

# Connecting with the Ardens

A Transportation Plan

July 2023

[wilmapco.org/ardens](http://wilmapco.org/ardens)



# Connecting with the Ardens

Connecting with the Ardens provides a long-term planning blueprint to enhance safety and mobility through the Ardens. Plan goals:

- Manage vehicular travel speeds and deploy safety countermeasures
- Provide enhanced pedestrian crossings
- Develop a bicycle/pedestrian network to traverse through the Ardens
- Enhance transit and school bus stops

This plan embraces the unique context of The Ardens and aims to provide a vision and improvement plan that will enhance the quality of life and safety of all users that are Connecting with the Ardens.

The preparation of this document was financed in part with funds provided by the Federal Government, including the Federal Transit Administration and the Federal Highway Administration of the United States Department of Transportation.

## Steering Committee Members

Village of Arden

Village of Ardencroft

Village of Ardentown

Claymont Fire Company, Station 13

Delaware Department of Transportation (DelDOT)

Delaware Transit Corporation (operating as DART First State)

New Castle County Department of Land Use

Wilmington Area Planning Council (WILMAPCO)

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# Table of Contents

<b>4</b>	Crafting a Plan for The Ardens
<b>12</b>	The Ardens Today
<b>21</b>	The Public Pulse
<b>33</b>	Alternatives
<b>58</b>	Locally Preferred Alternative
<b>67</b>	Implementation Plan
	Appendices



# List of Figures

FIGURE # / DESCRIPTION	PAGE #
Figure 1: Location of The Ardens In New Castle County, DE	4
Figure 2: Concept Alternative From Harvey Road Traffic Calming Study, 1998	6
Figure 3: Ardentown Paths Plan	7
Figure 4: Impervious Surfaces In The Village Of Arden	8
Figure 5: Path Improvements In Ardentown	8
Figure 6: Summary Of Locally Preferred Alternative	10
Figure 7: Proposed Multimodal Network	11
Figure 8: Land Use In The Ardens	13
Figure 9: Population Distribution Of The Ardens	13
Figure 10: Distribution Of Vehicle Type Along Sampled Roadways	14
Figure 11: Annual Average Daily Traffic Volumes In The Ardens	15
Figure 12: Observed 85th Percentile Speeds	16
Figure 13: Bicycle Level Of Traffic Stress In The Ardens	16
Figure14: Recommended Bicycle Network - New Castle County Bicycle Plan	17
Figure 15: Crash Hotspots (2017 - 2022)	18
Figure16: Existing Sidewalks And Paths	19
Figure 17: Existing Bus Routes	20
Figure 18: Bus Ridership	20
Figure 19: Survey Responses	23
Figure 20: Interactive Map Responses	28
Figure 21: Public Meeting #1 Boards	30
Figure 22: Initial Alternatives Considered	43
Figure 23: Alternatives And Public Support	47
Figure 24: Alternatives And Feasibility	48
Figure 25: Goal 3 - Preferences	52
Figure 26: Goal 3 - Alternatives	53
Figure 27: Bus Shelter Preferences	54
Figure 28: Bus Stop Location Preferences	55
Figure 29: Priority Bus Stop Locations	56
Figure 30: Conceptual Path To Naamans Road/Route 61	57

Figure 31: Summary Of Locally Preferred Alternative	58
Figure 32: Locally Preferred Alternative	59
Figure 33: Rendering Of Clubhouse Path / Harvey Road Crossing (Improvement H)	60
Figure 34: Proposed Multimodal Network	65
Figure 35: Estimate of Probable Cost (Preliminary)	66
Figure 36: Implementation Actions	67





# Crafting a Plan for the Ardens

## INTRODUCING THE ARDENS

The Ardens are a series of villages located in northern New Castle County nestled north of I-95 and generally along Harvey Road. The Ardens, encompassing 0.58 square miles, includes the village of Arden, Ardencroft, Ardentown as well as a small unincorporated area of New Castle County. The Village of Arden was founded in 1900 as a single tax community. The idea of the single tax community was expanded with the purchase of Harvey Farm and Hanby Farm in 1922. Ardencroft was founded in 1950. As of the 2020 US Census, the population of the Ardens was 935 persons.

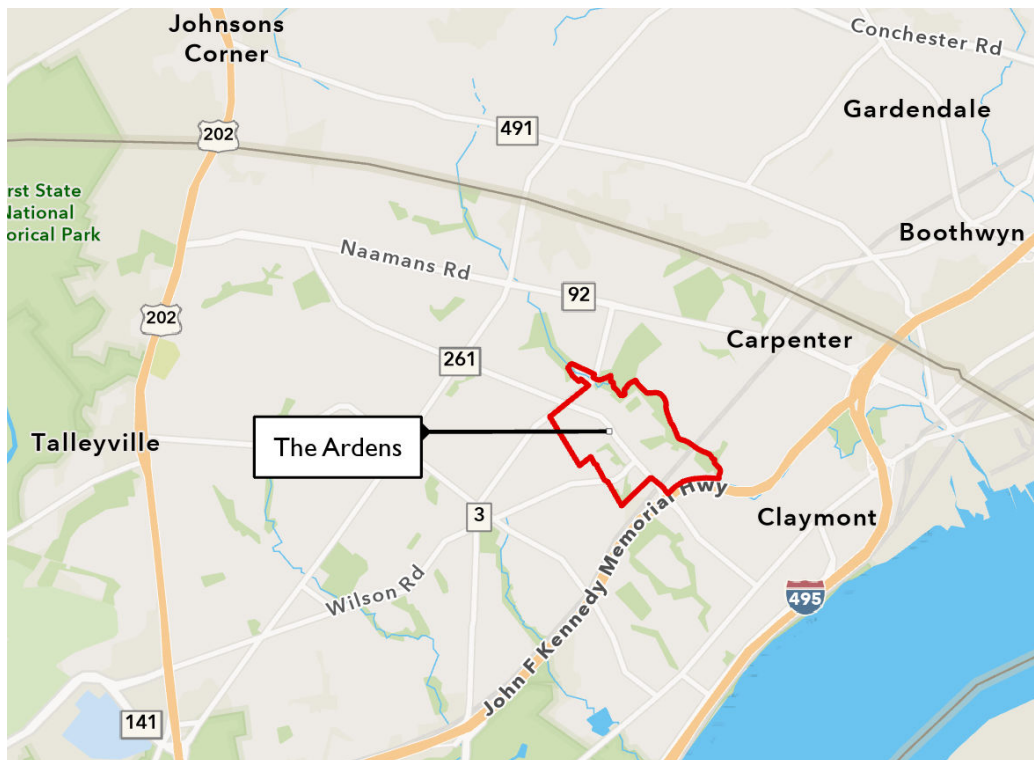


FIGURE 1: LOCATION OF THE ARDENS IN NEW CASTLE COUNTY, DE

## THE ARDENS TODAY

The rural and natural enclaves of Arden, Ardencroft, and Ardentown has been challenged by the communities' proximity to I-95 and growth in northern New Castle County along corridors like Naamans Road and US 202. Today, approximately 10,000 vehicles a day traverse along Marsh Road, 8,000 vehicles per day along Harvey Road, and 3,500 vehicles a day along Veale Road. The speed and sheer volume of this traffic has made it increasingly challenging to traverse through the Ardens via walking and bicycling.



## Connecting with The Ardens



As the Metropolitan Planning Organization (MPO), WILMAPCO staff received a request from the villages of Arden, Ardencroft, and Ardentown to develop a transportation plan for the Ardens. Primarily, this Plan would revisit a previous plan that was prepared in 1999 for the Ardens and build from recent community planning momentum from the Ardentown Paths Plan (also done by WILMAPCO) in 2017.

The Plan was completed as part of WILMAPCO's FY2023 Work Program, with WILMAPCO staff completing a Walkable Workshop, as part of their Walkable Workshop program; WILMAPCO staff also completed a Task 1 - Existing Conditions memorandum. A Consultant Team was retained to lead the development of alternatives, public engagement, and preferred alternatives, with ongoing support by WILMAPCO staff.

### PROJECT STEERING COMMITTEE

A project steering committee comprised of representatives from each of the villages, county and state agencies met five (5) times (virtually) to guide the development of the Plan. This group provided critical feedback to the Consultant Team and helped to frame and promote the public engagement portions of the plan.

### Steering Committee Members

Village of Arden

Village of Ardencroft

Village of Ardentown

Claymont Fire Company, Station 13

Delaware Department of Transportation (DelDOT)

Delaware Transit Corporation (operating as DART First State)

New Castle County Department of Land Use

Wilmington Area Planning Council (WILMAPCO)







## Supporting Plans

Connecting with the Ardens builds from a strong framework of previous plans and studies. These include:

### The Three Ardens - Harvey Road Traffic Calming Study (1998)

The Harvey Road corridor was studied in the late 1990s by Rummel, Klepper, & Kahl. This plan recommended a series of traffic calming features along Harvey Road including vertical features such as raised intersections and speed tables.

Upon initial installation of features, concerns emerged and Harvey Road Traffic Calming Design Steering Committee convened in 1998-99 to discuss modifications to the original concept plan. From these meetings, a set of consensus principles were developed and agreed upon; these principles included:

- No vertical calming features
- Use of horizontal calming features
- Features will comply with DelDOT standards (mountable curb, etc)
- Use of low-level landscaping
- Traffic calming features will be traversable for emergency vehicles, school and transit buses

FIGURE 2: CONCEPT ALTERNATIVE FROM HARVEY ROAD TRAFFIC CALMING STUDY, 1998



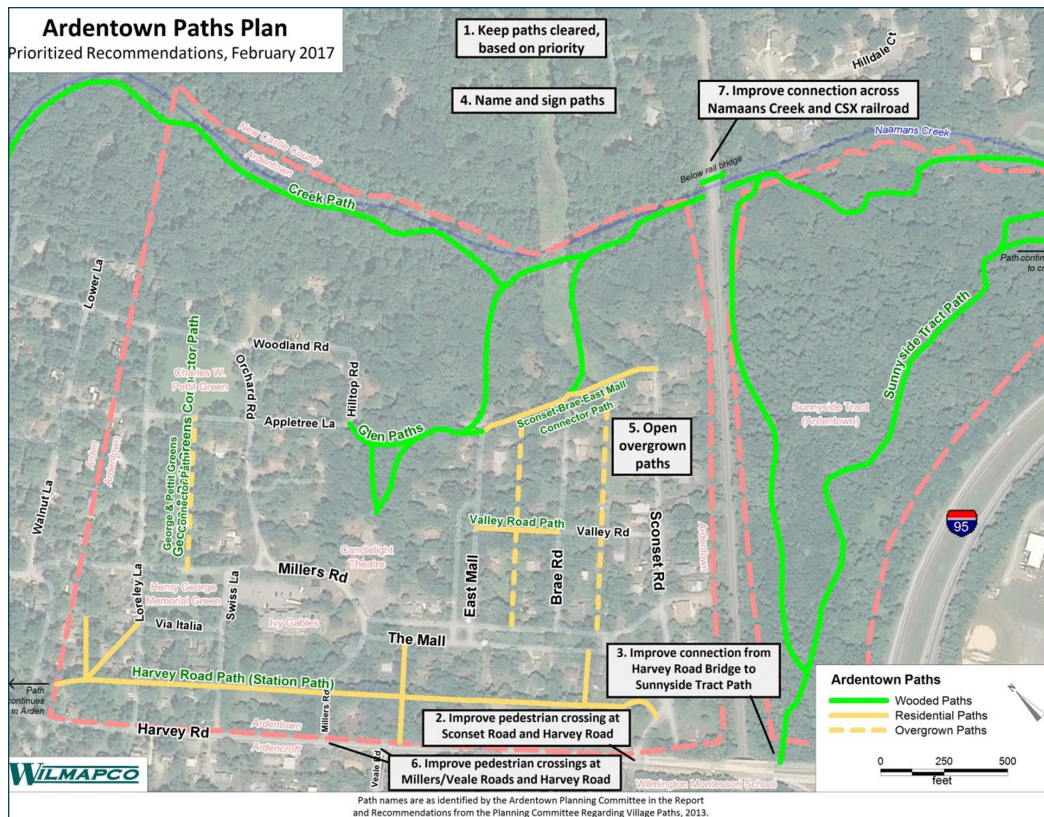


FIGURE 3: ARDENTOWN PATHS PLAN

### Ardentown Paths Plan (2017)

This paths plan updates the existing Ardentown paths report. The plan recommendations are improved connectivity and signage. The network of paths, was developed in the early twentieth century, connected homes with community buildings and a former train station. Some paths have become overgrown and unusable.

This Plan recommended:

1. **Keeping the paths cleared of obstructions**, based on a prioritization of path segments developed through a public survey.
2. **Improve the pedestrian crossing at Sconset Road and Harvey Road**, which would allow a safer crossing for students of Wilmington Montessori School as well as better access to Ardencroft and its own path network.
3. **Improve the connection from the Harvey Road bridge to the Sunnyside tract**, which would serve as the primary entrance into the nature preserve.
4. **Name and sign the paths**, which would improve wayfinding and help to identify the paths and their locations.
5. **Open overgrown paths**, which have been disused and are no longer passable.
6. **Improve the pedestrian crossings at Millers/Veale roads and Harvey Road**, providing an additional safe crossing of Harvey Road as well as better access to Ardencroft and its own path network.
7. **Improve the connection across Naaman's Creek and the CSX railroad**, which is an indirect connection between the creek path and the Sunnyside tract underneath the railroad bridge.
8. **Additional recommendations written in by survey respondents**, including repairing existing small bridges and improving access to and through the woods.





FIGURE 4: IMPERVIOUS SURFACES IN THE VILLAGE OF ARDEN

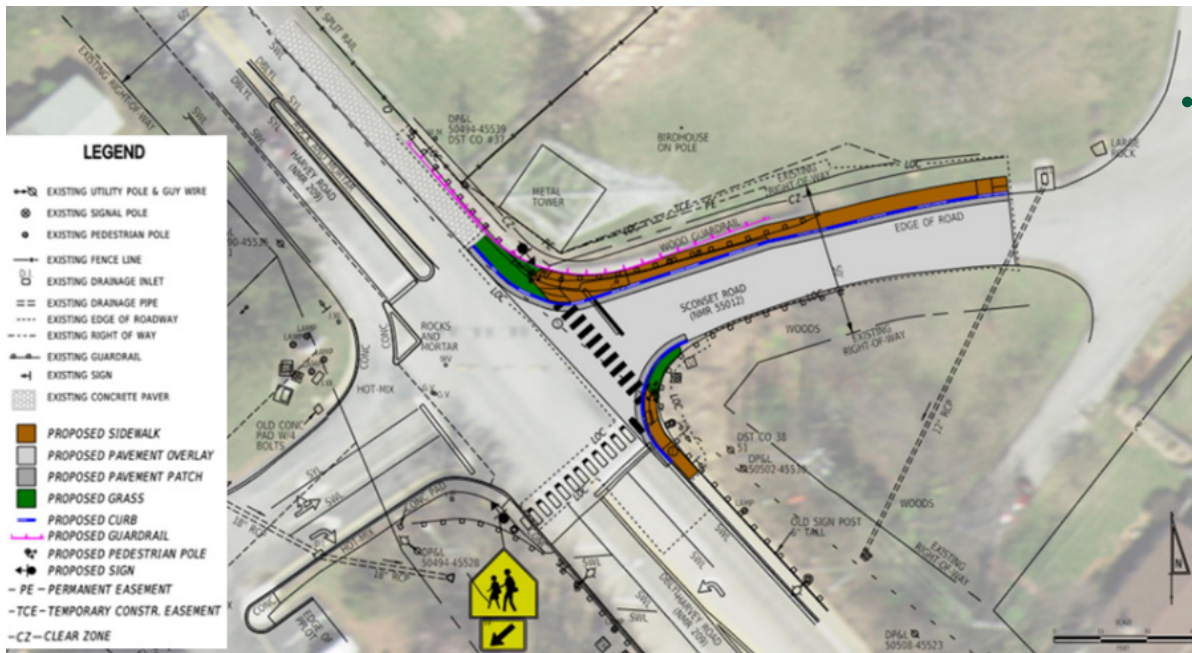


FIGURE 5: PATH IMPROVEMENTS IN ARDENTOWN

### Water Quality Master Plan (2022)

The village of Arden was established before contemporary requirements and designs for stormwater management. With increased impervious surface from development, this means that the natural landscape of the Ardens has been negatively affected. The plan's purpose is to identify areas within the village of Arden to implement stormwater Best Management Practices.

- Identifies broad scale drainage patterns through Arden lands using publicly available data.
- Determines feasible areas for implementation of stormwater BMPs.
- Evaluates the potential of the proposed BMPs.
- Differentiates the BMPs by subjective criteria to aid in implementation hierarchy.

### Safe Routes to School Program – Harvey Road at Sconset Road

The Safe Routes to School Program creates safe opportunities for children to walk or bicycle to and from school. In 2017, Wilmington Montessori School requested SRTS funding to improve pedestrian and bicycle infrastructure. The recommendations include traffic calming measures on Harvey Road, creating new paths that connect to Harvey Road adding sidewalks and improved signage and signaling.



# Plan Goals



**MANAGE VEHICULAR TRAVEL  
SPEEDS AND DEPLOY SAFETY  
COUNTERMEASURES**



**PROVIDE ENHANCED  
PEDESTRIAN CROSSINGS**



**DEVELOP A BICYCLE/  
PEDESTRIAN NETWORK  
TO TRAVERSE THROUGH  
THE ARDENS**



**ENHANCE TRANSIT AND  
SCHOOL BUS STOPS**

## Engagement Timeline

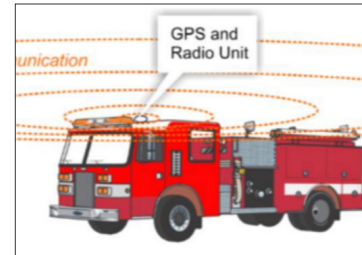
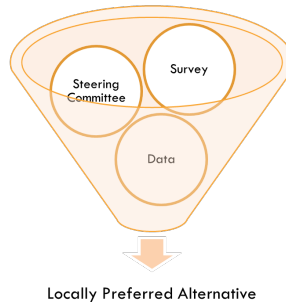
	AUG-22	SEP-22	OCT-22	NOV-22	DEC-22	JAN-23	FEB-23	MAR-23	APR-23	MAY-23	JUN-23
<b>WALKABLE WORKSHOP</b>	×										
<b>PROJECT WEBSITE / SOCIAL MEDIA</b>	×	×	×	×	×	×	×	×	×	×	×
<b>PROJECT STEERING COMMITTEE MEETINGS</b>	×			×			×	×		×	×
<b>PUBLIC MEETINGS</b>			×				×				×
<b>COMMUNITY SURVEYS</b>				×				×			



# Summary of Recommendations

## Locally Preferred Alternative

Based upon a robust public engagement process, Steering Committee refinement, and technical evaluation of multiple alternatives, a Locally Preferred Alternative was identified. Upon further engineering refinement, these improvements are recommended to be programmed within WILMAPCO's Long Range Plan and Transportation Improvement Program.



**FIGURE 6: SUMMARY OF LOCALLY PREFERRED ALTERNATIVE**

LOCATION	LIMITS	ID	DESCRIPTION	FURTHER ACTIONS
Harvey Road	at Marsh Road	A	Gateway (median, sign, landscaping)	Refine location/design specifics in preliminary engineering
	Mill Lane to Hillside Road	C	Bioswale	Refine location/design specifics in preliminary engineering
	Lovers Lane to Little Lane	E	Trail Crossing	Complete NCHRP 498 treatment assessment
	at Orleans Road	G	Maintain signal / improve geometry	Monitor crash history; define further geometric improvements
	at Clubhouse Path	H	Update pedestrian crossing	Complete NCHRP 498 treatment assessment
	Lower Lane to Meadow Lane	J	Crossing / Median	Complete NCHRP 498 treatment assessment
	north of Millers Road	M	Relocate crossing/install median	Determine preferred treatment in preliminary engineering
	north of Millers Road	N	Install bumpout	Determine preferred treatment in preliminary engineering
	north of Millers Road	O	Reestablish Trail	Advance in concert with Improvement M/N - when selected
	Millers Road to Veale Road	P	Curbside bioswale/bumpout	Refine location/design specifics in preliminary engineering
	Veale Road to Upper Greenbriar Road	Q	Curbside bioswale/bumpout	Refine location/design specifics in preliminary engineering
	at Sconset Road	R	Gateway (median, sign, curbside bioswale)	Refine location/design specifics in preliminary engineering
	Sconset Road to Glenrock Drive	U	Reduce NB Harvey Road to one lane	Capacity analysis of I-95/Harvey Road interchange required
	Sconset Road to Glenrock Drive	V	Enhance Speed Limit Signage	Coordinate with DelDOT to install signage
Veale Road	at W. Greenbriar Road	W	Median/pedestrian crossing	Complete NCHRP 498 treatment assessment
	at Sunset Lane; at Evergreen Lane	Y	Improve sight distance; improve crossings	Complete NCHRP 498 treatment assessment
	at Willow Way	Z	Gateway (median/sign)	Complete NCHRP 498 treatment assessment
	E. Dale Road to Bellemeade Place	AA	Median/pedestrian crossing	Complete NCHRP 498 treatment assessment
	E. Dale Road to Harvey Road	AB	Reduce speed limit to 25 mph	Coordinate with DelDOT to install signage
	W. Dale Road to E. Dale Road	AD	Vegetated median (See map beginning on page 46)	Refine location/design specifics in preliminary engineering
			Signal preemption for emergency responders	Pursue funding for emergency vehicle preemption emitters
			Enhanced bus stops at priority bus stop locations	Coordinate improvements with DART First State

