

# **Downtown Streetscape Project Needham, MA**

## **Future Conditions Traffic Analysis**

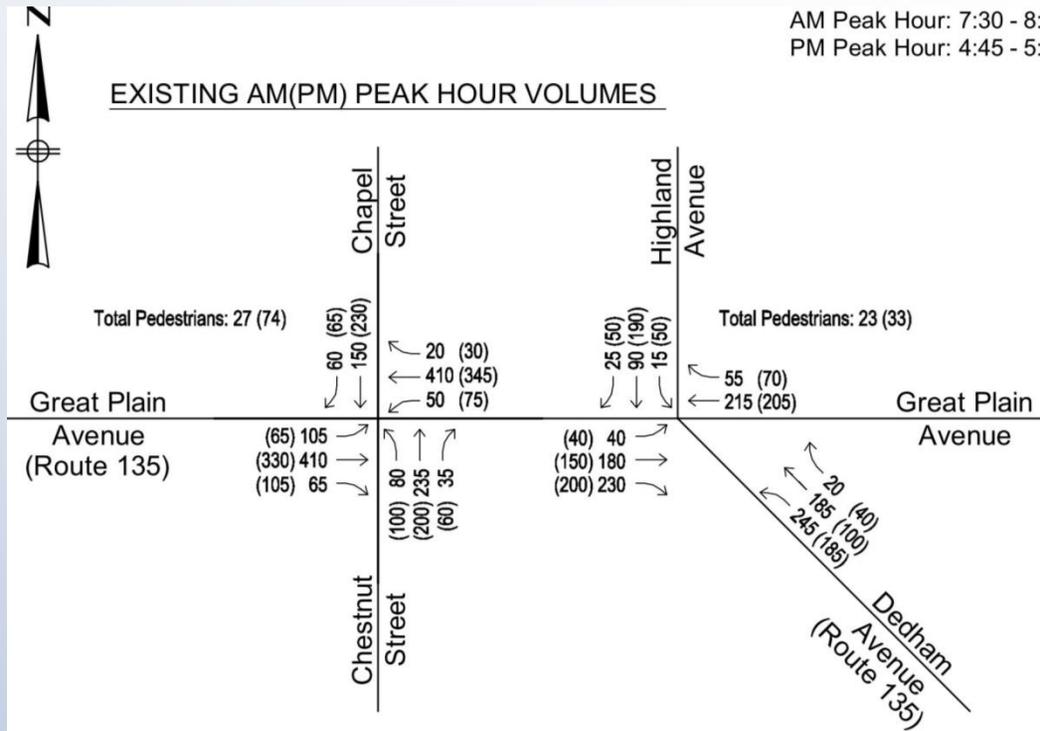
**May 29, 2013**

## Since Our Last Meeting:

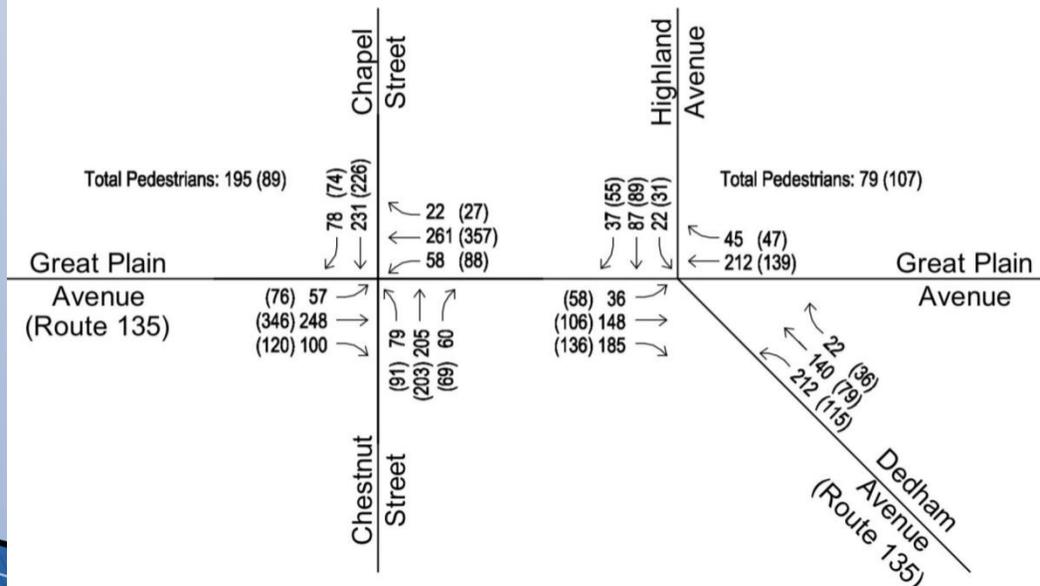
- ▶ Review of Mid-Day Traffic Volumes & Analysis
- ▶ Estimated Future Traffic Volumes
- ▶ Developed Improvement Alternatives
- ▶ Performed Analysis

