

Colchester/Riverside/Barrett/ Mill Intersection Study

PAC Meeting #5
June 19, 2018



Tonight's Agenda

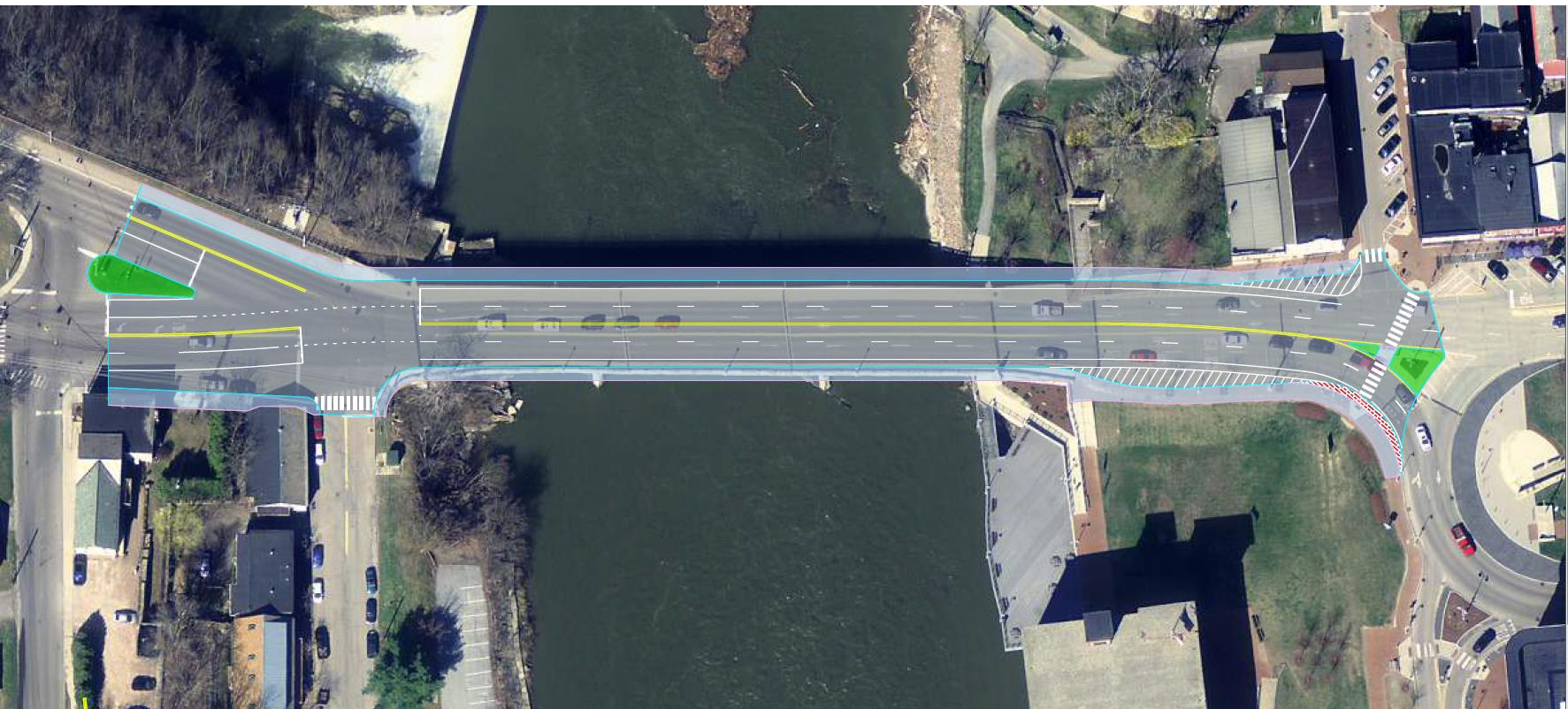
- Project History
- Project Updates
- Compare Alternatives
- Choose Preferred Alternative