# Multimodal Network

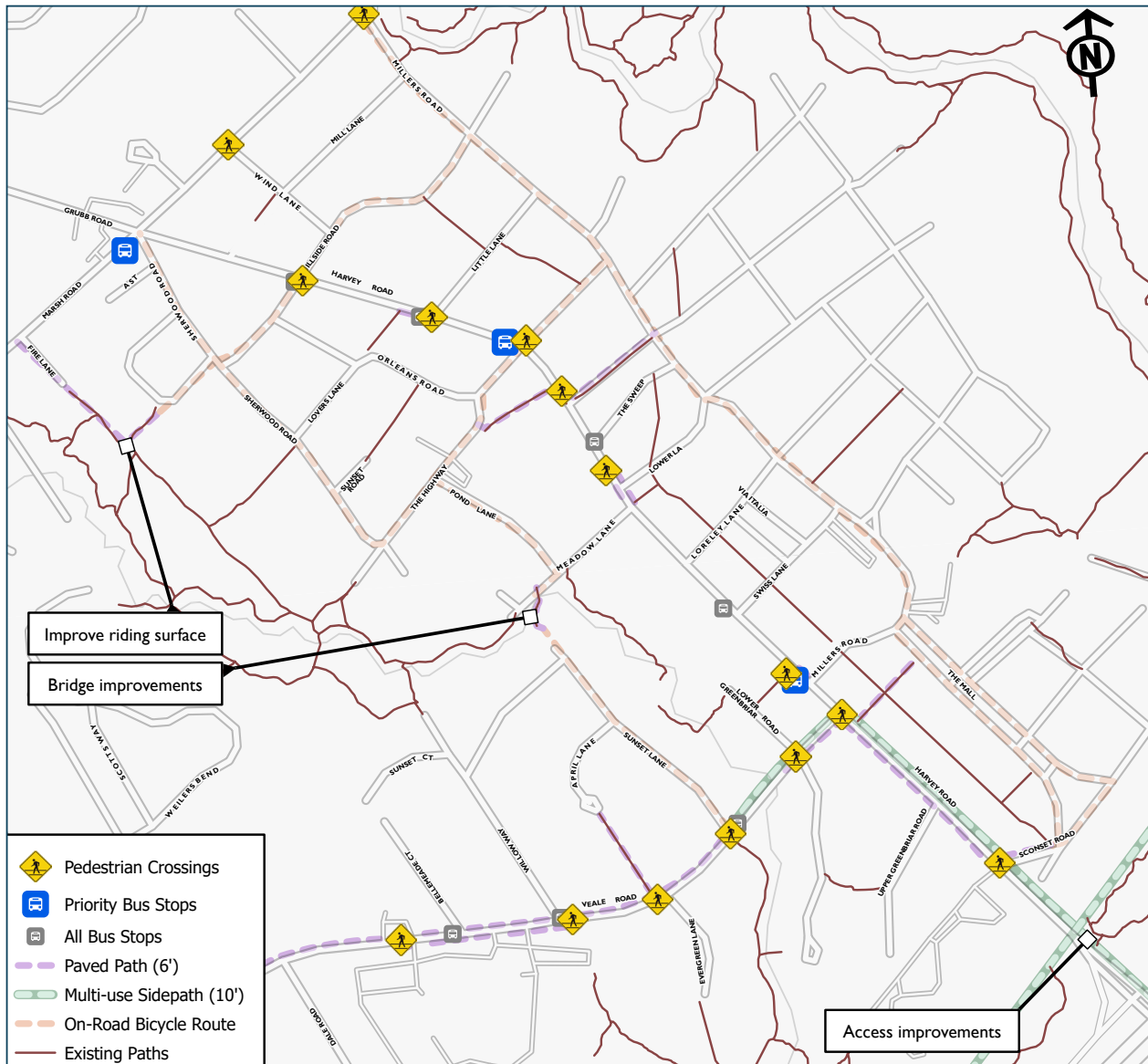


FIGURE 7: PROPOSED MULTIMODAL NETWORK

## TRANSIT IMPROVEMENTS BUS SHELTERS

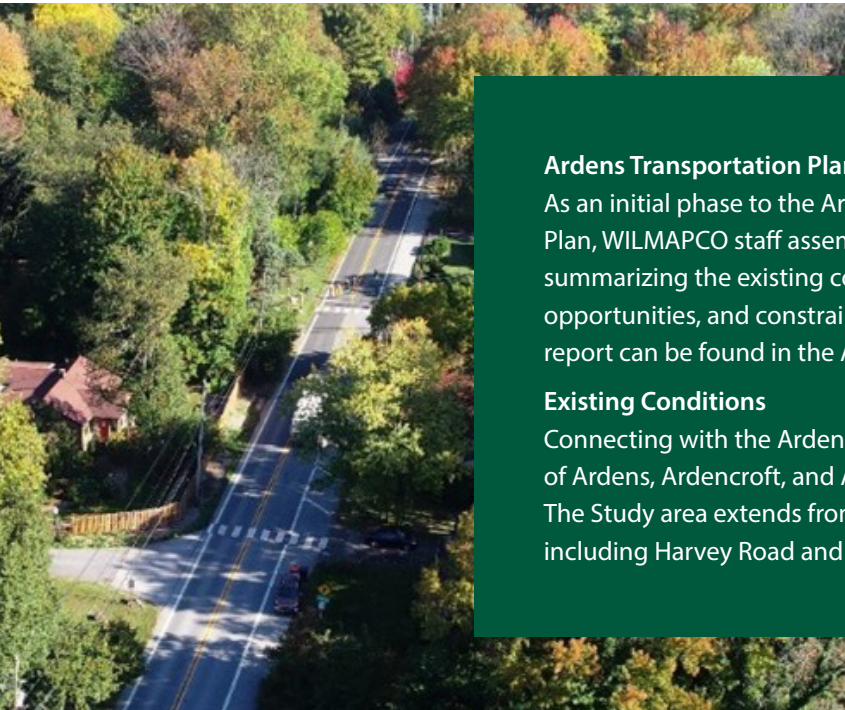


## EVALUATE SERVICE ENHANCEMENTS/ ALTERNATIVES





# The Ardens Today



## Ardens Transportation Plan - Task 1 Report

As an initial phase to the Ardens Transportation Plan, WILMAPCO staff assembled a technical report summarizing the existing conditions, key issues, opportunities, and constraints. The full Task 1 report can be found in the Appendix.

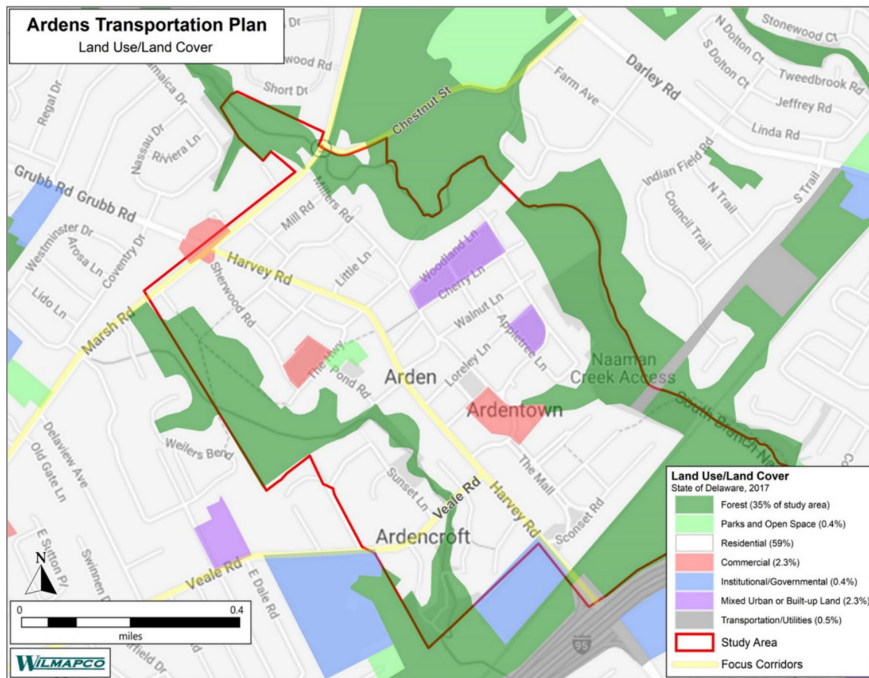
### Existing Conditions

Connecting with the Ardens includes the villages of Ardens, Ardencroft, and Ardentown as outlined. The Study area extends from I-95 to Marsh Road, including Harvey Road and Veale Road.

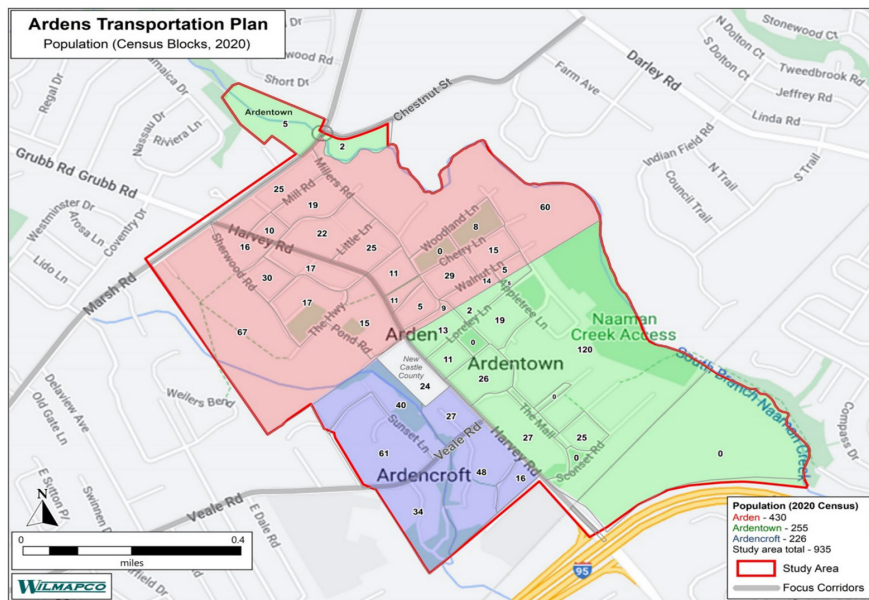


## Planning and Environmental Linkages

This study is being completed as part of a streamlined project development process in accordance with the Federal Highway Administration's Planning and Environmental Linkages (PEL) guidelines. PEL is a collaborative and integrated approach to transportation decision-making that considers benefits and impacts of proposed transportation system improvements to the environment, community, and economy during the transportation planning process. This study will inform the environmental review phase of the recommended transportation projects in accordance with the National Environmental Policy Act (NEPA) as well as the preliminary engineering phase. This report serves as a response to the PEL Questionnaire, and a checklist is provided in this Appendix.



**FIGURE 8: LAND USE IN THE ARDENS**



**FIGURE 9: POPULATION DISTRIBUTION OF THE ARDENS**

## Land Use

Present day land use is depicted in Figure 5. The Ardens is primarily detached residential units (59%) surrounded by forested woods and community greens/open space (36%). Other notable uses within the Ardens include Ivy Gables Senior Living, the Candlelight Theatre, the Gild Hall, and the Buzz Ware Village Center. Two private schools, St. Edmonds' Academy and Wilmington Montessori School, border the community.

## Demographics

As of the 2020 Census, the total population of the study area was 935 people. The Village of Arden has the highest population count at 430. Ardentown has a population of 255. Ardencroft has a population of 226. There are 24 people that live within the unincorporated section of New Castle County in the study area.



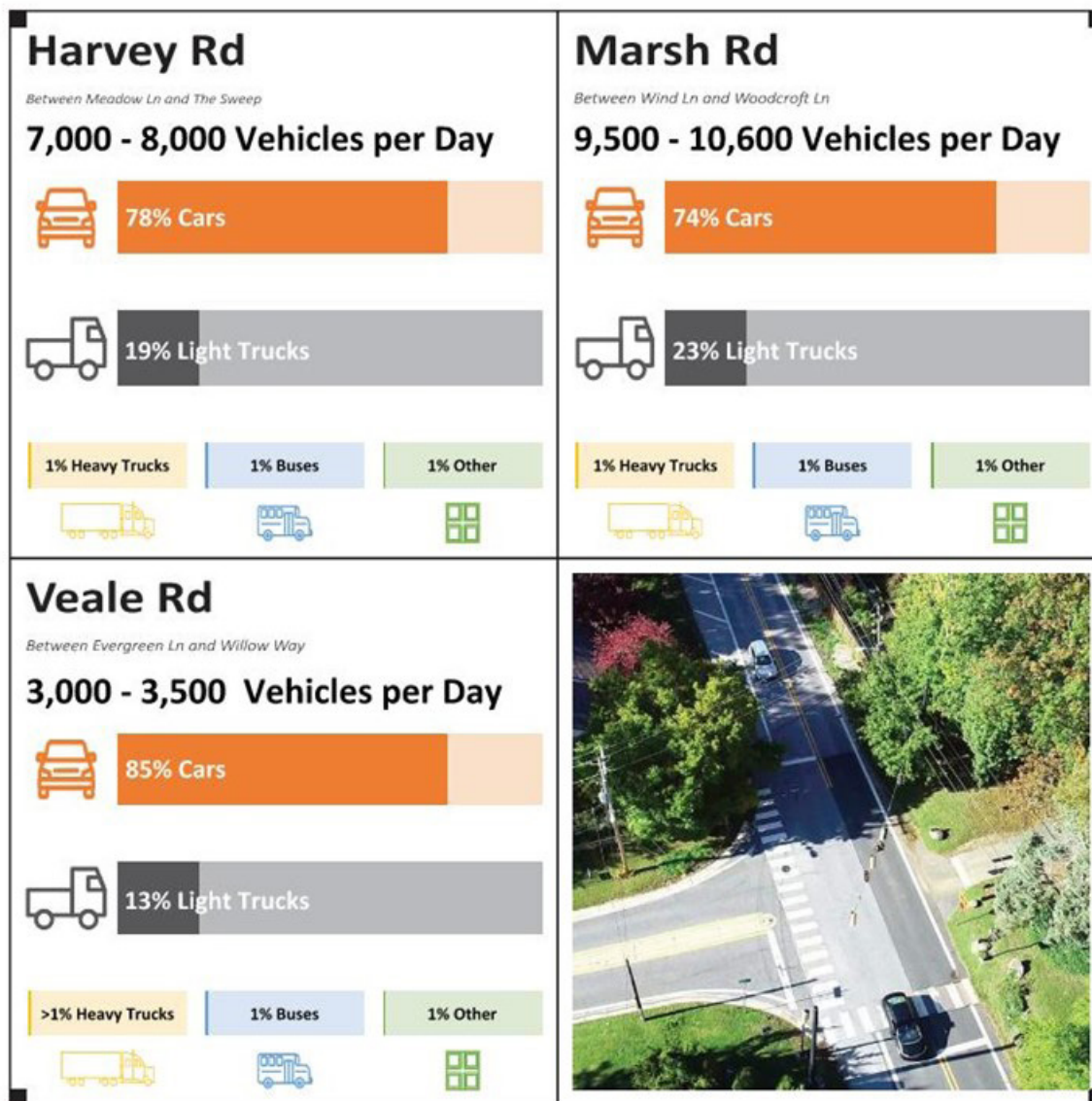


FIGURE 10: DISTRIBUTION OF VEHICLE TYPE ALONG SAMPLED ROADWAYS

### Traffic Conditions

In October 2022, the Consultant Team collected traffic data along Harvey Road, Marsh Road, and Veale Road, capturing both traffic volumes of vehicles and pedestrians/bicyclists. The tube counters collected both vehicle classification and traveling speed as well.

### Traffic Volumes

Marsh Road experienced the most usage with 9,500 to 10,600 vehicles per day. Harvey Road experienced 7,000 to 8,000 vehicles per day. Veale Road experienced the least volume with 3,000 to 3,500 vehicles per day.

For each of the three locations, cars represented the highest percentage of usage. Veale Road traffic had the highest percentage of cars at 85%. Light trucks included pickup trucks and two axle six tire trucks. Marsh Road had the highest percentage of light trucks at 23%. Heavy trucks were classified as three axle, four axle or six axle trucks. Heavy trucks accounted for 1% or less at each location. Buses accounted for 1% of vehicles at each location. Buses included school buses and DART transit.

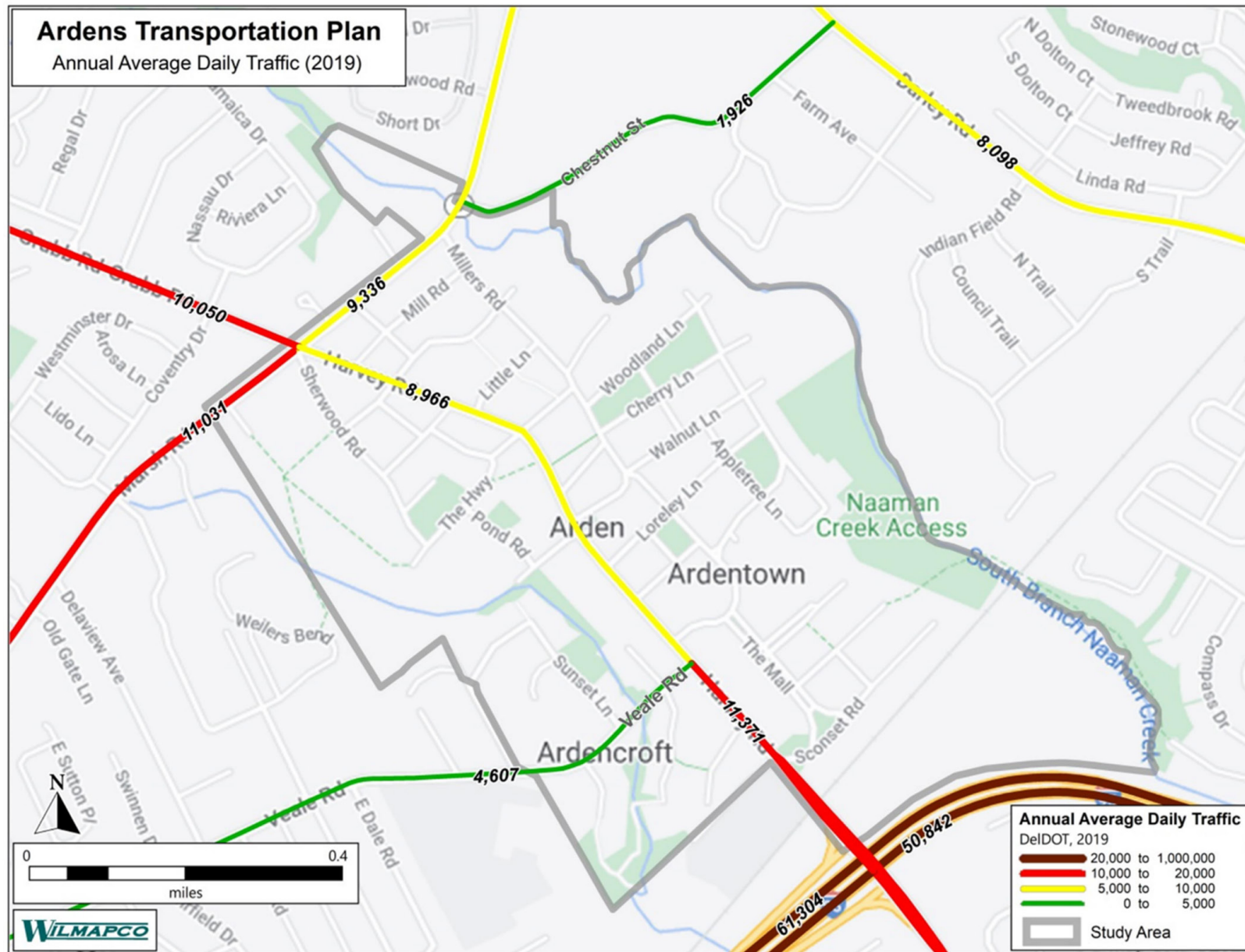
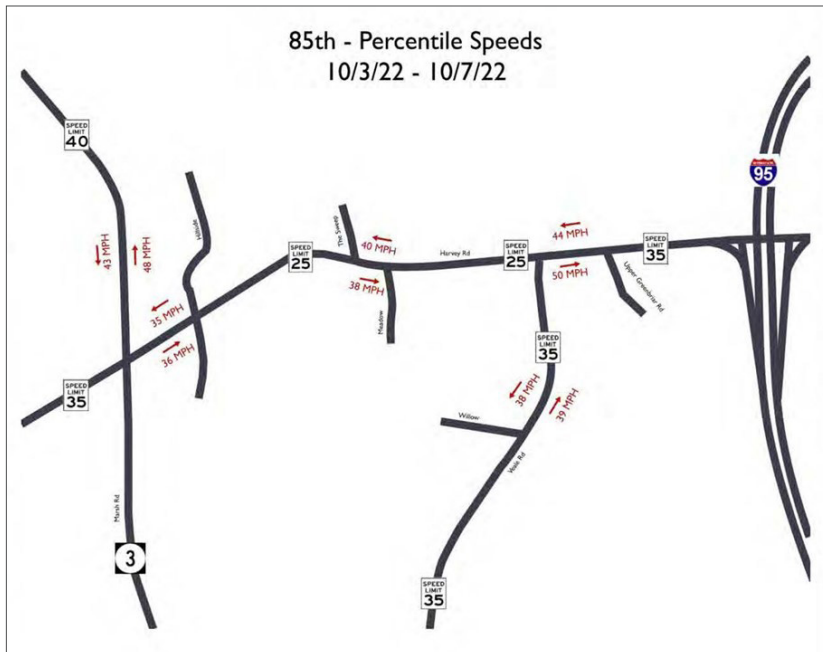
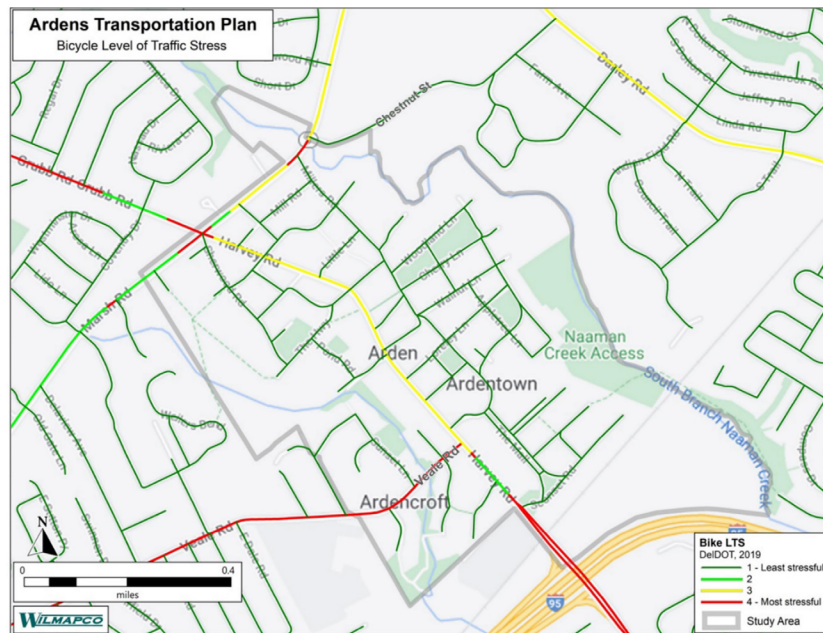


FIGURE 11: ANNUAL AVERAGE DAILY TRAFFIC VOLUMES IN THE ARDENS





**FIGURE 12: OBSERVED 85TH PERCENTILE SPEEDS**



**FIGURE 13: BICYCLE LEVEL OF TRAFFIC STRESS IN THE ARDENS**

## Travel Speeds

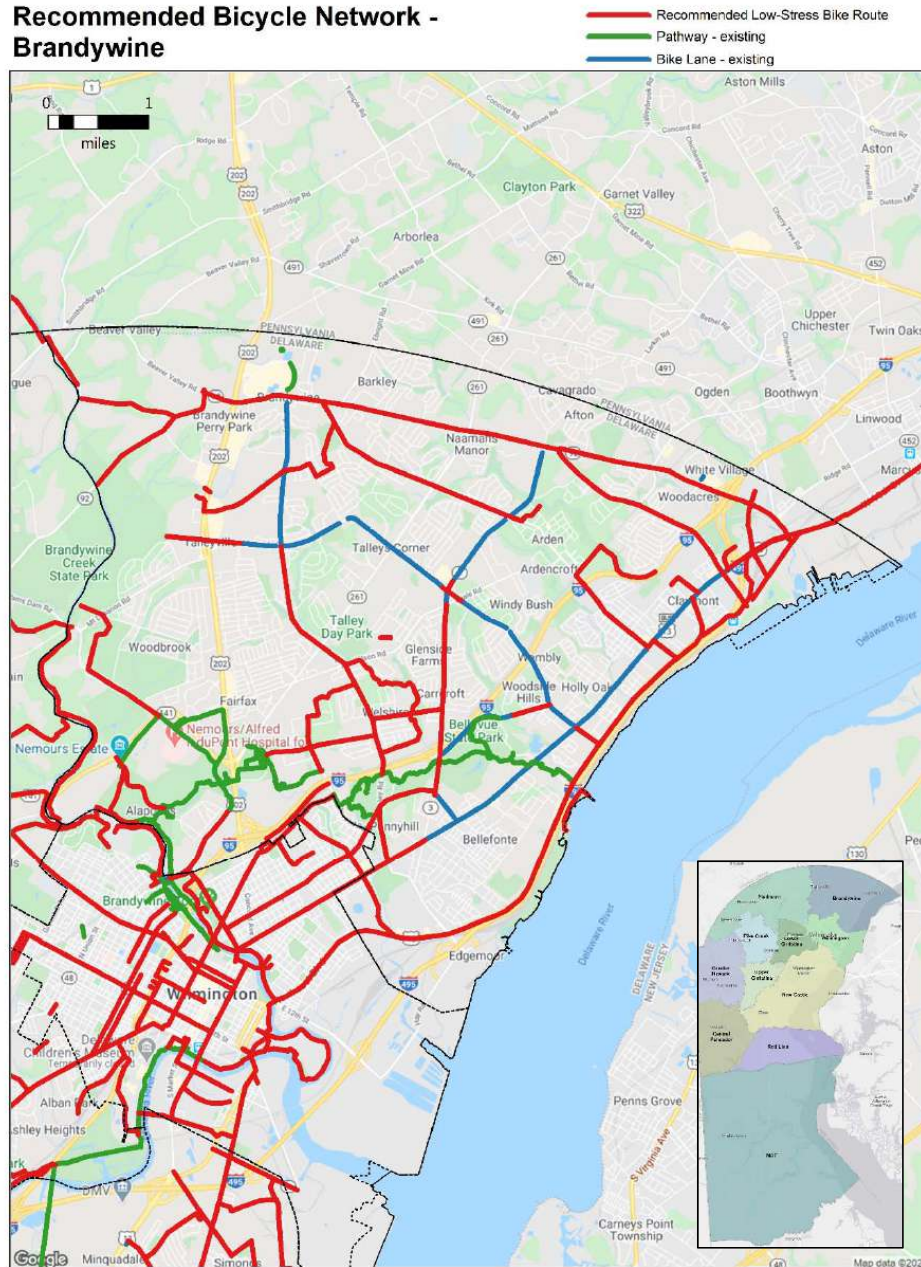
Given a prevailing concern about speeding throughout the Study Area, vehicle travel speeds were derived from the automatic traffic recorders. This data is summarized to the 85th percentile, which is customary to traffic engineering principles, in Figure 9. These speed results confirmed a speeding problem, especially along Harvey Road, where 85th percentile speeds were 15 to 25 mph above the posted speed limit of 25 miles per hour. Observed travel speeds along Marsh Road and Veale Road were closer aligned with the posted speed limits.

