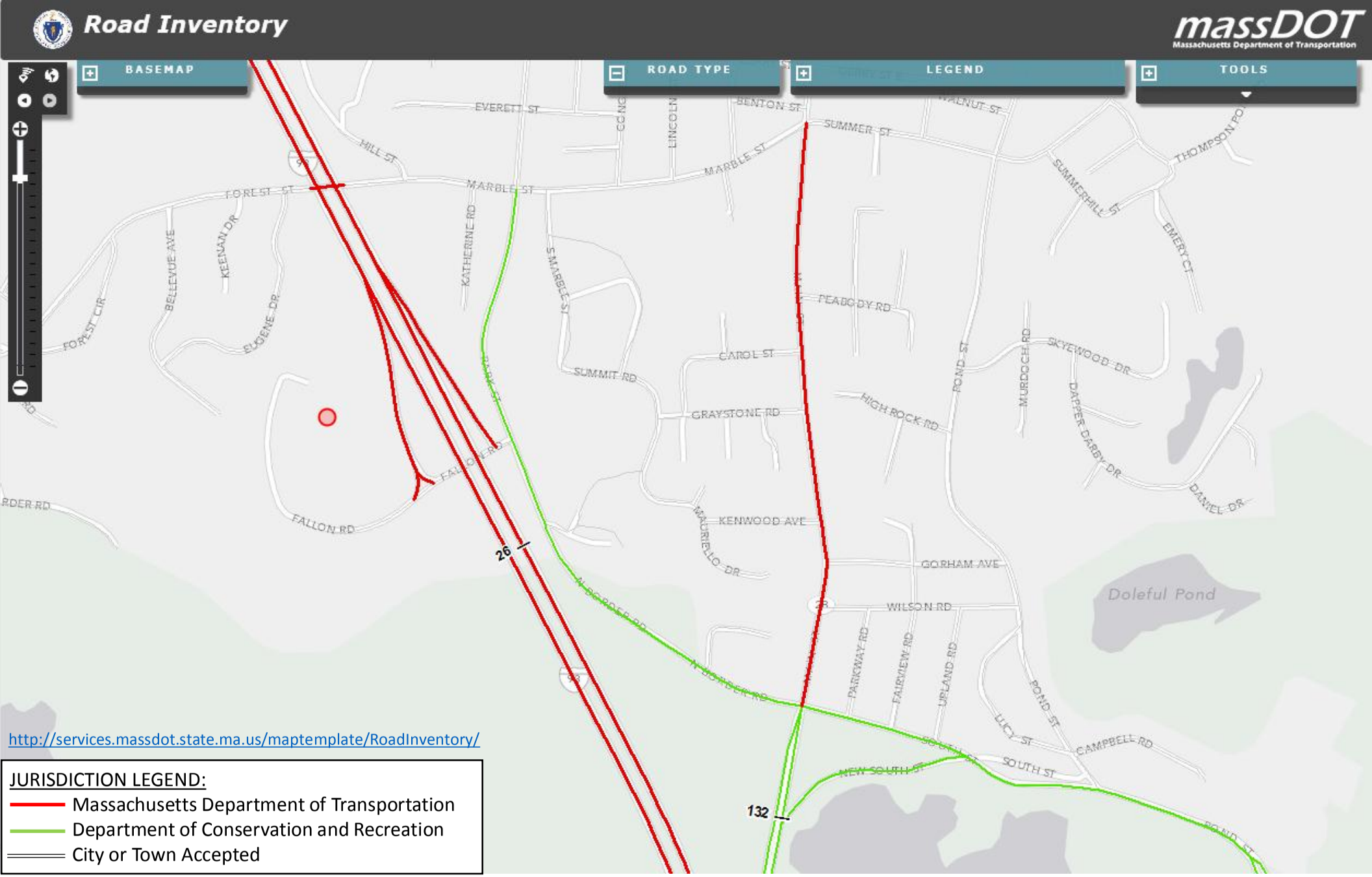
APPENDIX

MassDOT Roadway Data
MBTA Data
Traffic Counts and Seasonal Adjustments
MassDOT Crash Rate Worksheets
Capacity Analysis Methodology
Analysis Worksheets: Existing
Historical Traffic-Volume Data
Trip-Generation Calculations
Trip-Distribution Data
Analysis Worksheets: No-Build and Build
Traffic Signal Warrant Analysis Worksheet
Analysis Worksheets: Mitigated

Tighe&Bond

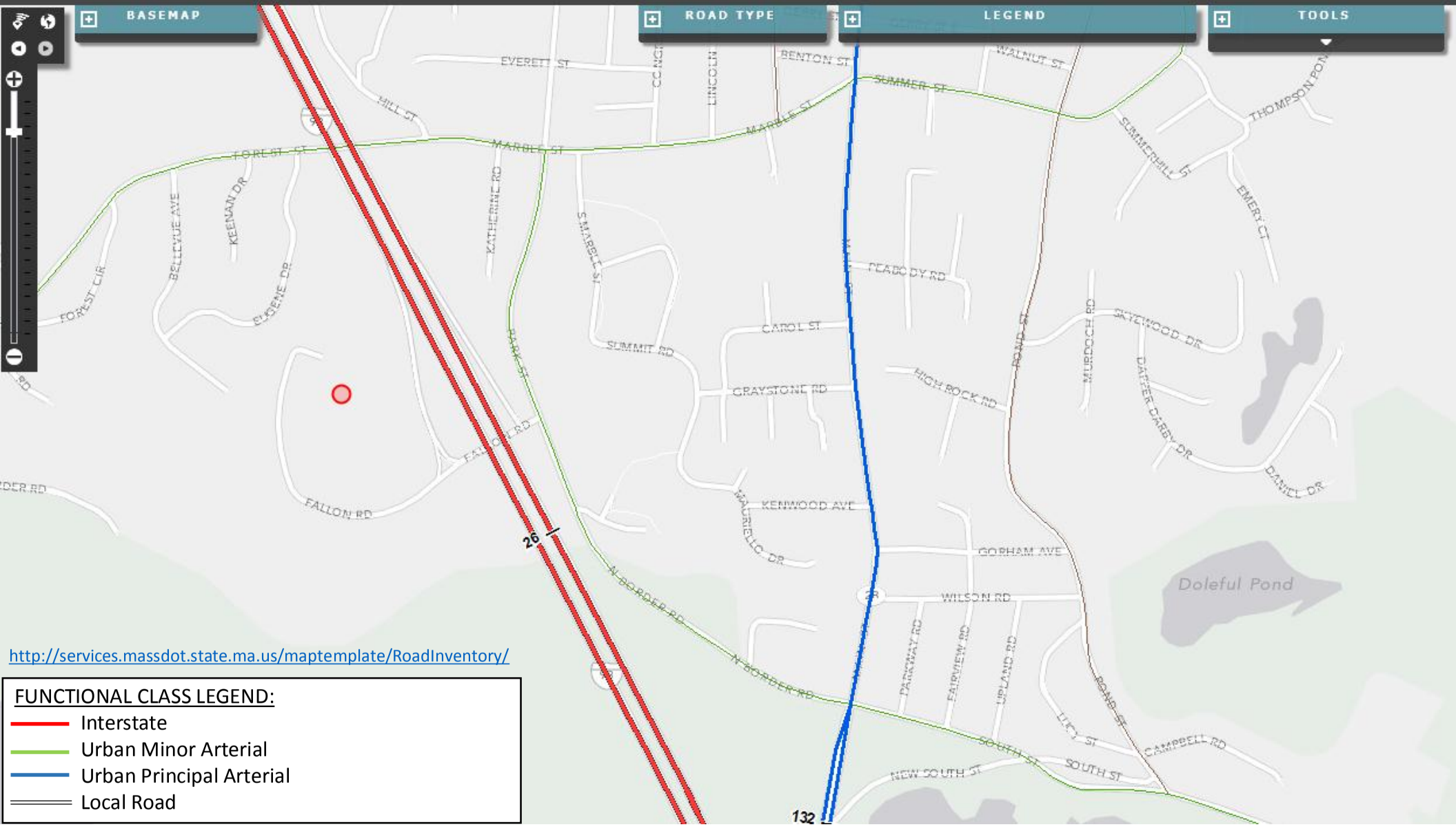
MassDOT Roadway Data

Tighe&Bond


Road Inventory
massDOT
Massachusetts Department of Transportation
BASEMAP
ROAD TYPE
LEGEND
TOOLS
EVERETT ST
BENTON ST
SUMMER ST
WALNUT ST
THOMPSON PO
HILL ST
MARBLE ST
FOREST ST
SUMMERHILL ST
EMERY CT
BELLEVUE AVE
KEENAN DR
EUGENE DR
KATHERINE RD
S MARBLE ST
PEABODY RD
FOREST CIR
CAROL ST
SUMMIT RD
POND ST
MURDOCH RD
SKYWOOD DR
GRAYSTONE RD
HIGH ROCK RD
DAPPER DARBY DR
DANIEL DR
FALLON RD
KENWOOD AVE
MAURIELLO DR
GORHAM AVE
26
WILSON RD
Doleful Pond
PARKWAY RD
FAIRVIEW RD
UPLAND RD
LUCY ST
CAMPBELL RD
SOUTH ST
NEW SOUTH ST
132
http://services.massdot.state.ma.us/maptemplate/RoadInventory/
JURISDICTION LEGEND:
Massachusetts Department of Transportation
Department of Conservation and Recreation
City or Town Accepted

Road Inventory

massDOT
Massachusetts Department of Transportation



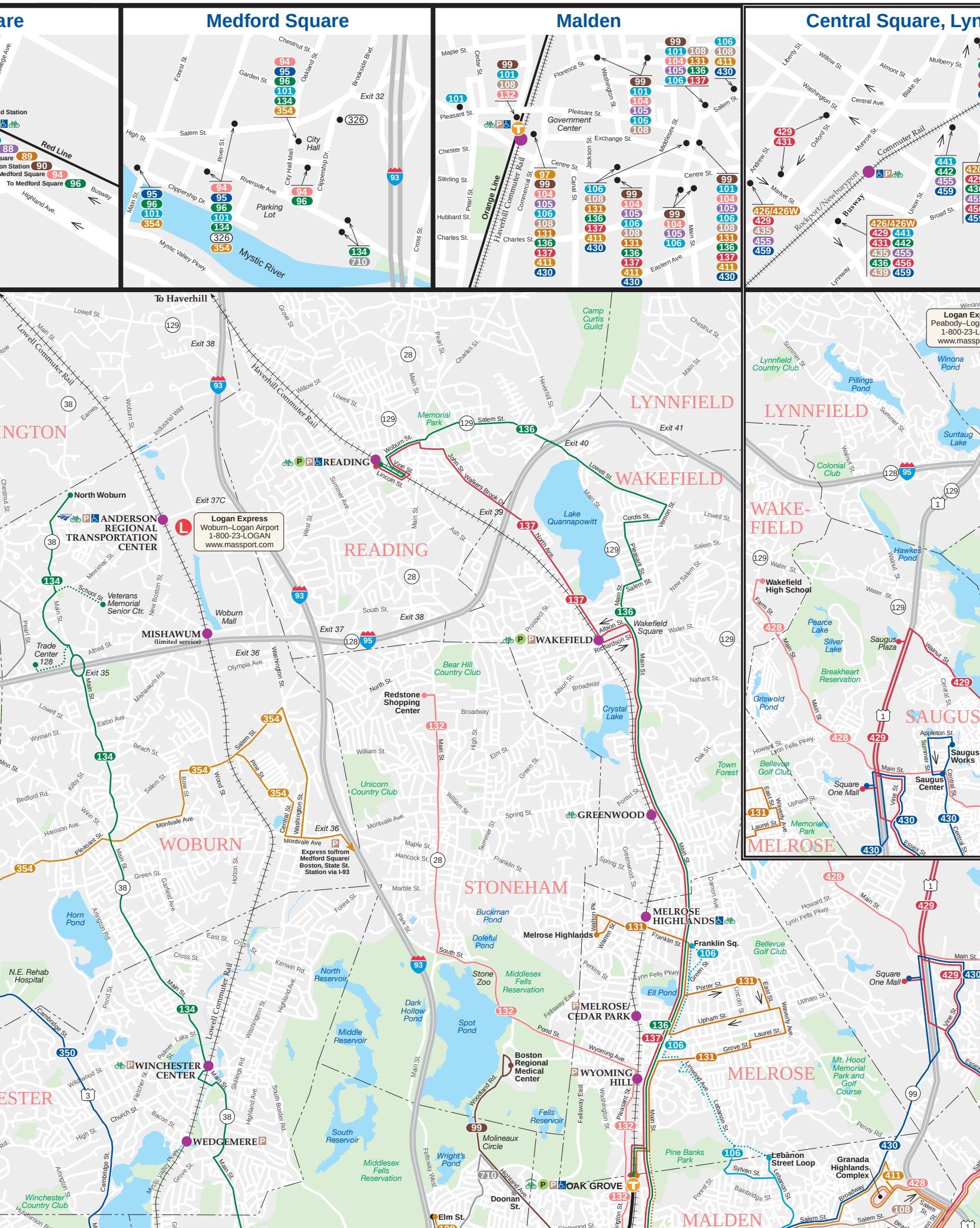
http://services.massdot.state.ma.us/maptemplate/RoadInventory/

FUNCTIONAL CLASS LEGEND:

- Interstate
- Urban Minor Arterial
- Urban Principal Arterial
- Local Road

MBTA Data

Tighe&Bond


Medford Square
Malden
Central Square, Lyn
Red Line
Busway
Highland Ave.
Chestnut St.
Forest St.
Garden St.
Oakland St.
Brookside Blvd.
Exit 32
Salem St.
High St.
River St.
City Hall
City Hall Mall
Clippership Dr.
Riverside Ave.
Parking Lot
Main St.
Mystic Valley Pkwy.
Mystic River
Cross St.
Maple St.
Cedar St.
Pleasant St.
Florence St.
Washington St.
Government Center
Exchange St.
Middlesex St.
Chester St.
Centre St.
Jackson St.
Sterling St.
Pearl St.
Hubbard St.
Charles St.
Orange Line
Haverhill Commuter Rail
Commercial St.
Canal St.
Eastern Ave.
Liberty St.
Willow St.
Almont St.
Mulberry St.
Blake St.
Central Ave.
Oxford St.
Andrew St.
Commuter Rail
Rockport/Newburyport
Market St.
Union St.
Broad St.
Lynnway
To Haverhill
Lowell Commuter Rail
Haverhill Commuter Rail
Exit 38
Exit 37C
Exit 37
Exit 36
Exit 35
Exit 39
Exit 40
Exit 41
Lowell St.
Eames St.
Woburn St.
Industrial Way
Grove St.
Willow St.
Pearl St.
Charles St.
Haverhill St.
Camp Curtis Guild
Chestnut St.
Memorial Park
Salem St.
Woburn St.
Vine St.
Lincoln St.
John St.
Walkers Brook Dr.
Summer Ave.
West St.
Ash St.
North Ave.
Lake Quannapowitt
Cordis St.
Vernon St.
Pleasant St.
New Salem St.
Water St.
Wakefield Square
Albion St.
Richardson St.
Prospect St.
South St.
Olympia Ave.
Washington St.
Bear Hill Country Club
Crystal Lake
Nahant St.
Broadway
Redstone Shopping Center
North St.
William St.
Elm St.
Green St.
Oak St.
Town Forest
Unicorn Country Club
Spring St.
Forest St.
Montvale Ave.
Maple St.
Hancock St.
Franklin St.
Greenwood St.
Main St.
Marble St.
Park St.
Buckman Pond
Doleful Pond
Melrose Highlands
Walton Pk.
Warren St.
Franklin Sq.
Bellevue Golf Club
Stone Zoo
Middlesex Fells Reservation
Perkins St.
Lynn Fells Pkwy.
Ell Pond
Porter St.
Lincoln St.
East St.
Waverly Ave.
Upham St.
Laurel St.
Grove St.
Pond St.
Wyoming Ave.
Linwood Ave.
Lebanon St.
Mt. Hood Memorial Park and Golf Course
Square One Mall
Dark Hollow Pond
Spot Pond
Middle Reservoir
North Reservoir
South Reservoir
Fells Reservoir
Wright's Pond
Molineaux Circle
Boston Regional Medical Center
Woodland Rd.
Fellsway East
Fellsway West
Highland Ave.
Pine Banks Park
Lebanon Street Loop
Sylvan St.
Granada Highlands Complex
Bainbridge St.
Penny Rd.
Doonan St.
Elm St.
Glenwood St.
Washington St.
Pleasant St.
Lynnfield Country Club
Pillings Pond
Winona Pond
Suntaug Lake
Colonial Club
Hawkes Pond
Wakefield High School
Pearce Lake
Silver Lake
Saugus Plaza
Breakheart Reservation
Griswold Pond
Bellevue Golf Club
Saugus Works
Saugus Center
Appleton St.
Howard St.
Lynn Fells Pkwy.
Memorial Park
Essex St.
Central St.
Summer St.
Walnut St.
Winona
Logan Express
Peabody–Log
1-800-23-L
www.massp
LYNNFIELD
WAKEFIELD
READING
WOBURN
STONEHAM
MELROSE
SAUGUS
MALDEN
North Woburn
ANDERSON REGIONAL TRANSPORTATION CENTER
Logan Express
Woburn–Logan Airport
1-800-23-LOGAN
www.massport.com
Veterans Memorial Senior Ctr.
Trade Center 128
MISHAWUM
(limited service)
Mishawum Rd.
Merrimac St.
New Boston St.
Alfred St.
Eaton Ave.
Wyman St.
Beach St.
Killy St.
Bedford Rd.
Winn St.
Harrison Ave.
Pleasant St.
Bow St.
Wood St.
Pine St.
Central St.
Washington St.
Express to/from Medford Square/ Boston, State St. Station via I-93
Holton St.
Garfield Ave.
Horn Pond
Arlington Rd.
East St.
Cross St.
Kenwin Rd.
Highland Ave.
N.E. Rehab Hospital
Pond St.
Cambridge St.
Lake St.
Palmer St.
Skillings Rd.
South Border Rd.
Wildwood St.
Fletcher St.
Church St.
Bacon St.
Winchester Country Club
Mystic Valley Pkwy.
Grove St.
WINCHESTER CENTER
WEDGEMERE
ESTER
Redstone Shopping Center
Melrose Highlands
MELROSE HIGHLANDS
Franklin Sq.
MELROSE/ CEDAR PARK
WYOMING HILL
OAK GROVE
GREENWOOD
Square One Mall
Saugus Works
Saugus Center
Lebanon Street Loop
Granada Highlands Complex
Mt. Hood Memorial Park and Golf Course
Wakefield High School
Wakefield Square
Melrose Highlands
Doonan St.
Elm St.
Molineaux Circle
Wright's Pond
Middlesex Fells Reservation
Winchester Country Club
Horn Pond
N.E. Rehab Hospital
Woburn Mall
Trade Center 128
Lake Quannapowitt
Crystal Lake
Bear Hill Country Club
Unicorn Country Club
Buckman Pond
Doleful Pond
Stone Zoo
Ell Pond
Spot Pond
Dark Hollow Pond
Middle Reservoir
North Reservoir
South Reservoir
Fells Reservoir
Pine Banks Park
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Saugus Plaza
Saugus Works
Saugus Center
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Colonial Club
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Elm St.
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Colonial Club
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Wakefield Square
Melrose Highlands
Franklin Sq.
Doonan St.
Elm St.
Molineaux Circle
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Middlesex Fells Reservation
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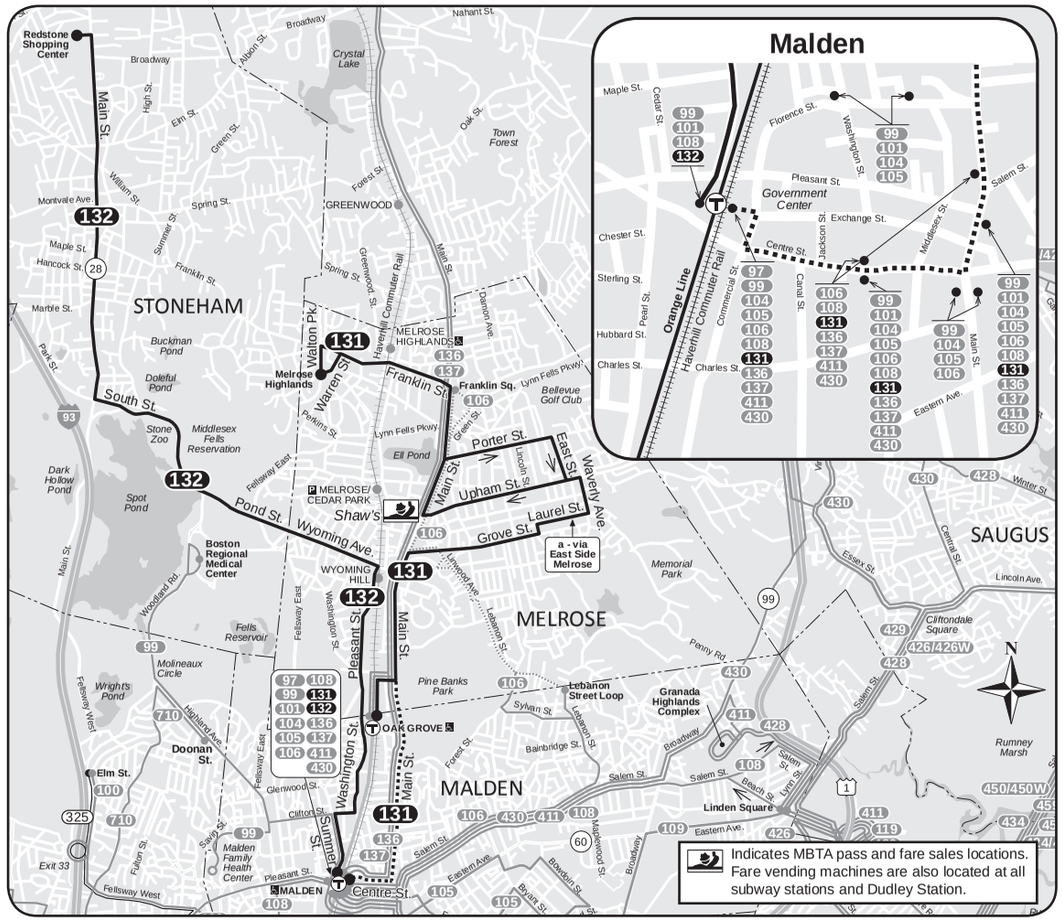
Buckman Pond
Doleful Pond
Stone Zoo
Ell Pond
Spot Pond
Dark Hollow Pond
Middle Reservoir
North Reservoir
South Reservoir
Fells Reservoir
Pine Banks Park

Route 131 Melrose Highlands - Malden Center Station
Route 132 Redstone Shopping Center - Malden Center Station



131•132

Spring March 22, 2014 - June 20, 2014

131 Melrose Highlands-Malden Station

132 Redstone Shopping Center-Malden Station

Serving

- Wyoming Square
- Melrose East Side
- Oak Grove Station
- Malden Square
- Orange Line
- Haverhill Commuter Rail

Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

131 Weekday

Inbound			Outbound		
Leave Franklin at Warren	Arrive Oak Grove Station	Arrive Malden Station	Leave Malden Station	Lv/Arrive Oak Grove Station	Arrive Franklin at Warren
a 6:25A	6:44A	.....	6:00A	.....	6:20A
a 6:45	7:04	.....	6:20	.....	6:40
a 7:05	7:25	.....	.....	6:48A	7:00
a 7:25	7:45	.....	.....	a 7:05	7:23
a 7:45	8:05	.....	.....	7:28	7:42
a 8:05	8:25	.....	.....	7:48	8:02
a 8:25	8:43	.....	.....	8:08	8:22
a 8:45	9:03	.....	.....	8:28	8:42
a 9:05	9:23	.....	.....	8:48	9:02
a 9:45	10:02	.....	.....	a 9:25	9:43
			a 11:45	11:53	**12:14P**
a12:15P	**.....**	**12:37P**	**a 12:45P**	**12:53P**	**1:12P**
a 1:15	**.....**	**1:36**	**a 1:45**	**1:53**	**2:13**
a 2:15	**.....**	**2:38**	**a 2:45**	**2:54**	**3:15**
3:15	**3:28P**	**.....**	**.....**	**a 3:45**	**4:03**
4:15	**4:27**	**.....**	**.....**	**a 4:15**	**4:36**
4:38	**4:50**	**.....**	**.....**	**a 4:35**	**4:57**
4:58	**5:10**	**.....**	**.....**	**a 4:55**	**5:17**
5:18	**5:30**	**.....**	**.....**	**a 5:15**	**5:37**
5:38	**5:50**	**.....**	**.....**	**a 5:35**	**5:58**
5:58	**6:10**	**.....**	**.....**	**a 5:55**	**6:18**
6:18	**6:30**	**.....**	**.....**	**a 6:15**	**6:38**
6:38	**6:50**	**.....**	**.....**	**a 6:35**	**6:57**
6:57	**.....**	**7:14**	**.....**	**a 6:55**	**7:17**
7:17	**.....**	**7:34**			

a - Via East Side Melrose

No Route 131 service on Saturday or Sunday

Route 131
Melrose Highlands-Malden Ctr. Station

132 Weekday

Inbound			Outbound		
Leave Redstone Shopping Center	Arrive Wyoming Square	Arrive Malden Station	Leave Malden Station	Arrive Wyoming Square	Arrive Redstone Shopping Center
6:00A	6:13A	6:25A	5:30A	5:35A	5:48A
6:30	6:43	6:55	6:00	6:05	6:18
6:55	7:12	7:25	6:52	6:57	7:12
7:15	7:33	7:46	7:30	7:36	7:55
7:35	7:53	8:06	8:30	8:36	8:52
8:00	8:18	8:31	9:30	9:36	9:52
8:30	8:45	8:56	10:30	10:36	10:52
9:00	9:14	9:25	11:30	11:36	11:52
10:00	10:13	10:24			
11:00	11:13	11:24			
			12:30P	**12:36P**	**12:52P**
12:00N	**12:13P**	**12:24P**	**1:30**	**1:36**	**1:52**
1:00	**1:15**	**1:26**	**2:30**	**2:36**	**2:55**
2:00	**2:15**	**2:26**	**3:15**	**3:21**	**3:37**
3:00	**3:15**	**3:26**	**4:00**	**4:07**	**4:25**
3:45	**3:58**	**4:09**	**4:45**	**4:52**	**5:10**
4:30	**4:45**	**4:54**	**5:20**	**5:27**	**5:44**
5:15	**5:30**	**5:39**	**5:50**	**6:00**	**6:16**
6:05	**6:20**	**6:29**	**6:20**	**6:27**	**6:43**
7:00	**7:12**	**7:19**	**7:00**	**7:07**	**7:23**

132 Saturday

Inbound			Outbound		
Leave Redstone Shopping Center	Arrive Wyoming Square	Arrive Malden Station	Leave Malden Station	Arrive Wyoming Square	Arrive Redstone Shopping Center
8:00A	8:05A	8:20A	8:30A	8:36A	8:55A
9:00	9:05	9:20	9:30	9:36	9:56
10:00	10:13	10:27	10:30	10:36	10:56
11:00	11:13	11:27	11:30	11:36	11:56
12:00N	**12:13P**	**12:27P**	**12:30P**	**12:36P**	**12:56P**
1:00	**1:13**	**1:27**	**1:30**	**1:36**	**1:56**
2:00	**2:13**	**2:30**	**2:30**	**2:36**	**2:56**
3:00	**3:13**	**3:30**	**3:30**	**3:36**	**3:53**
4:00	**4:13**	**4:30**	**4:30**	**4:36**	**4:53**
5:00	**5:13**	**5:28**	**5:30**	**5:36**	**5:53**
6:00	**6:13**	**6:26**	**7:00**	**7:06**	**7:22**
7:30	**7:43**	**7:49**			

Route 132
Redstone Shopping Ctr.- Malden Ctr. Station

No route 132 service on Sunday

NOTE: All Route 132 trips travel via Oak Grove Station (West Side)

All buses are accessible to persons with disabilities

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.50	$1.50	$2.00	$2.00
CharlieTicket	$2.00	$2.00	$2.50	$4.50
Cash-on-Board	$2.00	$4.00	$2.50	$4.50
Student CharliCard*	$0.75	$0.75	$1.00	$1.00
Senior/TAP CharliCard**	$0.75	$0.75	$1.00	$1.00

VALID PASSES: LinkPass ($70/mo.); Monthly Local Bus ($48/mo.); *StudentPass ($25/mo. M-F only or $28 mo. 7 days); **Senior/TAP Pass($28/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children under 12 ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Spring 2014 Holidays
April 21: see Weekday **May 26: see Sunday**

Fares

PRICE PER TRIP	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.50	$1.50	$2.00	$2.00
CharlieTicket	$2.00	$2.00	$2.50	$4.50***
Cash-on-Board	$2.00	$4.00	$2.50	$4.50***
Student*	$0.75	$0.75	$1.00	$1.00
Senior/TAP**	$0.75	$0.75	$1.00	$1.00
UNLIMITED TRIP PASSES				
1-Day	$11.00	$11.00	$11.00	$11.00
7-Day	$18.00	$18.00	$18.00	$18.00
Monthly	$48.00	$48.00	$70.00	$70.00
Senior/TAP Monthly	$28.00/month for unlimited travel on Local Bus and Rapid Transit			

VALID PASSES: LinkPass ($70/mo.); StudentPass* ($25/mo. M-F only or $28/mo. 7 days); Senior/TAP Pass* ($28/mo.); and express bus, commuter rail, and boat passes.

FREE FARES: Children under 12 ride free when accompanied by an adult; Blind Access CharlieCard holders ride free: if using a guide, the guide rides free

* Available to students through participating middle schools and high schools.

** Available to Medicare cardholders, seniors 65+, and persons with disabilities.

*** For Silver Line SL4 or SL5 pay $2.50. Also see "transfers."

TRANSFERS

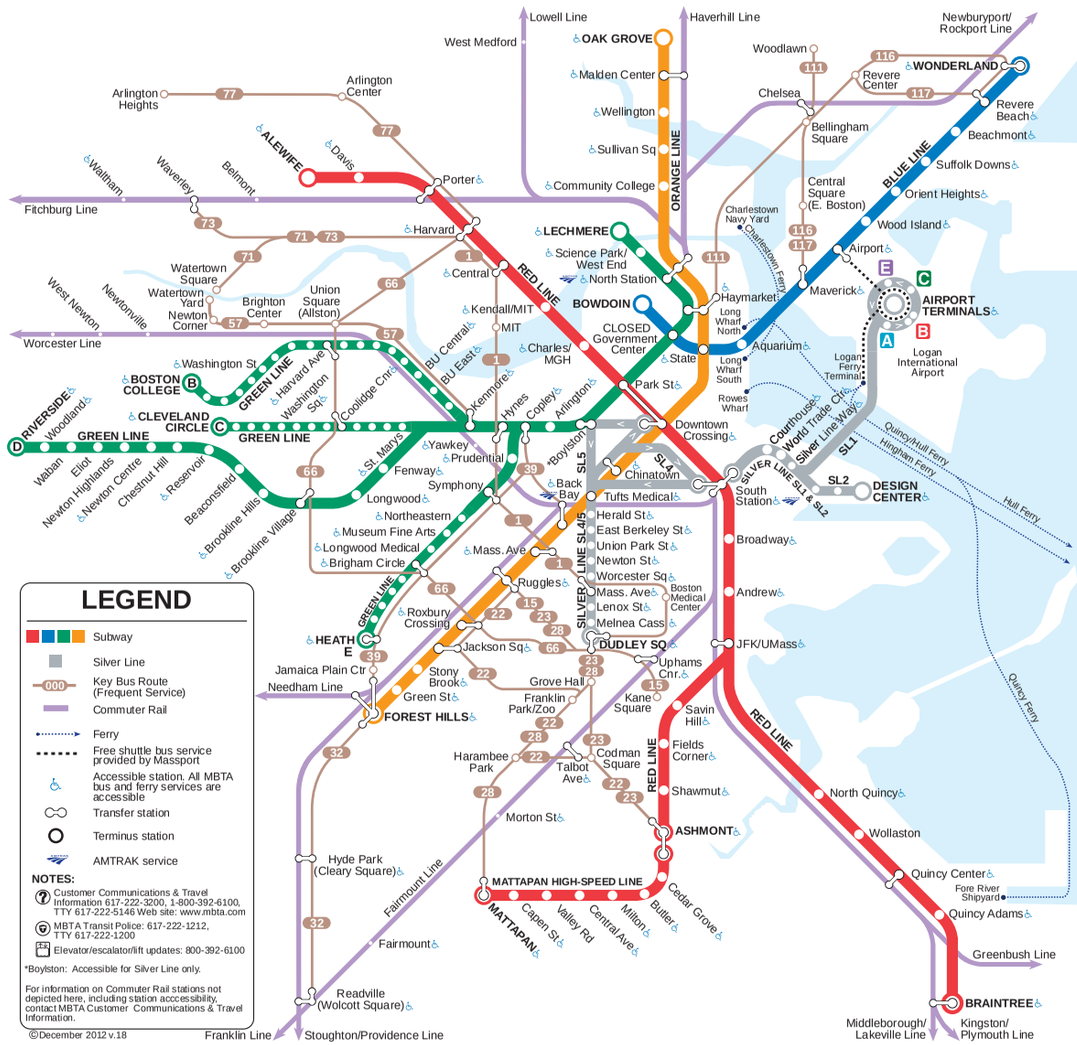
If paying with a CharlieTicket or CharlieCard, discounted transfers that are available are automatic — just use the same ticket or card throughout your trip. If paying with cash onboard a vehicle, free transfers are only allowed between rapid transit lines, and in either of the following cases you must ask for a transfer ticket from the operator before paying your fare:

- Boarding Silver Line SL4 or SL5 and transferring to other rapid transit.
- Boarding at a farebox aboard the Green Line or Silver Lines and transferring to Silver Line SL4 or SL5 later in your trip.

Free transfers between the Mattapan High Speed Line and the Red Line at Ashmont.

SCHEDULES

Schedules are available at the following stations: Park Street, Airport, Malden, Harvard, Government Center (Green Line Level), Back Bay, Downtown Crossing (Orange Line Level), and Quincy Center, or ask a Customer Service Agent. Schedules are also available at Boston City Hall, the State Transportation Building Library (10 Park Plaza), 45 High St, and online at mbta.com.



LEGEND

- Subway
- Silver Line
- Key Bus Route (Frequent Service)
- Commuter Rail
- Ferry
- Free shuttle bus service provided by Massport
- Accessible station. All MBTA bus and ferry services are accessible
- Transfer station
- Terminus station
- AMTRAK service

NOTES:

Customer Communications & Travel Information 617-222-3200, 1-800-392-6100, TTY 617-222-5146 Web site: www.mbta.com

MBTA Transit Police: 617-222-1212, TTY 617-222-1200

Elevator/escalator/lift updates: 800-392-6100

*Boylston: Accessible for Silver Line only.

For information on Commuter Rail stations not depicted here, including station accessibility, contact MBTA Customer Communications & Travel Information.