# Mid-Day Traffic Volumes

AM Peak Hour: 7:30 - 8:30 AM  
PM Peak Hour: 4:45 - 5:45 PM



**EXISTING 1:00pm-2:00pm (2:30pm - 3:30pm) VOLUMES**



# Level of Service Criteria

LOS	Signalized Intersections (Average Seconds of Delay/ Vehicle)
A	< 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.0

# Mid-Day Analysis Results

- ▶ Reviewed two peak periods
  - 1:00pm – 2:00pm
  - 2:30pm – 3:30pm

	PM Peak Hour (4:45-5:45 PM)	Mid-Day 1 (1:00-2:00 PM)	Mid-Day 2 (2:30-3:30 PM)
Great Plain Ave at Chapel/Chestnut Streets	D [53.5]	D [42.8]	D [48.2]
Great Plain Ave at Highland/Dedham Avenues	D [49.8]	D [39.7]	D [36.1]

# Future No-Build Condition Analysis Results

## ▶ Morning Peak Hour

	Existing	No-Build
Great Plain Ave at Chapel/Chestnut Streets	D [43.8]	D [46.4]
Great Plain Ave at Highland/Dedham Avenues	D [45.8]	D [52.2]

## ▶ Afternoon Peak Hour

	Existing	No-Build
Great Plain Ave at Chapel/Chestnut Streets	D [53.5]	E [56.5]
Great Plain Ave at Highland/Dedham Avenues	D [49.8]	D [52.5]

## Improvements Evaluated

- ▶ Optimized Signal Timing and Vehicle Detection
- ▶ Improved Railroad Preemption
- ▶ Chapel/Chestnut Streets
  - Reintroduce Chapel Street Southbound Left-turn
- ▶ Dedham/Highland Avenues
  - Modify Great Plain Avenue Eastbound Lane-use
  - Modify Great Plain Avenue Westbound Lane-use
  - Modify Dedham Avenue Northbound Approach

# Optimized Signal Timing

## ▶ Morning Peak Hour

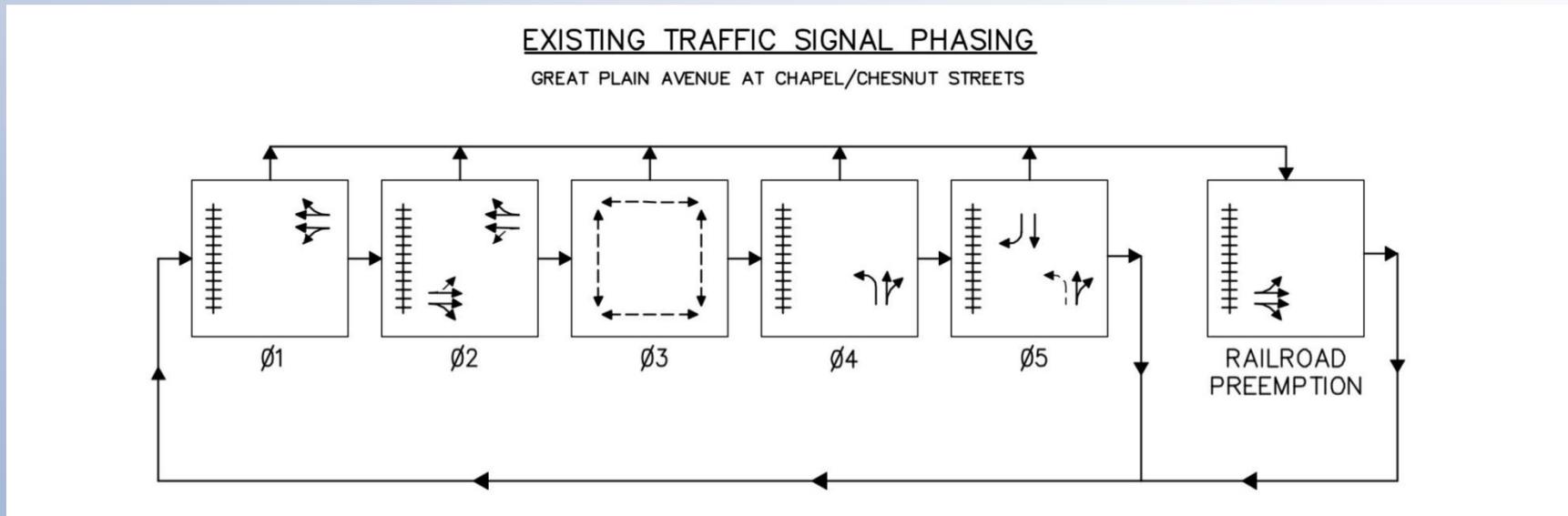
	No-Build	Optimized Timing
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	D [39.3]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	C [32.0]