## Bicycle Level of Stress

Bicycle Level of Stress (BLTS) is a measurement of how stressful roads are for bicycling, traffic speeds, traffic volumes and the number of lanes. In 2019, DeIDOT developed method for measuring bicycle level of stress. Each road segment is ranked based on a 1-4 range from 1 (being the least stressful) to 4 (being the most stressful) using factors like traffic volume, speed limit, and roadway/shoulder width. Figure 7 displays the bicycle level of stress for the Ardens.

The highest level of stress, shown in red can be found at the intersection of Marsh and Harvey, I-95 interchange, and along Veale Road. On Harvey Road, the level of stress varies between BLTS 4 and BLTS 3. Local roads within the Ardens are scored as BLTS 1 (least stressful) due to low traffic volumes.

## Recommended Bicycle Network - Brandywine

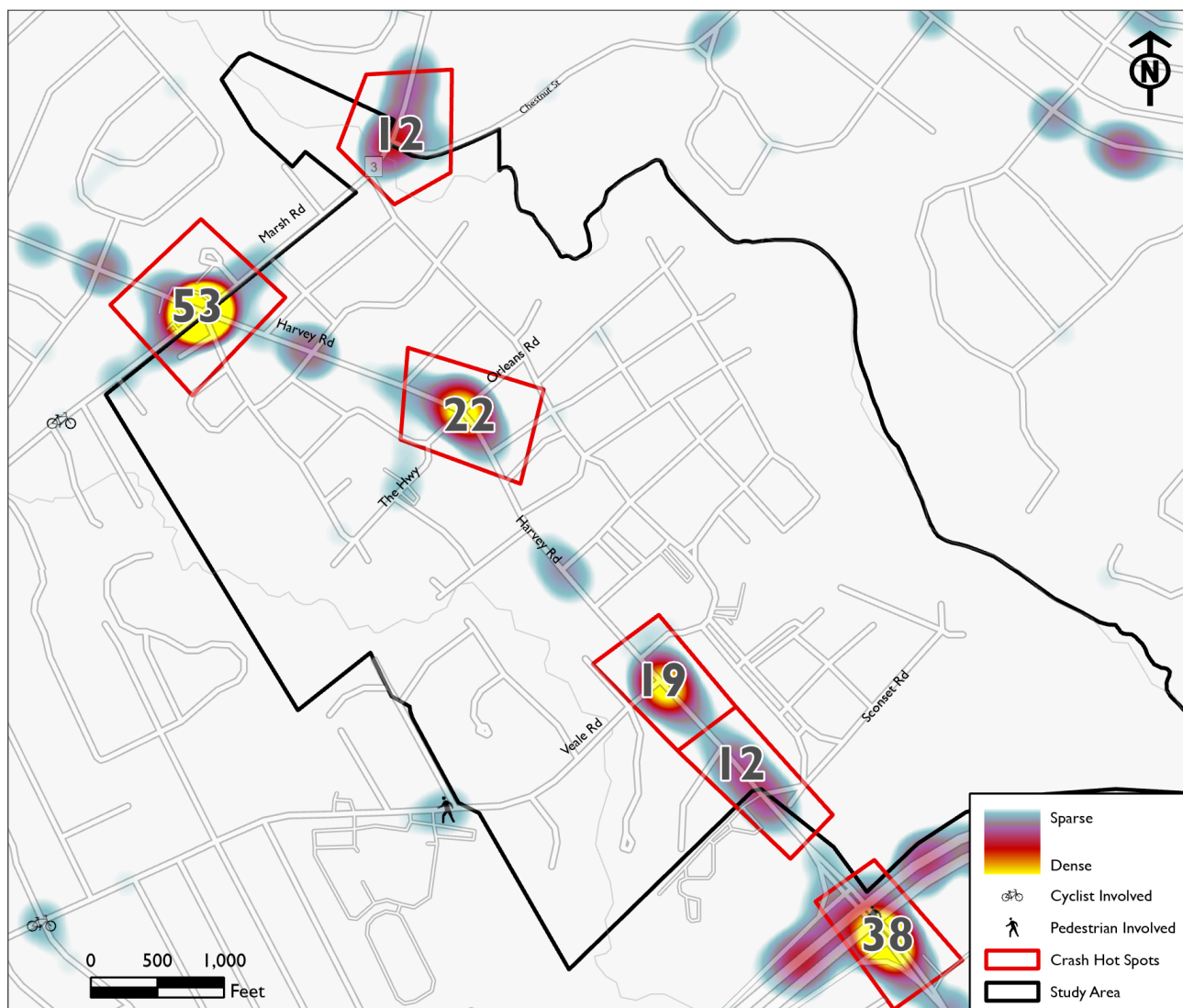


### New Castle County Bicycle Plan context:

Endorsed in 2020, the New Castle County Bicycle Plan provides a multimodal planning framework for regional bicycling connections. Specific to the Ardens, a bike lane currently exists on Marsh Road. The New Castle County Bicycle Plan recommends bicycle improvement along Harvey Road to connect Claymont up to Sconset Road as well as improvements from Hillside Road up to Naamans Road. The proposed network leaves a gap along Harvey Road within the immediate Ardens area. This gap is recommended to be filled-in through the development of low-stress bicycle routes running parallel to Harvey Road through the Ardens.

FIGURE14: RECOMMENDED BICYCLE NETWORK - NEW CASTLE COUNTY BICYCLE PLAN





**FIGURE 15: CRASH HOTSPOTS (2017 - 2022)**

### Crash Analysis

Reportable crashes (2017-2022) were mapped to identify crash hotspots, as displayed in Figure 11. The greatest concentration of crashes occurred around the Marsh Road/Harvey Road intersection. Notably, in 2022, DeIDOT completed an intersection improvement project at Marsh Road/Harvey Road, so this concentration of crashes is expected to dissipate significantly over time. Other clusters of crashes included the I-95/Harvey Road interchange (38 crashes), Harvey Road at Orleans Road (22 crashes), Harvey Road at Veale Road (19 crashes), Harvey Road from Sconset Road to Upper Greenbriar Road (12 crashes), and Marsh Road at Chestnut Street (12 crashes).

### Sidewalks and Paths

The Ardens are well served by paths which traverse throughout the Ardens. This network of paths cross Harvey Road at nine locations along the one-mile stretch of Harvey Road, with three of these locations at signalized intersections and the balance (6) at unsignalized intersections. Pedestrian amenities along the main roadways (Harvey Road, Veale Road, and Marsh Road), however, are extremely limited.

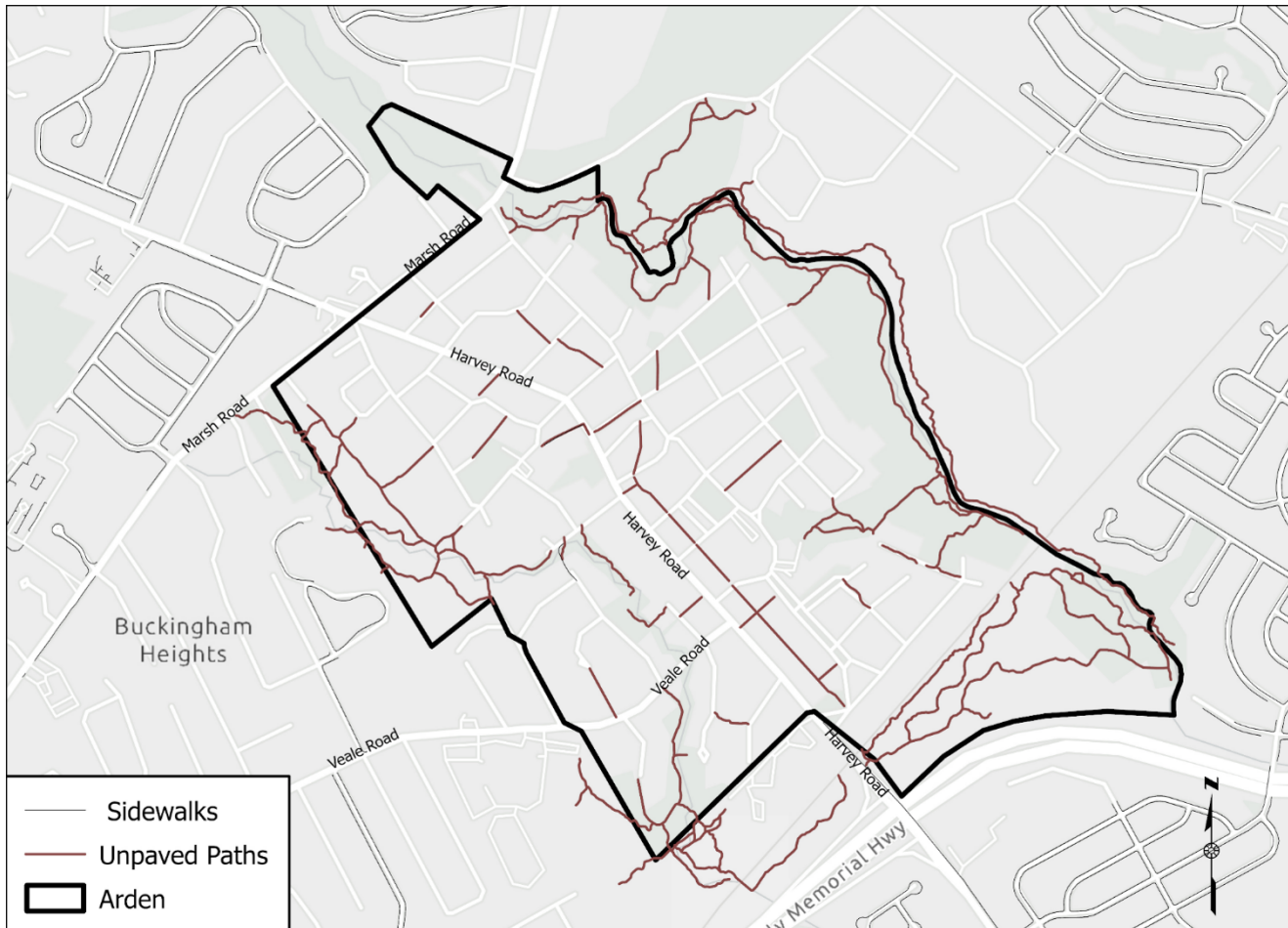


FIGURE16: EXISTING SIDEWALKS AND PATHS







**FIGURE 17: EXISTING BUS ROUTES**

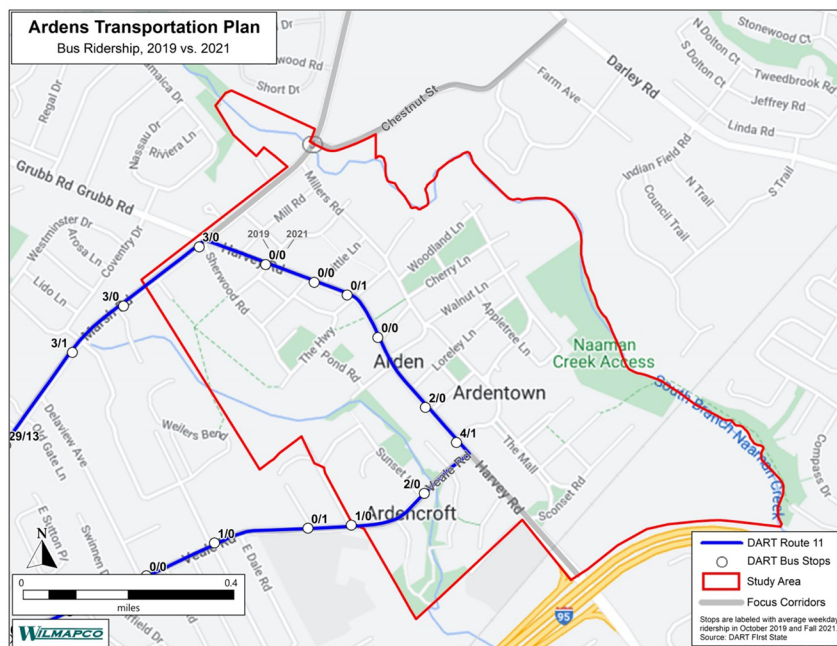
## Public Transportation

The Ardens is served directly by DART's Route 11, which runs from downtown Wilmington to the Ardens. The Route 11 operates in a loop using Marsh Road, Harvey Road, and Veale Road.

Additional transit service is provided along Foulk Road (Route 18) and Naamans Road (Route 61), however, these routes do not serve the Ardens directly.

Average daily ridership on the Route 11 in the Ardens was approximately 12 boardings per weekday in October 2019 (before the Pandemic). Ridership levels through the Pandemic and post-Pandemic have fallen to below five (5) boardings per weekday.

Given these levels of transit ridership, the Connecting with the Ardens plan considered alternative service delivery options such as microtransit and improved pedestrian connections.



**FIGURE 18: BUS RIDERSHIP**

# The Public Pulse

Community feedback was a critical driver throughout the development of the Plan, which kicked off with the WILMAPCO-led Walkable Workshop in August 2022. The public engagement during the Connecting with the Ardens plan included two public surveys, three community meetings, and a kids-oriented workshop as part of the second community meeting.

## Walkable Community Workshop

On August 8, 2022, WILMAPCO held a walkable community workshop to hear from residents about walkability and safety concerns. There were a total of 37 attendees. Part 1 consisted of a presentation on elements of a walkable community. In Part 2, participants surveyed the area and identified issues and opportunities. Part 3 involved participants mapping and sharing ideas on how to improve walkability. Participants identified their priority concerns, which included traffic speeds on Harvey Road and Veale Road, the transition from I-95 along Harvey Road into the Ardens, lack of lighting at night, lack of safe pedestrian crossings, lack of pedestrian push buttons at crossings, flooding, and drainage issues on paths as well as access to bus stops.







### Public Survey #1

A first community survey was conducted in November 2022 with the primary purpose of collecting community feedback on key issues and the Plan's goals. The survey, which was posted on WILMAPCO's project website and shared through email and social media, received 145 responses.



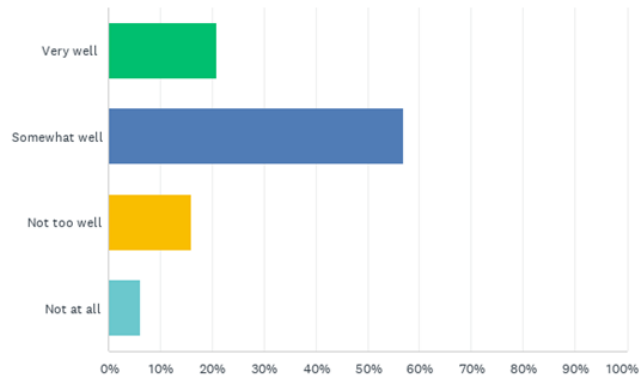
### THE HIGHLIGHTS OF SURVEY #1 INCLUDED:

145 total responses

Respondent Profiles

- 38% were residents of Arden (55).
- 26% were residents of Ardencroft (37).
- 21% were residents of Ardentown (31).
- 3% were resident in between the Ardens (5).
- 12% were residents outside the Ardens (17).

### Q3 How well do you feel the transportation system in the Ardens meets your travel needs?



When asked about the current transportation system in the Ardens, 57% of respondents felt that their transportation needs were met “Somewhat well”. 21% of respondents felt that the existing conditions met their needs “Very Well.” 16% of the respondents felt that their travel needs were “Not too well” met. 6% did not believe that their travel needs are being met.

The kid’s survey (launched concurrent with Survey #2) revealed similar sentiment from the community youth. Two-thirds of respondents felt their transportation needs were being met “Somewhat well”.

#### KID’S SURVEY

### Q3 How well do you feel the transportation system in the Ardens meets your travel needs?

Answered: 18 Skipped: 0

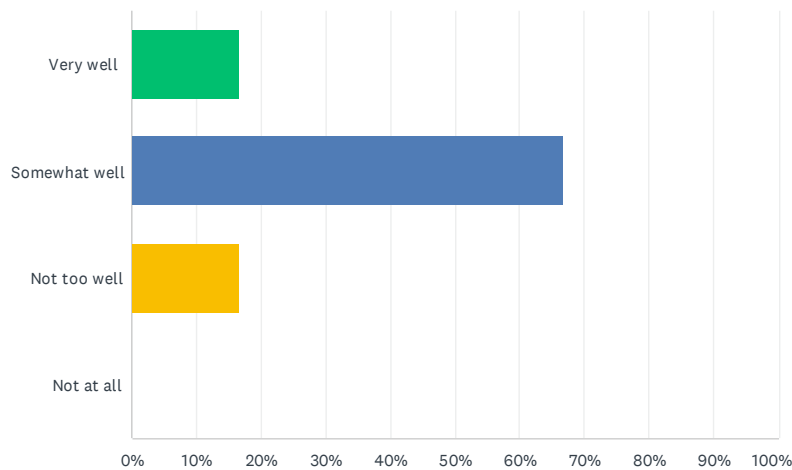


FIGURE 19: SURVEY RESPONSES

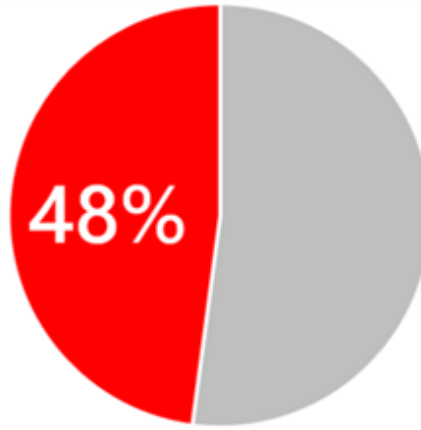


## Very or Extremely Concerned with Speeding and Safety

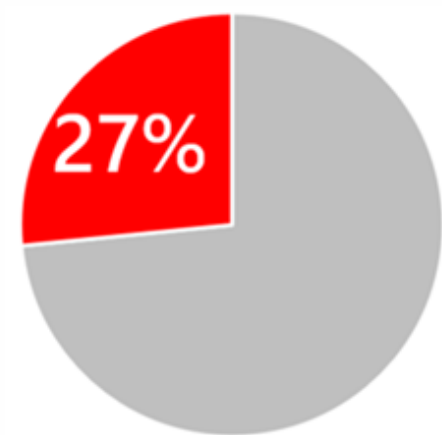
Harvey Road



Veale Road



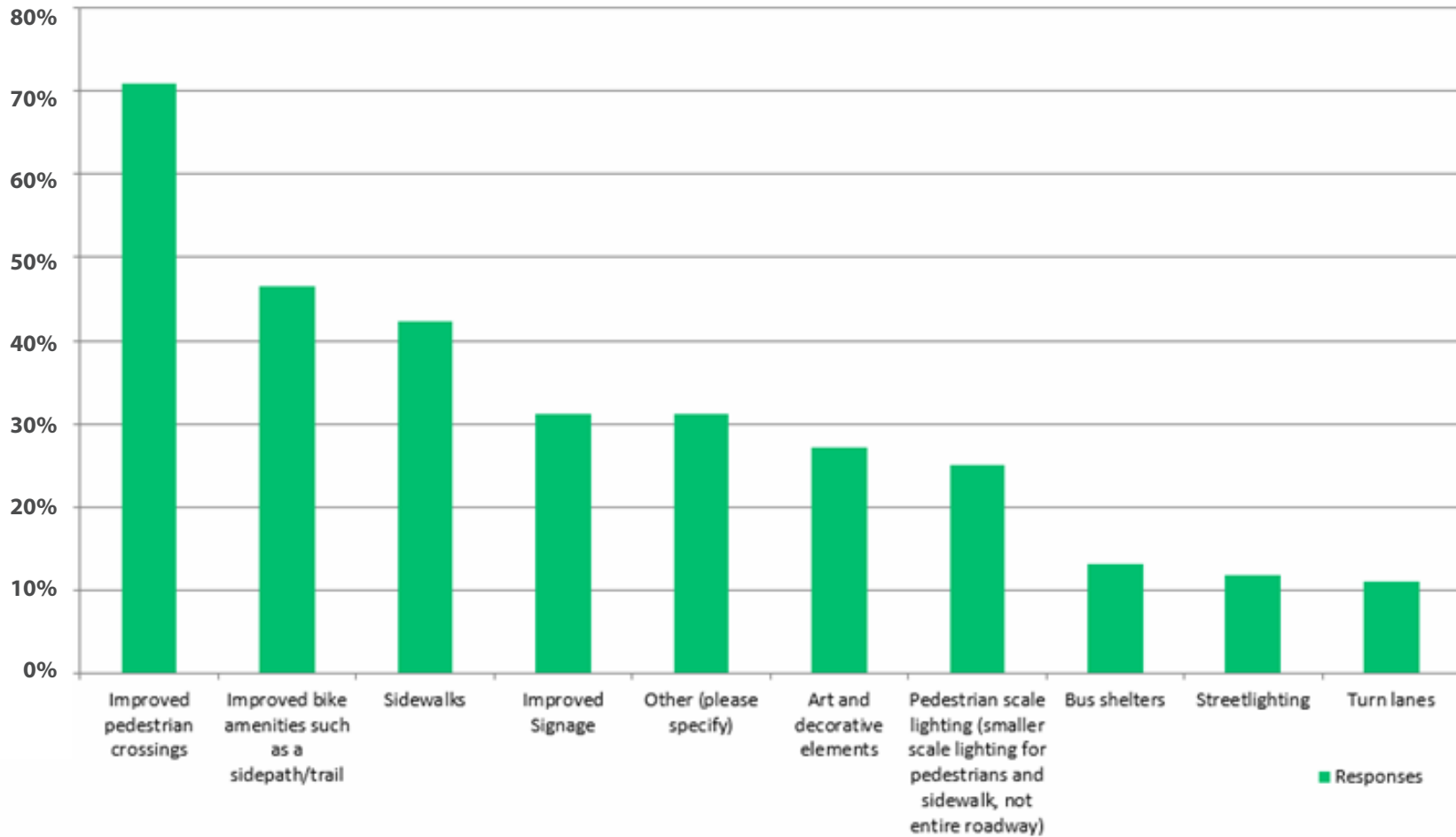
Marsh Road



Respondents were most concerned about the safety and speeding along Harvey Road. These responses generally align with the vehicle speed data that was collected, which showed the greatest speeding issue on Harvey Road.

Approximately half of survey respondents reported being concerned about speeding and safety along Veale Road.