Project History

- Committee Considered:
 - 1 Short-Term Alternative
 - 3 Medium-Term Alternatives
 - 1 Hybrid Alternative
- Committee Actions:
 - Approved Short-Term Alternative
 - Eliminated 1 Medium-Term Alternative
- CCRPC Initiated a Bridge Study

Project Updates

- Bridge Study Recommends 4-Lane Bridge
- Intersection Operations Analysis Revised
- Draft Report Updated and Distributed



Alternatives

- Short-Term
- Hybrid
- Medium-Term
 - Alternative 1 – 4 Way w/Pocket Park
 - Alternative 2 – 4 Way w/Separated Right Turn Lane
- Dismissed
 - Alternative 3 - Roundabout

Colchester/Riverside Ave.
Short Term Improvements
(4 Lane Bridge)

0 20 40
SCALE IN FEET



RIGHT ARROW FOR
SOUTHBOUND RIGHT TURNS

CROSSWALK WITH
PEDESTRIAN SIGNAL

MILL STREET
SIDEWALK

MILL STREET

RELOCATE BUS STOP WITH BULB OUT

BICYCLE CONNECTION
TO SHARED USE PATH

PEDESTRIAN SIGNAL
AT CROSSWALK
(LEADING INTERVAL)

DELINEATED ON-STREET PARKING

SHARROWS

PROTECTED LEFT TURN PHASE ADDED
FOR SOUTHBOUND COLCHESTER
AVENUE

BARRETT STREET

PED/BIKE
CROSSWALK

NEW PAVEMENT
MARKINGS

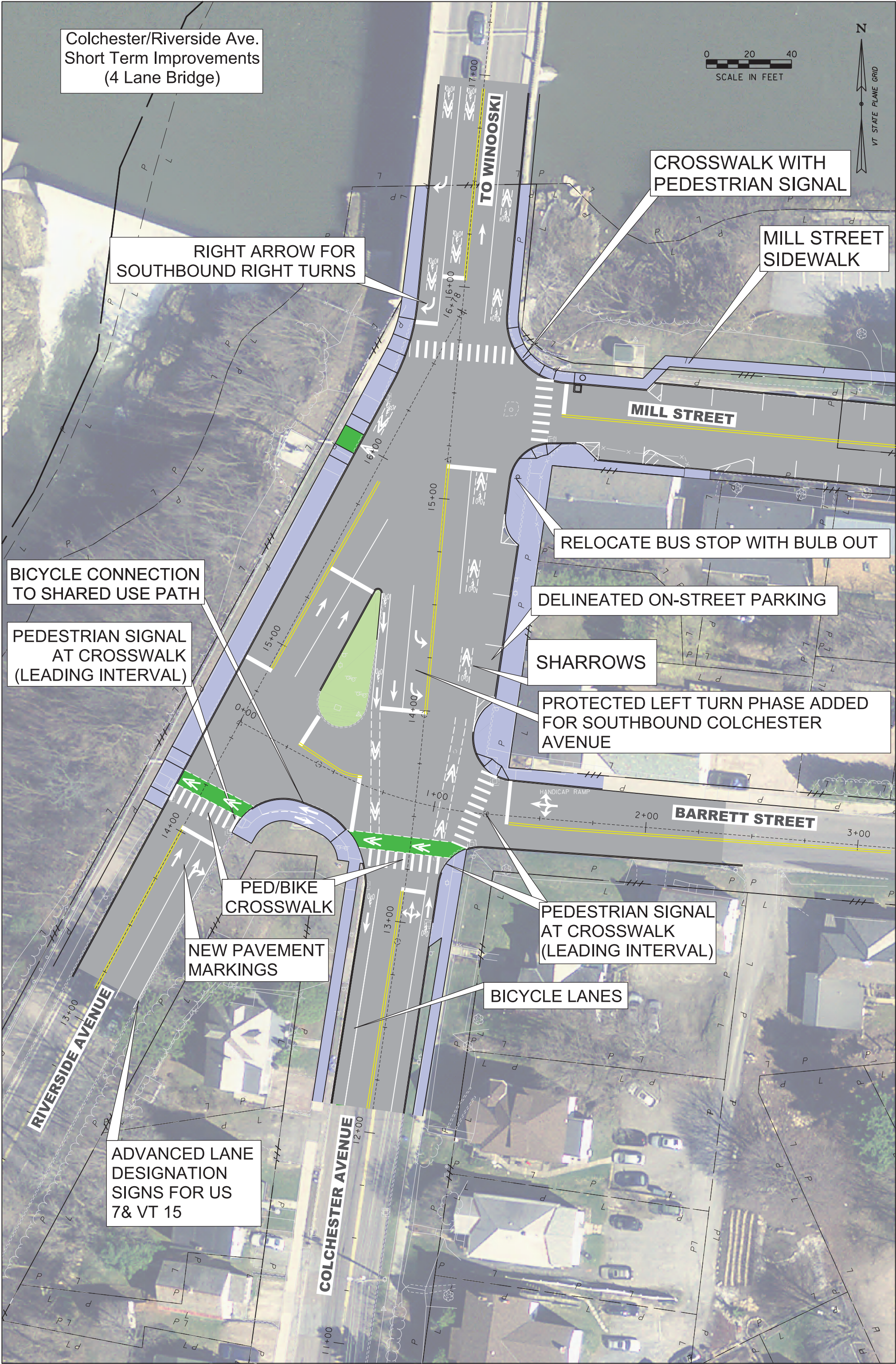
PEDESTRIAN SIGNAL
AT CROSSWALK
(LEADING INTERVAL)