## ▶ Afternoon Peak Hour

	No-Build	Optimized Timing
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	D [53.9]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	D [39.0]

# Improved Railroad Preemption

## ▶ Chapel/Chestnut Streets

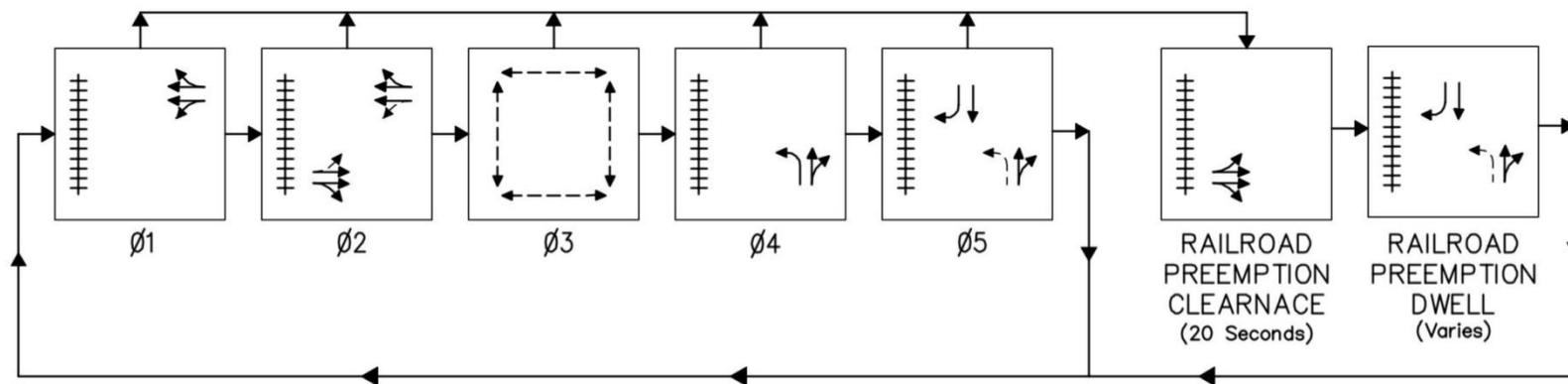


# Improved Railroad Preemption

## ▶ Chapel/Chestnut Streets

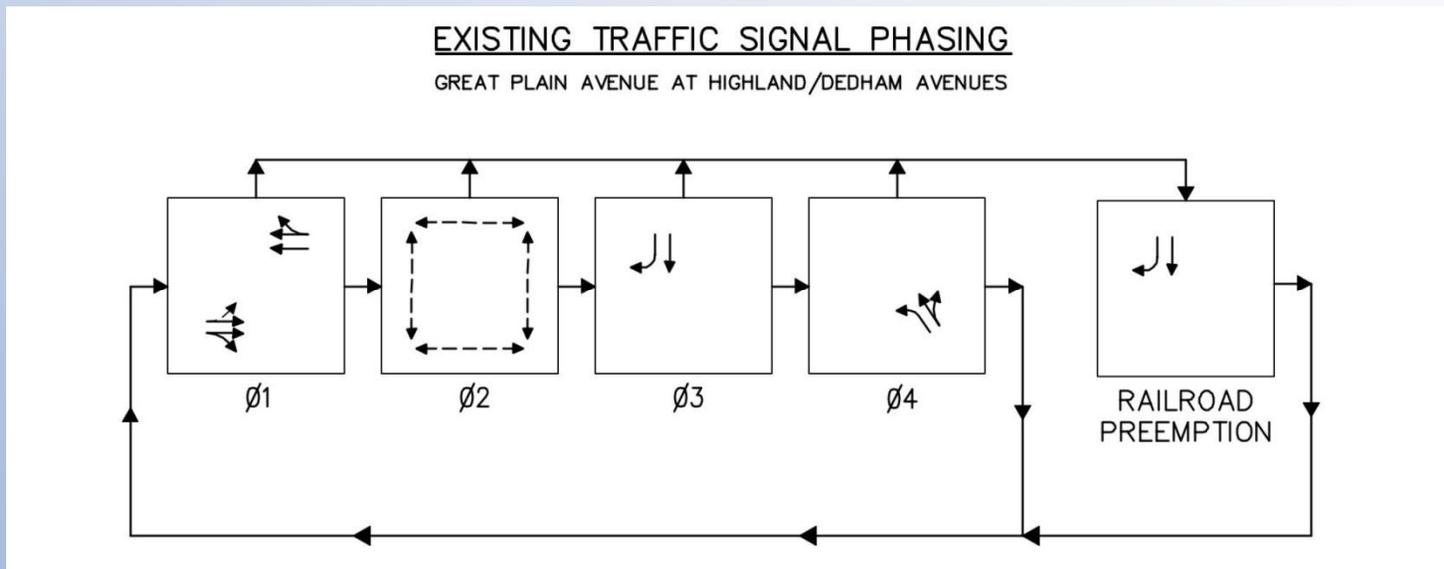
### ALTERNATIVE 1A TRAFFIC SIGNAL PHASING