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Rapid Transit

Spring March 22, 2014 – June 20, 2014

Extended late night service begins on March 28

Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

Rapid Transit Line	Weekday First Trip	Weekday Rush Hour Service	Weekday Midday Service	Weekday Evening Service	Weekday Late Night Service	Weekday Last Trip Monday-Thursday	Weekday Last Trip Friday	Saturday First Trip	Saturday A.M. Peak Service	Saturday P.M. Peak Service	Saturday Evening Service	Saturday Late Night Service	Saturday Last Trip	Sunday First Trip	Sunday A.M. Peak Service	Sunday P.M. Peak Service	Sunday Evening Service	Sunday Late Night Service	Sunday Last Trip
Red Line																			
Alewife	5:24AM	9 min	14 min	12 min	12 min	12:15AM	w 2:10AM	5:24AM	14 min	14 min	14 min	14 min	w 2:10AM	6:08AM	16 min	16 min	16 min	16 min	12:15AM
Braintree	5:15AM	9 min	14 min	12 min	12 min	12:18AM	1:52AM	5:15AM	14 min	14 min	14 min	14 min	1:52AM	6:00AM	16 min	16 min	16 min	16 min	12:18AM
Alewife	5:16AM	9 min	14 min	12 min	12 min	w12:22AM	w 2:15AM	5:16AM	14 min	14 min	14 min	14 min	w 2:15AM	6:00AM	16 min	16 min	16 min	16 min	w12:22AM
Ashmont	5:16AM	9 min	14 min	12 min	12 min	w12:30AM	w 2:07AM	5:16AM	14 min	14 min	14 min	14 min	w 2:07AM	6:00AM	16 min	16 min	16 min	16 min	w12:30AM
"M" Ashmont	5:17AM	5 min	8 min	12 min	12 min	w1:05AM	w 2:45AM	5:15AM	26 min	12 min	12 min	26 min	w 2:45AM	6:03AM	26 min	12 min	12 min	26 min	w1:05AM
Mattapan	5:05AM	5 min	8 min	12 min	12 min	12:53AM	2:33AM	5:05AM	26 min	12 min	12 min	26 min	2:33AM	5:51AM	26 min	12 min	12 min	26 min	12:53AM
Blue Line																			
Wonderland	5:13AM	5 min	9 min	9 min	10 min	12:35AM	2:05AM	5:25AM	9 min	9 min	9 min	13 min	2:05AM	5:58AM	13 min	9 min	9 min	13 min	12:26AM
Orient Heights	5:13AM	5 min	9 min	9 min	10 min	12:40AM	2:10AM	5:13AM	9 min	9 min	9 min	13 min	2:10AM	6:03AM	13 min	9 min	9 min	13 min	12:31AM
Bowdoin	5:29AM	5 min	9 min	9 min	10 min	w1:00AM	w 2:30AM	5:29AM	9 min	9 min	9 min	13 min	w 2:29AM	6:21AM	13 min	9 min	9 min	13 min	w1:00AM
Orange Line																			
Oak Grove	5:16AM	6 min	8 min	10 min	10 min	w12:30AM	w 2:10AM	5:16AM	10 min	8 min	10 min	10 min	w 2:10AM	6:00AM	13 min	10 min	10 min	10 min	w12:30AM
Forest Hills	5:16AM	6 min	8 min	10 min	10 min	w12:35AM	w 2:10AM	5:16AM	10 min	8 min	10 min	10 min	w 2:10AM	6:00AM	13 min	10 min	10 min	10 min	w12:35AM
Green Line																			
"B" Boston College	5:01AM	7 min	9 min	10 min	11 min	12:10AM	1:48AM	4:45AM*	7 min	7 min	7 min	11 min	1:48AM	5:20AM*	10 min	9 min	7 min	10 min	12:10AM
Park Street	5:39AM	7 min	9 min	10 min	11 min	w12:52AM	w 2:28AM	5:33AM	7 min	7 min	7 min	11 min	w 2:28AM	6:06AM	10 min	9 min	7 min	10 min	w12:48AM
"C" Cleveland Circle	5:01AM*	6 min	10 min	7 min	14 min	12:10AM	1:40AM	4:50AM*	10 min	8 min	8 min	10 min	1:40AM	5:30AM*	10 min	10 min	10 min	10 min	12:10AM
North Station	5:55AM	6 min	10 min	7 min	14 min	w12:46AM	w 2:25AM	5:30AM	10 min	8 min	8 min	10 min	w 2:25AM	6:06AM	10 min	10 min	10 min	10 min	w12:48AM
"D" Riverside	4:56AM	7 min	11 min	10 min	13 min	12:05AM	1:43AM	4:55AM	10 min	8 min	10 min	10 min	1:43AM	5:25AM	10 min	10 min	10 min	10 min	12:00AM
Park Street*	5:36AM	7 min	11 min	10 min	13 min	w12:49AM	w 2:30AM	5:39AM	10 min	8 min	10 min	10 min	w 2:30AM	6:09AM	10 min	10 min	10 min	10 min	w12:45AM
"E" Lechmere	5:01AM	6 min	8 min	10 min	14 min	w12:30AM	w 2:15AM	5:01AM	10 min	9 min	10 min	10 min	w 2:15AM	5:35AM	12 min	12 min	12 min	12 min	w12:30AM
Heath Street	5:30AM	6 min	8 min	10 min	14 min	w12:45AM	w 2:11AM	5:30AM	10 min	9 min	10 min	10 min	w 2:11AM	6:15AM	12 min	12 min	12 min	12 min	w12:47AM
Silver Line																			
SL1 Logan Airport	5:38AM	8 min	8 min	8 min	12 min	12:45AM	2:03AM	5:33AM	12 min	12 min	12 min	12 min	2:03AM	5:50AM	12 min	8 min	8 min	8 min	12:45AM
South Station	5:40AM	8 min	8 min	8 min	12 min	12:30AM	2:15AM	5:35AM	12 min	12 min	12 min	12 min	2:15AM	6:12AM	12 min	8 min	8 min	8 min	12:30AM
SL2 Design Center	6:03AM	5 min	10 min	9 min	15 min	12:30AM	12:30AM	6:10AM	15 min	15 min	15 min	15 min	12:35AM	6:50AM	15 min	15 min	15 min	15 min	12:34AM
South Station	5:45AM	5 min	10 min	9 min	15 min	w12:50AM	12:50AM	5:50AM	15 min	15 min	15 min	15 min	12:48AM	6:35AM	15 min	15 min	15 min	15 min	w12:48AM
Additional Waterfront-only service																			
Silver Line Way	5:28AM	5 min	**Use SL1/SL2**					5:28AM	**Use SL1/SL2**					6:05AM	**Use SL1/SL2**				
South Station	5:35AM	5 min				12:55AM	w 2:30AM						w 2:30AM						1:00AM
SL4 Dudley Station	5:20AM	10 min	15 min	15 min	20 min	12:20AM	2:20AM	5:23AM	15 min	15 min	15 min	20 min	2:20AM	6:02AM	15 min	15 min	15 min	20 min	12:20AM
South Station	5:40AM	10 min	15 min	15 min	20 min	12:40AM	2:05AM	5:40AM	15 min	15 min	15 min	20 min	2:05AM	6:20AM	15 min	15 min	15 min	20 min	12:40AM
SL5 Dudley Station	5:15AM	7 min	10 min	8 min	15 min	12:48AM	2:05AM	5:19AM	10 min	10 min	11 min	11 min	2:05AM	6:00AM	10 min	8 min	9 min	9 min	12:25AM
Downtown Xing	5:30AM	7 min	10 min	8 min	15 min	w1:02AM	w 2:30AM	5:34AM	10 min	10 min	11 min	11 min	w 2:30AM	6:15AM	10 min	8 min	9 min	9 min	w12:47AM

Extended late night service begins on March 28

Schedule Periods (approximate):

AM Rush Hour:	6:30 AM - 9:00 AM
Midday:	9:00 AM - 3:30 PM
PM Rush Hour:	3:30 PM - 6:30 PM
Evening:	6:30 PM - 8:00 PM
Late Night:	8:00 PM - CLOSE

Government Center:
Due to the closure of Government Center Station, please use Orange Line and Haymarket Station to transfer between Blue and Green Lines. For travel around the Government Center area, walking to/from a nearby station will often be fastest. A shuttle bus (Rt. 608) also operates every 20 minutes from 5:20AM – 1:00AM, starting at Haymarket and serving State, Government Center, and Bowdoin Stations, 7 days a week. Shuttle operates until 2:40AM on Friday/Saturday nights, and begins at 6:00AM on Sundays.

Green Line Notes:
*The first two "C" Line AM inbound trips run through to Lechmere Station on weekdays.

*The first "B" Line and second "C" Line AM inbound trips run through to Lechmere Station on weekends.

*The "D" Line will run to/from North Station off peak, late night and all trips on weekends.

w - Last trips wait at some stations, primarily in the Downtown area, for connecting service. Departure times are approximate.

Spring 2014 Holidays
April 21: see Weekday **May 26: see Sunday**

Traffic Counts and Seasonal Adjustments

Tighe&Bond

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

GPI Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Site Code: Fallon Road
Station ID: Between I-93 Ramps

Start Time	16-Aug Thu	Eastbound A.M.	Eastbound P.M.	Westbound A.M.	Westbound P.M.	Combined A.M.	Combined P.M.	17-Aug Fri	Eastbound A.M.	Eastbound P.M.	Westbound A.M.	Westbound P.M.	Combined A.M.	Combined P.M.
12:00		24	95	1	18	25	113		30	98	4	17	34	115
12:15		18	116	3	16	21	132		30	113	4	20	34	133
12:30		12	128	5	20	17	148		11	125	1	21	12	146
12:45		9	130	1	20	10	150		13	97	1	15	14	112
01:00		5	104	2	12	7	116		21	109	2	16	23	125
01:15		11	122	1	24	12	146		12	131	3	20	15	151
01:30		6	136	0	27	6	163		9	115	0	22	9	137
01:45		6	98	2	11	8	109		9	137	3	20	12	157
02:00		4	125	2	20	6	145		12	126	4	32	16	158
02:15		3	133	3	20	6	153		10	125	3	16	13	141
02:30		4	150	1	23	5	173		4	129	3	25	7	154
02:45		7	156	3	17	10	173		3	121	1	25	4	146
03:00		0	143	1	17	1	160		15	160	2	16	17	176
03:15		2	185	2	16	4	201		3	148	1	15	4	163
03:30		5	144	3	19	8	163		11	137	2	21	13	158
03:45		3	159	2	16	5	175		8	152	3	19	11	171
04:00		4	158	7	20	11	178		10	147	5	18	15	165
04:15		3	160	7	14	10	174		6	149	1	14	7	163
04:30		14	158	4	14	18	172		13	161	4	14	17	175
04:45		18	163	7	11	25	174		18	161	6	15	24	176
05:00		17	195	7	12	24	207		12	148	1	8	13	156
05:15		23	191	1	8	24	199		20	169	3	14	23	183
05:30		24	170	6	9	30	179		28	166	4	12	32	178
05:45		31	174	12	6	43	180		26	167	5	14	31	181
06:00		43	158	8	10	51	168		65	132	14	8	79	140
06:15		70	155	6	2	76	157		68	138	10	15	78	153
06:30		104	157	22	7	126	164		79	123	8	9	87	132
06:45		134	129	23	9	157	138		118	149	14	13	132	162
07:00		117	142	16	13	133	155		136	97	18	6	154	103
07:15		146	152	14	6	160	158		101	118	8	9	109	127
07:30		137	114	11	9	148	123		132	83	9	4	141	87
07:45		187	107	16	16	203	123		146	71	19	3	165	74
08:00		137	101	3	11	140	112		124	88	25	4	149	92
08:15		148	86	10	7	158	93		117	103	20	2	137	105
08:30		131	64	17	5	148	69		97	77	7	3	104	80
08:45		113	69	20	7	133	76		97	64	13	3	110	67
09:00		98	73	13	3	111	76		120	62	10	1	130	63
09:15		98	65	7	5	105	70		88	71	7	5	95	76
09:30		120	55	13	1	133	56		101	52	11	6	112	58
09:45		113	62	19	6	132	68		107	48	14	4	121	52
10:00		98	75	14	8	112	83		94	44	17	1	111	45
10:15		115	57	17	5	132	62		99	41	18	0	117	41
10:30		120	56	16	5	136	61		111	59	16	2	127	61
10:45		104	49	16	6	120	55		104	57	18	1	122	58
11:00		114	67	10	3	124	70		100	43	11	2	111	45
11:15		95	44	23	3	118	47		107	45	20	2	127	47
11:30		123	36	20	2	143	38		123	36	21	6	144	42
11:45		122	42	17	5	139	47		109	33	19	5	128	38
Total		3040	5608	434	544	3474	6152		2877	5125	413	543	3290	5668
Day Total		8648		978		9626			8002		956		8958	
% Total		31.6%	58.3%	4.5%	5.7%				32.1%	57.2%	4.6%	6.1%		
Peak		07:30	05:00	06:30	00:45	07:15	05:00		07:30	05:00	07:30	02:00	07:30	05:00
Vol.		609	730	75	83	651	765		519	650	73	98	592	698
P.H.F.		0.814	0.936	0.815	0.769	0.802	0.924		0.889	0.962	0.730	0.766	0.897	0.954

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GPI Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Site Code: Fallon Road
Station ID: Between I-93 Ramps

Start Time	16-Aug-12 Thu	Eastbound	Westbound	Combined Total
12:00 AM		63	10	73
01:00		28	5	33
02:00		18	9	27
03:00		10	8	18
04:00		39	25	64
05:00		95	26	121
06:00		351	59	410
07:00		587	57	644
08:00		529	50	579
09:00		429	52	481
10:00		437	63	500
11:00		454	70	524
12:00 PM		469	74	543
01:00		460	74	534
02:00		564	80	644
03:00		631	68	699
04:00		639	59	698
05:00		730	35	765
06:00		599	28	627
07:00		515	44	559
08:00		320	30	350
09:00		255	15	270
10:00		237	24	261
11:00		189	13	202
Total		8648	978	9626
Percent		89.8%	10.2%	

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Stoneham, MA
Client: Plourde
Phase I

Site Code: Fallon Road
Station ID: Between I-93 Ramps

Start Time	17-Aug-12 Fri	Eastbound	Westbound	Combined Total
12:00 AM		84	10	94
01:00		51	8	59
02:00		29	11	40
03:00		37	8	45
04:00		47	16	63
05:00		86	13	99
06:00		330	46	376
07:00		515	54	569
08:00		435	65	500
09:00		416	42	458
10:00		408	69	477
11:00		439	71	510
12:00 PM		433	73	506
01:00		492	78	570
02:00		501	98	599
03:00		597	71	668
04:00		618	61	679
05:00		650	48	698
06:00		542	45	587
07:00		369	22	391
08:00		332	12	344
09:00		233	16	249
10:00		201	4	205
11:00		157	15	172
Total		8002	956	8958
Percent		89.3%	10.7%	

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Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
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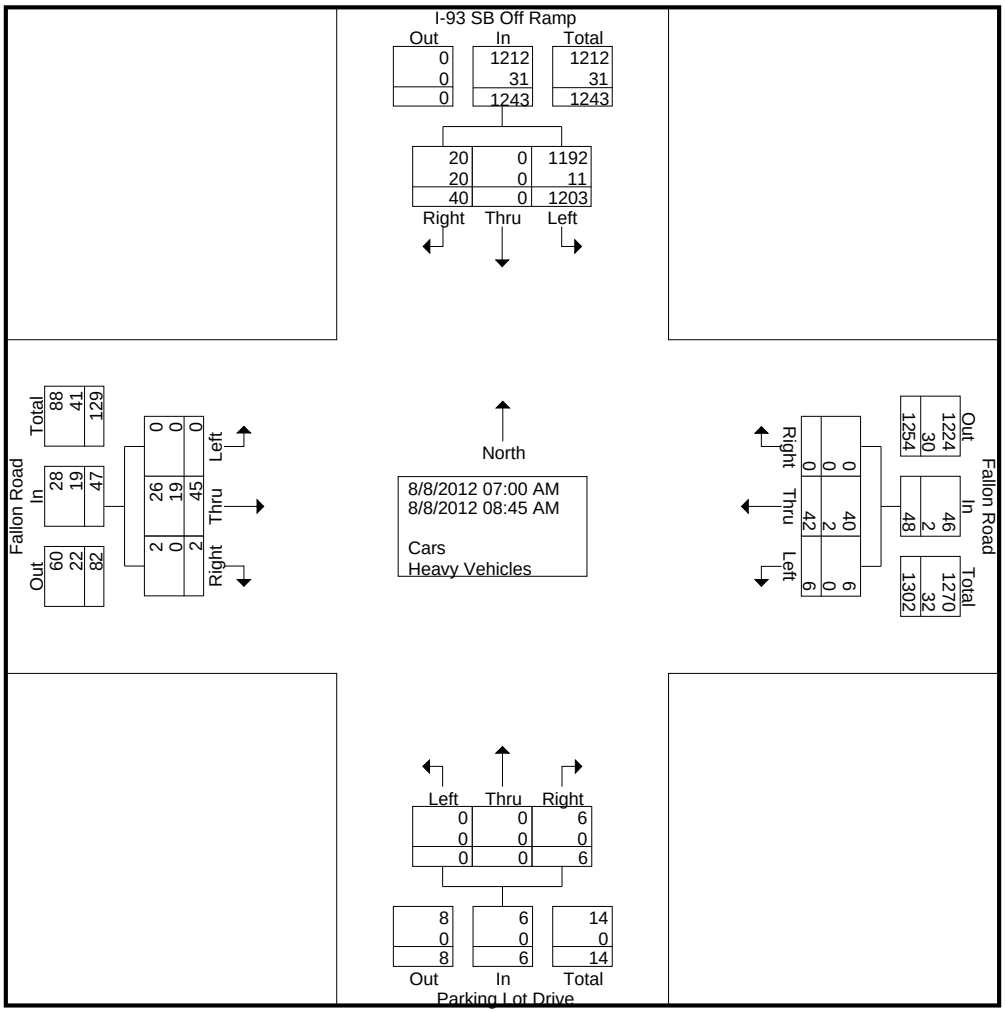
F: 617-801-8800
www.tsetraffic.com

File Name : 93s am
Site Code : 2
Start Date : 8/8/2012

Groups Printed- Cars - Heavy Vehicles

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	153	0	0	153	0	7	0	7	1	6	0	7	167
07:15 AM	0	0	0	0	138	0	4	142	0	3	0	3	1	5	0	6	151
07:30 AM	0	0	2	2	167	0	5	172	0	4	0	4	2	4	0	6	184
07:45 AM	0	0	2	2	161	0	10	171	0	6	2	8	0	6	0	6	187
Total	0	0	4	4	619	0	19	638	0	20	2	22	4	21	0	25	689
08:00 AM	0	0	1	1	152	0	1	153	0	10	0	10	1	6	0	7	171
08:15 AM	0	0	1	1	138	0	8	146	0	7	0	7	1	1	0	2	156
08:30 AM	0	0	0	0	142	0	4	146	0	2	0	2	0	5	0	5	153
08:45 AM	0	0	0	0	152	0	8	160	0	6	0	6	0	9	0	9	175
Total	0	0	2	2	584	0	21	605	0	25	0	25	2	21	0	23	655
Grand Total	0	0	6	6	1203	0	40	1243	0	45	2	47	6	42	0	48	1344
Apprch %	0	0	100		96.8	0	3.2		0	95.7	4.3		12.5	87.5	0		
Total %	0	0	0.4	0.4	89.5	0	3	92.5	0	3.3	0.1	3.5	0.4	3.1	0	3.6	
Cars	0	0	6	6	1192	0	20	1212	0	26	2	28	6	40	0	46	2584
% Cars	0	0	100	100	99.1	0	50	97.5	0	57.8	100	59.6	100	95.2	0	95.8	96.1
Heavy Vehicles	0	0	0	0	11	0	20	31	0	19	0	19	0	2	0	2	104
% Heavy Vehicles	0	0	0	0	0.9	0	50	2.5	0	42.2	0	40.4	0	4.8	0	4.2	3.9



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-443-5686
F: 617-801-8800
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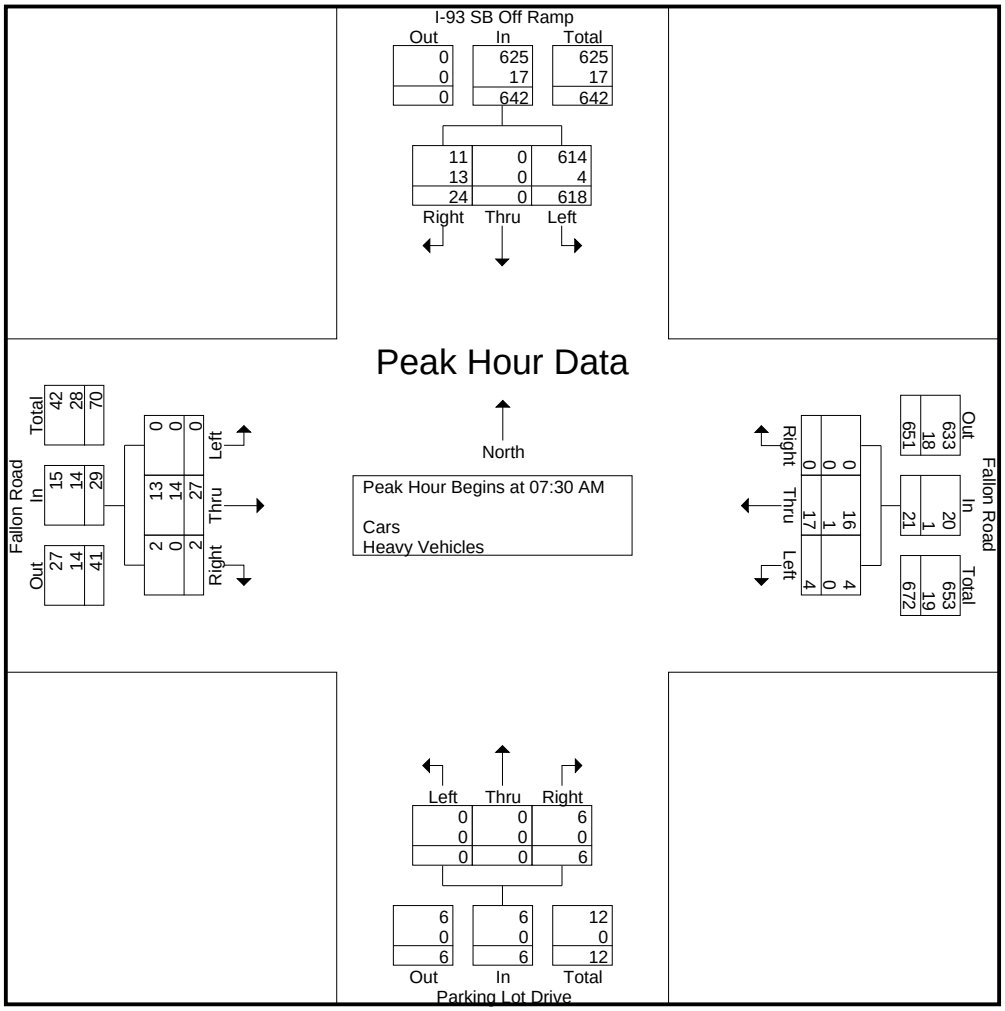
File Name : 93s am
Site Code : 2
Start Date : 8/8/2012

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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	0	0	**2**	**2**	**167**	0	5	**172**	0	4	0	4	**2**	4	0	6	184
07:45 AM	0	0	2	2	161	0	**10**	171	0	6	**2**	8	0	**6**	0	6	**187**
08:00 AM	0	0	1	1	152	0	1	153	0	**10**	0	**10**	1	6	0	**7**	171
08:15 AM	0	0	1	1	138	0	8	146	0	7	0	7	1	1	0	2	156
Total Volume	0	0	6	6	618	0	24	642	0	27	2	29	4	17	0	21	698
% App. Total	0	0	100		96.3	0	3.7		0	93.1	6.9		19	81	0		
PHF	.000	.000	.750	.750	.925	.000	.600	.933	.000	.675	.250	.725	.500	.708	.000	.750	.933
Cars	0	0	6	6	614	0	11	625	0	13	2	15	4	16	0	20	666
% Cars	0	0	100	100	99.4	0	45.8	97.4	0	48.1	100	51.7	100	94.1	0	95.2	95.4
Heavy Vehicles	0	0	0	0	4	0	13	17	0	14	0	14	0	1	0	1	32
% Heavy Vehicles	0	0	0	0	0.6	0	54.2	2.6	0	51.9	0	48.3	0	5.9	0	4.8	4.6



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Groups Printed- Heavy Vehicles

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	2	0	0	2	0	1	0	1	0	1	0	1	4
07:15 AM	0	0	0	0	3	0	2	5	0	0	0	0	0	0	0	0	5
07:30 AM	0	0	0	0	2	0	1	3	0	2	0	2	0	1	0	1	6
07:45 AM	0	0	0	0	0	0	8	8	0	3	0	3	0	0	0	0	11
Total	0	0	0	0	7	0	11	18	0	6	0	6	0	2	0	2	26
08:00 AM	0	0	0	0	1	0	1	2	0	6	0	6	0	0	0	0	8
08:15 AM	0	0	0	0	1	0	3	4	0	3	0	3	0	0	0	0	7
08:30 AM	0	0	0	0	0	0	1	1	0	2	0	2	0	0	0	0	3
08:45 AM	0	0	0	0	2	0	4	6	0	2	0	2	0	0	0	0	8
Total	0	0	0	0	4	0	9	13	0	13	0	13	0	0	0	0	26
Grand Total	0	0	0	0	11	0	20	31	0	19	0	19	0	2	0	2	52
Apprch %	0	0	0		35.5	0	64.5		0	100	0		0	100	0		
Total %	0	0	0	0	21.2	0	38.5	59.6	0	36.5	0	36.5	0	3.8	0	3.8	

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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	0	0	0	0	**2**	0	1	3	0	2	0	2	0	**1**	0	**1**	6
07:45 AM	0	0	0	0	0	0	**8**	**8**	0	3	0	3	0	0	0	0	**11**
08:00 AM	0	0	0	0	1	0	1	2	0	**6**	0	**6**	0	0	0	0	8
08:15 AM	0	0	0	0	1	0	3	4	0	3	0	3	0	0	0	0	7
Total Volume	0	0	0	0	4	0	13	17	0	14	0	14	0	1	0	1	32
% App. Total	0	0	0		23.5	0	76.5		0	100	0		0	100	0		
PHF	.000	.000	.000	.000	.500	.000	.406	.531	.000	.583	.000	.583	.000	.250	.000	.250	.727

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:30 AM				07:00 AM			
+0 mins.	0	0	0	0	2	0	0	2	0	2	0	2	0	**1**	0	**1**
+15 mins.	0	0	0	0	**3**	0	2	5	0	3	0	3	0	0	0	0
+30 mins.	0	0	0	0	2	0	1	3	0	**6**	0	**6**	0	1	0	1
+45 mins.	0	0	0	0	0	0	**8**	**8**	0	3	0	3	0	0	0	0
Total Volume	0	0	0	0	7	0	11	18	0	14	0	14	0	2	0	2
% App. Total	0	0	0		38.9	0	61.1		0	100	0		0	100	0	
PHF	.000	.000	.000	.000	.583	.000	.344	.563	.000	.583	.000	.583	.000	.500	.000	.500

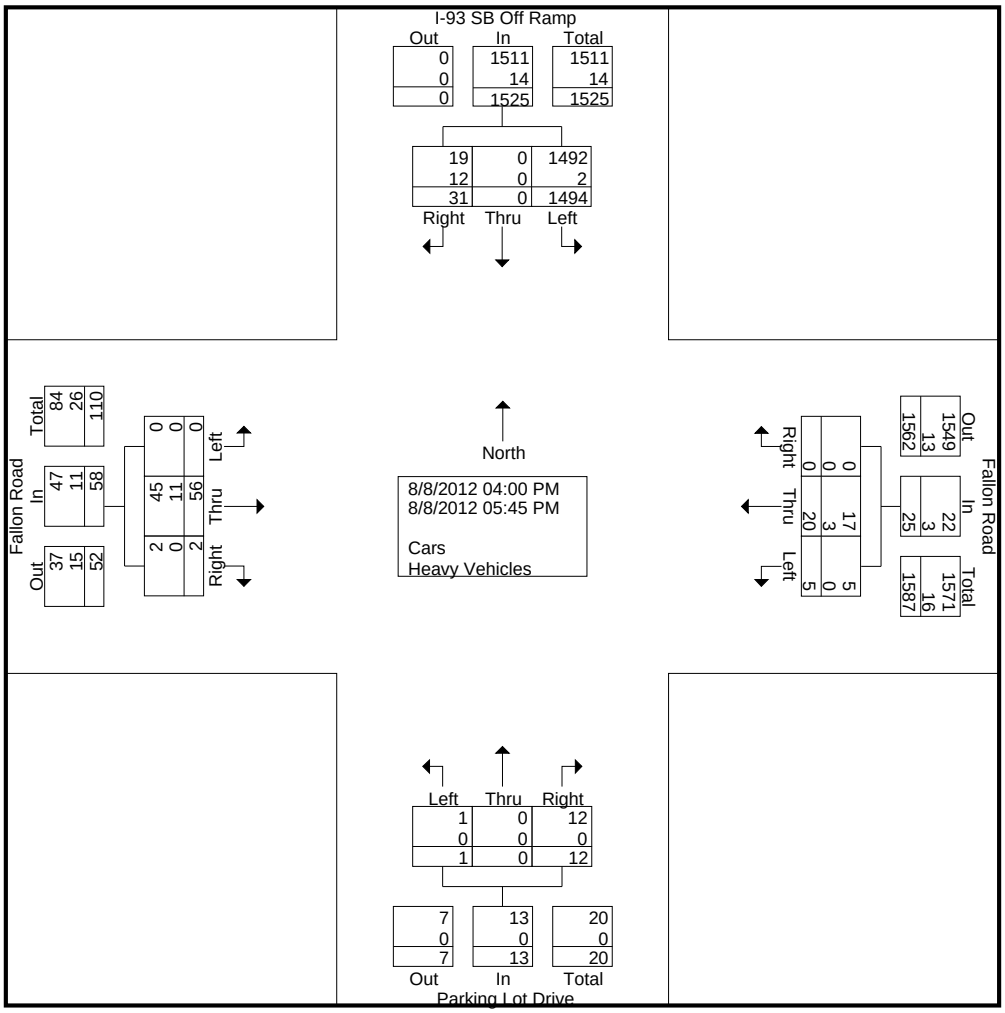
Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : 93S PM
Site Code : 2
Start Date : 8/8/2012
Page No : 1 of 4

Groups Printed- Cars - Heavy Vehicles

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	1	1	139	0	7	146	0	6	0	6	0	2	0	2	155
04:15 PM	1	0	0	1	173	0	5	178	0	8	0	8	0	3	0	3	190
04:30 PM	0	0	2	2	175	0	4	179	0	10	0	10	2	4	0	6	197
04:45 PM	0	0	3	3	189	0	4	193	0	8	2	10	2	2	0	4	210
Total	1	0	6	7	676	0	20	696	0	32	2	34	4	11	0	15	752
05:00 PM	0	0	3	3	210	0	1	211	0	5	0	5	0	2	0	2	221
05:15 PM	0	0	1	1	227	0	5	232	0	10	0	10	0	3	0	3	246
05:30 PM	0	0	1	1	218	0	3	221	0	7	0	7	0	1	0	1	230
05:45 PM	0	0	1	1	163	0	2	165	0	2	0	2	1	3	0	4	172
Total	0	0	6	6	818	0	11	829	0	24	0	24	1	9	0	10	869
Grand Total	1	0	12	13	1494	0	31	1525	0	56	2	58	5	20	0	25	1621
Apprch %	7.7	0	92.3		98	0	2		0	96.6	3.4		20	80	0		
Total %	0.1	0	0.7	0.8	92.2	0	1.9	94.1	0	3.5	0.1	3.6	0.3	1.2	0	1.5	
Cars	1	0	12	13	1492	0	19	1511	0	45	2	47	5	17	0	22	3186
% Cars	100	0	100	100	99.9	0	61.3	99.1	0	80.4	100	81	100	85	0	88	98.3
Heavy Vehicles	0	0	0	0	2	0	12	14	0	11	0	11	0	3	0	3	56
% Heavy Vehicles	0	0	0	0	0.1	0	38.7	0.9	0	19.6	0	19	0	15	0	12	1.7

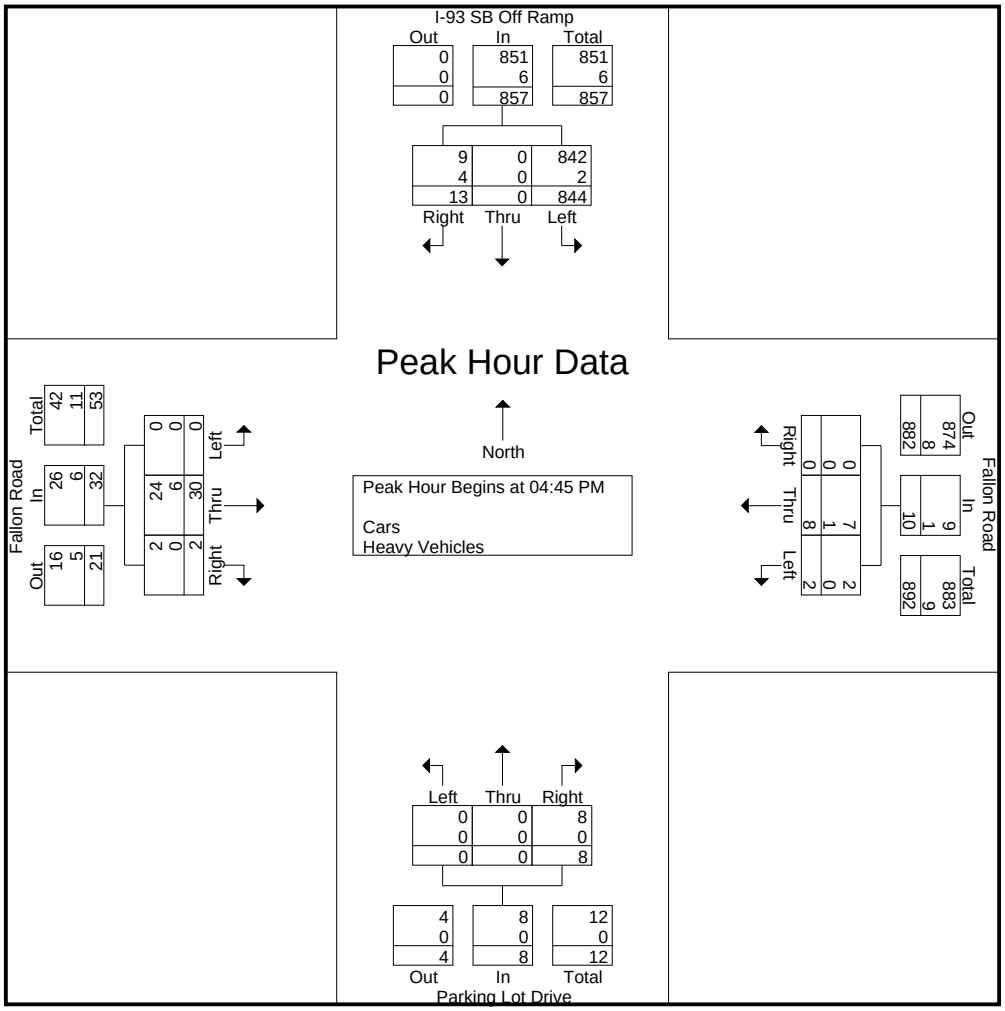


Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-301-3300
www.tsetraffic.com

File Name : 93S PM
Site Code : 2
Start Date : 8/8/2012

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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 04:45 PM																	
04:45 PM	0	0	**3**	**3**	189	0	4	193	0	8	**2**	**10**	**2**	2	0	**4**	210
05:00 PM	0	0	3	3	210	0	1	211	0	5	0	5	0	2	0	2	221
05:15 PM	0	0	1	1	**227**	0	**5**	**232**	0	**10**	0	10	0	**3**	0	3	**246**
05:30 PM	0	0	1	1	218	0	3	221	0	7	0	7	0	1	0	1	230
Total Volume	0	0	8	8	844	0	13	857	0	30	2	32	2	8	0	10	907
% App. Total	0	0	100		98.5	0	1.5		0	93.8	6.2		20	80	0		
PHF	.000	.000	.667	.667	.930	.000	.650	.923	.000	.750	.250	.800	.250	.667	.000	.625	.922
Cars	0	0	8	8	842	0	9	851	0	24	2	26	2	7	0	9	894
% Cars	0	0	100	100	99.8	0	69.2	99.3	0	80.0	100	81.3	100	87.5	0	90.0	98.6
Heavy Vehicles	0	0	0	0	2	0	4	6	0	6	0	6	0	1	0	1	13
% Heavy Vehicles	0	0	0	0	0.2	0	30.8	0.7	0	20.0	0	18.8	0	12.5	0	10.0	1.4