BICYCLE LANES

ADVANCED LANE
DESIGNATION
SIGNS FOR US
7 & VT 15

COLCHESTER AVENUE

RIVERSIDE AVENUE



**Colchester/Riverside Study
4-way Intersection
(4 Lane Bridge-2NB/2SB)**

0 60 120
SCALE IN FEET



RIGHT TURN ONLY-
(PEAK HOUR OPTION)

MILL STREET
SIDEWALK

MILL STREET

POCKET PARK

TRUCK APRON

PEDESTRIAN SIGNAL
AT CROSSWALK

RELOCATE BUS STOP

REMOVE ON STREET PARKING

UNLOADING AREA RETAINED

BARRETT STREET

NEW TRAFFIC SIGNAL WITH PEDESTRIAN
SIGNALS AND LIGHTING (LEADING INTERVAL)

PEDESTRIAN/BIKE CONNECTION
TO SHARED USE PATH

WIDER
CROSSWALK

ADDITIONAL APPROACH LANE

PROTECTED
BICYCLE LANES

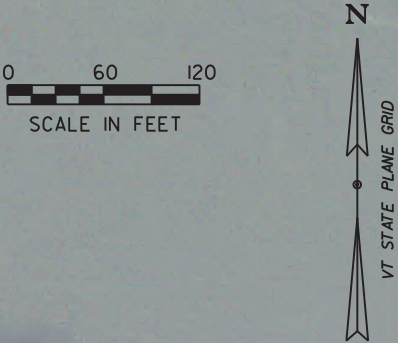
ADVANCED LANE
DESIGNATION
SIGNS FOR US
7& VT 15

RIVERSIDE AVENUE

COLCHESTER AVENUE

TO WINOOSKI

Colchester/Riverside Study
4-way Intersection - Separated Right Lane
(4 Lane Bridge-2NB/2SB)



SEPARATED RIGHT TURN

YIELD CONTROLLED
CROSSWALK

TRUCK APRON

WIDER
CROSSWALK

ADVANCED LANE
DESIGNATION
SIGNS FOR US
7& VT 15

TO WINOOSKI

RIGHT TURN ONLY
(PEAK HOUR OPTION)

MILL STREET
SIDEWALK

MILL STREET

RELOCATE BUS STOP

REMOVE ON-STREET PARKING

UNLOADING AREA RETAINED

BARRETT STREET

NEW TRAFFIC SIGNAL WITH PEDESTRIAN
SIGNALS AND LIGHTING (LEADING INTERVAL)

