Congestion Reduction Project Scopes Study

APPENDIX C: DESIGN JUSTIFICATION REPORT

NOVEMBER 2025

WESTCOG

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Overview

The following document serves as the technical supplement to the Congestion Reduction Project Scopes Study final report. It presents the proposed projects, assessed benefits, and estimated costs for each of the six intersections. As noted in the final report, the study investigated congestion in the WestCOG region with the goal of developing actionable projects for a subset of the most congested intersections. In this process, more than 500 locations were initially identified. Through a screening process, the project team identified six sites to develop concept designs[1]. These six locations were selected through a collaborative process between WestCOG and its constituent communities.

For each intersection presented below, the following five areas are addressed:

- **Initial intersection overview:** Introduces the existing intersection function and geometry and provides a summary of existing and future roadway volumes.
- **Existing Congestion:** Summarizes the likely causes of existing congestion based on GIS-based congestion data and community conversations.
- **Proposed Countermeasure:** Provides an overview of the project concept designs and the reasoning behind its recommendation. The project concept design expands up the concept project sketch to provide a feasible project that identifies likely lane patterns, intersection scale, property impacts, and key dimensions to ensure the project meets applicable design standards.
- **Congestion Reduction Effect:** Presents the summary table from modeling completed for the subject intersection and discusses the perceived benefits in terms of reduced seconds of delay and changes in the level of service (LOS).
- **Conceptual Cost Estimate:** Presents a present-dollar cost estimate for each location based on the CTDOT LOTCIP cost estimating template.

Congestion Reduction Benefits Overview

The expected congestion reduction benefits were estimated using computational estimation methods for signalized intersections and roundabouts. The Highway Capacity Manual (HCM) Quick Estimation Methodology was used for existing, future no-build, and future build years at signalized intersections. The future no-build condition refers to the scenario in which no improvements are made and current conditions perpetuate. The

[1] The results of this analysis identified viable projects at five of the six locations. The project concept developed for the Westport intersection did not indicate substantial enough congestion reduction benefits to be considered at this time and is not included in the final report, Appendix C, Appendix D or Appendix E.

future build condition refers to the scenario in which the proposed project has been implemented. For the four locations where a roundabout is the recommended countermeasure, the HCM Quick Estimation Methodology was used for the existing and future no-build conditions, while the Georgia Department of Transportation (GDOT) Roundabout Analysis Tool was used for the future build scenario. Both these tools are widely used to assess congestion at intersections.

The HCM Quick Estimation Methodology was used to compute the intersection delay, volume-to-capacity (v/c) ratio, and level of service for each location under existing conditions. Existing traffic data were collected by WestCOG using midweek counts in 2024 or 2025, depending on location. The Quick Estimation method included lane volume computations and calculation of the average vehicle delay. For future no-build conditions, the Quick Estimation Methodology was also used, but with volumes escalated to a 20-year projection. The future volumes were computed using an annual growth rate of 0.5%. The same future volumes were also input for future build conditions. For locations that included a proposed roundabout, the GDOT Roundabout Analysis Tool was used to produce intersection delay, v/c ratio, and LOS results. This allows for an direct comparison between two methods and between pre- and post-implementation conditions.

The two performance measures discussed below are overall intersection delay and Level of Service (LOS).

Overall intersection delay: estimates the time experienced when traversing the intersection, i.e. a greater value means a more congested intersection. Many of the most congested locations are operating with significant delay that place them well beyond an LOS F. Considering changes to seconds of delay between the existing, future build, and future no-build provides additional levels of insight when assessing the congestion reduction benefits of the proposed projects.

Level of Service (LOS) is an indicator of operating conditions that occur on a given roadway feature while accommodating varying levels of traffic volumes. It is a measure that accounts for a number of operational factors, including roadway geometry, speed, traffic composition, peak hour factors, freedom to maneuver, and driver expectation. When all these measures are assessed and an average delay per vehicle is calculated, the LOS is assigned to a roadway or intersection based on the calculated delay. The LOS is equivalent to presenting an "index" to the operational qualities of the section under study. LOS is classified in the 2000 edition of the Highway Capacity Manual (2000 HCM) into six levels that are designated 'A' through 'F' based on the control delay ranges they fall under. These ranges are presented in Table 1, for both unsignalized and signalized intersections. In practice, any given roadway/intersection may operate at a wide LOS range depending upon time of day, day of week, or period of year.

Table 1. Level of Service (LOS) Criteria for Signalized and Unsignalized Intersections

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

Intersection Geometry

The conceptual intersection geometry was developed in accordance with CTDOT's Highway Design Manual, Section 11-3 (Intersections At-Grade, Jan 2012). The applicable CTDOT design vehicles include P, SU, BUS, WB-62, and WB-67. For each approach, the largest vehicle expected to turn frequently was selected as the governing design vehicle. The geometry was verified using turning templates for the controlling right-turn movements and receiving-lane widths. At constrained locations, limited tolerable encroachment was permitted in accordance with §11-3.03, and noted in the tables provided for each intersection.

The five intersections with proposed projects are:

- South Main Street (Route 25) at Mile Hill Road (Route 860) Intersection, Newtown
- Grove Street at Broad Street Intersection, Stamford
- White Street – Newtown Road – Triangle Street Intersection, Danbury
- Westport Road (Route 33) at Chestnut Hill Road (Route 53) Intersection, Wilton
- Danbury Road (Route 202) at Sullivan Road Intersection, New Milford

Newtown: South Main Street (Route 25) at Mile Hill Road (Route 860) Intersection

S. Main Street and Mile Hill Road is a three-legged signalized intersection. S. Main Street is classified as a Principal Arterial and provides a single travel lane in each direction with turn lanes in both directions onto Mile Hill Road. Mile Hill Road is classified as a Major Collector and provides a single travel lane in each direction with an exclusive right turn lane for the westbound approach.

As shown in Table 12, the AADT on the north leg of S Main Street is 17,600 and 19,900 to the south of the intersection. AADT on Mile Hill Road is 10,600. The AADT was projected 20 years, to the year 2042, using an annual growth rate of 0.5%, which is typical for urban areas.

