

Milford: NW & NE 10th St/N. Church St/ N. Rehoboth Boulevard/ N. Walnut Street Intersection Study - Recommendations Report



Prepared for:



Prepared by:



Milford: NW & NE 10th St/N. Church St/N. Rehoboth Boulevard/ N. Walnut Street Intersection Study - Recommendations Report

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Executive Summary

The City of Milford requested the Dover Kent County MPO study the intersection of N. Walnut Street/NW & NE Tenth Street/N. Church Street/N. Rehoboth Boulevard, which is the convergence of several City and State maintained roads in the City of Milford. The intersection is southwest of the Milford School District Property, which includes Milford High School and Milford Central Academy. The school campus feels disconnected from the residential portion of the Town due to a lack of bicycle/pedestrian infrastructure, crash rates, and congestion issues.

The goal of the study is to provide a safer route to Milford High School and address the congestion at the intersection. The goal includes infrastructure improvements that enhance operations for pedestrians, cyclists, and motorists.

This study will evaluate intersection improvements and/or reconfigurations to improve mobility for pedestrians, cyclists, and motorists in compliance with the recently adopted Milford Bicycle Master Plan and Milford's Comprehensive Plan. Recommendations as part of the Milford Bicycle Master Plan include a north/south crossing across NW & NE 10th Street and crossing the southern leg of N. Rehoboth Boulevard, while avoiding impacts to the Dairy Queen property. Additionally, intersection connectivity was studied as part of Bike Delaware's "Day with the Dutch," which addressed bicycles on all four corners of the intersection. Improvements to the configuration of N. Church Street at N. Walnut Street are also included.

Extensive data gathering occurred throughout the study, including traffic counts to determine existing traffic volumes. The existing traffic volumes were used to determine future growth volumes and analyze how the intersection would function in future years depending on the recommendations. A community visioning workshop was held on December 13, 2022, where members expressed concerns about heavy vehicular traffic, delays during school dismissal (afternoons), speeding, and the complexity of the intersection causing driver confusion. Most of the community's concerns centered around the flow of vehicles along NW & NE 10th Street.

Several alternatives were prepared and analyzed including reconfiguring the intersection to a protected intersection, which would accommodate bicycles, pedestrians, and vehicles, as well as an elongated roundabout. These alternatives were presented to the community in a second workshop held on March 23rd, 2023. Recommendations at this workshop included an interim improvement that could provide temporary relief to the area, while the larger project that will achieve more of the project goals is under funding consideration and design.

This project incorporated community involvement through two community workshops, and separate coordination with one developer, who is preparing a new site plan/use for the property at the Southeast corner of the intersection.

Century, the City of Milford, and Dover Kent MPO support the long term Protected Intersection (Phased Approach) Recommendation for this project, with the interim improvement as a viable temporary infrastructure improvement.

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Introduction

The NW & NE 10th St/N. Church St/N. Walnut Street/N. Rehoboth Boulevard Intersection Study analyzed the intersection located south of Milford High School and Milford Central Academy. This area is comprised of the junction of NW & NE 10th Street, N. Church Avenue, N. Rehoboth Boulevard, and N. Walnut Street. This challenging intersection is characterized by high volumes, delays, and a lack of pedestrian and bicycle infrastructure that creates a feeling of disconnection between the school complex and the residential community. The City of Milford requested Dover Kent County MPO study this intersection, and in response, Century evaluated intersection improvements to improve mobility for pedestrians, cyclists, and motorists in compliance with the recently adopted Milford Bicycle Master Plan and Milford's Comprehensive Plan. Recommendations in the Milford Bicycle Master Plan included a north/south crossing across NW 10th Street, crossing the southern leg of N. Rehoboth Boulevard, and avoiding impacts to the Dairy Queen Property. In addition, Century coordinated with the property owner on the northwest corner of the intersection, currently known as Pattie's Nectars, and the southeast corner, known as Fisher Auto Parts.

Study Location and Study Area

The intersection study is located in Kent County in the City of Milford. The intersection includes the roads NW & NE 10th Street, N. Church Street, N. Rehoboth Boulevard, and N. Walnut Street (**Figure 1**). There is a large median separating N. Walnut Street from N. Rehoboth Boulevard south of the intersection. Motorists often use the adjacent parking lot to cut through the intersection between N. Walnut Street and N. Rehoboth Boulevard because the turns and movements designated for this connection on the roadway are challenging and confusing. N. Walnut Street and N. Rehoboth Avenue are main north/south routes that help the community travel in and out of Downtown Milford and surrounding areas.



Figure 1 - Study Area Map

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Purpose and Need

The purpose and need of this study are to analyze connectivity between Milford Senior High School, Milford Central Academy, and residential communities to the south. The study will evaluate intersection improvements and/or reconfigurations to improve mobility for pedestrians, cyclists, and motorists. This project will implement elements from the Milford Bicycle Master Plan and the Milford Comprehensive Plan.

Existing Conditions, Proposed & Committed Development, and Future Traffic with Development

Existing Roadway Conditions

The intersection being studied includes bi-directional roads compromised of one lane in each direction. Turn lanes exist on N. Rehoboth Boulevard and N. Walnut Street. The roadways are all major collectors except for NW & NE 10th Street, which is a Minor Collector. The intersection is signalized except for a connection between N. Walnut Street and N. Rehoboth Boulevard which is under STOP condition. One challenging movement for motorists is traveling from N. Church Street to N. Rehoboth Avenue. A vehicle traveling north on N. Church Street would make a right onto N. Walnut Street to stop a few feet south to make a left onto N. Rehoboth Boulevard. Many community members during the public workshop noted that rather than doing this multi-turn approach to get from N. Church Street to N. Rehoboth Boulevard, motorists simply used the adjacent parking lot to go straight across. In general, there are only sidewalks and bicycle markings along N. Rehoboth Avenue, with markings approaching the intersection.

N. Rehoboth Avenue, N. Walnut Street, N. Church St and NW & NE 10th Street are bus routes with one bus stop located in the triangular median separating N. Walnut Street from N. Rehoboth Avenue.

Traffic Analysis

Existing intersection turning movement count data was obtained for A.M. peak hour, extended midday to capture end of the school day traffic, and P.M. peak hour on Thursday November 3, 2022, at the following intersections:

1. N Walnut Street at NW / NW & NE 10th Street (Signalized)
2. N Walnut Street at N Rehoboth Boulevard (Unsignalized –TWSC)
3. N Walnut Street at N. Church Street (Unsignalized –TWSC)

The existing A.M. Midday and P.M. peak hour turning movement counts are provided in **Figure 2, Figure 3, and Figure 4**, respectively.

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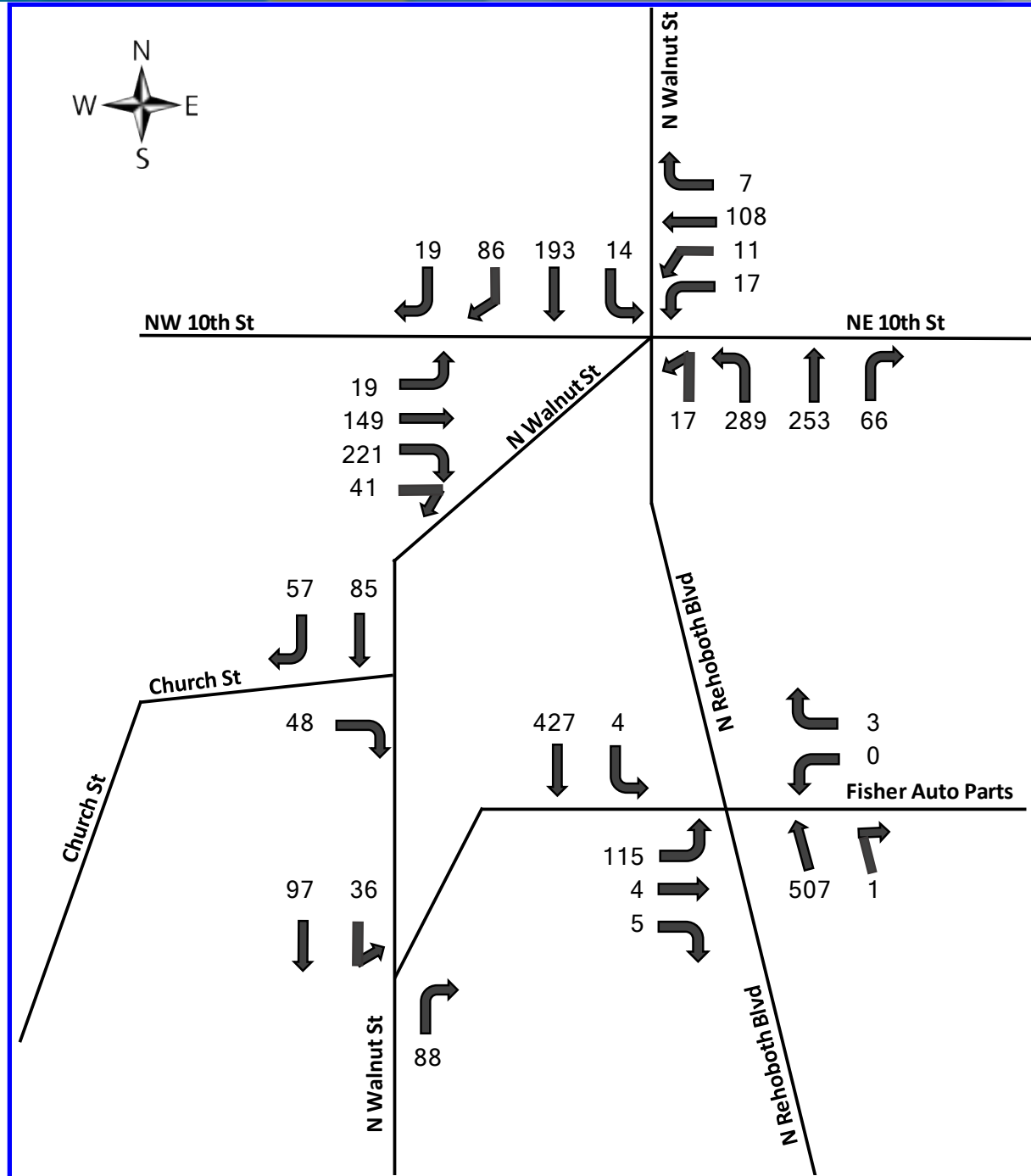


Figure 2 - Existing A.M. Peak Hour Traffic Volumes

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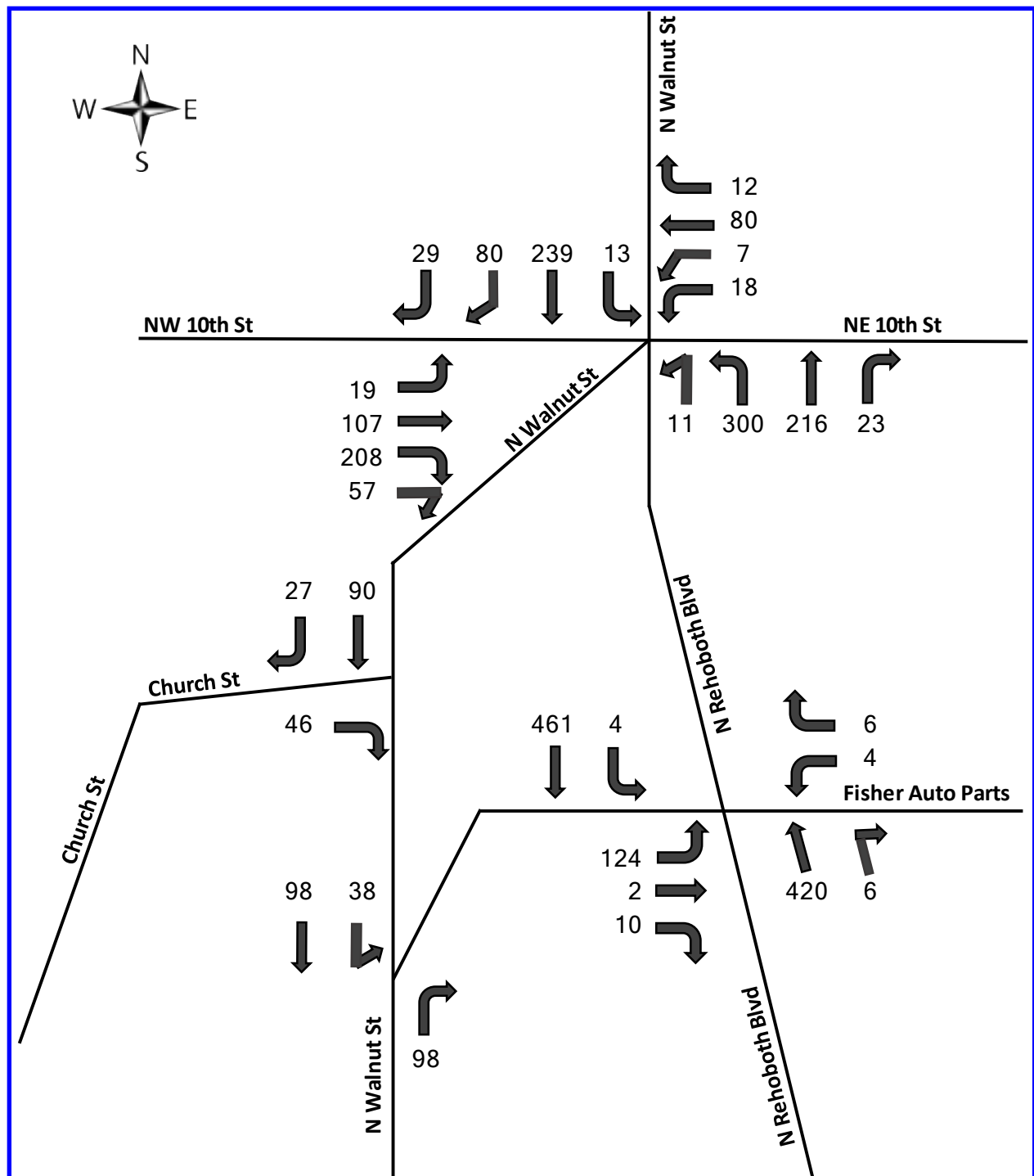


Figure 3 - Existing Midday Peak Hour Traffic Volumes

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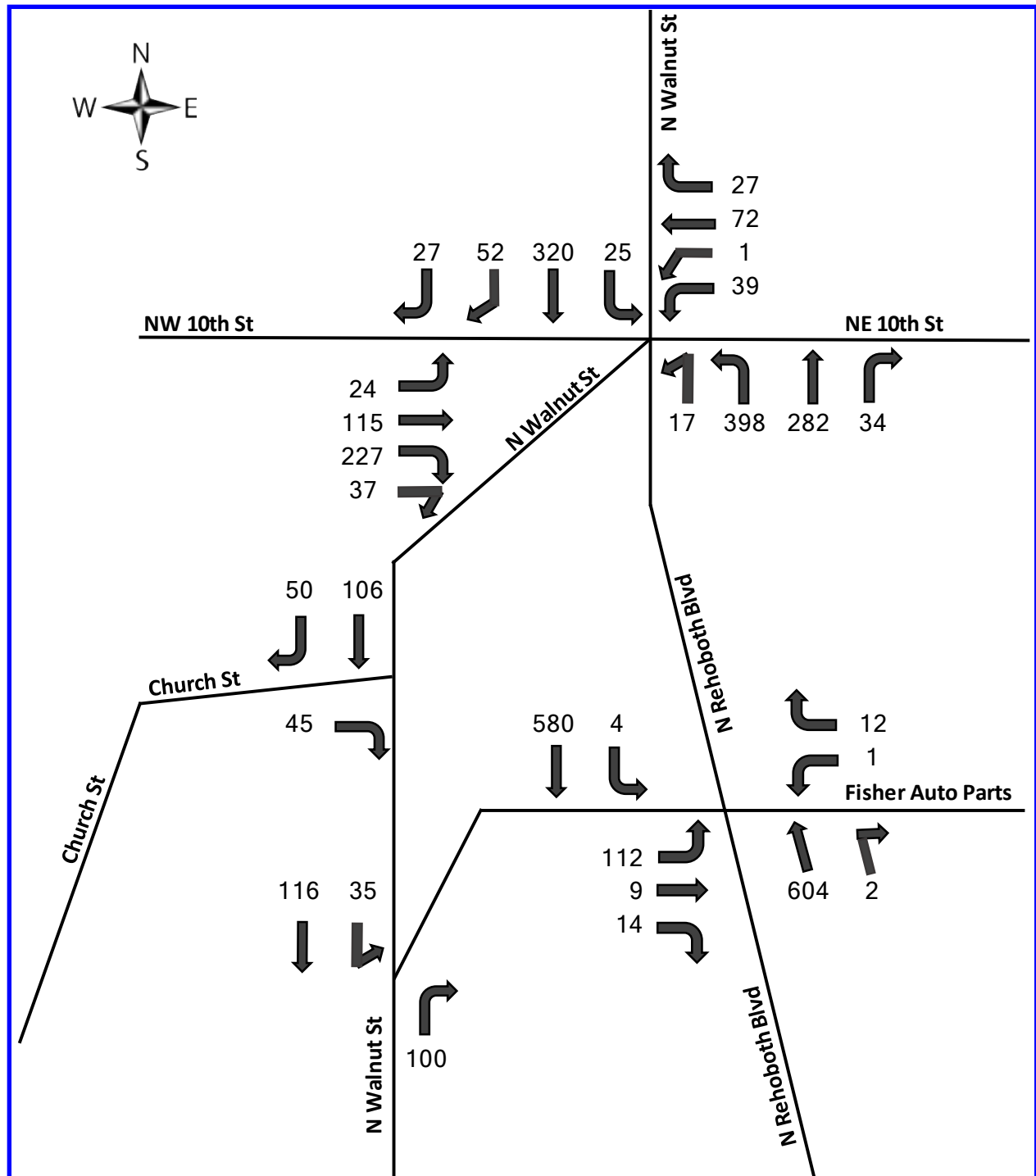


Figure 4 - Existing P.M. Peak Hour Traffic Volumes

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Synchro version 11 was used for the traffic operational analysis. A network of the study roadways and intersections shown in **Figure 1** was developed in Synchro for the A.M. Midday and P.M. existing geometric and peak hour traffic conditions using the traffic volumes provided in **Figure 2** through **Figure 4**, as applicable.