PEDESTRIAN/BIKE CONNECTION
TO SHARED USE PATH

ADDITIONAL APPROACH LANE

PROTECTED
BICYCLE LANES

RIVERSIDE AVENUE

COLCHESTER AVENUE

**Colchester/Riverside Study
Roundabout Intersection
(4 Lane Bridge)**

0 60 120
SCALE IN FEET



RIGHT TURN
ONLY

MILL STREET
SIDEWALK

MILL STREET

RELOCATE BUS STOP
WITH WIDENED
SIDEWALK AND PARKING
REMOVAL

BARRETT STREET

NEW RETAINING
WALL

SINGLE APPROACH LANE

BIKE CONNECTION TO
SHARED USE PATH

PROTECTED
BICYCLE LANES

REQUIRES LOT
ACQUISITION

ADVANCED LANE
DESIGNATION
SIGNS FOR US
7& VT 15

NEW RETAINING
WALL

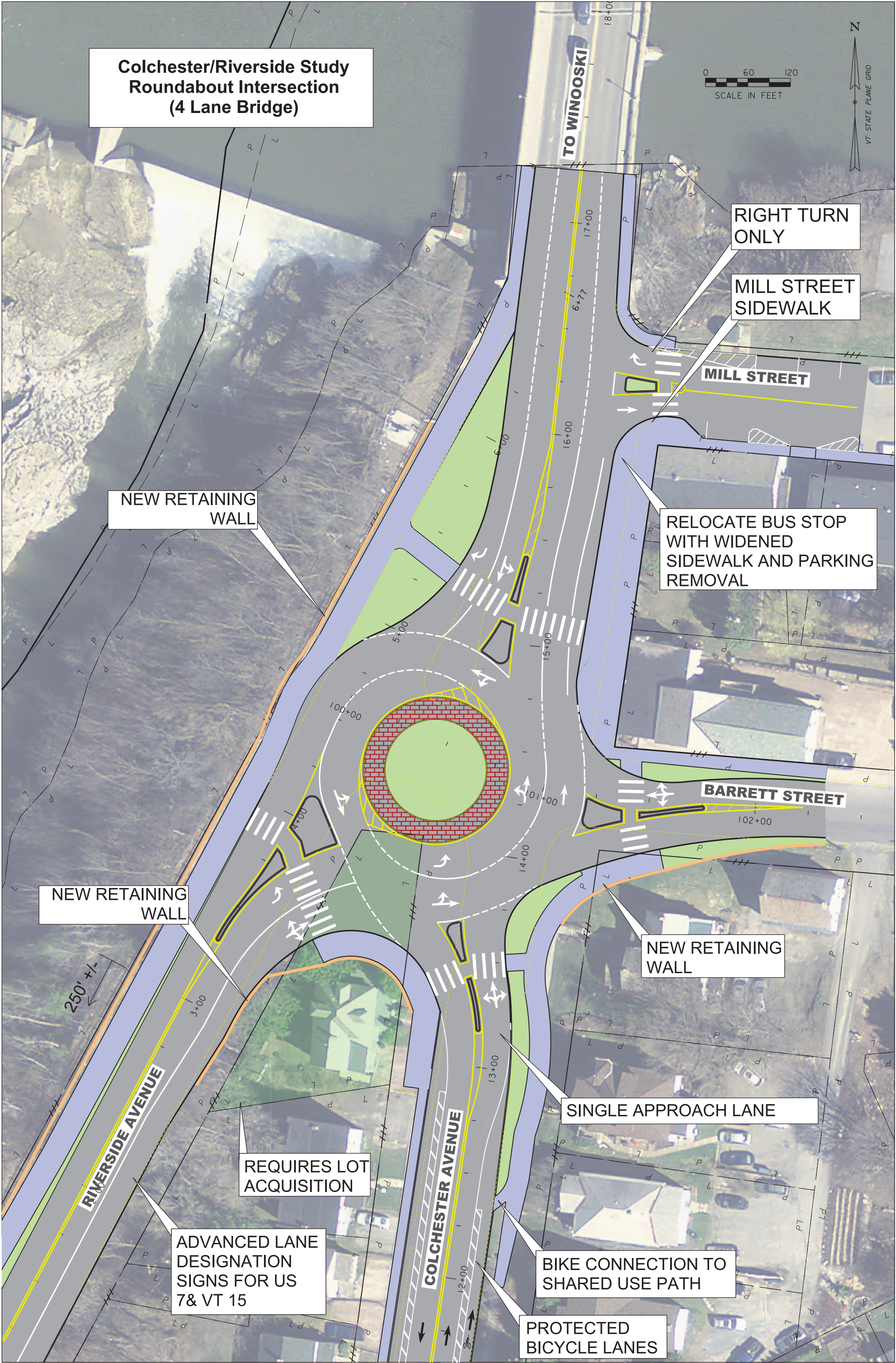
NEW RETAINING
WALL

RIVERSIDE AVENUE

COLCHESTER AVENUE

TO WINOOSKI

250' +/-



**Colchester/Riverside Study
4-way Intersection
(4 Lane Bridge-2NB/2SB)**

0 60 120
SCALE IN FEET



RIGHT TURN ONLY-
(PEAK HOUR OPTION)

MILL STREET
SIDEWALK

POCKET PARK

TRUCK APRON

PEDESTRIAN SIGNAL
AT CROSSWALK

RELOCATE BUS STOP WITH BULB OUT

UNLOADING AREA RETAINED

BARRETT STREET

NEW TRAFFIC SIGNAL WITH PEDESTRIAN
SIGNALS AND LIGHTING (LEADING INTERVAL)

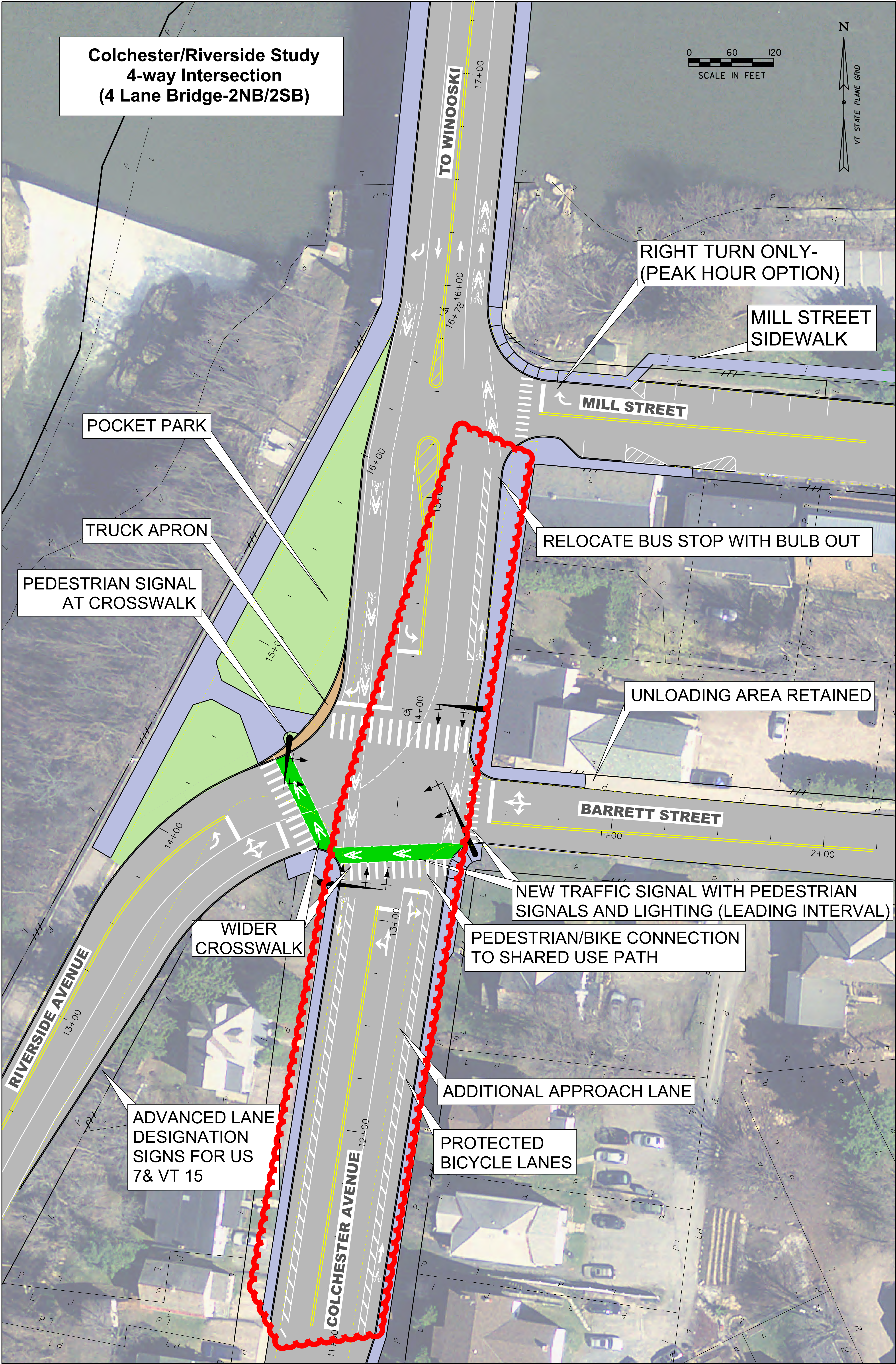
PEDESTRIAN/BIKE CONNECTION
TO SHARED USE PATH

