McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Appendix for Traffic Impact Study

Residential Development

Pond Street
Rockland, MA

Prepared for
Coneco Engineers

November 2019

APPENDIX A
Proposed Site Plan

NOTES:

1. MAXIMUM SLOPE IN HANDICAPPED PARKING AREA IS 2.0%
2. ACCESSIBLE ROUTE FROM ACCESSIBLE HANDICAPPED PARKING SHALL NOT EXCEED 5% LONG LONGITUDINALLY AND 2.0% CROSS SLOPE.
3. ALL CURB RADII TO BE 5' UNLESS OTHERWISE NOTED.

CONC. CURB

30' SIDE YARD SETBACK

PC: 6+20.31

PT: 6+20.80

PT: 3+38.40

PC: 1+81.82

PT: 0+64.64

PC: 0+27.13

PC: 8+33.59

CCB

24.0'

9.0' (TYP.)

18.0' (TYP.)

R200.0'

R30.0'

R50.0'

PROPOSED GUARD RAIL (TYP.)

PROPOSED RETAINING WALL (TYP.)

20' WIDE DRAIN EASEMENT PARCEL 1 PLAN 353 OF 1961

POND STREET (Public - 50' wide)

WRIGHT STREET (Private - 50' wide)

50' SIDE YARD RESIDENTIAL SETBACK

SHEET 2

SCALE IN FEET

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:

SHINGLEMILL, LLC
4 FIRST STREET
BRIDGEWATER, MASSACHUSETTS 02324

PROJECT:

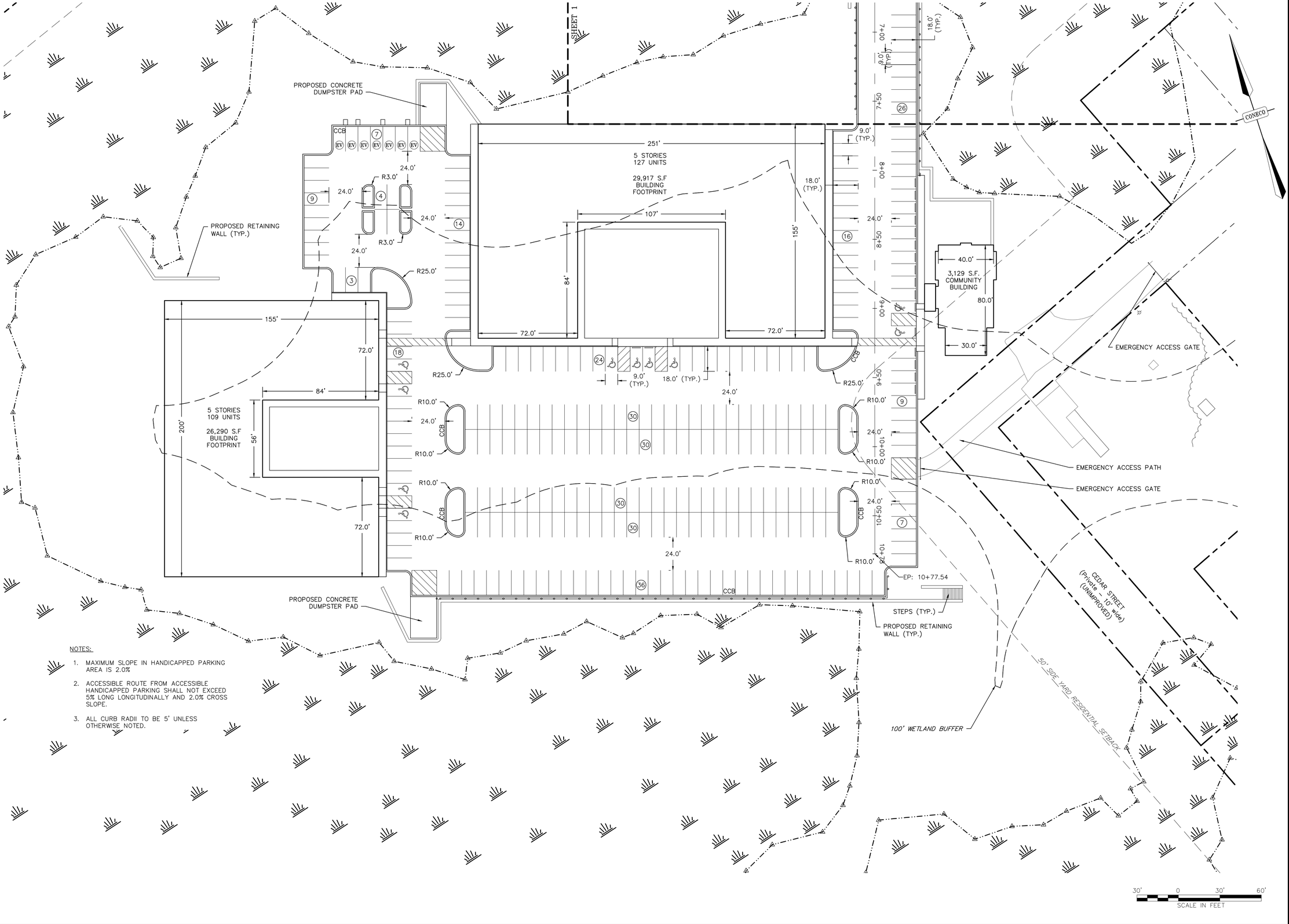
SHINGLEMILL
0 POND STREET
ROCKLAND, MASSACHUSETTS 02370

DRAWING: SITE LAYOUT PLAN
SHEET 1 OF 2

PLAN SET: SITE PLANS

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	10/29/2019
DESIGNED: DJD	CHECKED: JEN
DRAFTED: DJD	IN CHARGE: RRL
SCALE:	1" = 30'
PROJECT NO.	3395.1
SHEET NO.	9 OF 19



NOTES:

1. MAXIMUM SLOPE IN HANDICAPPED PARKING AREA IS 2.0%
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DRAWING:
SITE LAYOUT PLAN
SHEET 2 OF 2

PROJECT:
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APPENDIX B
Manual Turning Movement Counts

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
tel (781) 587-0086 cell (781) 439-4999

N/S: Pond Street
E: Longwater Drive
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137A
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	37	69	0	59	5	0	21	131	0	322
07:15 AM	39	73	0	46	1	0	17	131	0	307
07:30 AM	35	120	0	58	5	0	37	131	0	386
07:45 AM	33	185	0	79	2	1	95	117	0	512
Total	144	447	0	242	13	1	170	510	0	1527
08:00 AM	31	179	0	103	11	0	96	119	0	539
08:15 AM	31	131	0	119	12	0	41	104	0	438
08:30 AM	23	143	0	58	3	0	28	95	0	350
08:45 AM	41	127	0	52	1	0	19	97	0	337
Total	126	580	0	332	27	0	184	415	0	1664
Grand Total	270	1027	0	574	40	1	354	925	0	3191
Apprch %	20.8	79.2	0	93.3	6.5	0.2	27.7	72.3	0	
Total %	8.5	32.2	0	18	1.3	0	11.1	29	0	
Cars & Peds	260	1016	0	567	40	1	353	914	0	3151
% Cars & Peds	96.3	98.9	0	98.8	100	100	99.7	98.8	0	98.7
Trucks & Buses	10	11	0	7	0	0	1	11	0	40
% Trucks & Buses	3.7	1.1	0	1.2	0	0	0.3	1.2	0	1.3
Bikes by Direction	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	**35**	120	0	155	58	5	0	63	37	**131**	0	168	386
07:45 AM	33	**185**	0	**218**	79	2	**1**	82	95	117	0	212	512
08:00 AM	31	179	0	210	103	11	0	114	**96**	119	0	**215**	**539**
08:15 AM	31	131	0	162	**119**	**12**	0	**131**	41	104	0	145	438
Total Volume	130	615	0	745	359	30	1	390	269	471	0	740	1875
% App. Total	17.4	82.6	0		92.1	7.7	0.3		36.4	63.6	0		
PHF	.929	.831	.000	.854	.754	.625	.250	.744	.701	.899	.000	.860	.870
Cars & Peds	126	608	0	734	355	30	1	386	268	467	0	735	1855
% Cars & Peds	96.9	98.9	0	98.5	98.9	100	100	99.0	99.6	99.2	0	99.3	98.9
Trucks & Buses	4	7	0	11	4	0	0	4	1	4	0	5	20
% Trucks & Buses	3.1	1.1	0	1.5	1.1	0	0	1.0	0.4	0.8	0	0.7	1.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0

Transportation Data Corporation

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tel (781) 587-0086 cell (781) 439-4999

N/S: Pond Street
E: Longwater Drive
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137A
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Cars & Peds

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	37	67	0	58	5	0	21	129	0	317
07:15 AM	35	73	0	44	1	0	17	128	0	298
07:30 AM	35	120	0	58	5	0	36	127	0	381
07:45 AM	32	181	0	78	2	1	95	117	0	506
Total	139	441	0	238	13	1	169	501	0	1502
08:00 AM	29	178	0	101	11	0	96	119	0	534
08:15 AM	30	129	0	118	12	0	41	104	0	434
08:30 AM	22	142	0	58	3	0	28	94	0	347
08:45 AM	40	126	0	52	1	0	19	96	0	334
Total	121	575	0	329	27	0	184	413	0	1649
Grand Total	260	1016	0	567	40	1	353	914	0	3151
Apprch %	20.4	79.6	0	93.3	6.6	0.2	27.9	72.1	0	
Total %	8.3	32.2	0	18	1.3	0	11.2	29	0	

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	**35**	120	0	155	58	5	0	63	36	**127**	0	163	381
07:45 AM	32	**181**	0	**213**	78	2	**1**	81	95	117	0	212	506
08:00 AM	29	178	0	207	101	11	0	112	**96**	119	0	**215**	**534**
08:15 AM	30	129	0	159	**118**	**12**	0	**130**	41	104	0	145	434
Total Volume	126	608	0	734	355	30	1	386	268	467	0	735	1855
% App. Total	17.2	82.8	0		92	7.8	0.3		36.5	63.5	0		
PHF	.900	.840	.000	.862	.752	.625	.250	.742	.698	.919	.000	.855	.868

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Start Date : 3/5/2019
Page No : 1

Groups Printed- Trucks & Buses

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	0	2	0	1	0	0	0	2	0	5
07:15 AM	4	0	0	2	0	0	0	3	0	9
07:30 AM	0	0	0	0	0	0	1	4	0	5
07:45 AM	1	4	0	1	0	0	0	0	0	6
Total	5	6	0	4	0	0	1	9	0	25
08:00 AM	2	1	0	2	0	0	0	0	0	5
08:15 AM	1	2	0	1	0	0	0	0	0	4
08:30 AM	1	1	0	0	0	0	0	1	0	3
08:45 AM	1	1	0	0	0	0	0	1	0	3
Total	5	5	0	3	0	0	0	2	0	15
Grand Total	10	11	0	7	0	0	1	11	0	40
Apprch %	47.6	52.4	0	100	0	0	8.3	91.7	0	
Total %	25	27.5	0	17.5	0	0	2.5	27.5	0	

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	2	0	2	1	0	0	1	0	2	0	2	5
07:15 AM	**4**	0	0	4	**2**	0	0	**2**	0	3	0	3	**9**
07:30 AM	0	0	0	0	0	0	0	0	**1**	**4**	0	**5**	5
07:45 AM	1	**4**	0	**5**	1	0	0	1	0	0	0	0	6
Total Volume	5	6	0	11	4	0	0	4	1	9	0	10	25
% App. Total	45.5	54.5	0		100	0	0		10	90	0		
PHF	.313	.375	.000	.550	.500	.000	.000	.500	.250	.563	.000	.500	.694

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File Name : 05137A
Site Code : Y1911111
Start Date : 3/5/2019

Groups Printed- Bikes by Direction

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	
Total %										

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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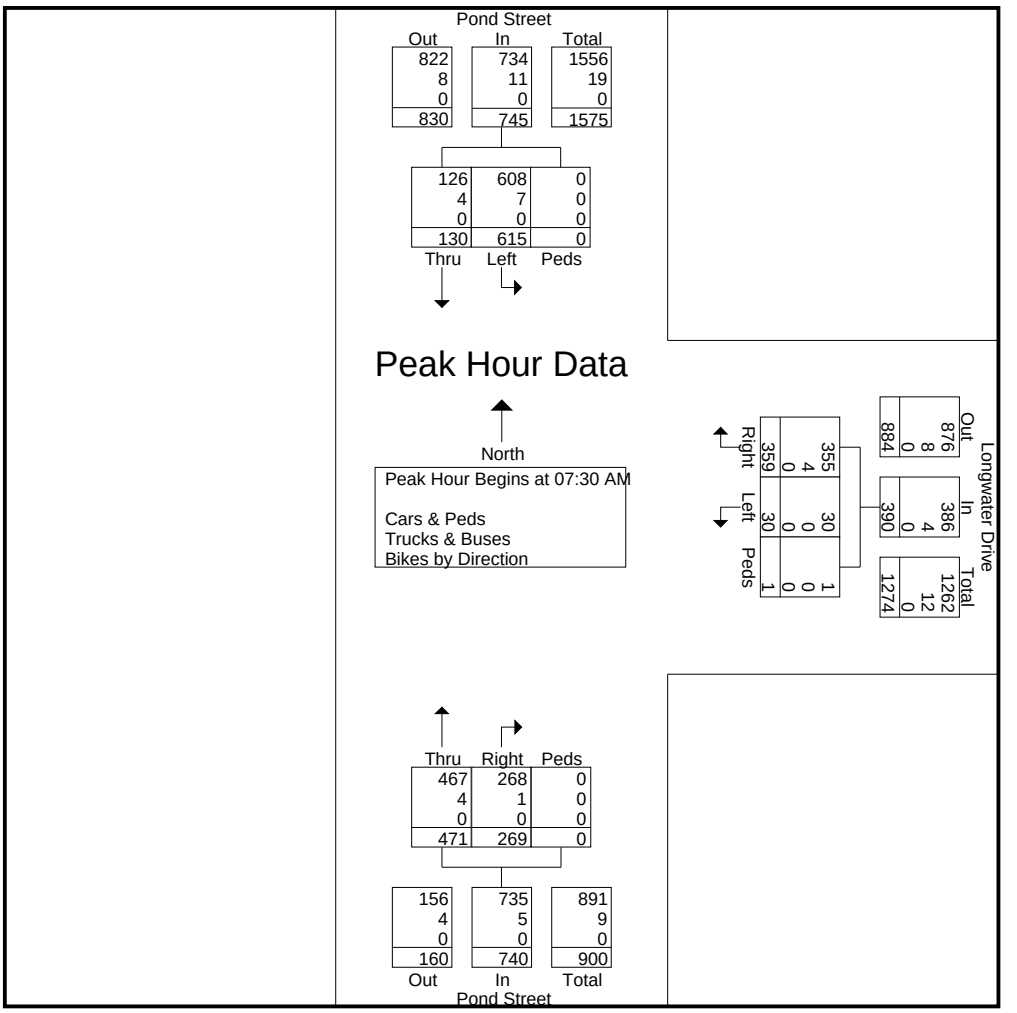
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	**35**	120	0	155	58	5	0	63	37	**131**	0	168	386
07:45 AM	33	**185**	0	**218**	79	2	**1**	82	95	117	0	212	512
08:00 AM	31	179	0	210	103	11	0	114	**96**	119	0	**215**	**539**
08:15 AM	31	131	0	162	**119**	**12**	0	**131**	41	104	0	145	438
Total Volume	130	615	0	745	359	30	1	390	269	471	0	740	1875
% App. Total	17.4	82.6	0		92.1	7.7	0.3		36.4	63.6	0		
PHF	.929	.831	.000	.854	.754	.625	.250	.744	.701	.899	.000	.860	.870
Cars & Peds	126	608	0	734	355	30	1	386	268	467	0	735	1855
% Cars & Peds	96.9	98.9	0	98.5	98.9	100	100	99.0	99.6	99.2	0	99.3	98.9
Trucks & Buses	4	7	0	11	4	0	0	4	1	4	0	5	20
% Trucks & Buses	3.1	1.1	0	1.5	1.1	0	0	1.0	0.4	0.8	0	0.7	1.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	129	70	0	134	22	0	2	59	0	416
04:15 PM	124	71	0	111	12	0	3	54	0	375
04:30 PM	141	69	0	110	37	0	2	51	0	410
04:45 PM	164	63	0	134	27	0	3	44	0	435
Total	558	273	0	489	98	0	10	208	0	1636
05:00 PM	134	62	0	175	51	0	5	59	0	486
05:15 PM	143	59	0	166	21	0	3	54	0	446
05:30 PM	136	73	0	110	13	0	4	58	0	394
05:45 PM	116	81	0	100	18	0	5	60	0	380
Total	529	275	0	551	103	0	17	231	0	1706
Grand Total	1087	548	0	1040	201	0	27	439	0	3342
Apprch %	66.5	33.5	0	83.8	16.2	0	5.8	94.2	0	
Total %	32.5	16.4	0	31.1	6	0	0.8	13.1	0	
Cars & Peds	1083	548	0	1040	201	0	27	438	0	3337
% Cars & Peds	99.6	100	0	100	100	0	100	99.8	0	99.9
Trucks & Buses	4	0	0	0	0	0	0	1	0	5
% Trucks & Buses	0.4	0	0	0	0	0	0	0.2	0	0.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	141	**69**	0	210	110	37	0	147	2	51	0	53	410
04:45 PM	**164**	63	0	**227**	134	27	0	161	3	44	0	47	435
05:00 PM	134	62	0	196	**175**	**51**	0	**226**	**5**	**59**	0	**64**	**486**
05:15 PM	143	59	0	202	166	21	0	187	3	54	0	57	446
Total Volume	582	253	0	835	585	136	0	721	13	208	0	221	1777
% App. Total	69.7	30.3	0		81.1	18.9	0		5.9	94.1	0		
PHF	.887	.917	.000	.920	.836	.667	.000	.798	.650	.881	.000	.863	.914
Cars & Peds	581	253	0	834	585	136	0	721	13	208	0	221	1776
% Cars & Peds	99.8	100	0	99.9	100	100	0	100	100	100	0	100	99.9
Trucks & Buses	1	0	0	1	0	0	0	0	0	0	0	0	1
% Trucks & Buses	0.2	0	0	0.1	0	0	0	0	0	0	0	0	0.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0

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	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	129	70	0	134	22	0	2	58	0	415
04:15 PM	123	71	0	111	12	0	3	54	0	374
04:30 PM	141	69	0	110	37	0	2	51	0	410
04:45 PM	164	63	0	134	27	0	3	44	0	435
Total	557	273	0	489	98	0	10	207	0	1634
05:00 PM	133	62	0	175	51	0	5	59	0	485
05:15 PM	143	59	0	166	21	0	3	54	0	446
05:30 PM	136	73	0	110	13	0	4	58	0	394
05:45 PM	114	81	0	100	18	0	5	60	0	378
Total	526	275	0	551	103	0	17	231	0	1703
Grand Total	1083	548	0	1040	201	0	27	438	0	3337
Apprch %	66.4	33.6	0	83.8	16.2	0	5.8	94.2	0	
Total %	32.5	16.4	0	31.2	6	0	0.8	13.1	0	

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	141	**69**	0	210	110	37	0	147	2	51	0	53	410
04:45 PM	**164**	63	0	**227**	134	27	0	161	3	44	0	47	435
05:00 PM	133	62	0	195	**175**	**51**	0	**226**	**5**	**59**	0	**64**	**485**
05:15 PM	143	59	0	202	166	21	0	187	3	54	0	57	446
Total Volume	581	253	0	834	585	136	0	721	13	208	0	221	1776
% App. Total	69.7	30.3	0		81.1	18.9	0		5.9	94.1	0		
PHF	.886	.917	.000	.919	.836	.667	.000	.798	.650	.881	.000	.863	.915

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N/S: Pond Street
E: Longwater Drive
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137AA
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Trucks & Buses

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	1	0	1
04:15 PM	1	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	1	0	2
05:00 PM	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	2	0	0	0	0	0	0	0	0	2
Total	3	0	0	0	0	0	0	0	0	3
Grand Total	4	0	0	0	0	0	0	1	0	5
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	80	0	0	0	0	0	0	20	0	

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	1	0	0	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	**2**	0	0	**2**	0	0	0	0	0	0	0	0	**2**
Total Volume	3	0	0	3	0	0	0	0	0	0	0	0	3
% App. Total	100	0	0		0	0	0		0	0	0		
PHF	.375	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.375

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Client: McM/E. Buck

File Name : 05137AA
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Bikes by Direction

	Pond Street From North			Longwater Drive From East			Pond Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	
Total %										

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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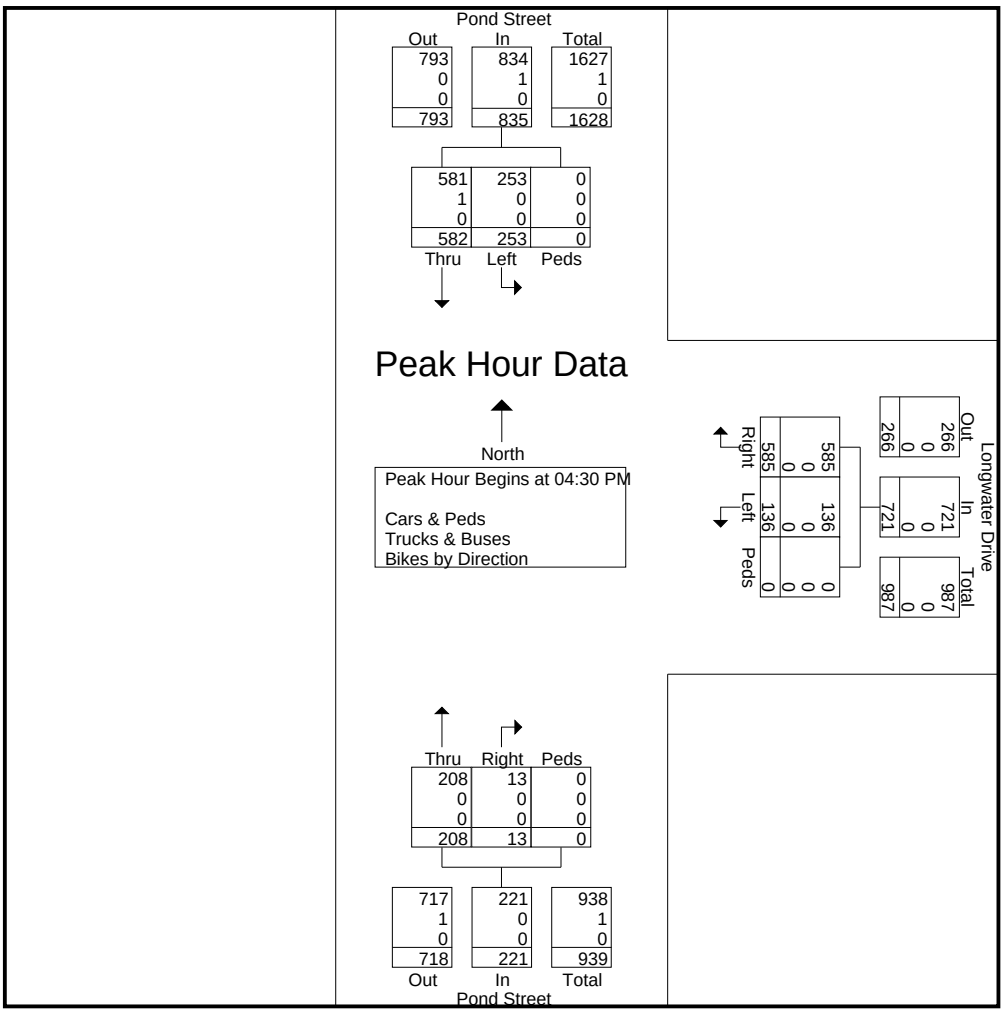
File Name : 05137AA
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

	Pond Street From North				Longwater Drive From East				Pond Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	141	**69**	0	210	110	37	0	147	2	51	0	53	410
04:45 PM	**164**	63	0	**227**	134	27	0	161	3	44	0	47	435
05:00 PM	134	62	0	196	**175**	**51**	0	**226**	**5**	**59**	0	**64**	**486**
05:15 PM	143	59	0	202	166	21	0	187	3	54	0	57	446
Total Volume	582	253	0	835	585	136	0	721	13	208	0	221	1777
% App. Total	69.7	30.3	0		81.1	18.9	0		5.9	94.1	0		
PHF	.887	.917	.000	.920	.836	.667	.000	.798	.650	.881	.000	.863	.914
Cars & Peds	581	253	0	834	585	136	0	721	13	208	0	221	1776
% Cars & Peds	99.8	100	0	99.9	100	100	0	100	100	100	0	100	99.9
Trucks & Buses	1	0	0	1	0	0	0	0	0	0	0	0	1
% Trucks & Buses	0.2	0	0	0.1	0	0	0	0	0	0	0	0	0.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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N/S: Park & Ride/Pond Street
E/W: Hingham Street (Route 228)
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137B
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	6	1	5	0	17	144	28	0	152	12	33	0	79	150	6	0	633
07:15 AM	1	1	7	0	10	195	33	0	127	9	34	0	91	158	2	0	668
07:30 AM	4	3	7	0	29	270	36	0	138	8	40	0	127	189	4	1	856
07:45 AM	0	0	3	0	5	268	59	0	143	2	57	0	175	200	0	0	912
Total	11	5	22	0	61	877	156	0	560	31	164	0	472	697	12	1	3069
08:00 AM	1	1	2	0	15	293	72	0	159	2	52	0	145	215	5	0	962
08:15 AM	2	1	6	0	10	224	37	0	165	2	52	0	118	188	4	0	809
08:30 AM	3	1	8	0	7	239	51	0	115	0	48	0	107	205	6	0	790
08:45 AM	3	0	5	0	3	211	53	0	118	4	38	0	112	218	2	0	767
Total	9	3	21	0	35	967	213	0	557	8	190	0	482	826	17	0	3328
Grand Total	20	8	43	0	96	1844	369	0	1117	39	354	0	954	1523	29	1	6397
Apprch %	28.2	11.3	60.6	0	4.2	79.9	16	0	74	2.6	23.4	0	38.1	60.7	1.2	0	
Total %	0.3	0.1	0.7	0	1.5	28.8	5.8	0	17.5	0.6	5.5	0	14.9	23.8	0.5	0	
Cars & Peds	20	8	37	0	90	1820	365	0	1107	39	345	0	938	1489	29	1	6288
% Cars & Peds	100	100	86	0	93.8	98.7	98.9	0	99.1	100	97.5	0	98.3	97.8	100	100	98.3
Trucks & Buses	0	0	6	0	6	24	4	0	10	0	9	0	16	34	0	0	109
% Trucks & Buses	0	0	14	0	6.2	1.3	1.1	0	0.9	0	2.5	0	1.7	2.2	0	0	1.7
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**4**	**3**	**7**	0	**14**	**29**	270	36	0	335	138	**8**	40	0	186	127	189	4	**1**	321	856
07:45 AM	0	0	3	0	3	5	268	59	0	332	143	2	**57**	0	202	**175**	200	0	0	**375**	912
08:00 AM	1	1	2	0	4	15	**293**	**72**	0	**380**	159	2	52	0	213	145	**215**	**5**	0	365	**962**
08:15 AM	2	1	6	0	9	10	224	37	0	271	**165**	2	52	0	**219**	118	188	4	0	310	809
Total Volume	7	5	18	0	30	59	1055	204	0	1318	605	14	201	0	820	565	792	13	1	1371	3539
% App. Total	23.3	16.7	60	0		4.5	80	15.5	0		73.8	1.7	24.5	0		41.2	57.8	0.9	0.1		
PHF	.438	.417	.643	.000	.536	.509	.900	.708	.000	.867	.917	.438	.882	.000	.936	.807	.921	.650	.250	.914	.920
Cars & Peds	7	5	15	0	27	56	1040	202	0	1298	602	14	196	0	812	557	780	13	1	1351	3488
% Cars & Peds	100	100	83.3	0	90.0	94.9	98.6	99.0	0	98.5	99.5	100	97.5	0	99.0	98.6	98.5	100	100	98.5	98.6
Trucks & Buses	0	0	3	0	3	3	15	2	0	20	3	0	5	0	8	8	12	0	0	20	51
% Trucks & Buses	0	0	16.7	0	10.0	5.1	1.4	1.0	0	1.5	0.5	0	2.5	0	1.0	1.4	1.5	0	0	1.5	1.4
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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N/S: Park & Ride/Pond Street
E/W: Hingham Street (Route 228)
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137B
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Cars & Peds