Existing traffic signal timing and coordination data was obtained from the DelDOT TMC for use in the modeling to obtain results that would mimic existing traffic operations as closely as possible. For this same reason, the traffic analysis models were calibrated with existing posted speeds and heavy vehicle percentages.

Measures of effectiveness (MOE) generated from the operational analyses were Level of Service (LOS) and delay for both the approaches and intersections of the signalized intersection. For the unsignalized intersections, Highway Capacity Manual 6th edition (HCM 6) LOS and delay were generated for the free approach left-turn movement and the stop-controlled approaches. This is because LOS is not defined for major road through traffic or the intersection per HCM 6 methodology. All delay provided is average delay measured in seconds per vehicle. The LOS criteria for signalized and unsignalized intersections are provided in **Table 1**. The operational analyses results are presented in **Table 2** through **Table 4**.

Level of Service Criteria		
LOS	Delay (Seconds per Vehicle)	
	Signalized	Unsignalized
A	0 to 10	0 to 10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	>80	>50

Table 1 - HCM 6 LOS Criteria

Approach / Intersection	2022 Weekday AM Peak Hour		2022 Weekday Midday Peak Hour		2022 Weekday PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
NB N Rehoboth Blvd	12.6	B	13.6	B	40.7	D
SB N Walnut St	21.6	C	23.6	C	25.7	C
EB NW 10th St	86.3	F	85.1	F	141.7	F
WB NE 10th St	24.0	C	23.6	C	48.3	D
Intersection	36.5	D	36.7	D	61.6	E

Table 2 - N. Walnut Street & N. Rehoboth Boulevard at NW & NE 10th Street Signalized Intersection

As shown in **Table 2**, per the operational analysis results, the eastbound NW 10th Street approach operates at LOS F for all three peak hours at the intersection of N Walnut Street & N Rehoboth Boulevard at NW &

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NE 10th Street, with delays of 86.3 seconds, 85.1 seconds, and 141.7 seconds respectively for the A.M., Midday and P.M. peak hours. All the other approaches operate at LOS D or better for all three peak hours. The overall intersection operates at LOS D during the A.M. and Midday peak hours. For the P.M. peak hour, the intersection operates at LOS E with delay of 61.6 seconds.

N Walnut Street & N Rehoboth Boulevard:

Approach / Intersection	2022 Weekday AM Peak Hour		2022 Weekday Midday Peak Hour		2022 Weekday PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
SBL N Rehoboth Blvd	9.1	A	8.3	A	8.7	A
EB N Walnut St	70.7	F	42.1	E	96.5	F
WB Fisher Auto Parts	12.2	B	15.3	C	14.1	B

Table 3 - N. Walnut Street at N. Rehoboth Boulevard Unsignalized Intersection

At the unsignalized intersection of N Walnut Street at N Rehoboth Boulevard, the eastbound N Walnut Street stop-controlled approach operates at LOS F with delays of 70.7 seconds and 96.5 seconds, respectively, for the A.M. and P.M. peak hours per the operational analysis (**Table 3**). During the Midday peak hour, this approach operates at LOS E with a delay of 42.1 seconds. The N Rehoboth Boulevard southbound left-turn movement operates at LOS A for all three peak hours, with a worst delay of 9.1 seconds for the A.M. peak hour. The westbound Fisher Auto Parts stop-controlled approach operates at LOS B with delays of 12.2 seconds and 14.1 seconds, respectively, for the A.M. and P.M. peak hours per the analysis as shown in **Table 3**. The approach operates at LOS C with 15.3 seconds delay for the Midday peak hour.

N Walnut Street & N Rehoboth Boulevard:

Approach / Intersection	2022 Weekday AM Peak Hour		2022 Weekday Midday Peak Hour		2022 Weekday PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
EB Church St	9.2	A	9.1	A	9.3	A

Table 4 - N. Walnut Street at N. Church Street Unsignalized Intersection

As shown **Table 4**, per the operational analysis results, eastbound N. Church Street operates at LOS A for all three peak hours with a worst delay of 9.3 seconds for the P.M. peak hour.

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Crash Evaluation

Crash data covering the five-year period from November 10, 2017, through November 10, 2022, at the intersections and along the roadway segments within the study limits was obtained from DelDOT for evaluation. Total reported crashes for the limits within 0.1-mile radius of the intersection of N Walnut Street & N Rehoboth Boulevard at NW & NE 10th Street for this period were forty-three (43). Most of the crashes within the study limits, twenty-three (23), approximately 53%, occurred at the intersection of N Walnut Street and N Rehoboth Boulevard at NW & NE 10th Street. There were no reported fatal crashes.

The primary contributing factor for crashes is “Driver Inattention, Distraction, or Fatigue” at 19 occurrences, or 44.2% of the crashes. “Following too Close” (6 / 14.0%) was the next most frequent reason, and “Failure to Yield Right of Way (ROW)” (5 / 11.6%) was the third most frequent reason. Together these three reasons accounted for thirty (30) out of the total of the forty-three (43) reported crashes i.e., approximately 70%. The first two reasons are driver behaviors that are not necessarily susceptible to correction with physical improvements. While some road signs may need to be upgraded to meet current Delaware Manual on Uniform Traffic Control Devices (DE MUTCD) standards, STOP and turn restriction signs are clearly visible to road users, and the traffic signal was not reported as malfunctioning for any of the crashes; therefore, the “Failure to Yield ROW” crashes also appear to have driver behavior as the underlying factor.

Most of the reported crashes occurred during daylight conditions and under clear weather and dry road surface conditions. Forty out of the forty-three reported crashes, approximately 93%, occurred under daylight (34 / 79.1%) and dark but lighted (6 / 14.0%)

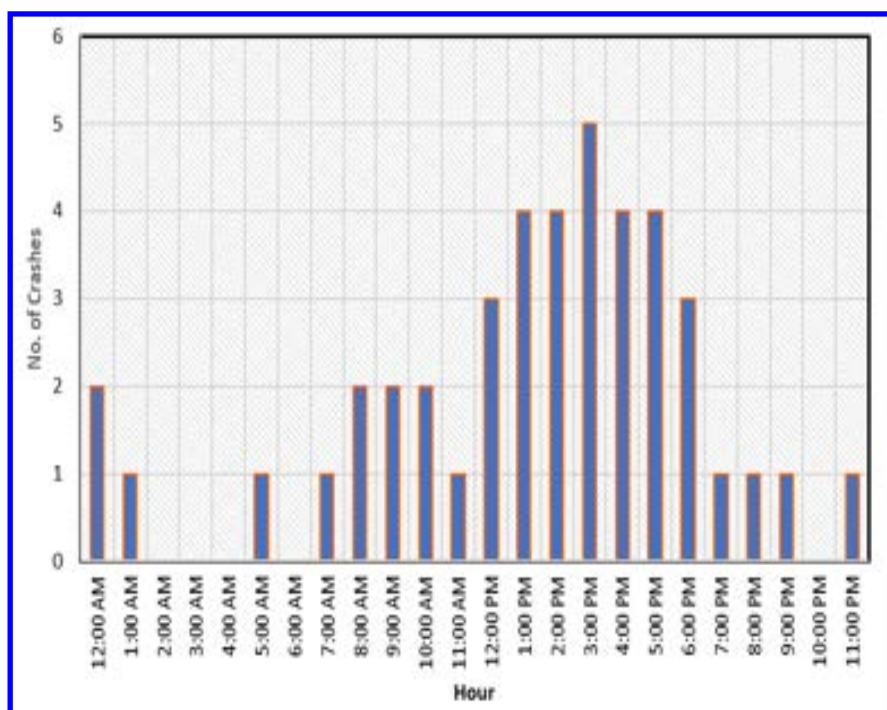


Figure 5 - Time-of-Day Crash Data (Five Year Period)

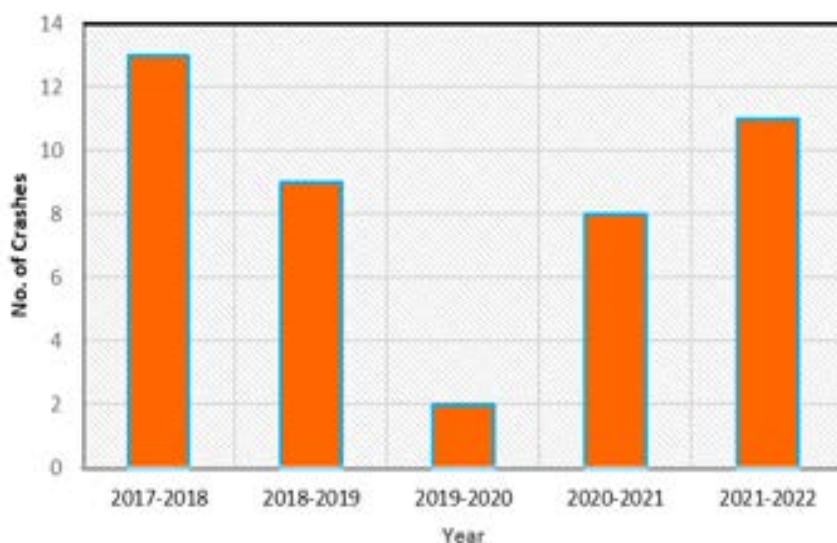
conditions. It appears that lighting is not a problem associated with crashes within the study limits. An in-depth review of the time of day of crashes indicates that they are not confined to any particular time of day within the study limits. Crashes, as shown in **Figure 5**, are highest between noon and 7:00 P.M., peaking at 3:00 P.M. This time period encompasses the dismissal periods for Milford High School at 2:25

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P.M., and Milford Central Academy at 3:25 P.M. Crashes appear to be higher during the hours of increased traffic activity, as is logically expected.

The highest number of annual crashes as shown in **Figure 6**, thirteen, was recorded during the 2017 – 2018 period. During the 2018 – 2019 period the number of crashes dropped to nine, an approximately 31% decrease. The following year, 2019 - 2020 was marked by an approximately 78% decrease from the preceding year, down from nine crashes to two crashes. This decrease may be the result of significantly fewer vehicles within the study limits as a result of the Covid-19 Restrictions. For most of this period,

Figure 6 - Annual Crashes



schools were online learning only and businesses were work from home where possible. The following annual period, 2020 – 2021, the number of crashes rose to eight, almost back to the preceding pre-Covid year's value of nine. Reported crashes rose by three crashes, from eight to eleven, approximately 38% during the final year period evaluated, 2021 - 2022.

Crash data is summarized on the following map.

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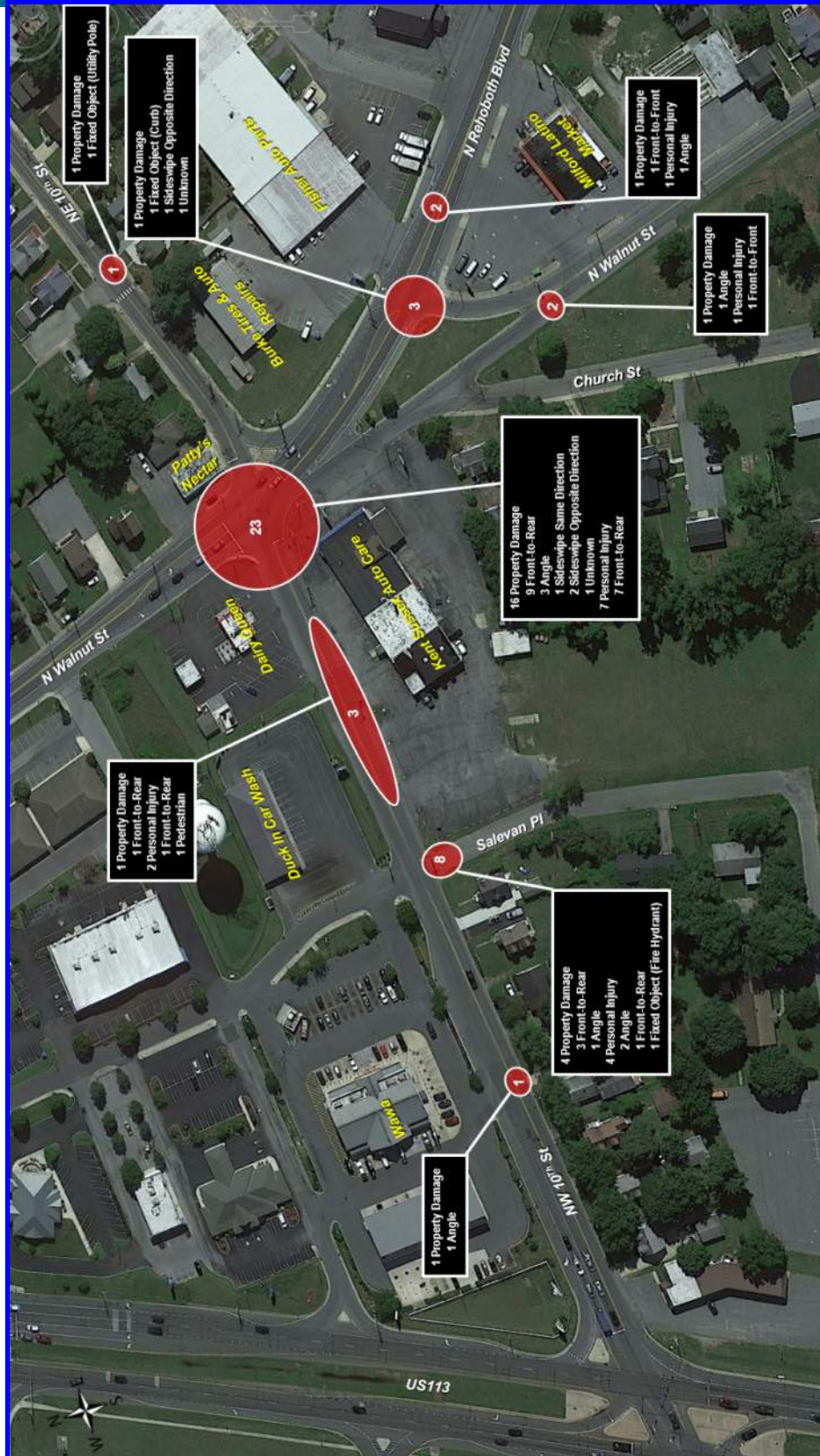


Figure 7 - Crash Data Summary

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Traffic Operational Analysis Results

Table 5 Level of Service Criteria	
LOS	Signalized Delay (Seconds per Vehicle)
A	0 to 10
B	>10 to 20
C	>20 to 35
D	>35 to 55
E	>55 to 80
F	>80

Measures of effectiveness (MOE) results generated from the synchro traffic operational analyses are delay in seconds per vehicle and level of service (LOS). The LOS criteria are provided in **Table 5**. The goal is to maintain an LOS of D or better throughout the study corridor. In the cases for which improvements were needed to achieve satisfactory MOE, the type of improvement and the resulting MOE are also given below.

