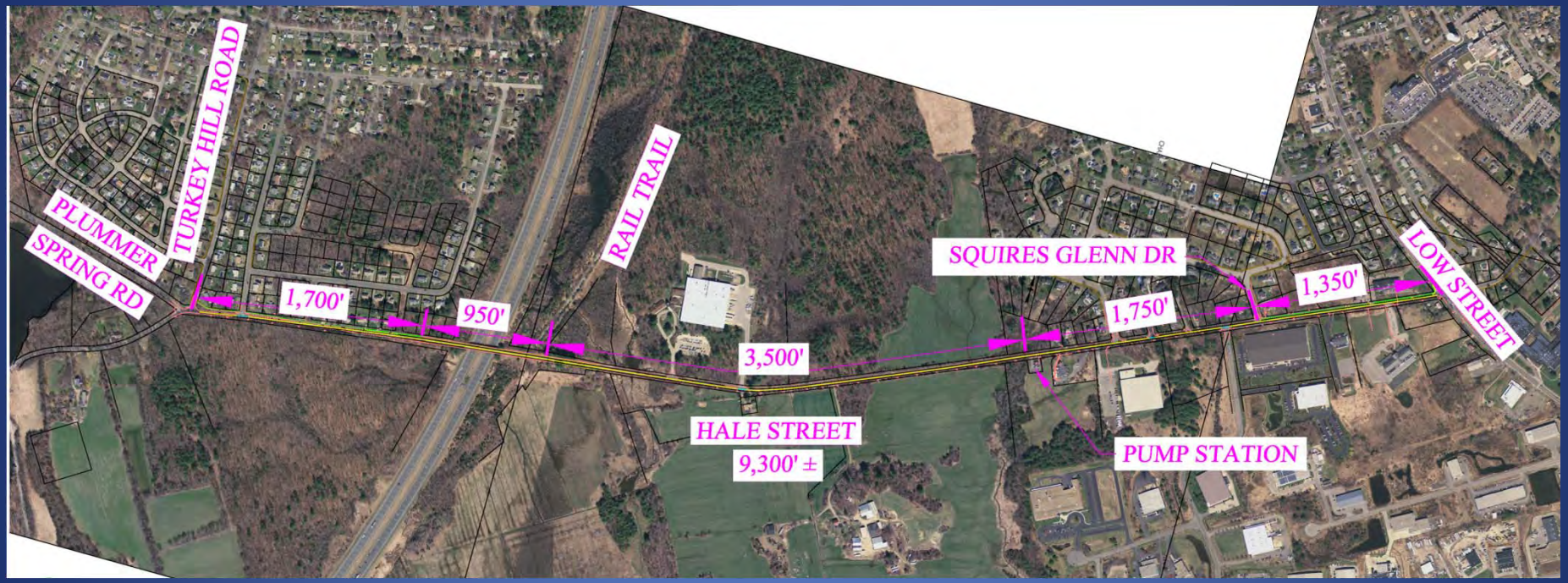
City of Newburyport

Improving Public Access and Safety On Hale Street

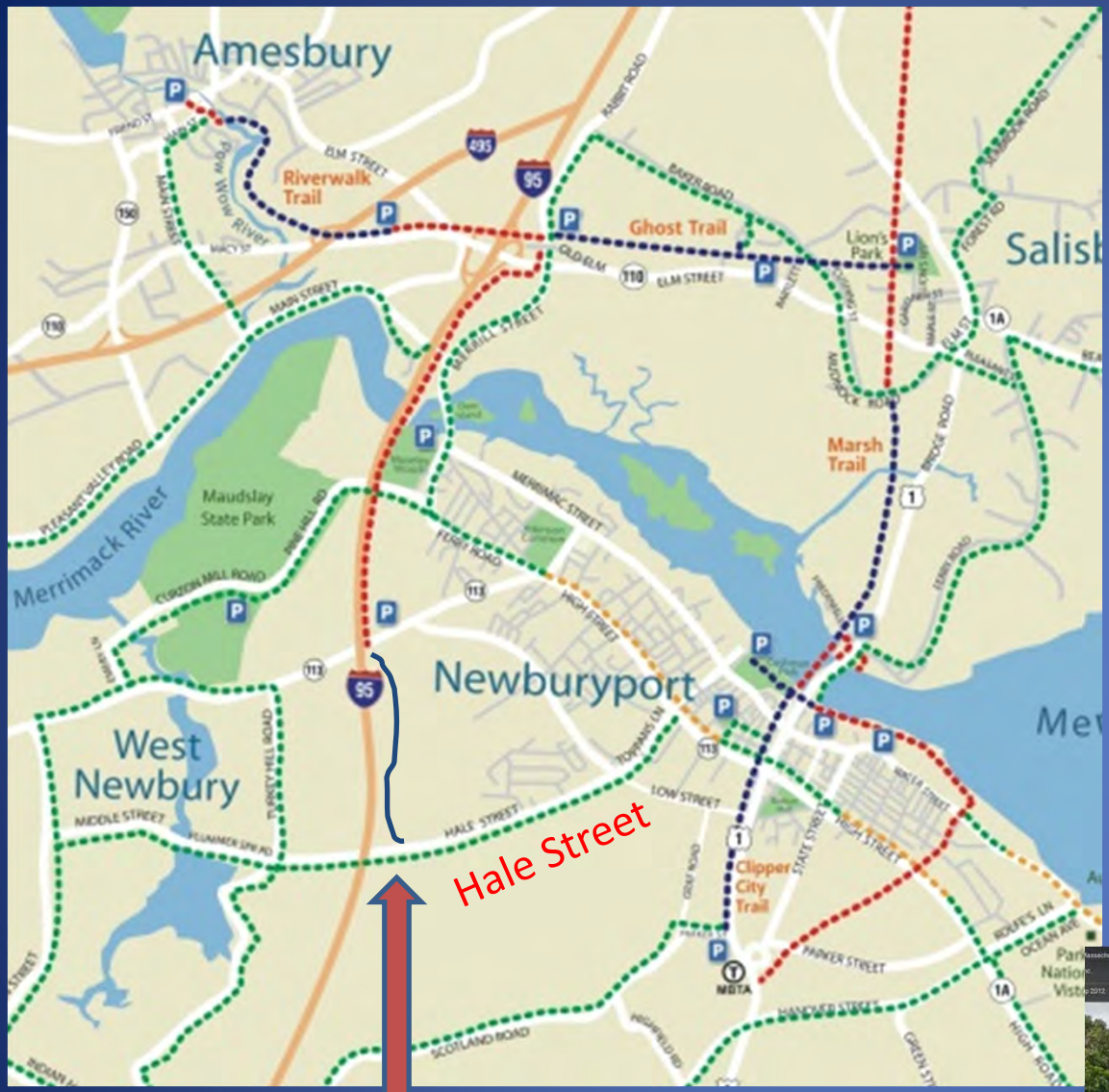
Newburyport Livable Streets Meeting
7pm, February 4, 2020
Senior/Community Center