Table 2. Existing and future AADT for S Main Street at Mile Hill Road intersection in Newtown

Street	AADT (2022)	AADT (2042) [2]
S Main Street – north leg	17,600	19,446
S Main Street – south leg	19,900	21,987
Mile Hill Road – east leg	10,600	11712

Existing Congestion

The intersection experiences significant congestion as identified by the GIS analysis during both the AM and PM. As shown in Figure 11 significant congestion occurs on each of the three approaches. Significant congestion indicates that the highlighted area is operating at 0-45% of free flow speeds in each of the three AM and/or four PM peak 1-hour collection periods. The moderate congestion areas refers to locations where operating speeds were 45-65% of free flow speeds across all hours of the collection periods.

The most significant queuing identified by the analysis occurs on the southbound approach to the intersection along S. Main Street and on the westbound approach along Mile Hill Road. The queueing along S. Main Street measured at least 1,200 feet and 600 feet along Mile Hill Road. Segments of moderate congestion were identified along the other approaches.

[2] The 20-year AADT growth is calculated using a 0.5% growth rate for an urban area.

The identified congestion suggests that the intersection may not be operating efficiently and is exacerbated by high traffic volumes on both roadways at the intersection. Several potential conflict points were identified.

1. Heavy left turn volume onto Mile Hill Road from S. Main Street.
2. The Mile Hill Road approach has a fairly steep grade, which negatively affects intersection capacity and results in extended queues. Large and heavy vehicles exacerbate this effect.

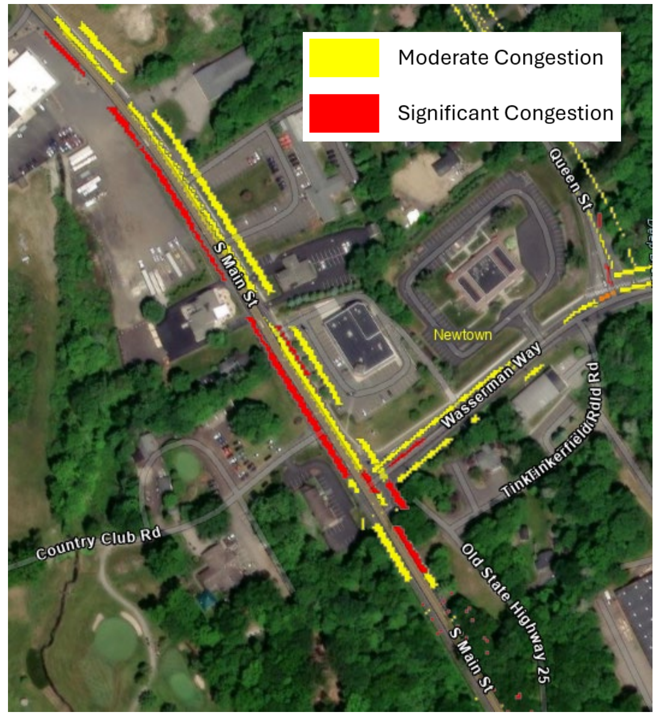

Figure 1. Overlayed Congestion at Grove Street at Broad Street

Proposed Countermeasures

Figure 2. S. Main Street at Mile Hill Road Project Concept Design of Proposed Project (complete concept package included in Appendix D: Project Concept Designs)

To reduce congestion, the study recommends replacing the existing signalized intersection with a single-lane roundabout and reducing the Mile Hill Road approach grade (i.e., change profile to make it less steep). The proposed roundabout would reduce the number of entering lanes on each approach from two to one. The conceptual design also includes crosswalks to improve pedestrian connectivity.

1. **Modified Curbing and Paving:** The curbs around certain sections of the intersection will be extended. Some pavement areas will be removed to narrow down lanes for the roundabout.
2. **Modified Pavement Markings:** Crosswalk markings will be included in the new design to accommodate pedestrians on new and modified sidewalks.

Table 3. South Main Street (Route 25) at Mile Hill Road Summary of Congestion Reduction Benefits Intersection Geometry Design Vehicle Recommendations

Approach (Functional Classification)	Turn to: (functional classification)	Design Vehicle	Basic CTDOT Guidance Concept Plan Notes
South Main Street - Both approaches (Principal Arterial)	Mile Hill Road (Major Collector)	WB-62	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.
Mile Hill Road (Major Collector)	South Main Street (Principal Arterial)	WB-62	Higher-classification design vehicle due to proximity to NHS/Interstate and existing HV volumes, which are noted to contribute to intersection congestion.

Congestion Reduction Effect

As summarized in the Final Report, the congestion reduction benefits of the proposed concept were assessed using a combination of the HCM Quick Estimation Methodology for existing and future no-build scenarios and the GDOT Roundabout Analysis Tool for the future build scenario. The table below summarizes the overall intersection delay and Level of Service for the weekday morning and afternoon peak hours, under the Existing, Future No-Build, and Future Build scenarios.

Table 4. S Main Street at Mile Hill Road Summary of Congestion Reduction Benefits

	Existing		Future No-Build		Future Build	
	Delay [1]	LOS [2]	Delay [1]	LOS [2]	Delay [1]	LOS [2]
Weekday Morning Peak Hour	326	LOS F	389	LOS F	37	LOS E
Weekday Afternoon Peak Hour	446	LOS F	533	LOS F	59	LOS F
[1] Overall Intersection Delay, measured in seconds per vehicle [2] Level of Service						

This intersection is currently operating at an estimated 326 seconds of delay in the morning peak and 446 seconds in the afternoon peak, equating to a severe LOS F. As noted in the final report, the signalized threshold for LOS F in seconds of delay is 80 seconds, and the intersection is currently operating well beyond that threshold. The proposed project offers a substantial reduction (approximately 90%) in seconds of delay during both the morning and afternoon peak periods when compared to the future no-build condition, providing substantial congestion reduction benefits.

Conceptual Cost Estimate

A conceptual cost estimate was developed for the proposed project using the CTDOT LOTCIP application cost estimate template. The estimate is presented in 2025 dollars and not escalated since the likely bid date is not known. The total project cost is estimated at approximately $3.8 million. The itemized cost estimate can be found in Appendix E: Conceptual Cost Estimates.