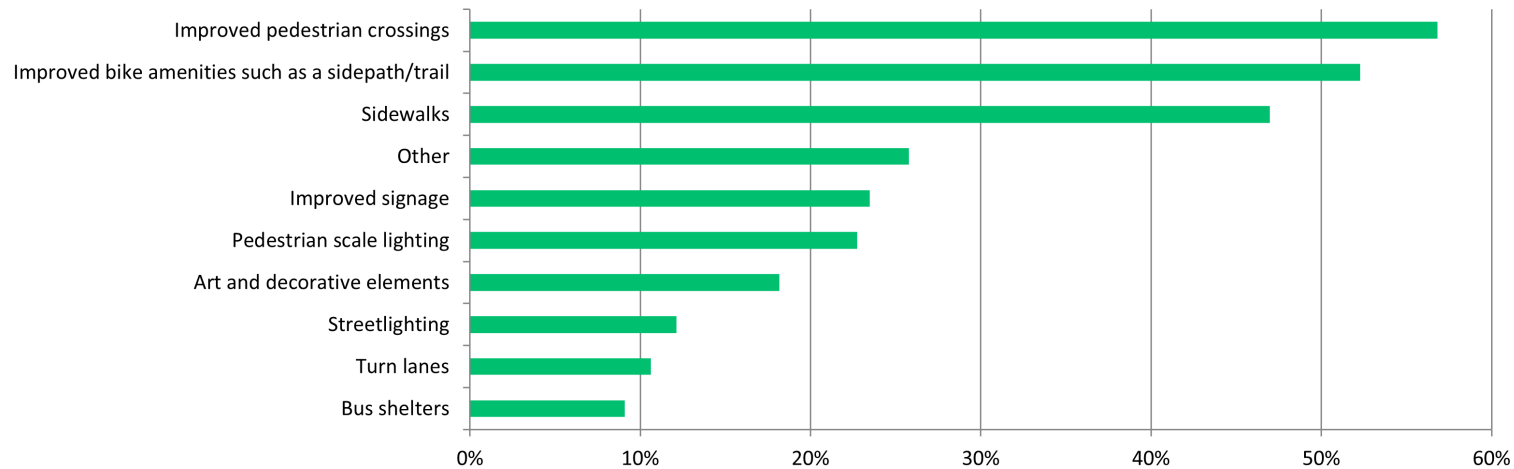
## What types of amenities would you like to see added to Harvey Road?



Respondents chose “Improved pedestrian crossings” as the top amenity that they would like to see on Harvey Road.

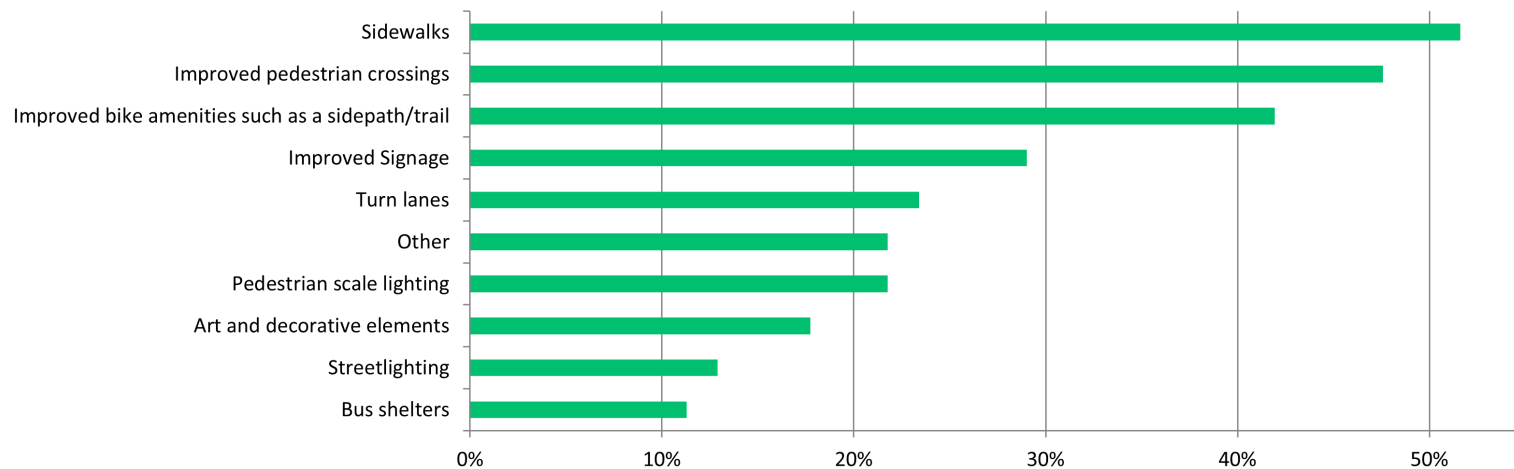


## What types of amenities would you like to see added to Veale Road?



Respondents chose "Improved pedestrian crossings" as the top amenity they would like to see on Veale Road.

## What types of amenities would you like to see added to Marsh Road?

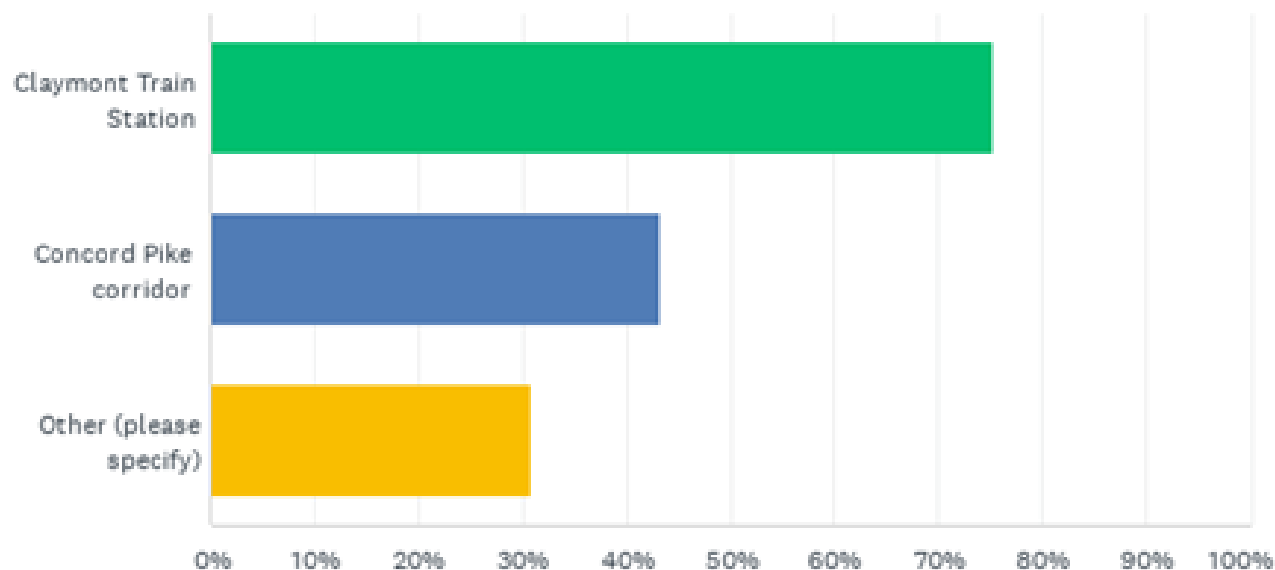


Sidewalks were the respondent's top choice for amenities on Marsh Road.





## Q16 Where would you like to be able to go on the bus?

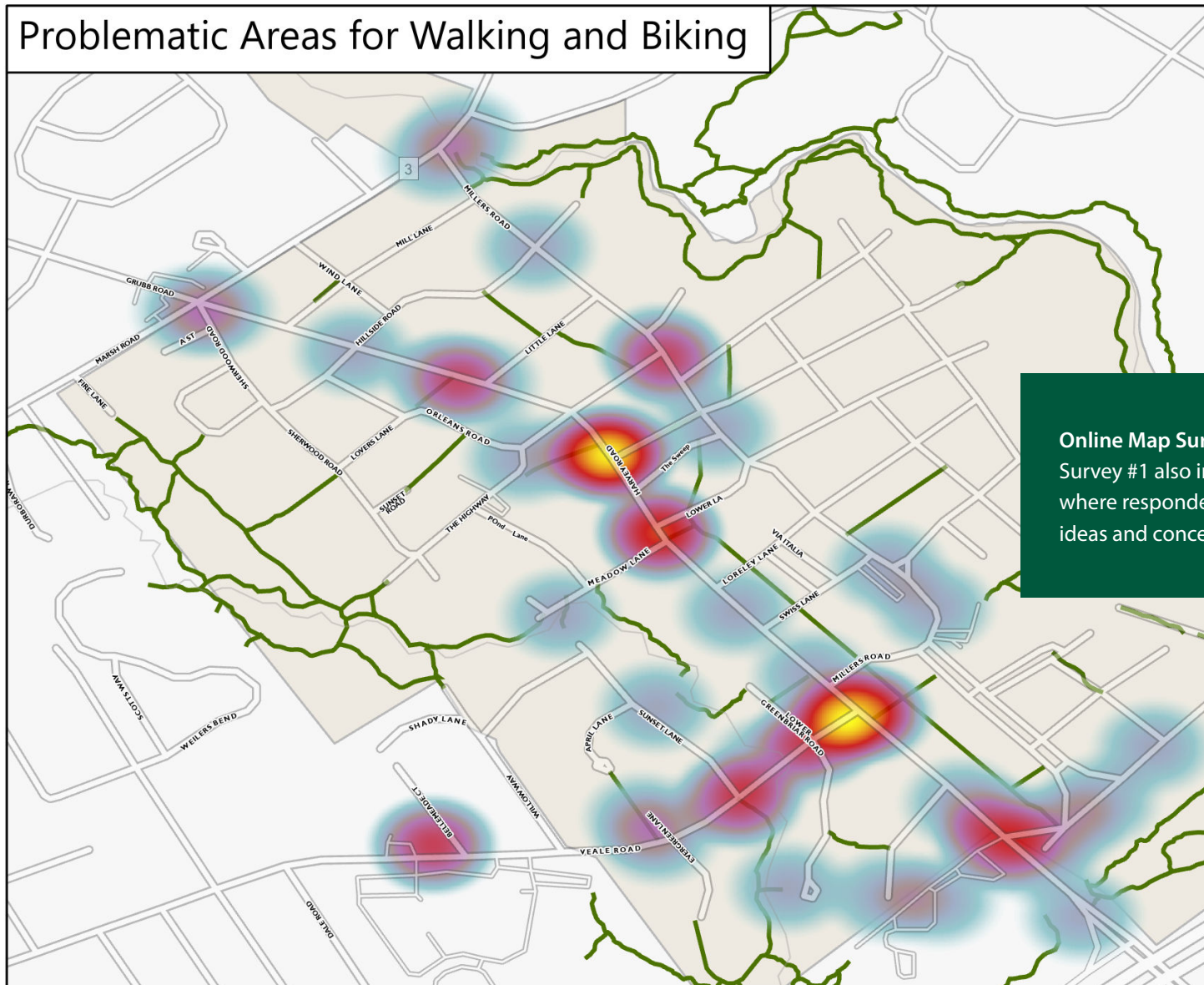


Respondents chose “Claymont Train Station” as the top destination to travel to by bus. Other responses included:

- Wilmington (downtown) / Riverfront
- Wilmington/Biden Train Station
- Marcus Hook Train Station
- Brandywine Hundred and Claymont libraries
- Branmar Plaza
- Bellevue State Park



## Problematic Areas for Walking and Biking



Online Map Survey – included in Public Survey #1  
Survey #1 also included an interactive map survey, where respondents could report location specific ideas and concerns.

**FIGURE 20: INTERACTIVE MAP RESPONSES**



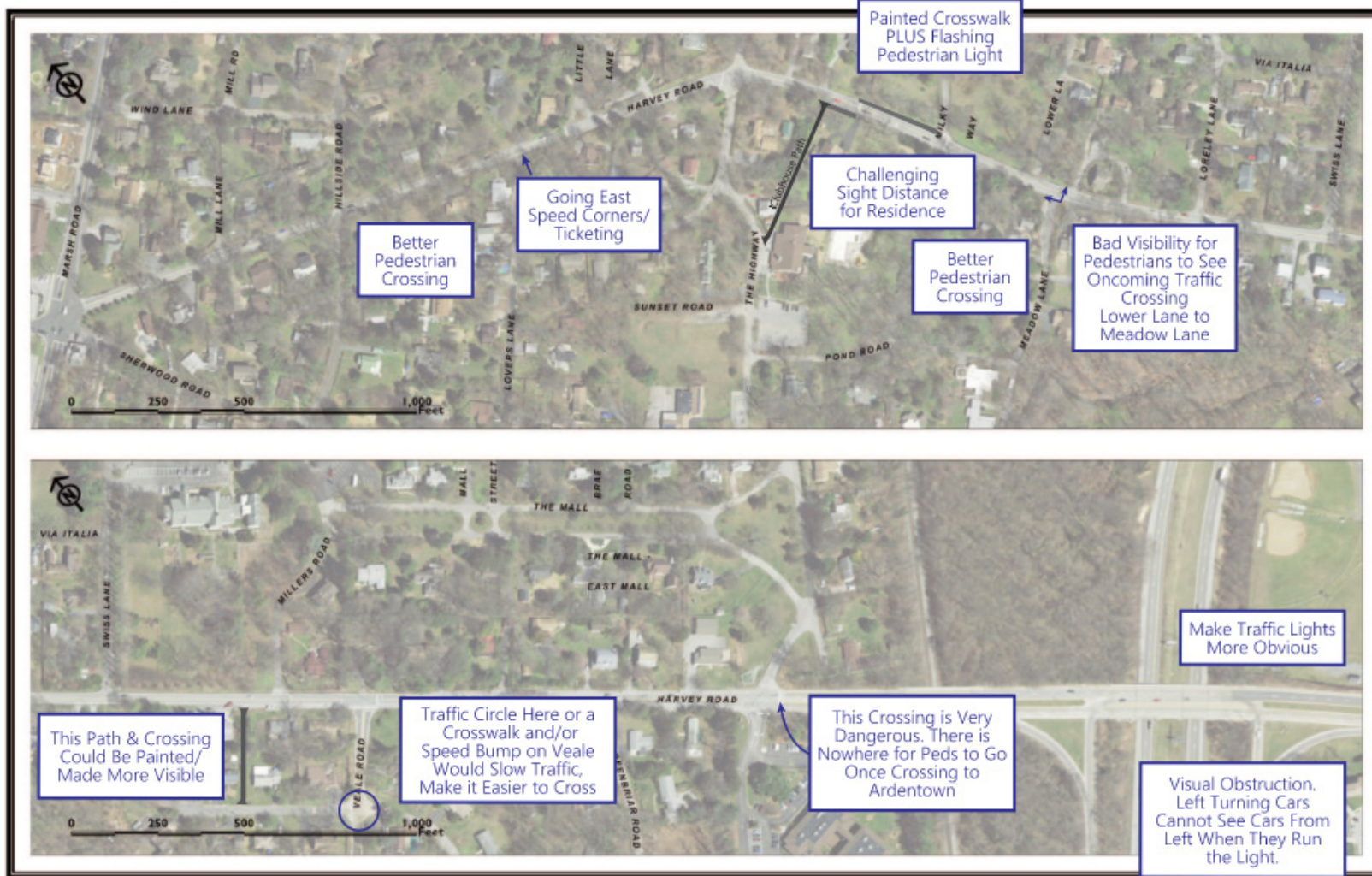
### Public Meeting #1

A first public meeting was held on Tuesday, October 25, 2022 at the Buzz Ware Community Center. Similar to Survey #1, the primary focus of the first public meeting was to collect public concerns, ideas, and suggestions.





# Harvey Road



Connecting with the Ardens | A Transportation Plan  
October 25, 2022 Public Meeting



FIGURE 21: PUBLIC MEETING #1 BOARDS



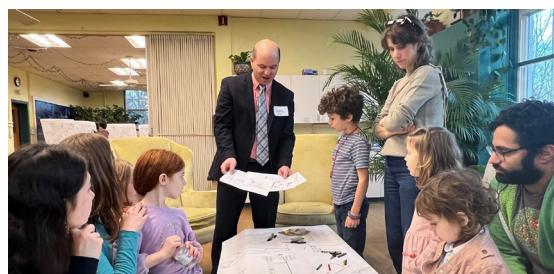
## MARSH ROAD



## VEALE ROAD





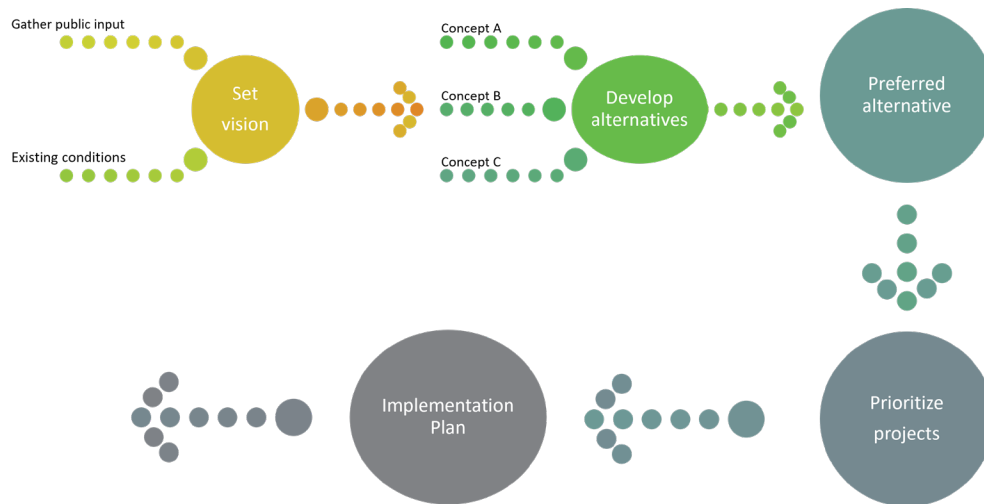


## Public Meeting #2

On February 15, 2023, WILMAPCO held a public meeting to gather feedback from participants about improvement alternatives. The meeting started with a kid's workshop. The kid's portion gave children the opportunity to share their ideas about how to improve their community. After the kids' workshop, the main meeting began. Comment boards were placed throughout the room giving participants the option of providing their feedback in writing.



# Alternatives



Working closely with the Steering Committee, the Consultant Team developed a suite of alternatives that could potentially fulfill the Plan's Goals:

- Manage vehicular travel speeds and deploy safety countermeasures
- Provide enhanced pedestrian crossings
- Develop a bicycle/pedestrian network to traverse through the Ardens
- Enhance transit and school bus stops

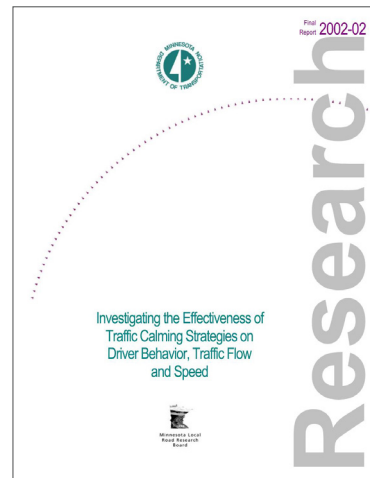
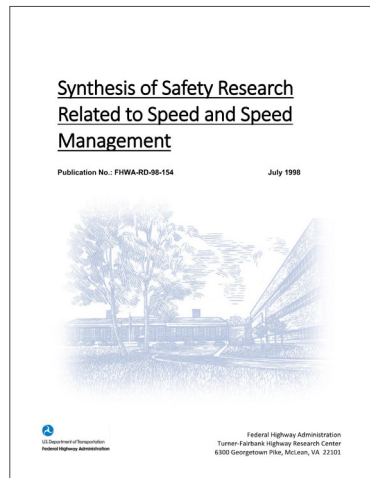
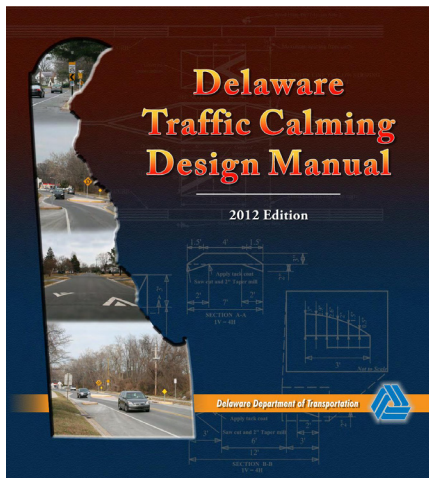
## PUBLIC FEEDBACK

### Public Survey #2

The Plan's second survey offered a video overview of the Plan's alternatives; respondents were then asked to provide their feedback on each of the Plan's Goals as well as the alternatives within each goal area.



## TAP EACH COVER FOR FURTHER RESOURCES ON TRAFFIC CALMING EFFECTIVENESS



### LINKS

[https://deldot.gov/Publications/manuals/traffic\\_calming/pdfs/Delaware\\_TrafficCalmingDesignManual.pdf?cache=1687476142022](https://deldot.gov/Publications/manuals/traffic_calming/pdfs/Delaware_TrafficCalmingDesignManual.pdf?cache=1687476142022)

[https://safety.fhwa.dot.gov/speedmgt/ref\\_mats/fhwasa09028/resources/Synthesis%20of%20Safety%20Researc...pdf](https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Synthesis%20of%20Safety%20Researc...pdf)

<https://mdl.mndot.gov/items/200202>

## GOAL #1 - MANAGE VEHICULAR TRAVEL SPEEDS AND DEPLOY SAFETY COUNTERMEASURES

Specific to the Plan's Goal 1 (traffic calming and safety), the Consultant Team applied the consensus principles which were developed and agreed upon in the early 2000's as part of a prior traffic calming plan for Harvey Road. These principles included:

- No vertical calming features
- Use of horizontal calming features
- Features will comply with DelDOT standards (mountable curb, etc)
- Use of low-level landscaping
- Traffic calming features will be traversable for emergency vehicles, school and transit buses

### Traffic Calming Principles

In general, a well-performing traffic calming plan has a traffic calming device every 500 to 750 feet in order to keep vehicles at the desirable travel speed: 25 miles per hour. Therefore, the Consultant Team proposed an interchangeable array of traffic calming concepts, which could be adapted and adjusted based on Steering Committee and community feedback.

## Traffic Calming Measures Considered

**MEDIAN ISLANDS/GATEWAY**



**BUMPOUT**



**BIOSWALE**



**MINI-ROUNDBABOUT**





3C.1 HORIZONTAL CONTROL MEASURES: *Chokers*  
(MID-BLOCK NARROWINGS)

**Description:**

A choker narrows the travel lanes of a road by bringing the existing curbs closer to the centerline of the road. The typical two-lane choker is 20 ft wide (curb-to-curb) at its most narrow point. Chokers should extend toward the centerline beyond any parking lanes. While the typical curb to curb width of a two-lane choker is significantly less than most streets, there is sufficient width for vehicles to pass each other. As a result, speed reductions will be modest.

The length of a choker can vary depending on the location of driveways and curbside parking. By bringing the curbs closer together, chokers may also present a favorable location to install a mid-block crosswalk (either raised or level with the roadway) because crossing distances are reduced, motor vehicle speeds are lower, and the combination of design elements will draw greater visual attention to the crossing location.

Chokers can be created by either curb extensions or edge islands. Edge islands are less aesthetic but leave existing drainage channels open. They also make it possible to provide bicycle bypass lanes on streets without curbside parking. If motor vehicle volumes are large, chokers can be hazardous to bicyclists, who get squeezed by passing motorists. In such cases the bicycle bypass lanes should be considered.

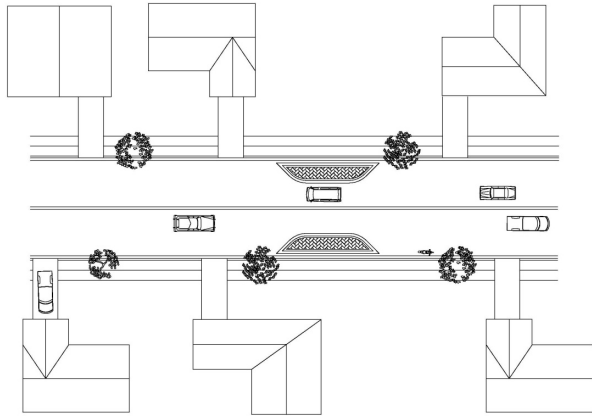


DIAGRAM OF CHOKER  
FIGURE III-9



CHOKER (Main Street, Newark)



RESIDENTIAL STREET CHOKER

**Application:**

<b>Types of Streets</b>	Chokers are appropriate for collectors, local roads and subdivision streets. Streets may be two-lane, two way streets or one lane, one-way streets.
<b>Speed Limits</b>	Speed limits on roadways utilizing chokers should be 35 MPH or less.
<b>Design Vehicles</b>	The design vehicle for a choker is primarily the same design vehicle used in the original street design. Sufficient lane width is provided for all vehicles throughout the choker.
<b>Street Grades</b>	Chokers are not recommended for installation on sections of streets with grades in excess of 6%.