Meeting Agenda

- City’s recent efforts since 2018
- Discuss existing conditions
- Summary of MassDOT design standards
- Discuss proposed concepts
- Open discussion and public participation


PLUMMER
SPRING RD
TURKEY HILL ROAD
1,700'
950'
RAIL TRAIL
3,500'
HALE STREET
9,300' ±
SQUIRES GLENN DR
1,750'
1,350'
LOW STREET
PUMP STATION

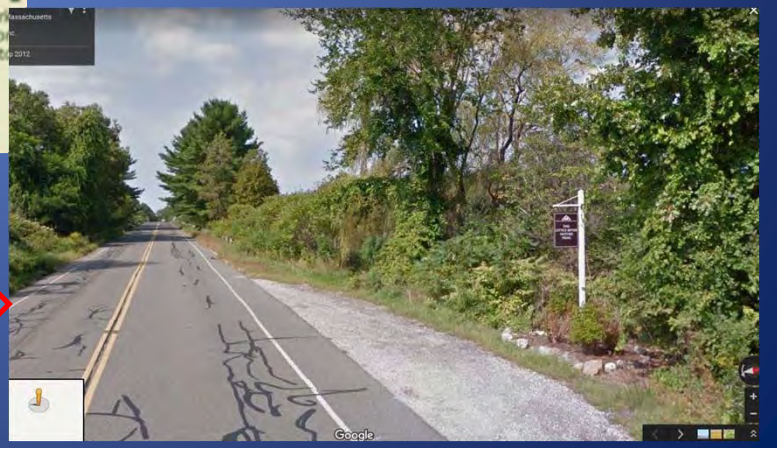
LOCUS PLAN

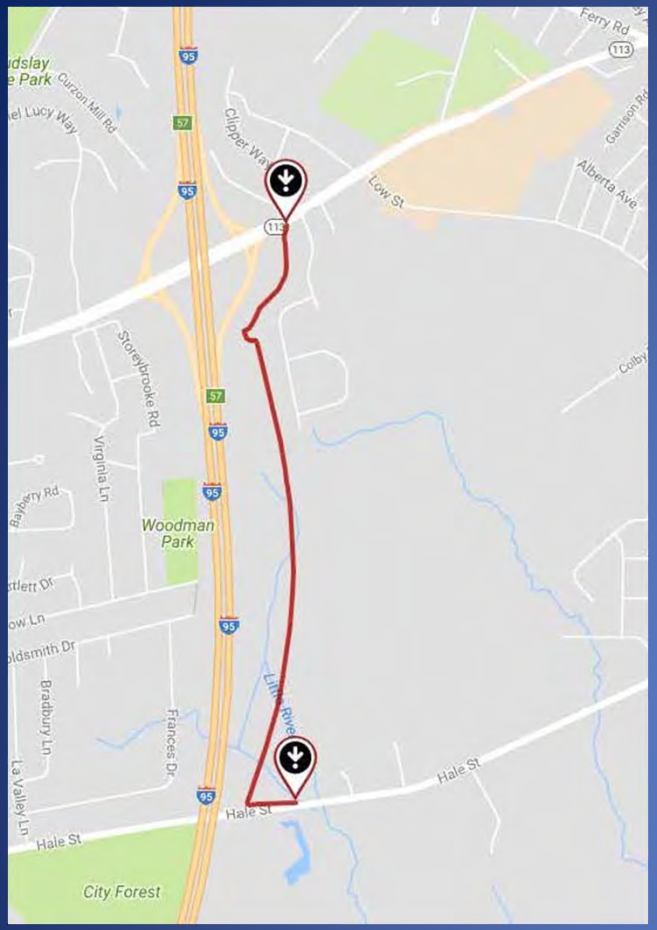


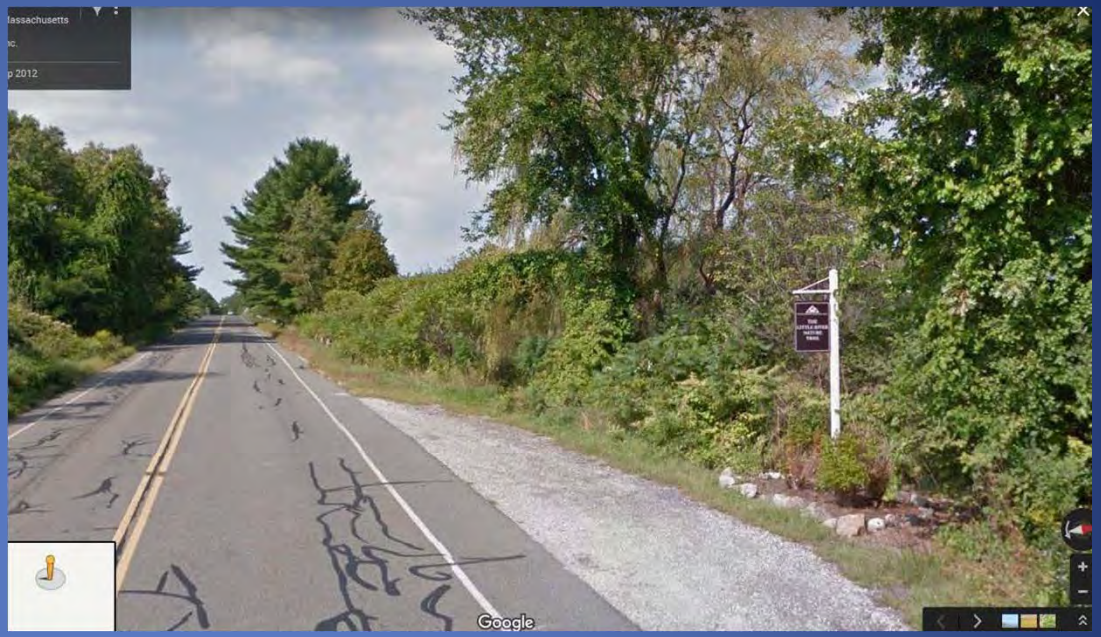
Coastal Trails Coalition
coastaltrails.org

