4.5	4.9	4.4	8.6	9.2	8.1	35.3	31.5	31.5	32.0	31.5	31.6
Progression Factor	0.59	0.74	0.86	1.16	1.21	1.76	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.6	0.3	0.1	6.2	0.0	0.0	0.1	0.0	0.0
Delay (s)	2.7	3.9	3.9	10.6	11.4	14.3	41.4	31.5	31.5	32.1	31.5	31.7
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		3.7			11.6			38.6				31.7
Approach LOS		A			B			D				C

Intersection Summary

HCM Average Control Delay: 11.9 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.34
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 55.6% ICU Level of Service: B
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	158	293	261	16	261	98	207	174	27	98	163	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	293	261	16	359	0	207	174	27	98	163	141
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.26	0.29	0.27	0.04	0.25		0.53	0.31	0.05	0.57	0.61	0.41
Control Delay	3.5	4.4	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	4.4	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
90th %ile Green (s)	12.3	43.2	43.2	27.4	27.4		12.5	34.8	34.8	18.8	18.8	18.8
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	9.7	47.5	47.5	34.3	34.3		12.5	30.5	30.5	14.5	14.5	14.5
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	8.3	49.5	49.5	37.7	37.7		12.5	28.5	28.5	12.5	12.5	12.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	6.9	53.1	53.1	42.7	42.7		11.0	24.9	24.9	10.4	10.4	10.4
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	56.4	56.4	46.9	46.9		8.1	21.6	21.6	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	8	17	0	5	55		87	74	0	53	89	0
Queue Length 95th (ft)	18	36	1	22	105		128	113	16	97	141	47
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	632	1004	969	442	1419		404	764	665	286	442	482
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.29	0.27	0.04	0.25		0.51	0.23	0.04	0.34	0.37	0.29

Intersection Summary

Area Type: Other

Cycle Length: 90

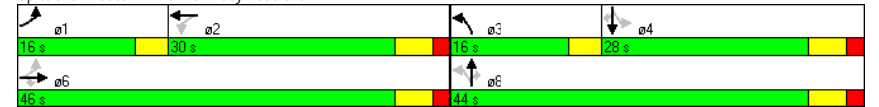
Actuated Cycle Length: 90

Offset: 77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 210: New Lacy Road & CTH MM



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3297		1719	1810	1538	1719	1810	1538
Flt Permitted	0.49	1.00	1.00	0.58	1.00		0.45	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	887	1810	1538	1051	3297		821	1810	1538	1171	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	293	261	16	261	98	207	174	27	98	163	141
RTOR Reduction (vph)	0	0	116	0	34	0	0	0	19	0	0	120
Lane Group Flow (vph)	158	293	145	16	325	0	207	174	8	98	163	21
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Effective Green, g (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Actuated g/C Ratio	0.55	0.55	0.55	0.42	0.42		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	571	1004	853	441	1385		369	565	480	173	267	227
v/s Ratio Prot	0.03	c0.16			0.10		c0.07	0.10				0.09
v/s Ratio Perm	0.13		0.09	0.02			c0.10		0.01	0.08		0.01
v/c Ratio	0.28	0.29	0.17	0.04	0.23		0.56	0.31	0.02	0.57	0.61	0.09
Uniform Delay, d1	9.9	10.7	9.9	15.4	16.8		24.4	23.6	21.4	35.7	35.9	33.1
Progression Factor	0.25	0.31	0.11	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	0.4	0.2	0.4		1.2	0.1	0.0	2.5	2.9	0.1
Delay (s)	2.6	4.0	1.5	15.5	17.2		25.5	23.7	21.4	38.2	38.8	33.2
Level of Service	A	A	A	B	B		C	C	C	D	D	C
Approach Delay (s)		2.8			17.1			24.5				36.7
Approach LOS		A			B			C				D

Intersection Summary				
HCM Average Control Delay		17.5	HCM Level of Service	B
HCM Volume to Capacity ratio		0.37		
Actuated Cycle Length (s)		90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization		61.4%	ICU Level of Service	B
Analysis Period (min)		15		
c Critical Lane Group				

APPENDIX B

Year 2025 Build Traffic – 40% Shift Peak Hour Analysis Outputs

**Year 2025 Build Traffic - 40% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	A	A	A	A	B	A	C	C	C	D	C	C
		PM	A	C	A	B	B	B	C	C	C	D	C	C
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	A	C	B	-	-	-	-	D	D	C
		PM	-	A	A	D	A	-	-	-	-	D	D	C
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	C	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	B	B	B	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	D	C	B	D	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1025	1	45	1580	240	5	25	25	115	25	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	16	1114	1	49	1717	261	5	27	27	125	27	27
Shared Lane Traffic (%)	16	1114	1	49	1717	261	5	27	27	125	27	27
Lane Group Flow (vph)	16	1114	1	49	1717	261	5	27	27	125	27	27
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.07	0.50	0.00	0.13	0.72	0.23	0.03	0.10	0.11	0.62	0.10	0.11
Control Delay	4.6	10.3	7.0	3.1	11.0	1.7	30.2	32.0	12.5	49.3	32.0	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	10.3	7.0	3.1	11.0	1.7	30.2	32.0	12.5	49.3	32.0	12.5
90th %ile Green (s)	6.0	49.4	49.4	6.3	49.7	49.7	18.8	18.8	18.8	18.8	18.8	18.8
90th %ile Term Code	Min	Coord	Coord	Gap	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	53.3	53.3	6.0	62.8	62.8	15.2	15.2	15.2	15.2	15.2	15.2
70th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	55.7	55.7	6.0	65.2	65.2	12.8	12.8	12.8	12.8	12.8	12.8
50th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	67.7	67.7	0.0	67.7	67.7	10.3	10.3	10.3	10.3	10.3	10.3
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	2	171	0	4	261	8	3	14	0	68	14	0
Queue Length 95th (ft)	8	269	2	m8	#566	m38	12	34	21	117	34	21
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	226	2247	1005	370	2395	1136	327	442	396	327	442	396
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.50	0.00	0.13	0.72	0.23	0.02	0.06	0.07	0.38	0.06	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	17 (19%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1025	1	45	1580	240	5	25	25	115	25	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.09	1.00	1.00	0.20	1.00	1.00	1.00	0.74	1.00	0.74	1.00	1.00
Satd. Flow (perm)	156	3438	1538	368	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	1114	1	49	1717	261	5	27	27	125	27	27
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	23	0	0	23
Lane Group Flow (vph)	16	1114	1	49	1717	190	5	27	4	125	27	4
Turn Type	pm+pt	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	58.6	57.4	57.4	63.6	59.9	59.9	13.4	13.4	13.4	13.4	13.4	13.4
Effective Green, g (s)	58.6	57.4	57.4	63.6	59.9	59.9	13.4	13.4	13.4	13.4	13.4	13.4
Actuated g/C Ratio	0.65	0.64	0.64	0.71	0.67	0.67	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	122	2193	981	316	2288	1024	199	269	229	199	269	229
v/s Ratio Prot	0.00	0.32		c0.01	c0.50			0.01			0.01	
v/s Ratio Perm	0.08		0.00	0.10		0.12	0.00		0.00	c0.09		0.00
v/c Ratio	0.13	0.51	0.00	0.16	0.75	0.19	0.03	0.10	0.02	0.63	0.10	0.02
Uniform Delay, d1	8.4	8.7	5.9	4.9	10.1	5.7	32.7	33.1	32.7	36.0	33.1	32.7
Progression Factor	1.00	1.00	1.00	0.68	0.93	0.73	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.8	0.0	0.1	1.6	0.3	0.0	0.1	0.0	4.4	0.1	0.0
Delay (s)	8.5	9.6	5.9	3.4	10.9	4.5	32.7	33.2	32.7	40.4	33.2	32.7
Level of Service	A	A	A	A	B	A	C	C	C	D	C	C
Approach Delay (s)		9.6			9.9			32.9			38.1	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1	1	1			0	0	0	0	1		1
Taper Length (ft)	100	100	100			100	100	100	100	100		100
Right Turn on Red		Yes				Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1082	185	120	793	0	0	0	0	583	1234	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	35.0	35.0	15.0	30.0	0.0	0.0	0.0	0.0	40.0	40.0	20.0
Total Split (%)	0.0%	38.9%	38.9%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	44.4%	44.4%	22.2%
Maximum Green (s)		29.0	29.0	11.5	24.0					34.0	34.0	15.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.60	0.26	0.44	0.69					0.94	0.82	
Control Delay		18.2	1.8	28.0	17.6					52.7	21.0	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		18.2	1.8	28.0	17.6					52.7	21.0	
90th %ile Green (s)		30.0	30.0	10.5	24.0					34.0	34.0	15.5
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Max
70th %ile Green (s)		31.7	31.7	8.8	24.2					34.0	34.0	15.3
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		32.8	32.8	7.7	30.4					34.0	34.0	9.1
50th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
30th %ile Green (s)		35.1	35.1	6.6	32.2					32.8	32.8	8.5
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
10th %ile Green (s)		41.2	41.2	6.0	39.4					27.3	27.3	6.8
10th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		199	5	28	201					306	303	
Queue Length 95th (ft)		171	5	m90	#341					#509	336	
Internal Link Dist (ft)		1240			570			622			1008	

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

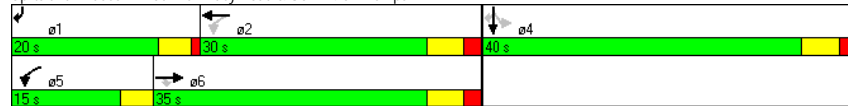


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1793	699	342	1147						651	1635
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		27	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.26	0.35	0.69						0.90	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 49 (54%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑						↓	↓↑
Volume (vph)	0	995	170	110	730	0	0	0	0	535	1	1135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.87	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4723	1538	1719	3438						1723	2707
Flt Permitted		1.00	1.00	0.19	1.00						0.95	1.00
Satd. Flow (perm)		4723	1538	338	3438						1723	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1082	185	120	793	0	0	0	0	582	1	1234
RTOR Reduction (vph)	0	0	115	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	0	1082	70	120	793	0	0	0	0	583	1217	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		34.2	34.2	38.0	30.1						32.4	43.4
Effective Green, g (s)		34.2	34.2	38.0	30.1						32.4	43.4
Actuated g/C Ratio		0.38	0.38	0.42	0.33						0.36	0.48
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1795	584	264	1150						620	1305
v/s Ratio Prot		c0.23		0.04	c0.23							c0.11
v/s Ratio Perm			0.05	0.15							0.34	0.34
v/c Ratio		0.60	0.12	0.45	0.69						0.94	0.93
Uniform Delay, d1		22.4	18.1	16.5	25.9						27.9	21.9
Progression Factor		0.72	0.29	1.95	0.50						1.00	1.00
Incremental Delay, d2		1.4	0.4	0.4	2.7						22.3	12.0
Delay (s)		17.5	5.6	32.6	15.7						50.2	33.9
Level of Service		B	A	C	B						D	C
Approach Delay (s)		15.8			17.9		0.0				39.1	
Approach LOS		B			B		A				D	

Intersection Summary

HCM Average Control Delay: 26.9 HCM Level of Service: C
 HCM Volume to Capacity ratio: 0.90
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 22.5
 Intersection Capacity Utilization: 102.1% ICU Level of Service: G
 Analysis Period (min): 15
 Description: EBT FLU = $995 / (380 * 3) = 0.87$
 c Critical Lane Group

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖			↖ ↗	↖ ↗			↖ ↗			
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	0	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	0	0	1	0	0	0
Taper Length (ft)	100	0	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		650			1320			746			792	
Travel Time (s)		14.8			25.7			17.0			18.0	
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)	821	842	0	0	652	516	261	1	141	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	821	842	0	0	652	516	0	262	141	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.87	0.68			0.57	0.63	0.82	0.35				
Control Delay	16.2	16.8			21.3	7.2	56.0	8.1				
Queue Delay	0.0	0.5			0.0	0.0	0.0	0.0				
Total Delay	16.2	17.3			21.3	7.2	56.0	8.1				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	26.4	59.8			27.4	27.4	18.2	18.2	18.2			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	24.1	62.5			32.4	32.4	15.5	15.5	15.5			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	20.5	66.4			39.9	39.9	11.6	11.6	11.6			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	226	366			154	85	141	0				
Queue Length 95th (ft)	0	m422			183	34	#245	47				
Internal Link Dist (ft)		570			1240		666				712	

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

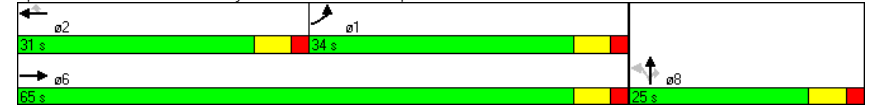


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1234			1144	816		364	436			
Starvation Cap Reductn	0	111			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.79	0.75			0.57	0.63		0.72	0.32			

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑		↑↑	↑↑	↑		↑	↑			
Volume (vph)	755	775	0	0	600	475	240	1	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	821	842	0	0	652	516	261	1	141	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	305	0	0	115	0	0	0
Lane Group Flow (vph)	821	842	0	0	652	211	0	262	26	0	0	0
Turn Type	Prot				Perm	Perm	Perm					
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Actuated Green, G (s)	25.4	61.3			29.9	29.9		16.7	16.7			
Effective Green, g (s)	25.4	61.3			29.9	29.9		16.7	16.7			
Actuated g/C Ratio	0.28	0.68			0.33	0.33		0.19	0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0		2.0	2.0			
Lane Grp Cap (vph)	941	1233			1142	511		320	285			
v/s Ratio Prot	c0.25	c0.47			0.19							
v/s Ratio Perm						0.14		0.15	0.02			
v/c Ratio	0.87	0.68			0.57	0.41		0.82	0.09			
Uniform Delay, d1	30.8	8.6			24.8	23.3		35.2	30.4			
Progression Factor	0.23	1.56			0.73	0.81		1.00	1.00			
Incremental Delay, d2	7.2	1.7			1.9	2.2		14.2	0.1			
Delay (s)	14.2	15.0			20.1	21.1		49.4	30.4			
Level of Service	B	B			C	C		D	C			
Approach Delay (s)		14.6			20.5			42.8		0.0		
Approach LOS		B			C			D		A		

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes		Yes		Yes			Yes
Link Speed (mph)		35			35		30		30			30
Link Distance (ft)		1320			400		279		455			455
Travel Time (s)		25.7			7.8		6.3		10.3			10.3
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
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		4			4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.35	0.30	0.18	0.24	0.45	0.09	0.79	0.04	0.20	0.14	0.03	0.30
Control Delay	6.1	6.6	1.9	17.1	16.3	6.1	49.6	23.7	6.8	25.9	23.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	6.6	1.9	17.1	16.5	6.1	49.6	23.7	6.8	25.9	23.2	6.2
90th %ile Green (s)	11.0	49.3	49.3	34.8	34.8	34.8	28.7	28.7	28.7	28.7	28.7	28.7
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.7	53.9	53.9	41.7	41.7	41.7	24.1	24.1	24.1	24.1	24.1	24.1
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.4	57.2	57.2	46.3	46.3	46.3	20.8	20.8	20.8	20.8	20.8	20.8
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.3	60.7	60.7	50.9	50.9	50.9	17.3	17.3	17.3	17.3	17.3	17.3
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.7	65.7	56.2	56.2	56.2	12.3	12.3	12.3	12.3	12.3	12.3
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	24	73	12	27	129	4	131	7	0	20	5	0
Queue Length 95th (ft)	m46	115	m26	m53	178	m19	193	21	31	41	16	39
Internal Link Dist (ft)		1240			320		199					375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

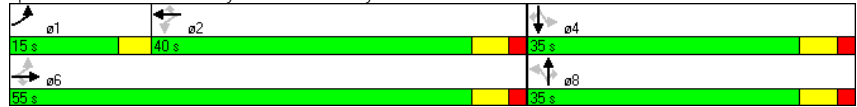


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	489	2191	1047	376	1756	823	437	583	551	436	583	588
Starvation Cap Reductn	0	0	0	0	260	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.30	0.18	0.24	0.53	0.09	0.56	0.03	0.15	0.10	0.02	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 80 (89%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	595	170	85	725	70	225	15	75	40	10	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.28	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	502	3438	1538	735	3438	1538	1358	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	647	185	92	788	76	245	16	82	43	11	136
RTOR Reduction (vph)	0	0	67	0	0	37	0	0	63	0	0	105
Lane Group Flow (vph)	152	647	118	92	788	39	245	16	19	43	11	31
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2		8		4		4
Actuated Green, G (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	57.4	57.4	57.4	46.0	46.0	46.0	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.64	0.64	0.64	0.51	0.51	0.51	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	427	2193	981	376	1757	786	311	414	352	309	414	352
v/s Ratio Prot	c0.03	0.19			c0.23		0.01		0.01		0.01	
v/s Ratio Perm	0.20		0.08	0.13		0.03	c0.18		0.01	0.03		0.02
w/c Ratio	0.36	0.30	0.12	0.24	0.45	0.05	0.79	0.04	0.05	0.14	0.03	0.09
Uniform Delay, d1	7.3	7.3	6.4	12.3	14.0	11.0	32.6	27.0	27.1	27.6	26.9	27.3
Progression Factor	0.65	0.76	1.07	0.98	0.99	1.37	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	1.3	0.7	0.1	11.5	0.0	0.0	0.1	0.0	0.0
Delay (s)	4.9	5.8	7.0	13.3	14.5	15.2	44.1	27.0	27.1	27.7	26.9	27.4
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		5.9			14.4		39.3				27.4	
Approach LOS		A			B		D				C	

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	174	321	277	27	408	152	332	277	43	152	250	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	321	277	27	560	0	332	277	43	152	250	217
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.41	0.36	0.31	0.08	0.47		0.81	0.41	0.07	0.75	0.72	0.46
Control Delay	7.3	6.2	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	6.5	1.0	24.4	23.6		36.5	21.7	5.2	55.6	45.9	7.6
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.4	39.7	39.7	24.8	24.8		13.5	38.3	38.3	21.3	21.3	21.3
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.5	43.0	43.0	30.0	30.0		13.5	35.0	35.0	18.0	18.0	18.0
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.8	46.8	46.8	35.5	35.5		13.5	31.2	31.2	14.2	14.2	14.2
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	52.0	52.0	42.5	42.5		12.1	26.0	26.0	10.4	10.4	10.4
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	13	26	0	10	117		133	111	0	81	133	0
Queue Length 95th (ft)	31	54	0	33	185		#209	163	19	142	202	54
Internal Link Dist (ft)		320			387			197				364

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	451	887	895	357	1187		412	784	691	261	442	540
Starvation Cap Reductn	0	174	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.45	0.31	0.08	0.47		0.81	0.35	0.06	0.58	0.57	0.40
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	84 (93%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
Splits and Phases: 210: New Lacy Road & CTH MM												
Phase	ø1	ø2	ø3	ø4	ø6	ø8						
Duration	15 s	30 s	17 s	28 s	45 s	45 s						

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	295	255	25	375	140	305	255	40	140	230	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3298		1719	1810	1538	1719	1810	1538
Flt Permitted	0.33	1.00	1.00	0.57	1.00		0.33	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	594	1810	1538	1024	3298		605	1810	1538	1066	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	321	277	27	408	152	332	277	43	152	250	217
RTOR Reduction (vph)	0	0	141	0	38	0	0	0	27	0	0	176
Lane Group Flow (vph)	174	321	136	27	522	0	332	277	16	152	250	41
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Effective Green, g (s)	44.1	44.1	44.1	31.4	31.4		33.9	33.9	33.9	17.2	17.2	17.2
Actuated g/C Ratio	0.49	0.49	0.49	0.35	0.35		0.38	0.38	0.38	0.19	0.19	0.19
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	406	887	754	357	1151		391	682	579	204	346	294
v/s Ratio Prot	c0.04	0.18			0.16		c0.12	0.15			0.14	
v/s Ratio Perm	c0.17		0.09	0.03			c0.20		0.01	0.14		0.03
v/c Ratio	0.43	0.36	0.18	0.08	0.45		0.85	0.41	0.03	0.75	0.72	0.14
Uniform Delay, d1	13.6	14.2	12.8	19.6	22.7		22.5	20.6	17.7	34.3	34.2	30.3
Progression Factor	0.33	0.32	0.08	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.5	0.4	1.3		15.1	0.1	0.0	12.1	6.2	0.1
Delay (s)	4.8	5.7	1.5	20.0	24.0		37.6	20.8	17.7	46.5	40.4	30.3
Level of Service	A	A	A	C	C		D	C	B	D	D	C
Approach Delay (s)		4.0			23.8			29.1				38.3
Approach LOS		A			C			C				D

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1410	5	30	965	160	5	25	45	245	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red		Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		815			1320			437			462	
Travel Time (s)		18.5			30.0			9.9			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
Adj. Flow (vph)	22	1533	5	33	1049	174	5	27	49	266	27	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1533	5	33	1049	174	5	27	49	266	27	16
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	47.0	47.0	10.0	47.0	47.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	11.1%	52.2%	52.2%	11.1%	52.2%	52.2%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Maximum Green (s)	6.5	41.0	41.0	6.5	41.0	41.0	27.0	27.0	27.0	27.0	27.0	27.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.07	0.79	0.01	0.17	0.52	0.18	0.02	0.06	0.12	0.84	0.06	0.04
Control Delay	7.4	22.0	8.2	8.0	13.4	3.8	23.2	24.3	7.9	54.3	24.3	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	22.0	8.2	8.0	13.4	3.8	23.2	24.3	7.9	54.3	24.3	10.9
90th %ile Green (s)	6.0	41.3	41.3	6.2	41.5	41.5	27.0	27.0	27.0	27.0	27.0	27.0
90th %ile Term Code	Min	Coord	Coord	Gap	Coord	Coord	Hold	Hold	Hold	Max	Max	Max
70th %ile Green (s)	6.0	42.9	42.9	6.0	42.9	42.9	25.6	25.6	25.6	25.6	25.6	25.6
70th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	46.3	46.3	6.0	55.8	55.8	22.2	22.2	22.2	22.2	22.2	22.2
50th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	59.3	59.3	0.0	59.3	59.3	18.7	18.7	18.7	18.7	18.7	18.7
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	0.0	64.6	64.6	0.0	64.6	64.6	13.4	13.4	13.4	13.4	13.4	13.4
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	4	381	0	7	176	9	2	12	0	143	12	0
Queue Length 95th (ft)	14	#602	6	m18	228	39	10	30	25	219	30	15
Internal Link Dist (ft)		735			1240			357			382	