Stamford: Grove Street at Broad Street Intersection

Grove Street at Broad Street is currently a four-legged signalized intersection. Grove Street is classified as a minor arterial with two southbound lanes approaching the intersection, opening up to three, an exclusive left turn, a through lane, and a shared/left turn lane. The northbound approach consists of three travel lanes, which are assigned as a dedicated turn lane, a through, and a through/right turn lane. Broad Street is classified as a minor arterial which provides two travel lanes in each direction which open into four lanes at the eastbound approach to the intersection (with one exclusive left-turn lane and one exclusive right-turn lane) and three lanes on the westbound approach to the intersection (with one exclusive left-turn lane). As shown in Table 10, the AADT on the north leg of Grove Street is 17,600. The AADT on the south leg of Grove Street is 19,400. The AADT on Broad Street in the vicinity of the intersection is 16,500. The AADT was projected 20 years, to the year 2043, using an annual growth rate of 0.5%, which is typical for urban areas.

Table 5. Existing and future AADT for Grove Street at Broad Street intersection in Stamford

Street	AADT (2023)	AADT (2043)[3]
Grove Street – north leg	17,600	19,450
Grove Street – south leg	19,400	21,450
Broad Street – both legs	16,500	18,250

Existing Congestion

This location was identified by GIS analysis to experience daily congestion during the weekday AM and PM peak periods. As shown in Figure 3 significant congestion occurs on each of the four approaches. Significant congestion indicates that the highlighted area is operating at 0-45% of free flow speeds in each of the three AM and/or four PM peak 1-hour collection periods. The moderate congestion areas refers to locations where operating speeds were 45-65% of free flow speeds across all hours of the collection periods.

The typical queue during PM hours is approximately 900 feet in the SB direction on Grove Street approaching the intersection and approximately 500 feet in the NB direction. In the EB and WB directions approaching the intersection, the queuing stretches to approximately 400 feet upstream from the intersection, with further sections of moderate congestion following each of these segments.

[3] The 20-year AADT growth is calculated using a 0.5% growth rate for an urban area.

The identified congestion suggests that the intersection may not be operating efficiently and is exacerbated by high traffic volumes on both roadways at the intersection. Several potential conflict points were identified.

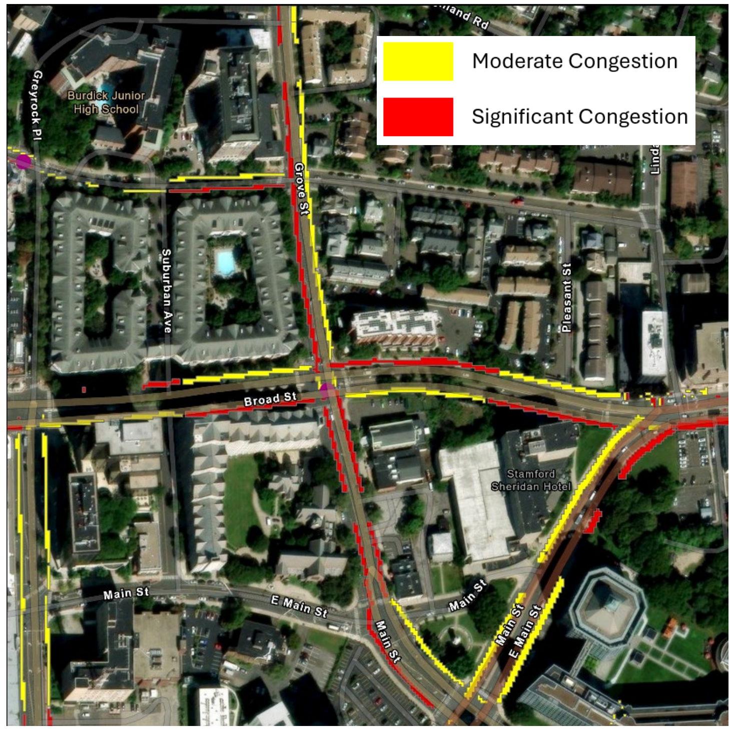

Figure 3. Overlayed Congestion at Grove Street at Broad Street

1. Left turn conflicts for all directions, where the existing lanes are not clearing sufficient volume.
2. Right turn conflicts impacting throughput of the straight lanes, potentially exacerbated by activation of pedestrian signals or downstream delays limiting turning movements.
3. Poor signal timing exacerbating traffic congestion during the significant peak volumes.
4. Significant traffic volume and poor adjacent signal coordination leading to traffic queuing within the intersection inhibiting other movements.

Proposed Countermeasures

Figure 4. Grove Street at Broad Street Project Concept Design of Proposed Project (complete concept package included in Appendix D: Project Concept Designs)

To address the probable causes of the identified congestion, a full traffic signal upgrade is recommended. The traffic signal upgrade should include an adaptive signal system (with improved timing at adjacent intersections) in conjunction with lane/intersection modifications to better accommodate peak period flows and improve pedestrian safety.

1. **New Adaptive Signal System:** The new signal system will be able to adapt and respond to traffic flows in real time to better clear vehicle queues when there are incongruities between legs. This could include modifying the signal timing to give priority to SB traffic during the PM peak hour.
2. **Modified Lane Markings:** Modification of the approach lane layout is recommended to include lane restriping, median island widening and sidewalk reconstruction on the northwest corner to include a bump-out.

a. Modifications to lane markings are intended to more efficiently connect movement patterns and improve intersection throughput.
b. Median widening and the pedestrian bump-out are intended to improve pedestrian safety and slow vehicle traffic through the intersection.
c. Introduction of signage and pavement markings to identify no blocking of the intersection. This would reduce impacts to other intersection approaches during times of high traffic volumes.