Coastal Trails Network Map
Completed Trail
Proposed Trail
Bike Lanes
On Road Bike Route
Parking
0 1 mile

Gloria Braunhardt Little River Nature Trailhead

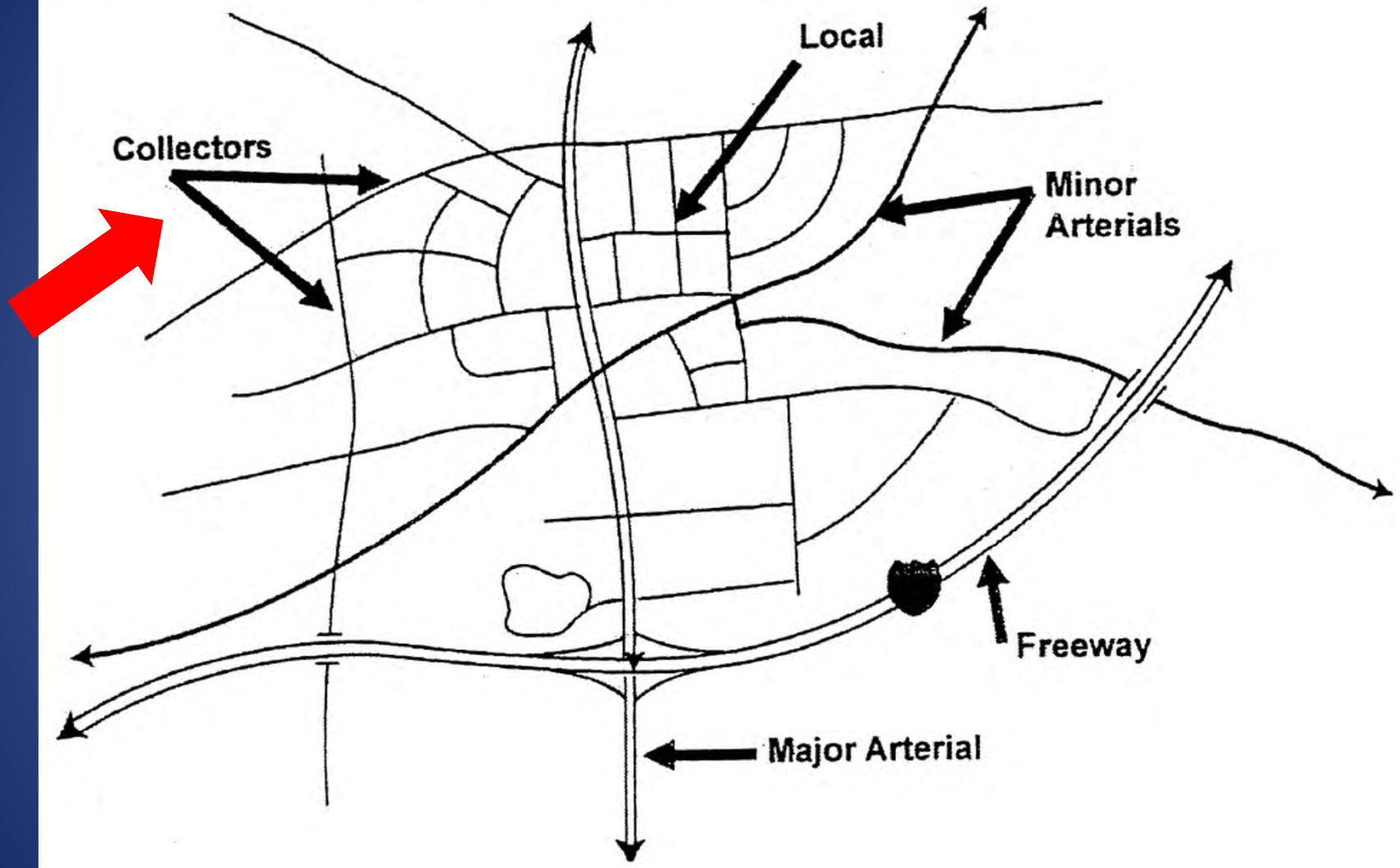






Gloria Braunhardt Little River Nature Trail runs from Hale Street to Storey Ave (Rt. 113)

Exhibit 3-5
Schematic Representation of Roadway Type



ROADWAY TYPES

2006 EDITION MASSHIGHWAY

Exhibit 3-6
Design Vehicle Dimensions

Vehicle	Vehicle Length	Vehicle Width	Operating Width[1]
Passenger Cars and Light Trucks	19.0 feet	7.0 feet	9.0 ft
School Bus	36.0 feet	8.0 feet	10.0 ft
Transit Bus	40.0 feet	8.5 feet	10.5 ft
Single Unit Truck[2]	30.0 feet	8.0 feet	10.0 ft
Tractor-Trailer	55.0 feet	8.5 feet	10.5 ft

Source: *A Policy on the Geometric Design of Streets and Highways*, AASHTO, 2004. Chapter 2 Design Controls and Criteria

1 Assuming one-foot clearance on both sides of vehicle

2 The SU-30 design vehicle is commonly used to model emergency response vehicle operations

VEHICLE DIMENSIONS

Exhibit 5-14
Range of Travel Lane Widths (In Feet)

Area Type	Roadway Type			
	Freeways	Arterials[1]	Collectors[2]	Local Roads
Rural Natural	12	11 to 12	10 to 12	9 to 12
Rural Developed	12	11 to 12	10 to 12	9 to 12
Rural Village	N/A	11 to 12	10 to 12	9 to 12
Suburban Low Density	12	11 to 12	10 to 12	9 to 12
Suburban High Density	12	11 to 12	10 to 12	9 to 12
Suburban Village/Town Center	N/A	11 to 12	10 to 12	9 to 12
Urban	12	11 to 12	10 to 12	9 to 12

1 Lane widths less than the values shown above may be used if a design exception is obtained. See Chapter 2 for a description of the design exception procedure. Situations where narrower lanes may be considered are described below.