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	346	1944	872	206	2018	975	402	543	496	402	543	473
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.79	0.01	0.16	0.52	0.18	0.01	0.05	0.10	0.66	0.05	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	1 (1%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	80											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	20	1410	5	30	965	160	5	25	45	245	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.22	1.00	1.00	0.08	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	392	3438	1538	143	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1533	5	33	1049	174	5	27	49	266	27	16
RTOR Reduction (vph)	0	0	2	0	0	76	0	0	37	0	0	12
Lane Group Flow (vph)	22	1533	3	33	1049	98	5	27	12	266	27	4
Turn Type	pm+pt	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6	5	2	2	8	8	8	4	4	4	4
Permitted Phases	6	6	2	6	2	8	8	8	4	4	4	4
Actuated Green, G (s)	51.9	49.5	49.5	54.3	50.7	50.7	21.4	21.4	21.4	21.4	21.4	21.4
Effective Green, g (s)	51.9	49.5	49.5	54.3	50.7	50.7	21.4	21.4	21.4	21.4	21.4	21.4
Actuated g/C Ratio	0.58	0.55	0.55	0.60	0.56	0.56	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	261	1891	846	149	1937	866	318	430	366	318	430	366
v/s Ratio Prot	0.00	c0.45		c0.01	0.31			0.01			0.01	
v/s Ratio Perm	0.05		0.00	0.12		0.06	0.00		0.01	c0.20		0.00
v/c Ratio	0.08	0.81	0.00	0.22	0.54	0.11	0.02	0.06	0.03	0.84	0.06	0.01
Uniform Delay, d1	8.8	16.4	9.1	12.1	12.3	9.2	26.2	26.5	26.3	32.6	26.5	26.2
Progression Factor	1.00	1.00	1.00	0.89	0.94	1.42	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	3.9	0.0	0.3	1.0	0.2	0.0	0.0	0.0	16.4	0.0	0.0
Delay (s)	8.8	20.3	9.1	11.1	12.6	13.3	26.2	26.6	26.4	49.1	26.6	26.2
Level of Service	A	C	A	B	B	C	C	C	C	D	C	C
Approach Delay (s)		20.1			12.7			26.4			45.9	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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Synchro 7 - Report

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225	0	0	0	0	0	0	225	350	350
Storage Lanes	1	1	1	0	0	0	0	0	0	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Link Speed (mph)		30		30		30		30		30		30
Link Distance (ft)		1320		650		702		1088		1088		1088
Travel Time (s)		30.0		14.8		16.0		24.7		24.7		24.7
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
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6	5	2						4	1	
Permitted Phases		6	2							4	4	
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	40.0	40.0	15.0	30.0	0.0	0.0	0.0	0.0	35.0	35.0	25.0
Total Split (%)	0.0%	44.4%	44.4%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	38.9%	38.9%	27.8%
Maximum Green (s)		34.0	34.0	11.5	24.0					29.0	29.0	20.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.66	0.26	0.38	0.29					0.86	0.64	
Control Delay		9.5	0.7	35.8	5.1					49.0	17.8	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		9.5	0.7	35.8	5.1					49.0	17.8	
90th %ile Green (s)		37.2	37.2	8.3	36.9					29.0	29.0	7.6
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
70th %ile Green (s)		38.4	38.4	7.1	38.3					29.0	29.0	6.2
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		42.4	42.4	6.2	41.6					25.9	25.9	6.0
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
30th %ile Green (s)		45.9	45.9	6.0	44.9					22.6	22.6	6.0
30th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Min
10th %ile Green (s)		60.5	60.5	0.0	50.0					17.5	17.5	6.0
10th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Min
Queue Length 50th (ft)		110	0	19	56							216
Queue Length 95th (ft)		165	m1	77	77							#316
Internal Link Dist (ft)		1240			570					622		1008

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Synchro 7 - Report

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

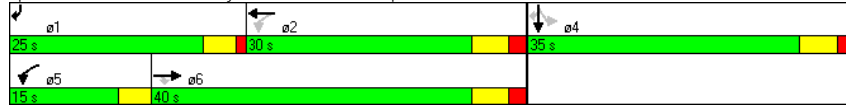


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2463	878	304	1617						555	1622
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.66	0.26	0.27	0.29						0.74	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑	↑↑					↓	↑↑
Volume (vph)	0	1490	210	75	435	0	0	0	0	375	1	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	171	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1620	228	82	473	0	0	0	0	408	1	783
RTOR Reduction (vph)	0	0	113	0	0	0	0	0	0	0	0	120
Lane Group Flow (vph)	0	1620	115	82	473	0	0	0	0	0	409	663

Turn Type	Perm	pm+pt	Perm	custom
Protected Phases	6	5	2	4
Permitted Phases		6	2	4
Actuated Green, G (s)	44.2	44.2	47.8	24.8
Effective Green, g (s)	44.2	44.2	47.8	24.8
Actuated g/C Ratio	0.49	0.49	0.53	0.28
Clearance Time (s)	6.0	6.0	3.5	6.0
Vehicle Extension (s)	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	2426	755	185	475
v/s Ratio Prot	c0.33	0.03	0.14	c0.05
v/s Ratio Perm		0.07	0.21	0.24
v/c Ratio	0.67	0.15	0.44	0.86
Uniform Delay, d1	17.3	12.6	12.1	31.0
Progression Factor	0.46	0.09	3.64	1.00
Incremental Delay, d2	0.9	0.3	0.6	14.3
Delay (s)	8.9	1.4	44.6	45.3
Level of Service	A	A	D	D
Approach Delay (s)	8.0		10.7	33.6
Approach LOS	A		B	C

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)	30			35			30			30		
Link Distance (ft)	650			1320			746			792		
Travel Time (s)	14.8			25.7			17.0			18.0		
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)	1163	864	0	0	375	359	179	1	98	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1163	864	0	0	375	359	0	180	98	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8					
Permitted Phases					2		8		8			
Detector Phase	1	6			2		8		8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	45.0	70.0	0.0	0.0	25.0	25.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	50.0%	77.8%	0.0%	0.0%	27.8%	27.8%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.88	0.66			0.41	0.57	0.74	0.74	0.32			
Control Delay	13.7	10.2			24.6	10.1	55.7		10.6			
Queue Delay	0.0	0.3			0.0	0.0	0.0		0.0			
Total Delay	13.7	10.5			24.6	10.1	55.7		10.6			
90th %ile Green (s)	39.0	64.0			19.0	19.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	38.9	63.9			19.0	19.0	14.1	14.1	14.1			
70th %ile Term Code	Gap	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	36.7	64.1			21.4	21.4	13.9	13.9	13.9			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	34.2	66.4			26.2	26.2	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	29.3	68.0			32.7	32.7	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	253	254			95	53	98		0			
Queue Length 95th (ft)	0	309			128	107	#184		43			
Internal Link Dist (ft)	570				1240		666		712			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	225						150					
Base Capacity (vph)	1445	1313			904	631	268		322			
Starvation Cap Reductn	0	98			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	0.80	0.71			0.41	0.57	0.67		0.30			
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	25 (28%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green											
Natural Cycle:	65											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps												

HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗			
Volume (vph)	1070	795	0	0	345	330	165	1	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1163	864	0	0	375	359	179	1	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	226	0	0	84	0	0	0
Lane Group Flow (vph)	1163	864	0	0	375	133	0	180	14	0	0	0
Turn Type	Prot				Perm	Perm	Perm	Perm				
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Actuated Green, G (s)	35.6	65.3			23.7	23.7		12.7	12.7			
Effective Green, g (s)	35.6	65.3			23.7	23.7		12.7	12.7			
Actuated g/C Ratio	0.40	0.73			0.26	0.26		0.14	0.14			
Clearance Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0		2.0	2.0			
Lane Grp Cap (vph)	1319	1313			905	405		243	217			
v/s Ratio Prot	c0.35	c0.48			0.11							
v/s Ratio Perm						0.09		0.10	0.01			
v/c Ratio	0.88	0.66			0.41	0.33		0.74	0.06			
Uniform Delay, d1	25.2	6.5			27.4	26.7		37.1	33.5			
Progression Factor	0.28	1.15			0.80	0.98		1.00	1.00			
Incremental Delay, d2	5.4	1.8			1.4	2.1		10.1	0.0			
Delay (s)	12.4	9.3			23.2	28.3		47.2	33.5			
Level of Service	B	A			C	C		D	C			
Approach Delay (s)		11.1			25.7			42.4		0.0		
Approach LOS		B			C			D		A		

Intersection Summary		
HCM Average Control Delay	17.5	HCM Level of Service
HCM Volume to Capacity ratio	0.81	
Actuated Cycle Length (s)	90.0	Sum of lost time (s)
Intersection Capacity Utilization	75.2%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	150	50	150	50	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2			8				4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.23	0.26	0.15	0.14	0.25	0.06	0.68	0.04	0.17	0.12	0.04	0.27
Control Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	4.3	1.1	13.5	12.6	6.3	49.8	28.8	10.1	30.9	28.8	9.0
90th %ile Green (s)	9.7	57.0	57.0	43.8	43.8	43.8	21.0	21.0	21.0	21.0	21.0	21.0
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	7.8	60.8	60.8	49.5	49.5	49.5	17.2	17.2	17.2	17.2	17.2	17.2
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	6.8	63.5	63.5	53.2	53.2	53.2	14.5	14.5	14.5	14.5	14.5	14.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.0	66.3	66.3	56.8	56.8	56.8	11.7	11.7	11.7	11.7	11.7	11.7
30th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	12	37	6	17	75	2	83	5	0	13	5	0
Queue Length 95th (ft)	m30	77	m16	m42	117	m22	135	18	28	34	18	37
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	697	2411	1131	432	2000	917	362	483	446	362	483	474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.26	0.15	0.14	0.25	0.06	0.42	0.02	0.11	0.07	0.02	0.18

Intersection Summary

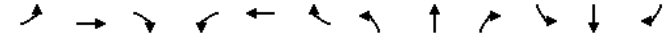
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 68 (76%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	585	160	55	455	50	140	10	45	25	10	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.41	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	793	3438	1538	743	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	636	174	60	495	54	152	11	49	27	11	87
RTOR Reduction (vph)	0	0	52	0	0	23	0	0	41	0	0	73
Lane Group Flow (vph)	152	636	122	60	495	31	152	11	8	27	11	14
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2		8		8	4	
Actuated Green, G (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	63.1	63.1	63.1	52.3	52.3	52.3	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.70	0.70	0.70	0.58	0.58	0.58	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	631	2410	1078	432	1998	894	225	300	255	225	300	255
v/s Ratio Prot	0.02	c0.18			0.14			0.01				0.01
v/s Ratio Perm	0.15		0.08	0.08		0.02	c0.11		0.01	0.02		0.01
w/c Ratio	0.24	0.26	0.11	0.14	0.25	0.04	0.68	0.04	0.03	0.12	0.04	0.06
Uniform Delay, d1	4.5	4.9	4.4	8.6	9.2	8.1	35.3	31.5	31.5	32.0	31.5	31.6
Progression Factor	0.59	0.74	0.86	1.16	1.21	1.76	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.6	0.3	0.1	6.2	0.0	0.0	0.1	0.0	0.0
Delay (s)	2.7	3.9	3.9	10.6	11.4	14.3	41.4	31.5	31.5	32.1	31.5	31.7
Level of Service	A	A	A	B	B	B	D	C	C	C	C	C
Approach Delay (s)		3.7			11.6			38.6				31.7
Approach LOS		A			B			D				C

Intersection Summary

HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	158	293	261	16	261	98	207	174	27	98	163	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	293	261	16	359	0	207	174	27	98	163	141
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.26	0.29	0.27	0.04	0.25		0.53	0.31	0.05	0.57	0.61	0.41
Control Delay	3.6	4.6	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	4.6	0.9	19.9	16.2		26.5	24.0	7.3	48.0	45.5	9.4
90th %ile Green (s)	12.3	43.2	43.2	27.4	27.4		12.5	34.8	34.8	18.8	18.8	18.8
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	9.7	47.5	47.5	34.3	34.3		12.5	30.5	30.5	14.5	14.5	14.5
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	8.3	49.5	49.5	37.7	37.7		12.5	28.5	28.5	12.5	12.5	12.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	6.9	53.1	53.1	42.7	42.7		11.0	24.9	24.9	10.4	10.4	10.4
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	56.4	56.4	46.9	46.9		8.1	21.6	21.6	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	8	17	0	5	55		87	74	0	53	89	0
Queue Length 95th (ft)	18	36	1	22	105		128	113	16	97	141	47
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	632	1004	969	442	1419		404	764	665	286	442	482
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.29	0.27	0.04	0.25		0.51	0.23	0.04	0.34	0.37	0.29
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑	↗	↘	↗	↘	↘	↑	↗	↘	↑	↗
Volume (vph)	145	270	240	15	240	90	190	160	25	90	150	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3297		1719	1810	1538	1719	1810	1538
Flt Permitted	0.49	1.00	1.00	0.58	1.00		0.45	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	887	1810	1538	1051	3297		821	1810	1538	1171	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	293	261	16	261	98	207	174	27	98	163	141
RTOR Reduction (vph)	0	0	116	0	34	0	0	0	19	0	0	120
Lane Group Flow (vph)	158	293	145	16	325	0	207	174	8	98	163	21
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Effective Green, g (s)	49.9	49.9	49.9	37.8	37.8		28.1	28.1	28.1	13.3	13.3	13.3
Actuated g/C Ratio	0.55	0.55	0.55	0.42	0.42		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	571	1004	853	441	1385		369	565	480	173	267	227
v/s Ratio Prot	0.03	c0.16			0.10		c0.07	0.10				0.09
v/s Ratio Perm	0.13		0.09	0.02			c0.10		0.01	0.08		0.01
v/c Ratio	0.28	0.29	0.17	0.04	0.23		0.56	0.31	0.02	0.57	0.61	0.09
Uniform Delay, d1	9.9	10.7	9.9	15.4	16.8		24.4	23.6	21.4	35.7	35.9	33.1
Progression Factor	0.25	0.32	0.11	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	0.4	0.2	0.4		1.2	0.1	0.0	2.5	2.9	0.1
Delay (s)	2.6	4.1	1.5	15.5	17.2		25.5	23.7	21.4	38.2	38.8	33.2
Level of Service	A	A	A	B	B		C	C	C	D	D	C
Approach Delay (s)		2.8			17.1			24.5				36.7
Approach LOS		A			B			C				D

Intersection Summary				
HCM Average Control Delay		17.5	HCM Level of Service	B
HCM Volume to Capacity ratio		0.37		
Actuated Cycle Length (s)		90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization		61.4%	ICU Level of Service	B
Analysis Period (min)		15		
c Critical Lane Group				

APPENDIX C

2035 BUILD TRAFFIC PEAK HOUR ANALYSIS OUTPUTS

APPENDIX C

Year 2035 Build Traffic – 10% Shift Peak Hour Analysis Outputs

**Year 2035 Build Traffic - 10% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	B	A	A	A	A	A	D	D	D	D	D	D
		PM	A	B	A	A	A	A	D	D	D	D	D	D
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	B	D	C	-	-	-	-	D	D	D
		PM	-	B	A	D	A	-	-	-	-	D	D	D
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	B	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	A	A	A	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	C	C	B	C	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	5	1260	1	15	2060	75	1	25	5	35	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30				30			30
Link Distance (ft)		815			1320				437			462
Travel Time (s)		18.5			30.0				9.9			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
Adj. Flow (vph)	5	1370	1	16	2239	82	1	27	5	38	27	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1370	1	16	2239	82	1	27	5	38	27	11
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.03	0.48	0.00	0.05	0.78	0.06	0.01	0.13	0.03	0.25	0.13	0.06
Control Delay	2.4	5.2	4.0	1.9	9.0	1.7	36.0	37.8	22.6	41.3	37.8	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	5.2	4.0	1.9	9.0	1.7	36.0	37.8	22.6	41.3	37.8	19.8
90th %ile Green (s)	6.0	58.2	58.2	6.0	58.2	58.2	10.3	10.3	10.3	10.3	10.3	10.3
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
70th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
50th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	133	0	1	375	0	1	14	0	20	14	0
Queue Length 95th (ft)	2	275	2	m2	m#846	m5	5	39	10	51	39	16
Internal Link Dist (ft)		735			1240			357			382	

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	209	2859	1279	364	2859	1288	327	442	380	327	442	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.48	0.00	0.04	0.78	0.06	0.00	0.06	0.01	0.12	0.06	0.03

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 16 (18%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 175: New Lacy Road & Ninebark Road



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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	5	1260	1	15	2060	75	1	25	5	35	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.06	1.00	1.00	0.17	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	108	3438	1538	309	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1370	1	16	2239	82	1	27	5	38	27	11
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	5	0	0	10
Lane Group Flow (vph)	5	1370	1	16	2239	69	1	27	0	38	27	11
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4	4	
Actuated Green, G (s)	68.4	67.2	67.2	68.4	67.2	67.2	6.1	6.1	6.1	6.1	6.1	6.1
Effective Green, g (s)	68.4	67.2	67.2	68.4	67.2	67.2	6.1	6.1	6.1	6.1	6.1	6.1
Actuated g/C Ratio	0.76	0.75	0.75	0.76	0.75	0.75	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	104	2567	1148	254	2567	1148	91	123	104	91	123	104
v/s Ratio Prot	0.00	0.40		c0.00	c0.65			0.01			0.01	
v/s Ratio Perm	0.04		0.00	0.05		0.04	0.00		0.00	c0.03		0.00
v/c Ratio	0.05	0.53	0.00	0.06	0.87	0.06	0.01	0.22	0.00	0.42	0.22	0.01
Uniform Delay, d1	10.5	4.8	2.9	3.1	8.3	3.0	39.1	39.7	39.1	40.2	39.7	39.1
Progression Factor	1.00	1.00	1.00	0.81	0.90	0.78	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	0.0	0.0	2.0	0.0	0.0	0.3	0.0	1.1	0.3	0.0
Delay (s)	10.5	5.6	2.9	2.5	9.4	2.4	39.2	40.0	39.1	41.4	40.0	39.1
Level of Service	B	A	A	A	A	A	D	D	D	D	D	D
Approach Delay (s)		5.6			9.1			39.9			40.6	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1	1	1			0	0	0	0	1		1
Taper Length (ft)	100	100	100			100	100	100	100	100		100
Right Turn on Red		Yes				Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1207	207	190	940	0	0	0	0	512	1397	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases		6	2							4	4	
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	36.0	36.0	18.0	32.0	0.0	0.0	0.0	0.0	36.0	36.0	22.0
Total Split (%)	0.0%	40.0%	40.0%	20.0%	35.6%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%	24.4%
Maximum Green (s)		30.0	30.0	14.5	26.0					30.0	30.0	17.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.61	0.28	0.61	0.92					0.93	0.88	
Control Delay		20.1	3.5	37.2	25.7					56.1	23.4	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		20.1	3.5	37.2	25.7					56.1	23.4	
90th %ile Green (s)		30.0	30.0	14.5	26.0					30.0	30.0	17.5
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		32.5	32.5	12.0	26.0					30.0	30.0	17.5
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Max
50th %ile Green (s)		34.9	34.9	9.6	26.0					30.0	30.0	17.5
50th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Max
30th %ile Green (s)		37.3	37.3	8.0	26.0					29.2	29.2	18.3
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Max
10th %ile Green (s)		44.6	44.6	6.0	30.3					23.9	23.9	19.3
10th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		202	22	68	289					273	340	
Queue Length 95th (ft)		273	35	m95	#420					#460	468	
Internal Link Dist (ft)		1240			570			622			1008	

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

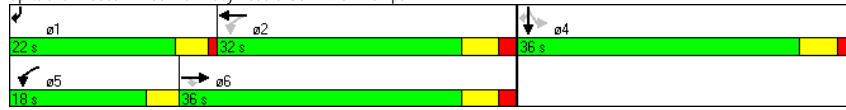


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1968	738	394	1026						574	1592
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		5	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.28	0.48	0.92						0.89	0.88

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 48 (53%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis

180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑						↓	↓↑
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.20	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	361	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	1207	83	190	940	0	0	0	0	0	512	1386
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		35.9	35.9	36.9	26.9						28.6	46.6
Effective Green, g (s)		35.9	35.9	36.9	26.9						28.6	46.6
Actuated g/C Ratio		0.40	0.40	0.41	0.30						0.32	0.52
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1971	613	299	1028						548	1402
v/s Ratio Prot		0.24		0.07	c0.27							c0.20
v/s Ratio Perm			0.05	0.19							0.30	0.31
v/c Ratio		0.61	0.13	0.64	0.91						0.93	0.99
Uniform Delay, d1		21.5	17.2	17.7	30.4						29.8	21.4
Progression Factor		0.82	0.78	2.68	0.46						1.00	1.00
Incremental Delay, d2		1.3	0.4	2.0	9.2						23.0	21.1
Delay (s)		19.0	13.7	49.3	23.2						52.8	42.5
Level of Service		B	B	D	C						D	D
Approach Delay (s)		18.3			27.6		0.0				45.3	
Approach LOS		B			C		A				D	

Intersection Summary

HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	870	848	0	0	859	478	272	1	168	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	870	848	0	0	859	478	0	273	168	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.89	0.69			0.79	0.60	0.83	0.39				
Control Delay	18.5	15.8			27.8	5.6	57.1	8.0				
Queue Delay	0.0	0.3			0.0	0.0	0.0	0.0				
Total Delay	18.5	16.0			27.8	5.6	57.1	8.0				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	27.9	59.0			25.1	25.1	19.0	19.0	19.0			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	25.6	61.8			30.2	30.2	16.2	16.2	16.2			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	21.9	65.8			37.9	37.9	12.2	12.2	12.2			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	236	319			251	42	146	0				
Queue Length 95th (ft)	0	m373			#352	20	#262	51				
Internal Link Dist (ft)		570			1240		666					712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1225			1094	798			364			457
Starvation Cap Reductn	0	69			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	0.84	0.73			0.79	0.60			0.75			0.37