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-301-8300
www.tsetraffic.com

File Name : 93S PM
Site Code : 2
Start Date : 8/8/2012

Groups Printed- Heavy Vehicles

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	3	3	0	2	0	2	0	1	0	1	6
04:30 PM	0	0	0	0	0	0	1	1	0	2	0	2	0	1	0	1	4
04:45 PM	0	0	0	0	1	0	2	3	0	3	0	3	0	0	0	0	6
Total	0	0	0	0	1	0	10	11	0	7	0	7	0	2	0	2	20
05:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	2	2	0	1	0	1	0	1	0	1	4
05:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	0	0	0	0	1	0	2	3	0	4	0	4	0	1	0	1	8
Grand Total	0	0	0	0	2	0	12	14	0	11	0	11	0	3	0	3	28
Apprch %	0	0	0		14.3	0	85.7		0	100	0		0	100	0		
Total %	0	0	0	0	7.1	0	42.9	50	0	39.3	0	39.3	0	10.7	0	10.7	

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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	**4**	**4**	0	0	0	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	3	3	0	2	0	2	0	**1**	0	**1**	**6**
04:30 PM	0	0	0	0	0	0	1	1	0	2	0	2	0	1	0	1	4
04:45 PM	0	0	0	0	**1**	0	2	3	0	**3**	0	**3**	0	0	0	0	6
Total Volume	0	0	0	0	1	0	10	11	0	7	0	7	0	2	0	2	20
% App. Total	0	0	0		9.1	0	90.9		0	100	0		0	100	0		
PHF	.000	.000	.000	.000	.250	.000	.625	.688	.000	.583	.000	.583	.000	.500	.000	.500	.833

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:15 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	**4**	**4**	0	2	0	2	0	0	0	0
+15 mins.	0	0	0	0	0	0	3	3	0	2	0	2	0	**1**	0	**1**
+30 mins.	0	0	0	0	0	0	1	1	0	**3**	0	**3**	0	1	0	1
+45 mins.	0	0	0	0	**1**	0	2	3	0	1	0	1	0	0	0	0
Total Volume	0	0	0	0	1	0	10	11	0	8	0	8	0	2	0	2
% App. Total	0	0	0		9.1	0	90.9		0	100	0		0	100	0	
PHF	.000	.000	.000	.000	.250	.000	.625	.688	.000	.667	.000	.667	.000	.500	.000	.500

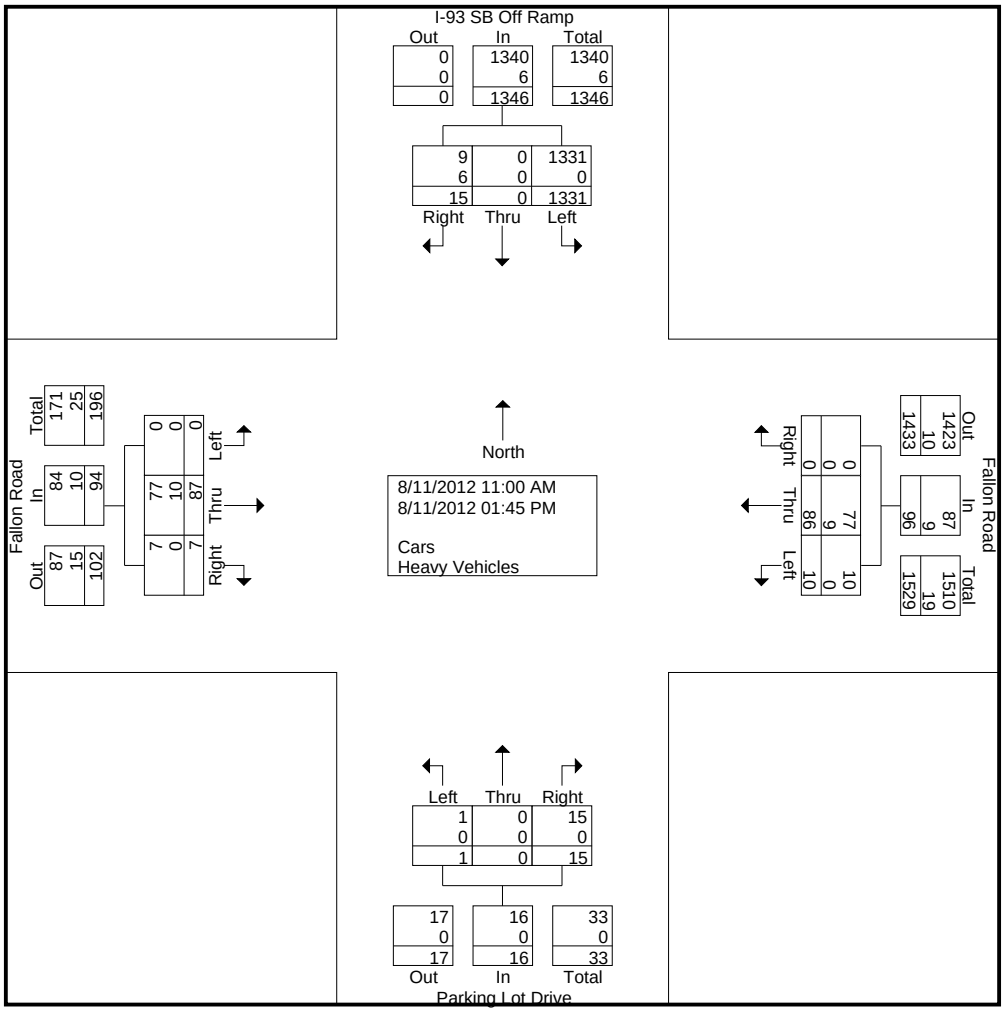
Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8300
www.tsetraffic.com

File Name : 93S SAT
Site Code : 2
Start Date : 8/11/2012

Groups Printed- Cars - Heavy Vehicles

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
11:00 AM	0	0	1	1	105	0	0	105	0	11	2	13	1	10	0	11	130
11:15 AM	0	0	0	0	110	0	1	111	0	7	0	7	1	10	0	11	129
11:30 AM	1	0	2	3	120	0	1	121	0	5	1	6	1	10	0	11	141
11:45 AM	0	0	0	0	102	0	5	107	0	12	0	12	2	7	0	9	128
Total	1	0	3	4	437	0	7	444	0	35	3	38	5	37	0	42	528
12:00 PM	0	0	0	0	116	0	1	117	0	12	0	12	1	9	0	10	139
12:15 PM	0	0	1	1	105	0	2	107	0	11	0	11	3	4	0	7	126
12:30 PM	0	0	2	2	112	0	2	114	0	4	2	6	0	8	0	8	130
12:45 PM	0	0	2	2	98	0	0	98	0	13	1	14	0	9	0	9	123
Total	0	0	5	5	431	0	5	436	0	40	3	43	4	30	0	34	518
01:00 PM	0	0	1	1	117	0	0	117	0	1	0	1	0	4	0	4	123
01:15 PM	0	0	1	1	117	0	1	118	0	5	1	6	1	5	0	6	131
01:30 PM	0	0	0	0	110	0	0	110	0	2	0	2	0	3	0	3	115
01:45 PM	0	0	5	5	119	0	2	121	0	4	0	4	0	7	0	7	137
Total	0	0	7	7	463	0	3	466	0	12	1	13	1	19	0	20	506
Grand Total	1	0	15	16	1331	0	15	1346	0	87	7	94	10	86	0	96	1552
Apprch %	6.2	0	93.8		98.9	0	1.1		0	92.6	7.4		10.4	89.6	0		
Total %	0.1	0	1	1	85.8	0	1	86.7	0	5.6	0.5	6.1	0.6	5.5	0	6.2	
Cars	1	0	15	16	1331	0	9	1340	0	77	7	84	10	77	0	87	3054
% Cars	100	0	100	100	100	0	60	99.6	0	88.5	100	89.4	100	89.5	0	90.6	98.4
Heavy Vehicles	0	0	0	0	0	0	6	6	0	10	0	10	0	9	0	9	50
% Heavy Vehicles	0	0	0	0	0	0	40	0.4	0	11.5	0	10.6	0	10.5	0	9.4	1.6

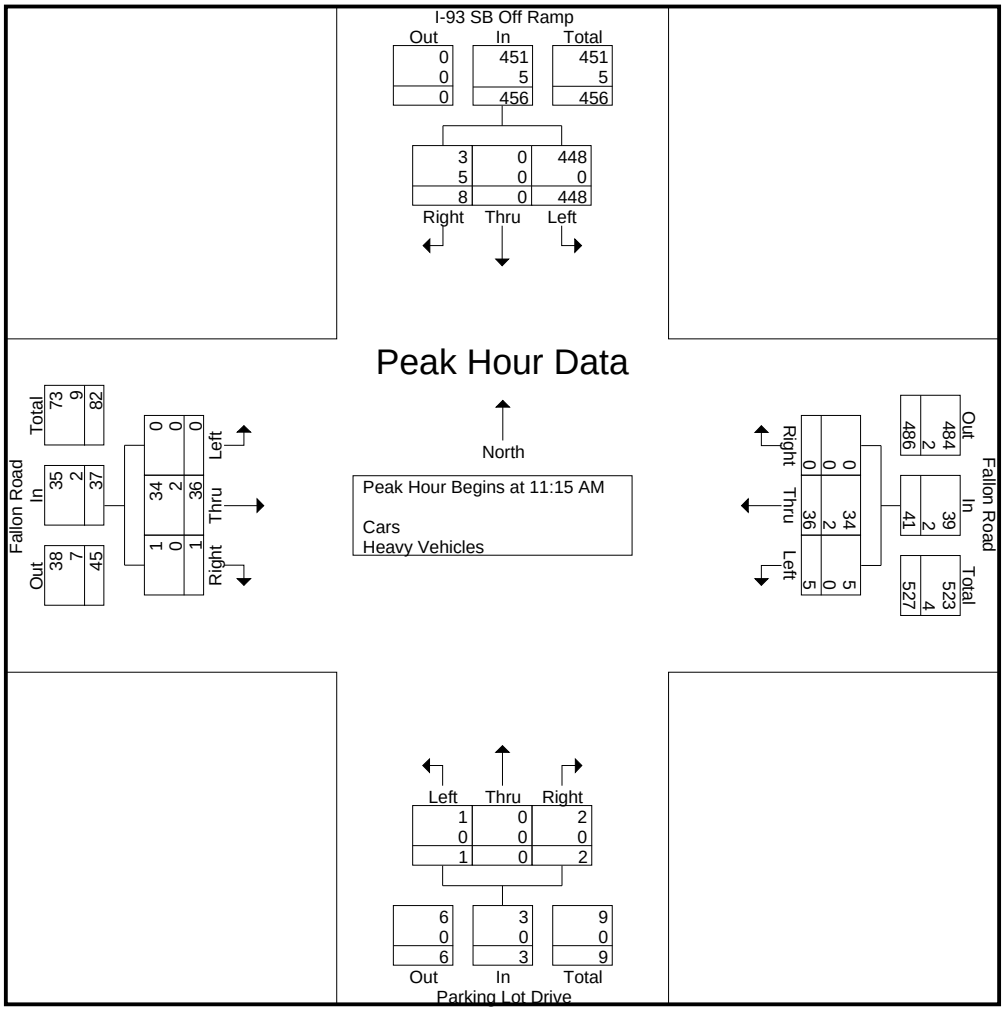


Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : 93S SAT
Site Code : 2
Start Date : 8/11/2012

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	0	0	0	0	110	0	1	111	0	7	0	7	1	**10**	0	**11**	129
11:30 AM	**1**	0	**2**	**3**	**120**	0	1	**121**	0	5	**1**	6	1	10	0	11	**141**
11:45 AM	0	0	0	0	102	0	**5**	107	0	**12**	0	**12**	**2**	7	0	9	128
12:00 PM	0	0	0	0	116	0	1	117	0	12	0	12	1	9	0	10	139
Total Volume	1	0	2	3	448	0	8	456	0	36	1	37	5	36	0	41	537
% App. Total	33.3	0	66.7		98.2	0	1.8		0	97.3	2.7		12.2	87.8	0		
PHF	.250	.000	.250	.250	.933	.000	.400	.942	.000	.750	.250	.771	.625	.900	.000	.932	.952
Cars	1	0	2	3	448	0	3	451	0	34	1	35	5	34	0	39	528
% Cars	100	0	100	100	100	0	37.5	98.9	0	94.4	100	94.6	100	94.4	0	95.1	98.3
Heavy Vehicles	0	0	0	0	0	0	5	5	0	2	0	2	0	2	0	2	9
% Heavy Vehicles	0	0	0	0	0	0	62.5	1.1	0	5.6	0	5.4	0	5.6	0	4.9	1.7



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : 93S SAT
Site Code : 2
Start Date : 8/11/2012

Groups Printed- Heavy Vehicles

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
11:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3
11:15 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1	3
11:45 AM	0	0	0	0	0	0	3	3	0	1	0	1	0	1	0	1	5
Total	0	0	0	0	0	0	5	5	0	3	0	3	0	4	0	4	12
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	2
12:45 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6
Total	0	0	0	0	0	0	1	1	0	5	0	5	0	3	0	3	9
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
01:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
Total	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
Grand Total	0	0	0	0	0	0	6	6	0	10	0	10	0	9	0	9	25
Apprch %	0	0	0		0	0	100		0	100	0		0	100	0		
Total %	0	0	0	0	0	0	24	24	0	40	0	40	0	36	0	36	

	Parking Lot Drive Northbound				I-93 SB Off Ramp Southbound				Fallon Road Eastbound				Fallon Road Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	**2**	0	**2**	3
11:15 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1	3
11:45 AM	0	0	0	0	0	0	**3**	**3**	0	1	0	1	0	1	0	1	**5**
Total Volume	0	0	0	0	0	0	5	5	0	3	0	3	0	4	0	4	12
% App. Total	0	0	0		0	0	100		0	100	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.417	.417	.000	.750	.000	.750	.000	.500	.000	.500	.600

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				12:00 PM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	0	**2**
+15 mins.	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0
+30 mins.	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1
+45 mins.	0	0	0	0	0	0	**3**	**3**	0	**3**	0	**3**	0	1	0	1
Total Volume	0	0	0	0	0	0	5	5	0	5	0	5	0	4	0	4
% App. Total	0	0	0		0	0	100		0	100	0		0	100	0	
PHF	.000	.000	.000	.000	.000	.000	.417	.417	.000	.417	.000	.417	.000	.500	.000	.500

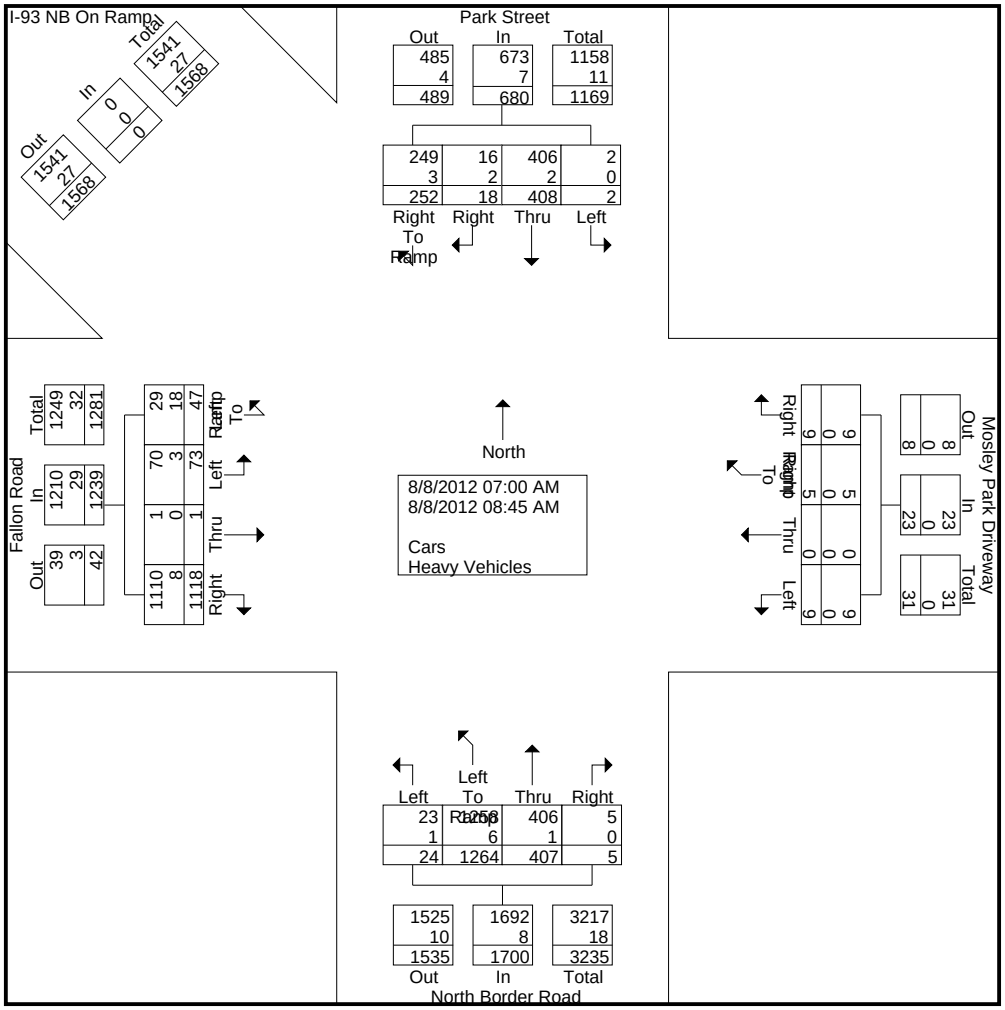
Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Mosley AM
Site Code : 3
Start Date : 8/8/2012
Page No : 1 of 4

Groups Printed- Cars - Heavy Vehicles

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
07:00 AM	3	145	32	0	180	0	46	4	26	76	9	8	0	144	161	3	0	1	2	6	423
07:15 AM	2	182	44	0	228	2	46	3	30	81	3	7	0	131	141	0	0	1	1	2	452
07:30 AM	3	172	57	2	234	0	49	1	36	86	8	10	1	153	172	1	0	1	0	2	494
07:45 AM	3	161	59	1	224	0	63	2	34	99	6	8	0	155	169	1	0	1	1	3	495
Total	11	660	192	3	866	2	204	10	126	342	26	33	1	583	643	5	0	4	4	13	1864
08:00 AM	3	147	53	2	205	0	61	1	33	95	9	7	0	152	168	4	0	1	1	6	474
08:15 AM	2	154	57	0	213	0	68	2	33	103	5	12	0	125	142	0	0	0	1	1	459
08:30 AM	3	164	55	0	222	0	34	3	33	70	1	9	0	126	136	0	0	0	1	1	429
08:45 AM	5	139	50	0	194	0	41	2	27	70	6	12	0	132	150	0	0	0	2	2	416
Total	13	604	215	2	834	0	204	8	126	338	21	40	0	535	596	4	0	1	5	10	1778
Grand Total	24	1264	407	5	1700	2	408	18	252	680	47	73	1	1118	1239	9	0	5	9	23	3642
Apprch %	1.4	74.4	23.9	0.3		0.3	60	2.6	37.1		3.8	5.9	0.1	90.2		39.1	0	21.7	39.1		
Total %	0.7	34.7	11.2	0.1	46.7	0.1	11.2	0.5	6.9	18.7	1.3	2	0	30.7	34	0.2	0	0.1	0.2	0.6	
Cars	23	1258	406	5	1692	2	406	16	249	673	29	70	1	1110	1210	9	0	5	9	23	7196
% Cars	95.8	99.5	99.8	100	99.5	100	99.5	88.9	98.8	99	61.7	95.9	100	99.3	97.7	100	0	100	100	100	98.8
Heavy Vehicles	1	6	1	0	8	0	2	2	3	7	18	3	0	8	29	0	0	0	0	0	88
% Heavy Vehicles	4.2	0.5	0.2	0	0.5	0	0.5	11.1	1.2	1	38.3	4.1	0	0.7	2.3	0	0	0	0	0	1.2

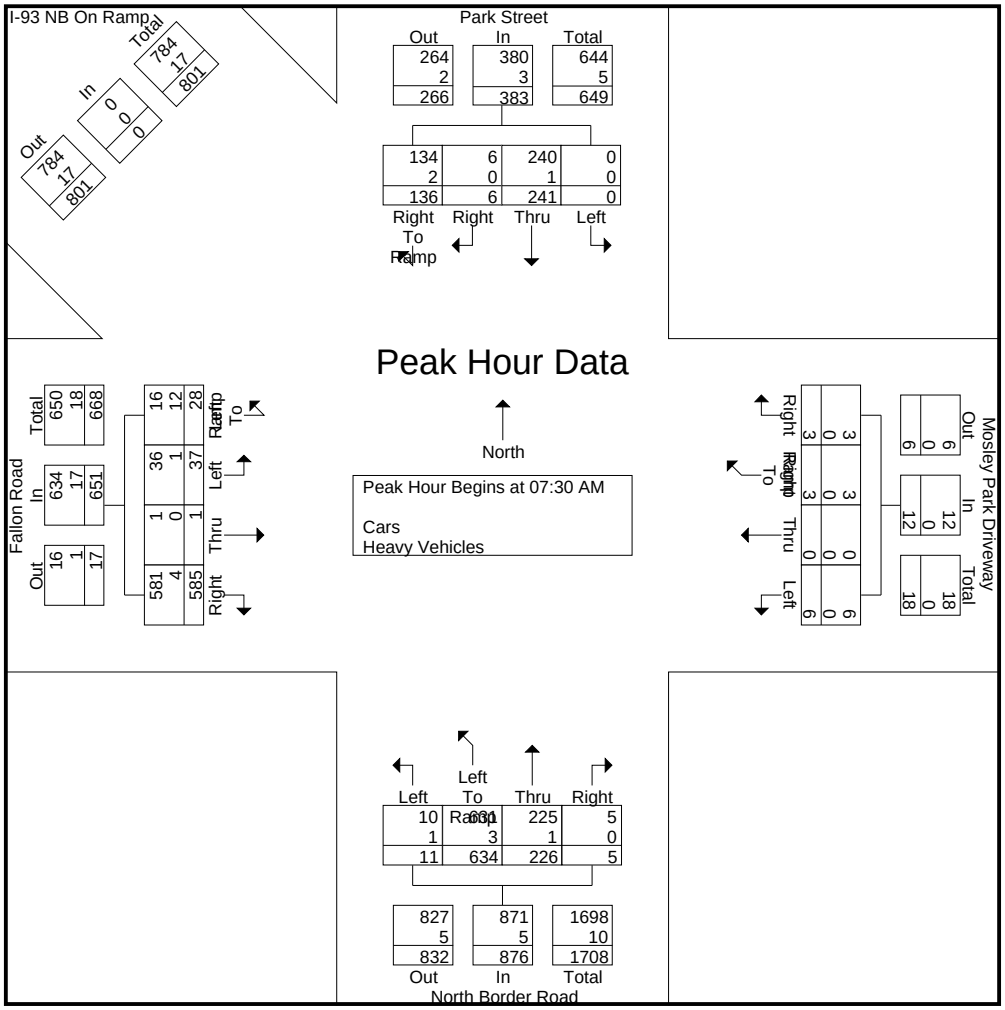


Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Mosley AM
Site Code : 3
Start Date : 8/8/2012
Page No : 2 of 4

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	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	**3**	**172**	57	**2**	**234**	0	49	1	**36**	86	8	10	**1**	153	**172**	1	0	**1**	0	2	494
07:45 AM	3	161	**59**	1	224	0	63	**2**	34	99	6	8	0	**155**	169	1	0	1	**1**	3	**495**
08:00 AM	3	147	53	2	205	0	61	1	33	95	**9**	7	0	152	168	**4**	0	1	1	**6**	474
08:15 AM	2	154	57	0	213	0	**68**	2	33	**103**	5	**12**	0	125	142	0	0	0	1	1	459
Total Volume	11	634	226	5	876	0	241	6	136	383	28	37	1	585	651	6	0	3	3	12	1922
% App. Total	1.3	72.4	25.8	0.6		0	62.9	1.6	35.5		4.3	5.7	0.2	89.9		50	0	25	25		
PHF	.917	.922	.958	.625	.936	.000	.886	.750	.944	.930	.778	.771	.250	.944	.946	.375	.000	.750	.750	.500	.971
Cars	10	631	225	5	871	0	240	6	134	380	16	36	1	581	634	6	0	3	3	12	1897
% Cars	90.9	99.5	99.6	100	99.4	0	99.6	100	98.5	99.2	57.1	97.3	100	99.3	97.4	100	0	100	100	100	98.7
Heavy Vehicles	1	3	1	0	5	0	1	0	2	3	12	1	0	4	17	0	0	0	0	0	25
% Heavy Vehicles	9.1	0.5	0.4	0	0.6	0	0.4	0	1.5	0.8	42.9	2.7	0	0.7	2.6	0	0	0	0	0	1.3



Project #: MAX-2012078
Stoneham, MA
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Phase I

Traffic Survey Expedition
106 Sharon Road
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File Name : Mosley AM
Site Code : 3
Start Date : 8/8/2012
Page No : 4 of 4

Groups Printed- Heavy Vehicles

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	1	0	1	1	1	0	1	3	0	0	0	0	0	4
07:15 AM	0	2	0	0	2	0	0	0	0	0	2	1	0	1	4	0	0	0	0	0	6
07:30 AM	1	2	0	0	3	0	0	0	1	1	3	0	0	0	3	0	0	0	0	0	7
07:45 AM	0	1	1	0	2	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0	5
Total	1	5	1	0	7	0	0	1	1	2	8	3	0	2	13	0	0	0	0	0	22
08:00 AM	0	0	0	0	0	0	1	0	0	1	5	0	0	2	7	0	0	0	0	0	8
08:15 AM	0	0	0	0	0	0	0	0	1	1	2	0	0	2	4	0	0	0	0	0	5
08:30 AM	0	1	0	0	1	0	0	1	1	2	1	0	0	1	2	0	0	0	0	0	5
08:45 AM	0	0	0	0	0	0	1	0	0	1	2	0	0	1	3	0	0	0	0	0	4
Total	0	1	0	0	1	0	2	1	2	5	10	0	0	6	16	0	0	0	0	0	22
Grand Total	1	6	1	0	8	0	2	2	3	7	18	3	0	8	29	0	0	0	0	0	44
Apprch %	12.5	75	12.5	0		0	28.6	28.6	42.9		62.1	10.3	0	27.6		0	0	0	0		
Total %	2.3	13.6	2.3	0	18.2	0	4.5	4.5	6.8	15.9	40.9	6.8	0	18.2	65.9	0	0	0	0	0	

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	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 07:15 AM																					
07:15 AM	0	**2**	0	0	2	0	0	0	0	0	2	**1**	0	1	4	0	0	0	0	0	6
07:30 AM	**1**	2	0	0	**3**	0	0	0	**1**	**1**	3	0	0	0	3	0	0	0	0	0	7
07:45 AM	0	1	**1**	0	2	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0	5
08:00 AM	0	0	0	0	0	0	**1**	0	0	1	**5**	0	0	**2**	**7**	0	0	0	0	0	**8**
Total Volume	1	5	1	0	7	0	1	0	1	2	12	2	0	3	17	0	0	0	0	0	26
% App. Total	14.3	71.4	14.3	0		0	50	0	50		70.6	11.8	0	17.6		0	0	0	0		
PHF	.250	.625	.250	.000	.583	.000	.250	.000	.250	.500	.600	.500	.000	.375	.607	.000	.000	.000	.000	.000	.813

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM					08:00 AM					07:15 AM					07:00 AM				
+0 mins.	0	0	0	0	0	0	**1**	0	0	1	2	**1**	0	1	4	0	0	0	0	0
+15 mins.	0	**2**	0	0	2	0	0	0	**1**	1	3	0	0	0	3	0	0	0	0	0
+30 mins.	**1**	2	0	0	**3**	0	0	**1**	1	**2**	2	1	0	0	3	0	0	0	0	0
+45 mins.	0	1	**1**	0	2	0	1	0	0	1	**5**	0	0	**2**	**7**	0	0	0	0	0
Total Volume	1	5	1	0	7	0	2	1	2	5	12	2	0	3	17	0	0	0	0	0
% App. Total	14.3	71.4	14.3	0		0	40	20	40		70.6	11.8	0	17.6		0	0	0	0	
PHF	.250	.625	.250	.000	.583	.000	.500	.250	.500	.625	.600	.500	.000	.375	.607	.000	.000	.000	.000	.000

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Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
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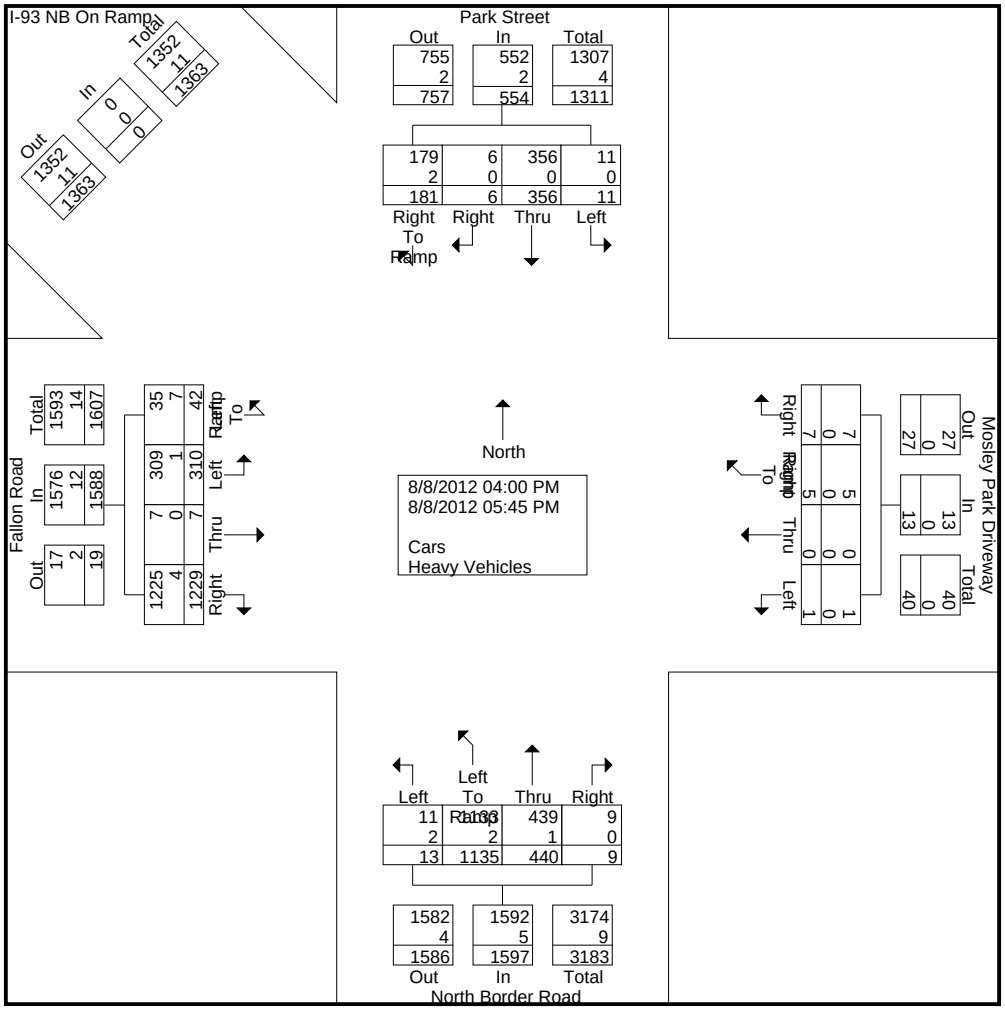
www.tsetraffic.com

File Name : Mosley PM
Site Code : 3
Start Date : 8/8/2012
Page No : 1 of 4

Groups Printed- Cars - Heavy Vehicles

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
04:00 PM	3	154	42	0	199	3	37	0	31	71	3	29	2	131	165	0	0	0	1	1	436
04:15 PM	1	165	49	1	216	2	44	2	28	76	5	36	2	137	180	0	0	0	1	1	473
04:30 PM	3	163	48	2	216	1	40	2	22	65	7	36	0	156	199	1	0	1	0	2	482
04:45 PM	4	138	50	2	194	1	44	0	19	64	6	39	2	147	194	0	0	0	1	1	453
Total	11	620	189	5	825	7	165	4	100	276	21	140	6	571	738	1	0	1	3	5	1844
05:00 PM	0	125	65	2	192	2	51	1	26	80	5	44	0	169	218	0	0	0	2	2	492
05:15 PM	0	161	68	1	230	1	44	0	19	64	8	45	0	167	220	0	0	2	2	4	518
05:30 PM	0	115	61	1	177	1	48	0	18	67	4	47	1	163	215	0	0	2	0	2	461
05:45 PM	2	114	57	0	173	0	48	1	18	67	4	34	0	159	197	0	0	0	0	0	437
Total	2	515	251	4	772	4	191	2	81	278	21	170	1	658	850	0	0	4	4	8	1908
Grand Total	13	1135	440	9	1597	11	356	6	181	554	42	310	7	1229	1588	1	0	5	7	13	3752
Apprch %	0.8	71.1	27.6	0.6		2	64.3	1.1	32.7		2.6	19.5	0.4	77.4		7.7	0	38.5	53.8		
Total %	0.3	30.3	11.7	0.2	42.6	0.3	9.5	0.2	4.8	14.8	1.1	8.3	0.2	32.8	42.3	0	0	0.1	0.2	0.3	
Cars	11	1133	439	9	1592	11	356	6	179	552	35	309	7	1225	1576	1	0	5	7	13	7466
% Cars	84.6	99.8	99.8	100	99.7	100	100	100	98.9	99.6	83.3	99.7	100	99.7	99.2	100	0	100	100	100	99.5
Heavy Vehicles	2	2	1	0	5	0	0	0	2	2	7	1	0	4	12	0	0	0	0	0	38
% Heavy Vehicles	15.4	0.2	0.2	0	0.3	0	0	0	1.1	0.4	16.7	0.3	0	0.3	0.8	0	0	0	0	0	0.5



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
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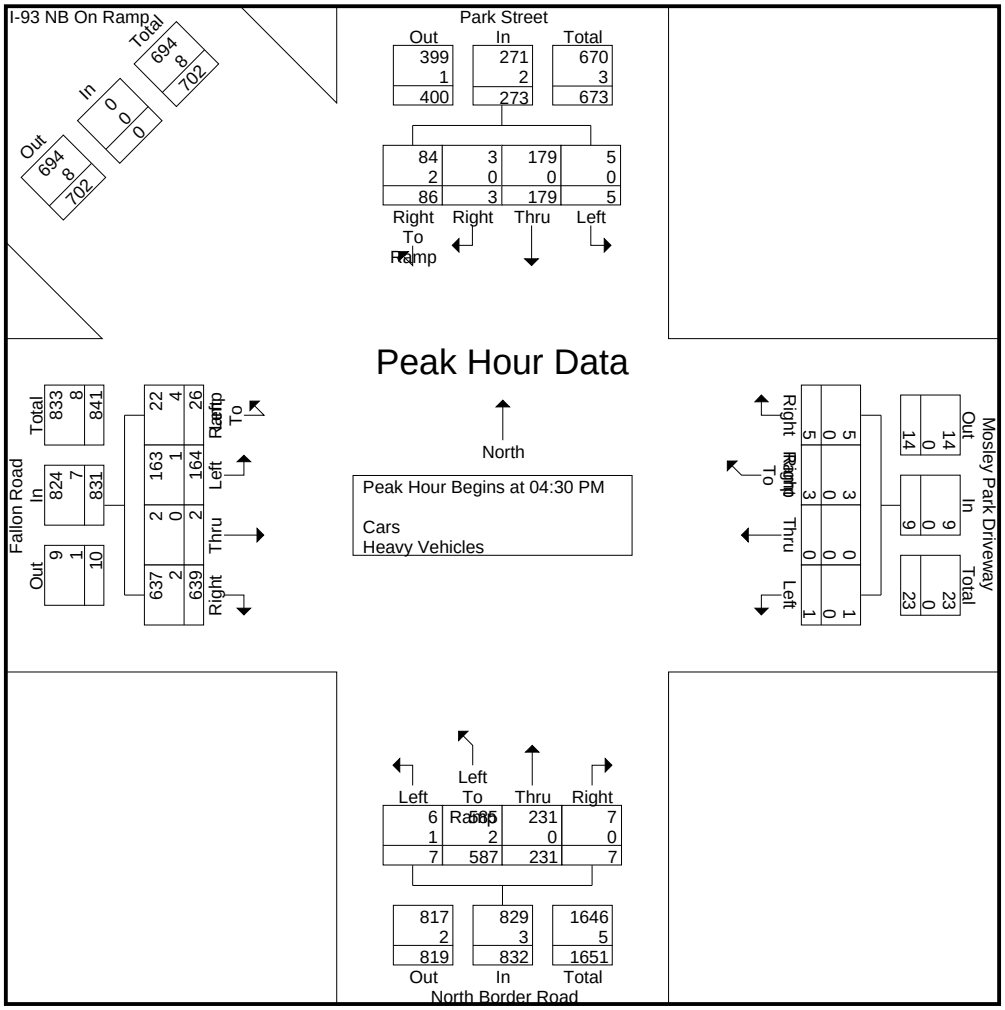
File Name : Mosley PM
Site Code : 3
Start Date : 8/8/2012