Table 6. Grove Street at Broad Street Intersection Geometry Design Vehicle Recommendations

Approach (Functional Classification)	**Turn to: (functional classification)**	**Design Vehicle**	**Basic CTDOT Guidance** **Concept Plan Notes**
Grove Street (Minor Arterial)	Broad Street (Minor Arterial)	WB-62	The intersection geometry was evaluated for the WB-62 design vehicle per CTDOT's Highway Design Manual (Section 11-3). In urban, pedestrian-focused areas like this location, the Manual allows for design vehicle encroachment into adjacent lanes due to physical constraints, such as the Broad Street median, pedestrian bump outs, and Grove Street's skewed approach. This approach prioritizes pedestrian safety and urban context over full truck maneuverability, as permitted by the Manual [Section 11-3.03.01]. The Concept Plan presented in Appendix D illustrates turning templates that confirm the WB-62 can complete movements with encroachment, which is acceptable given the City's pedestrian focus and the availability of alternate truck routes. The design balances operational needs with safety and accessibility goals.
Broad Street (Minor Arterial)	Grove Street (Minor Arterial)	WB-62	The intersection geometry was evaluated for the WB-62 design vehicle per CTDOT's Highway Design Manual (Section 11-3). In urban, pedestrian-focused areas like this location, the Manual allows for design vehicle encroachment into adjacent lanes due to physical constraints, such as the Broad Street median, pedestrian bump outs, and Grove Street's skewed

Approach (Functional Classification)	Turn to: (functional classification)	Design Vehicle	Basic CTDOT Guidance Concept Plan Notes
			approach. This approach prioritizes pedestrian safety and urban context over full truck maneuverability, as permitted by the Manual [Section 11-3.03.01]. The Concept Plan presented in Appendix D illustrates turning templates that confirm the WB-62 can complete movements with encroachment, which is acceptable given the City's pedestrian focus and the availability of alternate truck routes. The design balances operational needs with safety and accessibility goals.

Congestion Reduction Effect

As summarized in the Final Report the congestion reduction benefits of the proposed concept were assessed using a combination of the HCM Quick Estimation Methodology for existing, future no-build, and future build scenario. The table below summarizes the overall intersection delay and Level of Service for the weekday morning and afternoon peak hours, under the Existing, Future No-Build, and Future Build scenarios.

Table 7. Grove Street at Broad Street Summary of Congestion Reduction Benefits

	Existing		Future No-Build		Future Build	
	Delay [1]	**LOS [2]**	**Delay [1]**	**LOS [2]**	**Delay [1]**	**LOS [2]**
Weekday Morning Peak Hour	139	LOS F	175	LOS F	52	LOS D
Weekday Afternoon Peak Hour	75	LOS E	125	LOS F	98	LOS F

[1] Overall Intersection Delay, measured in seconds per vehicle
[2] Level of Service

This intersection is currently operating at an estimated 139 seconds of delay in the morning peak hour and 75 seconds in the afternoon peak hour, which equates to a LOS F and LOS E. For the future build scenario, there is a delay reduction of 70% in the morning peak period and 22% in the evening peak period. While the intersection is projected to be operating at an LOS of F in the future build condition for the afternoon peak, the percent reduction in seconds of delay is substantial, given the constraints of the corridor and volume in the corridor during peak periods.

Conceptual Cost Estimate

A conceptual cost estimate was developed for the proposed project using the CTDOT LOTCIP application cost estimate template. The estimate is presented in 2025 dollars and not escalated since the likely bid date is not known. The total project cost is estimated at approximately $2 million. The itemized cost estimate can be found in Appendix E: Conceptual Cost Estimates.

Danbury: White Street – Newtown Road – Triangle Street Intersection

The intersection of White Street with Newtown Road and Triangle Street in Danbury is a complex irregular, multi-legged signalized intersection with challenging approach geometry and curb cuts. White Street/Newtown Road is classified as a minor arterial. Triangle Street is classified as a major collector, and Beaver Brook Road is classified as a local road.

According to the CTDOT traffic monitoring data website, there is an AADT of 18,200 on White Street/Newtown Road. The AADT on Triangle Street approaching the intersection is 8,200. The AADT on Cross St is 5,000. The AADT was projected 20 years, to the year 2043, using an annual growth rate of 0.5%.

Table 8. Existing and future AADT for White Street – Newtown Road – Triangle Street Intersection in Danbury

Street	AADT (2023)	AADT (2043)[4]
Triangle Street	8,200	9,060
White Street	18,200	20,109
Newtown Road	18,200	20,109
Cross Street	5,000	5,524

Existing Congestion

The existing intersection experiences significant congestion during the morning and afternoon peak periods, which is likely driven by the intersection's complex geometry and numerous approaches. With the complex geometry, the site lines as shown in Figure 1 significant congestion occurs on both the White Street and Triangle Street approaches. Significant

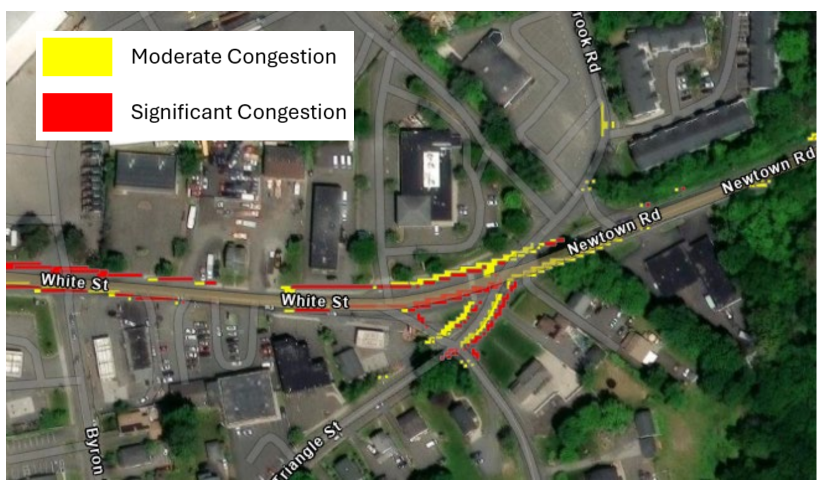

Figure 5. Overlayed Congestion at White Street – Newtown Road – Triangle Street

[4] The 20-year AADT growth is calculated using a 0.5% growth rate for an urban area.

congestion indicates that the highlighted area is operating at 0-45% of free flow speeds in each of the three AM and/or four PM peak 1-hour collection periods. The moderate congestion areas indicate that at least a moderate level of congestion (45-65% of free flow speed) was experienced across all hours of the collection periods.