2 Minimum 11-foot lanes are required for design speeds of 45 miles per hour or greater.

N/A Not Applicable

Source: Adapted from A Policy on Geometric Design of Highways and Streets, AASHTO 2004, Chapter 4 Cross-Section Elements.

TYPICAL TRAVEL LANE WIDTHS

2006 EDITION MASSHIGHWAY

Exhibit 5-12
Widths of Usable Shoulders (In Feet)

Area Type	Roadway Type: Freeways[1]	Arterials[2]	Collectors[2]	Local Roads
Rural Natural	10 to 12	4 to 12	4 to 10	2 to 8
Rural Developed	10 to 12	4 to 12	4 to 10	2 to 8
Rural Village	N/A	4 to 12	4 to 10	2 to 8
Suburban Low Density	10 to 12	4 to 12	4 to 10	2 to 8
Suburban High Density	10 to 12	4 to 12	4 to 10	2 to 8
Suburban Village/Town Center	N/A	4 to 12	4 to 10	2 to 8
Urban	10 to 12	4 to 12	4 to 10	2 to 8

Source: *Flexibility in Highway Design*, AASHTO 2004. Chapter 6 Cross Section Elements

1 Left shoulders are required on Freeways and other divided roadways. See the AASHTO Green Book for left-shoulder guidance.

2 Shoulder widths less than the values shown above may be used if a design exception is obtained. See Chapter 2 for a description of the design exception procedure. Situations where narrower shoulders may be considered are described below.

Note: An additional 2-foot offset from the edge of the shoulder is required to vertical elements over 6-inches in height (such as guardrail).

TYPICAL SHOULDER WIDTHS

2006 EDITION MASSHIGHWAY

Exhibit 5-11

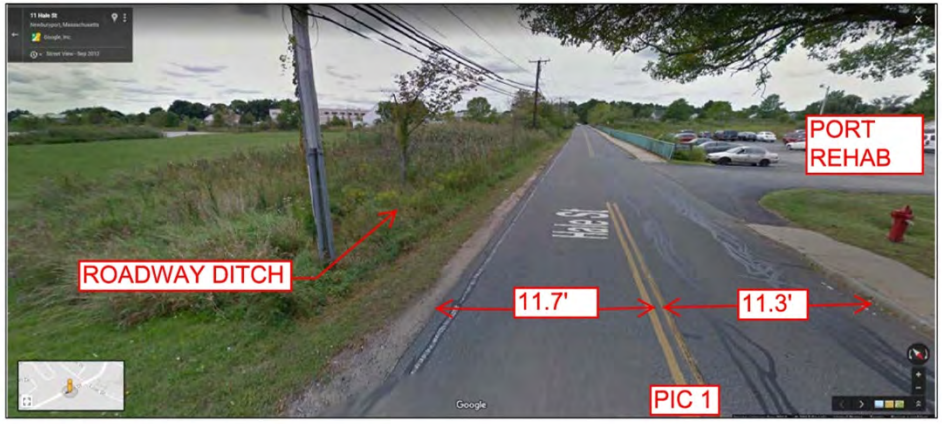
Minimum Shoulder Width (in feet) to Provide Various Functions

Shoulder Function	Roadway Type	
	Arterials	Collectors
Drainage of Traveled Way	1.0	1.0
Lateral Support of Pavement	1.5	1.0
Encroachment of Wide Vehicles	2.0	2.0
Off-tracking of Wide Vehicles	2.0	2.0
Errant Vehicles	3.0	2.0
Bicycle and Pedestrian Use	4.0	4.0
Emergency Stopping	6.0	6.0
Emergency Travel	6.0	6.0
Mail Delivery and Garbage Pickup	6.0	6.0
Law Enforcement Operations	8.0	6.0
Large Vehicle Emergency Stopping	10.0	10.0
Occasional Travel/Detours	10.0	9.0
Highway Maintenance	8.0	8.0

Source: *Flexibility in Highway Design*, AASHTO 2004. Chapter 6 Cross Section Elements

