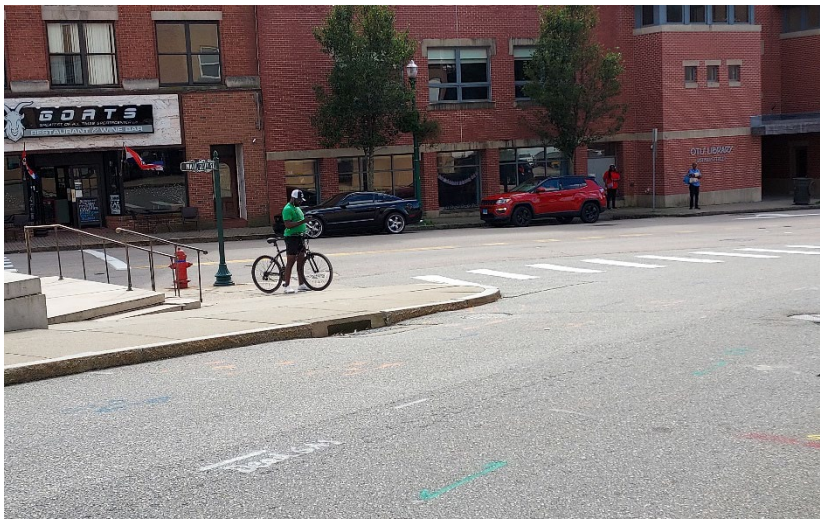
CHELSEA HARBOR / DOWNTOWN NORWICH
Mobility Study

https://www.downtownnorwichmobilitystudy.com/



Future Conditions Report

City of Norwich, CT

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Future Conditions

This section of the Chelsea Harbor/Downtown Norwich Mobility Study summarizes the tasks associated with the assessment of future conditions within the study area. The future conditions were based upon post-COVID pandemic traffic volumes, base year 2023.

The assessment of future conditions includes a review of planned future development, traffic growth forecasts, and the potential for increased bicycle, pedestrian, and public transit trips.

3.1 Methodology

An important component of this study involved forecasting travel demands and land use changes. Doing so ensures that the studied alternatives and the recommended transportation infrastructure investments are feasible, anticipate future needs, and provide long-term benefits for the City of Norwich. To estimate future conditions in the Chelsea Harbor Drive/Downtown Norwich area, a 20-year planning horizon was studied incorporating all potential transportation and development activity that may be realized by the year 2043. Based upon these projections, the future conditions were studied to understand the No-Build scenario, the baseline traffic conditions before recommendations are made. In the Alternatives Analysis memorandum, potential recommendations will be reviewed to understand conditions under a Build Condition where recommendations are implemented.

The 2043 No-Build Condition models future transportation conditions including regional traffic growth, planned geometric and operational transportation projects identified by the Connecticut Department of Transportation (CTDOT), and planned development projects in the downtown area. The proposed transportation improvement alternatives that are

described in later sections of this document are not included in the 2043 No-Build Condition. The resulting comparison of Existing Conditions to the 2043 No-Build Condition is a measure of the ability of the existing transportation system to handle future travel demands.

The 2043 Build Condition, discussed in the Alternatives Analysis memorandum, includes the future transportation and development characteristics described in the No-Build Condition as well as the transportation improvement alternatives recommended in this mobility study. The purpose of the transportation improvement alternatives is to provide for consideration conceptual transportation solutions at locations in the downtown area with existing safety or operational deficiencies as noted by the City of Norwich, SCCOG, the public, and the traffic operations analyses herein. Subsequent sections of this mobility study describe the transportation improvement alternatives in detail. The resulting comparison of the future conditions is a measure of the effectiveness of transportation improvements if implemented.

3.2 2043 No-Build Condition

The No-Build Condition was developed using information provided by CTDOT and the City of Norwich. Ultimately, this information was used to estimate traffic operations in the downtown area in 2043 without any of the transportation improvement alternatives proposed in the Alternatives Analysis.

3.2.1 2043 Traffic Volumes

Traffic volumes along a corridor or within a downtown change over time according to driving demand, which is influenced by anticipated land development, economic activity, broader regional driving trends, and land use characteristics. New developments typically attract new driving trips, even in dense urban locations with existing land use characteristics like downtown Norwich. However, there are efforts being made by the City of Norwich and developers towards providing better accommodation for a mixture of different travel modes, including bicycling, walking, and public transportation. Some developments are even limiting the number of on-site parking spaces in their construction in anticipation of a demographic of people that do not own cars, use car share, and/or get around via biking, walking, and public transit – in which case they would not need as much parking for automobiles as is often proposed. Later sections of this document discuss these efforts in more detail to support access and demand for non-car transportation modes.