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	6	1	5	0	16	142	27	0	151	12	31	0	78	143	6	0	618
07:15 AM	1	1	6	0	9	194	33	0	124	9	32	0	87	152	2	0	650
07:30 AM	4	3	6	0	28	264	36	0	136	8	39	0	127	187	4	1	843
07:45 AM	0	0	2	0	5	265	58	0	143	2	56	0	171	200	0	0	902
Total	11	5	19	0	58	865	154	0	554	31	158	0	463	682	12	1	3013
08:00 AM	1	1	2	0	15	292	71	0	158	2	50	0	142	208	5	0	947
08:15 AM	2	1	5	0	8	219	37	0	165	2	51	0	117	185	4	0	796
08:30 AM	3	1	7	0	7	236	51	0	114	0	48	0	105	200	6	0	778
08:45 AM	3	0	4	0	2	208	52	0	116	4	38	0	111	214	2	0	754
Total	9	3	18	0	32	955	211	0	553	8	187	0	475	807	17	0	3275
Grand Total	20	8	37	0	90	1820	365	0	1107	39	345	0	938	1489	29	1	6288
Apprch %	30.8	12.3	56.9	0	4	80	16	0	74.2	2.6	23.1	0	38.2	60.6	1.2	0	
Total %	0.3	0.1	0.6	0	1.4	28.9	5.8	0	17.6	0.6	5.5	0	14.9	23.7	0.5	0	

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**4**	**3**	**6**	0	**13**	**28**	264	36	0	328	136	**8**	39	0	183	127	187	4	**1**	319	843
07:45 AM	0	0	2	0	2	5	265	58	0	328	143	2	**56**	0	201	**171**	200	0	0	**371**	902
08:00 AM	1	1	2	0	4	15	**292**	**71**	0	**378**	158	2	50	0	210	142	**208**	**5**	0	355	**947**
08:15 AM	2	1	5	0	8	8	219	37	0	264	**165**	2	51	0	**218**	117	185	4	0	306	796
Total Volume	7	5	15	0	27	56	1040	202	0	1298	602	14	196	0	812	557	780	13	1	1351	3488
% App. Total	25.9	18.5	55.6	0		4.3	80.1	15.6	0		74.1	1.7	24.1	0		41.2	57.7	1	0.1		
PHF	.438	.417	.625	.000	.519	.500	.890	.711	.000	.858	.912	.438	.875	.000	.931	.814	.938	.650	.250	.910	.921

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City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137B
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Trucks & Buses

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	0	1	2	1	0	1	0	2	0	1	7	0	0	15
07:15 AM	0	0	1	0	1	1	0	0	3	0	2	0	4	6	0	0	18
07:30 AM	0	0	1	0	1	6	0	0	2	0	1	0	0	2	0	0	13
07:45 AM	0	0	1	0	0	3	1	0	0	0	1	0	4	0	0	0	10
Total	0	0	3	0	3	12	2	0	6	0	6	0	9	15	0	0	56
08:00 AM	0	0	0	0	0	1	1	0	1	0	2	0	3	7	0	0	15
08:15 AM	0	0	1	0	2	5	0	0	0	0	1	0	1	3	0	0	13
08:30 AM	0	0	1	0	0	3	0	0	1	0	0	0	2	5	0	0	12
08:45 AM	0	0	1	0	1	3	1	0	2	0	0	0	1	4	0	0	13
Total	0	0	3	0	3	12	2	0	4	0	3	0	7	19	0	0	53
Grand Total	0	0	6	0	6	24	4	0	10	0	9	0	16	34	0	0	109
Apprch %	0	0	100	0	17.6	70.6	11.8	0	52.6	0	47.4	0	32	68	0	0	
Total %	0	0	5.5	0	5.5	22	3.7	0	9.2	0	8.3	0	14.7	31.2	0	0	

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	**1**	2	**1**	0	4	1	0	**2**	0	3	1	**7**	0	0	8	15
07:15 AM	0	0	**1**	0	**1**	1	1	0	0	2	**3**	0	2	0	**5**	**4**	6	0	0	**10**	**18**
07:30 AM	0	0	1	0	1	1	**6**	0	0	**7**	2	0	1	0	3	0	2	0	0	2	13
07:45 AM	0	0	1	0	1	0	3	1	0	4	0	0	1	0	1	4	0	0	0	4	10
Total Volume	0	0	3	0	3	3	12	2	0	17	6	0	6	0	12	9	15	0	0	24	56
% App. Total	0	0	100	0		17.6	70.6	11.8	0		50	0	50	0		37.5	62.5	0	0		
PHF	.000	.000	.750	.000	.750	.750	.500	.500	.000	.607	.500	.000	.750	.000	.600	.563	.536	.000	.000	.600	.778

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City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137B
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Bikes by Direction

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Transportation Data Corporation

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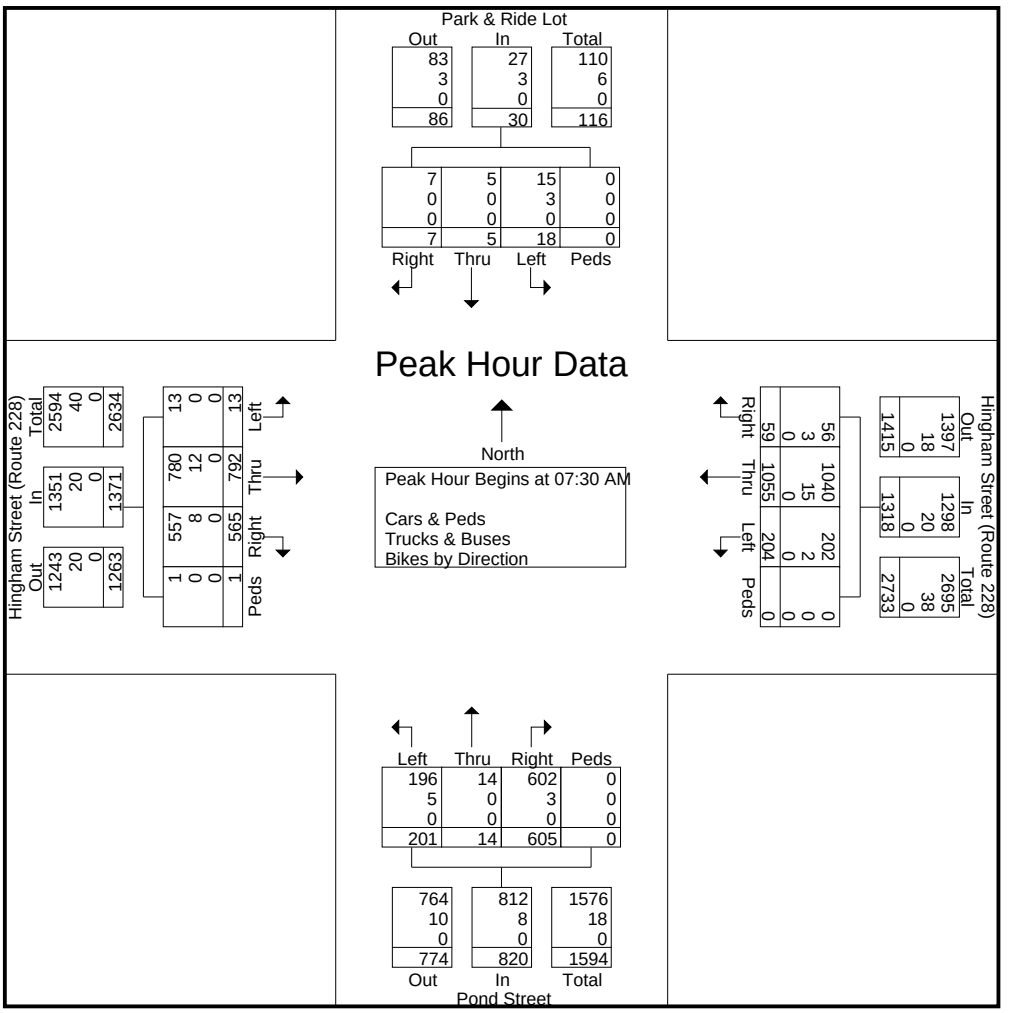
N/S: Park & Ride/Pond Street
E/W: Hingham Street (Route 228)
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137B
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**4**	**3**	**7**	0	**14**	**29**	270	36	0	335	138	**8**	40	0	186	127	189	4	**1**	321	856
07:45 AM	0	0	3	0	3	5	268	59	0	332	143	2	**57**	0	202	**175**	200	0	0	**375**	912
08:00 AM	1	1	2	0	4	15	**293**	**72**	0	**380**	159	2	52	0	213	145	**215**	**5**	0	365	**962**
08:15 AM	2	1	6	0	9	10	224	37	0	271	**165**	2	52	0	**219**	118	188	4	0	310	809
Total Volume	7	5	18	0	30	59	1055	204	0	1318	605	14	201	0	820	565	792	13	1	1371	3539
% App. Total	23.3	16.7	60	0		4.5	80	15.5	0		73.8	1.7	24.5	0		41.2	57.8	0.9	0.1		
PHF	.438	.417	.643	.000	.536	.509	.900	.708	.000	.867	.917	.438	.882	.000	.936	.807	.921	.650	.250	.914	.920
Cars & Peds	7	5	15	0	27	56	1040	202	0	1298	602	14	196	0	812	557	780	13	1	1351	3488
% Cars & Peds	100	100	83.3	0	90.0	94.9	98.6	99.0	0	98.5	99.5	100	97.5	0	99.0	98.6	98.5	100	100	98.5	98.6
Trucks & Buses	0	0	3	0	3	3	15	2	0	20	3	0	5	0	8	8	12	0	0	20	51
% Trucks & Buses	0	0	16.7	0	10.0	5.1	1.4	1.0	0	1.5	0.5	0	2.5	0	1.0	1.4	1.5	0	0	1.5	1.4
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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N/S: Park & Ride/Pond Street
E/W: Hingham Street (Route 228)
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137BB
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	13	5	6	0	6	233	78	0	131	1	54	0	109	268	4	0	908
04:15 PM	6	3	3	0	2	217	70	0	122	0	44	0	116	235	6	0	824
04:30 PM	4	1	2	0	4	254	65	0	123	1	51	0	172	244	3	0	924
04:45 PM	13	9	7	0	4	254	64	0	115	1	49	0	143	253	6	0	918
Total	36	18	18	0	16	958	277	0	491	3	198	0	540	1000	19	0	3574
05:00 PM	10	2	7	0	3	283	70	0	180	2	74	0	109	253	8	0	1001
05:15 PM	6	5	6	0	2	229	67	0	125	3	59	0	141	261	4	0	908
05:30 PM	18	12	12	0	3	229	52	0	124	2	41	0	154	211	10	1	869
05:45 PM	4	1	6	0	5	203	42	0	110	0	53	0	137	211	2	0	774
Total	38	20	31	0	13	944	231	0	539	7	227	0	541	936	24	1	3552
Grand Total	74	38	49	0	29	1902	508	0	1030	10	425	0	1081	1936	43	1	7126
Apprch %	46	23.6	30.4	0	1.2	78	20.8	0	70.3	0.7	29	0	35.3	63.2	1.4	0	
Total %	1	0.5	0.7	0	0.4	26.7	7.1	0	14.5	0.1	6	0	15.2	27.2	0.6	0	
Cars & Peds	68	38	47	0	27	1890	507	0	1029	10	425	0	1077	1923	36	1	7078
% Cars & Peds	91.9	100	95.9	0	93.1	99.4	99.8	0	99.9	100	100	0	99.6	99.3	83.7	100	99.3
Trucks & Buses	6	0	2	0	2	12	1	0	1	0	0	0	4	13	7	0	48
% Trucks & Buses	8.1	0	4.1	0	6.9	0.6	0.2	0	0.1	0	0	0	0.4	0.7	16.3	0	0.7
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	4	1	2	0	7	**4**	254	65	0	323	123	1	51	0	175	**172**	244	3	0	**419**	924
04:45 PM	**13**	**9**	**7**	0	**29**	4	254	64	0	322	115	1	49	0	165	143	253	6	0	402	918
05:00 PM	10	2	7	0	19	3	**283**	**70**	0	**356**	**180**	2	**74**	0	**256**	109	253	**8**	0	370	**1001**
05:15 PM	6	5	6	0	17	2	229	67	0	298	125	**3**	59	0	187	141	**261**	4	0	406	908
Total Volume	33	17	22	0	72	13	1020	266	0	1299	543	7	233	0	783	565	1011	21	0	1597	3751
% App. Total	45.8	23.6	30.6	0		1	78.5	20.5	0		69.3	0.9	29.8	0		35.4	63.3	1.3	0		
PHF	.635	.472	.786	.000	.621	.813	.901	.950	.000	.912	.754	.583	.787	.000	.765	.821	.968	.656	.000	.953	.937
Cars & Peds	31	17	21	0	69	12	1014	266	0	1292	543	7	233	0	783	563	1006	19	0	1588	3732
% Cars & Peds	93.9	100	95.5	0	95.8	92.3	99.4	100	0	99.5	100	100	100	0	100	99.6	99.5	90.5	0	99.4	99.5
Trucks & Buses	2	0	1	0	3	1	6	0	0	7	0	0	0	0	0	2	5	2	0	9	19
% Trucks & Buses	6.1	0	4.5	0	4.2	7.7	0.6	0	0	0.5	0	0	0	0	0	0.4	0.5	9.5	0	0.6	0.5
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Transportation Data Corporation

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N/S: Park & Ride/Pond Street
E/W: Hingham Street (Route 228)
City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137BB
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Cars & Peds

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	12	5	6	0	6	231	78	0	130	1	54	0	109	268	3	0	903
04:15 PM	6	3	3	0	2	215	69	0	122	0	44	0	116	233	6	0	819
04:30 PM	4	1	2	0	3	251	65	0	123	1	51	0	172	242	3	0	918
04:45 PM	12	9	6	0	4	252	64	0	115	1	49	0	142	252	5	0	911
Total	34	18	17	0	15	949	276	0	490	3	198	0	539	995	17	0	3551
05:00 PM	9	2	7	0	3	283	70	0	180	2	74	0	108	252	7	0	997
05:15 PM	6	5	6	0	2	228	67	0	125	3	59	0	141	260	4	0	906
05:30 PM	15	12	12	0	3	228	52	0	124	2	41	0	154	208	6	1	858
05:45 PM	4	1	5	0	4	202	42	0	110	0	53	0	135	208	2	0	766
Total	34	20	30	0	12	941	231	0	539	7	227	0	538	928	19	1	3527
Grand Total	68	38	47	0	27	1890	507	0	1029	10	425	0	1077	1923	36	1	7078
Apprch %	44.4	24.8	30.7	0	1.1	78	20.9	0	70.3	0.7	29	0	35.5	63.3	1.2	0	
Total %	1	0.5	0.7	0	0.4	26.7	7.2	0	14.5	0.1	6	0	15.2	27.2	0.5	0	

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	4	1	2	0	7	3	251	65	0	319	123	1	51	0	175	**172**	242	3	0	**417**	918
04:45 PM	**12**	**9**	6	0	**27**	**4**	252	64	0	320	115	1	49	0	165	142	252	5	0	399	911
05:00 PM	9	2	**7**	0	18	3	**283**	**70**	0	**356**	**180**	2	**74**	0	**256**	108	252	**7**	0	367	**997**
05:15 PM	6	5	6	0	17	2	228	67	0	297	125	**3**	59	0	187	141	**260**	4	0	405	906
Total Volume	31	17	21	0	69	12	1014	266	0	1292	543	7	233	0	783	563	1006	19	0	1588	3732
% App. Total	44.9	24.6	30.4	0		0.9	78.5	20.6	0		69.3	0.9	29.8	0		35.5	63.4	1.2	0		
PHF	.646	.472	.750	.000	.639	.750	.896	.950	.000	.907	.754	.583	.787	.000	.765	.818	.967	.679	.000	.952	.936

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City, State: Rockland, MA
Client: McM/E. Buck

File Name : 05137BB
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Trucks & Buses

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	1	0	0	0	0	2	0	0	1	0	0	0	0	0	1	0	5
04:15 PM	0	0	0	0	0	2	1	0	0	0	0	0	0	2	0	0	5
04:30 PM	0	0	0	0	1	3	0	0	0	0	0	0	0	2	0	0	6
04:45 PM	1	0	1	0	0	2	0	0	0	0	0	0	1	1	1	0	7
Total	2	0	1	0	1	9	1	0	1	0	0	0	1	5	2	0	23
05:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	4
05:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
05:30 PM	3	0	0	0	0	1	0	0	0	0	0	0	0	3	4	0	11
05:45 PM	0	0	1	0	1	1	0	0	0	0	0	0	2	3	0	0	8
Total	4	0	1	0	1	3	0	0	0	0	0	0	3	8	5	0	25
Grand Total	6	0	2	0	2	12	1	0	1	0	0	0	4	13	7	0	48
Apprch %	75	0	25	0	13.3	80	6.7	0	100	0	0	0	16.7	54.2	29.2	0	
Total %	12.5	0	4.2	0	4.2	25	2.1	0	2.1	0	0	0	8.3	27.1	14.6	0	

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	4
05:15 PM	0	0	0	0	0	0	**1**	0	0	1	0	0	0	0	0	0	1	0	0	1	2
05:30 PM	**3**	0	0	0	**3**	0	1	0	0	1	0	0	0	0	0	0	**3**	**4**	0	**7**	**11**
05:45 PM	0	0	**1**	0	1	**1**	1	0	0	**2**	0	0	0	0	0	**2**	3	0	0	5	8
Total Volume	4	0	1	0	5	1	3	0	0	4	0	0	0	0	0	3	8	5	0	16	25
% App. Total	80	0	20	0		25	75	0	0		0	0	0	0		18.8	50	31.2	0		
PHF	.333	.000	.250	.000	.417	.250	.750	.000	.000	.500	.000	.000	.000	.000	.000	.375	.667	.313	.000	.571	.568

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Client: McM/E. Buck

File Name : 05137BB
Site Code : Y1911111
Start Date : 3/5/2019
Page No : 1

Groups Printed- Bikes by Direction

	Park & Ride Lot From North				Hingham Street (Route 228) From East				Pond Street From South				Hingham Street (Route 228) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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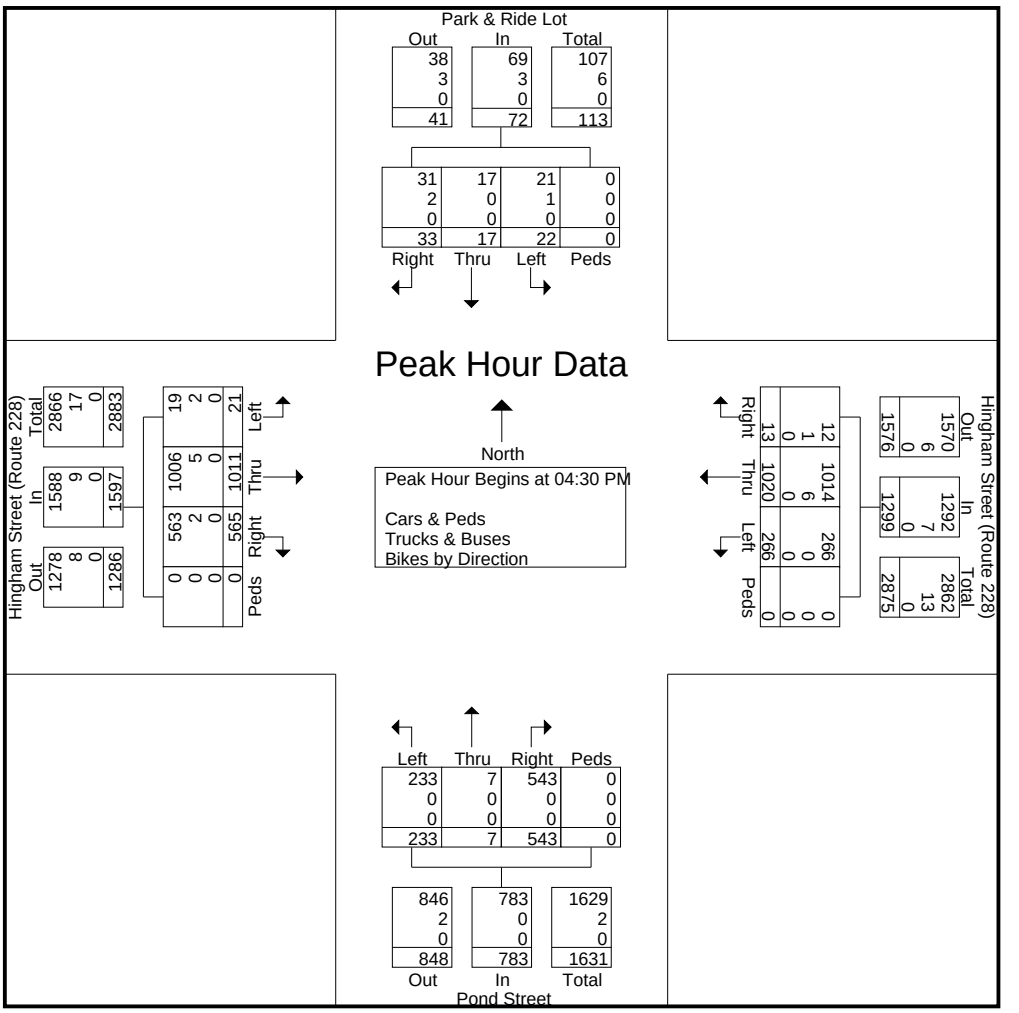
	Park & Ride Lot From North					Hingham Street (Route 228) From East					Pond Street From South					Hingham Street (Route 228) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	4	1	2	0	7	**4**	254	65	0	323	123	1	51	0	175	**172**	244	3	0	**419**	924
04:45 PM	**13**	**9**	**7**	0	**29**	4	254	64	0	322	115	1	49	0	165	143	253	6	0	402	918
05:00 PM	10	2	7	0	19	3	**283**	**70**	0	**356**	**180**	2	**74**	0	**256**	109	253	**8**	0	370	**1001**
05:15 PM	6	5	6	0	17	2	229	67	0	298	125	**3**	59	0	187	141	**261**	4	0	406	908
Total Volume	33	17	22	0	72	13	1020	266	0	1299	543	7	233	0	783	565	1011	21	0	1597	3751
% App. Total	45.8	23.6	30.6	0		1	78.5	20.5	0		69.3	0.9	29.8	0		35.4	63.3	1.3	0		
PHF	.635	.472	.786	.000	.621	.813	.901	.950	.000	.912	.754	.583	.787	.000	.765	.821	.968	.656	.000	.953	.937
Cars & Peds	31	17	21	0	69	12	1014	266	0	1292	543	7	233	0	783	563	1006	19	0	1588	3732
% Cars & Peds	93.9	100	95.5	0	95.8	92.3	99.4	100	0	99.5	100	100	100	0	100	99.6	99.5	90.5	0	99.4	99.5
Trucks & Buses	2	0	1	0	3	1	6	0	0	7	0	0	0	0	0	2	5	2	0	9	19
% Trucks & Buses	6.1	0	4.5	0	4.2	7.7	0.6	0	0	0.5	0	0	0	0	0	0.4	0.5	9.5	0	0.6	0.5
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



APPENDIX C
Automatic Traffic Recorder Data

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
tel (781) 587-0086 cell (781) 439-4999

Pond Street
north of Longwater Drive
City, State: Rockland, MA
Client: McM/E. Buck

05137ACLASS
Site Code: Y-19111.11

Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/05/19	0	4	5	0	0	0	0	0	0	0	0	0	0	9
01:00	0	12	3	0	1	0	0	0	0	0	0	0	0	16
02:00	0	5	1	0	0	1	0	0	0	0	0	0	0	7
03:00	0	13	5	0	3	0	0	0	2	0	0	0	0	23
04:00	0	67	55	0	10	0	0	0	2	0	0	0	0	134
05:00	0	291	138	2	30	2	0	0	4	0	0	0	0	467
06:00	0	466	146	3	21	3	0	2	3	0	0	0	0	644
07:00	0	537	127	4	26	1	1	1	5	0	0	0	0	702
08:00	0	495	122	4	27	10	0	0	1	0	0	0	0	659
09:00	0	354	102	1	35	2	0	0	2	0	0	0	0	496
10:00	0	311	73	4	14	0	0	0	6	0	0	0	0	408
11:00	0	343	77	1	18	5	0	0	1	0	0	0	0	445
12 PM	0	403	102	4	24	4	0	3	2	0	0	0	0	542
13:00	0	375	81	5	18	4	0	1	2	0	0	0	0	486
14:00	0	355	89	6	24	2	0	2	1	0	0	0	0	479
15:00	0	518	110	6	23	9	0	1	0	0	0	0	0	667
16:00	0	544	102	1	17	4	0	0	0	0	0	0	0	668
17:00	0	611	63	1	7	5	0	0	0	0	0	0	0	687
18:00	0	361	64	0	9	1	0	0	2	0	0	0	0	437
19:00	0	196	40	0	6	1	0	0	1	0	0	0	0	244
20:00	0	129	18	0	4	1	0	0	0	0	0	0	0	152
21:00	0	90	7	0	2	0	0	0	0	0	0	0	0	99
22:00	0	39	10	0	1	0	0	0	0	0	0	0	0	50
23:00	0	17	8	0	0	0	0	0	0	0	0	0	0	25
Total	0	6536	1548	42	320	55	1	10	34	0	0	0	0	8546
Percent	0.0%	76.5%	18.1%	0.5%	3.7%	0.6%	0.0%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	06:00	07:00	09:00	08:00	07:00	06:00	10:00					07:00
Vol.		537	146	4	35	10	1	2	6					702
PM Peak		17:00	15:00	14:00	12:00	15:00		12:00	12:00					17:00
Vol.		611	110	6	24	9		3	2					687

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05137ACLASS
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Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/06/19	0	11	3	0	1	0	0	0	0	0	0	0	0	15
01:00	0	15	1	0	0	0	0	0	0	0	0	0	0	16
02:00	0	7	4	0	0	0	0	0	1	0	0	0	0	12
03:00	0	12	9	0	2	0	0	0	0	0	0	0	0	23
04:00	0	67	56	0	9	1	0	0	3	0	0	0	0	136
05:00	0	284	140	2	32	1	0	0	5	0	0	0	0	464
06:00	0	458	146	4	22	4	0	3	4	0	0	0	0	641
07:00	0	554	114	3	21	2	2	2	2	0	0	0	0	700
08:00	0	490	122	7	29	6	1	0	0	0	0	0	0	655
09:00	0	348	90	1	23	1	0	1	0	0	0	0	0	464
10:00	0	361	94	5	18	7	0	0	0	0	0	0	0	485
11:00	0	360	80	6	19	6	0	2	1	0	0	0	0	474
12 PM	0	543	126	5	22	3	1	2	2	0	0	0	0	704
13:00	0	355	98	4	16	2	0	0	0	0	0	0	0	475
14:00	0	352	80	8	17	7	0	0	3	1	0	0	0	468
15:00	0	385	107	3	24	2	0	2	0	0	0	0	0	523
16:00	0	542	86	2	16	2	0	1	0	0	0	0	0	649
17:00	0	572	63	0	20	6	0	1	1	0	0	0	0	663
18:00	0	357	57	0	13	2	0	0	0	0	0	0	0	429
19:00	0	175	32	0	12	0	0	0	0	0	0	0	0	219
20:00	0	110	26	1	2	0	0	0	0	0	0	0	0	139
21:00	0	84	13	0	3	0	0	0	0	0	0	0	0	100
22:00	0	50	9	0	0	0	0	0	0	0	0	0	0	59
23:00	0	26	10	0	1	0	0	0	0	0	0	0	0	37
Total	0	6518	1566	51	322	52	4	14	22	1	0	0	0	8550
Percent	0.0%	76.2%	18.3%	0.6%	3.8%	0.6%	0.0%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	06:00	08:00	05:00	10:00	07:00	06:00	05:00					07:00
Vol.		554	146	7	32	7	2	3	5					700
PM Peak		17:00	12:00	14:00	15:00	14:00	12:00	12:00	14:00	14:00				12:00
Vol.		572	126	8	24	7	1	2	3	1				704
Grand Total	0	13054	3114	93	642	107	5	24	56	1	0	0	0	17096
Percent	0.0%	76.4%	18.2%	0.5%	3.8%	0.6%	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	

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05137ACLASS
Site Code: Y-19111.11

Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/05/19	0	25	7	0	2	0	0	0	0	0	0	0	0	34
01:00	0	16	3	0	3	0	0	0	0	0	0	0	0	22
02:00	0	9	2	0	0	0	0	0	0	0	0	0	0	11
03:00	0	6	1	0	2	0	0	0	0	0	0	0	0	9
04:00	0	31	6	0	3	0	0	0	0	0	0	0	0	40
05:00	0	45	12	0	4	0	0	0	0	0	0	0	0	61
06:00	0	160	45	3	8	1	0	0	0	0	0	0	0	217
07:00	0	479	70	5	16	2	0	0	0	0	0	0	0	572
08:00	0	543	77	1	16	8	0	0	1	0	0	0	0	646
09:00	0	316	67	1	12	1	0	1	3	0	0	0	0	401
10:00	0	263	68	1	7	3	0	2	2	0	0	0	0	346
11:00	0	255	94	6	21	1	0	0	1	0	0	0	0	378
12 PM	0	337	94	3	29	6	0	1	3	0	0	0	0	473
13:00	0	375	104	4	32	5	0	1	3	0	0	0	0	524
14:00	0	502	158	10	32	6	1	3	2	0	0	0	0	714
15:00	0	562	181	3	28	4	0	3	1	0	0	0	0	782
16:00	0	607	172	1	27	4	0	0	0	0	0	0	0	811
17:00	0	550	137	3	11	6	0	0	0	0	0	0	0	707
18:00	0	504	104	0	15	2	0	1	0	0	0	0	0	626
19:00	0	376	95	1	9	0	0	0	0	0	0	0	0	481
20:00	0	231	53	0	10	0	0	0	0	0	0	0	0	294
21:00	0	150	30	0	7	0	0	0	0	0	0	0	0	187
22:00	0	110	29	0	5	0	0	0	0	0	0	0	0	144
23:00	0	55	21	0	4	0	0	0	0	0	0	0	0	80
Total	0	6507	1630	42	303	49	1	12	16	0	0	0	0	8560
Percent	0.0%	76.0%	19.0%	0.5%	3.5%	0.6%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	11:00	11:00	11:00	08:00		10:00	09:00					08:00
Vol.		543	94	6	21	8		2	3					646
PM Peak		16:00	15:00	14:00	13:00	12:00	14:00	14:00	12:00					16:00
Vol.		607	181	10	32	6	1	3	3					811

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05137ACLASS
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Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/06/19	0	40	7	0	2	0	0	0	0	0	0	0	0	49
01:00	0	14	2	0	0	0	0	0	0	0	0	0	0	16
02:00	0	13	2	0	0	0	0	0	0	0	0	0	0	15
03:00	0	6	2	0	0	1	0	0	1	0	0	0	0	10
04:00	0	27	9	0	2	0	0	0	0	0	0	0	0	38
05:00	0	43	13	0	5	0	0	0	0	0	0	0	0	61
06:00	0	164	46	4	9	0	0	0	0	0	0	0	0	223
07:00	0	479	62	5	14	4	0	0	0	0	0	0	0	564
08:00	0	575	64	5	17	2	0	0	0	0	0	0	0	663
09:00	0	350	76	3	13	2	0	0	1	0	0	0	0	445
10:00	0	224	68	6	17	4	0	0	1	0	0	0	0	320
11:00	0	324	96	4	24	1	0	0	4	0	0	0	0	453
12 PM	0	385	91	4	15	1	0	1	1	0	0	0	0	498
13:00	0	372	112	7	35	1	0	1	2	0	0	0	0	530
14:00	0	461	160	8	21	3	0	3	0	0	0	0	0	656
15:00	0	501	173	1	33	1	0	2	2	0	0	0	0	713
16:00	0	586	172	1	33	2	0	1	0	0	0	0	0	795
17:00	0	614	131	3	12	5	0	2	2	0	0	0	0	769
18:00	0	494	107	1	17	3	0	0	0	0	0	0	0	622
19:00	0	330	71	0	12	0	0	1	0	0	0	0	0	414
20:00	0	228	54	2	8	0	0	0	0	0	0	0	0	292
21:00	0	177	44	0	8	0	0	0	0	0	0	0	0	229
22:00	0	99	17	0	6	0	0	0	0	0	0	0	0	122
23:00	0	56	25	0	4	0	0	0	0	0	0	0	0	85
Total	0	6562	1604	54	307	30	0	11	14	0	0	0	0	8582
Percent	0.0%	76.5%	18.7%	0.6%	3.6%	0.3%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	11:00	10:00	11:00	07:00			11:00					08:00
Vol.		575	96	6	24	4			4					663
PM Peak		17:00	15:00	14:00	13:00	17:00		14:00	13:00					16:00
Vol.		614	173	8	35	5		3	2					795
Grand Total	0	13069	3234	96	610	79	1	23	30	0	0	0	0	17142
Percent	0.0%	76.2%	18.9%	0.6%	3.6%	0.5%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	

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05137Aspeed
Site Code: Y-19111.11

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	Total
03/05/19	0	0	1	0	2	4	1	0	1	0	0	0	0	9
01:00	0	0	0	6	8	2	0	0	0	0	0	0	0	16
02:00	0	0	0	1	3	2	1	0	0	0	0	0	0	7
03:00	0	0	0	2	9	12	0	0	0	0	0	0	0	23
04:00	0	0	0	4	45	64	18	3	0	0	0	0	0	134
05:00	6	2	5	48	197	196	13	0	0	0	0	0	0	467
06:00	12	4	11	83	325	198	10	1	0	0	0	0	0	644
07:00	55	15	30	126	362	108	6	0	0	0	0	0	0	702
08:00	66	7	34	161	278	104	8	1	0	0	0	0	0	659
09:00	16	0	15	100	223	135	6	0	1	0	0	0	0	496
10:00	10	0	2	75	206	105	10	0	0	0	0	0	0	408
11:00	13	0	3	55	248	116	10	0	0	0	0	0	0	445
12 PM	20	0	4	85	293	125	13	1	0	0	1	0	0	542
13:00	19	0	11	77	262	108	9	0	0	0	0	0	0	486
14:00	31	4	10	63	239	117	13	2	0	0	0	0	0	479
15:00	119	49	64	120	225	86	3	0	0	0	1	0	0	667
16:00	43	1	26	151	328	112	7	0	0	0	0	0	0	668
17:00	192	83	44	115	196	56	1	0	0	0	0	0	0	687
18:00	22	1	6	107	235	63	3	0	0	0	0	0	0	437
19:00	8	0	6	53	127	41	8	1	0	0	0	0	0	244
20:00	4	0	3	23	84	37	0	1	0	0	0	0	0	152
21:00	1	0	1	15	43	33	6	0	0	0	0	0	0	99
22:00	1	0	0	8	22	15	3	1	0	0	0	0	0	50
23:00	0	0	0	4	4	12	4	1	0	0	0	0	0	25
Total	638	166	276	1482	3964	1851	153	12	2	0	2	0	0	8546
Percent	7.5%	1.9%	3.2%	17.3%	46.4%	21.7%	1.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	

Daily

15th Percentile :	25 MPH
50th Percentile :	32 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	5815
Percent in Pace :	68.0%
Number of Vehicles > 35 MPH :	2020
Percent of Vehicles > 35 MPH :	23.6%

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Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	Total
03/06/19	0	0	0	1	7	5	1	1	0	0	0	0	0	15
01:00	0	0	1	8	5	2	0	0	0	0	0	0	0	16
02:00	0	0	1	3	0	5	3	0	0	0	0	0	0	12
03:00	0	0	0	2	9	8	4	0	0	0	0	0	0	23
04:00	1	0	0	6	34	82	11	2	0	0	0	0	0	136
05:00	9	1	3	45	201	193	11	1	0	0	0	0	0	464
06:00	9	2	7	79	337	196	11	0	0	0	0	0	0	641
07:00	43	30	118	112	278	105	13	0	1	0	0	0	0	700
08:00	87	194	128	54	122	62	7	1	0	0	0	0	0	655
09:00	12	0	1	45	238	153	14	1	0	0	0	0	0	464
10:00	9	0	4	82	235	132	22	1	0	0	0	0	0	485
11:00	13	0	5	89	228	126	13	0	0	0	0	0	0	474
12 PM	74	51	50	160	303	60	4	0	1	1	0	0	0	704
13:00	14	0	13	100	246	95	7	0	0	0	0	0	0	475
14:00	27	4	2	82	234	110	9	0	0	0	0	0	0	468
15:00	30	1	3	103	275	103	7	1	0	0	0	0	0	523
16:00	52	3	8	122	347	110	6	0	0	0	0	1	0	649
17:00	140	61	65	140	191	60	3	1	1	1	0	0	0	663
18:00	17	0	4	81	252	75	0	0	0	0	0	0	0	429
19:00	6	0	1	47	126	33	6	0	0	0	0	0	0	219
20:00	1	0	0	26	58	50	4	0	0	0	0	0	0	139
21:00	1	0	0	19	51	23	5	1	0	0	0	0	0	100
22:00	0	0	0	6	27	20	4	2	0	0	0	0	0	59
23:00	0	0	0	6	19	10	2	0	0	0	0	0	0	37
Total	545	347	414	1418	3823	1818	167	12	3	2	0	1	0	8550
Percent	6.4%	4.1%	4.8%	16.6%	44.7%	21.3%	2.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	

Daily

15th Percentile :	24 MPH
50th Percentile :	32 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	5641
Percent in Pace :	66.0%
Number of Vehicles > 35 MPH :	2003
Percent of Vehicles > 35 MPH :	23.4%

Grand Total	1183	513	690	2900	7787	3669	320	24	5	2	2	1	0	17096

Overall

15th Percentile :	25 MPH
50th Percentile :	32 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	11456
Percent in Pace :	67.0%
Number of Vehicles > 35 MPH :	4023
Percent of Vehicles > 35 MPH :	23.5%

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05137Aspeed
Site Code: Y-19111.11

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	Total
03/05/19	0	0	0	0	12	16	5	1	0	0	0	0	0	34
01:00	0	0	0	0	7	9	4	2	0	0	0	0	0	22
02:00	0	0	1	0	0	5	4	1	0	0	0	0	0	11
03:00	0	0	1	1	1	3	2	0	1	0	0	0	0	9
04:00	0	0	0	5	10	19	5	1	0	0	0	0	0	40
05:00	1	0	1	7	27	15	10	0	0	0	0	0	0	61
06:00	15	4	12	34	99	49	3	1	0	0	0	0	0	217
07:00	165	57	64	89	150	45	2	0	0	0	0	0	0	572
08:00	206	69	54	116	144	48	8	1	0	0	0	0	0	646
09:00	12	3	14	85	194	84	8	1	0	0	0	0	0	401
10:00	11	1	6	45	173	101	8	1	0	0	0	0	0	346
11:00	8	0	8	64	197	88	11	2	0	0	0	0	0	378
12 PM	20	1	8	85	228	117	14	0	0	0	0	0	0	473
13:00	14	4	27	110	263	96	10	0	0	0	0	0	0	524
14:00	70	36	67	184	248	98	11	0	0	0	0	0	0	714
15:00	102	26	58	201	286	102	7	0	0	0	0	0	0	782
16:00	55	21	35	150	381	157	11	1	0	0	0	0	0	811
17:00	85	19	64	185	257	94	3	0	0	0	0	0	0	707
18:00	24	1	31	196	269	99	5	1	0	0	0	0	0	626
19:00	10	0	12	96	230	119	13	1	0	0	0	0	0	481
20:00	3	0	1	33	137	108	11	0	1	0	0	0	0	294
21:00	1	4	0	17	79	75	11	0	0	0	0	0	0	187
22:00	0	0	0	7	51	70	14	2	0	0	0	0	0	144
23:00	0	0	0	7	32	27	10	1	3	0	0	0	0	80
Total	802	246	464	1717	3475	1644	190	17	5	0	0	0	0	8560
Percent	9.4%	2.9%	5.4%	20.1%	40.6%	19.2%	2.2%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	

Daily

15th Percentile :	22 MPH
50th Percentile :	31 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	5192
Percent in Pace :	60.7%
Number of Vehicles > 35 MPH :	1856
Percent of Vehicles > 35 MPH :	21.7%

Transportation Data Corporation
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Pond Street
north of Longwater Drive
City, State: Rockland, MA
Client: McM/E. Buck

05137Aspeed
Site Code: Y-19111.11

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	Total
03/06/19	0	0	0	2	12	22	9	4	0	0	0	0	0	49
01:00	0	0	0	1	3	8	3	1	0	0	0	0	0	16
02:00	0	0	0	1	5	7	2	0	0	0	0	0	0	15
03:00	0	1	0	2	0	5	1	1	0	0	0	0	0	10
04:00	1	0	0	2	12	17	4	2	0	0	0	0	0	38
05:00	0	0	0	5	30	16	9	1	0	0	0	0	0	61
06:00	19	2	10	31	98	57	4	1	1	0	0	0	0	223
07:00	168	28	48	112	141	58	8	0	1	0	0	0	0	564
08:00	311	86	57	82	93	30	3	0	0	1	0	0	0	663
09:00	29	3	11	87	194	102	19	0	0	0	0	0	0	445
10:00	13	1	7	38	150	84	26	0	1	0	0	0	0	320
11:00	19	0	15	73	227	104	13	1	0	0	0	1	0	453
12 PM	53	8	22	91	205	110	8	1	0	0	0	0	0	498
13:00	19	11	12	78	271	127	12	0	0	0	0	0	0	530
14:00	70	24	43	116	281	108	13	1	0	0	0	0	0	656
15:00	47	3	30	128	322	166	17	0	0	0	0	0	0	713
16:00	56	16	36	188	347	134	17	1	0	0	0	0	0	795
17:00	75	13	50	139	331	148	12	0	0	1	0	0	0	769
18:00	17	2	27	128	305	126	15	0	0	0	0	0	2	622
19:00	13	0	1	58	218	107	16	1	0	0	0	0	0	414
20:00	1	0	0	15	140	120	15	1	0	0	0	0	0	292
21:00	2	0	0	20	90	96	20	1	0	0	0	0	0	229
22:00	0	1	0	7	45	55	11	3	0	0	0	0	0	122
23:00	0	0	0	6	21	42	15	1	0	0	0	0	0	85
Total	913	199	369	1410	3541	1849	272	21	3	2	0	1	2	8582
Percent	10.6%	2.3%	4.3%	16.4%	41.3%	21.5%	3.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	

Daily

15th Percentile :	22 MPH
50th Percentile :	31 MPH
85th Percentile :	37 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	5390
Percent in Pace :	62.8%
Number of Vehicles > 35 MPH :	2150
Percent of Vehicles > 35 MPH :	25.1%

Grand Total	1715	445	833	3127	7016	3493	462	38	8	2	0	1	2	17142

Overall

15th Percentile :	22 MPH
50th Percentile :	31 MPH
85th Percentile :	37 MPH
95th Percentile :	39 MPH
Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	10509
Percent in Pace :	61.3%
Number of Vehicles > 35 MPH :	4006
Percent of Vehicles > 35 MPH :	23.4%

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Client: McM/E. Buck

05137AVOLUME
Site Code: Y-19111.11

Start Time	05-Mar-19 Tue	NB A.M.	NB P.M.	SB A.M.	SB P.M.	Combined A.M.	Combined P.M.	06-Mar Wed	NB A.M.	NB P.M.	SB A.M.	SB P.M.	Combined A.M.	Combined P.M.
12:00		5	137	17	103	22	240		4	191	20	138	24	329
12:15		2	147	8	131	10	278		6	213	8	125	14	338
12:30		1	120	5	117	6	237		1	159	11	105	12	264
12:45		1	138	4	122	5	260		4	141	10	130	14	271
01:00		9	129	8	126	17	255		8	137	6	123	14	260
01:15		2	103	8	132	10	235		6	106	5	149	11	255
01:30		5	131	6	130	11	261		0	109	4	130	4	239
01:45		0	123	0	136	0	259		2	123	1	128	3	251
02:00		1	109	3	151	4	260		6	107	4	130	10	237
02:15		2	123	5	177	7	300		0	105	4	165	4	270
02:30		3	133	1	178	4	311		4	143	2	168	6	311
02:45		1	114	2	208	3	322		2	113	5	193	7	306
03:00		6	192	1	184	7	376		4	137	0	162	4	299
03:15		3	157	1	201	4	358		3	91	1	194	4	285
03:30		5	164	3	205	8	369		6	137	5	181	11	318
03:45		9	154	4	192	13	346		10	158	4	176	14	334
04:00		12	198	2	***192***	14	***390***		14	143	6	174	20	317
04:15		18	157	8	***195***	26	***352***		20	145	5	***218***	25	***363***
04:30		48	144	13	***210***	61	***354***		41	***203***	16	***187***	57	***390***
04:45		56	***169***	17	***214***	73	***383***		61	***158***	11	***216***	72	***374***
05:00		92	***204***	13	154	105	358		109	***194***	8	***196***	117	***390***
05:15		111	***187***	12	157	123	344		109	***181***	8	182	117	363
05:30		125	***146***	15	216	140	362		122	142	15	215	137	357
05:45		139	150	21	180	160	330		124	146	30	176	154	322
06:00		150	131	35	177	185	308		137	134	27	191	164	325
06:15		155	115	47	168	202	283		147	113	47	161	194	274
06:30		162	103	55	151	217	254		177	99	60	129	237	228
06:45		177	88	80	130	257	218		***180***	83	89	141	269	224
07:00		192	68	105	146	297	214		***174***	67	90	107	264	174
07:15		162	72	121	113	283	185		***170***	49	118	106	288	155
07:30		***190***	60	***156***	115	***346***	175		***204***	55	***160***	107	***364***	162
07:45		***158***	44	***190***	107	***348***	151		152	48	***196***	94	***348***	142
08:00		***170***	53	***198***	85	***368***	138		157	41	***155***	85	***312***	126
08:15		***208***	46	***143***	77	***351***	123		165	33	***193***	71	***358***	104
08:30		142	21	145	84	287	105		162	32	151	59	313	91
08:45		139	32	160	48	299	80		171	33	164	77	335	110
09:00		139	29	117	59	256	88		116	34	128	67	244	101
09:15		129	22	108	47	237	69		127	25	106	59	233	84
09:30		114	23	91	46	205	69		110	21	105	55	215	76
09:45		114	25	85	35	199	60		111	20	106	48	217	68
10:00		97	10	83	43	180	53		130	21	87	40	217	61
10:15		97	20	95	38	192	58		107	12	73	29	180	41
10:30		103	8	86	29	189	37		132	15	79	27	211	42
10:45		111	12	82	34	193	46		116	11	81	26	197	37
11:00		82	6	88	22	170	28		126	12	94	19	220	31
11:15		121	7	94	23	215	30		114	10	110	21	224	31
11:30		117	5	91	18	208	23		116	8	115	27	231	35
11:45		125	7	105	17	230	24		118	7	134	18	252	25
Total		4010	4536	2737	5823	6747	10359		4085	4465	2857	5725	6942	10190
Day Total		8546		8560		17106			8550		8582		17132	
% Total		23.4%	26.5%	16.0%	34.0%				23.8%	26.1%	16.7%	33.4%		
Peak	-	07:30	04:45	07:30	04:00	07:30	04:00	-	06:45	04:30	07:30	04:15	07:30	04:15
Vol.	-	726	706	687	811	1413	1479	-	728	736	704	817	1382	1517
P.H.F.		0.873	0.865	0.867	0.947	0.960	0.948		0.892	0.864	0.898	0.937	0.949	0.972

ADT ADT 17,023 AADT 17,023

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05137AVOLUME
Site Code: Y-19111.11

Start Time	05-Mar-19 Tue	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		5	137			17	103				
12:15		2	147			8	131				
12:30		1	120			5	117				
12:45		1	138	9	542	4	122	34	473	43	1015
01:00		9	129			8	126				
01:15		2	103			8	132				
01:30		5	131			6	130				
01:45		0	123	16	486	0	136	22	524	38	1010
02:00		1	109			3	151				
02:15		2	123			5	177				
02:30		3	133			1	178				
02:45		1	114	7	479	2	208	11	714	18	1193
03:00		6	192			1	184				
03:15		3	157			1	201				
03:30		5	164			3	205				
03:45		9	154	23	667	4	192	9	782	32	1449
04:00		12	198			2	192				
04:15		18	157			8	195				
04:30		48	144			13	210				
04:45		56	169	134	668	17	214	40	811	174	1479
05:00		92	204			13	154				
05:15		111	187			12	157				
05:30		125	146			15	216				
05:45		139	150	467	687	21	180	61	707	528	1394
06:00		150	131			35	177				
06:15		155	115			47	168				
06:30		162	103			55	151				
06:45		177	88	644	437	80	130	217	626	861	1063
07:00		192	68			105	146				
07:15		162	72			121	113				
07:30		190	60			156	115				
07:45		158	44	702	244	190	107	572	481	1274	725
08:00		170	53			198	85				
08:15		208	46			143	77				
08:30		142	21			145	84				
08:45		139	32	659	152	160	48	646	294	1305	446
09:00		139	29			117	59				
09:15		129	22			108	47				
09:30		114	23			91	46				
09:45		114	25	496	99	85	35	401	187	897	286
10:00		97	10			83	43				
10:15		97	20			95	38				
10:30		103	8			86	29				
10:45		111	12	408	50	82	34	346	144	754	194
11:00		82	6			88	22				
11:15		121	7			94	23				
11:30		117	5			91	18				
11:45		125	7	445	25	105	17	378	80	823	105
Total		4010	4536			2737	5823			6747	10359
Combined Total		8546				8560				17106	
Percentage	0.0%										

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05137AVOLUME
Site Code: Y-19111.11

Start Time	06-Mar-19 Wed	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		4	191			20	138				
12:15		6	213			8	125				
12:30		1	159			11	105				
12:45		4	141	15	704	10	130	49	498	64	1202
01:00		8	137			6	123				
01:15		6	106			5	149				
01:30		0	109			4	130				
01:45		2	123	16	475	1	128	16	530	32	1005
02:00		6	107			4	130				
02:15		0	105			4	165				
02:30		4	143			2	168				
02:45		2	113	12	468	5	193	15	656	27	1124
03:00		4	137			0	162				
03:15		3	91			1	194				
03:30		6	137			5	181				
03:45		10	158	23	523	4	176	10	713	33	1236
04:00		14	143			6	174				
04:15		20	145			5	218				
04:30		41	203			16	187				
04:45		61	158	136	649	11	216	38	795	174	1444
05:00		109	194			8	196				
05:15		109	181			8	182				
05:30		122	142			15	215				
05:45		124	146	464	663	30	176	61	769	525	1432
06:00		137	134			27	191				
06:15		147	113			47	161				
06:30		177	99			60	129				
06:45		180	83	641	429	89	141	223	622	864	1051
07:00		174	67			90	107				
07:15		170	49			118	106				
07:30		204	55			160	107				
07:45		152	48	700	219	196	94	564	414	1264	633
08:00		157	41			155	85				
08:15		165	33			193	71				
08:30		162	32			151	59				
08:45		171	33	655	139	164	77	663	292	1318	431
09:00		116	34			128	67				
09:15		127	25			106	59				
09:30		110	21			105	55				
09:45		111	20	464	100	106	48	445	229	909	329
10:00		130	21			87	40				
10:15		107	12			73	29				
10:30		132	15			79	27				
10:45		116	11	485	59	81	26	320	122	805	181
11:00		126	12			94	19				
11:15		114	10			110	21				
11:30		116	8			115	27				
11:45		118	7	474	37	134	18	453	85	927	122
Total		4085	4465			2857	5725			6942	10190
Combined Total		8550				8582				17132	
Percentage	0.0%										
Total		8095	9001			5594	11548			13689	20549
Percent		47.4%	52.6%			32.6%	67.4%			40.0%	60.0%
ADT		ADT 17,023		AADT 17,023							

APPENDIX D
Seasonal Adjustment Data

Massachusetts Highway Department

H8165: Monthly Hourly Volume for March 2015

Location ID:	**H8165**	**Seasonal Factor Group:**	**U2**
County:	**Plymouth**	**Daily Factor Group:**	
Funcationl Class	**2**	**Axle Factor Group:**	**U2**
Location:	**SOUTHEAST EXPRESSWAY**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	**1502**	**1082**	**671**	**544**	**548**	**1215**	**2070**	**2555**	**3372**	**3982**	**4892**	**5604**	**6237**	**6339**	**6234**	**6234**	**6131**	4696	3496	3272	2120	1344	1726	1316	77182
2	1190	541	785	1144	1989	5738	5573	5918	5834	4834	4267	2769	4419	4615	5507	6406	6664	6933	5442	3600	3405	2629	1820	1133	93155
3	777	429	362	667	1879	4123	5662	5843	6144	5288	5006	4890	4974	5105	6047	6663	7211	7464	6026	4059	3791	2900	2050	1984	99344
4	694	388	253	351	1194	4294	4694	5608	5527	4983	4692	4718	4721	5197	5935	6832	7272	7697	5865	4296	3171	2388	1680	1095	93545
5																									
6	906	741	609	878	1816	4164	5390	6556	6309	5370	4033	5409	5880	6240	6496	7184	7383	7462	6364	5335	3888	3384	2947	2031	106775
7	1266	916	448	376	1009	2027	2796	3588	4552	4994	5688	6172	6321	6099	6111	6218	6337	5213	4664	3746	2823	2488	2184	1617	87653
8	925	738	0	558	630	1006	1823	2442	2588	3265	4260	5616	5955	6207	6275	6089	5965	5558	4393	3815	2781	1895	1559	1079	75422
9																									
10	506	267	202	293	1206	4311	5079	6175	5956	5019	4754	4827	4911	5245	6079	6926	7245	7666	6002	4353	3326	3075	2287	1460	97170
11	916	435	396	730	1846	4567	4879	5886	5787	5194	5063	5227	5313	5572	6962	7809	7798	7789	6407	4500	3549	2575	1764	1084	102048
12	653	331	219	303	1189	4415	5090	6165	6174	4714	3037	5372	5490	5970	6749	7234	6781	8015	6308	5843	2308	1674	1373	986	96393
13	543	275	118	119	188	1419	5085	6454	6115	5437	5315	5787	5725	6242	7013	7795	7827	7573	6543	4545	3548	2912	2386	1709	100673
14	972	545	339	288	450	1187	2062	2904	3980	5119	5882	6574	6653	6523	6273	6129	6445	6079	5238	3920	2963	2647	2437	1713	87322
15	1132	712	343	231	295	589	1129	1899	2599	3620	4737	6248	6214	6285	5995	5949	6473	6246	5140	4405	3969	3387	2343	1538	81478
16	706	366	289	587	1749	4125	5061	5666	6158	4952	4857	5344	5101	5404	6244	6953	7227	7616	6005	4197	2930	2435	1645	1231	96848
17	651	271	213	329	1213	4469	5070	6024	6167	5129	5221	1330	5332	5548	6408	7016	7548	7543	6291	4709	3430	3055	2324	1545	96836
18	922	420	380	625	1880	4309	5470	6459	6447	5584	5343	5464	5707	5870	6537	7548	7707	7849	6786	5152	4272	3418	2535	1662	108346
19	1047	620	485	821	2061	4614	5644	6731	6603	5618	5149	5585	5661	5917	6914	7326	7626	7668	6822	5384	4452	3709	2662	1823	110942
20	1142	675	573	781	1900	4254	5146	6463	6170	5176	5137	5387	5918	6306	6997	7740	7933	7786	5822	4394	3558	2779	2999	2179	107215
21	1166	834	431	352	1030	1994	2641	3293	5039	5809	6492	5875	5908	6168	6485	6449	6330	5772	5058	3759	3080	2580	2664	1810	91019
22																									
23																									
24																									
25																									
26	906	290	322	664	1890	4664	5202	6292	6130	5178	5319	5197	5240	5456	6491	7481	7569	7706	5908	4545	3388	2580	1998	1261	101677
27	733	404	258	316	974	3689	4557	6025	5828	4973	4982	5280	5569	6172	6723	7662	7594	7841	6473	4749	3337	2743	2364	1538	100784
28	1093	866	350	237	522	1359	2790	3815	4431	5363	5956	6377	6121	6606	6535	6431	6341	6120	5307	4286	3070	3616	3129	2622	93343
29	1597	971	425	292	542	1063	1961	2805	3404	4280	5537	6424	6846	6842	6790	6644	6335	5731	4794	3849	3045	2046	1239	863	84325
30	522	302	189	308	1202	4558	5176	6338	5974	4918	4888	4811	5087	5326	6129	6744	7314	7760	5990	3929	2972	2005	1388	889	94719
31	525	277	198	313	1610	4616	5315	6264	6276	5032	5105	5047	5471	5577	6450	7150	7652	7793	6388	4506	3241	2338	1796	1134	100074

March ADT	95371.52
2015 AADT	98,456
Adjustment	1.032342

APPENDIX E
Crash Summary

CRASH ANALYSIS

Rockland Apartments

Rockland, MA

	Hingham Street (Route 228) at Pond Street/Park and Ride	Pond Street at Longwater Drive
Tab Name	Hingham	Pond
Year		
2012	10	1
2013	5	1
2014	4	3
2015	12	3
2016	8	4
Total	39	12
Type		
Angle	16	1
Rear-end	15	2
Sideswipe	3	0
Head-on	2	0
Pedestrian	0	0
Bicycle	0	0
Single Vehicle	3	9
Other	0	0
Total	39	12
Severity		
Property Damage	22	9
Personal Injury	17	3
Fatality	0	0
Unknown	0	0
Total	39	12
Weather		
Clear	25	7
Cloudy	4	2
Rain	6	3
Snow	3	0
Fog	0	0
Not Reported	1	0
Total	39	12
Time		
7:00 AM to 9:00 AM	3	2
9:00 AM to 4:00 PM	15	3
4:00 PM to 6:00 PM	7	2
6:00 PM to 7:00 AM	14	5
Total	39	12
Crash Rate	0.49	0.32
State Average	0.78	0.57
District 5 Average	0.75	0.57

Source: MassDOT

APPENDIX F
Route 228 (Hingham Street) at Pond Street Road Safety Audit

ROAD SAFETY AUDIT

Route 228 (Hingham Street) at Pond Street

Town of Rockland

April 09, 2018

Prepared For:
MassDOT

Prepared By:
Howard Stein Hudson
11 Beacon Street, Boston, MA

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Background

Howard Stein Hudson (HSH) has conducted a Road Safety Audit (RSA) at the intersection of Route 228 (Hingham Street) at Pond Street and the Park & Ride lot (owned by MassDOT) in Rockland Massachusetts. For the remainder of the RSA, Hingham Street will be referred to as Route 228 for simplicity. The intersection is considered a High Crash Location and has been identified as an Highway Safety Improvement Program (HSIP) crash cluster, top 5% within the region, based on data from 2012 to 2014. The Equivalent Property Damage Only (EPDO) at the location was 52 including 20 total crashes of which 8 resulted in injury. EPDO is method weighting factors related to the societal costs of fatalities, injuries, and property damage-only crashes. The RSA was conducted as a MEPA requirement for the Union Point development located on the site of the former Southfield Naval Air Station. The RSA is being funded as part of mitigation commitments from the development. The goal of the RSA is to identify safety issues at the intersection and provide potential safety enhancement recommendations. These enhancements are then categorized by estimated measure of effectiveness, time frame to implement and estimated cost to address the issues.

