FINAL

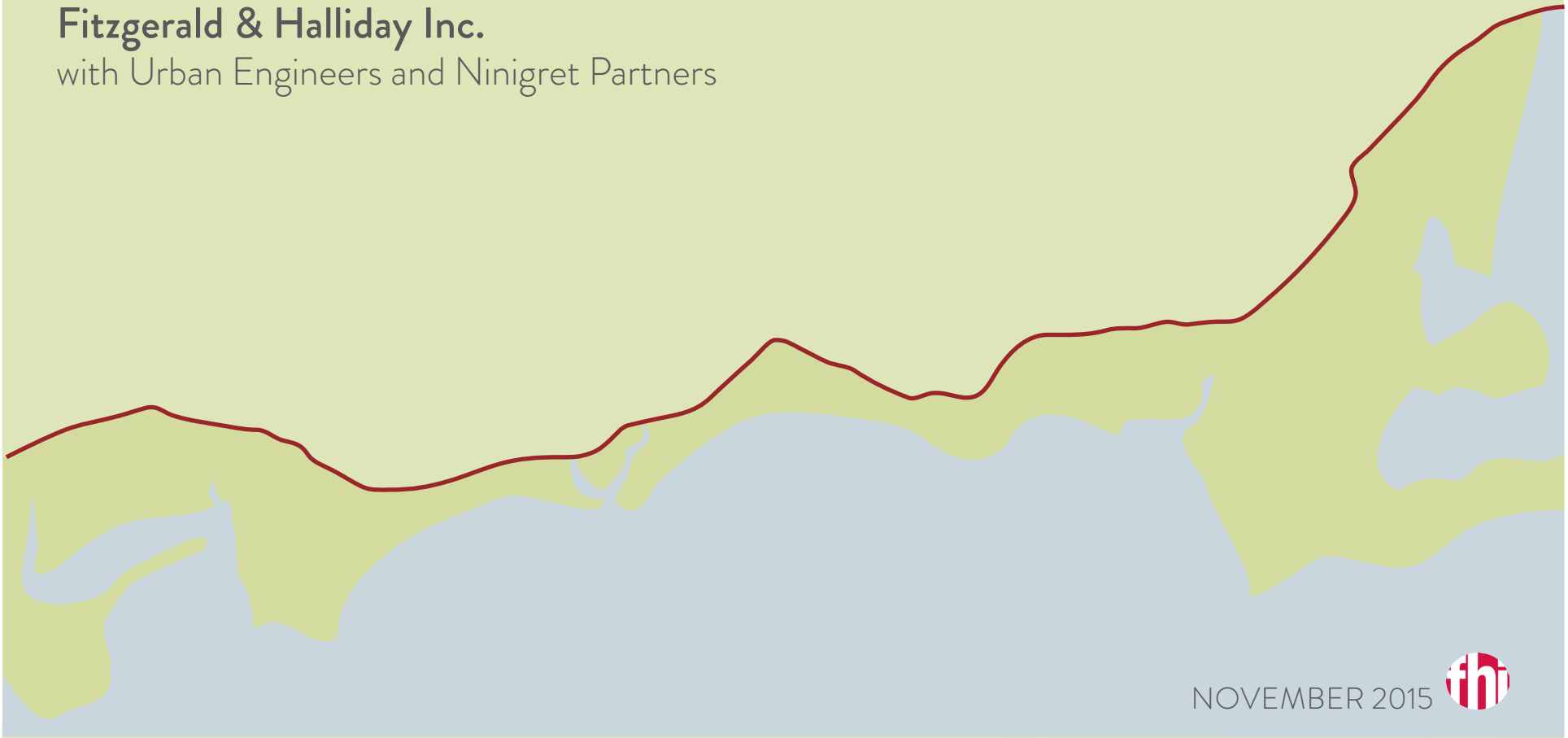
BOSTON POST ROAD CORRIDOR PLAN

CONNECTICUT RIVER TO CLINTON WESTERN TOWN BOUNDARY

APPENDIX:
Parts 1 & 2 (Existing Conditions and Corridor Vision)
Parts 3 & 4 (Recommendations and Implementation)

Submitted By:

Fitzgerald & Halliday Inc.
with Urban Engineers and Ninigret Partners

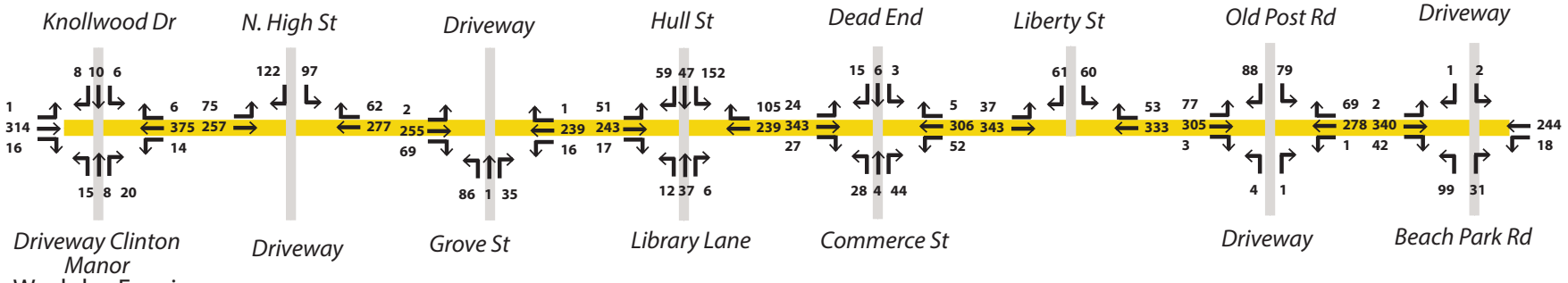


NOVEMBER 2015

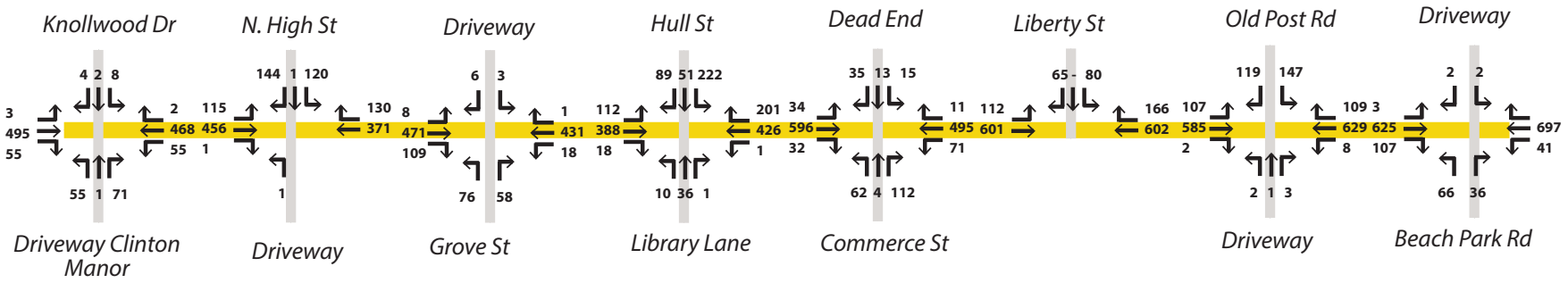
A. Maps

TRAFFIC COUNTS: CLINTON

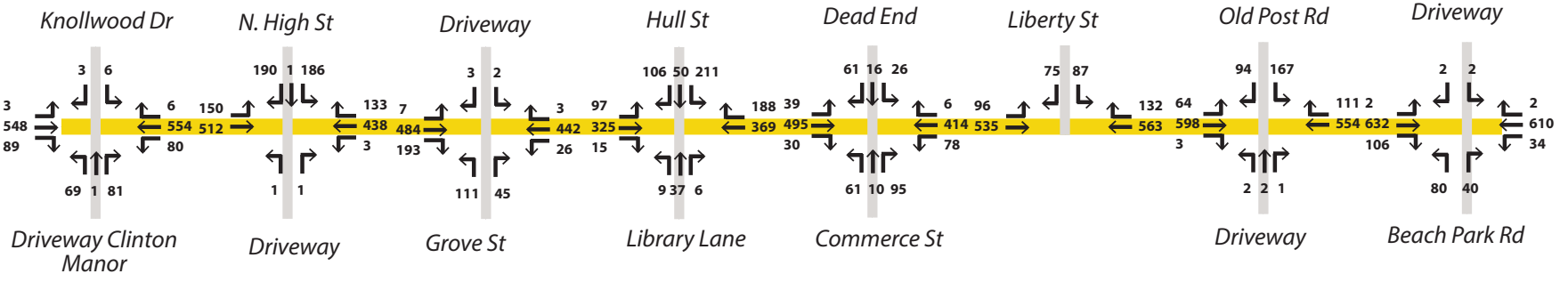
Weekday Morning
Peak Hour Data
8:00 AM - 9:00 AM



Weekday Evening
Peak Hour Data
4:00 PM - 5:00 PM

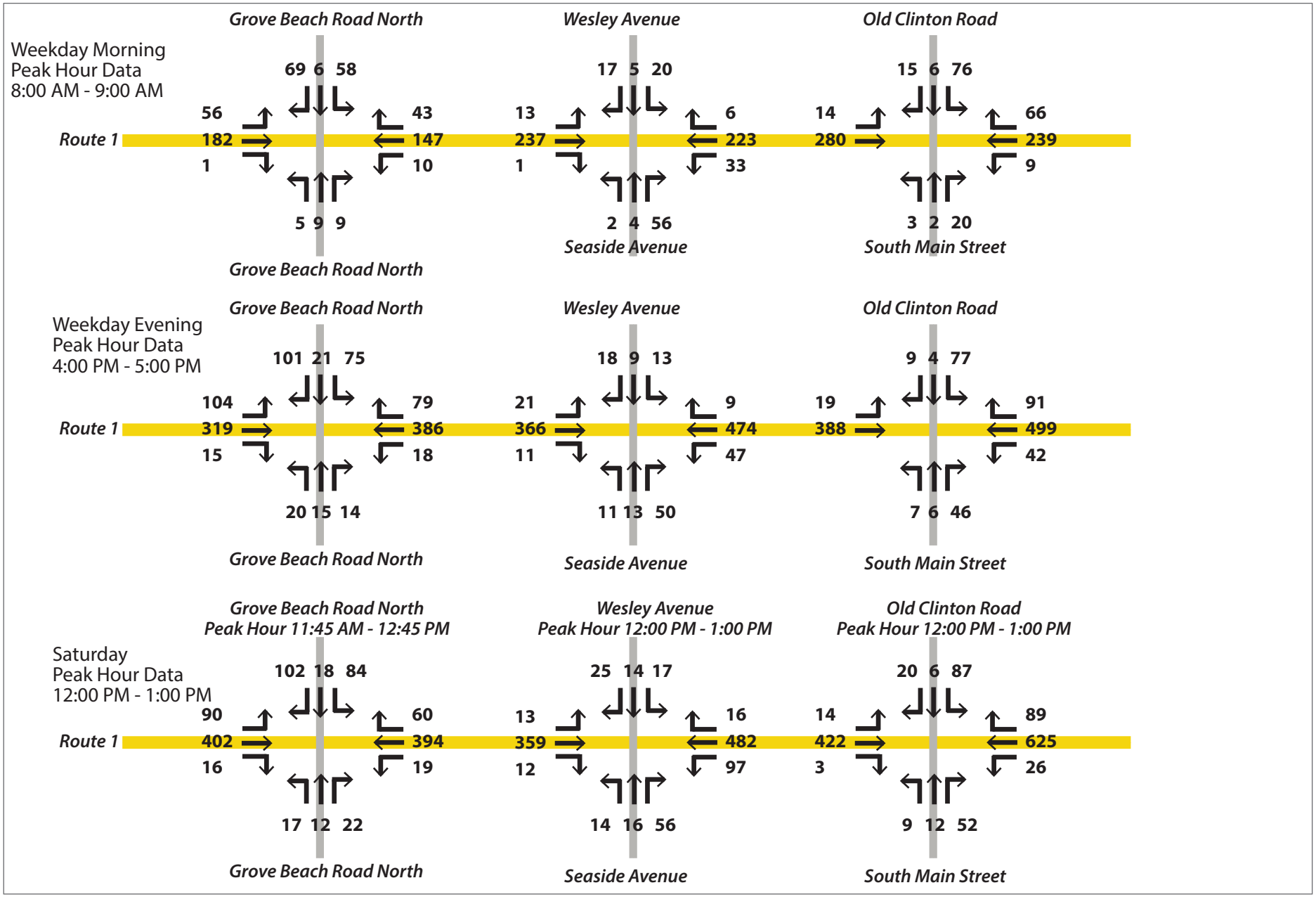


Saturday Peak Hour Data
12:00 PM - 1:00 PM



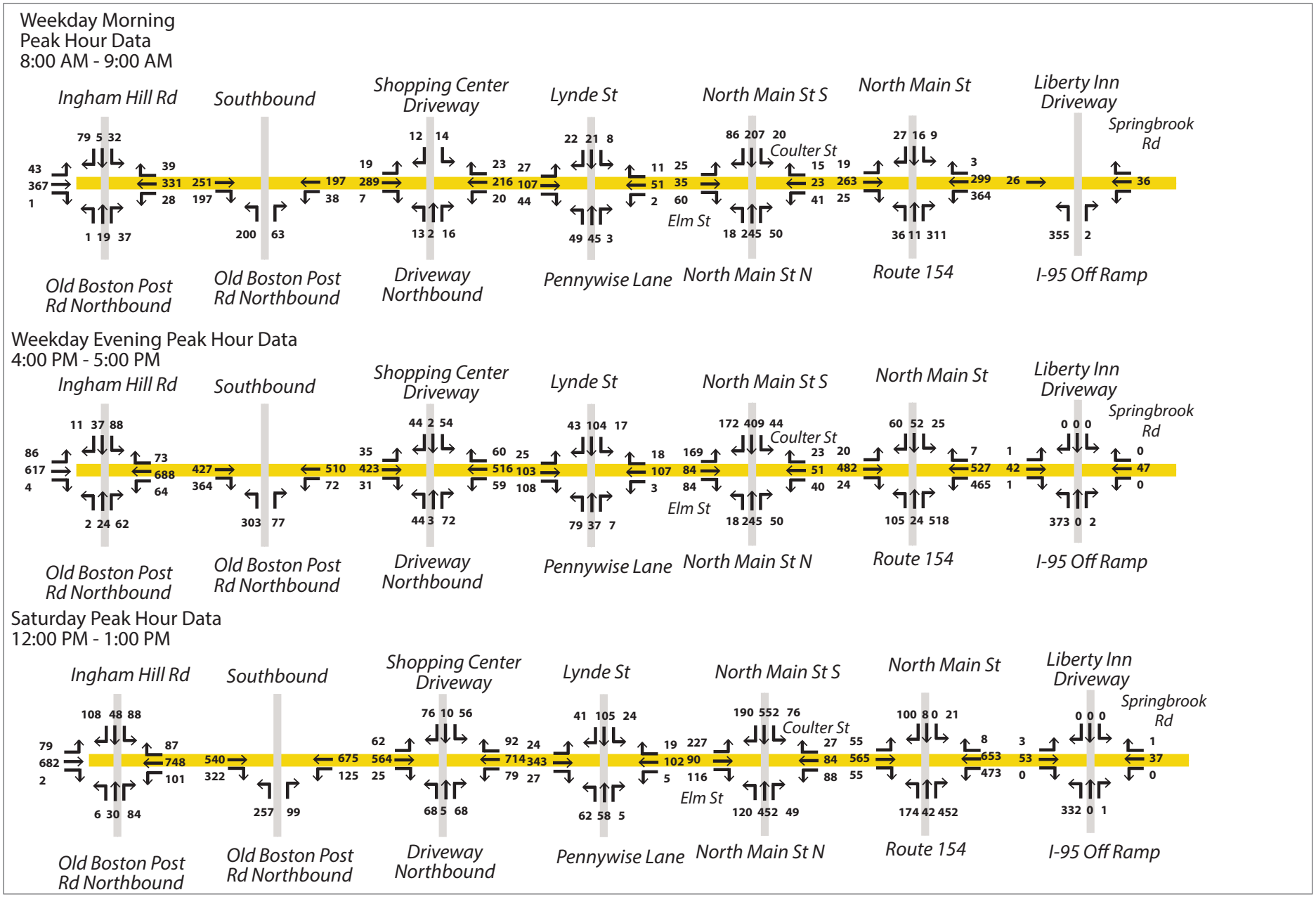
Source: Fitzgerald & Halliday, Inc., August 2013

TRAFFIC COUNTS: WESTBROOK



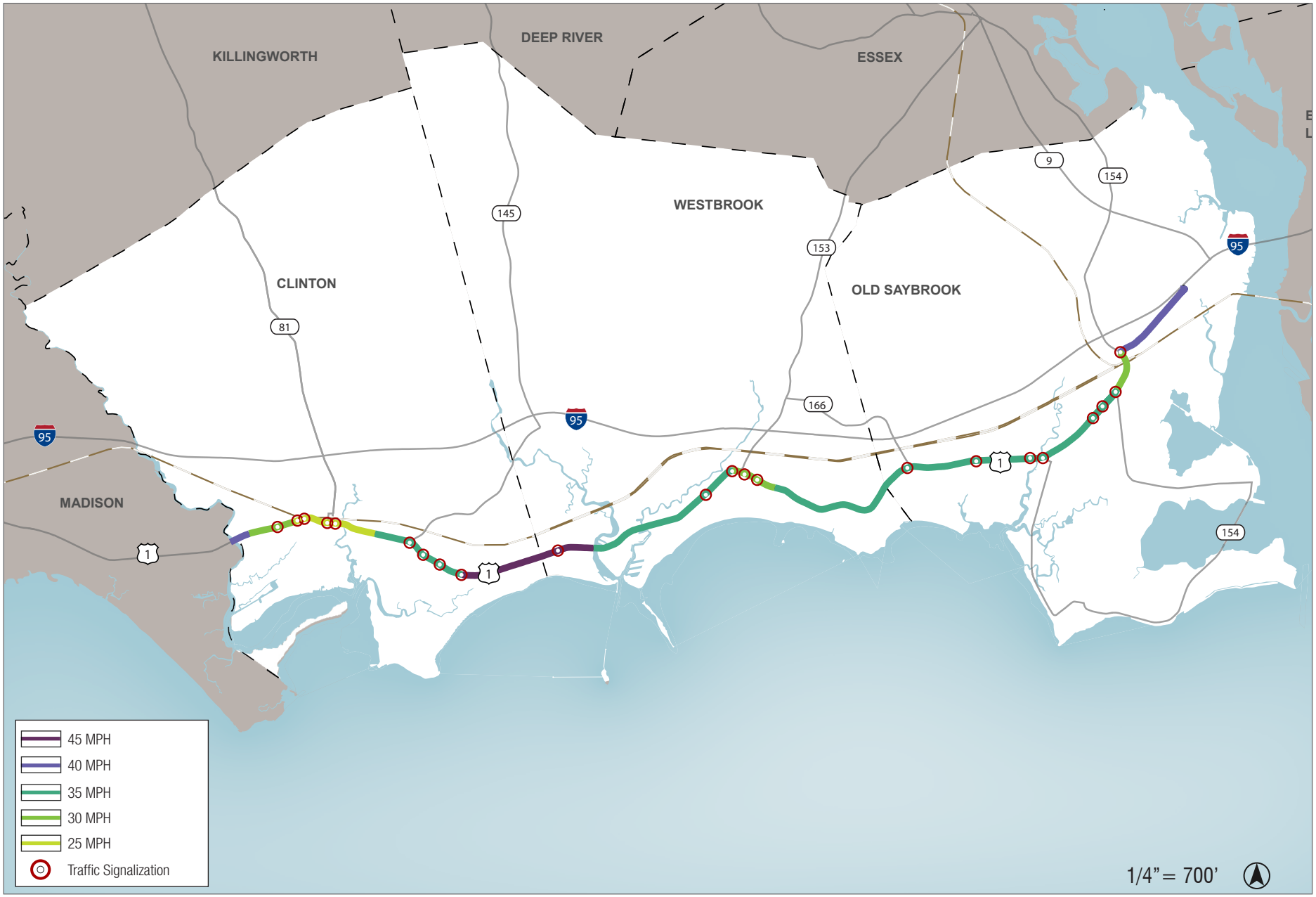
Source: Fitzgerald & Halliday, Inc., August 2013

TRAFFIC COUNTS: OLD SAYBROOK



Source: Fitzgerald & Halliday, Inc., August 2013

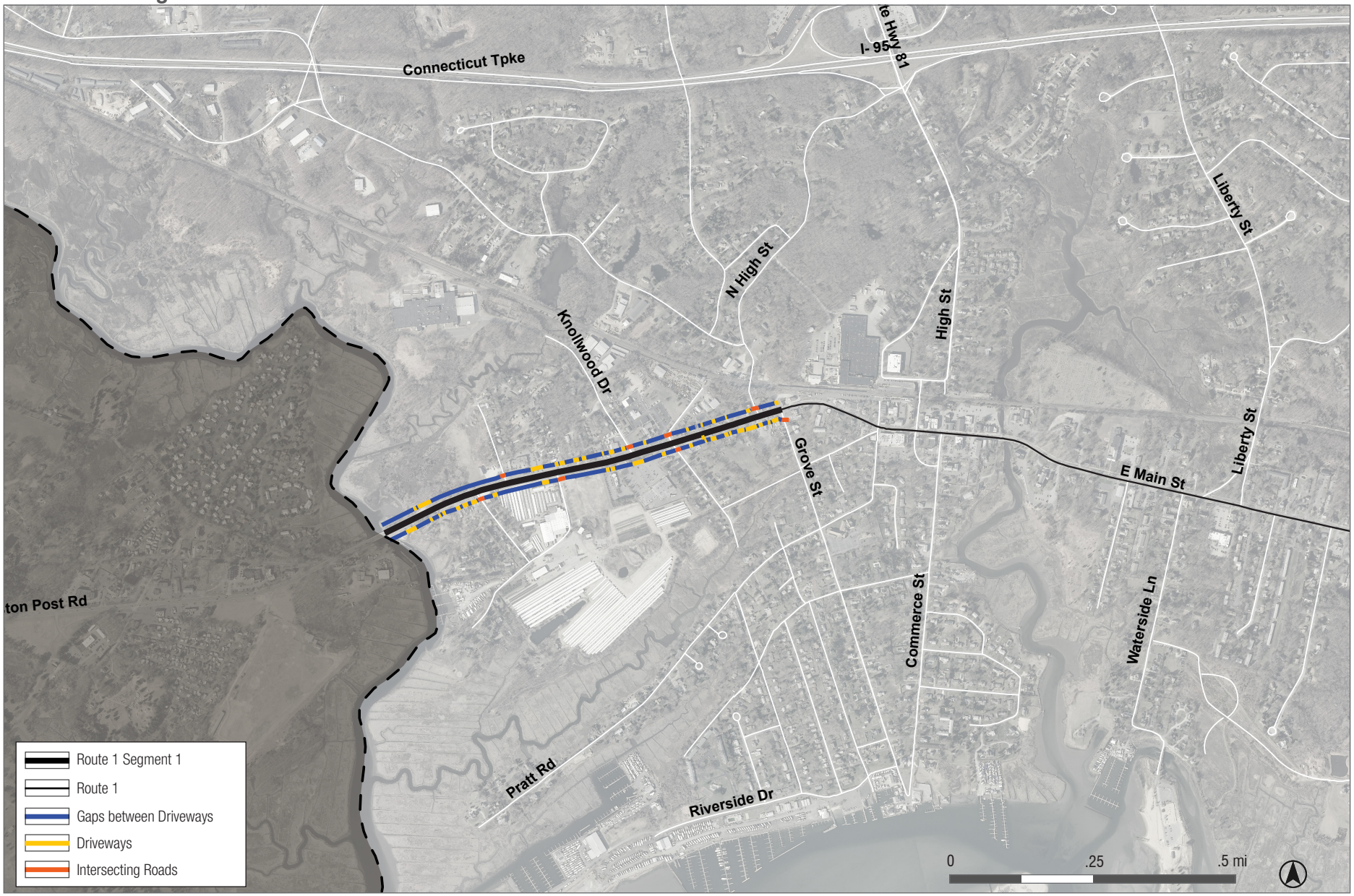
TRAFFIC CONTROL MAP: Route 1 Speed Limits and Traffic Signals



Source: Miles per hour data, Fitzgerald & Halliday, Inc., November 2013; Traffic Signalization data, Fitzgerald & Halliday, Inc., November 2013

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (1 of 9)

West Clinton Segment



Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (2 of 9)

Clinton Town Center Segment

Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (3 of 9)

Clinton East Retail Segment

Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (4 of 9)

Westbrook Marina and Beach Segment

Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

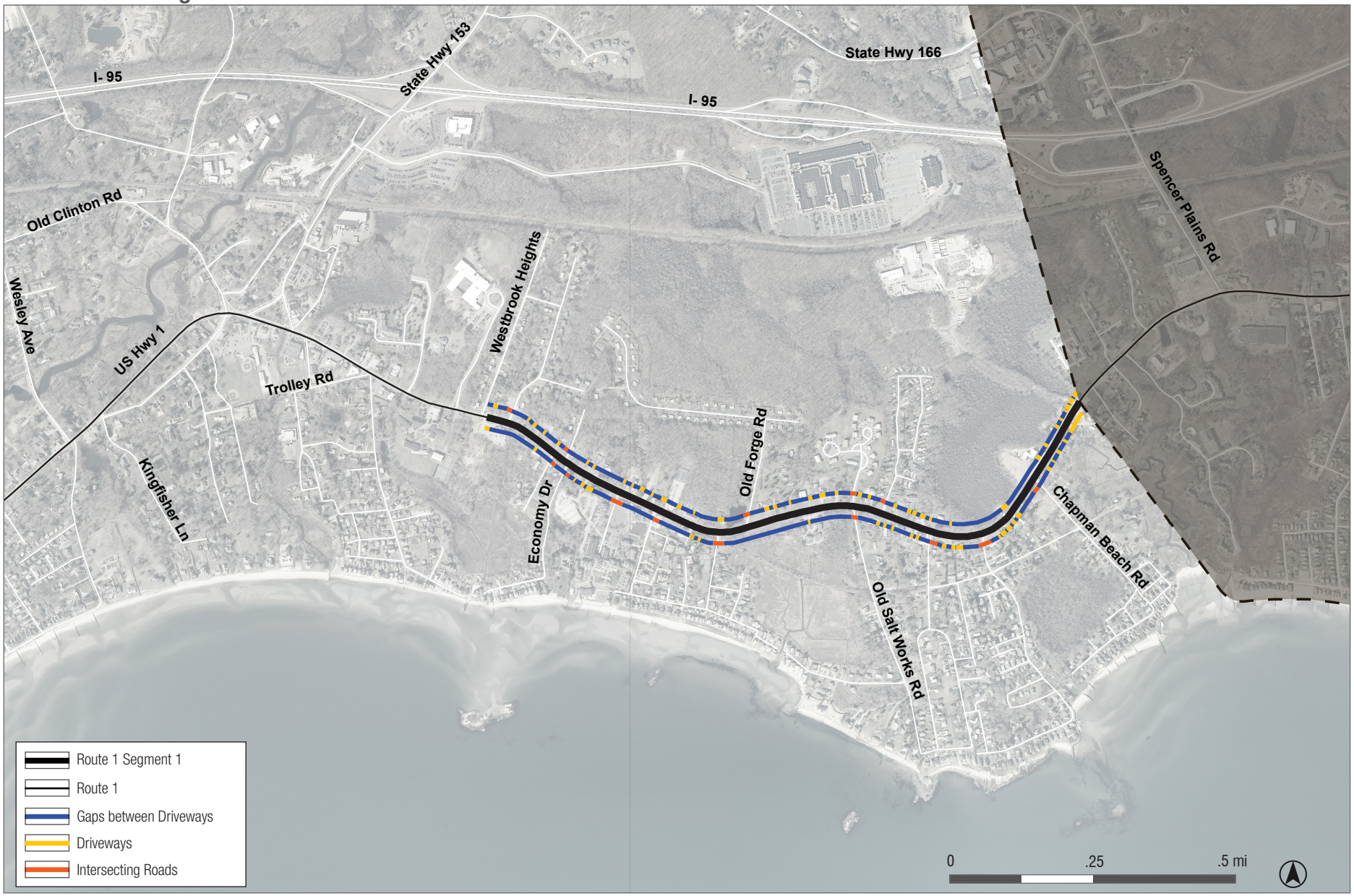
ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (5 of 9)

Westbrook Town Center Segment

Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (6 of 9)

Westbrook East Segment



Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (7 of 9)

West/ Old Saybrook High School Segment

Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

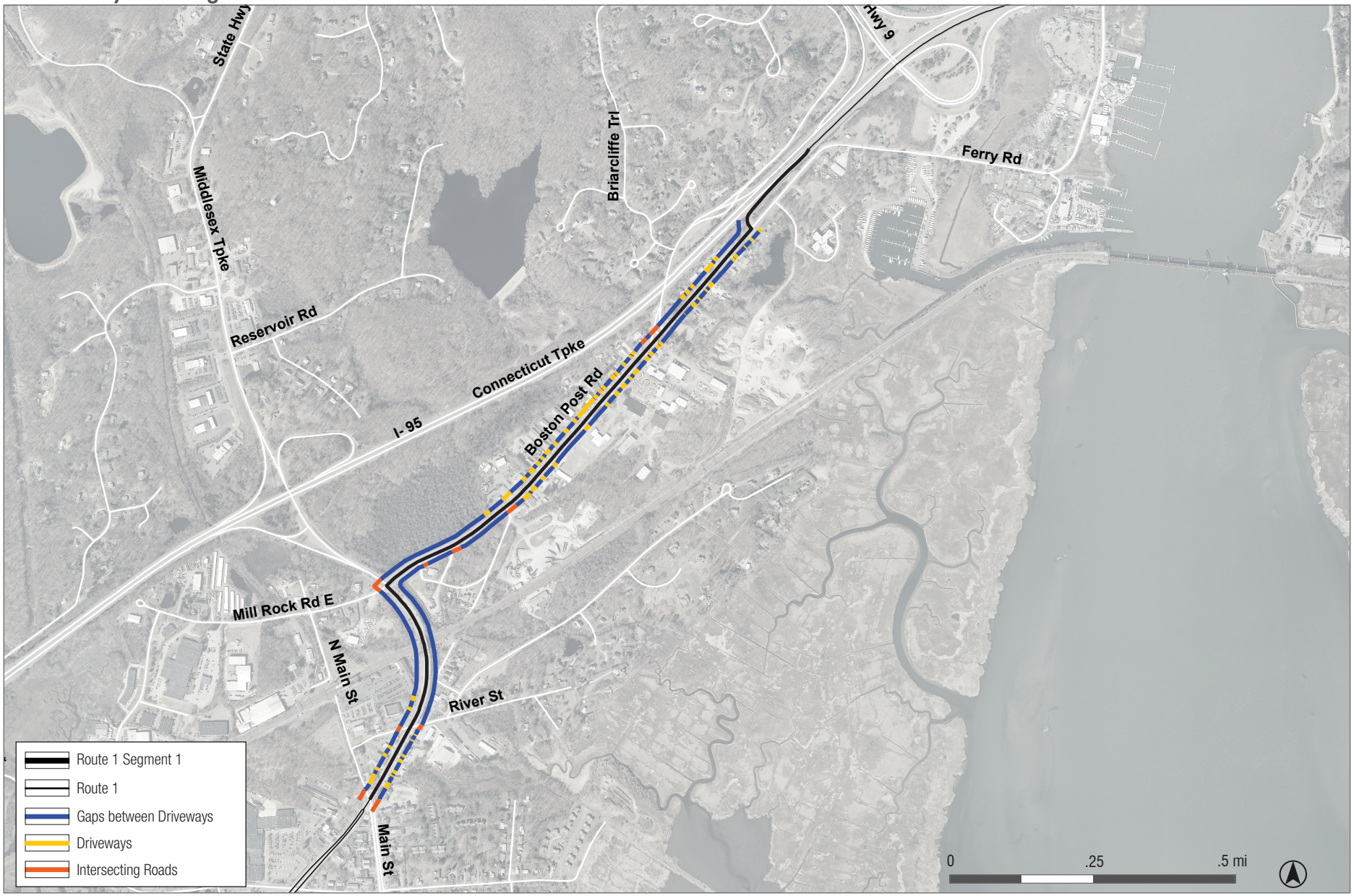
ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (8 of 9)

Central Old Saybrook Segment

Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

ROADWAY INTERSECTIONS & DRIVEWAY CURB CUTS (9 of 9)

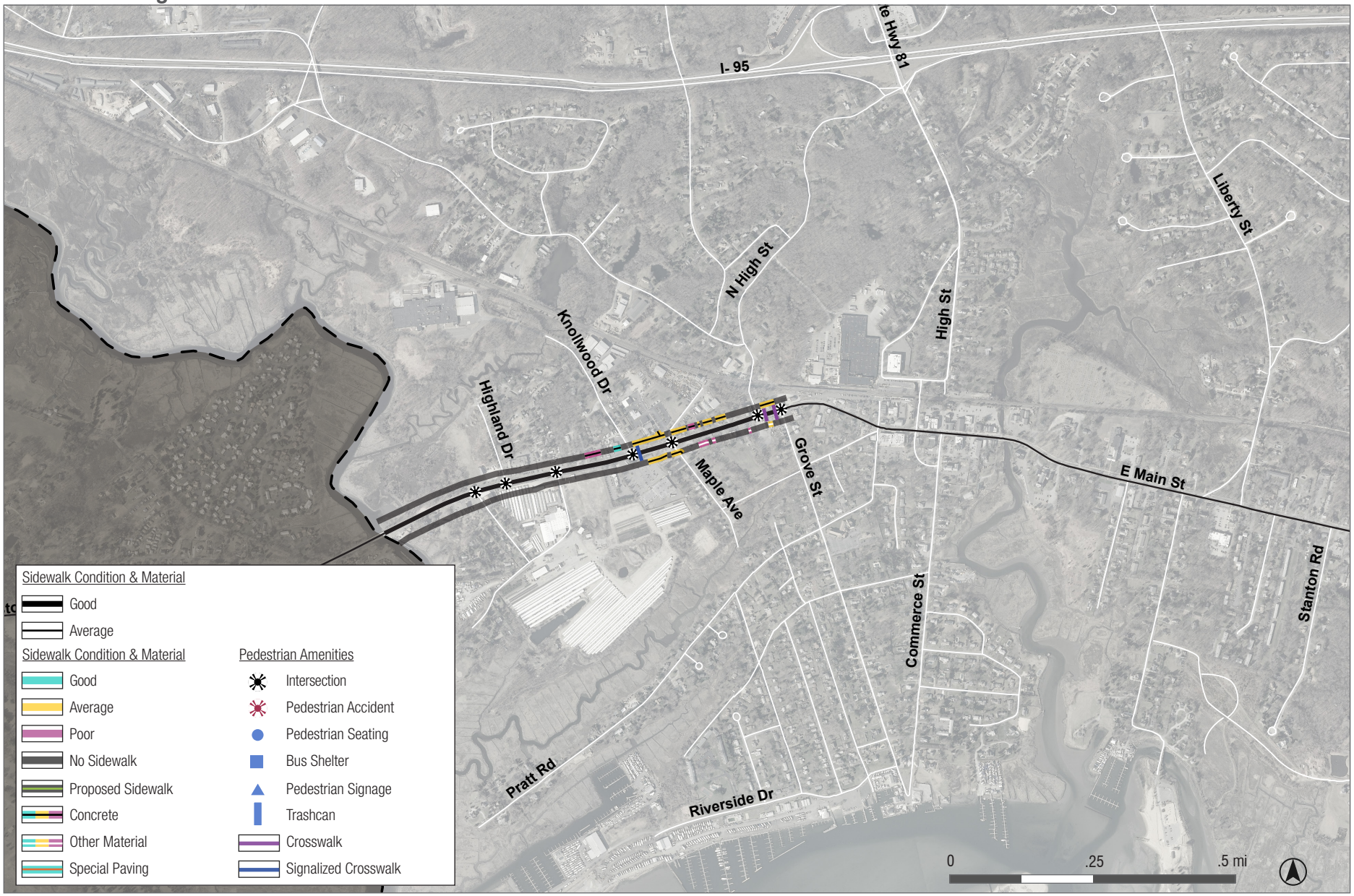
East Old Saybrook Segment



Source: Curb cut data collected by Fitzgerald & Halliday, Inc.