Future traffic volumes are typically estimated by growing existing traffic volume data by a percentage reflecting historical, area-specific traffic trends compounded over the length of the planning horizon. CTDOT calculated and provided 2043 peak hour traffic volumes in the study area by growing the 2023 traffic volumes previously described. The 2043 traffic volumes reflect approximately 10% growth from 2023 volumes, or about 0.5% per year, representing a highly conservative estimate of future traffic volumes. In other words, this percentage is the largest amount of traffic growth that should be expected based on current information. Predicting this level of traffic growth will help SCCOG and the City of Norwich make appropriate decisions to address likely deficiencies in the transportation network

before they arise. The 2043 peak hour traffic volume networks with volume information provided by CTDOT are included in the Appendix.

3.2.2 Planned and Future Development Projects

As an older urban center, downtown Norwich is effectively built-out. Opportunities for development are usually redevelopment of existing structures, including vacant and unoccupied buildings, or infill development on vacant land of previous building sites where a building was torn down and never replaced. There is significant local interest in redeveloping parcels downtown, particularly underutilized or vacant buildings that create significant gaps in the urban landscape and may become blighted and run-down. As noted in the Existing Conditions Report (Section 2.8.4), new housing and commercial space are reclaiming previously vacant historic structures to bring vitality back to downtown. There are also other developments underway, such as a major redevelopment of the wastewater treatment plant on Hollyhock Island.

The following list of development locations was included in the Existing Conditions Report, and has been updated with new information, if available at the time of writing, on development details and project timeframes:

- 77-91 Main Street: 42 housing units with mixed-use on the first floor are planned and under construction; apartments are currently being advertised for rent.
- 201 Main Street: 17 housing units and one or two street-level commercial spaces are planned by Heritage Housing for the former Reid and Hughes department store building.[1] It is unclear when the redevelopment will be completed.
- 337-341 Main Street (including adjacent parcels of 351-353 Main Street and 355 Main Street): the vacant downtown YMCA property will be redeveloped with eight apartments, restaurant space, three 1,200 square-foot retail spaces and office space for Mattern Construction, Inc., which owns the property. According to reports, the restaurant will be completed in fall 2024, the apartments will be completed soon afterward, and the commercials spaces should be leased by fall 2025. [2]
- 352 Main Street: the old Elks Lodge, across from the vacant YMCA that is under redevelopment, recently reopened as the Hotel Callista, a boutique hotel with 24 rooms. Parts of the hotel are still under construction and may take another year to complete.[3]
- 16 Cedar Street: the site of a historic jail (the New London County Jail), which was torn down in the 1950s. The developer has proposed 26 housing units here, though there is potential for as many as 36 units. Affordable housing is expected with the development. Due to its location and the local history around the Jail Hill neighborhood, an

[1] https://www.theday.com/local-news/20240127/three-long-awaited-norwich-projects-receive-approvals-updates/

[2] Ibid.

[3] https://www.theday.com/local-news/20240122/hotel-callista-opening-in-former-norwich-elks-club/

