TABLE A - RONKONKOMA HUB TOD
RAMP JUNCTION ANALYSIS

Intersection	Approach	Existing 2010		2010 Density / LOS (pc/mi/ln)		Growth to 2020		No Build 2020		No Build Density / LOS (pc/mi/ln)		Trip Dist %	Full Build Site Gen		Full Build Ramp Volume		Build Density / LOS (pc/mi/ln)	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM		AM	PM	AM	PM	AM	PM
LIE North Service Road @ Exit 60 Off Ramp	WB	886	635	34.8 - F	22.2 - C	58	41	944	676	39.2 - F	23.8 - C	10%	62	78	1006	754	39.2 - F	23.9 - C
LIE North Service Road @ Exit 60 On Ramp	WB	640	559	41.4 - F	28.6 - D	42	35	682	594	45.8 - F	30.7 - F	(12%)	(62)	(100)	744	694	46.3 - F	31.5 - F
LIE SouthService Road @ Exit 60 Off Ramp	EB	442	501	19.5 - B	41.9 - F	29	33	471	534	21.1 - C	46.8 - F	12%	74	93	545	627	20.4 - C	46.8 - F
LIE SouthService Road @ Exit 60 On Ramp	EB	484	904	24.4 - C	50.0 - F	31	58	515	962	26.2 - C	54.9 - F	(10%)	(52)	(83)	567	1045	26.6 - C	55.6 - F

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	AM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4496	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	442	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	484	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4496	442	484	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1222	120	132	v
Trucks and buses	6	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.971	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5034	485	531	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 3541.84 (Equation 13-12 or 13-13)

P_{FD} = 0.628 Using Equation 6

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3340 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5034	6750	No
$v_{FO} = v_F - v_R$	4549	6750	No
v_R	485	2000	No
v_3 or v_{av34}	1694 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3340 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3340	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.472

Space mean speed in ramp influence area, S_R = 48.9 mph

Space mean speed in outer lanes, S_0 = 57.6 mph

Space mean speed for all vehicles, S = 51.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	AM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4496	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	484	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	442	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4496	484	442	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1222	132	120	v
Trucks and buses	6	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.967	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5053	531	485	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1289.18 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3130 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5584	6750	No
v_3 or v_{av34}	1923 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 3130 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3661	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.368

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 49.9 mph

Space mean speed for all vehicles, S = 50.1 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	AM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6990	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	886	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	640	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6990	886	640	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1899	241	174	v
Trucks and buses	6	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.971	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7826	973	703	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2999.15 (Equation 13-12 or 13-13)

P_{FD} = 0.520 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4534 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7826	6750	Yes
$v_{FO} = v_F - v_R$	6853	6750	Yes
v_R	973	2000	No
v_3 or v_{av34}	3292 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 5126 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5126	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	D_S = 0.516	
Space mean speed in ramp influence area,	S_R = 48.3	mph
Space mean speed in outer lanes,	S_0 = 53.7	mph
Space mean speed for all vehicles,	S = 50.0	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	AM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6990	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	640	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	886	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6990	640	886	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1899	174	241	v
Trucks and buses	6	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.967	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7856	703	973	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1925.83 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4867 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8559	6750	Yes

v_3 or v_{av34} 2989 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 5156 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5859	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 41.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.582	
Space mean speed in ramp influence area,	S_R = 34.4	mph
Space mean speed in outer lanes,	S_0 = 46.1	mph
Space mean speed for all vehicles,	S = 37.4	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	PM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7802	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	501	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	904	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7802	501	904	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2120	136	246	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.980	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8650	550	992	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 4348.02 (Equation 13-12 or 13-13)

P_{FD} = 0.518 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4749 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8650	6750	Yes
$v_{FO} = v - v_F - v_R$	8100	6750	Yes
v_R	550	2000	No
v_3 or v_{av34}	3901 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 5950 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5950	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 41.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.478

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 53.7 mph

Space mean speed for all vehicles, S = 50.2 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	PM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7802	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	904	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	501	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7802	904	501	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2120	246	136	v
Trucks and buses	4	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.977	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8684	992	550	pcph

Estimation of V12 Merge Areas

L_{EQ} = 2164.86 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 5380 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9676	6750	Yes
v_3 or v_{av34}	3304 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 5984 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6976	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 50.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 4.391

Space mean speed in ramp influence area, S_R = -2.1 mph

Space mean speed in outer lanes, S_0 = 46.1 mph

Space mean speed for all vehicles, S = mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	PM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5210	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	635	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	559	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5210	635	559	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1416	173	152	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.980	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5776	697	614	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.584 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3661 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5776	6750	No
$v_{FO} = v_F - v_R$	5079	6750	No
v_R	697	2000	No
v_3 or v_{av34}	2115 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3661 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3661	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12}$ = 22.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.491

Space mean speed in ramp influence area, S_R = 48.6 mph

Space mean speed in outer lanes, S_0 = 56.0 mph

Space mean speed for all vehicles, S = 51.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.50

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	PM Peak Hour - 2010
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2010 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5210	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	559	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	635	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5210	559	635	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1416	152	173	v
Trucks and buses	4	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.977	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5799	614	697	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1466.58 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3592 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6413	6750	No
v_3 or v_{av34}	2207 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 3592 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4206	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.478	
Space mean speed in ramp influence area,	S_R = 48.8	mph
Space mean speed in outer lanes,	S_0 = 48.9	mph
Space mean speed for all vehicles,	S = 48.8	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	AM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4788	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	471	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	515	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4788	471	515	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1301	128	140	v
Trucks and buses	6	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.971	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5360	517	565	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 3645.44 (Equation 13-12 or 13-13)

P_{FD} = 0.622 Using Equation 6

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3528 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5360	6750	No
$v_{FO} = v - v_F - v_R$	4843	6750	No
v_R	517	2000	No
v_3 or v_{av34}	1832 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3528 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3528	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_{12}$ = 21.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 57.1 mph

Space mean speed for all vehicles, S = 51.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	AM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4788	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	515	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	471	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4788	515	471	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1301	140	128	v
Trucks and buses	6	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.967	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5381	565	517	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1366.64 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3334 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5946	6750	No
v_3 or v_{av34}	2047 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3334 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3899	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 26.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.408	
Space mean speed in ramp influence area,	S_R = 49.7	mph
Space mean speed in outer lanes,	S_0 = 49.4	mph
Space mean speed for all vehicles,	S = 49.6	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	AM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7444	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	944	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	682	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7444	944	682	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2023	257	185	v
Trucks and buses	6	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.971	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8334	1036	749	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2999.15 (Equation 13-12 or 13-13)

P_{FD} = 0.504 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4714 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8334	6750	Yes
$v_{FO} = v_F - v_R$	7298	6750	Yes
v_R	1036	2000	No
v_3 or v_{av34}	3620 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 5634 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5634	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 39.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	D_S = 0.521	
Space mean speed in ramp influence area,	S_R = 48.2	mph
Space mean speed in outer lanes,	S_0 = 53.7	mph
Space mean speed for all vehicles,	S = 49.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.50

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	AM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hob

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7444	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	682	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	944	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7444	682	944	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2023	185	257	v
Trucks and buses	6	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.967	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8366	749	1036	pcph

Estimation of V12 Merge Areas

L_{EQ} = 2044.81 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 5183 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9115	6750	Yes

v_3 or v_{av34} 3183 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 5666 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6415	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 45.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 2.599

Space mean speed in ramp influence area, S_R = 21.2 mph

Space mean speed in outer lanes, S_0 = 46.1 mph

Space mean speed for all vehicles, S = 25.3 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	PM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	8309	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	534	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	962	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8309	534	962	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2258	145	261	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.980	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9212	586	1056	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 4430.65 (Equation 13-12 or 13-13)

P_{FD} = 0.503 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4923 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9212	6750	Yes
$v_{FO} = v_F - v_R$	8626	6750	Yes
v_R	586	2000	No
v_3 or v_{av34}	4289 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 6512 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6512	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 46.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.481

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 53.7 mph

Space mean speed for all vehicles, S = 50.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.50

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	PM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	8309	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	962	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	534	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8309	962	534	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2258	261	145	v
Trucks and buses	4	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.977	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9248	1056	586	pcph

Estimation of V12 Merge Areas

L_{EQ} = 2299.26 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 5729 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	10304	6750	Yes

v_3 or v_{av34} = 3519 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 6548 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7604	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 54.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 8.040

Space mean speed in ramp influence area, S_R = -49.5 mph

Space mean speed in outer lanes, S_0 = 46.1 mph

Space mean speed for all vehicles, S = mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	PM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5549	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	676	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	594	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5549	676	594	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1508	184	161	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.980	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6152	742	652	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.572 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3837 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6152	6750	No
$v_{FO} = v_F - v_R$	5410	6750	No
v_R	742	2000	No
v_3 or v_{av34}	2315 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3837 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3837	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12}$ = 23.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.495

Space mean speed in ramp influence area, S_R = 48.6 mph

Space mean speed in outer lanes, S_0 = 55.2 mph

Space mean speed for all vehicles, S = 50.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	PM Peak Hour - NB 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5549	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	594	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	676	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5549	594	676	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1508	161	184	v
Trucks and buses	4	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.977	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6176	652	742	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1555.39 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3826 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6828	6750	Yes
v_3 or v_{av34}	2350 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 3826 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4478	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.559	
Space mean speed in ramp influence area,	S_R = 47.7	mph
Space mean speed in outer lanes,	S_0 = 48.2	mph
Space mean speed for all vehicles,	S = 47.9	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	AM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4788	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	545	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	567	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4788	545	567	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1301	148	154	v
Trucks and buses	6	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.971	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5360	598	622	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 4179.21 (Equation 13-12 or 13-13)