Project Data

The RSA was conducted on February 20, 2018 at 1:00 p.m. at the Rockland Town Hall. A field visit was performed during the audit and RSA participants were also encouraged to do their own field reconnaissance prior to the RSA meeting. **Table 1** shows the participating members of the audit.

Police crash reports were compiled at the intersection between 2012 and 2016 and a total of 37 crashes were reported. Of the 37 crashes, 18 (or 49%) were angle crashes; 13 (35%) were rear end crashes; 2 (5%) were single vehicle crashes; 2 (5%) were sideswipe crashes; and 2 (5%) were head-on crashes. Seventeen (46%) crashes resulted in personal injury. Eighteen (49%) of the crashes occurred during either the weekday morning peak period (6:00-10:00 a.m.) or the weekday evening peak period (3:00-7:00 p.m.). No crashes involving pedestrians or bicyclists were reported and there were no fatalities.

Table 1: Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Faina Veinstein	MassDOT District 5: Traffic
Thomas Rebello	MassDOT District 5: Traffic
Yelena Dolezsar	MassDOT District 5: Traffic
Elsa Chan	MassDOT Traffic Safety
Michelle Deng	MassDOT Traffic Safety
Kevin T Fitzgerald	MassDOT Traffic Safety
Scott Duffey	Rockland Fire Department
Nicholas Zeoli	Rockland Police Department
John Lucas	Rockland Planning Department
David Taylor	Rockland Highway Department
Mark Abbott	CTPS/Boston Region MPO
Michael Littman	Howard Stein Hudson
Andrew Fabiszewski	Howard Stein Hudson
Kayla Arruda	Howard Stein Hudson

Project Location and Description

Roadway Descriptions

Route 228 is a 9.4-mile roadway that runs in a north-south direction between George Washington Boulevard in Hull to the north and Exit 14, Route 3 southbound on/off ramps to the south. In the study area, Route 228 is also referred to as Hingham Street. Route 228 is classified as an urban minor arterial roadway under MassDOT's jurisdiction under the Route 3 bridge and under local town of Rockland jurisdiction otherwise. At the intersection, Route 228 is a two-way, four-lane roadway that runs in an east-west direction. On-street parking and formal sidewalks are not provided, however, there are indications that pedestrians walk along the roadway from the paths along the grass. The roadway has two-foot shoulders, vertical granite curbs, and at times a guardrail on each side of the roadway. Guardrails are present on both sides of Route 228 to the west of the intersection, on the west side of Pond Street to the south of the intersection, and on the north side of Route 228 approximately 75 feet to the east of the intersection. No dedicated bicycle accommodations are provided. Route 228 has a speed limit of 45 mph.

Pond Street is a 1.0-mile roadway that runs in a north-south direction between Route 228 to the north and the Rockland-Hanover Town Line to the south. Pond Street is classified as an urban collector roadway under the Town of Rockland's jurisdiction. At the intersection, Pond Street is a two-way, two-lane roadway. On-street parking and formal sidewalks are not provided, however, there are indications that pedestrians walk along the roadway from the paths along the grass. The roadway has one-foot shoulders, vertical granite curbs, and at times a guardrail on each side of the roadway. Pond Street has a speed limit of 25 mph in the town of Rockland and changes to 35 mph in the town of Hanover, approximately 1 mile to the south as the road changes to Whiting Street.

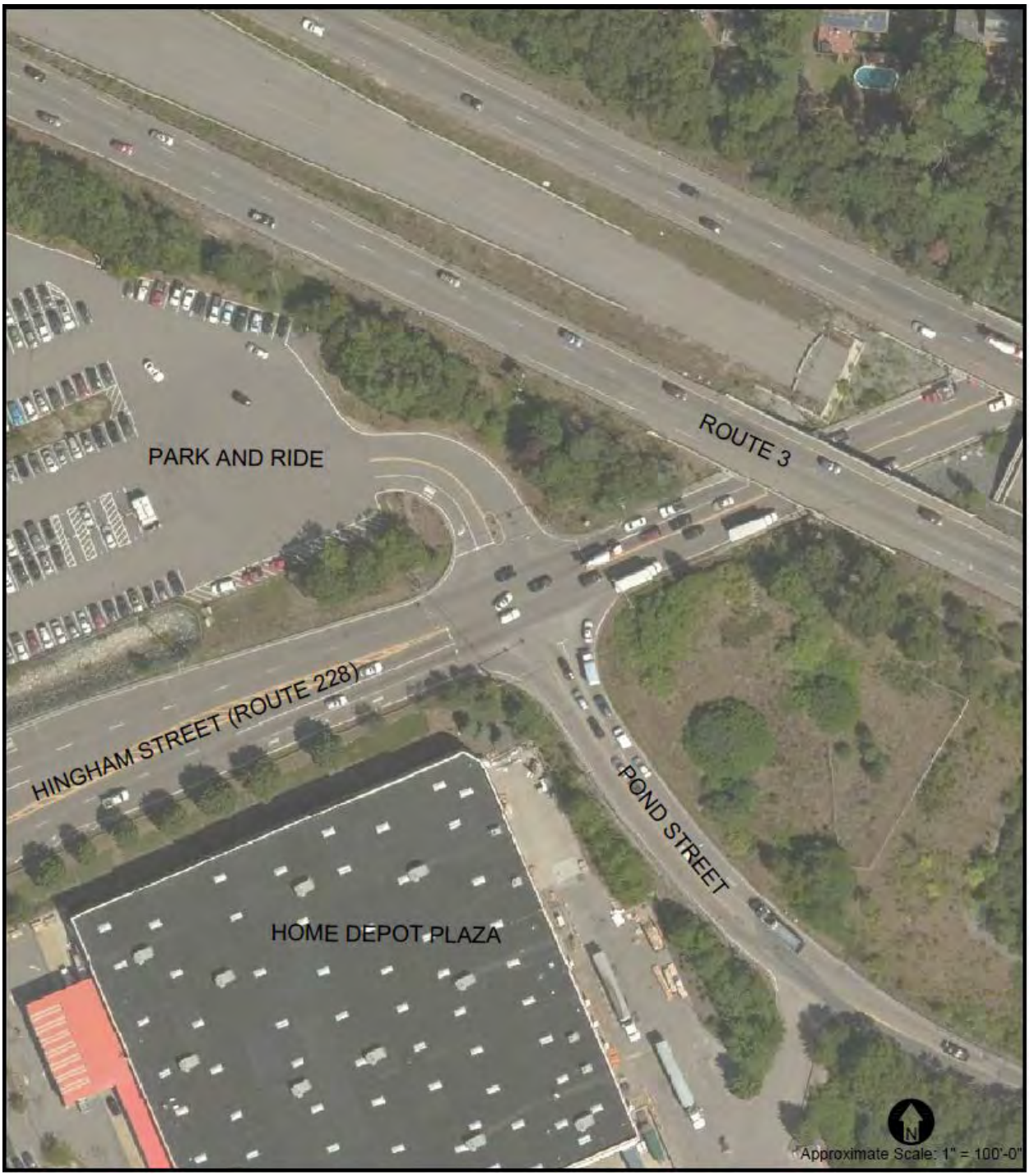
Intersection Description

Route 228 at Pond Street

Route 228 at Pond Street is a four-legged, signalized intersection. Route 228 generally runs east to west. The Route 228 eastbound approach consists of three lanes, one shared left-turn/through lane, one through only lane, and an exclusive right-turn lane approximately 160-feet long. The Route 228 westbound approach consists of two lanes, one shared left-turn/through lane and one shared through/right-turn lane. The Pond Street northbound approach and the Park & Ride Lot Driveway southbound approach both consist of a shared left-turn/through lane and an exclusive right turn lane approximately 100-feet long in the southbound direction and approximately 280-feet long in the northbound direction. On-street parking and sidewalks are not provided at the intersection. Pedestrian crossings are not provided and there are no dedicated bicycle accommodations, however loop detectors are provided for bicycles. **Figure 1** shows an aerial view of the intersection.

The Park & Ride lot accommodates a Plymouth-Brockton Bus Route stop that provides service to Boston and Logan Airport to the north and Cape Cod to the south. During the weekdays, there are 27 northbound buses and 29 southbound buses with frequent headways of 10-20 minutes for commuters. During the weekends there are 15 buses in each direction, with one bus about every hour.

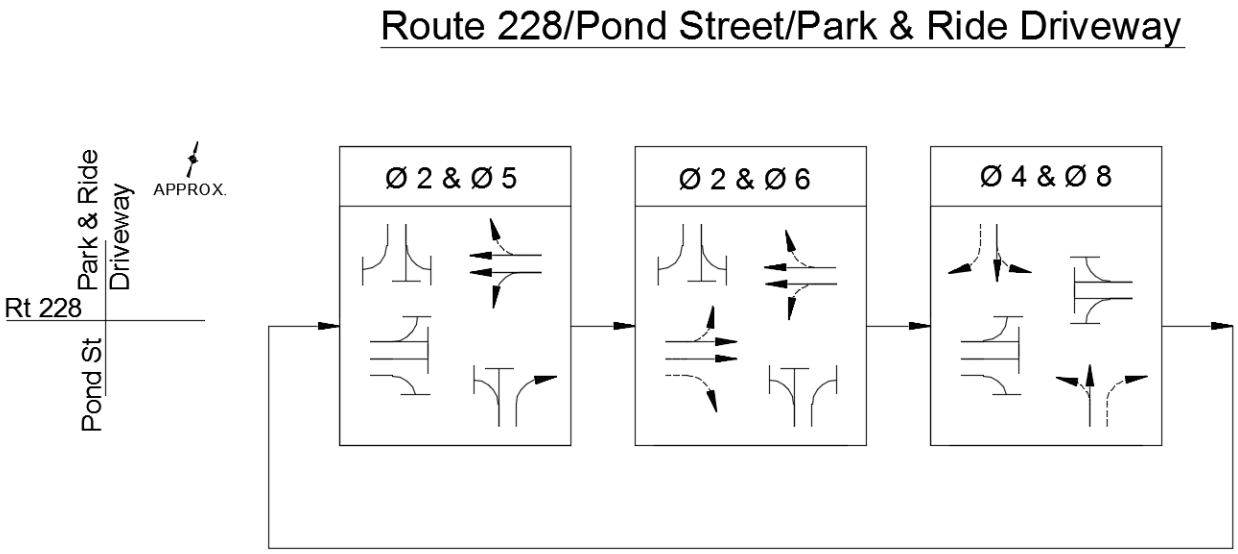
Figure 1: Locus Map



The traffic signal phasing is as follows and a phasing diagram is provided in **Figure 2**:

- The Route 228 westbound approach has a green light with a protected lead left green arrow and a northbound Pond Street right-turn arrow overlap;
- The Route 228 eastbound and westbound movements with permissive left-turns in each direction.
- The Pond Street northbound and Park & Ride southbound approaches run concurrently with permissive turns. Due to the low volume at the Park & Ride lot, especially during off-peak hours, the northbound approach functions like a protected phase.

Figure 2: Phasing Diagram



Audit Observations and Potential Safety Enhancements

The following section will identify safety issues and RSA participant observations at the intersection of Route 228 at Pond Street. Each safety issue will identify the type of collision that could have resulted from the safety issue. Finally, each safety issue will identify potential enhancements and safety improvements developed by the RSA team. The following section summarizes the issues and potential solutions, and assigns a safety payoff, timeframe, cost, and responsible agency.

Safety Issue #1: Lane Configuration

Observations

The primary factor that leads to this intersection having a high crash rate is the lane configuration and more specifically, the lack of exclusive left-turn lanes along Route 228. The mainline experiences high volumes in the eastbound and westbound directions during the weekday morning and evening peak hours. The lack of an exclusive left-turn lane can lead to angle, head-on, sideswipe and rear end crashes. In total 25 crashes may be attributed to this safety issue.

Image 1: Vehicles in the left lane, block the view of the right lane making it difficult to find a gap.

Since there are no exclusive left-turn lanes, when a vehicle is attempting to turn left into Pond Street or the Park & Ride lot, the left-turning vehicle typically needs to wait for a gap in traffic. As delays increase for the vehicle attempting to turn left, driver frustration can potentially lead to risky left-turn maneuvers with insufficient gaps. This may lead to angle crashes. Additionally, when two oncoming vehicles are turning left across each other at the intersection, from the driver's point of view, the oncoming vehicles in the right lane are blocked by the oncoming vehicles in the left lane. This occurs because the opposing left turn lanes do not line up to one another, also referred to a negative offset. The oncoming left-turning vehicle reduces the sight lines to safely turn left. This may also lead to angle crashes. According to the data, there were approximately 15 angle crashes along Route 228, seven of which resulted in an injury.

When a vehicle is slowing down to turn left in the shared left/through lane, the driver behind might not expect the vehicle in front to stop, making a rear end collision possible. According to the data, there were eight rear end crashes along the eastbound and westbound approaches and some of the crashes may be attributed to this safety issue. When a vehicle that is turning left is not able to find a gap, a queue can form in the left-turn/through lane. Often, vehicles that are stuck behind turning vehicles and want to continue through the intersection attempt to change lanes, potentially causing sideswipe crashes. According to the data, crash number 36 was a sideswipe collision that may be attributed to this behavior. Crash number 36 also resulted in an injury.

During the RSA field visit, it was observed that vehicles attempting to turn right-on-red from Pond Street northbound approach showed a tendency to creep out into the intersection watching for a gap in traffic. As drivers are attempting to make the right-turn on red in the northbound direction they are looking to the left for a gap in traffic. If vehicles are present in the eastbound exclusive right-turn lane, it makes it

difficult for the drivers turning right-on-red in the northbound direction to see past the vehicles in the eastbound exclusive right-turn lane, to the eastbound through lane, and find a gap in traffic. This causes drivers turning right-on-red in the northbound direction to creep past the stop bar to see the oncoming vehicles in the eastbound through lane, in order to safely make the turn. According to the data, there were two crashes that may be attributed to this safety issue.

Potential Enhancements:

1. Evaluate if left-turn lanes are warranted and consider creating exclusive westbound left-turn lanes along Route 228. This may require ROW takings, the Route 3 bridge reconstruction, or a conversion of the eastbound approach from two through lanes to one. This enhancement will provide left-turning vehicles the ability to be removed from the flow of mainline traffic.

2. Consider creating an exclusive eastbound left-turn lane into the Park & Ride lot by reassigning the shared left-turn/through lane to a left-turn only lane. This enhancement will provide left-turning vehicles the ability to be removed from the flow of mainline traffic and be provided an exclusive turning phase to safely complete the left turn.

3. If left turn lanes were added to both the eastbound and westbound approaches, consider aligning them with no offset. This enhancement will allow eastbound and westbound left-turning vehicles to turn at the same time, and if permissive turns are allowed, vehicles will be able to see oncoming traffic to find a gap and safely complete the left turn.

4. Consider moving the northbound right-turn lane stop bar closer to the intersection to better align vehicles with the edge of the roadway. This enhancement will allow right-turning vehicles that want to turn right-on-red to stop at the stop bar to find a gap in the conflicting traffic flow.

Safety Issue #2: Signal Phasing and Timing

Observations

As previously mentioned, the westbound approach has a protected leading left-turn phase, however after that phase ends, the eastbound and westbound left-turns are permissive. The intersection has significant mainline volume in both directions and left-turning vehicles can find difficulty in finding a gap to safely execute a left-turn maneuver. It was noted that the only way for vehicles to complete a left-turn maneuver during high the peak hours is to force a gap in oncoming traffic, or to sneak through at the end of the phase when oncoming traffic is coming to a stop for the red light. Attempting to force a gap can lead to angle crashes. According to the data, there were 17 angle crashes, eight of which resulted in an injury, some of which may be attributed to permissive left-turn movements.

RSA participants noted that this signal as well as the signals to the east and west at the Route 3 northbound and southbound ramps may have originally been coordinated with each other. RSA participants mentioned that the signal coordination might not be functioning as designed.

RSA participants noted that the yellow and red clearance times may be causing rear end crashes by creating option zones (when the yellow time is too long allowing vehicles to either safely stop on yellow or continue through the intersection) or dilemma zones (when the yellow time is too short resulting in vehicles neither being able to stop safely, nor continue through the intersection). It was also noted that the

all-red phase may be too short. According to the data, there were eight rear end crashes along the eastbound and westbound approaches some of which may be attributed to this safety issue.

Potential Enhancements:

1. Consider timing the intersection to a shorter cycle length to create more opportunities for sneaking left-turning vehicles to turn with the clearance phase. While this might not result in shorter queue lengths or improved capacity, it could result in more opportunities for left turning vehicles to safely complete the maneuver.

2. Evaluate if coordinating the signals along Route 228 would be practicable. This could reduce congestion related crashes such as rear ends.

3. Consider retiming the cycle length and phase splits with updated traffic counts.

4. Consider retiming of the clearance intervals using the MassDOT vehicle clearance calculator worksheet to ensure that the vehicles are completely out of the intersection before the next phase begins. This would enhance safety by providing enough clearance for vehicles to safely stop at the stop bar, or safely clear the intersection before the next phase begins.

Safety Issue #3: Signal Equipment

Observations

According to RSA participants, the Route 228 corridor is heavily used by several emergency services in Rockland as well as adjacent municipalities, including Hingham, Norwell, and Hanover. Opticom technology has been installed at this intersection however, it is not functioning for emergency vehicles traveling in the eastbound direction. No crashes related to this issue were recorded.

Additionally, some of the loop detectors may be damaged or not working. RSA participants could not identify which loop detectors were not functioning and no physical damage was noticed during the field visit. While no crashes were related to this issue, it is still a potential safety concern that should be addressed.

Potential Enhancements:

1. Consider repairing broken loop detectors, if any are found to be broken.

2. Consider repairing broken Opticom receivers, if any are found to be broken.

3. Continue to ensure the equipment at the intersection is functioning and maintained.

Safety Issue #4: Pedestrian and Bicycle Accommodations

Observations

Image 2: Indications of pedestrian use at the southeast corner of the intersection.

While there were no reported crashes involving a pedestrian, RSA participants noted that pedestrians have been observed crossing Route 228. Pedestrians have been observed to walk along Pond Street from the residential neighborhood to the Park & Ride lot to catch the Plymouth-Brockton bus or be picked up by a carpool. RSA participants noted the Route 228 is a wide roadway and that while there is no existing pedestrian crossing, installing one still yields a very long crossing distance. Pedestrians have also been observed walking along Route 228 under Route 3. There are no pedestrian facilities provided within the intersection or along any approaches to the intersection, except for the narrow (approximately 4 feet) emergency access sidewalks under the Route 3 bridge. There are signs of pedestrian traffic along the grass adjacent to the edge of roadway.

RSA participants noted that there is minimal bicycle activity in the area. This could be due to a lack of available and safe bicycle infrastructure. RSA participants noted that there is bicycle loop detection at the intersection. There were also no crashes related to bicycle users.

Potential Enhancements:

1. Consider installing a sidewalk along Pond Street as well as curb ramps, a crosswalk along the west leg, and ADA compliant pedestrian signal equipment with countdown indicators and APS push buttons to accommodate pedestrians from the residential neighborhood to the Park & Ride lot.

2. Consider installing a sidewalk along Route 228 as well as curb ramps, a crosswalk, and pedestrian signal equipment to accommodate pedestrians traveling along Route 228.

3. Evaluate pedestrian/bicycle connectivity needs in the area to decide if/where sidewalks, crosswalks, bike lanes, sharrows, etc. should be installed.

4. Consider the feasibility of providing bicycle accommodations. Due to the speed and volume of vehicles along Route 228, these facilities should consider a protected bicycle lane, or a shared-use path along the side of the roadway.

5. Consider installing a pedestrian warning sign along the roadway approaches to notify drivers that pedestrians may be crossing the roadway.

Safety Issue #5: Signage and Pavement Markings

Observations

In general, signage is in good condition and appear to be maintained as necessary. Signage appears to be clearly visible both from a placement and legibility/retro-reflectivity perspective, however, no observations were made at night. During the RSA site visit, it was noted that a "Right Lane Must Turn Right" sign was knocked over along the southbound approach to the intersection in the Park & Ride lot. It was also noted that, along Pond Street in the southbound direction, the "Speed Limit 30" sign was leaning to the left.

The pavement markings also are in good condition and appear to be maintained as necessary. Right-turn only pavement markings are present along all right-turn only lanes, however it was noted that no lane use pavement markings are provided to indicate the shared lanes such as a shared left-turn/through arrow stencil on the left-most lane.

During the field visit, RSA participants observed a vehicle in the northbound right-turn only lane that needed to make a left turn and was preventing the drivers behind from making the right-turn during the overlap phase with the westbound left-turn movement. These issues are not directly tied to a crash but could lead to driver confusion and/or distraction.

Potential Enhancements:

1. Consider installing advanced intersection lane control signage (R3-8) to notify drivers which lane to be in to make the desired movement through the intersection.

2. Consider supplementing all "RIGHT LANE MUST TURN RIGHT" (R3-7R) with the Right Turn Only (R3-5R) graphic sign. When post mounted the R3-5R must include the R3-5fP "RIGHT LANE" sign.

3. Consider adding lane-use pavement markings to all approach lanes at the intersection.

4. Consider replacing missing street name signs on the NW corner of the intersection.

5. If any signs are found to be outdated or missing the retro-reflectivity, consider replacing with a new sign.

Safety Issue #6: Lighting

Observations

It was noted during the RSA that there were inconsistencies in the crash data when it referenced the lighting conditions. Crashes that occurred at night were assigned as “dark – lighted roadway”, and “dark - roadway not lighted.” During the site visit it was observed that no overhead lighting is provided at the intersection. The RSA participants concluded that ambient lighting from the Home Depot site and the Park & Ride lot may provide enough lighting to spill into the intersection. According to the data, 27% of all crashes occurred at night when the roadway lighting may have been a factor.

Potential Enhancements:

1. Consider evaluating intersection lighting and providing overhead lighting, where necessary.

Safety Issue #7: Speeding

Observations

Route 228 is a wide, straight roadway that is condusive to speeding, however congestion during peak commuter hours does not allow space for vehicles to speed. The RSA participants indicated that typically speeding is not a problem except when there is a gap in congestion. It was noted that the speed limit in the westbound direction is 45 miles per hour.

Image 3: Speed Limit of 45 MPH traveling westbound leading into the intersection

Potential Enhancements:

1. Consider targeted speed enforcement during times of day where speeding seems to be an issue.

2. Consider installing speed feedback signs to reinforce safe operating speeds.

Safety Issue #8: Congestion

Observations

A residential neighborhood and several commercial properties including a new health club (as noted by RSA participants) are located to the south of the intersection. Pond Street is the main access point for these properties to reach Route 3. Vehicular access to and from this neighborhood is primarily provided via Pond Street. The next closest access points are High Street, about one mile to the east, and Webster Street, about two miles to the south. The neighborhood is confined by Route 3 to the northeast and by several undeveloped properties and two small ponds to the southwest.

The restricted access leads to high volumes along the Pond Street northbound approach to the intersection, as well as the eastbound and westbound turning movements from Hingham Street onto Pond Street. RSA participants noted the excess capacity at the signalized intersection to the west at the Route 3 off-ramps and the Home Depot Driveway. According to the data 15 crashes occurred with vehicles either attempting to enter or exit Pond Street indicating the heavy usage of this roadway.

It was also noted during the RSA that when the queue backs up from the intersection located to the east, vehicles attempting to turn right-on-red at the northbound Pond Street approach can rear end vehicles stopped in the queue along Route 228 in the eastbound direction. This happens because drivers have look to the left, waiting for a gap in the traffic and accelerate quickly to join the speed of traffic, rear ending vehicles in the queue. According to the traffic data three crashes, crash numbers 2, 8, and 19 can be related to this behavior, two of which resulted in injury.

Potential Enhancements:

1. Consider the feasibility of working with the Home Depot property or the owners of the parcel to the south on creating a secondary access point to Pond Street to relieve traffic volumes at the intersection.

2. Consider restricting right on red at the northbound Pond Street northbound approach.

Safety Issue #9: Heavy Vehicle Maneuvers

Observations

RSA participants noted that some large trucks have difficulty turning right from Route 228 eastbound into Pond Street. The trucks either encroach into the northbound approach or line up in the middle through only lane to make the right-turn. According to the MassDOT roadway design guide a truck making a maneuver from an arterial roadway onto a collector roadway, encroachment is allowed into travel lanes in the same direction, however no encroachment is allowed in oncoming travel lane. There are no crashes related to this safety issue, however during the field visit it was observed that a flat-bed truck making this maneuver could have had a collision as the truck encroached into the northbound shared left-turn/through lane. The truck had to stop and wait for the northbound vehicles to clear by the green light to avoide a collision.

Potential Enhancements:

1. Evaluate curb radius on the southwest corner of the intersection. If trucks require a larger radius, consider creating a mountable curb extension or truck apron to help reduce the turning speed of passenger vehicles who would track outside the apron, while allowing for trucks to turn and track over the apron as they maneuver through the intersection.

2. Consider moving the northbound left lane stop bar back from the intersection to allow for larger trucks to turn without encroaching the oncoming travel lane.

3. Consider utilizing the park and ride driveway as a jug-handle for heavy vehicles only to turn left from the westbound approach.

Summary of Road Safety Audits

Table 2 below shows the estimated time frames of short-term, mid-term, and long-term solutions, about what was discussed, as well as the cost ranges of low-cost, medium-cost, and high-cost projects. **Table 3** provides an estimate of the timeframe and cost of each potential safety issue that may address each of the identified safety issues.