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Natural Cycle: 75

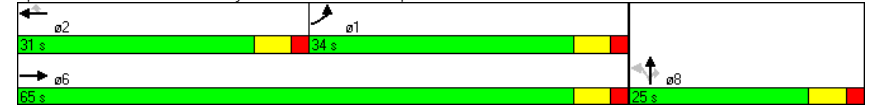
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗			
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	870	848	0	0	859	478	272	1	168	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	309	0	0	136	0	0	0
Lane Group Flow (vph)	870	848	0	0	859	169	0	273	32	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8		8			
Permitted Phases						2	8		8			
Actuated Green, G (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Effective Green, g (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Actuated g/C Ratio	0.29	0.68			0.32	0.32	0.19		0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0		2.0			
Lane Grp Cap (vph)	975	1225			1093	489	328		292			
v/s Ratio Prot	0.26	0.47			0.25							
v/s Ratio Perm						0.11			0.16			0.02
v/c Ratio	0.89	0.69			0.79	0.35	0.83		0.11			
Uniform Delay, d1	30.5	8.9			27.9	23.5	35.1		30.2			
Progression Factor	0.25	1.39			0.75	0.72	1.00		1.00			
Incremental Delay, d2	8.3	1.9			5.0	1.7	15.7		0.1			
Delay (s)	16.0	14.2			25.9	18.7	50.7		30.2			
Level of Service	B	B			C	B	D		C			
Approach Delay (s)		15.1			23.3		42.9				0.0	
Approach LOS		B			C		D				A	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	
HCM Volume to Capacity ratio	0.84	C	
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	79.0%	ICU Level of Service	
Analysis Period (min)	15	D	
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8			4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.44	0.31	0.17	0.35	0.53	0.14	0.80	0.04	0.26	0.26	0.04	0.34
Control Delay	6.3	5.2	1.3	14.7	13.2	2.8	50.1	23.3	6.1	27.8	23.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.2	1.3	14.7	13.3	2.8	50.1	23.3	6.1	27.8	23.3	5.9
90th %ile Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord	Coord	Max	Max	Max	Hold	Hold	Hold
70th %ile Green (s)	9.3	53.1	53.1	40.3	40.3	40.3	24.9	24.9	24.9	24.9	24.9	24.9
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.8	56.5	56.5	45.2	45.2	45.2	21.5	21.5	21.5	21.5	21.5	21.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.6	60.0	60.0	49.9	49.9	49.9	18.0	18.0	18.0	18.0	18.0	18.0
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.2	65.2	55.7	55.7	55.7	12.8	12.8	12.8	12.8	12.8	12.8
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	16	45	5	28	112	3	136	7	0	38	7	0
Queue Length 95th (ft)	m47	115	m20	m55	157	m6	201	21	37	68	21	43
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

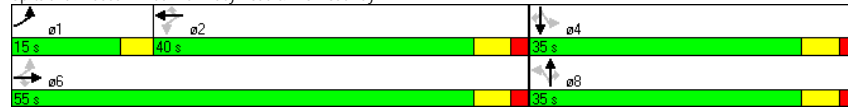


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200	200	200	200	200	200	150	150	50	150	50	50
Base Capacity (vph)	434	2168	1036	360	1720	829	436	583	577	436	583	609
Starvation Cap Reductn	0	0	0	0	155	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.31	0.17	0.35	0.58	0.14	0.58	0.03	0.21	0.19	0.03	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.22	1.00	1.00	0.40	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	404	3438	1538	720	3438	1538	1352	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
RTOR Reduction (vph)	0	0	66	0	0	60	0	0	92	0	0	128
Lane Group Flow (vph)	168	668	113	125	913	60	255	16	28	82	16	40
Turn Type	pm+pt		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6			2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Effective Green, g (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.63	0.63	0.63	0.50	0.50	0.50	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	375	2170	971	361	1723	771	318	426	362	318	426	362
v/s Ratio Prot	c0.04	0.19			c0.27			0.01				0.01
v/s Ratio Perm	0.24		0.07	0.17		0.04	c0.19		0.02	0.06		0.03
w/c Ratio	0.45	0.31	0.12	0.35	0.53	0.08	0.80	0.04	0.08	0.26	0.04	0.11
Uniform Delay, d1	8.3	7.6	6.6	13.6	15.2	11.7	32.4	26.5	26.8	28.0	26.5	27.0
Progression Factor	0.50	0.57	0.67	0.71	0.71	0.71	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.2	2.1	0.9	0.2	12.8	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.4	4.6	4.6	11.8	11.8	8.4	45.2	26.5	26.8	28.2	26.5	27.0
Level of Service	A	A	A	B	B	A	D	C	C	C	C	C
Approach Delay (s)		4.6			11.4		38.8					27.4
Approach LOS		A			B		D					C

Intersection Summary

HCM Average Control Delay: 14.2 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.60
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.5
 Intersection Capacity Utilization: 64.8% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		400			467			277			444	
Travel Time (s)		7.8			9.1			6.3			10.1	
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)	196	418	255	27	620	65	288	288	60	71	283	250
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	418	255	27	685	0	288	288	60	71	283	250
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.54	0.48	0.29	0.09	0.59		0.74	0.42	0.10	0.33	0.78	0.49
Control Delay	12.8	9.9	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
Queue Delay	0.0	0.4	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	10.2	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.7	39.2	39.2	24.0	24.0		13.5	38.8	38.8	21.8	21.8	21.8
70th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	10.3	41.8	41.8	28.0	28.0		13.5	36.2	36.2	19.2	19.2	19.2
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.5	45.5	45.5	33.5	33.5		13.4	32.5	32.5	15.6	15.6	15.6
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.2	52.2	52.2	42.5	42.5		10.6	25.8	25.8	11.7	11.7	11.7
10th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	23	54	0	11	172		109	114	0	34	151	0
Queue Length 95th (ft)	53	93	8	33	249		164	170	22	71	230	58
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	392	876	876	317	1153		395	784	700	258	442	565
Starvation Cap Reductn	0	131	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.56	0.29	0.09	0.59		0.73	0.37	0.09	0.28	0.64	0.44
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	80 (89%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
Splits and Phases:	210: New Lacy Road & CTH MM											

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3389		1719	1810	1538	1719	1810	1538
Flt Permitted	0.25	1.00	1.00	0.52	1.00		0.29	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	448	1810	1538	937	3389		525	1810	1538	1056	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	418	255	27	620	65	288	288	60	71	283	250
RTOR Reduction (vph)	0	0	132	0	8	0	0	0	37	0	0	200
Lane Group Flow (vph)	196	418	123	27	677	0	288	288	23	71	283	50
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Effective Green, g (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Actuated g/C Ratio	0.48	0.48	0.48	0.34	0.34		0.38	0.38	0.38	0.20	0.20	0.20
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	352	875	743	316	1145		372	694	590	212	364	309
v/s Ratio Prot	c0.06	0.23			0.20		c0.11	0.16			0.16	
v/s Ratio Perm	c0.21		0.08	0.03			c0.19		0.01	0.07		0.03
v/c Ratio	0.56	0.48	0.17	0.09	0.59		0.77	0.41	0.04	0.33	0.78	0.16
Uniform Delay, d1	14.7	15.6	13.1	20.3	24.7		21.5	20.3	17.4	30.8	34.0	29.7
Progression Factor	0.54	0.47	0.18	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.8	0.5	0.5	2.2		8.9	0.1	0.0	0.3	9.2	0.1
Delay (s)	9.0	9.1	2.8	20.9	26.9		30.3	20.5	17.4	31.1	43.2	29.8
Level of Service	A	A	A	C	C		C	C	B	C	D	C
Approach Delay (s)		7.2			26.7			24.6			36.2	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1925	1	10	1230	45	1	25	15	75	25	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	11	2092	1	11	1337	49	1	27	16	82	27	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	2092	1	11	1337	49	1	27	16	82	27	5
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.5	44.0	44.0	6.5	44.0	44.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.03	0.79	0.00	0.06	0.50	0.04	0.01	0.12	0.08	0.51	0.12	0.03
Control Delay	3.1	12.8	5.0	2.5	6.1	1.5	33.0	35.3	16.1	47.5	35.3	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	12.8	5.0	2.5	6.1	1.5	33.0	35.3	16.1	47.5	35.3	20.6
90th %ile Green (s)	6.0	53.7	53.7	6.0	53.7	53.7	14.8	14.8	14.8	14.8	14.8	14.8
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	66.1	66.1	0.0	66.1	66.1	11.9	11.9	11.9	11.9	11.9	11.9
70th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	68.1	68.1	0.0	68.1	68.1	9.9	9.9	9.9	9.9	9.9	9.9
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	69.0	69.0	0.0	69.0	69.0	9.0	9.0	9.0	9.0	9.0	9.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	311	0	1	95	0	1	14	0	45	14	0
Queue Length 95th (ft)	5	#808	2	m2	295	m9	5	37	18	86	37	10
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	349	2650	1186	206	2650	1197	357	483	422	357	483	414
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.79	0.00	0.05	0.50	0.04	0.00	0.06	0.04	0.23	0.06	0.01
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	1 (1%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	80											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1925	1	10	1230	45	1	25	15	75	25	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.17	1.00	1.00	0.06	1.00	1.00	0.74	1.00	0.74	1.00	1.00	1.00
Satd. Flow (perm)	309	3438	1538	113	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	2092	1	11	1337	49	1	27	16	82	27	5
RTOR Reduction (vph)	0	0	0	0	0	14	0	0	14	0	0	4
Lane Group Flow (vph)	11	2092	1	11	1337	35	1	27	2	82	27	1
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	65.4	64.2	64.2	65.4	64.2	64.2	9.1	9.1	9.1	9.1	9.1	9.1
Effective Green, g (s)	65.4	64.2	64.2	65.4	64.2	64.2	9.1	9.1	9.1	9.1	9.1	9.1
Actuated g/C Ratio	0.73	0.71	0.71	0.73	0.71	0.71	0.10	0.10	0.10	0.10	0.10	0.10
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	243	2452	1097	104	2452	1097	135	183	156	135	183	156
v/s Ratio Prot	0.00	c0.61		c0.00	0.39			0.01			0.01	
v/s Ratio Perm	0.03		0.00	0.08		0.02	0.00		0.00	c0.06		0.00
v/c Ratio	0.05	0.85	0.00	0.11	0.55	0.03	0.01	0.15	0.01	0.61	0.15	0.00
Uniform Delay, d1	4.0	9.4	3.7	10.4	6.1	3.8	36.4	36.9	36.4	38.7	36.9	36.4
Progression Factor	1.00	1.00	1.00	0.68	0.89	0.73	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	4.0	0.0	0.1	0.8	0.0	0.0	0.1	0.0	5.2	0.1	0.0
Delay (s)	4.1	13.5	3.7	7.2	6.2	2.8	36.4	37.0	36.4	43.9	37.0	36.4
Level of Service	A	B	A	A	A	A	D	D	D	D	D	D
Approach Delay (s)		13.4			6.1			36.8			42.0	
Approach LOS		B			A			D			D	

Intersection Summary	
HCM Average Control Delay	11.8 HCM Level of Service B
HCM Volume to Capacity ratio	0.81
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 15.5
Intersection Capacity Utilization	83.2% ICU Level of Service E
Analysis Period (min)	15
c Critical Lane Group	

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		200	225		0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)		0	1918	272	130	560		0	0	0	342	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1918	272	130	560	0	0	0	0	0	343	837
Turn Type		Perm	pm+pt					Perm	Perm		Perm	custom
Protected Phases		6		5	2						4	1
Permitted Phases			6	2							4	4
Detector Phase		6	6	5	2						4	4
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0						10.0	10.0
Minimum Split (s)		21.0	21.0	9.5	21.0						16.0	16.0
Total Split (s)		0.0	45.0	45.0	15.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0
Total Split (%)		0.0%	50.0%	50.0%	16.7%	38.9%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%
Maximum Green (s)		39.0	39.0	11.5	29.0						24.0	24.0
Yellow Time (s)		4.0	4.0	3.5	4.0						4.0	4.0
All-Red Time (s)		2.0	2.0	0.0	2.0						2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min						None	None
v/c Ratio		0.76	0.30	0.58	0.32						0.85	0.73
Control Delay		13.2	2.3	47.2	3.3						53.1	21.6
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		13.2	2.3	47.2	3.3						53.1	21.6
90th %ile Green (s)		40.7	40.7	9.8	37.7						24.0	24.0
90th %ile Term Code		Coord	Coord	Gap	Coord						Max	Max
70th %ile Green (s)		42.4	42.4	8.1	43.2						24.0	24.0
70th %ile Term Code		Coord	Coord	Gap	Coord						Max	Max
50th %ile Green (s)		44.9	44.9	7.1	45.0						22.5	22.5
50th %ile Term Code		Coord	Coord	Gap	Coord						Gap	Gap
30th %ile Green (s)		48.9	48.9	6.1	48.0						19.5	19.5
30th %ile Term Code		Coord	Coord	Gap	Coord						Gap	Gap
10th %ile Green (s)		53.6	53.6	6.0	52.6						14.9	14.9
10th %ile Term Code		Coord	Coord	Min	Coord						Gap	Gap
Queue Length 50th (ft)		319	25	58	40						183	175
Queue Length 95th (ft)		268	m19	m104	76						#301	215
Internal Link Dist (ft)		1240			570			622				1008

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

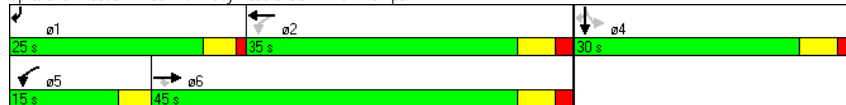


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2530	908	303	1730						460	1519
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.76	0.30	0.43	0.32						0.75	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis

180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑	↑↑					↓	↓
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	160	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	0	0	0	132
Lane Group Flow (vph)	0	1918	152	130	560	0	0	0	0	0	343	705

Turn Type	Perm	pm+pt	Perm	custom
Protected Phases	6	5	2	4
Permitted Phases		6	2	4
Actuated Green, G (s)	46.1	46.1	52.7	45.3
Effective Green, g (s)	46.1	46.1	52.7	45.3
Actuated g/C Ratio	0.51	0.51	0.59	0.50
Clearance Time (s)	6.0	6.0	3.5	6.0
Vehicle Extension (s)	5.0	5.0	2.0	5.0
Lane Grp Cap (vph)	2530	788	222	1730
v/s Ratio Prot	c0.39		0.05	0.16
v/s Ratio Perm		0.10	0.30	0.20
v/c Ratio	0.76	0.19	0.59	0.32
Uniform Delay, d1	17.5	11.9	12.8	13.3
Progression Factor	0.63	0.62	3.23	0.20
Incremental Delay, d2	1.4	0.3	1.9	0.4
Delay (s)	12.3	7.7	43.2	3.0
Level of Service	B	A	D	A
Approach Delay (s)	11.8		10.6	0.0
Approach LOS	B		B	A

Intersection Summary

HCM Average Control Delay: 19.5, HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.74
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 10.5
 Intersection Capacity Utilization: 77.4%, ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	0	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	0	0	1	0	0	0
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red		Yes			Yes				Yes			Yes
Link Speed (mph)		30			35				30			30
Link Distance (ft)		650			1320				746			792
Travel Time (s)		14.8			25.7				17.0			18.0
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)	1332	929	0	0	511	321	179	1	114	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1332	929	0	0	511	321	0	180	114	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	1	6			2			8				
Permitted Phases						2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	46.0	70.0	0.0	0.0	24.0	24.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	51.1%	77.8%	0.0%	0.0%	26.7%	26.7%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.93	0.71			0.65	0.55	0.74	0.74	0.36			
Control Delay	14.9	8.7			30.3	7.4			55.8			10.4
Queue Delay	0.0	0.2			0.0	0.0			0.0			0.0
Total Delay	14.9	9.0			30.3	7.4			55.8			10.4
90th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	40.0	64.1			18.1	18.1	13.9	13.9	13.9			
50th %ile Term Code	Max	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	38.7	66.4			21.7	21.7	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	34.9	68.0			27.1	27.1	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	0	214			153	48			98			0
Queue Length 95th (ft)	#15	258			159	32			#184			46
Internal Link Dist (ft)		570			1240				666			712

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1482	1313			786	579			268			336
Starvation Cap Reductn	0	61			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	0.90	0.74			0.65	0.55			0.67			0.34

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	26 (29%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↑↑	↑		↑↑	↑↑	↑		↑	↑				
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0			
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00			
Frt	1.00	1.00			1.00	0.85			1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538			
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1332	929	0	0	511	321	179	1	114	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	227	0	0	98	0	0	0	
Lane Group Flow (vph)	1332	929	0	0	511	94	0	180	16	0	0	0	
Turn Type	Prot		Perm				Perm		Perm				
Protected Phases	1	6			2				8				
Permitted Phases					2		8		8				
Actuated Green, G (s)	38.7	65.3			20.6	20.6		12.7	12.7				
Effective Green, g (s)	38.7	65.3			20.6	20.6		12.7	12.7				
Actuated g/C Ratio	0.43	0.73			0.23	0.23		0.14	0.14				
Clearance Time (s)	6.0	6.0			6.0	6.0		6.0	6.0				
Vehicle Extension (s)	2.0	5.0			5.0	5.0		2.0	2.0				
Lane Grp Cap (vph)	1434	1313			787	352		243	217				
v/s Ratio Prot	c0.40	c0.51			0.15								
v/s Ratio Perm						0.06		0.10	0.01				
v/c Ratio	0.93	0.71			0.65	0.27		0.74	0.07				
Uniform Delay, d1	24.3	7.0			31.4	28.5		37.1	33.5				
Progression Factor	0.23	0.85			0.80	0.65		1.00	1.00				
Incremental Delay, d2	7.2	2.1			4.0	1.8		10.1	0.1				
Delay (s)	12.9	8.0			29.2	20.3		47.2	33.6				
Level of Service	B A		C C				D C						
Approach Delay (s)	10.9			25.7				41.9			0.0		
Approach LOS	B			C				D			A		

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	77.4%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)	35		35		30		30		30			
Link Distance (ft)	1320		400		279		455					
Travel Time (s)	25.7		7.8		6.3		10.3					
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
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
Turn Type	pm+pt		Perm		Perm		Perm		Perm		Perm	
Protected Phases	1	6			2			8				4
Permitted Phases	6	6	6	2	2	2	8	8	8	4	4	4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag		Lag		Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.29	0.29	0.16	0.20	0.29	0.08	0.69	0.04	0.24	0.21	0.04	0.30
Control Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6
90th %ile Green (s)	10.5	56.5	56.5	42.5	42.5	42.5	21.5	21.5	21.5	21.5	21.5	21.5
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.4	60.4	60.4	48.5	48.5	48.5	17.6	17.6	17.6	17.6	17.6	17.6
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.2	63.1	63.1	52.4	52.4	52.4	14.9	14.9	14.9	14.9	14.9	14.9
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.2	65.9	65.9	56.2	56.2	56.2	12.1	12.1	12.1	12.1	12.1	12.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	29	79	12	10	37	0	86	5	0	24	5	0
Queue Length 95th (ft)	m54	110	m24	32	78	0	140	18	34	52	18	39
Internal Link Dist (ft)	1240		320		199		375					

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	648	2398	1129	406	1972	914	362	483	466	362	483	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.29	0.16	0.20	0.29	0.08	0.44	0.02	0.16	0.14	0.02	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.40	1.00	1.00	0.39	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	717	3438	1538	708	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
RTOR Reduction (vph)	0	0	56	0	0	32	0	0	63	0	0	86
Lane Group Flow (vph)	174	685	129	82	571	44	158	11	13	49	11	17
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Effective Green, g (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.70	0.70	0.70	0.57	0.57	0.57	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	586	2399	1073	406	1971	882	229	306	260	229	306	260
v/s Ratio Prot	0.03	c0.20			0.17		0.01		0.01		0.01	
v/s Ratio Perm	c0.18		0.08	0.12		0.03	c0.12		0.01	0.04		0.01
w/c Ratio	0.30	0.29	0.12	0.20	0.29	0.05	0.69	0.04	0.05	0.21	0.04	0.07
Uniform Delay, d1	4.8	5.1	4.5	9.3	9.8	8.4	35.2	31.3	31.3	32.2	31.3	31.4
Progression Factor	0.97	0.97	1.69	0.67	0.63	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	1.1	0.4	0.1	6.7	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.7	5.2	7.8	7.3	6.6	4.9	41.9	31.3	31.4	32.4	31.3	31.5
Level of Service	A	A	A	A	A	A	D	C	C	C	C	C
Approach Delay (s)		5.6			6.5		38.2				31.7	
Approach LOS		A			A		D				C	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↗	↖	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35				30			30
Link Distance (ft)		400			467				277			444
Travel Time (s)		7.8			9.1				6.3			10.1
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)	185	386	239	16	391	43	179	179	38	43	179	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	386	239	16	434	0	179	179	38	43	179	158
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.33	0.38	0.25	0.04	0.31		0.48	0.32	0.07	0.24	0.64	0.43
Control Delay	6.7	7.1	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	7.4	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
90th %ile Green (s)	13.8	42.6	42.6	25.3	25.3		12.5	35.4	35.4	19.4	19.4	19.4
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	10.8	46.6	46.6	32.3	32.3		12.5	31.4	31.4	15.4	15.4	15.4
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.0	49.6	49.6	37.1	37.1		11.6	28.4	28.4	13.3	13.3	13.3
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.5	53.4	53.4	42.4	42.4		10.0	24.6	24.6	11.1	11.1	11.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	57.1	57.1	47.6	47.6		7.4	20.9	20.9	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	18	43	0	5	82		74	77	0	22	98	0
Queue Length 95th (ft)	50	104	7	22	148		110	115	19	49	152	49
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↗	↖	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200	200	200
Base Capacity (vph)	590	1003	959	396	1398		393	764	671	285	442	495
Starvation Cap Reductn	0	211	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.49	0.25	0.04	0.31		0.46	0.23	0.06	0.15	0.40	0.32

Intersection Summary

Area Type: Other

Cycle Length: 90

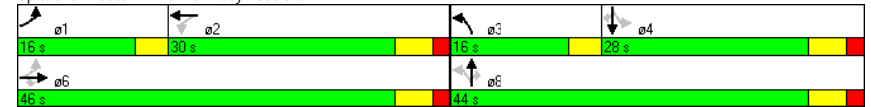
Actuated Cycle Length: 90

Offset: 72 (80%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 210: New Lacy Road & CTH MM



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3387		1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.53	1.00		0.42	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	788	1810	1538	965	3387		767	1810	1538	1166	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	386	239	16	391	43	179	179	38	43	179	158
RTOR Reduction (vph)	0	0	106	0	8	0	0	0	26	0	0	134
Lane Group Flow (vph)	185	386	133	16	426	0	179	179	12	43	179	24
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Effective Green, g (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Actuated g/C Ratio	0.55	0.55	0.55	0.41	0.41		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	534	1004	853	397	1392		354	565	480	179	278	236
v/s Ratio Prot	0.04	c0.21			0.13		c0.06	0.10			c0.10	
v/s Ratio Perm	0.16		0.09	0.02			0.10		0.01	0.04		0.02
v/c Ratio	0.35	0.38	0.16	0.04	0.31		0.51	0.32	0.02	0.24	0.64	0.10
Uniform Delay, d1	10.2	11.4	9.8	15.9	17.9		24.0	23.6	21.5	33.5	35.8	32.8
Progression Factor	0.50	0.47	0.24	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1	0.4	0.2	0.6		0.4	0.1	0.0	0.3	3.8	0.1
Delay (s)	5.2	6.4	2.8	16.1	18.4		24.4	23.7	21.5	33.7	39.6	32.8
Level of Service	A	A	A	B	B		C	C	C	C	D	C
Approach Delay (s)		5.1			18.3			23.8			36.1	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