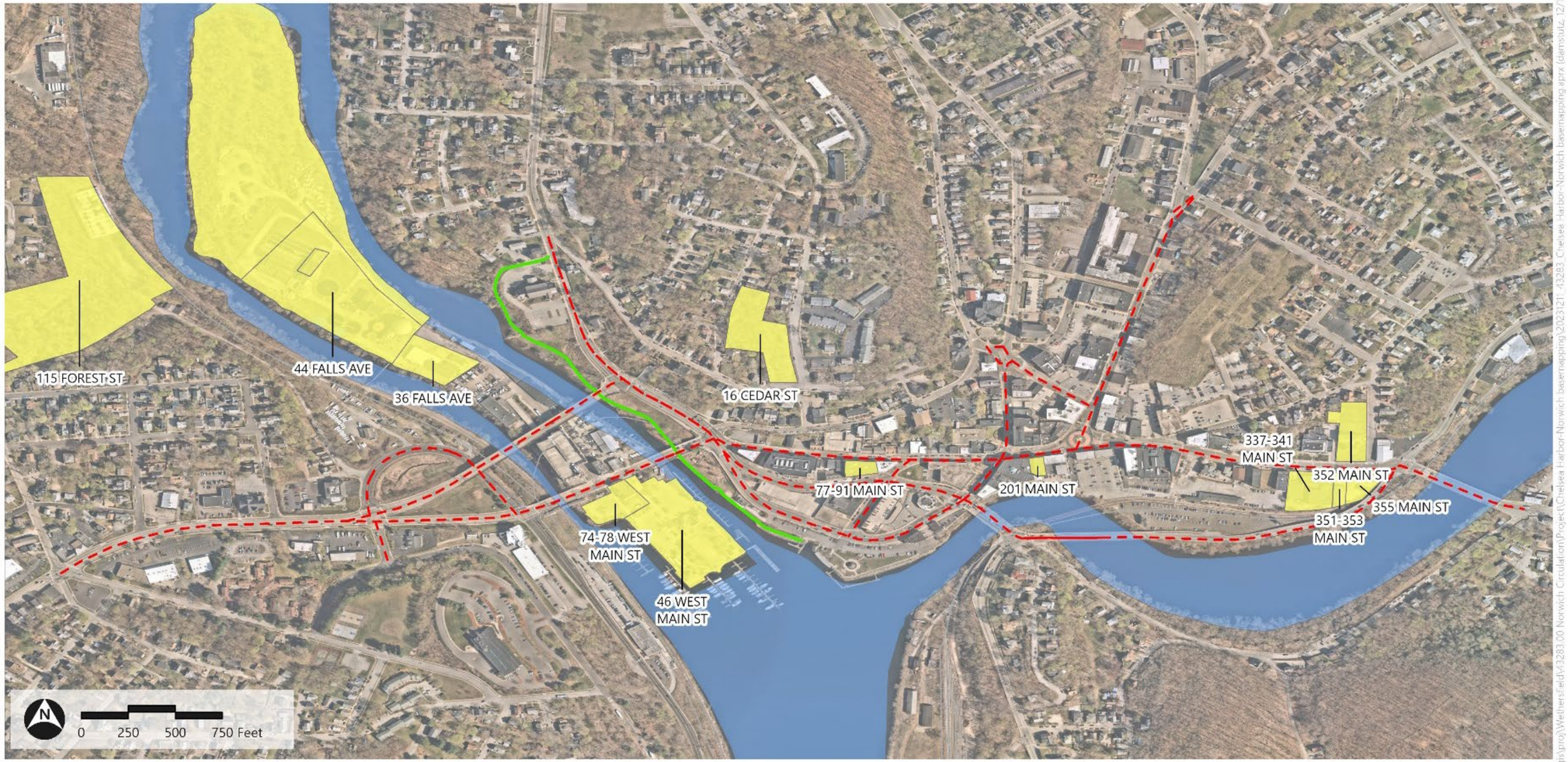
archaeological survey may be required.[4] A timeframe for the project development is not known as of this writing.

- 46 West Main Street/74-78 West Main Street: this is the address of the Norwich Marina, which has recently been sold to a new developer and is planned to reopen in 2024, including a new restaurant.
- 36 Falls Ave/44 Falls Ave: the current wastewater treatment plant on Hollyhock Island is being replaced with a modern facility costing $200 million and will take about 5 years to complete.
- 115 Forest Street: a cannabis cultivation plant has received zoning approval to set up in this former industrial building along the west bank of the Yantic River.

See Figure 1, which was included in the Existing Conditions Report, for a map of these development projects and their locations downtown.

[4] https://www.theday.com/local-news/20230604/apartment-building-proposed-for-19th-century-jail-site-in-norwich/

Figure 1 Current and Future Development Project Locations in Study Area



Overall, almost 100 units of new housing could be realized from the above development projects over the next few years, bringing new residents and activity to the downtown. Redevelopment of the former YMCA and Elks Lodge properties will bring interest back to the east end of downtown, while the sale and proposed revamp of the Norwich Marina will provide an additional destination for visitors. In the consideration of future traffic volumes, it was important to study these parcels and understand the potential traffic impacts that are expected to result from these and any other parcels identified for future development.

The annual traffic growth forecast provided by CTDOT is based on a regional traffic model that takes into account expected land developments, population and economic trends, historical traffic growth, and other key data to develop the forecast. Developments such as the ones listed in the previous paragraph are part of the expected growth in the regional model. The only vehicle trips from a new development that are not likely included in the forecast is the Norwich Marina, which was sold to a new developer in fall 2024, during the development of the Existing Conditions Report. The new developer has expressed interest in revitalizing the Marina and already has plans to reopen a restaurant at the Marina in spring 2024. There is also a building on the Marina property that could potentially be utilized as a hotel.

To understand the possible impact of the Marina developments, vehicle trips that could be generated by the new Marina restaurant and a potential hotel were approximated using the *Institute of Transportation Engineers Trip Generation Manual, 11th Edition*. The restaurant was assumed to be a 2,000 square foot sit-down, high turnover restaurant, while the hotel was assumed to have a 60-room capacity. The trips estimated were then distributed through the street network to understand their impact on future traffic operations. However, the number of trips estimated through this process and network distribution were found to be very low and would make no impact to traffic operations in the study area. As a result, no changes were made to the CTDOT forecasted trip numbers.