**Anticipated Impacts:**

**Speed:** Speed reduction is the goal in the construction of chokers. Lane width narrowing encourages motorists to reduce their speeds through the choker. Speed reduction is dependent on the degree of narrowing, as well as the volume and distribution of traffic. Chokers are less effective when the volume of traffic is significantly higher in one direction than the other or when volumes are so low that the likelihood of a motorist encountering an opposing motorist within the narrowed area is low.

**Traffic Diversion:** A choker can contribute to the diversion of traffic from a street. The amount of traffic diversion will depend on the amount of speed reduction, the increased travel time for non-local traffic and the availability of a quicker, alternative route. As with other traffic calming applications, using a choker as one of a series of traffic calming measures will likely be more effective in reducing travel speeds along a corridor and diverting unwanted traffic from a street.

**Advantages:**

- Reduced speeds in area of choker.
- Minimal impact to driving comfort.
- Where provided, shorter crossing distances for pedestrians.
- Protects adjacent on-street parking spaces.
- Provides landscaping opportunity.
- Can accommodate emergency vehicles.

**Disadvantages:**

- Only a modest reduction in vehicle speeds can be expected, unless chokers are used in conjunction with other speed reduction measures.
- Loss of on-street parking.

**Design Considerations:**

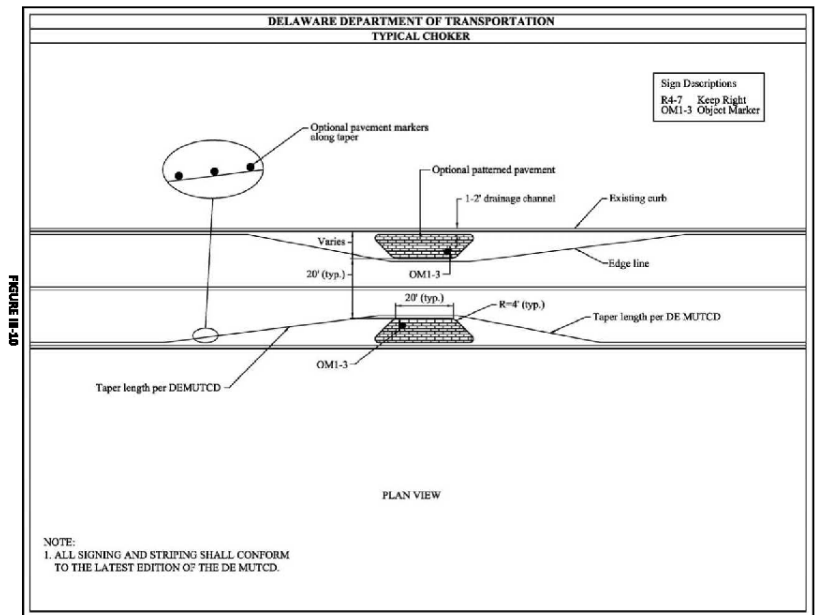
- Mid-block locations near streetlights are preferred.
- To comply with the International Fire Code that has been adopted by Emergency Services, the minimum street width between the choker islands shall be 20 feet.
- Consider bicyclists during the design process. On streets with little bicycle traffic and/or low motor vehicle volumes, the probability of vehicles and bicycles meeting at the choker is sufficiently low enough to require no special accommodation of bicycles. On wider streets with higher volumes, bypass lanes for bicycles, separated from the main travel lanes by the curb extensions may be considered.
- Edge line tapers should conform to the DE MUTCD taper formulas.
- The curb extensions that create the choker (narrowings) should include signs compliant with the DE MUTCD and/or landscaping that draw attention to them. However, preference should be given to low-lying, slow growing shrubs or herbaceous perennial plants to maintain adequate sight lines and minimize maintenance costs.
- The length of a choker island should be at least 20 feet, the length of a single car.

**Design Details:**

See Figure III-10

III - 40

November 2012





3C.3 HORIZONTAL CONTROL MEASURES: *Median Islands*  
(CENTER ISLAND NARROWINGS)

**Description:**  
Center island narrowings are achieved by placing a mid-block island in the centerline of the roadway, narrowing the lane width on either side of the island. The visual appearance of narrowed lanes will encourage drivers to slow down. In addition to slowing traffic, center island narrowings provide opportunities to provide a pedestrian refuge area, landscaping, or installation of gateway signs. To be most effective, the islands should be raised islands. Median treatments often incorporate textured pavements on the island itself, particularly for median islands without raised concrete islands, where textured pavements are essential in helping draw attention to the island.

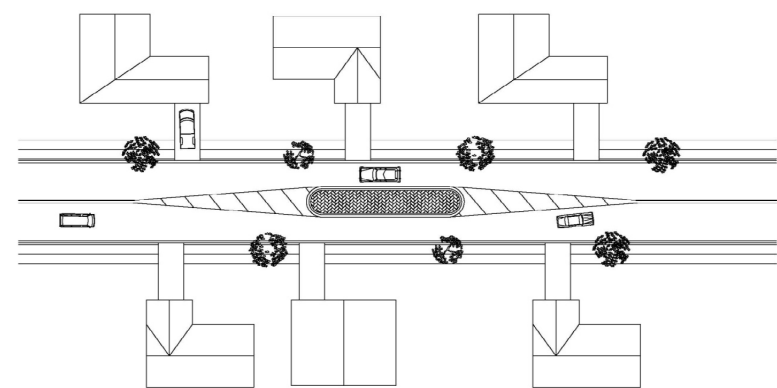


DIAGRAM OF MEDIAN ISLAND (Center Island Narrowing)  
FIGURE III-13



CENTER ISLAND NARROWING



CENTER ISLAND NARROWING (Centerville)

**Application:**

<b>Types of Streets</b>	Median islands are appropriate for arterials, urban or suburban collectors and local roads.
<b>Speed Limits</b>	Speed limits on roadways utilizing median islands should be 35 MPH or less.
<b>Design Vehicles</b>	The design vehicle for a median island is primarily the same design vehicle used in the original street design. Median islands are appropriate for streets with high volumes of transit and emergency vehicles.
<b>Street Grades</b>	Median islands are not recommended for installation on sections of streets with grades in excess of 6%.

**Anticipated Impacts:**

**Speed:** Speed reduction and pedestrian safety are the anticipated goals in the construction of median islands. Lane width narrowing encourages motorists to reduce their speeds in the area of the narrowed lanes. Speed reduction is dependent on the degree of narrowing, as well as the volume of traffic.

**Traffic Diversion:** Median islands have little effect on the diversion of traffic from a street. The amount of traffic diversion depends on the amount of speed reduction, the increased travel time for non-local traffic and the availability of a quicker, parallel route. As with other traffic calming applications, using median islands as one of a series of traffic calming measures will likely be more effective in reducing travel speeds along a corridor and diverting unwanted traffic from a street.

**Advantages:**

- Reduced speeds.
- Shorter crossing distances for pedestrians.
- If sufficiently wide enough (6 feet minimum), islands can provide a refuge area for pedestrians in middle of roadway.
- Provides a visual break in the streetscape and reduces the wide open appearance of the street.
- Provides landscaping opportunity.
- Little impact on emergency vehicles.

#### Disadvantages:

- Only a modest speed reduction can be expected from standalone installations.
- Loss of on-street parking.
- May force bicyclists into travel lanes at lane narrowing points.
- May impact driveways.

#### Design Considerations:

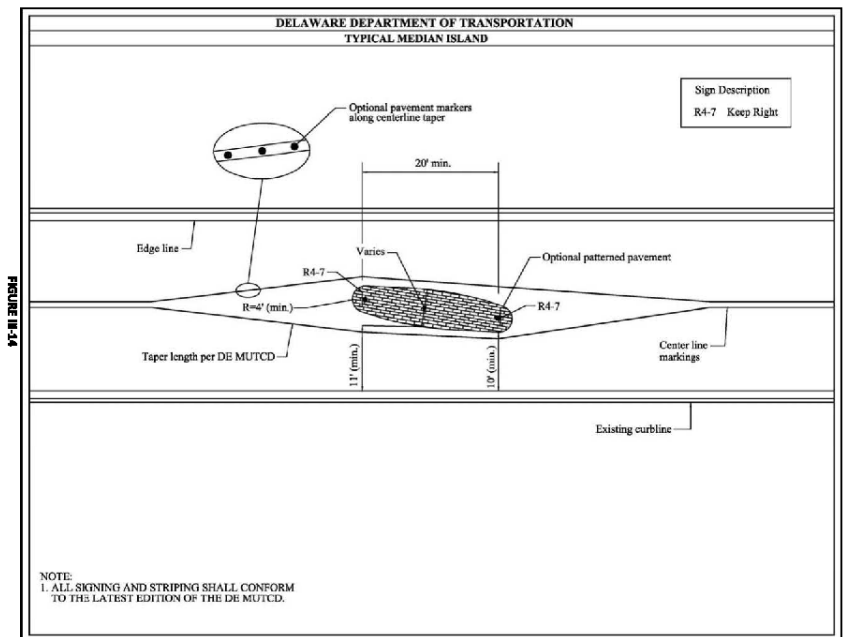
- The median islands should include DE MUTCD compliant signs to alert motorists of the presence of the median island.
- Signs may be supplemented by landscaping, however, preference should be given to low-lying, slow growing shrubs or herbaceous perennial plants to maintain adequate sight lines and minimize maintenance costs.
- Center Islands can be designed in conjunction with vertical speed reduction devices (raised crosswalks) to increase the likelihood of lower vehicle speeds and to help visually define the crossing. However, when vertical speed reduction devices are used, emergency vehicle response times should be considered.
- If a center island is wide enough (6 feet minimum), pedestrian crossings may be included in the design of a center island, since the islands can be used as refuge areas, minimizing crossing distances and allowing pedestrians to cross only one direction of traffic at a time. These pedestrian crossings can be level with the pavement (with a corresponding break in the median island), or raised, such that the pedestrian crossing is level with the sidewalk.
- If raised pedestrian crosswalks are included as a component of the median island design, care must be taken so that pedestrians with vision impairments can detect the crossing with the use of detectable truncated domes.
- Consider bicyclists during the design process. On streets with little bicycle traffic and/or low motor vehicle volumes, the probability of vehicles and bicycles meeting at the median island is sufficiently low enough to require no special accommodation of bicycles. However, at higher volumes, maintaining minimum width for bicyclists and motorists to pass safely (11 foot travel lane and a 4 foot bike lane) will need to be provided. While providing this much width is contrary to the goal of narrowing the traveled way, other visual features can be incorporated into the edge design, such as textured pavements and pavement striping to separate the bike lane from the travel lane, giving the appearance of a narrower cross section.
- Center islands should not be placed in front of driveways or in close proximity to driveways.

#### Design Details:

See Figure III-14

III - 48

November 2012





### 3C.7 HORIZONTAL CONTROL MEASURES: *Roundabouts*

#### **Description:**

Roundabouts are becoming more accepted in the United States as an intersection design that can often address capacity and safety issues in a more effective manner than installing a traffic signal or all way stop condition. Depending on the traffic operational issue, the functional class of the intersecting roads and the overall speed limit and size of the intersecting roads, roundabouts can be designed in three general sizes: full roundabouts, mini-roundabouts and neighborhood traffic circles.

Full roundabouts are primarily found on higher functional classification roads such as collectors and arterials. They are the largest in size and are designed to handle higher volumes and speeds. The full roundabout is typically sized to accommodate trucks and buses circulating around the central island and the central island is non-traversable. Full roundabouts generally do not fit within the footprint of residential collector and local roads; therefore, the Department reserves their use for the larger, higher classified roads and are not installed as a traffic calming measure in Delaware.

Mini-roundabouts and neighborhood traffic circles are small roundabouts with traversable central islands and are appropriate as a traffic calming measure to solve certain traffic calming issues. While they are similar in design, neighborhood traffic circles are smaller and, therefore, are slightly different in the way vehicles operate through them. The Federal Highway Administration's (FHWA) report *Mini-Roundabouts* defines the differences between mini-roundabouts and neighborhood traffic circles as follows:

*Mini-roundabouts are distinguished from neighborhood traffic circles primarily by their traversable islands and yield control on approaches, which allows them to function as other roundabouts do. Neighborhood traffic circles are typically built at the intersections of local streets for reasons of traffic calming and/or aesthetics. They typically are operated as two-way stop-controlled intersections and frequently do not include raised channelization to guide approaching traffic into the circulatory roadway. At some neighborhood traffic circles, left-turning vehicles must turn in front of the central island, potentially conflicting with other circulating traffic.*

Mini-roundabouts are typically intended for use on residential streets with operating speeds of 30 MPH or less. Mini-roundabouts, with yield crossing speeds of 20 MPH or less, typically require only minor modification to existing intersections. Depending on the width of the intersection and the diameter of the circular island, large vehicles (emergency vehicles and buses) may not be able to negotiate the turn around the central island. In order to facilitate those vehicles, mini-roundabouts are typically designed to include mountable concrete aprons, and with a fully traversable raised central island, so that large vehicles may be permitted to turn left over the circular island rather than going around it.

Neighborhood traffic circles have many of the same features of a mini-roundabout, except they are installed in smaller intersections and are designed to avoid modification of an existing intersection. In neighborhood traffic circles most vehicles larger than a passenger car must travel over at least a portion of the central island to make a left turn. Therefore, due to their small size, typically neighborhood traffic circles do not raise any portion of the central island and are installed without diverter islands on the approaches.

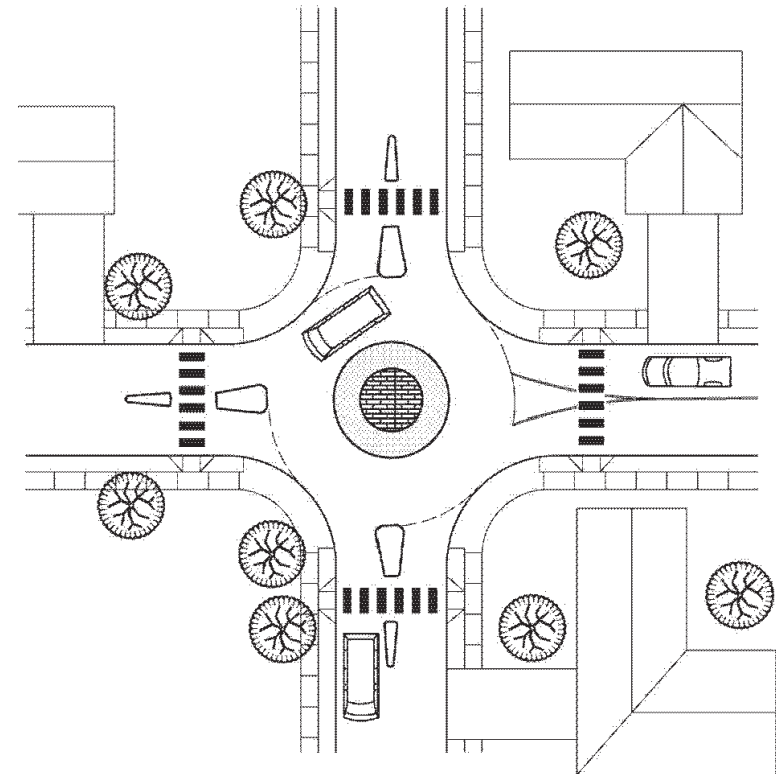


DIAGRAM OF A MINI-ROUNDABOUT  
FIGURE III-22



MINI-ROUNABOUT (Mifflin Road)



MINI-ROUNABOUT (Rose Hill Drive)

**Application:**

<b>Types of Streets</b>	Mini-roundabouts are appropriate for the junction of two lane residential collector and/or local roads that result in a single lane mini-roundabout. Neighborhood traffic circles are appropriate for the junction of two local roads where the existing intersection is too small to accommodate a mini-roundabout.
<b>Speed Limits</b>	Speed limits on roadways utilizing mini-roundabouts or neighborhood traffic circles should be 30 MPH or less.
<b>Design Vehicles</b>	The design vehicle for a mini-roundabout and the neighborhood traffic circle is the passenger car. The size of the central island is dictated by the design vehicle turning requirements, however, because of the need for larger vehicles to use local and collector streets the accommodation of larger vehicles must be considered. Typically, the center island of a mini-roundabout, though raised, is designed to be fully traversable, allowing large vehicles to turn left over or in front of the center island. Typically, no portion of the neighborhood traffic circle is raised; therefore, turns by any size vehicle can be accommodated to the same degree as the existing non-circular intersection.
<b>Street Grades</b>	Mini-roundabouts are not recommended for installation on sections of streets with grades in excess of 6%.

**Anticipated Impacts:**

**Safety:** The United States has rather limited experience with mini-roundabouts. Mini-roundabouts and neighborhood traffic circles have been used successfully in the United Kingdom with reported crash rate reductions of approximately 30% as compared to signalized intersections. FHWA is currently (2012) conducting research to evaluate the safety and operational effects of mini-roundabouts in the United States.

**Speed:** Speed reduction through mini-roundabouts and neighborhood traffic circles is largely dependent on the proper design of the approach lanes to deflect vehicles as they travel through the intersection. Without proper deflection, vehicles will be able to pass through the mini-roundabout without lowering their speed. The FHWA publication *Roundabouts: An*

**Informational Guide** provides theoretical speed profiles for an urban mini-roundabout that shows travel speeds being approximately 40% lower within the mini-roundabout than they are 350 feet away from the intersection. Since neighborhood traffic circles generally do not include diverter islands and a raised central island, speed reduction will be less. Motorists who chose to ignore the striping can easily drive over the central island and not around it.

**Traffic Diversion:** As a standalone installation, a mini-roundabout or a neighborhood traffic circle will have little effect on the diversion of traffic from a street. Traffic diversion depends on the amount of speed reduction, the increased travel time for non-local traffic and the availability of a quicker, parallel route. As with other traffic calming applications, using a mini-roundabout or a neighborhood traffic circle in a series of traffic calming measures will likely be more effective in diverting unwanted traffic from a street.

**Advantages:**

- Improved safety: a traditional four-legged intersection has 16 potential vehicle/pedestrian conflict points and 16 potential vehicle/vehicle conflict points for a total of 32 conflict points. A mini-roundabout or a neighborhood traffic circle has only 8 potential vehicle/pedestrian conflict points and only 4 potential vehicle/vehicle conflicts for a total of only 12 potential conflict points.
- Reduced speeds.
- Little right-of-way is needed for construction of a mini-roundabout and no right-of-way is required for a neighborhood traffic circle.
- Provides traffic calming and traffic control for two streets simultaneously.
- Lower maintenance cost than traffic signals.
- May reduce non-local traffic volumes.
- Mini-roundabouts or neighborhood traffic circles can be implemented for a modest cost.

**Disadvantages:**

- Emergency response times may be affected if designed for too low a speed.
- May require additional lighting.
- Potential loss of on-street parking on intersection approaches.
- Additional signing within mini-roundabout or neighborhood traffic circle and on their approaches.
- The raised islands of a mini-roundabout can force bicycles and cars closer together increasing the possibility of conflicts.
- May require curb ramps to be relocated further back along the approaches to the mini-roundabout or neighborhood traffic circle.
- Snow removal can be more difficult at mini-roundabouts than it is at conventional intersections or neighborhood traffic circles due to the raised islands.



### Design Considerations:

- The Department's preferred geometric layout for mini-roundabouts and neighborhood traffic circles is shown in Figure III-25. The travel path through the intersection has a horizontal curve radius of 95 ft., yielding a crossing speed of 20 MPH.
- The design vehicle for the preferred mini-roundabout is the passenger car. A single unit truck can pass through a treated intersection, but in most cases will need to mount the apron of the center island. Larger trucks and buses may have to traverse a portion of the center island when passing through a mini-roundabout, and generally cannot make left turns by circulating counterclockwise around the center island. Instead they must travel over the center island at a slow speed. The design vehicle for a neighborhood traffic circle is the passenger car. Most other vehicles will need to cross at least a portion of the central island to make a left turn.
- The typical mini-roundabout has a raised circular, traversable, center island while the neighborhood traffic circle does not.
- The center island of a mini-roundabout and a neighborhood traffic circle must be a different pavement type than the surrounding roadways to increase their visibility. Most often concrete or textured pavements are used to distinguish the central island from surrounding (mostly hot-mix) pavements. This pavement will be raised for mini-roundabouts and at existing street grades for neighborhood traffic circles.
- For drainage, the circulating lane of a mini-roundabout will ordinarily slope away from the center island of the traffic circle at a slope of 1 to 2 percent. Neighborhood traffic circles maintain all existing street grades and drainage is typically not an issue.
- Mini-roundabouts and neighborhood traffic circles are deployed at four-way intersections, since this is where the greatest safety benefits will be realized. If a mini-roundabout or neighborhood traffic circle is designed for a T-intersection, curbs should be either extended at the entrance and exit to the intersection or indented within the intersection to ensure adequate deflection of the vehicle path along the top of the T.
- If provided, crosswalks at mini-roundabouts and neighborhood traffic circles should be constructed in accordance with the guidance provided in the DE MUTCD for roundabouts with the appropriate setback from the yield line.