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	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	3	**163**	48	**2**	216	1	40	**2**	22	65	7	36	0	156	199	**1**	0	1	0	2	482
04:45 PM	**4**	138	50	2	194	1	44	0	19	64	6	39	**2**	147	194	0	0	0	1	1	453
05:00 PM	0	125	65	2	192	**2**	**51**	1	**26**	**80**	5	44	0	**169**	218	0	0	0	**2**	2	492
05:15 PM	0	161	**68**	1	**230**	1	44	0	19	64	**8**	**45**	0	167	**220**	0	0	**2**	2	**4**	**518**
Total Volume	7	587	231	7	832	5	179	3	86	273	26	164	2	639	831	1	0	3	5	9	1945
% App. Total	0.8	70.6	27.8	0.8		1.8	65.6	1.1	31.5		3.1	19.7	0.2	76.9		11.1	0	33.3	55.6		
PHF	.438	.900	.849	.875	.904	.625	.877	.375	.827	.853	.813	.911	.250	.945	.944	.250	.000	.375	.625	.563	.939
Cars	6	585	231	7	829	5	179	3	84	271	22	163	2	637	824	1	0	3	5	9	1933
% Cars	85.7	99.7	100	100	99.6	100	100	100	97.7	99.3	84.6	99.4	100	99.7	99.2	100	0	100	100	100	99.4
Heavy Vehicles	1	2	0	0	3	0	0	0	2	2	4	1	0	2	7	0	0	0	0	0	12
% Heavy Vehicles	14.3	0.3	0	0	0.4	0	0	0	2.3	0.7	15.4	0.6	0	0.3	0.8	0	0	0	0	0	0.6



Project #: MAX-2012078
Stoneham, MA
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Phase I

Traffic Survey Expedition
106 Sharon Road
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File Name : Mosley PM
Site Code : 3
Start Date : 8/8/2012
Page No : 4 of 4

Groups Printed- Heavy Vehicles

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
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	1	0	1	0	2	0	0	0	0	0	1	0	0	2	3	0	0	0	0	0	5
04:30 PM	1	1	0	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	0	0	0	1	1	2	1	0	1	4	0	0	0	0	0	5
Total	2	1	1	0	4	0	0	0	1	1	3	1	0	4	8	0	0	0	0	0	13
05:00 PM	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	2
05:15 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	1	1	4	0	0	0	4	0	0	0	0	0	6
Grand Total	2	2	1	0	5	0	0	0	2	2	7	1	0	4	12	0	0	0	0	0	19
Apprch %	40	40	20	0		0	0	0	100		58.3	8.3	0	33.3		0	0	0	0		
Total %	10.5	10.5	5.3	0	26.3	0	0	0	10.5	10.5	36.8	5.3	0	21.1	63.2	0	0	0	0	0	

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	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 04:15 PM																					
04:15 PM	**1**	0	**1**	0	**2**	0	0	0	0	0	1	0	0	**2**	3	0	0	0	0	0	**5**
04:30 PM	1	**1**	0	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	0	0	0	**1**	**1**	**2**	**1**	0	1	**4**	0	0	0	0	0	5
05:00 PM	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	2
Total Volume	2	1	1	0	4	0	0	0	2	2	4	1	0	4	9	0	0	0	0	0	15
% App. Total	50	25	25	0		0	0	0	100		44.4	11.1	0	44.4		0	0	0	0		
PHF	.500	.250	.250	.000	.500	.000	.000	.000	.500	.500	.500	.250	.000	.500	.563	.000	.000	.000	.000	.000	.750

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM					04:15 PM					04:15 PM					04:00 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	1	0	0	**2**	3	0	0	0	0	0
+15 mins.	**1**	0	**1**	0	**2**	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
+30 mins.	1	**1**	0	0	2	0	0	0	**1**	**1**	**2**	**1**	0	1	**4**	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0
Total Volume	2	1	1	0	4	0	0	0	2	2	4	1	0	4	9	0	0	0	0	0
% App. Total	50	25	25	0		0	0	0	100		44.4	11.1	0	44.4		0	0	0	0	
PHF	.500	.250	.250	.000	.500	.000	.000	.000	.500	.500	.500	.250	.000	.500	.563	.000	.000	.000	.000	.000

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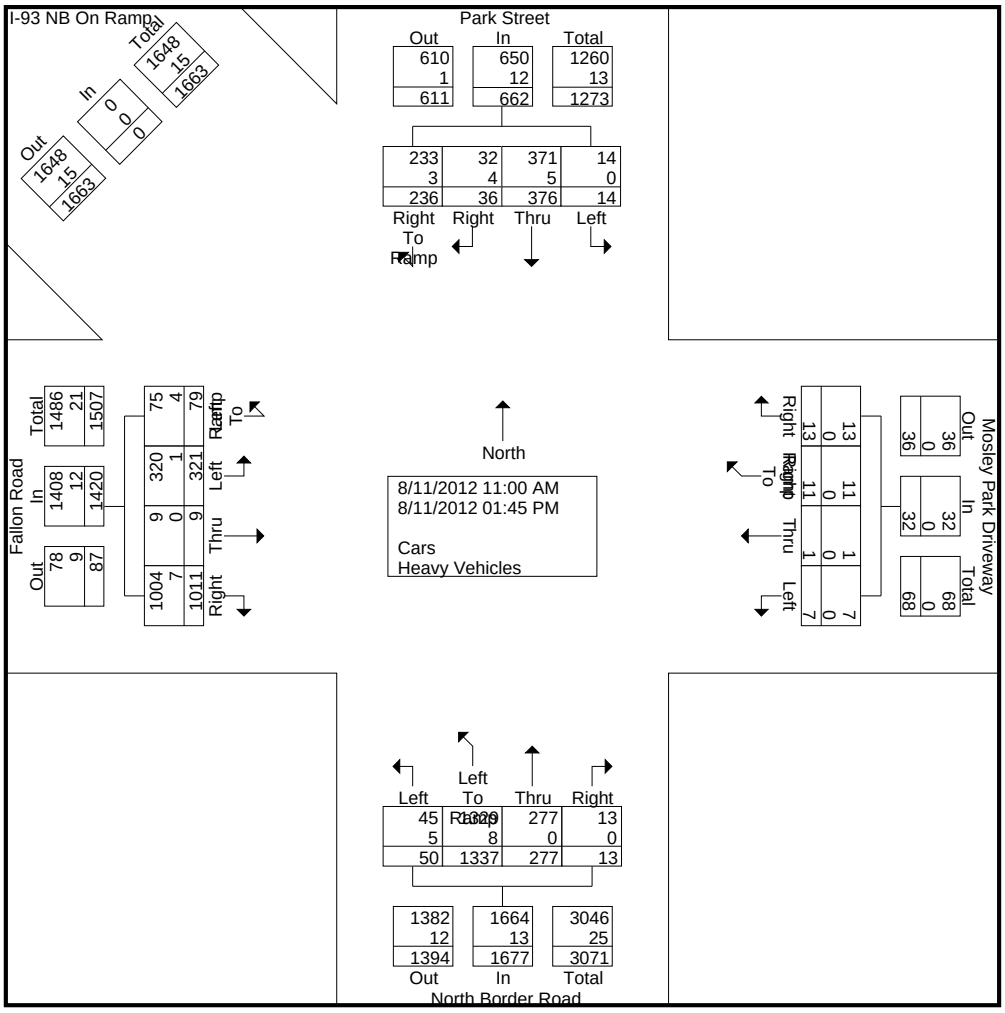
File Name : Mosley SAT
Site Code : 3
Start Date : 8/11/2012
Page No : 1 of 4

Groups Printed- Cars - Heavy Vehicles

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
11:00 AM	7	112	15	1	135	1	31	3	22	57	7	26	1	81	115	1	0	0	1	2	309
11:15 AM	6	114	22	0	142	0	27	4	20	51	4	28	0	83	115	0	1	1	0	2	310
11:30 AM	5	117	18	2	142	1	43	4	19	67	9	32	1	83	125	1	0	0	1	2	336
11:45 AM	6	97	28	2	133	3	34	3	19	59	5	26	1	80	112	1	0	2	1	4	308
Total	24	440	83	5	552	5	135	14	80	234	25	112	3	327	467	3	1	3	3	10	1263
12:00 PM	4	113	18	0	135	2	37	4	18	61	9	31	1	88	129	1	0	1	2	4	329
12:15 PM	5	113	25	3	146	1	34	3	18	56	11	21	0	83	115	0	0	2	1	3	320
12:30 PM	4	115	25	0	144	1	30	4	15	50	9	26	1	79	115	0	0	3	1	4	313
12:45 PM	3	114	22	2	141	1	30	3	16	50	4	26	0	84	114	1	0	0	0	1	306
Total	16	455	90	5	566	5	131	14	67	217	33	104	2	334	473	2	0	6	4	12	1268
01:00 PM	2	111	19	0	132	0	32	2	16	50	4	22	0	91	117	0	0	0	3	3	302
01:15 PM	4	122	28	0	154	2	26	2	21	51	6	32	2	84	124	1	0	1	1	3	332
01:30 PM	2	103	25	3	133	1	27	1	23	52	4	23	1	85	113	0	0	0	0	0	298
01:45 PM	2	106	32	0	140	1	25	3	29	58	7	28	1	90	126	1	0	1	2	4	328
Total	10	442	104	3	559	4	110	8	89	211	21	105	4	350	480	2	0	2	6	10	1260
Grand Total	50	1337	277	13	1677	14	376	36	236	662	79	321	9	1011	1420	7	1	11	13	32	3791
Apprch %	3	79.7	16.5	0.8		2.1	56.8	5.4	35.6		5.6	22.6	0.6	71.2		21.9	3.1	34.4	40.6		
Total %	1.3	35.3	7.3	0.3	44.2	0.4	9.9	0.9	6.2	17.5	2.1	8.5	0.2	26.7	37.5	0.2	0	0.3	0.3	0.8	
Cars	45	1329	277	13	1664	14	371	32	233	650	75	320	9	1004	1408	7	1	11	13	32	7508
% Cars	90	99.4	100	100	99.2	100	98.7	88.9	98.7	98.2	94.9	99.7	100	99.3	99.2	100	100	100	100	100	99
Heavy Vehicles	5	8	0	0	13	0	5	4	3	12	4	1	0	7	12	0	0	0	0	0	74
% Heavy Vehicles	10	0.6	0	0	0.8	0	1.3	11.1	1.3	1.8	5.1	0.3	0	0.7	0.8	0	0	0	0	0	1

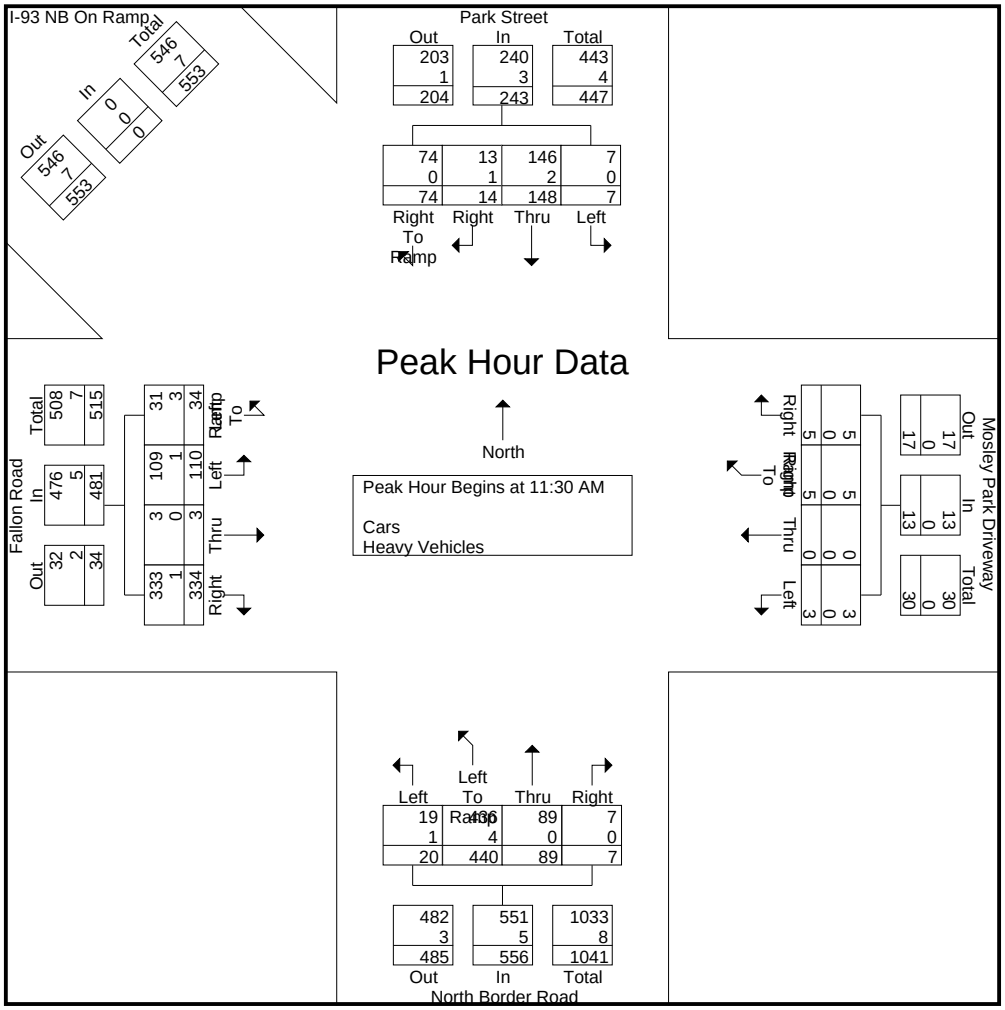


Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-443-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Mosley SAT
Site Code : 3
Start Date : 8/11/2012

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	5	**117**	18	2	142	1	**43**	**4**	**19**	**67**	9	**32**	**1**	83	125	**1**	0	0	1	2	**336**
11:45 AM	**6**	97	**28**	2	133	**3**	34	3	19	59	5	26	1	80	112	1	0	**2**	1	**4**	308
12:00 PM	4	113	18	0	135	2	37	4	18	61	9	31	1	**88**	**129**	1	0	1	**2**	4	329
12:15 PM	5	113	25	**3**	**146**	1	34	3	18	56	**11**	21	0	83	115	0	0	2	1	3	320
Total Volume	20	440	89	7	556	7	148	14	74	243	34	110	3	334	481	3	0	5	5	13	1293
% App. Total	3.6	79.1	16	1.3		2.9	60.9	5.8	30.5		7.1	22.9	0.6	69.4		23.1	0	38.5	38.5		
PHF	.833	.940	.795	.583	.952	.583	.860	.875	.974	.907	.773	.859	.750	.949	.932	.750	.000	.625	.625	.813	.962
Cars	19	436	89	7	551	7	146	13	74	240	31	109	3	333	476	3	0	5	5	13	1280
% Cars	95.0	99.1	100	100	99.1	100	98.6	92.9	100	98.8	91.2	99.1	100	99.7	99.0	100	0	100	100	100	99.0
Heavy Vehicles	1	4	0	0	5	0	2	1	0	3	3	1	0	1	5	0	0	0	0	0	13
% Heavy Vehicles	5.0	0.9	0	0	0.9	0	1.4	7.1	0	1.2	8.8	0.9	0	0.3	1.0	0	0	0	0	0	1.0



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Mosley SAT
Site Code : 3
Start Date : 8/11/2012

Groups Printed- Heavy Vehicles

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
11:00 AM	1	1	0	0	2	0	1	0	1	2	1	0	0	1	2	0	0	0	0	0	6
11:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	1	0	0	1	0	1	1	0	2	1	0	0	1	2	0	0	0	0	0	5
11:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	2
Total	2	2	0	0	4	0	2	1	1	4	3	1	0	2	6	0	0	0	0	0	14
12:00 PM	1	2	0	0	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4
12:15 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
12:45 PM	1	0	0	0	1	0	0	1	0	1	0	0	0	3	3	0	0	0	0	0	5
Total	2	3	0	0	5	0	1	2	0	3	1	0	0	3	4	0	0	0	0	0	12
01:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:15 PM	0	0	0	0	0	0	1	0	1	2	0	0	0	1	1	0	0	0	0	0	3
01:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
01:45 PM	1	1	0	0	2	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	5
Total	1	3	0	0	4	0	2	1	2	5	0	0	0	2	2	0	0	0	0	0	11
Grand Total	5	8	0	0	13	0	5	4	3	12	4	1	0	7	12	0	0	0	0	0	37
Apprch %	38.5	61.5	0	0		0	41.7	33.3	25		33.3	8.3	0	58.3		0	0	0	0		
Total %	13.5	21.6	0	0	35.1	0	13.5	10.8	8.1	32.4	10.8	2.7	0	18.9	32.4	0	0	0	0	0	

	North Border Road Northbound					Park Street Southbound					Fallon Road Eastbound					Mosley Park Driveway Westbound					
Start Time	Left	Left To Ramp	Thru	Right	App. Total	Left	Thru	Right	Right To Ramp	App. Total	Left To Ramp	Left	Thru	Right	App. Total	Left	Thru	Right To Ramp	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	**1**	**1**	0	0	**2**	0	**1**	0	**1**	**2**	**1**	0	0	**1**	**2**	0	0	0	0	0	**6**
11:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	1	0	0	1	0	1	**1**	0	2	1	0	0	1	2	0	0	0	0	0	5
11:45 AM	0	0	0	0	0	0	0	0	0	0	1	**1**	0	0	2	0	0	0	0	0	2
Total Volume	2	2	0	0	4	0	2	1	1	4	3	1	0	2	6	0	0	0	0	0	14
% App. Total	50	50	0	0		0	50	25	25		50	16.7	0	33.3		0	0	0	0		
PHF	.500	.500	.000	.000	.500	.000	.500	.250	.250	.500	.750	.250	.000	.500	.750	.000	.000	.000	.000	.000	.583

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	11:15 AM					01:00 PM					11:00 AM					11:00 AM				
+0 mins.	**1**	0	0	0	1	0	0	0	0	0	**1**	0	0	**1**	**2**	0	0	0	0	0
+15 mins.	0	1	0	0	1	0	**1**	0	**1**	2	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	0	0
+45 mins.	1	**2**	0	0	**3**	0	1	**1**	1	**3**	1	**1**	0	0	2	0	0	0	0	0
Total Volume	2	3	0	0	5	0	2	1	2	5	3	1	0	2	6	0	0	0	0	0
% App. Total	40	60	0	0		0	40	20	40		50	16.7	0	33.3		0	0	0	0	
PHF	.500	.375	.000	.000	.417	.000	.500	.250	.500	.417	.750	.250	.000	.500	.750	.000	.000	.000	.000	.000

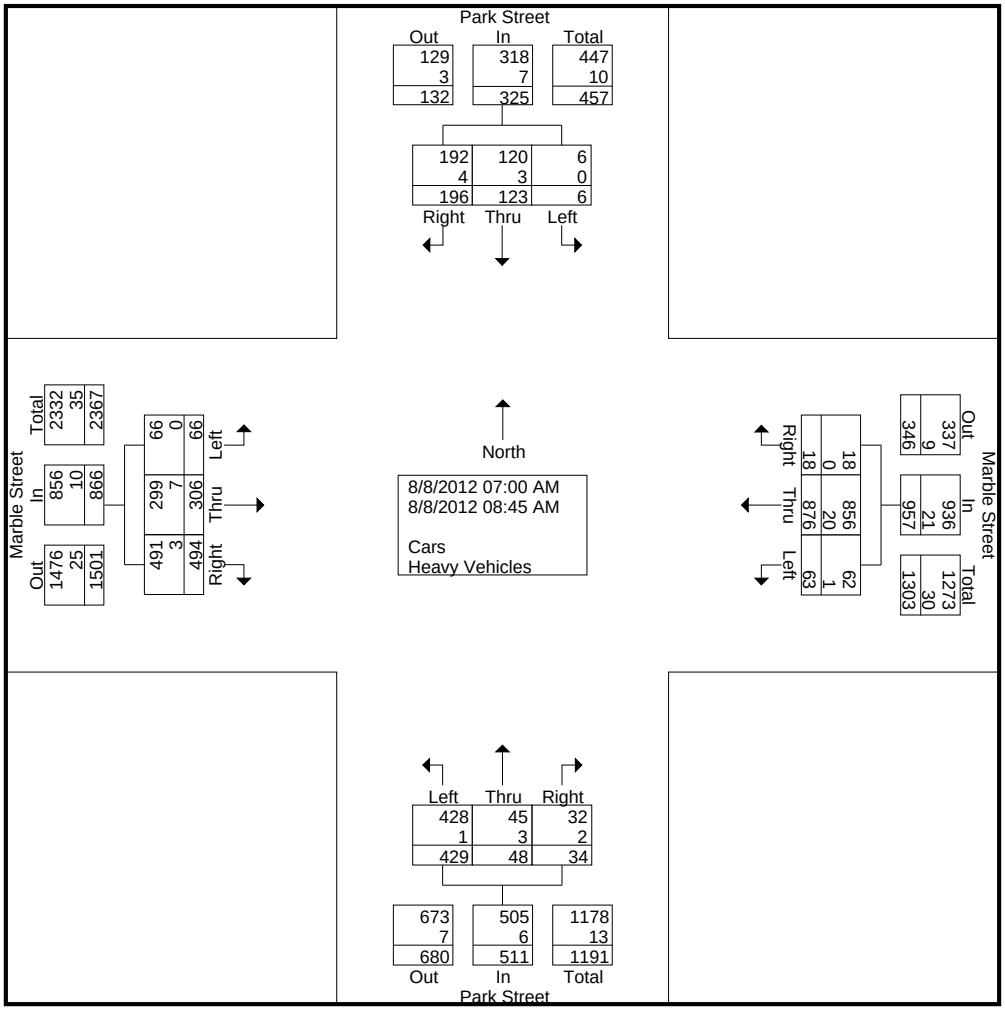
Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Marble AM
Site Code : 4
Start Date : 8/8/2012

Groups Printed- Cars - Heavy Vehicles

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	33	3	4	40	1	14	18	33	3	26	57	86	6	75	0	81	240
07:15 AM	43	4	2	49	1	13	16	30	6	25	56	87	5	114	6	125	291
07:30 AM	64	10	0	74	0	21	24	45	6	24	56	86	11	128	1	140	345
07:45 AM	60	10	6	76	1	24	25	50	10	37	61	108	12	114	2	128	362
Total	200	27	12	239	3	72	83	158	25	112	230	367	34	431	9	474	1238
08:00 AM	52	6	6	64	1	14	38	53	10	44	66	120	5	115	3	123	360
08:15 AM	59	7	8	74	0	17	34	51	13	57	79	149	11	117	0	128	402
08:30 AM	73	0	2	75	0	12	26	38	10	47	58	115	5	125	2	132	360
08:45 AM	45	8	6	59	2	8	15	25	8	46	61	115	8	88	4	100	299
Total	229	21	22	272	3	51	113	167	41	194	264	499	29	445	9	483	1421
Grand Total	429	48	34	511	6	123	196	325	66	306	494	866	63	876	18	957	2659
Apprch %	84	9.4	6.7		1.8	37.8	60.3		7.6	35.3	57		6.6	91.5	1.9		
Total %	16.1	1.8	1.3	19.2	0.2	4.6	7.4	12.2	2.5	11.5	18.6	32.6	2.4	32.9	0.7	36	
Cars	428	45	32	505	6	120	192	318	66	299	491	856	62	856	18	936	5230
% Cars	99.8	93.8	94.1	98.8	100	97.6	98	97.8	100	97.7	99.4	98.8	98.4	97.7	100	97.8	98.3
Heavy Vehicles	1	3	2	6	0	3	4	7	0	7	3	10	1	20	0	21	88
% Heavy Vehicles	0.2	6.2	5.9	1.2	0	2.4	2	2.2	0	2.3	0.6	1.2	1.6	2.3	0	2.2	1.7

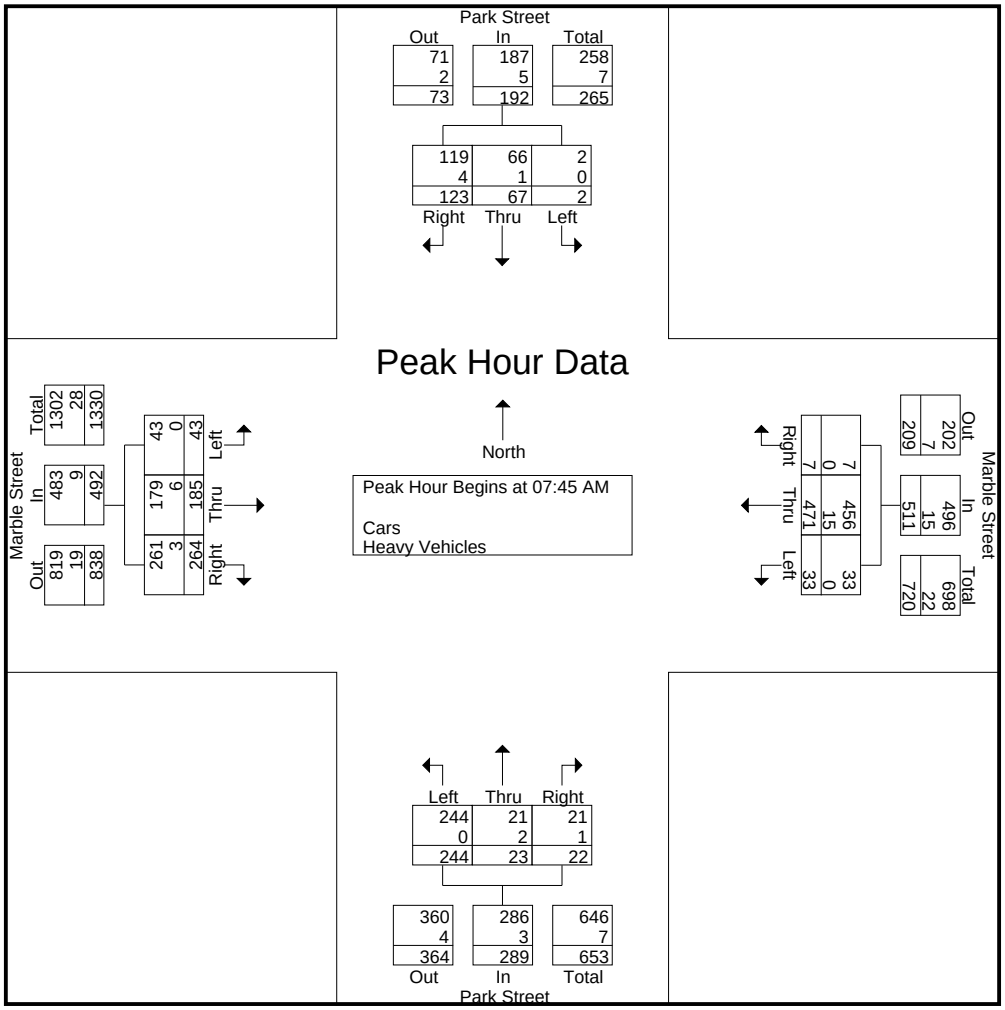


Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Marble AM
Site Code : 4
Start Date : 8/8/2012

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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 07:45 AM																	
07:45 AM	60	**10**	6	**76**	**1**	**24**	25	50	10	37	61	108	**12**	114	2	128	362
08:00 AM	52	6	6	64	1	14	**38**	**53**	10	44	66	120	5	115	**3**	123	360
08:15 AM	59	7	**8**	74	0	17	34	51	**13**	**57**	**79**	**149**	11	117	0	128	**402**
08:30 AM	**73**	0	2	75	0	12	26	38	10	47	58	115	5	**125**	2	**132**	360
Total Volume	244	23	22	289	2	67	123	192	43	185	264	492	33	471	7	511	1484
% App. Total	84.4	8	7.6		1	34.9	64.1		8.7	37.6	53.7		6.5	92.2	1.4		
PHF	.836	.575	.688	.951	.500	.698	.809	.906	.827	.811	.835	.826	.688	.942	.583	.968	.923
Cars	244	21	21	286	2	66	119	187	43	179	261	483	33	456	7	496	1452
% Cars	100	91.3	95.5	99.0	100	98.5	96.7	97.4	100	96.8	98.9	98.2	100	96.8	100	97.1	97.8
Heavy Vehicles	0	2	1	3	0	1	4	5	0	6	3	9	0	15	0	15	32
% Heavy Vehicles	0	8.7	4.5	1.0	0	1.5	3.3	2.6	0	3.2	1.1	1.8	0	3.2	0	2.9	2.2



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Marble AM
Site Code : 4
Start Date : 8/8/2012

Groups Printed- Heavy Vehicles

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	3	0	3	4
07:45 AM	0	1	1	2	0	0	1	1	0	1	0	1	0	1	0	1	5
Total	1	2	1	4	0	1	1	2	0	1	0	1	0	4	0	4	11
08:00 AM	0	1	0	1	0	0	3	3	0	0	1	1	0	4	0	4	9
08:15 AM	0	0	0	0	0	0	0	0	0	3	1	4	0	5	0	5	9
08:30 AM	0	0	0	0	0	1	0	1	0	2	1	3	0	5	0	5	9
08:45 AM	0	0	1	1	0	1	0	1	0	1	0	1	1	2	0	3	6
Total	0	1	1	2	0	2	3	5	0	6	3	9	1	16	0	17	33
Grand Total	1	3	2	6	0	3	4	7	0	7	3	10	1	20	0	21	44
Apprch %	16.7	50	33.3		0	42.9	57.1		0	70	30		4.8	95.2	0		
Total %	2.3	6.8	4.5	13.6	0	6.8	9.1	15.9	0	15.9	6.8	22.7	2.3	45.5	0	47.7	

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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 08:00 AM																	
08:00 AM	0	**1**	0	**1**	0	0	**3**	**3**	0	0	**1**	1	0	4	0	4	**9**
08:15 AM	0	0	0	0	0	0	0	0	0	**3**	1	**4**	0	**5**	0	**5**	9
08:30 AM	0	0	0	0	0	**1**	0	1	0	2	1	3	0	5	0	5	9
08:45 AM	0	0	**1**	1	0	1	0	1	0	1	0	1	**1**	2	0	3	6
Total Volume	0	1	1	2	0	2	3	5	0	6	3	9	1	16	0	17	33
% App. Total	0	50	50		0	40	60		0	66.7	33.3		5.9	94.1	0		
PHF	.000	.250	.250	.500	.000	.500	.250	.417	.000	.500	.750	.563	.250	.800	.000	.850	.917

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:15 AM				07:45 AM				08:00 AM			
+0 mins.	0	**1**	0	1	0	0	0	0	0	1	0	1	0	4	0	4
+15 mins.	**1**	0	0	1	0	**1**	0	1	0	0	**1**	1	0	**5**	0	**5**
+30 mins.	0	0	0	0	0	0	1	1	0	**3**	1	**4**	0	5	0	5
+45 mins.	0	1	**1**	**2**	0	0	**3**	**3**	0	2	1	3	**1**	2	0	3
Total Volume	1	2	1	4	0	1	4	5	0	6	3	9	1	16	0	17
% App. Total	25	50	25		0	20	80		0	66.7	33.3		5.9	94.1	0	
PHF	.250	.500	.250	.500	.000	.250	.333	.417	.000	.500	.750	.563	.250	.800	.000	.850

Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
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P: 617-448-5686
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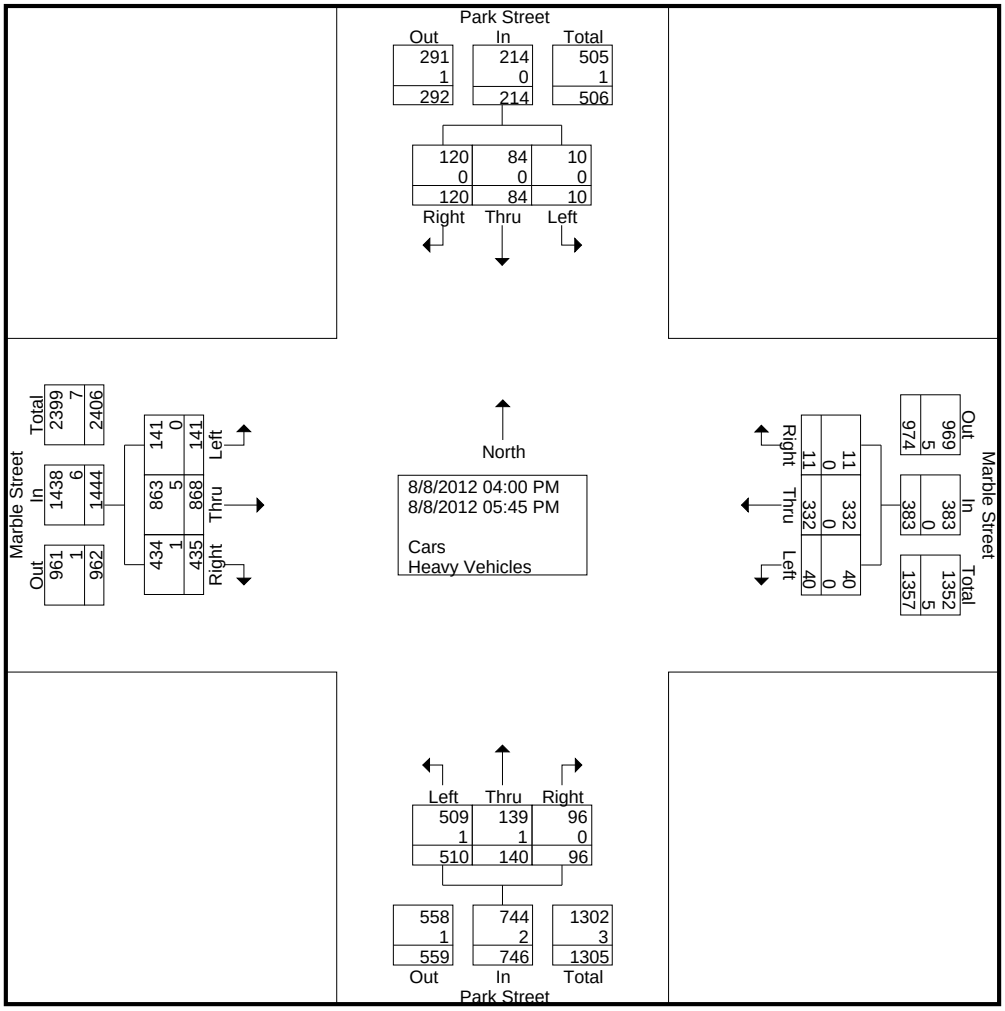
www.tsetraffic.com