P_{FD} = 0.598 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3448 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5360	6750	No
$v_{FO} = v - v_R$	4762	6750	No
v_R	598	2000	No
v_3 or v_{av34}	1912 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3448 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3448	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_{12}$ = 20.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.482

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 56.8 mph

Space mean speed for all vehicles, S = 51.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	AM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4788	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	567	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	545	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4788	567	545	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1301	154	148	v
Trucks and buses	6	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.967	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5381	622	598	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1378.84 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3334 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6003	6750	No
v_3 or v_{av34}	2047 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 3334 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3956	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 26.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.420	
Space mean speed in ramp influence area,	S_R = 49.5	mph
Space mean speed in outer lanes,	S_0 = 49.4	mph
Space mean speed for all vehicles,	S = 49.5	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	AM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7444	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1006	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	744	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7444	1006	744	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2023	273	202	v
Trucks and buses	6	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.971	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8334	1104	817	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2999.15 (Equation 13-12 or 13-13)

P_{FD} = 0.501 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4725 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8334	6750	Yes
$v_{FO} = v_F - v_R$	7230	6750	Yes
v_R	1104	2000	No
v_3 or v_{av34}	3609 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 5634 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5634	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 39.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.527

Space mean speed in ramp influence area, S_R = 48.1 mph

Space mean speed in outer lanes, S_0 = 53.7 mph

Space mean speed for all vehicles, S = 49.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.50

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	AM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7444	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	744	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1006	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7444	744	1006	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2023	202	273	v
Trucks and buses	6	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.967	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8366	817	1104	pcph

Estimation of V12 Merge Areas

L_{EQ} = 2059.36 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 5183 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9183	6750	Yes
v_3 or v_{av34}	3183 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 5666 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6483	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 46.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 2.766	
Space mean speed in ramp influence area,	S_R = 19.0	mph
Space mean speed in outer lanes,	S_0 = 46.1	mph
Space mean speed for all vehicles,	S = 23.0	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	PM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	8309	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	627	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1045	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8309	627	1045	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2258	170	284	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.980	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9212	688	1147	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 4974.24 (Equation 13-12 or 13-13)

P_{FD} = 0.498 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4933 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9212	6750	Yes
$v_{FO} = v_F - v_R$	8524	6750	Yes
v_R	688	2000	No
v_3 or v_{av34}	4279 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 6512 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6512	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 46.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.490

Space mean speed in ramp influence area, S_R = 48.6 mph

Space mean speed in outer lanes, S_0 = 53.7 mph

Space mean speed for all vehicles, S = 50.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	PM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / EB
Junction:	LIE SSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	8309	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1045	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	627	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8309	1045	627	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	2258	284	170	v
Trucks and buses	4	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.977	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9248	1147	688	pcph

Estimation of V12 Merge Areas

L_{EQ} = 2318.73 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 5729 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	10395	6750	Yes
v_3 or v_{av34}	3519 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 6548 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7695	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 55.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 8.786

Space mean speed in ramp influence area, S_R = -59.2 mph

Space mean speed in outer lanes, S_0 = 46.1 mph

Space mean speed for all vehicles, S = mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/9/2014
Analysis time period:	PM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext60 Off Ramp Diverge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5549	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	754	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	694	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5549	754	694	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1508	205	189	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.980	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6152	828	762	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.568 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3853 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6152	6750	No
$v_{FO} = v_F - v_R$	5324	6750	No
v_R	828	2000	No
v_3 or v_{av34}	2299 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3853 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3853	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12}$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.503

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_0 = 55.3 mph

Space mean speed for all vehicles, S = 50.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.50

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Dutt Tarigoppula
Agency/Co.:	VHB Engineering
Date performed:	3/7/2014
Analysis time period:	PM Peak Hour -Build 2020
Freeway/Dir of Travel:	LIE / WB
Junction:	LIE NSR Ext 60 On Ramp Merge
Jurisdiction:	
Analysis Year:	2020 Volumes
Description:	Ronkonkoma Hub

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5549	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	694	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	754	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5549	694	754	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1508	189	205	v
Trucks and buses	4	2	2	%
Recreational vehicles	2	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.977	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6176	762	828	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1578.93 (Equation 13-6 or 13-7)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3826 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6938	6750	Yes
v_3 or v_{av34}	2350 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 3826 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4588	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.599	
Space mean speed in ramp influence area,	S_R = 47.2	mph
Space mean speed in outer lanes,	S_0 = 48.2	mph
Space mean speed for all vehicles,	S = 47.5	mph

TABLE B - RONKONKOMA HUB TOD
Town Of Islip Intersections
VOLUME COMPARISON

Intersection		Existing 2010		Growth to 2020		No Build 2020		2020	Full Build Site Gen		Intersection Approach % Increase		Full Build 2020	
	Movements	AM	PM	AM	PM	AM	PM	Trip Dist %	AM	PM	AM	PM	AM	PM
Ocean Avenue @ LIE North Service Road**	WB T	1964	1611	128	105	2092	1716	(6%)	(31)	(50)			2123	1766
	NB T	688	1158	45	75	733	1233						733	1233
	SB T	1202	1048	78	68	1280	1116	2%	12	16			1292	1132
Ocean Avenue @ LIE South Service Road**	EB T	822	1533	53	100	875	1633	4%	25	31			900	1664
	NB T	854	1345	56	87	910	1432				1.3%	1.2%	910	1432
	SB T	1202	1048	78	68	1280	1116	2%	12	17			1292	1133
Ocean Avenue @ Johnson Avenue	EB L	67	67	4	4	71	71						71	71
	EB T	103	209	7	14	110	223	4%	25	31			135	254
	EB R	133	114	9	7	142	121						142	121
	WB L	186	104	12	7	198	111						198	111
	WB T	143	97	9	6	152	103	(6%)	(31)	(50)			183	153
	WB R	70	79	5	5	75	84						75	84
	NB L	82	188	5	12	87	200				2.3%	2.9%	87	200
	NB T	711	1199	46	78	757	1277						757	1277
	NB R	68	133	4	9	72	142	1%	6	8			78	150
	SB L	63	106	4	7	67	113						67	113
	SB T	1371	936	89	61	1460	997	1%	6	8			1466	1005
	SB R	24	76	2	5	26	81						26	81
Pond Road @ LIE South Service Road	EB L	36	82	1	3	37	85						37	85
	EB T	116	957	5	37	121	994	6%	37	47			158	1041
	EB R	9	23	0	1	9	24						9	24
	NB T	65	237	3	9	68	246	(2%)	(10)	(17)	12.3%	5.4%	78	263
	NB R	19	23	1	1	20	24						20	24
	SB L	73	58	3	2	76	60	2%	12	16			88	76
	SB T	160	102	6	4	166	106						166	106
Pond Road @ Johnson Avenue	EB L	23	72	1	3	24	75						24	75
	EB T	77	202	3	8	80	210	6%	37	47			117	257
	EB R	39	54	2	2	41	56						41	56
	WB L	94	19	4	1	98	20	(1%)	(5)	(8)			103	28
	WB T	208	151	8	6	216	157						216	157
	WB R	4	23	0	1	4	24	(3%)	(16)	(25)			20	49
	NB L	32	38	1	1	33	39				11.6%	11.5%	33	39
	NB T	42	171	2	7	44	178						44	178
	NB R	17	112	1	4	18	116	1%	6	8			24	124
	SB L	8	13	0	1	8	14	3%	18	23			26	37
	SB T	120	76	5	3	125	79						125	79
	SB R	44	32	2	1	46	33						46	33
Lakeland Aveue @ Smithtown Avenue	WB L	776	856	50	56	826	912	(19%)	(99)	(158)			925	1070
	WB R	116	41	8	3	124	44						124	44
	NB T	739	910	48	59	787	969				7.1%	8.6%	787	969
	NB R	654	1010	43	66	697	1076	19%	117	148			814	1224
	SB L	21	72	1	5	22	77						22	77
	SB T	719	672	47	44	766	716						766	716

TABLE C - RONKONKOMA HUB TOD
Town of Islip Intersections
LEVEL OF SERVICE TABLE

AM PEAK HOUR

Intersection	Movement	Lane Group	Existing		No Build 2020		Build 2020		Build 2020	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Lakeland Avenue & Smithtown Avenue	WB	L	28.1	C	28.9	C	26.9	C		
		R	4.7	A	4.7	A	4.6	A		
		Approach	25.0	C	25.8	C	24.3	C		
	NB	T	16.8	B	17.4	B	20.4	C		
		R	1.3	A	1.4	A	2.1	A		
		Approach	9.5	A	9.9	A	11.1	B		
	SB	L	13.9	B	14.0	B	15.1	B		
		T	17.0	B	17.7	B	20.7	C		
		Approach	16.9	B	17.6	B	20.6	C		
	Overall		**15.8**	B	**16.3**	B	**17.2**	B		
LIE South Service Road & Pond Road	EB	L	7.8	A	8.1	A	8.5	A	7.6	A
		T	8.6	A	8.8	A	9.7	A	8.8	A
		R	3.1	A	3.1	A	3.3	A	0.7	A
		Approach	8.1	A	8.4	A	9.2	A	8.2	A
	NB	TR	11.1	B	11.1	B	11.3	B	12.0	B
		Approach	11.1	B	11.1	B	11.3	B	12.0	B
	SB	LT	19.6	B	19.8	B	20.3	C	18.4	B
		Approach	19.6	B	19.8	B	20.3	C	18.4	B
	Overall		**13.9**	B	**14.1**	B	**14.4**	B	**13.3**	B
Pond Road & Johnson Avenue	EB	LTR	5.4	A	5.6	A	6.8	A		
		Approach	5.4	A	5.6	A	6.8	A		
	WB	LTR	8.7	A	9.1	A	10.1	B		
		Approach	8.7	A	9.1	A	10.1	B		
	NB	L	17.5	B	17.5	B	17.1	B		
		TR	13.2	B	13.1	B	11.9	B		
		Approach	14.7	B	14.7	B	13.6	B		
	SB	LTR	20.7	C	21.0	C	22.3	C		
		Approach	20.7	C	21.0	C	22.3	C		
	Overall		**12.1**	**B**	**12.3**	**B**	**13.1**	**B**		