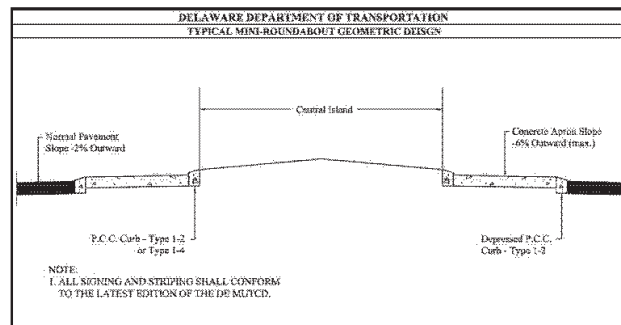


FIGURE III-23

Goal 1: Manage vehicular speeds and deploy safety countermeasures

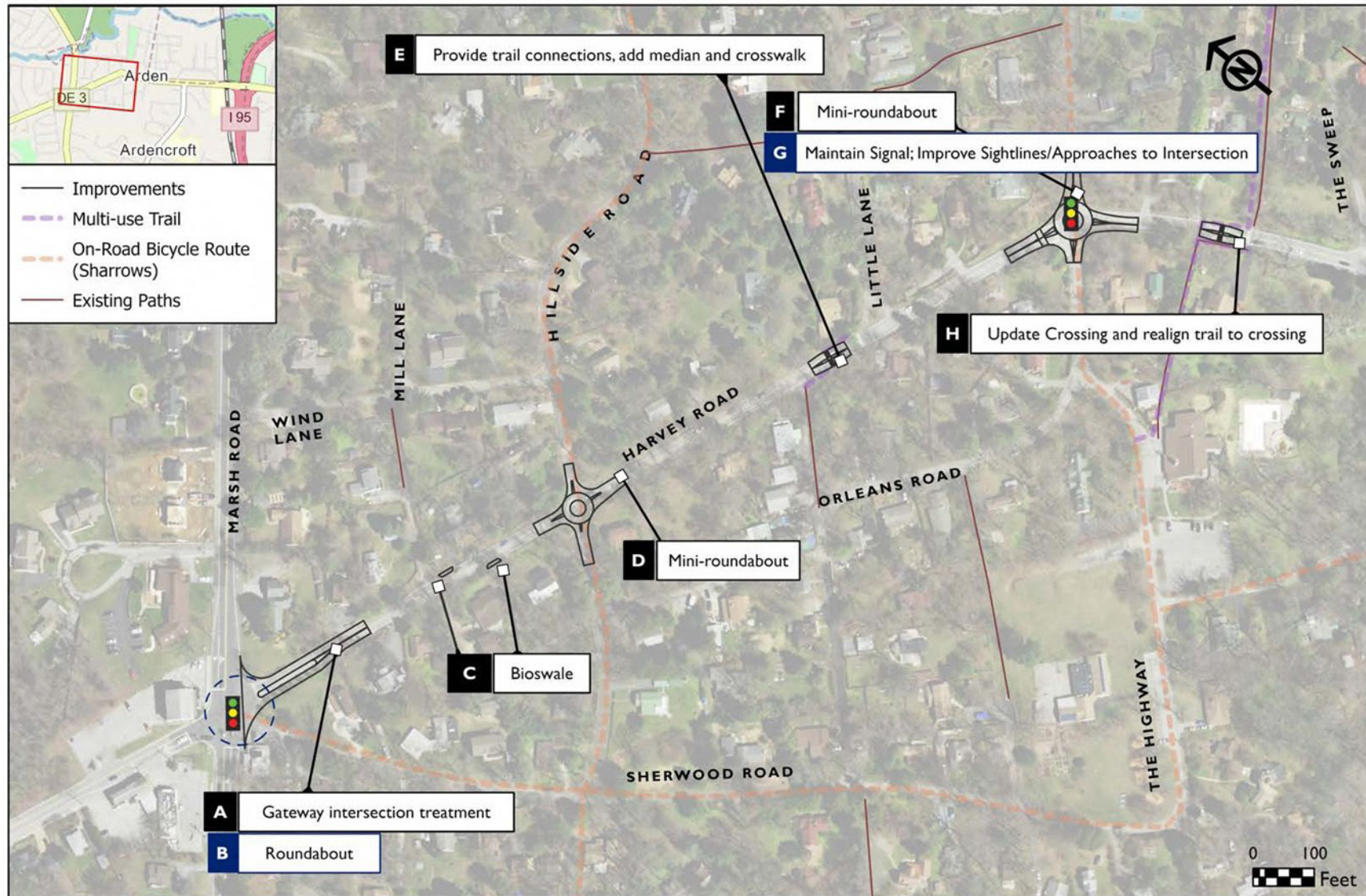
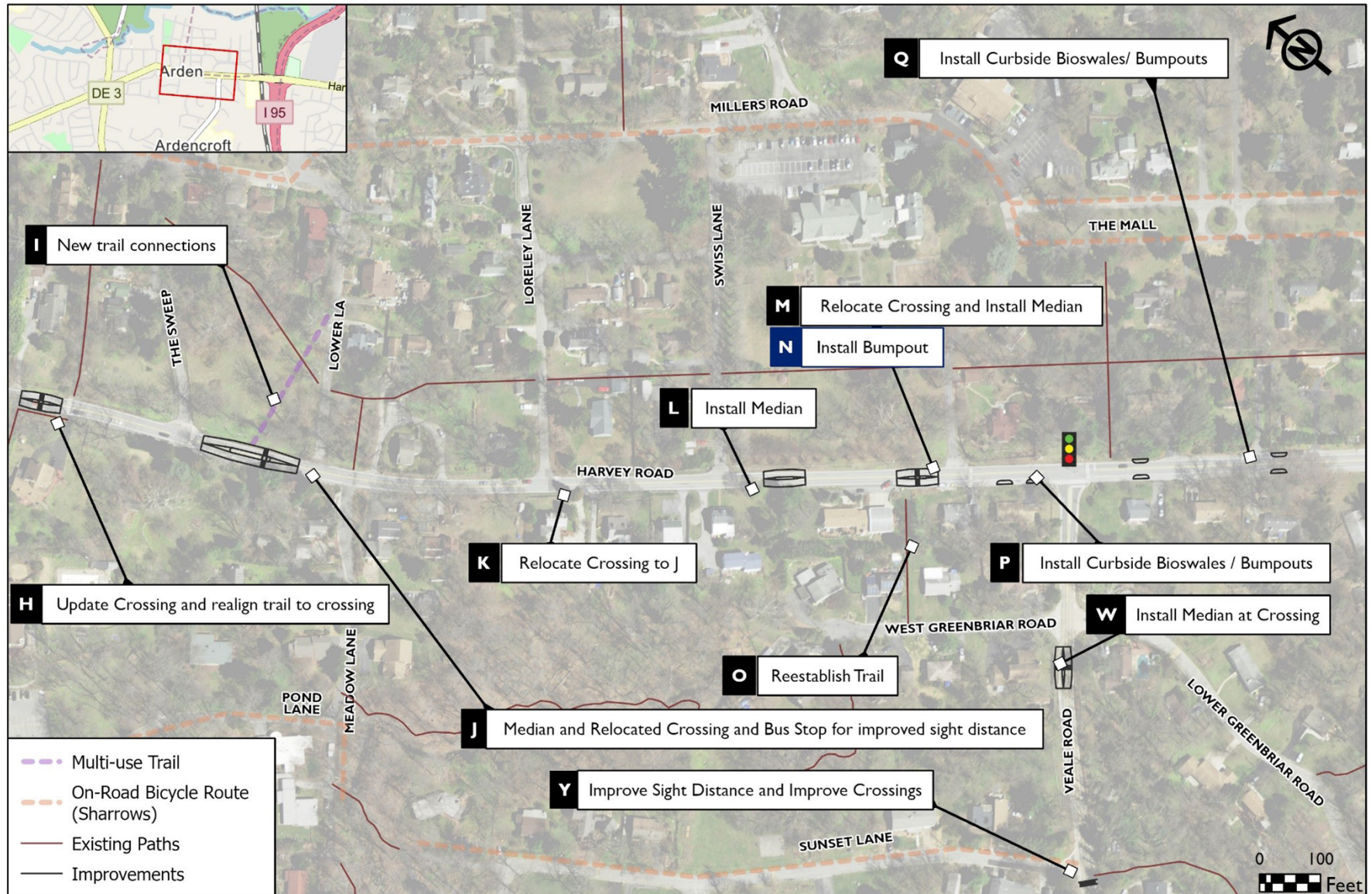


FIGURE 22: INITIAL ALTERNATIVES CONSIDERED



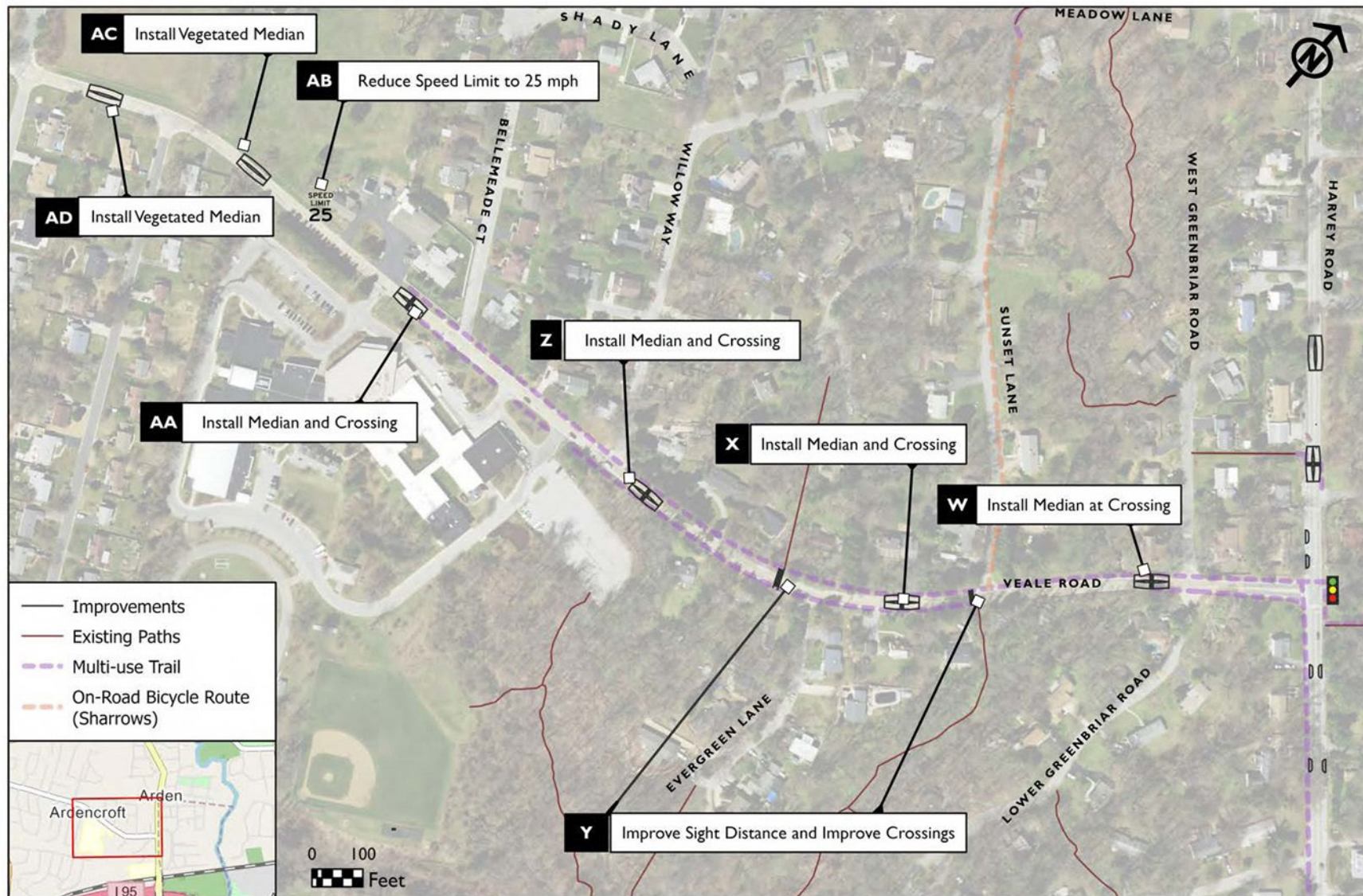








Goal 1: Manage vehicular speeds and deploy safety countermeasures



## Public Feedback

A total of 87 responses provided feedback on the Plan's alternatives. This included 42 responses from Arden residents, 17 responses from Ardencroft, 16 responses from Ardentown, and 1 response from the unincorporated New Castle County portion of the Study Area. At the direction of the Steering Committee, feedback is only reported from residents where each improvement is physically located.

LOCATION	LIMITS	ID	DESCRIPTION	ARDEN	NEW CASTLE	ARDENTOWN	ARDENCROFT	SUPPORT %	NEUTRAL %	OPPOSED %	NOT SURE %
Harvey Road	at Marsh Road	A	Gateway (median, sign, landscaping)	×				55%	17%	24%	5%
	at Marsh Road	B	Roundabout	×				19%	17%	60%	5%
	Mill Lane to Hillside Road	C	Bioswale	×				53%	23%	20%	5%
	at Hillside Road	D	Mini-roundabout	×				48%	5%	43%	5%
	Lovers Lane to Little Lane	E	Trail Crossing	×				55%	19%	19%	7%
	at Orleans Road	F	Mini-roundabout	×				38%	8%	53%	3%
	at Orleans Road	G	Maintain signal / improve geometry	×				64%	24%	10%	2%
	at Clubhouse Path	H	Update pedestrian crossing	×				77%	13%	8%	3%
	The Sweep to Lower Lane	I	New trail connections	×				45%	31%	19%	5%
	Lower Lane to Meadow Lane	J	Crossing / Median	×				60%	14%	19%	7%
	at Lorely Lane	K	Relocate crossing		×	×		47%	34%	13%	6%
	south of Swiss Lane	L	Install median			×	×	73%	12%	9%	6%
	north of Millers Road	M	Relocate crossing/install median			×	×	79%	6%	9%	6%
	north of Millers Road	N	Install bumpout			×	×	72%	19%	9%	0%
	north of Millers Road	O	Reestablish Trail			×	×	88%	6%	6%	0%
	Millers Road to Veale Road	P	Curbside bioswale/bumpout			×	×	82%	3%	12%	3%
	Veale Road to Upper Greenbriar Road	Q	Curbside bioswale/bumpout			×	×	79%	6%	12%	3%
	at Sconset Road	R	Gateway (median, sign, curbside bioswale)			×	×	88%	6%	0%	6%
The Mall	Southern end of The Mall	S	Modify intersection			×		48%	21%	21%	9%
Sconset Road	at the Mall	T	Modify intersection			×		48%	24%	24%	3%
Harvey Road	Sconset Road to Glenrock Drive	U	Reduce NB Harvey Road to one lane			×	×	70%	3%	18%	9%
	Sconset Road to Glenrock Drive	V	Enhance Speed Limit Signage			×	×	85%	6%	6%	3%
Veale Road	at W. Greenbriar Road	W	Median/pedestrian crossing				×	88%	6%	6%	0%
	Sunset Lane to Evergreen Lane	X	Median/pedestrian crossing				×	82%	6%	6%	6%
	at Sunset Lane; at Evergreen Lane	Y	Improve sight distance; improve crossings				×	88%	0%	6%	6%
	at Willow Way	Z	Gateway (median/sign)				×	76%	12%	6%	6%
	E. Dale Road to Bellemeade Place	AA	Median/pedestrian crossing				×	59%	35%	6%	0%
	E. Dale Road to Harvey Road	AB	Reduce speed limit to 25 mph				×	71%	18%	6%	6%
	E. Dale Road to Bellemeade Place	AC	Vegetated median				×	59%	29%	12%	0%
	W. Dale Road to E. Dale Road	AD	Vegetated median				×	59%	29%	12%	0%

**FIGURE 23: ALTERNATIVES AND PUBLIC SUPPORT**  
**SHADING = MULTIPLE ALTERNATIVES AT SAME LOCATION**

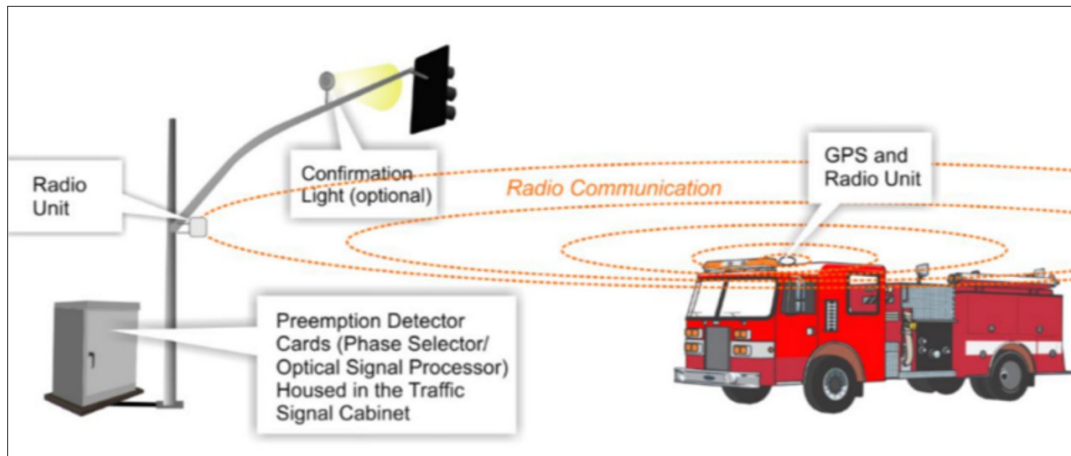


### Feasibility Assessment

The Project Steering Committee with support by the Consultant Team reviewed each improvement alternative with respect to the physical feasibility, environmental impact, and public feedback. The combination of this feedback assisted the Steering Committee in identifying the Locally Preferred Alternative.

LOCATION	LIMITS	ID	FEASIBILITY CONDITIONS	LOCALLY PREFERRED	FURTHER ACTIONS
Harvey Road	at Marsh Road	A	ROW impact to adjacent property-owners	Yes	
	at Marsh Road	B	ROW impact to adjacent businesses; concept previously studied/dismissed by DelDOT	No	
	Mill Lane to Hillside Road	C		Yes	Refine location/design specifics in preliminary engineering
	at Hillside Road	D	Queuing from Harvey Rd/Marsh Rd undermines traffic and operational feasibility	No	
	Lovers Lane to Little Lane	E	Alternative modified to remove median in order to limit improvement footprint	Yes	Complete NCHRP 498 treatment assessment
	at Orleans Road	F		No	
	at Orleans Road	G	ADA improvements scheduled for 2023	Yes	Monitor crash history; define further geometric improvements
	at Clubhouse Path	H		Yes	Complete NCHRP 498 treatment assessment
	The Sweep to Lower Lane	I	Locally preferred not to impact Arden Memorial Garden Overflow	No	
	Lower Lane to Meadow Lane	J	Sight distance improvements and RRFB required for Meadow Lane crossing to remain	Yes	Complete NCHRP 498 treatment assessment
	at Lorely Lane	K	Locally preferred to preserve existing crossing location	No	
	south of Swiss Lane	L	ROW impact to adjacent property-owners	No	
	north of Millers Road	M	ROW impact to adjacent property-owners	Yes	Determine preferred treatment in preliminary engineering
	north of Millers Road	N	Absence of median may limit traffic calming effectiveness	Yes	Determine preferred treatment in preliminary engineering
	north of Millers Road	O		Yes	Advance in concert with Improvement M/N - when selected
	Millers Road to Veale Road	P		Yes	Refine location/design specifics in preliminary engineering
	Veale Road to Upper Greenbriar Road	Q		Yes	Refine location/design specifics in preliminary engineering
	at Sconset Road	R		Yes	Refine location/design specifics in preliminary engineering
The Mall	southern end of The Mall	S	Locally preferred concern: impact to The Mall/disruption to existing trees/green	No	
Sconset Road	at the Mall	T		No	
Harvey Road	Sconset Road to Glenrock Drive	U	Pending capacity analysis feasibility	Yes	Capacity analysis of I-95/Harvey Road interchange required
	Sconset Road to Glenrock Drive	V		Yes	
Veale Road	at W. Greenbriar Road	W		Yes	Complete NCHRP 498 treatment assessment
	Sunset Lane to Evergreen Lane	X		No	
	at Sunset Lane; at Evergreen Lane	Y	Locally preferred - with sight distance improvements needed	Yes	Complete NCHRP 498 treatment assessment
	at Willow Way	Z		Yes	Complete NCHRP 498 treatment assessment
	E. Dale Road to Bellemeade Place	AA		Yes	Complete NCHRP 498 treatment assessment
	E. Dale Road to Harvey Road	AB		Yes	
	E. Dale Road to Bellemeade Place	AC		No	
	W. Dale Road to E. Dale Road	AD		Yes	

FIGURE 24: ALTERNATIVES AND FEASIBILITY



### Emergency Responsiveness

While aiming to curtail vehicles speeds along Harvey and Veale roads, the Plan aspires to maintain – if not improve – emergency responsiveness. The Consultant Team and WILMAPCO staff met with Claymont Fire Company (Station 13) personnel in February 2023 to review the Plan's alternatives. Within this discussion, Fire Company personnel noted that Harvey Road is a critical response corridor for the Fire Company – one of only three crossings of I-95. Additionally, the limited cartway width and lack of shoulders of Harvey Road is a challenge for emergency personnel as the motoring public has limited locations to pull over to allow apparatus to pass.

### Traffic Signal Preemption

Given the unique, constrained nature of Harvey Road, equipping all emergency vehicles with signal preemption was identified as a key strategy for improving emergency responsiveness. Currently, only the Company's ambulance fleet is equipped with signal preemption emitters. By outfitting the fire apparatus with signal preemption emitters, this technology would reduce vehicle queuing at the traffic signals along Harvey Road and improve emergency responsiveness. The estimated cost for outfitting the Department's 14 vehicles (at \$3,000 per vehicle) is approximately \$50,000. In addition to the fire apparatus at Station 13, neighboring stations should also be outfitted to maximize the system, community, and response benefit.

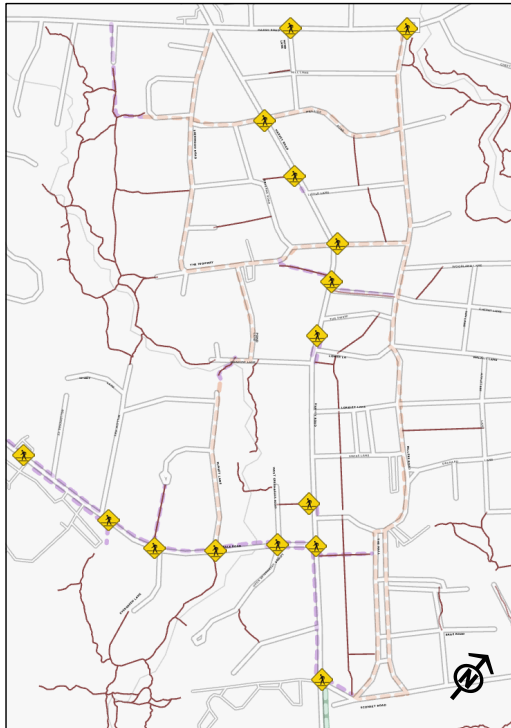
### Landscaping

Any landscaping added as part of this project can currently be paid for and installed by DelDOT, but that a local maintenance agreement will need to be executed prior to that installation that stipulates that ongoing maintenance work and costs will be borne locally.



**Goal 2: Provide Enhanced Pedestrian Crossings**

Key Crossing Locations



# NCHRP SYNTHESIS 498

NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

## Application of Pedestrian Crossing Treatments for Streets and Highways



*A Synthesis of Highway Practice*

TRANSPORTATION RESEARCH BOARD  
The National Academies of  
SCIENCES • ENGINEERING • MEDICINE

*Apply guidance of NCHRP 498 and DeIDOT*

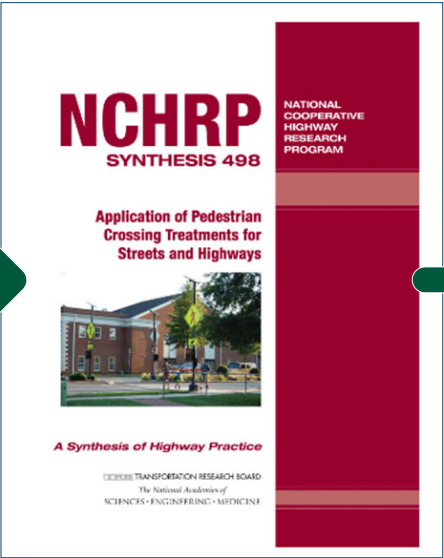
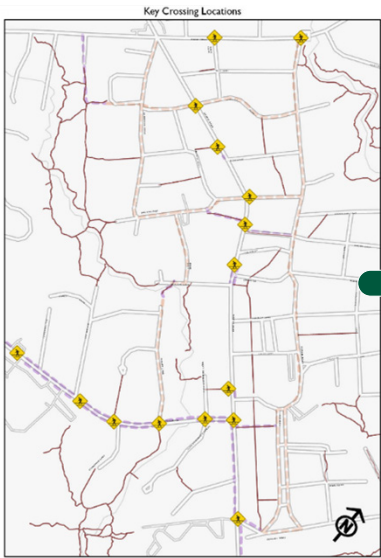
## GOAL #2 - PROVIDE ENHANCED PEDESTRIAN CROSSINGS

There was great interest by the community for improving the safety of pedestrian crossings along throughfares through the Ardens, especially the crossing of Harvey Road, Veale Road, and Marsh Road. The key crossings are locations where the Plan's nonmotorized multimodal network traverses these main roads.



**Determining intersection crossing protection**

This plan does not specifically evaluate what level of crossing protection is recommended for each crossing location. This determination is a recommended next step prior to any project or phase advancing into preliminary engineering. This evaluation, following DeIDOT guidelines and methods specified by the National Cooperative Highway Research Program (NCHRP) in Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways, will specify the degree of protection recommended for each crossing location.