Given this information, based on the development projects in the Existing Conditions Report, their type, expected impact, and location, as well as the population growth trends (as noted in Section 2.8.2), all new vehicle trips originating and accessing these development properties would be accounted for by the CTDOT forecast, and thus included in the 0.5% annual traffic growth.

3.2.3 Future Roadway Projects

Based on discussions with CTDOT, SCCOG, and the City of Norwich, the most significant transportation improvement currently planned near the study area in the foreseeable future is the Route 82 improvement project the begins on the western edge of the study area and continues west to I-395. This project includes extensive access management improvements and several roundabouts at intersections to reduce traffic speed and create a safer corridor. Aside from this project and expected maintenance of pavement conditions with typical milling and overlay of downtown Norwich roadways by CTDOT and the City, no other major projects are known at this time that would affect the No-Build Conditions. In addition, it can be expected that CTDOT may replace traffic control signal equipment at various locations

during the No-Build period, however those improvements are considered to be typical maintenance type improvements. Therefore, the 2043 No-Build condition was assumed to maintain existing roadway conditions within the central downtown Norwich area except for the Route 82 changes at the very western edge of downtown.

3.2.4 2043 No-Build Traffic Operations

Capacity analyses were performed to evaluate traffic operations at the study intersections during the weekday morning, weekday evening, and Saturday midday peak traffic periods under the 2043 No-Build scenario. These analyses were performed by inputting the 2043 peak hour traffic volumes provided by CTDOT into the existing conditions Synchro model discussed in the previous chapter to forecast future traffic operating conditions in 2043 if no transportation improvements or signal timing modifications are implemented. As noted in Section 3.2.2, additional traffic from proposed and potential Norwich Marina developments was included in the forecast.

The capacity analysis documented in the Existing Conditions identified two intersections within the study area that operate with an overall LOS D, E or F during the peak periods under existing conditions: Route 2 (Water Street) at Viaduct Road/Laurel Hill Road/Summer Street/Talman Street, and Route 2 (Main Street) at Route 12 (Viaduct Road & N. Main Street). The Viaduct Road/Laurel Hill Road/Summer Street/Talman Street intersection operates overall at LOS F during all peak hours, while the Route 12 (Viaduct Road & N. Main Street) intersection operates at LOS D in the morning peak, LOS F in the midday peak, and at LOS E in the evening peak hour.

The approximately 10-percent traffic growth forecast under the 2043 No-Build condition, in addition to the Norwich Marina trips, is expected to further exacerbate existing capacity issues at certain intersections within the downtown area. Delays and vehicle queues are not expected to change significantly at most study intersections, while the two intersections that currently have major capacity issues will remain congested and continue to deteriorate. Under the 2043 No Build condition, Route 2 (Water Street) at Viaduct Road/Laurel Hill Road/Summer Street/Talman Street will continue to operate at LOS F in all conditions, with worsening capacity issues and delays, and Route 2 (Main Street) at Route 12 (Viaduct Road & N. Main Street) will also experience worsening conditions with the morning peak hour staying at LOS D, the midday peak hour at LOS F, and the evening peak hour worsening from LOS E to LOS F. Main Street at Broadway and Courthouse Square will drop from LOS B at all peak hours to LOS C at all peak hours, the only other intersection with a significant change to its overall LOS.

The overall intersection LOS at each intersection during the weekday morning, evening, and Saturday midday peak traffic periods under 2043 No-Build conditions is shown on Figure XX. A detailed summary of the capacity analysis results, including LOS, delays, and vehicle queue lengths by lane group, is included in Table 1.