PEDESTRIAN ENVIRONMENT (1 of 9)

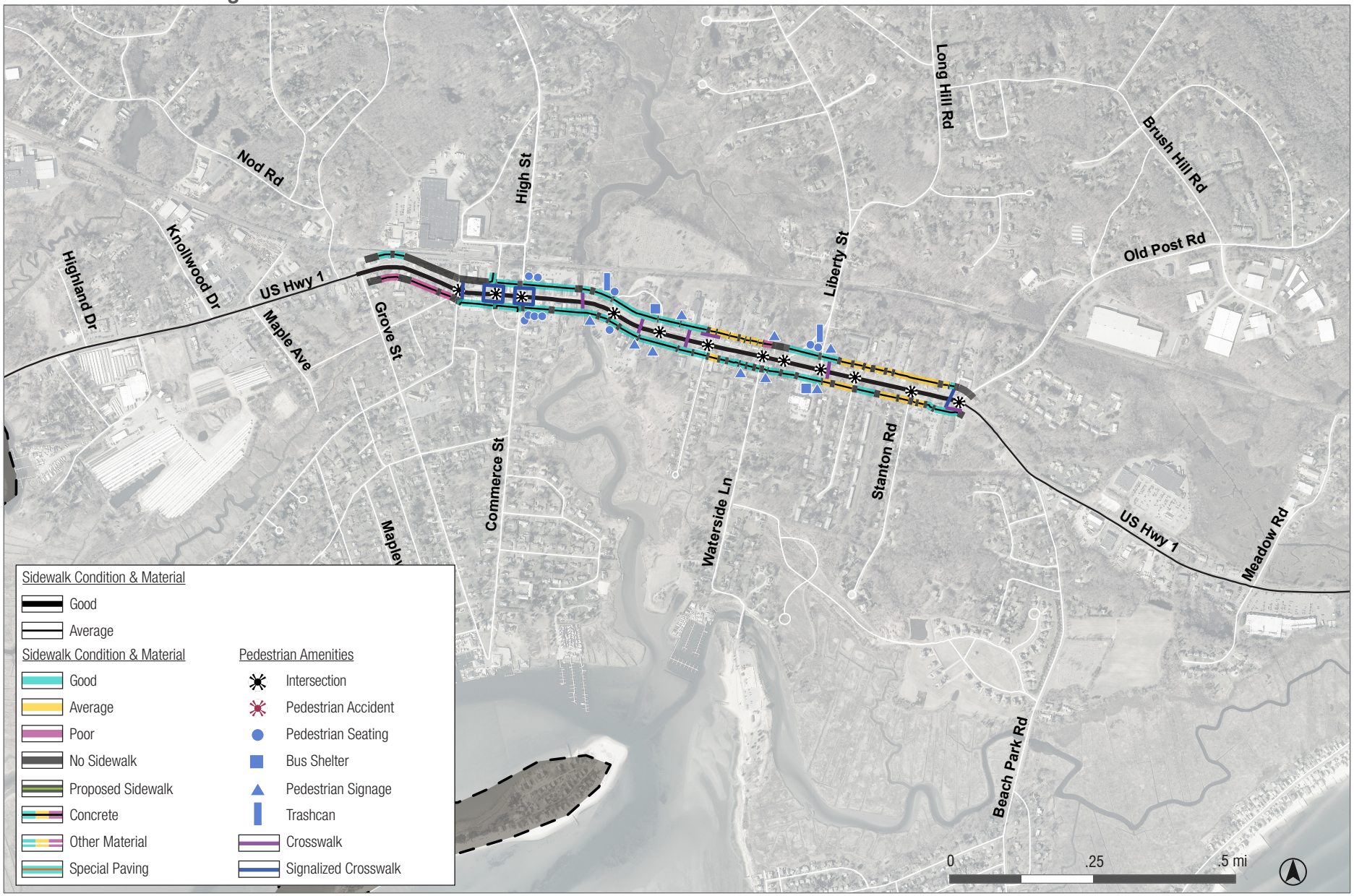
West Clinton Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (2 of 9)

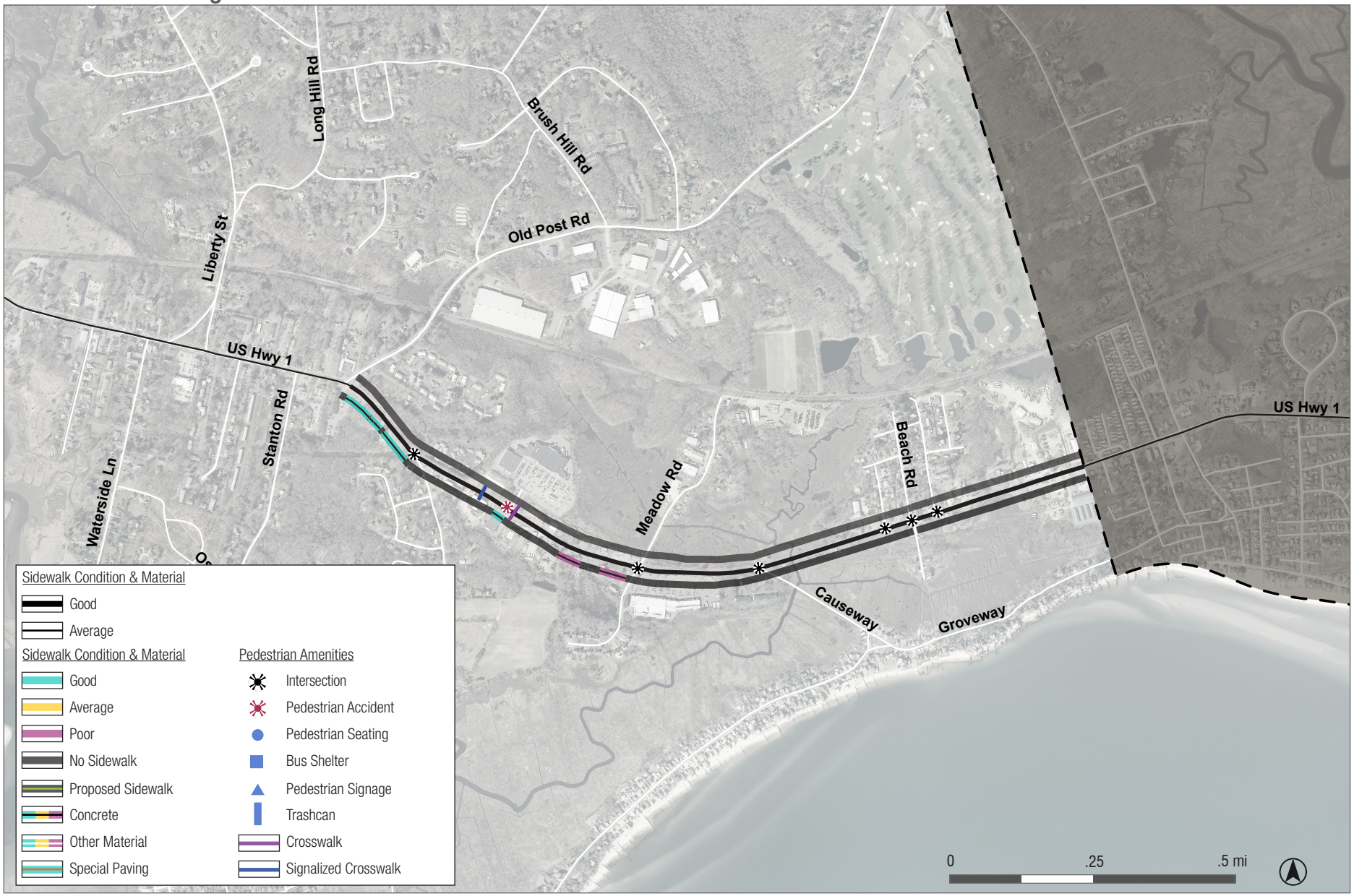
Clinton Town Center Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (3 of 9)

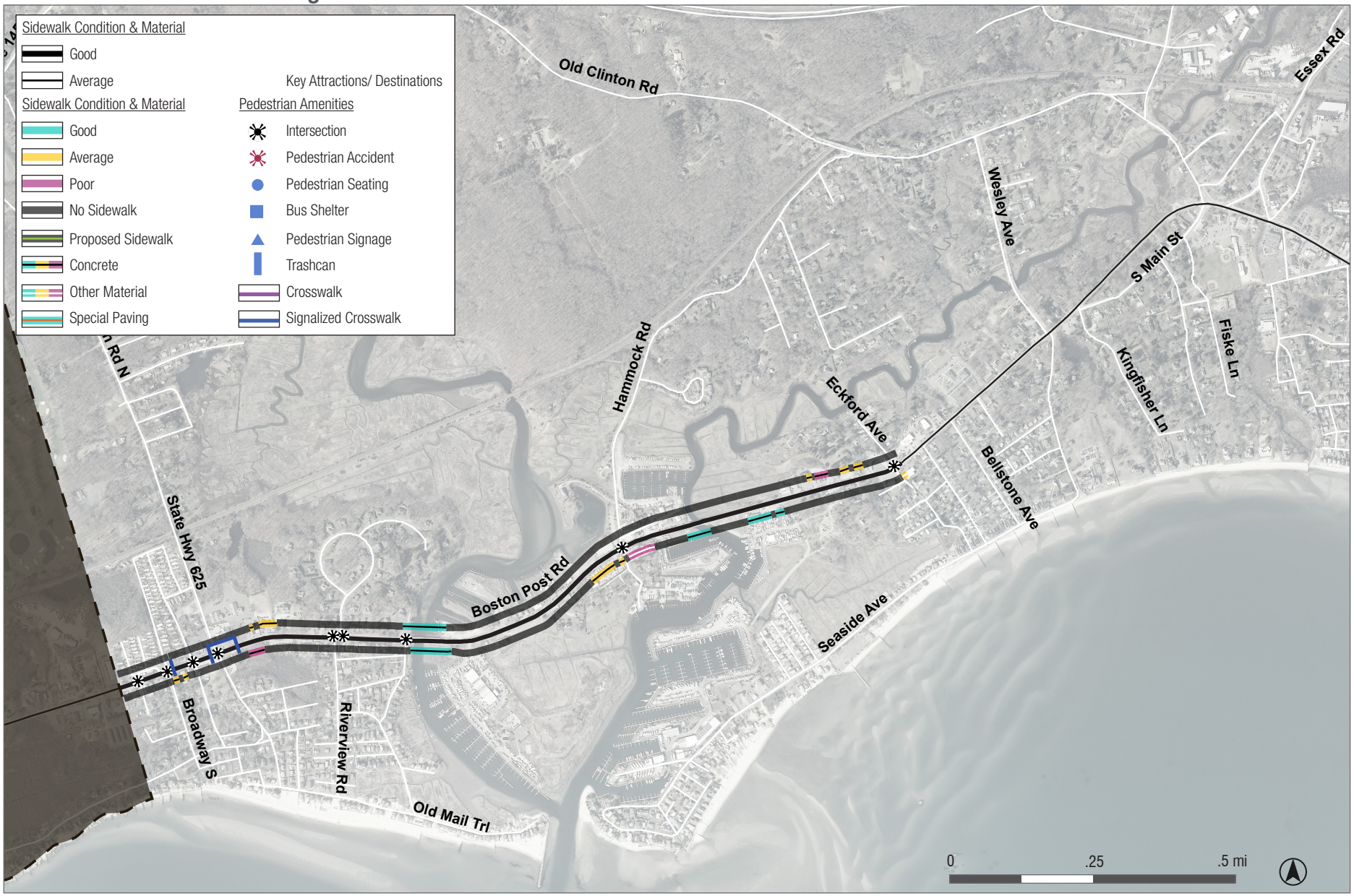
Clinton East Retail Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (4 of 9)

Westbrook Marina and Beach Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

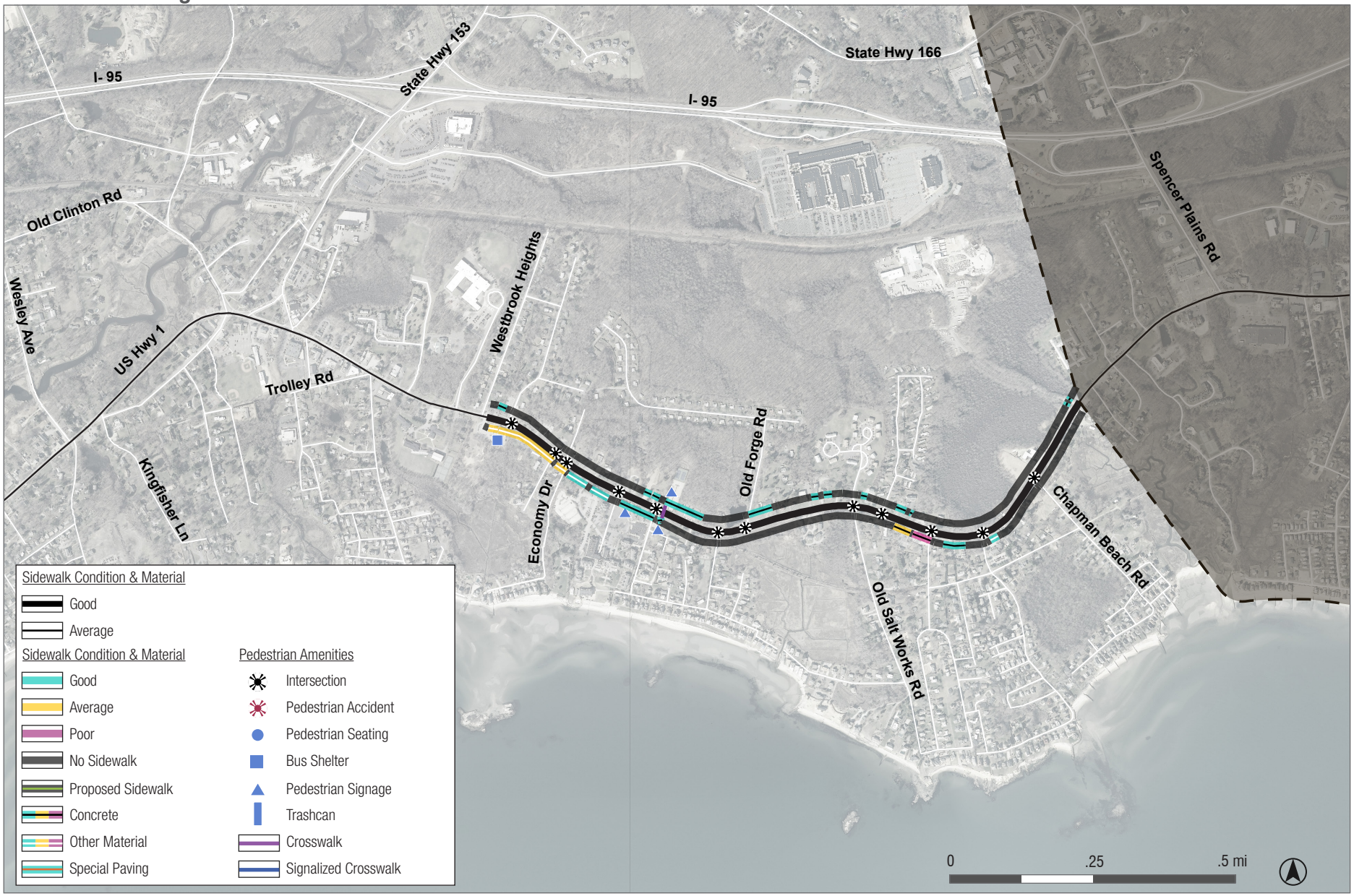
PEDESTRIAN ENVIRONMENT (5 of 9)

Westbrook Town Center Segment

Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (6 of 9)

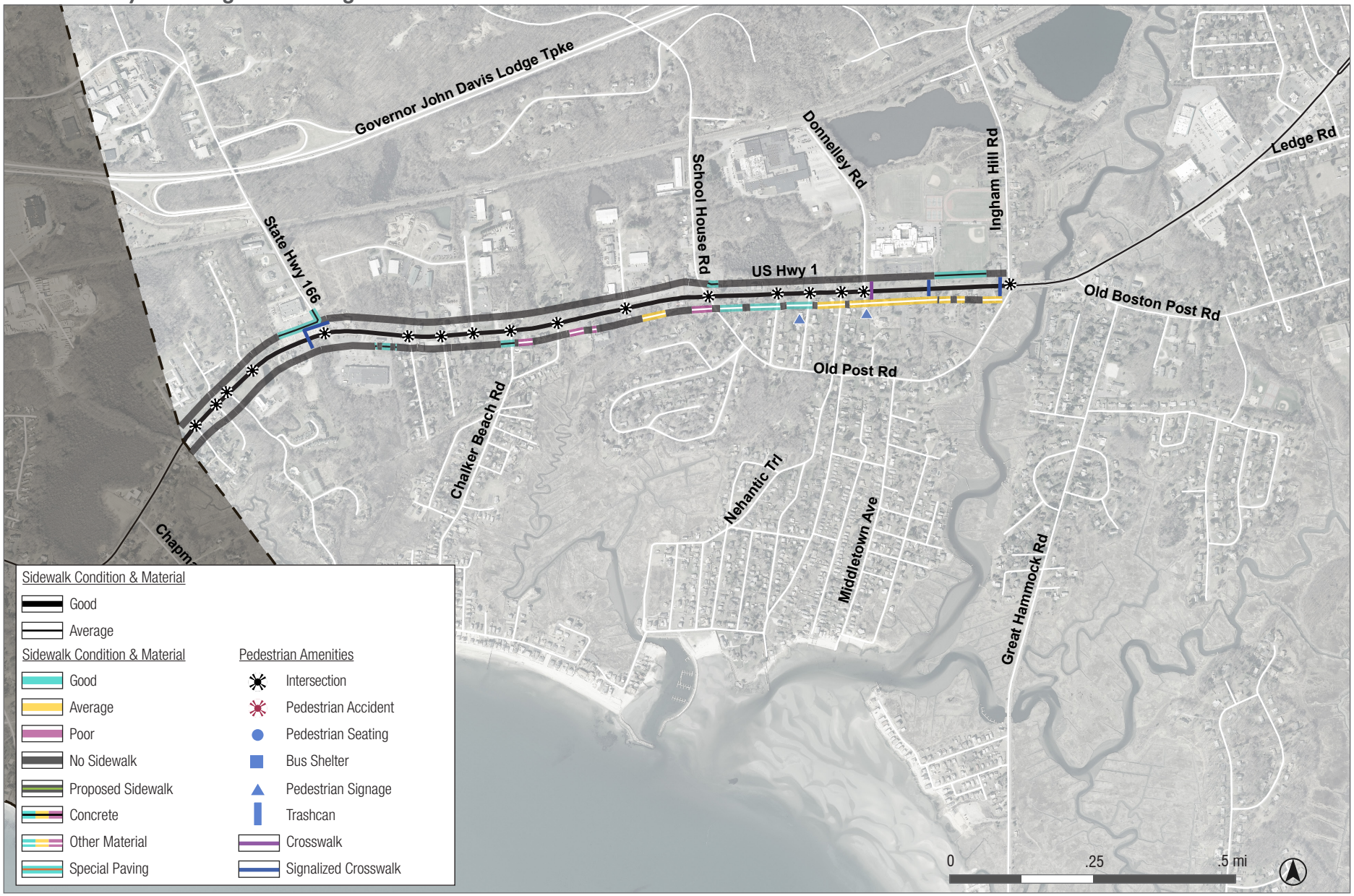
Westbrook East Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (7 of 9)

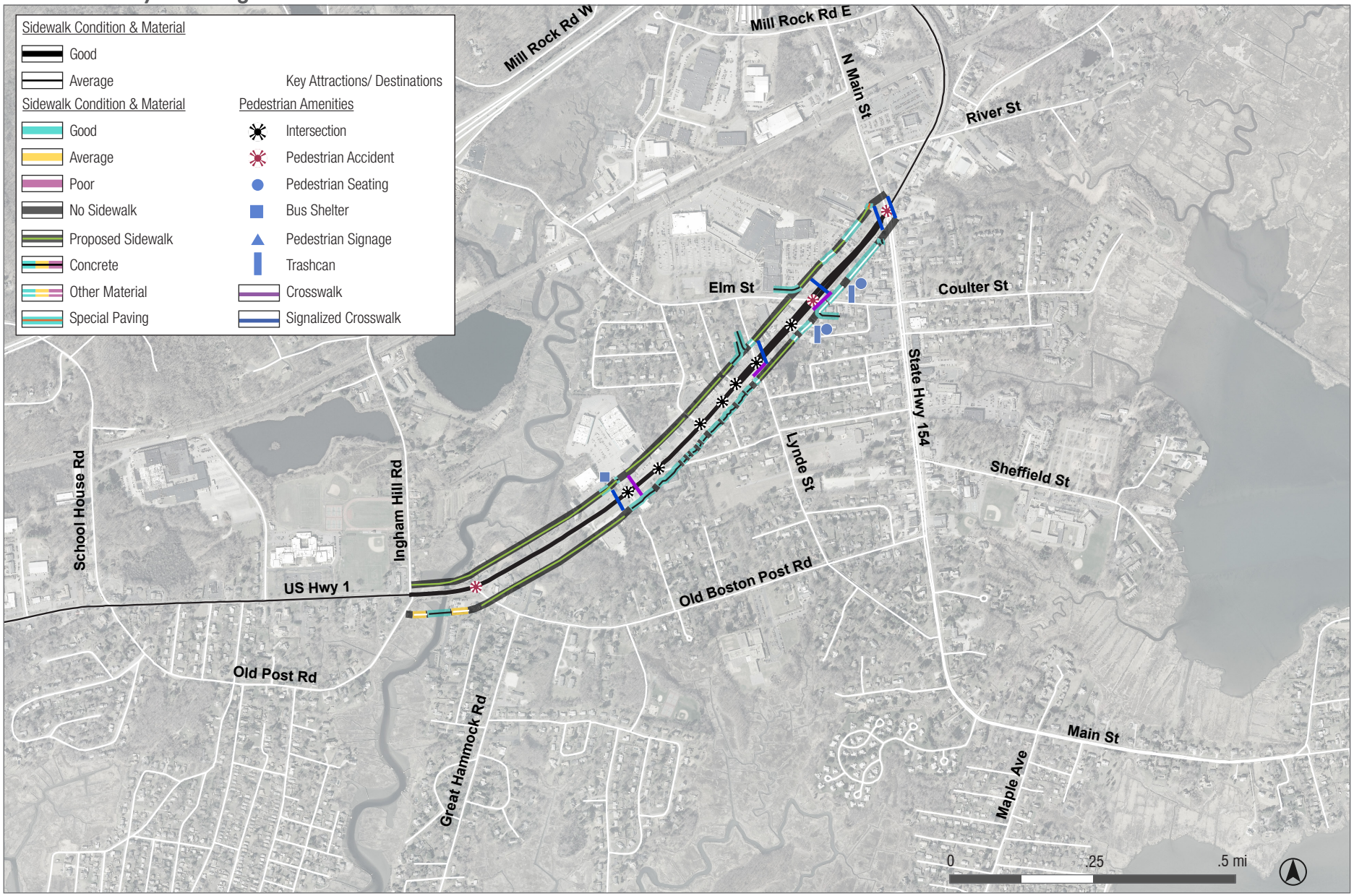
West/ Old Saybrook High School Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (8 of 9)

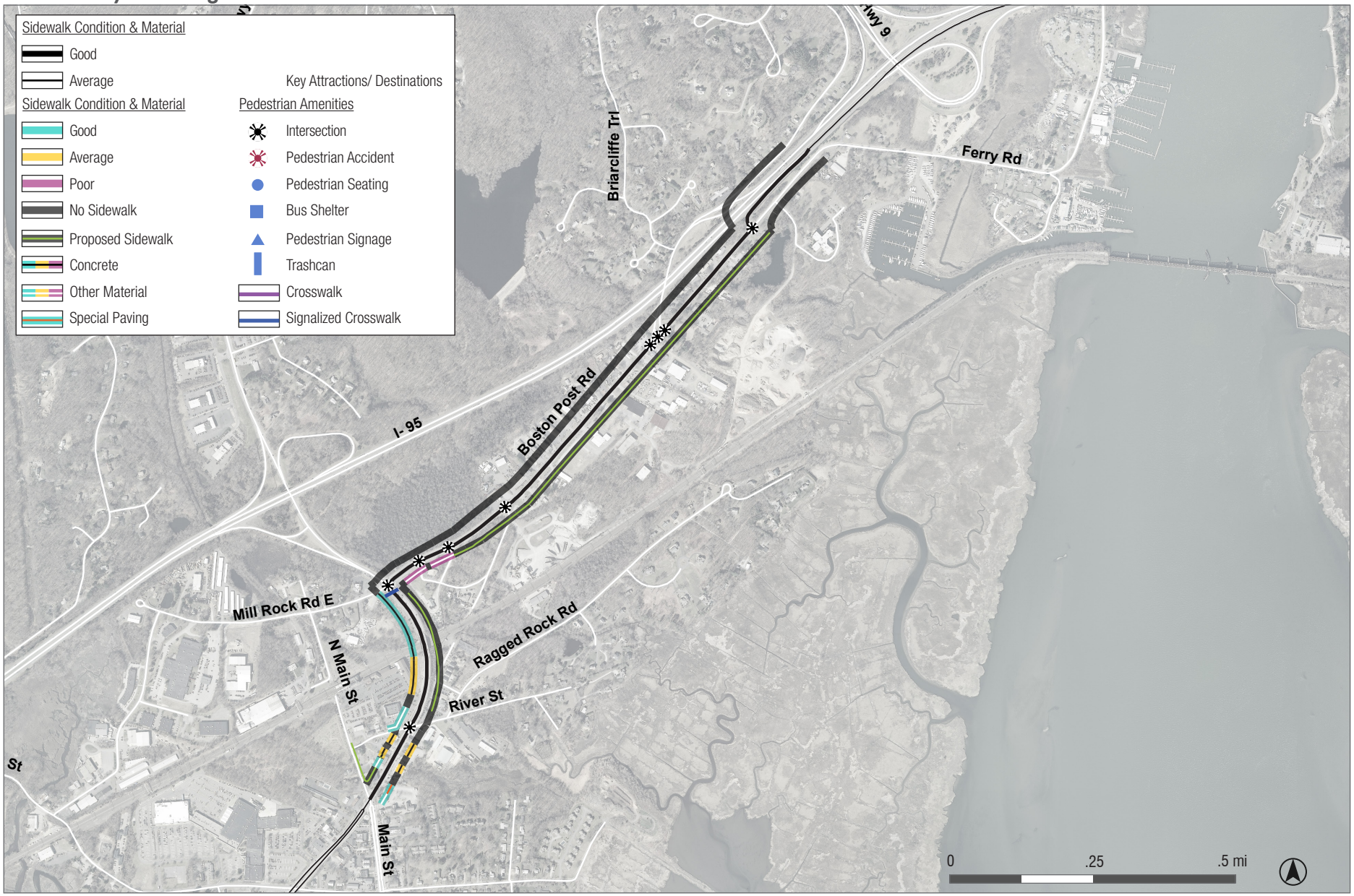
Central Old Saybrook Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

PEDESTRIAN ENVIRONMENT (9 of 9)

East Old Saybrook Segment



Source: Pedestrian Environment data Fitzgerald & Halliday, Inc., November 2013.

B. Pedestrian Environment Matrix Data

Pedestrian Environment Matrix Data

Routes (West - East)	West Clinton Segment	Clinton Village Segment	Clinton East Retail Segment	Westbrook Marina and Beach Segment	Town Center Segment	Westbrook East Segment	West/ Old Saybrook High School Segment	Central Old Saybrook Segment	East Old Saybrook Segment	Total
Length										
Feet	3,887.09	5,827.28	7,554.45	7,775.44	6,388.50	6,530.67	8,184.72	5,882.67	8,028.00	**60,058.82**
Miles	0.74	1.10	1.43	1.47	1.21	1.24	1.55	1.11	1.52	**11.37**
Pedestrian Safety										
# of intersections	9	20	11	9	13	12	16	10	10	**110**
# of intersections with crosswalks	3	9	2	2	6	1	2	6	2	**33**
# of crosswalks	3	16	4	4	10	1	3	8	3	**52**
# of intersections with crosswalks/ total intersections	33%	45%	18%	22%	46%	8%	13%	60%	20%	**30%**
Pedestrian Crashes	0	0	1	0	2	0	0	3	1	**7**
Signalized Crosswalk	1	4	1	3	4	0	3	4	3	**23**
Pedestrian Amenities										
# of benches	0	10	0	0	7	0	0	2	0	**19**
# of bus shelters	0	2	0	0	0	1	0	1	0	**4**
# of pedestrian signs	0	9	0	0	6	3	2	0	0	**20**
# of trashcans	0	5	0	0	0	0	0	2	0	**7**
Total Amenities	0	26	0	0	13	4	2	5	0	**50**
# of Amenities/ 1/4 mile (1320 ft)	-	5.89	-	-	2.69	0.81	0.32	1.12	-	**1.10**
# of Amenities/ 1/4 mile (1320 ft)	-	11.78	-	-	5.37	1.62	0.65	2.24	-	**2.20**
Sidewalks										
Potential Sidewalk Length: Road's edge where sidewalk could or does exist (excludes areas where there is no sidewalk due to an intersection) (ft)	7,502.01	11,144.67	14,976.82	14,695.42	12,428.71	12,468.27	15,156.75	11,780.17	11,589.78	**111,742.60**
All Existing Sidewalks (ft)	1,637.32	8,293.74	1,361.12	2,732.39	5,984.52	3,410.00	4,295.46	4,310.92	2,756.33	**34,781.80**
No Existing Sidewalk (ft)	5,864.69	2,850.93	13,615.70	11,963.03	6,444.19	9,058.27	10,861.29	7,469.25	8,833.45	**76,960.80**
No existing sidewalk due to intersection w/ another road (ft)	508.82	705.77	172.73	819.25	1,181.43	657.48	1,363.76	1,064.04	4,803.50	**11,276.77**
No Existing Sidewalk (Total) (ft)	6,373.51	3,556.70	13,788.43	12,782.27	7,625.62	9,715.75	12,225.05	8,533.29	13,636.95	**88,237.58**
% of 'Potential Sidewalk Length' that has no existing sidewalk	78%	26%	91%	81%	52%	73%	72%	63%	76%	**69%**

Pedestrian Environment Matrix Data

% of 'Potential Sidewalk Length' that has an existing sidewalk	22%	74%	9%	19%	48%	27%	28%	37%	24%	**31%**
Proposed sidewalks (ft)	-	-	-	-	-	-	-	7,221.20	6,650.63	
% of 'No Existing Sidewalk' for which a sidewalk has been proposed	NA	NA	NA	NA	NA	NA	NA	97%	75%	
Sidewalk Condition										
Existing Sidewalk: Poor (ft)	154.73	596.83	483.58	534.97	1,210.52	179.78	496.05	-	475.16	**4,131.62**
Existing Sidewalk: Average (ft)	1,198.33	1,826.03	-	881.99	1,751.86	968.41	1,739.06	276.54	751.52	**9,393.74**
Existing Sidewalk: Good (ft)	284.26	5,870.88	877.54	1,315.43	3,022.13	2,261.81	2,060.35	4,034.38	1,529.65	**21,256.44**
% of 'Potential Sidewalk Length' where a sidewalk exists in poor condition	2%	5%	3%	4%	10%	1%	3%	0%	4%	**4%**
% of 'Potential Sidewalk Length' where a sidewalk exists in average condition	16%	16%	0%	6%	14%	8%	11%	2%	6%	**8%**
% of 'Potential Sidewalk Length' where a sidewalk exists in good condition	4%	53%	6%	9%	24%	18%	14%	34%	13%	**19%**
% of 'Potential Sidewalk Length' that has 'No Existing Sidewalk'	78%	26%	91%	81%	52%	73%	72%	63%	76%	**69%**
Sidewalk Material										
Existing Sidewalk: Concrete (ft)	1,437.88	8,293.74	1,361.13	2,421.84	4,348.62	2,140.55	1,332.05	2,572.83	1,586.00	**25,494.64**
Existing Sidewalk: Other (ft)	199.44	-	-	310.55	1,653.89	1,260.27	2,963.42	1,680.88	971.25	**9,039.71**
Existing Sidewalk: Specialized Paving (ft)	-	-	-	-	-	-	-	57.21	94.83	**152.04**
% of 'Potential Sidewalk Length' where a concrete sidewalk exists	19%	74%	9%	16%	35%	17%	9%	22%	14%	**23%**
% of 'Potential Sidewalk Length' where a sidewalk exists made of 'other material; (ex: asphalt)	3%	-	-	2%	13%	10%	20%	14%	8%	**8%**
% of 'Potential Sidewalk Length' where a sidewalk exists made of specialized paving	-	-	-	-	-	-	-	0%	0.8%	**0%**
% of 'Potential Sidewalk Length' that has 'No Existing Sidewalk'	78%	26%	91%	81%	52%	73%	72%	63%	76%	**69%**
Roadway Intersections and Driveway Curb Cuts										

Pedestrian Environment Matrix Data

Along the northside of Rte 1/ along the road's edge next to traffic going westbound (WB)										
Total curb cuts along WB traffic's road edge (total length in ft)	964.97	1,866.31	1,737.93	2,458.63	1,649.69	1,641.97	1,892.15	2,405.36	2,076.67	**16,693.68**
Total curb cuts along WB traffic's road edge (total #)	21	40.00	36.00	42.00	42.00	43.00	36.00	42	34.00	**336**
Driveways along WB traffic's road edge (total length in ft)	705.27	1,367.49	1,477.69	2,021.03	1,098.05	1,392.66	1,298.98	2,008.12	1,683.76	**13,053.04**
Driveways along WB traffic's road edge (total #)	17	32	32	34	35	38	29	37	30	**284**
Roads intersecting with WB traffic's road edge (total length in ft)	259.7	498.82	260.24	437.60	551.64	249.31	593.17	397.24	392.91	**3,640.64**
Roads intersecting with WB traffic's road edge (total #)	4	8	4	8	7	5	7	5	4	**52**
Gaps between all curb cuts along WB traffic road's edge (total length in ft)	2844.56	4,004.06	5795.53	5,286.11	4,801.50	4,855.25	6320.76	3502.31	4,984.80	**42,394.89**
Gaps between all curb cuts along WB traffic road's edge (total #)	22	38	37	40	39	43	36	42	35	**332**
Average distance between driveways along WB traffic's road edge (ft)	135.46	100.10	160.99	125.86	114.32	112.91	175.58	83.39	146.61	**126.18**
Total distance along WB traffic's road edge (ft)	3809.53	5,870.37	7533.46	7,744.74	6,451.19	6,497.22	8212.91	5,907.67	7,061.47	**59,088.56**
% of WB traffic road edge that is used by driveways	19%	23%	20%	26%	17%	21%	16%	34%	24%	**22%**
% of WB traffic road edge that is used by any curb cut (driveways and roads)	25%	32%	23%	32%	26%	25%	23%	41%	29%	**28%**
Along the southside of Rte 1/ along the road's edge next to traffic going eastbound (EB)										
Total curb cuts along EB traffic's road edge (total length in ft)	1437	1,774.63	2132.84	2,349.18	1,616.69	1,779.87	2490	1934.02	1,528.36	**17,042.59**
Total curb cuts along EB traffic's road edge (total #)	30	43	40	49	39	38	48	34	35	**356**
Driveways along EB traffic's road edge (total length in ft)	1192.06	1,327.01	1628.93	1,923.45	1,120.40	1,114.20	1890	1391.89	1,224.59	**12,812.53**
Driveways along EB traffic's road edge (total #)	26	35	35	41	30	29	38	27	31	**292**

Pedestrian Environment Matrix Data

Roads intersecting with EB traffic's road edge (total length in ft)	244.9	447.6	503.9	425.7	496.3	665.7	600.0	542.1	303.8	**4,230.06**
Roads intersecting with EB traffic's road edge (total #)	4	8	5	8	9	9	10	7	4	**64**
Gaps between all curb cuts along EB traffic road's edge (total length in ft)	2550.76	4,061.80	5444.98	5,440.93	4,689.93	4,795.75	5683.89	3948.44	5,471.92	**42,088.39**
Gaps between all curb cuts along EB traffic road's edge (total #)	27	43	38	45	39	35	48	34	35	**344**
Average distance between driveways along EB traffic's road edge (ft)	85.03	94.46	136.12	111.04	120.25	126.20	118.41	116.13	156.34	**118.23**
Total distance along EB traffic's road edge (ft)	3987.76	5,836.43	7,577.82	7,790.11	6,306.61	6,575.62	8,173.89	5,882.46	7,000.28	**59,130.98**
% of EB traffic road edge that is used by driveways	30%	23%	21%	25%	18%	17%	23%	24%	17%	**22%**
% of EB traffic road edge that is used by any curb cut (driveways and roads)	36%	30%	28%	30%	26%	27%	30%	33%	22%	**29%**
TOTAL										
Average distance between driveways along total road edge (WB + EB) (ft)	121.5	101.5	151.2	129.5	111.7	111.5	157.9	94.0	160.9	**125.3**
Total distance along road's edge (ft)	7,797.3	11,706.8	15,111.3	15,534.9	12,757.8	13,072.8	16,386.8	11,790.1	14,061.8	**118,219.5**
% of road edge that is used by driveways	24%	23%	21%	25%	17%	19%	19%	29%	21%	**22%**
% of road edge that is used by any curb cut (driveways and roads)	31%	31%	26%	31%	26%	26%	27%	37%	26%	**29%**

C. Route 1 Public Visioning Survey

Route 1 Public Visioning Survey

DRAFT

Survey Results

March 27, 2014

Prepared by:

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Hartford, CT 06106
860-247-7200

Table of Contents

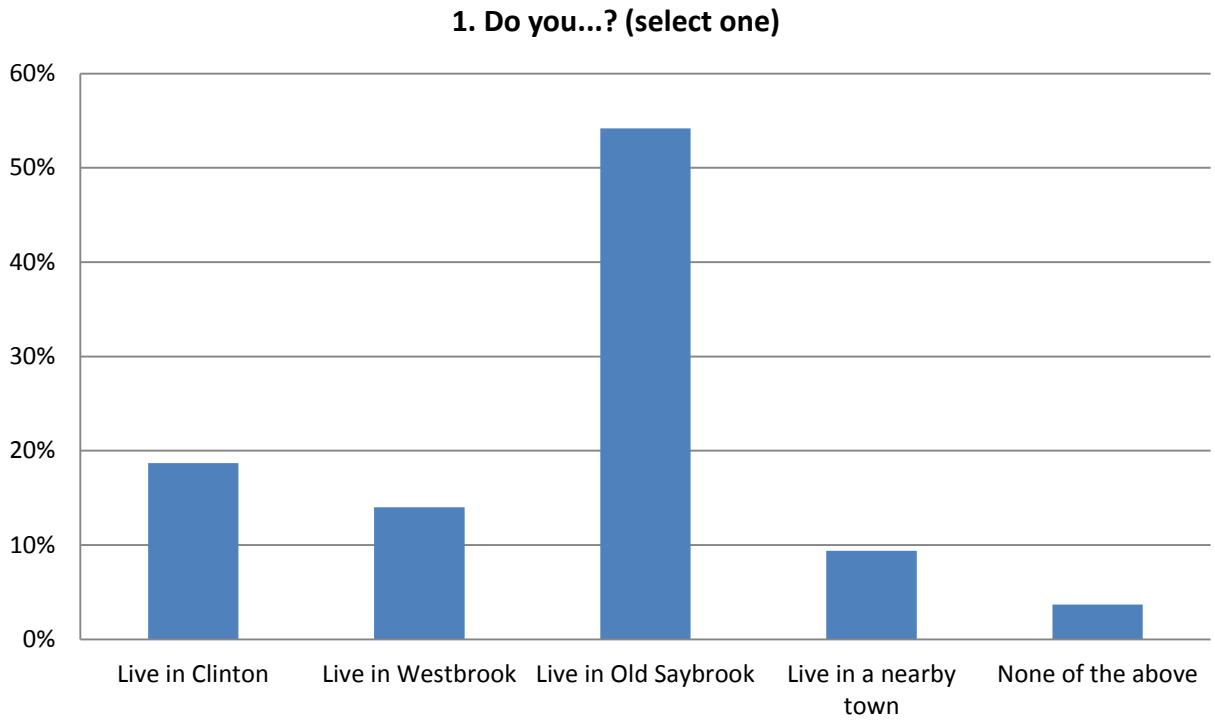
Survey Question Results

As of January 30th, 2014, there were 299 responses. The survey data is presented first as an overview, which shows responses for the survey questions from all respondents. Following this overview, the data is presented by town in the order of Clinton, Westbrook and Old Saybrook, which shows responses for survey questions from respondents according to which town they reside in. The final section of the report contains a comparison of responses between towns.

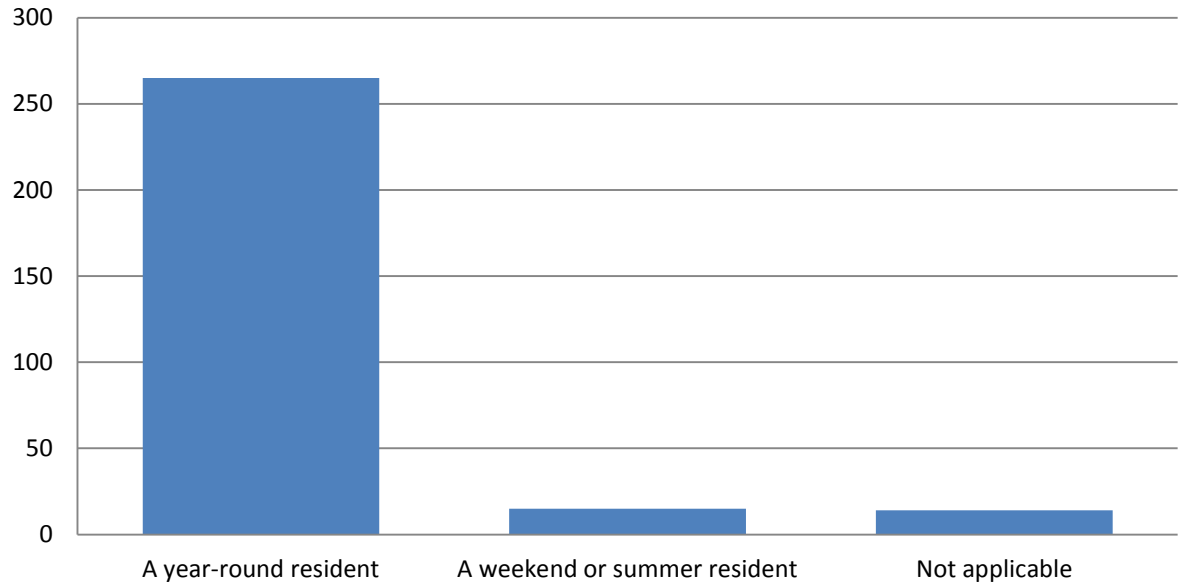
Overview of all Responses

Live and Work Survey Questions

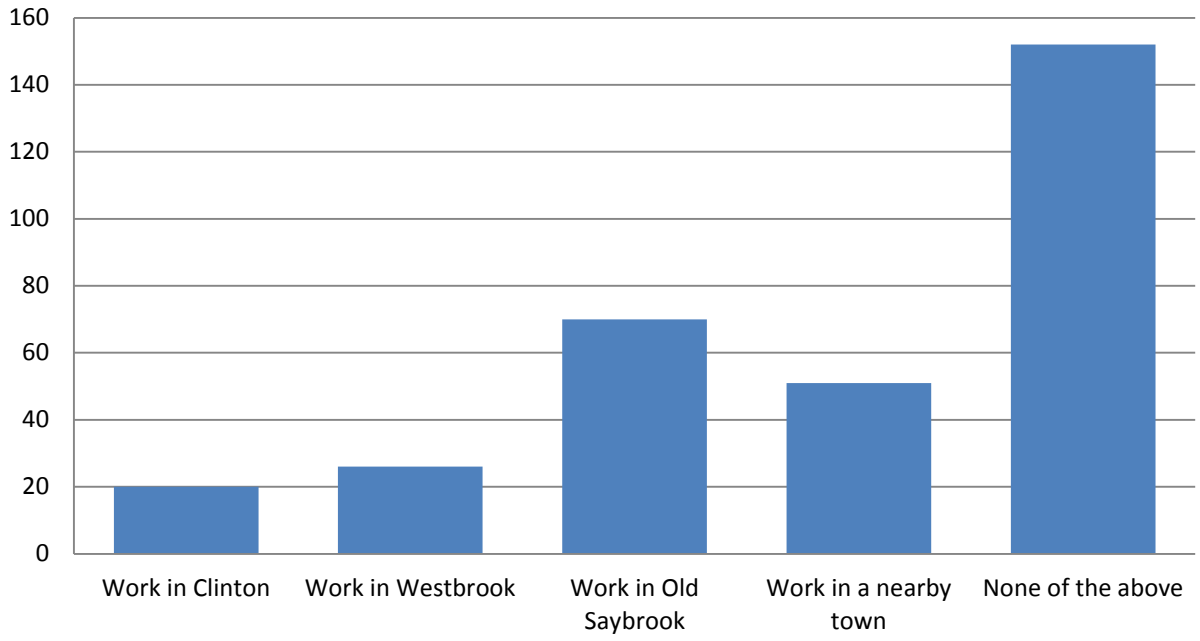
The survey included four questions about where respondents live, work, whether they are year-round or seasonal residents and whether they own commercial property (Questions 1 to 4). Old Saybrook had the greatest number of respondents, followed by Clinton and Westbrook. The majority of all respondents are year-round residents. Approximately half of all respondents work in a location other than Clinton, Westbrook, Old Saybrook or a nearby town. The majority of respondents do not own commercial property in any of these towns.