GREAT PLAIN AVENUE AT CHAPEL/CHESTNUT STREETS



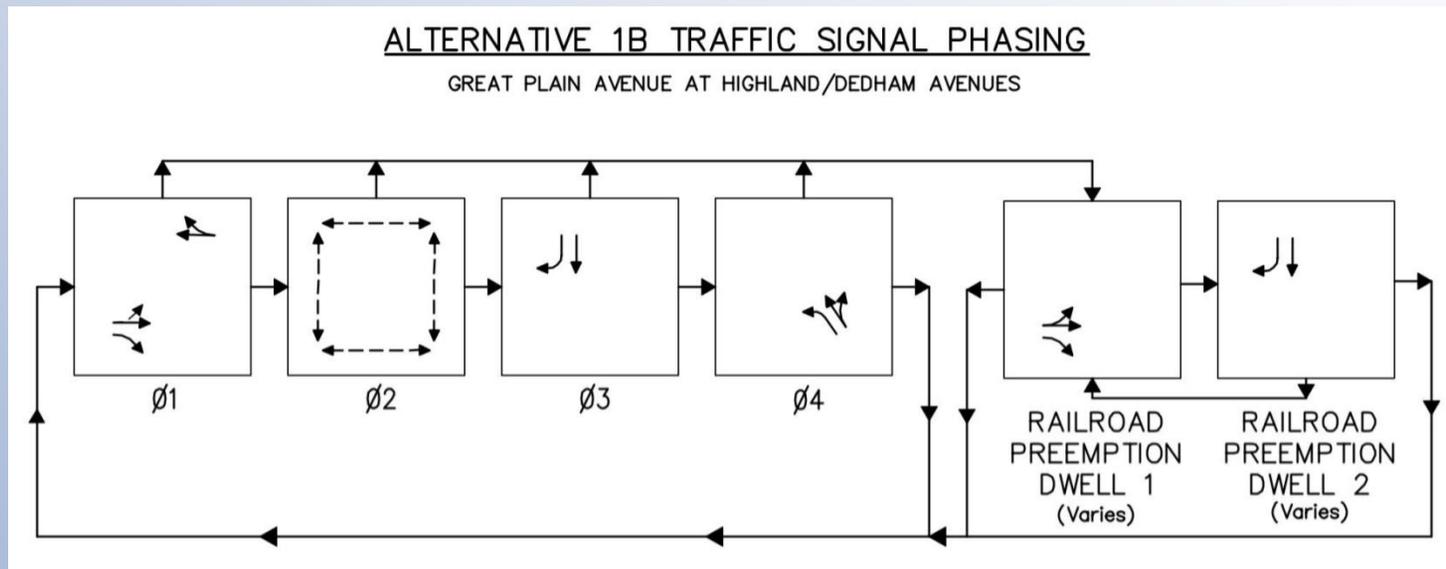
# Improved Railroad Preemption

## ▶ Highland/Dedham Avenues



# Improved Railroad Preemption

## ▶ Highland/Dedham Avenues



# Improved Railroad Preemption

## ▶ Morning Peak Hour

	No-Build	Optimized Railroad Preemption