Year 2035 Build Traffic – 20% Shift Peak Hour Analysis Outputs

**Year 2035 Build Traffic - 20% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	B	A	A	A	B	A	D	D	D	D	D	D
		PM	A	C	A	B	A	A	C	C	C	D	C	C
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	A	D	C	-	-	-	-	D	D	D
		PM	-	B	A	D	A	-	-	-	-	D	D	D
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	B	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	A	A	A	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	C	C	B	C	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1215	5	25	1975	150	1	25	15	70	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	11	1321	5	27	2147	163	1	27	16	76	27	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1321	5	27	2147	163	1	27	16	76	27	22
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.06	0.51	0.00	0.08	0.81	0.13	0.01	0.12	0.08	0.46	0.12	0.11
Control Delay	3.4	7.9	4.2	2.4	10.8	1.9	33.0	35.6	16.3	45.6	35.6	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	7.9	4.2	2.4	10.8	1.9	33.0	35.6	16.3	45.6	35.6	15.3
90th %ile Green (s)	6.0	54.3	54.3	6.0	54.3	54.3	14.2	14.2	14.2	14.2	14.2	14.2
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	57.1	57.1	6.0	66.6	66.6	11.4	11.4	11.4	11.4	11.4	11.4
70th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Min	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	1	125	0	1	359	0	1	14	0	41	14	0
Queue Length 95th (ft)	5	298	4	m3	m#833	m15	5	37	18	82	37	21
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	206	2578	1154	345	2650	1210	327	442	388	327	442	393
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.51	0.00	0.08	0.81	0.13	0.00	0.06	0.04	0.23	0.06	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	16 (18%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	10	1215	5	25	1975	150	1	25	15	70	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.06	1.00	1.00	0.17	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	115	3438	1538	305	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1321	5	27	2147	163	1	27	16	76	27	22
RTOR Reduction (vph)	0	0	2	0	0	30	0	0	14	0	0	20
Lane Group Flow (vph)	11	1321	4	27	2147	133	1	27	2	76	27	2
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8	4		4	4
Actuated Green, G (s)	64.2	63.0	63.0	66.6	64.2	64.2	9.1	9.1	9.1	9.1	9.1	9.1
Effective Green, g (s)	64.2	63.0	63.0	66.6	64.2	64.2	9.1	9.1	9.1	9.1	9.1	9.1
Actuated g/C Ratio	0.71	0.70	0.70	0.74	0.71	0.71	0.10	0.10	0.10	0.10	0.10	0.10
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	103	2407	1077	263	2452	1097	135	183	156	135	183	156
v/s Ratio Prot	0.00	0.38		c0.00	c0.62			0.01			0.01	
v/s Ratio Perm	0.07		0.00	0.07		0.09	0.00		0.00	c0.06		0.00
v/c Ratio	0.11	0.55	0.00	0.10	0.88	0.12	0.01	0.15	0.01	0.56	0.15	0.01
Uniform Delay, d1	11.4	6.6	4.1	4.0	9.9	4.0	36.4	36.9	36.4	38.6	36.9	36.4
Progression Factor	1.00	1.00	1.00	0.80	0.88	0.79	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9	0.0	0.0	2.1	0.1	0.0	0.1	0.0	3.2	0.1	0.0
Delay (s)	11.5	7.5	4.1	3.2	10.8	3.3	36.4	37.0	36.4	41.7	37.0	36.4
Level of Service	B	A	A	A	B	A	D	D	D	D	D	D
Approach Delay (s)		7.5			10.2			36.8			39.8	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100		100	100		100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1207	207	190	940	0	0	0	0	512	1397	
Turn Type		Perm	pm+pt				Perm	Perm		Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases		6	2							4		4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	36.0	36.0	18.0	32.0	0.0	0.0	0.0	0.0	36.0	36.0	22.0
Total Split (%)	0.0%	40.0%	40.0%	20.0%	35.6%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%	24.4%
Maximum Green (s)		30.0	30.0	14.5	26.0					30.0	30.0	17.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.61	0.28	0.61	0.92					0.93	0.88	
Control Delay		18.4	2.6	37.2	25.7					56.1	23.4	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		18.4	2.6	37.2	25.7					56.1	23.4	
90th %ile Green (s)		30.0	30.0	14.5	26.0					30.0	30.0	17.5
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		32.5	32.5	12.0	26.0					30.0	30.0	17.5
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Max
50th %ile Green (s)		34.9	34.9	9.6	26.0					30.0	30.0	17.5
50th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Max
30th %ile Green (s)		37.3	37.3	8.0	26.0					29.2	29.2	18.3
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Max
10th %ile Green (s)		44.6	44.6	6.0	30.3					23.9	23.9	19.3
10th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		205	20	68	289					273	340	
Queue Length 95th (ft)		228	18	m95	#420					#460	468	
Internal Link Dist (ft)		1240			570			622			1008	

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

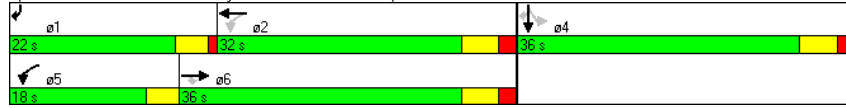


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1968	738	394	1026						574	1592
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		5	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.28	0.48	0.92						0.89	0.88

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 48 (53%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis

180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑						↓	↓↑
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.20	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	361	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	1207	83	190	940	0	0	0	0	0	512	1386
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		35.9	35.9	36.9	26.9						28.6	46.6
Effective Green, g (s)		35.9	35.9	36.9	26.9						28.6	46.6
Actuated g/C Ratio		0.40	0.40	0.41	0.30						0.32	0.52
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1971	613	299	1028						548	1402
v/s Ratio Prot		0.24		0.07	0.27							0.20
v/s Ratio Perm			0.05	0.19							0.30	0.31
v/c Ratio		0.61	0.13	0.64	0.91						0.93	0.99
Uniform Delay, d1		21.5	17.2	17.7	30.4						29.8	21.4
Progression Factor		0.75	0.54	2.68	0.46						1.00	1.00
Incremental Delay, d2		1.3	0.4	2.0	9.2						23.0	21.1
Delay (s)		17.5	9.6	49.3	23.2						52.8	42.5
Level of Service		B	A	D	C						D	D
Approach Delay (s)		16.3			27.6		0.0				45.3	
Approach LOS		B			C		A				D	

Intersection Summary

HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	870	848	0	0	859	478	272	1	168	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	870	848	0	0	859	478	0	273	168	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.89	0.69			0.79	0.60	0.83	0.83	0.39			
Control Delay	18.5	15.8			27.8	5.6	57.1	8.0	8.0			
Queue Delay	0.0	0.3			0.0	0.0	0.0	0.0	0.0			
Total Delay	18.5	16.0			27.8	5.6	57.1	8.0	8.0			
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	27.9	59.0			25.1	25.1	19.0	19.0	19.0			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	25.6	61.8			30.2	30.2	16.2	16.2	16.2			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	21.9	65.8			37.9	37.9	12.2	12.2	12.2			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	238	319			251	42	146	0	0			
Queue Length 95th (ft)	0	m372			#352	20	#262	51	51			
Internal Link Dist (ft)		570			1240		666					712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1225			1094	798			364			457
Starvation Cap Reductn	0	69			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	0.84	0.73			0.79	0.60			0.75			0.37

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Natural Cycle: 75

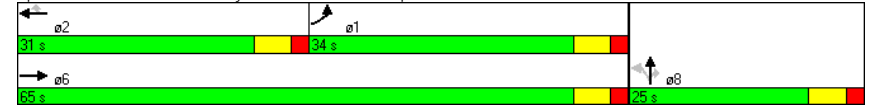
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗			
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	870	848	0	0	859	478	272	1	168	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	309	0	0	136	0	0	0
Lane Group Flow (vph)	870	848	0	0	859	169	0	273	32	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8		8			
Permitted Phases						2	8		8			
Actuated Green, G (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Effective Green, g (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Actuated g/C Ratio	0.29	0.68			0.32	0.32	0.19		0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0		2.0			
Lane Grp Cap (vph)	975	1225			1093	489	328		292			
v/s Ratio Prot	0.26	0.47			0.25							
v/s Ratio Perm						0.11	0.16		0.02			
v/c Ratio	0.89	0.69			0.79	0.35	0.83		0.11			
Uniform Delay, d1	30.5	8.9			27.9	23.5	35.1		30.2			
Progression Factor	0.25	1.39			0.75	0.72	1.00		1.00			
Incremental Delay, d2	8.3	1.9			5.0	1.7	15.7		0.1			
Delay (s)	16.0	14.2			25.9	18.7	50.7		30.2			
Level of Service	B	B			C	B	D		C			
Approach Delay (s)		15.1			23.3		42.9				0.0	
Approach LOS		B			C		D				A	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8			4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.44	0.31	0.17	0.35	0.53	0.14	0.80	0.04	0.26	0.26	0.04	0.34
Control Delay	6.3	5.2	1.3	14.7	13.2	2.8	50.1	23.3	6.1	27.8	23.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.2	1.3	14.7	13.3	2.8	50.1	23.3	6.1	27.8	23.3	5.9
90th %ile Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord	Coord	Max	Max	Max	Hold	Hold	Hold
70th %ile Green (s)	9.3	53.1	53.1	40.3	40.3	40.3	24.9	24.9	24.9	24.9	24.9	24.9
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.8	56.5	56.5	45.2	45.2	45.2	21.5	21.5	21.5	21.5	21.5	21.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.6	60.0	60.0	49.9	49.9	49.9	18.0	18.0	18.0	18.0	18.0	18.0
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.2	65.2	55.7	55.7	55.7	12.8	12.8	12.8	12.8	12.8	12.8
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	16	45	5	28	112	3	136	7	0	38	7	0
Queue Length 95th (ft)	m47	115	m20	m55	157	m6	201	21	37	68	21	43
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

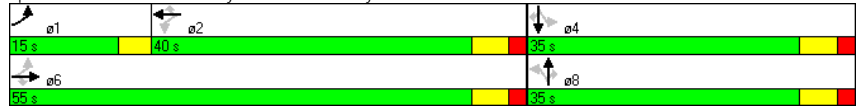


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	434	2168	1036	360	1720	829	436	583	577	436	583	609
Starvation Cap Reductn	0	0	0	0	155	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.31	0.17	0.35	0.58	0.14	0.58	0.03	0.21	0.19	0.03	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.22	1.00	1.00	0.40	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	404	3438	1538	720	3438	1538	1352	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
RTOR Reduction (vph)	0	0	66	0	0	60	0	0	92	0	0	128
Lane Group Flow (vph)	168	668	113	125	913	60	255	16	28	82	16	40
Turn Type	pm+pt		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6		2	2		8		8	4		4
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Effective Green, g (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.63	0.63	0.63	0.50	0.50	0.50	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	375	2170	971	361	1723	771	318	426	362	318	426	362
v/s Ratio Prot	c0.04	0.19			c0.27		0.01					0.01
v/s Ratio Perm	0.24		0.07	0.17		0.04	c0.19		0.02	0.06		0.03
w/c Ratio	0.45	0.31	0.12	0.35	0.53	0.08	0.80	0.04	0.08	0.26	0.04	0.11
Uniform Delay, d1	8.3	7.6	6.6	13.6	15.2	11.7	32.4	26.5	26.8	28.0	26.5	27.0
Progression Factor	0.50	0.57	0.66	0.71	0.71	0.71	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.2	2.1	0.9	0.2	12.8	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.4	4.6	4.6	11.8	11.8	8.4	45.2	26.5	26.8	28.2	26.5	27.0
Level of Service	A	A	A	B	B	A	D	C	C	C	C	C
Approach Delay (s)		4.6			11.4		38.8					27.4
Approach LOS		A			B		D					C

Intersection Summary

HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		400			467			277			444	
Travel Time (s)		7.8			9.1			6.3			10.1	
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)	196	418	255	27	620	65	288	288	60	71	283	250
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	418	255	27	685	0	288	288	60	71	283	250
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.54	0.48	0.29	0.09	0.59		0.74	0.42	0.10	0.33	0.78	0.49
Control Delay	12.8	9.8	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
Queue Delay	0.0	0.4	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	10.2	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.7	39.2	39.2	24.0	24.0		13.5	38.8	38.8	21.8	21.8	21.8
70th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	10.3	41.8	41.8	28.0	28.0		13.5	36.2	36.2	19.2	19.2	19.2
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.5	45.5	45.5	33.5	33.5		13.4	32.5	32.5	15.6	15.6	15.6
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.2	52.2	52.2	42.5	42.5		10.6	25.8	25.8	11.7	11.7	11.7
10th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	23	54	0	11	172		109	114	0	34	151	0
Queue Length 95th (ft)	53	93	8	33	249		164	170	22	71	230	58
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	392	876	876	317	1153		395	784	700	258	442	565
Starvation Cap Reductn	0	131	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.56	0.29	0.09	0.59		0.73	0.37	0.09	0.28	0.64	0.44
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	80 (89%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3389		1719	1810	1538	1719	1810	1538
Flt Permitted	0.25	1.00	1.00	0.52	1.00		0.29	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	448	1810	1538	937	3389		525	1810	1538	1056	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	418	255	27	620	65	288	288	60	71	283	250
RTOR Reduction (vph)	0	0	132	0	8	0	0	0	37	0	0	200
Lane Group Flow (vph)	196	418	123	27	677	0	288	288	23	71	283	50
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Effective Green, g (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Actuated g/C Ratio	0.48	0.48	0.48	0.34	0.34		0.38	0.38	0.38	0.20	0.20	0.20
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	352	875	743	316	1145		372	694	590	212	364	309
v/s Ratio Prot	c0.06	0.23			0.20		c0.11	0.16			0.16	
v/s Ratio Perm	c0.21		0.08	0.03			c0.19		0.01	0.07		0.03
v/c Ratio	0.56	0.48	0.17	0.09	0.59		0.77	0.41	0.04	0.33	0.78	0.16
Uniform Delay, d1	14.7	15.6	13.1	20.3	24.7		21.5	20.3	17.4	30.8	34.0	29.7
Progression Factor	0.54	0.46	0.18	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.8	0.5	0.5	2.2		8.9	0.1	0.0	0.3	9.2	0.1
Delay (s)	9.0	9.1	2.8	20.9	26.9		30.3	20.5	17.4	31.1	43.2	29.8
Level of Service	A	A	A	C	C		C	C	B	C	D	C
Approach Delay (s)		7.2			26.7			24.6			36.2	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1835	5	15	1180	90	1	25	30	150	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red		Yes			Yes			Yes			Yes	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	16	1995	5	16	1283	98	1	27	33	163	27	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1995	5	16	1283	98	1	27	33	163	27	11
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.5	44.0	44.0	6.5	44.0	44.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.05	0.86	0.00	0.08	0.55	0.09	0.00	0.09	0.11	0.71	0.09	0.04
Control Delay	5.2	18.8	6.2	4.4	9.7	2.2	27.0	29.3	10.8	51.3	29.3	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	18.8	6.2	4.4	9.7	2.2	27.0	29.3	10.8	51.3	29.3	14.7
90th %ile Green (s)	6.0	46.4	46.4	6.0	46.4	46.4	22.1	22.1	22.1	22.1	22.1	22.1
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	59.9	59.9	0.0	59.9	59.9	18.1	18.1	18.1	18.1	18.1	18.1
70th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	62.7	62.7	0.0	62.7	62.7	15.3	15.3	15.3	15.3	15.3	15.3
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	65.5	65.5	0.0	65.5	65.5	12.5	12.5	12.5	12.5	12.5	12.5
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	0.0	69.0	69.0	0.0	69.0	69.0	9.0	9.0	9.0	9.0	9.0	9.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	2	370	0	2	201	0	1	13	0	89	13	0
Queue Length 95th (ft)	10	#835	6	m6	288	m30	4	33	23	143	33	13
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	317	2319	1039	205	2319	1069	357	483	434	357	483	418
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.86	0.00	0.08	0.55	0.09	0.00	0.06	0.08	0.46	0.06	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	1 (1%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1835	5	15	1180	90	1	25	30	150	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.17	1.00	1.00	0.07	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	301	3438	1538	125	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	1995	5	16	1283	98	1	27	33	163	27	11
RTOR Reduction (vph)	0	0	1	0	0	35	0	0	27	0	0	9
Lane Group Flow (vph)	16	1995	4	16	1283	63	1	27	6	163	27	2
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4		4
Actuated Green, G (s)	59.1	57.9	57.9	59.1	57.9	57.9	15.4	15.4	15.4	15.4	15.4	15.4
Effective Green, g (s)	59.1	57.9	57.9	59.1	57.9	57.9	15.4	15.4	15.4	15.4	15.4	15.4
Actuated g/C Ratio	0.66	0.64	0.64	0.66	0.64	0.64	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	217	2212	989	103	2212	989	229	310	263	229	310	263
v/s Ratio Prot	0.00	c0.58		c0.00	0.37			0.01			0.01	
v/s Ratio Perm	0.05		0.00	0.10		0.04	0.00		0.00	c0.12		0.00
v/c Ratio	0.07	0.90	0.00	0.16	0.58	0.06	0.00	0.09	0.02	0.71	0.09	0.01
Uniform Delay, d1	6.4	13.6	5.7	14.1	9.1	6.0	30.9	31.4	31.0	35.2	31.4	31.0
Progression Factor	1.00	1.00	1.00	0.76	0.94	0.94	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	6.5	0.0	0.2	1.0	0.1	0.0	0.0	0.0	8.4	0.0	0.0
Delay (s)	6.4	20.2	5.7	11.0	9.6	5.7	30.9	31.4	31.0	43.6	31.4	31.0
Level of Service	A	C	A	B	A	A	C	C	C	D	C	C
Approach Delay (s)		20.0			9.3			31.2			41.3	
Approach LOS		C			A			C			D	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100	100	100			100	100	100	100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1918	272	130	560	0	0	0	0	343	837	
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases		6	2							4		4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	45.0	45.0	15.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	25.0
Total Split (%)	0.0%	50.0%	50.0%	16.7%	38.9%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	27.8%
Maximum Green (s)		39.0	39.0	11.5	29.0					24.0	24.0	20.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.76	0.30	0.58	0.32					0.85	0.73	
Control Delay		11.5	1.4	47.2	3.3					53.1	21.6	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		11.5	1.4	47.2	3.3					53.1	21.6	
90th %ile Green (s)		40.7	40.7	9.8	37.7					24.0	24.0	11.8
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
70th %ile Green (s)		42.4	42.4	8.1	43.2					24.0	24.0	6.3
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		44.9	44.9	7.1	45.0					22.5	22.5	6.0
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
30th %ile Green (s)		48.9	48.9	6.1	48.0					19.5	19.5	6.0
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
10th %ile Green (s)		53.6	53.6	6.0	52.6					14.9	14.9	6.0
10th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Min
Queue Length 50th (ft)		326	17	58	40							183
Queue Length 95th (ft)		170	m0	m104	76							#301
Internal Link Dist (ft)		1240			570			622				1008

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

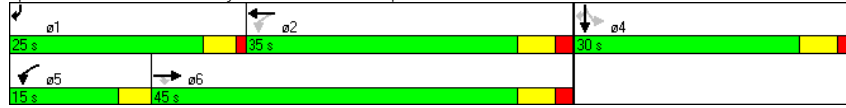


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2530	908	303	1730						460	1519
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.76	0.30	0.43	0.32						0.75	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑						↓	↓
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	160	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	0	0	0	132
Lane Group Flow (vph)	0	1918	152	130	560	0	0	0	0	0	343	705

Turn Type	Perm	pm+pt	Perm	custom
Protected Phases	6	5	2	4
Permitted Phases		6	2	4
Actuated Green, G (s)	46.1	46.1	52.7	45.3
Effective Green, g (s)	46.1	46.1	52.7	45.3
Actuated g/C Ratio	0.51	0.51	0.59	0.50
Clearance Time (s)	6.0	6.0	3.5	6.0
Vehicle Extension (s)	5.0	5.0	2.0	5.0
Lane Grp Cap (vph)	2530	788	222	1730
v/s Ratio Prot	c0.39		0.05	0.16
v/s Ratio Perm		0.10	0.30	0.20
v/c Ratio	0.76	0.19	0.59	0.32
Uniform Delay, d1	17.5	11.9	12.8	13.3
Progression Factor	0.54	0.32	3.23	0.20
Incremental Delay, d2	1.2	0.3	1.9	0.4
Delay (s)	10.7	4.1	43.2	3.0
Level of Service	B	A	D	A
Approach Delay (s)	9.8		10.6	0.0
Approach LOS	A		B	A

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)	30			35			30			30		
Link Distance (ft)	650			1320			746			792		
Travel Time (s)	14.8			25.7			17.0			18.0		
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)	1332	929	0	0	511	321	179	1	114	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1332	929	0	0	511	321	0	180	114	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8					
Permitted Phases					2		8		8			
Detector Phase	1	6			2		8		8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	46.0	70.0	0.0	0.0	24.0	24.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	51.1%	77.8%	0.0%	0.0%	26.7%	26.7%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.93	0.71			0.65	0.55	0.74	0.74	0.36			
Control Delay	15.0	8.7			30.3	7.4	55.8	10.4				
Queue Delay	0.0	0.2			0.0	0.0	0.0	0.0				
Total Delay	15.0	8.9			30.3	7.4	55.8	10.4				
90th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	40.0	64.1			18.1	18.1	13.9	13.9	13.9			
50th %ile Term Code	Max	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	38.7	66.4			21.7	21.7	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	34.9	68.0			27.1	27.1	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	0	214			153	48	98	0				
Queue Length 95th (ft)	#15	258			159	32	#184	46				
Internal Link Dist (ft)	570				1240		666		712			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	225						150					
Base Capacity (vph)	1482	1313			786	579			268	336		
Starvation Cap Reductn	0	61			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	0.90	0.74			0.65	0.55			0.67	0.34		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 26 (29%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