Proposed Countermeasures

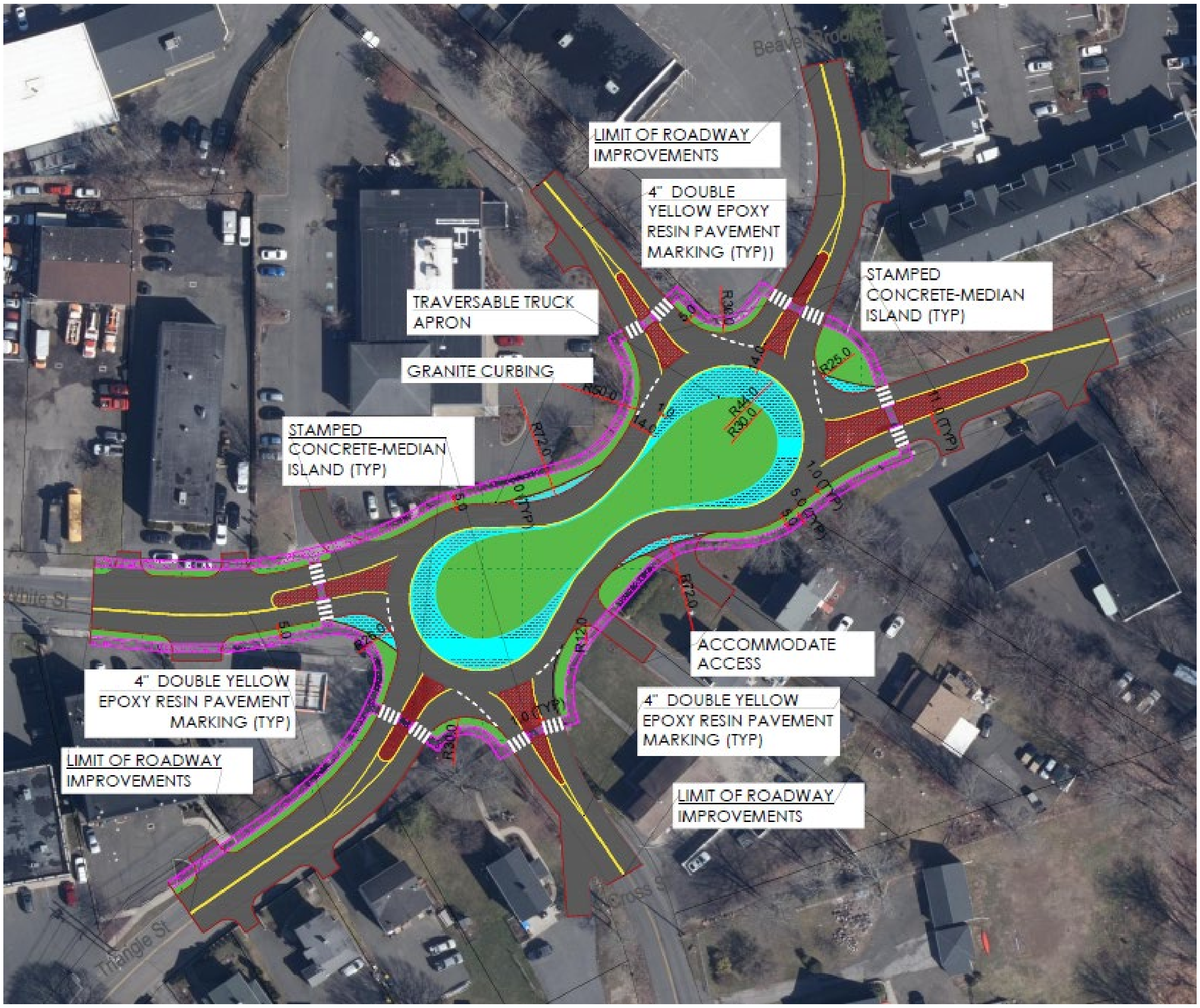

Figure 6. White Street – Newtown Road – Triangle Street Project Concept Design of Proposed Project (complete concept package included in Appendix D: Project Concept Designs)

To address the complex intersection layout, a peanut roundabout with six approach legs was proposed. Cross Street and the driveway west of Beaver Brook Road were added as approaches to the intersection. Curbline relocation will be dependent on ROW impacts on multiple areas of the intersection. Crosswalks and pedestrian curb ramps will be included on each approach. Sidewalks will also be included around the roundabout to accommodate pedestrian connectivity. The peanut roundabout will increase vehicle processing and reduce queueing on the approaches.

Table 9. White Street – Newtown Road – Triangle Street Intersection Geometry Design Vehicle Recommendations

Approach (Functional Classification)	**Turn to: (functional classification)**	**Design Vehicle**	**Basic CTDOT Guidance & Concept Plan Notes**
White Street (Minor Arterial)	Triangle Street (Collector), other roadways (Local Roadways)	WB-62	Recommend SU due to the residential nature of Triangle Street and the acute angle to connect with White Street.
Triangle Street (Major Collector)	White Street (Arterial), other roadways (Local Roadways)	SU	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.
Other roadways (Local Roadways)	White Street (Arterial), Triangle Street (Collector)	SU	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.

Congestion Reduction Effect

As summarized in the Final Report, the congestion reduction benefits of the proposed concept were assessed using a combination of the HCM Quick Estimation Methodology for existing and future no-build scenarios and the GDOT Roundabout Analysis Tool for the future build scenario. The table below summarizes the overall intersection delay and Level of Service for the weekday morning and afternoon peak hours, under the Existing, Future No-Build, and Future Build scenarios.

Table 10. White Street – Newtown Road – Triangle Street Summary of Congestion Reduction Benefits

	Existing		Future No-Build		Future Build	
	Delay [1]	LOS [2]	Delay [1]	LOS [2]	Delay [1]	LOS [2]
Weekday Morning Peak Hour	205	LOS F	272	LOS F	12	LOS B
Weekday Afternoon Peak Hour	315	LOS F	416	LOS F	14	LOS B
[1] Overall Intersection Delay, measured in seconds per vehicle [2] Level of Service						

This intersection currently operates at an estimated 205 seconds of delay in the morning peak and 315 seconds in the afternoon peak, equating to a severe LOS F. The level of delay experienced at the intersection is projected to worsen in the future no-build due to volume increasing in the corridor. The proposed project is projected to significantly reduce congestion at the intersection with an anticipated delay reduction of 95% when compared to the no-build condition, and leading to a future-build LOS B during both the morning and afternoon peak periods.