PM PEAK HOUR

Intersection	Movement	Lane Group	Existing		No Build 2020		Build 2020		Build 2020 Mitigation	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Lakeland Avenue & Smithtown Avenue	WB	L	29.8	C	35.1	D	60.1	E	53.6	D
		R	6.7	A	6.8	A	6.8	A	6.4	A
		Approach	28.8	C	33.8	C	58.0	E	51.8	D
	NB	T	21.6	C	21.0	C	21.0	C	21.9	C
		R	3.6	A	4.3	A	10.1	B	10.1	B
		Approach	12.1	B	12.2	B	14.9	B	15.3	B
	SB	L	37.0	D	42.2	D	42.2	D	47.5	D
		T	18.0	B	17.4	B	17.4	B	18.0	B
		Approach	19.8	B	19.8	B	19.8	B	20.9	C
	Overall		**18.2**	B	**19.5**	B	**28.1**	C	**26.8**	C
LIE South Service Road & Pond Road	EB	L	8.3	A	8.3	A	8.3	A	7.7	A
		T	36.5	D	43.4	D	55.7	E	46.4	D
		R	3.2	A	3.3	A	3.6	A	1.5	A
		Approach	33.6	C	39.8	D	51.1	D	42.6	D
	NB	TR	35.8	D	37.0	D	38.3	D	40.3	D
		Approach	35.8	D	37.0	D	38.3	D	40.3	D
	SB	LT	73.7	E	98.1	F	264.9	F	32.3	C
		Approach	73.7	E	98.1	F	264.9	F	32.3	C
	Overall		**39.0**	D	**46.4**	D	**75.9**	E	**40.8**	D
Pond Road & Johnson Avenue	EB	LTR	11.0	B	11.5	B	12.7	B		
		Approach	11.0	B	11.5	B	12.7	B		
	WB	LTR	8.8	A	9.1	A	9.3	A		
		Approach	8.8	A	9.1	A	9.3	A		
	NB	L	15.6	B	15.6	B	15.8	B		
		TR	22.7	C	23.4	C	23.7	C		
		Approach	21.9	C	22.5	C	22.8	C		
	SB	LTR	15.5	B	16.0	B	29.1	C		
		Approach	15.5	B	16.0	B	29.1	C		
	Overall		**14.8**	**B**	**15.3**	**B**	**17.6**	**B**		

2: Lakeland Avenue & Smithtown Avenue
Lanes, Volumes, Timings

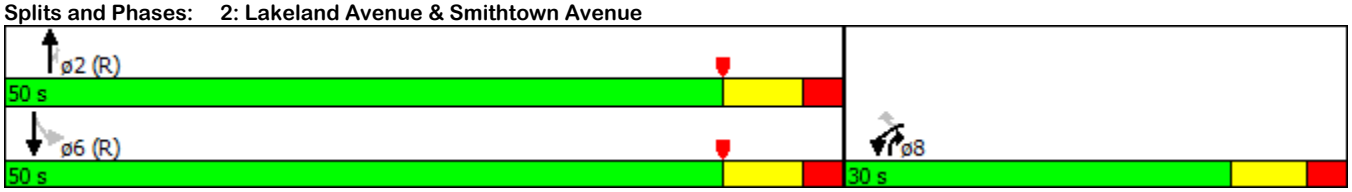
Existing 2013
AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	791	118	753	667	21	733
Satd. Flow (prot)	3164	1509	3172	1419	1586	3282
Flt Permitted	0.950				0.291	
Satd. Flow (perm)	3164	1509	3172	1419	486	3282
Satd. Flow (RTOR)		122				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.92	0.92	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	10%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	815	122	818	725	25	873
Turn Type	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	30.0	30.0	50.0	30.0	50.0	50.0
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	27.5	27.5	38.2	80.0	38.2	38.2
Actuated g/C Ratio	0.34	0.34	0.48	1.00	0.48	0.48
v/c Ratio	0.75	0.20	0.54	0.51	0.11	0.56
Control Delay	28.1	4.7	16.8	1.3	13.9	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	4.7	16.8	1.3	13.9	17.0
LOS	C	A	B	A	B	B
Approach Delay	25.0		9.5			16.9
Approach LOS	C		A			B
Queue Length 50th (ft)	174	0	152	0	7	164
Queue Length 95th (ft)	253	34	193	0	19	187
Internal Link Dist (ft)	1003		472			650
Turn Bay Length (ft)	225				175	
Base Capacity (vph)	1092	600	1698	1397	260	1757
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	0.75	0.20	0.48	0.52	0.10	0.50

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 15.8 — Intersection LOS: B
Intersection Capacity Utilization 74.1% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue



1: Pond Road & LIE South Service Road
Lanes, Volumes, Timings

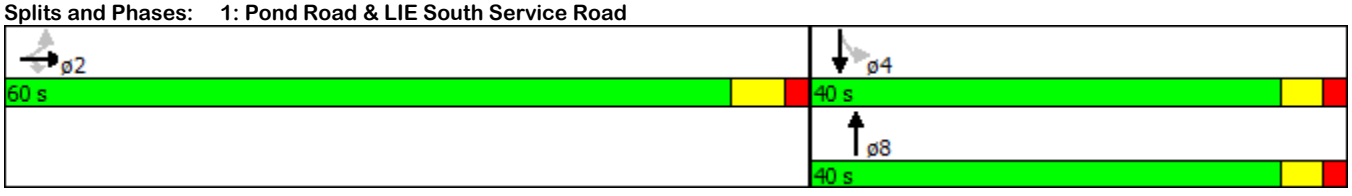
Existing 2014
AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	116	9	0	0	0	0	65	19	73	160	0
Satd. Flow (prot)	1687	1776	1509	0	0	0	0	1934	0	0	1842	0
Flt Permitted	0.950										0.853	
Satd. Flow (perm)	1687	1776	1509	0	0	0	0	1934	0	0	1595	0
Satd. Flow (RTOR)			22					16				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.72	0.72	0.84	0.84	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	8%	8%	5%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	151	12	0	0	0	0	116	0	0	277	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0		6.0	6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0		11.0	11.0	
Total Split (s)	60.0	60.0	60.0					40.0		40.0	40.0	
Total Split (%)	60.0%	60.0%	60.0%					40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None		None	None	
Act Effct Green (s)	20.1	20.1	20.1					12.5			12.5	
Actuated g/C Ratio	0.46	0.46	0.46					0.29			0.29	
v/c Ratio	0.06	0.18	0.02					0.21			0.61	
Control Delay	7.8	8.6	3.1					11.1			19.6	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	7.8	8.6	3.1					11.1			19.6	
LOS	A	A	A					B			B	
Approach Delay		8.1						11.1			19.6	
Approach LOS		A						B			B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 43.6
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 13.9 — Intersection LOS: B
Intersection Capacity Utilization 45.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	77	39	94	208	4	32	42	17	8	120	44
Satd. Flow (prot)	0	1976	0	0	2035	0	1776	1847	0	0	1919	0
Flt Permitted		0.915			0.852		0.590				0.983	
Satd. Flow (perm)	0	1823	0	0	1761	0	1103	1847	0	0	1890	0
Satd. Flow (RTOR)		44			2			20			31	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.82	0.82	0.82	0.84	0.84	0.84	0.72	0.72	0.72
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	164	0	0	374	0	38	70	0	0	239	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		1.0	1.0		6.0	6.0		1.0	1.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		28.1			28.1		10.8	10.8			10.8	
Actuated g/C Ratio		0.55			0.55		0.21	0.21			0.21	
v/c Ratio		0.16			0.39		0.16	0.17			0.56	
Control Delay		5.4			8.7		17.5	13.2			20.7	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		5.4			8.7		17.5	13.2			20.7	
LOS		A			A		B	B			C	
Approach Delay		5.4			8.7			14.7			20.7	
Approach LOS		A			A			B			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 51
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 12.1 — Intersection LOS: B
Intersection Capacity Utilization 48.8% — ICU Level of Service A
Analysis Period (min) 15

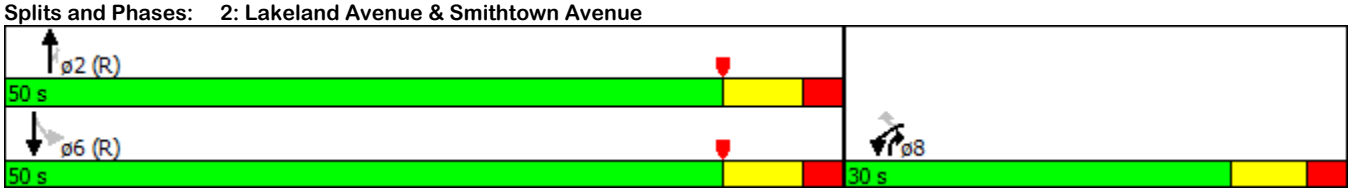
Splits and Phases: 2: Pond Road & Johnson Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	826	124	787	697	22	766
Satd. Flow (prot)	3164	1509	3172	1419	1586	3282
Flt Permitted	0.950				0.271	
Satd. Flow (perm)	3164	1509	3172	1419	452	3282
Satd. Flow (RTOR)		128				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.92	0.92	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	10%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	852	128	855	758	26	912
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	30.0	30.0	50.0	30.0	50.0	50.0
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	28.0	28.0	37.7	80.0	37.7	37.7
Actuated g/C Ratio	0.35	0.35	0.47	1.00	0.47	0.47
v/c Ratio	0.77	0.21	0.57	0.53	0.12	0.59
Control Delay	28.9	4.7	17.4	1.4	14.0	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	4.7	17.4	1.4	14.0	17.7
LOS	C	A	B	A	B	B
Approach Delay	25.8		9.9			17.6
Approach LOS	C		A			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 16.3 — Intersection LOS: B
Intersection Capacity Utilization 75.9% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue



1: Pond Road & LIE South Service Road
Lanes, Volumes, Timings

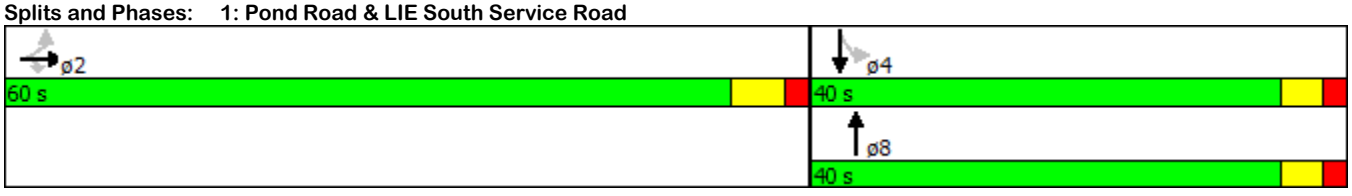
No Build 2020
AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	121	9	0	0	0	0	68	20	76	166	0
Satd. Flow (prot)	1687	1776	1509	0	0	0	0	1932	0	0	1842	0
Flt Permitted	0.950										0.851	
Satd. Flow (perm)	1687	1776	1509	0	0	0	0	1932	0	0	1591	0
Satd. Flow (RTOR)			22					16				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.72	0.72	0.84	0.84	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	8%	8%	5%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	157	12	0	0	0	0	122	0	0	288	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0		6.0	6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0		11.0	11.0	
Total Split (s)	60.0	60.0	60.0					40.0		40.0	40.0	
Total Split (%)	60.0%	60.0%	60.0%					40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None		None	None	
Act Effct Green (s)	20.1	20.1	20.1					12.8			12.8	
Actuated g/C Ratio	0.46	0.46	0.46					0.29			0.29	
v/c Ratio	0.06	0.19	0.02					0.21			0.62	
Control Delay	8.1	8.8	3.1					11.1			19.8	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	8.1	8.8	3.1					11.1			19.8	
LOS	A	A	A					B			B	
Approach Delay		8.4						11.1			19.8	
Approach LOS		A						B			B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 43.9
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 14.1 — Intersection LOS: B
Intersection Capacity Utilization 45.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



2: Pond Road & Johnson Avenue
Lanes, Volumes, Timings

No Build 2020
AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	80	41	98	216	4	33	44	18	8	125	46
Satd. Flow (prot)	0	1976	0	0	2035	0	1776	1847	0	0	1917	0
Flt Permitted		0.912			0.848		0.571				0.984	
Satd. Flow (perm)	0	1817	0	0	1752	0	1068	1847	0	0	1890	0
Satd. Flow (RTOR)		44			1			21			31	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.82	0.82	0.82	0.84	0.84	0.84	0.72	0.72	0.72
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	170	0	0	388	0	39	73	0	0	249	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		1.0	1.0		6.0	6.0		1.0	1.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		28.1			28.1		11.1	11.1			11.1	
Actuated g/C Ratio		0.55			0.55		0.22	0.22			0.22	
v/c Ratio		0.17			0.40		0.17	0.18			0.57	
Control Delay		5.6			9.1		17.5	13.1			21.0	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		5.6			9.1		17.5	13.1			21.0	
LOS		A			A		B	B			C	
Approach Delay		5.6			9.1			14.7			21.0	
Approach LOS		A			A			B			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 51.3
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 12.3 — Intersection LOS: B
Intersection Capacity Utilization 56.2% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Pond Road & Johnson Avenue

2: Lakeland Avenue & Smithtown Avenue
Lanes, Volumes, Timings

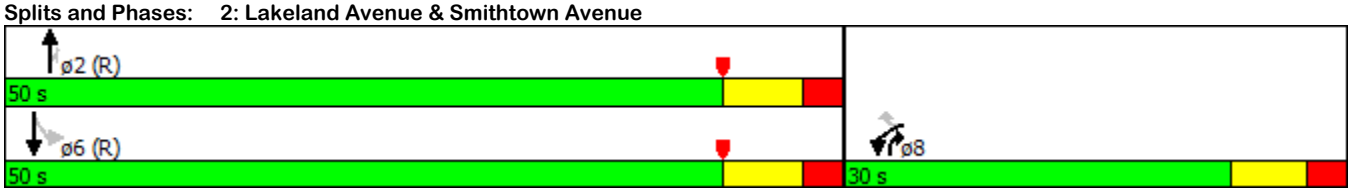
Build 2020
AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	925	124	787	814	22	766
Satd. Flow (prot)	3164	1509	3172	1419	1586	3282
Flt Permitted	0.950				0.252	
Satd. Flow (perm)	3164	1509	3172	1419	421	3282
Satd. Flow (RTOR)		128				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.92	0.92	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	10%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	954	128	855	885	26	912
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	30.0	30.0	50.0	30.0	50.0	50.0
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.9	31.9	33.8	80.0	33.8	33.8
Actuated g/C Ratio	0.40	0.40	0.42	1.00	0.42	0.42
v/c Ratio	0.76	0.19	0.64	0.62	0.15	0.66
Control Delay	26.9	4.6	20.4	2.1	15.1	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	4.6	20.4	2.1	15.1	20.7
LOS	C	A	C	A	B	C
Approach Delay	24.3		11.1			20.6
Approach LOS	C		B			C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 17.2 — Intersection LOS: B
Intersection Capacity Utilization 83.2% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue

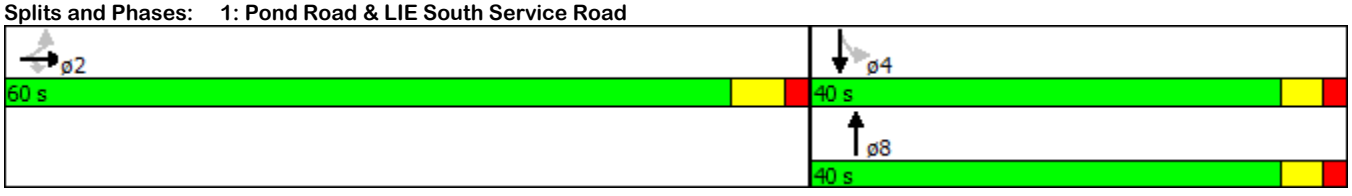


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	158	9	0	0	0	0	78	20	88	166	0
Satd. Flow (prot)	1687	1776	1509	0	0	0	0	1938	0	0	1838	0
Flt Permitted	0.950										0.831	
Satd. Flow (perm)	1687	1776	1509	0	0	0	0	1938	0	0	1554	0
Satd. Flow (RTOR)			22					14				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.72	0.72	0.84	0.84	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	8%	8%	5%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	205	12	0	0	0	0	136	0	0	303	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0		6.0	6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0		11.0	11.0	
Total Split (s)	60.0	60.0	60.0					40.0		40.0	40.0	
Total Split (%)	60.0%	60.0%	60.0%					40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None		None	None	
Act Effct Green (s)	20.1	20.1	20.1					13.6			13.6	
Actuated g/C Ratio	0.45	0.45	0.45					0.30			0.30	
v/c Ratio	0.06	0.26	0.02					0.23			0.64	
Control Delay	8.5	9.7	3.3					11.3			20.3	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	8.5	9.7	3.3					11.3			20.3	
LOS	A	A	A					B			C	
Approach Delay		9.2						11.3			20.3	
Approach LOS		A						B			C	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 44.7
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 14.4 — Intersection LOS: B
Intersection Capacity Utilization 46.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



2: Pond Road & Johnson Avenue
Lanes, Volumes, Timings

Build 2020
AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	117	41	103	216	20	33	44	24	26	125	46
Satd. Flow (prot)	0	1996	0	0	2023	0	1776	1826	0	0	1913	0
Flt Permitted		0.924			0.832		0.544				0.943	
Satd. Flow (perm)	0	1856	0	0	1709	0	1017	1826	0	0	1817	0
Satd. Flow (RTOR)		33			7			29			27	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.82	0.82	0.82	0.84	0.84	0.84	0.72	0.72	0.72
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	214	0	0	413	0	39	81	0	0	274	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		1.0	1.0		6.0	6.0		1.0	1.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		28.1			28.1		12.2	12.2			12.2	
Actuated g/C Ratio		0.54			0.54		0.23	0.23			0.23	
v/c Ratio		0.21			0.45		0.16	0.18			0.62	
Control Delay		6.8			10.1		17.1	11.9			22.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		6.8			10.1		17.1	11.9			22.3	
LOS		A			B		B	B			C	
Approach Delay		6.8			10.1			13.6			22.3	
Approach LOS		A			B			B			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 52.4	
Natural Cycle: 40	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 13.1	Intersection LOS: B
Intersection Capacity Utilization 60.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Pond Road & Johnson Avenue