Table 2: Estimated Time Frame and Costs Breakdown

Time Frame	
Short-Term	<1 Year
Mid-Term	1-3 Years
Long-Term	>3 Years

Costs	
Low	<$10,000
Medium	$10,001-$50,000
High	>$50,000

Table 3: Potential Safety Enhancement Summary

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Lane Configuration	Evaluate if left-turn lanes are warranted and consider creating exclusive westbound left-turn lanes along Route 228. This may require ROW takings, the Route 3 bridge reconstruction, or a conversion of the eastbound approach from two through lanes to one.	High	Long-term	High	MassDOT/Town of Rockland
	Consider creating an exclusive eastbound left-turn lane into the Park & Ride lot by reassigning the shared left-turn/through lane to a left-turn only lane.	Medium	Mid-term	High	MassDOT
	If left turn lanes were added to both the eastbound and westbound approaches, consider aligning them across the intersection with no offset.	Medium	Long-term	High	MassDOT
	Consider moving the northbound right-turn lane stop bar closer to the intersection to better align vehicles with the edge of the roadway.	Low	Short-term	Low	MassDOT/Town of Rockland
Signal Phasing and Timing	Consider timing the intersection to a shorter cycle length to create more opportunities for sneaking left-turning vehicles to turn with the clearance phase.	Medium	Short-term	Low	MassDOT
	Evaluate if coordinating the signals along Route 228 would be practicable.	Low	Short-term	Low	MassDOT
	Consider retiming the cycle length and phase splits with updated traffic counts.	Medium	Short-term	Low	MassDOT
	Consider retiming of the clearance intervals using the MassDOT vehicle clearance calculator worksheet to ensure that the vehicles are completely out of the intersection before the next phase begins	Medium	Short-term	Low	MassDOT

Table 3: Potential Safety Enhancement Summary (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Signal Equipment	Consider repairing broken loop detectors, if any are found to be broken.	Low	Short-term	Low	MassDOT/Town of Rockland
	Consider repairing broken Opticom receivers, if any are found to be broken.	Medium	Short-term	Low	Town of Rockland
	Continue to ensure the equipment at the intersection is functioning and maintained.	Medium	Short-term	Low	MassDOT
Pedestrian and Bicycle Accommodations	Consider installing a sidewalk along Pond Street as well as curb ramps, a crosswalk along the west leg, and ADA compliant pedestrian signal equipment with countdown indicators and APS push buttons to accommodate pedestrians from the residential neighborhood to the Park & Ride lot.	High	Long-term	High	MassDOT/Town of Rockland
	Consider installing a sidewalk along Route 228 as well as curb ramps, a crosswalk, and pedestrian signal equipment to accommodate pedestrians traveling along Route 228.	High	Long-term	High	MassDOT
	Evaluate pedestrian/bicycle connectivity needs in the area to decide if/where sidewalks, crosswalks, bike lanes, sharrows, etc. should be installed.	High	Long-term	High	MassDOT/Town of Rockland
	Consider the feasibility of providing bicycle accommodations. Due to the speed and volume of vehicles along Route 228, these facilities should consider a protected bicycle lane, or a shared-use path along the side of the roadway.	High	Long-term	High	MassDOT
	Consider installing a pedestrian warning sign along the roadway approaches to notify drivers that pedestrians may be crossing the roadway.	Low	Short-Team	Low	MassDOT

Table 3: Potential Safety Enhancement Summary (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Signage and Pavement Markings	Consider installing advanced intersection lane control signage (R3-8) to notify drivers which lane to be in to make the desired movement through the intersection.	Low	Short-term	Low	MassDOT
	Consider supplementing all "RIGHT LANE MUST TURN RIGHT" (R3-7R) with the Right Turn Only (R3-5R) graphic sign. When post mounted the R3-5R must include the R3-5fP "RIGHT LANE" sign.	Low	Short-term	Low	MassDOT
	Consider adding lane-use pavement markings to all approach lanes at the intersection.	Low	Short-term	Low	MassDOT
	Consider replacing missing street name signs on the NW corner of the intersection.	Low	Short-term	Low	MassDOT
	If any signs are found to be outdated or missing the retro-reflectivity, consider replacing with a new sign	Low	Short-term	Low	MassDOT
Lighting	Consider evaluating intersection lighting and providing overhead lighting, where necessary.	Medium	Mid-term	Medium	MassDOT/Town of Rockland
Speeding	Consider targeted speed enforcement during times of day where speeding seems to be an issue.	Medium	Short-term	Low	State Police/ Local Police
	Consider installing speed feedback signs to reinforce safe operating speeds.	Medium	Short-term	Low	State Police/ Local Police
Congestion	Consider the feasibility of working with the Home Depot property or the owners of the parcel to the south on creating a secondary access point to Pond Street to relieve traffic volumes at the intersection.	Medium	Long-term	High	MassDOT
	Consider removing the allowance of right on red at the northbound Pond Street northbound approach.	Medium	Short-term	Low	MassDOT/Town of Rockland

Table 3: Potential Safety Enhancement Summary (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Heavy Vehicle Maneuvers	Evaluate curb radius on the southwest corner of the intersection. If truck require a larger radius, consider creating a mountable curb extension or truck apron to help reduce the turning speed of passenger vehicles who would track outside the apron, while allowing for trucks to turn and track over the apron as they maneuver through the intersection.	Medium	Mid-term	Medium	MassDOT/Town of Rockland
	Consider moving the northbound left lane stop bar back from the intersection to allow for larger trucks to turn without encroaching the oncoming travel lane.	Low	Short-term	Low	MassDOT
	Consider utilizing the park and ride driveway as a jug-handle for heavy vehicles only to turn left from the westbound approach.	Low	Short-term	Low	MassDOT

Appendix A. RSA Meeting Agenda

Agenda

Road Safety Audit

Rockland, MA

Hingham Street at Pond Street

Meeting Location:
Rockland Town Hall:
Lawrence J. Chaffee Conference Room
(Downstairs Conference Room)
242 Union St, Rockland, MA

Tuesday, February 20, 2018
1:00 PM – 3:00 PM

Type of meeting:	**High Crash Location – Road Safety Audit**
Attendees:	**Invited Participants to Comprise a Multidisciplinary Team**
Please bring:	**Thoughts and Enthusiasm!!**
1:00 PM	**Welcome and Introductions**
1:15 PM	**Discussion of Safety Issues** • Crash history, Speed Regulations – provided in advance • Existing Geometries and Conditions
2:00 PM	**Site Visit** • Drive to the intersection of Hingham Street at Pond Street • As a group, identify areas for improvement
2:30 PM	**Discussion of Potential Improvements** • Discuss observations and finalize safety issue areas • Discuss potential improvements and finalize recommendations
3:00 PM	**Adjourn for the Day – but the RSA has not ended**

Instructions for Participants:

- **Before attending the RSA on February 20, 2018, participants are encouraged to drive/walk through the intersection and complete/consider elements on the RSA Prompt List with a focus on safety.**
- **All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, but are reminded that the synergy that develops and respect for others' opinions are key elements to the success of the overall RSA process.**
- **After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.**

Appendix B. RSA Audit Team Contact List

Participating Audit Team Members

Date: February 20, 2017 Time: 1:00 p.m. Location: Rockland Town hall

Audit Team Member	Agency/Affiliation
Faina Veinstein	MassDOT District 5: Traffic
Thomas Rebello	MassDOT District 5: Traffic
Yelena Dolezsar	MassDOT District 5: Traffic
Elsa Chan	MassDOT Traffic Safety
Michelle Deng	MassDOT Traffic Safety
Kevin T Fitzgerald	MassDOT Traffic Safety
Scott Duffey	Rockland Fire Department
Nicholas Zeoli	Rockland Police Department
John Lucas	Rockland Planning Department
David Taylor	Rockland Highway Department
Mark Abbott	CTPS/Boston Region MPO
Michael Littman	Howard Stein Hudson
Andrew Fabiszewski	Howard Stein Hudson
Kayla Arruda	Howard Stein Hudson

Appendix C. Detailed Crash Data

HOWARD STEIN HUDSON

ROCKLAND, MA

HINGHAM STREET & POND ST

REGION: MAPC

COLLISION DIAGRAM

TIME PERIOD ANALYZED: 2012 - 2016
SOURCE OF CRASH DATA: ROCKLAND POLICE DEPARTMENT
DATE PREPARED: OCTOBER 11, 2017
PREPARED BY: C. LUCAS

SYMBOLS	TYPES OF CRASH	SEVERITY
Moving Vehicle	Rear End	
Backing Vehicle	Head On	
Non-Involved Vehicle	Angle	Injury
Pedestrian	Turning Movement	
Bicycle	Sideswipe	Fatal
Animal	Out of Control	
Parked Vehicle	Night Time Crash	
Fixed Object		

* NOT TO SCALE

Crash Data Summary Table
Union Point: Hingham Street and Pond Street January
2012-December 2016

#	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages			Police Agency	Comments
1	3/9/2012	Friday	12:22 PM	Angle	Daylight	Clear	Dry	4 - Failed to yield right of way	59	32	-	Local police	V1 was traveling west on Hingham St. V2 was turning leftinto Park and ride and struck V1 during turn.
2	4/2/2012	Monday	4:27 PM	Rear End	Daylight	Clear	Dry	1 - No improper driving	27	44	-	Local police	All vehicles were heading in an easterly direction on Hingham St. As they passed the intersection an ambulance with emergency lights and sirens on went passing by in the left lane. An unidentified vehicle swerved into the right lane and caused V1 to hit the brakes. V2 rear ended V1, V3 rear ended V2, and V4 rear ended V3.
3	4/18/2012	Wednesday	6:31 AM	Rear End	Daylight	Clear	Dry	5 - Followed too closely	32	44	-	Local police	V1 traveling north on Hingham St came to a stop at the intersection when the vehicle in front stopped abruptly. V2 was unable to stop in time and struck V1 in the rear.
4	6/20/2012	Wednesday	5:45 PM	Rear End	Daylight	Clear	Dry	1 - No improper driving	30	19	-	Local police	V1 was traveling straight heading east on Hingham St. V2 was traveling west and turning left onto Pond St. as V2 was turning it struck V1.
5	6/26/2012	Tuesday	9:43 AM	Rear End	Daylight	Rain	Dry	5 - Followed too closely	34	38	-	Local police	V1 traveling north on Hingham St stops two cars back of the red traffic signal. V2 traveling behind V1 collided with V1.
6	7/23/2012	Monday	2:11 PM	Angle	Daylight	Clear	Dry	4 - Failed to yield right of way	17	62	-	Local police	V1 was heading north on Hingham St, making a right turn onto Pond St. V2 was heading south on Hingham St, making a left turn onto Pond St. Both operators thought they had green lights and collided.
7	8/29/2012	Wednesday	1:20 PM	Rear End	Daylight	Clear	Dry	5 - Followed too closely	42	27		Local police	V1 was traveling in an easterly direction on Hingham St and was slowing for traffic at the light. V2 was traveling behind V1 and rear ended V1.
8	9/4/2012	Tuesday	3:39 PM	Angle	Daylight	Rain	Wet	5 - Followed too closely	54	40	-	Local police	V1 was traveling in an easterly direction on Hingham St and was slowing for traffic at the light. V2 was traveling behind V1 and rear ended V1.
9	9/11/2012	Tuesday	7:05 AM	Rear End	Daylight	Clear	Dry	13 - Glare*	-	-	-	Local police	V1 and V2 were stopped at the traffic light on Hingham St facing north. V3 did not see V2 in front due to glare from the sun. V3 struck the rear of V2 causing V2 to strike the rear of V1.
10	11/14/2012	Wednesday	10:57 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	20 - Distracted*	-	-	-	Local police	V1 was heading westbound on Hingham St when rear ended by V2 just as the light turned green.
11	1/29/2013	Tuesday	6:58 PM	Angle	Dark - Lighted Roadway	Clear	Dry	4 - Failed to yield right of way	24	19	-	Local police	V1 was traveling straight through the intersection east on Hingham St and was struck by V2 which was turning left from Hingham St onto Pond St.
12	3/8/2013	Friday	12:39 PM	Head-on	Daylight	Snow	Snow	7 - Driving too fast for conditions, 11 - Swerving or avoiding due to wind, slippery surface, vehicle, object, nonmotorist in roadway, etc.	-	-	-	Local police	V1 had a green light and was pulling out of Park and Ride traveling southbound. V2 was traveling westbound on Hingham St and observed a yellow light but could not stop due to snow and ice on the roadway and collided with V1.
13	5/1/2013	Wednesday	5:14 PM	Rear End	Daylight	Clear	Dry	5 - Followed too closely	-	-	-	Local police	Both vehicles were traveling east on Hingham St when V2 rear ended V1.
14	5/21/2013	Tuesday	4:17 PM	Rear End	Daylight	Cloudy	Dry	5 - Followed too closely*	-	-	-	Local police	All vehicles were traveling in an easterly direction on Hingham St in very heavy traffic. V4 observed others brake lights but did not stop in time and rear ended V3. V2 then struck V2, and V2 struck V1.
15	5/24/2013	Friday	9:28 PM	Rear End	Dark - Lighted Roadway	Rain	Wet	19 - Inattention, 5 - Followed too closely	-	-	-	Local police	Both vehicles were facing west on Hingham St. V1 was stopped at the red light. V2 did not see V1 in front of her and struck the rear of V1.
16	6/3/2013	Monday	5:23 PM	Angle	Daylight	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling easterly on Hingham St. V2 was traveling westerly on Hingham St. V2 took a left turn, crossing into oncoming lane of V1 attempting to enter Pond St. V1 couldn't stop in time and struck V2.

Crash Data Summary Table
Union Point: Hingham Street and Pond Street January
2012-December 2016

17	7/12/2013	Friday	1:38 PM	Angle	Daylight	Clear	Dry	3 - Disregarded traffic signs, signals, road markings, 4 - Failed to yield right of way	-	-	-	Local police	V1 (motorcycle) was traveling on the inside NB lane on Hingham St. V2 was planning to turn left onto Pond St and did not yield right of way to the V1 as it crossed in the path.
18	8/22/2013	Thursday	8:08 AM	Sideswipe, same direction	Daylight	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling east on Hingham St. V2 drove out into oncoming traffic to merge onto Hingham St and did not yield the right of way to V1.

#	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages			Police Agency	Comments
19	1/17/2014	Friday	8:14 AM	Rear End	Daylight	Clear	Dry	19 - Inattention	-	-	-	Local police	V2 was on Pond St turning right onto Hingham St. V1 in front of her stopped and V2 barely tapped the rear end of V1.
20	7/9/2014	Wednesday	2:47 PM	Head-on	Daylight	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling straight ahead easterly on Hingham St. V2 was traveling westerly on Hingham St and attempted to take a left turn southerly onto Pond St, failed to yield right of way and struck V1.
21	8/4/2014	Monday	2:59 PM	Angle	Daylight	Clear	Slush	19 - Inattention, 4 - Failed to yield right of way	-	-	-	Local police	V1 was taking a right turn from Hingham St westbound as V2 was traveling straight on Hingham St eastbound. V2 struck V1 causing V1 to strike V3 which was stopped at the red light on Pond St northbound.
22	10/27/2014	Monday	6:36 PM	Angle	Dark - Lighted Roadway	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling straight on Hingham St. V2 was in the eastbound lane turning left into the Park and Ride. V2 crossed into the travelling lane of V1 and they collided.
23	11/18/2014	Tuesday	6:00 PM	Angle	Dark - Roadway not lighted	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling straight ahead easterly on Hingham St. V2 was traveling westerly on Hingham St and attempted to take a left turn onto Pond St, failing to yield right of way and was struck by V1.
24	1/7/2015	Wednesday	10:47 PM	Rear End	Dark - Lighted Roadway	Clear	Wet	10 - Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, 14 - Physical impairment	-	-	-	Local police	V1 was taking a right turn off of Hingham St onto Pond St when he was rear ended by V2.
25	3/30/2015	Monday	10:00 PM	Single Vehicle	Dark - Roadway not lighted	Cloudy	Dry	20 - Distracted, 9 - Failure to keep in proper lane or running off road	-	-	-	Local police	V1 was traveling NB on Pond St and attempted to take a left turn onto Hingham St. Made the turn, heard a bang, lost control and hit the guard rail.
26	5/5/2015	Tuesday	2:44 PM	Angle	Daylight	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling NB on Hingham St approaching intersection. V2 traveling SB on Hingham St came to a stop and attempted a left turn onto Pond St. V1 struck V2 when it crossed into travel lane.
27	7/25/2015	Saturday	11:11 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	5 - Followed too closely	-	-	-	Local police	V1 was traveling SB on Hingham St when stopped short and rear ended V2, which was waiting for the light to turn green.
28	8/27/2015	Thursday	8:28 AM	Angle	Daylight	Clear	Dry	19 - Inattention	-	-	-	Local police	V1 was attempting to turn left onto Pond St and proceeded believing that V2, traveling eastbound, was slowing at the light. V2 continue eastbound through the intersection on the green light and struck V1.
29	11/9/2015	Monday	5:13 AM	Rear End	Dark - Lighted Roadway	Clear	Dry	19 - Inattention	-	-	-	Local police	V1 was on Pond St making a right on red turn onto Hingham St. V1 had started to make the turn before stopping to yield to oncoming traffic. V2 struck V2 from behind.
30	12/3/2015	Thursday	7:42 AM	Angle	Daylight	Clear	Wet	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling NB on Hingham St. V2 was traveling SB on Hingham St. V2 attempted to execute a left turn onto Pond St and was struck by V2 which was proceeding straight ahead.
31	12/22/2015	Tuesday	12:55 PM	Angle	Daylight	Rain	Wet	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling easterly on Hingham St. V2 was traveling westerly on Hingham St. V2 attempted to take a left turn into the Park and Ride and struck V1.
32	1/28/2016	Thursday	10:15 PM	Angle	Dark - Lighted Roadway	Clear	Dry	1 - No improper driving	-	-	-	Local police	V1 traveling straight NB on Hingham St. V2 traveling SB on Hingham St attempted a left turn onto Pond St.V2 cut across intersection and struck V1 causing collision.
33	8/16/2016	Tuesday	3:53 PM	Single Vehicle	Daylight	Rain	Wet	1 - No improper driving	-	-	-	Local police	V1 (motorcycle) was pulling up to the red light EB on Hingham St, applied his brakes and the bike slid out from under him.

Crash Data Summary Table

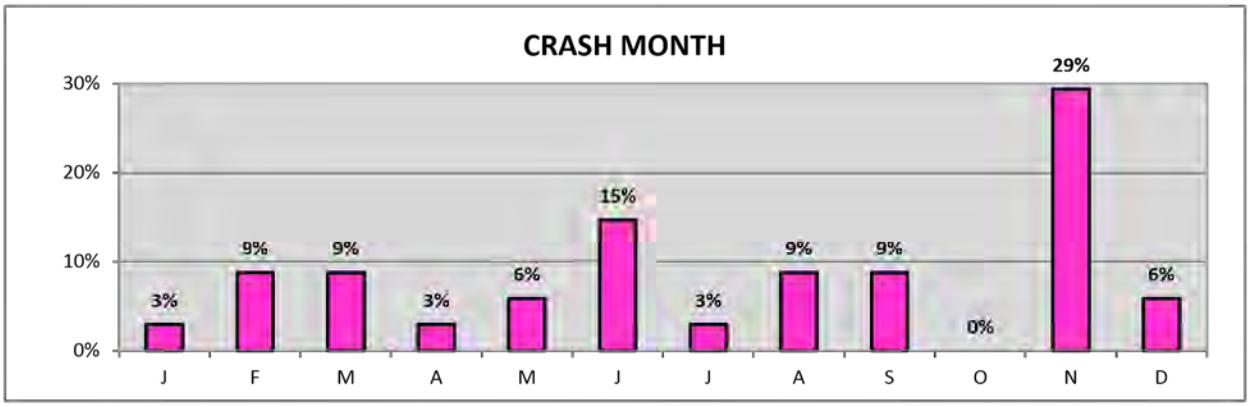
Union Point: Hingham Street and Pond Street January 2012-December 2016

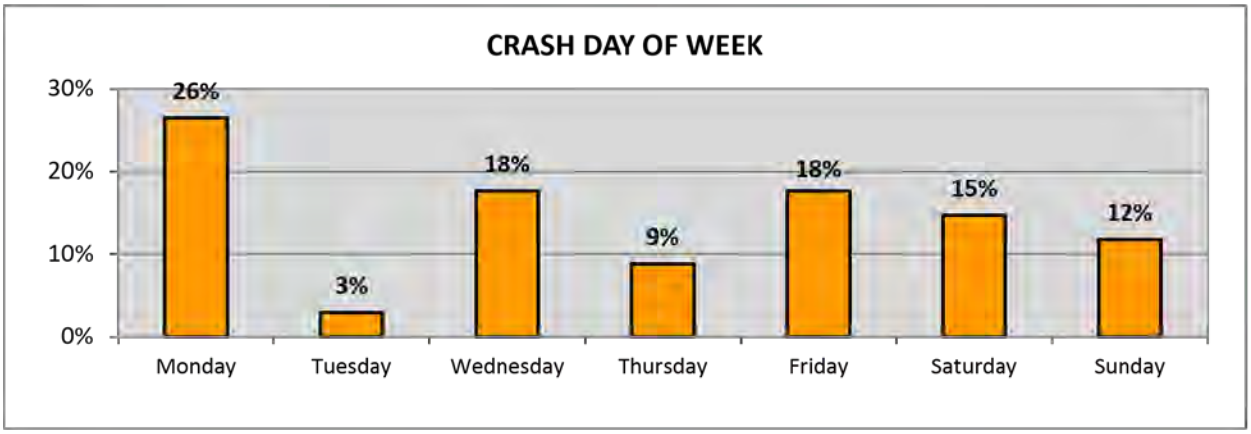
#	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages			Police Agency	Comments
36	11/15/2016	Tuesday	2:28 PM	Sideswipe, same direction	Daylight	Rain	Wet	4 - Failed to yield right of way	-	-	-	Local police	V1 and V2 were traveling westerly in the travel lane. V1 was in the left lane and V2 was in the right lane. V1 pulled into right lane to go around vehicle awaiting left turn onto Pond St and sideswiped V2. V2 then swerved and struck V3 stopped at the traffic signal at the exit of Park and Ride.
37	12/22/2016	Thursday	2:52 PM	Angle	Daylight	Cloudy	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling in a westerly direction on Hingham St. V2 was stopped at the intersection with Pond St facing EB. V2 was attempting to take a left turn into the Park and Ride. As V2 was taking the turn, V1 struck V2. V2 failed to yield the right of way.
34	8/31/2016	Wednesday	5:22 PM	Angle	Daylight	Clear	Dry	4 - Failed to yield right of way	-	-	-	Local police	V1 was traveling straight through the intersection on Hingham St WB when V2 attempted a left turn from Hingham St EB. V1 struck V2.
35	10/14/2016	Friday	10:41 AM	Angle	Daylight	Clear	Dry	11 - Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc.	-	-	-	Local police	V1 and V2 were traveling in an easterly direction on Hingham St. V1 was in the left travel lane and V2 in the right travel lane. Operator of V2 observed V3 attempt to exit Pond St and turn onto Hingham St. V2 swerved to the left to avoid a collision with V3 and struck V1.

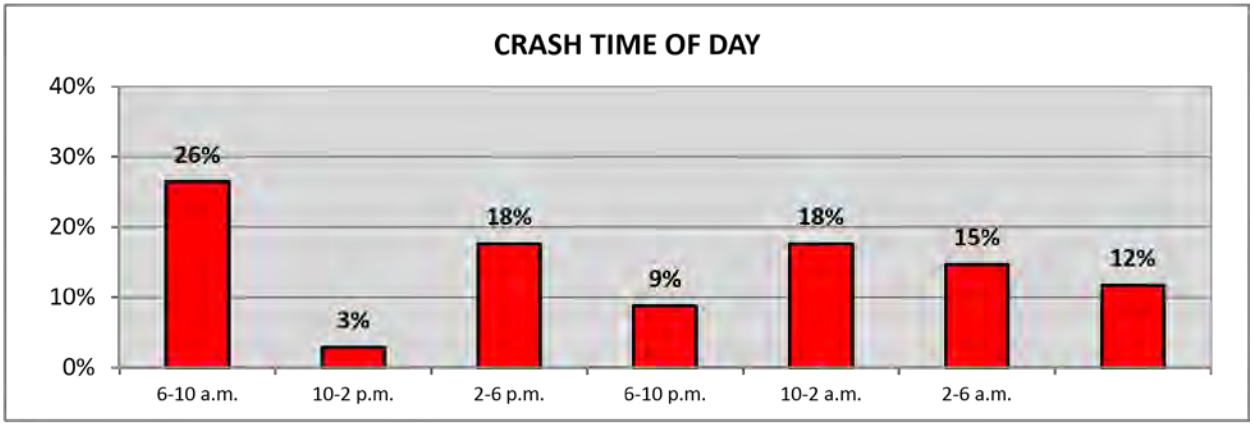
* Crash Report listed Driver Contribution Code as "1 - No Improper Driving", however, the narrative identified the cause of the crash. This summary table follows what was written in the narrative.