File Name : Marble PM
Site Code : 4
Start Date : 8/8/2012

Groups Printed- Cars - Heavy Vehicles

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	45	15	10	70	1	10	12	23	16	102	50	168	6	21	1	28	289
04:15 PM	57	20	12	89	2	13	19	34	18	105	52	175	6	24	1	31	329
04:30 PM	57	20	15	92	1	9	18	28	16	105	53	174	5	34	0	39	333
04:45 PM	62	12	9	83	2	8	8	18	15	110	54	179	3	53	2	58	338
Total	221	67	46	334	6	40	57	103	65	422	209	696	20	132	4	156	1289
05:00 PM	74	20	13	107	0	12	17	29	23	111	65	199	8	58	2	68	403
05:15 PM	76	19	12	107	0	14	17	31	19	113	67	199	4	55	1	60	397
05:30 PM	69	21	15	105	3	9	17	29	18	116	41	175	5	48	3	56	365
05:45 PM	70	13	10	93	1	9	12	22	16	106	53	175	3	39	1	43	333
Total	289	73	50	412	4	44	63	111	76	446	226	748	20	200	7	227	1498
Grand Total	510	140	96	746	10	84	120	214	141	868	435	1444	40	332	11	383	2787
Apprch %	68.4	18.8	12.9		4.7	39.3	56.1		9.8	60.1	30.1		10.4	86.7	2.9		
Total %	18.3	5	3.4	26.8	0.4	3	4.3	7.7	5.1	31.1	15.6	51.8	1.4	11.9	0.4	13.7	
Cars	509	139	96	744	10	84	120	214	141	863	434	1438	40	332	11	383	5558
% Cars	99.8	99.3	100	99.7	100	100	100	100	100	99.4	99.8	99.6	100	100	100	100	99.7
Heavy Vehicles	1	1	0	2	0	0	0	0	0	5	1	6	0	0	0	0	16
% Heavy Vehicles	0.2	0.7	0	0.3	0	0	0	0	0	0.6	0.2	0.4	0	0	0	0	0.3

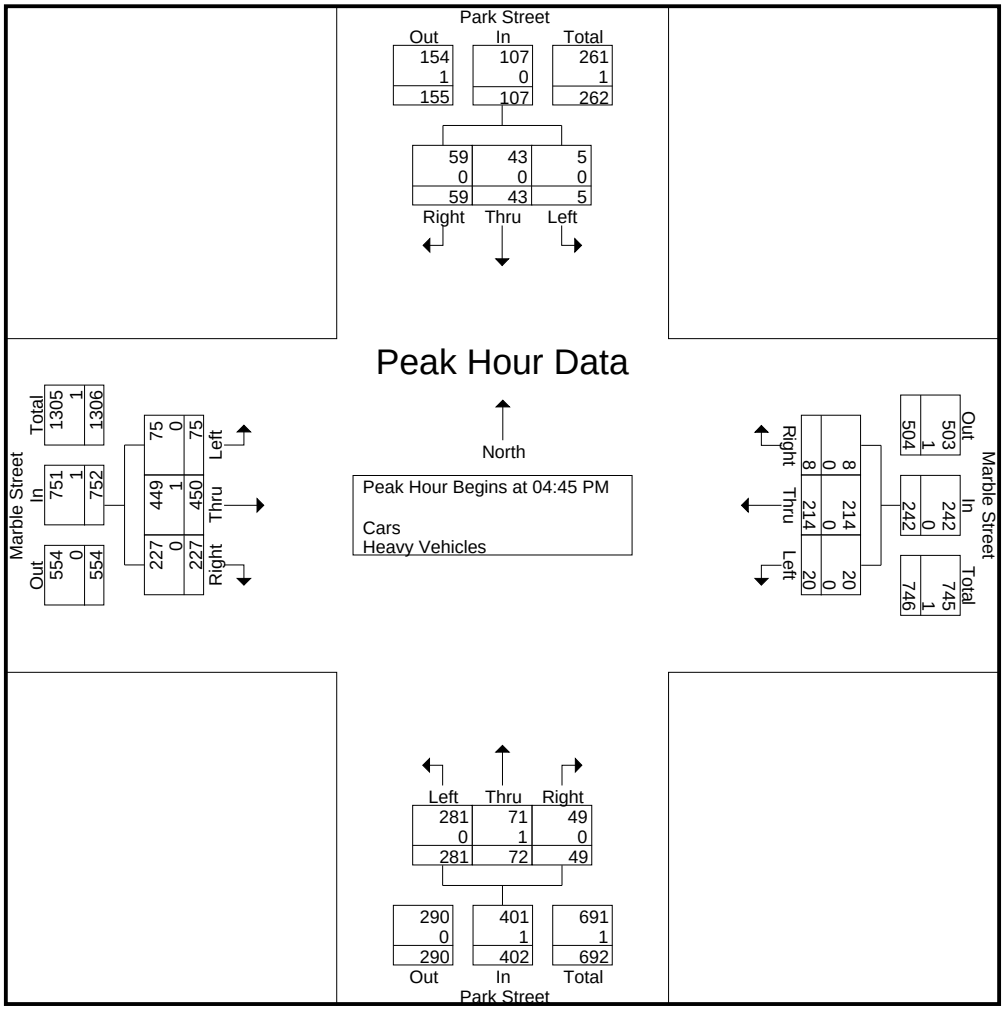


Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

File Name : Marble PM
Site Code : 4
Start Date : 8/8/2012

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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 04:45 PM																	
04:45 PM	62	12	9	83	2	8	8	18	15	110	54	179	3	53	2	58	338
05:00 PM	74	20	13	**107**	0	12	**17**	29	**23**	111	65	**199**	**8**	**58**	2	**68**	**403**
05:15 PM	**76**	19	12	107	0	**14**	17	**31**	19	113	**67**	199	4	55	1	60	397
05:30 PM	69	**21**	**15**	105	**3**	9	17	29	18	**116**	41	175	5	48	**3**	56	365
Total Volume	281	72	49	402	5	43	59	107	75	450	227	752	20	214	8	242	1503
% App. Total	69.9	17.9	12.2		4.7	40.2	55.1		10	59.8	30.2		8.3	88.4	3.3		
PHF	.924	.857	.817	.939	.417	.768	.868	.863	.815	.970	.847	.945	.625	.922	.667	.890	.932
Cars	281	71	49	401	5	43	59	107	75	449	227	751	20	214	8	242	1501
% Cars	100	98.6	100	99.8	100	100	100	100	100	99.8	100	99.9	100	100	100	100	99.9
Heavy Vehicles	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
% Heavy Vehicles	0	1.4	0	0.2	0	0	0	0	0	0.2	0	0.1	0	0	0	0	0.1



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File Name : Marble PM
Site Code : 4
Start Date : 8/8/2012

Groups Printed- Heavy Vehicles

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	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	1	0	0	1	0	0	0	0	0	1	1	2	0	0	0	0	3
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	1	0	2	0	0	0	0	0	2	1	3	0	0	0	0	5
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	1	0	1	0	0	0	0	1
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	2	0	2	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
Grand Total	1	1	0	2	0	0	0	0	0	5	1	6	0	0	0	0	8
Apprch %	50	50	0		0	0	0		0	83.3	16.7		0	0	0		
Total %	12.5	12.5	0	25	0	0	0	0	0	62.5	12.5	75	0	0	0	0	

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	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
04:15 PM	**1**	0	0	**1**	0	0	0	0	0	**1**	**1**	**2**	0	0	0	0	**3**
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
04:45 PM	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	1	1	0	2	0	0	0	0	0	2	1	3	0	0	0	0	5
% App. Total	50	50	0		0	0	0		0	66.7	33.3		0	0	0		
PHF	.250	.250	.000	.500	.000	.000	.000	.000	.000	.500	.250	.375	.000	.000	.000	.000	.417

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	**1**	0	0	**1**	0	0	0	0	0	**1**	**1**	**2**	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
+45 mins.	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	1	0	2	0	0	0	0	0	2	1	3	0	0	0	0
% App. Total	50	50	0		0	0	0		0	66.7	33.3		0	0	0	
PHF	.250	.250	.000	.500	.000	.000	.000	.000	.000	.500	.250	.375	.000	.000	.000	.000

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Stoneham, MA
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Phase I

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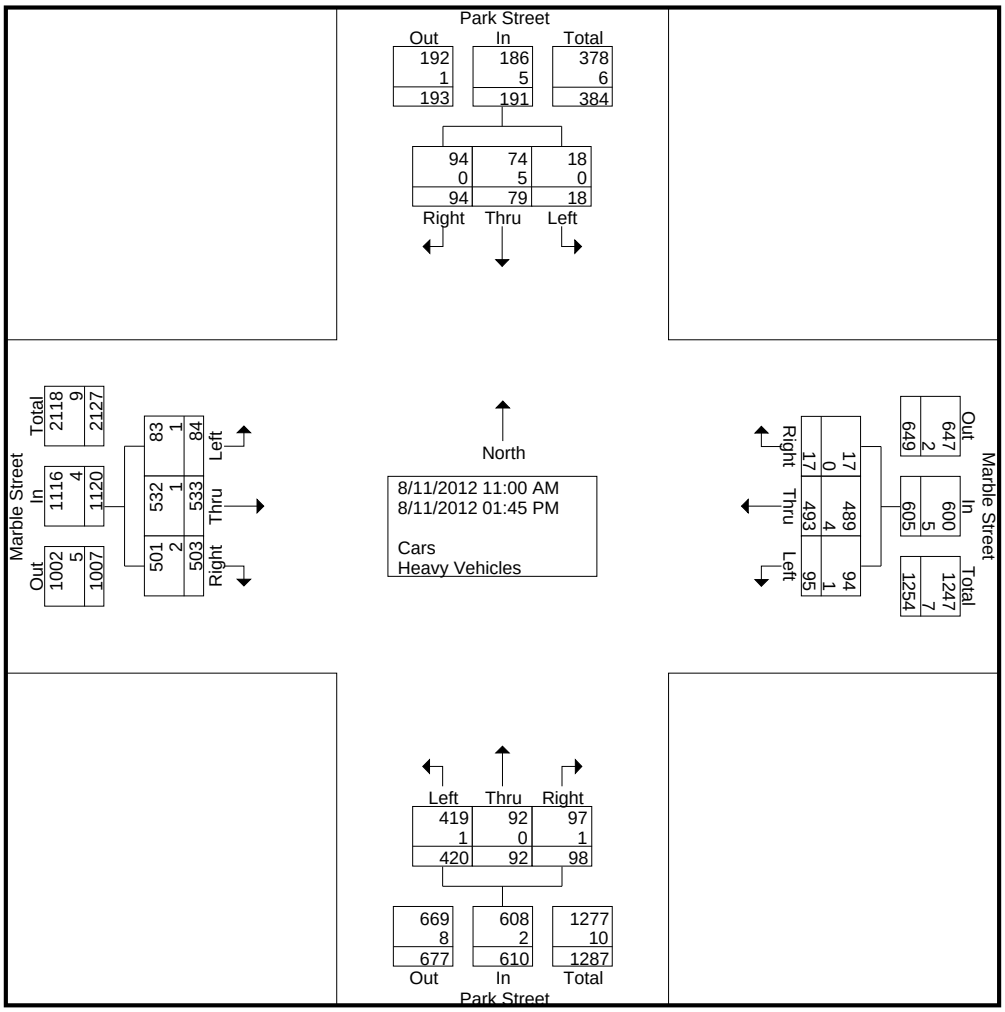
www.tsetraffic.com

File Name : Marble SAT
Site Code : 4
Start Date : 8/11/2012
Page No : 1 of 4

Groups Printed- Cars - Heavy Vehicles

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
11:00 AM	30	6	16	52	1	5	9	15	5	42	46	93	10	44	0	54	214
11:15 AM	44	11	3	58	2	10	14	26	12	38	29	79	7	47	3	57	220
11:30 AM	37	5	5	47	4	8	7	19	10	43	55	108	9	48	1	58	232
11:45 AM	39	10	7	56	3	7	11	21	12	40	46	98	8	38	3	49	224
Total	150	32	31	213	10	30	41	81	39	163	176	378	34	177	7	218	890
12:00 PM	36	6	11	53	0	12	8	20	4	47	44	95	10	49	1	60	228
12:15 PM	30	6	3	39	2	4	6	12	7	44	43	94	6	36	1	43	188
12:30 PM	25	9	12	46	0	8	4	12	6	34	36	76	10	35	1	46	180
12:45 PM	30	11	7	48	0	6	6	12	6	49	39	94	8	47	2	57	211
Total	121	32	33	186	2	30	24	56	23	174	162	359	34	167	5	206	807
01:00 PM	32	5	6	43	1	4	5	10	8	40	40	88	6	44	1	51	192
01:15 PM	40	8	11	59	3	6	12	21	4	51	42	97	4	34	0	38	215
01:30 PM	36	7	6	49	1	2	6	9	6	52	45	103	9	35	2	46	207
01:45 PM	41	8	11	60	1	7	6	14	4	53	38	95	8	36	2	46	215
Total	149	28	34	211	6	19	29	54	22	196	165	383	27	149	5	181	829
Grand Total	420	92	98	610	18	79	94	191	84	533	503	1120	95	493	17	605	2526
Apprch %	68.9	15.1	16.1		9.4	41.4	49.2		7.5	47.6	44.9		15.7	81.5	2.8		
Total %	16.6	3.6	3.9	24.1	0.7	3.1	3.7	7.6	3.3	21.1	19.9	44.3	3.8	19.5	0.7	24	
Cars	419	92	97	608	18	74	94	186	83	532	501	1116	94	489	17	600	5020
% Cars	99.8	100	99	99.7	100	93.7	100	97.4	98.8	99.8	99.6	99.6	98.9	99.2	100	99.2	99.4
Heavy Vehicles	1	0	1	2	0	5	0	5	1	1	2	4	1	4	0	5	32
% Heavy Vehicles	0.2	0	1	0.3	0	6.3	0	2.6	1.2	0.2	0.4	0.4	1.1	0.8	0	0.8	0.6



Project #: MAX-2012078
Stoneham, MA
Client: Plourde
Phase I

Traffic Survey Expedition
106 Sharon Road
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P: 617-448-5686
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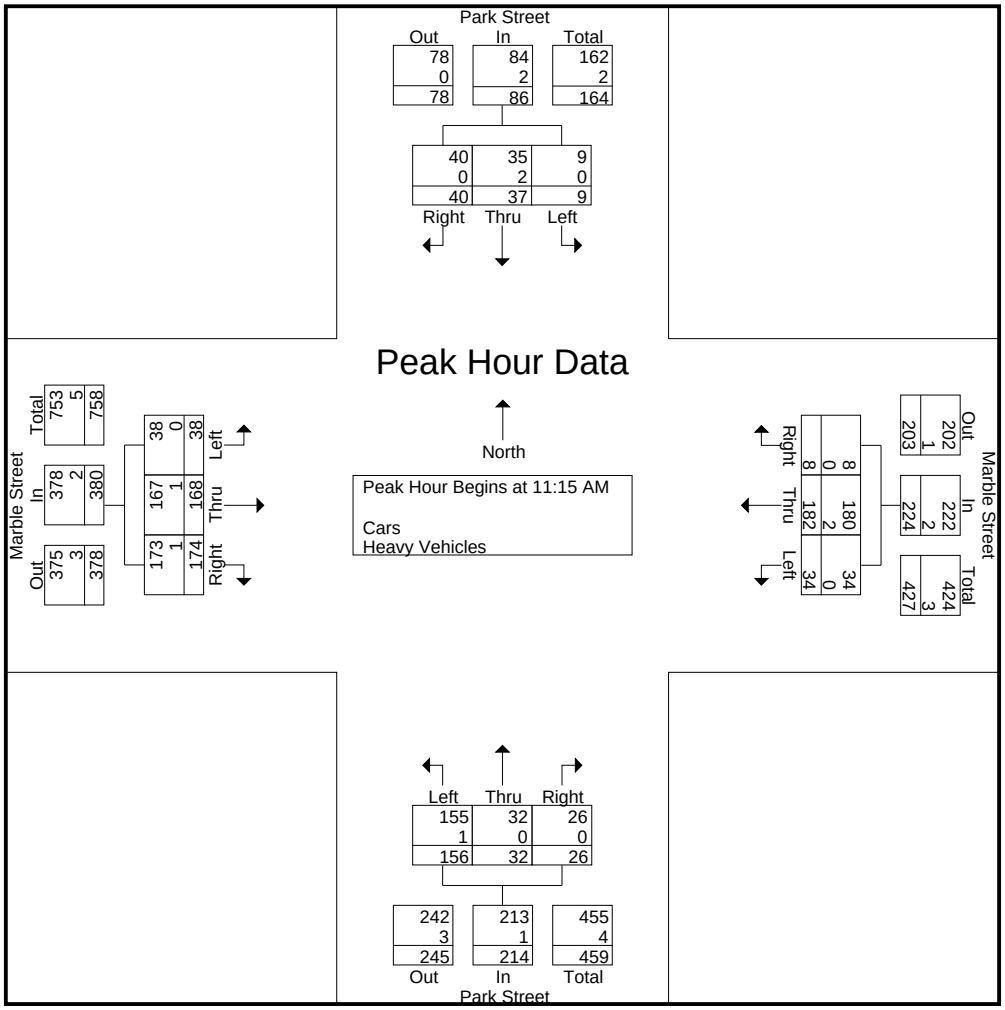
www.tsetraffic.com

File Name : Marble SAT
Site Code : 4
Start Date : 8/11/2012

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	**44**	**11**	3	**58**	2	10	**14**	**26**	**12**	38	29	79	7	47	**3**	57	220
11:30 AM	37	5	5	47	**4**	8	7	19	10	43	**55**	**108**	9	48	1	58	**232**
11:45 AM	39	10	7	56	3	7	11	21	12	40	46	98	8	38	3	49	224
12:00 PM	36	6	**11**	53	0	**12**	8	20	4	**47**	44	95	**10**	**49**	1	**60**	228
Total Volume	156	32	26	214	9	37	40	86	38	168	174	380	34	182	8	224	904
% App. Total	72.9	15	12.1		10.5	43	46.5		10	44.2	45.8		15.2	81.2	3.6		
PHF	.886	.727	.591	.922	.563	.771	.714	.827	.792	.894	.791	.880	.850	.929	.667	.933	.974
Cars	155	32	26	213	9	35	40	84	38	167	173	378	34	180	8	222	897
% Cars	99.4	100	100	99.5	100	94.6	100	97.7	100	99.4	99.4	99.5	100	98.9	100	99.1	99.2
Heavy Vehicles	1	0	0	1	0	2	0	2	0	1	1	2	0	2	0	2	7
% Heavy Vehicles	0.6	0	0	0.5	0	5.4	0	2.3	0	0.6	0.6	0.5	0	1.1	0	0.9	0.8



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Traffic Survey Expedition
106 Sharon Road
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P: 617-448-5686
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File Name : Marble SAT
Site Code : 4
Start Date : 8/11/2012

Groups Printed- Heavy Vehicles

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
11:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
11:30 AM	0	0	0	0	0	1	0	1	0	1	1	2	0	1	0	1	4
11:45 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	0	0	1	0	2	0	2	0	1	1	2	1	2	0	3	8
12:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
Total	0	0	0	0	0	1	0	1	0	0	1	1	0	1	0	1	3
01:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
01:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	1	0	1	3
Total	0	0	1	1	0	2	0	2	1	0	0	1	0	1	0	1	5
Grand Total	1	0	1	2	0	5	0	5	1	1	2	4	1	4	0	5	16
Apprch %	50	0	50		0	100	0		25	25	50		20	80	0		
Total %	6.2	0	6.2	12.5	0	31.2	0	31.2	6.2	6.2	12.5	25	6.2	25	0	31.2	

	Park Street Northbound				Park Street Southbound				Marble Street Eastbound				Marble Street Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**	0	0	**1**	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	1	1
11:30 AM	0	0	0	0	0	1	0	1	0	**1**	**1**	**2**	0	1	0	1	**4**
11:45 AM	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	1	0	0	1	0	2	0	2	0	1	1	2	1	2	0	3	8
% App. Total	100	0	0		0	100	0		0	50	50		33.3	66.7	0		
PHF	.250	.000	.000	.250	.000	.500	.000	.500	.000	.250	.250	.250	.250	.500	.000	.750	.500

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**	0	0	**1**
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	1
+30 mins.	0	0	0	0	0	1	0	1	0	**1**	**1**	**2**	0	1	0	1
+45 mins.	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	1	0	2	0	2	0	1	1	2	1	2	0	3
% App. Total	100	0	0		0	100	0		0	50	50		33.3	66.7	0	
PHF	.250	.000	.000	.250	.000	.500	.000	.500	.000	.250	.250	.250	.250	.500	.000	.750

MassDOT Traffic Volumes

Permanent Count Station 407[a]

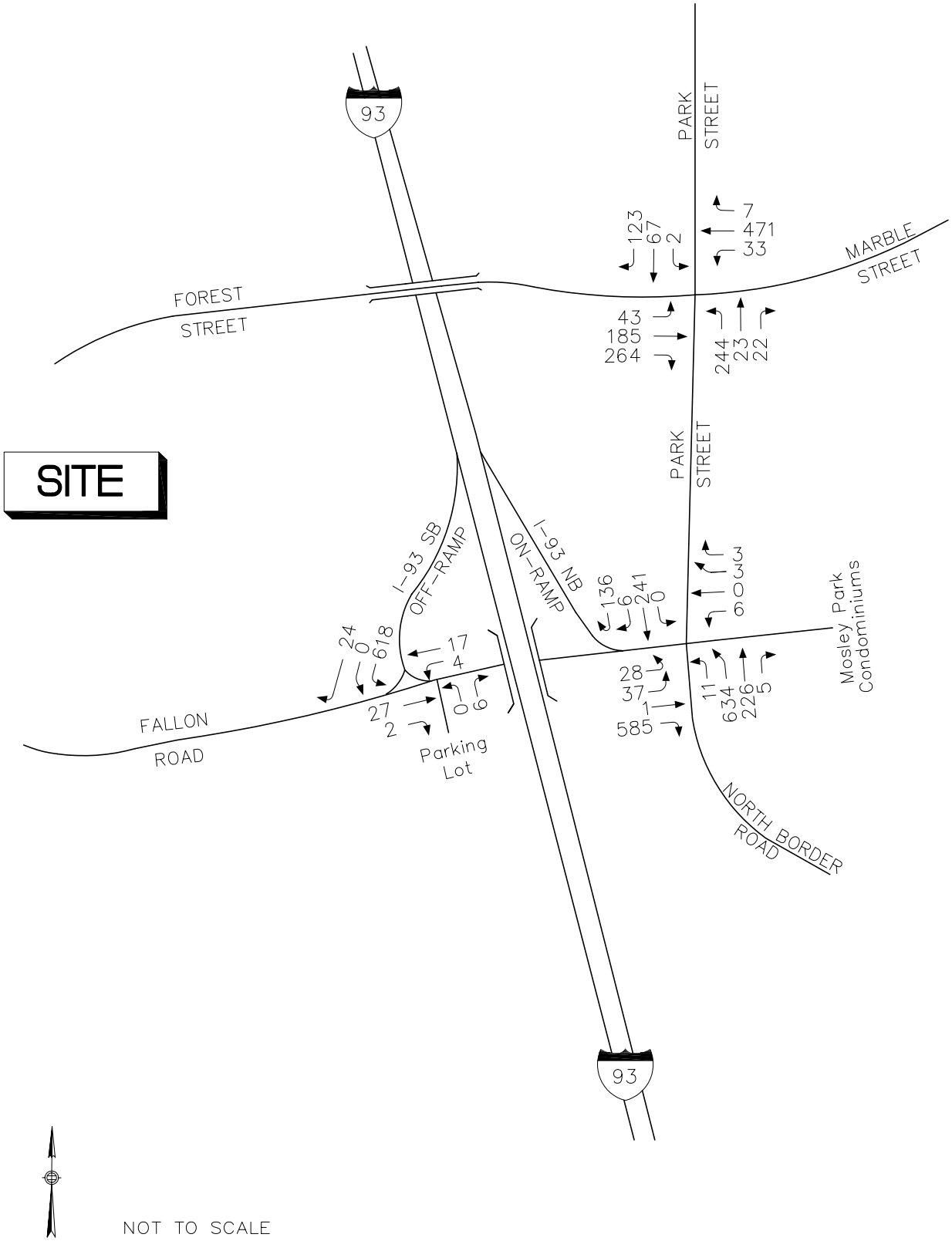
Stoneham - Route 28 South of the Reading Town Line

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	AADT[b]
2005	24,692	25,048	25,554	26,393	27,399	28,075	27,036	26,807	26,827	26,455	25,775	26,238	26,358
	0.41%	*-0.29%*	*1.40%*	*-0.84%*	*-0.90%*	*-1.52%*	*-5.99%*	*0.72%*	*1.77%*	*1.10%*	*1.00%*	*4.71%*	*0.10%*
2006	24,794	24,975	25,912	26,170	27,152	27,647	25,416	27,000	27,303	26,745	26,032	27,473	26,385
	-0.92%	*-1.82%*	*-1.55%*	*-1.27%*	*0.01%*	*-0.53%*	*0.09%*	*-1.23%*	*-2.83%*	*-1.66%*	*-1.33%*	*-3.80%*	*-1.41%*
2007	24,339	24,072	25,117	25,508	27,159	27,355	25,461	26,342	25,778	25,865	25,342	25,426	25,647
	-1.82%	*-1.51%*	*-4.34%*	*-10.25%*	*-5.11%*	*-6.16%*	*-3.95%*	*-7.36%*	*-3.01%*	*-2.18%*	*-0.17%*	*-4.46%*	*-4.24%*
2008	23,897	23,709	24,028	22,893	25,770	25,669	24,456	24,404	25,003	25,300	25,300	24,293	24,560
	-9.96%	*-1.50%*	*-1.97%*	*8.44%*	*-2.91%*	*-0.01%*	*2.06%*	*2.19%*	*-1.40%*	*-0.36%*	*-0.36%*	*2.89%*	*-0.28%*
2009	21,518	23,353	23,554	24,826	25,021	25,667	24,960	24,938	24,654	25,210	25,210	24,994	24,492
Seasonal Adj. [c]	**6.9%**	**5.2%**	**2.6%**	**1.3%**	**-3.8%**	**-5.2%**	**0.1%**	**-1.6%**	**-1.6%**	**-1.6%**	**-0.2%**	**-0.8%**	**0.0%**

[a] Based upon historical data. Source: MassDOT 2009 Traffic Volumes.

[b] Average Annual Daily Traffic.

[c] Seasonal adjustment to yearly average.

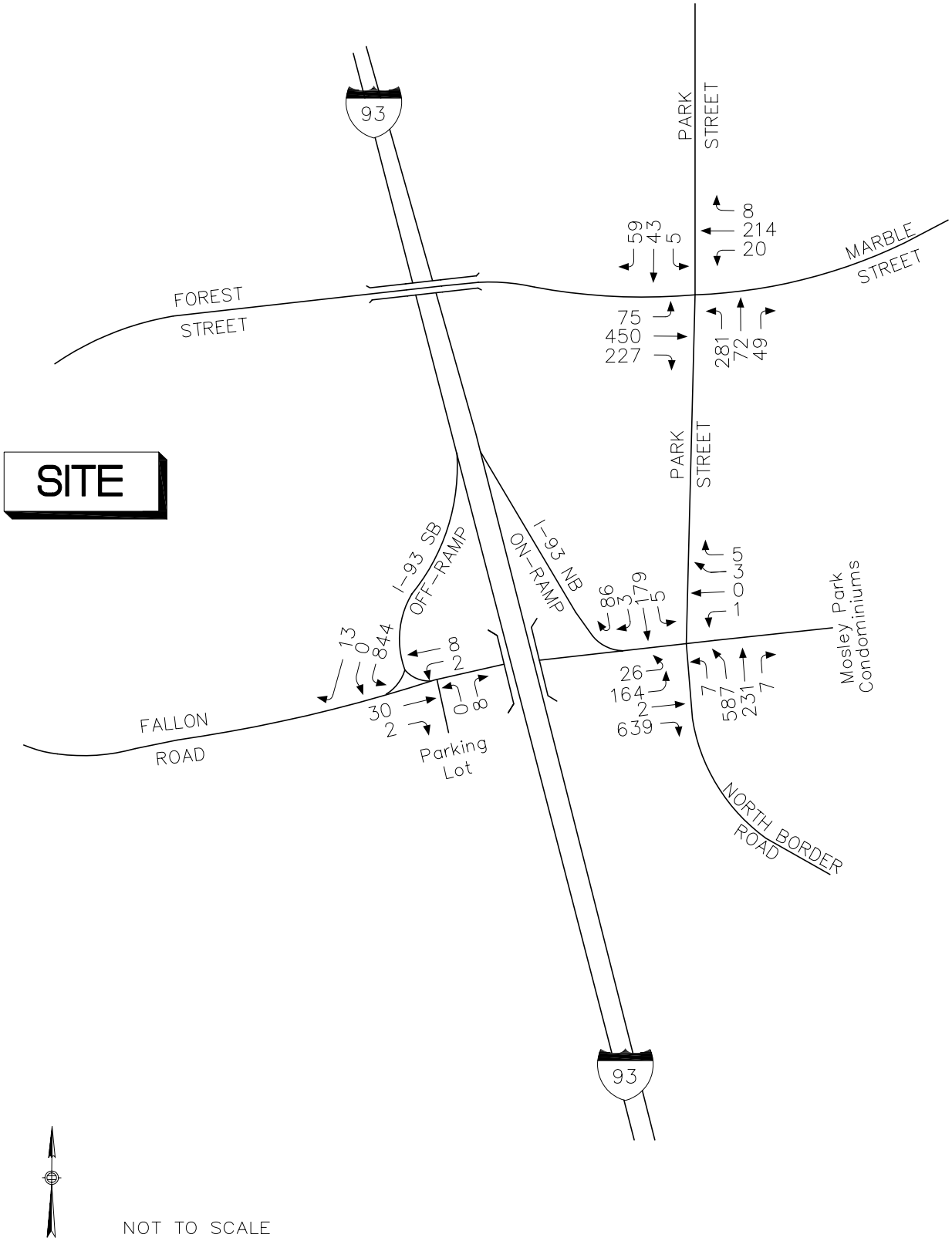


Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

Figure 2

2012 Existing
Weekday AM
Peak Hour Traffic Volumes



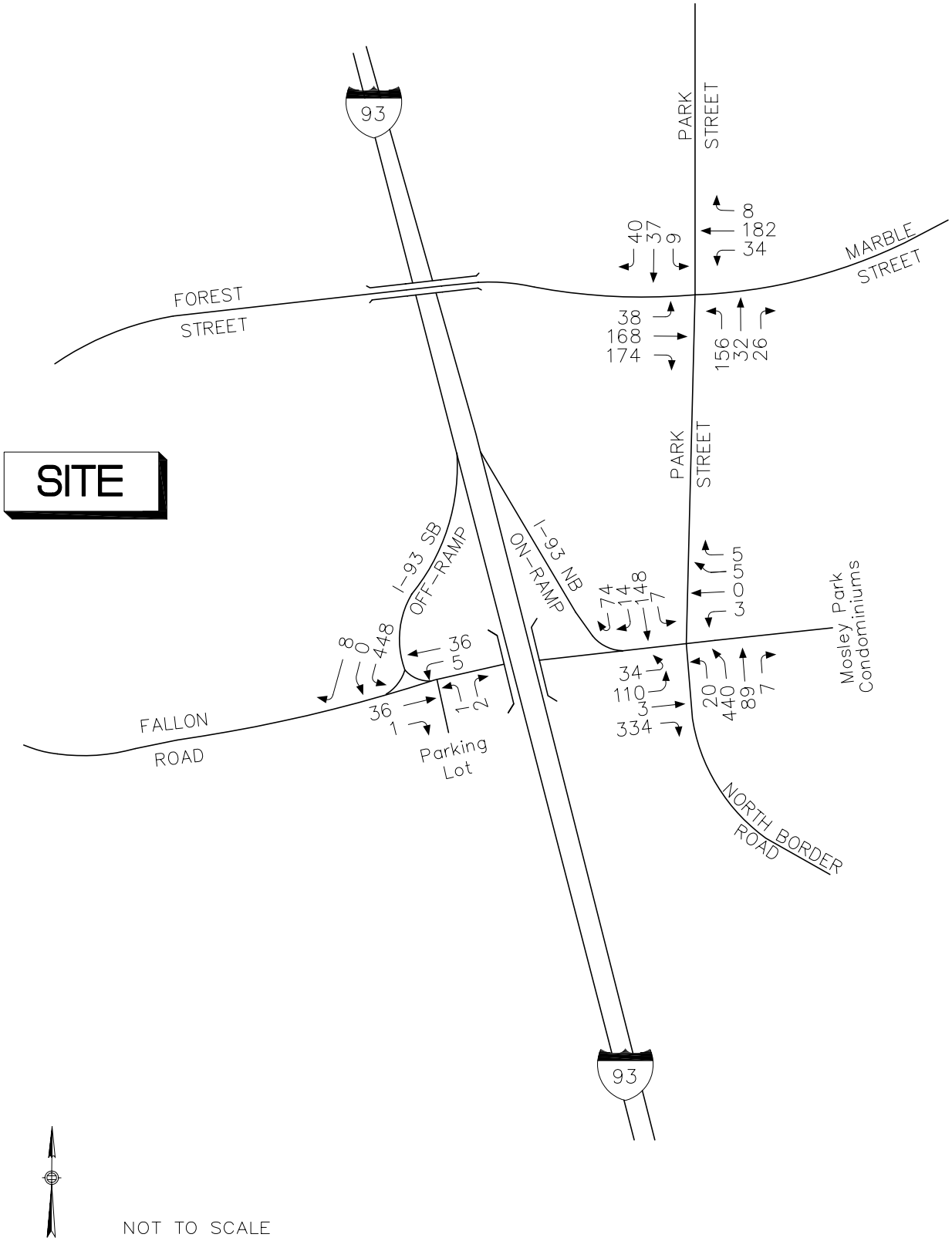
NOT TO SCALE

Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

Figure 3

2012 Existing
Weekday PM
Peak Hour Traffic Volumes



Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

Figure 4

2012 Existing
Saturday Midday
Peak Hour Traffic Volumes

MassDOT Crash Rate Worksheets

Tighe&Bond

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Stoneham

COUNT DATE : 8/8/2012

DISTRICT : 4

UNSIGNALIZED : ✓

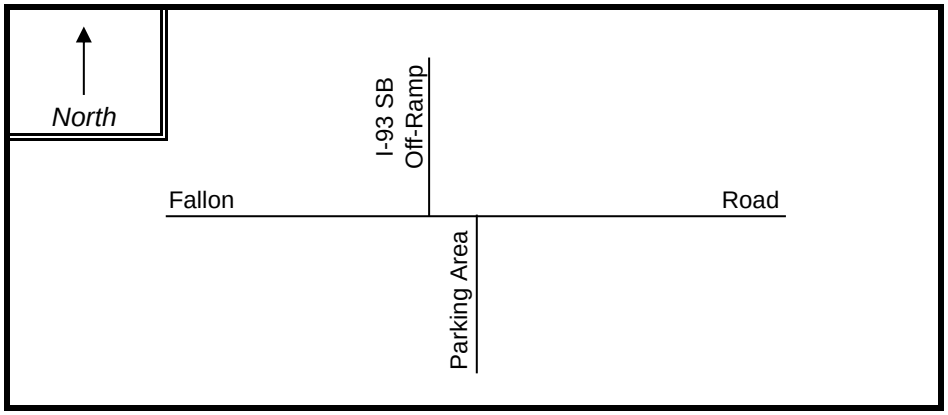
SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Fallon Road

MINOR STREET(S) : I-93 Southbound Off-Ramp and Parking Area used for Middlesex Fells

INTERSECTION DIAGRAM
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (~~AM~~/PM) :	32	10	8	857		**907**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **10,078**

TOTAL # OF CRASHES : 1

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **0.33**

CRASH RATE CALCULATION : 0.09

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : MassDOT Crash Portal for 2009-2011

Project Title & Date: Proposed Residential Development - Fallon Road, Stoneham, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Stoneham COUNT DATE : 8/8/2012

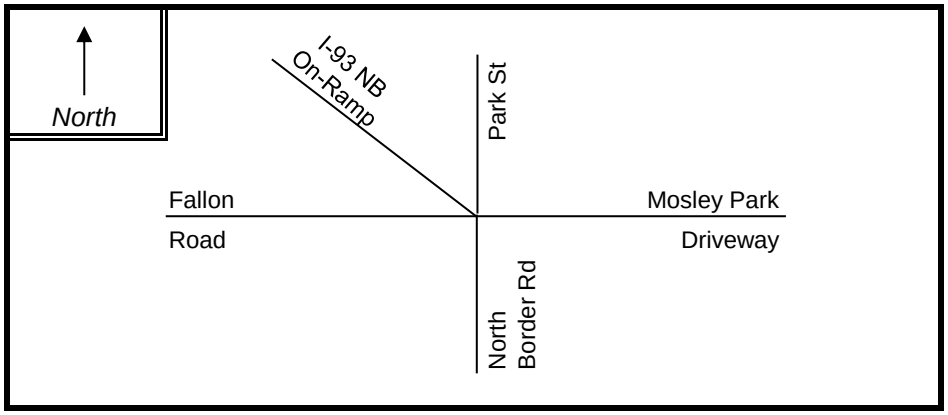
DISTRICT : 4 UNSIGNALIZED : ✓ SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Park Street and North Border Road

MINOR STREET(S) : Fallon Road, I-93 Northbound On-Ramp, and Mosley Park Driveway

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (~~AM~~/PM) :	832	273	831	9		**1,945**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **21,611**

TOTAL # OF CRASHES : 9 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (**A**) : **3.00**

CRASH RATE CALCULATION : **0.38**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : MassDOT Crash Portal for 2009-2011

Project Title & Date: Proposed Residential Development - Fallon Road, Stoneham, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Stoneham COUNT DATE : 8/8/2012

DISTRICT : 4 UNSIGNALIZED : [ ] SIGNALIZED : [✓]

~ INTERSECTION DATA ~

MAJOR STREET : Marble Street

MINOR STREET(S) : Park Street

INTERSECTION DIAGRAM (Label Approaches)

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (~~AM~~/PM) :	752	242	402	107		**1,503**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **16,700**

TOTAL # OF CRASHES : 7 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (**A**) : **2.33**

CRASH RATE CALCULATION : 0.38

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : MassDOT Crash Portal for 2009-2011

Project Title & Date: Proposed Residential Development - Fallon Road, Stoneham, MA

Capacity Analysis Methodology

Tighe&Bond

CAPACITY ANALYSIS METHODOLOGY

A primary result of capacity analysis is the assignment of levels of service to traffic facilities under various traffic flow conditions. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual* (HCM).[1] The concept of 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. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year. A description of the operating condition under each level of service is provided below:

- *LOS A* describes conditions with little to no delay to motorists.
- *LOS B* represents a desirable level with relatively low delay to motorists.
- *LOS C* describes conditions with average delays to motorists.
- *LOS D* describes operations where the influence of congestion becomes more noticeable. Delays are still within an acceptable range.
- *LOS E* represents operating conditions with high delay values. This level is considered by many agencies to be the limit of acceptable delay.
- *LOS F* is considered to be unacceptable to most drivers with high delay values that often occur, when arrival flow rates exceed the capacity of the intersection.