Conceptual Cost Estimate

A conceptual cost estimate was developed for the proposed project using the CTDOT LOTCIP application cost estimate template. The estimate is presented in current year dollars and not escalated that a likely bid date is not known. The total project cost is estimated at approximately $2.9 million. The itemized cost estimate can be found in Appendix E: Conceptual Cost Estimates.

Wilton: Westport Road (Route 33) at Chestnut Hill Road (Route 53) Intersection

The Wilton intersection at Westport Road and Chestnut Hill Road is currently a four-way signalized intersection with a right-turn WB slip lane. Westport Road and Chestnut Hill Road provide a single travel lane in each direction and are both classified as minor arterials.

As shown in Table 6, the AADT on the north leg of Chestnut Hill Road is 4,700. The AADT on the south leg of Chestnut Hill Road is 6,800. The AADT on Westport Road on the east leg is 11,700 and the AADT on Westport Road on the west leg is 10,200. The AADT was projected 20 years, to the year 2043, using an annual growth rate of 0.5%, which is typical for urban areas.

Table 11. Existing and future AADT for the Westport Road at Chestnut Hill Road intersection in Wilton

Street	AADT (2023)	AADT (2043)[5]
Chestnut Hill Road – north leg	4,700	5,193
Chestnut Hill Road – south leg	6,800	7,513
Westport Road – east leg	11,700	12,927
Westport Road – west leg	10,200	11,270

Existing Congestion

The intersection experiences significant congestion as identified by the GIS analysis during both the AM and PM peak periods. Significant congestion indicates that the highlighted area is operating at 0-45% of free flow speeds in each of the three AM and/or four PM peak 1-hour collection periods. The moderate congestion areas refers to locations where operating speeds were 45-65% of free flow speeds across all hours of the collection periods. The queuing on the EB

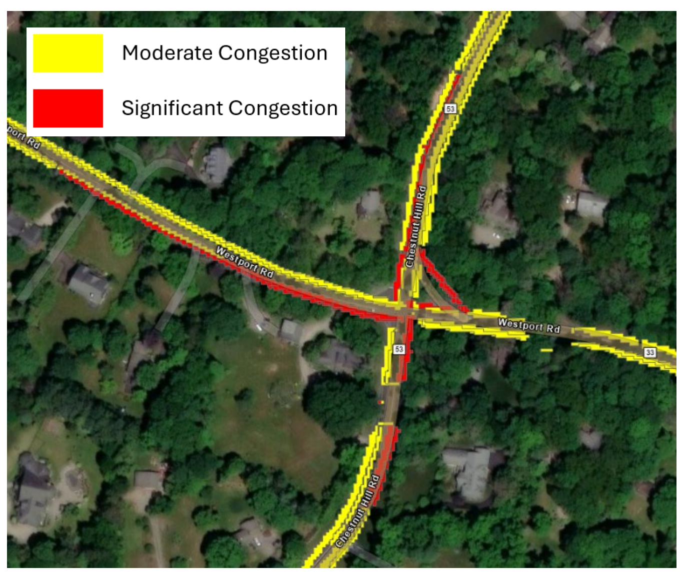

Figure 7. Overlayed Congestion at Westport Rd at Chestnut Hill

[5] The 20-year AADT growth is calculated using a 0.5% growth rate for an urban area.

approach extends approximately 700 feet and the queuing on the NB approach extends approximately 400 feet. There is also queuing on the right-turn WB slip-lane. The identified congestion indicates that there is likely a conflict at the intersection due to left-turning vehicles preventing through traffic from clearing the intersection, leading to extended queueing and reduced intersection throughput.

Proposed Countermeasures

Figure 8. Westport Road at Chestnut Hill Road Project Concept Design of Proposed Project (complete concept package included in Appendix D: Project Concept Designs)

The recommended congestion countermeasure is to convert the intersection into a single-lane roundabout with refuge islands on all approaches. A roundabout provides the most benefit for congestion reduction. It would help to keep traffic continuously moving and flowing. A roundabout could potentially reduce the footprint of the intersection, improve visibility for oncoming traffic, reduce the number of conflict points in the intersection.

1. **Modified Curbing and Paving**
    a. To account for the roundabout, curbing and paving needs to be extended on all four corners of the intersection. Median islands will also be included on each approach.

Table 12. Westport Road (Route 33) at Chestnut Hill Road (Route 53) Intersection Geometry Design Vehicle Recommendations

Approach (Functional Classification)	**Turn to: (functional classification)**	**Design Vehicle**	**Basic CTDOT Guidance & Concept Plan Notes**
Westport Road (Minor Arterial)	Chestnut Hill Road (Minor Arterial)	WB-62	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.
Chestnut Hill Road (Minor Arterial)	Westport Road (Minor Arterial)	WB-62	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.

Congestion Reduction Effect

As summarized in the Final Report the congestion reduction benefits of the proposed concept were assessed using a combination of the HCM Quick Estimation Methodology for existing and future no-build scenarios and the GDOT Roundabout Analysis Tool for the future build scenario. The table below summarizes the overall intersection delay and Level of Service for the weekday morning and afternoon peak hours, under the Existing, Future No-Build, and Future Build scenarios.

Table 13. Westport Road at Chestnut Hill Road Summary of Congestion Reduction Benefits

	Existing		**Future No-Build**		**Future Build**	
	Delay [1]	**LOS [2]**	**Delay [1]**	**LOS [2]**	**Delay [1]**	**LOS [2]**
Weekday Morning Peak Hour	127	LOS F	207	LOS F	21	LOS C
Weekday Afternoon Peak Hour	218	LOS F	335	LOS F	16	LOS C

[1] Overall Intersection Delay, measured in seconds per vehicle
[2] Level of Service

This intersection is currently operating at an estimated 127 seconds of delay in the morning peak and 218 seconds in the afternoon peak, equating to a LOS F. Forecasted volume increase in the future, the no-build scenario sees the estimated level of delay increase. For the future build condition, it is shown that a single-lane roundabout will result in a significant reduction in intersection delay and would achieve an LOS C equating to an approximate 90% delay reduction during both the morning and afternoon peak periods.