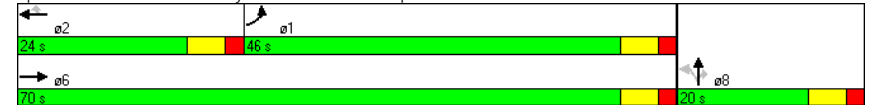
Natural Cycle: 75

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↗		↔	↗	↘		↔	↗				
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0			
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00			
Frt	1.00	1.00			1.00	0.85			1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538			
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1332	929	0	0	511	321	179	1	114	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	227	0	0	98	0	0	0	
Lane Group Flow (vph)	1332	929	0	0	511	94	0	180	16	0	0	0	
Turn Type	Prot		Perm				Perm		Perm				
Protected Phases	1	6	2				8		8				
Permitted Phases			2				8		8				
Actuated Green, G (s)	38.7	65.3	20.6				20.6		12.7			12.7	
Effective Green, g (s)	38.7	65.3	20.6				20.6		12.7			12.7	
Actuated g/C Ratio	0.43	0.73	0.23				0.23		0.14			0.14	
Clearance Time (s)	6.0	6.0	6.0				6.0		6.0			6.0	
Vehicle Extension (s)	2.0	5.0	5.0				5.0		2.0			2.0	
Lane Grp Cap (vph)	1434	1313	787				352		243			217	
v/s Ratio Prot	c0.40	c0.51	0.15										
v/s Ratio Perm			0.06				0.10		0.01				
v/c Ratio	0.93	0.71	0.65				0.27		0.74			0.07	
Uniform Delay, d1	24.3	7.0	31.4				28.5		37.1			33.5	
Progression Factor	0.23	0.85	0.80				0.65		1.00			1.00	
Incremental Delay, d2	7.2	2.1	4.0				1.8		10.1			0.1	
Delay (s)	12.9	8.0	29.2				20.3		47.2			33.6	
Level of Service	B		C				C		D			C	
Approach Delay (s)	10.9		25.7				41.9		0.0				
Approach LOS	B		C				D		A				

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	
HCM Volume to Capacity ratio	0.87	B	
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	77.4%	ICU Level of Service	
Analysis Period (min)	15	D	
c Critical Lane Group			

Volume

200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Link Speed (mph)	35		35		30		30		30		30	
Link Distance (ft)	1320		400		279		455		455		455	
Travel Time (s)	25.7		7.8		6.3		10.3		10.3		10.3	
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
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
Turn Type	pm+pt		Perm		Perm		Perm		Perm		Perm	
Protected Phases	1	6	2		2		8		8		4	
Permitted Phases	6		6		2		2		8		4	
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag		Lag		Lag		Lag		Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.29	0.29	0.16	0.20	0.29	0.08	0.69	0.04	0.24	0.21	0.04	0.30
Control Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6
90th %ile Green (s)	10.5	56.5	56.5	42.5	42.5	42.5	21.5	21.5	21.5	21.5	21.5	21.5
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.4	60.4	60.4	48.5	48.5	48.5	17.6	17.6	17.6	17.6	17.6	17.6
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.2	63.1	63.1	52.4	52.4	52.4	14.9	14.9	14.9	14.9	14.9	14.9
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.2	65.9	65.9	56.2	56.2	56.2	12.1	12.1	12.1	12.1	12.1	12.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	29	79	12	10	37	0	86	5	0	24	5	0
Queue Length 95th (ft)	m54	110	m24	32	78	0	140	18	34	52	18	39
Internal Link Dist (ft)	1240		320		199		375		375		375	

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	648	2398	1129	406	1972	914	362	483	466	362	483	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.29	0.16	0.20	0.29	0.08	0.44	0.02	0.16	0.14	0.02	0.21

Intersection Summary

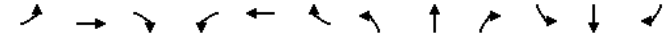
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.40	1.00	1.00	0.39	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	717	3438	1538	708	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
RTOR Reduction (vph)	0	0	56	0	0	32	0	0	63	0	0	86
Lane Group Flow (vph)	174	685	129	82	571	44	158	11	13	49	11	17
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Effective Green, g (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.70	0.70	0.70	0.57	0.57	0.57	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	586	2399	1073	406	1971	882	229	306	260	229	306	260
v/s Ratio Prot	0.03	c0.20			0.17		0.01		0.01		0.01	
v/s Ratio Perm	c0.18		0.08	0.12		0.03	c0.12		0.01	0.04		0.01
w/c Ratio	0.30	0.29	0.12	0.20	0.29	0.05	0.69	0.04	0.05	0.21	0.04	0.07
Uniform Delay, d1	4.8	5.1	4.5	9.3	9.8	8.4	35.2	31.3	31.3	32.2	31.3	31.4
Progression Factor	0.97	0.97	1.69	0.67	0.63	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	1.1	0.4	0.1	6.7	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.7	5.2	7.7	7.3	6.6	4.9	41.9	31.3	31.4	32.4	31.3	31.5
Level of Service	A	A	A	A	A	A	D	C	C	C	C	C
Approach Delay (s)		5.6			6.5		38.2				31.7	
Approach LOS		A			A		D				C	

Intersection Summary

HCM Average Control Delay: 11.5 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.37
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 57.1% ICU Level of Service: B
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		400			467			277			444	
Travel Time (s)		7.8			9.1			6.3			10.1	
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)	185	386	239	16	391	43	179	179	38	43	179	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	386	239	16	434	0	179	179	38	43	179	158
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.33	0.38	0.25	0.04	0.31		0.48	0.32	0.07	0.24	0.64	0.43
Control Delay	6.7	7.1	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	7.4	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
90th %ile Green (s)	13.8	42.6	42.6	25.3	25.3		12.5	35.4	35.4	19.4	19.4	19.4
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	10.8	46.6	46.6	32.3	32.3		12.5	31.4	31.4	15.4	15.4	15.4
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.0	49.6	49.6	37.1	37.1		11.6	28.4	28.4	13.3	13.3	13.3
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.5	53.4	53.4	42.4	42.4		10.0	24.6	24.6	11.1	11.1	11.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	57.1	57.1	47.6	47.6		7.4	20.9	20.9	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	18	42	0	5	82		74	77	0	22	98	0
Queue Length 95th (ft)	50	104	7	22	148		110	115	19	49	152	49
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200	200	200
Base Capacity (vph)	590	1003	959	396	1398		393	764	671	285	442	495
Starvation Cap Reductn	0	211	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.49	0.25	0.04	0.31		0.46	0.23	0.06	0.15	0.40	0.32
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	72 (80%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3387		1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.53	1.00		0.42	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	788	1810	1538	965	3387		767	1810	1538	1166	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	386	239	16	391	43	179	179	38	43	179	158
RTOR Reduction (vph)	0	0	106	0	8	0	0	0	26	0	0	134
Lane Group Flow (vph)	185	386	133	16	426	0	179	179	12	43	179	24
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Effective Green, g (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Actuated g/C Ratio	0.55	0.55	0.55	0.41	0.41		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	534	1004	853	397	1392		354	565	480	179	278	236
v/s Ratio Prot	0.04	c0.21			0.13		c0.06	0.10			c0.10	
v/s Ratio Perm	0.16		0.09	0.02			0.10		0.01	0.04		0.02
v/c Ratio	0.35	0.38	0.16	0.04	0.31		0.51	0.32	0.02	0.24	0.64	0.10
Uniform Delay, d1	10.2	11.4	9.8	15.9	17.9		24.0	23.6	21.5	33.5	35.8	32.8
Progression Factor	0.49	0.47	0.24	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1	0.4	0.2	0.6		0.4	0.1	0.0	0.3	3.8	0.1
Delay (s)	5.2	6.4	2.8	16.1	18.4		24.4	23.7	21.5	33.7	39.6	32.8
Level of Service	A	A	A	B	B		C	C	C	C	D	C
Approach Delay (s)		5.0			18.3			23.8			36.1	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

Year 2035 Build Traffic – 30% Shift Peak Hour Analysis Outputs

**Year 2035 Build Traffic - 30% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	B	A	A	A	B	A	D	D	C	D	D	C
		PM	A	C	A	B	B	B	C	C	C	D	C	C
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	A	D	C	-	-	-	-	D	D	D
		PM	-	A	A	D	A	-	-	-	-	D	D	D
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	B	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	A	A	A	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	C	C	B	C	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1175	5	40	1885	225	5	25	20	105	25	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	16	1277	5	43	2049	245	5	27	22	114	27	27
Shared Lane Traffic (%)	16	1277	5	43	2049	245	5	27	22	114	27	27
Lane Group Flow (vph)	16	1277	5	43	2049	245	5	27	22	114	27	27
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.08	0.52	0.00	0.13	0.79	0.20	0.03	0.10	0.09	0.60	0.10	0.11
Control Delay	4.5	10.0	5.2	3.2	11.7	2.2	31.0	32.7	13.8	48.7	32.7	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	10.0	5.2	3.2	11.7	2.2	31.0	32.7	13.8	48.7	32.7	12.9
90th %ile Green (s)	6.0	50.6	50.6	6.1	50.7	50.7	17.8	17.8	17.8	17.8	17.8	17.8
90th %ile Term Code	Min	Coord	Coord	Gap	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	0.0	54.1	54.1	6.0	63.6	63.6	14.4	14.4	14.4	14.4	14.4	14.4
70th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	0.0	56.5	56.5	6.0	66.0	66.0	12.0	12.0	12.0	12.0	12.0	12.0
50th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	10.0	10.0	10.0	10.0	10.0	10.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	0.0	84.0	84.0	0.0	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	2	204	0	2	337	0	3	14	0	62	14	0
Queue Length 95th (ft)	8	319	5	m6	m#814	m31	12	35	20	110	35	22
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	208	2439	1092	339	2585	1198	327	442	393	327	442	396
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.52	0.00	0.13	0.79	0.20	0.02	0.06	0.06	0.35	0.06	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 17 (19%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 175: New Lacy Road & Ninebark Road



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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	15	1175	5	40	1885	225	5	25	20	105	25	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.07	1.00	1.00	0.17	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	120	3438	1538	304	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	1277	5	43	2049	245	5	27	22	114	27	27
RTOR Reduction (vph)	0	0	2	0	0	51	0	0	19	0	0	24
Lane Group Flow (vph)	16	1277	3	43	2049	194	5	27	3	114	27	3
Turn Type	pm+pt	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6	5	2	2	8	8	4	4	4	4	4
Permitted Phases	6	6	2	6	2	8	8	4	4	4	4	4
Actuated Green, G (s)	61.3	60.1	60.1	66.1	62.5	62.5	10.8	10.8	10.8	10.8	10.8	10.8
Effective Green, g (s)	61.3	60.1	60.1	66.1	62.5	62.5	10.8	10.8	10.8	10.8	10.8	10.8
Actuated g/C Ratio	0.68	0.67	0.67	0.73	0.69	0.69	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	103	2296	1027	280	2388	1068	161	217	185	161	217	185
v/s Ratio Prot	0.00	0.37	c0.01	c0.60	0.13	0.00	0.01	0.00	c0.09	0.01	0.00	0.00
v/s Ratio Perm	0.10	0.00	0.11	0.15	0.18	0.03	0.12	0.01	0.71	0.12	0.02	0.02
w/c Ratio	0.16	0.56	0.00	0.15	0.86	0.18	0.03	0.12	0.01	0.71	0.12	0.02
Uniform Delay, d1	10.9	7.9	5.0	4.5	10.4	4.8	35.0	35.4	34.9	38.1	35.4	34.9
Progression Factor	1.00	1.00	1.00	0.81	0.89	0.84	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.0	0.0	0.0	1.9	0.2	0.0	0.1	0.0	11.0	0.1	0.0
Delay (s)	11.2	8.9	5.0	3.7	11.1	4.2	35.0	35.5	34.9	49.1	35.5	34.9
Level of Service	B	A	A	A	B	A	D	D	C	D	D	C
Approach Delay (s)	8.9			10.2			35.2			44.6		
Approach LOS	A			B			D			D		

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225	0	0	0	0	0	0	225	350	350
Storage Lanes	1	1	1	0	0	0	0	0	0	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes		Yes		Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	1320			650			702			1088		
Travel Time (s)	30.0			14.8			16.0			24.7		
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
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1207	207	190	940	0	0	0	0	512	1397	1397
Turn Type		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	custom
Protected Phases	6	6	2	5	2	8	8	4	4	4	4	4
Permitted Phases	6	6	2	6	2	8	8	4	4	4	4	4
Detector Phase	6	6	5	2	2	8	8	4	4	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	6.0	15.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0	6.0
Minimum Split (s)	21.0	21.0	9.5	21.0	21.0	21.0	21.0	21.0	21.0	16.0	16.0	10.5
Total Split (s)	0.0	36.0	36.0	18.0	32.0	0.0	0.0	0.0	0.0	36.0	36.0	22.0
Total Split (%)	0.0%	40.0%	40.0%	20.0%	35.6%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%	24.4%
Maximum Green (s)	30.0	30.0	14.5	26.0	26.0	26.0	26.0	26.0	26.0	30.0	30.0	17.5
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0
Recall Mode	C-Min	C-Min	None	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None
v/c Ratio	0.61	0.28	0.61	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.88
Control Delay	17.2	1.7	37.2	25.7	25.7	25.7	25.7	25.7	25.7	56.1	56.1	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	1.7	37.2	25.7	25.7	25.7	25.7	25.7	25.7	56.1	56.1	23.4
90th %ile Green (s)	30.0	30.0	14.5	26.0	26.0	26.0	26.0	26.0	26.0	30.0	30.0	17.5
90th %ile Term Code	Coord	Coord	Max	Coord	Coord	Coord	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	32.5	32.5	12.0	26.0	26.0	26.0	26.0	26.0	26.0	30.0	30.0	17.5
70th %ile Term Code	Coord	Coord	Gap	Coord	Coord	Coord	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	34.9	34.9	9.6	26.0	26.0	26.0	26.0	26.0	26.0	30.0	30.0	17.5
50th %ile Term Code	Coord	Coord	Gap	Coord	Coord	Coord	Coord	Coord	Coord	Max	Max	Max
30th %ile Green (s)	37.3	37.3	8.0	26.0	26.0	26.0	26.0	26.0	26.0	29.2	29.2	18.3
30th %ile Term Code	Coord	Coord	Gap	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Max
10th %ile Green (s)	44.6	44.6	6.0	30.3	30.3	30.3	30.3	30.3	30.3	23.9	23.9	19.3
10th %ile Term Code	Coord	Coord	Min	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap
Queue Length 50th (ft)	177	2	68	289	289	289	289	289	289	273	273	340
Queue Length 95th (ft)	177	6	m95	#420	#420	#420	#420	#420	#420	#460	#460	468
Internal Link Dist (ft)	1240			570			622			1008		

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

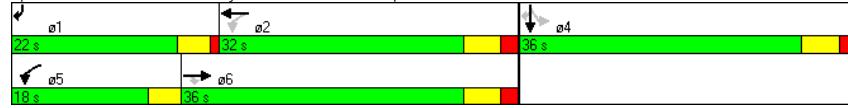


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1968	738	394	1026						574	1592
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		5	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.28	0.48	0.92						0.89	0.88

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 48 (53%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑						↓	↓↑
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.20	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	361	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	1207	83	190	940	0	0	0	0	0	512	1386
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		35.9	35.9	36.9	26.9						28.6	46.6
Effective Green, g (s)		35.9	35.9	36.9	26.9						28.6	46.6
Actuated g/C Ratio		0.40	0.40	0.41	0.30						0.32	0.52
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1971	613	299	1028						548	1402
v/s Ratio Prot		0.24		0.07	c0.27							c0.20
v/s Ratio Perm			0.05	0.19							0.30	0.31
v/c Ratio		0.61	0.13	0.64	0.91						0.93	0.99
Uniform Delay, d1		21.5	17.2	17.7	30.4						29.8	21.4
Progression Factor		0.70	0.24	2.68	0.46						1.00	1.00
Incremental Delay, d2		1.3	0.4	2.0	9.2						23.0	21.1
Delay (s)		16.3	4.6	49.3	23.2						52.8	42.5
Level of Service		B	A	D	C						D	D
Approach Delay (s)		14.6			27.6		0.0				45.3	
Approach LOS		B			C		A				D	

Intersection Summary

HCM Average Control Delay: 31.0 HCM Level of Service: C
 HCM Volume to Capacity ratio: 0.94
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 79.0% ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	870	848	0	0	859	478	272	1	168	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	870	848	0	0	859	478	0	273	168	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.89	0.69			0.79	0.60	0.83	0.39				
Control Delay	18.5	15.7			27.8	5.6	57.1	8.0				
Queue Delay	0.0	0.3			0.0	0.0	0.0	0.0				
Total Delay	18.5	16.0			27.8	5.6	57.1	8.0				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	27.9	59.0			25.1	25.1	19.0	19.0	19.0			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	25.6	61.8			30.2	30.2	16.2	16.2	16.2			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	21.9	65.8			37.9	37.9	12.2	12.2	12.2			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	239	319			251	42	146	0				
Queue Length 95th (ft)	0	m373			#352	20	#262	51				
Internal Link Dist (ft)		570			1240		666					712

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Synchro 7 - Report

Volume
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1225			1094	798			364			457
Starvation Cap Reductn	0	69			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	0.84	0.73			0.79	0.60			0.75			0.37

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Natural Cycle: 75

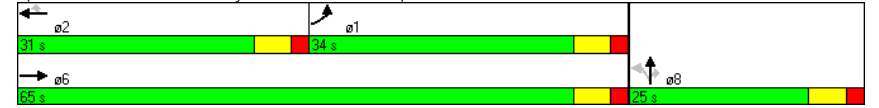
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗			
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	870	848	0	0	859	478	272	1	168	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	309	0	0	136	0	0	0
Lane Group Flow (vph)	870	848	0	0	859	169	0	273	32	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8		8			
Permitted Phases					2		8		8			
Actuated Green, G (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Effective Green, g (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Actuated g/C Ratio	0.29	0.68			0.32	0.32	0.19		0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0		2.0			
Lane Grp Cap (vph)	975	1225			1093	489	328		292			
v/s Ratio Prot	0.26	0.47			0.25							
v/s Ratio Perm					0.11		0.16		0.02			
v/c Ratio	0.89	0.69			0.79	0.35	0.83		0.11			
Uniform Delay, d1	30.5	8.9			27.9	23.5	35.1		30.2			
Progression Factor	0.25	1.39			0.75	0.72	1.00		1.00			
Incremental Delay, d2	8.3	1.9			5.0	1.7	15.7		0.1			
Delay (s)	16.0	14.2			25.9	18.7	50.7		30.2			
Level of Service	B	B			C	B	D		C			
Approach Delay (s)		15.1			23.3		42.9				0.0	
Approach LOS		B			C		D				A	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8			4
Permitted Phases	6	6	6	2	2	2	8	8	8	4	4	4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.44	0.31	0.17	0.35	0.53	0.14	0.80	0.04	0.26	0.26	0.04	0.34
Control Delay	6.3	5.2	1.3	14.7	13.2	2.8	50.1	23.3	6.1	27.8	23.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.2	1.3	14.7	13.3	2.8	50.1	23.3	6.1	27.8	23.3	5.9
90th %ile Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord	Coord	Max	Max	Max	Hold	Hold	Hold
70th %ile Green (s)	9.3	53.1	53.1	40.3	40.3	40.3	24.9	24.9	24.9	24.9	24.9	24.9
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.8	56.5	56.5	45.2	45.2	45.2	21.5	21.5	21.5	21.5	21.5	21.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.6	60.0	60.0	49.9	49.9	49.9	18.0	18.0	18.0	18.0	18.0	18.0
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.2	65.2	55.7	55.7	55.7	12.8	12.8	12.8	12.8	12.8	12.8
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	16	45	5	28	112	3	136	7	0	38	7	0
Queue Length 95th (ft)	m47	115	m20	m55	157	m6	201	21	37	68	21	43
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

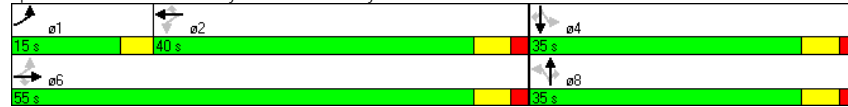


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	434	2168	1036	360	1720	829	436	583	577	436	583	609
Starvation Cap Reductn	0	0	0	0	155	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.31	0.17	0.35	0.58	0.14	0.58	0.03	0.21	0.19	0.03	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.22	1.00	1.00	0.40	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	404	3438	1538	720	3438	1538	1352	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
RTOR Reduction (vph)	0	0	66	0	0	60	0	0	92	0	0	128
Lane Group Flow (vph)	168	668	113	125	913	60	255	16	28	82	16	40
Turn Type	pm+pt		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6			2		8		8	4		4
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Effective Green, g (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.63	0.63	0.63	0.50	0.50	0.50	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	375	2170	971	361	1723	771	318	426	362	318	426	362
v/s Ratio Prot	c0.04	0.19			c0.27		0.01		0.01			0.01
v/s Ratio Perm	0.24		0.07	0.17		0.04	c0.19		0.02	0.06		0.03
w/c Ratio	0.45	0.31	0.12	0.35	0.53	0.08	0.80	0.04	0.08	0.26	0.04	0.11
Uniform Delay, d1	8.3	7.6	6.6	13.6	15.2	11.7	32.4	26.5	26.8	28.0	26.5	27.0
Progression Factor	0.50	0.57	0.66	0.71	0.71	0.71	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.2	2.1	0.9	0.2	12.8	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.4	4.6	4.6	11.8	11.8	8.4	45.2	26.5	26.8	28.2	26.5	27.0
Level of Service	A	A	A	B	B	A	D	C	C	C	C	C
Approach Delay (s)		4.6			11.4		38.8					27.4
Approach LOS		A			B		D					C

Intersection Summary

HCM Average Control Delay: 14.2 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.60
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.5
 Intersection Capacity Utilization: 64.8% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	196	418	255	27	620	65	288	288	60	71	283	250
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	418	255	27	685	0	288	288	60	71	283	250
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.54	0.48	0.29	0.09	0.59		0.74	0.42	0.10	0.33	0.78	0.49
Control Delay	12.8	9.8	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
Queue Delay	0.0	0.4	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	10.2	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.7	39.2	39.2	24.0	24.0		13.5	38.8	38.8	21.8	21.8	21.8
70th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	10.3	41.8	41.8	28.0	28.0		13.5	36.2	36.2	19.2	19.2	19.2
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.5	45.5	45.5	33.5	33.5		13.4	32.5	32.5	15.6	15.6	15.6
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.2	52.2	52.2	42.5	42.5		10.6	25.8	25.8	11.7	11.7	11.7
10th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	23	54	0	11	172		109	114	0	34	151	0
Queue Length 95th (ft)	53	93	8	33	249		164	170	22	71	230	58
Internal Link Dist (ft)		320			387			197				364