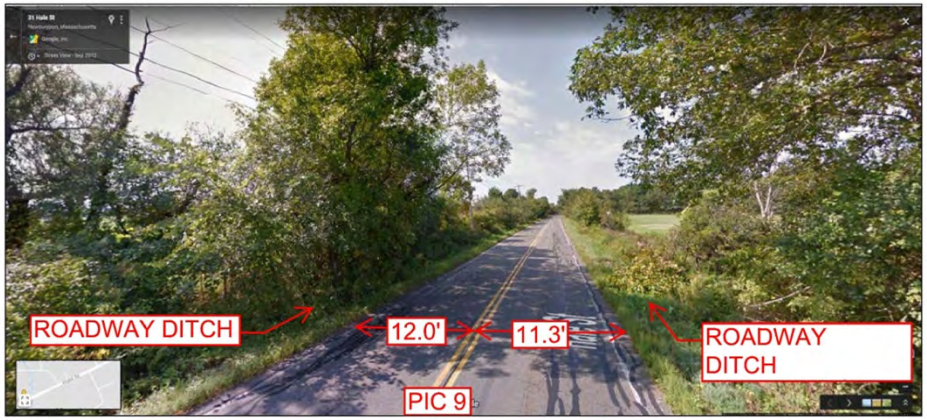
MINIMUM SHOULDER WIDTHS

2006 EDITION MASSHIGHWAY

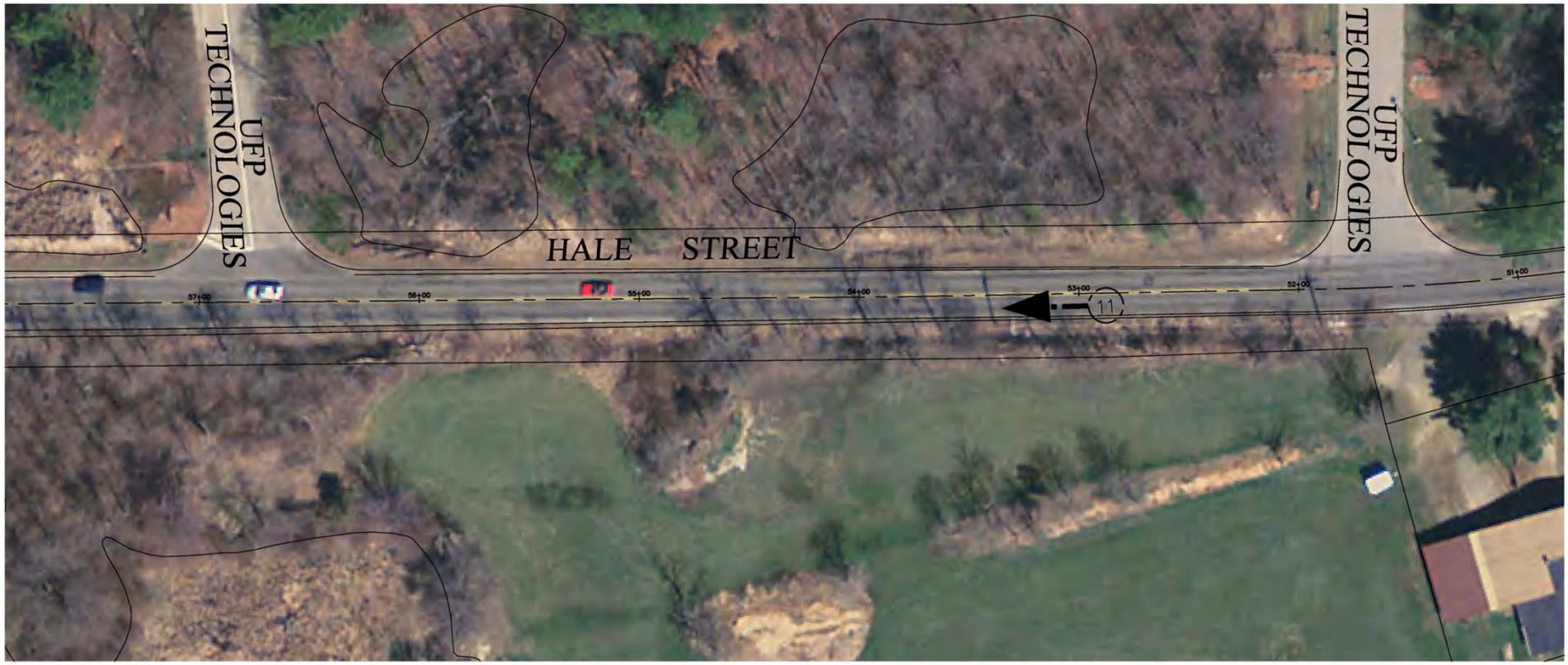


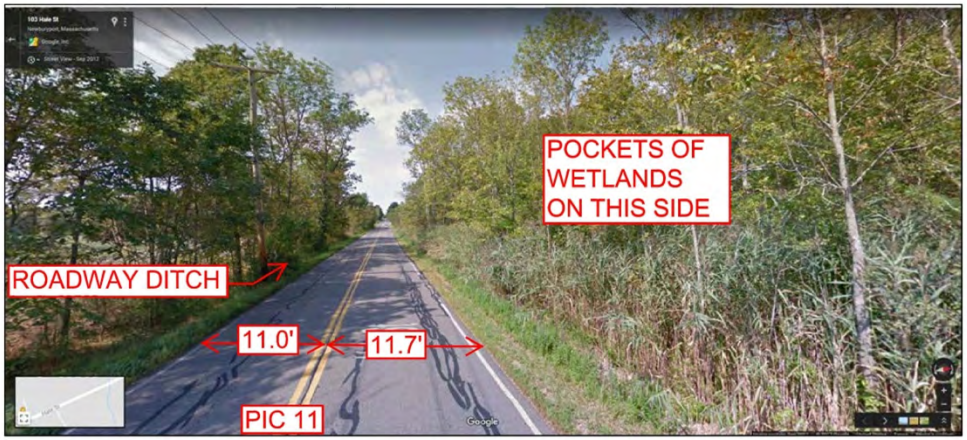
EXISTING CONDITIONS

EXISTING CONDITIONS

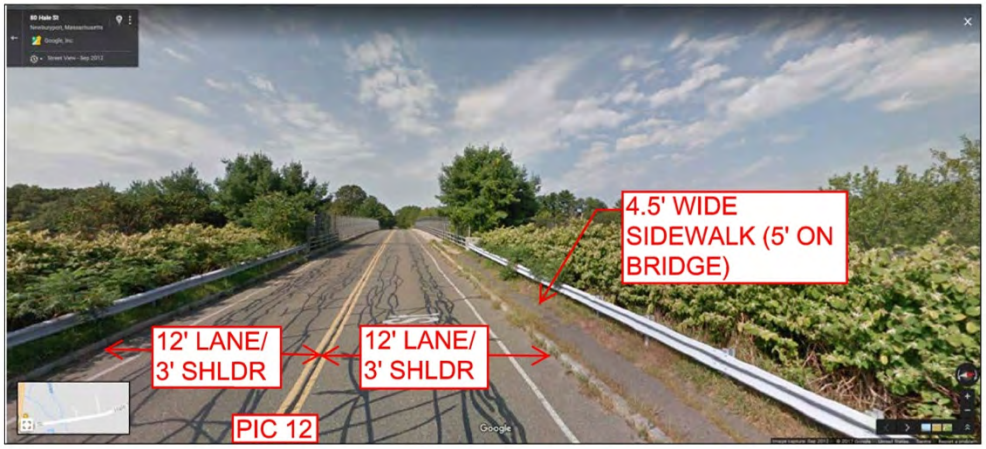


EXISTING CONDITIONS

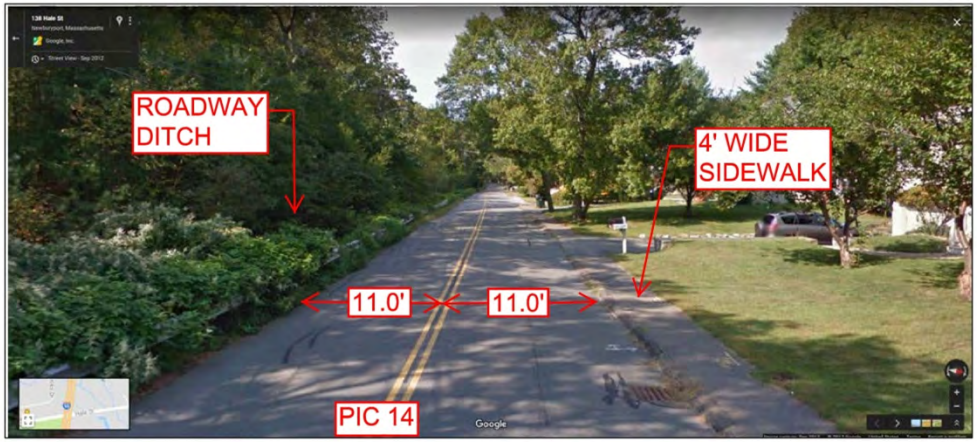




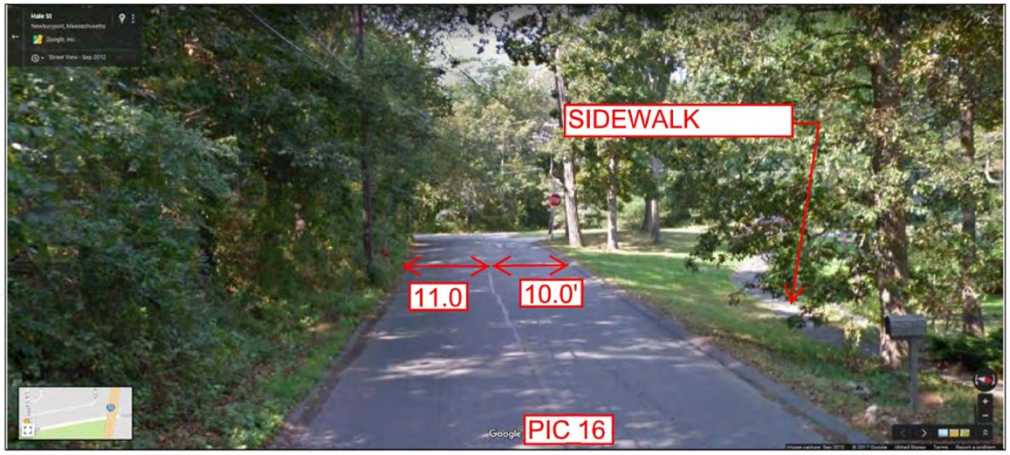