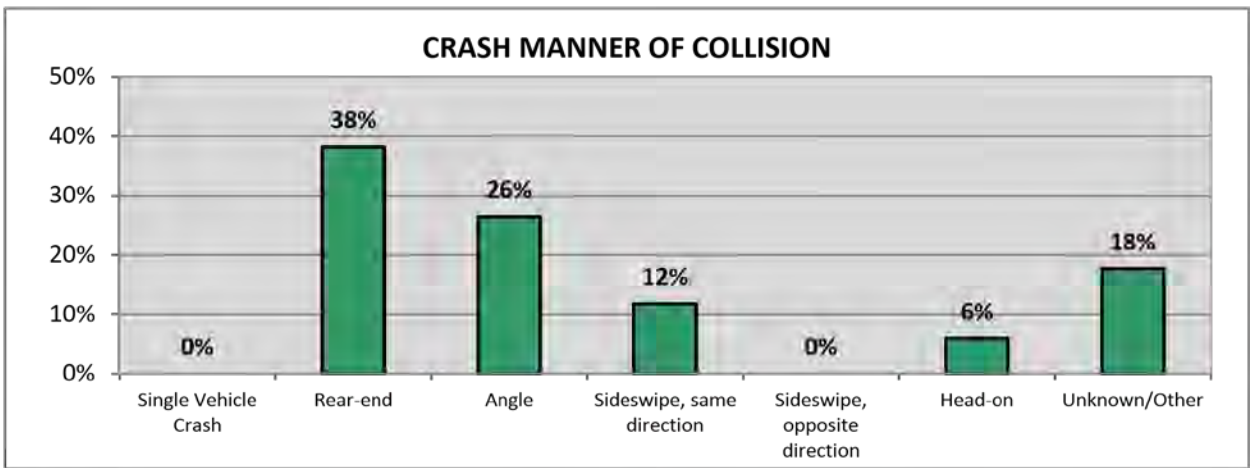
Crash Data Summary Charts

Union Point: Derby Street at Cushing Street



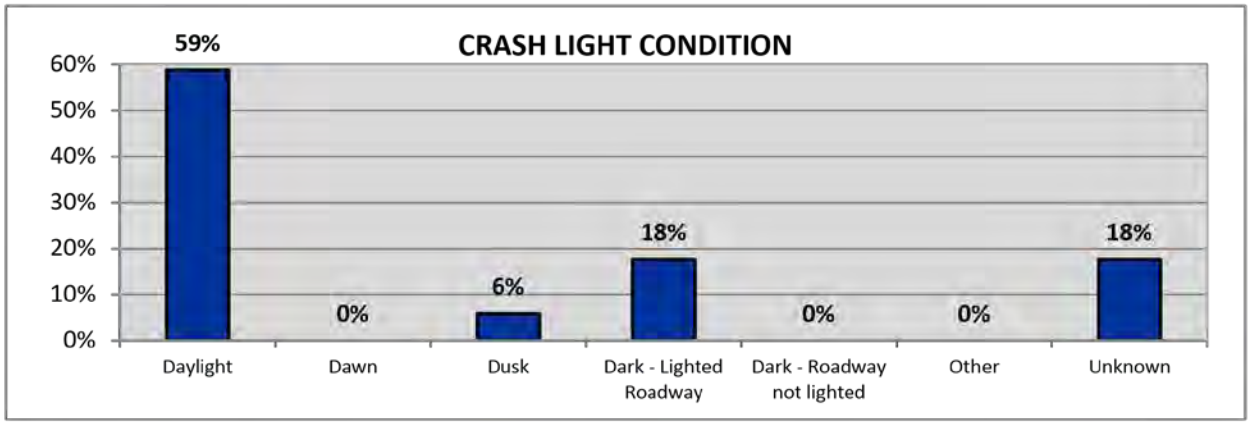


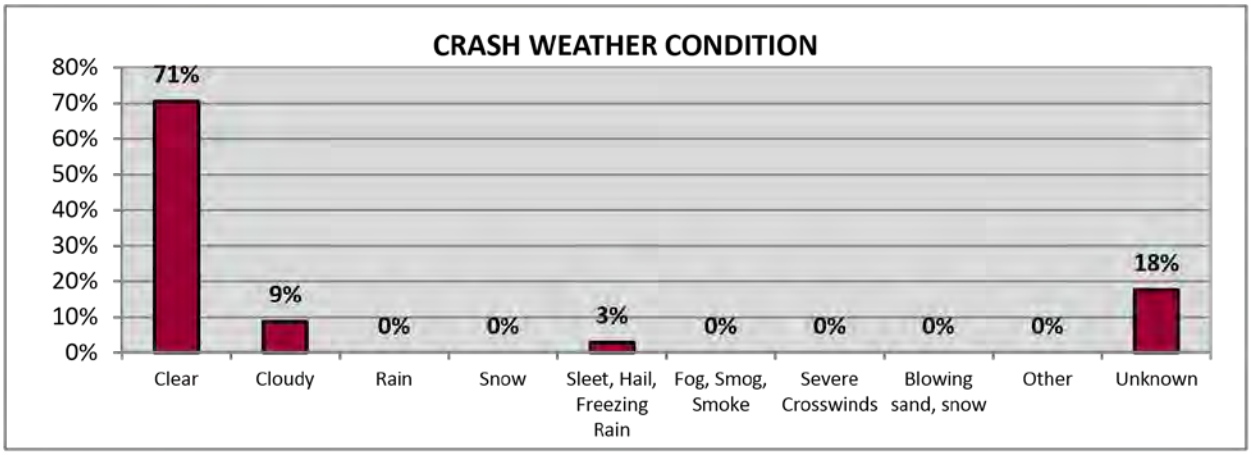


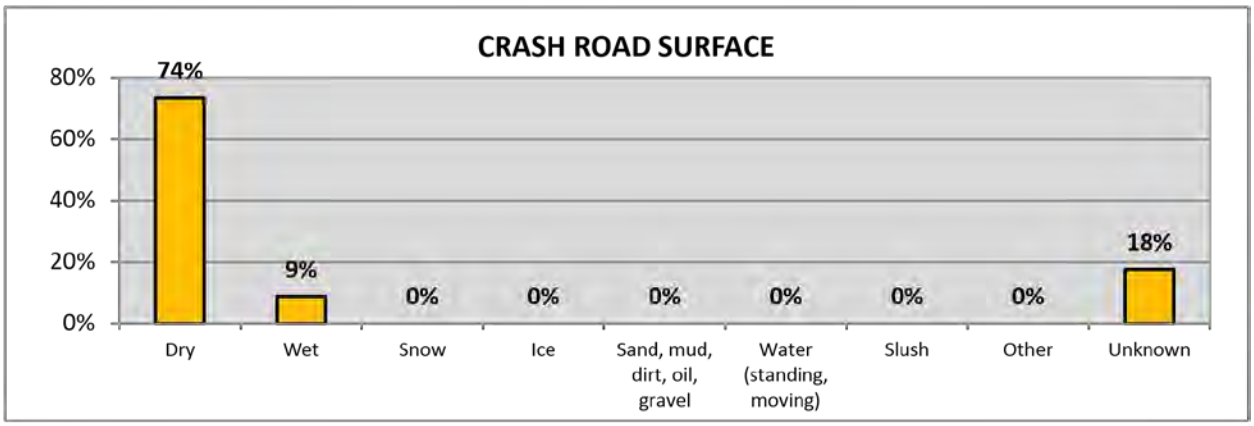


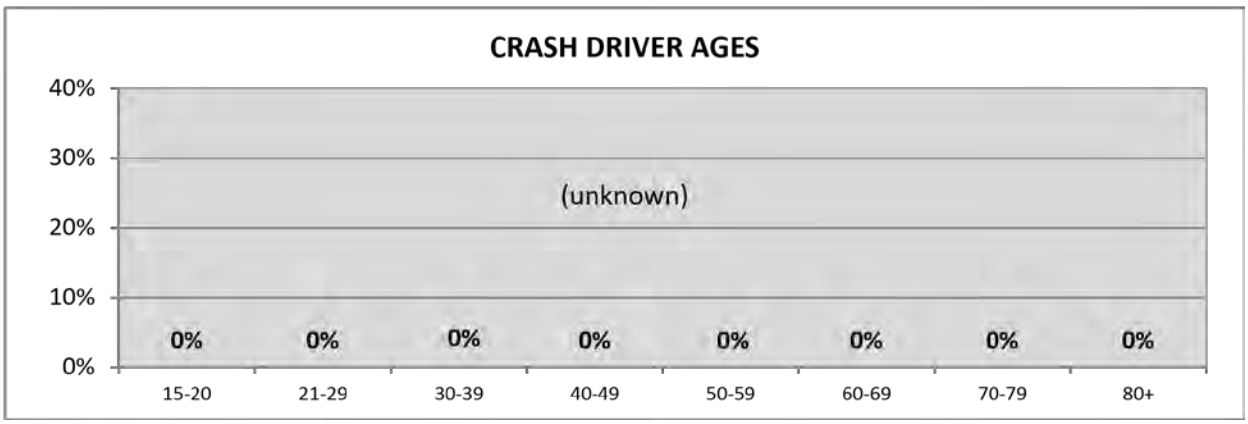
Crash Data Summary Charts

Union Point: Derby Street at Cushing Street









Appendix D. Road Safety Audit References

Road Safety Audit References

Massachusetts Traffic Safety Toolbox, Massachusetts Highway Department, www.mhd.state.ma.us/safetytoolbox.

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Road Safety Audit, 2nd edition. Austroads, 2000.

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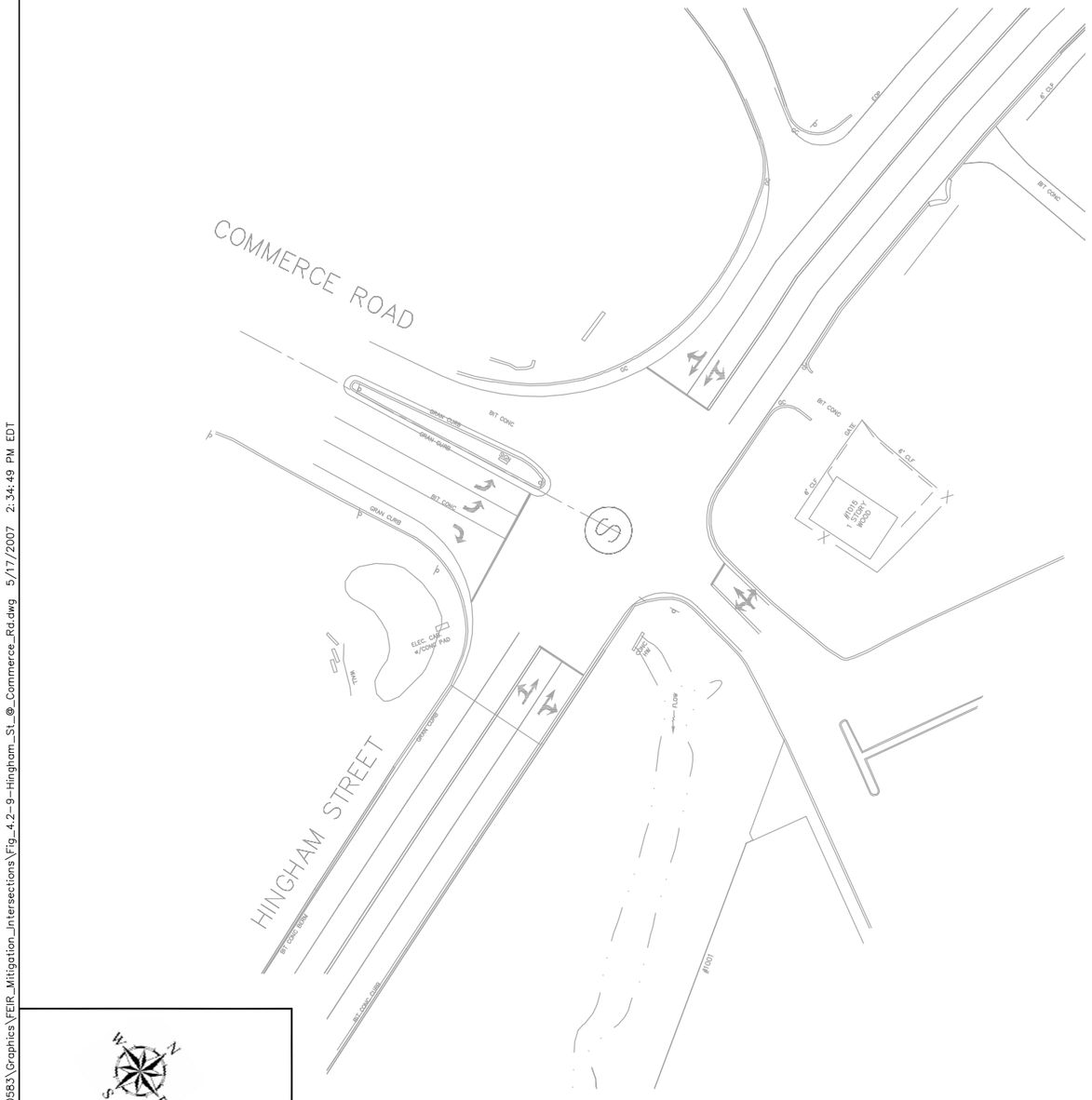
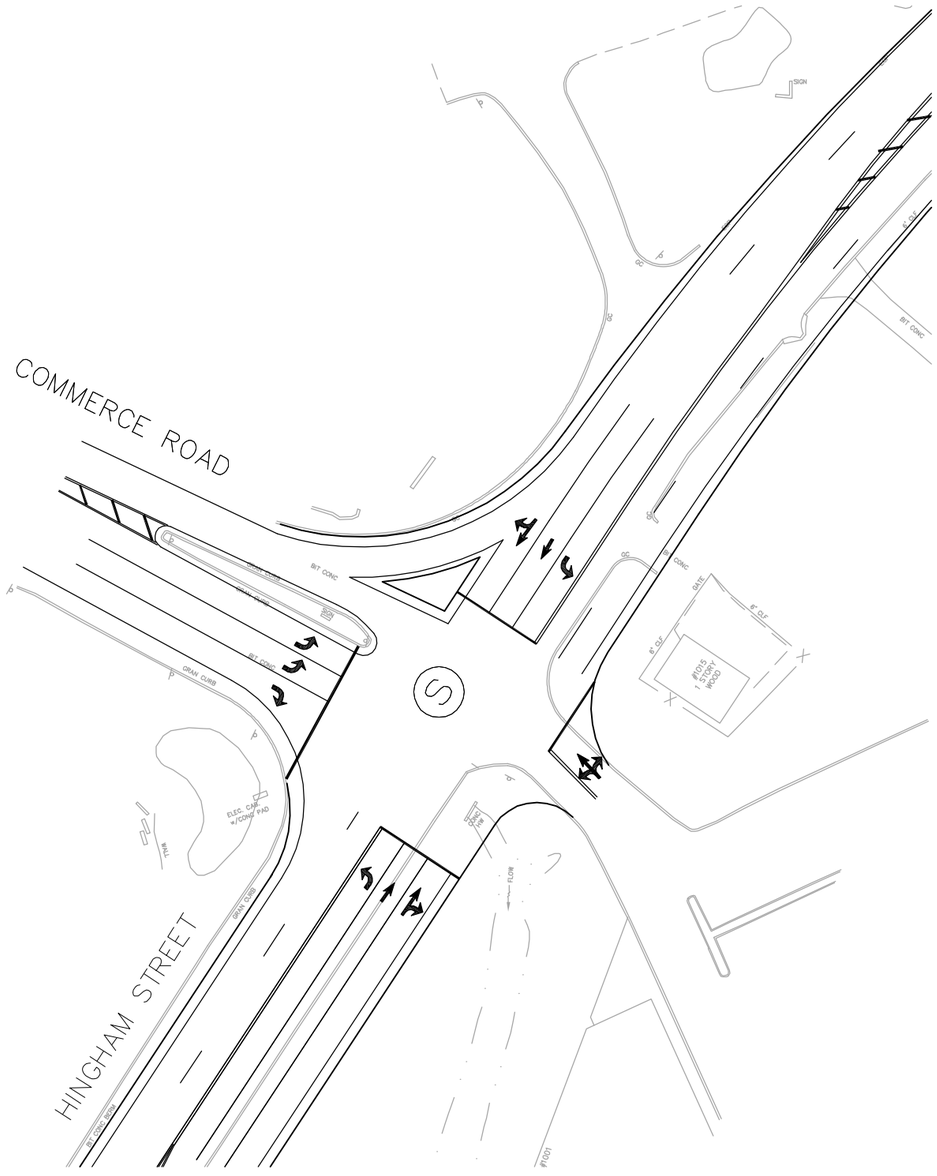
APPENDIX G
Proposed Union Point Improvements



NO-BUILD CONDITIONS



PROPOSED CONDITIONS

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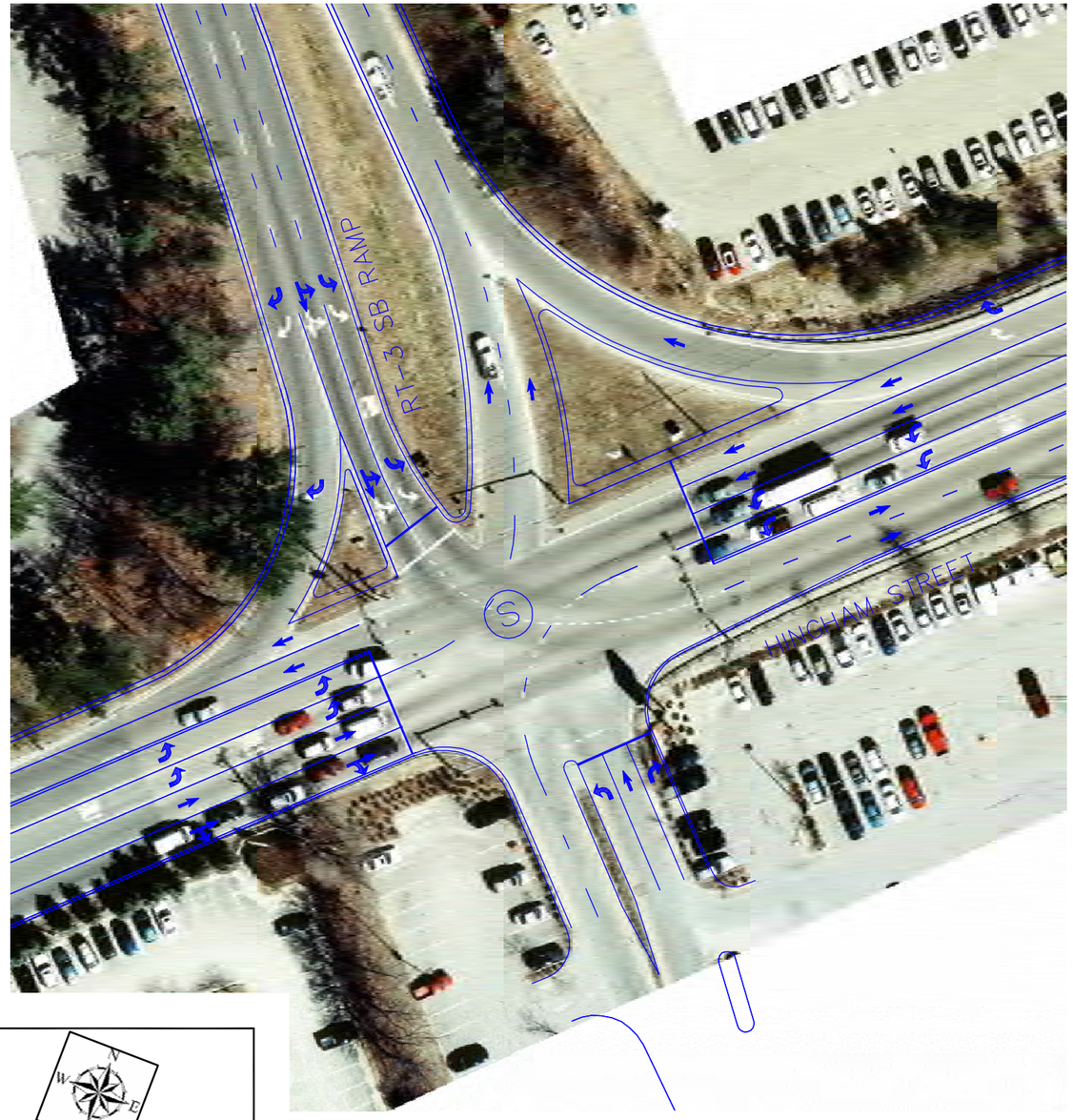
LNR Property Corporation

Tri-Town South Shore Development Corporation

Naval Air Station Development Project

Hingham St / Commerce Rd

Figure 4.2-9



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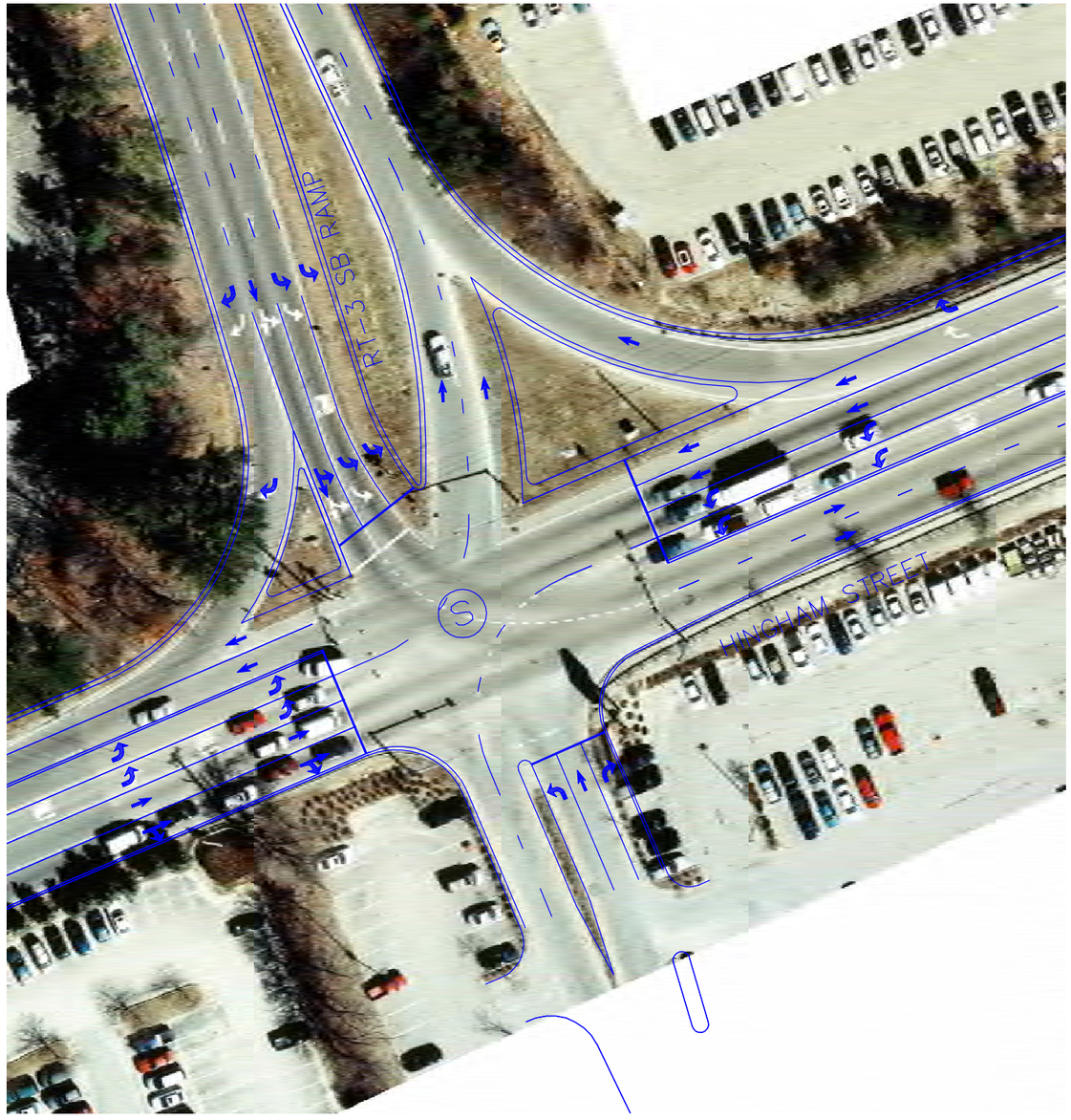

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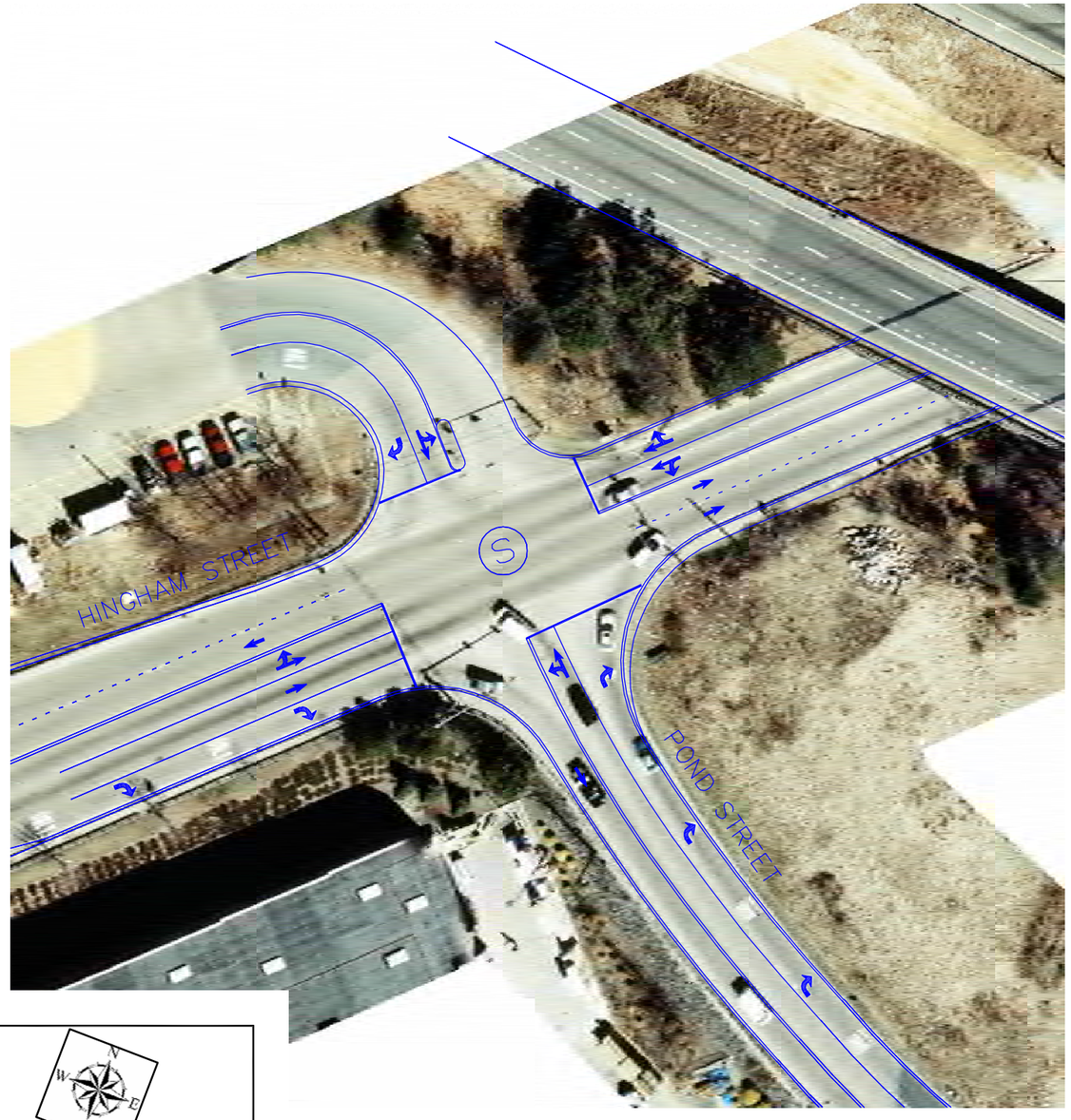
Naval Air Station Development Project

Hingham St / Route 3 SB Ramps

Figure 4.2-10



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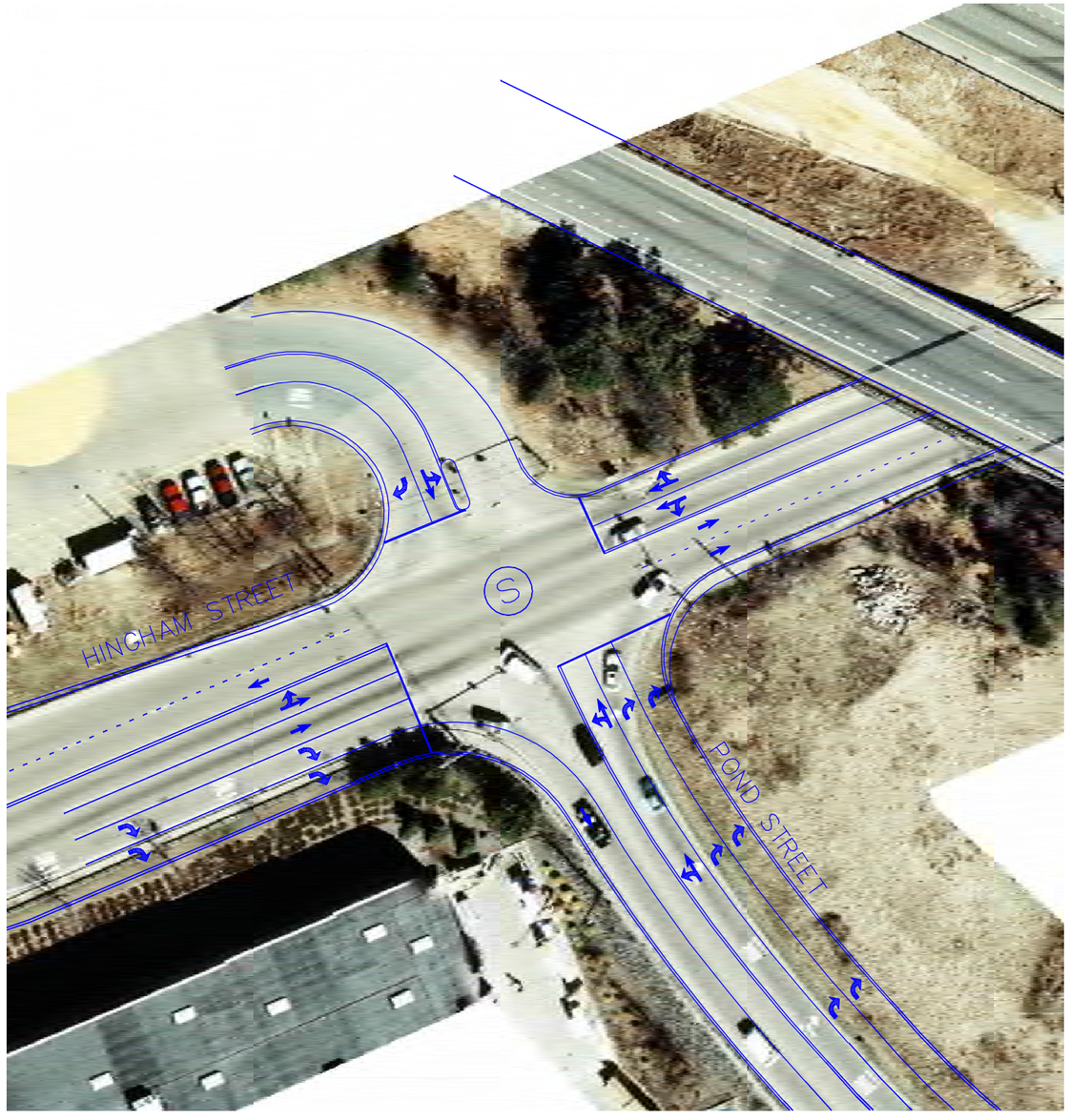