Signalized Intersections

Levels of service for signalized intersections are also calculated using the operational analysis methodology of the HCM. The methodology for signalized intersections assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on average *control* delay. Control delay is used to establish the operating characteristics for an intersection or an approach to an intersection. Volume-to-capacity (v/c) ratios are also used to help signify the utilization of a lane group's capacity at an intersection. The level-of-service criteria for signalized intersections are shown in Table A-1.

Unsignalized Intersections

Levels of service for unsignalized intersections are calculated using the operational analysis methodology of the HCM. The procedure accounts for lane configuration on both the minor and major street approaches, conflicting traffic stream volumes, and the type of intersection control (STOP, YIELD, or all-way STOP control). The definition of level of service for

[1] *Highway Capacity Manual.* Washington, D.C.: Transportation Research Board, National Research Council, 2000.

unsignalized intersections is a function of average *control* delay. Control delay at an unsignalized intersection is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

Volume-to-capacity (v/c) ratios are also used to help signify the utilization of a movement's capacity at an intersection. The capacity of the movements is based on the distribution of gaps in the major street traffic stream, the selection of gaps to complete the desired movement, and the follow-up headways for each driver in the queue. When an unsignalized intersection is located within 0.25 miles of a signalized intersection, traffic flows may not be random and some platoon structure may exist, thereby affecting the minor street operations. The level-of-service criteria for unsignalized intersections are shown in Table A-1.

TABLE A-1
Level-of-Service Criteria for Intersections

Level of Service	**Signalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**Unsignalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: *Highway Capacity Manual.* Washington, D.C.: Transportation Research Board, 2000. Pages 16-2 and 17-2.

For signalized intersections, this delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to the entire intersection. For unsignalized intersections, this delay criterion may be applied in assigning level-of-service designations to individual lane groups on the minor street approaches or to the left turns from the major street approaches.

Analysis Worksheets: Existing

Tighe&Bond

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	27	2	4	17	0	0	0	6	618	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.75	0.75	0.75	0.75	0.75	0.75	0.93	0.93	0.93
Hourly flow rate (vph)	0	38	3	5	23	0	0	0	8	665	0	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	23			40			85	72	39	80	74	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	23			40			85	72	39	80	74	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.8
p0 queue free %	100			100			100	100	99	26	100	97
cM capacity (veh/h)	1606			1582			878	819	1039	901	818	922

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	28	8	690
Volume Left	0	5	0	665
Volume Right	3	0	8	26
cSH	1700	1582	1039	936
Volume to Capacity	0.02	0.00	0.01	0.74
Queue Length 95th (ft)	0	0	1	172
Control Delay (s)	0.0	1.4	8.5	18.9
Lane LOS		A	A	C
Approach Delay (s)	0.0	1.4	8.5	18.9
Approach LOS			A	C

Intersection Summary			
Average Delay	17.2		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	1	585	6	3	3	645	226	5	0	241	142
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.50	0.50	0.50	0.94	0.94	0.94	0.93	0.93	0.93
Hourly flow rate (vph)	68	1	616	12	6	6	686	240	5	0	259	153
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	1881	1877	259	2183	2027	243	412			246		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1881	1877	259	2183	2027	243	412			246		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	96	21	0	75	99	40			100		
cM capacity (veh/h)	21	29	782	4	24	801	1152			1332		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	685	24	686	246	259	153
Volume Left	68	12	686	0	0	0
Volume Right	616	6	0	5	0	153
cSH	178	7	1152	1700	1332	1700
Volume to Capacity	3.86	3.55	0.60	0.14	0.00	0.09
Queue Length 95th (ft)	Err	Err	103	0	0	0
Control Delay (s)	Err	Err	12.6	0.0	0.0	0.0
Lane LOS	F	F	B			
Approach Delay (s)	Err	Err	9.3		0.0	
Approach LOS	F	F				

Intersection Summary				
Average Delay	3458.6			
Intersection Capacity Utilization	64.8%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	185	264	33	471	7	244	23	22	2	67	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			1.00			0.99			0.91	
Flt Protected		1.00			1.00			0.96			1.00	
Satd. Flow (prot)		1956			2085			1905			1691	
Flt Permitted		0.90			0.93			0.50			1.00	
Satd. Flow (perm)		1765			1947			1002			1686	
Peak-hour factor, PHF	0.83	0.83	0.83	0.97	0.97	0.97	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	52	223	318	34	486	7	257	24	23	2	74	135
RTOR Reduction (vph)	0	0	0	0	1	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	593	0	0	526	0	0	300	0	0	211	0
Heavy Vehicles (%)	0%	3%	1%	0%	3%	0%	0%	9%	4%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		22.0			22.0			15.0			15.0	
Effective Green, g (s)		25.0			25.0			18.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.27			0.27	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		658			726			269			452	
v/s Ratio Prot												
v/s Ratio Perm		c0.34			0.27			c0.30			0.13	
v/c Ratio		0.90			0.73			1.11			0.47	
Uniform Delay, d1		19.8			18.0			24.5			20.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		17.8			6.2			88.9			3.4	
Delay (s)		37.6			24.3			113.4			23.9	
Level of Service		D			C			F			C	
Approach Delay (s)		37.6			24.3			113.4			23.9	
Approach LOS		D			C			F			C	

Intersection Summary

HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

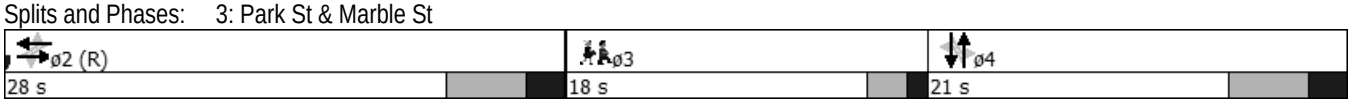
Phase Number	2	3	4
Movement	EBWB	Ped	NBSB
Lead/Lag		Lead	Lag
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	28	18	21
Maximum Split (%)	41.8%	26.9%	31.3%
Minimum Split (s)	16	18	14
Yellow Time (s)	4	2	4
All-Red Time (s)	2	1	2
Minimum Initial (s)	10	1	8
Vehicle Extension (s)	4	4	4
Minimum Gap (s)	4	3	4
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)		5	
Flash Dont Walk (s)		10	
Dual Entry	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	0	28	46
End Time (s)	28	46	0
Yield/Force Off (s)	22	43	61
Yield/Force Off 170(s)	22	33	61
Local Start Time (s)	0	28	46
Local Yield (s)	22	43	61
Local Yield 170(s)	22	33	61

Intersection Summary

Cycle Length	67
Control Type	Pretimed
Natural Cycle	90

Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	NB	SB	SB
Directions Served	TR	R	LT	R
Maximum Queue (ft)	80	34	803	313
Average Queue (ft)	10	4	314	49
95th Queue (ft)	54	22	862	224
Link Distance (ft)	1009	236	924	
Upstream Blk Time (%)			13	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)				350
Storage Blk Time (%)			26	0
Queuing Penalty (veh)			6	1

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	497	204	83	75	699	31	57
Average Queue (ft)	277	134	20	68	197	2	14
95th Queue (ft)	660	251	65	87	566	14	40
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	15						
Queuing Penalty (veh)	96						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	24	24		21	8	0	0
Queuing Penalty (veh)	139	16		49	50	0	0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	2110	1675	851	204
Average Queue (ft)	1205	1127	576	97
95th Queue (ft)	2386	2119	1179	171
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)	15	34	11	
Queuing Penalty (veh)	0	0	33	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 391

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	30	2	2	8	0	0	0	8	844	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.62	0.62	0.62	0.67	0.67	0.67	0.92	0.92	0.92
Hourly flow rate (vph)	0	38	2	3	13	0	0	0	12	917	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	13			40			58	58	39	70	59	13
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	13			40			58	58	39	70	59	13
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	100			100			100	100	99	0	100	99
cM capacity (veh/h)	1619			1583			928	835	1039	915	834	989

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	16	12	932
Volume Left	0	3	0	917
Volume Right	2	0	12	14
cSH	1700	1583	1039	929
Volume to Capacity	0.02	0.00	0.01	1.00
Queue Length 95th (ft)	0	0	1	472
Control Delay (s)	0.0	1.5	8.5	51.1
Lane LOS		A	A	F
Approach Delay (s)	0.0	1.5	8.5	51.1
Approach LOS			A	F

Intersection Summary			
Average Delay	47.8		
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	2	639	1	3	5	594	231	7	5	179	89
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.56	0.56	0.56	0.90	0.90	0.90	0.85	0.85	0.85
Hourly flow rate (vph)	202	2	680	2	5	9	660	257	8	6	211	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	1811	1807	211	2144	1908	261	315			264		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1811	1807	211	2144	1908	261	315			264		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	94	19	52	84	99	47			100		
cM capacity (veh/h)	31	38	835	4	33	783	1251			1311		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	884	16	660	264	216	105
Volume Left	202	2	660	0	6	0
Volume Right	680	9	0	8	0	105
cSH	120	24	1251	1700	1311	1700
Volume to Capacity	7.39	0.66	0.53	0.16	0.00	0.06
Queue Length 95th (ft)	Err	50	80	0	0	0
Control Delay (s)	Err	298.2	11.0	0.0	0.2	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	Err	298.2	7.9		0.2	
Approach LOS	F	F				

Intersection Summary			
Average Delay	4125.2		
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	450	227	20	214	8	281	72	49	5	43	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			1.00			0.98			0.93	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		2055			2135			1923			1754	
Flt Permitted		0.94			0.91			0.69			0.99	
Satd. Flow (perm)		1947			1953			1366			1733	
Peak-hour factor, PHF	0.94	0.94	0.94	0.89	0.89	0.89	0.94	0.94	0.94	0.86	0.86	0.86
Adj. Flow (vph)	80	479	241	22	240	9	299	77	52	6	50	69
RTOR Reduction (vph)	0	0	0	0	2	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	800	0	0	269	0	0	421	0	0	125	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		25.0			25.0			15.0			15.0	
Effective Green, g (s)		28.0			28.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.26			0.26	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		778			781			351			445	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.14			c0.31			0.07	
v/c Ratio		1.03			0.34			1.20			0.28	
Uniform Delay, d1		21.0			14.6			26.0			20.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		39.7			1.2			113.5			1.6	
Delay (s)		60.7			15.8			139.5			22.4	
Level of Service		E			B			F			C	
Approach Delay (s)		60.7			15.8			139.5			22.4	
Approach LOS		E			B			F			C	

Intersection Summary

HCM 2000 Control Delay	71.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

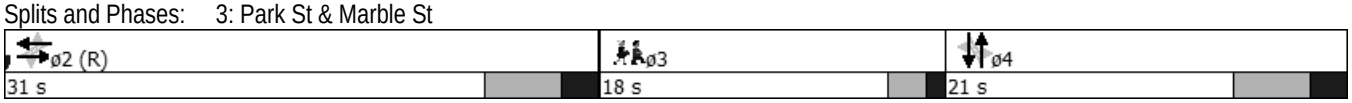
Phase Number	2	3	4
Movement	EBWB	Ped	NBSB
Lead/Lag		Lead	Lag
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	31	18	21
Maximum Split (%)	44.3%	25.7%	30.0%
Minimum Split (s)	16	18	14
Yellow Time (s)	4	2	4
All-Red Time (s)	2	1	2
Minimum Initial (s)	10	1	8
Vehicle Extension (s)	4	4	4
Minimum Gap (s)	4	3	4
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)		5	
Flash Dont Walk (s)		10	
Dual Entry	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	0	31	49
End Time (s)	31	49	0
Yield/Force Off (s)	25	46	64
Yield/Force Off 170(s)	25	36	64
Local Start Time (s)	0	31	49
Local Yield (s)	25	46	64
Local Yield 170(s)	25	36	64

Intersection Summary

Cycle Length	70
Control Type	Pretimed
Natural Cycle	90

Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	NB	SB	SB
Directions Served	TR	R	LT	R
Maximum Queue (ft)	114	47	966	375
Average Queue (ft)	10	7	726	86
95th Queue (ft)	57	31	1274	345
Link Distance (ft)	1029	236	924	
Upstream Blk Time (%)			65	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)				350
Storage Blk Time (%)			75	0
Queuing Penalty (veh)			10	1

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	569	205	39	75	236	27	41
Average Queue (ft)	407	179	9	58	40	2	5
95th Queue (ft)	711	269	32	87	152	13	24
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	18						
Queuing Penalty (veh)	164						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	51	11		11	0	0	0
Queuing Penalty (veh)	328	21		26	0	0	0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	2142	638	880	136
Average Queue (ft)	1756	264	447	53
95th Queue (ft)	2739	595	831	104
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)	63			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 551

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	36	1	5	36	0	1	0	2	448	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.93	0.93	0.93	0.25	0.25	0.25	0.94	0.94	0.94
Hourly flow rate (vph)	0	47	1	5	39	0	4	0	8	477	0	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	39			48			97	97	47	105	98	39
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	39			48			97	97	47	105	98	39
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.8
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.9
p0 queue free %	100			100			100	100	99	45	100	99
cM capacity (veh/h)	1584			1572			879	794	1027	871	794	885

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	48	44	12	485
Volume Left	0	5	4	477
Volume Right	1	0	8	9
cSH	1700	1572	973	886
Volume to Capacity	0.03	0.00	0.01	0.55
Queue Length 95th (ft)	0	0	1	85
Control Delay (s)	0.0	0.9	8.7	13.9
Lane LOS		A	A	B
Approach Delay (s)	0.0	0.9	8.7	13.9
Approach LOS			A	B

Intersection Summary			
Average Delay	11.7		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	3	334	3	5	5	460	89	7	7	148	88
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.81	0.81	0.81	0.95	0.95	0.95	0.91	0.91	0.91
Hourly flow rate (vph)	155	3	359	4	6	6	484	94	7	8	163	97
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	1249	1247	163	1425	1341	97	259			101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1249	1247	163	1425	1341	97	259			101		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	97	60	92	94	99	63			99		
cM capacity (veh/h)	100	110	887	47	97	964	1311			1504		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	517	16	484	101	170	97
Volume Left	155	4	484	0	8	0
Volume Right	359	6	0	7	0	97
cSH	289	108	1311	1700	1504	1700
Volume to Capacity	1.79	0.15	0.37	0.06	0.01	0.06
Queue Length 95th (ft)	854	13	43	0	0	0
Control Delay (s)	398.0	44.1	9.3	0.0	0.4	0.0
Lane LOS	F	E	A		A	
Approach Delay (s)	398.0	44.1	7.7		0.2	
Approach LOS	F	E				

Intersection Summary			
Average Delay	152.4		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	168	174	34	182	8	156	32	26	9	37	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.99			0.98			0.94	
Flt Protected		1.00			0.99			0.96			0.99	
Satd. Flow (prot)		1992			2109			1910			1735	
Flt Permitted		0.95			0.91			0.73			0.96	
Satd. Flow (perm)		1901			1926			1440			1672	
Peak-hour factor, PHF	0.88	0.88	0.88	0.93	0.93	0.93	0.92	0.92	0.92	0.83	0.83	0.83
Adj. Flow (vph)	43	191	198	37	196	9	170	35	28	11	45	48
RTOR Reduction (vph)	0	0	0	0	2	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	432	0	0	240	0	0	226	0	0	104	0
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		22.0			22.0			15.0			15.0	
Effective Green, g (s)		25.0			25.0			18.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.27			0.27	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		709			718			386			449	
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.12			c0.16			0.06	
v/c Ratio		0.61			0.33			0.58			0.23	
Uniform Delay, d1		17.0			15.0			21.3			19.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.9			1.3			6.3			1.2	
Delay (s)		20.9			16.3			27.6			20.3	
Level of Service		C			B			C			C	
Approach Delay (s)		20.9			16.3			27.6			20.3	
Approach LOS		C			B			C			C	

Intersection Summary

HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

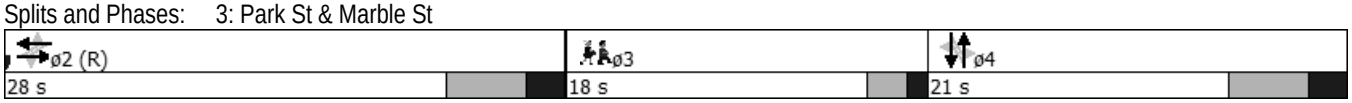
Phase Number	2	3	4
Movement	EBWB	Ped	NBSB
Lead/Lag		Lead	Lag
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	28	18	21
Maximum Split (%)	41.8%	26.9%	31.3%
Minimum Split (s)	16	18	14
Yellow Time (s)	4	2	4
All-Red Time (s)	2	1	2
Minimum Initial (s)	10	1	8
Vehicle Extension (s)	4	4	4
Minimum Gap (s)	4	3	4
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)		5	
Flash Dont Walk (s)		10	
Dual Entry	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	0	28	46
End Time (s)	28	46	0
Yield/Force Off (s)	22	43	61
Yield/Force Off 170(s)	22	33	61
Local Start Time (s)	0	28	46
Local Yield (s)	22	43	61
Local Yield 170(s)	22	33	61

Intersection Summary

Cycle Length	67
Control Type	Pretimed
Natural Cycle	60

Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	WB	NB	SB
Directions Served	LT	LTR	LT
Maximum Queue (ft)	10	35	135
Average Queue (ft)	0	3	73
95th Queue (ft)	5	19	113
Link Distance (ft)	552	236	924
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	177	135	44	74	172	26	43
Average Queue (ft)	72	43	12	54	23	1	6
95th Queue (ft)	140	89	38	84	107	10	24
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	1	0		8	0	0	0
Queuing Penalty (veh)	2	0		8	0	0	0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	473	356	192	108
Average Queue (ft)	220	143	96	43
95th Queue (ft)	511	310	163	84
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 10

Historical Traffic-Volume Data

Tighe&Bond

Historical Traffic Growth Rate[a]
Stoneham, Massachusetts

Location	Year										Average Annual Rate
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Main Street south of Reading Town Line	27,077	26,358	25,549	25,209	24,776	24,226	25,213	24,944	25,519	27,100	0.06%
I-93 south of Montvale Avenue	183,663	184,058	181,644	182,761	162,364	162,358	162,430	159,911	184,511	172,167	-0.50%
I-93 south of Border Road	172,600	171,200	161,800	157,200	155,978	156,250	156,592	156,558	169,451	169,821	-0.12%
Fellsway south of South Street			14,800				15,212				0.69%
Montvale Avenue east of I-93 interchange			18,400				18,913				0.69%
Pleasant Street north of Gould Street			7,200				7,401				0.69%

Average Annual Growth Rate = 0.25%

[a] Source: MassDOT Transportation Data Management System.

Trip-Generation Calculations

Tighe&Bond

NOTICE OF PROJECT CHANGE

Stoneham Crossing

EEA # 13836

Submitted to:
MEPA Office
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Prepared by:
Epsilon Associates, Inc.
3 Clock Tower Place
Suite 250
Maynard, MA 01754

Submitted by:
225 Fallon Road Realty, LLC
c/o The Richmond Company, Inc.
23 Concord Street
Wilmington, MA 01887

In Association with:
Greenman Pedersen Inc.
BSC Group

October 15, 2008

Epsilon
ASSOCIATES INC.

volumes that are expected to be generated by the proposed self-storage facility. All trip-generation data are provided in the Appendix 2.

Table 4-3 Trip-Generation Summary – Currently Proposed Self-Storage Facility

Time Period/Direction	Self-Storage Facility Trips [a]
Weekday AM Peak Hour:	
Enter	8
Exit	5
Total	13
Weekday PM Peak Hour:	
Enter	12
Exit	11
Total	23
Saturday Midday Peak Hour:	
Enter	17
Exit	17
Total	34

[a] ITE Land Use Code 151 (Mini-Warehouse) for 87,000 sf.

Based on additional engineering/line of sight analyses and in response to comments received during the previous permitting/environmental review process, to provide more optimal separation distances, the easternmost site driveway is proposed to be physically relocated (approximately 200 linear feet further to the west) further away from the I-93 southbound off-ramp, but will still function as the main site access driveway. This site driveway is expected to be improved to meet industry standard design criteria for two way traffic (i.e., 24 foot minimum paved surface width).

4.3.4 Trip-Generation Comparison (Office Building Complex Versus Self Storage Facility)

To determine the difference in trip generation/traffic volumes for the current build program, a trip-generation comparison was made between: (1) the existing uses on the site (as previously occupied as an office complex), (2) the previously proposed/approved redevelopment project (the retail home improvement center and office building combination), and (3) the currently proposed self storage facility.

Institute of Transportation Engineers (ITE)
Land Use Code (LUC) 220 - Apartment

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 298

AVERAGE WEEKDAY DAILY
T = 6.06 * (X) + 123.56
T = 6.06 * 298 + 123.56
T = 1929.44
T = 1,930 vehicle trips
with 50% (965 vpd) entering and 50% (965 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC
T = 0.49 * (X) + 3.73
T = 0.49 * 298 + 3.73
T = 149.75
T = 150 vehicle trips
with 20% (30 vph) entering and 80% (120 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC
T = 0.55 * (X) + 17.65
T = 0.55 * 298 + 17.65
T = 181.55
T = 182 vehicle trips
with 65% (118 vph) entering and 35% (64 vph) exiting.

SATURDAY DAILY
T = 6.39 * (X)
T = 6.39 * 298
T = 1904.22
T = 1,904 vehicle trips
with 50% (952 vpd) entering and 50% (952 vpd) exiting.

SATURDAY PEAK HOUR OF GENERATOR
T = 0.52 * (X)
T = 0.52 * 298
T = 154.96
T = 155 vehicle trips
with 50% (78 vph) entering and 50% (77 vph) exiting.

Trip-Distribution Data

Tighe&Bond

Central Transportation Planning Package

Journey-to-Work Data
Residence: Stoneham, Massachusetts

		Park St	Marble St	Marble St to/from East		I-93	North Border Rd South		
Workplace	**Number of People**	**to/from North**	**to/from West**	**Rte 28 North**	**Summer St East**	**to/from North**	**I-93 & Rte 28 South**	**South St East**	**TOTAL**
Acton, MA	48	0	0	0	0	48	0	0	48
Andover, MA	136	0	0	0	0	136	0	0	136
Arlington, MA	63	0	0	32	0	0	32	0	63
Ashby, MA	14	0	0	0	0	14	0	0	14
Ashland, MA	18	0	0	0	0	18	0	0	18
Avon, MA	8	0	0	0	0	0	8	0	8
Ayer, MA	15	0	0	0	0	15	0	0	15
Bedford, MA	177	0	0	0	0	177	0	0	177
Belmont, MA	28	0	0	0	0	0	28	0	28
Beverly, MA	53	0	0	0	0	53	0	0	53
Billerica, MA	121	0	0	0	0	121	0	0	121
Boston, MA	2,078	0	0	0	0	0	2,078	0	2,078
Boxford, MA	12	0	0	0	0	12	0	0	12
Braintree, MA	11	0	0	0	0	0	11	0	11
Brookline, MA	38	0	0	0	0	0	38	0	38
Burlington, MA	429	0	0	0	0	429	0	0	429
Cambridge, MA	515	0	0	0	0	0	515	0	515
Canton, MA	19	0	0	0	0	0	19	0	19
Carlisle, MA	8	0	0	0	0	8	0	0	8
Chelmsford, MA	47	0	0	0	0	47	0	0	47
Chelsea, MA	117	0	0	0	0	0	117	0	117
Concord, MA	60	0	0	0	0	60	0	0	60
Danvers, MA	101	0	0	0	0	101	0	0	101
Dedham, MA	19	0	0	0	0	19	0	0	19
Dracut, MA	14	0	0	0	0	14	0	0	14
Easton, MA	8	0	0	0	0	0	8	0	8
Everett, MA	98	0	0	0	0	0	74	25	98
Fall River, MA	6	0	0	0	0	0	6	0	6
Framingham, MA	94	0	0	0	0	94	0	0	94
Franklin, MA	9	0	0	0	0	5	5	0	9
Georgetown, MA	11	0	0	0	0	11	0	0	11
Groton, MA	11	0	0	0	0	11	0	0	11
Groveland, MA	11	0	0	0	0	11	0	0	11

Haverhill, MA	25	0	0	0	0	25	0	0	25
Hingham, MA	7	0	0	0	0	0	7	0	7
Hudson, MA	24	0	0	0	0	24	0	0	24
Lawrence, MA	46	0	0	0	0	46	0	0	46
Lexington, MA	131	0	0	0	0	131	0	0	131
Littleton, MA	14	0	0	0	0	14	0	0	14
Lowell, MA	117	0	0	0	0	117	0	0	117
Lynn, MA	114	0	0	0	0	57	0	57	114
Lynnfield, MA	40	0	0	0	0	40	0	0	40
Malden, MA	198	0	0	0	0	0	198	0	198
Marblehead, MA	13	0	0	0	0	13	0	0	13
Marlboro, MA	56	0	0	0	0	56	0	0	56
Mashpee, MA	7	0	0	0	0	0	7	0	7
Medford, MA	275	0	0	0	0	0	275	0	275
Melrose, MA	134	0	0	0	0	0	0	134	134
Methuen, MA	22	0	0	0	0	22	0	0	22
Middletown, MA	8	0	0	0	0	8	0	0	8
Millis, MA	9	0	0	0	0	9	0	0	9
Natick, MA	75	0	0	0	0	75	0	0	75
Needham, MA	44	0	0	0	0	44	0	0	44
Newbury, MA	7	0	0	0	0	7	0	0	7
Newburyport, MA	6	0	0	0	0	6	0	0	6
Newton, MA	146	0	0	0	0	146	0	0	146
North Andover, MA	31	0	0	0	0	31	0	0	31
North Reading, MA	99	0	0	0	0	99	0	0	99
Norwood, MA	9	0	0	0	0	9	0	0	9
Peabody, MA	178	0	0	0	0	178	0	0	178
Quincy, MA	54	0	0	0	0	0	54	0	54
Randolph, MA	20	0	0	0	0	0	20	0	20
Reading, MA	236	0	0	0	0	236	0	0	236
Revere, MA	38	0	0	0	0	0	38	0	38
Salem, MA	79	0	0	0	0	79	0	0	79
Saugus, MA	93	0	0	0	0	0	0	93	93
Shirley, MA	7	0	0	0	0	7	0	0	7
Somerville, MA	216	0	0	0	0	0	216	0	216
Stoneham, MA	1,760	176	0	616	440	352	0	176	1,760
Stoughton, MA	10	0	0	0	0	0	10	0	10
Stow, MA	8	0	0	0	0	8	0	0	8
Sudbury, MA	11	0	0	0	0	11	0	0	11

Tewksbury, MA	82	0	0	0	0	82	0	0	82
Tyngsborough, MA	22	0	0	0	0	22	0	0	22
Wakefield, MA	382	0	0	96	0	287	0	0	382
Waltham, MA	346	0	0	0	0	346	0	0	346
Watertown, MA	77	0	0	0	0	0	77	0	77
Wayland, MA	14	0	0	0	0	14	0	0	14
Wellesley, MA	15	0	0	0	0	15	0	0	15
Wenham, MA	12	0	0	0	0	12	0	0	12
Westborough, MA	22	0	0	0	0	22	0	0	22
Westford, MA	60	0	0	0	0	60	0	0	60
Weston, MA	10	0	0	0	0	10	0	0	10
Westwood, MA	5	0	0	0	0	5	0	0	5
Weymouth, MA	27	0	0	0	0	0	27	0	27
Wilmington, MA	221	0	0	0	0	221	0	0	221
Winchester, MA	269	0	269	0	0	0	0	0	269
Winthrop, MA	7	0	0	0	0	0	7	0	7
Woburn, MA	848	0	424	0	0	424	0	0	848
Worcester, MA	6	0	0	0	0	6	0	0	6
Wrentham, MA	22	0	0	0	0	0	22	0	22
Bedford, NH	7	0	0	0	0	7	0	0	7
Manchester, NH	21	0	0	0	0	21	0	0	21
Nashua, NH	9	0	0	0	0	9	0	0	9
Peterborough, NH	10	0	0	0	0	10	0	0	10
Concord, NH	9	0	0	0	0	9	0	0	9
Londonderry, NH	17	0	0	0	0	17	0	0	17
Salem, NH	18	0	0	0	0	18	0	0	18
Pawtucket, RI	8	0	0	0	0	0	8	0	8
Providence, RI	8	0	0	0	0	0	8	0	8
Burlington, VT	8	0	0	0	0	8	0	0	8
TOTALS:	11,326	176	693	744	440	4,878	3,910	485	11,326
		1.55%	6.12%	6.57%	3.88%	43.07%	34.52%	4.28%	
	Assumed:	**5%**	**5%**	**5%**	**5%**	**40%**	**35%**	**5%**	**100%**

Analysis Worksheets: No-Build and Build

Tighe&Bond

Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	WB	NB	SB	SB
Directions Served	TR	LT	R	LT	R
Maximum Queue (ft)	274	15	51	971	375
Average Queue (ft)	86	0	10	717	87
95th Queue (ft)	264	5	36	1288	346
Link Distance (ft)	1029	552	236	924	
Upstream Blk Time (%)				67	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				72	0
Queuing Penalty (veh)				26	2

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	565	205	100	75	1210	31	57
Average Queue (ft)	490	136	30	70	403	2	18
95th Queue (ft)	729	287	89	86	1065	15	44
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	50						
Queuing Penalty (veh)	386						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	61	27		37	0	0	0
Queuing Penalty (veh)	430	20		100	1	0	0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1999	1736	298	139
Average Queue (ft)	1111	1081	131	71
95th Queue (ft)	2346	2144	243	124
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)	19	35		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 966

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	32	2	4	25	0	0	0	6	738	0	36
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	35	2	4	27	0	0	0	7	802	0	39
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	27			37			72	72	36	78	73	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			37			72	72	36	78	73	27
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.8
p0 queue free %	100			100			100	100	99	11	100	96
cM capacity (veh/h)	1600			1587			883	820	1043	905	819	917

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	37	32	7	841
Volume Left	0	4	0	802
Volume Right	2	0	7	39
cSH	1700	1587	1043	950
Volume to Capacity	0.02	0.00	0.01	0.89
Queue Length 95th (ft)	0	0	0	306
Control Delay (s)	0.0	1.0	8.5	29.7
Lane LOS		A	A	D
Approach Delay (s)	0.0	1.0	8.5	29.7
Approach LOS			A	D

Intersection Summary			
Average Delay	27.4		
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	71	1	704	6	3	3	735	267	5	0	284	156
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	1	765	7	3	3	799	290	5	0	309	170
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	2202	2202	309	2583	2369	293	478			296		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2202	2202	309	2583	2369	293	478			296		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	91	0	0	65	100	27			100		
cM capacity (veh/h)	9	12	734	0	9	751	1089			1277		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	843	13	799	296	309	170
Volume Left	77	7	799	0	0	0
Volume Right	765	3	0	5	0	170
cSH	85	0	1089	1700	1277	1700
Volume to Capacity	9.90	Err	0.73	0.17	0.00	0.10
Queue Length 95th (ft)	Err	Err	173	0	0	0
Control Delay (s)	Err	Err	16.8	0.0	0.0	0.0
Lane LOS	F	F	C			
Approach Delay (s)	Err	Err	12.3		0.0	
Approach LOS	F	F				

Intersection Summary				
Average Delay		Err		
Intersection Capacity Utilization		72.6%	ICU Level of Service	C
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	215	290	37	530	12	278	31	24	10	84	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		2.0			2.0			2.0			2.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			1.00			0.99			0.92	
Flt Protected		1.00			1.00			0.96			1.00	
Satd. Flow (prot)		1959			2083			1905			1703	
Flt Permitted		0.93			0.95			0.60			0.98	
Satd. Flow (perm)		1833			1993			1190			1676	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	234	315	40	576	13	302	34	26	11	91	145
RTOR Reduction (vph)	0	0	0	0	1	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	600	0	0	628	0	0	359	0	0	247	0
Heavy Vehicles (%)	0%	3%	1%	0%	3%	0%	0%	9%	4%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		20.0			20.0			20.0			20.0	
Effective Green, g (s)		23.0			23.0			23.0			23.0	
Actuated g/C Ratio		0.46			0.46			0.46			0.46	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		843			916			547			770	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.32			c0.30			0.15	
v/c Ratio		0.71			0.69			0.66			0.32	
Uniform Delay, d1		10.8			10.6			10.4			8.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.4			1.7			2.2			0.1	
Delay (s)		13.2			12.4			12.6			8.6	
Level of Service		B			B			B			A	
Approach Delay (s)		13.2			12.4			12.6			8.6	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