EXISTING CONDITIONS



EXISTING CONDITIONS



EXISTING CONDITIONS



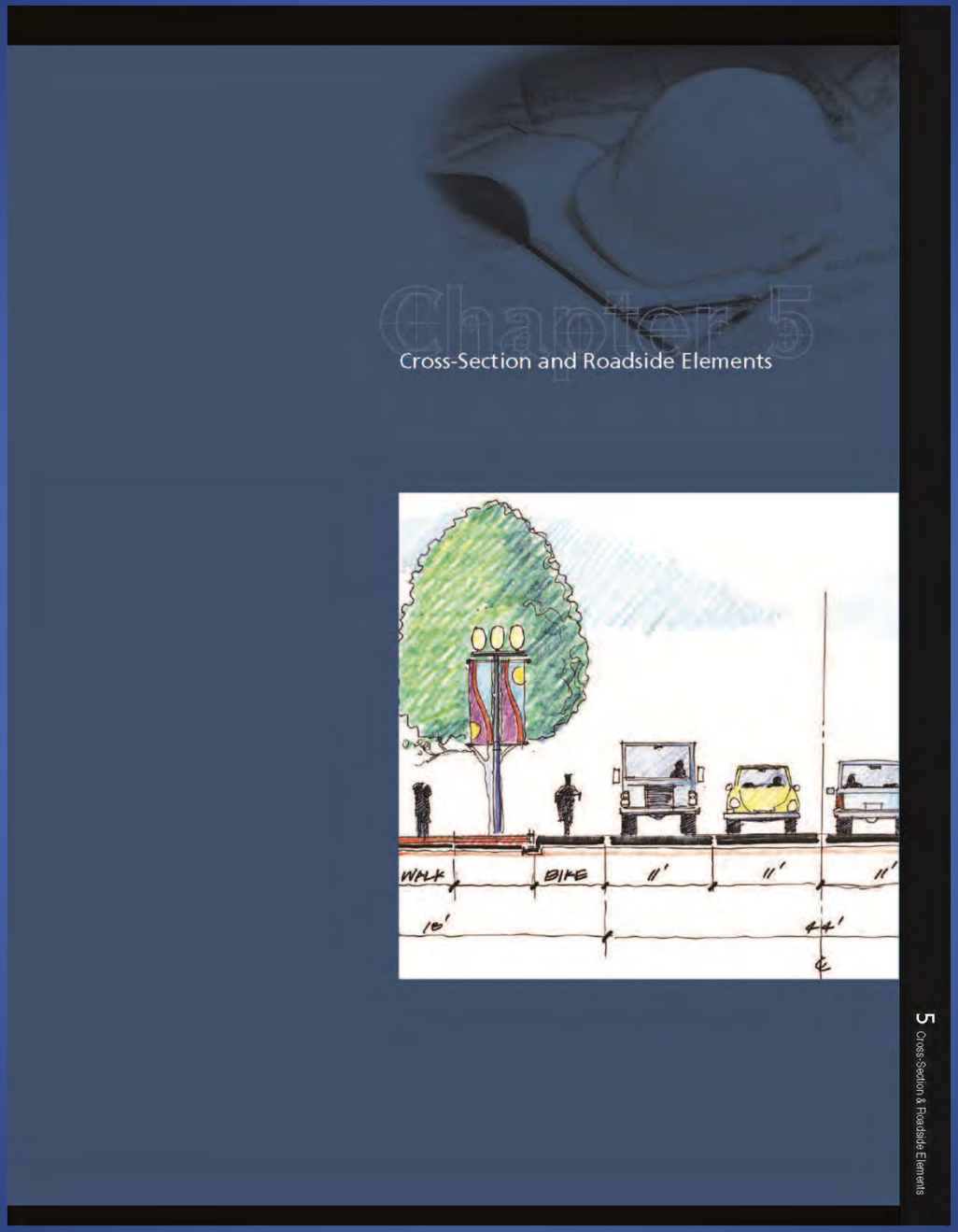
EXISTING CONDITIONS

Improving Public Access on Hale Street

Possible Solutions

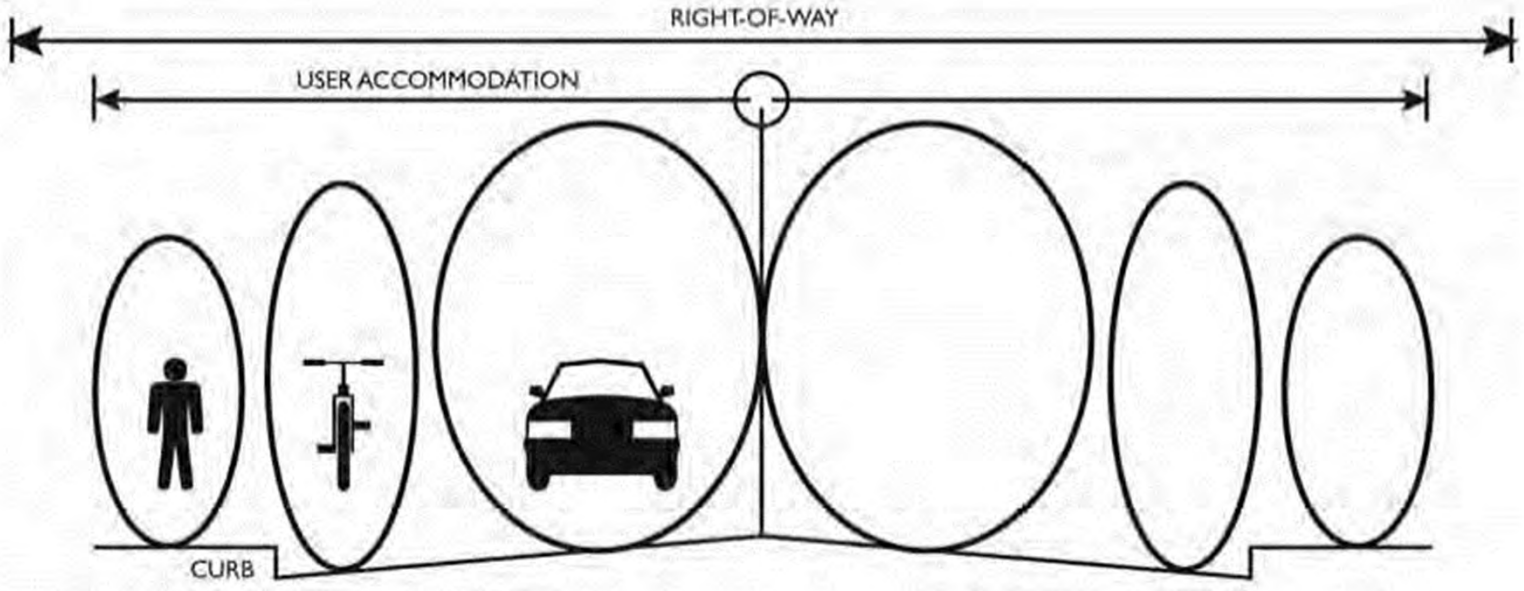
Option 1: Shoulder w/ Sidewalk

Option 2: Shared Use Path



MassDOT Project Development & Design Guide

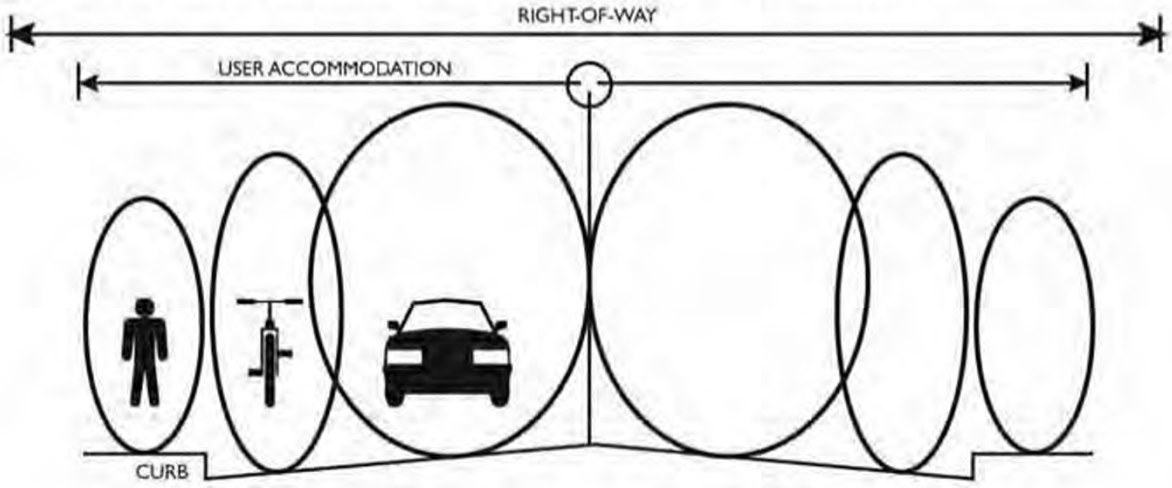
Exhibit 5-1
Case 1: Separate Accommodation For All Users



Source: MassHighway

Provision of a striped bicycle lane or shoulder suitable for bicycle use (4 feet minimum, 5 feet preferred) encourages cyclists to use the roadway. The bicycle lane/shoulder also provides for additional separation between motor vehicle traffic and pedestrians.