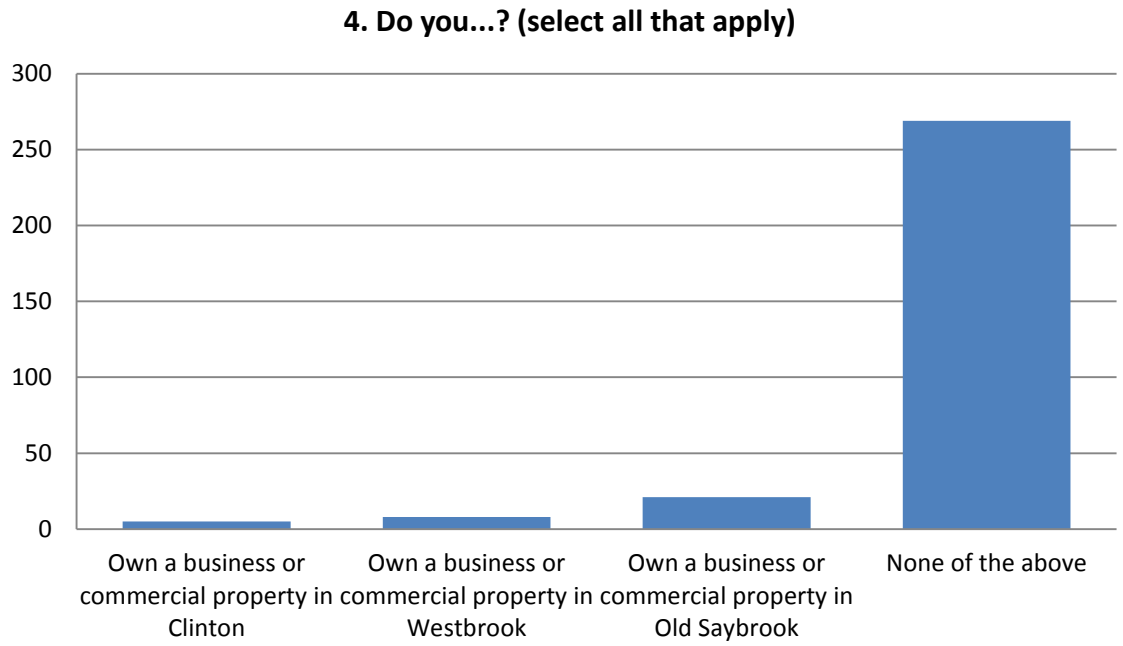


2. If you consider yourself a resident of one of the three corridor towns, or from a nearby town, are you....?



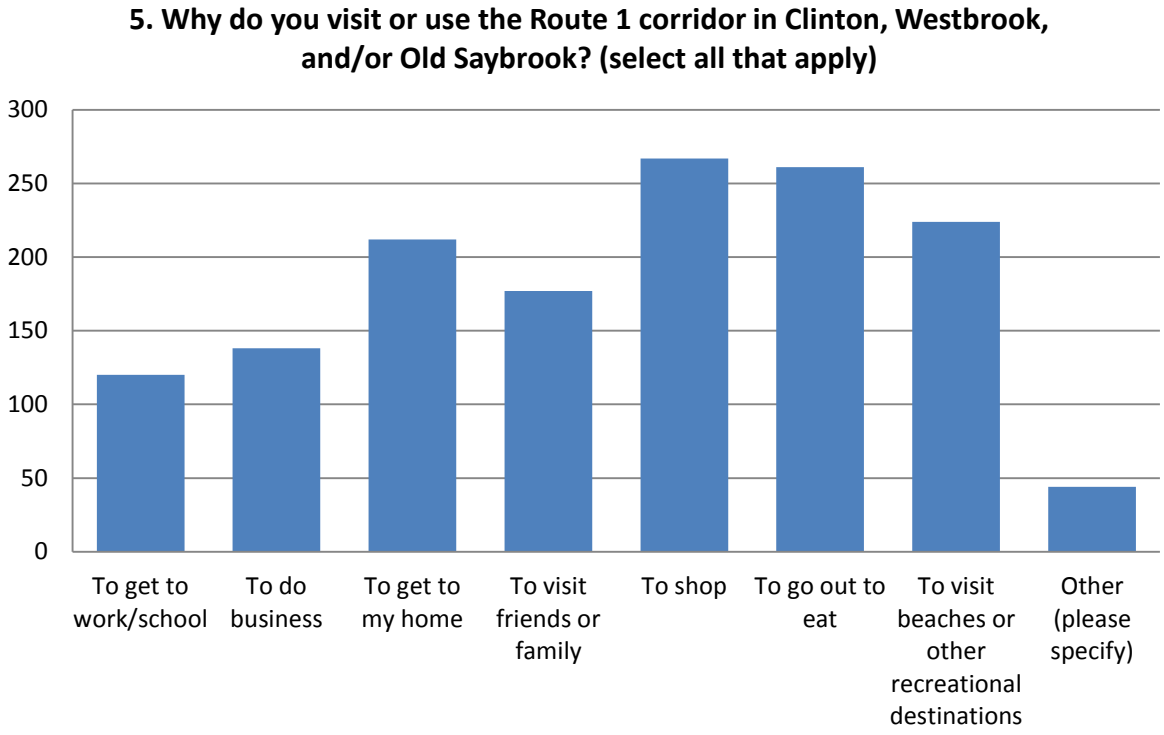
3. Do you...? (select all that apply)

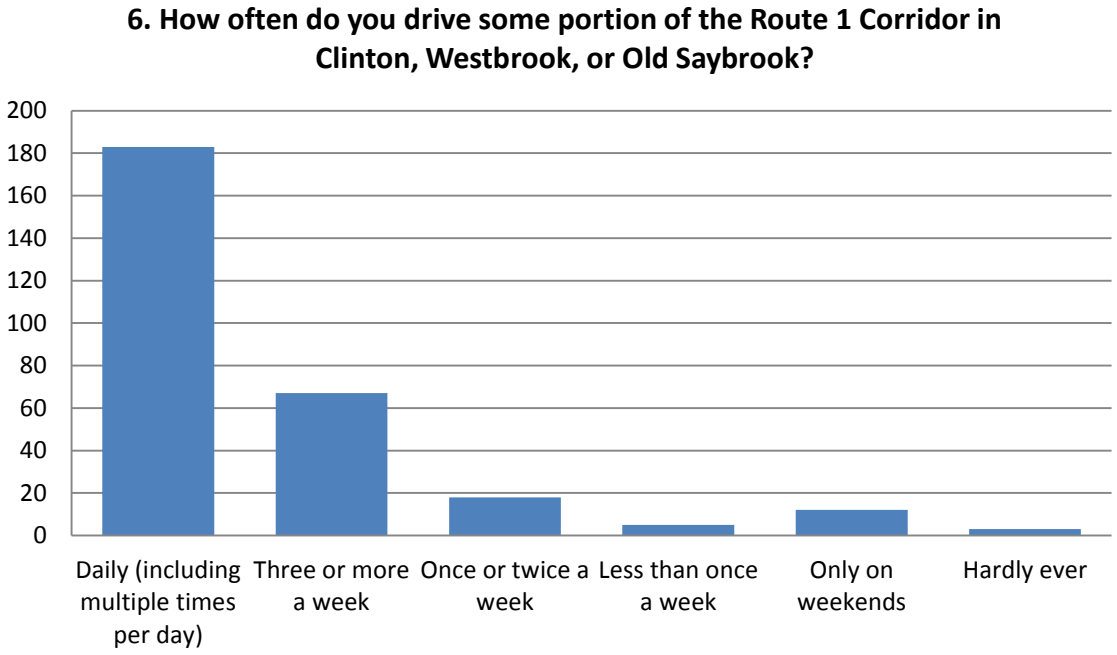




Use of corridor

The survey included two questions (Questions 5 and 6) about respondents' use of the corridor, including their purpose and frequency. Respondents use the Route 1 corridor for several reasons, but the greatest responses included shopping, dining, recreation and traveling home. More than half of the respondents use the corridor on a daily basis.

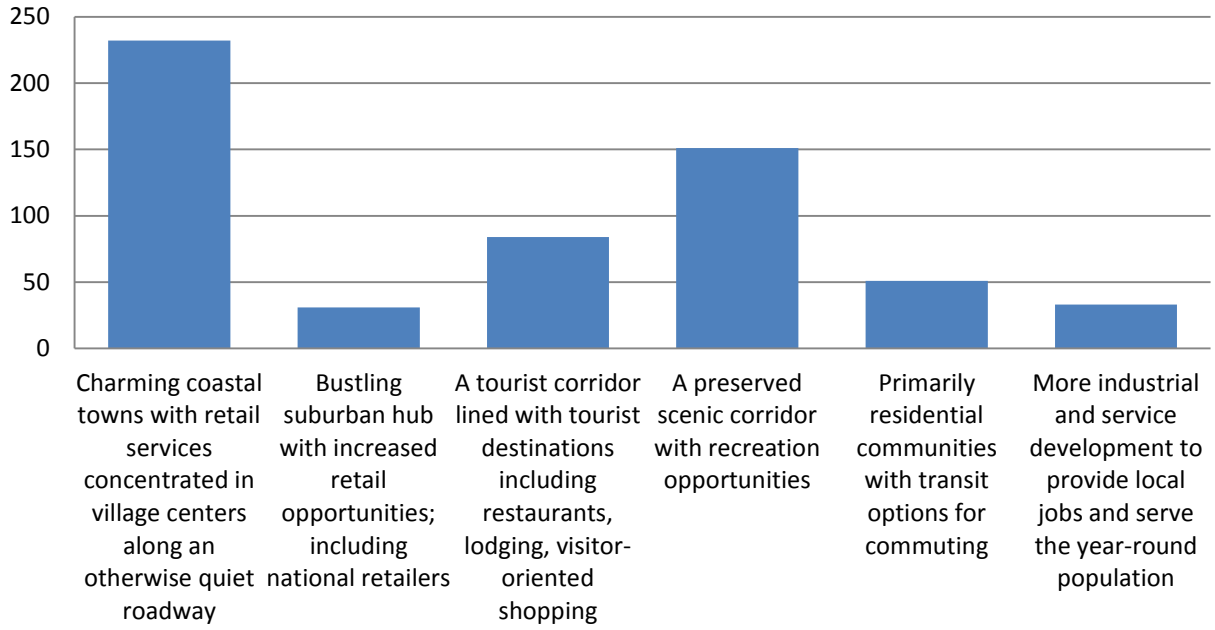




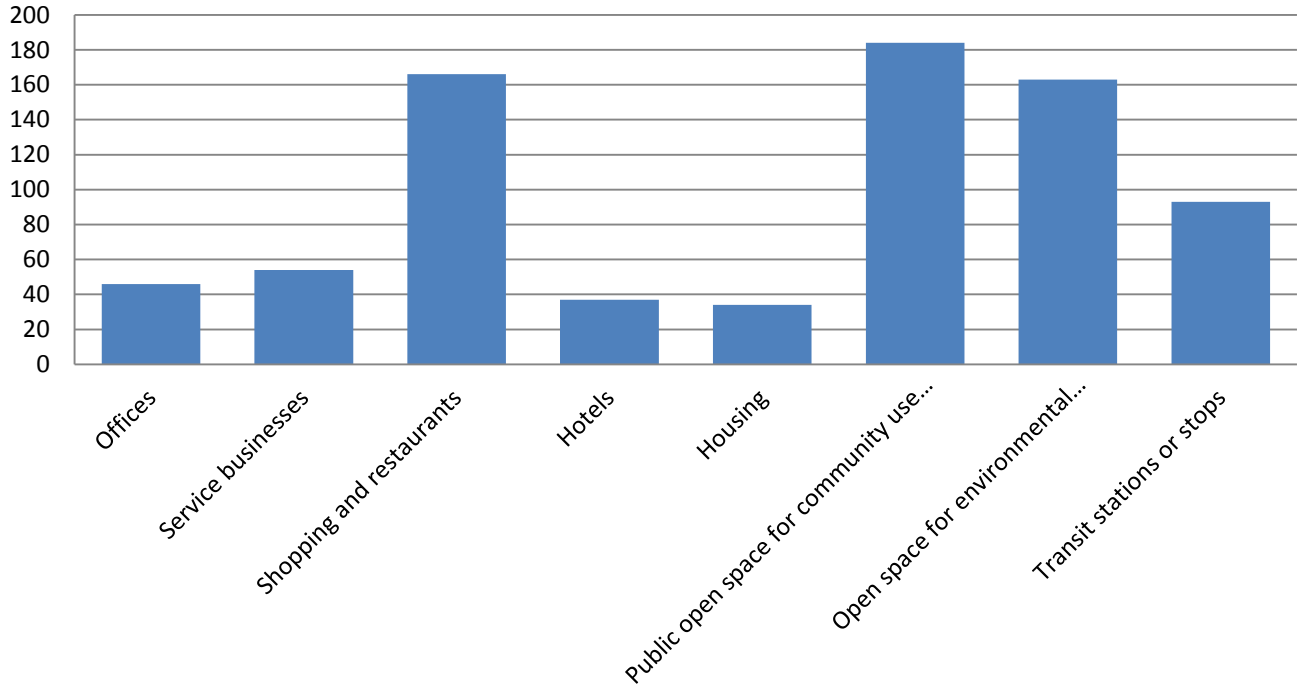
Vision

The survey included four questions about the vision for the Route 1 corridor in terms of the overall ideal vision, land use, economic development and open space (Questions 7 to 10). Respondents were interested in several types of visions for the Route 1 corridor, but the vision type selected by the most respondents included 'charming coastal towns with concentrated retail in village centers'. The next most favored vision type was a 'preserved scenic corridor with recreation opportunities', followed by a 'tourist corridor with tourist destinations'. The most favored types of land use selected include 'shops and restaurants', 'public space for community use' and 'open space for environmental preservation'. In terms of economic development, a little more than a third of respondents thought that growth should be limited. The type of growth most favored by respondents includes 'commercial growth and housing within village centers', though approximately 80 respondents were also interested in 'development that is both inside and outside of the village centers'. 'Large shopping centers with parking garages' were the least favored type of economic development. Regarding types of open space and preserved lands, the 'preservation of open coastal views' was chosen by the greatest number of respondents, followed by 'incorporating multi-use trails', 'park space with recreational opportunities' and 'conservation land' as the next most favorable.

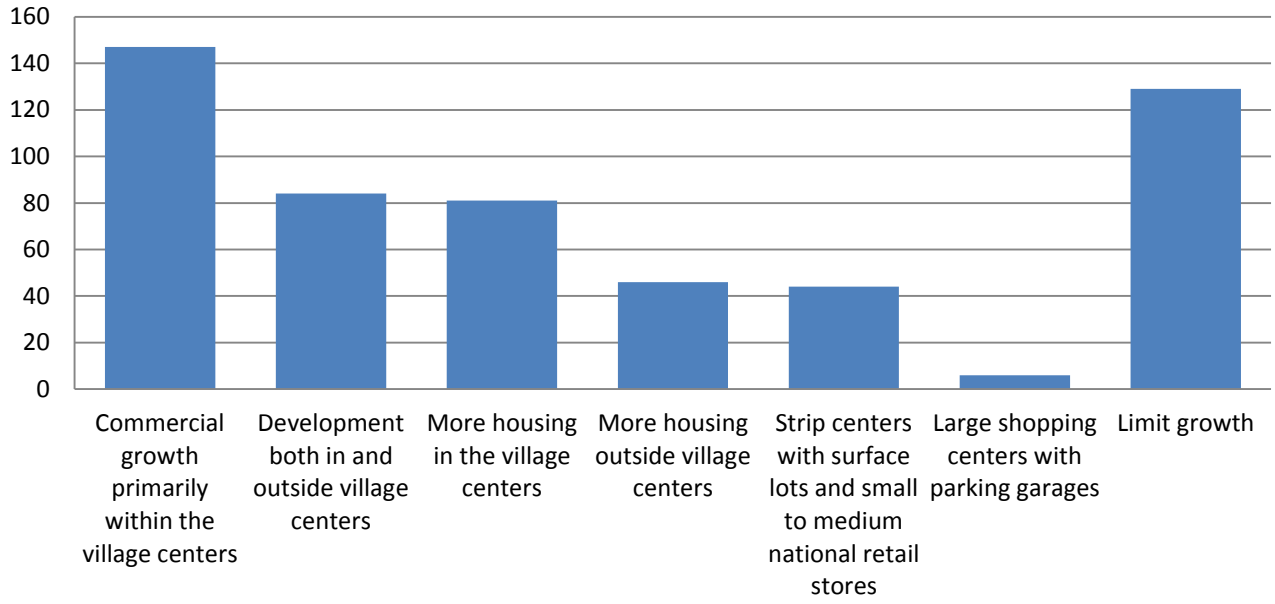
7. Picture your ideal vision for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook. Which of the following best defines your vision? (select all that apply)



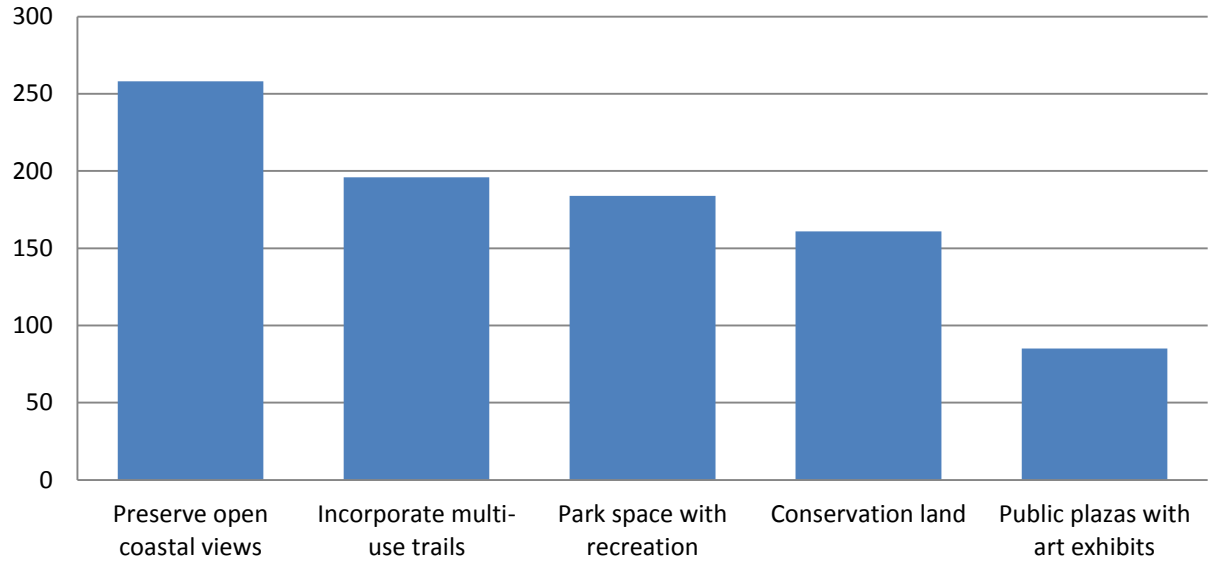
8. Which types of land use would you like to see more of along the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



9. Which types of economic development opportunities do you feel are best suited for the community character of the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



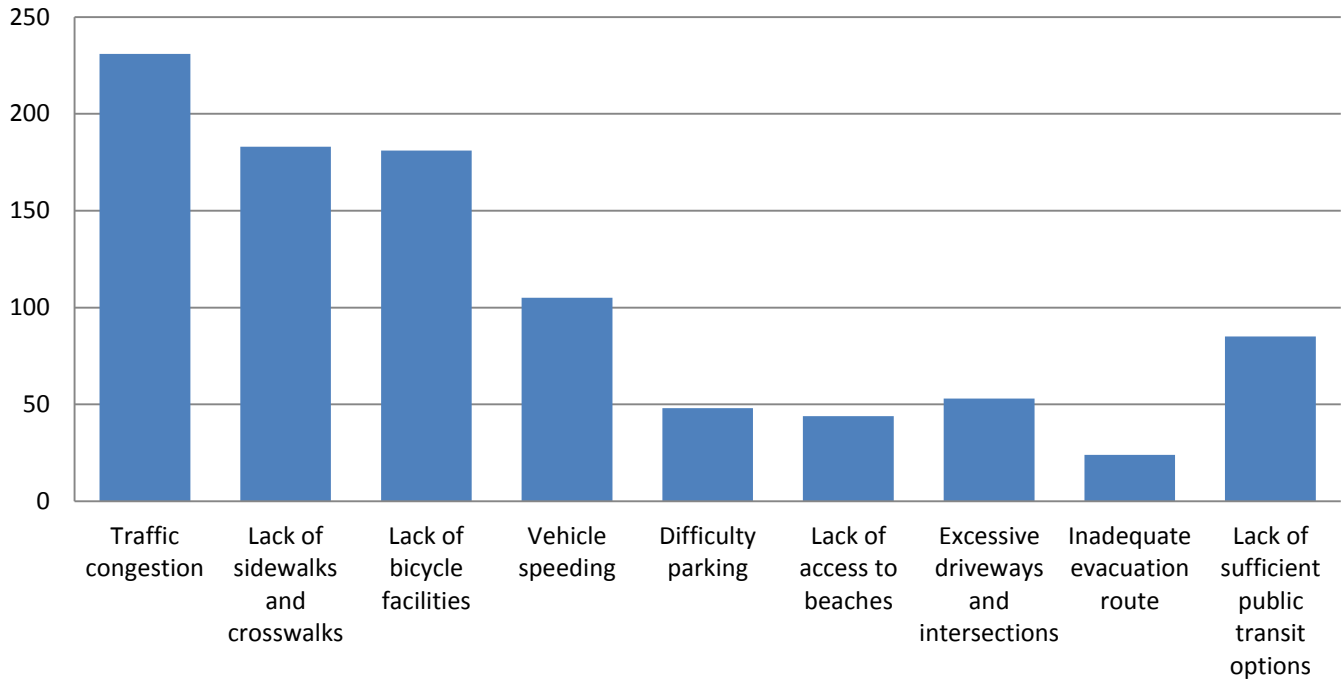
10. Which types of open space or preservation do you feel are best suited for the community character of the Route 1 Corridor between Clinton, Westbrook and Old Saybrook? (select all that apply)



Concerns

Question 11 asked respondents about their greatest travel concerns on the Route 1 corridor. 'Traffic congestion' was selected by the greatest number of respondents, with 231 respondents selecting it as one of their greatest concerns. Other travel concerns included the 'lack of sidewalks and crosswalks' and 'lack of bicycle facilities', which were both selected by nearly two-thirds of all respondents. 'Vehicle speeding' and the 'lack of sufficient public transit options' were selected by approximately a third of respondents.

11. What are your greatest travel concerns regarding the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



Improvements and opportunities

The survey asked respondents about which types of improvements had the greatest priority for them, which types of improvements would encourage them to walk more along the corridor, what their specific priorities would be for various types of improvements along the corridor (Questions 11 to 18). Regarding the priority of improvements along the corridor, respondents selected 'bicycle lanes, shoulder or paths'; 'sidewalks and crosswalks'; 'traffic calming enhancements' and 'beautification' as the highest priorities. The addition of 'shops and restaurants' was selected by most respondents as a medium priority, along with 'additional bus routes and stops'. The addition of 'more hotels', 'new housing developments', 'better access to beaches', 'improved direction signage' and 'additional parking' were selected as low priority improvements by most respondents.

Regarding walking along the Route 1 corridor, a slightly higher number of respondents claim to walk along the corridor than not. For those that do not walk along the corridor, most respondents selected 'all of the above' as to the reasons that they do not walk along the corridor. Among the answer choices,

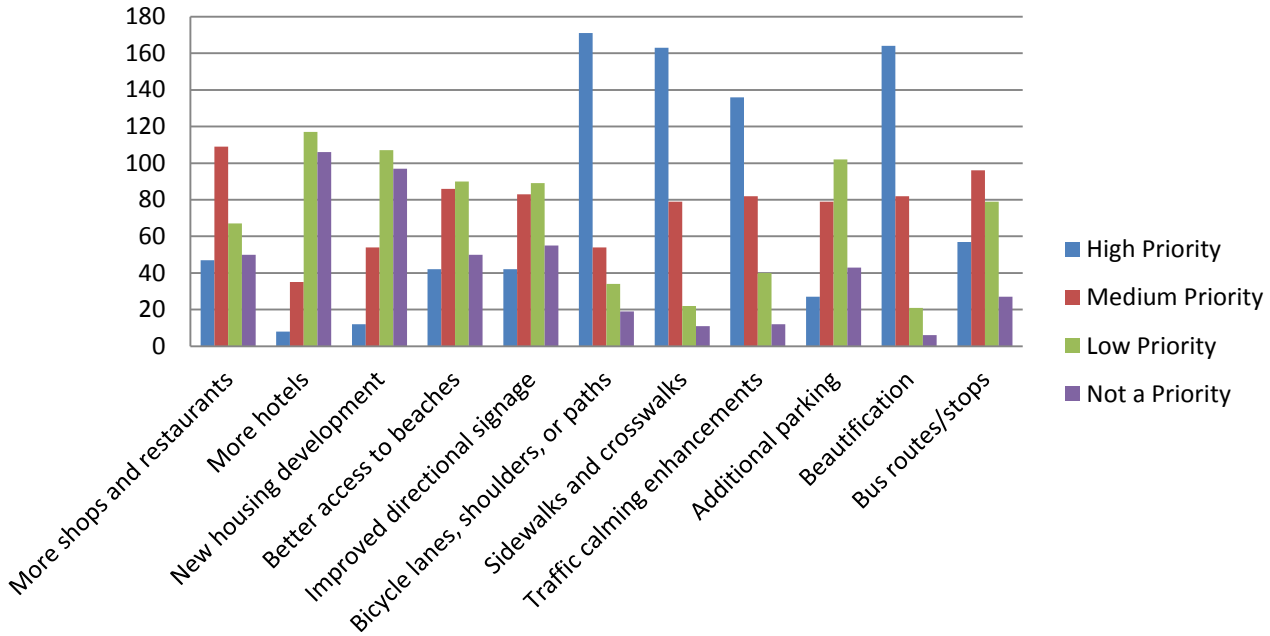
'inconsistent sidewalks and crosswalks' and 'too much vehicular traffic' were selected by more respondents than the other two answer options, 'businesses and homes are too far apart' and 'poor lighting with no pedestrian amenities'. For those respondents that do walk along the corridor, most respondents claimed that 'better sidewalks and crosswalks' would encourage them to walk more often in the Route 1 corridor. Many respondents also selected 'lighting and benches in areas of activity' to encourage more walking.

In terms of bicycle use along the Route 1 corridor, respondents selected a 'marked bicycle path' as the greatest priority, followed by an 'off-road bicycle path' and then 'wider shoulders'. The improvement selected as the lowest priority was 'fewer or more narrow driveways'.

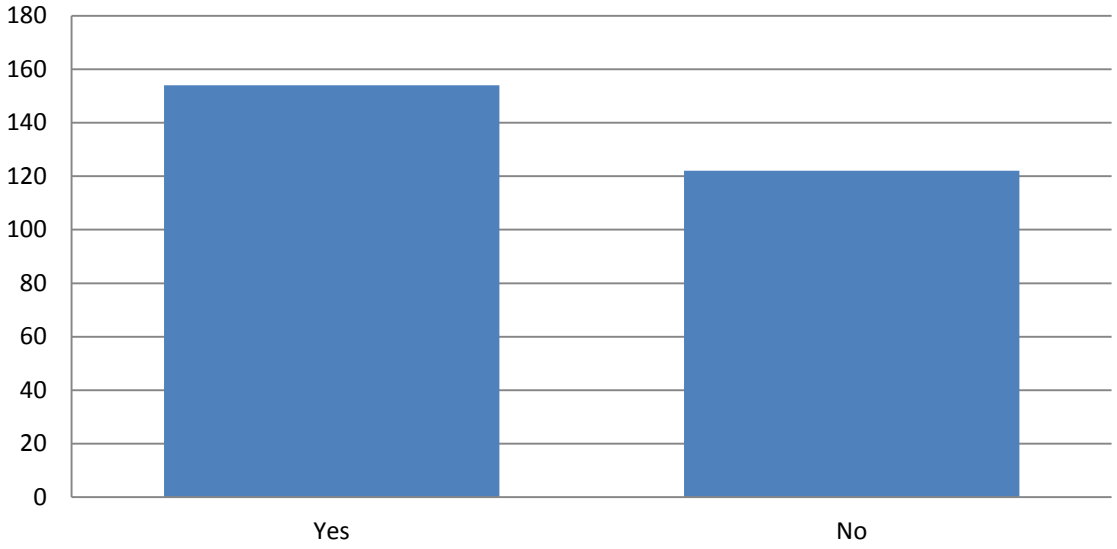
Concerning transportation improvement priorities, 'reducing vehicle congestion' and 'creating a more bikable corridor' were selected as the highest priorities. Medium priority improvements included 'improving the safety of the corridor', 'creating a more walkable corridor' and 'traffic calming'. Low priority or non-priority improvements included 'more parking', 'enhancing transit services', 'enhancing access to train stations', 'fewer or better designed driveways' and 'improving gateways and signage'.

When asked what they viewed as the greatest opportunity for the Route 1 corridor, most respondents selected a 'shopping and restaurant district', 'pedestrian and bicycle recreation' and a 'scenic corridor'. A number of respondents also chose 'Main Street activity centers' as the greatest opportunity for the corridor.

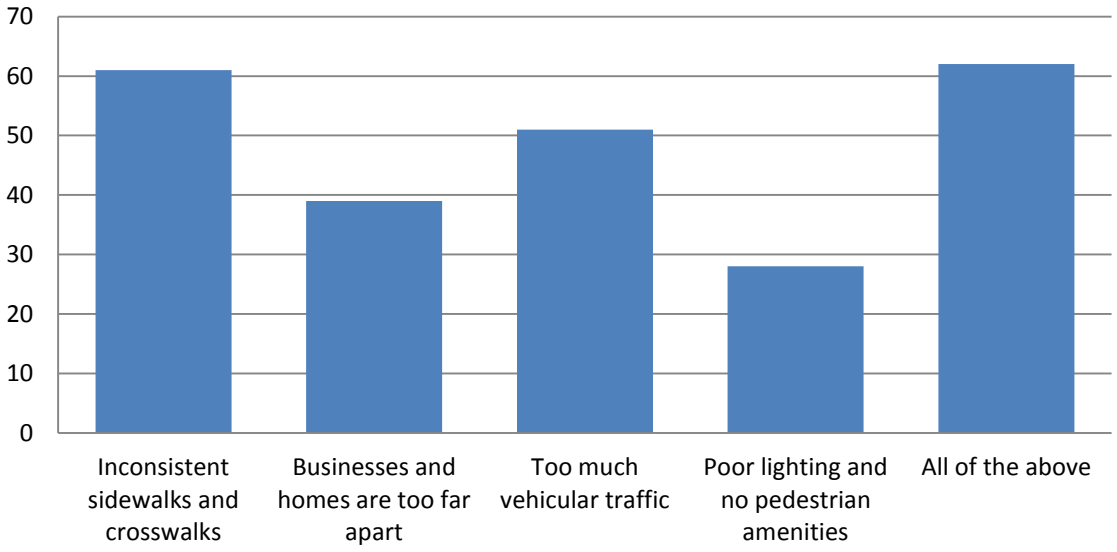
12. What improvements along the Route 1 Corridor, in Clinton, Westbrook and Old Saybrook, do you believe should have the highest priority? (please rate each improvement high, medium, low or not a priorty)



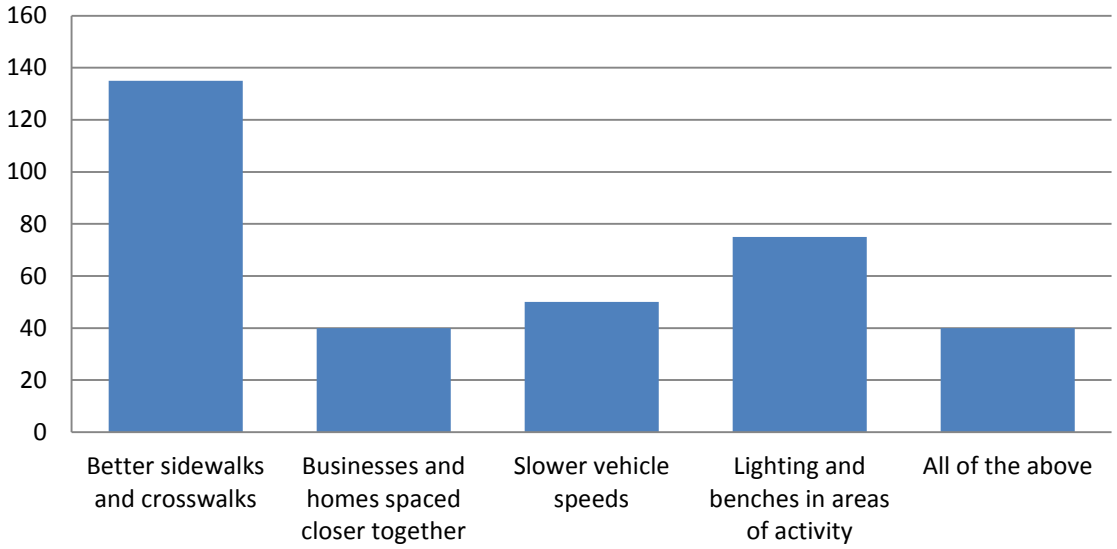
13. Do you ever walk along the Route 1 Corridor in Clinton, Westbrook and/or Old Saybrook?



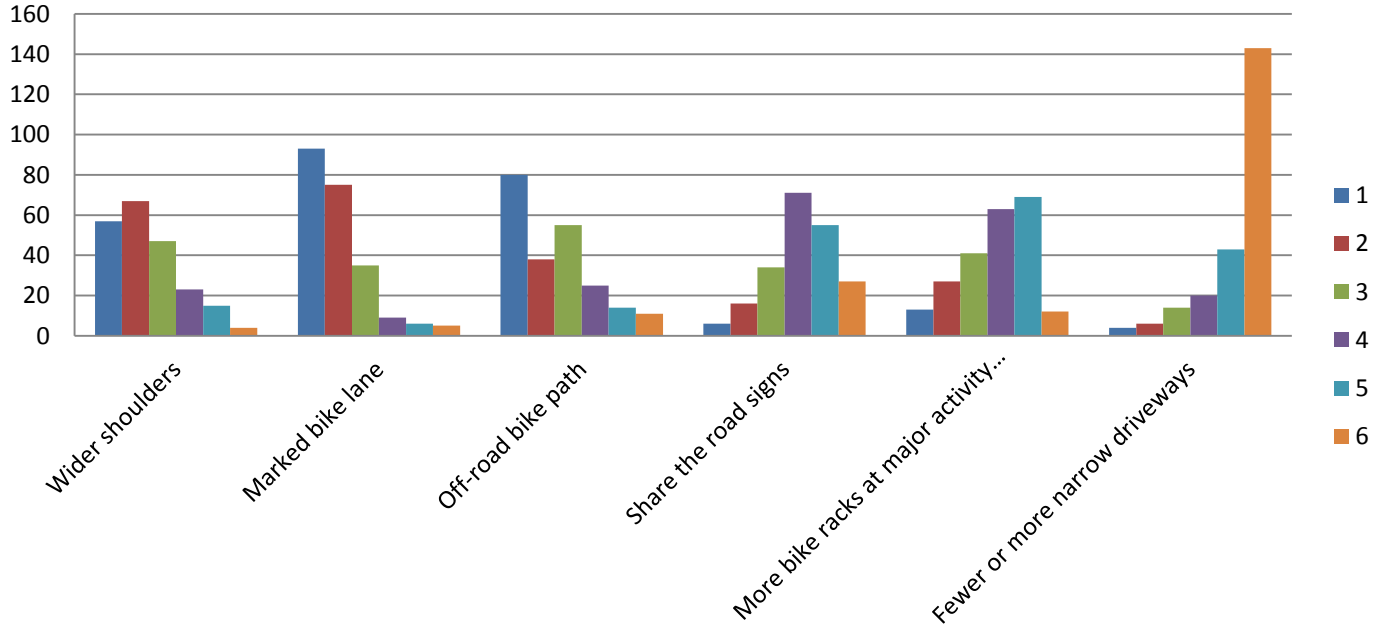
14. If no, why don't you ever walk in the Route 1 Corridor? (select all that apply)



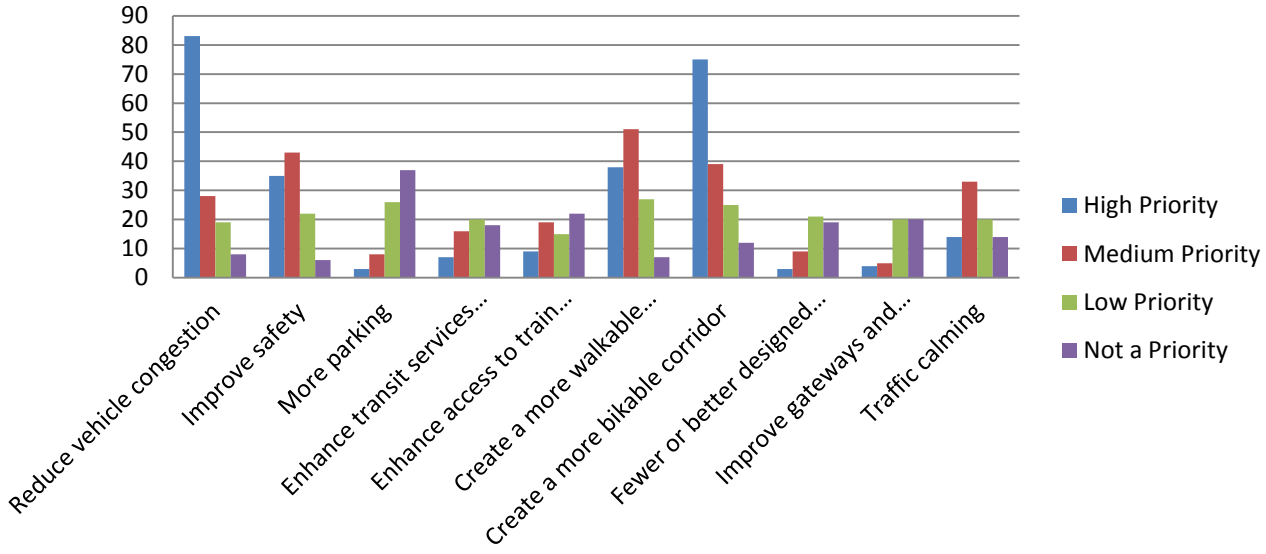
15. If yes, what would get you to walk more in the Route 1 Corridor? (select all that apply)



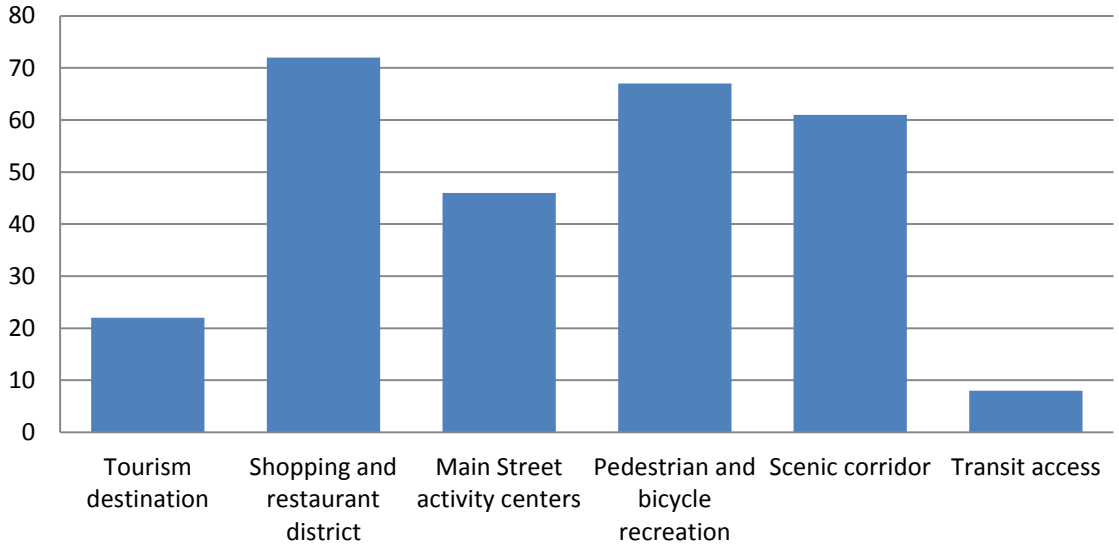
16. To facilitate more bicycle use along the Route 1 Corridor, within and between Clinton, Westbrook and Old Saybrook, what improvements do you believe should have the highest priority? (please rank, with 1 being the highest priority and 6 being the lowes



17. What are your transportation priorities for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook?
(please rank, with 1 being the highest priority and 5 being the lowest priority)



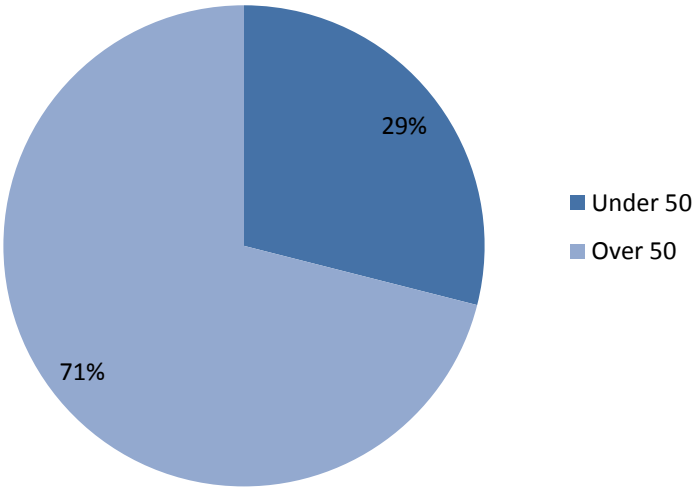
18. What do you see as the greatest opportunity for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook?