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	C [32.0]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	C [31.7]

## ▶ Afternoon Peak Hour

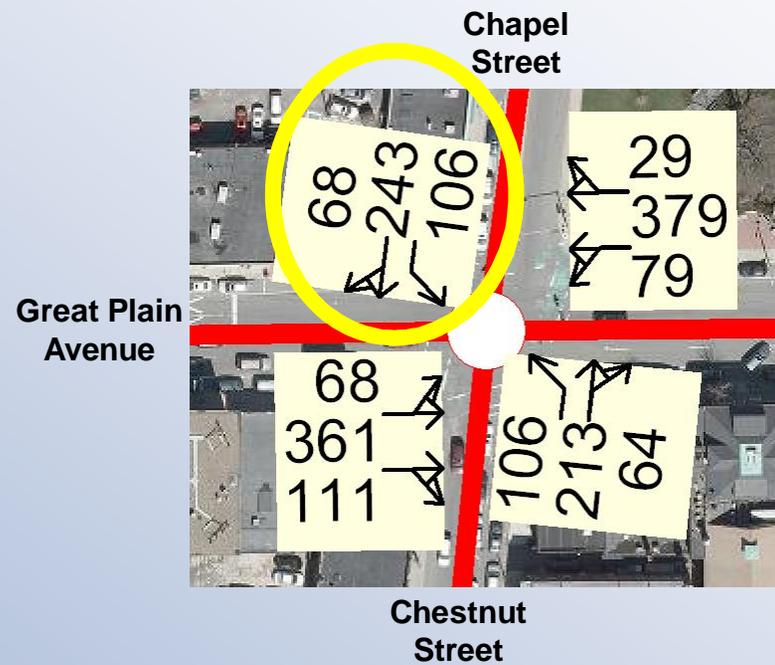
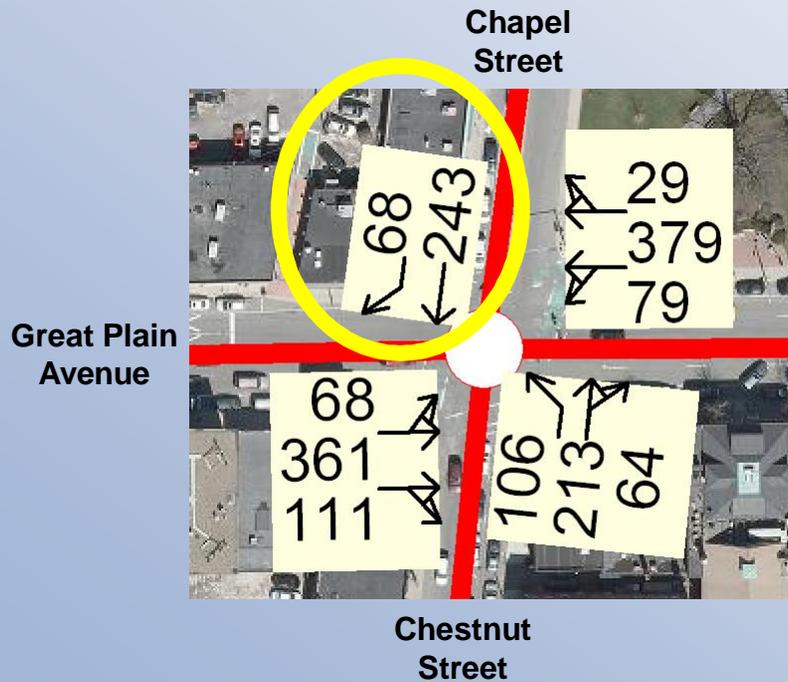
	No-Build	Optimized Railroad Preemption
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	D [42.4]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	D [39.3]