1: Pond Road & LIE South Service Road
Lanes, Volumes, Timings

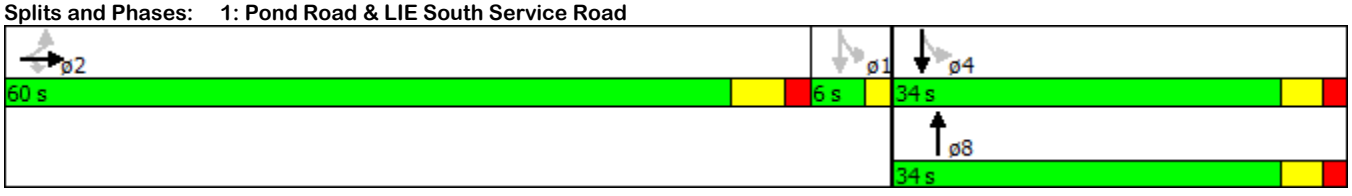
Build 2020 Mitigation
AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	158	9	0	0	0	0	78	20	88	166	0
Satd. Flow (prot)	1687	1776	1509	0	0	0	0	1938	0	0	1838	0
Flt Permitted	0.950										0.000	
Satd. Flow (perm)	1687	1776	1509	0	0	0	0	1938	0	0	0	0
Satd. Flow (RTOR)			44					13				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.72	0.72	0.84	0.84	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	8%	8%	5%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	205	12	0	0	0	0	136	0	0	303	0
Turn Type	Perm	NA	Perm					NA		custom	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4 1	1	
Detector Phase	2	2	2					8		4 1	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0			6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0			11.0	
Total Split (s)	60.0	60.0	60.0					34.0			34.0	
Total Split (%)	60.0%	60.0%	60.0%					34.0%			34.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0			3.0	
All-Red Time (s)	2.0	2.0	2.0					2.0			2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag	Lead	Lead	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	Min	Min	Min					None			None	
Act Effct Green (s)	20.1	20.1	20.1					12.1			12.1	
Actuated g/C Ratio	0.47	0.47	0.47					0.28			0.28	
v/c Ratio	0.06	0.25	0.02					0.25			0.59	
Control Delay	7.6	8.8	0.7					12.0			18.4	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	7.6	8.8	0.7					12.0			18.4	
LOS	A	A	A					B			B	
Approach Delay		8.2						12.0			18.4	
Approach LOS		A						B			B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 43.2
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 13.3 — Intersection LOS: B
Intersection Capacity Utilization 46.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



Lane Group	ø1
Lane Configurations	
Volume (vph)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	6.0
Total Split (s)	6.0
Total Split (%)	6%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

2: Lakeland Avenue & Smithtown Avenue
Lanes, Volumes, Timings

Existing 2013
PM Peak

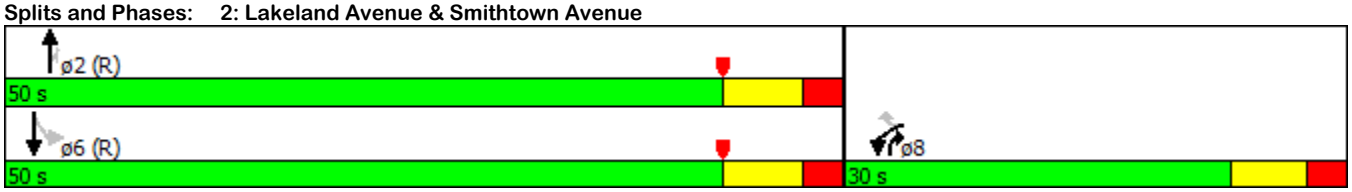
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	873	42	928	1030	73	685
Satd. Flow (prot)	3224	1538	3323	1487	1678	3471
Flt Permitted	0.950				0.184	
Satd. Flow (perm)	3224	1538	3323	1487	325	3471
Satd. Flow (RTOR)		49				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.92	0.92	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1027	49	1009	1120	85	797
Turn Type	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	30.0	30.0	50.0	30.0	50.0	50.0
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.7	31.7	34.0	80.0	34.0	34.0
Actuated g/C Ratio	0.40	0.40	0.42	1.00	0.42	0.42
v/c Ratio	0.80	0.08	0.72	0.75	0.62	0.54
Control Delay	29.8	6.7	21.6	3.6	37.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	6.7	21.6	3.6	37.0	18.0
LOS	C	A	C	A	D	B
Approach Delay	28.8		12.1			19.8
Approach LOS	C		B			B
Queue Length 50th (ft)	230	0	209	0	32	150
Queue Length 95th (ft)	#380	21	226	0	71	153
Internal Link Dist (ft)	1003		472			650
Turn Bay Length (ft)	225				175	
Base Capacity (vph)	1279	639	1773	1487	173	1852
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	0.80	0.08	0.57	0.75	0.49	0.43

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 18.2 — Intersection LOS: B
Intersection Capacity Utilization 96.5% — ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue

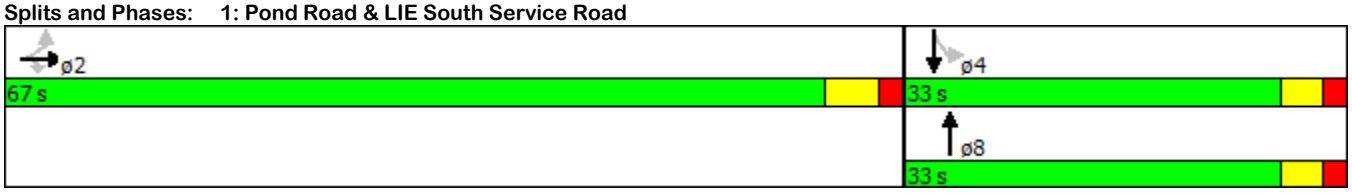


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	957	23	0	0	0	0	237	23	58	102	0
Satd. Flow (prot)	1770	1863	1583	0	0	0	0	2086	0	0	1890	0
Flt Permitted	0.950										0.458	
Satd. Flow (perm)	1770	1863	1583	0	0	0	0	2086	0	0	882	0
Satd. Flow (RTOR)			25					5				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.25	0.25	0.25	0.25	0.72	0.72	0.73	0.73	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	2%	2%	2%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	1075	26	0	0	0	0	361	0	0	219	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0		6.0	6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0		11.0	11.0	
Total Split (s)	67.0	67.0	67.0					33.0		33.0	33.0	
Total Split (%)	67.0%	67.0%	67.0%					33.0%		33.0%	33.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None		None	None	
Act Effct Green (s)	57.5	57.5	57.5					26.2			26.2	
Actuated g/C Ratio	0.61	0.61	0.61					0.28			0.28	
v/c Ratio	0.09	0.95	0.03					0.62			0.90	
Control Delay	8.3	36.5	3.2					35.8			73.7	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	8.3	36.5	3.2					35.8			73.7	
LOS	A	D	A					D			E	
Approach Delay		33.6						35.8			73.7	
Approach LOS		C						D			E	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 94.8
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 39.0 — Intersection LOS: D
Intersection Capacity Utilization 86.1% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	202	54	19	151	23	38	171	112	13	76	32
Satd. Flow (prot)	0	2042	0	0	2067	0	1829	1870	0	0	1967	0
Flt Permitted		0.869			0.942		0.700				0.855	
Satd. Flow (perm)	0	1794	0	0	1957	0	1347	1870	0	0	1691	0
Satd. Flow (RTOR)		22			15			59			32	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.75	0.75	0.75	0.74	0.74	0.74	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	426	0	0	257	0	51	382	0	0	183	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		1.0	1.0		6.0	6.0		1.0	1.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		28.2			28.2		14.6	14.6			14.6	
Actuated g/C Ratio		0.51			0.51		0.27	0.27			0.27	
v/c Ratio		0.46			0.25		0.14	0.71			0.39	
Control Delay		11.0			8.8		15.6	22.7			15.5	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		11.0			8.8		15.6	22.7			15.5	
LOS		B			A		B	C			B	
Approach Delay		11.0			8.8			21.9			15.5	
Approach LOS		B			A			C			B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 14.8 — Intersection LOS: B
Intersection Capacity Utilization 59.9% — ICU Level of Service B
Analysis Period (min) 15

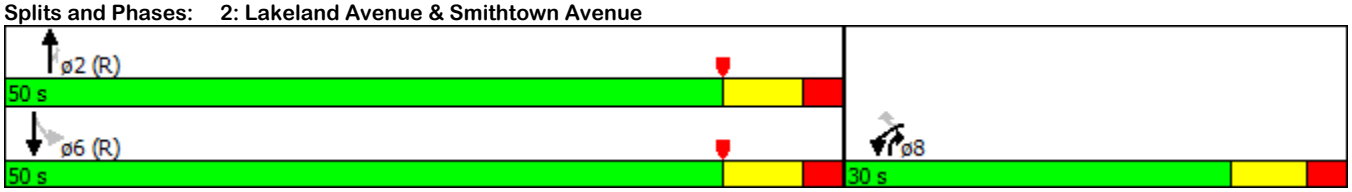
Splits and Phases: 2: Pond Road & Johnson Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	912	44	969	1076	77	716
Satd. Flow (prot)	3224	1538	3323	1487	1678	3471
Flt Permitted	0.950				0.174	
Satd. Flow (perm)	3224	1538	3323	1487	307	3471
Satd. Flow (RTOR)		52				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.92	0.92	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1073	52	1053	1170	90	833
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	30.0	30.0	50.0	30.0	50.0	50.0
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	30.5	30.5	35.2	80.0	35.2	35.2
Actuated g/C Ratio	0.38	0.38	0.44	1.00	0.44	0.44
v/c Ratio	0.87	0.08	0.72	0.79	0.67	0.55
Control Delay	35.1	6.8	21.0	4.3	42.2	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	6.8	21.0	4.3	42.2	17.4
LOS	D	A	C	A	D	B
Approach Delay	33.8		12.2			19.8
Approach LOS	C		B			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 19.5 — Intersection LOS: B
Intersection Capacity Utilization 99.4% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue



1: Pond Road & LIE South Service Road
Lanes, Volumes, Timings

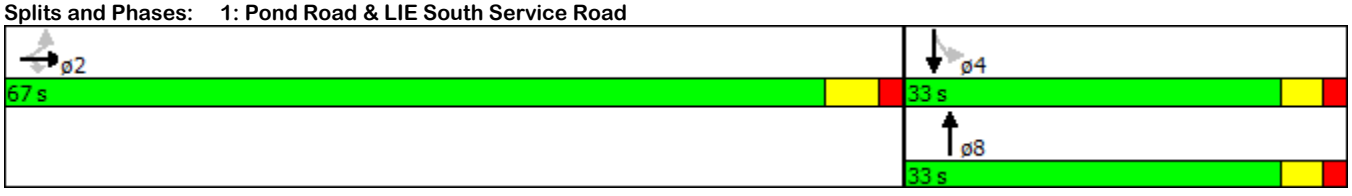
No Build 2020
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	994	24	0	0	0	0	246	24	60	106	0
Satd. Flow (prot)	1770	1863	1583	0	0	0	0	2086	0	0	1890	0
Flt Permitted	0.950										0.423	
Satd. Flow (perm)	1770	1863	1583	0	0	0	0	2086	0	0	814	0
Satd. Flow (RTOR)			25					5				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.25	0.25	0.25	0.25	0.72	0.72	0.73	0.73	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	2%	2%	2%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1117	27	0	0	0	0	375	0	0	227	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0		6.0	6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0		11.0	11.0	
Total Split (s)	67.0	67.0	67.0					33.0		33.0	33.0	
Total Split (%)	67.0%	67.0%	67.0%					33.0%		33.0%	33.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None		None	None	
Act Effct Green (s)	61.0	61.0	61.0					28.0			28.0	
Actuated g/C Ratio	0.61	0.61	0.61					0.28			0.28	
v/c Ratio	0.09	0.98	0.03					0.64			1.00	
Control Delay	8.3	43.4	3.3					37.0			98.1	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	8.3	43.4	3.3					37.0			98.1	
LOS	A	D	A					D			F	
Approach Delay		39.8						37.0			98.1	
Approach LOS		D						D			F	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 46.4 — Intersection LOS: D
Intersection Capacity Utilization 88.9% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



2: Pond Road & Johnson Avenue
Lanes, Volumes, Timings

No Build 2020
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	210	56	20	157	24	39	178	116	14	79	33
Satd. Flow (prot)	0	2042	0	0	2067	0	1829	1870	0	0	1967	0
Flt Permitted		0.866			0.936		0.685				0.827	
Satd. Flow (perm)	0	1788	0	0	1944	0	1319	1870	0	0	1635	0
Satd. Flow (RTOR)		22			15			59			32	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.75	0.75	0.75	0.74	0.74	0.74	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	443	0	0	268	0	53	398	0	0	191	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		1.0	1.0		6.0	6.0		1.0	1.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		28.2			28.2		15.0	15.0			15.0	
Actuated g/C Ratio		0.51			0.51		0.27	0.27			0.27	
v/c Ratio		0.48			0.27		0.15	0.72			0.41	
Control Delay		11.5			9.1		15.6	23.4			16.0	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		11.5			9.1		15.6	23.4			16.0	
LOS		B			A		B	C			B	
Approach Delay		11.5			9.1			22.5			16.0	
Approach LOS		B			A			C			B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 55.2
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 15.3 — Intersection LOS: B
Intersection Capacity Utilization 62.2% — ICU Level of Service B
Analysis Period (min) 15

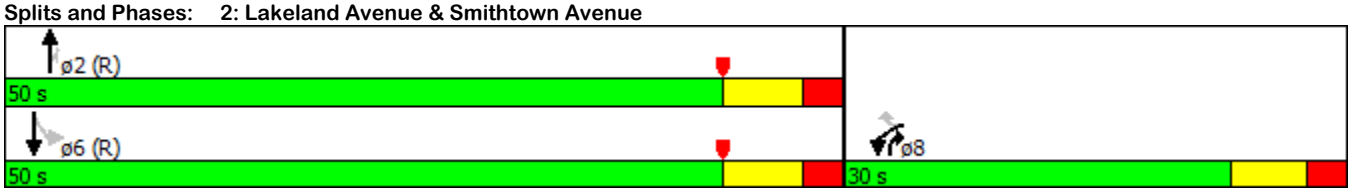
Splits and Phases: 2: Pond Road & Johnson Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	1070	44	969	1224	77	716
Satd. Flow (prot)	3224	1538	3323	1487	1678	3471
Flt Permitted	0.950				0.174	
Satd. Flow (perm)	3224	1538	3323	1487	307	3471
Satd. Flow (RTOR)		52				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.92	0.92	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1259	52	1053	1330	90	833
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	30.0	30.0	50.0	30.0	50.0	50.0
Total Split (%)	37.5%	37.5%	62.5%	37.5%	62.5%	62.5%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	30.5	30.5	35.2	80.0	35.2	35.2
Actuated g/C Ratio	0.38	0.38	0.44	1.00	0.44	0.44
v/c Ratio	1.02	0.08	0.72	0.89	0.67	0.55
Control Delay	60.1	6.8	21.0	10.1	42.2	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.1	6.8	21.0	10.1	42.2	17.4
LOS	E	A	C	B	D	B
Approach Delay	58.0		14.9			19.8
Approach LOS	E		B			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 28.1 — Intersection LOS: C
Intersection Capacity Utilization 108.5% — ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue



1: Pond Road & LIE South Service Road
Lanes, Volumes, Timings

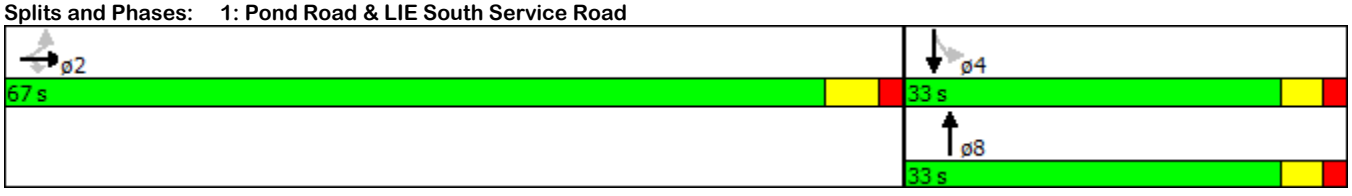
Build 2020
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1041	24	0	0	0	0	263	24	76	106	0
Satd. Flow (prot)	1770	1863	1583	0	0	0	0	2088	0	0	1886	0
Flt Permitted	0.950										0.318	
Satd. Flow (perm)	1770	1863	1583	0	0	0	0	2088	0	0	612	0
Satd. Flow (RTOR)			23					5				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.25	0.25	0.25	0.25	0.72	0.72	0.73	0.73	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	2%	2%	2%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1170	27	0	0	0	0	398	0	0	249	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0		6.0	6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0		11.0	11.0	
Total Split (s)	67.0	67.0	67.0					33.0		33.0	33.0	
Total Split (%)	67.0%	67.0%	67.0%					33.0%		33.0%	33.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None		None	None	
Act Effct Green (s)	61.0	61.0	61.0					28.0			28.0	
Actuated g/C Ratio	0.61	0.61	0.61					0.28			0.28	
v/c Ratio	0.09	1.03	0.03					0.68			1.46	
Control Delay	8.3	55.7	3.6					38.3			264.9	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	8.3	55.7	3.6					38.3			264.9	
LOS	A	E	A					D			F	
Approach Delay		51.1						38.3			264.9	
Approach LOS		D						D			F	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 120
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.46
Intersection Signal Delay: 75.9 — Intersection LOS: E
Intersection Capacity Utilization 93.2% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



2: Pond Road & Johnson Avenue
Lanes, Volumes, Timings

Build 2020
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	257	56	28	157	49	39	178	124	37	79	33
Satd. Flow (prot)	0	2048	0	0	2040	0	1829	1864	0	0	1964	0
Flt Permitted		0.869			0.910		0.633				0.547	
Satd. Flow (perm)	0	1798	0	0	1867	0	1218	1864	0	0	1087	0
Satd. Flow (RTOR)		19			30			63			26	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.77	0.77	0.77	0.75	0.75	0.75	0.74	0.74	0.74	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	504	0	0	311	0	53	409	0	0	226	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		1.0	1.0		6.0	6.0		1.0	1.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		28.1			28.1		15.2	15.2			15.2	
Actuated g/C Ratio		0.51			0.51		0.27	0.27			0.27	
v/c Ratio		0.55			0.32		0.16	0.73			0.71	
Control Delay		12.7			9.3		15.8	23.7			29.1	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		12.7			9.3		15.8	23.7			29.1	
LOS		B			A		B	C			C	
Approach Delay		12.7			9.3			22.8			29.1	
Approach LOS		B			A			C			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 55.4
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 17.6 — Intersection LOS: B
Intersection Capacity Utilization 73.6% — ICU Level of Service D
Analysis Period (min) 15