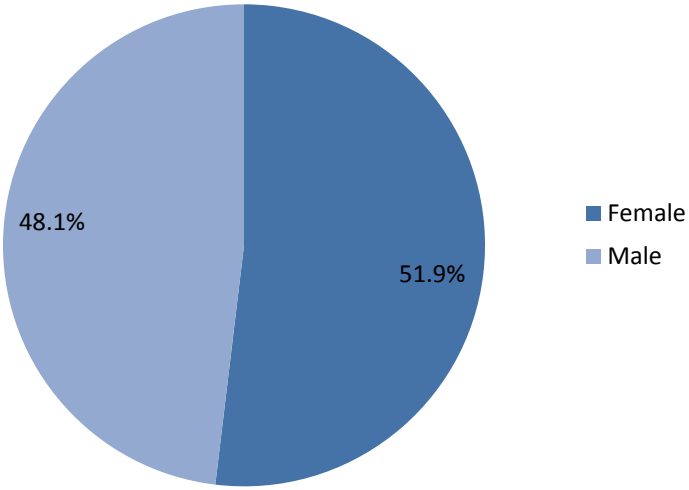
Demographics

Questions 19 and 20 asked respondents optional demographic information. Most respondents were between 50 and 69 years of age, and there were slightly more female respondents than males.

19. What is your age? (optional)



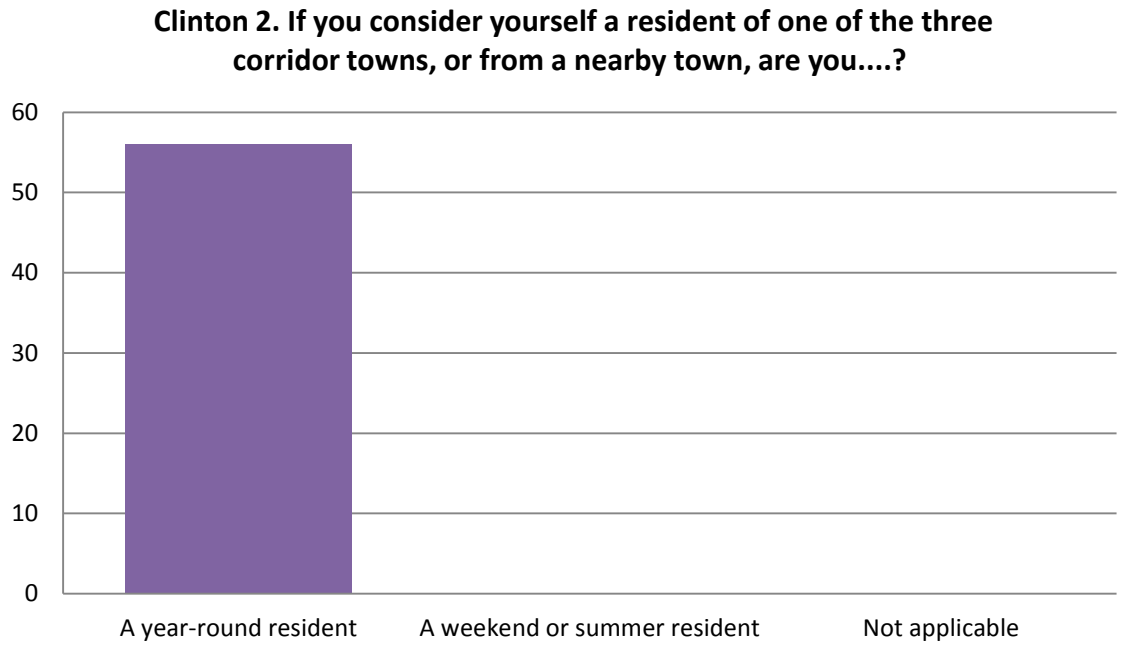
20. What is your gender? (optional)



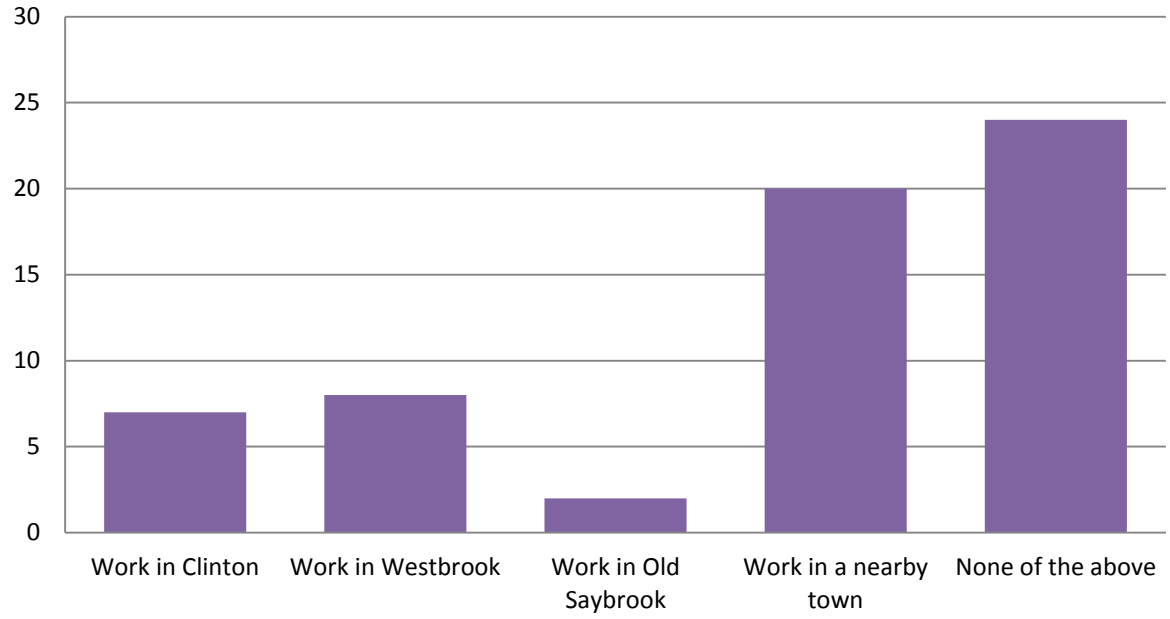
Survey responses from Town of Clinton residents:

The following set of responses includes only those from respondents who claimed to live in the Town of Clinton.

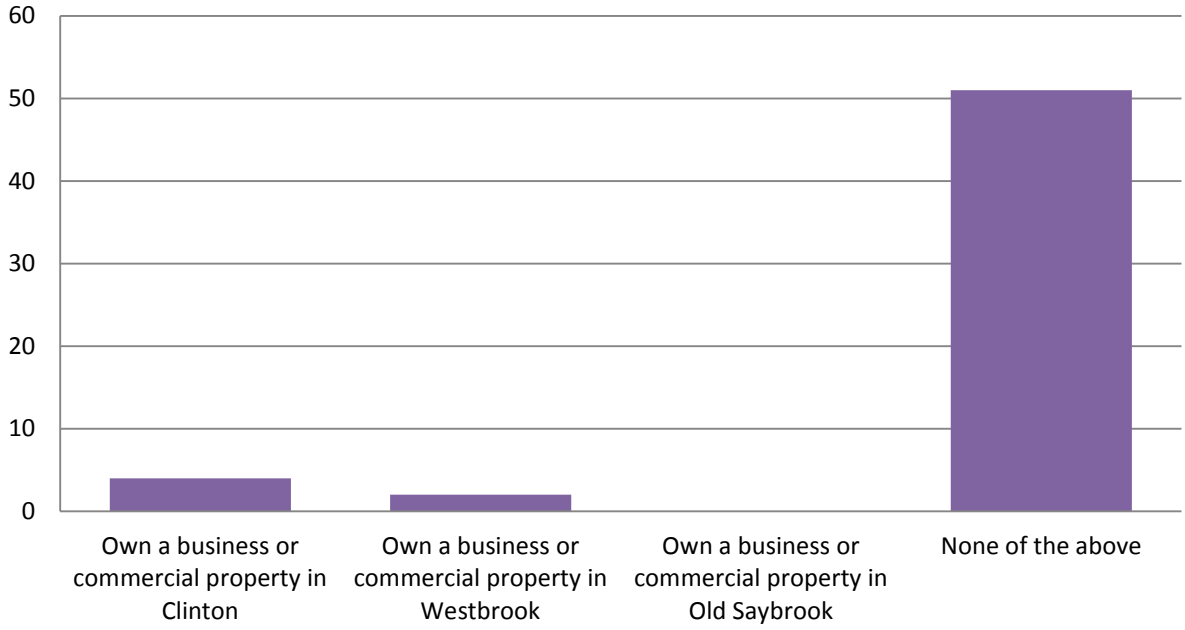
In terms of differences noted when looking solely at the responses from residents of the Town of Clinton as compared to all responses, a few differences can be noted. When asked about their preferred economic development options, a greater proportion of residents of Clinton chose 'development both in and outside village centers' and 'strip centers with surface lots and small to medium national retail stores'. Regarding improvements along the corridor, 'more shops and restaurants' was selected as a high priority; it was a medium priority in the overall group of respondents. As with the overall group of respondents, residents of Clinton also chose 'bicycle lanes, shoulders or paths'; 'sidewalks and crosswalks'; 'traffic calming enhancements' and 'beautification' were also selected as high priority improvements. A greater proportion of Clinton residents claim to walk along the corridor, but their reasons for not walking along the corridor or their ideas for what would encourage more walking along the corridor, are very similar to that of the overall group of respondents. A greater proportion of Clinton residents selected 'shopping and restaurant district' as the greatest opportunity for the corridor, though several still also chose 'pedestrian and bicycle recreation' and 'Main Street activity centers'.



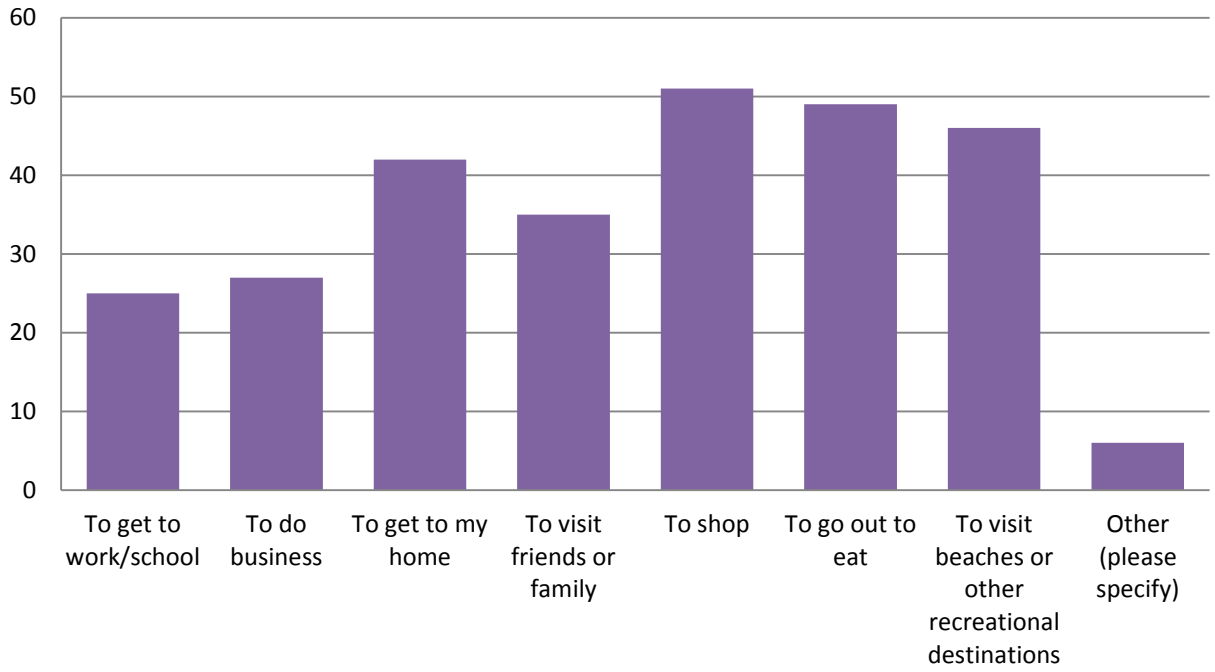
Clinton 3. Do you...? (select all that apply)



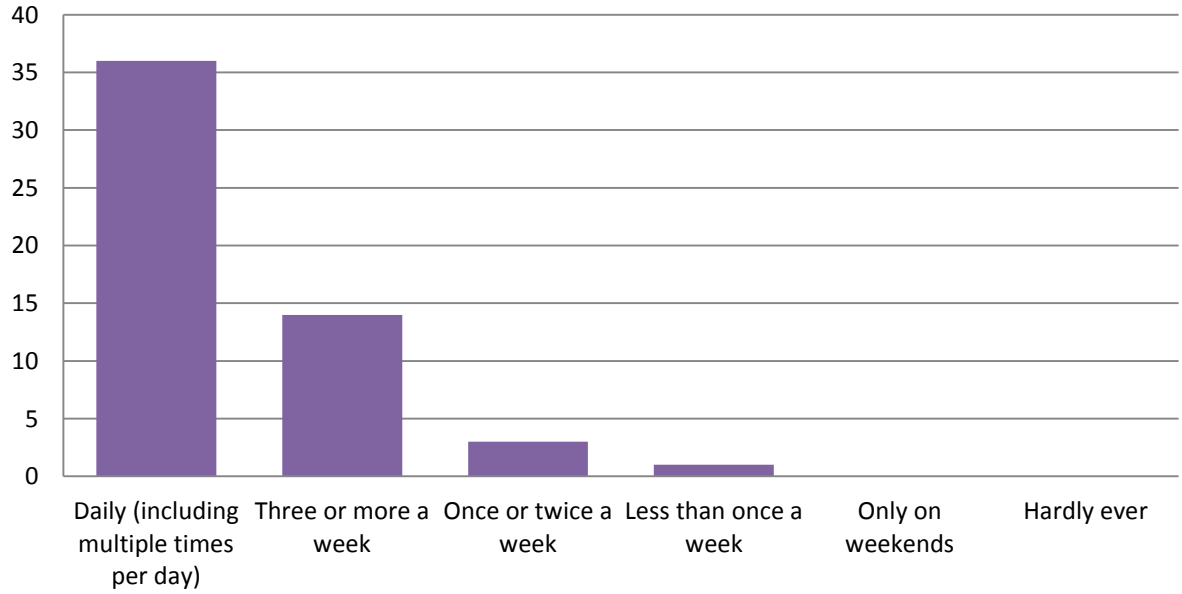
Clinton 4. Do you...? (select all that apply)



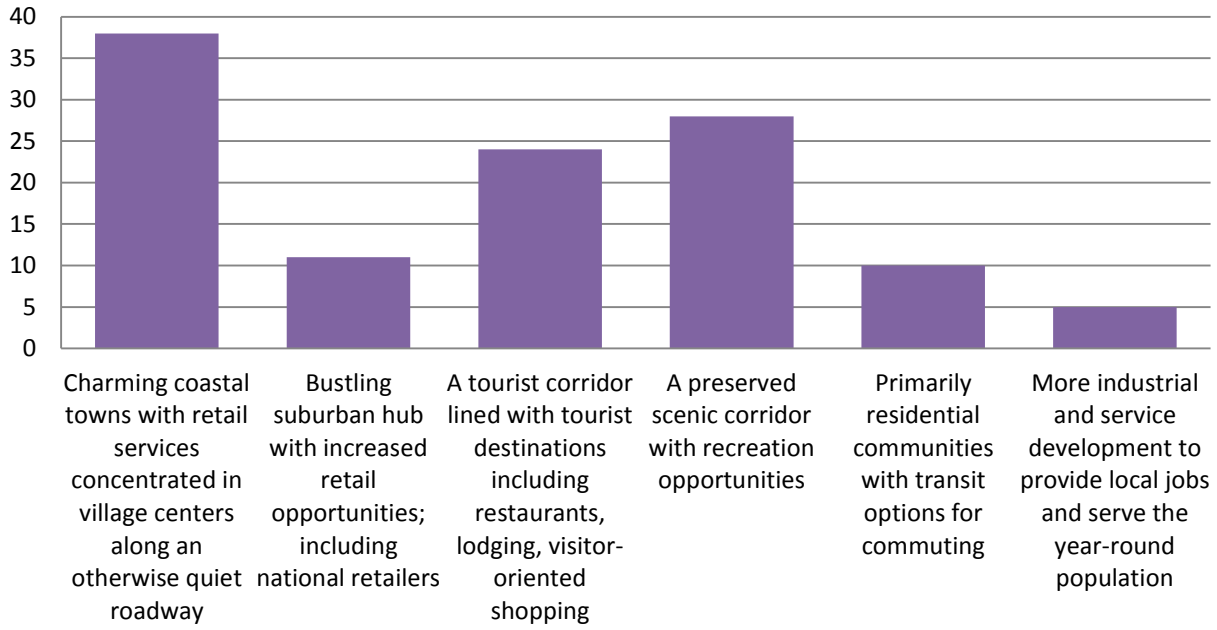
Clinton 5. Why do you visit or use the Route 1 corridor in Clinton, Westbrook, and/or Old Saybrook? (select all that apply)



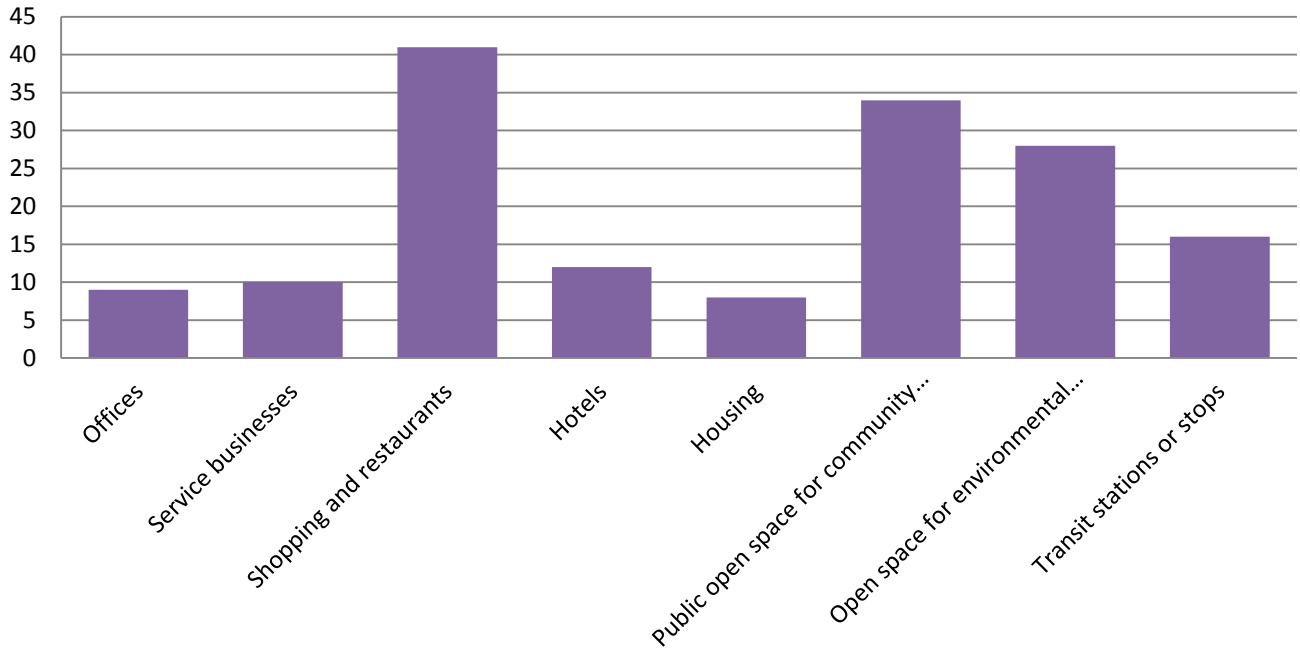
Clinton 6. How often do you drive some portion of the Route 1 Corridor in Clinton, Westbrook, or Old Saybrook?



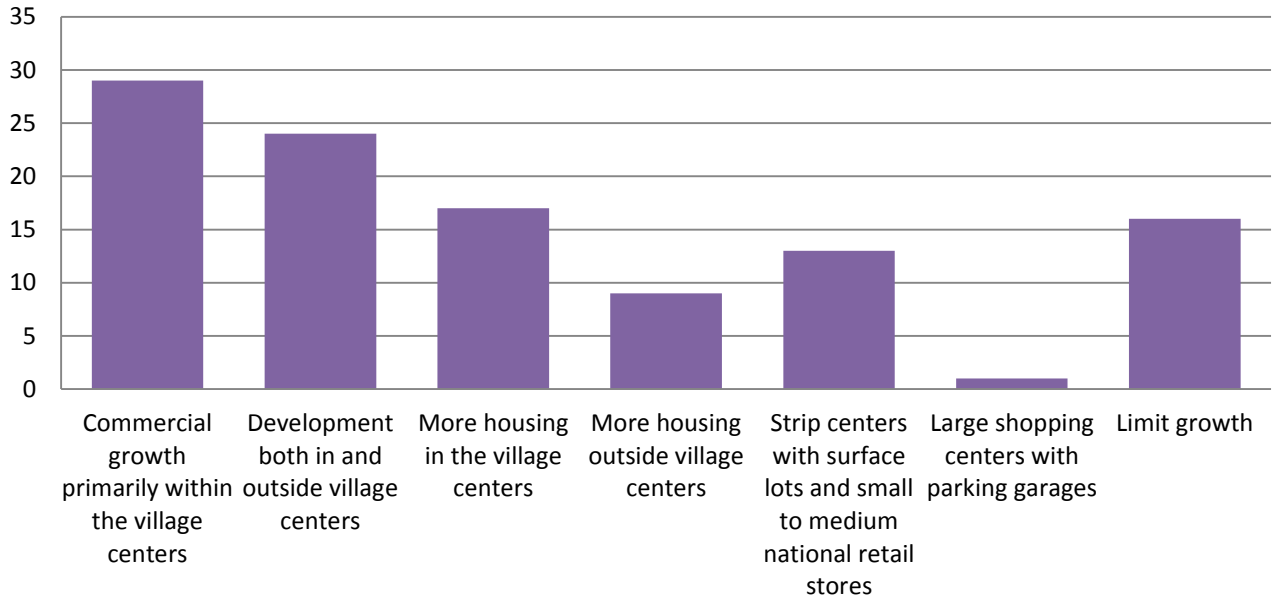
Clinton 7. Picture your ideal vision for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook. Which of the following best defines your vision? (select all that apply)



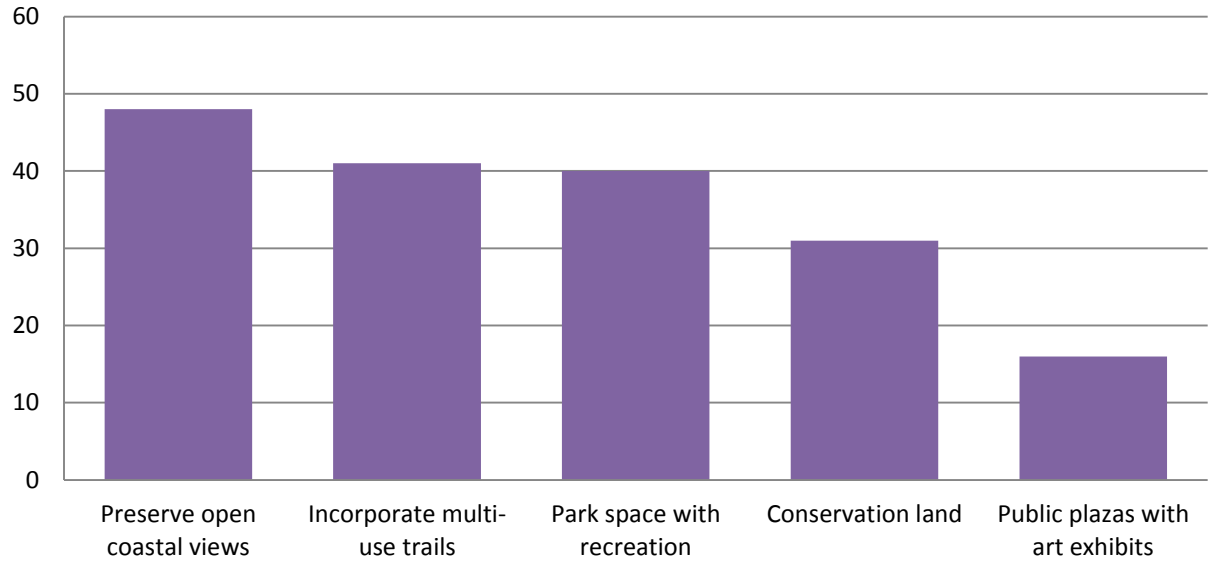
Clinton 8. Which types of land use would you like to see more of along the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



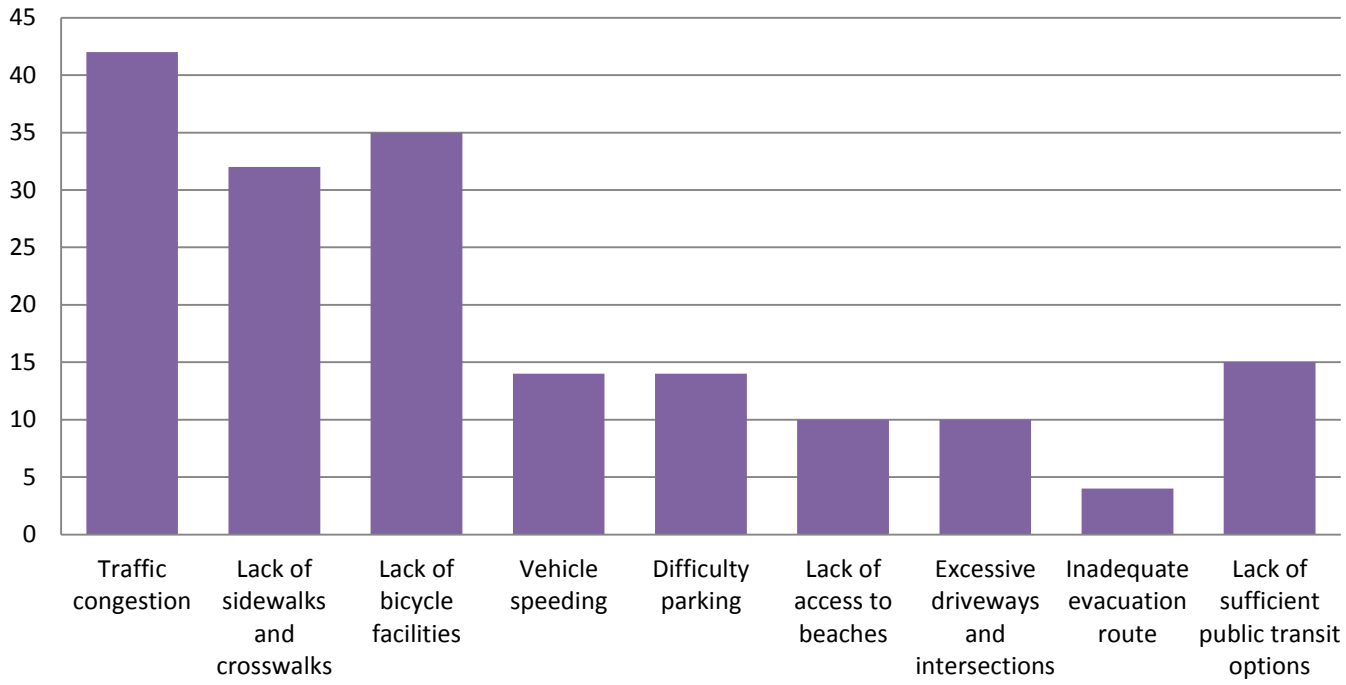
Clinton 9. Which types of economic development opportunities do you feel are best suited for the community character of the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



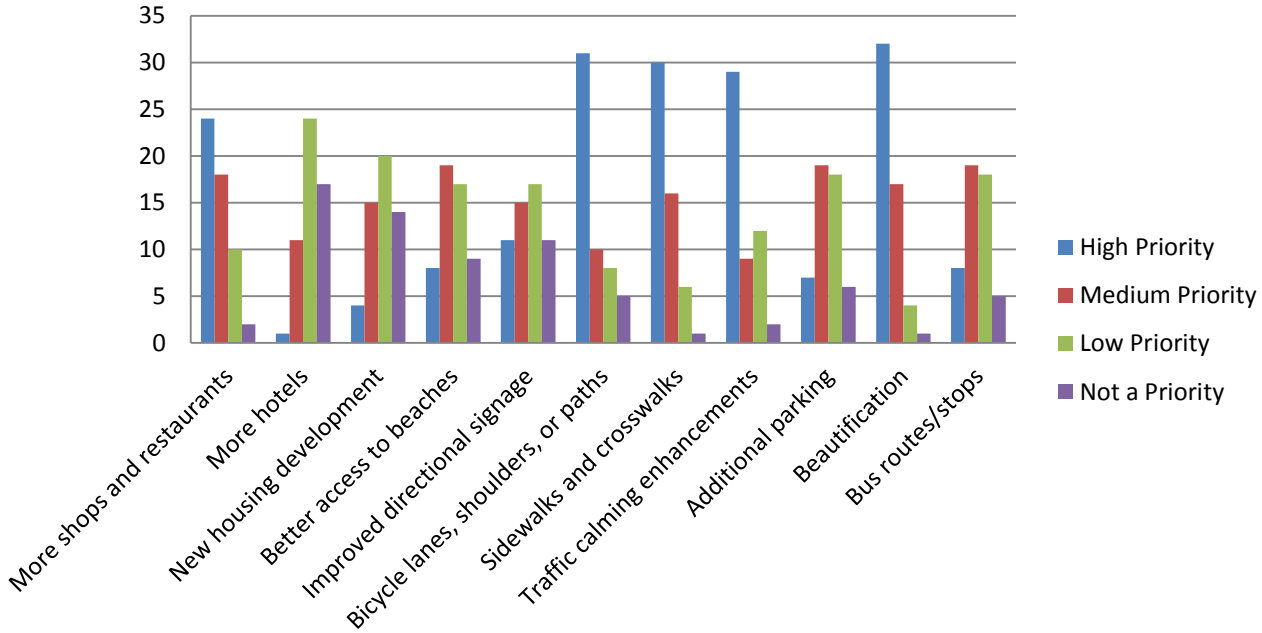
Clinton 10. Which types of open space or preservation do you feel are best suited for the community character of the Route 1 Corridor between Clinton, Westbrook and Old Saybrook? (select all that apply)



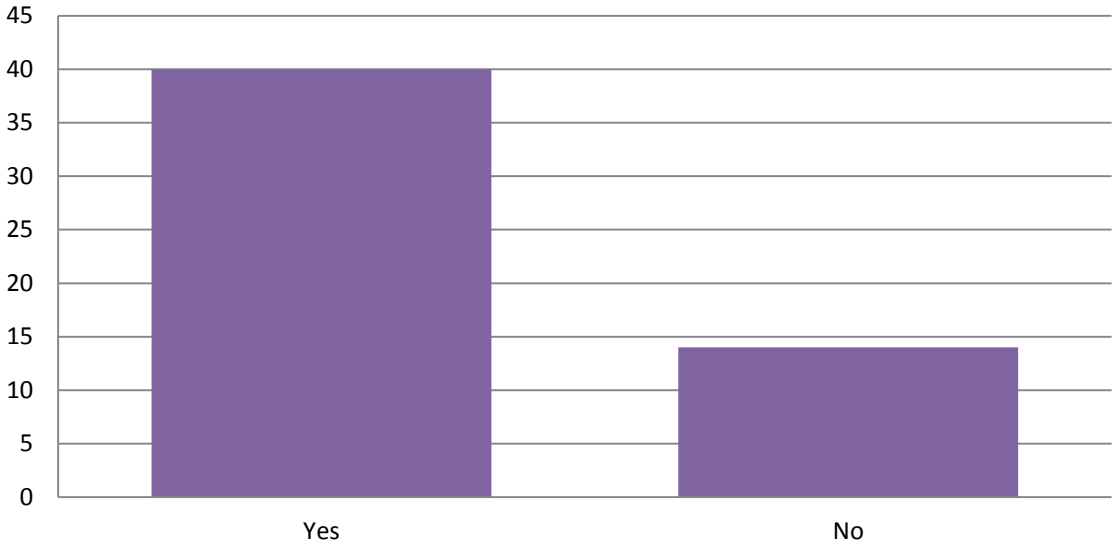
Clinton 11. What are your greatest travel concerns regarding the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



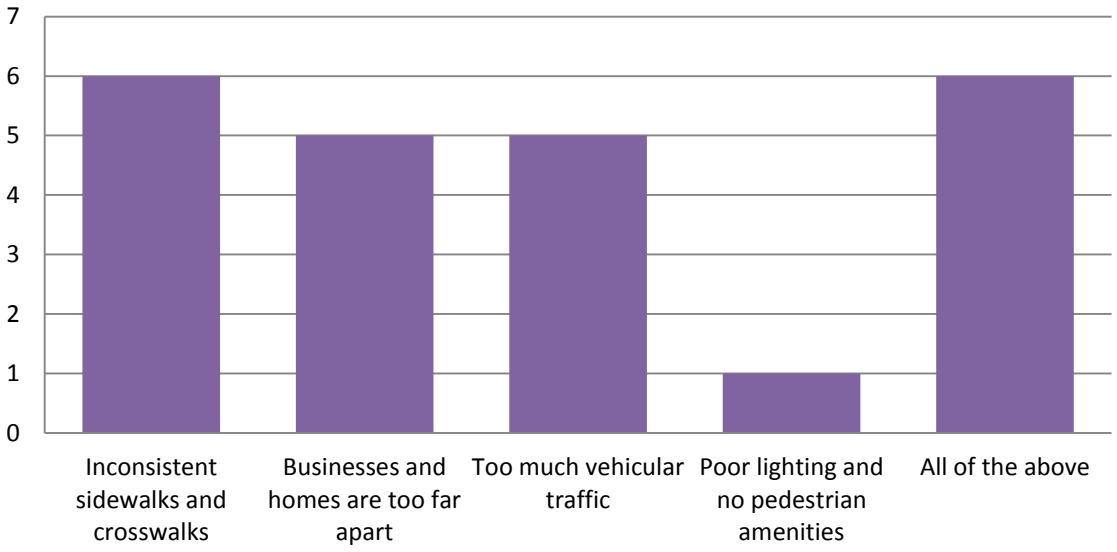
Clinton 12. What improvements along the Route 1 Corridor, in Clinton, Westbrook and Old Saybrook, do you believe should have the highest priority? (please rate each improvement high, medium, low or not a priorty)



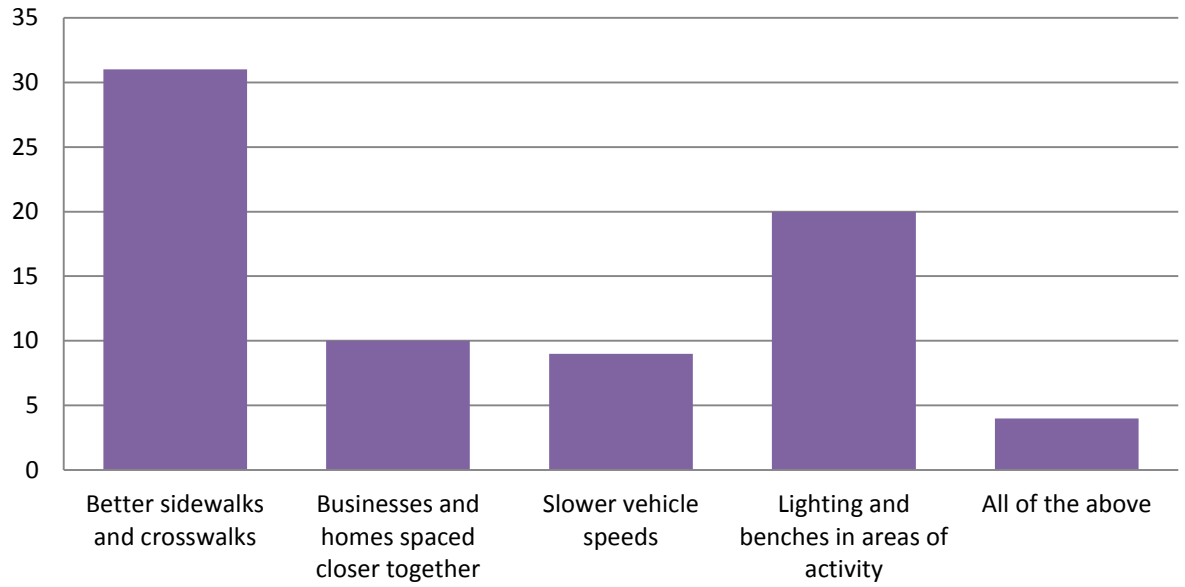
Clinton 13. Do you ever walk along the Route 1 Corridor in Clinton, Westbrook and/or Old Saybrook?