Table 1 Signalized Intersection Capacity Analysis Summary – 2043 Conditions

		Morning Peak Hour					Midday Peak Hour					Evening Peak Hour				
Location	Mov't	v/c[1]	Del[2]	LOS[3]	Q50[4]	Q95[5]	v/c	Del	LOS	Q50	Q95	v/c	Del	LOS	Q50	Q95
Route 82 at West Side Blvd. & N. Thames St/ N. High St.	EB T/R	0.44	17	B	89	230	0.49	17	B	107	313	0.63	21	C	152	#438
	WB L	0.49	50	D	58	101	0.32	45	D	38	80	0.58	47	D	72	110
	WB T	0.33	8	A	47	201	0.34	8	A	50	227	0.52	10	A	86	303
	WB R	0.17	7	A	0	31	0.09	6	A	0	32	0.15	7	A	0	21
	NB L/T/R	0.04	43	D	0	0	0.04	43	D	0	0	0.07	42	D	0	26
	SB L/T/R	0.21	44	D	14	46	0.03	43	D	0	0	0.13	42	D	10	23
	Overall	**0.36**	**15**	**B**			**0.36**	**15**	**B**			**0.48**	**17**	**B**		
Route 82 at N. Thames St / Thames St.	EB L/T	0.27	11	B	39	138	0.36	11	B	53	195	0.52	16	B	67	#395
	EB R	0.06	14	B	0	37	0.05	14	B	0	32	0.06	21	C	0	m34
	NB T	0.10	32	C	19	37	0.14	35	C	25	49	0.14	30	C	32	58
	NB R	0.18	33	C	0	38	0.16	35	D	0	53	0.16	30	C	0	53
	SB L	0.08	32	C	11	29	0.06	34	C	7	18	0.05	29	C	7	15
	SB T	0.67	42	D	136	192	0.64	43	D	110	135	0.71	41	D	161	156
	Overall	**0.35**	**23**	**C**			**0.40**	**21**	**C**			**0.52**	**24**	**C**		
Route 2 at West Side Blvd.	SE T/R	0.71	34	C	115	178	0.51	29	C	73	128	0.61	31	C	89	131
	NW L	0.38	13	B	71	198	0.43	13	B	87	236	0.54	14	B	118	#337
	NW T	0.34	4	A	0	166	0.34	4	A	0	169	0.41	5	A	0	214
	Overall	**0.45**	**19**	**B**			**0.43**	**16**	**B**			**0.53**	**18**	**B**		
Route 2 (Water St) at Route 82 & Church St. & Main St.	WB L/R	0.55	34	C	23	67	0.54	34	C	30	95	0.62	38	D	36	#124
	WB R	0.58	36	D	23	70	0.57	35	D	31	#105	0.65	41	D	36	#132
	NB T/R	0.63	22	C	97	#256	0.65	23	C	106	#255	0.71	27	C	100	#257
	SB L/T	0.58	21	C	73	147	0.34	20	C	46	124	0.36	23	C	43	122
	NE L	0.35	21	C	44	150	0.33	21	C	48	141	0.53	28	C	69	#225
	NE T/R	0.52	25	C	53	#249	0.83	40	D	123	#428	0.83	43	D	104	#425
	NE R	0.22	20	B	0	74	0.31	21	C	0	74	0.29	24	C	0	92
	Overall	**0.54**	**22**	**C**			**0.67**	**26**	**C**			**0.64**	**30**	**C**		
Chelsea Harbor Dr. at Market Street	EB L/T/R	0.20	1	A	23	36	0.24	2	A	33	52	0.26	2	A	37	58
	NB T/R	0.12	37	D	5	26	0.12	36	D	5	30	0.10	36	D	5	26
	SB L/T	0.26	38	D	10	32	0.38	39	D	16	41	0.41	39	D	18	45
	Overall	**0.20**	**3**	**A**			**0.25**	**4**	**A**			**0.27**	**4**	**A**		
Route 2 (Water St) at Courthouse Sq. & Chelsea Harbor	NW T/R	0.36	8	A	32	211	0.39	8	A	37	191	0.44	10	A	54	231
	NE L/T	0.24	22	C	12	45	0.32	22	C	18	66	0.47	22	C	38	98
	NE R	0.45	4	A	0	30	0.49	4	A	0	43	0.66	6	A	0	20
	Overall	**0.42**	**8**	**A**			**0.46**	**8**	**A**			**0.61**	**10**	**B**		

Source: VHB, Inc. using Synchro 11 software.

Table 1 Signalized Intersection Capacity Analysis Summary – 2043 Conditions (Continued)