Using the highest Peak Hour Volumes, which occurred in the P.M. Peak, an operational analysis was completed for each alternative to determine future traffic volumes, average delay (seconds/vehicle), LOS, V/C ratio, and 95th-percentile queue in feet using Synchro/SimTraffic 11 software. Existing signal timing, coordination, and time of day (TOD) data was obtained from the DelDOT Traffic Management Center (TMC) for use in the analysis to obtain as close to actual operating conditions as feasible.

Initially four alternatives were analyzed for the design year 2050 P.M. Peak Hour:

- Alternative 1 – 4-Leg Signalized Intersection (Protected Intersection, one lane each direction with single lane turn-lanes at all four legs)
- Alternative 2 – Alternative 1 with double northbound lefts on N. Rehoboth Boulevard
- Alternative 3 – Single Lane Roundabout
- Alternative 4 – 4-Leg Signalized Intersection with prohibited northbound lefts on N. Rehoboth Boulevard onto NW 10th Street replaced with a jug-handle on Salevan Place

Alternative 1 is a Protected Intersection, which aims to make pedestrians and cyclists safer by separating them from vehicles. A Protected Intersection results in less conflict points and clear travel paths through the intersection for bicycles and pedestrians. The protected intersection was the suggested solution to this intersection at Bike Delaware's "Day with the Dutch."

Alternative 1 reached failure with an LOS F and 114.2 seconds/vehicle of delay in 2050. Alternative 1 did not meet the project goals.

Alternative 2 is the same alternative as Alternative 1, but added a double left turn along N. Rehoboth Boulevard in the northbound approach. This additional left turn lane resulted in a slight improvement to LOS E, with 72.3 seconds/vehicle of delay in 2050; however, this did not meet the minimum LOS D. Alternative 2 does not meet the project goals.

Alternative 3 is a single lane elongated roundabout. It reached failure in 2050 with an LOS F and 89.9 seconds/vehicle of delay in 2050. Alternative 3 did not meet the project goals.

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Finally, Alternative 4 is modified version of Alternative 1 that restricts northbound lefts at N. Rehoboth Boulevard on NW 10th Street. To accommodate vehicles wanting to make the left turn, a jug handle utilizing Salevan Place was suggested to move motorists from N. Rehoboth Boulevard onto NW&NE 10th Street. This alternative resulted in the best outcome of LOS D and 42.3 seconds/vehicle of delay in 2050; however, Salevan Place would need to be upgraded to local road standards. This would conflict with truck restrictions on Salevan Place, and therefore this alternative did not meet the project goals.

Full results of this analysis can be found in **Appendix A – Traffic Results: 1. Original Alternatives Analysis.**

Additional modifications were evaluated based on the preferred Alternative 1 (Protected Intersection) to determine if additional modifications, restrictions, or improvements would result in a favorable LOS to meet the MOE required LOS D or better in design year 2050. Using Alternative 1 as the baseline with an LOS F in 2050 and 114.2 seconds/vehicle of delay, modifications were evaluated as follows:

- Alternative 1B-1 – Alternative 1 with prohibited northbound left turns from N. Rehoboth Boulevard onto NW 10th Street. The northbound N. Rehoboth Boulevard approach would be comprised of one through lane and one right-turn lane. This resulted in an LOS E in 2050 with 66.9 seconds/vehicle of delay. This alternative did not meet the project goals.
- Alternative 1B-2 – Alternative 1B-1, but with NW 10th Street converted to a one-way direction eastbound between US 113 and N. Walnut Street, comprised of one shared left/through lane and one right-turn lane. Westbound traffic typically utilizing NW 10th Street would use Buccaneer Street for left turns, which would remain bi-directional in this alternative. This resulted in an LOS D with 40.4 seconds/vehicle in 2050.
- Alternative 1C-1 – Alternative 1B-1, but the left turn lane would be converted to a through lane. The lane configuration northbound would include one through lane and one through/right turn lane. The Southbound N. Walnut Street approach would be reconfigured to one shared left/through/right turn lane to allow for the accommodation of the necessitated one additional northbound receiving lane without right of way impacts. The protected portion of the left-turn phase is still maintained at the beginning of the southbound signal phase. This resulted in an LOS D in 2050 with 45.9 seconds/vehicle of delay.
- Alternative 1C-2 – Alternative 1C-1, but with NW 10th Street converted to one-way eastbound comprising one shared left/through lane and one right turn lane and Buccaneer Street converted to a one-way westbound approach. This results in an LOS B in 2050 with 15.6 seconds/vehicle of delay.

Alternative 1C-1 and Alternative 1C-2 both met MOE standards established in the project goals. Full results of this analysis can be found in **Appendix A – Traffic Results: 2. Protected Intersections Options MOE.**

A sensitivity analysis was developed using incremental applications of growth factors. The analysis looked at MOE results in years 2028, 2029, 2036, 2037, and 2050. The sensitivity analysis concluded that a phased approach to the preferred analysis could occur. The Protected Intersection Alternative 1C-1 would operate at a LOS D until 2037, at which time Buccaneer Street would also need to be converted to a one-way westbound direction only comprised of a left through lane and a right turn lane.

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This phased approach to Alternative 1C-1/1C-2 is the preferred alternative that meets the project goals.

Full results of this analysis can be found in **Appendix A – Traffic Results: 3. Sensitivity Analysis.**

Public Involvement

Public involvement is an integral element of any successful planning study. Public involvement and community outreach were important components of the Milford: NW & NE 10th St/N. Church St/N. Rehoboth Boulevard/ N. Walnut Street Intersection Study. Residents, the business community, state and local stakeholders provided input throughout the Study. The following summarizes public involvement and outreach that occurred throughout the study and helped guide the development of conceptual improvement alternatives:

Community Workshop 1

December 13, 2022

- Location: Milford's Public Works Facility
- Advertised through the City of Milford and the Dover/Kent MPO
- Century Engineering presented numerous boards with information including the study area, project goals, Milford Bicycle Master Plan Recommendations, the study's involvement with Delaware's "Day with the Dutch", existing traffic volumes, crash data, levels of service for the intersecting roads, and the anticipated schedule for the Intersection Study.
- 17 Attendees
- Community members were asked for feedback on their main concerns about how the intersection operates today.
- 4 Comments were received
- See [Appendix B](#) for Public Involvement Summaries

Community Workshop 2

March 23, 2023

- Location: Milford's Public Works Facility
- Advertised through the City of Milford and the Dover/Kent MPO
- Century Engineering presented numerous display boards with information including the study area, project goals, existing traffic volumes, crash data, levels of service for the intersecting roads, interim improvements, long term improvements with phased approach, alternatives considered but not progressed, and the anticipated schedule for the Intersection Study.
- Feedback was gathered from attendees through conversations with Century Engineering personnel, questionnaires, and comment forms.
- 17 Attendees
- 3 Comments were received
- See [Appendix B](#) for Public Involvement Summaries

Public Advisory Committee (PAC)

June 8, 2023

- Study Area
- Goals

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- Crash Summary
- Existing LOS
- Existing Crash Data
- First Workshop Summary
- Second Workshop Summary
- Preferred Alternative
- Alternatives considered but not progressed
- Cost Estimates
- Schedule & Next Steps

Technical Advisory Committee (TAC)

June 13, 2023

- Study Area
- Goals
- Crash Summary
- Existing LOS
- Existing Crash Data
- First Workshop Summary
- Second Workshop Summary
- MOE/Sensitivity Analysis
- Preferred Alternative
- Alternatives considered but not progressed
- Cost Estimates
- Schedule & Next Steps

MPO Council Presentation

July 6, 2023

- Study Area
- Goals
- Crash Summary
- Existing LOS
- Existing Crash Data
- First Workshop Summary
- Second Workshop Summary
- MOE/Sensitivity Analysis
- Preferred Alternative
- Alternatives considered but not progressed
- Cost Estimates

Alternatives Considered/Preferred Alternative

Numerous alternatives were developed and analyzed to determine their performance in design year 2050. Using Measures of effectiveness (MOE) results generated from the synchro traffic operational analyses compared to the goal of maintaining an LOS of D or better throughout the study corridor, one alternative met the criteria and became the preferred alternative. This alternative is comprised of a protected

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intersection, with prohibited northbound left turns along N. Rehoboth Boulevard onto NW 10th Street. NW 10th Street and Buccaneer Street would be converted into one-way pairs; NW 10th Street converted to an eastbound approach, and Buccaneer Street converted to a westbound approach. A sensitivity analysis was performed and determined 2037 is the design year when the conversion of NW 10th Street and Buccaneer Street needs to occur. This will enable traffic improvements with anticipated growth, while phasing the amount of overall funding needed for the ultimate 2050 design. It is suggested that the traffic numbers be revisited ahead of 2037 to determine if actual growth matches anticipated growth, or if the design year for the one way conversion of NW 10th Street and Buccaneer Street can be postponed to a later year.

In addition, the preferred alternative closes N Church Street 600' south of the intersection to 1600' south of the intersection. This enables N. Church Street to act as a driveway to the southeast corner property, Fisher Auto Parts. Eliminating the large extent of traffic coming to the N. Walnut leg of the intersection from N. Church Street will help improve safety and reduce delays. The two residential properties along N. Church Street would utilize a new connection from N. Church Street to Salevan Place to reach NE 10th Street and N. Rehoboth Boulevard. The 1000' of removed N. Church Street would be reconfigured to a 10' side shared use path. A new connection between N. Church Street and N. Rehoboth Avenue provides a continuation of Allen Way and provides a connection to N. Rehoboth Boulevard from Brightway Commons and points south.

In addition, an interim improvement was developed to assist in improving pedestrian connectivity to the school campus northeast of the intersection. A 10' wide shared use path will connect the intersection to the school entrance path along N. Walnut Street/N. Rehoboth Boulevard. Modifications will also be made to N. Church Street and N. Walnut Street to improve the turning movements and intersection skew.

Conceptual plans are provided in [Appendix C](#) of this report.

Cost Estimates

Conceptual cost estimates were developed for the Preferred Alternative (2037), Preferred Alternative Modification (2050), and the Interim Improvement. The following provides a summary of the conceptual cost estimates.

Preferred Alternative (2037)

Preliminary Engineering	TBD
Right-of-Way	TBD
Construction	\$3,800,000.00
Total Cost	TBD

Preferred Alternative (2050)

Preliminary Engineering	\$TBD
Right-of-Way	\$TBD
Construction	\$4,300,000.00
Total Cost	TBD

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Interim Improvement	
Preliminary Engineering	TBD
Right-of-Way	TBD
Construction	\$1,115,000.000
Total Cost	TBD

Complete conceptual cost estimates are provided in [Appendix D](#) of this report.

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Appendix A: Traffic Analysis Results

1. Original Alternatives Analysis

Approach / Intersection	Alternative 1: 4-Leg Signalized Intersection					Alternative 2: Alternative 1 w/ Double Rehoboth NBL				
	Traffic Volume	Average Delay (Sec/Veh)	LOS	V/C Ratio	95%ile Queue (Feet)	Traffic Volume	Average Delay (Sec/Veh)	LOS	V/C Ratio	95%ile Queue (Feet)
NWB N Rehoboth Blvd	1,040	156.5	F	1.49	698	1,040	56.7	E	0.93	336
NB N Walnut St	-	-	-	-	-	-	-	-	-	-
SB N Walnut St	660	102.4	F	1.12	700	660	102.4	F	1.12	700
EB NW 10th St	568	76.8	E	1.03	596	568	76.8	E	1.03	596
WB NE 10th St	213	43.6	D	0.71	233	213	43.6	D	0.71	233
NEB Church St	-	-	-	-	-	-	-	-	-	-
Intersection	2,481	114.2	F	-	-	2,481	72.3	E	-	-
Total Entering Intersection Demand Volume = Peak Hour Factor Adjusted Volume	2,697					2,697				

Alternative 3: Single Lane Roundabout					Alternative 4: NBL Prohibited w/ Jug-Handle via NE Salevan PI				
Traffic Volume	Average Delay (Sec/Veh)	LOS	V/C Ratio	95%ile Queue (Feet)	Traffic Volume	Average Delay (Sec/Veh)	LOS	V/C Ratio	95%ile Queue (Feet)
952	113.1	F	1.18	2,076	475	45.8	D	0.82	512
169	18.2	C	0.45	55	-	-	-	-	-
660	128.4	F	1.20	1,377	660	44.5	D	0.89	599
600	57.4	F	0.99	638	568	24.7	C	0.73	403
213	18.1	C	0.51	68	778	51.0	D	0.97	761
9	11.1	B	0.03	3	-	-	-	-	-
2,603	89.9	F	-	-	2,481	42.3	D	-	-
2,830					2,697				

Milford: NW & NE 10th St/N. Church St/N. Rehoboth Boulevard/ N. Walnut Street Intersection Study - Recommendations Report

2. Protected Intersection Options MOE

Approach / Intersection	2050 Preferred Alternative 1A (Without any Modifications)			2050 Preferred Alternative 1B-1 NBL Prohibited*		
	Average Delay (Sec/Veh)	LOS	95%ile Queue (Feet)	Average Delay (Sec/Veh)	LOS	95%ile Queue (Feet)
NB N Rehoboth Blvd	156.5	F	698	104.6	F	1,053
SB N Walnut St	102.4	F	700	19.3	B	382
EB NW 10th St	76.8	E	596	64.3	E	596
WB NE 10th St	43.6	D	233	37.2	D	208
Intersection	114.2	F	-	66.9	E	-
Description	Protected intersection as currently designed			Protected intersection with N Rehoboth Blvd NBL Prohibited. All left-turn traffic added to N Rehoboth Blvd NBT. The NB Rehoboth Blvd approach would be comprised of one through lane and one right-turn Lane.		

Milford: NW & NE 10th St/N. Church St/N. Rehoboth Boulevard/ N. Walnut Street Intersection Study - Recommendations Report

2050 Preferred Alternative 1B-2 NBL Prohibited + One-Way EB NW 10th St*			2050 Preferred Alternative 1C-1 NBL Prohibited & 2-Ln NBT*			2050 Preferred Alternative 1C-2 NBL Prohibited & 2-Ln NBT* + One- Way EB NW 10th St*		
Average Delay (Sec/Veh)	LOS	95%ile Queue (Feet)	Average Delay (Sec/Veh)	LOS	95%ile Queue (Feet)	Average Delay (Sec/Veh)	LOS	95%ile Queue (Feet)
70.7	E	866	44.0	D	277	10.4	B	170
8.3	A	212	23.8	C	477	9.7	A	262
24.9	C	239	76.8	E	596	26.8	C	240
26.7	C	151	41.7	D	225	28.8	C	154
40.4	D	-	45.9	D	-	15.6	B	-
Same as Alternative 1B-1 but with NW 10th St converted to one-way eastbound comprising one shared left/through lane and one right-turn lane.			Protected intersection with N Rehoboth Blvd NBL Prohibited. All left-turn traffic added to N Rehoboth Blvd NBT. The NB Rehoboth Blvd approach would be comprised of one through lane and one shared through/right-turn lane. SB N Walnut St approach is reconfigured to one shared left-through-right lane to allow for the accomodation of the necessitated one additional NB receiving lane without R.O.W. impacts. The protected portion of the left-turn phase is still maintained at the begining of the SB signal phase.			Same as Alternative 1C-1 but with NW 10th St converted to one-way eastbound comprising one shared left/through lane and one right-turn lane.		