Clinton 14. If no, why don't you ever walk in the Route 1 Corridor? (select all that apply)



Clinton 15. If yes, what would get you to walk more in the Route 1 Corridor? (select all that apply)



Clinton 16. To facilitate more bicycle use along the Route 1 Corridor, within and between Clinton, Westbrook and Old Saybrook, what improvements do you believe should have the highest priority?
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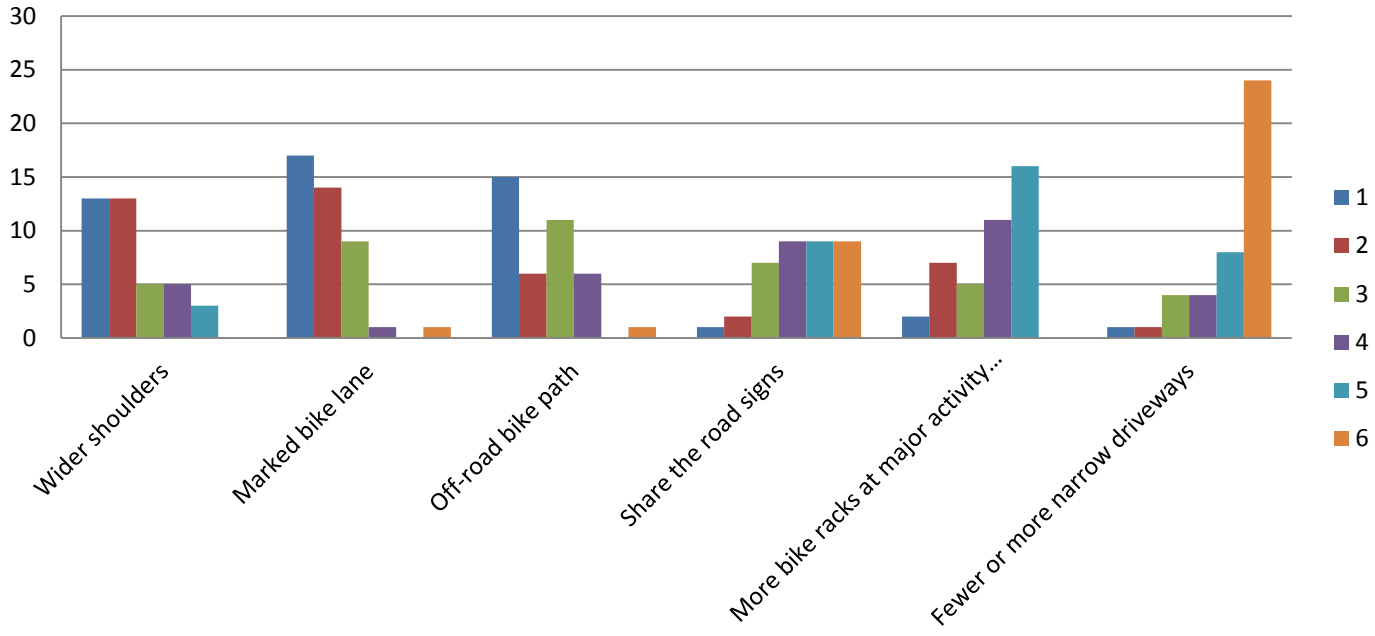
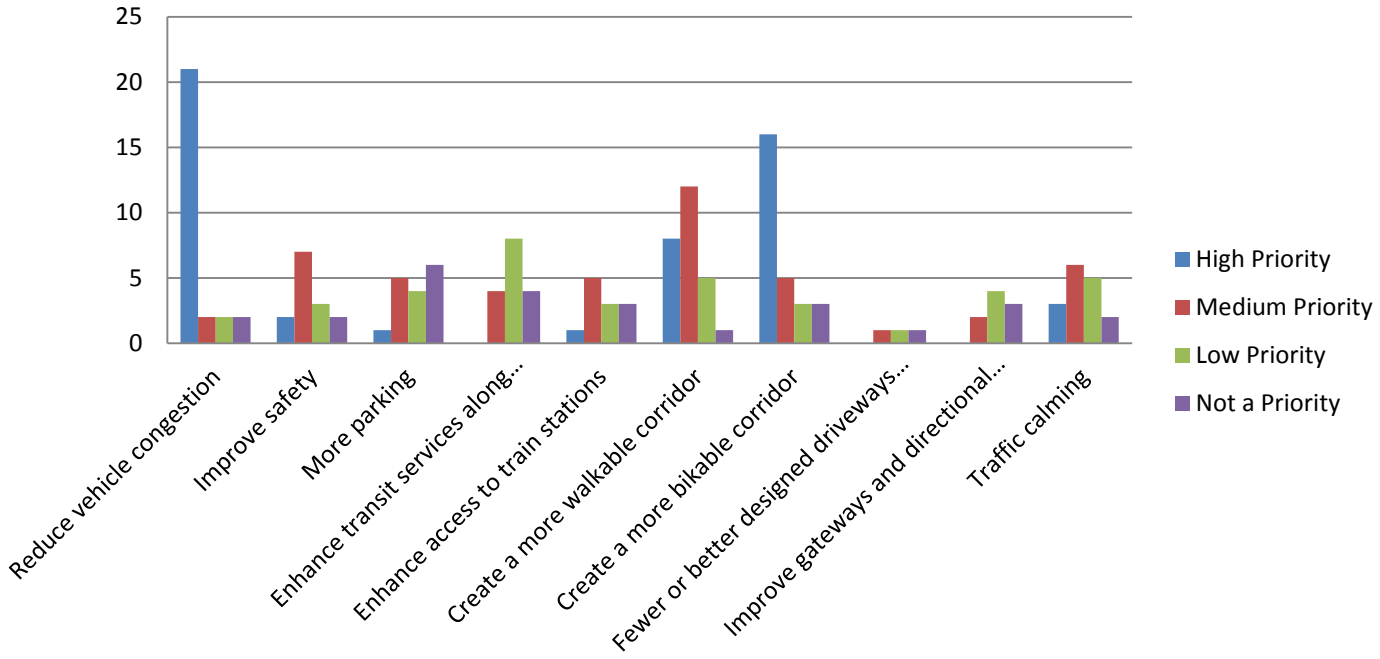
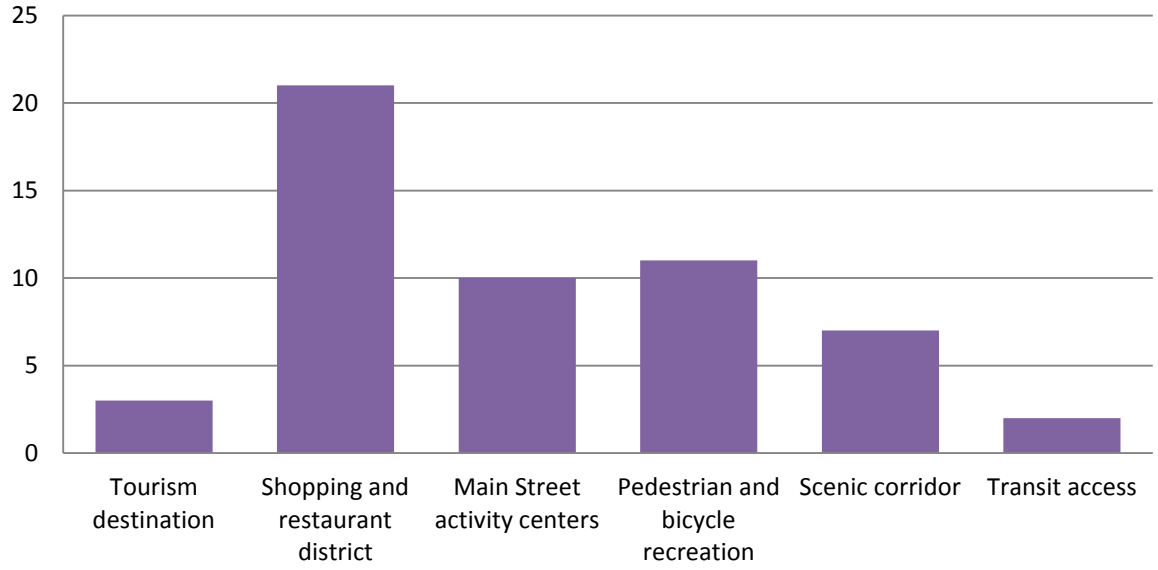


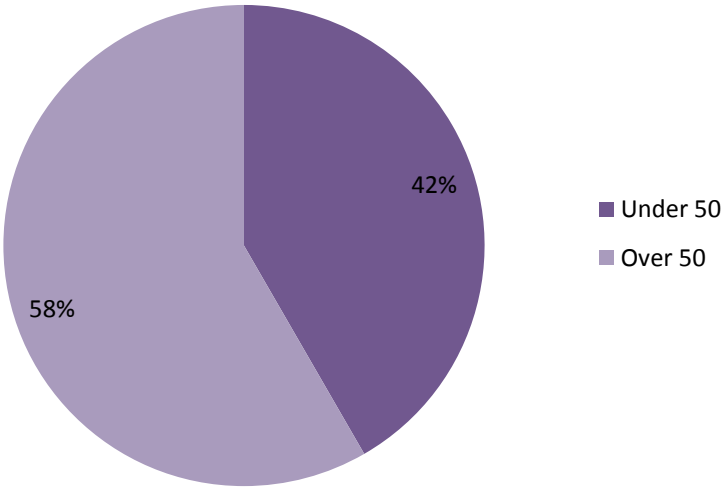
Clinton 17. What are your transportation priorities for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook?
(please rank, with 1 being the highest priority and 5 being the lowest priority)



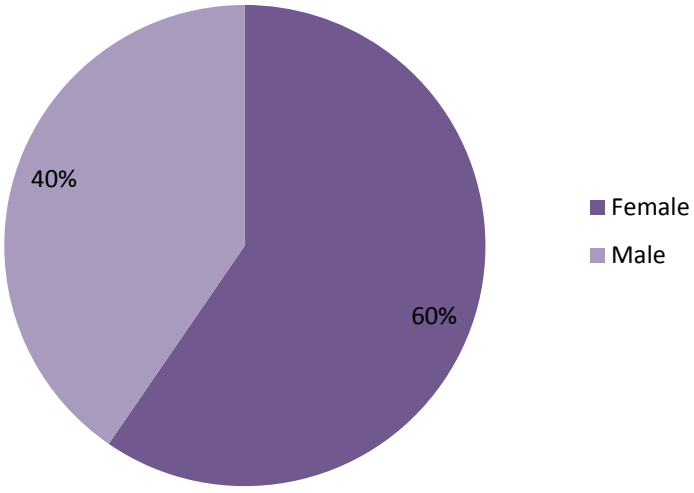
Clinton 18. What do you see as the greatest opportunity for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook?



Clinton 19. What is your age? (optional)



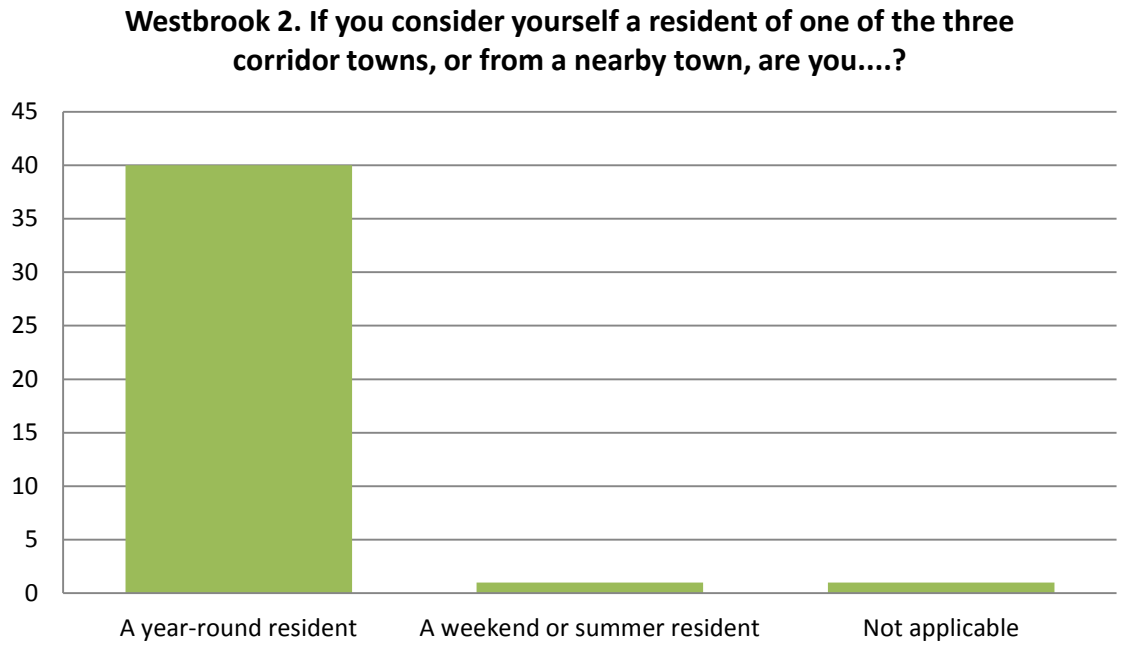
Clinton 20. What is your gender? (optional)



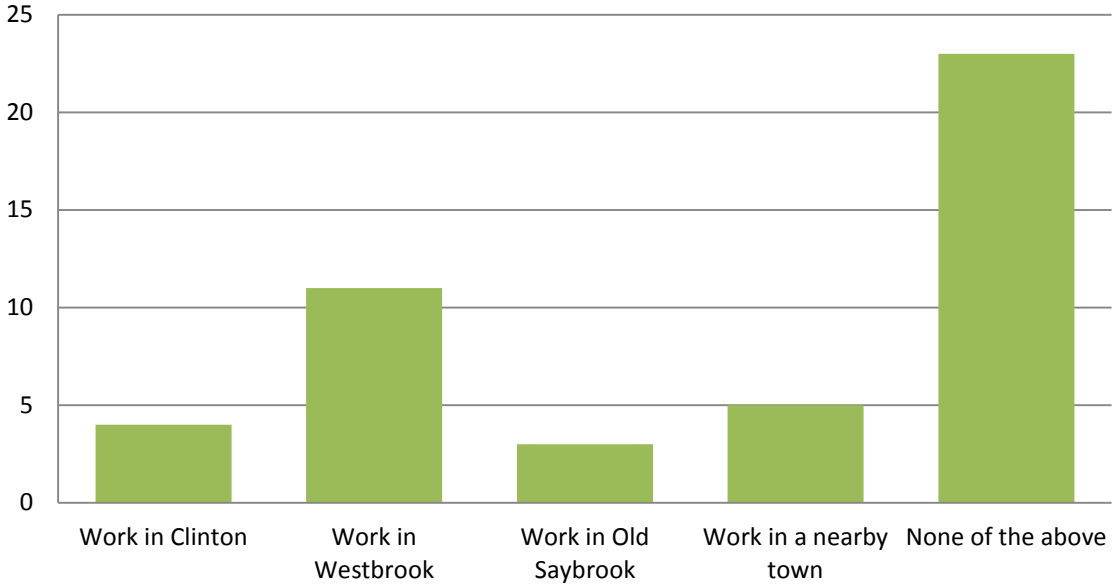
Survey responses from Town of Westbrook residents:

The following set of responses includes only those from respondents who claimed to live in the Town of Westbrook.

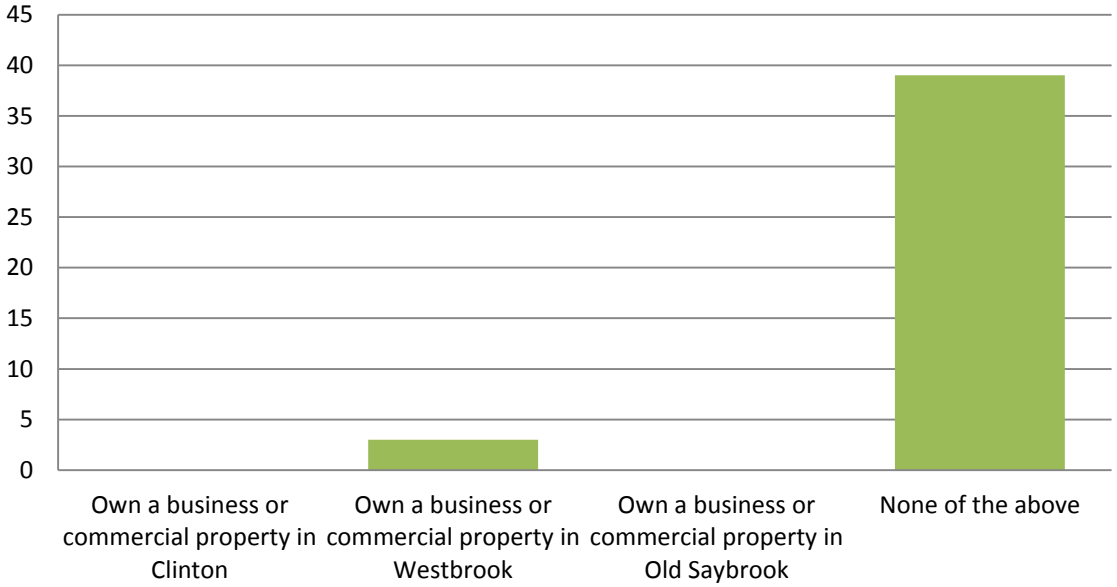
A few differences can be noted when comparing the results from the overall group of respondents with those residing solely in the Town of Westbrook. Regarding where respondents work, a number of the Westbrook residents claim to work in Westbrook, but most respondents still selected 'none of the above' indicating that they work elsewhere. In terms of economic development, a greater proportion of Westbrook residents selected 'more housing in the village centers', though, similar to the overall group, 'commercial growth primarily within the village centers' was still selected by more respondents. A greater proportion of Westbrook residents claim to walk along the corridor. When asked about transportation priorities, Westbrook residents chose 'creating a more walkable corridor' as a higher priority than 'creating a more bikable corridor'. Westbrook residents chose 'creating a scenic corridor' as the greatest opportunity for the Route 1 corridor, followed by 'creating a pedestrian and bicycle recreation corridor'.



Westbrook 3. Do you...? (select all that apply)

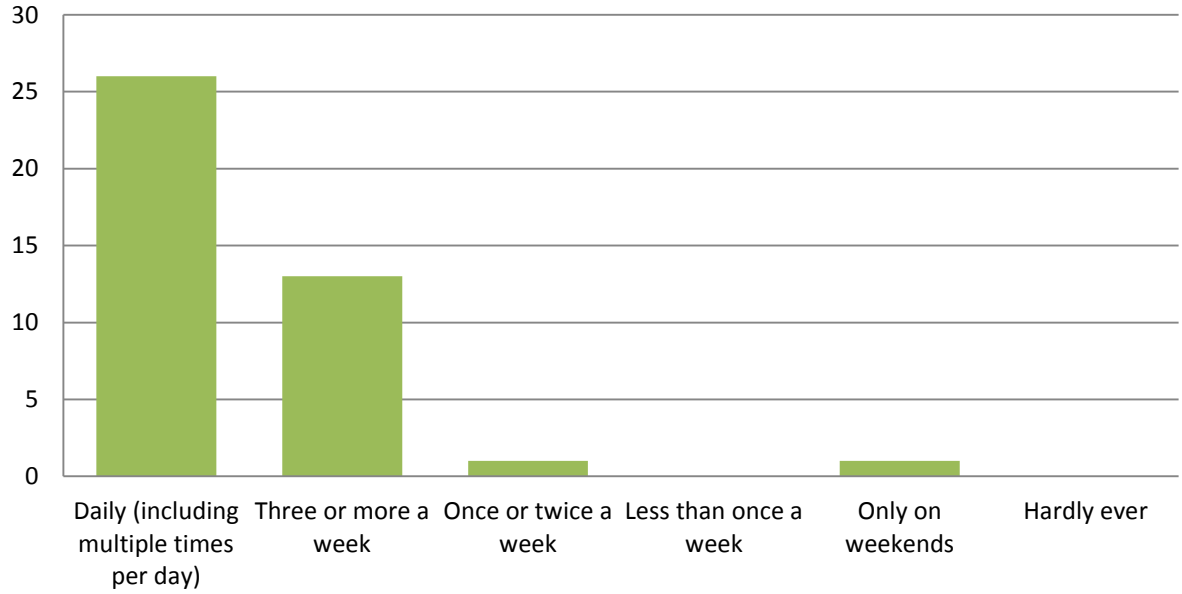


Westbrook 4. Do you...? (select all that apply)

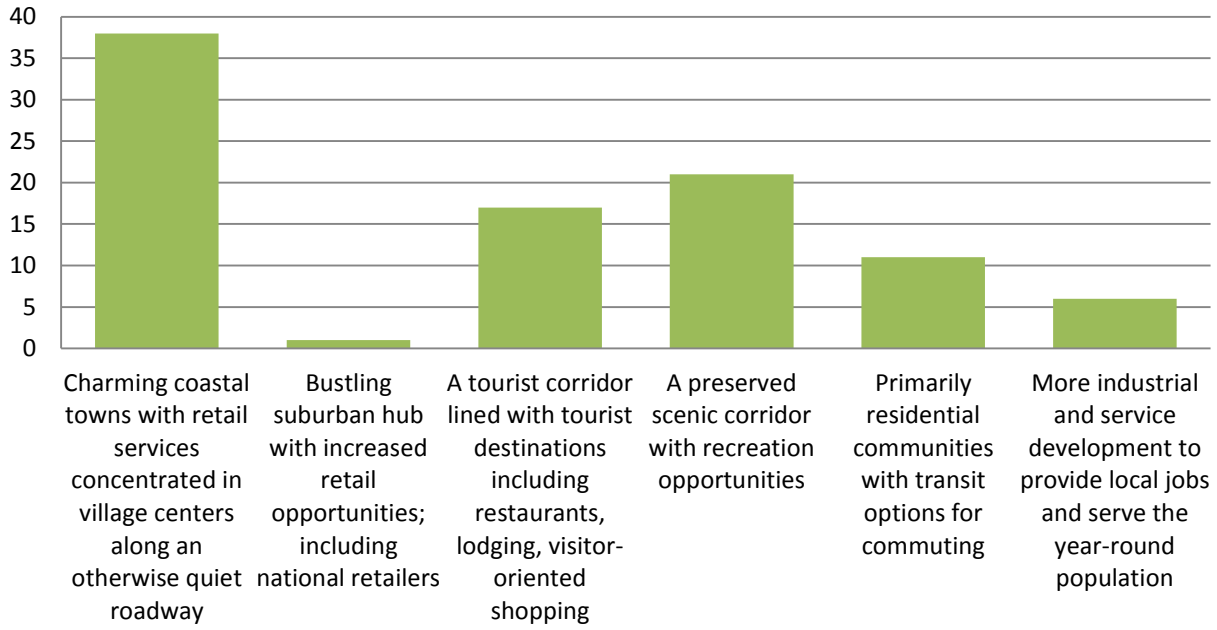


Westbrook 5. Why do you visit or use the Route 1 corridor in Clinton, Westbrook, and/or Old Saybrook? (select all that apply)

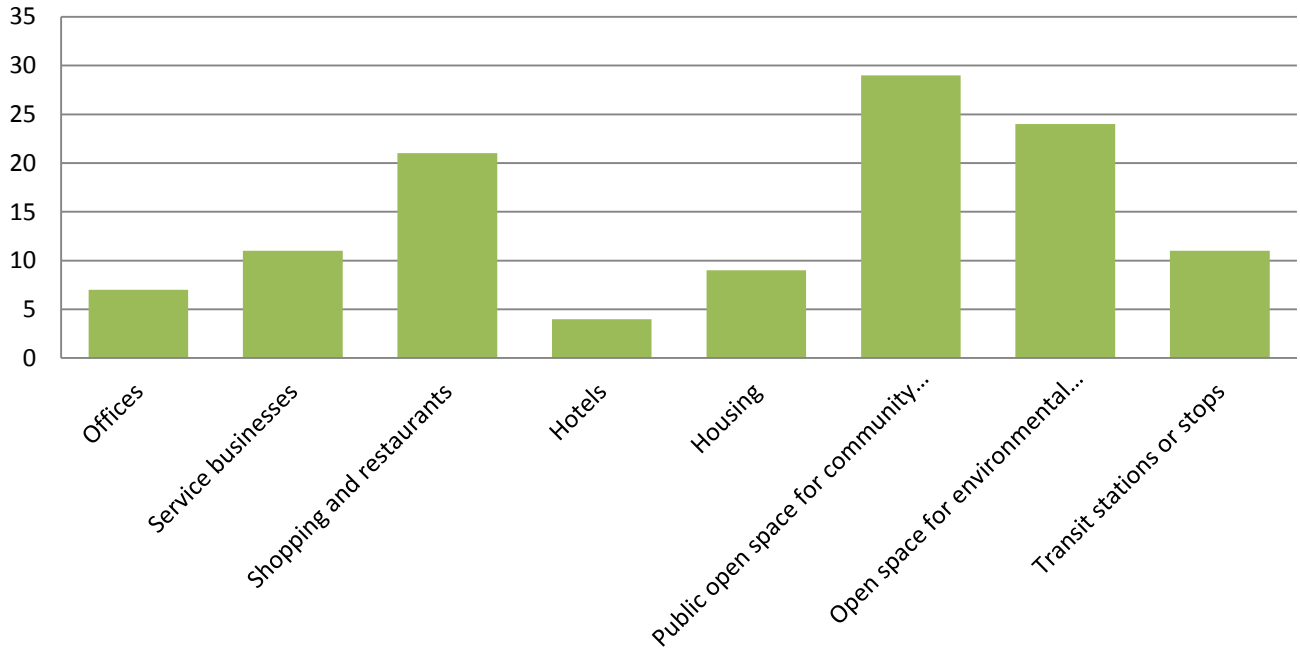
Westbrook 6. How often do you drive some portion of the Route 1 Corridor in Clinton, Westbrook, or Old Saybrook?



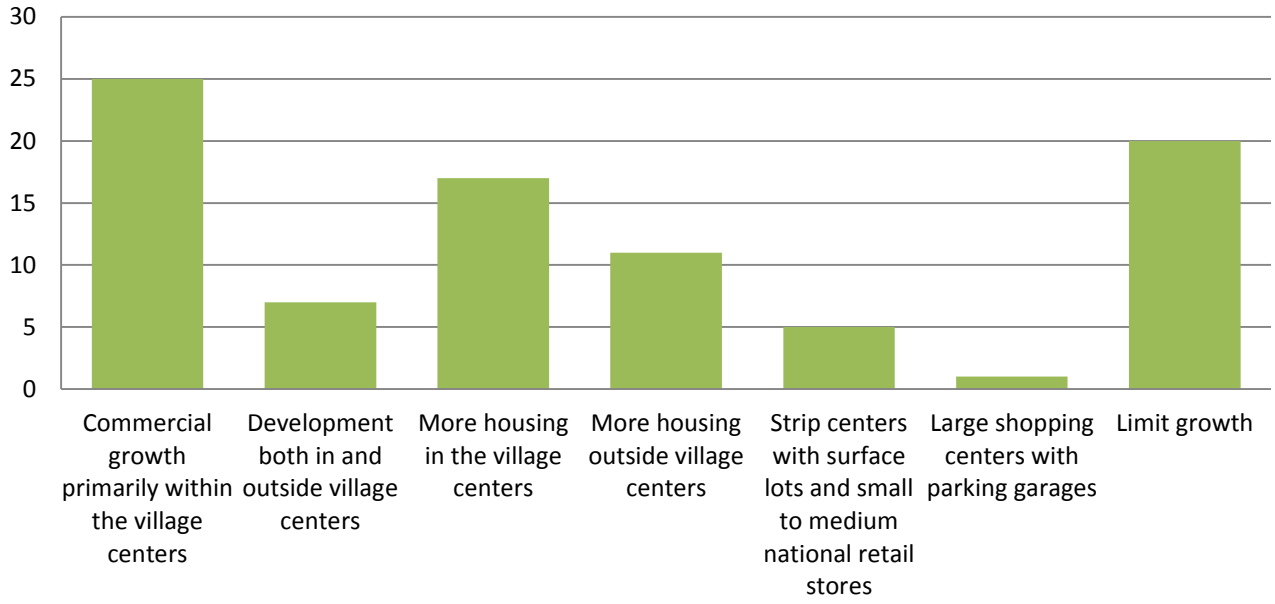
Westbrook 7. Picture your ideal vision for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook. Which of the following best defines your vision? (select all that apply)



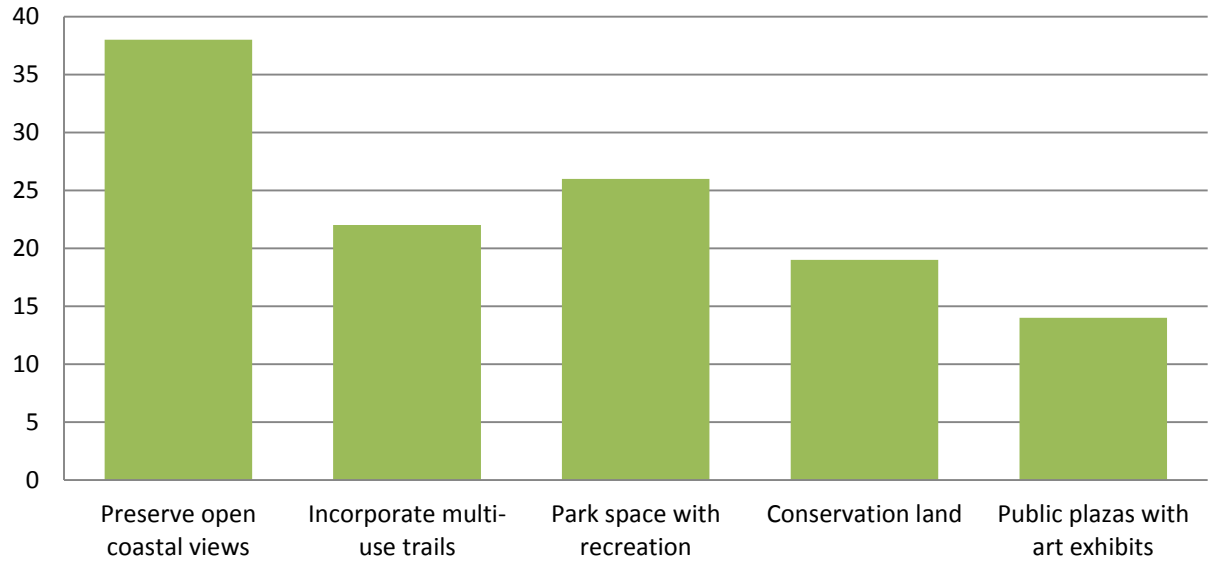
Westbrook 8. Which types of land use would you like to see more of along the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



Westbrook 9. Which types of economic development opportunities do you feel are best suited for the community character of the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



Westbrook 10. Which types of open space or preservation do you feel are best suited for the community character of the Route 1 Corridor between Clinton, Westbrook and Old Saybrook? (select all that apply)



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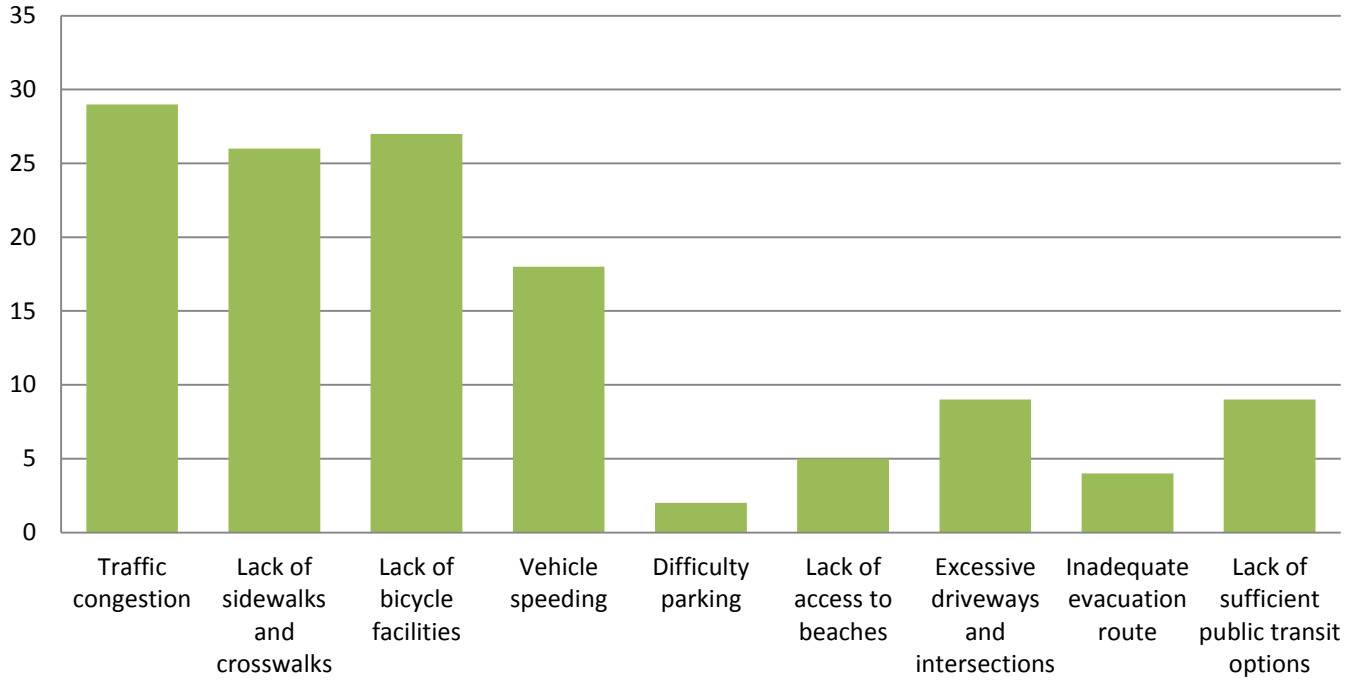

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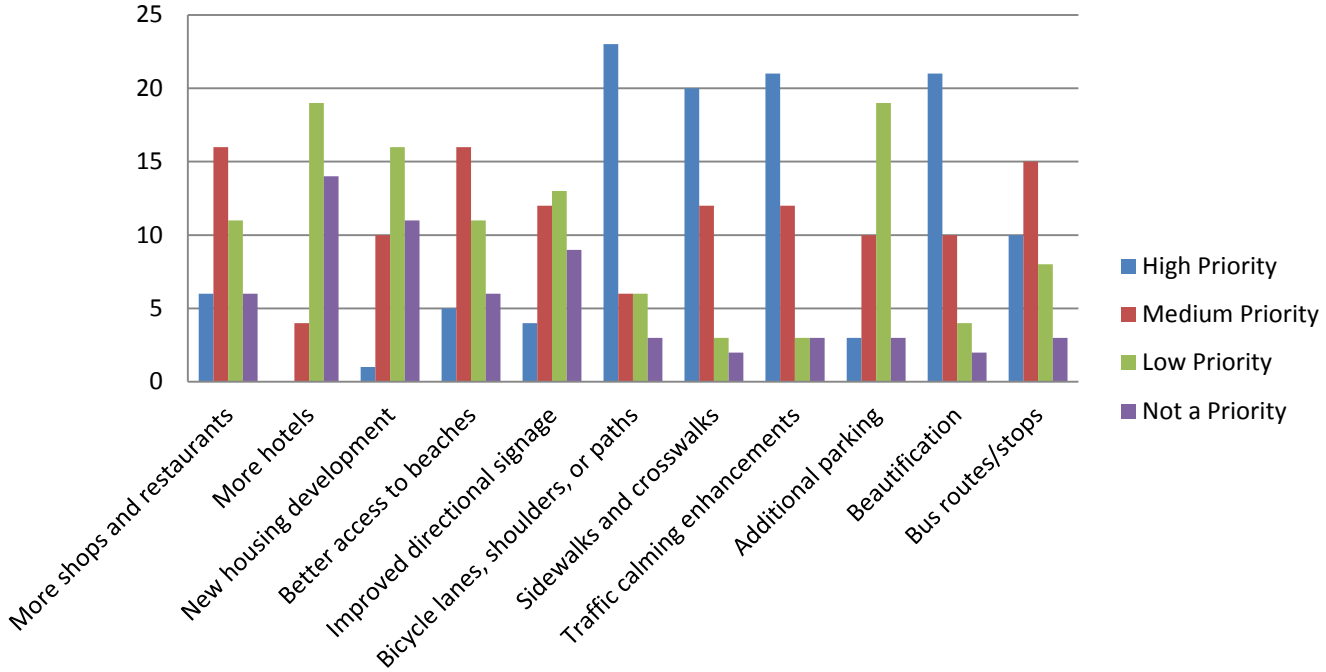

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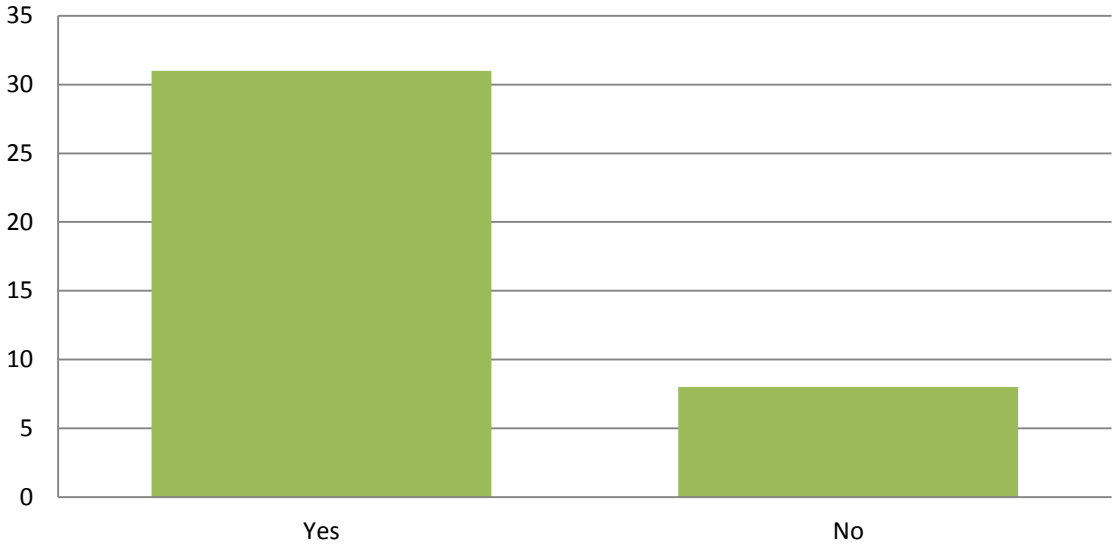
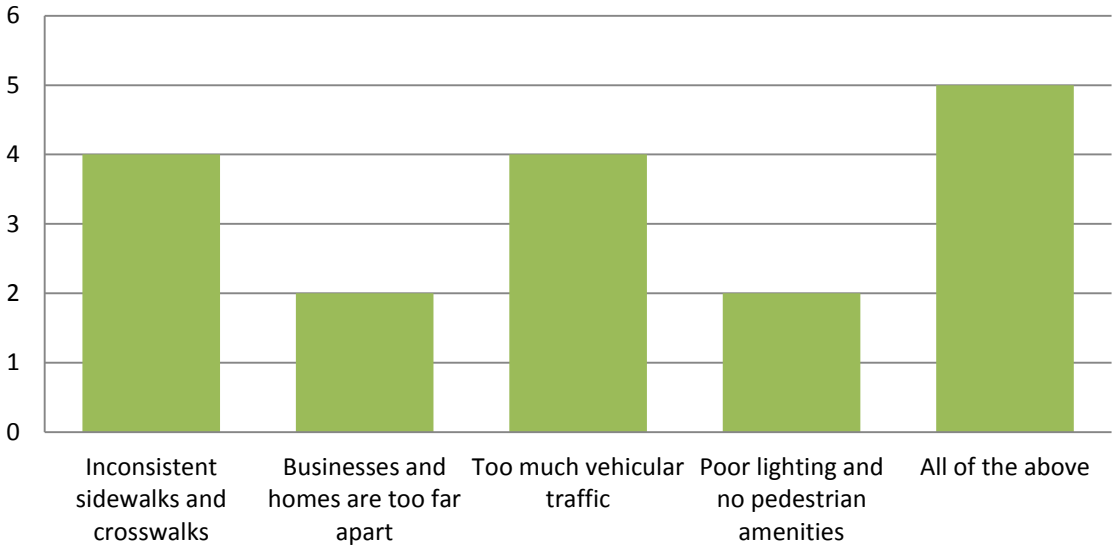
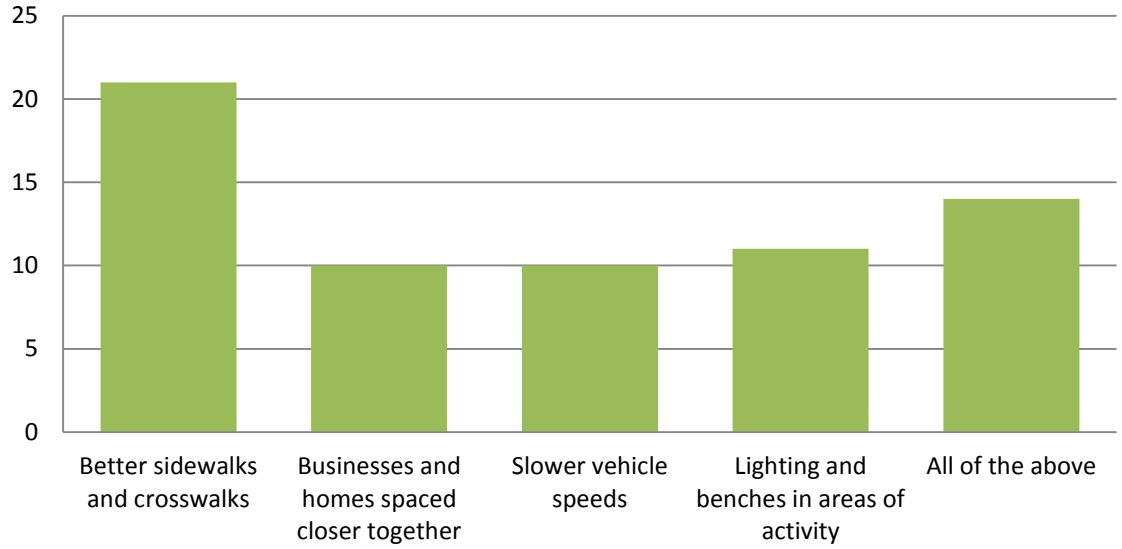