# Return Chapel Street Southbound Left-turn

- ▶ Chapel/Chestnut Streets

EXISTING

PROPOSED

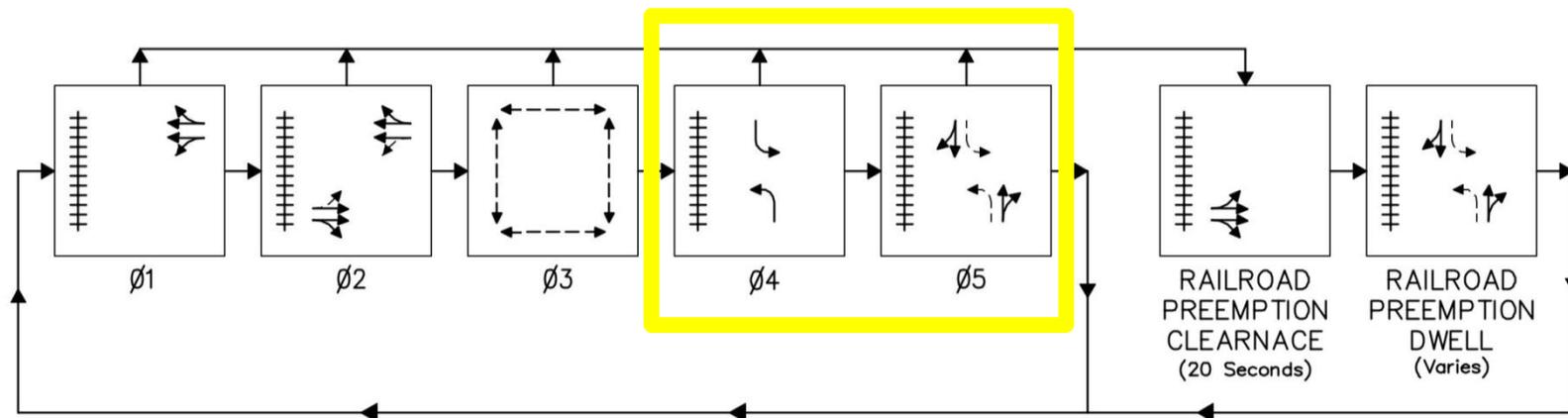


# Return Chapel Street Southbound Left-turn

## ▶ Chapel/Chestnut Streets

### ALTERNATIVE 2A TRAFFIC SIGNAL PHASING

GREAT PLAIN AVENUE AT CHAPEL/CHESTNUT STREETS



# Return Chapel Street Southbound Left-turn

## ▶ Morning Peak Hour

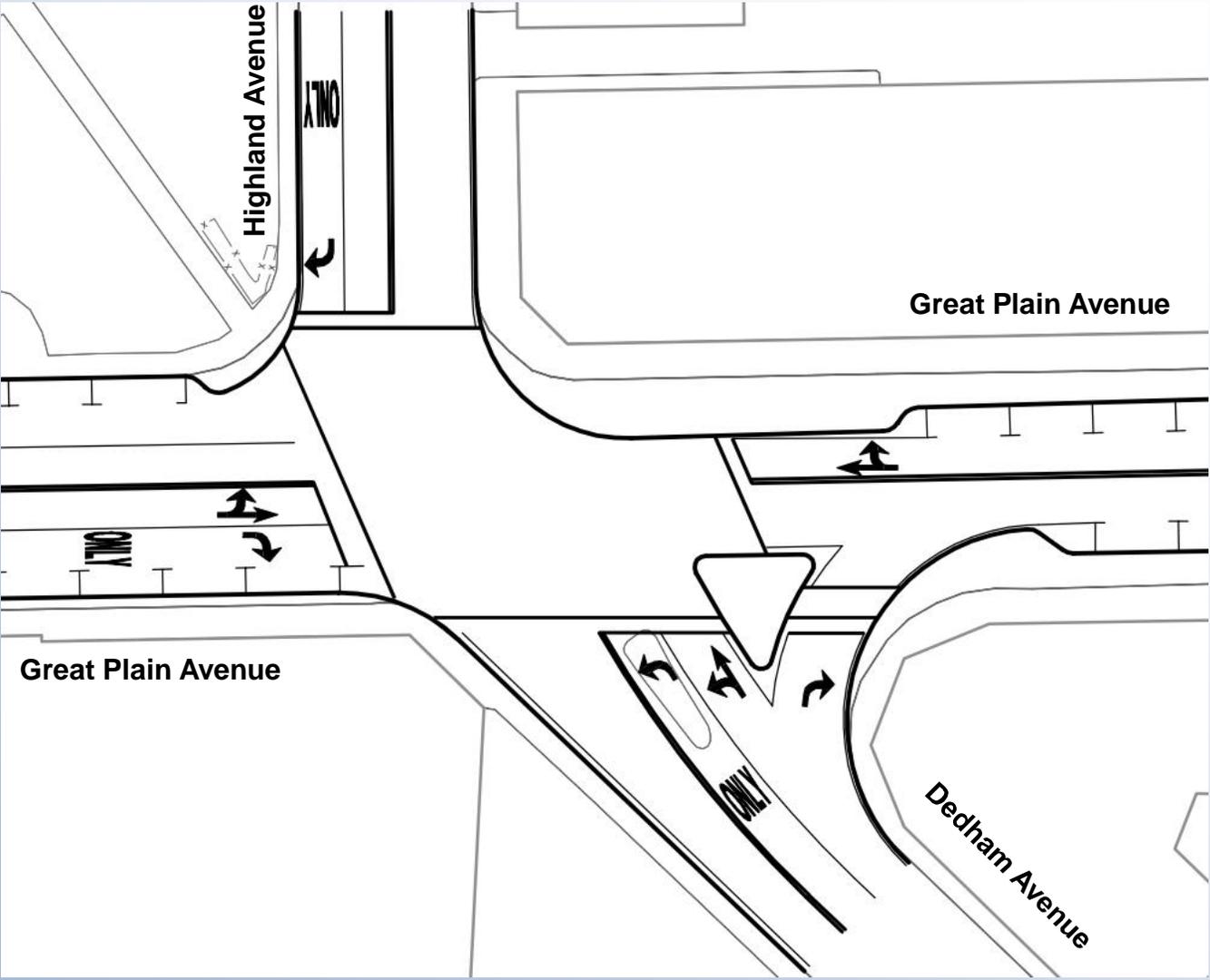
	No-Build	Return Southbound Left-turn
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	D [38.6]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	D [42.5]

## ▶ Afternoon Peak Hour

	No-Build	Return Southbound Left-turn
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	D [41.2]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	D [41.9]