		Morning Peak Hour					Midday Peak Hour					Evening Peak Hour				
Location	**Mov't**	**v/c[1]**	**Del[2]**	**LOS[3]**	**Q50[4]**	**Q95[5]**	**v/c**	**Del**	**LOS**	**Q50**	**Q95**	**v/c**	**Del**	**LOS**	**Q50**	**Q95**
Main St at Broadway & Courthouse Sq.	WB T	0.44	18	B	128	201	0.46	19	B	140	#274	0.45	20	B	134	#286
	NB L	0.01	34	C	0	0	0.01	34	C	0	0	0.02	34	C	0	0
	NB R	0.12	9	A	0	36	0.14	9	A	0	38	0.22	10	A	0	31
	SB L	0.51	33	C	65	105	0.44	31	C	58	96	0.50	32	C	72	119
	SB R	0.43	32	C	48	84	0.53	33	C	65	106	0.56	33	C	73	122
	Overall	**0.36**	**21**	**C**			**0.38**	**20**	**C**			**0.39**	**20**	**C**		
Route 2 at Viaduct Rd./Laurel Hill Rd/Summer St/Talman St	WB L	1.17	>120	F	~226	#345	0.79	44	D	117	#192	0.88	56	E	134	#266
	WB R	0.60	19	B	66	122	0.68	22	C	79	#188	0.62	19	B	71	#208
	NB L/T/R	0.42	43	D	5	11	0.49	41	D	11	16	0.61	67	E	7	19
	SE L/T	1.08	97	F	162	#438	>1.20	>120	F	252	#696	>1.20	>120	F	~361	#835
	SE R	0.44	16	B	57	164	0.22	14	B	26	97	0.33	14	B	41	139
	NW L/T/R	0.42	41	D	10	8	0.30	42	D	3	13	0.52	49	D	6	10
	NE L/R	>1.20	>120	F	~229	#247	0.98	75	E	99	#183	>1.20	>120	F	~178	#273
	Overall	**1.17**	**>120**	**F**			**1.06**	**104**	**F**			**>1.20**	**>120**	**F**		
Franklin St at Boswell St/Oak St	WB L/R	0.51	32	C	7	43	0.46	30	C	16	50	0.44	32	C	14	58
	NB T	0.24	19	B	17	74	0.30	24	C	28	97	0.34	23	C	40	130
	NB R	0.15	6	A	9	65	0.21	8	A	32	114	0.32	9	A	54	174
	SB L	0.21	24	C	5	34	0.30	28	C	10	46	0.32	28	C	11	50
	SB T	0.19	12	B	12	78	0.17	16	B	17	69	0.16	14	B	18	72
	SW L/R	0.49	19	B	32	125	0.35	19	B	46	131	0.47	22	C	54	152
	Overall	**0.36**	**16**	**B**			**0.31**	**18**	**B**			**0.38**	**17**	**B**		
Route 2 at Route 12 (Viaduct Rd & N. Main St)	EB L	0.18	29	C	12	43	0.24	29	C	18	65	0.49	30	C	31	96
	EB T/R	0.64	40	D	104	212	0.64	41	D	101	#262	0.69	42	D	117	#308
	WB L	0.97	67	E	145	#388	0.84	42	D	121	#346	1.03	86	F	148	#429
	WB T/R	0.70	36	D	169	#453	0.74	40	D	158	#469	1.06	98	F	~276	#677
	NB L/T/R	1.05	93	F	223	#646	>1.20	>120	F	~455	#914	>1.20	>120	F	~445	#995
	SB L	0.46	23	C	39	124	0.40	22	C	29	106	0.41	23	C	31	96
	SB T/R	0.67	24	C	181	471	0.49	20	B	118	354	0.59	22	C	159	382
	Overall	**0.95**	**50**	**D**			**1.03**	**112**	**F**			**1.11**	**109**	**F**		

Source: VHB, using Synchro 11 software

3.2.5 Traffic Signal Adjustments

The analysis of traffic operations for the 2043 No-Build scenario as described in Section 3.2.4 was conducted under the assumption that no changes would be made to traffic signals for optimization. However, it is likely that over the years there will be adjustments made to the signals to attempt to optimize them to improve the operations at intersections, with or without any major changes or improvements to the transportation network. As part of the review of the 2043 No-Build scenario, potential traffic signal adjustments were modeled for the two intersections with the lowest LOS grades (Route 2 (Water Street) at Viaduct Road/Laurel Hill Road/Summer Street/Talman Street, and Route 2 (Main Street) at Route 12 (Viaduct Road & N. Main Street) to determine if there are ways to improve signal operations without major changes.

While it is possible to improve overall traffic conditions for both intersections by adjusting signal timings, overall LOS and LOS for most of the approaches to the intersections are still poor. The LOS at Route 2 (Water Street) at Viaduct Road/Laurel Hill Road/Summer Street/Talman Street remains at an F condition, although delays and the volume to capacity (v/c) ratio is reduced. Where previously there were delays predicted of 120 seconds or longer, delays could be reduced to 85 second for the intersection as a whole – still considered an LOS F. Volume to capacity ratios are lowered from over 1.2 to around 1.07. Delays on the different approaches remain mostly the same in this situation. For the Route 2 (Main Street) at Route 12 (Viaduct Road & N. Main Street) intersection, optimization can improve the overall intersection LOS from F to E, with delays being reduced from 109 second to 69 seconds and v/c ratios dropping from 1.11 to 0.94. However, this does require increasing delays and reducing LOS on some of the approaches to rebalance the signal timing at the intersection.

Optimization can make some improvements for the most challenging intersections in downtown Norwich, but it can only make modest changes in their operation. Alternatives will be reviewed to determine what other changes could be made to improve operations at these intersections.