PROPOSED CONDITIONS

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LNR Property Corporation

Tri-Town South Shore Development Corporation

Naval Air Station Development Project

Hingham St / Pond St

Figure 4.2-11

APPENDIX H
Traffic Projection Model

TRAFFIC PROJECTION MODEL

Rockland Apartments

Weekday Morning Peak Hour

Rockland, MA

Intersection	Dir.	Turn	2019 Counted Volumes	Seasonal Adjustment	2019 Existing Volumes	Background Growth 7 yrs (at 1.5% per year)	External Development	2026 No-Build Volumes	New Project PERCENT ENTER	New Project Trips ENTER	New Project PERCENT EXIT	New Project Trips EXIT	New Project Trips TOTAL	2026 Build Volumes
Hingham Streert at	EB	L	13	0	13	0		13		0		0	0	13
Pond Street/Park and Ride		T	792	32	824	91		915		0		0	0	915
		R	565	23	588	65		653	25%	5		0	5	658
	WB	L	204	8	212	23		235	50%	11		0	11	246
		T	1055	42	1097	120		1217		0		0	0	1217
		R	59	0	59	0		59		0		0	0	59
	NB	L	203	8	211	24		235		0	25%	15	15	250
		T	14	0	14	0		14		0		0	0	14
		R	613	25	638	71		709		0	50%	29	29	738
	SB	L	18	0	18	0		18		0		0	0	18
		T	5	0	5	0		5		0		0	0	5
		R	7	0	7	0		7		0		0	0	7
Pond Street at	WB	L	30	1	31	3		34		0		0	0	34
Longwater Drive		R	359	14	373	41		414	10%	2		0	2	416
	NB	T	471	19	490	54		544	15%	3		0	3	547
		R	269	11	280	31		311		0		0	0	311
	SB	L	639	26	665	73		738		0	10%	6	6	744
		T	135	5	140	15		155		0	15%	9	9	164
Pond Street at	EB	L	0	0	0	0		0		0	75%	44	44	44
Proposed Site Driveway		R	0	0	0	0		0		0	25%	15	15	15
	NB	L	0	0	0	0		0	25%	5		0	5	5
		T	830	33	863	95		958		0		0	0	958
	SB	T	774	31	805	88		893		0		0	0	893
		R	0	0	0	0		0	75%	16		0	16	16
Peak Hour: 7:30 AM - 8:30 AM									100%	21	85%	59		

TRAFFIC PROJECTION MODEL

Rockland Apartments

Weekday Afternoon Peak Hour

Rockland, MA

Intersection	Dir.	Turn	2019 Counted Volumes	Seasonal Adjustment	2019 Existing Volumes	Background Growth 7 yrs (at 1.5% per year)	External Development	2026 No-Build Volumes	New Project PERCENT ENTER	New Project Trips ENTER	New Project PERCENT EXIT	New Project Trips EXIT	New Project Trips TOTAL	2026 Build Volumes
Hingham Streert at	EB	L	21	0	21	0		21		0		0	0	21
Pond Street/Park and Ride		T	1011	40	1051	115		1166		0		0	0	1166
		R	565	23	588	65		653	25%	15		0	15	668
	WB	L	266	11	277	31		308	50%	31		0	31	339
		T	1020	41	1061	117		1178		0		0	0	1178
		R	13	0	13	0		13		0		0	0	13
	NB	L	236	9	245	27		272		0	25%	9	9	281
		T	7	0	7	0		7		0		0	0	7
		R	550	22	572	63		635		0	50%	20	20	655
	SB	L	22	0	22	0		22		0		0	0	22
		T	17	0	17	0		17		0		0	0	17
		R	33	0	33	0		33		0		0	0	33
Pond Street at	WB	L	136	5	141	15		156		0		0	0	156
Longwater Drive		R	585	23	608	67		675	10%	6		0	6	681
	NB	T	208	8	216	23		239	15%	10		0	10	249
		R	13	1	14	2		16		0		0	0	16
	SB	L	259	10	269	29		298		0	10%	4	4	302
		T	589	24	613	67		680		0	15%	6	6	686
Pond Street at	EB	L	0	0	0	0		0		0	75%	29	29	29
Proposed Site Driveway		R	0	0	0	0		0		0	25%	10	10	10
	NB	L	0	0	0	0		0	25%	16		0	16	16
		T	793	32	825	91		914		0		0	0	914
	SB	T	848	34	882	97		978		0		0	0	978
		R	0	0	0	0		0	75%	46		0	46	46
Peak Hour: 4:30 PM - 5:30 PM									100%	62	85%	39		

APPENDIX I
Journey-to-Work Data

Residence MCD/County to Workplace MCD/County Flows for Town of Rockland
Journey-to-Work

Residence		Workplace			%	Pond Street from north	Pond Street from south	Hingham from east	Hingham from west	Long Water
Number	MCD	State/U.S. Island Area/Foreign Country	County	MCD	0.164%	0.164%		0.164%		
14	Rockland town	Connecticut	Middlesex County	Durham town	0.386%	0.386%		0.386%		
33	Rockland town	Massachusetts	Bristol County	Attleboro city	0.210%	0.210%			0.210%	
18	Rockland town	Massachusetts	Bristol County	Dartmouth town	0.187%	0.187%		0.187%		
16	Rockland town	Massachusetts	Bristol County	Dighton town	0.456%		0.456%			
39	Rockland town	Massachusetts	Bristol County	Easton town	0.245%	0.245%		0.245%		
21	Rockland town	Massachusetts	Bristol County	Freetown town	0.129%	0.129%		0.129%		
11	Rockland town	Massachusetts	Bristol County	Mansfield town	0.409%	0.409%		0.409%		
35	Rockland town	Massachusetts	Bristol County	Norton town	0.152%	0.152%		0.152%		
13	Rockland town	Massachusetts	Bristol County	Somerset town	0.538%		0.538%			
46	Rockland town	Massachusetts	Bristol County	Taunton city	0.397%	0.397%		0.397%		
34	Rockland town	Massachusetts	Essex County	Andover town	0.140%	0.140%		0.140%		
12	Rockland town	Massachusetts	Essex County	Beverly city	0.129%	0.129%		0.129%		
11	Rockland town	Massachusetts	Middlesex County	Bedford town	1.215%	1.215%		1.215%		
104	Rockland town	Massachusetts	Middlesex County	Cambridge city	0.245%	0.245%		0.245%		
21	Rockland town	Massachusetts	Middlesex County	Hudson town	0.503%	0.503%		0.503%		
43	Rockland town	Massachusetts	Middlesex County	Malden city	0.748%	0.748%		0.748%		
64	Rockland town	Massachusetts	Middlesex County	Marlborough city	0.093%	0.093%		0.093%		
8	Rockland town	Massachusetts	Middlesex County	Melrose city	0.140%	0.140%		0.140%		
12	Rockland town	Massachusetts	Middlesex County	Natick town	0.549%	0.549%		0.549%		
47	Rockland town	Massachusetts	Middlesex County	Newton city	0.584%	0.584%		0.584%		
50	Rockland town	Massachusetts	Middlesex County	Waltham city	0.117%	0.117%		0.117%		
10	Rockland town	Massachusetts	Middlesex County	Watertown Town city	0.222%	0.222%		0.222%		
19	Rockland town	Massachusetts	Middlesex County	Wayland town	0.947%		0.947%			
81	Rockland town	Massachusetts	Norfolk County	Avon town	3.296%	3.296%		3.296%		
282	Rockland town	Massachusetts	Norfolk County	Braintree Town city	0.421%	0.421%		0.421%		
36	Rockland town	Massachusetts	Norfolk County	Brookline town	1.099%	1.099%		1.099%		
94	Rockland town	Massachusetts	Norfolk County	Canton town	0.654%	0.654%		0.654%		
56	Rockland town	Massachusetts	Norfolk County	Cohasset town	0.339%	0.339%		0.339%		
29	Rockland town	Massachusetts	Norfolk County	Dedham town	0.362%	0.362%		0.362%		
31	Rockland town	Massachusetts	Norfolk County	Foxborough town	0.818%	0.818%		0.818%		
70	Rockland town	Massachusetts	Norfolk County	Holbrook town	0.234%	0.234%		0.234%		
20	Rockland town	Massachusetts	Norfolk County	Medway town	0.058%	0.058%		0.058%		
5	Rockland town	Massachusetts	Norfolk County	Milton town	1.402%	1.402%		1.402%		
120	Rockland town	Massachusetts	Norfolk County	Needham town	0.666%	0.666%		0.666%		
57	Rockland town	Massachusetts	Norfolk County	Norwood town	5.271%	5.271%		5.271%		
451	Rockland town	Massachusetts	Norfolk County	Quincy city	0.526%	0.526%			0.526%	
45	Rockland town	Massachusetts	Norfolk County	Randolph town	0.187%	0.187%		0.187%		
16	Rockland town	Massachusetts	Norfolk County	Sharon town	1.519%	1.519%			1.519%	
130	Rockland town	Massachusetts	Norfolk County	Stoughton town	0.643%	0.643%		0.643%		
55	Rockland town	Massachusetts	Norfolk County	Walpole town	0.631%	0.631%		0.631%		
54	Rockland town	Massachusetts	Norfolk County	Wellesley town	0.210%	0.210%		0.210%		
18	Rockland town	Massachusetts	Norfolk County	Westwood town	5.411%	5.411%		5.411%		
463	Rockland town	Massachusetts	Norfolk County	Weymouth Town city	3.751%		3.751%			
321	Rockland town	Massachusetts	Plymouth County	Abington town	0.654%		0.654%			
56	Rockland town	Massachusetts	Plymouth County	Bridgewater town	6.416%		6.416%			
549	Rockland town	Massachusetts	Plymouth County	Brockton city	1.192%	1.192%			1.192%	
102	Rockland town	Massachusetts	Plymouth County	Duxbury town	0.140%		0.140%			
12	Rockland town	Massachusetts	Plymouth County	East Bridgewater town	4.429%		4.429%			
379	Rockland town	Massachusetts	Plymouth County	Hanover town	1.157%		1.157%			
99	Rockland town	Massachusetts	Plymouth County	Hanson town	3.705%	3.705%		3.705%		
317	Rockland town	Massachusetts	Plymouth County	Hingham town	0.386%	0.386%		0.386%		
33	Rockland town	Massachusetts	Plymouth County	Hull town	0.316%	0.316%			0.316%	
27	Rockland town	Massachusetts	Plymouth County	Kingston town	0.070%		0.070%			
6	Rockland town	Massachusetts	Plymouth County	Lakeville town	0.164%	0.164%			0.164%	
14	Rockland town	Massachusetts	Plymouth County	Marion town	0.514%	0.514%			0.514%	
44	Rockland town	Massachusetts	Plymouth County	Marshfield town	0.164%		0.164%			
14	Rockland town	Massachusetts	Plymouth County	Middleborough town	3.950%		3.950%			3.950%
338	Rockland town	Massachusetts	Plymouth County	Norwell town	1.718%		1.718%			1.718%
147	Rockland town	Massachusetts	Plymouth County	Pembroke town	1.028%		1.028%			1.028%
88	Rockland town	Massachusetts	Plymouth County	Plymouth town	18.441%	18.441%			18.441%	
1,578	Rockland town	Massachusetts	Plymouth County	Rockland town	0.316%		0.316%			0.316%
27	Rockland town	Massachusetts	Plymouth County	Scituate town	0.105%	0.105%			0.105%	
9	Rockland town	Massachusetts	Plymouth County	Wareham town	0.362%		0.362%			
31	Rockland town	Massachusetts	Plymouth County	West Bridgewater town	0.245%		0.245%			
21	Rockland town	Massachusetts	Plymouth County	Whitman town	14.912%	14.912%		14.912%		
1,276	Rockland town	Massachusetts	Suffolk County	Boston city	0.631%	0.631%		0.631%		
54	Rockland town	Massachusetts	Suffolk County	Chelsea city	0.269%	0.269%		0.269%		
23	Rockland town	Massachusetts	Suffolk County	Revere city	0.245%	0.245%		0.245%		
21	Rockland town	Massachusetts	Suffolk County	Winthrop Town city	0.175%	0.175%		0.175%		
15	Rockland town	Massachusetts	Worcester County	Auburn town	0.152%	0.152%		0.152%		
13	Rockland town	Massachusetts	Worcester County	Spencer town	0.210%	0.210%		0.210%		
18	Rockland town	Ohio	Cuyahoga County		0.234%	0.234%		0.234%		
20	Rockland town	Rhode Island	Kent County	Warwick city	0.362%	0.362%		0.362%		
31	Rockland town	Rhode Island	Providence County	Lincoln town	0.748%	0.748%		0.748%		
64	Rockland town	Rhode Island	Providence County	Providence city	0.187%	0.187%		0.187%		
16	Rockland town	Vermont	Rutland County	Poultney town	100%	74%	26%	51%	23%	7%
8,557										

Source: U.S. Census Bureau, 2006-2010 American Community Survey

APPENDIX J
Highway Capacity Manual Methodologies

CAPACITY/LEVEL-OF-SERVICE ANALYSES METHODOLOGY

The detailed capacity/level-of-service analysis contained in this traffic impact study was performed in accordance with the standard techniques contained in the *Highway Capacity Manual*.(1) By definition, capacity represents "the maximum rate of flow that can reasonably be expected to pass a point on a uniform section of a lane or roadway under prevailing roadway, traffic, and control conditions." The level of functioning of an intersection or a uniform section of a lane or roadway can be expressed in terms of levels of service. Level of service (LOS) is defined as "a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers". Such measures include "speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety."

At unsignalized intersections, a methodology for evaluating the relative functioning of intersections controlled by stop or yield signs has been developed, and is based on several assumptions, including:

- Major street flows are not affected by the minor (stop-sign controlled) street movements.
- Left turns from the major street to the minor street are influenced only by opposing major street through flow.
- Minor street left turns are impeded by all major street traffic plus opposing minor street traffic.
- Minor street through traffic is impeded by all major street traffic.
- Minor street right turns are impeded only by the major street traffic coming from the left.

The concept of stop-controlled or yield-controlled intersection analysis is based on the estimate of average total delay on minor streets. The methodology of analysis relies on three elements: the size and distribution of gaps in the major traffic stream, the usefulness of these gaps to the minor stream drivers, and the relative priority of the various traffic streams at the intersection. The results of the analysis provide an estimate of average total delay for the various critical movements at the unsignalized intersections. Correlation between average total delay and the respective levels of service are provided for unsignalized intersections as follows:

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(1) *Transportation Research Board, Highway Capacity Manual, 6th Edition, published by the Transportation Research Board, Washington, DC, 2016.*

Unsignalized Intersections

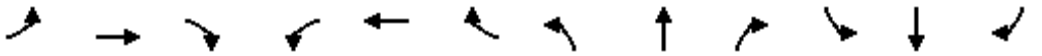
Level of Service	Control Delay Per Vehicle (seconds)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	> 50

At signalized intersections, an additional element must be considered: time allocation. Level of service is based on the average control delay per vehicle for various movements within the intersection. Volume/capacity relationships also affect the operations of signalized intersections. Thus, both volume/capacity and delay must be considered to evaluate the overall operation of a signalized intersection. Correlation between average delay per vehicle and the respective levels of service are provided for signalized intersections as follows:

Signalized Intersections

Level of Service	Control Delay Per Vehicle (seconds)
A	$\leq$ 10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	> 80

APPENDIX K
2019 Existing Capacity/Level-of-Service Analysis



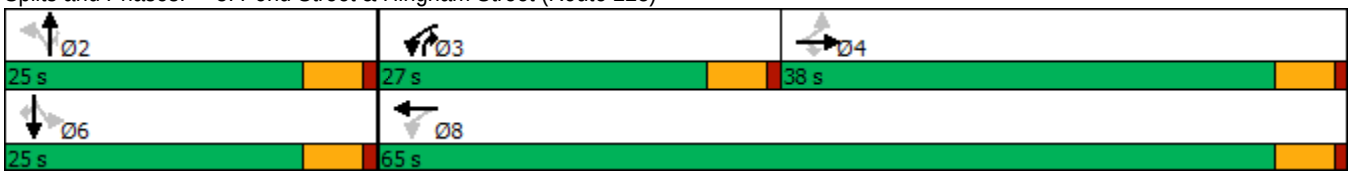
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	824	588	212	1097	59	211	14	638	18	5	7
Future Volume (vph)	13	824	588	212	1097	59	211	14	638	18	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		300	0		0	0		300	0		100
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3419	1546	0	3401	0	0	1765	1599	0	1611	1615
Flt Permitted		0.912			0.534			0.718			0.709	
Satd. Flow (perm)	0	3121	1546	0	1831	0	0	1327	1599	0	1187	1615
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			646		11							85
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		626			776			1032			100	
Travel Time (s)		9.5			11.8			23.5			2.3	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.94	0.94	0.94	0.80	0.80	0.80
Heavy Vehicles (%)	0%	2%	1%	1%	1%	5%	3%	0%	1%	17%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	919	646	0	1573	0	0	239	679	0	29	9
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	3	8		2	2	3	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	14.0	14.0	10.0	14.0		14.0	14.0	10.0	14.0	14.0	14.0
Total Split (s)	38.0	38.0	38.0	27.0	65.0		25.0	25.0	27.0	25.0	25.0	25.0
Total Split (%)	42.2%	42.2%	42.2%	30.0%	72.2%		27.8%	27.8%	30.0%	27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	None		None	None	None	None	None	None
Act Effct Green (s)		34.0	34.0		60.0			18.6	44.6		18.6	18.6
Actuated g/C Ratio		0.38	0.38		0.68			0.21	0.50		0.21	0.21
v/c Ratio		0.77	0.65		0.97			0.86	0.84		0.12	0.02
Control Delay		29.8	5.3		28.2			63.3	30.3		29.5	0.1
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		29.8	5.3		28.2			63.3	30.3		29.5	0.1
LOS		C	A		C			E	C		C	A
Approach Delay		19.7			28.2			38.9			22.5	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)		242	0		254			130	303		13	0
Queue Length 95th (ft)		321	74		#386			#254	#497		32	0
Internal Link Dist (ft)		546			696			952			20	
Turn Bay Length (ft)			300						300			100

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1196	991		1617			299	822		267	430
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.77	0.65		0.97			0.80	0.83		0.11	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 88.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 27.3		Intersection LOS: C	
Intersection Capacity Utilization 93.1%		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: 3: Pond Street & Hingham Street (Route 228)



Intersection	
Int Delay, s/veh	87.8

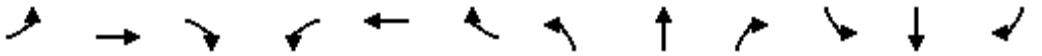
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	373	490	280	665	140
Future Vol, veh/h	31	373	490	280	665	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	85	85
Heavy Vehicles, %	0	1	1	0	1	3
Mvmt Flow	39	466	570	326	782	165

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2299	570	0	-	570	0
Stage 1	570	-	-	-	-	-
Stage 2	1729	-	-	-	-	-
Critical Hdwy	6.4	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	43	523	-	0	1007	-
Stage 1	570	-	-	0	-	-
Stage 2	159	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 6	523	-	-	1007	-
Mov Cap-2 Maneuver	~ 6	-	-	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	~ 23	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 321	0	16.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	6	523	1007	-
HCM Lane V/C Ratio	-	6.458	0.891	0.777	-
HCM Control Delay (s)	-	$ 3636.5	45.4	19.8	0
HCM Lane LOS	-	F	E	C	A
HCM 95th %tile Q(veh)	-	6.4	10.1	8.1	-

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



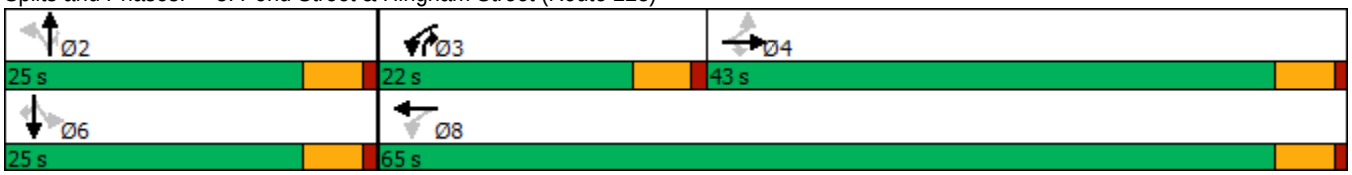
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1051	588	277	1061	13	245	7	572	22	17	33
Future Volume (vph)	21	1051	588	277	1061	13	245	7	572	22	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		300	0		0	0		300	0		100
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3446	1561	0	3422	0	0	1813	1615	0	1795	1524
Flt Permitted		0.895			0.508			0.696			0.587	
Satd. Flow (perm)	0	3087	1561	0	1756	0	0	1322	1615	0	1084	1524
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			619		2							85
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		626			776			1032			100	
Travel Time (s)		9.5			11.8			23.5			2.3	
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	10%	1%	0%	0%	1%	8%	0%	0%	0%	5%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1128	619	0	1484	0	0	315	715	0	49	41
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	3	8		2	2	3	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	14.0	14.0	10.0	14.0		14.0	14.0	10.0	14.0	14.0	14.0
Total Split (s)	43.0	43.0	43.0	22.0	65.0		25.0	25.0	22.0	25.0	25.0	25.0
Total Split (%)	47.8%	47.8%	47.8%	24.4%	72.2%		27.8%	27.8%	24.4%	27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	None
Act Effct Green (s)		38.0	38.0		60.0			20.0	42.0		20.0	20.0
Actuated g/C Ratio		0.42	0.42		0.67			0.22	0.47		0.22	0.22
v/c Ratio		0.87	0.61		1.00			1.08	0.95		0.20	0.10
Control Delay		32.3	4.4		35.6			109.9	47.3		31.2	1.5
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		32.3	4.4		35.6			109.9	47.3		31.2	1.5
LOS		C	A		D			F	D		C	A
Approach Delay		22.4			35.6			66.5			17.7	
Approach LOS		C			D			E			B	
Queue Length 50th (ft)		298	0		230			~201	375		23	0
Queue Length 95th (ft)		#406	62		#433			#303	#499		48	0
Internal Link Dist (ft)		546			696			952			20	
Turn Bay Length (ft)			300						300			100

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1303	1016		1486			293	753		240	404
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.87	0.61		1.00			1.08	0.95		0.20	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 37.2		Intersection LOS: D	
Intersection Capacity Utilization 100.6%		ICU Level of Service G	
Analysis Period (min) 15			

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

Splits and Phases: 3: Pond Street & Hingham Street (Route 228)



Intersection	
Int Delay, s/veh	63.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	141	608	216	14	269	613
Future Vol, veh/h	141	608	216	14	269	613
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	176	760	251	16	292	666

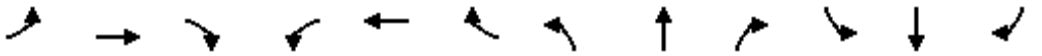
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1501	251	0	-	251	0
Stage 1	251	-	-	-	-	-
Stage 2	1250	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 136	793	-	0	1326	-
Stage 1	795	-	-	0	-	-
Stage 2	273	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 88	793	-	-	1326	-
Mov Cap-2 Maneuver	~ 88	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	177	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	143.7	0	2.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	88	793	1326	-
HCM Lane V/C Ratio	-	2.003	0.958	0.221	-
HCM Control Delay (s)	-	$ 567.8	45.4	8.5	0
HCM Lane LOS	-	F	E	A	A
HCM 95th %tile Q(veh)	-	15.3	14.9	0.8	-

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

APPENDIX L
22026 No Build Capacity/Level-of-Service Analysis



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	915	653	235	1217	59	235	14	709	18	5	7
Future Volume (vph)	13	915	653	235	1217	59	235	14	709	18	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		300	0		0	0		300	0		100
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3419	1546	0	3402	0	0	1765	1599	0	1611	1615
Flt Permitted		0.908			0.505			0.717			0.674	
Satd. Flow (perm)	0	3107	1546	0	1732	0	0	1325	1599	0	1128	1615
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			718		10							85
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		626			776			1032			100	
Travel Time (s)		9.5			11.8			23.5			2.3	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.94	0.94	0.94	0.80	0.80	0.80
Heavy Vehicles (%)	0%	2%	1%	1%	1%	5%	3%	0%	1%	17%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1019	718	0	1737	0	0	265	754	0	29	9
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	3	8		2	2	3	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	14.0	14.0	10.0	14.0		14.0	14.0	10.0	14.0	14.0	14.0
Total Split (s)	38.0	38.0	38.0	27.0	65.0		25.0	25.0	27.0	25.0	25.0	25.0
Total Split (%)	42.2%	42.2%	42.2%	30.0%	72.2%		27.8%	27.8%	30.0%	27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	None		None	None	None	None	None	None
Act Effct Green (s)		33.2	33.2		60.0			19.5	46.3		19.5	19.5
Actuated g/C Ratio		0.37	0.37		0.67			0.22	0.52		0.22	0.22
v/c Ratio		0.88	0.70		1.10			0.92	0.91		0.12	0.02
Control Delay		37.4	6.0		71.1			72.6	37.3		29.6	0.1
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		37.4	6.0		71.1			72.6	37.3		29.6	0.1
LOS		D	A		E			E	D		C	A
Approach Delay		24.4			71.1			46.5			22.6	
Approach LOS		C			E			D			C	
Queue Length 50th (ft)		283	0		~424			147	367		13	0
Queue Length 95th (ft)		#406	81		#608			#291	#620		32	0
Internal Link Dist (ft)		546			696			952			20	
Turn Bay Length (ft)			300						300			100

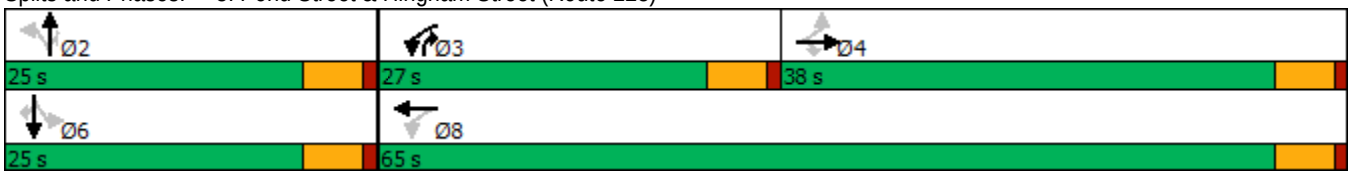
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1152	1025		1572			296	830		252	427
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.88	0.70		1.10			0.90	0.91		0.12	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 89.5			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.10			
Intersection Signal Delay: 47.2		Intersection LOS: D	
Intersection Capacity Utilization 100.9%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Pond Street & Hingham Street (Route 228)



Intersection	
Int Delay, s/veh	12.6

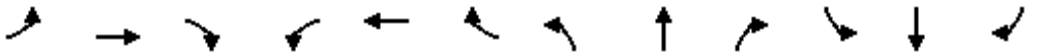
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	414	544	311	738	155
Future Vol, veh/h	34	414	544	311	738	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	85	85
Heavy Vehicles, %	0	1	1	0	1	3
Mvmt Flow	43	518	633	362	868	182

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2551	633	0	-	633	0
Stage 1	633	-	-	-	-	-
Stage 2	1918	-	-	-	-	-
Critical Hdwy	6.4	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	~ 30	~ 482	-	0	955	-
Stage 1	533	-	-	0	-	-
Stage 2	128	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	0	~ 482	-	-	955	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	533	-	-	-	-	-
Stage 2	0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		0	26.9
HCM LOS	-		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	482	955	-
HCM Lane V/C Ratio	-	-	1.074	0.909	-
HCM Control Delay (s)	-	-	91.4	32.6	0
HCM Lane LOS	-	-	F	D	A
HCM 95th %tile Q(veh)	-	-	16.3	13.4	-

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



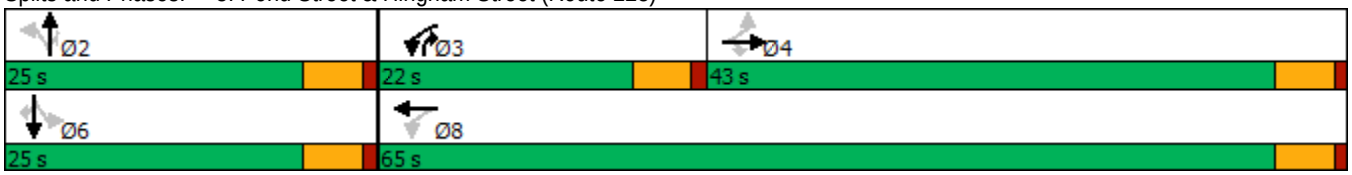
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1166	653	308	1178	13	272	7	635	22	17	33
Future Volume (vph)	21	1166	653	308	1178	13	272	7	635	22	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		300	0		0	0		300	0		100
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3446	1561	0	3422	0	0	1813	1615	0	1795	1524
Flt Permitted		0.890			0.513			0.696			0.515	
Satd. Flow (perm)	0	3070	1561	0	1773	0	0	1322	1615	0	951	1524
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			687		2							85
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		626			776			1032			100	
Travel Time (s)		9.5			11.8			23.5			2.3	
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	10%	1%	0%	0%	1%	8%	0%	0%	0%	5%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1249	687	0	1647	0	0	349	794	0	49	41
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	3	8		2	2	3	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	14.0	14.0	10.0	14.0		14.0	14.0	10.0	14.0	14.0	14.0
Total Split (s)	43.0	43.0	43.0	22.0	65.0		25.0	25.0	22.0	25.0	25.0	25.0
Total Split (%)	47.8%	47.8%	47.8%	24.4%	72.2%		27.8%	27.8%	24.4%	27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	None
Act Effct Green (s)		38.0	38.0		60.0			20.0	42.0		20.0	20.0
Actuated g/C Ratio		0.42	0.42		0.67			0.22	0.47		0.22	0.22
v/c Ratio		0.96	0.65		1.10			1.19	1.05		0.23	0.10
Control Delay		44.2	4.8		71.0			148.3	73.8		32.2	1.5
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		44.2	4.8		71.0			148.3	73.8		32.2	1.5
LOS		D	A		E			F	E		C	A
Approach Delay		30.2			71.0			96.6			18.2	
Approach LOS		C			E			F			B	
Queue Length 50th (ft)		354	0		~375			~242	~499		23	0
Queue Length 95th (ft)		#507	64		#623			#343	#589		49	0
Internal Link Dist (ft)		546			696			952			20	
Turn Bay Length (ft)			300						300			100