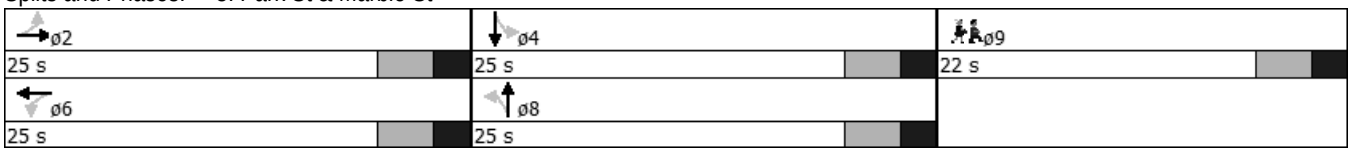
c Critical Lane Group

Phase Number	2	4	6	8	9
Movement	EBTL	SBTL	WBTL	NBTL	Ped
Lead/Lag					
Lead-Lag Optimize					
Recall Mode	Min	None	Min	None	None
Maximum Split (s)	25	25	25	25	22
Maximum Split (%)	34.7%	34.7%	34.7%	34.7%	30.6%
Minimum Split (s)	16	12	16	12	22
Yellow Time (s)	3	3	3	3	3
All-Red Time (s)	2	2	2	2	2
Minimum Initial (s)	10	6	10	6	1
Vehicle Extension (s)	2	2	2	2	2
Minimum Gap (s)	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					7
Flash Dont Walk (s)					10
Dual Entry	Yes	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25	0	25	50
End Time (s)	25	50	25	50	0
Yield/Force Off (s)	20	45	20	45	67
Yield/Force Off 170(s)	20	45	20	45	57
Local Start Time (s)	0	25	0	25	50
Local Yield (s)	20	45	20	45	67
Local Yield 170(s)	20	45	20	45	57

Intersection Summary

Cycle Length	72
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	WB	NB	SB	SB
Directions Served	TR	LT	R	LT	R
Maximum Queue (ft)	520	10	60	964	375
Average Queue (ft)	132	0	10	909	62
95th Queue (ft)	438	5	37	1121	291
Link Distance (ft)	1029	552	236	924	
Upstream Blk Time (%)				93	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				97	0
Queuing Penalty (veh)				17	1

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	569	205	35	75	393	29	45
Average Queue (ft)	547	160	8	68	108	2	13
95th Queue (ft)	644	296	30	83	294	13	35
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	61						
Queuing Penalty (veh)	615						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	89	5		20	0	0	0
Queuing Penalty (veh)	658	10		57	0	0	0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1420	757	239	112
Average Queue (ft)	709	220	133	48
95th Queue (ft)	1468	546	213	88
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1358

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	50	2	2	11	0	0	0	8	948	0	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	2	2	12	0	0	0	9	1030	0	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	12			57			72	72	55	80	73	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			57			72	72	55	80	73	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	100			100			100	100	99	0	100	98
cM capacity (veh/h)	1620			1561			906	821	1017	904	820	990

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	57	14	9	1049
Volume Left	0	2	0	1030
Volume Right	2	0	9	18
cSH	1700	1561	1017	912
Volume to Capacity	0.03	0.00	0.01	1.15
Queue Length 95th (ft)	0	0	1	753
Control Delay (s)	0.0	1.1	8.6	98.9
Lane LOS		A	A	F
Approach Delay (s)	0.0	1.1	8.6	98.9
Approach LOS			A	F

Intersection Summary			
Average Delay	92.0		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	219	2	734	1	3	5	712	280	7	5	209	97
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	238	2	798	1	3	5	774	304	8	5	227	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	2097	2098	227	2494	2199	308	333			312		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2097	2098	227	2494	2199	308	333			312		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	89	2	0	81	99	37			100		
cM capacity (veh/h)	16	19	817	0	17	737	1232			1260		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	1038	10	774	312	233	105
Volume Left	238	1	774	0	5	0
Volume Right	798	5	0	8	0	105
cSH	66	2	1232	1700	1260	1700
Volume to Capacity	15.78	5.20	0.63	0.18	0.00	0.06
Queue Length 95th (ft)	Err	Err	117	0	0	0
Control Delay (s)	Err	Err	12.7	0.0	0.2	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	Err	Err	9.1		0.2	
Approach LOS	F	F				

Intersection Summary			
Average Delay	4242.8		
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	500	253	22	254	18	325	88	55	9	53	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		2.0			2.0			2.0			2.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.98			0.93	
Flt Protected		1.00			1.00			0.97			1.00	
Satd. Flow (prot)		2055			2127			1924			1764	
Flt Permitted		0.94			0.92			0.71			0.96	
Satd. Flow (perm)		1938			1973			1412			1706	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	543	275	24	276	20	353	96	60	10	58	70
RTOR Reduction (vph)	0	0	0	0	2	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	906	0	0	318	0	0	503	0	0	138	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.0			27.0			18.0			18.0	
Effective Green, g (s)		30.0			30.0			21.0			21.0	
Actuated g/C Ratio		0.55			0.55			0.38			0.38	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1057			1076			539			651	
v/s Ratio Prot												
v/s Ratio Perm		c0.47			0.16			c0.36			0.08	
v/c Ratio		0.86			0.30			0.93			0.21	
Uniform Delay, d1		10.7			6.8			16.3			11.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		6.8			0.1			23.2			0.1	
Delay (s)		17.4			6.8			39.5			11.5	
Level of Service		B			A			D			B	
Approach Delay (s)		17.4			6.8			39.5			11.5	
Approach LOS		B			A			D			B	

Intersection Summary

HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		

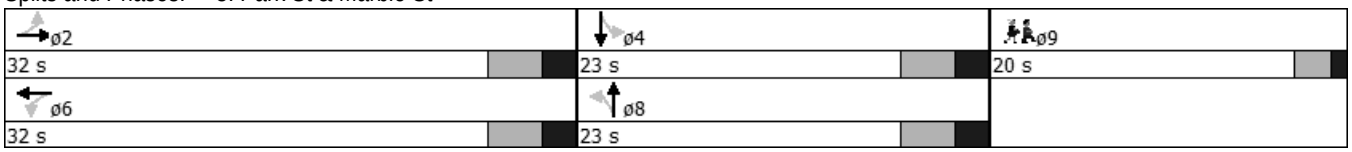
c Critical Lane Group

Phase Number	2	4	6	8	9
Movement	EBTL	SBTL	WBTL	NBTL	Ped
Lead/Lag					
Lead-Lag Optimize					
Recall Mode	Min	None	Min	None	None
Maximum Split (s)	32	23	32	23	20
Maximum Split (%)	42.7%	30.7%	42.7%	30.7%	26.7%
Minimum Split (s)	16	12	16	12	20
Yellow Time (s)	3	3	3	3	2
All-Red Time (s)	2	2	2	2	1
Minimum Initial (s)	10	6	10	6	1
Vehicle Extension (s)	2	2	2	2	2
Minimum Gap (s)	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					7
Flash Dont Walk (s)					10
Dual Entry	Yes	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	32	0	32	55
End Time (s)	32	55	32	55	0
Yield/Force Off (s)	27	50	27	50	72
Yield/Force Off 170(s)	27	50	27	50	62
Local Start Time (s)	0	32	0	32	55
Local Yield (s)	27	50	27	50	72
Local Yield 170(s)	27	50	27	50	62

Intersection Summary

Cycle Length	75
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	WB	NB	SB	SB
Directions Served	TR	LT	LTR	LT	R
Maximum Queue (ft)	6	15	30	193	16
Average Queue (ft)	0	1	4	83	1
95th Queue (ft)	4	6	20	145	12
Link Distance (ft)	1029	552	236	924	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					350
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	437	205	36	75	208	11	43
Average Queue (ft)	131	73	11	59	45	1	9
95th Queue (ft)	332	180	35	87	155	11	30
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	1						
Queuing Penalty (veh)	4						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	10	1		12	0		0
Queuing Penalty (veh)	38	1		14	0		0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	198	118	144	112
Average Queue (ft)	96	60	68	39
95th Queue (ft)	164	111	121	76
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 58

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	38	1	5	37	0	1	0	2	509	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	41	1	5	40	0	1	0	2	553	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	40			42			93	93	42	95	93	40
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	40			42			93	93	42	95	93	40
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.8
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.9
p0 queue free %	100			100			100	100	100	38	100	98
cM capacity (veh/h)	1582			1580			879	798	1035	888	798	883

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	46	3	567
Volume Left	0	5	1	553
Volume Right	1	0	2	14
cSH	1700	1580	977	911
Volume to Capacity	0.02	0.00	0.00	0.62
Queue Length 95th (ft)	0	0	0	112
Control Delay (s)	0.0	0.9	8.7	15.3
Lane LOS		A	A	C
Approach Delay (s)	0.0	0.9	8.7	15.3
Approach LOS			A	C

Intersection Summary			
Average Delay	13.3		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	154	3	387	3	5	5	519	103	7	7	167	94
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	167	3	421	3	5	5	564	112	8	8	182	102
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	1445	1445	182	1653	1543	116	284			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1445	1445	182	1653	1543	116	284			120		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	96	51	87	92	99	56			99		
cM capacity (veh/h)	67	74	866	26	65	942	1284			1481		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	591	14	564	120	189	102
Volume Left	167	3	564	0	8	0
Volume Right	421	5	0	8	0	102
cSH	201	66	1284	1700	1481	1700
Volume to Capacity	2.94	0.22	0.44	0.07	0.01	0.06
Queue Length 95th (ft)	1324	18	57	0	0	0
Control Delay (s)	923.0	74.4	10.0	0.0	0.3	0.0
Lane LOS	F	F	A		A	
Approach Delay (s)	923.0	74.4	8.2		0.2	
Approach LOS	F	F				

Intersection Summary				
Average Delay	349.6			
Intersection Capacity Utilization	63.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	187	190	36	203	11	171	39	28	12	44	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		2.0			2.0			2.0			2.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.99			0.98			0.94	
Flt Protected		1.00			0.99			0.97			0.99	
Satd. Flow (prot)		1993			2108			1912			1739	
Flt Permitted		0.95			0.91			0.74			0.96	
Satd. Flow (perm)		1909			1937			1472			1671	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	203	207	39	221	12	186	42	30	13	48	47
RTOR Reduction (vph)	0	0	0	0	2	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	455	0	0	270	0	0	253	0	0	108	0
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		14.7			14.7			11.9			11.9	
Effective Green, g (s)		17.7			17.7			14.9			14.9	
Actuated g/C Ratio		0.48			0.48			0.41			0.41	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		923			936			599			680	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.14			c0.17			0.06	
v/c Ratio		0.49			0.29			0.42			0.16	
Uniform Delay, d1		6.4			5.7			7.8			6.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.1			0.2			0.0	
Delay (s)		6.6			5.7			7.9			6.9	
Level of Service		A			A			A			A	
Approach Delay (s)		6.6			5.7			7.9			6.9	
Approach LOS		A			A			A			A	

Intersection Summary

HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	36.6	Sum of lost time (s)	7.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

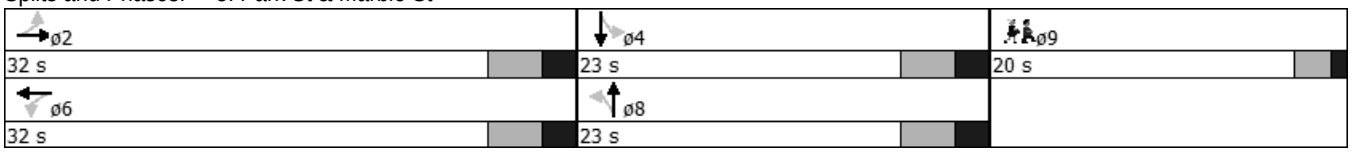
c Critical Lane Group

Phase Number	2	4	6	8	9
Movement	EBTL	SBTL	WBTL	NBTL	Ped
Lead/Lag					
Lead-Lag Optimize					
Recall Mode	Min	None	Min	None	None
Maximum Split (s)	32	23	32	23	20
Maximum Split (%)	42.7%	30.7%	42.7%	30.7%	26.7%
Minimum Split (s)	15	11	15	11	20
Yellow Time (s)	3	3	3	3	2
All-Red Time (s)	2	2	2	2	1
Minimum Initial (s)	10	6	10	6	1
Vehicle Extension (s)	2	2	2	2	2
Minimum Gap (s)	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					7
Flash Dont Walk (s)					10
Dual Entry	Yes	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	32	0	32	55
End Time (s)	32	55	32	55	0
Yield/Force Off (s)	27	50	27	50	72
Yield/Force Off 170(s)	27	50	27	50	62
Local Start Time (s)	0	32	0	32	55
Local Yield (s)	27	50	27	50	72
Local Yield 170(s)	27	50	27	50	62

Intersection Summary

Cycle Length	75
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	WB	NB	SB	SB
Directions Served	TR	LT	R	LT	R
Maximum Queue (ft)	1090	4	104	983	375
Average Queue (ft)	759	0	30	881	64
95th Queue (ft)	1377	3	98	1179	297
Link Distance (ft)	1029	552	236	924	
Upstream Blk Time (%)	53			88	
Queuing Penalty (veh)	0			0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				92	0
Queuing Penalty (veh)				45	1

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	570	205	84	75	1050	32	55
Average Queue (ft)	542	97	23	71	346	1	18
95th Queue (ft)	662	263	64	82	954	12	44
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	75						
Queuing Penalty (veh)	673						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	87	9		37	0	0	0
Queuing Penalty (veh)	656	13		102	3	0	0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1968	1593	221	138
Average Queue (ft)	1059	879	109	74
95th Queue (ft)	2384	1867	186	124
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)	23	23		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1493

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	152	2	4	43	0	0	0	6	738	0	48
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	165	2	4	47	0	0	0	7	802	0	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	47			167			222	222	166	228	223	47
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	47			167			222	222	166	228	223	47
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.8
p0 queue free %	100			100			100	100	99	0	100	94
cM capacity (veh/h)	1574			1423			694	678	883	722	677	893

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	167	51	7	854
Volume Left	0	4	0	802
Volume Right	2	0	7	52
cSH	1700	1423	883	756
Volume to Capacity	0.10	0.00	0.01	1.13
Queue Length 95th (ft)	0	0	1	627
Control Delay (s)	0.0	0.7	9.1	96.2
Lane LOS		A	A	F
Approach Delay (s)	0.0	0.7	9.1	96.2
Approach LOS			A	F

Intersection Summary			
Average Delay	76.2		
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	1	752	6	3	3	747	267	5	0	284	162
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	155	1	817	7	3	3	812	290	5	0	309	176
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	2228	2228	309	2635	2402	293	485			296		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2228	2228	309	2635	2402	293	485			296		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	90	0	0	61	100	25			100		
cM capacity (veh/h)	8	11	734	0	8	751	1083			1277		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	974	13	812	296	309	176
Volume Left	155	7	812	0	0	0
Volume Right	817	3	0	5	0	176
cSH	46	0	1083	1700	1277	1700
Volume to Capacity	21.29	Err	0.75	0.17	0.00	0.10
Queue Length 95th (ft)	Err	Err	184	0	0	0
Control Delay (s)	Err	Err	17.5	0.0	0.0	0.0
Lane LOS	F	F	C			
Approach Delay (s)	Err	Err	12.8		0.0	
Approach LOS	F	F				

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	215	292	40	530	12	284	37	36	10	85	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		2.0			2.0			2.0			2.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			1.00			0.99			0.92	
Flt Protected		1.00			1.00			0.96			1.00	
Satd. Flow (prot)		1959			2083			1897			1704	
Flt Permitted		0.93			0.95			0.61			0.98	
Satd. Flow (perm)		1832			1985			1197			1675	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	234	317	43	576	13	309	40	39	11	92	145
RTOR Reduction (vph)	0	0	0	0	1	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	602	0	0	631	0	0	384	0	0	248	0
Heavy Vehicles (%)	0%	3%	1%	0%	3%	0%	0%	9%	4%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		20.0			20.0			20.0			20.0	
Effective Green, g (s)		23.0			23.0			23.0			23.0	
Actuated g/C Ratio		0.46			0.46			0.46			0.46	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		842			913			550			770	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.32			c0.32			0.15	
v/c Ratio		0.71			0.69			0.70			0.32	
Uniform Delay, d1		10.9			10.7			10.7			8.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.4			1.8			3.1			0.1	
Delay (s)		13.3			12.5			13.8			8.6	
Level of Service		B			B			B			A	
Approach Delay (s)		13.3			12.5			13.8			8.6	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

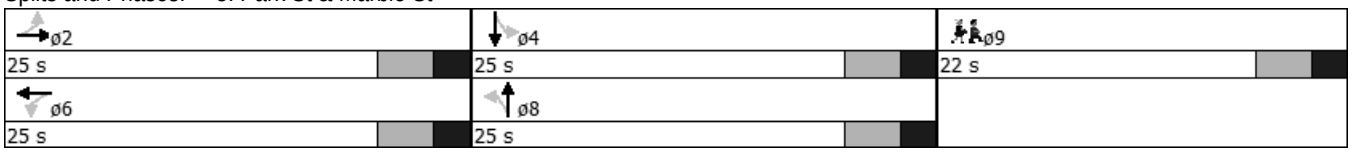
c Critical Lane Group

Phase Number	2	4	6	8	9
Movement	EBTL	SBTL	WBTL	NBTL	Ped
Lead/Lag					
Lead-Lag Optimize					
Recall Mode	Min	None	Min	None	None
Maximum Split (s)	25	25	25	25	22
Maximum Split (%)	34.7%	34.7%	34.7%	34.7%	30.6%
Minimum Split (s)	16	12	16	12	22
Yellow Time (s)	3	3	3	3	3
All-Red Time (s)	2	2	2	2	2
Minimum Initial (s)	10	6	10	6	1
Vehicle Extension (s)	2	2	2	2	2
Minimum Gap (s)	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					7
Flash Dont Walk (s)					10
Dual Entry	Yes	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25	0	25	50
End Time (s)	25	50	25	50	0
Yield/Force Off (s)	20	45	20	45	67
Yield/Force Off 170(s)	20	45	20	45	57
Local Start Time (s)	0	25	0	25	50
Local Yield (s)	20	45	20	45	67
Local Yield 170(s)	20	45	20	45	57

Intersection Summary

Cycle Length	72
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Park St & Marble St



Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	WB	NB	SB	SB
Directions Served	TR	LT	R	LT	R
Maximum Queue (ft)	951	5	78	967	375
Average Queue (ft)	480	0	14	917	67
95th Queue (ft)	1169	0	50	1084	304
Link Distance (ft)	1029	552	236	924	
Upstream Blk Time (%)	22			94	
Queuing Penalty (veh)	0			0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				96	0
Queuing Penalty (veh)				62	1

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	569	205	60	75	569	22	51
Average Queue (ft)	547	126	13	70	177	1	13
95th Queue (ft)	648	286	44	84	450	8	36
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	73						
Queuing Penalty (veh)	781						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	92	2		26	0		0
Queuing Penalty (veh)	699	6		76	1		0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1802	1549	225	132
Average Queue (ft)	862	668	121	53
95th Queue (ft)	1839	1531	194	97
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)	6	4		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1626

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	114	2	2	82	0	0	0	8	948	0	64
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	124	2	2	89	0	0	0	9	1030	0	70
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	89			126			218	218	125	227	220	89
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	89			126			218	218	125	227	220	89
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	100			100			100	100	99	0	100	92
cM capacity (veh/h)	1519			1473			684	682	931	725	681	895

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	126	91	9	1100
Volume Left	0	2	0	1030
Volume Right	2	0	9	70
cSH	1700	1473	931	742
Volume to Capacity	0.07	0.00	0.01	1.48
Queue Length 95th (ft)	0	0	1	1314
Control Delay (s)	0.0	0.2	8.9	240.6
Lane LOS		A	A	F
Approach Delay (s)	0.0	0.2	8.9	240.6
Approach LOS			A	F

Intersection Summary			
Average Delay	199.6		
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	257	2	760	1	3	5	759	280	7	5	209	121
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	279	2	826	1	3	5	825	304	8	5	227	132
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	2199	2200	227	2610	2328	308	359			312		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2199	2200	227	2610	2328	308	359			312		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	85	0	0	72	99	32			100		
cM capacity (veh/h)	12	14	817	0	12	737	1206			1260		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	1108	10	825	312	233	132
Volume Left	279	1	825	0	5	0
Volume Right	826	5	0	8	0	132
cSH	44	0	1206	1700	1260	1700
Volume to Capacity	25.40	Err	0.68	0.18	0.00	0.08
Queue Length 95th (ft)	Err	Err	145	0	0	0
Control Delay (s)	Err	Err	14.2	0.0	0.2	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	Err	Err	10.3		0.1	
Approach LOS	F	F				

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	500	259	34	254	18	328	91	61	9	59	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		2.0			2.0			2.0			2.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.98			0.93	
Flt Protected		1.00			0.99			0.97			1.00	
Satd. Flow (prot)		2054			2124			1923			1769	
Flt Permitted		0.94			0.89			0.70			0.97	
Satd. Flow (perm)		1935			1897			1402			1715	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	543	282	37	276	20	357	99	66	10	64	70
RTOR Reduction (vph)	0	0	0	0	2	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	913	0	0	331	0	0	516	0	0	144	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		27.0			27.0			18.0			18.0	
Effective Green, g (s)		30.0			30.0			21.0			21.0	
Actuated g/C Ratio		0.55			0.55			0.38			0.38	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1055			1034			535			654	
v/s Ratio Prot												
v/s Ratio Perm		c0.47			0.17			c0.37			0.08	
v/c Ratio		0.87			0.32			0.96			0.22	
Uniform Delay, d1		10.8			6.9			16.6			11.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.3			0.1			29.6			0.1	
Delay (s)		18.1			6.9			46.2			11.5	
Level of Service		B			A			D			B	
Approach Delay (s)		18.1			6.9			46.2			11.5	
Approach LOS		B			A			D			B	

Intersection Summary

HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	6	8	9
Movement	EBTL	SBTL	WBTL	NBTL	Ped
Lead/Lag					
Lead-Lag Optimize					
Recall Mode	Min	None	Min	None	None
Maximum Split (s)	32	23	32	23	20
Maximum Split (%)	42.7%	30.7%	42.7%	30.7%	26.7%
Minimum Split (s)	16	12	16	12	20
Yellow Time (s)	3	3	3	3	2
All-Red Time (s)	2	2	2	2	1
Minimum Initial (s)	10	6	10	6	1
Vehicle Extension (s)	2	2	2	2	2
Minimum Gap (s)	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					7
Flash Dont Walk (s)					10
Dual Entry	Yes	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	32	0	32	55
End Time (s)	32	55	32	55	0
Yield/Force Off (s)	27	50	27	50	72
Yield/Force Off 170(s)	27	50	27	50	62
Local Start Time (s)	0	32	0	32	55
Local Yield (s)	27	50	27	50	72
Local Yield 170(s)	27	50	27	50	62

Intersection Summary

Cycle Length	75
Control Type	Actuated-Uncoordinated
Natural Cycle	140

Splits and Phases: 3: Park St & Marble St

ø2	ø4	ø9
32 s	23 s	20 s
ø6	ø8	
32 s	23 s	

Intersection: 1: Parking Area/I-93 SB Off-Ramp & Fallon Rd

Movement	EB	WB	NB	SB	SB
Directions Served	TR	LT	LTR	LT	R
Maximum Queue (ft)	43	5	34	846	315
Average Queue (ft)	5	0	2	430	88
95th Queue (ft)	29	4	16	1073	346
Link Distance (ft)	1029	552	236	924	
Upstream Blk Time (%)				24	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					350
Storage Blk Time (%)				39	0
Queuing Penalty (veh)				17	2

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	LT	R
Maximum Queue (ft)	569	205	44	75	231	16	54
Average Queue (ft)	380	155	12	66	67	1	11
95th Queue (ft)	719	275	38	86	191	8	34
Link Distance (ft)	552		186		2671	1057	
Upstream Blk Time (%)	20						
Queuing Penalty (veh)	111						
Storage Bay Dist (ft)		180		50			50
Storage Blk Time (%)	50	6		16	0		0
Queuing Penalty (veh)	211	12		18	0		0

Intersection: 3: Park St & Marble St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	203	175	153	105
Average Queue (ft)	97	69	72	44
95th Queue (ft)	164	131	126	82
Link Distance (ft)	2127	1689	1057	868
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 372

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	38	1	5	84	0	1	0	2	509	0	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	41	1	5	91	0	1	0	2	553	0	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												14
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	91			42			144	144	42	146	145	91
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	91			42			144	144	42	146	145	91
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.8
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.9
p0 queue free %	100			100			100	100	100	33	100	94
cM capacity (veh/h)	1516			1580			779	748	1035	823	748	824

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	97	3	601
Volume Left	0	5	1	553
Volume Right	1	0	2	48
cSH	1700	1580	933	894
Volume to Capacity	0.02	0.00	0.00	0.67
Queue Length 95th (ft)	0	0	0	134
Control Delay (s)	0.0	0.4	8.9	17.2
Lane LOS		A	A	C
Approach Delay (s)	0.0	0.4	8.9	17.2
Approach LOS			A	C

Intersection Summary			
Average Delay	14.0		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	200	3	418	3	5	5	550	103	7	7	167	110
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	217	3	454	3	5	5	598	112	8	8	182	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			7									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1129	
pX, platoon unblocked												
vC, conflicting volume	1512	1512	182	1737	1628	116	301			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1512	1512	182	1737	1628	116	301			120		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	95	48	84	90	99	53			99		
cM capacity (veh/h)	57	64	866	20	54	942	1266			1481		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	675	14	598	120	189	120
Volume Left	217	3	598	0	8	0
Volume Right	454	5	0	8	0	120
cSH	155	52	1266	1700	1481	1700
Volume to Capacity	4.36	0.27	0.47	0.07	0.01	0.07
Queue Length 95th (ft)	Err	23	65	0	0	0
Control Delay (s)	Err	97.5	10.4	0.0	0.3	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	Err	97.5	8.6		0.2	
Approach LOS	F	F				

Intersection Summary			
Average Delay	3939.4		
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	187	194	44	203	11	175	43	35	12	48	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	14	14	14	12	12	12
Total Lost time (s)		2.0			2.0			2.0			2.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.99			0.98			0.94	
Flt Protected		1.00			0.99			0.97			0.99	
Satd. Flow (prot)		1992			2106			1909			1742	
Flt Permitted		0.95			0.89			0.75			0.96	
Satd. Flow (perm)		1906			1893			1480			1675	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	203	211	48	221	12	190	47	38	13	52	47
RTOR Reduction (vph)	0	0	0	0	2	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	459	0	0	279	0	0	269	0	0	112	0
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		14.5			14.5			12.5			12.5	
Effective Green, g (s)		17.5			17.5			15.5			15.5	
Actuated g/C Ratio		0.47			0.47			0.42			0.42	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		901			895			620			701	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.15			c0.18			0.07	
v/c Ratio		0.51			0.31			0.43			0.16	
Uniform Delay, d1		6.8			6.0			7.6			6.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.1			0.2			0.0	
Delay (s)		6.9			6.1			7.8			6.7	
Level of Service		A			A			A			A	
Approach Delay (s)		6.9			6.1			7.8			6.7	
Approach LOS		A			A			A			A	

Intersection Summary

HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

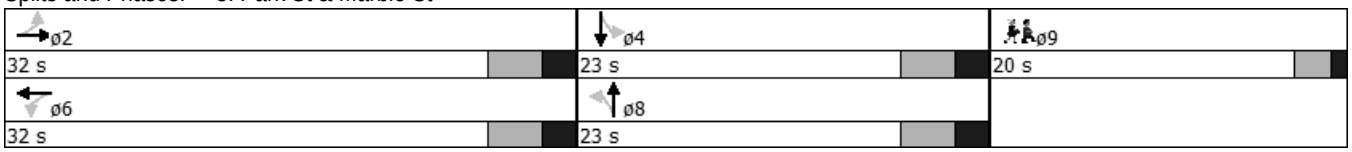
c Critical Lane Group

Phase Number	2	4	6	8	9
Movement	EBTL	SBTL	WBTL	NBTL	Ped
Lead/Lag					
Lead-Lag Optimize					
Recall Mode	Min	None	Min	None	None
Maximum Split (s)	32	23	32	23	20
Maximum Split (%)	42.7%	30.7%	42.7%	30.7%	26.7%
Minimum Split (s)	15	11	15	11	20
Yellow Time (s)	3	3	3	3	2
All-Red Time (s)	2	2	2	2	1
Minimum Initial (s)	10	6	10	6	1
Vehicle Extension (s)	2	2	2	2	2
Minimum Gap (s)	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					7
Flash Dont Walk (s)					10
Dual Entry	Yes	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	32	0	32	55
End Time (s)	32	55	32	55	0
Yield/Force Off (s)	27	50	27	50	72
Yield/Force Off 170(s)	27	50	27	50	62
Local Start Time (s)	0	32	0	32	55
Local Yield (s)	27	50	27	50	72
Local Yield 170(s)	27	50	27	50	62

Intersection Summary

Cycle Length	75
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 3: Park St & Marble St



Traffic Signal Warrant Analysis Worksheet

Tighe&Bond

Traffic Control Signal Warrant Analyses

(Based on Manual on Uniform Traffic Control Devices - 2009 Edition)

Intersection:	Fallon Road at I-93 NB On-Ramp, Park Street, and North Border Road				
Pop. <10,000?:	N	Count Date:	August 2012	Analysis Date:	06/12/14
Speed (in mph):	30 mph	Analysis Year:	2012 Existing	Analyst:	JRP
		Adjustment Factor:	1		

	Is Major? (Y/N)	#Lanes (one way)
EB	N	2
WB	N	1
NB	Y	2
SB	Y	2

Major Lanes:	2
Minor Lanes:	2

Time	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
7:00 AM	0	507	0	5	4	4	0	576	0	0	534	0
8:00 AM	0	428	0	4	1	5	0	589	0	0	598	0
9:00 AM	0	409	0	0	0	0	0	538	0	0	441	0
10:00 AM	0	401	0	0	0	0	0	476	0	0	337	0
11:00 AM	0	432	0	0	0	0	0	467	0	0	395	0
12:00 PM	0	426	0	0	0	0	0	506	0	0	440	0
1:00 PM	0	484	0	0	0	0	0	485	0	0	389	0
2:00 PM	0	493	0	0	0	0	0	564	0	0	470	0
3:00 PM	0	587	0	0	0	0	0	572	0	0	441	0
4:00 PM	0	608	0	1	1	3	0	636	0	0	555	0
5:00 PM	0	640	0	0	4	4	0	657	0	0	654	0
6:00 PM	0	533	0	0	0	0	0	565	0	0	579	0
7:00 PM	0	363	0	0	0	0	0	405	0	0	361	0

Time	∑ EB	∑ WB	∑ NB	∑ SB	∑ Major	∑ Minor	∑ Max Minor	**W1 A**	**W1 B**	**W1 combo**	**W2**	**W3**
7:00 AM	507	13	576	534	1110	520	507	**Y**	**Y**	**Y**	**Y**	**Y**
8:00 AM	428	10	589	598	1188	438	428	**Y**	**Y**	**Y**	**Y**	**Y**
9:00 AM	409	0	538	441	979	409	409	**Y**	**Y**	**Y**	**Y**	**Y**
10:00 AM	401	0	476	337	813	401	401	**Y**	**N**	**Y**	**Y**	**N**
11:00 AM	432	0	467	395	862	432	432	**Y**	**N**	**Y**	**Y**	**N**
12:00 PM	426	0	506	440	946	426	426	**Y**	**Y**	**Y**	**Y**	**Y**
1:00 PM	484	0	485	389	874	484	484	**Y**	**N**	**Y**	**Y**	**Y**
2:00 PM	493	0	564	470	1034	493	493	**Y**	**Y**	**Y**	**Y**	**Y**
3:00 PM	587	0	572	441	1013	587	587	**Y**	**Y**	**Y**	**Y**	**Y**
4:00 PM	608	5	636	555	1191	613	608	**Y**	**Y**	**Y**	**Y**	**Y**
5:00 PM	640	8	657	654	1312	647	640	**Y**	**Y**	**Y**	**Y**	**Y**
6:00 PM	533	0	565	579	1143	533	533	**Y**	**Y**	**Y**	**Y**	**Y**
7:00 PM	363	0	405	361	767	363	363	**Y**	**N**	**Y**	**Y**	**N**
								13 of 8	**9 of 8**	**13 of 8**	**13 of 4**	**10 of 1**

Warrant Analyses

Warrant 1: Condition A Minimum Vehicular Volume Warrant is Met
Warrant 1: Condition B Interruption of Continuous Traffic Warrant is Met
Warrant 1: Combination of Warrants 1A and 1B is Met
Warrant 2: Four-Hour Warrant is Met
Warrant 3: One-Hour Warrant is Met

Raw Counts

Time	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
7:00 AM		515		5	4	4		585			543	
8:00 AM		435		4	1	5		599			608	
9:00 AM		416						547			448	
10:00 AM		408						484			342	
11:00 AM		439						475			401	
12:00 PM		433						514			447	
1:00 PM		492						493			395	
2:00 PM		501						573			478	
3:00 PM		597						581			448	
4:00 PM		618		1	1	3		646			564	
5:00 PM		650		0	4	4		668			665	
6:00 PM		542						574			588	
7:00 PM		369						412			367	

Seasonal Adjustment to Average Month Conditions = -1.6%

Seasonally Adjusted Volumes

Time	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
7:00 AM	0	507	0	5	4	4	0	576	0	0	534	0
8:00 AM	0	428	0	4	1	5	0	589	0	0	598	0
9:00 AM	0	409	0	0	0	0	0	538	0	0	441	0
10:00 AM	0	401	0	0	0	0	0	476	0	0	337	0
11:00 AM	0	432	0	0	0	0	0	467	0	0	395	0
12:00 PM	0	426	0	0	0	0	0	506	0	0	440	0
1:00 PM	0	484	0	0	0	0	0	485	0	0	389	0
2:00 PM	0	493	0	0	0	0	0	564	0	0	470	0
3:00 PM	0	587	0	0	0	0	0	572	0	0	441	0
4:00 PM	0	608	0	1	1	3	0	636	0	0	555	0
5:00 PM	0	640	0	0	4	4	0	657	0	0	654	0
6:00 PM	0	533	0	0	0	0	0	565	0	0	579	0
7:00 PM	0	363	0	0	0	0	0	405	0	0	361	0

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-801-8800
www.tsetraffic.com

Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID: On Park Street
North of Fallon Road