3.3 Bicycle, Pedestrian, and Transit Potential

Downtown Norwich was originally constructed in a dense, walkable development pattern that made it easy for people to walk from their home to local businesses, their work, or to school. As noted in the Existing Conditions Report, much of this development pattern and urban form remains, despite the destruction of parts of it due to urban renewal and the construction of high-speed roads to move cars through the city as quickly as possible, as well as car-centered development that sprung up in the 20th century. As a result, the great majority of trips made through the city center are via car or truck. Data collected for this study shows that only about 2-3% of trips in downtown are done by bicycling and walking. There is room for improvement to encourage and support these trips. Norwich retains

significant potential to be a better place for people to walk, bicycle, and use transit for everyday trips.

To tap into the potential for more bicycling, walking, and transit trips, these modes must be made attractive, with a special focus on safety, comfort, and ease of use. The Existing Conditions Report noted that there are no dedicated bicycle facilities in downtown, except for some scattered bicycle racks and the Heritage Trail, which is oriented towards walking trips. Pedestrians often have difficult conditions for getting around, which long crosswalks and narrow sidewalks that may have few streetscape amenities and little shade. Transit issues were also reported in the Existing Conditions Report. Overall, safety is key priority for this study, especially for pedestrians given they are overrepresented in injury crashes based on the review of crashes from the last five years.

For this section, potential future opportunities for bicycle, pedestrian, trail, and transit improvements will be discussed in a general nature. Specific recommendations for each area will be included in the Alternatives Analysis memorandum.

3.3.1 Pedestrian

The development of a walkable and pedestrian-friendly downtown is a critical piece of creating a vibrant area where visitors can park once and walk around comfortably, and residents can safely make trips for errands, work, school, entertainment, etc. Safe walking areas are also a key part of making public transportation more accessible and viable, as most transit trips start as walking trips.

Deficiencies in pedestrian facilities were noted above – narrow sidewalks in some areas, long or difficult crossings, and lack of streetscape amenities such as street trees. To address crossing issues, crossings much be made shorter to reduce pedestrian exposure to car traffic in the road, which can be accomplished through curb extensions and intersections redesigns that reduce crossing times and address curb ramps so that pedestrians with mobility impairments can also be served well. Given the concentration of social services in the downtown, there are likely to be more pedestrians with mobility impairments that would benefit from increased accessibility. Uncontrolled crossings also need to be addressed, especially in the areas where high speed and high-volume car traffic make it incredibly difficult for pedestrians to find an appropriate gap to cross the street or have drivers yield to pedestrians. The crosswalks to cross W. Main Street at Falls Ave and crossing Water Street at Market Street are examples of crosswalks that have these characteristics.

Narrow and uncomfortable sidewalks – particularly along Chelsea Harbor Drive, Washington Street, W. Main Street, and Route 82 – lack shade trees to protect pedestrians from sun and weather and are either built to an outdated standard or are too narrow to allow pedestrians to comfortably pass each other. There may also be a lack of a buffer between the sidewalk and the road, which carries fast-moving traffic, or the buffer is small and unattractive. Widening sidewalks or installing street trees may require removing road space or parking areas. Part of the analysis of alternatives includes reviewing potential areas for road diets to add space for bicycle and pedestrian facilities or converting road space to biking and walking space. These changes will make it much easier for pedestrians to get around and support an attractive downtown that will improve economic development.

3.3.2 Bicycling

Bicycling is a healthy and economical mode of transportation that also allows for longer trips than by walking and can help extend trips made on public transportation. People riding bicycles are still vulnerable users however and are exposed to traffic more often than people walking. High speed and high-volume traffic is challenging for bicyclists, especially those that are less experienced and have less tolerance for uncomfortable situations.

Much of the existing bicycle traffic occurs on Main Street in downtown Norwich. Its lower traffic speeds and volumes are more conducive to bicycle users, who can go about the same speed of traffic and find it easier to get to places in a denser urban environment. Despite some of the steep topography in the downtown area and in the nearby neighborhoods, the lower speeds and traffic, along with densely connected neighborhood streets that allow for alternate routes, make bicycling an important potential transportation mode in the study area and beyond. Although the neighborhoods immediately adjacent to downtown, on the north sides of the Yantic and Shetucket Rivers, are accessible by bicycle, it is more difficult to get to the neighborhoods on the other sides of the rivers, limiting their transportation options to the downtown. Making the river bridges and connection points bicycle-friendly should be a priority for future improvements.

Other improvements to create bicycle facilities and lower car traffic speeds would also be beneficial to encouraging bicycle travel. If dedicated bicycle facilities can not be developed, shared bicycle and pedestrian facilities such as trails or sidepaths would assist with filling gaps and providing a comfortable place off the roadway for bicyclists to travel.