Westbrook 14. If no, why don't you ever walk in the Route 1 Corridor? (select all that apply)



Westbrook 15. If yes, what would get you to walk more in the Route 1 Corridor? (select all that apply)



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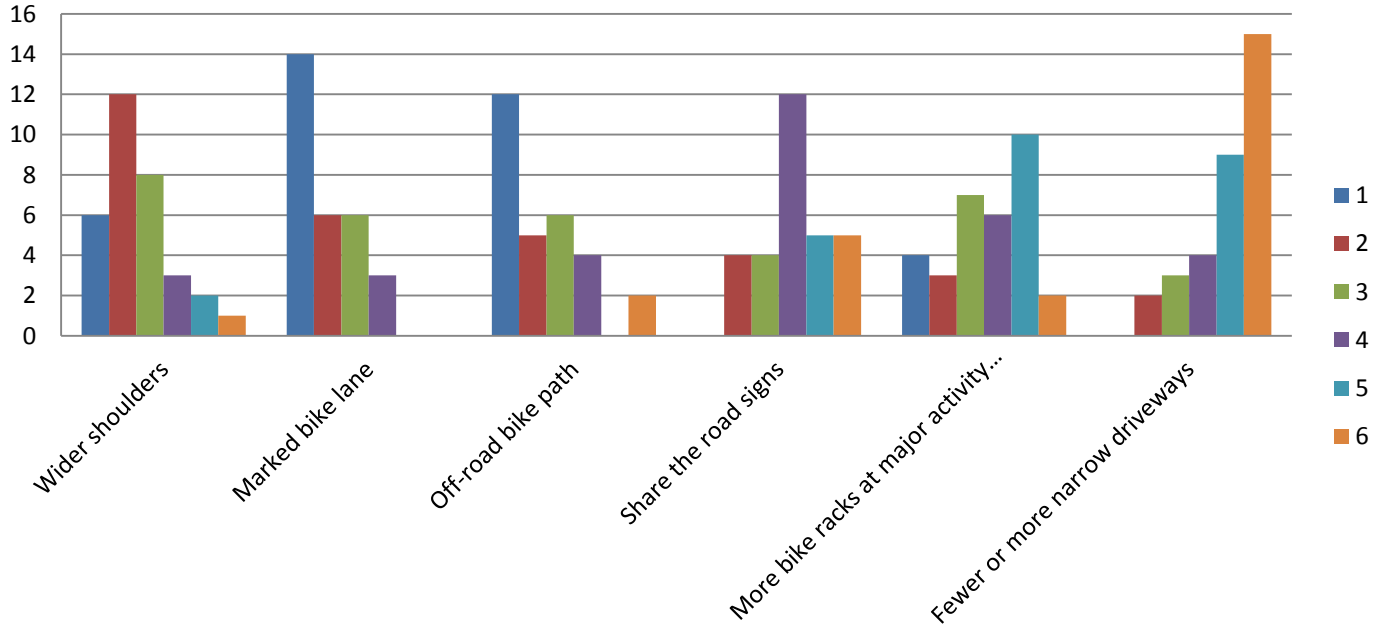
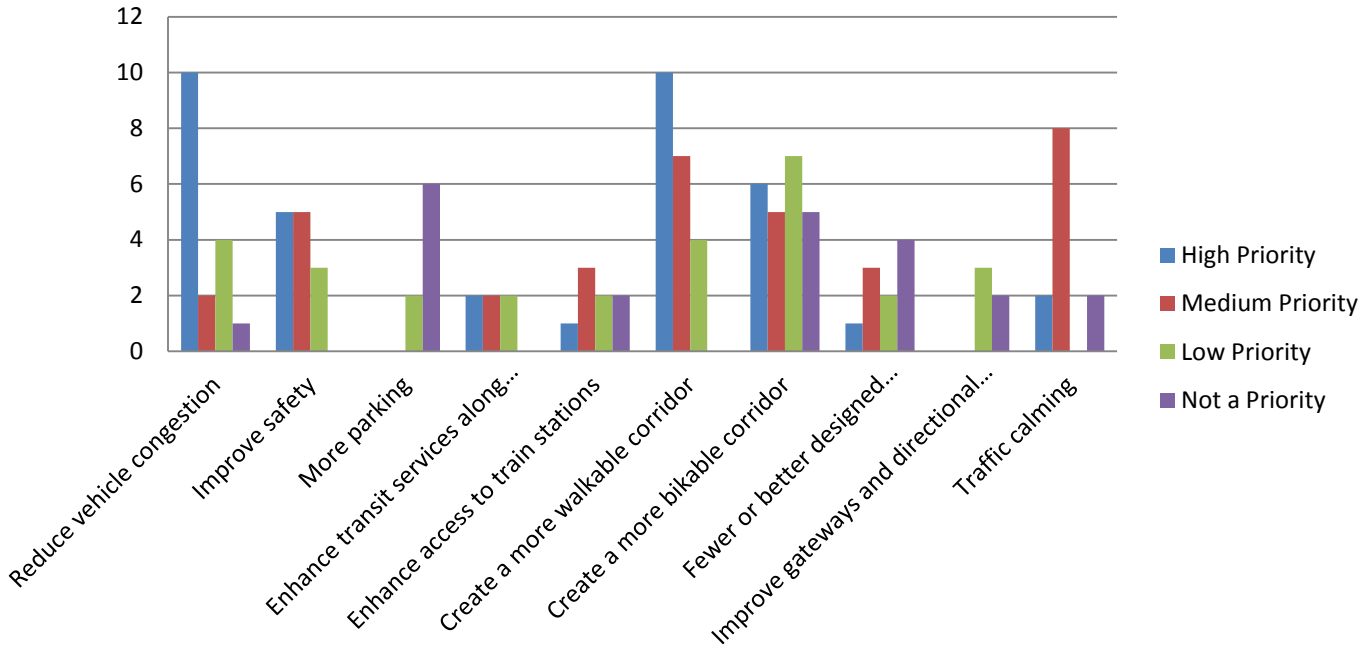
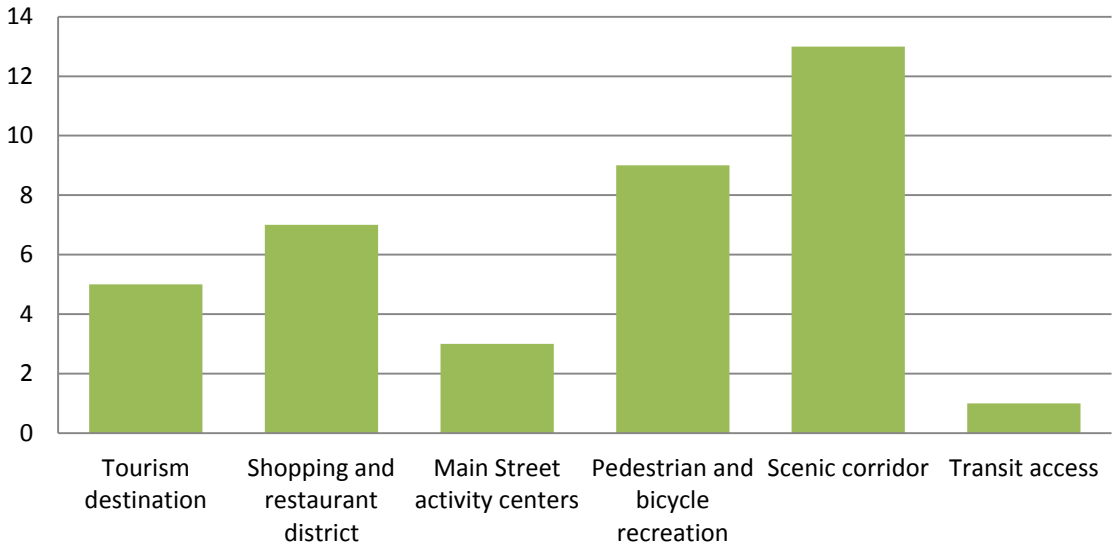
(please rank, with 1 being the highest priority and 6 being



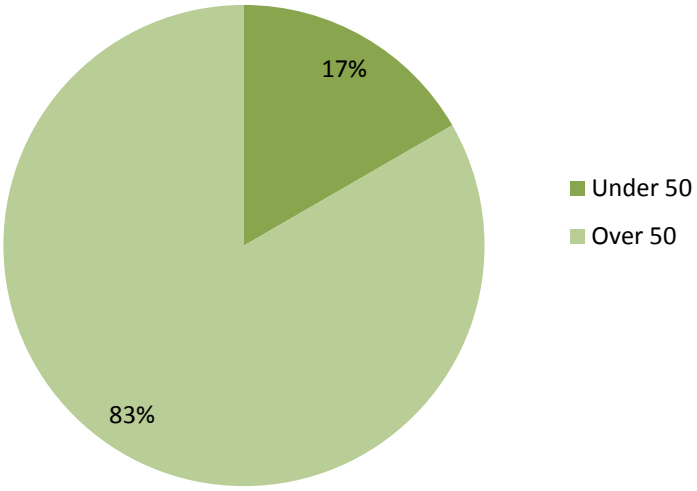
Westbrook 17. What are your transportation priorities for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook?
(please rank, with 1 being the highest priority and 5 being the lowest priority)



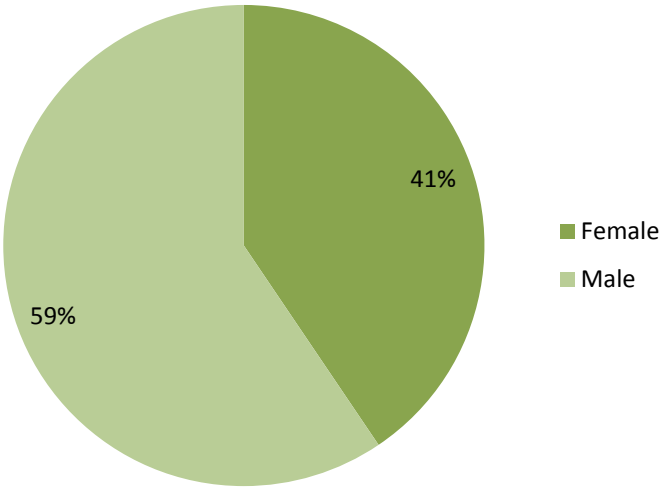
Westbrook 18. What do you see as the greatest opportunity for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook?



Westbrook 19. What is your age? (optional)



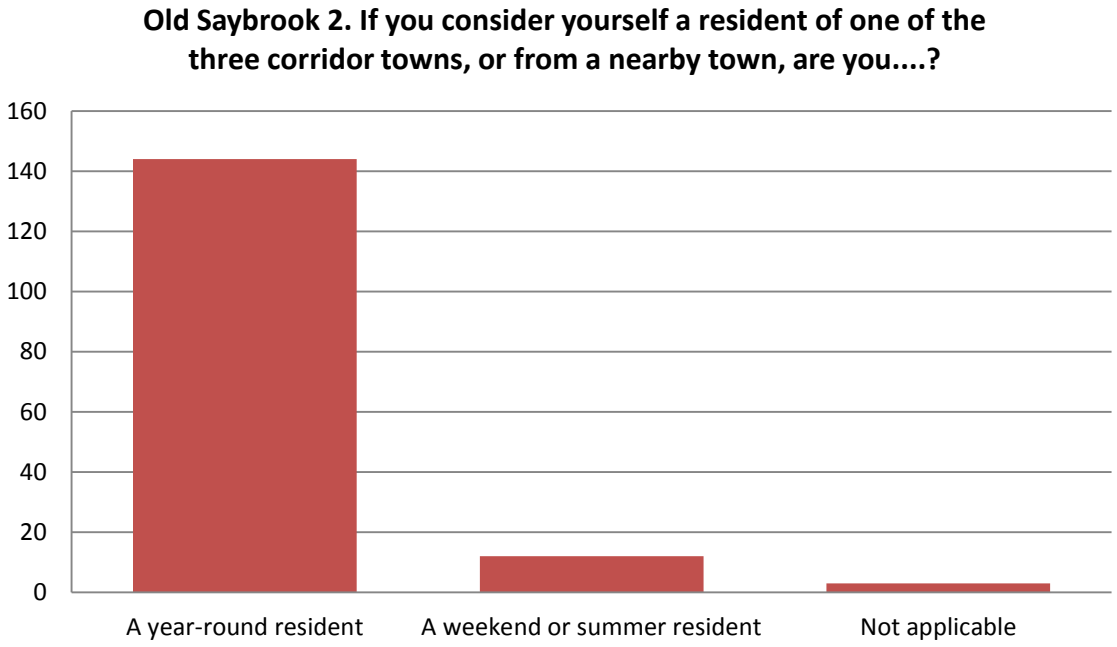
Westbrook 20. What is your gender? (optional)

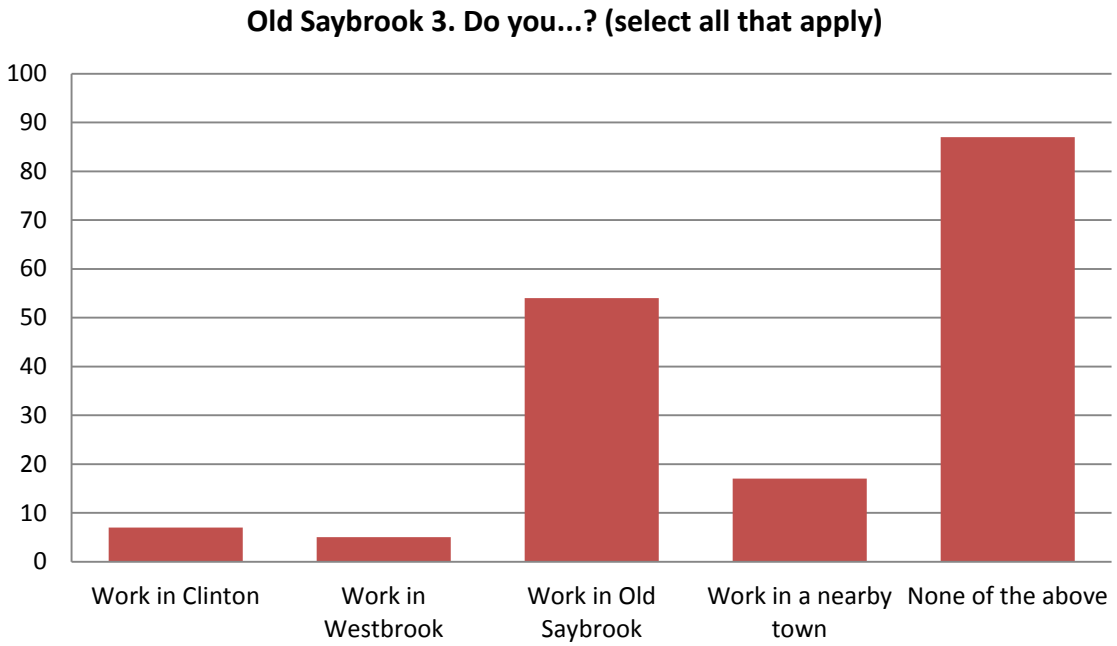


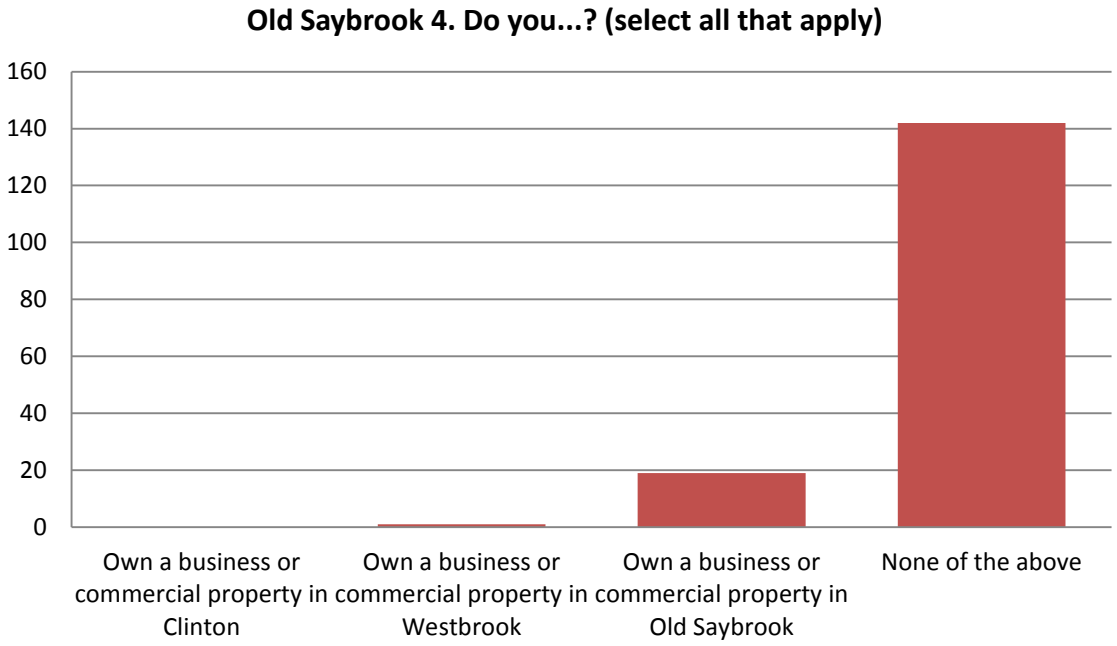
Survey responses from Town of Old Saybrook residents:

The following set of responses includes only those from respondents who claimed to live in the Town of Old Saybrook.

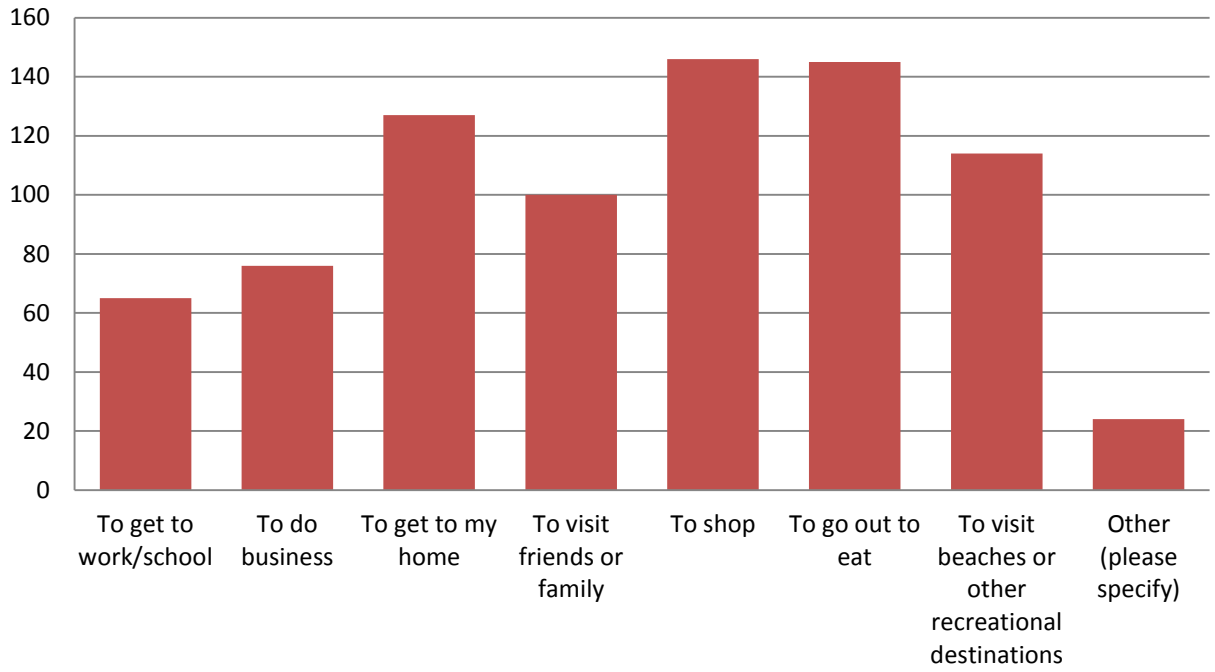
There are a few differences that can be noted when looking solely at the responses from residents of the Town of Old Saybrook as compared to all responses. A significant number of Old Saybrook residents work in Old Saybrook. More than half of the respondents from Old Saybrook claim that they do not walk along the Route 1 corridor. More respondents chose 'pedestrian and bicycle recreation' as the greatest opportunity for the corridor, though almost just as many respondents chose a 'shopping and restaurant district' or a 'scenic corridor'.



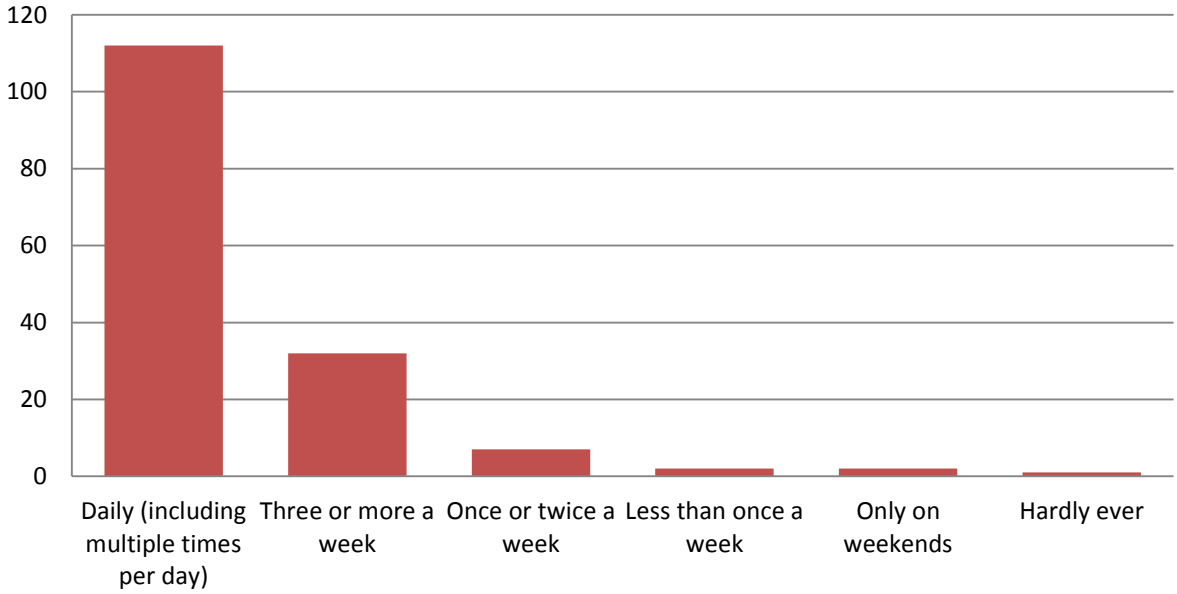

Old Saybrook 3. Do you...? (select all that apply)
100
90
80
70
60
50
40
30
20
10
0
Work in Clinton
Work in Westbrook
Work in Old Saybrook
Work in a nearby town
None of the above


Old Saybrook 4. Do you...? (select all that apply)
160
140
120
100
80
60
40
20
0
Own a business or commercial property in Clinton
Own a business or commercial property in Westbrook
Own a business or commercial property in Old Saybrook
None of the above

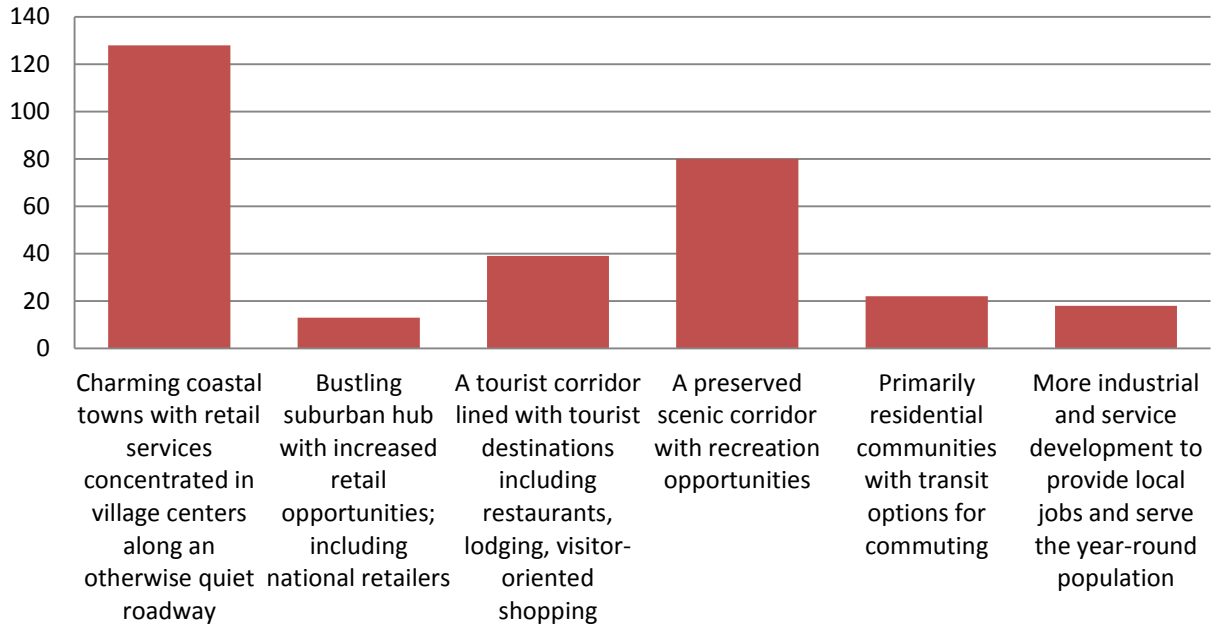
Old Saybrook 5. Why do you visit or use the Route 1 corridor in Clinton, Westbrook, and/or Old Saybrook? (select all that apply)



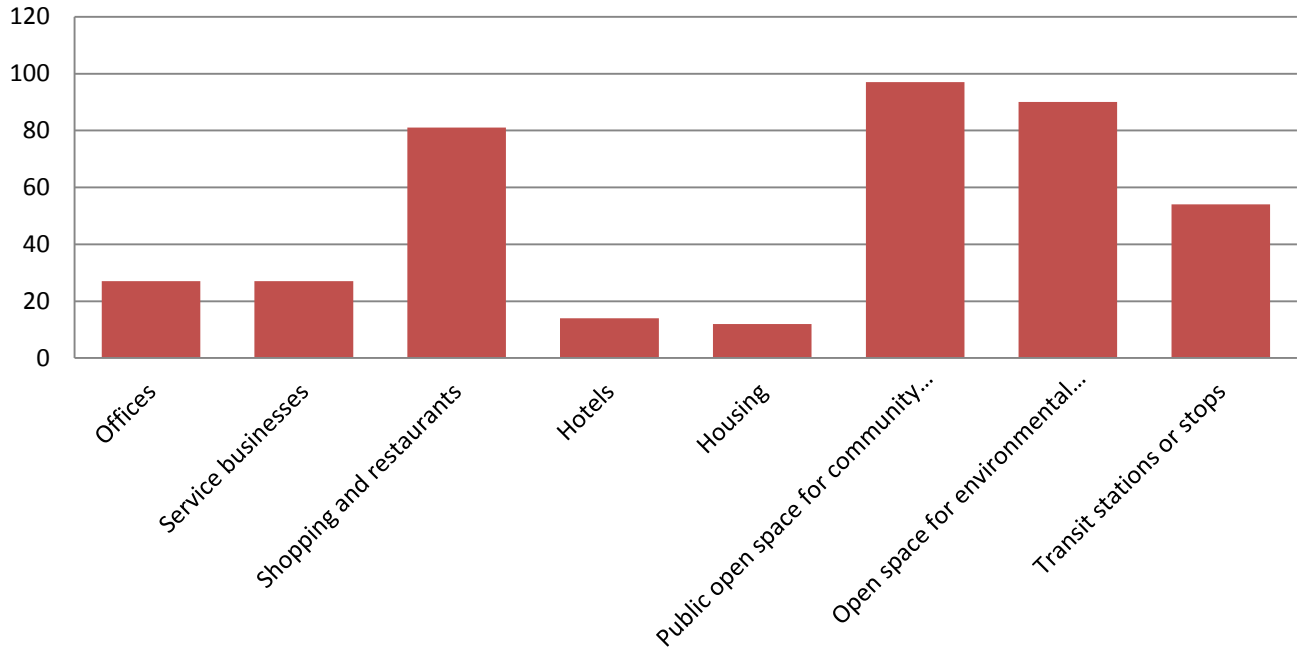
Old Saybrook 6. How often do you drive some portion of the Route 1 Corridor in Clinton, Westbrook, or Old Saybrook?



Old Saybrook 7. Picture your ideal vision for the Route 1 Corridor in Clinton, Westbrook and Old Saybrook. Which of the following best defines your vision? (select all that apply)



Old Saybrook 8. Which types of land use would you like to see more of along the Route 1 Corridor in Clinton, Westbrook and Old Saybrook? (select all that apply)



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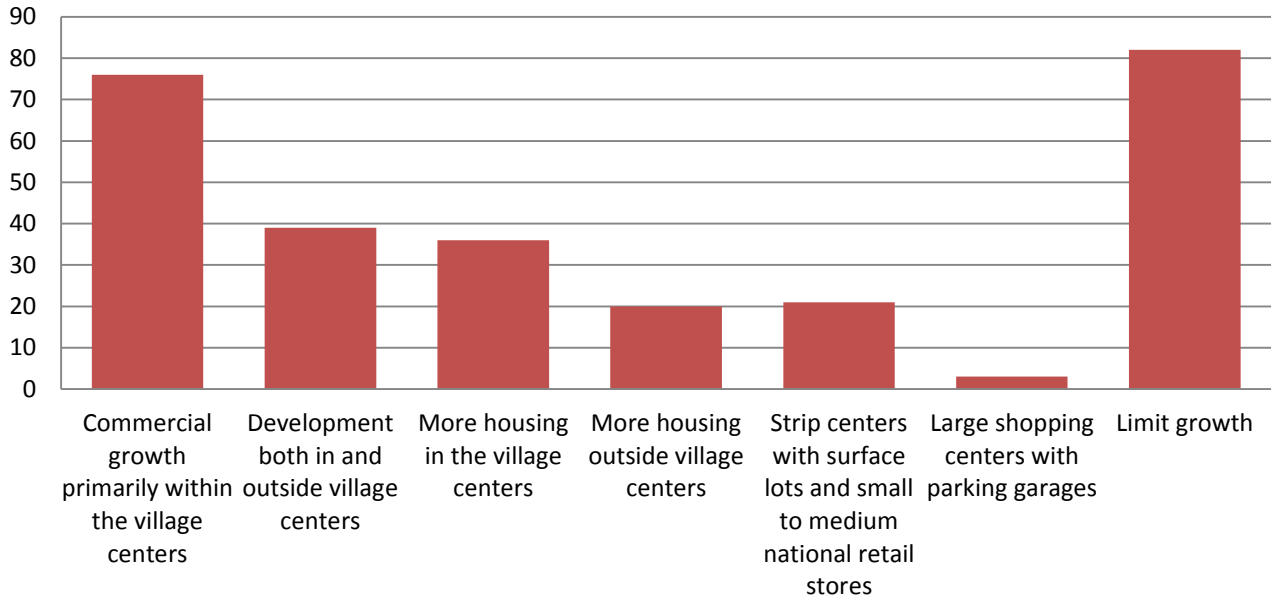

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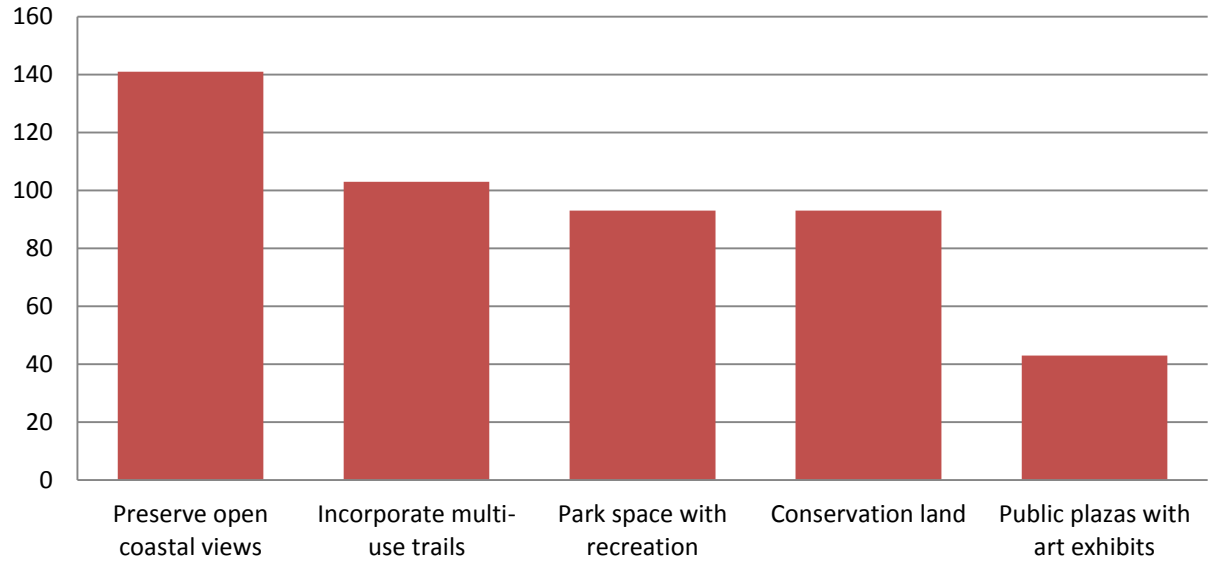

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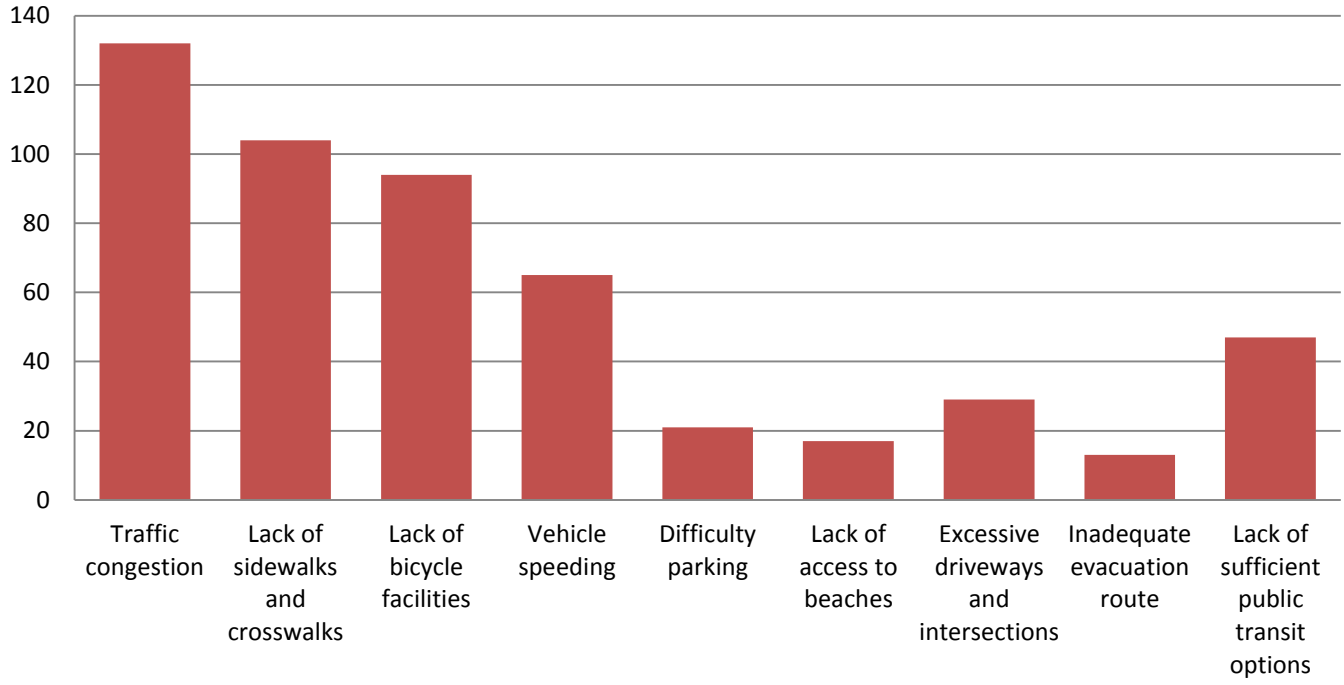

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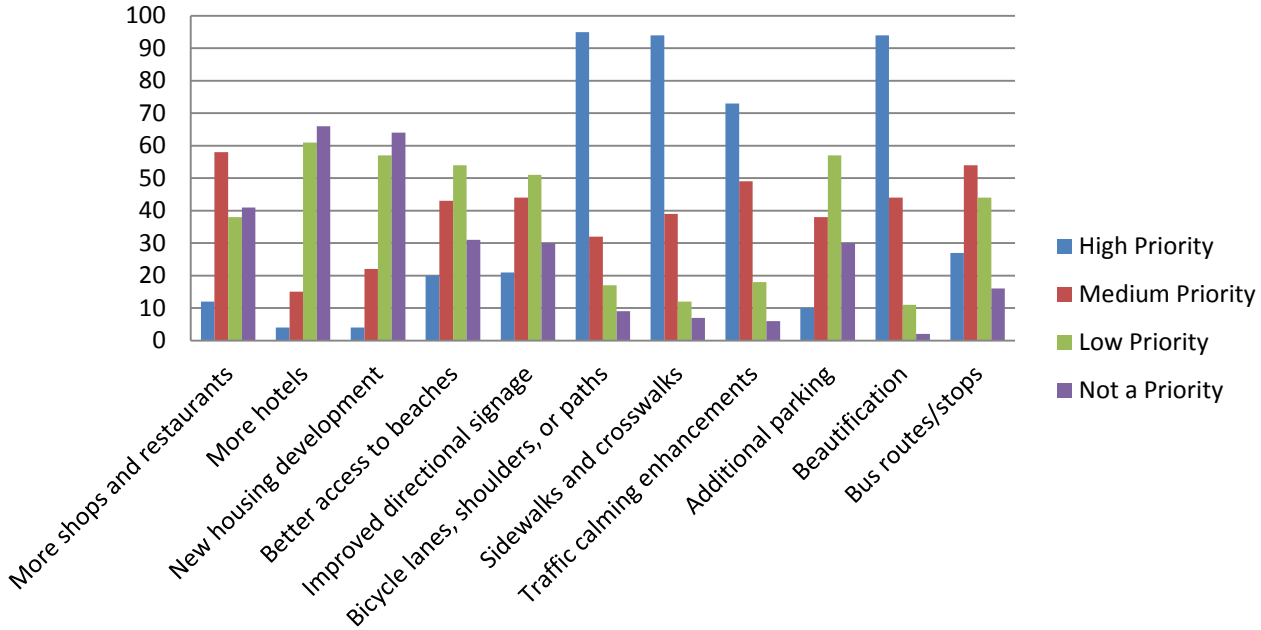