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200	200	200
Base Capacity (vph)	392	876	876	317	1153		395	784	700	258	442	565
Starvation Cap Reductn	0	131	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.56	0.29	0.09	0.59		0.73	0.37	0.09	0.28	0.64	0.44
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	80 (89%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
15 s	30 s	17 s	28 s									
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
45 s		45 s										

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3389		1719	1810	1538	1719	1810	1538
Flt Permitted	0.25	1.00	1.00	0.52	1.00		0.29	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	448	1810	1538	937	3389		525	1810	1538	1056	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	418	255	27	620	65	288	288	60	71	283	250
RTOR Reduction (vph)	0	0	132	0	8	0	0	0	37	0	0	200
Lane Group Flow (vph)	196	418	123	27	677	0	288	288	23	71	283	50
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Effective Green, g (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Actuated g/C Ratio	0.48	0.48	0.48	0.34	0.34		0.38	0.38	0.38	0.20	0.20	0.20
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	352	875	743	316	1145		372	694	590	212	364	309
v/s Ratio Prot	c0.06	0.23			0.20		c0.11	0.16			0.16	
v/s Ratio Perm	c0.21		0.08	0.03			c0.19		0.01	0.07		0.03
v/c Ratio	0.56	0.48	0.17	0.09	0.59		0.77	0.41	0.04	0.33	0.78	0.16
Uniform Delay, d1	14.7	15.6	13.1	20.3	24.7		21.5	20.3	17.4	30.8	34.0	29.7
Progression Factor	0.54	0.46	0.18	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.8	0.5	0.5	2.2		8.9	0.1	0.0	0.3	9.2	0.1
Delay (s)	9.0	9.1	2.8	20.9	26.9		30.3	20.5	17.4	31.1	43.2	29.8
Level of Service	A	A	A	C	C		C	C	B	C	D	C
Approach Delay (s)		7.2			26.7			24.6			36.2	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	25	1750	1	25	1125	135	1	25	40	225	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200		200		250		200
Storage Lanes	1		1	1		1		1		1		1
Taper Length (ft)	100		100	100		100		100		100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	27	1902	1	27	1223	147	1	27	43	245	27	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	1902	1	27	1223	147	1	27	43	245	27	16
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	9.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.5	44.0	44.0	6.5	44.0	44.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.09	0.92	0.00	0.14	0.59	0.15	0.00	0.07	0.12	0.83	0.07	0.05
Control Delay	6.8	27.2	9.0	6.4	13.2	3.1	24.0	26.0	8.9	56.2	26.0	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	27.2	9.0	6.4	13.2	3.1	24.0	26.0	8.9	56.2	26.0	11.8
90th %ile Green (s)	6.0	44.5	44.5	6.0	44.5	44.5	24.0	24.0	24.0	24.0	24.0	24.0
90th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Max	Max	Max
70th %ile Green (s)	6.0	44.5	44.5	6.0	44.5	44.5	24.0	24.0	24.0	24.0	24.0	24.0
70th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Hold	Hold	Hold	Max	Max	Max
50th %ile Green (s)	0.0	57.0	57.0	0.0	57.0	57.0	21.0	21.0	21.0	21.0	21.0	21.0
50th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	0.0	60.4	60.4	0.0	60.4	60.4	17.6	17.6	17.6	17.6	17.6	17.6
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	0.0	65.4	65.4	0.0	65.4	65.4	12.6	12.6	12.6	12.6	12.6	12.6
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Hold	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	5	421	0	4	210	2	0	12	0	131	12	0
Queue Length 95th (ft)	15	#798	3	m11	277	40	4	32	25	#225	32	15
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200		200		250		200
Base Capacity (vph)	299	2076	929	205	2076	987	357	483	442	357	483	422
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.92	0.00	0.13	0.59	0.15	0.00	0.06	0.10	0.69	0.06	0.04
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	1 (1%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	25	1750	1	25	1125	135	1	25	40	225	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.16	1.00	1.00	0.08	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	296	3438	1538	138	3438	1538	1338	1810	1538	1338	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1902	1	27	1223	147	1	27	43	245	27	16
RTOR Reduction (vph)	0	0	0	0	0	62	0	0	34	0	0	12
Lane Group Flow (vph)	27	1902	1	27	1223	85	1	27	9	245	27	4
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases	6		6	2		2	8	8		4		4
Actuated Green, G (s)	54.7	52.3	52.3	54.7	52.3	52.3	19.8	19.8	19.8	19.8	19.8	19.8
Effective Green, g (s)	54.7	52.3	52.3	54.7	52.3	52.3	19.8	19.8	19.8	19.8	19.8	19.8
Actuated g/C Ratio	0.61	0.58	0.58	0.61	0.58	0.58	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	218	1998	894	126	1998	894	294	398	338	294	398	338
v/s Ratio Prot	0.00	c0.55		c0.01	0.36			0.01			0.01	
v/s Ratio Perm	0.07		0.00	0.12		0.06	0.00		0.01	c0.18		0.00
v/c Ratio	0.12	0.95	0.00	0.21	0.61	0.10	0.00	0.07	0.03	0.83	0.07	0.01
Uniform Delay, d1	8.4	17.7	7.9	16.9	12.3	8.4	27.4	27.8	27.5	33.5	27.8	27.4
Progression Factor	1.00	1.00	1.00	0.82	0.93	1.23	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	11.6	0.0	0.3	1.3	0.2	0.0	0.0	0.0	17.3	0.0	0.0
Delay (s)	8.5	29.3	7.9	14.1	12.6	10.5	27.4	27.8	27.6	50.8	27.8	27.4
Level of Service	A	C	A	B	B	B	C	C	C	D	C	C
Approach Delay (s)		29.0			12.4			27.7			47.3	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225			0	0	0	0	225		350
Storage Lanes	1		1	1		0	0	0	0	1		1
Taper Length (ft)	100	100	100			100	100	100	100	100		100
Right Turn on Red		Yes				Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1320			650			702				1088
Travel Time (s)		30.0			14.8			16.0				24.7
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
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases		6	6	2						4		4
Detector Phase		6	6	5	2					4	4	1
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	6.0
Minimum Split (s)		21.0	21.0	9.5	21.0					16.0	16.0	10.5
Total Split (s)	0.0	45.0	45.0	15.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	25.0
Total Split (%)	0.0%	50.0%	50.0%	16.7%	38.9%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	27.8%
Maximum Green (s)		39.0	39.0	11.5	29.0					24.0	24.0	20.5
Yellow Time (s)		4.0	4.0	3.5	4.0					4.0	4.0	3.5
All-Red Time (s)		2.0	2.0	0.0	2.0					2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag		Lag	Lag	Lead	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)		5.0	5.0	2.0	5.0					2.0	2.0	2.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
v/c Ratio		0.76	0.30	0.58	0.32					0.85	0.73	
Control Delay		9.6	0.7	47.2	3.3					53.1	21.6	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		9.6	0.7	47.2	3.3					53.1	21.6	
90th %ile Green (s)		40.7	40.7	9.8	37.7					24.0	24.0	11.8
90th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
70th %ile Green (s)		42.4	42.4	8.1	43.2					24.0	24.0	6.3
70th %ile Term Code		Coord	Coord	Gap	Coord					Max	Max	Gap
50th %ile Green (s)		44.9	44.9	7.1	45.0					22.5	22.5	6.0
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
30th %ile Green (s)		48.9	48.9	6.1	48.0					19.5	19.5	6.0
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Min
10th %ile Green (s)		53.6	53.6	6.0	52.6					14.9	14.9	6.0
10th %ile Term Code		Coord	Coord	Min	Coord					Gap	Gap	Min
Queue Length 50th (ft)		261	9	58	40							183
Queue Length 95th (ft)		m163	m0	m104	76							#301
Internal Link Dist (ft)		1240			570			622				1008

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

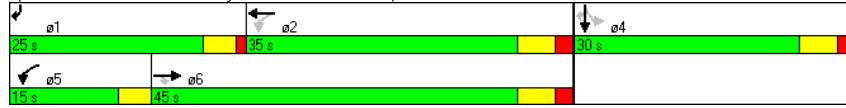


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2530	908	303	1730						460	1519
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.76	0.30	0.43	0.32						0.75	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↓↓
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	160	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	0	0	0	132
Lane Group Flow (vph)	0	1918	152	130	560	0	0	0	0	0	343	705
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		46.1	46.1	52.7	45.3						21.0	28.2
Effective Green, g (s)		46.1	46.1	52.7	45.3						21.0	28.2
Actuated g/C Ratio		0.51	0.51	0.59	0.50						0.23	0.31
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		2530	788	222	1730						402	848
v/s Ratio Prot		c0.39		0.05	0.16							c0.07
v/s Ratio Perm			0.10	0.30							0.20	0.19
v/c Ratio		0.76	0.19	0.59	0.32						0.85	0.83
Uniform Delay, d1		17.5	11.9	12.8	13.3						33.0	28.7
Progression Factor		0.45	0.10	3.23	0.20						1.00	1.00
Incremental Delay, d2		1.0	0.3	1.9	0.4						15.4	6.7
Delay (s)		8.9	1.4	43.2	3.0						48.4	35.4
Level of Service		A	A	D	A						D	D
Approach Delay (s)		7.9			10.6		0.0				39.2	
Approach LOS		A			B		A				D	

Intersection Summary

HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	1332	929	0	0	511	321	179	1	114	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1332	929	0	0	511	321	0	180	114	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	46.0	70.0	0.0	0.0	24.0	24.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	51.1%	77.8%	0.0%	0.0%	26.7%	26.7%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.93	0.71			0.65	0.55	0.74	0.74	0.36			
Control Delay	14.8	8.7			30.3	7.4		55.8	10.4			
Queue Delay	0.0	0.2			0.0	0.0		0.0	0.0			
Total Delay	14.8	8.9			30.3	7.4		55.8	10.4			
90th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	40.0	64.1			18.1	18.1	13.9	13.9	13.9			
50th %ile Term Code	Max	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	38.7	66.4			21.7	21.7	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	34.9	68.0			27.1	27.1	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	0	214			153	48		98	0			
Queue Length 95th (ft)	#15	258			159	32		#184	46			
Internal Link Dist (ft)		570			1240			666				712

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1482	1313			786	579		268	336			
Starvation Cap Reductn	0	61			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	0.90	0.74			0.65	0.55		0.67	0.34			

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	26 (29%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↑		↔	↑	↔		↔	↑				
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0			
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00			
Frt	1.00	1.00			1.00	0.85			1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538			
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1332	929	0	0	511	321	179	1	114	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	227	0	0	98	0	0	0	
Lane Group Flow (vph)	1332	929	0	0	511	94	0	180	16	0	0	0	
Turn Type	Prot		Perm				Perm		Perm				
Protected Phases	1	6	2				8		8				
Permitted Phases			2				8		8				
Actuated Green, G (s)	38.7	65.3	20.6				20.6		12.7			12.7	
Effective Green, g (s)	38.7	65.3	20.6				20.6		12.7			12.7	
Actuated g/C Ratio	0.43	0.73	0.23				0.23		0.14			0.14	
Clearance Time (s)	6.0	6.0	6.0				6.0		6.0			6.0	
Vehicle Extension (s)	2.0	5.0	5.0				5.0		2.0			2.0	
Lane Grp Cap (vph)	1434	1313	787				352		243			217	
v/s Ratio Prot	c0.40	c0.51	0.15										
v/s Ratio Perm			0.06				0.10		0.01				
v/c Ratio	0.93	0.71	0.65				0.27		0.74			0.07	
Uniform Delay, d1	24.3	7.0	31.4				28.5		37.1			33.5	
Progression Factor	0.23	0.85	0.80				0.65		1.00			1.00	
Incremental Delay, d2	7.2	2.1	4.0				1.8		10.1			0.1	
Delay (s)	12.8	8.0	29.2				20.3		47.2			33.6	
Level of Service	B		C				C		D			C	
Approach Delay (s)	10.8		25.7				41.9		0.0			0.0	
Approach LOS	B		C				D		A			A	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	
HCM Volume to Capacity ratio	0.87	B	
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	77.4%	ICU Level of Service	
Analysis Period (min)	15	D	
c Critical Lane Group			

Volume

200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↑	↔	↔	↑	↔	↔	↑	↔	↔	↑	↔	
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50	
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1	
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100	
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes		
Link Speed (mph)	35		35		30		30		30		30		
Link Distance (ft)	1320		400		279		455		455		455		
Travel Time (s)	25.7		7.8		6.3		10.3		10.3		10.3		
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	
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103	
Turn Type	pm+pt		Perm		Perm		Perm		Perm		Perm		
Protected Phases	1	6	2				8		4			4	
Permitted Phases	6		6		2		2		8		4		
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4	
Switch Phase													
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0	
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lead		Lag		Lag		Lag		Lag		Lag		
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None	
v/c Ratio	0.29	0.29	0.16	0.20	0.29	0.08	0.69	0.04	0.24	0.21	0.04	0.30	
Control Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6	
90th %ile Green (s)	10.5	56.5	56.5	42.5	42.5	42.5	21.5	21.5	21.5	21.5	21.5	21.5	
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold	
70th %ile Green (s)	8.4	60.4	60.4	48.5	48.5	48.5	17.6	17.6	17.6	17.6	17.6	17.6	
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold	
50th %ile Green (s)	7.2	63.1	63.1	52.4	52.4	52.4	14.9	14.9	14.9	14.9	14.9	14.9	
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold	
30th %ile Green (s)	6.2	65.9	65.9	56.2	56.2	56.2	12.1	12.1	12.1	12.1	12.1	12.1	
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold	
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0	
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold	
Queue Length 50th (ft)	29	79	12	10	37	0	86	5	0	24	5	0	
Queue Length 95th (ft)	m54	110	m24	32	78	0	140	18	34	52	18	39	
Internal Link Dist (ft)	1240		320		199		375		375		375		

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

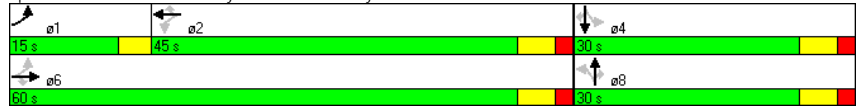


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	648	2398	1129	406	1972	914	362	483	466	362	483	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.29	0.16	0.20	0.29	0.08	0.44	0.02	0.16	0.14	0.02	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.40	1.00	1.00	0.39	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	717	3438	1538	708	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
RTOR Reduction (vph)	0	0	56	0	0	32	0	0	63	0	0	86
Lane Group Flow (vph)	174	685	129	82	571	44	158	11	13	49	11	17
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Effective Green, g (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.70	0.70	0.70	0.57	0.57	0.57	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	586	2399	1073	406	1971	882	229	306	260	229	306	260
v/s Ratio Prot	0.03	c0.20			0.17		0.01		0.01		0.01	
v/s Ratio Perm	c0.18		0.08	0.12		0.03	c0.12		0.01	0.04		0.01
w/c Ratio	0.30	0.29	0.12	0.20	0.29	0.05	0.69	0.04	0.05	0.21	0.04	0.07
Uniform Delay, d1	4.8	5.1	4.5	9.3	9.8	8.4	35.2	31.3	31.3	32.2	31.3	31.4
Progression Factor	0.97	0.97	1.69	0.67	0.63	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	1.1	0.4	0.1	6.7	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.7	5.2	7.8	7.3	6.6	4.9	41.9	31.3	31.4	32.4	31.3	31.5
Level of Service	A	A	A	A	A	A	D	C	C	C	C	C
Approach Delay (s)		5.6			6.5		38.2				31.7	
Approach LOS		A			A		D				C	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	185	386	239	16	391	43	179	179	38	43	179	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	386	239	16	434	0	179	179	38	43	179	158
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.33	0.38	0.25	0.04	0.31		0.48	0.32	0.07	0.24	0.64	0.43
Control Delay	7.0	7.3	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	7.6	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
90th %ile Green (s)	13.8	42.6	42.6	25.3	25.3		12.5	35.4	35.4	19.4	19.4	19.4
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	10.8	46.6	46.6	32.3	32.3		12.5	31.4	31.4	15.4	15.4	15.4
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.0	49.6	49.6	37.1	37.1		11.6	28.4	28.4	13.3	13.3	13.3
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.5	53.4	53.4	42.4	42.4		10.0	24.6	24.6	11.1	11.1	11.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	57.1	57.1	47.6	47.6		7.4	20.9	20.9	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	18	42	0	5	82		74	77	0	22	98	0
Queue Length 95th (ft)	50	104	7	22	148		110	115	19	49	152	49
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200				200					200		200
Base Capacity (vph)	590	1003	959	396	1398		393	764	671	285	442	495
Starvation Cap Reductn	0	211	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.49	0.25	0.04	0.31		0.46	0.23	0.06	0.15	0.40	0.32
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	72 (80%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3387		1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.53	1.00		0.42	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	788	1810	1538	965	3387		767	1810	1538	1166	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	386	239	16	391	43	179	179	38	43	179	158
RTOR Reduction (vph)	0	0	106	0	8	0	0	0	26	0	0	134
Lane Group Flow (vph)	185	386	133	16	426	0	179	179	12	43	179	24
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Effective Green, g (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Actuated g/C Ratio	0.55	0.55	0.55	0.41	0.41		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	534	1004	853	397	1392		354	565	480	179	278	236
v/s Ratio Prot	0.04	c0.21			0.13		c0.06	0.10			c0.10	
v/s Ratio Perm	0.16		0.09	0.02			0.10		0.01	0.04		0.02
v/c Ratio	0.35	0.38	0.16	0.04	0.31		0.51	0.32	0.02	0.24	0.64	0.10
Uniform Delay, d1	10.2	11.4	9.8	15.9	17.9		24.0	23.6	21.5	33.5	35.8	32.8
Progression Factor	0.52	0.48	0.25	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1	0.4	0.2	0.6		0.4	0.1	0.0	0.3	3.8	0.1
Delay (s)	5.5	6.5	2.8	16.1	18.4		24.4	23.7	21.5	33.7	39.6	32.8
Level of Service	A	A	A	B	B		C	C	C	C	D	C
Approach Delay (s)		5.2			18.3			23.8			36.1	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

Year 2035 Build Traffic – 40% Shift Peak Hour Analysis Outputs

**Year 2035 Build Traffic - 40% Shift
With Anticipated Transportation Improvements**

New Lacy Road Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Ninebark Road	Traffic Signal	AM	B	B	A	A	C	A	D	D	D	C	C	C
		PM	B	D	B	B	B	B	D	D	D	D	C	C
USH 14 Southbound Ramps	Traffic Signal	AM	-	B	A	D	C	-	-	-	-	D	D	D
		PM	-	A	A	D	A	-	-	-	-	D	D	D
USH 14 Northbound Ramps	Traffic Signal	AM	B	B	-	-	C	B	D	D	C	-	-	-
		PM	B	A	-	-	C	C	D	D	C	-	-	-
N-S Roadway	Traffic Signal	AM	A	A	A	B	B	B	D	C	C	C	C	C
		PM	A	A	A	A	A	A	D	C	C	C	C	C
CTH MM	Traffic Signal	AM	A	A	A	C	C	C	C	C	B	C	D	C
		PM	A	A	A	B	B	B	C	C	C	D	D	C

Notes: (-) indicates a movement that is not possible or is prohibited. (*) indicates uncontrolled or free-flow movement.

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	20	1130	5	50	1800	300	5	25	25	145	25	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	815			1320			437			462		
Travel Time (s)	18.5			30.0			9.9			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
Adj. Flow (vph)	22	1228	5	54	1957	326	5	27	27	158	27	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1228	5	54	1957	326	5	27	27	158	27	38
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		Perm
Protected Phases	1	6		5	2			8		7	4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	6.0	10.0	10.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	10.5	16.0	16.0
Total Split (s)	10.0	52.0	52.0	10.0	52.0	52.0	16.0	16.0	16.0	12.0	28.0	28.0
Total Split (%)	11.1%	57.8%	57.8%	11.1%	57.8%	57.8%	17.8%	17.8%	17.8%	13.3%	31.1%	31.1%
Maximum Green (s)	6.5	46.0	46.0	6.5	46.0	46.0	10.0	10.0	10.0	8.5	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	3.5	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.11	0.61	0.01	0.19	0.90	0.31	0.03	0.13	0.14	0.56	0.08	0.12
Control Delay	6.7	15.2	6.8	5.3	19.7	3.4	36.4	37.9	15.8	36.9	27.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	15.2	6.8	5.3	19.7	3.4	36.4	37.9	15.8	36.9	27.5	9.9
90th %ile Green (s)	6.0	46.0	46.0	6.5	46.5	46.5	10.0	10.0	10.0	8.5	22.0	22.0
90th %ile Term Code	Min	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	46.5	46.5	6.0	46.5	46.5	10.0	10.0	10.0	8.5	22.0	22.0
70th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Max	Max	Max	Max	Hold	Hold
50th %ile Green (s)	0.0	46.5	46.5	6.0	56.0	56.0	10.0	10.0	10.0	8.5	22.0	22.0
50th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Max	Max	Max	Max	Hold	Hold
30th %ile Green (s)	0.0	58.5	58.5	6.0	68.0	68.0	0.0	0.0	0.0	12.5	10.0	10.0
30th %ile Term Code	Skip	Coord	Coord	Min	Coord	Coord	Skip	Skip	Skip	Hold	Hold	Hold
10th %ile Green (s)	0.0	68.0	68.0	0.0	68.0	68.0	0.0	0.0	0.0	12.5	10.0	10.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Hold	Hold	Hold
Queue Length 50th (ft)	4	262	0	7	382	13	3	14	0	72	12	0
Queue Length 95th (ft)	12	342	5	m10	m#805	m46	13	39	24	127	33	24
Internal Link Dist (ft)	735			1240			357			382		

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	211	2028	909	287	2177	1059	149	201	195	283	442	405
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.61	0.01	0.19	0.90	0.31	0.03	0.13	0.14	0.56	0.06	0.09
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	14 (16%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												