Conceptual Cost Estimate

A conceptual cost estimate was developed for the proposed project using the CTDOT LOTCIP application cost estimate template. The estimate is presented in current-year dollars and not escalated because a likely bid date is not known. The total project cost is estimated at approximately $3.2 million. The itemized cost estimate can be found in Appendix E: Conceptual Cost Estimates.

New Milford: Danbury Road (Route 202) at Sullivan Road Intersection

Danbury Road (Rt 202) at Sullivan Road is currently a four-legged signalized intersection, with a commercial driveway as the westbound approach. Danbury Road is classified as a principal arterial and provides two lanes southbound which open into four lanes on the southbound approach to the intersection (an exclusive left turn lane, two through lanes, and an exclusive right turn lane), the northbound approach provides two lanes northbound which transition into three lanes approaching the intersection (an exclusive left turn lane, a through lane, and a shared through/right turn lane). Sullivan Road is classified as a minor arterial, which provides one lane eastbound, which opens into three lanes at the eastbound approach to the intersection (an exclusive left turn lane, a shared through/left turn lane, and an exclusive right turn lane).

As shown in Table 4, the AADT on the north leg of Danbury Road is 30,200. The AADT on the south leg of Danbury Road is 29,100. The AADT on Sullivan Road on the west leg is 5,700. The AADT was projected 20 years, to the year 2043, using an annual growth rate of 0.5%, which is typical for urban areas.

Table 14. Existing and future AADT for Danbury Road and Sullivan Road intersection in New Milford

Street	AADT (2023)	AADT (2043)[6]
Danbury Road – north leg	30,200	33,368
Danbury Road – south leg	29,100	32,152
Sullivan Road – west leg	5,700	6,298

Existing Congestion

Despite the scale of the intersection and existing lane configurations, this location was identified by GIS analysis to experience daily congestion during the weekday AM and PM peak periods. As shown in Figure 3 significant congestion occurs at the north and southbound approaches on Danbury Road and to a lesser degree along the Sulivan Road approach. Significant congestion indicates that the highlighted area is operating at 0-45% of free flow speeds in each of the three AM and/or four PM peak 1-hour collection periods.

[6] The 20-year AADT growth is calculated using a 0.5% growth rate for an urban area.

The moderate congestion areas refer to locations where operating speeds were 45-65% of free flow speeds across all hours of the collection periods.

The typical queue during the PM peak extends more than 1,000 feet in the NB direction on Danbury Road (Rt 202) approaching the intersection and approximately 500 feet in the NB direction. In the EB direction approaching the intersection, the queuing stretches to approximately 400 feet upstream from the intersection, with further sections of moderate congestion following each of these segments.

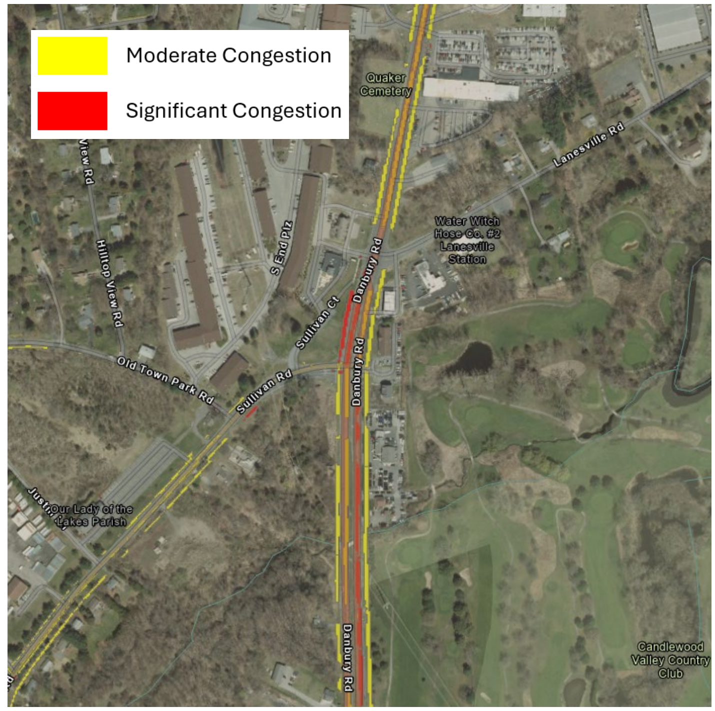

Figure 9. Overlayed Congestion at Danbury Road at Sullivan Road

The identified congestion suggests that the intersection is not operating efficiently, and its operation is exacerbated by high traffic volumes on Danbury Road. Several potential conflict points were identified.

1. Left turn conflicts for all directions.
2. Poor signal timing.
3. Poor adjacent signal.
4. Direct access by an adjacent commercial property.