Milford: NW & NE 10th St/N. Church St/N. Rehoboth Boulevard/ N. Walnut Street Intersection Study - Recommendations Report

Appendix B: Public Workshop Summaries

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



A community workshop was organized for the North Walnut Street / North Rehoboth Boulevard / 10th Street Intersection Study on December 13, 2022. The workshop was held at Milford's Public Works Facility from 6:00-8:00 pm. Area residents were invited to attend. The workshop was advertised through the City of Milford and the Dover/Kent MPO. Seventeen community members attended the meeting and numerous others reviewed the information online that was posted shortly after the workshop.

Century Engineering presented numerous boards with information including the study area, Project Goals, Milford Bicycle Master Plan Recommendations, the study's involvement with Delaware's "Day with the Dutch", existing traffic volumes, crash data & levels of service for the intersecting roads, and the anticipated schedule for the Intersection Study. Feedback was gathered from attendees through conversations with Century Engineering personnel, questionnaires, and a comment box.

Workshop boards can be found at the end of this workshop summary report. After the workshop, the workshop boards were posted on the City of Milford's website so that community members who did not attend the meeting could review the materials and offer feedback. This option was successful in providing additional community feedback for the project.

Comments

Approximately 4 comments were received regarding the information presented.

Community members overall expressed an interest in the study and were in favor of this intersection being studied for improvements. Different elements of the project goals were appealing to them, and they were engaged to learn more about the project.

Community members were asked for feedback on their main concerns about how the intersection operates today. Heavy vehicular traffic, speeding, substantial amounts of pedestrians and the complexity of the intersection were some of the overarching concerns. Multiple attendees specified that the intersection operates worst around 2:30 pm on weekdays when the nearby schools release their students, increasing vehicular traffic and inundating the intersection with pedestrians. In contrast, it was mentioned by a few attendees that bicyclists generally are not seen using this intersection.

Much of the community's concern about traffic seemed to relate specifically to the flow of vehicles on 10th Street. According to a resident of the street, the existing signage reading: "No Trucks Over 10,000 Lbs. Except Local Services - On NE 10th St - Strictly Enforced" is not properly enforced. They are also concerned by the increased volume of vehicles using the road to travel to and from State Route 1 combined with speeding issues along the street, and an existing stormwater catch basin east of the intersection that could be repaired as part of the eventual improvements. Another resident shared concerns about the traffic flow along 10th Street, pointing out that through traffic is held up by vehicles waiting to make left turns since the through and left movements share one lane through this intersection in both directions.

The community was also asked to provide any ideas they might have on how the intersection could be improved. One of the most common suggestions from those who submitted comments was to build a pedestrian overpass to alleviate some of the excessive traffic experienced by drivers at the intersection due to commuting students. Of those who advocated for this solution, one specified that the overpass

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



should either be constructed north of the intersection across Walnut Street at the Dairy Queen parking lot, or south of the intersection across North Rehoboth Boulevard, at the pedestrian crossing location indicated on the Milford Bicycle Master Plan. It should also be noted that the Milford School District has expressed agreement with improvements to this intersection and area, specifically voicing support for the near-term solution of a mid-block crossing of North Rehoboth Boulevard at Northeast Salevan Place.

Another shared recommendation to alleviate stress on the intersection was to change the layout of the property on the Northeast corner, Patty's Nectars. The property owner suggested a new site plan that shifts her entrance on Northeast 10th Street towards the East (approximately between address numbers 3 and 5), further away from the traffic light. She proposed it be made into a right-in/right-out style entrance, with access to her property from North Walnut Street maintained through a right-in only. She also expressed agreement with the idea of having a new sidewalk installed around her corner of the intersection.

A similar suggestion was to shift the 10th Street access point to Patty's Nectars, but to make it an exit only, allowing for one-way traffic off the property and eliminating the need for vehicles to turn left across North Walnut Street when leaving the business. This property was also noted to be a common cut-through route for students walking between Northeast 10th Street and North Walnut Street, who prefer it to walking along the narrow, aged sidewalk that runs along a portion of the corner.

The concept developed as part of Delaware's "Day with the Dutch" was discussed and supported by some, although the owner of the property on the Southwest corner of the intersection, Kent Sussex Auto Care, raised some concerns about the layout. As the concept plan eliminates a portion of North Walnut Street directly adjacent to his property, access would be restricted to Northwest 10th Street and Church Street. He would like to maintain access from North Rehoboth Boulevard for future uses on the site, but unfortunately this direct access would be eliminated if North Walnut Street was spliced according to the Dutch concept.

Some other concerns of the public included the possibility that too much improvement to the intersection may cause more of the commercial space in the area to be pushed out of use, and that the Dairy Queen on the Northwest corner of the intersection should remain as-is throughout the improvements due to its iconic status in the community. One attendee noted that the establishment previously tried to add a drive-thru, but they ran into issues with DelDOT, so the effort was unsuccessful. It was also suggested during the workshop discussion that the Reconnecting Communities Pilot (RCP) discretionary grant program through the US Department of Transportation be used to help fund the improvements.

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



Questionnaire Responses

Comment forms were prepared to ask specific questions about each option while also requesting feedback from the community on the overall presentation. The results are below:

1. What are your main concerns about how this intersection operates today? (Examples could be speeding, crashes, turning movements that are difficult, lack of bicycle or pedestrian infrastructure, etc.)

- All of the above; too much traffic for the existing infrastructure especially when high school lets out
- I have never experienced bikes or pedestrians sharing the intersections in question when I was there in 6 years; this is our main route out of town or to services along airport park area; it is a complex intersection which might be made smoother

2. What ideas do you have on how this intersection could be improved?

- Eliminate the school buses at 2:30 pm; build a pedestrian overpass
- My worry is that a lot of commercial space might be pushed out of use if too much is changed

Workshop Boards

Welcome to the

N. Walnut St./N. Rehoboth Blvd./10th St. Intersection
Study

Public Workshop #1

December 13, 2022

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Study Area





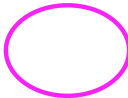
N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Project Goals

- Analyze connectivity between Milford Senior High School, Milford Central Academy, and residential communities to the south
- Evaluate intersection improvements and/or road reconfigurations to improve mobility for pedestrians, cyclists and motorists
- Implement elements from the Milford Bicycle Master Plan and the Milford Comprehensive Plan

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Milford Bicycle Master Plan Recommendations

-  North/south crossing of 10th Street
-  East/west crossing of N. Rehoboth Boulevard
-  Avoid impacts to Dairy Queen property



N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Studied as part of Bike Delaware's
"Day with the Dutch"



N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Existing Traffic Volumes



A.M. Peak



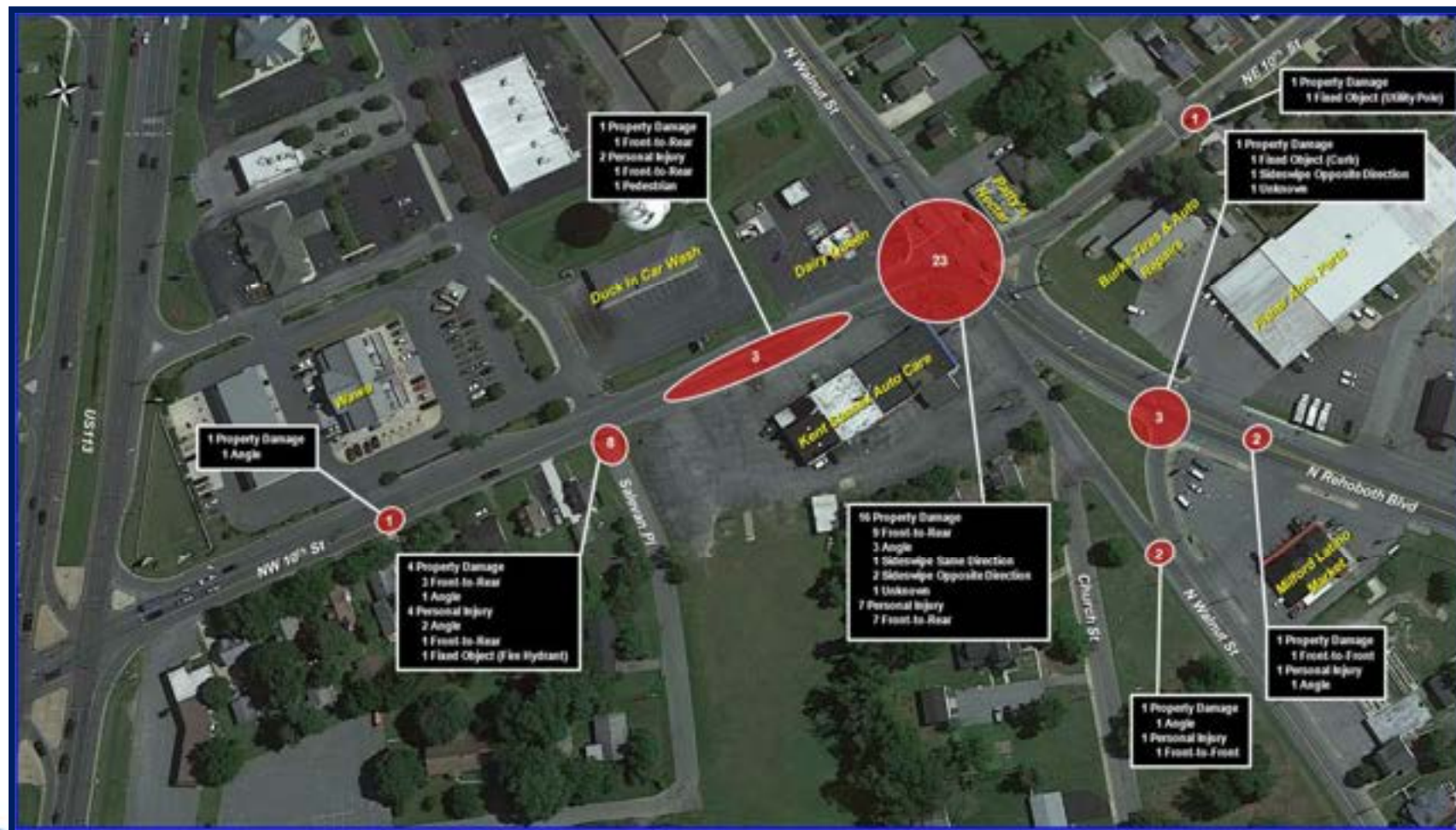
Midday Peak



P.M. Peak

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

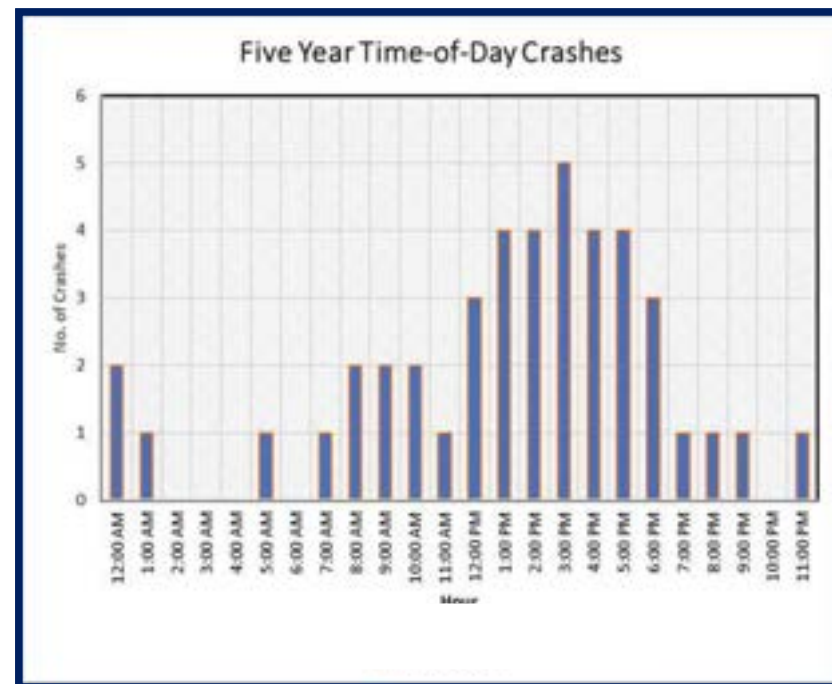
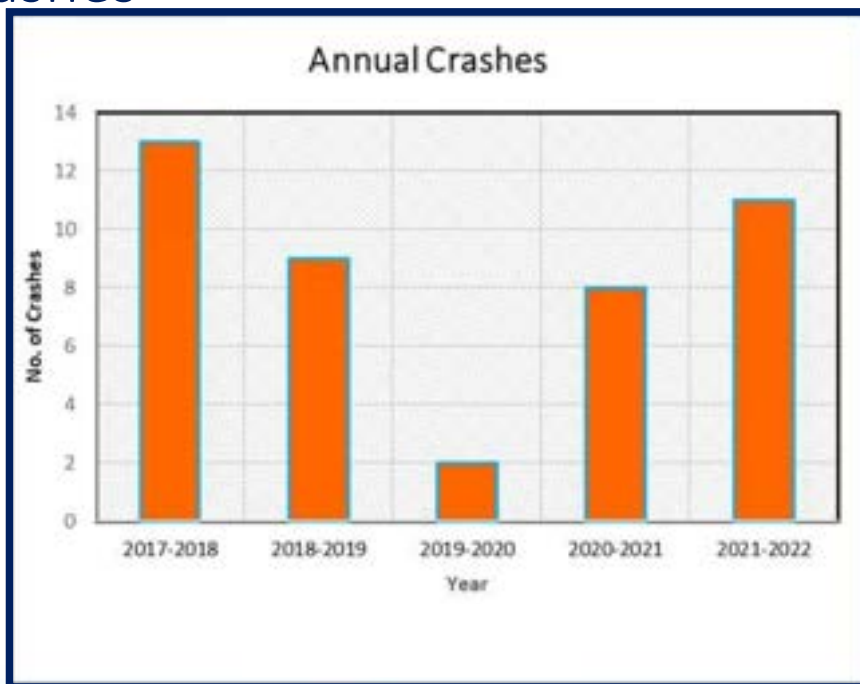
Existing Crash Data



N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Existing Crash Data

- Crash data analyzed from November 10, 2017 through November 10, 2022
- Crash data study area 0.1-mile radius from intersection
- 43 crashes occurred / 23 crashes occurred at the intersection
- No fatal crashes



N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Existing Levels of Service (LOS)

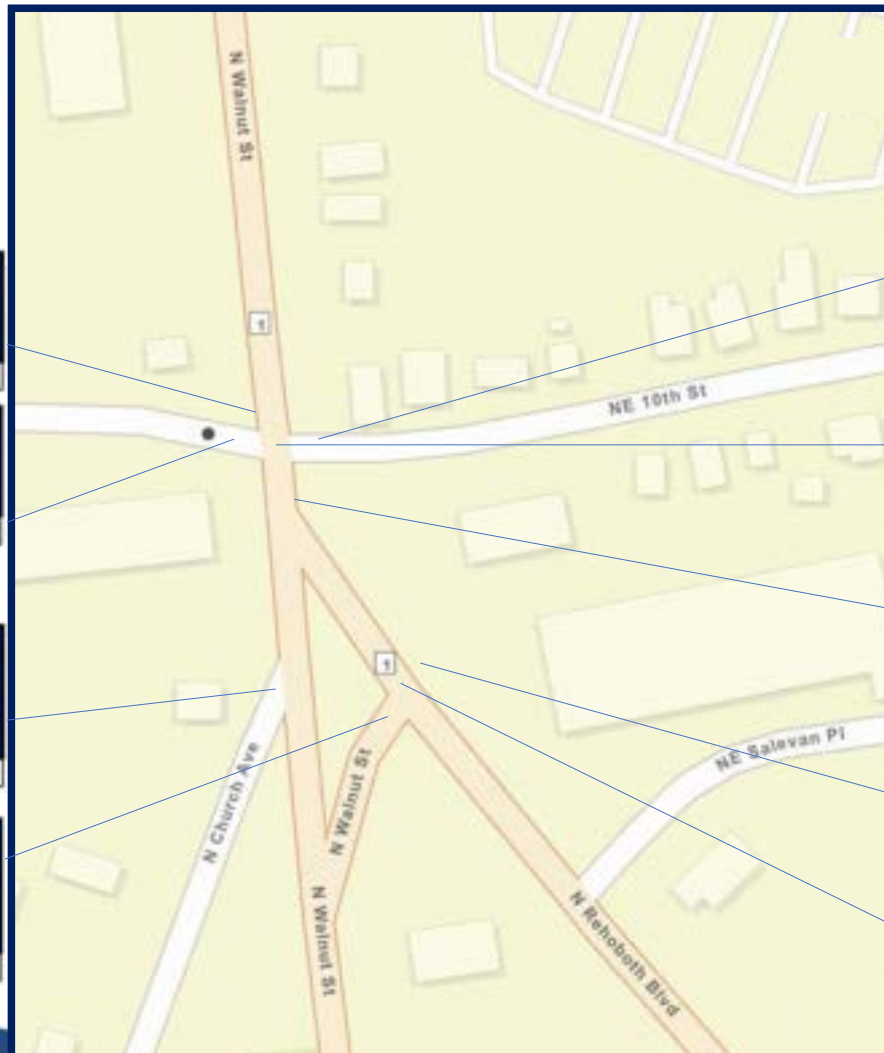
Level of Service Criteria		
LOS	Delay (Seconds per Vehicle)	
	Signalized	Unsignalized
A	0 to 10	0 to 10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	>80	>50