WIDER
CROSSWALK

ADDITIONAL APPROACH LANE

PROTECTED
BICYCLE LANES

ADVANCED LANE
DESIGNATION
SIGNS FOR US
7& VT 15



Comparison of Alternatives

Attribute	No Build		Alt 1	Alt 2
Traffic Operations	LOS E 105% OF CAPACITY		LOS E 98% OF CAPACITY	LOS E 99% OF CAPACITY
Crash Reduction	\$0 SAVINGS		\$5.6M SAVINGS	\$7.2M SAVINGS
Pedestrian Experience	NO CHANGE		SIGNAL CONTROL FOR MOST CROSS WALKS (MILL ST EXCEPTED)	SIGNAL CONTROL FOR MOST CROSS WALKS - "YIELD" CONTROL FOR RIVERSIDE
Bicyclist Experience	NO CHANGE		PROTECTED BIKE LANES	PROTECTED BIKE LANES
Intersection Complexity	NO CHANGE		ONE 4-WAY INTERSECTION ONE T-TYPE INTERSECTION	ONE 4-WAY INTERSECTION TWO T-TYPE INTERSECTIONS
Cost	\$0		\$3.3M	\$3.4M
Risk	NONE		MINOR WIDENING	MINOR WIDENING
Disruption	NONE		1.0 TO 1.5 YEARS	1.0 TO 1.5 YEARS

Legend

Much Worse than No Build		Somewhat Worse than No Build		Comparable to No Build		Somewhat Better than No Build		Much Better than No Build
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Purpose and Need Compliance

Category	No Build	Alt 1	Alt 2
Enhance Pedestrian Safety		◆	◆
Safer Bike Connection to Winooski		◆	◆
Reduce Crashes		◆	◆
Address Complexity		◆	◆
Formalize On-Street Parking		◆	◆
Manage Congestion		◆	◆
Satisfies Purpose and Need Statement	No	Yes	Yes