Alternative 2-A Marked Crosswalk

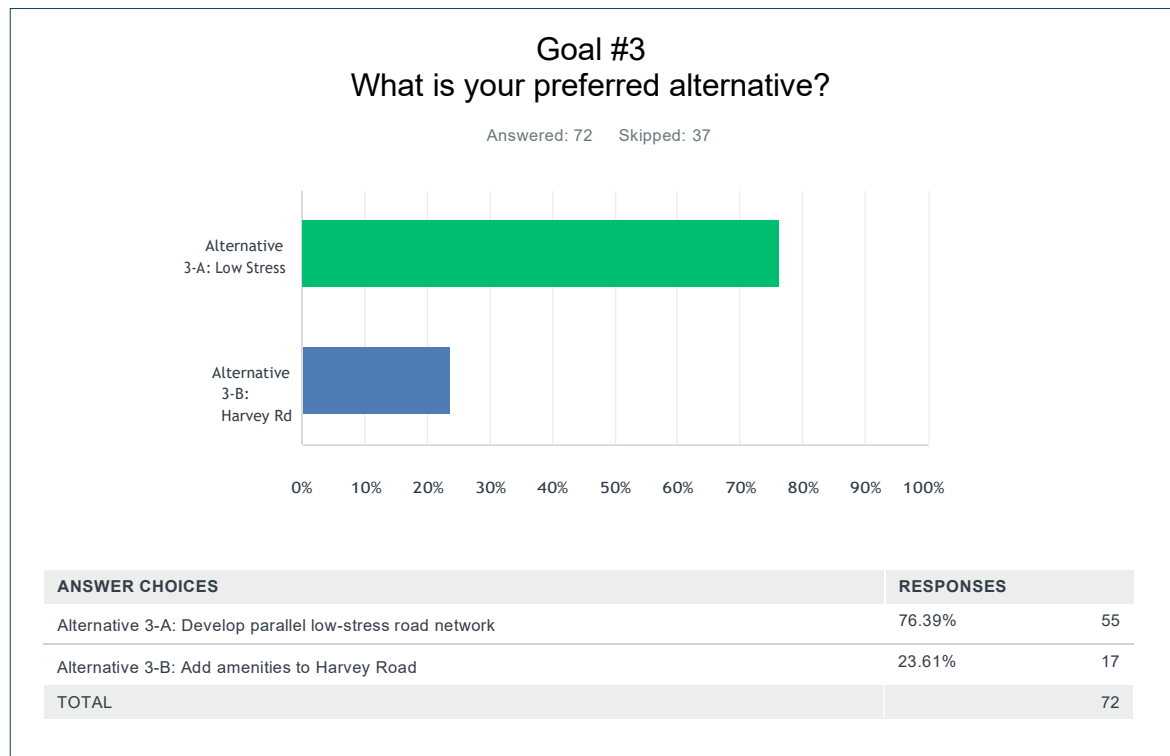


Alternative 2-B Rectangular Rapid Flash Beacon



Alternative 2-C HAWK Signal





**FIGURE 25: GOAL 3 PREFERENCES**

### GOAL #3 - DEVELOP A BICYCLE/PEDESTRIAN NETWORK TO TRAVERSE THROUGH THE ARDENS

Maintaining, enhancing, and improving non-motorized methods of traversing through the Ardens is a key goal of the Plan. Given that Harvey Road was identified as a critical barrier for walking and biking, two alternatives were developed to improve non-motorized mobility through the Ardens. The first alternative (Alternative 3-A) proposed primarily the avoidance of Harvey Road, whereby parallel routes for walking and bicycling would be established. This alternative is not a new concept to the Ardens, but rather a defining design principle of the Ardens' original design. This alternative would utilize the Ardens' robust network of existing trails with modest improvements proposed, such as ADA improvements at road crossings.

The second alternative (Alternative 3 B) proposed the establishment or creation of multimodal facilities along Harvey Road. This alternative would include widened shoulders for bicycling purposes as well as sidewalks along Harvey Road. Given the space requirements of this alternative, this alternative was estimated to have a significant environmental and right-of-way impact to Harvey Road.

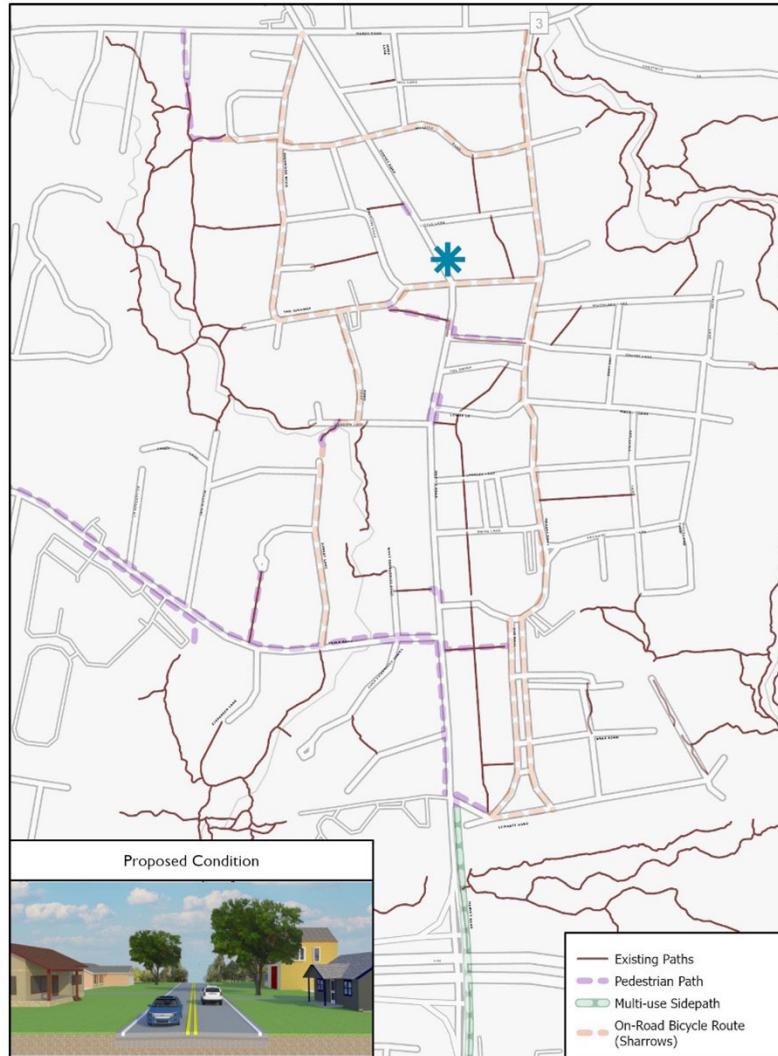
When posed in Survey #2, survey respondents supported Alternative 3-A (the low stress alternative) with 76% of votes versus Alternative 3-B (Harvey Road) at 24%.

Given the support of more than three quarters of survey respondents for Alternative 3-A, as well as the environmental impact of Alternative 3-B, Alternative 3-A (parallel, low-stress network) was recommended as the locally preferred alternative.

Though not the principal focus, some amenities could still be added along Harvey Road when deemed feasible upon further engineering and public engagement.

**Goal 3: Develop a Bicycle/Pedestrian Network that traverses the Ardens**

Alternative 3-A: Develop parallel low-stress network



Alternative 3-B: Add amenities to Harvey Road



**FIGURE 26: GOAL 3 ALTERNATIVES**



Alternative 4-A: Modern/Sleek



Alternative 4-B: Traditional



Alternative 4-C: Wooden Bus Stop

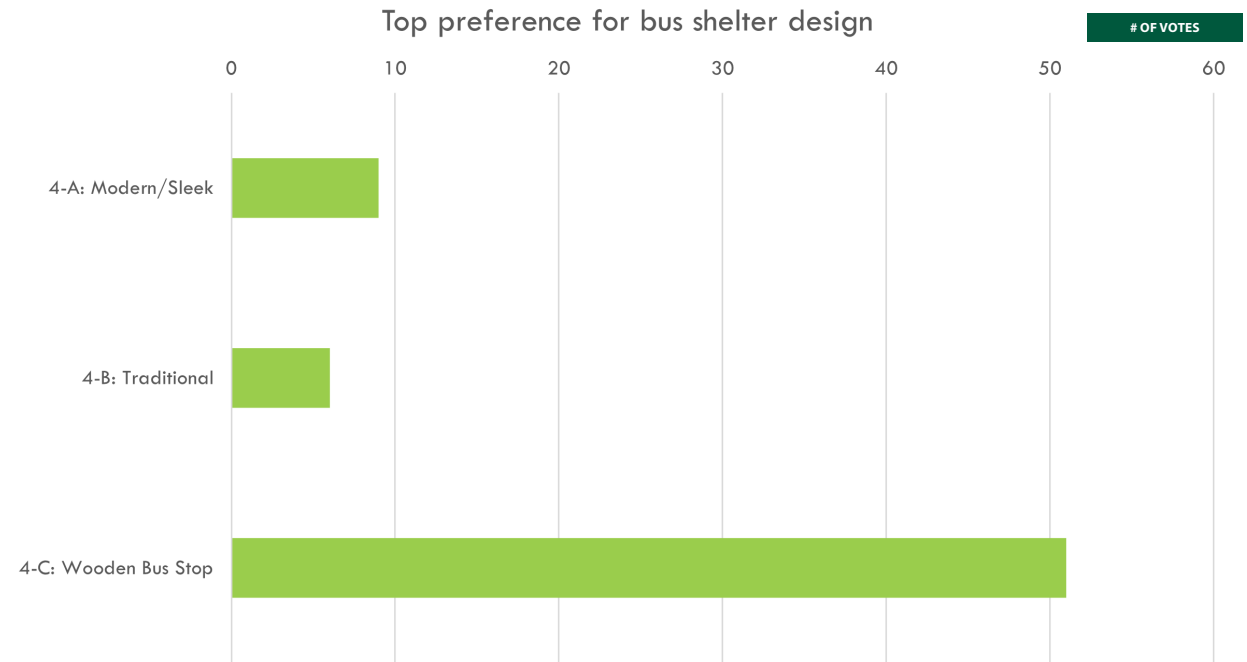


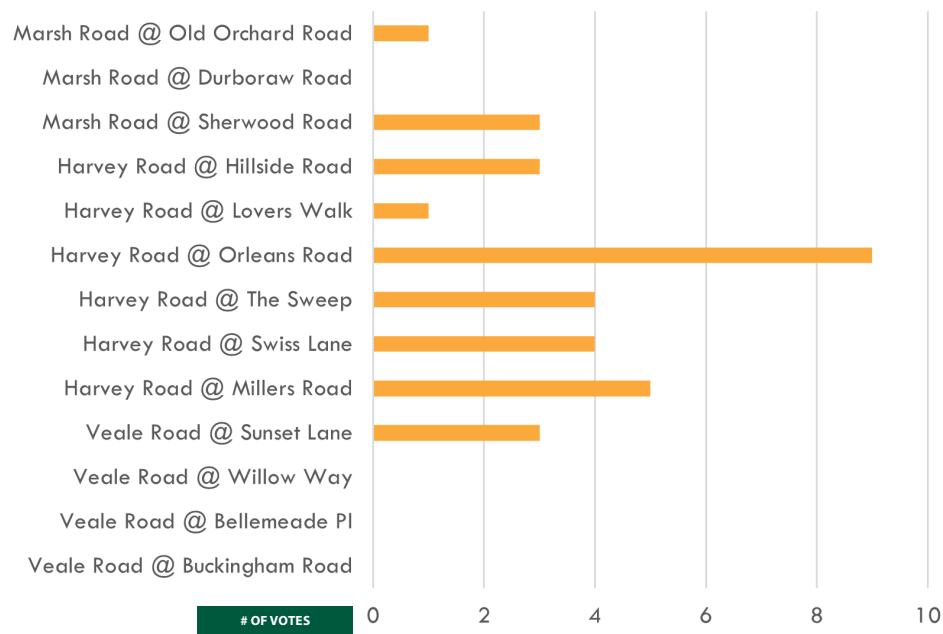
FIGURE 27: BUS SHELTER PREFERENCES

#### GOAL #4 - ENHANCE TRANSIT AND SCHOOL BUS STOPS

As an extension of the multimodal network, the fourth goal of the Connecting with the Ardens Plan is the enhancement of transit and school bus stops. Presently, the only transit shelter that exists within the Study Area is at the Orleans Road / Harvey Road intersection.

With the goal and intent of installing additional shelters, Survey #2 asked survey respondents to rank their visual preferences for three types of bus shelters, including a modern/sleek design, a traditional shelter design, and an all-wood design. The all-wood design received a vast majority of votes as the top design preference with 51 out of 68 votes (77%). Notably, this bus shelter design is unique and not compliant with DeIDOT/DART's bus shelters guidelines; therefore, any such installation of this all-wood shelter design would require local arrangements and maintenance responsibilities. Additionally, this shelter design would need to comply with DeIDOT breakaway standards for fixed objects in DeIDOT right-of-way.

## Which bus stop do you feel should be the highest priority for improvement?



**FIGURE 28: BUS STOP LOCATION PREFERENCES**



### Priority Bus Stop Locations

As part of Survey #2, the Ardens community was asked to identify which bus location would be the highest priority for improvement. The Harvey Road / Orleans Road bus stop received the most support with nine (9) votes as the top location. Notably, the second survey was released and completed by the public in March 2023; in April 2023, DelDOT constructed ADA improvements at the Harvey Road / Orleans Road intersection, including a sidewalk connection to the existing shelter.

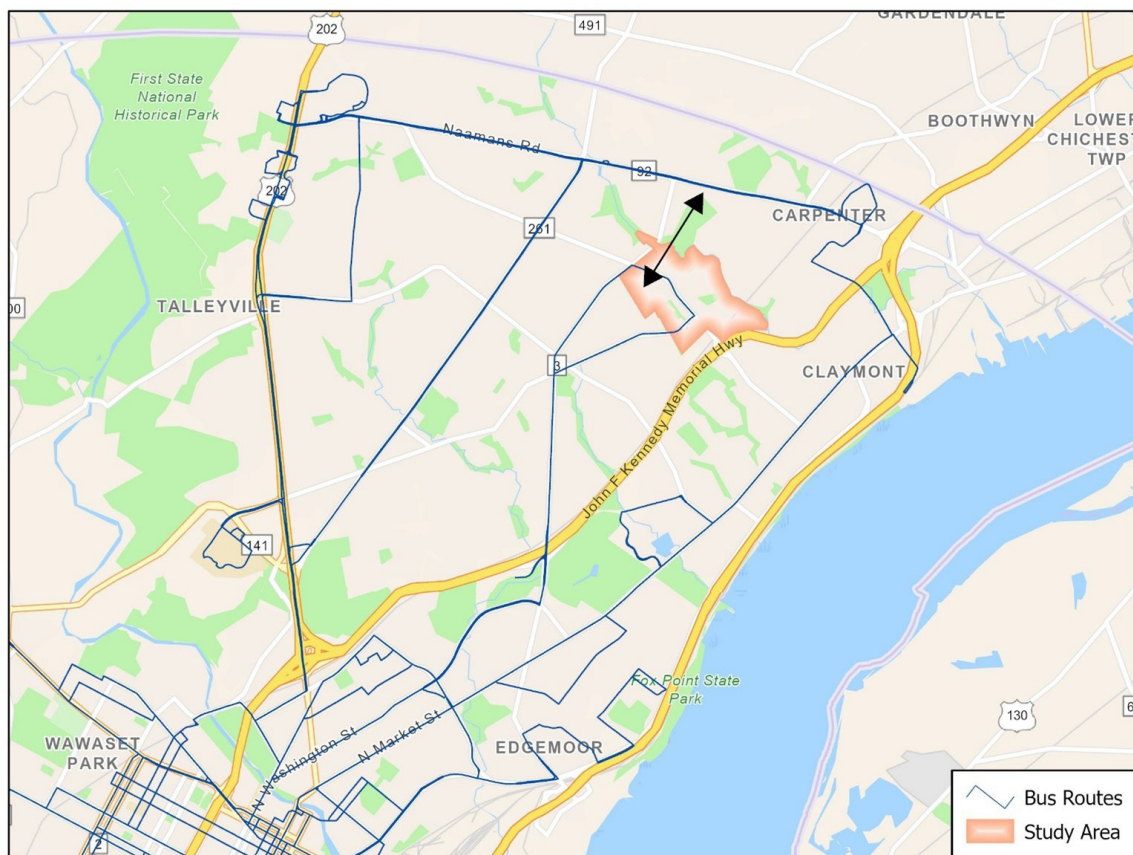
Beyond the Harvey Road / Orleans Road intersection, six other locations received three to five votes.

Based on Steering Committee direction, the community survey results, and a distribution of stop locations, three locations were identified as priority bus stop locations:

- Marsh Road at Sherwood Road
- Harvey Road at Orleans Road
- Harvey Road at Millers Road







**FIGURE 30: CONCEPTUAL PATH TO NAAMANS ROAD/ROUTE 61**



### Service Alternatives

In addition to improved transit amenities/bus shelters, the Consultant Team coordinated with DART First State to review and discuss alternatives for improving transit service to the Study Area.

#### Accessibility to Route 61 / Naamans Road

In reviewing the community feedback from Survey #1 where respondents expressed a desire to take transit the Claymont Train Station as well as the Naamans Road/Route 202 corridor, one service improvement alternative is to improve walking and bicycling accessibility to the Route 61 bus, which operates along Naamans Road.

This alternative would require a trail bridge to be constructed over the South Branch of Naamans Creek, crossing of Chestnut Street, and the continuation of trail/path to Naamans Road.

A follow-up feasibility study would be required to further investigate the opportunities and constraints for this alternative.

#### Microtransit / DART Connect

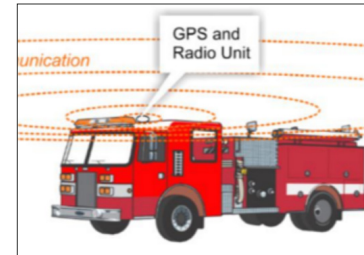
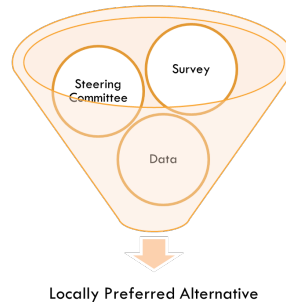
A second service alternative is the provision of on-demand microtransit to serve the Study Area. This alternative would provide similar service to DART's Connect service, which currently serves Georgetown and Millsboro in Sussex County and being introduced in Newark in 2023. An origin-destination study, which thoroughly quantifies the density of potential riders, trip purposes, and destinations, would be required to further investigate this alternative.



# Locally Preferred Alternative

## Locally Preferred Alternative

Based on feedback from Survey #2 and the second Public Meeting, the Steering Committee, with Consultant Team facilitation, selected a Locally Preferred Alternative from the array of improvement alternatives.



LOCATION	LIMITS	ID	DESCRIPTION	FURTHER ACTIONS
Harvey Road	at Marsh Road	A	Gateway (median, sign, landscaping)	Refine location/design specifics in preliminary engineering
	Mill Lane to Hillside Road	C	Bioswale	Refine location/design specifics in preliminary engineering
	Lovers Lane to Little Lane	E	Trail Crossing	Complete NCHRP 498 treatment assessment
	at Orleans Road	G	Maintain signal / improve geometry	Monitor crash history; define further geometric improvements
	at Clubhouse Path	H	Update pedestrian crossing	Complete NCHRP 498 treatment assessment
	Lower Lane to Meadow Lane	J	Crossing / Median	Complete NCHRP 498 treatment assessment
	north of Millers Road	M	Relocate crossing/install median	Determine preferred treatment in preliminary engineering
	north of Millers Road	N	Install bumpout	Determine preferred treatment in preliminary engineering
	north of Millers Road	O	Reestablish Trail	Advance in concert with Improvement M/N - when selected
	Millers Road to Veale Road	P	Curbside bioswale/bumpout	Refine location/design specifics in preliminary engineering
	Veale Road to Upper Greenbriar Road	Q	Curbside bioswale/bumpout	Refine location/design specifics in preliminary engineering
	at Sconset Road	R	Gateway (median, sign, curbside bioswale)	Refine location/design specifics in preliminary engineering
	Sconset Road to Glenrock Drive	U	Reduce NB Harvey Road to one lane	Capacity analysis of I-95/Harvey Road interchange required
	Sconset Road to Glenrock Drive	V	Enhance Speed Limit Signage	Coordinate with DelDOT to install signage
Veale Road	at W. Greenbriar Road	W	Median/pedestrian crossing	Complete NCHRP 498 treatment assessment
	at Sunset Lane; at Evergreen Lane	Y	Improve sight distance; improve crossings	Complete NCHRP 498 treatment assessment
	at Willow Way	Z	Gateway (median/sign)	Complete NCHRP 498 treatment assessment
	E. Dale Road to Bellemeade Place	AA	Median/pedestrian crossing	Complete NCHRP 498 treatment assessment
	E. Dale Road to Harvey Road	AB	Reduce speed limit to 25 mph	Coordinate with DelDOT to install signage
	W. Dale Road to E. Dale Road	AD	Vegetated median (See map beginning on page 46)	Refine location/design specifics in preliminary engineering
			Signal preemption for emergency responders	Pursue funding for emergency vehicle preemption emitters
			Enhanced bus stops at priority bus stop locations	Coordinate improvements with DART First State