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TADI

Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	20	1130	5	50	1800	300	5	25	25	145	25	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	3.5	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.08	1.00	1.00	0.15	1.00	1.00	0.74	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	145	3438	1538	264	3438	1538	1338	1810	1538	845	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1228	5	54	1957	326	5	27	27	158	27	38
RTOR Reduction (vph)	0	0	2	0	0	97	0	0	25	0	0	30
Lane Group Flow (vph)	22	1228	3	54	1957	229	5	27	2	158	27	8
Turn Type	pm+pt	Perm	pm+pt	Perm	Perm	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm
Protected Phases	1	6	5	2	2	8	8	8	7	4	4	4
Permitted Phases	6	6	2	2	8	8	8	8	4	4	4	4
Actuated Green, G (s)	52.4	50.0	50.0	57.4	52.5	52.5	6.0	6.0	6.0	19.6	19.6	19.6
Effective Green, g (s)	52.4	50.0	50.0	57.4	52.5	52.5	6.0	6.0	6.0	19.6	19.6	19.6
Actuated g/C Ratio	0.58	0.56	0.56	0.64	0.58	0.58	0.07	0.07	0.07	0.22	0.22	0.22
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	126	1910	854	248	2006	897	89	121	103	282	394	335
v/s Ratio Prot	0.00	0.36	c0.01	c0.57	0.15	0.00	0.01	0.00	c0.06	0.01	0.01	0.01
v/s Ratio Perm	0.10	0.00	0.13	0.98	0.26	0.06	0.22	0.02	0.56	0.07	0.02	0.02
v/c Ratio	0.17	0.64	0.00	0.22	0.98	0.02	0.02	0.02	0.56	0.07	0.02	0.02
Uniform Delay, d1	17.8	13.8	8.9	8.4	18.1	9.2	39.3	39.8	39.2	30.4	28.0	27.7
Progression Factor	1.00	1.00	1.00	0.85	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.7	0.0	0.1	8.6	0.3	0.1	0.3	0.0	1.5	0.0	0.0
Delay (s)	18.1	15.5	8.9	7.2	24.9	8.5	39.4	40.1	39.3	31.9	28.0	27.7
Level of Service	B	B	A	A	C	A	D	D	D	C	C	C
Approach Delay (s)	15.5			22.2			39.7			30.7		
Approach LOS	B			C			D			C		

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225	0	0	0	0	0	0	225	350	350
Storage Lanes	1	1	1	0	0	0	0	0	0	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	1320			650			702			1088		
Travel Time (s)	30.0			14.8			16.0			24.7		
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
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1207	207	190	940	0	0	0	0	0	512	1397
Turn Type		Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm
Protected Phases	6	6	5	2	2	8	8	8	7	4	4	4
Permitted Phases	6	6	2	2	8	8	8	8	4	4	4	4
Detector Phase	6	6	5	2	2	8	8	8	7	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	6.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0	6.0
Minimum Split (s)	21.0	21.0	9.5	21.0	21.0	16.0	16.0	16.0	16.0	16.0	16.0	10.5
Total Split (s)	0.0	36.0	36.0	18.0	32.0	0.0	0.0	0.0	0.0	36.0	36.0	22.0
Total Split (%)	0.0%	40.0%	40.0%	20.0%	35.6%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%	24.4%
Maximum Green (s)	30.0	30.0	14.5	26.0	26.0	30.0	30.0	30.0	30.0	30.0	30.0	17.5
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag	Lag	Lag	Lead	Lag	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.61	0.28	0.61	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.88
Control Delay	14.5	1.2	37.2	25.7	25.7	56.1	56.1	56.1	56.1	56.1	56.1	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	1.2	37.2	25.7	25.7	56.1	56.1	56.1	56.1	56.1	56.1	23.4
90th %ile Green (s)	30.0	30.0	14.5	26.0	26.0	30.0	30.0	30.0	30.0	30.0	30.0	17.5
90th %ile Term Code	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Max	Max	Max
70th %ile Green (s)	32.5	32.5	12.0	26.0	26.0	30.0	30.0	30.0	30.0	30.0	30.0	17.5
70th %ile Term Code	Coord	Coord	Gap	Coord	Coord	Max	Max	Max	Max	Max	Max	Max
50th %ile Green (s)	34.9	34.9	9.6	26.0	26.0	30.0	30.0	30.0	30.0	30.0	30.0	17.5
50th %ile Term Code	Coord	Coord	Gap	Coord	Coord	Max	Max	Max	Max	Max	Max	Max
30th %ile Green (s)	37.3	37.3	8.0	26.0	26.0	29.2	29.2	29.2	29.2	29.2	29.2	18.3
30th %ile Term Code	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Gap	Gap	Gap	Max
10th %ile Green (s)	44.6	44.6	6.0	30.3	30.3	23.9	23.9	23.9	23.9	23.9	23.9	19.3
10th %ile Term Code	Coord	Coord	Min	Coord	Coord	Gap	Gap	Gap	Gap	Gap	Gap	340
Queue Length 50th (ft)	66	0	68	289	289	273	273	273	273	273	273	340
Queue Length 95th (ft)	153	5	m95	#420	#420	#460	#460	#460	#460	#460	#460	468
Internal Link Dist (ft)	1240			570			622			1008		

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

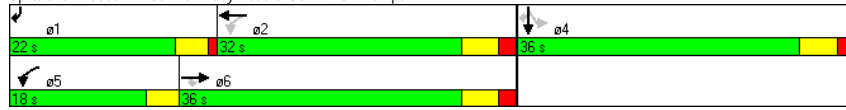


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		1968	738	394	1026						574	1592
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		5	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.61	0.28	0.48	0.92						0.89	0.88

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 48 (53%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis

180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↑↑
Volume (vph)	0	1110	190	175	865	0	0	0	0	470	1	1285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.20	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	361	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1207	207	190	940	0	0	0	0	511	1	1397
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	1207	83	190	940	0	0	0	0	0	512	1386
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		35.9	35.9	36.9	26.9						28.6	46.6
Effective Green, g (s)		35.9	35.9	36.9	26.9						28.6	46.6
Actuated g/C Ratio		0.40	0.40	0.41	0.30						0.32	0.52
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		1971	613	299	1028						548	1402
v/s Ratio Prot		0.24		0.07	c0.27							c0.20
v/s Ratio Perm			0.05	0.19							0.30	0.31
v/c Ratio		0.61	0.13	0.64	0.91						0.93	0.99
Uniform Delay, d1		21.5	17.2	17.7	30.4						29.8	21.4
Progression Factor		0.59	0.13	2.68	0.46						1.00	1.00
Incremental Delay, d2		1.2	0.4	2.0	9.2						23.0	21.1
Delay (s)		13.8	2.6	49.3	23.2						52.8	42.5
Level of Service		B	A	D	C						D	D
Approach Delay (s)		12.2			27.6		0.0				45.3	
Approach LOS		B			C		A				D	

Intersection Summary

HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗			↖	↖			↗			
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		650			1320			746			792	
Travel Time (s)		14.8			25.7			17.0			18.0	
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)	870	848	0	0	859	478	272	1	168	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	870	848	0	0	859	478	0	273	168	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	34.0	65.0	0.0	0.0	31.0	31.0	25.0	25.0	25.0	0.0	0.0	0.0
Total Split (%)	37.8%	72.2%	0.0%	0.0%	34.4%	34.4%	27.8%	27.8%	27.8%	0.0%	0.0%	0.0%
Maximum Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.89	0.69			0.79	0.60	0.83	0.39				
Control Delay	18.3	15.7			27.8	5.6	57.1	8.0				
Queue Delay	0.0	0.3			0.0	0.0	0.0	0.0				
Total Delay	18.3	16.0			27.8	5.6	57.1	8.0				
90th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	28.0	59.0			25.0	25.0	19.0	19.0	19.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	27.9	59.0			25.1	25.1	19.0	19.0	19.0			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	25.6	61.8			30.2	30.2	16.2	16.2	16.2			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	21.9	65.8			37.9	37.9	12.2	12.2	12.2			
10th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	199	319			251	42	146	0				
Queue Length 95th (ft)	0	m373			#352	20	#262	51				
Internal Link Dist (ft)		570			1240		666				712	

Volume

190: New Lacy Road & USH 14 NB Ramps

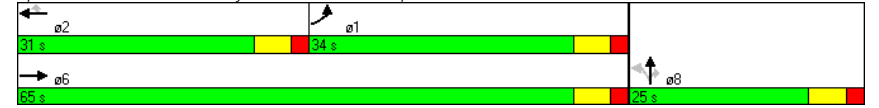
4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1038	1225			1094	798		364	457			
Starvation Cap Reductn	0	69			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	0.84	0.73			0.79	0.60		0.75	0.37			

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 34 (38%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis
190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗		↔	↗	↘		↔	↗		↔	↘
Volume (vph)	800	780	0	0	790	440	250	1	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0		
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00		
Frt	1.00	1.00			1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538		
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00		
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	870	848	0	0	859	478	272	1	168	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	309	0	0	136	0	0	0
Lane Group Flow (vph)	870	848	0	0	859	169	0	273	32	0	0	0
Turn Type	Prot				Perm		Perm		Perm			
Protected Phases	1	6			2		8		8			
Permitted Phases					2		8		8			
Actuated Green, G (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Effective Green, g (s)	26.3	60.9			28.6	28.6	17.1		17.1			
Actuated g/C Ratio	0.29	0.68			0.32	0.32	0.19		0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0		2.0			
Lane Grp Cap (vph)	975	1225			1093	489	328		292			
v/s Ratio Prot	0.26	0.47			0.25							
v/s Ratio Perm						0.11			0.16			0.02
v/c Ratio	0.89	0.69			0.79	0.35	0.83		0.11			
Uniform Delay, d1	30.5	8.9			27.9	23.5	35.1		30.2			
Progression Factor	0.24	1.39			0.75	0.72	1.00		1.00			
Incremental Delay, d2	8.3	1.9			5.0	1.7	15.7		0.1			
Delay (s)	15.8	14.2			25.9	18.7	50.7		30.2			
Level of Service	B	B			C	B	D		C			
Approach Delay (s)		15.0			23.3		42.9				0.0	
Approach LOS		B			C		D				A	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		1320			400			279				455
Travel Time (s)		25.7			7.8			6.3				10.3
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
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8			4
Permitted Phases	6		6	2	2	2	8		8	4		4
Detector Phase	1	6	6	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	55.0	55.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	61.1%	61.1%	44.4%	44.4%	44.4%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Maximum Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.44	0.31	0.17	0.35	0.53	0.14	0.80	0.04	0.26	0.26	0.04	0.34
Control Delay	6.3	5.2	1.3	14.7	13.2	2.8	50.1	23.3	6.1	27.8	23.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.2	1.3	14.7	13.3	2.8	50.1	23.3	6.1	27.8	23.3	5.9
90th %ile Green (s)	11.5	49.0	49.0	34.0	34.0	34.0	29.0	29.0	29.0	29.0	29.0	29.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord	Coord	Max	Max	Max	Hold	Hold	Hold
70th %ile Green (s)	9.3	53.1	53.1	40.3	40.3	40.3	24.9	24.9	24.9	24.9	24.9	24.9
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.8	56.5	56.5	45.2	45.2	45.2	21.5	21.5	21.5	21.5	21.5	21.5
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.6	60.0	60.0	49.9	49.9	49.9	18.0	18.0	18.0	18.0	18.0	18.0
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	65.2	65.2	55.7	55.7	55.7	12.8	12.8	12.8	12.8	12.8	12.8
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
Queue Length 50th (ft)	16	45	5	28	112	3	136	7	0	38	7	0
Queue Length 95th (ft)	m47	115	m20	m55	157	m6	201	21	37	68	21	43
Internal Link Dist (ft)		1240			320			199				375

Volume
200: New Lacy Road & N-S Roadway

4/12/2012

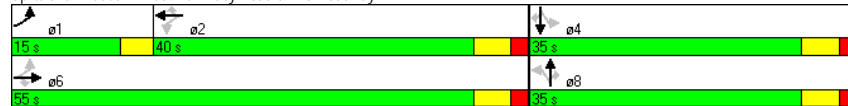


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200	200	200	200	200	150	150	50	150	50	150	50
Base Capacity (vph)	434	2168	1036	360	1720	829	436	583	577	436	583	609
Starvation Cap Reductn	0	0	0	0	155	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.31	0.17	0.35	0.58	0.14	0.58	0.03	0.21	0.19	0.03	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	155	615	165	115	840	110	235	15	110	75	15	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.22	1.00	1.00	0.40	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	404	3438	1538	720	3438	1538	1352	1810	1538	1352	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	668	179	125	913	120	255	16	120	82	16	168
RTOR Reduction (vph)	0	0	66	0	0	60	0	0	92	0	0	128
Lane Group Flow (vph)	168	668	113	125	913	60	255	16	28	82	16	40
Turn Type	pm+pt		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6		2	2		8		8	4		4
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Effective Green, g (s)	56.8	56.8	56.8	45.1	45.1	45.1	21.2	21.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.63	0.63	0.63	0.50	0.50	0.50	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	375	2170	971	361	1723	771	318	426	362	318	426	362
v/s Ratio Prot	c0.04	0.19			c0.27		0.01					0.01
v/s Ratio Perm	0.24		0.07	0.17		0.04	c0.19		0.02	0.06		0.03
w/c Ratio	0.45	0.31	0.12	0.35	0.53	0.08	0.80	0.04	0.08	0.26	0.04	0.11
Uniform Delay, d1	8.3	7.6	6.6	13.6	15.2	11.7	32.4	26.5	26.8	28.0	26.5	27.0
Progression Factor	0.50	0.57	0.67	0.71	0.71	0.71	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.2	2.1	0.9	0.2	12.8	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.4	4.6	4.6	11.8	11.8	8.4	45.2	26.5	26.8	28.2	26.5	27.0
Level of Service	A	A	A	B	B	A	D	C	C	C	C	C
Approach Delay (s)		4.6			11.4		38.8					27.4
Approach LOS		A			B		D					C

Intersection Summary

HCM Average Control Delay: 14.2 HCM Level of Service: B
 HCM Volume to Capacity ratio: 0.60
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.5
 Intersection Capacity Utilization: 64.8% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		400			467			277			444	
Travel Time (s)		7.8			9.1			6.3			10.1	
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)	196	418	255	27	620	65	288	288	60	71	283	250
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	418	255	27	685	0	288	288	60	71	283	250
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	45.0	45.0	30.0	30.0	0.0	17.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	16.7%	50.0%	50.0%	33.3%	33.3%	0.0%	18.9%	50.0%	50.0%	31.1%	31.1%	31.1%
Maximum Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.54	0.48	0.29	0.09	0.59		0.74	0.42	0.10	0.33	0.78	0.49
Control Delay	12.8	9.8	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
Queue Delay	0.0	0.4	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	10.2	1.2	25.1	28.5		30.8	21.5	4.7	33.9	48.8	7.4
90th %ile Green (s)	11.5	39.0	39.0	24.0	24.0		13.5	39.0	39.0	22.0	22.0	22.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Max	Max	Max
70th %ile Green (s)	11.7	39.2	39.2	24.0	24.0		13.5	38.8	38.8	21.8	21.8	21.8
70th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	10.3	41.8	41.8	28.0	28.0		13.5	36.2	36.2	19.2	19.2	19.2
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.5	45.5	45.5	33.5	33.5		13.4	32.5	32.5	15.6	15.6	15.6
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.2	52.2	52.2	42.5	42.5		10.6	25.8	25.8	11.7	11.7	11.7
10th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
Queue Length 50th (ft)	23	54	0	11	172		109	114	0	34	151	0
Queue Length 95th (ft)	53	93	8	33	249		164	170	22	71	230	58
Internal Link Dist (ft)		320			387			197			364	

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200			200			200		200
Base Capacity (vph)	392	876	876	317	1153		395	784	700	258	442	565
Starvation Cap Reductn	0	131	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.56	0.29	0.09	0.59		0.73	0.37	0.09	0.28	0.64	0.44
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	80 (89%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	180	385	235	25	570	60	265	265	55	65	260	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3389		1719	1810	1538	1719	1810	1538
Flt Permitted	0.25	1.00	1.00	0.52	1.00		0.29	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	448	1810	1538	937	3389		525	1810	1538	1056	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	418	255	27	620	65	288	288	60	71	283	250
RTOR Reduction (vph)	0	0	132	0	8	0	0	0	37	0	0	200
Lane Group Flow (vph)	196	418	123	27	677	0	288	288	23	71	283	50
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Effective Green, g (s)	43.5	43.5	43.5	30.4	30.4		34.5	34.5	34.5	18.1	18.1	18.1
Actuated g/C Ratio	0.48	0.48	0.48	0.34	0.34		0.38	0.38	0.38	0.20	0.20	0.20
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	352	875	743	316	1145		372	694	590	212	364	309
v/s Ratio Prot	c0.06	0.23			0.20		c0.11	0.16			0.16	
v/s Ratio Perm	c0.21		0.08	0.03			c0.19		0.01	0.07		0.03
v/c Ratio	0.56	0.48	0.17	0.09	0.59		0.77	0.41	0.04	0.33	0.78	0.16
Uniform Delay, d1	14.7	15.6	13.1	20.3	24.7		21.5	20.3	17.4	30.8	34.0	29.7
Progression Factor	0.54	0.46	0.18	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.8	0.5	0.5	2.2		8.9	0.1	0.0	0.3	9.2	0.1
Delay (s)	9.0	9.1	2.8	20.9	26.9		30.3	20.5	17.4	31.1	43.2	29.8
Level of Service	A	A	A	C	C		C	C	B	C	D	C
Approach Delay (s)		7.2			26.7			24.6			36.2	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↗	↖	↘	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	30	1660	5	30	1075	180	5	25	50	305	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		200	200		200	250		200
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		815			1320			437				462
Travel Time (s)		18.5			30.0			9.9				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
Adj. Flow (vph)	33	1804	5	33	1168	196	5	27	54	332	27	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1804	5	33	1168	196	5	27	54	332	27	16
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		Perm
Protected Phases	1	6		5	2			8		7		4
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	8	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	9.0	9.0	9.0	6.0	9.0	9.0
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	15.0	15.0	15.0	10.5	15.0	15.0
Total Split (s)	10.0	47.0	47.0	10.0	47.0	47.0	15.0	15.0	15.0	18.0	33.0	33.0
Total Split (%)	11.1%	52.2%	52.2%	11.1%	52.2%	52.2%	16.7%	16.7%	16.7%	20.0%	36.7%	36.7%
Maximum Green (s)	6.5	41.0	41.0	6.5	41.0	41.0	9.0	9.0	9.0	14.5	27.0	27.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	3.5	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.13	0.98	0.01	0.16	0.63	0.21	0.04	0.15	0.27	0.84	0.06	0.04
Control Delay	8.7	40.8	9.2	8.5	16.9	4.1	37.4	39.2	14.7	46.8	22.9	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	40.8	9.2	8.5	16.9	4.1	37.4	39.2	14.7	46.8	22.9	10.7
90th %ile Green (s)	6.2	41.3	41.3	6.2	41.3	41.3	9.0	9.0	9.0	14.5	27.0	27.0
90th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	41.5	41.5	6.0	41.5	41.5	9.0	9.0	9.0	14.5	27.0	27.0
70th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Max	Max	Max	Max	Hold	Hold
50th %ile Green (s)	6.0	41.5	41.5	6.0	41.5	41.5	9.0	9.0	9.0	14.5	27.0	27.0
50th %ile Term Code	Min	Coord	Coord	Min	Coord	Coord	Max	Max	Max	Max	Hold	Hold
30th %ile Green (s)	0.0	51.0	51.0	0.0	51.0	51.0	9.0	9.0	9.0	14.5	27.0	27.0
30th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Max	Max	Max	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	66.0	0.0	66.0	66.0	0.0	0.0	0.0	14.5	12.0	12.0
10th %ile Term Code	Skip	Coord	Coord	Skip	Coord	Coord	Skip	Skip	Skip	Max	Hold	Hold
Queue Length 50th (ft)	7	-636	0	8	209	13	3	14	0	156	11	0
Queue Length 95th (ft)	19	#775	6	m16	267	51	13	40	34	#278	30	15
Internal Link Dist (ft)		735			1240			357				382

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Synchro 7 - Report

Volume
175: New Lacy Road & Ninebark Road

4/12/2012

	↖	→	↘	↙	←	↖	↙	↘	↗	↖	↘	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			200		200	200		200	250		200
Base Capacity (vph)	272	1843	826	209	1843	916	134	181	202	397	543	473
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.98	0.01	0.16	0.63	0.21	0.04	0.15	0.27	0.84	0.05	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	4 (4%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
-	Volume exceeds capacity, queue is theoretically infinite.											
	Queue shown is maximum after two cycles.											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											
m	Volume for 95th percentile queue is metered by upstream signal.											
Splits and Phases: 175: New Lacy Road & Ninebark Road												
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
10 s	47 s	33 s	47 s	18 s	15 s							
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
10 s	47 s	18 s	15 s									

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

175: New Lacy Road & Ninebark Road

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	30	1660	5	30	1075	180	5	25	50	305	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	3.5	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.15	1.00	1.00	0.09	1.00	1.00	0.74	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	276	3438	1538	158	3438	1538	1338	1810	1538	901	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	1804	5	33	1168	196	5	27	54	332	27	16
RTOR Reduction (vph)	0	0	2	0	0	96	0	0	50	0	0	12
Lane Group Flow (vph)	33	1804	3	33	1168	100	5	27	4	332	27	4
Turn Type	pm+pt	Perm	pm+pt	Perm	Perm	Perm	pm+pt	Perm	pm+pt	Perm	Perm	Perm
Protected Phases	1	6	5	2	2	8	8	8	7	4	4	4
Permitted Phases	6	6	2	2	8	8	8	8	4	4	4	4
Actuated Green, G (s)	49.3	45.7	45.7	49.3	45.7	45.7	7.2	7.2	7.2	25.2	25.2	25.2
Effective Green, g (s)	49.3	45.7	45.7	49.3	45.7	45.7	7.2	7.2	7.2	25.2	25.2	25.2
Actuated g/C Ratio	0.55	0.51	0.51	0.55	0.51	0.51	0.08	0.08	0.08	0.28	0.28	0.28
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0	6.0	6.0	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	209	1746	781	149	1746	781	107	145	123	384	507	431
v/s Ratio Prot	0.01	c0.52	c0.01	0.34	0.06	0.00	0.01	0.00	c0.14	0.01	0.00	0.00
v/s Ratio Perm	0.08	0.16	0.00	0.22	0.67	0.13	0.05	0.19	0.04	0.86	0.05	0.01
w/c Ratio	0.16	1.03	0.00	0.22	0.67	0.13	0.05	0.19	0.04	0.86	0.05	0.01
Uniform Delay, d1	11.1	22.1	10.9	19.2	16.5	11.7	38.2	38.7	38.2	29.2	23.7	23.4
Progression Factor	1.00	1.00	1.00	0.89	0.90	1.55	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	30.6	0.0	0.2	1.9	0.3	0.1	0.2	0.0	17.4	0.0	0.0
Delay (s)	11.2	52.8	10.9	17.3	16.8	18.4	38.3	38.9	38.2	46.6	23.7	23.4
Level of Service	B	D	B	B	B	D	D	D	D	D	C	C
Approach Delay (s)		51.9		17.0		38.4		44.0				
Approach LOS		D		B		D		D				

Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Volume

180: New Lacy Road & USH 14 SB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250	200	225	0	0	0	0	0	0	225	350	350
Storage Lanes	1	1	1	0	0	0	0	0	0	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	1320	650	702	1088	1088	1088	1088	1088	1088	1088	1088	1088
Travel Time (s)	30.0	14.8	16.0	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
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
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
Turn Type	Perm	pm+pt	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm
Protected Phases	6	5	2	4	4	4	4	4	4	4	4	4
Permitted Phases	6	6	2	4	4	4	4	4	4	4	4	4
Detector Phase	6	6	5	2	4	4	4	4	4	4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	6.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0	9.5	21.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	0.0	45.0	45.0	15.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	25.0
Total Split (%)	0.0%	50.0%	50.0%	16.7%	38.9%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	27.8%
Maximum Green (s)	39.0	39.0	11.5	29.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	20.5
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	3.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.5
Lead/Lag	Lag	Lag	Lead	Lag								Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.76	0.30	0.58	0.32	0.85	0.73	0.85	0.73	0.85	0.73	0.85	0.73
Control Delay	8.4	0.3	47.2	3.3	53.1	21.6	53.1	21.6	53.1	21.6	53.1	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	0.3	47.2	3.3	53.1	21.6	53.1	21.6	53.1	21.6	53.1	21.6
90th %ile Green (s)	40.7	40.7	9.8	37.7	24.0	24.0	24.0	24.0	24.0	24.0	24.0	11.8
90th %ile Term Code	Coord	Coord	Gap	Coord	Max	Max	Max	Max	Max	Max	Max	Gap
70th %ile Green (s)	42.4	42.4	8.1	43.2	24.0	24.0	24.0	24.0	24.0	24.0	24.0	6.3
70th %ile Term Code	Coord	Coord	Gap	Coord	Max	Max	Max	Max	Max	Max	Max	Gap
50th %ile Green (s)	44.9	44.9	7.1	45.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5	6.0
50th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Min
30th %ile Green (s)	48.9	48.9	6.1	48.0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	6.0
30th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Min
10th %ile Green (s)	53.6	53.6	6.0	52.6	14.9	14.9	14.9	14.9	14.9	14.9	14.9	6.0
10th %ile Term Code	Coord	Coord	Min	Coord	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Min
Queue Length 50th (ft)	71	0	58	40	183	175	183	175	183	175	183	175
Queue Length 95th (ft)	m105	m0	m104	76	#301	215	#301	215	#301	215	#301	215
Internal Link Dist (ft)	1240	570	622	1008								

Volume
180: New Lacy Road & USH 14 SB Ramps

4/12/2012

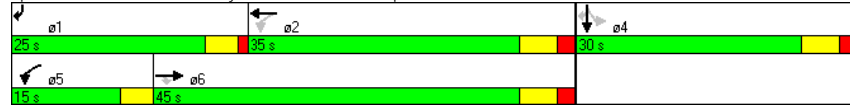


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			200	225								350
Base Capacity (vph)		2530	908	303	1730						460	1519
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.76	0.30	0.43	0.32						0.75	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 180: New Lacy Road & USH 14 SB Ramps



HCM Signalized Intersection Capacity Analysis
180: New Lacy Road & USH 14 SB Ramps

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑						↓	↑↑
Volume (vph)	0	1765	250	120	515	0	0	0	0	315	1	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Lane Util. Factor		0.91	1.00	1.00	0.95						1.00	0.88
Flt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		4940	1538	1719	3438						1724	2707
Flt Permitted		1.00	1.00	0.09	1.00						0.95	1.00
Satd. Flow (perm)		4940	1538	160	3438						1724	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1918	272	130	560	0	0	0	0	342	1	837
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	0	0	0	132
Lane Group Flow (vph)	0	1918	152	130	560	0	0	0	0	0	343	705
Turn Type		Perm	pm+pt							Perm	custom	
Protected Phases		6		5	2						4	1
Permitted Phases			6	2						4		4
Actuated Green, G (s)		46.1	46.1	52.7	45.3						21.0	28.2
Effective Green, g (s)		46.1	46.1	52.7	45.3						21.0	28.2
Actuated g/C Ratio		0.51	0.51	0.59	0.50						0.23	0.31
Clearance Time (s)		6.0	6.0	3.5	6.0						6.0	4.5
Vehicle Extension (s)		5.0	5.0	2.0	5.0						2.0	2.0
Lane Grp Cap (vph)		2530	788	222	1730						402	848
v/s Ratio Prot		c0.39		0.05	0.16							c0.07
v/s Ratio Perm			0.10	0.30							0.20	0.19
v/c Ratio		0.76	0.19	0.59	0.32						0.85	0.83
Uniform Delay, d1		17.5	11.9	12.8	13.3						33.0	28.7
Progression Factor		0.40	0.01	3.23	0.20						1.00	1.00
Incremental Delay, d2		0.8	0.2	1.9	0.4						15.4	6.7
Delay (s)		7.7	0.3	43.2	3.0						48.4	35.4
Level of Service		A	A	D	A						D	D
Approach Delay (s)		6.8			10.6			0.0			39.2	
Approach LOS		A			B			A			D	

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	225	0	225	0	150	0	0	0
Storage Lanes	2	0	0	0	1	0	1	0	1	0	0	0
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red		Yes			Yes			Yes				Yes
Link Speed (mph)		30			35			30				30
Link Distance (ft)		650			1320			746				792
Travel Time (s)		14.8			25.7			17.0				18.0
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)	1332	929	0	0	511	321	179	1	114	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1332	929	0	0	511	321	0	180	114	0	0	0
Turn Type	Prot				Perm	Perm		Perm				
Protected Phases	1	6			2			8				
Permitted Phases					2	8		8				
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	14.0	21.0			21.0	21.0	16.0	16.0	16.0			
Total Split (s)	46.0	70.0	0.0	0.0	24.0	24.0	20.0	20.0	20.0	0.0	0.0	0.0
Total Split (%)	51.1%	77.8%	0.0%	0.0%	26.7%	26.7%	22.2%	22.2%	22.2%	0.0%	0.0%	0.0%
Maximum Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0			5.0	5.0	2.0	2.0	2.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
v/c Ratio	0.93	0.71			0.65	0.55	0.74	0.74	0.36			
Control Delay	14.3	8.7			30.3	7.4		55.8	10.4			
Queue Delay	0.0	0.2			0.0	0.0		0.0	0.0			
Total Delay	14.3	8.9			30.3	7.4		55.8	10.4			
90th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	40.0	64.0			18.0	18.0	14.0	14.0	14.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	40.0	64.1			18.1	18.1	13.9	13.9	13.9			
50th %ile Term Code	Max	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	38.7	66.4			21.7	21.7	11.6	11.6	11.6			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	34.9	68.0			27.1	27.1	10.0	10.0	10.0			
10th %ile Term Code	Gap	Coord			Coord	Coord	Min	Min	Min			
Queue Length 50th (ft)	0	214			153	48		98	0			
Queue Length 95th (ft)	#15	258			159	32		#184	46			
Internal Link Dist (ft)		570			1240			666				712

Volume

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)						225						150
Base Capacity (vph)	1482	1313			786	579		268	336			
Starvation Cap Reductn	0	61			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	0.90	0.74			0.65	0.55		0.67	0.34			

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	26 (29%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 190: New Lacy Road & USH 14 NB Ramps



HCM Signalized Intersection Capacity Analysis

190: New Lacy Road & USH 14 NB Ramps

4/12/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↗		↔	↗	↘		↔	↗				
Volume (vph)	1225	855	0	0	470	295	165	1	105	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.0	6.0			6.0	6.0			6.0	6.0			
Lane Util. Factor	0.97	1.00			0.95	1.00			1.00	1.00			
Frt	1.00	1.00			1.00	0.85			1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (prot)	3335	1810			3438	1538			1724	1538			
Flt Permitted	0.95	1.00			1.00	1.00			0.95	1.00			
Satd. Flow (perm)	3335	1810			3438	1538			1724	1538			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1332	929	0	0	511	321	179	1	114	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	227	0	0	98	0	0	0	
Lane Group Flow (vph)	1332	929	0	0	511	94	0	180	16	0	0	0	
Turn Type	Prot		Perm				Perm		Perm				
Protected Phases	1	6	2				8		8				
Permitted Phases			2				8		8				
Actuated Green, G (s)	38.7	65.3	20.6				20.6		12.7			12.7	
Effective Green, g (s)	38.7	65.3	20.6				20.6		12.7			12.7	
Actuated g/C Ratio	0.43	0.73	0.23				0.23		0.14			0.14	
Clearance Time (s)	6.0	6.0	6.0				6.0		6.0			6.0	
Vehicle Extension (s)	2.0	5.0	5.0				5.0		2.0			2.0	
Lane Grp Cap (vph)	1434	1313	787				352		243			217	
v/s Ratio Prot	c0.40	c0.51	0.15						0.10			0.01	
v/s Ratio Perm			0.65				0.27		0.74			0.07	
Uniform Delay, d1	24.3	7.0	31.4				28.5		37.1			33.5	
Progression Factor	0.20	0.84	0.80				0.65		1.00			1.00	
Incremental Delay, d2	7.2	2.1	4.0				1.8		10.1			0.1	
Delay (s)	12.2	8.0	29.2				20.3		47.2			33.6	
Level of Service	B		C				C		D			C	
Approach Delay (s)	10.4		25.7				41.9		0.0			0.0	
Approach LOS	B		C				D		A			A	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	
HCM Volume to Capacity ratio	0.87	B	
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	
Intersection Capacity Utilization	77.4%	ICU Level of Service	
Analysis Period (min)	15	D	
c Critical Lane Group			

Volume

200: New Lacy Road & N-S Roadway

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	200	200	200	200	200	150	50	150	50	150	50
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	100	100	100	100	100	100	100	100	100	100	100	100
Right Turn on Red	Yes			Yes			Yes			Yes		
Link Speed (mph)	35			35			30			30		
Link Distance (ft)	1320			400			279			455		
Travel Time (s)	25.7			7.8			6.3			10.3		
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
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
Turn Type	pm+pt		Perm		Perm		Perm		Perm		Perm	
Protected Phases	1	6	2				8		4			
Permitted Phases	6	6	6	2	2	8	8	8	4	4	4	4
Detector Phase	1	6	6	2	2	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Split (s)	15.0	60.0	60.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%	50.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	11.5	54.0	54.0	39.0	39.0	39.0	24.0	24.0	24.0	24.0	24.0	24.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag		Lag		Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
v/c Ratio	0.29	0.29	0.16	0.20	0.29	0.08	0.69	0.04	0.24	0.21	0.04	0.30
Control Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	5.8	2.0	9.1	7.3	2.0	50.0	28.5	9.1	32.5	28.5	8.6
90th %ile Green (s)	10.5	56.5	56.5	42.5	42.5	42.5	21.5	21.5	21.5	21.5	21.5	21.5
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	8.4	60.4	60.4	48.5	48.5	48.5	17.6	17.6	17.6	17.6	17.6	17.6
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	7.2	63.1	63.1	52.4	52.4	52.4	14.9	14.9	14.9	14.9	14.9	14.9
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.2	65.9	65.9	56.2	56.2	56.2	12.1	12.1	12.1	12.1	12.1	12.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	68.0	68.0	58.5	58.5	58.5	10.0	10.0	10.0	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord	Coord	Min	Min	Min	Hold	Hold	Hold
Queue Length 50th (ft)	29	79	12	10	37	0	86	5	0	24	5	0
Queue Length 95th (ft)	m54	110	m24	32	78	0	140	18	34	52	18	39
Internal Link Dist (ft)	1240			320			199			375		

Volume
200: New Lacy Road & N-S Roadway

4/12/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200		200	200		200	150		50	150		50
Base Capacity (vph)	648	2398	1129	406	1972	914	362	483	466	362	483	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.29	0.16	0.20	0.29	0.08	0.44	0.02	0.16	0.14	0.02	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 77 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 200: New Lacy Road & N-S Roadway



HCM Signalized Intersection Capacity Analysis
200: New Lacy Road & N-S Roadway

4/12/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	160	630	170	75	525	70	145	10	70	45	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1810	1538	1719	1810	1538
Flt Permitted	0.40	1.00	1.00	0.39	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	717	3438	1538	708	3438	1538	1358	1810	1538	1358	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	685	185	82	571	76	158	11	76	49	11	103
RTOR Reduction (vph)	0	0	56	0	0	32	0	0	63	0	0	86
Lane Group Flow (vph)	174	685	129	82	571	44	158	11	13	49	11	17
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6			2		8		8		4	
Permitted Phases	6		6	2		2		8		4		4
Actuated Green, G (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Effective Green, g (s)	62.8	62.8	62.8	51.6	51.6	51.6	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.70	0.70	0.70	0.57	0.57	0.57	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	586	2399	1073	406	1971	882	229	306	260	229	306	260
v/s Ratio Prot	0.03	c0.20			0.17		0.01		0.01		0.01	
v/s Ratio Perm	c0.18		0.08	0.12		0.03	c0.12		0.01	0.04		0.01
w/c Ratio	0.30	0.29	0.12	0.20	0.29	0.05	0.69	0.04	0.05	0.21	0.04	0.07
Uniform Delay, d1	4.8	5.1	4.5	9.3	9.8	8.4	35.2	31.3	31.3	32.2	31.3	31.4
Progression Factor	0.97	0.96	1.69	0.67	0.63	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	1.1	0.4	0.1	6.7	0.0	0.0	0.2	0.0	0.0
Delay (s)	4.7	5.2	7.8	7.3	6.6	4.9	41.9	31.3	31.4	32.4	31.3	31.5
Level of Service	A	A	A	A	A	A	D	C	C	C	C	C
Approach Delay (s)		5.6			6.5		38.2				31.7	
Approach LOS		A			A		D				C	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30				30
Link Distance (ft)		400			467			277				444
Travel Time (s)		7.8			9.1			6.3				10.1
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)	185	386	239	16	391	43	179	179	38	43	179	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	386	239	16	434	0	179	179	38	43	179	158
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Detector Phase	1	6	6	2	2		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	12.0	12.0	12.0	12.0		6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.5	18.0	18.0	18.0	18.0		9.5	16.0	16.0	16.0	16.0	16.0
Total Split (s)	16.0	46.0	46.0	30.0	30.0	0.0	16.0	44.0	44.0	28.0	28.0	28.0
Total Split (%)	17.8%	51.1%	51.1%	33.3%	33.3%	0.0%	17.8%	48.9%	48.9%	31.1%	31.1%	31.1%
Maximum Green (s)	12.5	40.0	40.0	24.0	24.0		12.5	38.0	38.0	22.0	22.0	22.0
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0		3.5	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	6.0	6.0	6.0	6.0	4.0	3.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None	None	None	None	None
v/c Ratio	0.33	0.38	0.25	0.04	0.31		0.48	0.32	0.07	0.24	0.64	0.43
Control Delay	7.2	7.7	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
Queue Delay	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	8.0	1.1	21.2	20.1		25.1	23.9	6.4	35.2	46.1	9.1
90th %ile Green (s)	13.8	42.6	42.6	25.3	25.3		12.5	35.4	35.4	19.4	19.4	19.4
90th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
70th %ile Green (s)	10.8	46.6	46.6	32.3	32.3		12.5	31.4	31.4	15.4	15.4	15.4
70th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Max	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.0	49.6	49.6	37.1	37.1		11.6	28.4	28.4	13.3	13.3	13.3
50th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	7.5	53.4	53.4	42.4	42.4		10.0	24.6	24.6	11.1	11.1	11.1
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Gap	Gap	Gap
10th %ile Green (s)	6.0	57.1	57.1	47.6	47.6		7.4	20.9	20.9	10.0	10.0	10.0
10th %ile Term Code	Min	Coord	Coord	Coord	Coord		Gap	Hold	Hold	Min	Min	Min
Queue Length 50th (ft)	23	56	1	5	82		74	77	0	22	98	0
Queue Length 95th (ft)	50	104	7	22	148		110	115	19	49	152	49
Internal Link Dist (ft)		320			387			197				364

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Synchro 7 - Report

Volume
210: New Lacy Road & CTH MM

4/12/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200				200					200	200	200
Base Capacity (vph)	590	1003	959	396	1398		393	764	671	285	442	495
Starvation Cap Reductn	0	211	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.49	0.25	0.04	0.31		0.46	0.23	0.06	0.15	0.40	0.32
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	72 (80%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Splits and Phases: 210: New Lacy Road & CTH MM												

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Synchro 7 - Report

HCM Signalized Intersection Capacity Analysis

210: New Lacy Road & CTH MM

4/12/2012



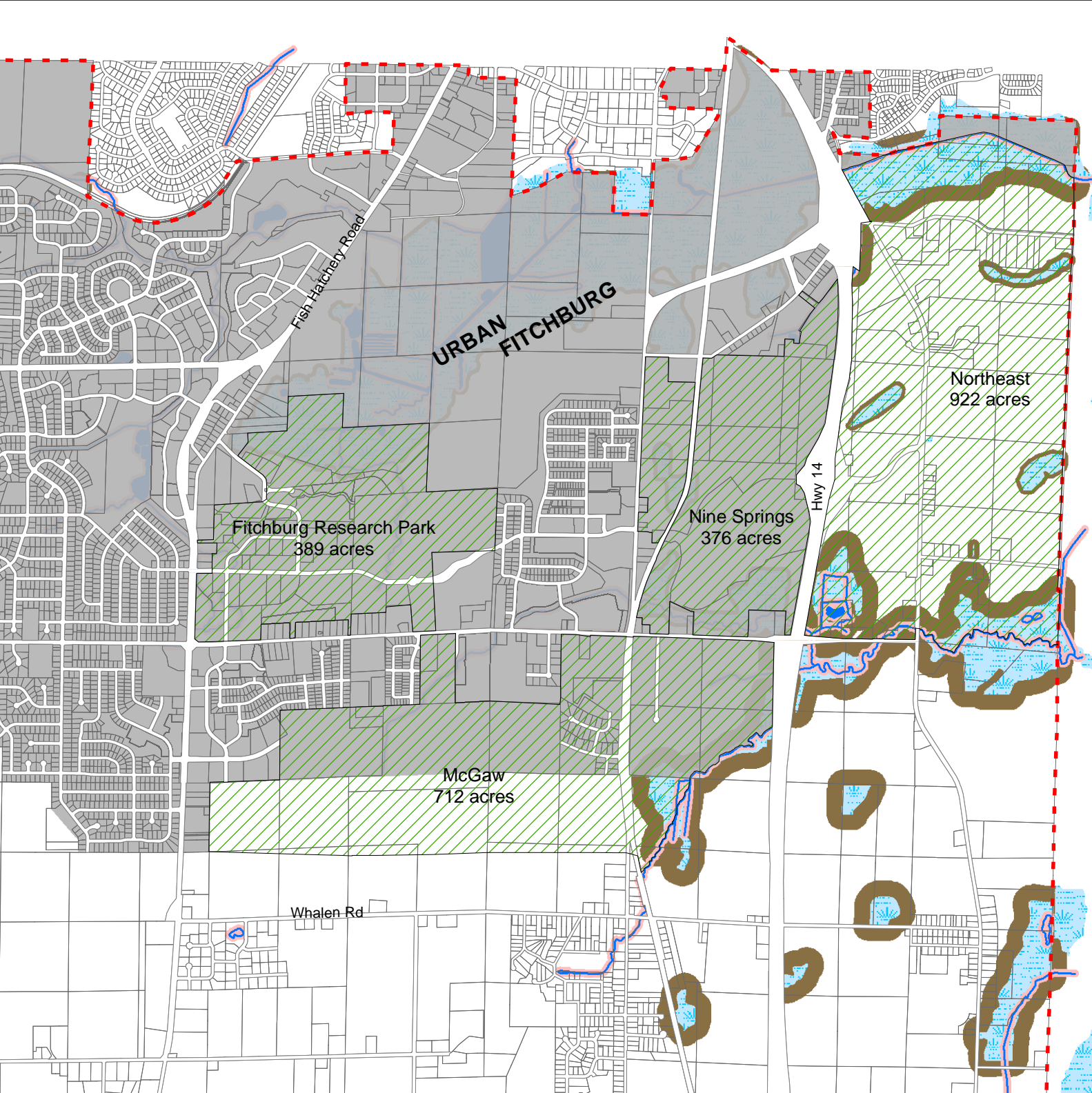
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↖	↘	↗	↖	↘	↗	↖	↘	↗	↖
Volume (vph)	170	355	220	15	360	40	165	165	35	40	165	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538	1719	3387		1719	1810	1538	1719	1810	1538
Flt Permitted	0.44	1.00	1.00	0.53	1.00		0.42	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	788	1810	1538	965	3387		767	1810	1538	1166	1810	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	386	239	16	391	43	179	179	38	43	179	158
RTOR Reduction (vph)	0	0	106	0	8	0	0	0	26	0	0	134
Lane Group Flow (vph)	185	386	133	16	426	0	179	179	12	43	179	24
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	1	6			2		3	8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Effective Green, g (s)	49.9	49.9	49.9	37.0	37.0		28.1	28.1	28.1	13.8	13.8	13.8
Actuated g/C Ratio	0.55	0.55	0.55	0.41	0.41		0.31	0.31	0.31	0.15	0.15	0.15
Clearance Time (s)	3.5	6.0	6.0	6.0	6.0		3.5	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	534	1004	853	397	1392		354	565	480	179	278	236
v/s Ratio Prot	0.04	c0.21			0.13		c0.06	0.10			c0.10	
v/s Ratio Perm	0.16		0.09	0.02			0.10		0.01	0.04		0.02
v/c Ratio	0.35	0.38	0.16	0.04	0.31		0.51	0.32	0.02	0.24	0.64	0.10
Uniform Delay, d1	10.2	11.4	9.8	15.9	17.9		24.0	23.6	21.5	33.5	35.8	32.8
Progression Factor	0.55	0.51	0.26	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1	0.4	0.2	0.6		0.4	0.1	0.0	0.3	3.8	0.1
Delay (s)	5.8	6.9	2.9	16.1	18.4		24.4	23.7	21.5	33.7	39.6	32.8
Level of Service	A	A	A	B	B		C	C	C	C	D	C
Approach Delay (s)		5.5			18.3			23.8			36.1	
Approach LOS		A			B			C			D	








Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX D

MAP OF DEVELOPABLE LANDS

Fitchburg Highway 14 Neighborhoods



 Wetlands	 Streams	 City Boundary
 Wetland Buffer - 300'	 Open Water	
 Parks	 Water Buffer - 75'	

Prepared by: Planning/Zoning
 Source: Planning/Zoning & Dane County LIO
 Created 4/16/2012

N
 Acreege reflects gross acreage of neighborhoods.