3.3.3 Trails

The Heritage Way Trail runs from Howard T. Brown Park to the west and north along the east side of the Yantic River approximately 1/3 of a mile before ending at 88 Washington Street, near the intersection with School Street. This trail is an important part of the bicycle and pedestrian network, but it currently has limited connectivity and so does not contribute much to the mobility of users in the downtown area. However, there are additional portions of the trail along the river to the north of where this section stops, that connect to the neighborhoods along Maple Grove Ave, Goldberg Ave, Sturtevant Ave, Tyler Ave, and Watercress Ave. The trail eventually connects to Yantic Street and an overlook of the Uncas Leap at Yantic Falls, which includes a pedestrian bridge over the Yantic River to reach Monroe Street and Asylum Street on the opposite side.

The Norwich Heritage Society provides a map to show users the trail along the river; however, it is unclear how well the trail is marked for users who are navigating through the neighborhoods to get to the next sections. Additionally, the trails are oriented to local history and recreation, not as an alternate route for people biking and walking to access downtown. There is potential for linking this trail more comprehensively into the biking and walking network as well as creating better wayfinding through the neighborhood it travels through.

To the east and south, trail access is constrained by the crossings over the rivers, as noted under the biking and walking sections. There is also limited property to work with, as many

of the roads have been placed along the edge of the rivers, with any land along the edge steeply sloping down to the water. On the land side of the roads, steep topography and narrow local streets creates challenges for trails, as the mountainous terrain has limited housing development as well. Existing railroad infrastructure creates additional difficulties as much of it lies on the bottom of the steep slopes, just above the water. It is unlikely that the railroad right of ways will be available for trail conversion as they are actively being considered for passenger rail traffic as discussed in the Eastern Connecticut Corridor Rail and Transit Feasibility Study. Therefore, any further trail improvements may need to come on-road or leverage the existing road infrastructure to be built along the road right of way.

3.3.4 Public Transportation

The Southeast Area Transit District (SEAT) provides the primary public transportation service in the Norwich area. This is a critical service for lower-income residents and people who cannot afford to own a car to travel within Norwich as well as outside of Norwich for jobs, errands, and everyday trips. SEAT routes run from Norwich to the Mohegan Sun casino, New London, Groton, East Lyme, and Waterford in the south, and to Lisbon and Griswold in the northeast. Routes also run to the Foxwoods casino in the east. Given the density of Norwich, particularly downtown, public transportation potential is high for serving these areas as public transit can compete more favorably against single-occupancy vehicles in dense, congested areas. However, these routes run on 60- or 120-minute timetables, requiring users to plan ahead for their trips. If they miss a bus, they must wait an hour for the next one, likely making them late for work or needing to get a taxi or rideshare to get to their destination if it is simply too far to walk or bicycle. This low frequency makes it challenging for people to use the service who have more convenient options to available, or if they already have access to a private vehicle.

Besides issues of frequency, comfort and user experience are important to make the service easy to use and understand. As a flag-down service, riders can board or exit the bus at virtually any point, as long as they are on the same side of the road as the bus. The Existing Conditions Report noted areas where there appear to be stops for the buses, making it unclear if these are regular stops where people often wait or get dropped off. In addition, three bus shelters were noted, although at least two of them are not being used, which can confuse a potential bus rider when they may expect to pick up a bus which has been rerouted or no longer stops at that shelter. Lack of bus information signage means that to ride the bus you need to know which side of the road to be on and what the bus schedule is. These create additional hurdles for someone to choose to ride the bus when they must have already ridden the bus or must research bus information well in advance.

Another issue is that many of the routes divert to circle into a neighborhood or business park adjacent to its main route or go on one road in one direction and use a different road on the return direction. The route diversions can be important to serve key populations and provide coverage to certain neighborhoods that are transit-dependent. Unfortunately, they also increase the travel time of the service to make these diversions and most users likely do not need to access those particular neighborhoods or businesses. In addition, using different roadways for inbound and outbound trips again provides coverage for an area, but makes the route more confusing for users and makes it difficult for users to get back to where they

started from if, for example, they are trying to return from a shopping trip to their home. Straightening out routes and having them travel on the same roads provides consistency for users and better travel times for the buses, even potentially making it possible to add more service. The one-way streets downtown contribute to the complications of making a logical public transit system, but the challenges of the bus routes go beyond the confines of the Norwich downtown.

Finally, SEAT identified certain issues they have with downtown, including having difficulty exiting the Transportation Center from Falls Ave to W. Main Street, due to high speeds and volumes on W. Main Street, and flooding issues at the Center which sometimes force them to pick up and drop off bus riders in the shoulder on W. Side Boulevard. Access to the main part of downtown from the Transportation Center for bus riders can also be challenging due to the distance to walk and the need to cross roads with high volume and high speed traffic on W. Main Street, Washington Street, and Chelsea Harbor Drive.