Start Time	09-Aug Thu	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.	10-Aug Fri	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.
12:00		17	54	7	51	24	105		4	55	6	58	10	113
12:15		12	66	9	42	21	108		8	55	4	65	12	120
12:30		10	44	3	69	13	113		10	56	2	50	12	106
12:45		12	56	4	65	16	121		7	39	8	47	15	86
01:00		9	58	2	37	11	95		3	60	2	55	5	115
01:15		9	46	6	50	15	96		4	55	2	47	6	102
01:30		6	48	2	39	8	87		4	45	2	45	6	90
01:45		5	70	4	47	9	117		4	68	3	59	7	127
02:00		3	58	3	48	6	106		3	53	1	51	4	104
02:15		5	56	0	58	5	114		5	68	2	58	7	126
02:30		1	66	4	72	5	138		2	63	1	***75***	3	138
02:45		3	67	0	53	3	120		6	72	0	***50***	6	122
03:00		1	56	4	64	5	120		3	72	4	***59***	7	131
03:15		4	59	1	50	5	109		1	78	0	***65***	1	143
03:30		1	55	0	66	1	121		0	66	0	65	0	131
03:45		0	42	2	56	2	98		2	89	1	43	3	132
04:00		2	57	6	61	8	118		2	61	1	50	3	111
04:15		2	78	5	74	7	152		1	85	5	68	6	153
04:30		1	81	1	***70***	2	151		2	81	2	63	4	144
04:45		4	77	4	***66***	8	143		7	74	4	46	11	120
05:00		4	91	5	***89***	9	180		4	***98***	7	60	11	***158***
05:15		5	***101***	9	***77***	14	***178***		4	***98***	7	64	11	***162***
05:30		9	***90***	24	68	33	***158***		11	***95***	19	51	30	***146***
05:45		19	***88***	19	61	38	***149***		11	***89***	20	43	31	***132***
06:00		9	***108***	29	76	38	***184***		14	70	24	59	38	129
06:15		12	86	46	70	58	156		16	71	38	49	54	120
06:30		37	71	53	53	90	124		27	59	52	51	79	110
06:45		32	61	60	63	92	124		45	50	49	47	94	97
07:00		32	52	62	52	94	104		34	45	69	43	103	88
07:15		44	46	83	50	127	96		47	43	73	53	120	96
07:30		69	47	***83***	42	***152***	89		49	33	***86***	40	***135***	73
07:45		***73***	42	***97***	36	***170***	78		***62***	38	***85***	22	***147***	60
08:00		***67***	38	***92***	32	***159***	70		***60***	31	***86***	29	***146***	60
08:15		***61***	54	***108***	27	***169***	81		***63***	34	***79***	28	***142***	62
08:30		***70***	36	78	29	148	65		***61***	22	54	24	115	46
08:45		56	42	76	24	132	66		60	33	66	28	126	61
09:00		56	24	54	30	110	54		38	26	59	20	97	46
09:15		55	29	68	21	123	50		48	34	65	26	113	60
09:30		38	40	56	21	94	61		34	34	52	23	86	57
09:45		58	20	63	12	121	32		42	16	58	20	100	36
10:00		38	32	49	22	87	54		42	18	60	20	102	38
10:15		38	17	48	17	86	34		34	19	59	19	93	38
10:30		37	17	50	18	87	35		40	12	65	13	105	25
10:45		42	19	40	9	82	28		50	15	43	13	93	28
11:00		41	22	55	15	96	37		51	17	64	14	115	31
11:15		47	12	52	12	99	24		44	11	58	9	102	20
11:30		50	16	49	14	99	30		53	12	62	13	115	25
11:45		41	14	66	7	107	21		40	11	51	8	91	19
Total		1247	2509	1641	2185	2888	4694		1162	2429	1560	2008	2722	4437
Day Total		3756		3826		7582			3591		3568		7159	
% Total		16.4%	33.1%	21.6%	28.8%				16.2%	33.9%	21.8%	28.0%		
Peak		07:45	05:15	07:30	04:30	07:30	05:15		07:45	05:00	07:30	02:30	07:30	05:00
Vol.		271	387	380	302	650	669		246	380	336	249	570	598
P.H.F.		0.928	0.896	0.880	0.848	0.956	0.909		0.976	0.969	0.977	0.830	0.969	0.923

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-301-3300
www.tsetraffic.com

Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID: On Park Street
North of Fallon Road

Start Time	11-Aug Sat	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.	12-Aug Sun	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.
12:00		9	50	4	58	13	108		*	*	*	*	*	*
12:15		7	41	4	58	11	99		*	*	*	*	*	*
12:30		11	41	4	52	15	93		*	*	*	*	*	*
12:45		8	51	3	56	11	107		*	*	*	*	*	*
01:00		7	36	5	49	12	85		*	*	*	*	*	*
01:15		4	***54***	5	52	9	106		*	*	*	*	*	*
01:30		3	***48***	3	61	6	109		*	*	*	*	*	*
01:45		5	***65***	4	50	9	115		*	*	*	*	*	*
02:00		3	***40***	1	43	4	83		*	*	*	*	*	*
02:15		5	48	4	***61***	9	***109***		*	*	*	*	*	*
02:30		5	41	0	***58***	5	***99***		*	*	*	*	*	*
02:45		1	63	3	***61***	4	***124***		*	*	*	*	*	*
03:00		2	41	2	***51***	4	***92***		*	*	*	*	*	*
03:15		3	40	0	60	3	100		*	*	*	*	*	*
03:30		2	41	5	51	7	92		*	*	*	*	*	*
03:45		0	45	0	51	0	96		*	*	*	*	*	*
04:00		2	51	0	48	2	99		*	*	*	*	*	*
04:15		0	46	3	34	3	80		*	*	*	*	*	*
04:30		2	40	1	46	3	86		*	*	*	*	*	*
04:45		12	44	1	47	13	91		*	*	*	*	*	*
05:00		0	48	1	41	1	89		*	*	*	*	*	*
05:15		2	41	5	34	7	75		*	*	*	*	*	*
05:30		6	48	8	51	14	99		*	*	*	*	*	*
05:45		2	39	15	47	17	86		*	*	*	*	*	*
06:00		6	51	11	34	17	85		*	*	*	*	*	*
06:15		8	42	9	44	17	86		*	*	*	*	*	*
06:30		5	38	18	41	23	79		*	*	*	*	*	*
06:45		22	42	24	36	46	78		*	*	*	*	*	*
07:00		8	37	27	30	35	67		*	*	*	*	*	*
07:15		25	40	34	36	59	76		*	*	*	*	*	*
07:30		21	32	35	32	56	64		*	*	*	*	*	*
07:45		24	30	32	33	56	63		*	*	*	*	*	*
08:00		20	36	33	24	53	60		*	*	*	*	*	*
08:15		21	22	25	36	46	58		*	*	*	*	*	*
08:30		24	30	29	15	53	45		*	*	*	*	*	*
08:45		30	30	40	20	70	50		*	*	*	*	*	*
09:00		21	24	46	18	67	42		*	*	*	*	*	*
09:15		29	17	51	18	80	35		*	*	*	*	*	*
09:30		40	18	45	22	85	40		*	*	*	*	*	*
09:45		37	35	49	23	86	58		*	*	*	*	*	*
10:00		41	16	***71***	10	112	26		*	*	*	*	*	*
10:15		49	18	***59***	16	108	34		*	*	*	*	*	*
10:30		40	20	***40***	13	80	33		*	*	*	*	*	*
10:45		***51***	12	***68***	17	119	29		*	*	*	*	*	*
11:00		***35***	15	59	14	***94***	29		*	*	*	*	*	*
11:15		***62***	16	44	12	***106***	28		*	*	*	*	*	*
11:30		***42***	17	64	9	***106***	26		*	*	*	*	*	*
11:45		51	10	70	10	***121***	20		*	*	*	*	*	*
Total		813	1750	1064	1783	1877	3533		0	0	0	0	0	0
Day Total		2563		2847		5410			0		0		0	
% Total		15.0%	32.3%	19.7%	33.0%				0.0%	0.0%	0.0%	0.0%		
Peak		10:45	01:15	10:00	02:15	11:00	02:15							
Vol.		190	207	238	231	427	424							
P.H.F.		0.766	0.796	0.838	0.947	0.882	0.855							

ADT	Not Calculated

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
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F: 617-801-8800
www.tsetraffic.com

Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID: On Park Street
North of Fallon Road

Start Time	09-Aug-12 Thu	Northbound	Southbound	Combined Total
12:00 AM		51	23	74
01:00		29	14	43
02:00		12	7	19
03:00		6	7	13
04:00		9	16	25
05:00		37	57	94
06:00		90	188	278
07:00		218	325	543
08:00		254	354	608
09:00		207	241	448
10:00		155	187	342
11:00		179	222	401
12:00 PM		220	227	447
01:00		222	173	395
02:00		247	231	478
03:00		212	236	448
04:00		293	271	564
05:00		370	295	665
06:00		326	262	588
07:00		187	180	367
08:00		170	112	282
09:00		113	84	197
10:00		85	66	151
11:00		64	48	112
Total		3756	3826	7582
Percent		49.5%	50.5%	

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Client: Plourde

Site Code: Phase II
Station ID: On Park Street
North of Fallon Road

Start Time	10-Aug-12 Fri	Northbound	Southbound	Combined Total
12:00 AM		29	20	49
01:00		15	9	24
02:00		16	4	20
03:00		6	5	11
04:00		12	12	24
05:00		30	53	83
06:00		102	163	265
07:00		192	313	505
08:00		244	285	529
09:00		162	234	396
10:00		166	227	393
11:00		188	235	423
12:00 PM		205	220	425
01:00		228	206	434
02:00		256	234	490
03:00		305	232	537
04:00		301	227	528
05:00		380	218	598
06:00		250	206	456
07:00		159	158	317
08:00		120	109	229
09:00		110	89	199
10:00		64	65	129
11:00		51	44	95
Total		3591	3568	7159
Percent		50.2%	49.8%	

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Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID: On Park Street
North of Fallon Road

Start Time	11-Aug-12 Sat	Northbound	Southbound	Combined Total
12:00 AM		35	15	50
01:00		19	17	36
02:00		14	8	22
03:00		7	7	14
04:00		16	5	21
05:00		10	29	39
06:00		41	62	103
07:00		78	128	206
08:00		95	127	222
09:00		127	191	318
10:00		181	238	419
11:00		190	237	427
12:00 PM		183	224	407
01:00		203	212	415
02:00		192	223	415
03:00		167	213	380
04:00		181	175	356
05:00		176	173	349
06:00		173	155	328
07:00		139	131	270
08:00		118	95	213
09:00		94	81	175
10:00		66	56	122
11:00		58	45	103
Total		2563	2847	5410
Percent		47.4%	52.6%	
Grand Total		9910	10241	
Percentage		49.2%	50.8%	
ADT		Not Calculated		

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Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID:
North Border Road
South of Fallon Road

Start Time	09-Aug Thu	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.	10-Aug Fri	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.
12:00		42	134	26	110	68	244		19	128	29	116	48	244
12:15		21	143	25	112	46	255		12	127	21	114	33	241
12:30		21	121	16	114	37	235		11	132	9	102	20	234
12:45		20	116	17	127	37	243		15	132	11	110	26	242
01:00		15	100	12	104	27	204		6	115	8	108	14	223
01:15		12	132	16	111	28	243		7	135	8	88	15	223
01:30		14	119	8	106	22	225		8	126	6	92	14	218
01:45		11	142	11	100	22	242		7	133	4	104	11	237
02:00		13	136	13	120	26	256		7	136	8	115	15	251
02:15		12	124	1	117	13	241		7	153	8	101	15	254
02:30		11	148	5	133	16	281		6	140	6	105	12	245
02:45		8	165	4	119	12	284		8	174	3	115	11	289
03:00		1	136	7	144	8	280		3	151	6	127	9	278
03:15		6	139	2	150	8	289		6	175	0	131	6	306
03:30		4	167	2	148	6	315		2	139	1	126	3	265
03:45		8	139	5	153	13	292		6	155	4	112	10	267
04:00		5	149	6	141	11	290		10	***161***	7	150	17	***311***
04:15		12	***173***	3	153	15	326		7	***172***	5	161	12	***333***
04:30		15	***168***	6	158	21	326		8	***154***	12	151	20	***305***
04:45		17	***156***	19	132	36	288		28	***167***	17	114	45	***281***
05:00		22	***185***	10	149	32	***334***		23	158	15	***149***	38	307
05:15		29	158	23	166	52	***324***		34	137	23	***156***	57	293
05:30		63	166	40	***152***	103	***318***		61	165	30	***146***	91	311
05:45		84	159	41	***148***	125	***307***		71	144	33	***128***	104	272
06:00		75	186	71	***146***	146	332		83	138	70	139	153	277
06:15		112	122	92	***193***	204	315		99	141	82	137	181	278
06:30		142	143	122	146	264	289		123	121	115	133	238	254
06:45		138	123	147	122	285	245		157	105	121	98	278	203
07:00		117	107	170	111	287	218		118	100	124	105	242	205
07:15		***147***	115	138	130	285	245		141	83	***118***	95	259	178
07:30		***186***	102	***156***	106	***342***	208		143	70	***129***	89	***272***	159
07:45		***135***	88	***152***	103	***287***	191		151	83	***132***	62	***283***	145
08:00		***161***	78	***156***	82	***317***	160		***154***	82	***134***	65	***288***	147
08:15		144	81	***167***	67	***311***	148		***152***	66	118	76	***270***	142
08:30		147	76	132	89	279	165		***142***	48	119	51	261	99
08:45		147	68	116	89	263	157		***162***	57	117	66	279	123
09:00		153	53	112	77	265	130		108	53	111	64	219	117
09:15		149	62	113	63	262	125		152	66	101	48	253	114
09:30		115	64	110	68	225	132		129	51	83	70	212	121
09:45		130	48	108	51	238	99		124	35	106	54	230	89
10:00		106	49	96	67	202	116		135	43	109	63	244	106
10:15		124	46	94	53	218	99		131	41	94	39	225	80
10:30		128	42	107	54	235	96		119	32	97	48	216	80
10:45		126	36	103	51	229	87		136	33	110	38	246	71
11:00		104	29	108	31	212	60		114	38	109	37	223	75
11:15		116	26	99	31	215	57		129	32	108	41	237	73
11:30		134	42	83	33	217	75		125	38	100	37	225	75
11:45		121	34	104	37	225	71		134	28	88	29	222	57
Total		3623	5295	3174	5167	6797	10462		3533	5093	2869	4605	6402	9698
Day Total		8918		8341		17259			8626		7474		16100	
% Total		21.0%	30.7%	18.4%	29.9%				21.9%	31.6%	17.8%	28.6%		
Peak		07:15	04:15	07:30	05:30	07:30	05:00		08:00	04:00	07:15	05:00	07:30	04:00
Vol.		629	682	631	639	1257	1283		610	654	513	579	1113	1230
P.H.F.		0.845	0.922	0.945	0.828	0.919	0.960		0.941	0.951	0.957	0.899	0.966	0.923

Traffic Survey Expedition
106 Sharon Road
N. Quincy, MA 02171
P: 617-448-5686
F: 617-301-8800
www.tsetraffic.com

Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID:
North Border Road
South of Fallon Road

Start Time	11-Aug Sat	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.	12-Aug Sun	Northbound A.M.	Northbound P.M.	Southbound A.M.	Southbound P.M.	Combined A.M.	Combined P.M.
12:00		22	122	24	118	46	240		*	*	*	*	*	*
12:15		17	142	20	101	37	243		*	*	*	*	*	*
12:30		16	***142***	18	106	34	***248***		*	*	*	*	*	*
12:45		12	***140***	19	122	31	***262***		*	*	*	*	*	*
01:00		17	***117***	12	116	29	***233***		*	*	*	*	*	*
01:15		16	***161***	15	111	31	***272***		*	*	*	*	*	*
01:30		12	130	9	100	21	230		*	*	*	*	*	*
01:45		10	141	7	106	17	247		*	*	*	*	*	*
02:00		6	116	10	74	16	190		*	*	*	*	*	*
02:15		12	121	11	116	23	237		*	*	*	*	*	*
02:30		7	110	6	129	13	239		*	*	*	*	*	*
02:45		6	136	5	96	11	232		*	*	*	*	*	*
03:00		3	118	5	103	8	221		*	*	*	*	*	*
03:15		5	110	2	114	7	224		*	*	*	*	*	*
03:30		4	134	7	114	11	248		*	*	*	*	*	*
03:45		3	125	1	99	4	224		*	*	*	*	*	*
04:00		6	137	5	105	11	242		*	*	*	*	*	*
04:15		3	120	4	***113***	7	233		*	*	*	*	*	*
04:30		9	105	4	***133***	13	238		*	*	*	*	*	*
04:45		16	105	5	***114***	21	219		*	*	*	*	*	*
05:00		8	109	7	***121***	15	230		*	*	*	*	*	*
05:15		20	101	9	105	29	206		*	*	*	*	*	*
05:30		24	91	8	108	32	199		*	*	*	*	*	*
05:45		20	106	13	82	33	188		*	*	*	*	*	*
06:00		31	114	22	104	53	218		*	*	*	*	*	*
06:15		29	128	8	103	37	231		*	*	*	*	*	*
06:30		30	99	29	107	59	206		*	*	*	*	*	*
06:45		77	113	45	108	122	221		*	*	*	*	*	*
07:00		60	94	43	82	103	176		*	*	*	*	*	*
07:15		70	84	52	82	122	166		*	*	*	*	*	*
07:30		68	74	50	76	118	150		*	*	*	*	*	*
07:45		79	64	54	86	133	150		*	*	*	*	*	*
08:00		76	73	44	68	120	141		*	*	*	*	*	*
08:15		119	54	56	88	175	142		*	*	*	*	*	*
08:30		101	58	67	63	168	121		*	*	*	*	*	*
08:45		113	59	77	70	190	129		*	*	*	*	*	*
09:00		74	55	56	67	130	122		*	*	*	*	*	*
09:15		108	44	71	64	179	108		*	*	*	*	*	*
09:30		95	29	75	61	170	90		*	*	*	*	*	*
09:45		132	56	97	66	229	122		*	*	*	*	*	*
10:00		114	46	102	45	216	91		*	*	*	*	*	*
10:15		132	45	95	68	227	113		*	*	*	*	*	*
10:30		138	42	97	53	235	95		*	*	*	*	*	*
10:45		121	31	105	54	226	85		*	*	*	*	*	*
11:00		***125***	39	***118***	43	***243***	82		*	*	*	*	*	*
11:15		***157***	35	***79***	45	***236***	80		*	*	*	*	*	*
11:30		***129***	38	***117***	41	***246***	79		*	*	*	*	*	*
11:45		***132***	21	***113***	42	***245***	63		*	*	*	*	*	*
Total		2584	4434	1898	4292	4482	8726		0	0	0	0	0	0
Day Total		7018		6190		13208			0		0		0	
% Total		19.6%	33.6%	14.4%	32.5%				0.0%	0.0%	0.0%	0.0%		
Peak		11:00	00:30	11:00	04:15	11:00	00:30							
Vol.		543	560	427	481	970	1015							
P.H.F.		0.865	0.870	0.905	0.904	0.986	0.933							

ADT Not Calculated

Traffic Survey Expedition
106 Sharon Road
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Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID:
North Border Road
South of Fallon Road

Start Time	09-Aug-12 Thu	Northbound	Southbound	Combined Total
12:00 AM		104	84	188
01:00		52	47	99
02:00		44	23	67
03:00		19	16	35
04:00		49	34	83
05:00		198	114	312
06:00		467	432	899
07:00		585	616	1201
08:00		599	571	1170
09:00		547	443	990
10:00		484	400	884
11:00		475	394	869
12:00 PM		514	463	977
01:00		493	421	914
02:00		573	489	1062
03:00		581	595	1176
04:00		646	584	1230
05:00		668	615	1283
06:00		574	607	1181
07:00		412	450	862
08:00		303	327	630
09:00		227	259	486
10:00		173	225	398
11:00		131	132	263
Total		8918	8341	17259
Percent		51.7%	48.3%	

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Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID:
North Border Road
South of Fallon Road

Start Time	10-Aug-12 Fri	Northbound	Southbound	Combined Total
12:00 AM		57	70	127
01:00		28	26	54
02:00		28	25	53
03:00		17	11	28
04:00		53	41	94
05:00		189	101	290
06:00		462	388	850
07:00		553	503	1056
08:00		610	488	1098
09:00		513	401	914
10:00		521	410	931
11:00		502	405	907
12:00 PM		519	442	961
01:00		509	392	901
02:00		603	436	1039
03:00		620	496	1116
04:00		654	576	1230
05:00		604	579	1183
06:00		505	507	1012
07:00		336	351	687
08:00		253	258	511
09:00		205	236	441
10:00		149	188	337
11:00		136	144	280
Total		8626	7474	16100
Percent		53.6%	46.4%	

Traffic Survey Expedition
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Project #: MAX 2012038
Stoneham, MA
Client: Plourde

Site Code: Phase II
Station ID:
North Border Road
South of Fallon Road

Start Time	11-Aug-12 Sat	Northbound	Southbound	Combined Total
12:00 AM		67	81	148
01:00		55	43	98
02:00		31	32	63
03:00		15	15	30
04:00		34	18	52
05:00		72	37	109
06:00		167	104	271
07:00		277	199	476
08:00		409	244	653
09:00		409	299	708
10:00		505	399	904
11:00		543	427	970
12:00 PM		546	447	993
01:00		549	433	982
02:00		483	415	898
03:00		487	430	917
04:00		467	465	932
05:00		407	416	823
06:00		454	422	876
07:00		316	326	642
08:00		244	289	533
09:00		184	258	442
10:00		164	220	384
11:00		133	171	304
Total		7018	6190	13208
Percent		53.1%	46.9%	
Grand Total		24562	22005	
Percentage		52.7%	47.3%	
ADT		Not Calculated		

Analysis Worksheets: Mitigated

Tighe&Bond

Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park & I-93 NB On-Ramp

Movement	EB	WB	NB	NB	B13	SB
Directions Served	<LT	LTR>	<L	TR	T	TR>
Maximum Queue (ft)	206	43	534	213	743	604
Average Queue (ft)	95	10	388	60	207	308
95th Queue (ft)	173	32	620	170	781	581
Link Distance (ft)	549	179	453	453	2153	940
Upstream Blk Time (%)			20			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						40
Queuing Penalty (veh)						30

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	79	64	1	752	6	0	3	3	28	719	267	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	12	12	12	12	11	11	11	12
Total Lost time (s)			2.0	1.0		2.0				2.0	2.0	
Lane Util. Factor			1.00	1.00		1.00				1.00	1.00	
Frt			1.00	0.85		0.94				1.00	1.00	
Flt Protected			0.95	1.00		0.97				0.95	1.00	
Satd. Flow (prot)			1401	1546		1735				1723	1832	
Flt Permitted			0.72	1.00		0.88				0.95	1.00	
Satd. Flow (perm)			1059	1546		1569				1723	1832	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	70	1	817	7	0	3	3	30	782	290	5
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	157	817	0	3	0	0	0	812	294	0
Heavy Vehicles (%)	43%	3%	0%	1%	0%	0%	0%	0%	9%	1%	0%	0%
Turn Type	Perm	Perm	NA	Free	Perm	NA			Prot	Prot	NA	
Protected Phases			4			8			5	5	2	
Permitted Phases	4	4		Free	8							
Actuated Green, G (s)			15.6	87.6		15.6				40.1	62.0	
Effective Green, g (s)			18.6	87.6		18.6				43.1	65.0	
Actuated g/C Ratio			0.21	1.00		0.21				0.49	0.74	
Clearance Time (s)			5.0			5.0				5.0	5.0	
Vehicle Extension (s)			3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)			224	1546		333				847	1359	
v/s Ratio Prot										c0.47	0.16	
v/s Ratio Perm			c0.15	0.53		0.00						
v/c Ratio			0.70	0.53		0.01				0.96	0.22	
Uniform Delay, d1			31.9	0.0		27.2				21.4	3.5	
Progression Factor			1.00	1.00		1.00				1.00	1.00	
Incremental Delay, d2			9.5	1.3		0.0				21.2	0.1	
Delay (s)			41.4	1.3		27.2				42.6	3.6	
Level of Service			D	A		C				D	A	
Approach Delay (s)			7.8			27.2					32.2	
Approach LOS			A			C					C	

Intersection Summary

HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL	SBT	SBR	SBR2
Lane Configurations				
Volume (vph)	0	284	15	147
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	11
Total Lost time (s)		2.0		1.0
Lane Util. Factor		0.95		0.95
Frt		0.99		0.85
Flt Protected		1.00		1.00
Satd. Flow (prot)		1719		1454
Flt Permitted		1.00		1.00
Satd. Flow (perm)		1719		1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	309	16	160
RTOR Reduction (vph)	0	2	0	0
Lane Group Flow (vph)	0	339	0	144
Heavy Vehicles (%)	0%	0%	0%	2%
Turn Type	Prot	NA		Free
Protected Phases	1	6		
Permitted Phases				Free
Actuated Green, G (s)		16.9		87.6
Effective Green, g (s)		19.9		87.6
Actuated g/C Ratio		0.23		1.00
Clearance Time (s)		5.0		
Vehicle Extension (s)		3.0		
Lane Grp Cap (vph)		390		1454
v/s Ratio Prot		c0.20		
v/s Ratio Perm				0.10
v/c Ratio		0.87		0.10
Uniform Delay, d1		32.6		0.0
Progression Factor		1.00		1.00
Incremental Delay, d2		18.1		0.1
Delay (s)		50.7		0.1
Level of Service		D		A
Approach Delay (s)		35.7		
Approach LOS		D		

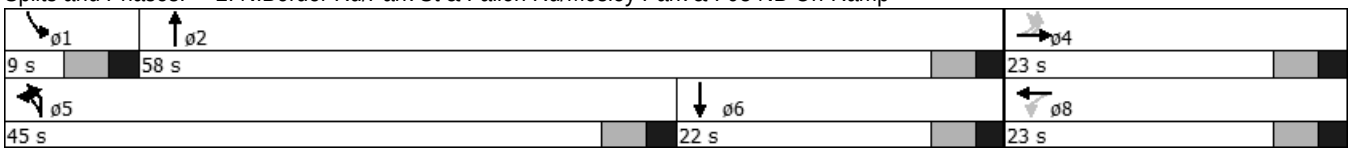
Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	9	58	23	45	22	23
Maximum Split (%)	10.0%	64.4%	25.6%	50.0%	24.4%	25.6%
Minimum Split (s)	9	9	23	9	9	9
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)			7			
Flash Dont Walk (s)			11			
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	9	67	0	45	67
End Time (s)	9	67	0	45	67	0
Yield/Force Off (s)	4	62	85	40	62	85
Yield/Force Off 170(s)	4	62	74	40	62	85
Local Start Time (s)	45	54	22	45	0	22
Local Yield (s)	49	17	40	85	17	40
Local Yield 170(s)	49	17	29	85	17	40

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park & I-93 NB On-Ramp



Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park & I-93 NB On-Ramp

Movement	EB	WB	NB	NB	B13	SB	SB
Directions Served	<LT	LTR>	<L	TR	T	L	TR>
Maximum Queue (ft)	209	31	520	306	547	100	505
Average Queue (ft)	115	6	380	72	141	7	267
95th Queue (ft)	187	24	592	182	568	54	502
Link Distance (ft)	549	179	453	453	2153		940
Upstream Blk Time (%)			17				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)						100	
Storage Blk Time (%)							59
Queuing Penalty (veh)							30

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	64	193	2	760	1	0	3	5	56	703	267	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	12	12	12	12	11	11	11	12
Total Lost time (s)			2.0	1.0		2.0				2.0	2.0	
Lane Util. Factor			1.00	1.00		1.00				1.00	1.00	
Frt			1.00	0.85		0.88				1.00	1.00	
Flt Protected			0.95	1.00		0.99				0.95	1.00	
Satd. Flow (prot)			1651	1546		1663				1727	1832	
Flt Permitted			0.72	1.00		0.98				0.95	1.00	
Satd. Flow (perm)			1251	1546		1631				1727	1832	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	210	2	826	1	0	3	5	61	764	290	5
RTOR Reduction (vph)	0	0	0	0	0	7	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	282	826	0	2	0	0	0	825	294	0
Heavy Vehicles (%)	15%	3%	0%	1%	0%	0%	0%	0%	14%	0%	0%	0%
Turn Type	Perm	Perm	NA	Free	Perm	NA			Prot	Prot	NA	
Protected Phases			4			8			5	5	2	
Permitted Phases	4	4		Free	8							
Actuated Green, G (s)			20.7	91.1		20.7				41.3	54.6	
Effective Green, g (s)			23.7	91.1		23.7				44.3	57.6	
Actuated g/C Ratio			0.26	1.00		0.26				0.49	0.63	
Clearance Time (s)			5.0			5.0				5.0	5.0	
Vehicle Extension (s)			3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)			325	1546		424				839	1158	
v/s Ratio Prot										c0.48	0.16	
v/s Ratio Perm			c0.23	0.53		0.00						
v/c Ratio			0.87	0.53		0.01				0.98	0.25	
Uniform Delay, d1			32.2	0.0		25.0				23.0	7.3	
Progression Factor			1.00	1.00		1.00				1.00	1.00	
Incremental Delay, d2			20.9	1.3		0.0				26.8	0.1	
Delay (s)			53.1	1.3		25.0				49.8	7.5	
Level of Service			D	A		C				D	A	
Approach Delay (s)			14.5			25.0					38.7	
Approach LOS			B			C					D	

Intersection Summary

HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	91.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL	SBT	SBR	SBR2
Lane Configurations				
Volume (vph)	5	209	28	93
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	11
Total Lost time (s)	2.0	2.0		1.0
Lane Util. Factor	1.00	0.95		0.95
Frt	1.00	0.98		0.85
Flt Protected	0.95	1.00		1.00
Satd. Flow (prot)	1745	1704		1454
Flt Permitted	0.95	1.00		1.00
Satd. Flow (perm)	1745	1704		1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	227	30	101
RTOR Reduction (vph)	0	2	0	0
Lane Group Flow (vph)	5	265	0	91
Heavy Vehicles (%)	0%	0%	0%	2%
Turn Type	Prot	NA		Free
Protected Phases	1	6		
Permitted Phases				Free
Actuated Green, G (s)	0.8	14.1		91.1
Effective Green, g (s)	3.8	17.1		91.1
Actuated g/C Ratio	0.04	0.19		1.00
Clearance Time (s)	5.0	5.0		
Vehicle Extension (s)	3.0	3.0		
Lane Grp Cap (vph)	72	319		1454
v/s Ratio Prot	0.00	c0.16		
v/s Ratio Perm				0.06
v/c Ratio	0.07	0.83		0.06
Uniform Delay, d1	42.0	35.6		0.0
Progression Factor	1.00	1.00		1.00
Incremental Delay, d2	0.4	16.7		0.1
Delay (s)	42.4	52.3		0.1
Level of Service	D	D		A
Approach Delay (s)		39.1		
Approach LOS		D		

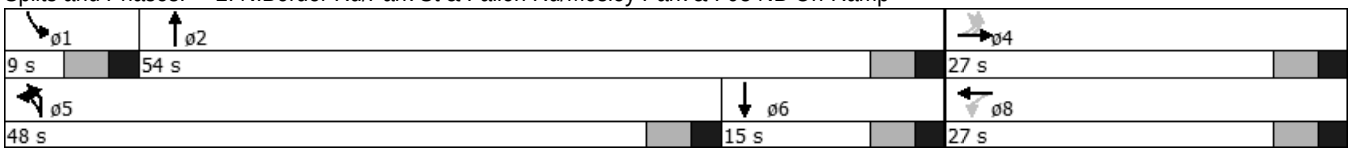
Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	9	54	27	48	15	27
Maximum Split (%)	10.0%	60.0%	30.0%	53.3%	16.7%	30.0%
Minimum Split (s)	9	9	23	9	9	9
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)			7			
Flash Dont Walk (s)			11			
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	9	63	0	48	63
End Time (s)	9	63	0	48	63	0
Yield/Force Off (s)	4	58	85	43	58	85
Yield/Force Off 170(s)	4	58	74	43	58	85
Local Start Time (s)	42	51	15	42	0	15
Local Yield (s)	46	10	37	85	10	37
Local Yield 170(s)	46	10	26	85	10	37

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park & I-93 NB On-Ramp



Intersection: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park & I-93 NB On-Ramp

Movement	EB	WB	NB	NB	SB	SB
Directions Served	<LT	LTR>	<L	TR	L	TR>
Maximum Queue (ft)	201	43	367	68	36	424
Average Queue (ft)	86	9	194	24	2	156
95th Queue (ft)	152	31	313	60	20	324
Link Distance (ft)	549	179	453	453		940
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)					100	
Storage Blk Time (%)						10
Queuing Penalty (veh)						5

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	65	135	3	418	3	0	5	5	52	498	103	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	12	12	12	12	11	11	11	12
Total Lost time (s)			2.0	1.0		2.0				2.0	2.0	
Lane Util. Factor			1.00	1.00		1.00				1.00	1.00	
Frt			1.00	0.85		0.90				1.00	0.99	
Flt Protected			0.95	1.00		0.99				0.95	1.00	
Satd. Flow (prot)			1690	1561		1683				1722	1818	
Flt Permitted			0.72	1.00		0.95				0.95	1.00	
Satd. Flow (perm)			1277	1561		1610				1722	1818	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	147	3	454	3	0	5	5	57	541	112	8
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	221	454	0	3	0	0	0	598	117	0
Heavy Vehicles (%)	9%	1%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%
Turn Type	Perm	Perm	NA	Free	Perm	NA			Prot	Prot	NA	
Protected Phases			4			8			5	5	2	
Permitted Phases	4	4		Free	8							
Actuated Green, G (s)			16.9	81.2		16.9				30.6	48.6	
Effective Green, g (s)			19.9	81.2		19.9				33.6	51.6	
Actuated g/C Ratio			0.25	1.00		0.25				0.41	0.64	
Clearance Time (s)			5.0			5.0				5.0	5.0	
Vehicle Extension (s)			3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)			312	1561		394				712	1155	
v/s Ratio Prot										c0.35	0.06	
v/s Ratio Perm			c0.17	0.29		0.00						
v/c Ratio			0.71	0.29		0.01				0.84	0.10	
Uniform Delay, d1			28.0	0.0		23.2				21.4	5.8	
Progression Factor			1.00	1.00		1.00				1.00	1.00	
Incremental Delay, d2			7.2	0.5		0.0				8.6	0.0	
Delay (s)			35.2	0.5		23.2				30.0	5.8	
Level of Service			D	A		C				C	A	
Approach Delay (s)			11.8			23.2					26.0	
Approach LOS			B			C					C	

Intersection Summary

HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	81.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

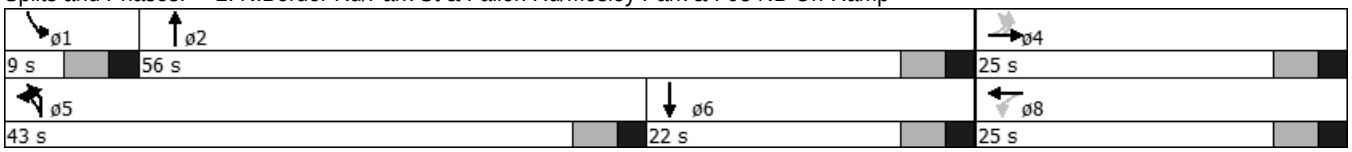
c Critical Lane Group

Movement	SBL	SBT	SBR	SBR2
Lane Configurations				
Volume (vph)	7	167	30	80
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	11	11	11	11
Total Lost time (s)	2.0	2.0		1.0
Lane Util. Factor	1.00	0.95		0.95
Frt	1.00	0.97		0.85
Flt Protected	0.95	1.00		1.00
Satd. Flow (prot)	1745	1665		1483
Flt Permitted	0.95	1.00		1.00
Satd. Flow (perm)	1745	1665		1483
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	182	33	87
RTOR Reduction (vph)	0	1	0	0
Lane Group Flow (vph)	8	223	0	78
Heavy Vehicles (%)	0%	1%	7%	0%
Turn Type	Prot	NA		Free
Protected Phases	1	6		
Permitted Phases				Free
Actuated Green, G (s)	0.7	18.7		81.2
Effective Green, g (s)	3.7	21.7		81.2
Actuated g/C Ratio	0.05	0.27		1.00
Clearance Time (s)	5.0	5.0		
Vehicle Extension (s)	3.0	3.0		
Lane Grp Cap (vph)	79	444		1483
v/s Ratio Prot	0.00	c0.13		
v/s Ratio Perm				0.05
v/c Ratio	0.10	0.50		0.05
Uniform Delay, d1	37.2	25.2		0.0
Progression Factor	1.00	1.00		1.00
Incremental Delay, d2	0.6	0.9		0.1
Delay (s)	37.7	26.1		0.1
Level of Service	D	C		A
Approach Delay (s)		19.8		
Approach LOS		B		

Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	9	56	25	43	22	25
Maximum Split (%)	10.0%	62.2%	27.8%	47.8%	24.4%	27.8%
Minimum Split (s)	9	9	23	9	9	9
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)			7			
Flash Dont Walk (s)			11			
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	9	65	0	43	65
End Time (s)	9	65	0	43	65	0
Yield/Force Off (s)	4	60	85	38	60	85
Yield/Force Off 170(s)	4	60	74	38	60	85
Local Start Time (s)	47	56	22	47	0	22
Local Yield (s)	51	17	42	85	17	42
Local Yield 170(s)	51	17	31	85	17	42

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 2: N.Border Rd/Park St & Fallon Rd/Mosley Park & I-93 NB On-Ramp