SB N. Walnut St 2022 Weekday AM Peak Hour Delay LOS 21.6 C	SB N. Walnut St 2022 Weekday Midday Peak Hour Delay LOS 23.6 C	SB N. Walnut St 2022 Weekday PM Peak Hour Delay LOS 25.7 C
--	--	--

EB NW 10th Street 2022 Weekday AM Peak Hour Delay LOS 86.3 F	EB NW 10th Street 2022 Weekday Midday Peak Hour Delay LOS 85.1 F	EB NW 10th Street 2022 Weekday PM Peak Hour Delay LOS 141.7 F
--	--	---

N. Walnut St @ Church St 2022 Weekday AM Peak Hour Delay LOS 9.2 A	N. Walnut St @ Church St 2022 Weekday Midday Peak Hour Delay LOS 9.1 A	N. Walnut St @ Church St 2022 Weekday PM Peak Hour Delay LOS 9.3 A
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N. Walnut St @ N. Rehoboth Blvd 2022 Weekday AM Peak Hour Delay LOS 70.7 F	N. Walnut St @ N. Rehoboth Blvd 2022 Weekday Midday Peak Hour Delay LOS 42.1 E	N. Walnut St @ N. Rehoboth Blvd 2022 Weekday PM Peak Hour Delay LOS 96.5 F
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WB NE 10th St 2022 Weekday AM Peak Hour Delay LOS 24 C	WB NE 10th St 2022 Weekday Midday Peak Hour Delay LOS 23.6 C	WB NE 10th St 2022 Weekday PM Peak Hour Delay LOS 48.3 D
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Intersection 2022 Weekday AM Peak Hour Delay LOS 36.5 D	Intersection 2022 Weekday Midday Peak Hour Delay LOS 36.7 D	Intersection 2022 Weekday PM Peak Hour Delay LOS 61.6 E
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NB N. Rehoboth Blvd 2022 Weekday AM Peak Hour Delay LOS 12.6 B	NB N. Rehoboth Blvd 2022 Weekday Midday Peak Hour Delay LOS 13.6 B	NB N. Rehoboth Blvd 2022 Weekday PM Peak Hour Delay LOS 40.7 D
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N. Walnut St @ N. Rehoboth Blvd 2022 Weekday AM Peak Hour Delay LOS 12.2 B	N. Walnut St @ N. Rehoboth Blvd 2022 Weekday Midday Peak Hour Delay LOS 15.3 C	N. Walnut St @ N. Rehoboth Blvd 2022 Weekday PM Peak Hour Delay LOS 14.1 B
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N. Walnut St @ N. Rehoboth Blvd 2022 Weekday AM Peak Hour Delay LOS 9.1 A	N. Walnut St @ N. Rehoboth Blvd 2022 Weekday Midday Peak Hour Delay LOS 8.3 A	N. Walnut St @ N. Rehoboth Blvd 2022 Weekday PM Peak Hour Delay LOS 8.7 A
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N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Schedule

	Completed	Completed	Data Gathering
Traffic Counts	Completed	December 13, 2022	First Public Workshop
Alternatives Development	January 2023	Late Winter 2023	Second Public Workshop
Draft Report to MPO	Spring 2023	Late Spring 2023	Third Public Workshop
Final Report	June/July 2023		

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Thank you for attending our workshop.
For future information please contact:

James J. Galvin, Jr. AICP

Principal Planner

Dover/Kent County MPO

james.galvin@doverkentmpo.org

<http://www.doverkentmpo.org>

Rob Pierce, Planning Director

City of Milford

rpierce@milford-de.gov

<http://cityofmilford.com>

Sonia Marichic-Goudy

Century Engineering


smarichicgoudy@kleinfelder.com



Sign in
Sheets

10TH STREET INTERSECTION PUBLIC INPUT MEETING

DECEMBER 13, 2022
SIGN IN SHEET

	NAME	ADDRESS	PHONE #	EMAIL
1	Michelle Koam			
2	James Grant			
3	Michael Ward			
4	Mark Whitfield			
5	Jon LaBando			
6	Danny + Kay Skinner			
7	Ann Cincin-Miller			
8	Sonya LaGrand			
9	Steve Venett			
10	George B. Mansolf			
11	Jim Galvin			
12	David Muller			
13	James Wilson			
14	Brian Baer			
15	Lisa DiVincenzo			

10TH STREET INTERSECTION

PUBLIC INPUT MEETING

DECEMBER 13, 2022

SIGN IN SHEET

	NAME	ADDRESS	PHONE #	EMAIL
16	JOHN SCHATZSCHNEIDER			
17	Yvonne Fletcher			
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Community Feedback

Community Workshop for:
N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
December 13, 2022



Comments:

1. What are your main concerns about how this intersection operates today? (Examples could be speeding, crashes, turning movements that are difficult, lack of bicycle or pedestrian infrastructure, etc).

All of the above. Too much traffic for the existing infrastructure esp. when high school lets out.

2. What ideas do you have on how this intersection could be improved?

*Eliminate the school buses @ 2:30 pm.
Build a pedestrian overpass*

Optional: Please provide your information to stay informed about this project and upcoming information:

Name: *Nina Fletcher*

Organization:

Address:

Email Address:

☒ Please add my/our name(s) to the Project Mailing List.

☐ Please delete my/our name(s) from the Project Mailing List.

Your comments and opinions are very important. All information provided on this form will be carefully reviewed by the Project Team. Under state law, this form is public domain, and if requested, a copy of it must be provided to the media or public. Thank you for your participation and contributions to this important transportation project.

Please hand your comment sheets in at the workshop or mail/email prior to January 13, 2023 to:



Rob Pierce | Planning Director

rpierce@milford-de.gov | O: 302.424.8395 | F: 302.424.3559

180 Vickers Dr. | Milford, DE 19963 | www.cityofmilford.com

Community Workshop for:
N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
December 13, 2022



Comments:

1. What are your main concerns about how this intersection operates today? (Examples could be speeding, crashes, turning movements that are difficult, lack of bicycle or pedestrian infrastructure, etc).

I have never experienced bikers or pedestrians sharing the information in question when I was there in 6 years. This is our main route out of town or to services along airport park area. It is a complex intersection which might be made smoother.

2. What ideas do you have on how this intersection could be improved?

My worry is that a lot of commercial space might be pushed out as use if too much is changed.

Optional: Please provide your information to stay informed about this project and upcoming information:

Name: Georgia B. Mansolf
Organiz: [REDACTED]
Address: [REDACTED]
Email Address: [REDACTED]

- ☒ Please add my/our name(s) to the Project Mailing List.
☐ Please delete my/our name(s) from the Project Mailing List.

Your comments and opinions are very important. All information provided on this form will be carefully reviewed by the Project Team. Under state law, this form is public domain, and if requested, a copy of it must be provided to the media or public. Thank you for your participation and contributions to this important transportation project.

Please hand your comment sheets in at the workshop or mail/email prior to January 13, 2023 to:



Rob Pierce | Planning Director

rpierce@milford-de.gov | O: 302.424.8395 | F: 302.424.3559

180 Vickers Dr. | Milford, DE 19963 | www.cityofmilford.com



CITY OF MILFORD
10th STREET INTERSECTION
COMMENT CARD

We would like to hear your thoughts, comments or concerns:

NAME	Michelle Koam
ADDRESS	[REDACTED]
PHONE #	[REDACTED]
EMAIL	[REDACTED]
COMMENTS:	Make Between 3 NE 10 & 5 NE 10 Make Exit .

Thank you for your feedback! Additional comments can be emailed to Rob Pierce at rpierce@milford-de.gov.

Pedestrian Overpass at Darg Queens Flat
~~Or~~ Or at Blue Myster Plain
Recommendation

Reconnecting Communities Grant

Interurban2021.kilip.org
Seaford

Note do James Wilson of Dutch Chap
will be recommended

Comments I heard (Sonia) from
The Community who came by:

① The property across from Dairy Queen wants a new
Site Plan with Right in on Walnut & a RT/RO on
Tenth St. She is OK w/ a sidewalk going in her
corner

② Dairy Queen - DO NOT TOUCH ME!
It is an iconic bldg. They tried adding a
drive through but DelDOT caused issues.
The community loves it

Sonia Marichic-Goudy

From: Pierce, Rob <rpierce@milford-de.gov>
Sent: Tuesday, December 27, 2022 2:16 PM
To: Sonia Marichic-Goudy; Ted Foglietta; Drew Boyce
Cc: Whitfield, Mark; Mike Svaby; James Puddicombe; Sara M. Bluhm
Subject: 10th Street/N. Walnut Street Open House

External Email

Good afternoon,

See below for a summary of conversations and comments made during the 10th Street intersection open house. I have not received any additional comments from the public to date.

- The school district supports a near term solution with a mid-block crossing of N. Rehoboth Boulevard at NE Salevan Place. They are very supportive of improvements to this intersection and area.
- The owner of the NE corner of the 10th Street intersection supports creating a new exit from her property at the far eastern edge of the parcel on 10th street and eliminating her access near the red light, allowing for one way traffic out onto 10th Street to avoid people trying to make left turns across N. Rehoboth Boulevard from her property.
- The owner of the SW corner of the 10th Street intersection has concerns with the dutch concept which eliminated portions of Walnut Street to create a more organized three way intersection. His concerns relates to his properties access to N. Rehoboth Boulevard, which he would like to maintain for future uses on the site.
- A resident of 10th Street had concerns regarding the enforcement of the “no truck traffic” sign along with the repair of an existing stormwater catch basin located further east of the intersection. Also has a concern with vehicles speeding along 10th Street and the increased volume heading to and from Route 1.
- Resident had concerns regarding traffic flow through the current intersection, specifically traffic traveling along 10th Street. Traffic waiting to make left turns in both directions hold up thru traffic.

Can you send me copies of any written comments provided by the attendees the night of the meeting?

Rob

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



A community workshop was organized for the North Walnut Street / North Rehoboth Boulevard / 10th Street Intersection Study on March 23, 2023. The workshop was held at Milford's Public Works Facility from 6:00 pm-8:00 pm. Area residents were invited to attend. The workshop was advertised through the City of Milford and the Dover/Kent MPO. Seventeen community members attended the meeting and numerous others reviewed the information online that was posted shortly after the workshop.

Century Engineering presented numerous display boards with information including the study area, project goals, existing traffic volumes, crash data & levels of service for the intersecting roads, interim improvements, long term improvements with phasing approach, alternatives considered but not progressed, and the anticipated schedule for the Intersection Study. Feedback was gathered from attendees through conversations with Century Engineering personnel, questionnaires, and comment forms.

Workshop display boards can be found at the end of this workshop summary report. After the workshop, the workshop boards were posted on the City of Milford's website so community members who did not attend the meeting could review the materials and offer feedback. This option was successful in providing additional community feedback for the project.

Interim improvements included providing pedestrian access across N. Rehoboth Boulevard at N. Walnut Street and reconfiguring Church Street to tie into N. Walnut Street rather than N. Rehoboth Boulevard. This would include adding a traffic signal to this intersection and a stop sign to Church Street at N. Walnut Street.



The long-term solution is a protected intersection that can build on the interim improvements. The same treatment at Church Street/N Walnut St/N. Rehoboth Boulevard including adding a signal would be

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



included in this alternative as well. This alternative also includes tying Salevan Place into Church Street and tying Church Street to N. Walnut Street with a new local road with one lane in each direction. This would result in additional connections to remove some of the traffic from the traffic signals.



To further improve the level of service and reduce delays in the ultimate design year of 2050, improvements add the conversion of Buccaneer Street and SW 10th Street to a one way pair of roadways. In this scenario Buccaneer Street would travel westbound only and SW 10th Street would travel eastbound only.

The alternatives analysis provided a level of service and anticipated delays in 2050, which are shown below:

2050 Design Year Analysis Results			
Phased Approach	No.	Level of Service Intersection	Intersection Delay (sec)
Protected Intersection	1	F	114.2
Protected Intersection with N Rehoboth Blvd northbound lefts prohibited. All left-turn traffic added to N Rehoboth Blvd northbound through lane. The northbound Rehoboth Blvd approach would be comprised of one through lane and one right-turn lane; lefts would occur at Buccaneer Street	1A	E	66.9
Same as Alternative 1A but with NW 10th St converted to one-way eastbound comprising one shared left/through lane and one right-turn lane and Buccaneer Street converted to one-way westbound comprising one shared left/through lane and one right-turn lane	1B	D	40.5

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



Comments

Numerous comments were received during the workshop. In general, the community was favorable toward the alternatives presented and are looking forward to the implementation of this work. New development at one corner of the intersection is in progress and the owner is willing to work with the plan as much as possible. This development is scheduled to be in place prior to this intersection improvement being implemented, but both conceptual designer and the developer will work together as much as possible.

Mixed reviews were received on converting Buccaneer St and SW 10th Street to a one-way pair of roads. There was a concern for those coming from the east side of Town (3rd Ward) having to travel too far. When delays are reduced by implementing this alternative this concern may fade. Attendees asked about a roundabout at the intersection, which was analyzed but would require two lanes and extensive widening. As a result, this option was ruled out. Attendees also requested a short term crossing for pedestrians at N. Rehoboth Boulevard adjacent to the Fisher Auto Parts, which is currently under new development.

To meet the future development plan of the Fisher Auto Parts/Meineke the property owner would like a right-in-only from the existing right turn lane along N. Rehoboth Boulevard into the property near the existing entrance. This would allow the existing entrance shown on the current alternative to be removed as a building and other site amenities will be placed in that area.

Questionnaire Responses

Comment forms were prepared to ask specific questions about each option while also requesting feedback from the community on the overall presentation. The results are below:

1. What are your overall thoughts on the Protected Intersection shown at the workshop?
Do you support this reconfiguration of the intersection? Do you have any concerns you would like to share?
 - Improves walkability
 - Overall looks fine; although I do not want one-way streets, which confuse drivers especially visitors to Milford
 - I would like to see the multi-use paths have a different color asphalt (paint) within the intersections
2. Do you support the implementation of moving left turns from N. Rehoboth Blvd onto NW 10th St to Buccaneer Street to improve traffic operations, traffic delays, and pedestrian safety? Do you have any concerns you would like to share?
 - ABSOLUTELY!!!
 - No, I do not. Makes getting to US 113 from Ward 3 more difficult.
 - Yes, there needs to be paths on both sides of the road

N. Walnut Street/N. Rehoboth Boulevard/ 10th Street Intersection Study



3. Do you support the implementation of making Buccaneer St and NW 10th Street between US 113 and N. Walnut St a one way pair (Buccaneer St would have one shared/left through lane and one right-turn lane in a westbound approach only and NW 10th St would have one shared/left through lane and one right turn lane in an eastbound approach only)? Left turns onto NW 10th St would still be made by turning left at Buccaneer St. Do you have any concerns you would like to share?
- ABSOLUTELY!!! Bus traffic has to be reduced at Dairy Queen.
 - No, 10th and Airport Road are needed as east/west routes. Can we widen 10th on the south side instead? I prefer two-way streets over one-way every time.
 - Yes, that will also close up the nightmare by WAWA on NE 10th Street.