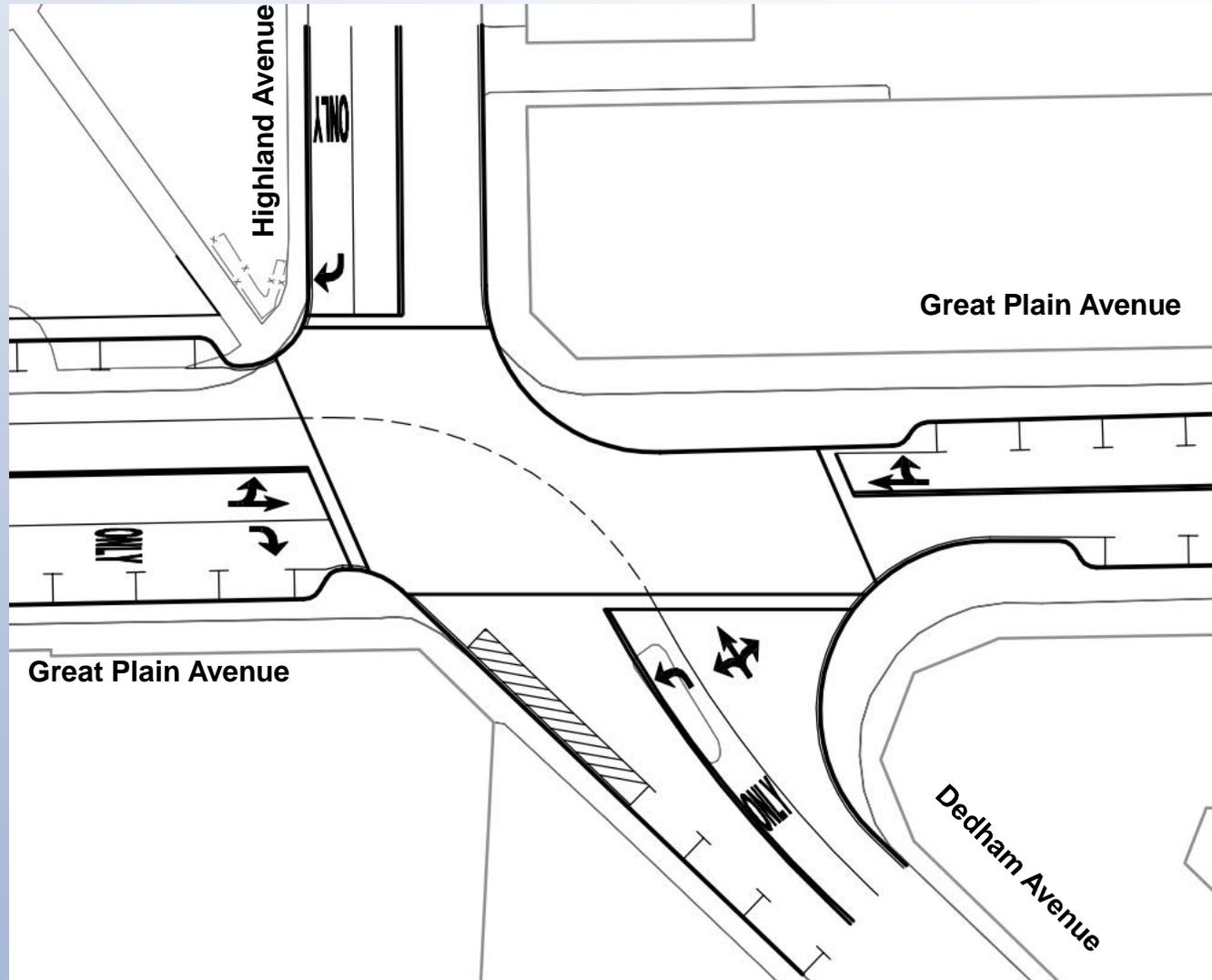
# GPA and Dedham Avenue Lane-use Changes

DA-1



# GPA and Dedham Avenue Lane-use Changes

DA-2



# GPA and Dedham Avenue (DA-1) Lane-use Changes

## ▶ Morning Peak Hour

	No-Build	Lane-use Changes
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	C [32.8]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	C [31.6]

## ▶ Afternoon Peak Hour

	No-Build	Lane-use Changes
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	C [33.3]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	D [36.9]

# GPA and Dedham Avenue (DA-2) Lane-use Changes

## ▶ Morning Peak Hour

	No-Build	Lane-use Changes
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	D [40.3]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	E [56.2]

## ▶ Afternoon Peak Hour

	No-Build	Lane-use Changes
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	D [36.1]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	E [57.1]

## Chapel LT + GPA and Dedham Ave (DA-1) Lane-use Changes

### ▶ Morning Peak Hour

	No-Build	Build
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	D [42.5]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	D [38.8]

### ▶ Afternoon Peak Hour

	No-Build	Build
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	D [40.8]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	D [39.6]

# Analysis Summary

## ▶ Morning Peak Hour

	No-Build	Opt. Timing	Pre-empt	Chapel SB LT	DA-1	DA-2	All Build
Great Plain Ave at Chapel/Chestnut Streets	D [46.4]	D [39.3]	C [32.0]	D [38.6]	C [32.8]	D [40.3]	D [42.5]
Great Plain Ave at Highland/Dedham Avenues	D [52.2]	C [32.0]	C [31.7]	D [42.5]	C [31.6]	E [56.2]	D [38.8]

## ▶ Afternoon Peak Hour

	No-Build	Opt. Timing	Pre-empt	Chapel SB LT	DA-1	DA-2	All Build
Great Plain Ave at Chapel/Chestnut Streets	E [56.5]	D [53.9]	C [42.4]	D [41.2]	C [33.3]	D [36.1]	D [40.8]
Great Plain Ave at Highland/Dedham Avenues	D [52.5]	D [39.0]	C [39.3]	D [41.9]	C [36.9]	E [57.1]	D [39.6]

NOTES: 1) Railroad Preempt is Included in all Alternatives Except No-Build and Opt. Timing  
 2) DA-1 & DA-2 Do Not Include Chapel SB LT  
 3) All Build Includes: Opt. Timing, Railroad Preempt, Chapel SB LT, & DA-1