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1296	1056		1494			293	753		211	404
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.96	0.65		1.10			1.19	1.05		0.23	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 59.7		Intersection LOS: E	
Intersection Capacity Utilization 109.4%		ICU Level of Service H	
Analysis Period (min) 15			

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

Splits and Phases: 3: Pond Street & Hingham Street (Route 228)



Intersection	
Int Delay, s/veh	122.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	156	675	239	16	298	680
Future Vol, veh/h	156	675	239	16	298	680
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	195	844	278	19	324	739

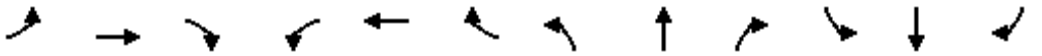
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1665	278	0	-	278	0
Stage 1	278	-	-	-	-	-
Stage 2	1387	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 108	~ 766	-	0	1296	-
Stage 1	774	-	-	0	-	-
Stage 2	234	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 62	~ 766	-	-	1296	-
Mov Cap-2 Maneuver	~ 62	-	-	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	~ 135	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	277.6	0	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	62	766	1296	-
HCM Lane V/C Ratio	-	3.145	1.102	0.25	-
HCM Control Delay (s)	-	$ 1107.1	85.9	8.7	0
HCM Lane LOS	-	F	F	A	A
HCM 95th %tile Q(veh)	-	20.2	23.3	1	-

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

APPENDIX M
2026 Build Capacity/Level-of-Service Analysis



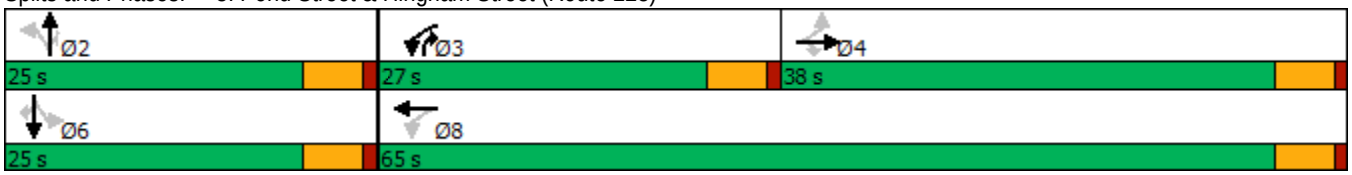
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	915	658	246	1217	59	250	14	738	18	5	7
Future Volume (vph)	13	915	658	246	1217	59	250	14	738	18	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		300	0		0	0		300	0		100
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3419	1546	0	3402	0	0	1764	1599	0	1611	1615
Flt Permitted		0.907			0.506			0.716			0.656	
Satd. Flow (perm)	0	3104	1546	0	1735	0	0	1323	1599	0	1098	1615
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			723		10							85
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		626			776			537			100	
Travel Time (s)		9.5			11.8			12.2			2.3	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.94	0.94	0.94	0.80	0.80	0.80
Heavy Vehicles (%)	0%	2%	1%	1%	1%	5%	3%	0%	1%	17%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1019	723	0	1750	0	0	281	785	0	29	9
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	3	8		2	2	3	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	14.0	14.0	10.0	14.0		14.0	14.0	10.0	14.0	14.0	14.0
Total Split (s)	38.0	38.0	38.0	27.0	65.0		25.0	25.0	27.0	25.0	25.0	25.0
Total Split (%)	42.2%	42.2%	42.2%	30.0%	72.2%		27.8%	27.8%	30.0%	27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	None		None	None	None	None	None	None
Act Effct Green (s)		33.2	33.2		60.0			20.0	46.8		20.0	20.0
Actuated g/C Ratio		0.37	0.37		0.67			0.22	0.52		0.22	0.22
v/c Ratio		0.89	0.70		1.12			0.96	0.94		0.12	0.02
Control Delay		38.2	6.0		77.1			79.4	42.3		29.6	0.1
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		38.2	6.0		77.1			79.4	42.3		29.6	0.1
LOS		D	A		E			E	D		C	A
Approach Delay		24.8			77.1			52.1			22.6	
Approach LOS		C			E			D			C	
Queue Length 50th (ft)		283	0		~437			159	397		13	0
Queue Length 95th (ft)		#406	82		#624			#314	#658		32	0
Internal Link Dist (ft)		546			696			457			20	
Turn Bay Length (ft)			300						300			100

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1145	1026		1563			294	835		244	425
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.89	0.70		1.12			0.96	0.94		0.12	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 51.1		Intersection LOS: D	
Intersection Capacity Utilization 102.1%		ICU Level of Service G	
Analysis Period (min) 15			

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

Splits and Phases: 3: Pond Street & Hingham Street (Route 228)



Intersection	
Int Delay, s/veh	13.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	416	547	311	744	164
Future Vol, veh/h	34	416	547	311	744	164
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	85	85
Heavy Vehicles, %	0	1	1	0	1	3
Mvmt Flow	43	520	636	362	875	193

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2579	636	0	-	636	0
Stage 1	636	-	-	-	-	-
Stage 2	1943	-	-	-	-	-
Critical Hdwy	6.4	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	~ 29	~ 480	-	0	952	-
Stage 1	531	-	-	0	-	-
Stage 2	124	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	0	~ 480	-	-	952	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	531	-	-	-	-	-
Stage 2	0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		0	28
HCM LOS	-		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	480	952	-
HCM Lane V/C Ratio	-	-	1.083	0.919	-
HCM Control Delay (s)	-	-	94.6	34.2	0
HCM Lane LOS	-	-	F	D	A
HCM 95th %tile Q(veh)	-	-	16.7	13.9	-

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

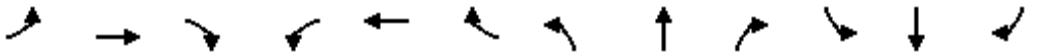
Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	44	15	5	958	893	16
Future Vol, veh/h	44	15	5	958	893	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	86	86	85	85
Heavy Vehicles, %	0	0	0	1	3	0
Mvmt Flow	48	16	6	1114	1051	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2187	1061	1070	0	-	0
Stage 1	1061	-	-	-	-	-
Stage 2	1126	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	51	274	659	-	-	-
Stage 1	336	-	-	-	-	-
Stage 2	313	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	50	274	659	-	-	-
Mov Cap-2 Maneuver	50	-	-	-	-	-
Stage 1	328	-	-	-	-	-
Stage 2	313	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	186.4	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	659	-	50	274	-	-
HCM Lane V/C Ratio	0.009	-	0.957	0.06	-	-
HCM Control Delay (s)	10.5	0	243.5	19	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0	-	4.1	0.2	-	-



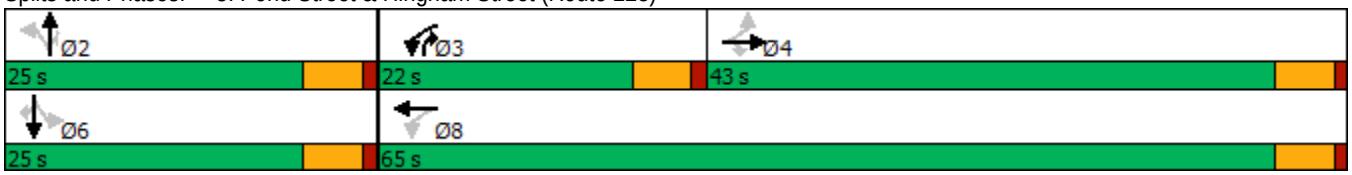
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1166	668	339	1178	13	281	7	655	22	17	33
Future Volume (vph)	21	1166	668	339	1178	13	281	7	655	22	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		300	0		0	0		300	0		100
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3446	1561	0	3419	0	0	1813	1615	0	1795	1524
Flt Permitted		0.888			0.516			0.695			0.492	
Satd. Flow (perm)	0	3063	1561	0	1784	0	0	1320	1615	0	909	1524
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			690		2							85
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		626			776			553			100	
Travel Time (s)		9.5			11.8			12.6			2.3	
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	10%	1%	0%	0%	1%	8%	0%	0%	0%	5%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1249	703	0	1682	0	0	360	819	0	49	41
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	3	8		2	2	3	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	14.0	14.0	10.0	14.0		14.0	14.0	10.0	14.0	14.0	14.0
Total Split (s)	43.0	43.0	43.0	22.0	65.0		25.0	25.0	22.0	25.0	25.0	25.0
Total Split (%)	47.8%	47.8%	47.8%	24.4%	72.2%		27.8%	27.8%	24.4%	27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	None
Act Effct Green (s)		38.0	38.0		60.0			20.0	42.0		20.0	20.0
Actuated g/C Ratio		0.42	0.42		0.67			0.22	0.47		0.22	0.22
v/c Ratio		0.97	0.67		1.12			1.23	1.09		0.24	0.10
Control Delay		44.7	5.2		79.3			162.2	84.9		32.6	1.5
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		44.7	5.2		79.3			162.2	84.9		32.6	1.5
LOS		D	A		E			F	F		C	A
Approach Delay		30.4			79.3			108.5			18.4	
Approach LOS		C			E			F			B	
Queue Length 50th (ft)		354	4		~409			~255	~528		23	0
Queue Length 95th (ft)		#508	75		#668			#358	#618		49	0
Internal Link Dist (ft)		546			696			473			20	
Turn Bay Length (ft)			300						300			100

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1293	1057		1498			293	753		202	404
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.97	0.67		1.12			1.23	1.09		0.24	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 65.8		Intersection LOS: E	
Intersection Capacity Utilization 110.8%		ICU Level of Service H	
Analysis Period (min) 15			

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

Splits and Phases: 3: Pond Street & Hingham Street (Route 228)



Intersection	
Int Delay, s/veh	131

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	156	681	249	16	302	686
Future Vol, veh/h	156	681	249	16	302	686
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	195	851	290	19	328	746

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1692	290	0	-	290	0
Stage 1	290	-	-	-	-	-
Stage 2	1402	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 104	~ 754	-	0	1283	-
Stage 1	764	-	-	0	-	-
Stage 2	230	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 59	~ 754	-	-	1283	-
Mov Cap-2 Maneuver	~ 59	-	-	-	-	-
Stage 1	764	-	-	-	-	-
Stage 2	~ 130	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	298.9	0	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	59	754	1283	-
HCM Lane V/C Ratio	-	3.305	1.129	0.256	-
HCM Control Delay (s)	-	$ 1184.4	96	8.8	0
HCM Lane LOS	-	F	F	A	A
HCM 95th %tile Q(veh)	-	20.6	24.9	1	-

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

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	10	16	914	978	46
Future Vol, veh/h	29	10	16	914	978	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	86	86	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	32	11	19	1063	1063	50

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2189	1088	1113	0	-	0
Stage 1	1088	-	-	-	-	-
Stage 2	1101	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	51	265	635	-	-	-
Stage 1	326	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	47	265	635	-	-	-
Mov Cap-2 Maneuver	47	-	-	-	-	-
Stage 1	302	-	-	-	-	-
Stage 2	321	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	136.2	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	635	-	47	265	-	-
HCM Lane V/C Ratio	0.029	-	0.671	0.041	-	-
HCM Control Delay (s)	10.8	0	176.6	19.2	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	2.6	0.1	-	-

APPENDIX N
Capacity/Level-of-Service Summary

Capacity Analysis Summary
Residential Development
Rockland, MA

Weekday Morning Peak Hour													
			2019 Existing			2026 No Build			2026 Build			2026 Build - Mitigation		
Intersection	**Movement**		**LOS[1]**	**Delay[2]**	**V/C[3]**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**
Hingham Street (Route 228) at	EB	LT	C	29.8	0.77	D	37.4	0.88	D	38.2	0.89	D	38.2	0.89
Pond Street/Park and Ride		R	A	5.3	0.65	A	6.0	0.70	A	6.0	0.70	A	6.0	0.70
	WB	LTR	C	28.2	0.97	E	71.1	>1.00	E	77.1	>1.00	E	77.1	>1.00
	NB	LT	E	63.3	0.86	E	72.6	0.92	E	79.4	0.96	E	79.4	0.96
		R	C	30.3	0.84	D	37.3	0.91	D	42.3	0.94	D	42.3	0.94
	SB	L	C	29.5	0.12	C	29.6	0.12	C	29.6	0.12	C	29.6	0.12
		R	A	0.1	0.02	A	0.1	0.02	A	0.1	0.02	A	0.1	0.02
	Overall		C	27.3	0.93	D	47.2	>1.00	D	51.1	>1.00	D	51.1	>1.00
Pond Street at	WB	L	F	>50.0	>1.00	F	>50.0	>1.00	F	>50.0	>1.00	F	>50.0	>1.00
Longwater Drive		R	E	45.4	0.89	F	>50.0	>1.00	F	>50.0	>1.00	F	>50.0	>1.00
	NB	TR	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00
	SB	LT	C	16.3	0.78	D	26.9	0.91	D	34.2	0.92	n/a	n/a	n/a
		L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	D	34.2	0.92
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	A	0.0	0.00
Pond Street at	EB	L	n/a	n/a	n/a	n/a	n/a	n/a	F	>50.0	0.96	F	>50.0	0.96
Proposed Site Driveway		R	n/a	n/a	n/a	n/a	n/a	n/a	C	19.0	0.06	C	19.0	0.06
	NB	LT	n/a	n/a	n/a	n/a	n/a	n/a	A	0.1	0.01	A	0.1	0.01
	SB	TR	n/a	n/a	n/a	n/a	n/a	n/a	A	0.0	0.00	A	0.0	0.00

1 Level-of-Service

2 Average vehicle delay in seconds

3 Volume to capacity ratio

Queue Summary
Residential Development
Rockland, MA

Weekday Morning Peak Hour										
			2019 Existing		2026 No Build		2026 Build		2026 Build - Mitigation	
Intersection	**Movement**		**50th Queue[1]**	**95th Queue[2]**	**50th Queue**	**95th Queue**	**50th Queue**	**95th Queue**	**50th Queue**	**95th Queue**
Hingham Street (Route 228) at	EB	LT	242	321	283	406	283	406	283	406
Pond Street/Park and Ride		R	0	74	0	81	0	82	0	82
	WB	LTR	254	386	424	608	437	624	437	624
	NB	LT	130	254	147	291	159	314	159	314
		R	303	497	367	620	397	658	397	658
	SB	L	13	32	13	32	13	32	13	32
		R	0	0	0	0	0	0	0	0
Pond Street at	WB	L	n/a	160	n/a	-	n/a	-	n/a	183
Longwater Drive		R	n/a	253	n/a	408	n/a	418	n/a	418
	NB	TR	n/a	0	n/a	0	n/a	0	n/a	0
	SB	LT	n/a	203	n/a	335	n/a	348	n/a	n/a
		L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	348
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
Pond Street at	EB	L	n/a	n/a	n/a	n/a	n/a	103	n/a	103
Proposed Site Driveway		R	n/a	n/a	n/a	n/a	n/a	5	n/a	5
	NB	LT	n/a	n/a	n/a	n/a	n/a	0	n/a	0
	SB	TR	n/a	n/a	n/a	n/a	n/a	0	n/a	0

1 50th Percentile Queue Length (ft)

2 95th Percentile Queue Length (ft)

Capacity Analysis Summary
Residential Development
Rockland, MA

Weekday Afternoon Peak Hour													
			2019 Existing			2026 No Build			2026 Build			2026 Build - Mitigation		
Intersection	**Movement**		**LOS[1]**	**Delay[2]**	**V/C[3]**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**
Hingham Street (Route 228) at	EB	LT	C	32.3	0.87	D	44.2	0.96	D	44.7	0.97	D	44.7	0.97
Pond Street/Park and Ride		R	A	4.4	0.61	A	4.8	0.65	A	5.2	0.67	A	5.2	0.67
	WB	LTR	D	35.6	>1.00	E	71.0	>1.00	E	79.3	>1.00	E	79.3	>1.00
	NB	LT	F	>80.0	>1.00	F	>80.0	>1.00	F	>80.0	>1.00	F	>80.0	>1.00
		R	D	47.3	0.95	E	73.8	>1.00	F	84.9	>1.00	F	84.9	>1.00
	SB	L	C	31.2	0.20	C	32.2	0.23	C	32.6	0.24	C	32.6	0.24
		R	A	1.5	0.10	A	1.5	0.10	A	1.5	0.10	A	1.5	0.10
	Overall		D	37.2	>1.00	E	59.7	>1.00	E	65.8	>1.00	E	65.8	>1.00
Pond Street at	WB	L	F	>50.0	>1.00	F	>50.0	>1.00	F	>50.0	>1.00	F	>50.0	>1.00
Longwater Drive		R	E	45.4	0.96	F	>50.0	>1.00	F	>50.0	>1.00	F	>50.0	>1.00
	NB	TR	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00
	SB	LT	A	2.6	0.22	A	2.7	0.25	A	8.8	0.26	n/a	n/a	n/a
		L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	A	8.8	0.26
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	A	0.0	0.00
Pond Street at	EB	L	n/a	n/a	n/a	n/a	n/a	n/a	F	>50.0	0.67	F	>50.0	0.67
Proposed Site Driveway		R	n/a	n/a	n/a	n/a	n/a	n/a	C	19.2	0.04	C	19.2	0.04
	NB	LT	n/a	n/a	n/a	n/a	n/a	n/a	A	0.2	0.03	A	0.2	0.03
	SB	TR	n/a	n/a	n/a	n/a	n/a	n/a	A	0.0	0.00	A	0.0	0.00

1 Level-of-Service

2 Average vehicle delay in seconds

3 Volume to capacity ratio

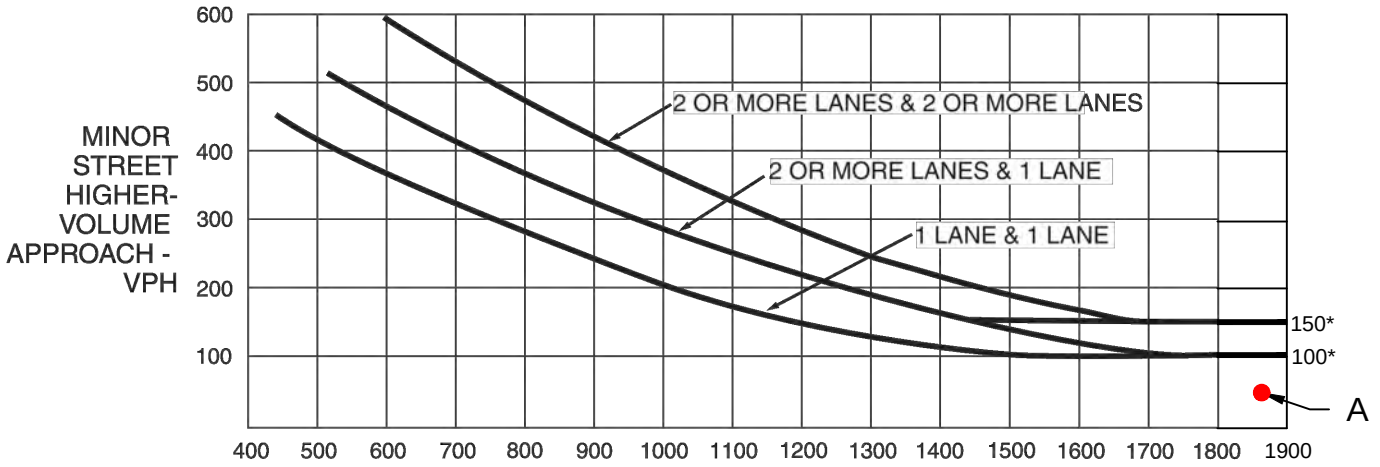
Queue Summary
Residential Development
Rockland, MA

Weekday Morning Peak Hour										
			2019 Existing		2026 No Build		2026 Build		2026 Build - Mitigation	
Intersection	**Movement**		**50th Queue[1]**	**95th Queue[2]**	**50th Queue**	**95th Queue**	**50th Queue**	**95th Queue**	**50th Queue**	**95th Queue**
Hingham Street (Route 228) at	EB	LT	298	406	354	507	354	508	354	508
Pond Street/Park and Ride		R	0	62	0	64	4	75	4	75
	WB	LTR	230	433	375	623	409	668	409	668
	NB	LT	201	303	242	343	255	358	255	358
		R	375	499	499	589	528	618	528	618
	SB	L	23	48	23	49	23	49	23	49
		R	0	0	0	0	0	0	0	0
Pond Street at	WB	L	n/a	383	n/a	505	n/a	515	n/a	468
Longwater Drive		R	n/a	373	n/a	583	n/a	623	n/a	623
	NB	TR	n/a	0	n/a	0	n/a	0	n/a	0
	SB	LT	n/a	20	n/a	25	n/a	25	n/a	n/a
		L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	25
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
Pond Street at	EB	L	n/a	n/a	n/a	n/a	n/a	65	n/a	65
Proposed Site Driveway		R	n/a	n/a	n/a	n/a	n/a	3	n/a	3
	NB	LT	n/a	n/a	n/a	n/a	n/a	3	n/a	3
	SB	TR	n/a	n/a	n/a	n/a	n/a	0	n/a	0

1 50th Percentile Queue Length (ft)

2 95th Percentile Queue Length (ft)

APPENDIX O
Peak Hour Traffic Signal Warrant



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

POND STREET AT PROPOSED SITE DRIVEWAY			
DATA POINT	TIME	MAJOR APPROACH VOLUME	MINOR APPROACH VOLUME
A	7:30 AM - 8:30 AM	1872	59

APPENDIX P
Proposed Roadway Improvements Concept

N

POND STREET

LONGWATER DRIVE

CURRY STREET

CHANGE CATCH BASIN TO MANHOLE

PROPOSED DRAIN PIPE

PROPOSED WHITE LINE

PROPOSED CATCH BASIN

YELLOW GORE LINE (10' SPACING AT 45°)

PROPOSED DRAIN MANHOLE

ADJUST CURB LINE TO ACCOMMODATE WB-62 LEFT TURN FROM POND STREET TO LONGWATER DRIVE

REMOVE AND RESET STOP SIGN

RELOCATE STOP BAR

PROPOSED HMA PAVEMENT

PROPOSED WHITE LINE

PROPOSED YELLOW GORE LINE (10' SPACING AT 45°)

PROPOSED DOUBLE YELLOW LINE

PROPOSED GUARDRAIL END TREATMENT

PROPOSED GUARDRAIL

PROPOSED HMA BERM

PROPOSED WHITE LINE

PROPOSED ROADWAY EDGE

PROPOSED SAWCUT

POTENTIAL GUY POLE RELOCATION

PROPOSED CLEARING AND GRUBBING

PROPOSED RETAINING WALL

LIMIT OF REGRADING

PROPOSED LOAM AND SEED

PROPOSED EROSION CONTROL BLANKET

PROPOSED CATCH BASIN

PROPOSED DRAIN PIPE

PROPOSED GUARDRAIL END TREATMENT

PROPOSED APARTMENT ENTRANCE

CHANGE CATCH BASIN TO MANHOLE

36" RCP
l=134.90'

36" RCP
l=135.53'

30" RCP
l=134.52'

18" RCP
l=135.18'

UTILITY POLE NO. 40

UTILITY POLE NO. 39

UTILITY POLE NO. 38

UTILITY POLE NO. 1

UTILITY POLE NO. 2

UTILITY POLE NO. 84

UTILITY POLE NO. 37

UTILITY POLE NO. 436

GUY POLE NO. 28-34

3" & 4" PVC FORCE MAIN

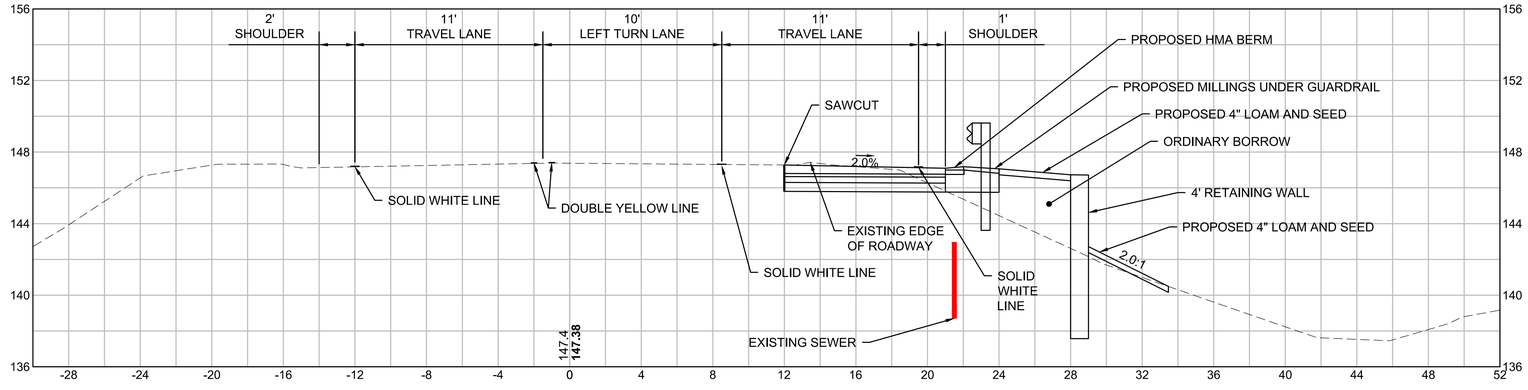
METAL GUARDRAIL

R=40.64
l(IN)=136.57
l(OUT)=135.48

B1 B2 B3 B4

WF

OHW



HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

SECTION VIEW

0 20 50 100

SCALE: 1" = 20'

PLAN VIEW

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

PROPOSED ROADWAY IMPROVEMENTS AT POND STREET & LONGWATER DRIVE ROCKLAND, MA

APPENDIX Q
2026 Build with Mitigation Capacity/Level-of-Service Analysis

Intersection	
Int Delay, s/veh	269.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	416	547	311	744	164
Future Vol, veh/h	34	416	547	311	744	164
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	85	85
Heavy Vehicles, %	0	1	1	0	1	3
Mvmt Flow	43	520	636	362	875	193

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2579	636	0	-	636	0
Stage 1	636	-	-	-	-	-
Stage 2	1943	-	-	-	-	-
Critical Hdwy	6.4	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	~ 29	~ 480	-	0	952	-
Stage 1	531	-	-	0	-	-
Stage 2	124	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 2	~ 480	-	-	952	-
Mov Cap-2 Maneuver	~ 2	-	-	-	-	-
Stage 1	531	-	-	-	-	-
Stage 2	~ 10	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, $	1033.7	0	28
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	2	480	952	-
HCM Lane V/C Ratio	-	21.25	1.083	0.919	-
HCM Control Delay (s)	$ 1	2523.4	94.6	34.2	-
HCM Lane LOS	-	F	F	D	-
HCM 95th %tile Q(veh)	-	7.3	16.7	13.9	-

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

Intersection	
Int Delay, s/veh	100.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	156	681	249	16	302	686
Future Vol, veh/h	156	681	249	16	302	686
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	100	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	86	86	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	195	851	290	19	328	746

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1692	290	0	-	290	0
Stage 1	290	-	-	-	-	-
Stage 2	1402	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 104	~ 754	-	0	1283	-
Stage 1	764	-	-	0	-	-
Stage 2	230	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 77	~ 754	-	-	1283	-
Mov Cap-2 Maneuver	~ 77	-	-	-	-	-
Stage 1	764	-	-	-	-	-
Stage 2	~ 171	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	229.4	0	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	77	754	1283	-
HCM Lane V/C Ratio	-	2.532	1.129	0.256	-
HCM Control Delay (s)	-	$ 811.5	96	8.8	-
HCM Lane LOS	-	F	F	A	-
HCM 95th %tile Q(veh)	-	18.7	24.9	1	-

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