Welcome to the

N. Walnut St./N. Rehoboth Blvd./10th St. Intersection
Study

Public Workshop #2

March 23, 2023

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Project Goals

- Analyze connectivity between Milford Senior High School, Milford Central Academy, and residential communities to the south
- Evaluate intersection improvements and/or road reconfigurations to improve mobility for pedestrians, cyclists and motorists
- Implement elements from the Milford Bicycle Master Plan and the Milford Comprehensive Plan

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Study Area



N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Existing Traffic Volumes



A.M. Peak



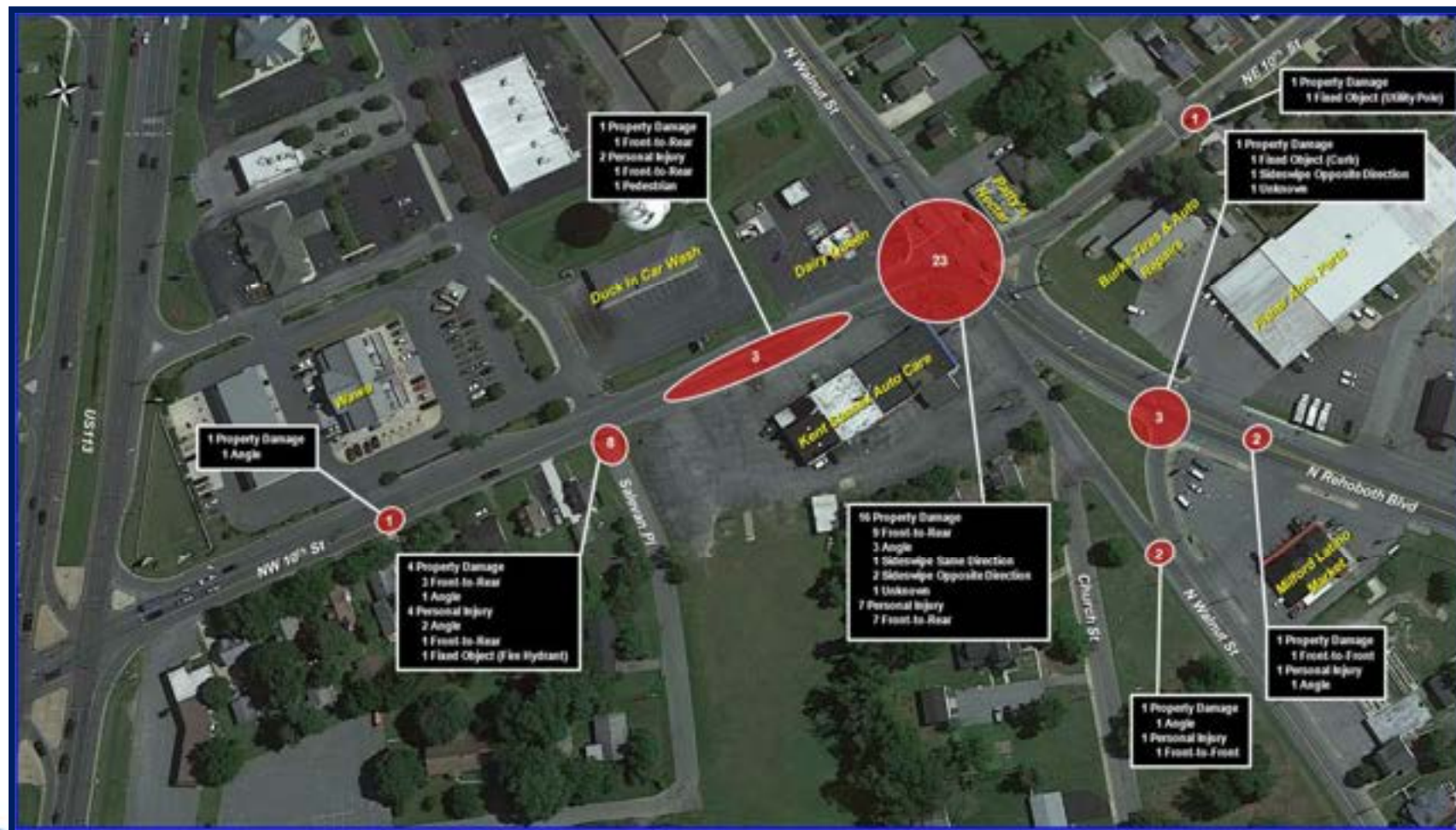
Midday Peak



P.M. Peak

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

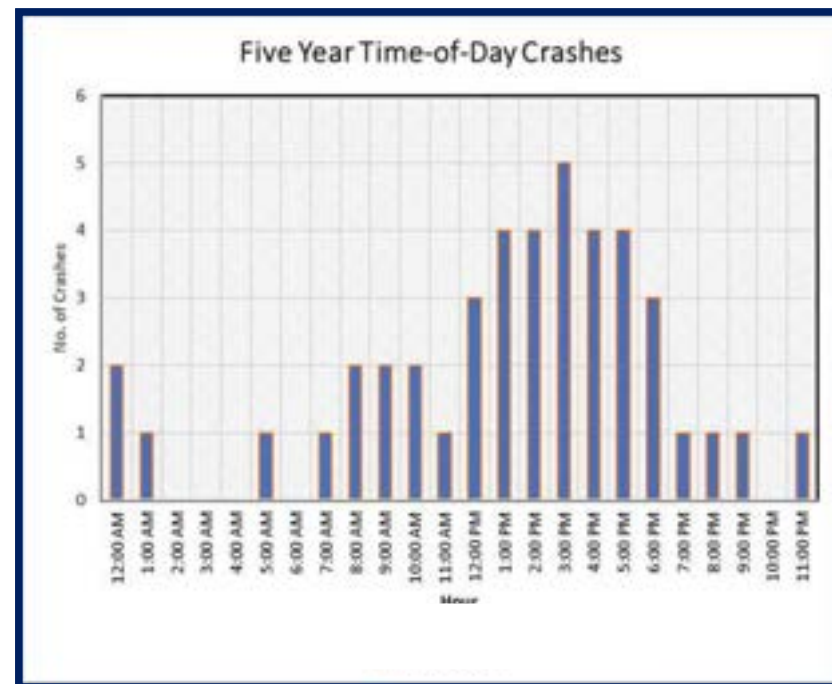
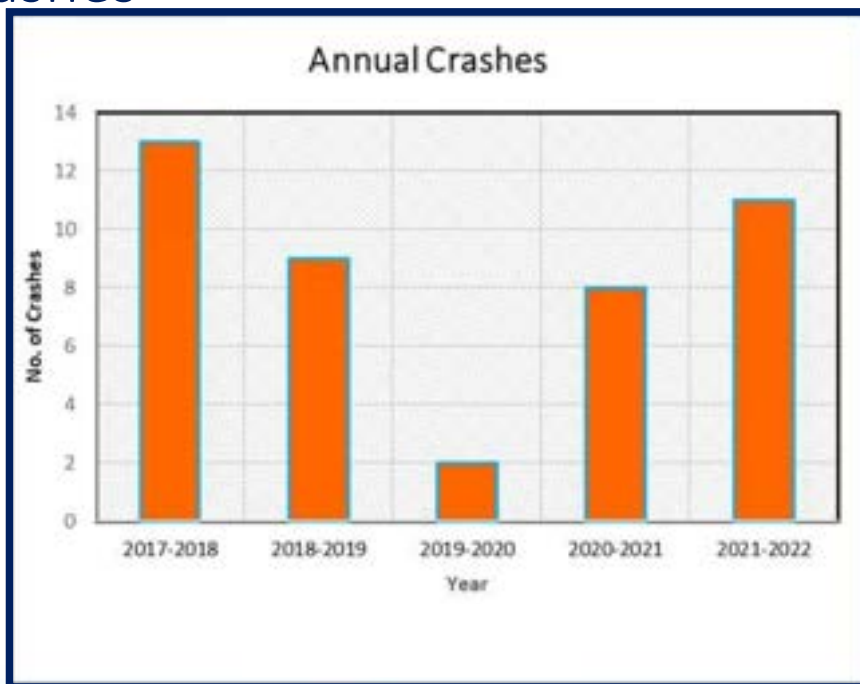
Existing Crash Data



N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Existing Crash Data

- Crash data analyzed from November 10, 2017 through November 10, 2022
- Crash data study area 0.1-mile radius from intersection
- 43 crashes occurred / 23 crashes occurred at the intersection
- No fatal crashes



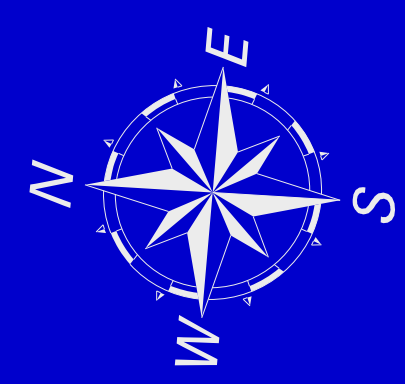
**DOVER KENT MPO
NORTH WALNUT STREET / NORTH REHOBOTH BOULEVARD /
10TH STREET INTERSECTION STUDY**

INTERIM IMPROVEMENTS



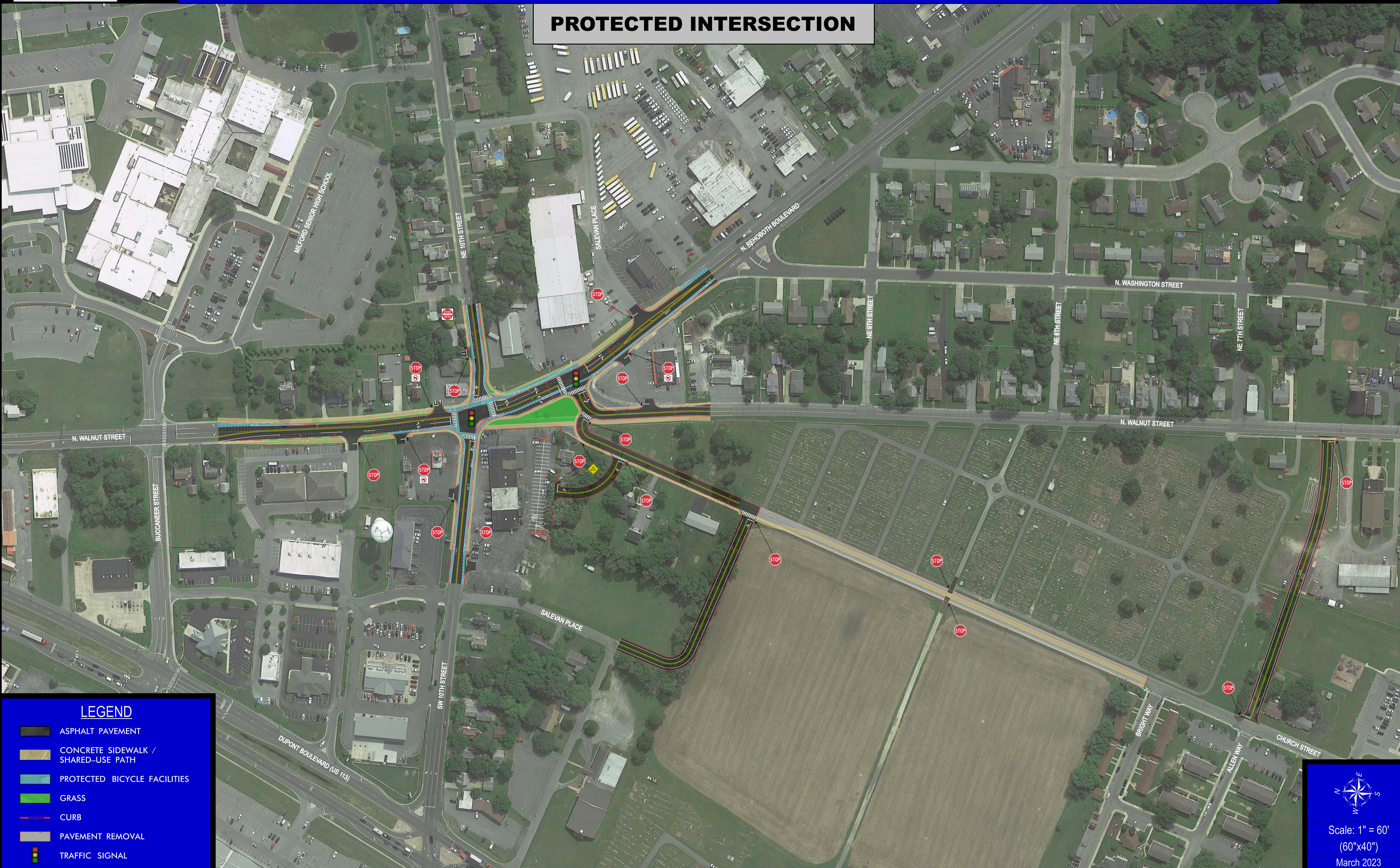
LEGEND

- ASPHALT PAVEMENT
- CONCRETE SIDEWALK / SHARED-USE PATH
- CURB
- PAVEMENT REMOVAL
- TRAFFIC SIGNAL



Scale: 1" = 60'
(60"x40")
March 2023

PROTECTED INTERSECTION



DOVER KENT MPO

NORTH WALNUT STREET / NORTH REHOBOTH BOULEVARD /
10TH STREET INTERSECTION STUDY



PROTECTED INTERSECTION

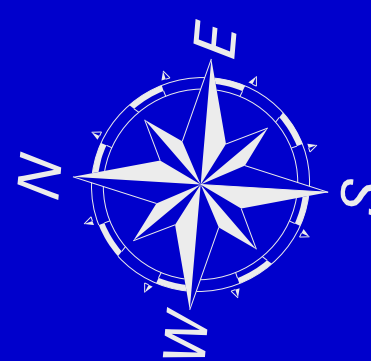
PHASED APPROACH

2050 Design Year Analysis Results

Phased Approach	No.	Level of Service Intersection	Intersection Delay (sec)
Protected Intersection	1	F	114.2
Protected Intersection with N Rehoboth Blvd northbound lefts prohibited. All left-turn traffic added to N Rehoboth Blvd northbound through lane. The northbound Rehoboth Blvd approach would be comprised of one through lane and one right-turn lane; lefts would occur at Buccaneer Street	1A	E	66.9
Same as Alternative 1A but with NW 10th St converted to one-way eastbound comprising one shared left/through lane and one right-turn lane and Buccaneer Street converted to one-way westbound comprising one shared left/through lane and one right-turn lane	1B	D	40.5

LEGEND

-  ASPHALT PAVEMENT
-  CONCRETE SIDEWALK / SHARED-USE PATH
-  PROTECTED BICYCLE FACILITIES
-  GRASS
-  CURB
-  PAVEMENT REMOVAL
-  TRAFFIC SIGNAL



Scale: 1" = 60'
(60"x40")
March 2023

Alternatives Considered But Not Progressed

- ✓ Traditional Intersection
 - Does not meet project goals
- ✓ Roundabout
 - Single lane roundabout fails in Design Year 2050
 - Requires a two-lane roundabout
 - Does not meet project goals
- ✓ Remove Rehoboth Blvd. NB left turns using Salevan Place jug handle
 - Upgrade Salevan Plan to local road standards
 - Restrict left turns from N. Rehoboth Blvd onto NE 10th Street
 - Conflicts with truck restrictions
 - Does not meet project goals

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Schedule

	Completed	Completed	Data Gathering
Traffic Counts	Completed	December 13, 2022	First Public Workshop
Alternatives Development	January 2023	Late Winter 2023	Second Public Workshop
Draft Report to MPO	Spring 2023	Late Spring 2023	Third Public Workshop
Final Report	June/July 2023		

N. Walnut St./N. Rehoboth Blvd./10TH St. Intersection Study

Thank you for attending our workshop.
For future information please contact:

James J. Galvin, Jr. AICP

Principal Planner

Dover/Kent County MPO

james.galvin@doverkentmpo.org

<http://www.doverkentmpo.org>

Rob Pierce, Planning Director

City of Milford

rpierce@milford-de.gov

<http://cityofmilford.com>

Sonia Marichic-Goudy

Century Engineering

smarichicgoudy@kleinfelder.com



Community Workshop #2 for:
N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
March 23, 2023



Comments:

1. What are your overall thoughts on the Protected Intersection shown at the workshop? Do you support this reconfiguration of the intersection? Do you have any concerns you would like to share?