Discussion and Selection of Preferred Alternative

Calculated Safety Benefits

Location/Performance Measure	Baseline (Existing Conditions)	Alternative 1 (4-way, Signalized Intersection)	Alternative 2 (4-way with Right Lane)
Colchester Avenue/Barrett Street			
Crash Rate (Crashes per MEV)	1.18	1.2	0.92
Cost per Crash	\$82,000	\$28,000	\$27,000
Annual Cost of Crashes	\$493,000	\$360,000	\$209,000
Present Value of Crashes	\$7,340,000	\$5,352,000	\$3,116,000
Riverside Avenue/Barrett Street			
Crash Rate (Crashes per MEV)	0.60	NA	0.23
Cost per Crash	\$29,000	NA	\$25,000
Annual Cost of Crashes	\$117,000	NA	\$39,000
Present Value of Crashes	\$1,744,000	\$0	\$576,000
Riverside Ave/Colchester Ave/Mill Street			
Crash Rate (Crashes per MEV)	0.84	0.34	0.34
Cost per Crash	\$29,000	\$35,000	\$35,000
Annual Cost of Crashes	\$244,000	\$120,000	\$120,000
Present Value of Crashes	\$3,633,000	\$1,787,000	\$1,787,000
Combined (three locations)			
Present Value of Crashes	\$12,717,000	\$7,139,000	\$5,480,000
Savings Relative to Existing	-	\$5,578,000	\$7,237,000

Table 1: Colchester/Barrett Intersection Performance by Approach for Each Alternative

Peak Hour	Approach and Movement	Alternative 1				Alternative 2				Alternative 3			
		LOS ¹	Delay ²	V/C ³	Queue ⁴	LOS ¹	Delay ²	V/C ³	Queue ⁴	LOS ¹	Delay ²	V/C ³	Queue ⁴
AM	Northbound-Colchester Avenue												
	All	C	26.8	0.56	114	B	18.7	0.39	93	A	5.5	0.36	32
	Southbound-Colchester Avenue												
	All	B	13.0	-	-	B	15.8	-	-	C	20.1	0.88	422
	Left	C	30.6	0.49	107	B	12.1	0.30	63				
	Through	B	18.9	0.90	288	B	16.7	0.65	275				
	Right	A	3.8	0.69	119	-	-	-	-				
	Eastbound-Riverside Avenue												
	All	C	32.6	-	-	C	32.0	-	-	A	7.9	0.61	95
	Left	C	32.5	0.76	296	C	32.0	0.78	275				
	Through/Right	D	32.8	0.76	304	C	32.0	0.78	282				
	Westbound-Barrett Street												
	All	D	33.6	0.54	125	C	34.7	0.58	96	A	6.6	0.42	40
	Overall	C	21.7	0.69		C	24.0	0.75		NA	NA	NA	
PM	Northbound-Colchester Avenue												
	All	E	75.8	1.00	448	E	62.6	0.96	429	E	47.0	1.09	610
	Southbound-Colchester Avenue												
	All	C	22.8	-	-	C	29.6	-	-	C	24.3	0.94	460
	Left	F	130.4	0.93	165	C	31.2	0.54	75				
	Through	C	29.4	0.50	294	C	29.3	0.50	290				
	Right	A	9.1	0.67	396	-	-	-	-				
	Eastbound-Riverside Avenue												
	All	E	77.8	-	-	E	79.4	-	-	C	16.0	0.86	291
	Left	E	79.4	1.01	710	F	80.8	1.01	722				
	Through/Right	E	76.1	0.99	705	E	77.9	1.00	717				
	Westbound-Barrett Street												
	All	F	122.5	1.07	456	F	114.6	1.05	456	C	16.6	0.67	96
	Overall	E	62.1	0.98		E	70.9	0.99		NA	NA	NA	

¹ LOS= Level of Service

² Delay = Average delay expressed in seconds per vehicle

³ V/C = Volume-to-capacity ratio for critical movements

⁴ 95th Percentile Queue in feet. Bold text indicates that the queue exceeds the available storage of: 40 feet in the southbound left-turn lane for Alternatives 1 and 2.

NA-Not Applicable. Overall volume to capacity ratios and delay are not calculated for roundabouts.