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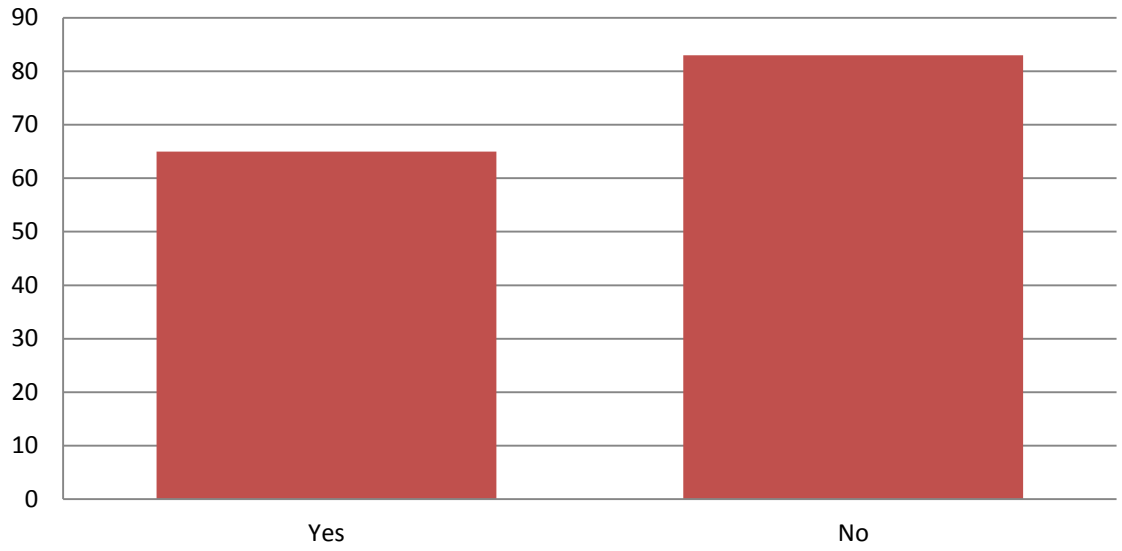
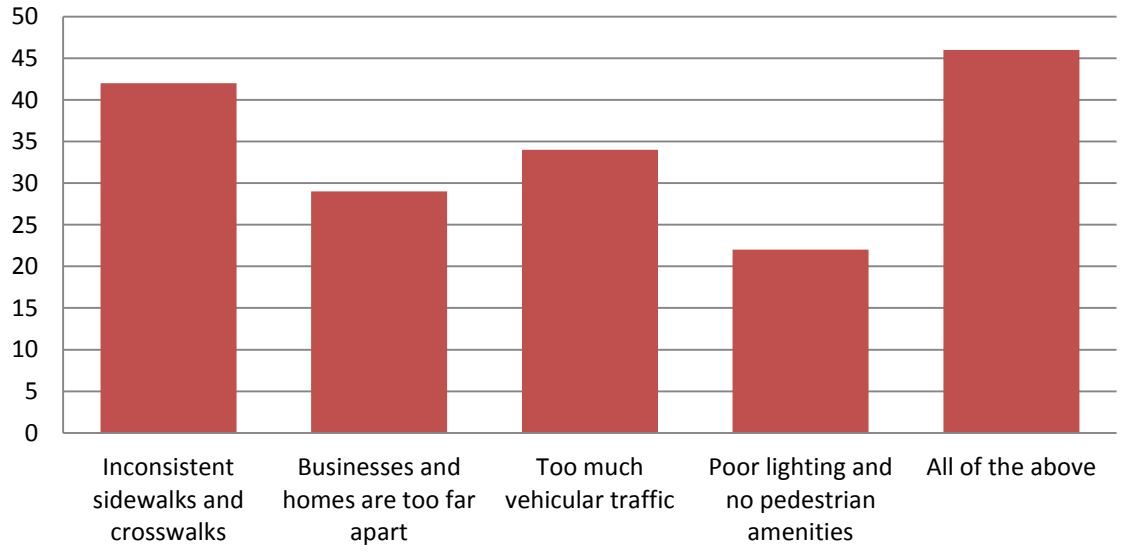
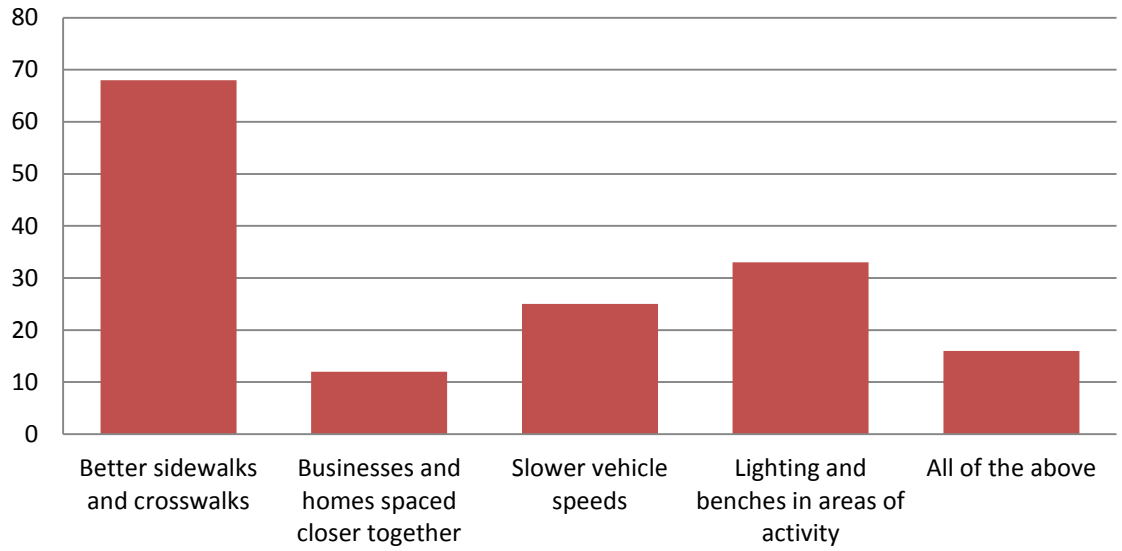


Old Saybrook 14. If no, why don't you ever walk in the Route 1 Corridor? (select all that apply)



Old Saybrook 15. If yes, what would get you to walk more in the Route 1 Corridor? (select all that apply)



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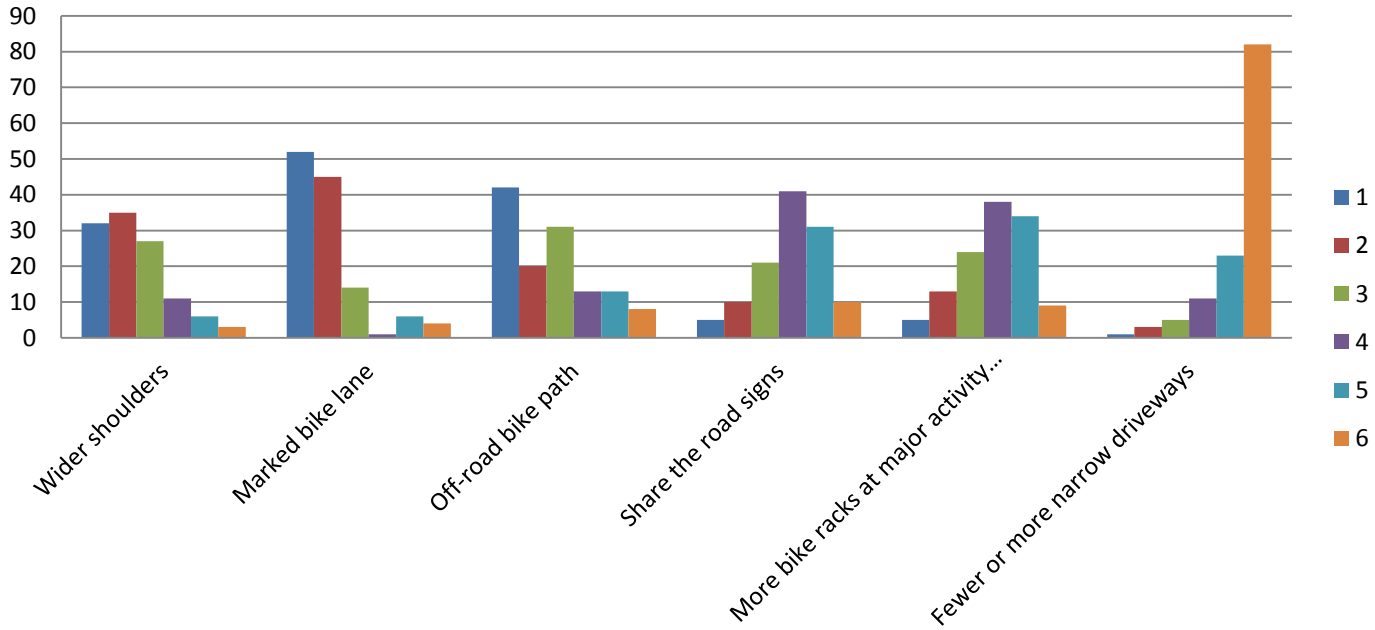

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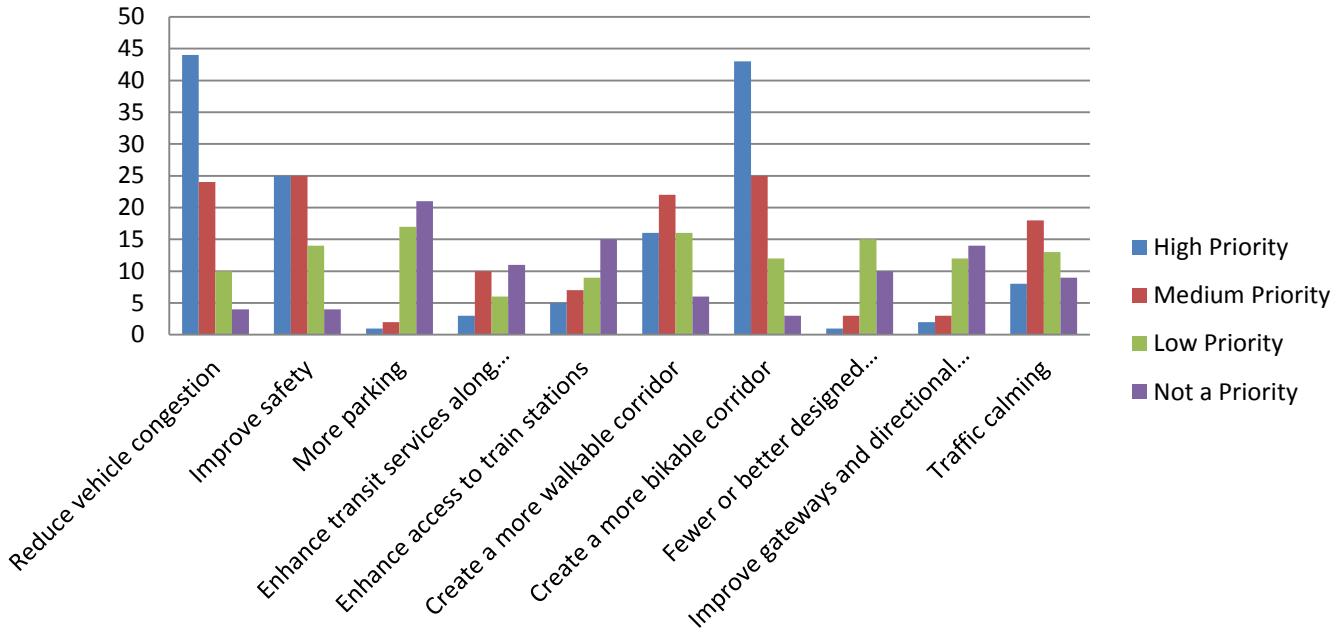

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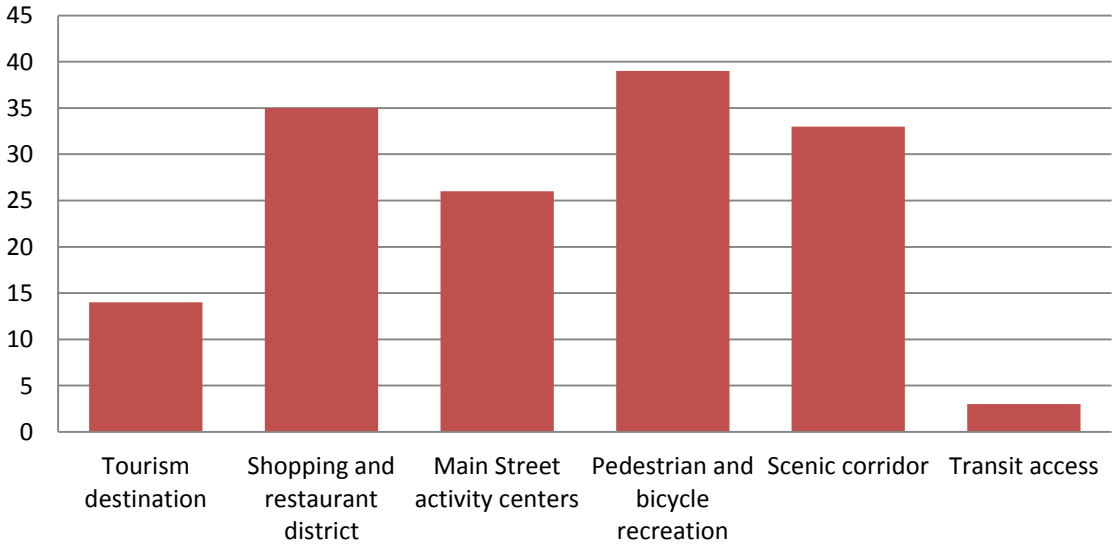
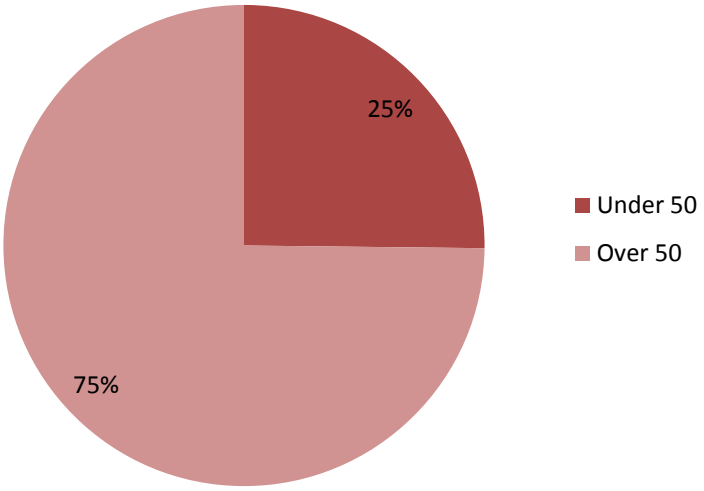
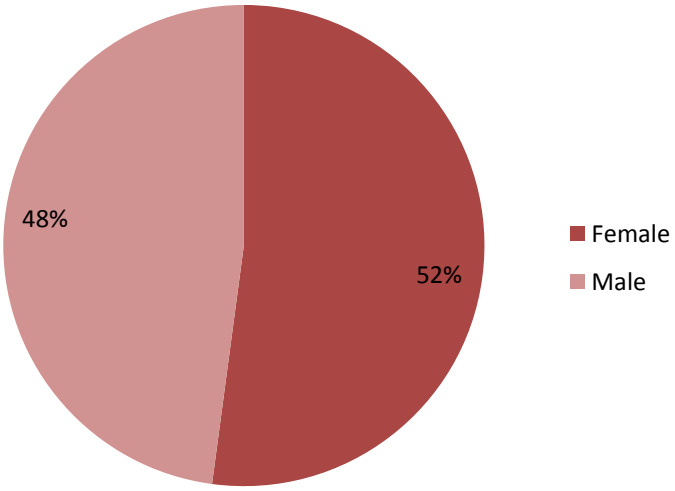


Old Saybrook 19. What is your age? (optional)



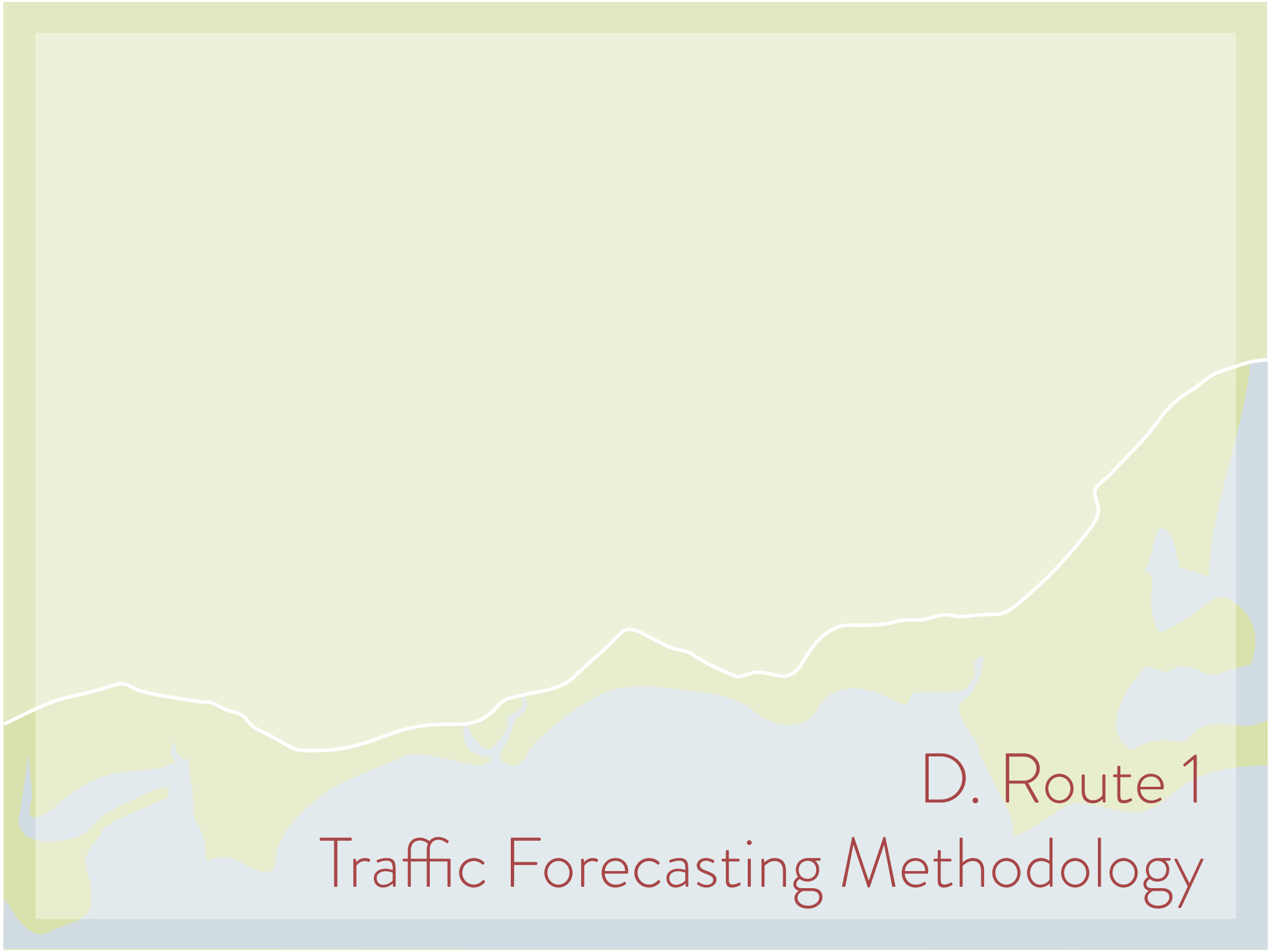
Old Saybrook 20. What is your gender? (optional)



Comparison of town responses

If you compare the responses from residents of each of the three towns, Clinton, Westbrook and Old Saybrook, with one another, a few commonalities and differences can be noted. Most respondents are year-round residents. Westbrook and Old Saybrook have more respondents that work in their hometowns than Clinton does. Clinton had slightly more interest in shopping and restaurants for land use than Westbrook or Old Saybrook, which chose public open space and open space for environmental preservation as their land use preferences. Old Saybrook residents were more likely to select to 'limit

growth' in terms of economic development. In terms of their greatest travel concerns, more Clinton residents saw difficulty parking as a concern, whereas more Westbrook and Old Saybrook residents saw vehicle speeding as a concern, though all three towns selected 'traffic congestion', 'lack of sidewalk and crosswalks' and 'lack of bicycle facilities' as their greatest travel concerns. Clinton residents chose 'more shops and restaurants' as a high priority for corridor improvements. Old Saybrook respondents had a greater proportion that claimed they do not walk along the corridor, while Westbrook had a greater proportion that claimed they do walk along the corridor. Westbrook residents selected 'creating a more walkable corridor' as a high priority for transportation improvements, though all three towns selected 'reduce vehicle congestion' and 'create a more bikable corridor' as high priority improvements. The greatest difference noted was in the respondents' ideas for the greatest opportunity for the Route 1 corridor. Clinton respondents see the greatest opportunity for the corridor to be a 'shopping and restaurant district'. Westbrook residents see the greatest opportunity as a 'scenic corridor' or 'pedestrian and bicycle recreation'. Old Saybrook residents selected all three of these options, fairly equally, as the greatest opportunity for the Route 1 corridor.



D. Route 1
Traffic Forecasting Methodology

FITZGERALD & HALLIDAY, INC.
Innovative Planning, Better Communities

MEMORANDUM

To: Anna Bergeron
CC: Jean Davis

Project: Boston Post Road Corridor Plan

From: FHI Project Team

Date: August 1, 2014

Subject: Route 1 Traffic Forecasting Methodology

The purpose of this memorandum is to summarize the method used to develop a traffic growth rate for the Boston Post Road Corridor Plan. Several sources were reviewed to determine the growth rate for our 20 year time horizon (2013 to 2033) including:

- Existing traffic demand
- Historical traffic demand
- Existing land use context
- Planned projects as part of the future land use scenario

Once approved, growth rate(s) will be applied to our existing traffic counts to develop future traffic projections for use in the analysis of future conditions for the study corridor. The process is summarized below:

1) The Connecticut Department of Transportation (CTDOT) maintains an automatic traffic recorder (ATR) database. This database system contains 24-hour traffic counts, usually data collected on a Tuesday, Wednesday, or Thursday, at various locations throughout the state, and were used in the historical assessment. In **Table 1**, a catalogue of historical traffic trends was created at four locations along the study area where data was available from 1992 through 2010. The catalogue was separated into two timeframes based on historical traffic trends; one growth period (1992 – 2001), and one non-growth period (2004 – 2010).

Table 1: Historic Traffic Trends

Location	Trend - Annual Historic Growth Rate		
	All Years	1992 - 2001	2004 - 2010
Downtown Clinton	*-0.74%*	*-0.67%*	*-0.68%*
Downtown Westbrook	0.00%	**0.83%**	*-1.91%*
Old Saybrook (NE of Rte 154 (W JCT))	*-0.60%*	**3.00%**	*-1.40%*
Old Saybrook (W/O Ingham Hill Rd)	*-0.20%*	**1.98%**	*-0.48%*
Route 1 (all ADTs)	*-0.40%*	**1.25%**	*-1.09%*

2) Understanding the future land use context is important when determining an appropriate traffic growth rate. Development opportunities were identified through interviews with the community planners and planning or zoning commission members along with field review. These development

opportunities fall into two broad categories; 1) current planned and programmed projects, and 2) other parcels with potential for development/redevelopment. Additional information on projects can be found in Chapters V and VI of the Existing Conditions report. Site generated traffic from the following approved projects is included in the future traffic volume:

- Max's Place retail development at the intersection of Route 1/Route 66 in Old Saybrook
- Eastpoint at Saybrook Junction (186 housing units)

Other parcels within the study corridor have less specificity with regard to type and scale of development, so trips for those are accounted for in a general growth rate as explained in the next section.

3) The timeframe from 1992 to 2001 was a traffic growth period – particularly for Old Saybrook (2% to 3% annually). The Route 1 corridor also grew 1.25% per year during that period (all three towns combined). The timeframe from 2004 to 2010 is generally characterized as stagnant or declining growth. Based on the future land use context and potential project generated trips, we recommend the following growth rate for each town:

   - Old Saybrook has the highest development potential and a strategic vision for future growth. For these reasons, we recommend a **1.0%** compounding annual growth rate.
   - For Westbrook, which has more constraints to development and a Vision of preservation, we recommend a **0.5%** compounding annual growth rate. We envision continued travel demand increases for the entire shoreline corridor, as well as some modest localized development potential.
   - For Clinton, which has development potential just north of the town center, we recommend two growth rates: a **1.0%** compounding annual growth rate for the town center and a **0.5%** compounding annual growth rate for the remaining locations. We envision Route 1 in Clinton to become more vibrant and the Unilever site holds redevelopment potential; however the existing function of Route 1 as Clinton's 'Main Street' will continue to be a constraint for significantly higher levels of traffic growth.

   The above recommended growth rates will increase traffic demand by approximately 10% to over 20% in Clinton, 10% in Westbrook, and over 20% in Old Saybrook, by 2033. We will apply these general growth rates to all existing year intersection turning movements and add the site-specific traffic volumes generated by Max's Place and Eastpoint at Saybrook Junction to forecast the future traffic volumes for the year 2033.

E. Route 1/ Main Street Build Options White Paper

FITZGERALD & HALLIDAY, INC.
Innovative Planning, Better Communities

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Hartford, CT 06103
t (860) 247-7200
www.fhiplan.com

MEMORANDUM

To:	Project Team	Project:	Boston Post Road Corridor Study
From:	FHI	Date:	January 2015
Subject:	DRAFT Route 1/Main Street Build Options White Paper		

Introduction

A detailed traffic assessment was undertaken to compare alternative concepts for the Route 1/Main Street intersection in Old Saybrook, Connecticut. The options include:

- **No Build:** Represents estimated future traffic conditions under the existing geometric (travel lane) configuration. No Build establishes a future baseline that alternatives may be compared against.
- **Option 1:** Construction of dual left turn lanes (300 feet, plus 75 feet of taper) from Route 1 southbound onto Main Street, maintaining all other geometric conditions.
- **Option 2:** Option 1, plus repurposing a northbound Route 1 through lane (between Main Street and Stage Road) to accommodate a second southbound left turn lane, thereby reducing the potential for property impacts.
- **Option 3:** Reduce the Route 1 cross section at Main Street from 4 lanes to 3 lanes, and eliminate the left turn lane from Route 1 southbound to Main Street and redirect traffic to Stage Road and North Main Street eastbound.

Intersection Operations

Traffic flow at signalized intersections is a function of individual traffic movements (by lane) operating within the confines of the overall traffic signal cycle length. The cycle length is the total time for a traffic signal to complete one sequence of all movements within an intersection and generally ranges from 45 seconds to 180 seconds. The larger or more complex an intersection's configuration is, the greater the cycle length will need to be in order to accommodate all movements. Traffic demand and intersection configurations vary along Route 1 and cycle lengths range from 45 seconds to 145 seconds. The intersection of Route 1/ Main Street has the highest cycle length of the corridor, at 145 seconds. This intersection is also one of the more complex and serves high traffic demand – particularly turning movements.

In addition to the intersection cycle length, individual movements are measured by delay. For example, a driver who approaches an intersection expects to not be delayed more than one minute on average – understanding there will be times they may clear the intersection with no delay, and times they could be delayed more than one minute). If there is too much delay, long traffic queues may begin to occur leading

to increasing driver frustration. A performance measure referred to as level of service (LOS) is a qualitative measure of how effectively an intersection processes traffic. In general terms, LOS is a function of vehicle delay through an intersection. Six levels of service are defined with letter designations from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. Table 1 outlines the LOS criteria.

Table 1: Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (seconds/vehicle)
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

Source: 2000 Highway Capacity Manual (Special Report 209)

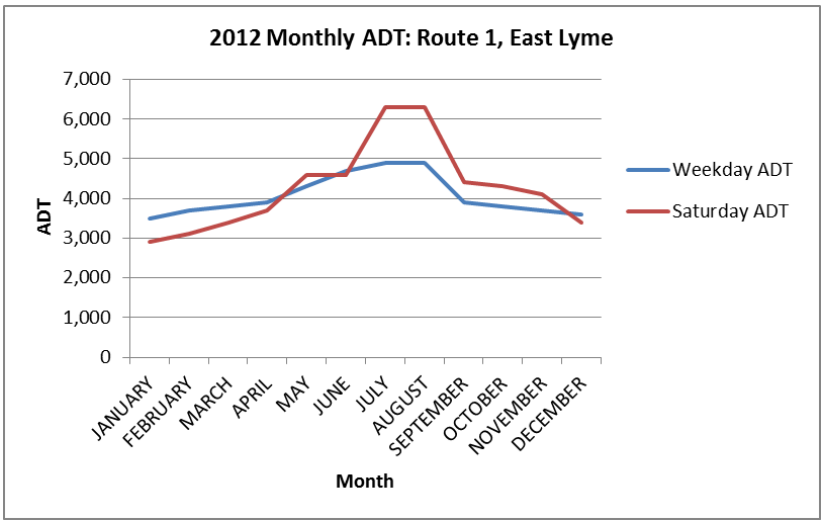
For this analysis, intersection movements that operate below a LOS D (i.e. LOS E and F) have been identified as requiring additional evaluation and potentially receiving solutions to mitigate the delay.

Computer software is used to compute intersection cycle length and LOS based generally on intersection geometry and traffic demand. The intersection cycle length confines all individual movements to a timing plan specific to the needs of that intersection. For example, if the cycle length of Route 1/ Main Street were to be reduced (<145 seconds), there may not be sufficient time for vehicles to clear certain movements before the signal changes phases. Conversely, if the cycle length is extended (>145 seconds), drivers may be delayed because the signal will allocate more time to each individual movement, requiring traffic at the red light to wait longer to get a green phase; therefore, the LOS is based on the balance between individual movements operating within the confines of the cycle length. Adding or reducing capacity of one approach will ultimately influence the other movements.

Traffic

To select a Design Hourly Volume (DHV) for the Route 1 corridor, seasonal and daily traffic trends were analyzed. The DHV is a parameter considered when determining road modifications. Seasonal variations reflect the changing patterns of recreational, school, and tourism travel activity; particularly during the summer months. Monthly data from Connecticut Department of Transportation's (CTDOT) permanent count site located on Route 1 in East Lyme (just east of the study corridor) for 2012 is illustrated on Figure 1.

Figure 1: Seasonal Variation in Traffic Demand on Route 1



Source: CTDOT

A pronounced spike in weekend (Saturday) traffic demand occurs during July and August; otherwise there is little difference between weekday and weekend average traffic volumes during the other months[1]. Recent peak hour intersection counts on Route 1 in the study area obtained in August 2013 confirmed a similar pattern between weekday and weekend traffic during the summer. Along Route 1 in the study area, Saturday traffic demand during July and August is approximately 20 percent higher than weekday traffic during the same months. Based on the relatively limited spike in traffic during summer weekends, and the community outreach that suggested a more walkable and bikable Route 1 though Old Saybrook, the Study Advisory Committee confirmed that the Design Hourly Volume should reflect a 'typical' peak condition, which is an average Saturday during non-summer months. This DHV does not reflect the worst-case traffic condition in the corridor, but one that exhibits average traffic levels that are typical during about 90% of the total days in the year.[2]

The existing traffic counts were then inflated to a future year through a combination of an annual growth rate and the addition of recently approved but not yet constructed projects. See the Existing and Future Conditions report for more details on Route 1 traffic forecasts.

Definition of options

A conventional response aimed at reducing congestion is to add capacity as needed. Such a response should be carefully considered given the community's desire to make Route 1 safer and more pedestrian and bicycle friendly through Old Saybrook.[3] An operational analysis for the Route 1/Main Street intersection was conducted for each of the following alternative options:

[1] Based on a CTDOT permanent count station on Route 1 in East Lyme
[2] This is an estimate based on average daily traffic that is not influenced by road construction or traffic accidents
[3] The primary reason for selecting a DHV that does not reflect the worst-case traffic demand forecast

- **No Build:** Represents estimated future traffic conditions under the existing geometric (travel lane) configuration. No Build establishes a future baseline that alternatives may be compared against.
- **Option 1:** Construction of dual left turn lanes (300 feet, plus 75 feet of taper) from Route 1 southbound onto Main Street, maintaining all other geometric conditions.
- **Option 2:** Same as Option 1, but repurposing a northbound Route 1 through lane (between Main Street and Stage Road) to accommodate a second southbound left turn lane, thereby reducing the potential for property impacts.
- **Option 3:** Reduce the Route 1 cross section at Main Street from 4 lanes to 3 lanes, and eliminate the left turn lane from Route 1 southbound to Main Street and redirect traffic to Stage Road and North Main Street eastbound.

Operations and potential impacts of each option

Four options for the intersection of Route 1 and Main St./Stage Road were considered. The following paragraphs and illustrations describe the expected operations from a traffic perspective, as well as the potential impacts of each.

No Build: For the No Build option, delays along Route 1 northbound and southbound will increase due to future growth in traffic demand – mainly for left-turning vehicles off Route 1 onto Main Street. Higher delays are also expected to occur for the westbound through movement on Main Street as Route 1 becomes increasingly congested and the traffic signal is unable to provide sufficient green time for all movements while maintaining a reasonable LOS. If the cycle length was increased in an attempt to capture more time for the congested movements, the overall intersection LOS would actually degrade. This holds true for each option, as well.

Option 1 will result in modest improvements to signal operations when compared to No Build. The southbound left-turn movement delays are reduced by approximately 20 percent while overall intersection delays are expected to be reduced by approximately 15 percent. Because the southbound left-turning movement is much greater than the northbound left, they do not run concurrently; therefore, the southbound left and through usually run during the same phase. The southbound through movement will continue to create high delays for northbound left-turning vehicles, similar to No Build. High delays are expected to remain for the westbound through movement on Main Street. Even at 300 feet, queues are expected to extend beyond the storage capacity of the proposed turn lanes during peak conditions.

To accommodate the addition of a southbound left-turn lane that provides a sufficient turn radius for trucks, Route 1 will need to be widened approximately 10 to 12 feet beyond the existing curb line. Figure 2 illustrates property impacts that would occur if Route 1 was widened to the east (east was initially selected because buildings/structures are set back further from the existing roadway, compared to the west). Furthermore, the utility right-of-way will need to extend back proportionately with the roadway. Utilities would include a traffic signal mast arm; therefore, could not be buried under the sidewalk. This will require property acquisition and may potentially

impact building structures along the eastern front of Route 1 the length of the proposed turn lane (~375 feet total).

Figure 3 illustrates property impacts that would occur if the widening of Route 1 was more centered. Implementation will require property acquisition east of Route 1 to accommodate utilities (traffic signal mast arm), but structural impacts would be limited. However, the alignment demonstrates any encroachment to the west would result in the loss of the Monkey Farm Café, and potentially the adjacent structure to the north.

Figure 2: Option 1

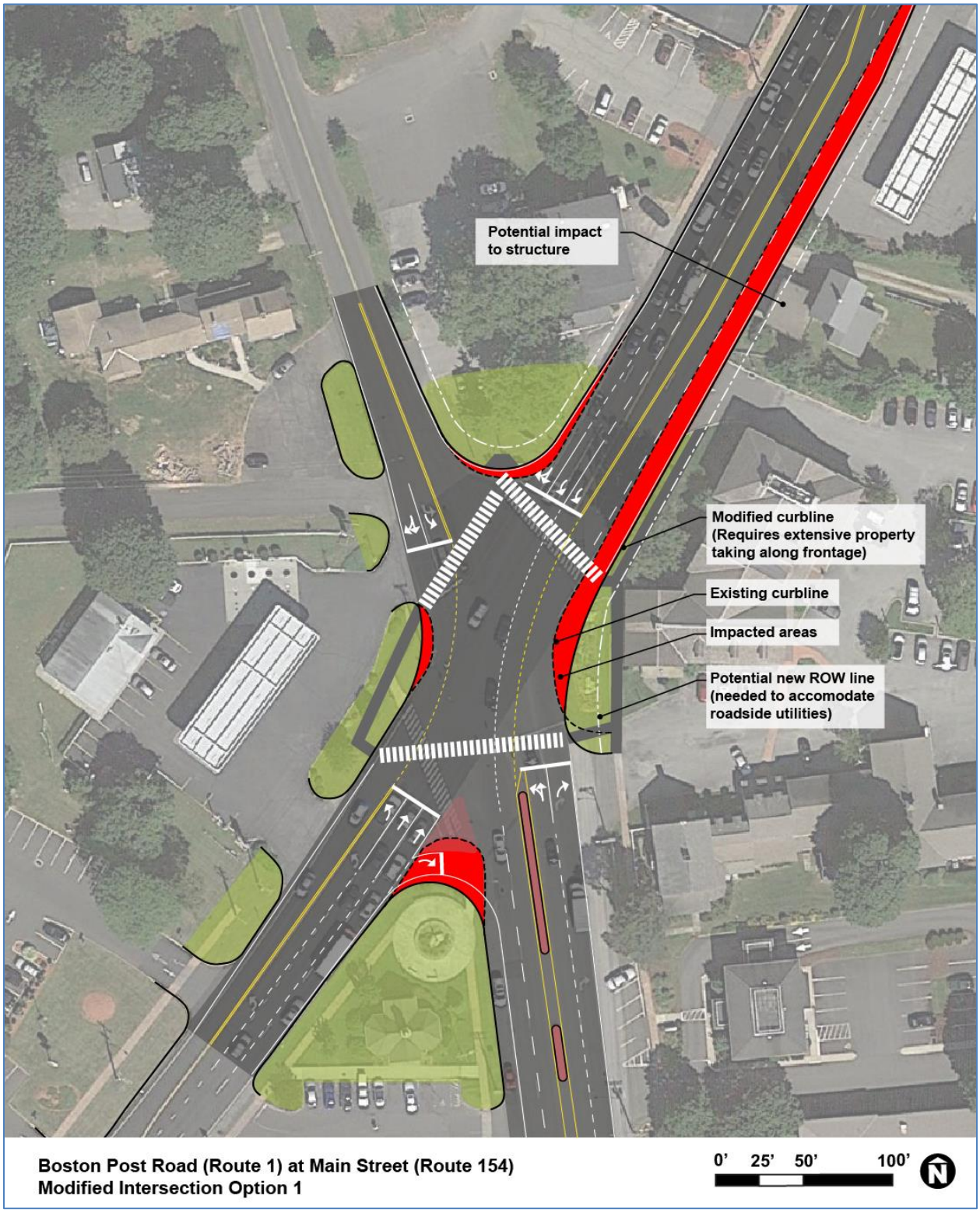
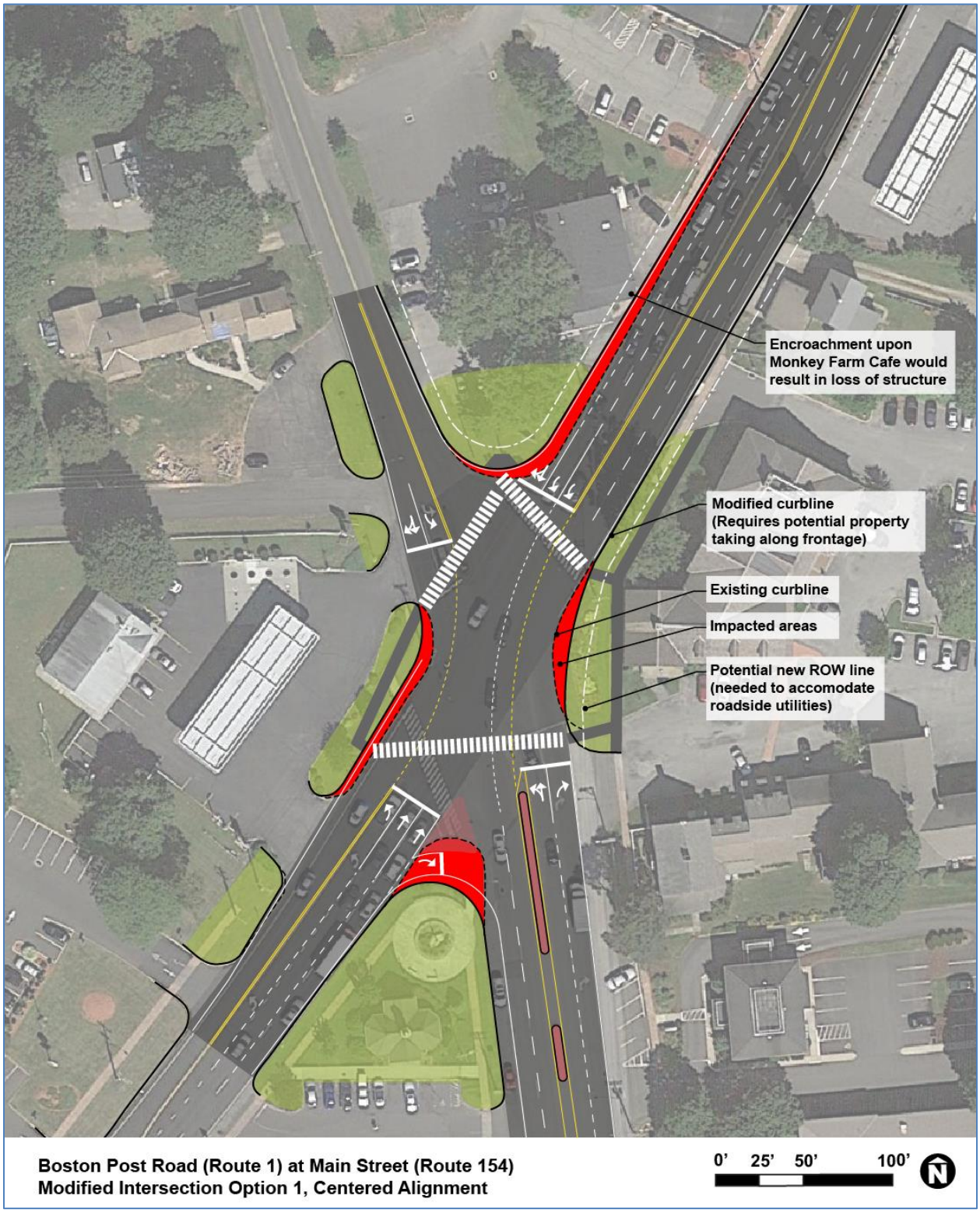


Figure 3: Option 1, Centered Alignment



Option 2 will experience increased delay compared to No Build, resulting from the repurposing of a northbound Route 1 through lane (between Main Street and Stage Road) to accommodate the southbound left turn lane. Northbound traffic will require an additional 10 seconds of green time with only one through lane in order to process the traffic demand; therefore, the conflicting southbound left movement's green time must be reduced in order to maintain travel flow on Route 1 resulting in delays greater than No Build, even with two southbound left-turn lanes. The westbound through movement on Main Street is expected to operate at LOS F as time must be reallocated to higher demand movements. Queues are expected to extend beyond the storage capacity of the proposed turn lanes during peak conditions.