I would like to see the multi-use paths have a different color asphalt (Paint) within the intersection

2. Do you support the implementation of moving left turns from N. Rehoboth Blvd onto NW 10th St to Buccaneer Street to improve traffic operations, traffic delays, and pedestrian safety? Do you have any concerns you would like to share?

yes, there needs to be paths on BOTH side of the road

3. Do you support the implementation of making Buccaneer St and NW 10th Street between US 113 and N. Walnut St a one way pair (Buccaneer St would have two lanes in a westbound approach only and NW 10th St would have two lanes in an eastbound approach only)? Left turns onto NW 10th St would still be made by turning left at Buccaneer St. Do you have any concerns you would like to share?

yes - that will also clear up the right lane by Wawa on tenth

Optional: Please provide your information to stay informed about this project and upcoming information:

Name: _____ Organization: _____

Address: _____

Email Address: _____

- ☐ Please add my/our name(s) to the Project Mailing List.
☐ Please delete my/our name(s) from the Project Mailing List.

Your comments and opinions are very important. All information provided on this form will be carefully reviewed by the Project Team. Under state law, this form is public domain, and if requested, a copy of it must be provided to the media or public. Thank you for your participation and contributions to this important transportation project.



Please hand your comment sheets in at the workshop or mail/email prior to April 21, 2023 to:

Rob Pierce | Planning Director

rpierce@milford-de.gov | O: 302.424.8395 | F: 302.424.3559

180 Vickers Dr. | Milford, DE 19963 | www.cityofmilford.com

**Community Workshop #2 for:
N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
March 23, 2023**



Comments:

1. What are your overall thoughts on the Protected Intersection shown at the workshop? Do you support this reconfiguration of the intersection? Do you have any concerns you would like to share?
Overall looking fine, although I do not want one-way streets, which confuse drivers, especially visitors to Milford.
2. Do you support the implementation of moving left turns from N. Rehoboth Blvd onto NW 10th St to Buccaneer Street to improve traffic operations, traffic delays, and pedestrian safety? Do you have any concerns you would like to share?
No I do not. Makes getting to 113 from Ward 3 more difficult.
3. Do you support the implementation of making Buccaneer St and NW 10th Street between US 113 and N. Walnut St a one way pair (Buccaneer St would have two lanes in a westbound approach only and NW 10th St would have two lanes in an eastbound approach only)? Left turns onto NW 10th St would still be made by turning left at Buccaneer St. Do you have any concerns you would like to share?
*No, 10th and Airport Rd are needed as E/W routes
Can we widen 10th on the south side instead?
I prefer 2-way streets over one-way every time.*

Optional: Please provide your information to stay informed about this project and upcoming information:

Name: *Brian Baer* Organization: *Council, Ward 3*

Address: [REDACTED]

Email Address: [REDACTED]

- ☒ Please add my/our name(s) to the Project Mailing List.
☐ Please delete my/our name(s) from the Project Mailing List.

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Community Workshop #2 for:
N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
March 23, 2023



Comments:

1. What are your overall thoughts on the Protected Intersection shown at the workshop? Do you support this reconfiguration of the intersection? Do you have any concerns you would like to share?

Definitely improves walkability/safety

2. Do you support the implementation of moving left turns from N. Rehoboth Blvd onto NW 10th St to Buccaneer Street to improve traffic operations, traffic delays, and pedestrian safety? Do you have any concerns you would like to share?

Absolutely! See below

3. Do you support the implementation of making Buccaneer St and NW 10th Street between US 113 and N. Walnut St a one way pair (Buccaneer St would have two lanes in a westbound approach only and NW 10th St would have two lanes in an eastbound approach only)? Left turns onto NW 10th St would still be made by turning left at Buccaneer St. Do you have any concerns you would like to share?

Absolutely bus traffic has to be reduced @ Dairy Queen

Optional: Please provide your information to stay informed about this project and upcoming information:

Name: Anna Pelchen Organization: _____

Address: _____

Email Address: _____

- ☐ Please add my/our name(s) to the Project Mailing List.
☐ Please delete my/our name(s) from the Project Mailing List.

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Please hand your comment sheets in at the workshop or mail/email prior to April 21, 2023 to:

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{ < . Milford
N. Walnut, N Rehoboth, 10th St
Public Workshop
12/13/22

Make NW 10th Street one way East
N. Walnut St Traffic ~~to~~ make left on Becaneer^{87th}

Close West most entrance into Walnut
add turn lane for second Walnut
Entrance

West/Sussex Auto Care bought by Meisha
Roundabout at intersection

Short Term Fix - Ped Crosswalk across
N. Rehoboth at Fisher Auto Parts

Rt only off Rt 1 "Jumper" cars onto
NE 10th St

Roundabout or Oblong/roundabout
w/ Rehoboth one way works

Mifford

N. Walnut, W Rehoboth, 10th St

Pub Workshop 2

3/23/23

Do not like one way pass
Too far for people on East side of town
(3rd Ward)

Milford Workshop

3/23/2023

Meinck wants to put in
a grid road to Salwan
and then tie into Chuck
- Do the connection to
Salwan by him
and then give him
a Right in only from
the turn lane
LRT

**N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
Community Workshop #2**

March 23, 2023



1	Name <i>Thomas Johnson</i>	Address	
	Organization	Email Address	
2	Name <i>Colleen Johnson</i>	Address	
	Organization	Email Address	
3	Name <i>Sue Lindale</i>	Address	
	Organization	Email Address	
4	Name <i>David Miller</i>	Address	
	Organization	Email Address	
5	Name <i>Glendon Chmielewski</i>	Address	
	Organization	Email Address	
6	Name <i>Virginia Chmielewski</i>	Address	
	Organization	Email Address	
7	Name <i>Glendon Chmielewski III</i>	Address	
	Organization	Email Address	

**N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
Community Workshop #2**

March 23, 2023



8	Name <i>Merissa Wilkins</i>	Address	
	Organization	Email Address	
9	Name <i>Lezlie Easters</i>	Address <i>7</i>	
	Organization	Email Address	
10	Name <i>David Sauls</i>	Address <i>2</i>	
	Organization	Email Address	
11	Name <i>Michael Ward</i>	Address <i>D</i>	
	Organization <i>↓</i>	Email Address	
12	Name <i>Michelle Koan</i>	Address	
	Organization	Email Address	
13	Name <i>Robert Viramontes</i>	Address <i>40</i>	
	Organization	Email Address	
14	Name <i>Rose Viramontes</i>	Address <i>40</i>	
	Organization	Email Address	

**N. Walnut St./N. Rehoboth Blvd./10th St. Intersection Study
Community Workshop #2**

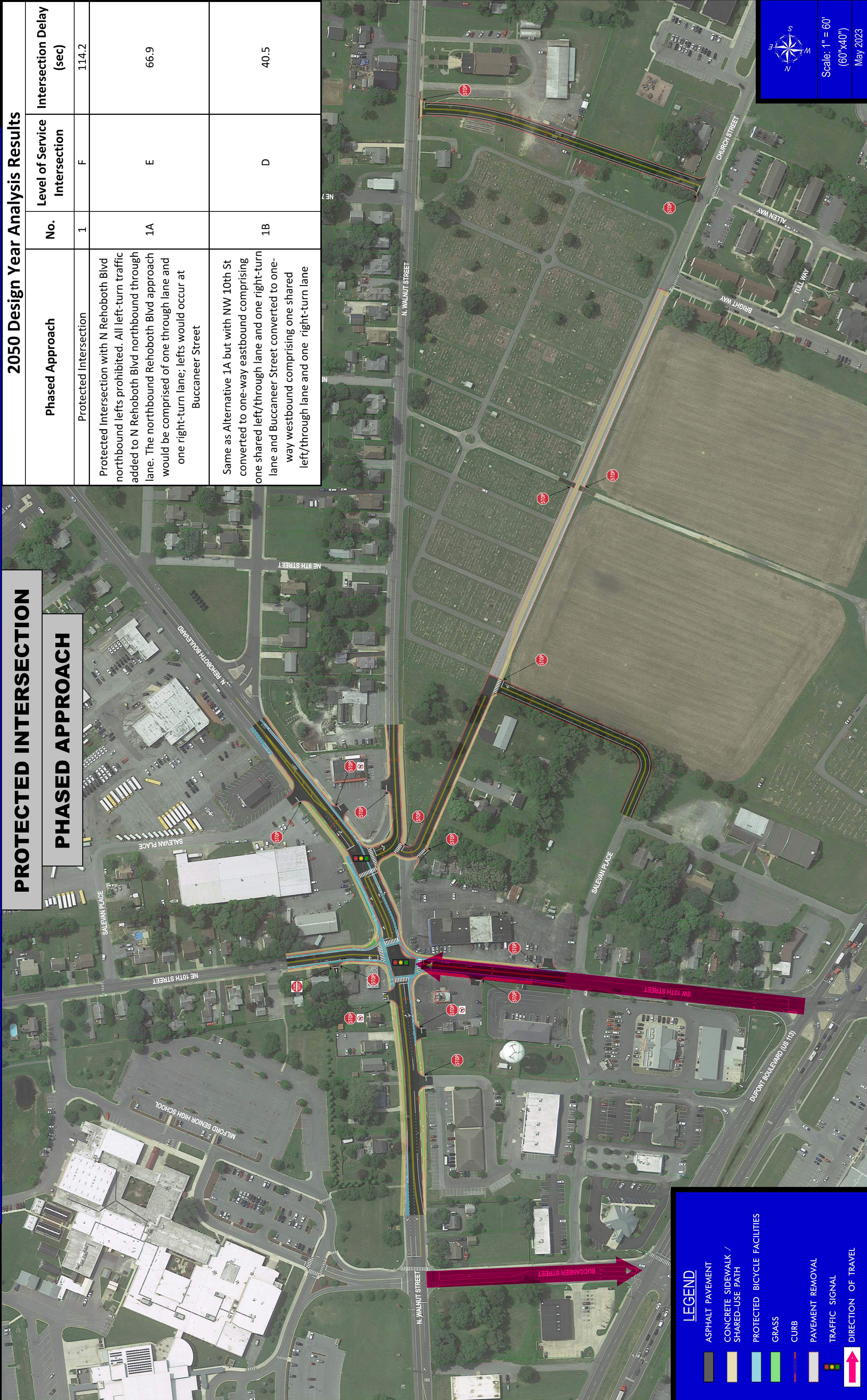
March 23, 2023



15	Name <i>Jim Galvin</i>	<div style="background-color: black; width: 100%; height: 100%; border: 2px solid red;"></div>	
	Organization <i>DKMPO</i>		
16	Name <i>Nina Fletcher</i>		
	Organization		
17	Name <i>Brian Bauer</i>		
	Organization <i>3rd Ward</i>		
18	Name	Address	Phone
	Organization	Email Address	
19	Name	Address	Phone
	Organization	Email Address	
20	Name	Address	Phone
	Organization	Email Address	
21	Name	Address	Phone
	Organization	Email Address	

Milford: NW & NE 10th St/N. Church St/N. Rehoboth Boulevard/ N. Walnut Street Intersection Study - Recommendations Report

Appendix C: Preferred Alternative



Appendix D: Cost Estimates

10th St & Church, Milford					
Interim					
Concept 5/18/2023					
ITEM #	TITLE	UNIT	ESTIMATE COST	UNIT QUANTITY	TOTAL
201000	CLEARING AND GRUBBING	LS	\$10,000.00	1.00	\$10,000.00
202000	EXCAVATION AND EMBANKMENT	CY	\$15.00	751.00	\$11,265.00
202003	UNDERCUT EXCAVATION	CY	\$23.00	151.00	\$3,473.00
207000	STRUCTURAL EXCAVATION	CY	\$15.00	0.00	\$0.00
209001	BORROW, TYPE A	CY	\$20.00	0.00	\$0.00
209005	FURNISHING BORROW, TYPE C FOR PIPE AND UTILITY TRENCH BACKFILL	CY	\$24.00	0.00	\$0.00
209006	BORROW, TYPE F	CY	\$12.00	0.00	\$0.00
211000	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	\$15,000.00	1.00	\$15,000.00
211001	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT, CURB AND SIDEWALK	SY	\$28.00	1393.00	\$39,004.00
301001	GRADED AGGREGATE BASE COURSE, TYPE B	CY	\$55.00	176.00	\$9,680.00
301002	GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	CY	\$95.00	215.00	\$20,425.00
401014	SUPERPAVE TYPE B, PG 64-22	TON	\$100.00	113.00	\$11,300.00
401030	SUPERPAVE TYPE B, PG 64-22, PATCHING	TON	\$140.00	20.00	\$2,800.00
401036	SUPERPAVE TYPE C, PG 64-22, WEDGE	TON	\$150.00	0.00	\$0.00
401044	SUPERPAVE TYPE C, PG 64-22 (NON-CARBONATE STONE)	TON	\$110.00	253.00	\$27,830.00
601033	REINFORCED CONCRETE PIPE, 18", CLASS IV	LF	\$95.00	0.00	\$0.00
602004	DRAINAGE INLET, 48" X 30"	EACH	\$4,200.00	0.00	\$0.00
602130	ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	EACH	\$1,800.00	5.00	\$9,000.00
602132	ADJUSTING AND REPAIRING EXISTING MANHOLE	EACH	\$1,800.00	1.00	\$1,800.00
701013	PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	LF	\$30.00	168.00	\$5,040.00
701014	PORTLAND CEMENT CONCRETE CURB, TYPE 2	LF	\$25.00	1821.00	\$45,525.00
701023	INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-8	LF	\$35.00	160.00	\$5,600.00
705001	PORTLAND CEMENT CONCRETE SIDEWALK, 4"	SF	\$12.00	7711.00	\$92,532.00
705002	PORTLAND CEMENT CONCRETE SIDEWALK, 6"	SF	\$14.00	0.00	\$0.00
705005	PORTLAND CEMENT CONCRETE SIDEWALK, 8"	SF	\$16.00	0.00	\$0.00
705007	SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF	\$38.00	176.00	\$6,688.00
705008	PEDESTRIAN CONNECTION, TYPE 1	SF	\$15.50	578.00	\$8,959.00
710002	ADJUST WATER VALVE BOXES	EACH	\$450.00	0.00	\$0.00
710041	RELOCATING FIRE HYDRANT	EACH	\$7,500.00	0.00	\$0.00
760010	PAVEMENT MILLING, BITUMINOUS CONCRETEPAVEMENT	SYIN	\$2.50	2380.00	\$5,950.00
762000	SAW CUTTING, BITUMINOUS CONCRETE	LF	\$3.00	2090.00	\$6,270.00
762001	SAW CUTTING, CONCRETE, FULL DEPTH	LF	\$15.00	82.00	\$1,230.00
801000	MAINTENANCE OF TRAFFIC	LS	\$150,000.00	1.00	\$150,000.00
817002	PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, ALKYD- THERMOPLASTIC	SF	\$6.00	818.00	\$4,908.00
817003	TEMPORARY MARKINGS, PAINT, 4"	LF	\$0.55	0.00	\$0.00
817004	TEMPORARY MARKINGS, PAINT, SYMBOL/LEGEND	SF	\$4.00	0.00	\$0.00
817005	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 5"	LF	\$5.00	0.00	\$0.00
817015	PREFORMED RETROREFLECTIVE THERMOPLASTIC MARKINGS, BIKE SYMBOL	EACH	\$400.00	0.00	\$0.00
817042	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 6"	LF	\$1.50	2661.00	\$3,991.50
817043	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 12"	LF	\$3.00	0.00	\$0.00
818001	SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE IV, RETROREFLECTIVE SHEETING		\$30.00	0.00	\$0.00
818003	SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE XI, RETROREFLECTIVE SHEETING		\$30.00	15.00	\$450.00
819011	GALVANIZED TELESCOPING STEEL SIGN POSTS, 12' X 2", COMPLETE W/ BASEPOSTS AND HARDWARE		\$175.00	2.00	\$350.00
819018	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH	\$110.00	2.00	\$220.00
819019	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON MULTIPLE SIGN POSTS	SF	\$22.00	0.00	\$0.00
905001	SILT FENCE	LF	\$4.00	0.00	\$0.00
905004	INLET SEDIMENT CONTROL, DRAINAGE INLET	EACH	\$200.00	0.00	\$0.00
905005	INLET SEDIMENT CONTROL, CURB INLET	EACH	\$200.00	5.00	\$1,000.00
907017	COMPOST FILTER LOGS	LF	\$24.00	0.00	\$0.00
908004	TOPSOIL, 6" DEPTH	SY	\$4.50	608.00	\$2,736.00
908020	EROSION CONTROL BLANKET MULCH	SY	\$4.00	608.00	\$2,432.00
908023	STABILIZED CONSTRUCTION ENTRANCE	SY	\$75.00	0.00	\$0.00
	Subtotal				\$505,458.50
763000	Initial Expense (5%)	L.S.	\$25,272.93	1	\$25,272.93
763501	Construction Engineering (5%)	L.S.	\$25,272.93	1	\$25,272.93
	TOTAL BASE FOR PROJECT				\$556,004.35
	CONSTRUCTION CONTINGENCY	20%	\$111,200.87	1	\$111,200.87
	TRAFFIC (FROM TRAFFIC STATEMENT)	L.S.	\$250,000.00	1	\$250,000.00
	UTILITY	L.S.	\$50,000.00	1	\$50,000.00
	QA/QC for HMA	L.S.	\$95.55	1	\$95.55
	Asphalt Cost Adj	L.S.	\$2,105.40	1	\$2,105.40
	TOTAL CONSTRUCTION COST				\$969,406.17
	CONSTRUCTION ENGINEERING - (INSPECTION, CE, ETC)	L.S.	\$145,410.93	1	\$145,410.93
	TOTAL BASE CONSTRUCTION COST				\$1,114,817.10