Proposed Countermeasures

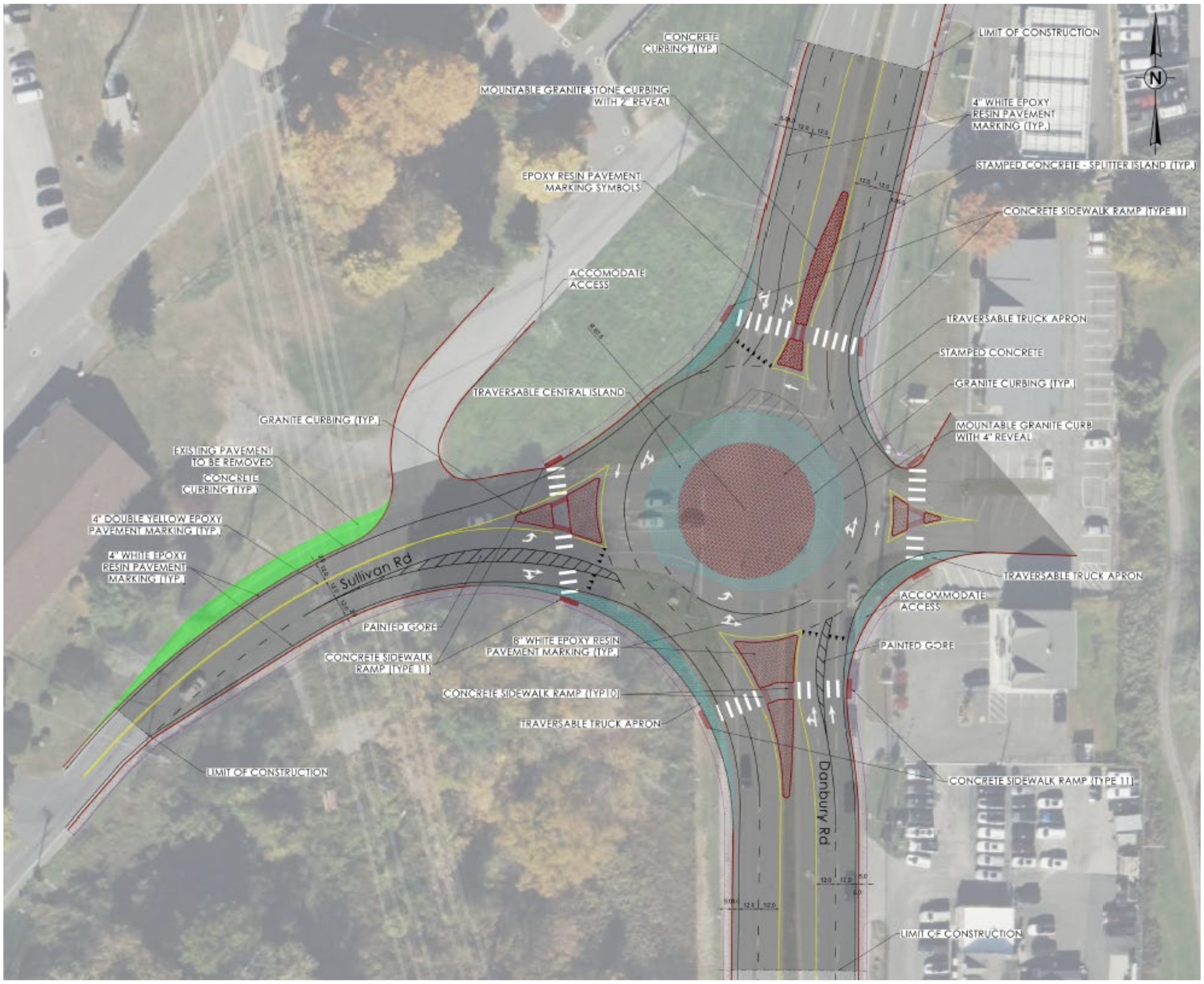

Figure 10. Danbury Road (Rt 202) at Sullivan Road Project Concept Design of Proposed Project (complete concept package included in Appendix D: Project Concept Designs)

To address the identified congestion, a conversion of the signalized intersection to a roundabout is proposed. The proposed roundabout would maintain the existing lane configurations, with two lanes in each direction on Danbury Road and two lanes entering and one receiving on Sullivan Road. The proposed roundabout would reduce queueing on the approaches by allowing for a continuously flowing traffic pattern in addition to reducing conflict points at the intersection.

1. **Modified Curbing and Paving**: The edge of the pavement will be extended in certain areas to accommodate the multilane roundabout. A center island will be included with a diameter of approximately 100 feet. Median islands will be included on each

approach with concrete sidewalk curb ramps. These curbing and paving modifications will help to slow down vehicles and control traffic flow.

2. **Modified Pavement Markings**: Crosswalk markings and lane configuration modifications are recommended to improve pedestrian connectivity and traffic flow.
    a. Modifications to lane markings are necessary to accommodate the roundabout alternative and to reduce the number of lanes on the northbound and southbound approaches.
    b. Crosswalk markings will be included as part of the design to provide pedestrian facilities.

Table 15. Danbury Road (Route 202) at Sullivan Road Intersection Geometry Design Vehicle Recommendations

Approach (Functional Classification)	Turn to: (functional classification)	Design Vehicle	Basic CTDOT Guidance & Concept Plan Notes
Danbury Road (Principal Arterial)	Sullivan Road (Minor Arterial)	WB-62	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.
Sullivan Road (Minor Arterial)	Danbury Road (Principal Arterial)	WB-62	The Concept Plan presented in Appendix D illustrates compliance by the recommended design vehicle.

Congestion Reduction Effect

As summarized in the Final Report, the congestion reduction benefits of the proposed concept were assessed using a combination of the HCM Quick Estimation Methodology for existing and future no-build scenarios and the GDOT Roundabout Analysis Tool for the future build scenario. The table below summarizes the overall intersection delay and Level of Service for the weekday morning and afternoon peak hours, under the Existing, Future No-Build, and Future Build scenarios.

Table 16. Danbury Road (Rt. 202) at Sullivan Road Summary of Congestion Reduction Benefits

	Existing		Future No-Build		Future Build	
	Delay [1]	**LOS [2]**	**Delay [1]**	**LOS [2]**	**Delay [1]**	**LOS [2]**
Weekday Morning Peak Hour	483	LOS F	640	LOS F	13	LOS B
Weekday Afternoon Peak Hour	590	LOS F	788	LOS F	17	LOS C
[1] Overall Intersection Delay, measured in seconds per vehicle [2] Level of Service						

The intersection is currently operating at an estimated 483 seconds of delay in the morning peak and 590 seconds in the afternoon peak. This equates to a severe LOS F, indicating that significant delays are being experienced by roadway users. Without intervention, the intersection operations worsen further in the future no-build scenario due to increased roadway volumes. Results from the GDOT Roundabout Analysis Tool indicate that the proposed multilane roundabout would have a substantial impact on improving intersection operations. Under the future build, there would be an estimated 98% delay reduction in the future build condition when compared to the no-build condition, leading to LOS of B and C in the morning and afternoon peaks, respectively.

Conceptual Cost Estimate

A conceptual cost estimate was developed for the proposed project using the CTDOT LOTCIP application cost estimate template. The estimate is presented in 2025 dollars and not escalated as a likely bid date is not known. The total project cost is estimated at approximately $3.5 million. The itemized cost estimate can be found in Appendix E: Conceptual Cost Estimates.