Even though an existing lane will be repurposed to accommodate the additional turn lane, implementation will result in property impacts as illustrated in Figure 4. Notably, the curbline along the east edge of the intersection would require modification to provide adequate clearance for westbound right turning trucks. However, structural impacts are not anticipated with Option 2.

Option 3 will improve intersection operations compared to No Build. By removing the southbound left turn lane from Route 1 to Main Street, more time can be allocated to other movements – mainly the northbound through movement. Furthermore, traffic demand once making the left turn has now shifted to the eastbound approach and will be shared with the existing movements; thereby creating a net gain in time. This configuration also simplifies the intersection by removing left turning vehicles and reduces the time allocated to the pedestrian phase by shortening the crossing distance.

As seen in Figure 5, the eastbound left movement from North Main Street to Route 1 will be repurposed to an eastbound through lane; however, drivers can still utilize Stage Road. A roundabout is proposed at the intersection of Stage Road/North Main Street to help reduce the potential for queueing but a traffic signal may also be considered. See the Boston Post Road Corridor Plan for more information on this concept.

Under Option 3, no property impacts resulting from the geometric change to the intersection are anticipated along Route 1 and North Main Street within the vicinity of Main Street. In fact, the additional right-of-way gained may be repurposed to accommodate other uses (i.e. bike lanes, parking). Property impacts indicated on Figure 5 are associated with proposed sidewalks – which would be precluded in Options 1 and 2. Property impacts would be expected at the intersection of North Main Street/Stage Road to accommodate a roundabout. A traffic signal could replace the roundabout and reduce the impacts, but it may not function as well.

Figure 4: Option 2

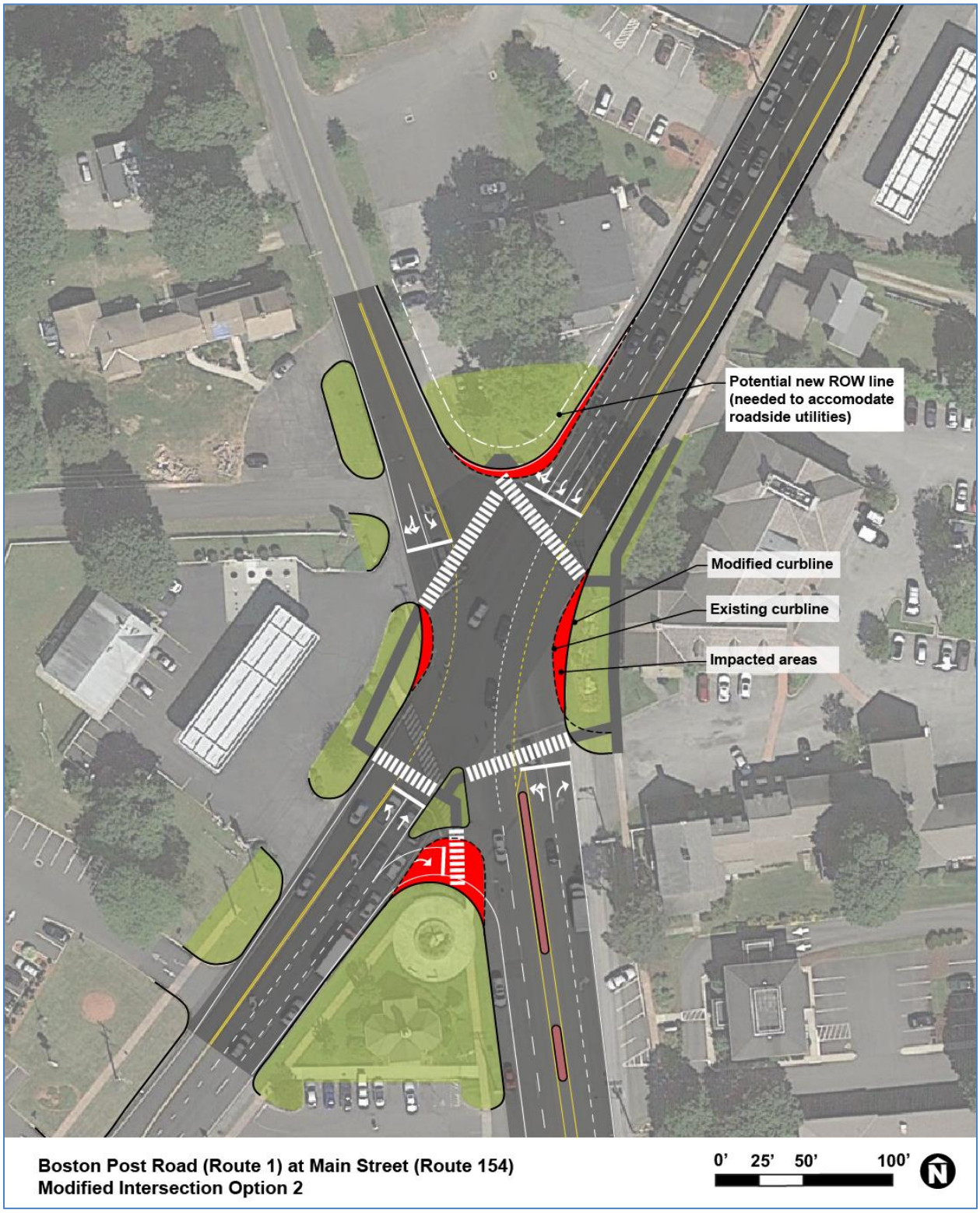
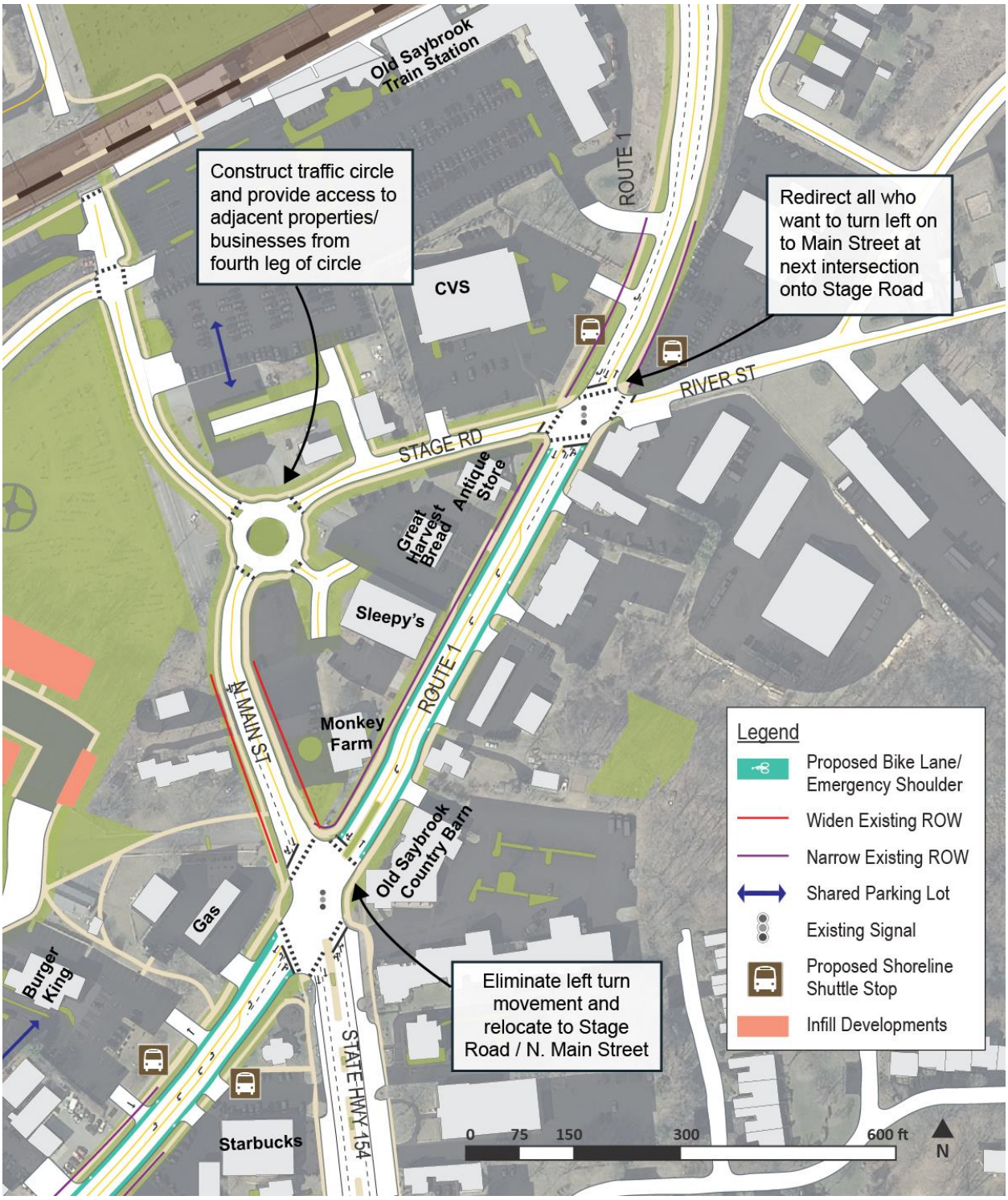


Figure 5: Option 3



The operational analysis was completed using Synchro 8.0, a computer-based intersection operations model that replicates procedures from the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000 and 2010). Results are summarized in Table 2.

Table 2: Level of Service Results

Route 1 and Main Street			No Build		Option 1		Option 2		Option 3	
			Saturday Peak Hour		Saturday Peak Hour		Saturday Peak Hour		Saturday Peak Hour	
Approach	Roadway	Movement	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS
Eastbound	North Main Street	Left	39.8	D	39.0	D	43.1	D	N/A	
Eastbound	North Main Street	Thru-right	33.6	C	32.6	C	36.8	D	54.6	D
Westbound	Main Street	Thru-left	63.9	E	55.8	E	83.1	F	54.1	D
Westbound	Main Street	Right	1.8	A	2.4	A	3.4	A	10.5	B
Northbound	Route 1	Left	59.9	E	71.1	E	55.5	E	79.7	E
Northbound	Route 1	Thru-right	50.2	D	37.0	D	47.8	D	27.5	C
Southbound	Route 1	Left	61.4	E	48.7	D	67.7	E	N/A	
Southbound	Route 1	Thru-right	37.9	D	37.2	D	37.2	D	48.2	D
Intersection			**41.2**	**D**	**35.3**	**D**	**43.3**	**D**	**39.0**	**D**

N/A: not applicable - movement removed or repurposed

Conclusions and Recommendations

Overall, most intersections along Route 1 in the study corridor are expected to manage traffic reasonably well during a typical future non-summer weekend, but isolated pockets of congestion do occasionally develop, particularly during the afternoon hours. Traveling north along Route 1, congestion approaching Main Street has been observed. Traveling south along Route 1 at Main Street, congestion throughout the day has been observed for left-turning vehicles and the through movement - at times extending back to Stage Road. Congestion was also observed on Main Street approaching Route 1 from the east.

The assessment of options for the intersection of Route 1 and Main St/Stage Rd includes traffic operational performance, project benefits, and potential impacts. Table 3 lists both quantitative and qualitative results of this evaluation, and the following text briefly describes the results:

- **No Build:** delays and congestion along Route 1 northbound and southbound will continue to increase due to future growth in traffic demand – mainly for left turning vehicles from Route 1 to Main Street. Safety will continue to be a concern along this stretch of Route 1 which currently experiences a high number of vehicular crashes. This option does not compliment the community's vision for a road environment that accommodates all modes safely and reflects the character of the town. Leaving the intersection as is has not adverse impacts to property or utilities.

- **Option 1:** will improve signal operations overall when compared to No Build; however, the configuration will require property acquisition and may potentially impact building structures along Route 1 the length of the proposed turn lane (~375 feet total). This option does not support the community vision of a safe multimodal corridor, as it further widens Route 1 to accommodate the high left-turn traffic volume. The option has various property and utility impacts associated with widening, and therefore the cost would be significant.
- **Option 2:** the southbound left movement's green time will be reduced in order to maintain travel flow on Route 1 northbound, resulting in delays greater than No Build. The configuration will also require property acquisition but structural impacts will be limited. This option minimizes the impacts associated with the previous Option 2; however, the community benefits are similar and the signal operations are expected to be worse than they are under existing conditions (Option 1).
- **Option 3:** will improve operations compared to No Build. Furthermore, no property impacts are anticipated along Route 1 within the vicinity of Main Street and the right-of-way gained could be repurposed to accommodate other uses. This option meets the community vision because it addresses traffic congestion, improves safety by eliminating a number of driveways along Route 1, and provides space for bicycle lanes. It also creates a more seamless continuation of Main Street to the train station and the associated transit oriented development expected to take place there in the future. The cost of redesigning Stage Road and North Main Street is significant; however, this appears to be the only option that addresses community vision, improves safety, provides better bicycle and pedestrian accessibility, and reasonably deals with typical traffic demand.

Table 3: Comparative Evaluation Matrix

Route 1 intersection with Main St/Stage Rd Option	*Traffic Operations*		*Benefits*					*Impacts*		
	Intersection (LOS/Delay)	Worst Movement (LOS/Delay)	Safety	Community Vision	Multimodal	TOD Supportive	Access Management	Property	Utilities	Cost
No build	LOS D/ 41 seconds	LOS E/ 63 seconds								
Option 1	LOS D/ 35 seconds	LOS E/ 71 seconds								
Option 2	LOS D/ 43 seconds	LOS F/ 83 seconds								
Option 3	LOS D/ 39 seconds	LOS E/ 80 seconds								

This assessment illustrates that in order to improve delay at the Route 1/Main Street intersection, but limit the operational and/or right-of-way impacts, Option 3 provides the best balanced solution. With an improved overall LOS compared to No Build, no right-of-way impacts, and a wide range of multimodal and/or on-street parking benefits, **Option 3 is recommended for advancement.**

F. Route 1 Traffic Analysis White Paper

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MEMORANDUM

To:	Project Team	Project:	Boston Post Road Corridor Study
From:	FHI	Date:	February 2015
Subject:	DRAFT Route 1 Traffic Analysis White Paper		

Introduction

This memorandum documents the traffic analysis conducted for the Route 1 Corridor Study and includes:

- **Existing:** Represents existing traffic conditions under the existing geometric (travel lane) configuration
- **Future 2033 No Build:** Represents estimated future traffic conditions under the existing geometric (travel lane) configuration. No Build establishes a future baseline that Build recommendations may be compared against
- **Future 2033 Build:** Represents estimated future traffic conditions under the proposed geometric reconfigurations along the Route 1 corridor

Intersection Operations

A performance measure referred to as level of service (LOS) is a qualitative measure of how effectively an intersection processes traffic. In general terms, LOS is a function of vehicle delay through an intersection. Six levels of service are defined with letter designations from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. Table 1 outlines the LOS criteria.

Table 1: Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	0-10	0-10
B	>10-20	> 10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

Source: 2000 Highway Capacity Manual (Special Report 209)

Conventional practices point to LOS C, describing a condition of stable traffic flow, as the minimum desirable level for peak traffic flow in rural and suburban areas. LOS D (and sometimes LOS E), with greater vehicle queues and delay, are often considered

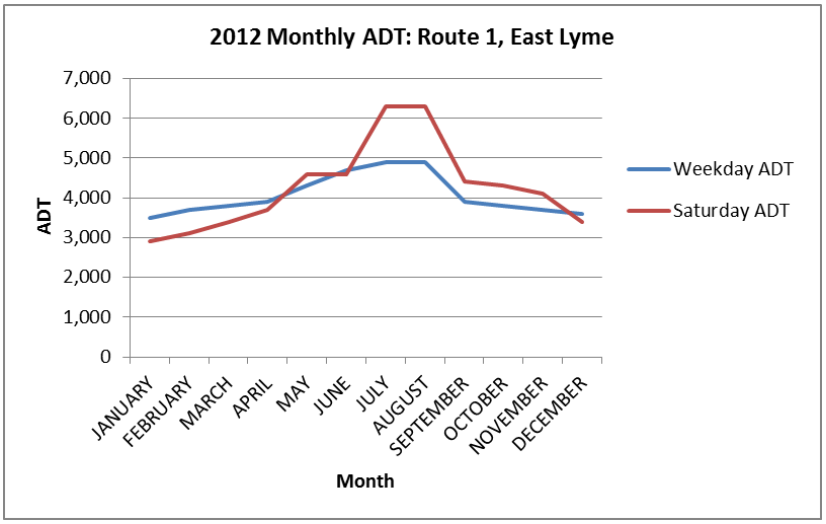
acceptable for urban areas because of the accessibility benefits and higher pedestrian interactions that result from increased density. For the purposes of this traffic assessment, a Build concept should ensure operations of LOS D or better.

Traffic

Existing intersection turning movement counts were collected at the study intersections during peak summer conditions (August 2013 on a clear day). As the study progressed and more data was needed, traffic counts were obtained from recently completed traffic studies and compared against the collected counts to ensure consistency.

To select a Design Hourly Volume (DHV) to analyze future No-Build and Build conditions for the Route 1 corridor, seasonal and daily traffic trends were analyzed. The DHV is a parameter considered when determining road modifications. Seasonal variations reflect the changing patterns of recreational, school, and tourism travel activity; particularly during the summer months. Monthly data from the Connecticut Department of Transportation's (CTDOT) permanent count site located on Route 1 in East Lyme (just east of the study corridor) for 2012 is illustrated on Figure 1.

Figure 1: Seasonal Variation in Traffic Demand on Route 1



Source: CTDOT

A pronounced spike in weekend (Saturday) traffic demand occurs during July and August; otherwise there is little difference between weekday and weekend average traffic volumes during the other months[1]. The peak hour intersection counts on Route 1 in the study area obtained in August 2013 confirmed a similar pattern between weekday and weekend traffic during the summer. Saturday traffic demand during July and August is approximately 20 percent higher than weekday traffic during the same months. Because the summer season is relatively short, and the community vision for Route 1strived for a more multimodal corridor with less auto-dominance, the Study Advisory Committee confirmed that the Design Hourly Volume should reflect a 'typical'

[1] Based on a CTDOT permanent count station on Route 1 in East Lyme

peak hour, which is midday on Saturday during non-summer months. This DHV does not reflect the worst-case traffic condition in the corridor, but one that exhibits average traffic levels that are typical during about 90% of the total days in the year.[2]

The existing traffic counts were adjusted to reflect typical peak conditions, and then projected to 2033 through a combination of an annual growth rate and the addition of recently approved and planned constructed projects. Site generated traffic from the following approved projects were included in the analysis:

- Max's Place retail development at the intersection of Route 1/Route 66 in Old Saybrook (this was not complete at the time counts were conducted by has since opened)
- Eastpoint at Saybrook Junction (186 housing units)
- Increased parking at the Old Saybrook train station planned by CTDOT

The potential demand of site generated traffic from the remaining approved and/or planned projects was accounted for in the annual background growth rate.

Scenario Conditions

An operational analysis for the Route 1 corridor was conducted for each of the following scenarios:

- **Existing Conditions:** Represents existing traffic conditions under the existing geometric configuration for summer and non-summer. The existing counts obtained in August 2013 were adjusted and reflect typical non-summer conditions. Understanding traffic conditions under summer conditions is not a direct comparison to the future design hour but is useful in providing perspective into the "worst case" summer congestion.
- **Future 2033 No-Build Conditions:** Represents estimated future traffic conditions (DHVs) under the existing geometric (travel lane) configuration. The Future No-Build scenario establishes a future baseline that Build recommendations may be compared against.
- **Future 2033 Build Conditions:** Represents estimated future traffic conditions (DHVs) under the proposed geometric reconfigurations along the Route 1 corridor.

Existing and Future No Build Operations

Existing Conditions: Results of the traffic analysis indicates that all intersections operate at LOS D or better during weekday and weekend peak hour conditions, with the exception of Liberty Street in Clinton (LOS E). In general, delays during Saturday peak conditions are higher than AM or PM peak hour conditions.

[2] This is an estimate based on average daily traffic that is not influenced by road construction or traffic accidents

There are occurrences where a specific intersection approach or movement may exceed LOS D, even if the total intersection does not. Based on the traffic analysis and field observations, drivers may experience more extended delays at the following locations:

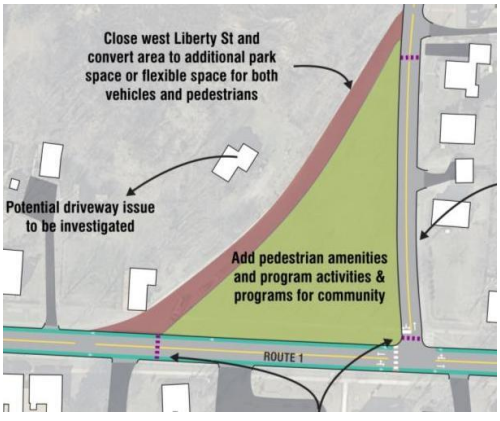
- Hull Street approach to Route 1 in Clinton
- Commerce Street approach to Route 1 in Clinton
- Liberty Street (West) approach to Route 1 in Clinton
- Eastbound and westbound approach to Ingham Hill Road on Route 1 in Old Saybrook
- Lynde Street approach to Route 1 in Old Saybrook
- Elm Street approach to Route 1 in Old Saybrook
- Main Street approach to Route 1 in Old Saybrook
- Route 1 southbound approach to Main Street in Old Saybrook

The delays experienced by drivers at these locations are a result of a combination of factors. Closely spaced signals and the addition of traffic on Route 1 from Hull Street increases delay for intersections in downtown Clinton. High peak hour traffic on Route 1 increases side-street wait time at Liberty Street, which is controlled by a stop sign. The eastbound approach to Ingham Hill Road serves high demand prior to traffic turning off Route 1 onto Old Boston Post Road (Route 154). The remaining delays experienced by drivers in Old Saybrook are a result of high peak hour traffic on Route 1 which increases wait time for cross streets. Furthermore, most intersections (including driveways) are not signalized and the delay from those can be high since available gaps (space between cars) in the traffic stream are infrequent. This type of delay frequently occurs in Old Saybrook.

Future No-Build Conditions: Results of the traffic analysis indicates that all intersections operate at LOS D or better under 2033 No Build conditions, with the exception of Route 166 in Old Saybrook.

Future Build Operations

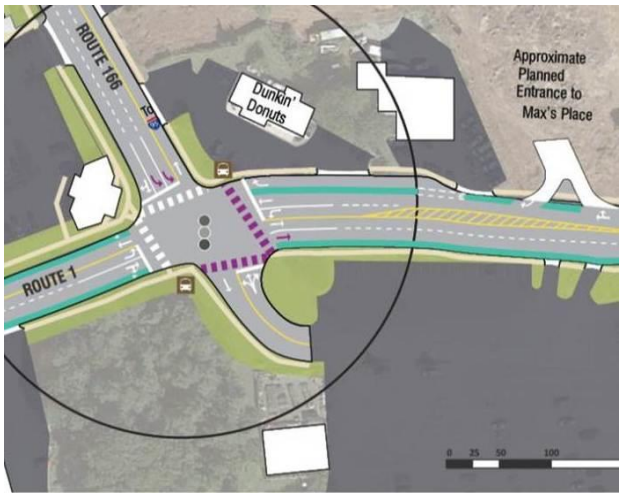
The future Build Scenario represents estimated future traffic conditions under the proposed geometric reconfigurations recommended for Route 1. The recommendations are reflective of community outreach initiatives that suggest multimodal solutions and address operational concerns along the corridor.



Liberty Street and Route 1, Clinton: The Liberty Street Concept Plan repurposes West Liberty Street to additional park space or flexible space for both vehicles and pedestrians. East Liberty Street is converted to two-way traffic flow and traffic is reassigned to the intersection of East Liberty Street and Route 1. The intersection will remain unsignalized.

Under No Build conditions, the intersections at West Liberty Street and East Liberty Street operate at LOS C and A, respectively. Multiple accidents were reported at or near these intersections, likely a result of the skewed alignment of West Liberty Street.[3] Under Build conditions, the side street stop controlled movement on East Liberty Street will operate at LOS D.

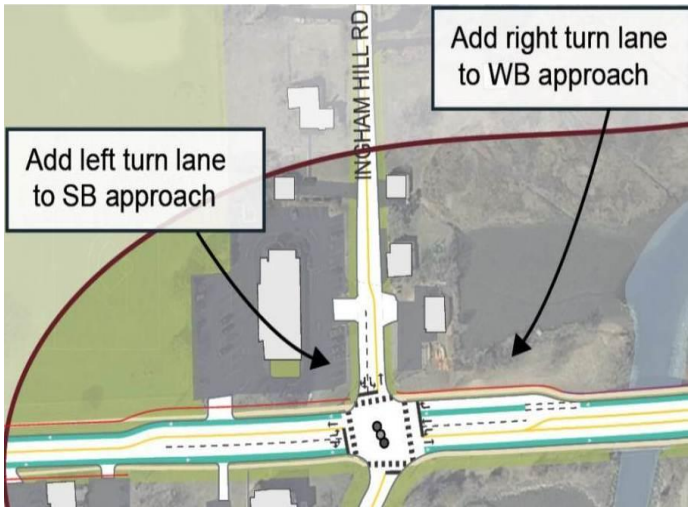
Route 166, Old Saybrook: The Route 166 Concept Plan adds an additional southbound left-turn lane from Route 166 to Route 1 eastbound. To accommodate the additional turn lane, Route 1 must be widened to receive the lanes. The widening would extend approximately 350 east of the intersection before it tapers back to one northbound lane on Route 1.



Under Future No-Build conditions, the Route 166 intersection operates at LOS E. To note, the No Build condition includes traffic generated by Max's Place, which was not open during the time intersection counts were collected. Under Future Build conditions, the intersection is projected to improve and operate at LOS D.

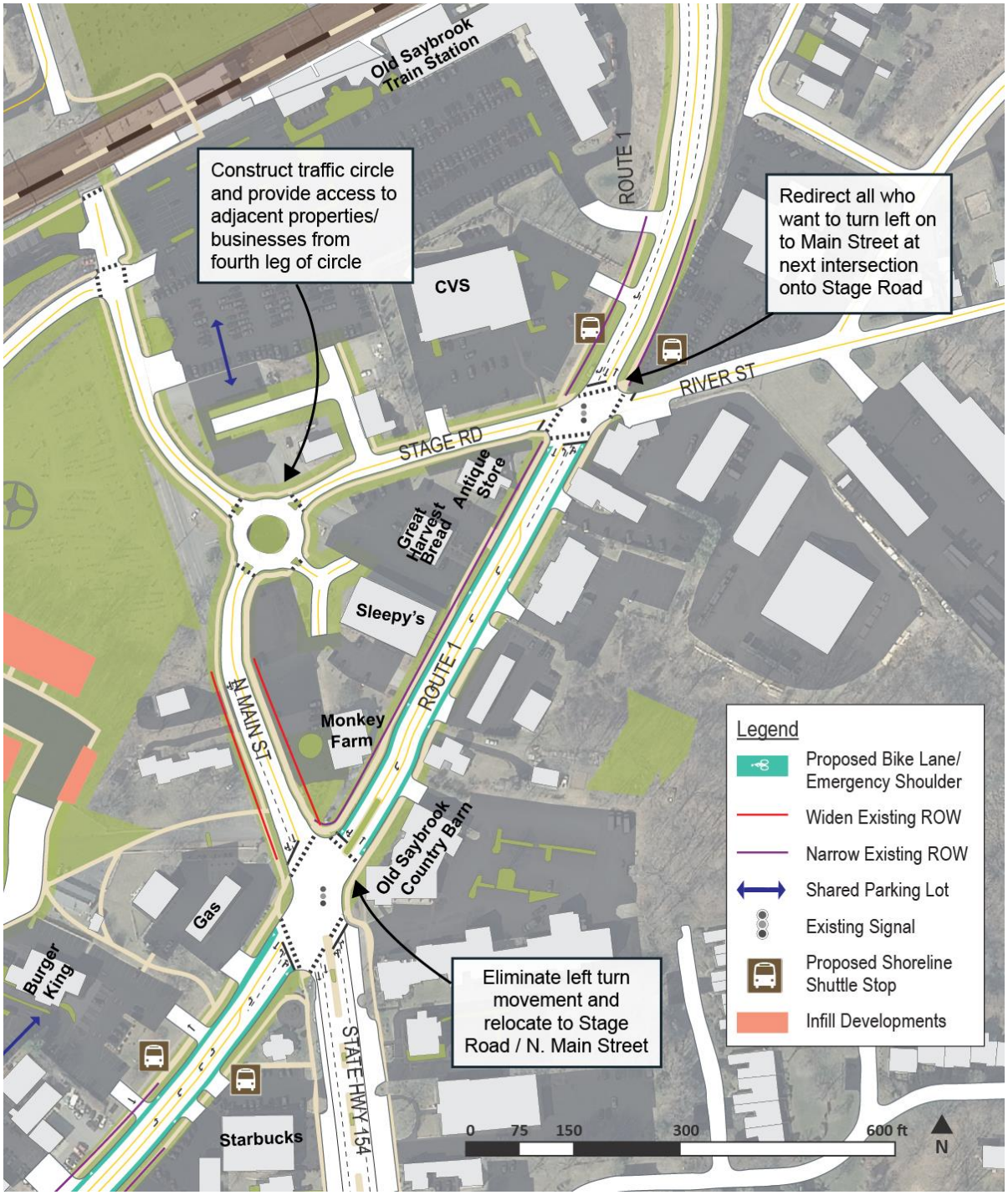
Ingham Hill Road, Old Saybrook: The Ingham Hill Road Concept Plan adds a dedicated right-turn lane to the westbound approach to Ingham Hill Road on Route 1 and a dedicated left-turn lane to the southbound approach to Route 1 on Ingham Hill Road.

Under Future No-Build conditions, the intersection is projected to operate at LOS D. Multiple accidents were reported at or near this intersection, likely a result of heavy volume mixed with local High School traffic.[4] Under proposed Future Build conditions, the intersection is projected to improve and operate at LOS B.



[3] See Boston Post Road Corridor Plan Exising Conditions report for the safety assessment
[4] See Boston Post Road Corridor Plan Existing Conditions report for the safety assessment

Old Saybrook Road Diet and Main Street Gateway Proposal: The Old Saybrook Road Diet and Main Street Gateway Concept Plan reduces the Route 1 cross section from 4 lanes to 3 lanes, including a shared center two-way turn lane from the Staples entrance to Stage Road. It also modifies the operations of Route 1 and Main Street/N. Main Street with turn retrictions and the enhancement of the local roadway network to redistribute traffic demand and better utilize existing undertulized network capacity.



Under Future No-Build conditions, the intersections from Staples to Stage Road are project to operate at LOS D or better. Under Future Build conditions with the road diet proposal in place the intersections are projected to continue to operate at LOS D or better. These results show that the cross section modification does not compromise roadway and intersection capacity. It is however, expected to result in significantly improved safety and access management conditions for all users through this nearly one mile section of Route 1.

This concept plan meets the community vision because it addresses traffic congestion, improves safety by eliminating and consolidating a number of driveways, adds sidewalks and creates a more pedestrian friendly environment, and provides space for bicycle lanes through repurposing of Route 1 travel lanes. It also creates a more seamless continuation of Route 1 and Main Street to the train station and the associated transit oriented development expected to take place there in the future. A Vissim simulation of this proposal was prepared as part of this study and can be viewed upon request.

Traffic Operations Summary

The traffic analysis was completed using Synchro 8.0, a computer-based intersection operations model, which implements procedures presented in the Highway Capacity Manual (HCM) 2000 and 2010. Synchro is designed to evaluate the performance of arterials, signalized intersections, and unsignalized intersections (two-way stop, all-way stop, and roundabouts). The intersection LOS reported by Synchro reflects the total intersection delay for all movements. Results are summarized in Table 2 and Table 3 for Existing, 2030 No build, and 2030 Build.

Table 2: Existing Conditions Level of Service Results

Town	Intersecting Roadway	Existing Conditions (Peak Summer)						Existing Conditions (Non-Summer Typical)					
		AM Peak Hour		PM Peak Hour		Sat Peak Hour		AM Peak Hour		PM Peak Hour		Sat Peak Hour	
		Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS
Clinton	Clinton Manor/Knollwood Road	5.5	A	8.7	A	9.4	A	5.1	A	7.8	A	8.1	A
	North High Street	10.6	B	12.5	B	17.4	B	10.0	A	11.7	B	15.5	B
	Grove Street	11.8	B	10.1	B	11.4	B	11.2	B	9.2	A	11.6	A
	Hull Street/Library Square	18.9	B	27.7	C	29.3	C	17.8	B	25.0	C	23.7	C
	Commerce Street	15.5	B	25.4	C	28.1	C	13.9	B	22.0	C	22.2	C
	Liberty Street (West)[1]	15.7	C	36.5	E	29.5	D	13.7	B	23.7	C	18.0	C
	Liberty Street (East)[1]	1.2	A	3.4	A	2.7	A	1.1	A	2.7	A	2.1	A
	Old Post Road (Route 145)	11.7	B	22.7	C	17.2	B	9.9	A	17.0	B	12.3	B
	Beach Park Road	10.3	B	11.3	B	11.8	B	9.3	A	8.9	A	8.7	A
Westbrook	Grove Beach Road	12.3	B	18.1	B	18.2	B	11.6	B	15.3	B	14.5	B
	Wesley Avenue	7.4	A	8.1	A	8.8	A	7.2	A	7.6	A	7.3	A
	Old Clinton Road	5.7	A	6.2	A	7.9	A	5.4	A	5.5	A	5.9	A
	Westbrook Place (Route 153)	14.6	B	17.3	B	16.2	B	13.9	B	16.0	B	15.0	B
	Salt Island Road	8.5	A	8.3	A	11.8	B	8.4	A	8.3	A	9.0	A
Old Saybrook	Route 166	*	*	*	*	54.9	D	*	*	*	*	34.0	C
	Ingham Hill Road	7.8	A	17.7	B	19.5	B	7.2	A	14.3	B	13.7	B
	Old Boston Post Road	15.3	B	13.8	B	14.2	B	15.2	B	13.2	B	12.4	B
	Staples Entrance	4.8	A	8.5	A	10.4	B	4.7	A	6.8	A	8.9	A
	Lynde Street	10.7	B	13.0	B	13.5	B	9.8	A	11.9	B	11.6	B
	Elm Street	13.4	B	21.5	C	27.5	C	12.3	B	20.2	C	23.8	C
	Main Street	25.4	C	31.7	C	42.3	D	22.3	C	28.5	C	33.5	C
	Stage Road	*	*	*	*	6.1	A	*	*	*	*	4.2	A
	Route 154/Middle Rock Road	22.4	C	31.0	C	27.6	C	18.4	B	26.8	C	21.3	C
	I-95 Exit Ramp[1]	11.9	B	12.5	B	11.9	B	11.3	B	11.8	B	11.1	B

[1]Stop controlled intersection: LOS reported for the worst movement

*Data not available; Saturday traffic counts obtained from recent traffic studies

Table 3: Future No Build and Build Level of Service Results

Town	Intersecting Roadway	Existing (Non-Summer Typical)		Future No Build		Future Build		Concept
		Saturday Peak Hour		DHV		DHV		
		Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	
Clinton	Clinton Manor/Knollwood Road	8.1	A	8.7	A	*	*	
	North High Street	15.5	B	17.5	B	*	*	
	Grove Street	11.6	A	12.6	B	*	*	
	Hull Street/Library Square	23.7	C	28.4	C	*	*	
	Commerce Street	22.2	C	28.3	C	*	*	
	Liberty Street (West)[1]	18.0	C	23.3	C	N/A	N/A	**Liberty Street Concept Plan**
	Liberty Street (East)[1]	2.1	A	2.3	A	27.8	D	
	Old Post Road (Route 145)	12.3	B	14.3	B	*	*	
	Beach Park Road	8.7	A	10.7	B	*	*	
Westbrook	Grove Beach Road	14.5	B	19.2	B	*	*	
	Wesley Avenue	7.3	A	8.2	A	*	*	
	Old Clinton Road	5.9	A	8.7	A	*	*	
	Westbrook Place (Route 153)	15.0	B	17.4	B	*	*	
	Salt Island Road	9.0	A	10.1	B	*	*	
Old Saybrook	Route 166	34.0	C	55.6	E	42.1	D	**Route 166 Concept Plan**
	Ingham Hill Road	13.7	B	35.6	D	16.3	B	**Ingham Hill Road Concept Plan**
	Old Boston Post Road	12.4	B	16.0	B	*	*	
	Staples Entrance	8.9	A	10.3	B	10.5	B	
	Lynde Street	11.6	B	13.1	B	17.3	B	**Old Saybrook Road Diet Concept Plan - Main Street Option 3**
	Elm Street	23.8	C	27.3	C	35.8	D	
	Main Street	33.5	C	41.2	D	39.0	D	
	Stage Road	4.2	A	8.4	A	9.5	A	
	Route 154/Middle Rock Road	21.3	C	26.9	C	*	*	
	I-95 Exit Ramp[1]	11.1	B	11.8	B	*	*	

[1]Stop controlled intersection: LOS reported for the worst movement
*No Change in LOS, no modifications are proposed
N/A: intersection does not exist under Build

Conclusions

Overall, most intersections along Route 1 in the study corridor are expected to manage traffic reasonably well during Existing and Future 2033 No-Build conditions, but isolated pockets of congestion are expected in the future if no intersection modifications are made.

This traffic assessment was undertaken to identify anticipated future intersection capacity issues and to evaluate proposed intersection concepts for the Route 1 corridor study area with respect to intersection level of service. These proposed intersection improvements are part of a more comprehensive corridor plan that aims to:

1) Address traffic congestion concerns today and into the future (2033 analysis year)
2) Improve safety for all modes of travel
3) Provide more multimodal travel options for residents and visitors to the area by integrating more robust bicycle and pedestrian facilities and better balancing the priorities of all modes.