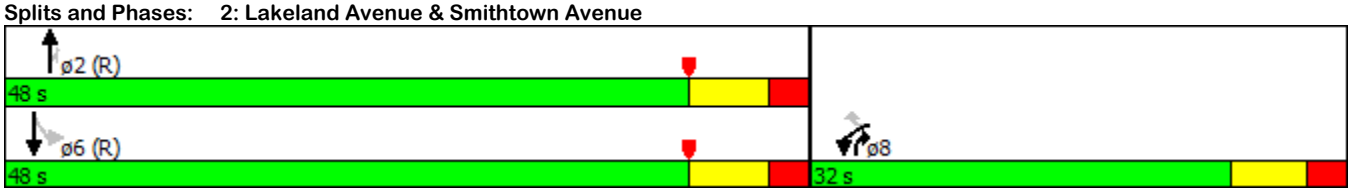
Splits and Phases: 2: Pond Road & Johnson Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	1070	44	969	1224	77	716
Satd. Flow (prot)	3224	1538	3323	1487	1678	3471
Flt Permitted	0.950				0.170	
Satd. Flow (perm)	3224	1538	3323	1487	300	3471
Satd. Flow (RTOR)		52				
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.92	0.92	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1259	52	1053	1330	90	833
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	8	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	25.0	6.0	25.0	25.0
Minimum Split (s)	41.0	41.0	32.3	41.0	32.4	32.4
Total Split (s)	32.0	32.0	48.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.5	4.5	4.8	4.5	4.8	4.8
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.3	7.0	7.3	7.3
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.2	31.2	34.5	80.0	34.5	34.5
Actuated g/C Ratio	0.39	0.39	0.43	1.00	0.43	0.43
v/c Ratio	1.00	0.08	0.74	0.89	0.70	0.56
Control Delay	53.6	6.4	21.9	10.1	47.5	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	6.4	21.9	10.1	47.5	18.0
LOS	D	A	C	B	D	B
Approach Delay	51.8		15.3			20.9
Approach LOS	D		B			C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 44 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 26.8 — Intersection LOS: C
Intersection Capacity Utilization 108.5% — ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 2: Lakeland Avenue & Smithtown Avenue

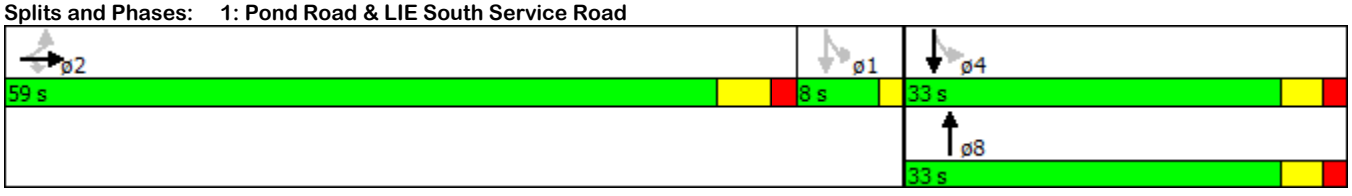


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1041	24	0	0	0	0	263	24	76	106	0
Satd. Flow (prot)	1770	1863	1583	0	0	0	0	2088	0	0	1886	0
Flt Permitted	0.950										0.000	
Satd. Flow (perm)	1770	1863	1583	0	0	0	0	2088	0	0	0	0
Satd. Flow (RTOR)			44					5				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.25	0.25	0.25	0.25	0.72	0.72	0.73	0.73	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	2%	2%	2%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1170	27	0	0	0	0	398	0	0	249	0
Turn Type	Perm	NA	Perm					NA		custom	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2							4 1	1	
Detector Phase	2	2	2					8		4 1	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0					6.0			6.0	
Minimum Split (s)	26.0	26.0	26.0					11.0			11.0	
Total Split (s)	59.0	59.0	59.0					33.0			33.0	
Total Split (%)	59.0%	59.0%	59.0%					33.0%			33.0%	
Yellow Time (s)	4.0	4.0	4.0					3.0			3.0	
All-Red Time (s)	2.0	2.0	2.0					2.0			2.0	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0					5.0			5.0	
Lead/Lag	Lead	Lead	Lead									
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min					None			None	
Act Effct Green (s)	53.2	53.2	53.2					20.8			20.8	
Actuated g/C Ratio	0.63	0.63	0.63					0.24			0.24	
v/c Ratio	0.09	1.00	0.03					0.77			0.54	
Control Delay	7.7	46.4	1.5					40.3			32.3	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	7.7	46.4	1.5					40.3			32.3	
LOS	A	D	A					D			C	
Approach Delay		42.6						40.3			32.3	
Approach LOS		D						D			C	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 85
Natural Cycle: 100
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 40.8 — Intersection LOS: D
Intersection Capacity Utilization 93.2% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 1: Pond Road & LIE South Service Road



Lane Group	ø1
Lane Configurations	
Volume (vph)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	8.0
Total Split (s)	8.0
Total Split (%)	8%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

March 20, 2014

Ref: 28743.04

Mr. Jason Reznak
Town of Brookhaven Division of Traffic Safety & Streetlighting
One Independence Hill
Farmingville, NY 11738

Re: Ronkonkoma HUB Transit Oriented Development
Your January 31, 2014 memo

Dear Mr. Reznak:

We are in receipt of your memorandum dated January 31, 2014 to Mr. Peter Fountaine of the Town's Planning Division which contains comments on the transportation sections of the Draft Supplemental Generic Environmental Impact Statement (DSGEIS) prepared for the Ronkonkoma HUB project. We have reviewed the comments and offer the following responses. For ease of review, your comments are reproduced below in **bold type**, followed by our response to each comment.

Comment No. 1: Accident History – More than 50% of the accidents at the LI Expressway Service Road Intersections on Hawkins Avenue were right-angle collisions, which are not usually the most prevalent accident type at signalized intersections. Are the durations of the signal clearance intervals, as obtained in the field, adequate? Please review the accident data in more detail for any trends (e.g., time of day, pavement condition, contributing factors) and recommended mitigation measures, if appropriate.

In response to this comment, the accident history information was reviewed in additional detail. This review revealed that at the North Service Road intersection, nine of the 11 right-angle accidents included a notation that one of the motorists failed to yield or disregarded the traffic signal. At the South Service Road intersection, 12 of 12 right angle accidents were recorded with this notation. This is consistent with the fact that these types of accidents cannot occur without a failure to yield or a rare signal malfunction. At each intersection, the accidents were fairly evenly split between day and night, and there were more accidents that occurred during dry pavement conditions than wet (19 of 23).

To determine if this relatively high percentage of right-angle accidents may be related to the traffic signal phasing clearance times, the traffic signal programming obtained from the New York State Department of Transportation (NYSDOT) was reviewed, and the clearance times for the yellow and all-red phases were compared to published standards. Review of the signal programming indicates that both intersections are running with a 4.3 second yellow interval on the Service Road approaches and a 4.0 second yellow interval on the Hawkins Avenue approaches. All approaches are operating with the same 2.0 second all-red clearance interval. The 4.3 second yellow interval is consistent with published standards for a 45 mile per hour (mph) speed, while the 4.0 second yellow interval is consistent with a 40 mph speed. Based on the roadway geometry, at 40 and 45 mph, the calculated all-red clearance time is 1.5 seconds or less, depending on the

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method used and the speed. The programmed all-red clearance time exceeds this in all cases and is in excess of the requirement.

Based on the above, the clearance intervals provided by NYSDOT for the intersections are appropriate for the conditions. The all-red clearance interval exceeds the requirements, which would tend to reduce the potential for right-angle accidents. Therefore, the potential contributing factor that may influence the relatively high percentage of right-angle accidents is likely not related to the clearance intervals.

Comment No. 2: Proposed Mitigation Measures for Full Build-out of the TOD – The most significant roadway improvement measures involve four intersections – the LI Expressway North and South Service Road intersections with Ronkonkoma and Hawkins Avenues. The key findings of the TIS are the determination of the overall impacts associated with the TOD project, as well as their phased implementation as the project is constructed. It should be noted that these improvements will require both NYSDOT and SCDPW concurrence. The service roads are maintained by SCDPW, and NYSDOT maintains the adjacent entrance and exit ramps to the Expressway, as well as the traffic signals at the four intersections.

a. Proposed Mitigation

i. ***Ronkonkoma Avenue at LIE South Service Road** – The first key improvement is the widening of the South Service Road west of Ronkonkoma Avenue from three to four approach lanes. The net result is an additional thru lane for the eastbound service road. The widening is adjacent to the abandoned service station at the southwest corner of the intersection as shown on Figure 12. That parcel is the subject of a pending Special Use Permit application (Log # 2012-28, Bolla Management Corporation) for a gasoline station with a convenience store. In our September 30, 2013 comments on that application, we recommend that the owner provide a property dedication for the road widening along his site frontage. If that property cannot be obtained, the widening should be constructed on the north side of the service road (similar to what is being proposed at the Hawkins Avenue/South Service Road intersection).*

It is difficult to see the details associated with the realignment of Ronkonkoma Avenue to the west at the intersection on Figure 12. An enlargement of the intersection, showing the lane realignments, should be provided for review.