Notes: 1. All MOT items included in Item 801000 for this estimate. Breakouts of individual items will be included in the semi-final cost estimate.
2. Assumes 400 Calendar Days.

10th St & Church, Milford					
Final					
Concept 5/18/2023					
ITEM #	TITLE	UNIT	ESTIMATE COST	UNIT QUANTITY	TOTAL
201000	CLEARING AND GRUBBING	LS	\$25,000.00	1.00	\$25,000.00
202000	EXCAVATION AND EMBANKMENT	CY	\$15.00	4593.00	\$68,895.00
202003	UNDERCUT EXCAVATION	CY	\$23.00	919.00	\$21,137.00
207000	STRUCTURAL EXCAVATION	CY	\$15.00	0.00	\$0.00
209001	BORROW, TYPE A	CY	\$20.00	0.00	\$0.00
209005	FURNISHING BORROW, TYPE C FOR PIPE AND UTILITY TRENCH BACKFILL	CY	\$24.00	0.00	\$0.00
209006	BORROW, TYPE F	CY	\$12.00	0.00	\$0.00
211000	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	\$25,000.00	1.00	\$25,000.00
211001	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT, CURB AND SIDEWALK	SY	\$28.00	5755.00	\$161,140.00
301001	GRADED AGGREGATE BASE COURSE, TYPE B	CY	\$55.00	2050.00	\$112,750.00
301002	GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	CY	\$95.00	481.00	\$45,695.00
401014	SUPERPAVE TYPE B, PG 64-22	TON	\$100.00	1802.00	\$180,200.00
401030	SUPERPAVE TYPE B, PG 64-22, PATCHING	TON	\$140.00	44.00	\$6,160.00
401036	SUPERPAVE TYPE C, PG 64-22, WEDGE	TON	\$150.00	0.00	\$0.00
401044	SUPERPAVE TYPE C, PG 64-22 (NON-CARBONATE STONE)	TON	\$110.00	2156.00	\$237,160.00
601033	REINFORCED CONCRETE PIPE, 18", CLASS IV	LF	\$95.00	0.00	\$0.00
602004	DRAINAGE INLET, 48" X 30"	EACH	\$4,200.00	0.00	\$0.00
602130	ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	EACH	\$1,800.00	12.00	\$21,600.00
602132	ADJUSTING AND REPAIRING EXISTING MANHOLE	EACH	\$1,800.00	11.00	\$19,800.00
701013	PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	LF	\$30.00	248.00	\$7,440.00
701014	PORTLAND CEMENT CONCRETE CURB, TYPE 2	LF	\$25.00	3850.00	\$96,250.00
701023	INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-8	LF	\$35.00	3468.00	\$121,380.00
705001	PORTLAND CEMENT CONCRETE SIDEWALK, 4"	SF	\$12.00	31928.00	\$383,136.00
705002	PORTLAND CEMENT CONCRETE SIDEWALK, 6"	SF	\$14.00	12073.00	\$169,022.00
705005	PORTLAND CEMENT CONCRETE SIDEWALK, 8"	SF	\$16.00	0.00	\$0.00
705007	SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF	\$38.00	550.00	\$20,900.00
705008	PEDESTRIAN CONNECTION, TYPE 1	SF	\$15.50	4125.00	\$63,937.50
710002	ADJUST WATER VALVE BOXES	EACH	\$450.00	15.00	\$6,750.00
710041	RELOCATING FIRE HYDRANT	EACH	\$7,500.00	2.00	\$15,000.00
760010	PAVEMENT MILLING, BITUMINOUS CONCRETEPAVEMENT	SYIN	\$2.50	27560.00	\$68,900.00
762000	SAW CUTTING, BITUMINOUS CONCRETE	LF	\$3.00	14145.00	\$42,435.00
762001	SAW CUTTING, CONCRETE, FULL DEPTH	LF	\$15.00	136.00	\$2,040.00
801000	MAINTENANCE OF TRAFFIC	LS	\$250,000.00	1.00	\$250,000.00
817002	PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, ALKYD- THERMOPLASTIC	SF	\$6.00	2236.00	\$13,416.00
817015	PERFORMED RETROREFLECTIVE THERMOPLASTIC MARKINGS, BIKE SYMBOL	EACH	\$400.00	20.00	\$8,000.00
817042	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 6"	LF	\$1.50	21745.00	\$32,617.50
817043	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 12"	LF	\$3.00	182.00	\$546.00
818001	SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE IV, RETROREFLECTIVE SHEETING		\$30.00	24.00	\$720.00
818003	SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE XI, RETROREFLECTIVE SHEETING		\$30.00	136.00	\$4,080.00
819011	GALVANIZED TELESCOPING STEEL SIGN POSTS, 12' X 2", COMPLETE W/ BASEPOSTS AND HARDWARE		\$175.00	19.00	\$3,325.00
819018	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH	\$110.00	21.00	\$2,310.00
819019	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON MULTIPLE SIGN POSTS	SF	\$22.00	0.00	\$0.00
905001	SILT FENCE	LF	\$4.00	0.00	\$0.00
905004	INLET SEDIMENT CONTROL, DRAINAGE INLET	EACH	\$200.00	6.00	\$1,200.00
905005	INLET SEDIMENT CONTROL, CURB INLET	EACH	\$200.00	6.00	\$1,200.00
907017	COMPOST FILTER LOGS	LF	\$24.00	0.00	\$0.00
908004	TOPSOIL, 6" DEPTH	SY	\$4.50	2247.00	\$10,111.50
908017	TEMPORARY GRASS SEEDING	SY	\$0.75	0.00	\$0.00
908020	EROSION CONTROL BLANKET MULCH	SY	\$4.00	2247.00	\$8,988.00
908023	STABILIZED CONSTRUCTION ENTRANCE	SY	\$75.00	0.00	\$0.00
	Subtotal				\$2,258,241.50
763000	Initial Expense (5%)	L.S.	\$112,912.08	1	\$112,912.08
763501	Construction Engineering (5%)	L.S.	\$112,912.08	1	\$112,912.08
	TOTAL BASE FOR PROJECT				\$2,484,065.65
	CONSTRUCTION CONTINGENCY	20%	\$496,813.13	1	\$496,813.13
	TRAFFIC (FROM TRAFFIC STATEMENT)	L.S.	\$300,000.00	1	\$300,000.00
	UTILITY	L.S.	\$0.00	1	\$0.00
	QA/QC for HMA	L.S.	\$770.00	1	\$770.00
	Asphalt Cost Adj	L.S.	\$17,107.20	1	\$17,107.20
	TOTAL CONSTRUCTION COST				\$3,298,755.98
	CONSTRUCTION ENGINEERING - (INSPECTION, CE, ETC)	L.S.	\$494,813.40	1	\$494,813.40
	TOTAL BASE CONSTRUCTION COST				\$3,793,569.38

Notes: 1. All MOT items included in Item 801000 for this estimate. Breakouts of individual items will be included in the semi-final cost estimate.
2. Assumes 400 Calendar Days.

10th St & Church, Milford					
1-Way Conversion					
Concept 5/18/2023					
ITEM #	TITLE	UNIT	ESTIMATE COST	UNIT QUANTITY	TOTAL
201000	CLEARING AND GRUBBING	LS	\$10,000.00	1.00	\$10,000.00
202000	EXCAVATION AND EMBANKMENT	CY	\$15.00	340.00	\$5,100.00
202003	UNDERCUT EXCAVATION	CY	\$23.00	68.00	\$1,564.00
207000	STRUCTURAL EXCAVATION	CY	\$15.00	0.00	\$0.00
209001	BORROW, TYPE A	CY	\$20.00	0.00	\$0.00
209005	FURNISHING BORROW, TYPE C FOR PIPE AND UTILITY TRENCH BACKFILL	CY	\$24.00	0.00	\$0.00
209006	BORROW, TYPE F	CY	\$12.00	0.00	\$0.00
211000	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	\$10,000.00	1.00	\$10,000.00
211001	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT, CURB AND SIDEWALK	SY	\$28.00	231.00	\$6,468.00
301001	GRADED AGGREGATE BASE COURSE, TYPE B	CY	\$55.00	17.00	\$935.00
301002	GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	CY	\$95.00	12.00	\$1,140.00
401014	SUPERPAVE TYPE B, PG 64-22	TON	\$100.00	0.00	\$0.00
401030	SUPERPAVE TYPE B, PG 64-22, PATCHING	TON	\$140.00	2.00	\$280.00
401036	SUPERPAVE TYPE C, PG 64-22, WEDGE	TON	\$150.00	0.00	\$0.00
401044	SUPERPAVE TYPE C, PG 64-22 (NON-CARBONATE STONE)	TON	\$110.00	598.00	\$65,780.00
601033	REINFORCED CONCRETE PIPE, 18", CLASS IV	LF	\$95.00	0.00	\$0.00
602004	DRAINAGE INLET, 48" X 30"	EACH	\$4,200.00	0.00	\$0.00
602130	ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	EACH	\$1,800.00	2.00	\$3,600.00
602132	ADJUSTING AND REPAIRING EXISTING MANHOLE	EACH	\$1,800.00	0.00	\$0.00
701013	PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	LF	\$30.00	0.00	\$0.00
701014	PORTLAND CEMENT CONCRETE CURB, TYPE 2	LF	\$25.00	0.00	\$0.00
701023	INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-8	LF	\$35.00	209.00	\$7,315.00
705001	PORTLAND CEMENT CONCRETE SIDEWALK, 4"	SF	\$12.00	1023.00	\$12,276.00
705002	PORTLAND CEMENT CONCRETE SIDEWALK, 6"	SF	\$14.00	0.00	\$0.00
705005	PORTLAND CEMENT CONCRETE SIDEWALK, 8"	SF	\$16.00	0.00	\$0.00
705007	SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF	\$38.00	0.00	\$0.00
705008	PEDESTRIAN CONNECTION, TYPE 1	SF	\$15.50	0.00	\$0.00
710002	ADJUST WATER VALVE BOXES	EACH	\$450.00	0.00	\$0.00
710041	RELOCATING FIRE HYDRANT	EACH	\$7,500.00	0.00	\$0.00
760010	PAVEMENT MILLING, BITUMINOUS CONCRETEPAVEMENT	SYIN	\$2.50	10540.00	\$26,350.00
762000	SAW CUTTING, BITUMINOUS CONCRETE	LF	\$3.00	435.00	\$1,305.00
762001	SAW CUTTING, CONCRETE, FULL DEPTH	LF	\$15.00	6.00	\$90.00
801000	MAINTENANCE OF TRAFFIC	LS	\$75,000.00	1.00	\$75,000.00
817002	PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, ALKYD- THERMOPLASTIC	SF	\$6.00	392.00	\$2,352.00
817003	TEMPORARY MARKINGS, PAINT, 4"	LF	\$0.55	0.00	\$0.00
817004	TEMPORARY MARKINGS, PAINT, SYMBOL/LEGEND	SF	\$4.00	0.00	\$0.00
817005	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 5"	LF	\$5.00	0.00	\$0.00
817015	PREFORMED RETROREFLECTIVE THERMOPLASTIC MARKINGS, BIKE SYMBOL	EACH	\$400.00	3.00	\$1,200.00
817042	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 6"	LF	\$1.50	3728.00	\$5,592.00
817043	PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 12"	LF	\$3.00	0.00	\$0.00
818001	SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE IV, RETROREFLECTIVE SHEETING		\$30.00	99.00	\$2,970.00
818003	SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE XI, RETROREFLECTIVE SHEETING		\$30.00	71.00	\$2,130.00
819011	GALVANIZED TELESCOPING STEEL SIGN POSTS, 12' X 2", COMPLETE W/ BASEPOSTS AND HARDWARE		\$175.00	17.00	\$2,975.00
819018	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH	\$110.00	19.00	\$2,090.00
819019	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON MULTIPLE SIGN POSTS	SF	\$22.00	0.00	\$0.00
905001	SILT FENCE	LF	\$4.00	0.00	\$0.00
905004	INLET SEDIMENT CONTROL, DRAINAGE INLET	EACH	\$200.00	0.00	\$0.00
905005	INLET SEDIMENT CONTROL, CURB INLET	EACH	\$200.00	2.00	\$400.00
907017	COMPOST FILTER LOGS	LF	\$24.00	0.00	\$0.00
908004	TOPSOIL, 6" DEPTH	SY	\$4.50	90.00	\$405.00
908017	TEMPORARY GRASS SEEDING	SY	\$0.75	0.00	\$0.00
908020	EROSION CONTROL BLANKET MULCH	SY	\$4.00	90.00	\$360.00
908023	STABILIZED CONSTRUCTION ENTRANCE	SY	\$75.00	0.00	\$0.00
	Subtotal				\$247,677.00
763000	Initial Expense (5%)	L.S.	\$12,383.85	1	\$12,383.85
763501	Construction Engineering (5%)	L.S.	\$12,383.85	1	\$12,383.85
	TOTAL BASE FOR PROJECT				\$272,444.70
	CONSTRUCTION CONTINGENCY	20%	\$54,488.94	1	\$54,488.94
	TRAFFIC (FROM TRAFFIC STATEMENT)	L.S.	\$100,000.00	1	\$100,000.00
	UTILITY	L.S.	\$0.00	1	\$0.00
	QA/QC for HMA	L.S.	\$210.00	1	\$210.00
	Asphalt Cost Adj	L.S.	\$4,677.60	1	\$4,677.60
	TOTAL CONSTRUCTION COST				\$431,821.24
	CONSTRUCTION ENGINEERING - (INSPECTION, CE, ETC)	L.S.	\$64,773.19	1	\$64,773.19
	TOTAL BASE CONSTRUCTION COST				\$496,594.43

Notes: 1. All MOT items included in Item 801000 for this estimate. Breakouts of individual items will be included in the semi-final cost estimate.
2. Assumes 400 Calendar Days.