**FIGURE 31: SUMMARY OF LOCALLY PREFERRED ALTERNATIVE**

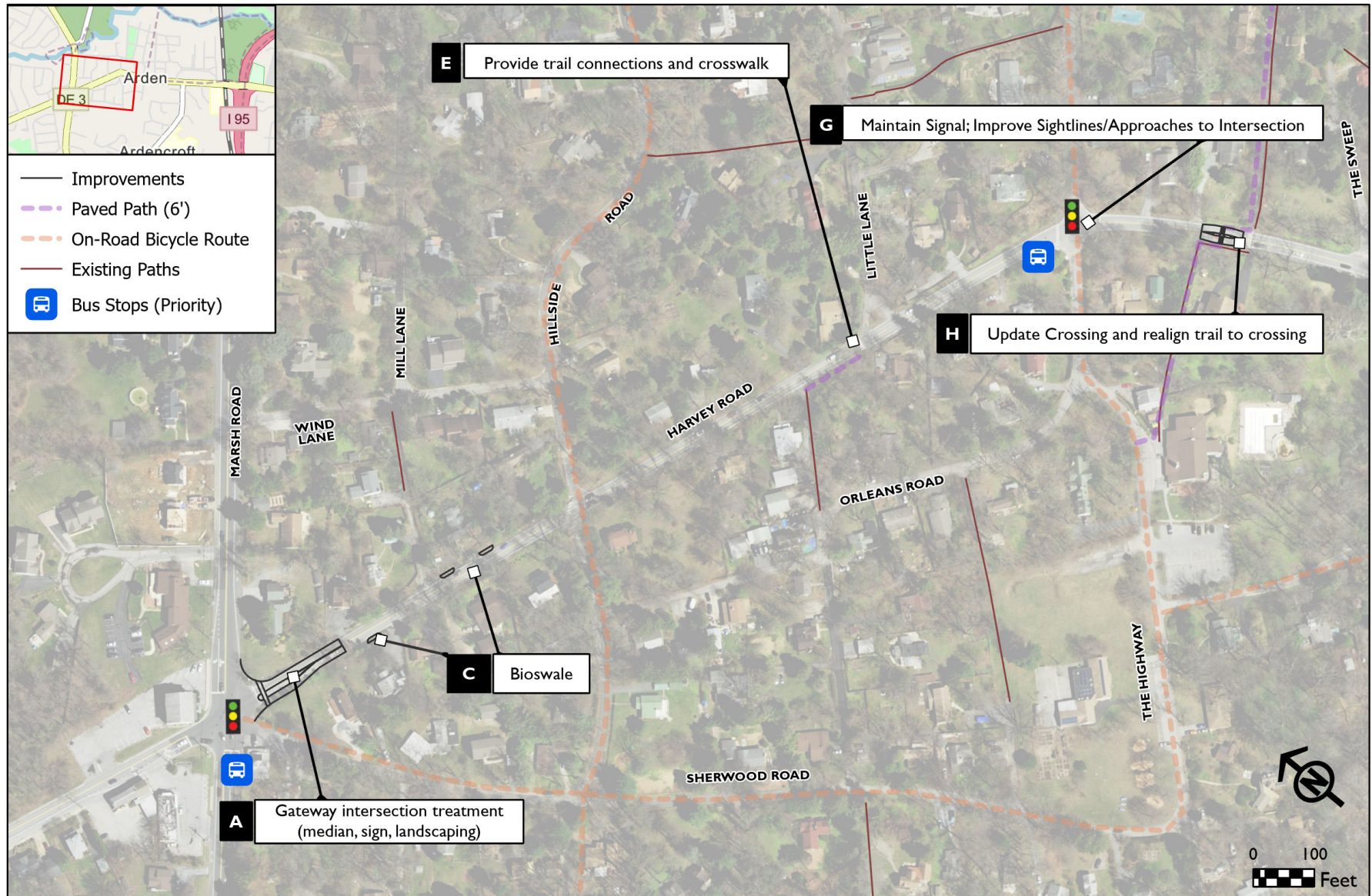


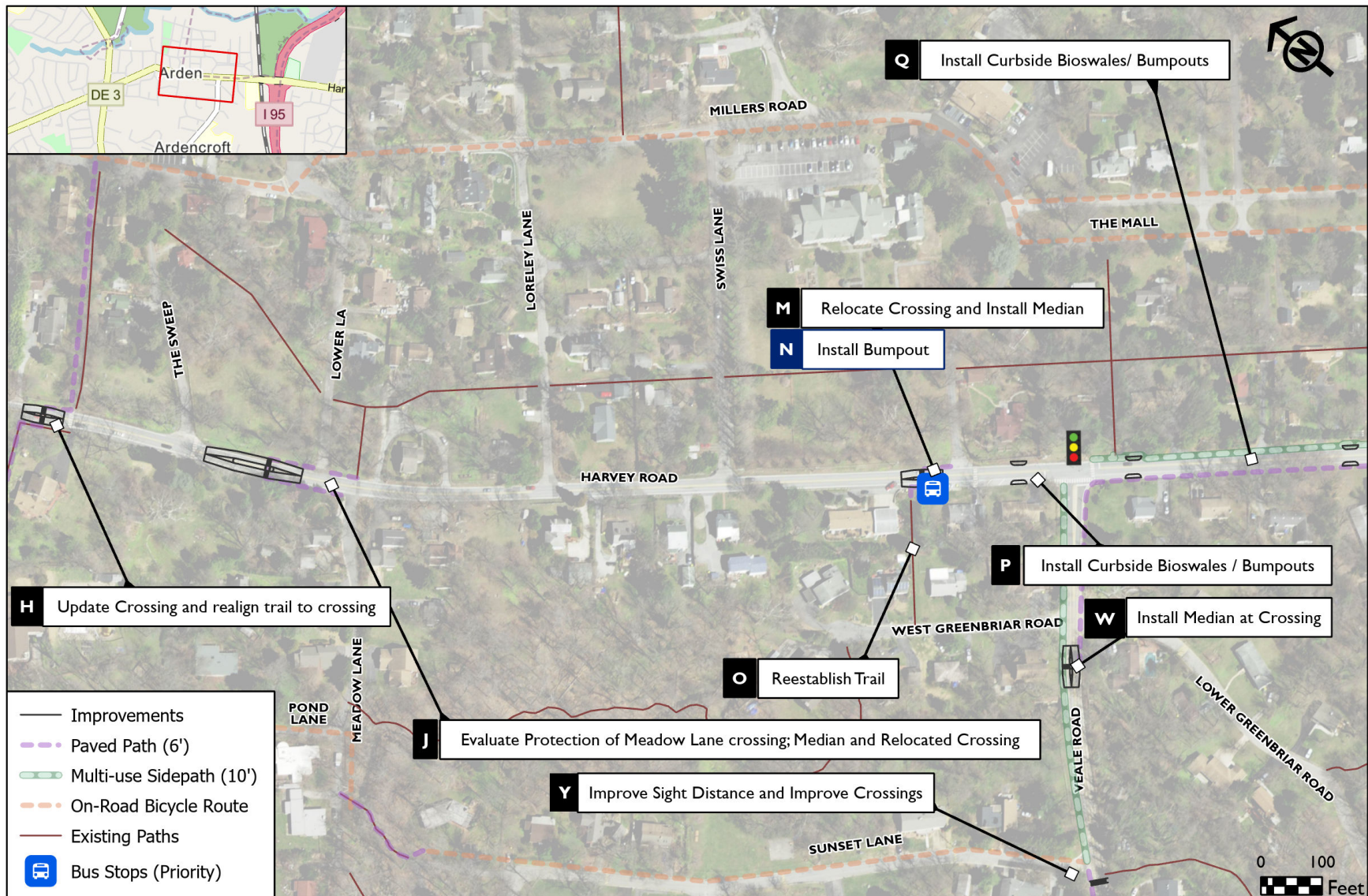
FIGURE 32: LOCALLY PREFERRED ALTERNATIVE



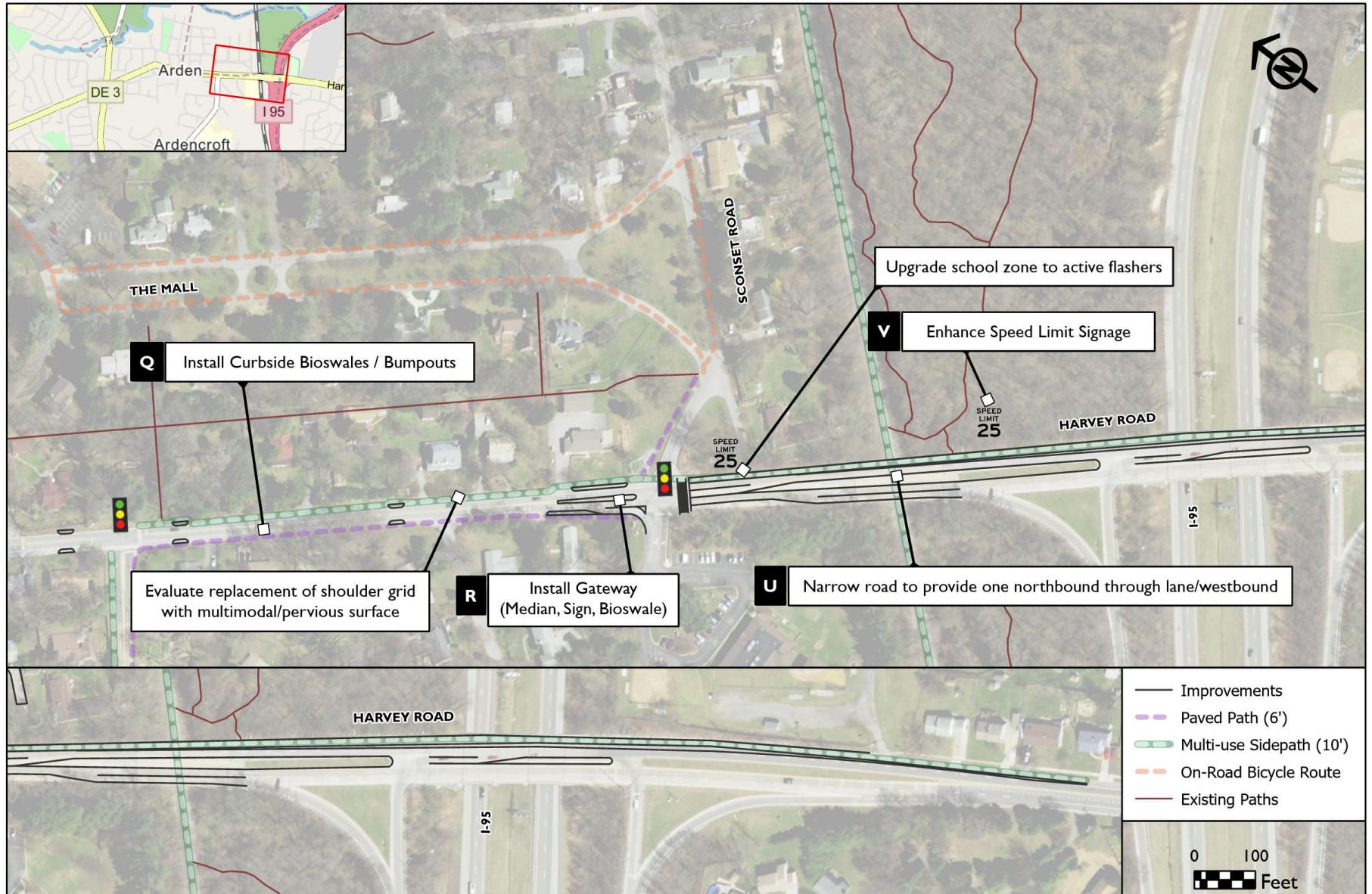


**FIGURE 33: RENDERING OF CLUBHOUSE PATH / HARVEY ROAD CROSSING (IMPROVEMENT H)**

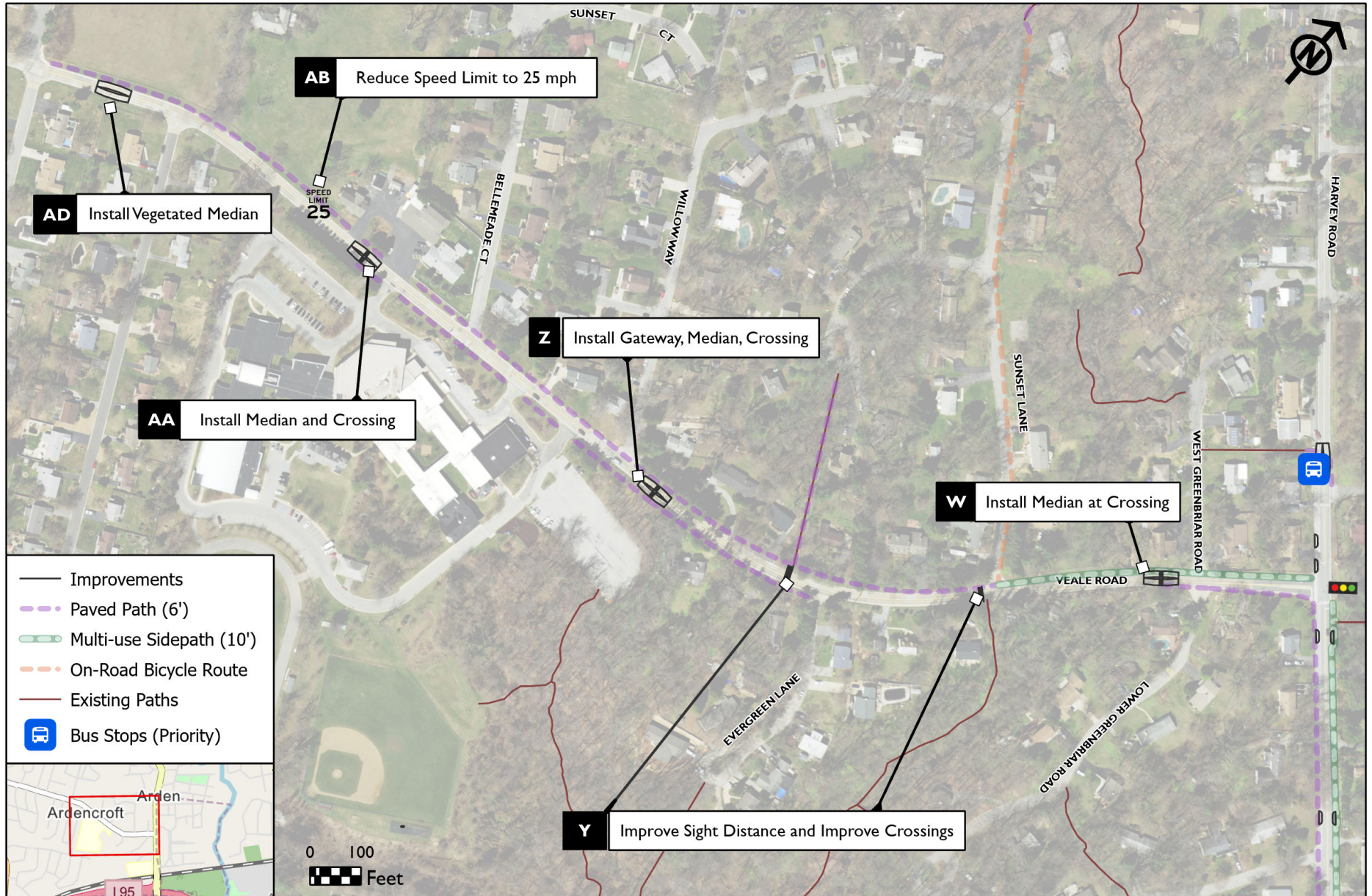














# Success Within The Ardens



## COMMUNITY CONTEXT

### Context Sensitive Materials

As any of the proposed improvements proceed into design, special care and attention should be dedicated to selecting materials, pavements, colors, and textures that adhere to the community palette of the Ardens.

Additionally, DelDOT and any other project leads should continue to consult and review any aesthetic treatments with appropriate committees.

### Maintenance

Some of the proposed features - bioswales, vegetated medians, and uniquely design bus shelters - will require local maintenance agreements where the Ardens will need to agree to maintenance of these assets. It should be recognized that this acceptance of maintenance responsibility is a required role in order to achieve and preserve the unique character of the Ardens.

### Enforcement

Curtailling travel speeds requires more than engineering treatments. The Ardens should continue to coordinate and partner with the Delaware State Police to conduct regular speed enforcement, while recognizing manpower and resource limitations.

Additionally, throughout the course of the plan's development, multiple community members expressed interest in automated speed enforcement. As of June 2023, speed cameras are only permitted on I-95 construction zones as part of a pilot project. Notably, there is active legislation proposing to expand the use of automated speed enforcement to neighborhood streets following the completion of a traffic study. House Bill 94 was introduced on March 29, 2023 to the Delaware House of Representatives and passed by the House on June 15, 2023. The legislation (as of June 21, 2023) remains in committee with the state Senate.

### Education

The Ardens are encouraged to work with the Delaware Office of Highway Safety and supportive stakeholders to develop a neighborhood slow down campaign. This education campaign could target many sub-groups of drivers and community members: residents, school parents, bus drivers, delivery drivers, commuters, commercial drivers.

# Multimodal Network (Proposed)

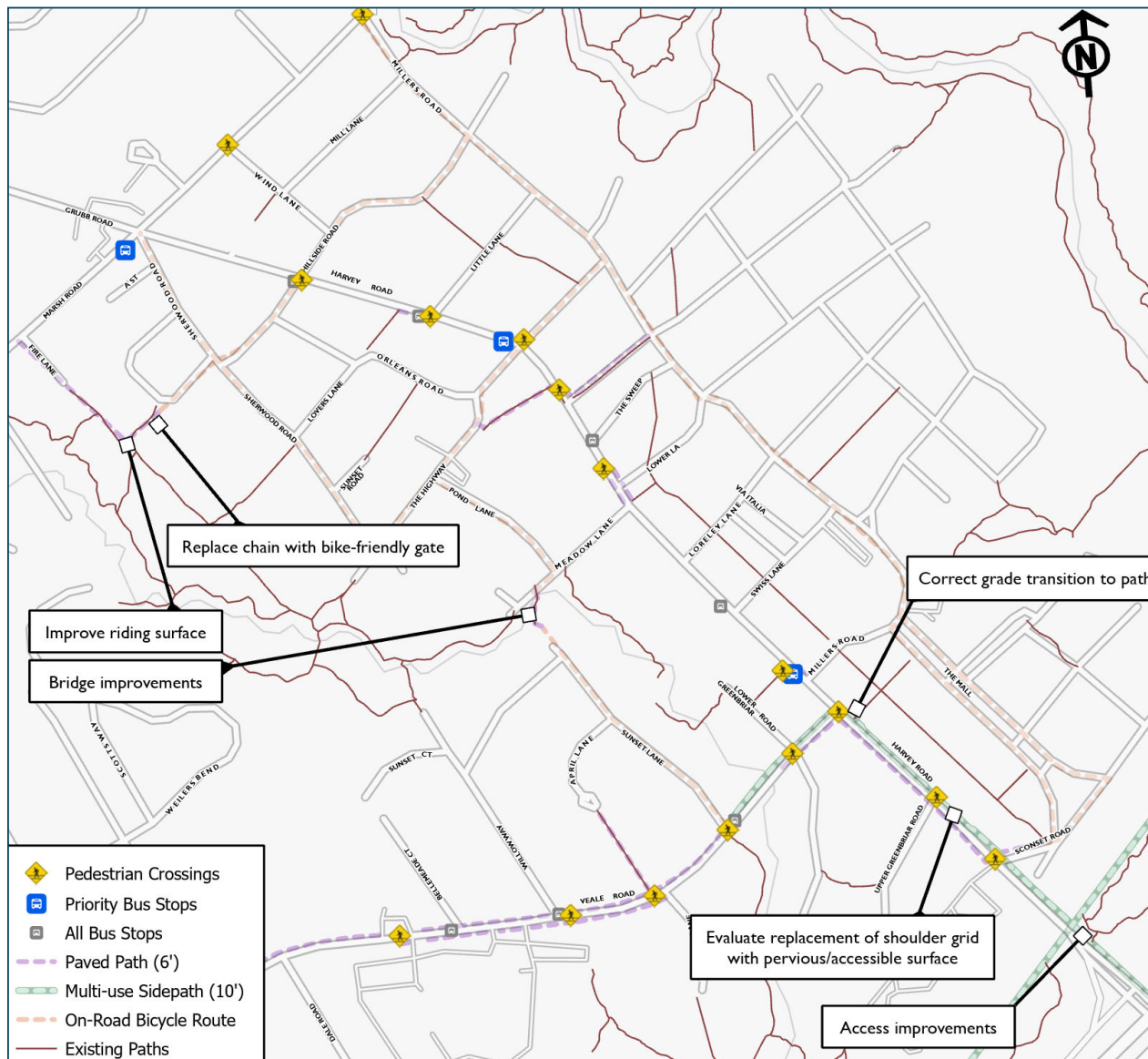


FIGURE 34: PROPOSED MULTIMODAL NETWORK

## Minimizing Path Widths

Given the unique character and constraints of the Ardens (e.g. small setbacks), all efforts should be taken to minimize the path widths, while adhering to federal and state standards.

## Path Maintenance / Conditions

Developing this low-stress multimodal network will require ongoing maintenance of the trails, paths, and roadways to ensure user safety.



# Estimate of Probable Cost

Using the Locally Preferable Alternative, the Consultant Team prepared an estimate of probable cost for the proposed improvements. For cost estimating purposes, the proposed improvements were divided into five sub-projects or phases:

- Harvey Road – Marsh Road to Clubhouse Path
- Harvey Road – the Sweep to Veale Road
- Harvey Road – Veale Road to Sconset Road
- Harvey Road – Sconset Road to Glenrock Drive (including I-95 Interchange)
- Veale Road – Harvey Road to West Dale Road

These sub-projects or phases have independent utility where one or more of these phases could be advanced independently of the other phases.

Due to the preliminary nature of this Plan, rather than developing a precise estimate of engineering and cost construction costs, a range of project development and construction costs was prepared. Additionally, it should be noted that this estimate does not include right-of-way costs, utility work/relocation, and construction inspection. Within this context, the range of project development costs (survey, environmental clearance, design) for the full locally preferred alternative was estimated to be between \$1.5 million and \$3.1 million; the range of construction costs was estimated between \$7.8 million and \$13.3 million.

These costs are expected to be principally borne not locally, but by federal transportation dollars with a state funded match. Additionally, implementation of this project will likely take many years – about a decade. Local advocacy for the projects will be very beneficial given the backlog of transportation needs and projects across the region.

**Figure 35: Estimate of Probable Cost (Preliminary)**  
Locally Preferred Alternative - Ardens Transportation Plan

PHASE	PROJECT DEVELOPMENT (low to high range)		CONSTRUCTION (low to high range)		TOTAL (low to high range)	
Harvey Road between Marsh Road and the Clubhouse Connection (A, C, E, G, H)	\$210,000	\$500,000	\$1,000,000	\$2,000,000	\$1,210,000	\$2,500,000
Harvey Road between The Sweep and Veale Road (J, M, N, O, P)	\$180,000	\$400,000	\$850,000	\$1,600,000	\$1,030,000	\$2,000,000
Harvey Road between Veale Road and Sconset Road (Q, R)	\$210,000	\$420,000	\$1,010,000	\$1,950,000	\$1,220,000	\$2,370,000
Harvey Road from Sconset Road over I-95 to Glenrock Drive (U)	\$500,000	\$800,000	\$2,600,000	\$3,700,000	\$3,100,000	\$4,500,000
Veale Road between Harvey Road and W. Dale Road (W, Y, Z, AA, AB, AD)	\$420,000	\$970,000	\$2,370,000	\$4,090,000	\$2,790,000	\$5,060,000
<b>ALL SEGMENTS / PHASES</b>	<b>\$1,520,000</b>	<b>\$3,090,000</b>	<b>\$7,830,000</b>	<b>\$13,340,000</b>	<b>\$9,350,000</b>	<b>\$16,430,000</b>

## Notes

Does not include right-of-way acquisition, utilities, and construction inspection  
All prices are given in current dollars, as noted. No allowance for inflation is included.  
Mobilization % also includes construction survey, scheduling, and related services.

# Implementation Plan

The Implementation Plan provides a list of appropriate next steps to advance the goals and improvements proposed within the Connecting with the Ardens plan. A key concept within the Implementation Plan is the convening of a Monitoring Committee. This group is envisioned to include similar representation as the Project Steering Committee, with representatives of Arden, Ardencroft, Ardentown, WILMAPCO, and partnering agencies. The Monitoring Committee is expected to track and guide the implementation of this Plan.

ACTION	RESPONSIBLE AGENCY	TIMING
Adopt the Connecting to the Ardens plan	Ardens, Ardencroft, Ardentown, WILMAPCO Council	June / July 2023
Convene Plan monitoring committee	WILMAPCO + Project Steering Committee	Summer / Fall 2023
Pursue funding for emergency vehicle preemption emitters	Claymont Fire Company, Project Steering Committee, WILMAPCO	Summer / Fall 2023
Complete operational analysis of I-95 / Harvey Road interchange	Connecting with the Ardens monitoring committee, DelDOT, WILMAPCO	Fall 2023
Complete NCHRP 498 evaluation of pedestrian crossings	Connecting with the Ardens monitoring committee, DelDOT	Fall 2023
Complete trail feasibility study from Ardens to Naamans Road / DART 61 bus route	Connecting with the Ardens monitoring committee	To be determined
Complete microtransit feasibility study / transit origin-destination study	DART First State, Connecting with the Ardens monitoring committee	To be determined
Coordinate bus stop / shelter improvements	Connecting with the Ardens monitoring committee, DART First State	To be determined
Submit project(s) for consideration in WILMAPCO's Transportation Improvement Program (TIP)	Connecting with the Ardens monitoring committee, DelDOT	To be determined
Consider / pursue grant opportunities for priority improvements	Connecting with the Ardens monitoring committee, DelDOT	Ongoing
CSX Rail with Trail - feasibility Study	Connecting with the Ardens monitoring committee	To be determined
Veale Road corridor (to Silverside / Allen Tract)	Connecting with the Ardens monitoring committee	To be determined

**FIGURE 36: IMPLEMENTATION ACTIONS**



# Funding Opportunities

## Transportation Alternatives Program

Transportation Alternatives Program (TAP) is a set-aside of the federal Surface Transportation Block Grant (STBG) Program. TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for the planning, design or construction of boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.

For more information click [HERE!](#)



## Safe Streets for All – Implementation Grant

Safe Streets for All is a discretionary program established by the Bipartisan Infrastructure Law (BIL) aimed to prevent roadway deaths and serious injuries. The program has been appropriated \$5 billion in funding over a 5-year period. Per federal requirements, a community must first complete a Safety Action Plan before pursuing funding for safety improvements. WILMAPCO is currently completing a Safety Action Plan for New Castle County. Upon completion of the New Castle County Safety Action Plan, an implementation grant could be submitted for the full scope of the Locally Preferred Alternative. Further, local governments may apply for supplemental planning or implementation grants.

For more information click [HERE!](#)

## Community Transportation Funds

These are distributed by local elected officials and can fund small-scale projects, such as the equipment for the fire trucks.

## Transportation Improvement Program (TIP) – WILMAPCO

The Transportation Improvement Program is a prioritized capital program of multimodal improvements, allocating state and federal transportation funds over a 4-year horizon. TIP project submissions are prioritized using WILMAPCO's Project Prioritization Process: <http://www.wilmapco.org/priority/>.

There are currently two projects in the WILMAPCO 2050 RTP ([www.wilmapco.org/rtp](http://www.wilmapco.org/rtp)) that would support implementation of this work. These are the Harvey Road Traffic Calming and Harvey Road and Sconset Road Pedestrian Improvements – both from the Ardentowns Paths Plan. After the endorsement of the plan, the locally preferred alternative would replace the Harvey Road Traffic Calming within the RTP.

For more information click [HERE!](#)

**Bowman**