A larger scale version of the concept plan is attached to this correspondence. Note that these improvements are shown in concept only and would be developed into design plans for review by the NYSDOT and SCDPW upon completion of the State Environmental Quality Review Act (SEQRA) process and decisions by the Town Board.

ii. ***<u>Ronkonkoma Avenue at LIE North Service Road</u> –Unlike the South Service Road, the North Service Road east of Ronkonkoma Avenue is located in close proximity to the noise wall/slope on the south side of the service road. A lack of available Right of Way on the north side precludes road widening here. The proposed lane modifications would not totally mitigate the project's impacts in the Build year (2020), i.e., overall average delay per vehicle will increase by approximately 15 seconds in the critical morning peak hour.***

As noted in the comment, lack of available right-of-way limits the extent of potential roadway improvement.

iii. ***<u>Hawkins Avenue at LIE North Service Road</u> – The proposed mitigation will result in about a 5-second increase in average vehicle delay in the AM peak hour. As is the case at the North Service Road intersection with Ronkonkoma Avenue, there is no available ROW on the north side to widen the service road east of the intersection, and there is an existing noise wall/slope along the south side. Here too, it is proposed to alter the service road lane configuration. In addition, the center median on the Hawkins Avenue bridge would be removed to improve storage for the northbound left turn movement. With about 200 vehicles per our making this movement in the PM peak hour, queuing can extend into the left northbound thru lane. It is unclear whether this was taken into account in the Synchro analysis, i.e., can northbound thru vehicle readily utilize the left thru lane? In the Build condition, the TOD project would add about 120 vehicles to this movement. To mitigate this condition, consideration should be given to converting the left thru lane into a second left turn lane. An analysis of this should be provided for review.***

As noted in the comment, lack of available right-of-way limits the extent of potential improvement. The analysis in SYNCHRO included the effects of modeling the left turn lane storage as it exists and as proposed with mitigation. The analysis results include a "starvation capacity reduction" for the northbound movement. While the average queue in the northbound left turn lane in the 2020 build with modifications scenario is less than the provided storage, the volume of left turns may occasionally exceed the storage provided. This effect is included in the results in the DSGEIS. The potential conversion of one of the northbound through lanes at the intersection to a second dedicated left turn lane would require that the movement be provided with a fully-protected left turn phase. This would have a detrimental effect on southbound traffic and is not recommended.

iv. ***<u>Hawkins Avenue at LIE South Service Road</u> – As was proposed for the South Service Road intersection with Ronkonkoma Avenue, the proposed improvements involve the widening of the eastbound service road approach to the intersection. In addition, with removal of the center median on the bridge as previously described, storage for the southbound left turn movement would be nominally increased. With over 350 vehicles per hour making this movement in the PM peak hour, queuing extends into the left southbound thru lane. It***

is unclear whether this was taken into account in the Synchro analysis, i.e., can southbound thru vehicles readily utilize the left thru lane? In the Build condition, the TOD project would add about 40 vehicles to this movement.

In addition to the service road widening and median removal, mitigation includes construction of a northbound right turn lane on Hawkins Avenue approaching the intersection. Property acquisition would be required from the parcel at the southeast corner of the intersection. That parcel is the subject of a pending change of zone application (Log # 2013-02-CZ, Hawkins Avenue and Yerke Avenue Redevelopment) for a 4,200 SF restaurant. In our February 19, 2013 comments on that application, we recommended that the owner provide a property dedication along his site frontage to enable construction of the right turn lane.

The analysis in SYNCHRO included the effects of modeling the left turn lane storage as it exists and as proposed with mitigation. The analysis results include a "starvation capacity reduction" for the southbound movement. The queue in the southbound left turn lane in the 2020 build with modifications scenario may occasionally exceed the storage provided. This effect is included in the results in the DSGEIS. The potential conversion of one of the southbound through lanes at the intersection to a second dedicated left turn lane would require that the movement be provided with a fully-protected left turn phase. This would have a detrimental effect on northbound traffic, which is expected to experience delays during this condition, and, thus, is not recommended. As noted in the previous comment, lack of available right-of-way limits the extent of the potential improvement here beyond that proposed.

b. Staging of Roadway Mitigation Improvements

In the TIS, a scenario that assesses conditions at key intersections under about 50% of the total trip generation (1,100 PM peak hour trips, compared with the estimated total generation of 2,413 trips) is presented, as a basis for developing a five-level mitigation plan to implement mitigation measures as the project develops. With a proposed development of this magnitude, given the number of variables listed below, predicting the final impacts, particularly at individual intersections, is very challenging.

- ***Percentage of generated trips using mass transit (25% was assumed in the TIS)***
- ***Directional distribution of tips (auto), i.e., their orientation with respect the site***
- ***Assignment of trips to the roadway network, i.e., which roads/intersections will motorists utilize to travel to/from the TOD? This is typically primarily dependent upon the shortest travel time, and if congestion becomes worse on a motorist's preferred route, he may divert to a less congested alternative route.***

Variations in these estimates could result increases or decreases in levels of mitigation at each of the intersections analyzed in the TIS. As a result, rather than attempting to identify a staged mitigation plan before construction begins, we recommend that an update to this TIS be conducted as the TOD is implemented. The Town has used this approach in the past (e.g., Brookhaven Walk/Yaphank Meadows). We suggest updating the TIS upon the TOD occupancy level equivalent to 1/3 of the total generated trips. At that point, motorists' actual routes to and from the site can be used to more accurately predict total numbers of trips, as well as trip assignment upon completion of the TOD.

Given the level of background traffic in the study area in and around the proposed Transit- Oriented Development (TOD) due to typical commuter traffic and the draw of the LIRR Ronkonkoma Station, it would be very difficult (if not impossible) to determine which vehicles are destined to or leaving from the TOD. As the TOD does not have a distinct and separate access point (as an office building or residential community typically does) and a significant amount of parking would occur on-street, the determination of a directional distribution once a portion of the development is operating would be very difficult (if even possible). For the same reasons, it would not be feasible to isolate the TOD for the purpose of measuring actual trip generation. It is because of this that the thresholds established for mitigation in the DSGEIS are designed to utilize published trip generation statistics and not actual counts.

The TOD will begin generating trips upon the initial phase of its occupancy. The four service road intersections are currently congested in the peak hour; any traffic increases will worsen this congestion. Therefore, some mitigation measures will be needed upon initial occupancy of the TOD. Following are recommendations for these measures:

i. ***<u>Ronkonkoma Avenue at LIE South Service Road</u> – Construct the service road widening and land configurations shown on Figure 12. If property cannot be obtained prior to initial TOD occupancy from the owner of the parcel in the southwest corner of the intersection, widen the service road on its north side. Realign Ronkonkoma Avenue as shown on Figure 12. Implement traffic signal modifications.***

ii. ***<u>Ronkonkoma Avenue at LIE North Service Road</u> – Implement the service road lane modifications shown on Figure 12. Implement traffic signal modifications.***

iii. ***<u>Hawkins Avenue at LIE North Service Road</u> – Remove the center median on the Hawkins Avenue bridge. Convent the northbound left thru lane into a second left turn lane, if traffic analysis justifies. Implement the service road lane modifications shown on Figure 12. Implement traffic signal modifications.***

iv. ***<u>Hawkins Avenue at LIE South Service Road</u> – Implement widening of the service road west of the intersection and the lane configurations shown on Figure 12. Implement traffic signal modifications.***

The mitigation phasing plan developed and presented in the DSGEIS is designed to balance the need for mitigation of traffic impacts with the development of the site over a number of years. The mitigation phasing considers the need for mitigation, the timeframe when the mitigation is required (based on when the impacts would be realized) and the costs of the various mitigation plan components. While it is acknowledged that there is congestion at the Service Road intersections as noted in the comment, the phasing plan requires the completion of the improvements along the LIE South Service Road by the point that the development is generating only 500 net trips during the weekday p.m. peak hour (combined entering and exiting, calculated using ITE's Trip Generation and reflective of the TOD and pass-by credits noted in the DSGEIS). This represents only 31% of the total net trip generation studied for the TOD. The phasing plan also requires the completion of the improvements along the LIE North Service Road by the point that the development is generating only 700 net trips during the weekday p.m. peak hour (combined entering and exiting, calculated using ITE's Trip Generation and reflective of the TOD and pass-by credits noted in the DSGEIS). This represents less than 45% of the total net trip generation studied for the TOD. In addition, the DSGEIS identifies a number of specific mitigation measures that are to be in place for initial occupancy, which includes the widening of roadways, traffic signal modification and new traffic signals. These are detailed in Section 5.0 of the DSGEIS.

Comment No. 3: Other Comments:

a. With an estimate of 25% of the TOD trips to be made by mass transit, Suffolk County Transit should be contacted now for input. SC Transit may have initial ideas on new routes, route revisions, and service frequency that would service the TOD.

Based on extensive experience, Suffolk County Transit typically increases or modifies the level or type of service provided in reaction to changes in demand, if any, as development occurs. The Master Developer of the TOD will engage Suffolk County Transit in discussions in this regard and will continue dialogue throughout the development process to maximize the effectiveness of this service at the TOD develops over time.

b. If the property dedication identified for the northbound right turn lane at the southeast corner of the Hawkins Avenue/South Service Road intersection cannot be obtained from the owner of the adjacent property, that property should be acquired in conjunction with other ROW needed for the widening of Hawkins Avenue north of Union Avenue.

The comment is noted.

c. ***Given the economic benefits associated with the TOD project, as well as its consistency with planning studies such as the Long Island Sustainability Plan 2035, public funding for roadway improvements should continue to be solicited through Federal and State (via the Consolidated Funding Application) processes.***

The comment is noted, and it is our understanding that this is the intention of the Town and the Master Developer.

d. ***We may have additional recommendations based on the responses to this memo, or upon review of the site plan applications for the TOD project.***

The comment is noted.

Thank you for your comments, and we trust that the above responses satisfy your inquiries.

Sincerely,

VHB Engineering, Surveying and Landscape Architecture, P.C.

Patrick Lenihan, P.E.
Director of Transportation

PL/lm

enc.
cc: L. Rate, Esq.
T. Bertoli

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Figure A

Proposed Mitigation Plan
LIE S. Service Rd. at Ronkonkoma A
Ronkonkoma Hub TOD