Exhibit 5-2
Case 2: Partial Sharing for Bicycles and Motor Vehicles

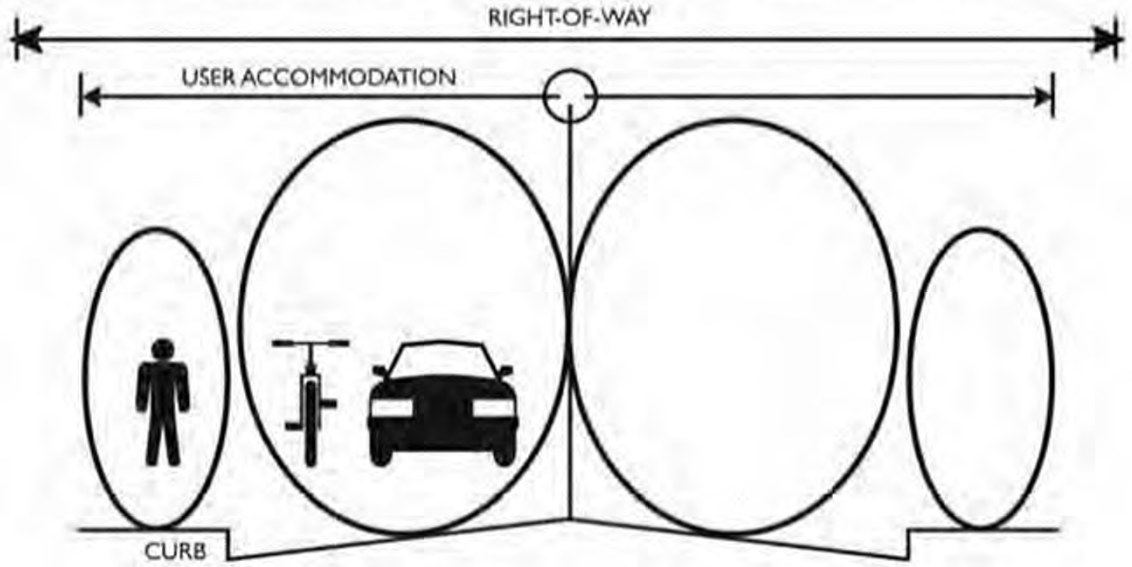


Source: MassHighway

In Case 2, there is some overlap between the space provided for bicycle use and that provided for motor vehicle travel. Depending on the lane and shoulder widths provided, Case 2 accommodation may require a Design Exception. Signs or pavement markings indicating that the roadway is shared between cyclists and motor vehicles are appropriate for Case 2 roadways.

This type of accommodation is often used in areas with low motor vehicle speeds, low to moderate motor vehicle traffic volumes, and areas of environmental or right-of-way constraint where a smaller cross-section is necessary.

Exhibit 5-3
Case 3: Shared Bicycle/Motor Vehicle Accommodation



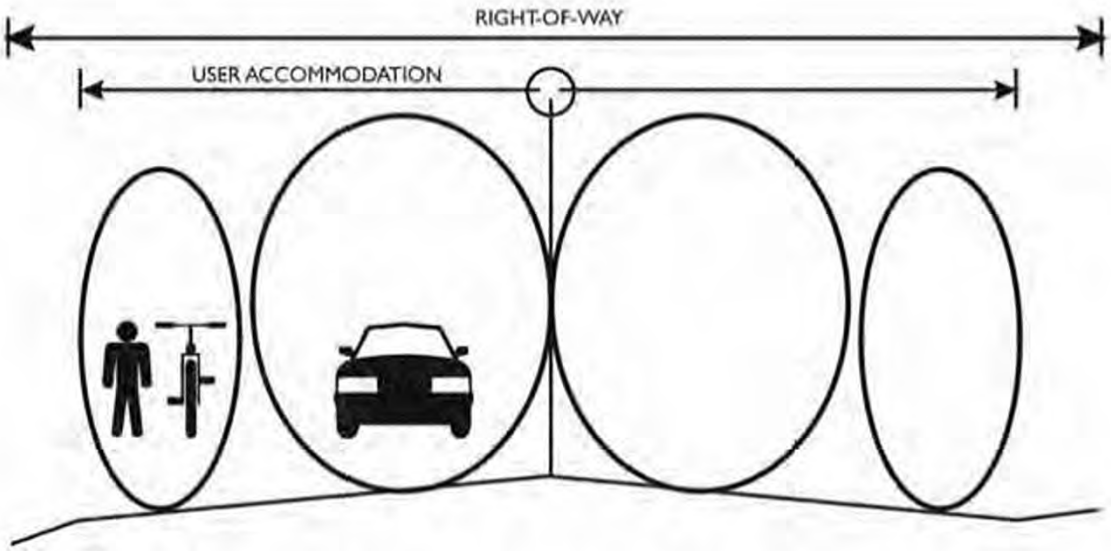
Source: MassHighway

Pedestrians are provided with a sidewalk separated from the roadway by a raised curb and preferably a landscaped buffer, increasing the safety and comfort of walking along this roadway. The clear width of the sidewalk should be sufficient to allow pedestrians or wheelchair users to pass without interfering with each other's movement (at least 5 feet excluding the curb and sidewalk clear of other roadside obstructions).

5.2.4 Case 4: Shared Bicycle/Pedestrian Accommodation

In sparsely developed areas (such as rural natural, rural developed, and suburban low density areas), curbed roadway sections bounded by sidewalk are less common. This case is illustrated in Exhibit 5-4.

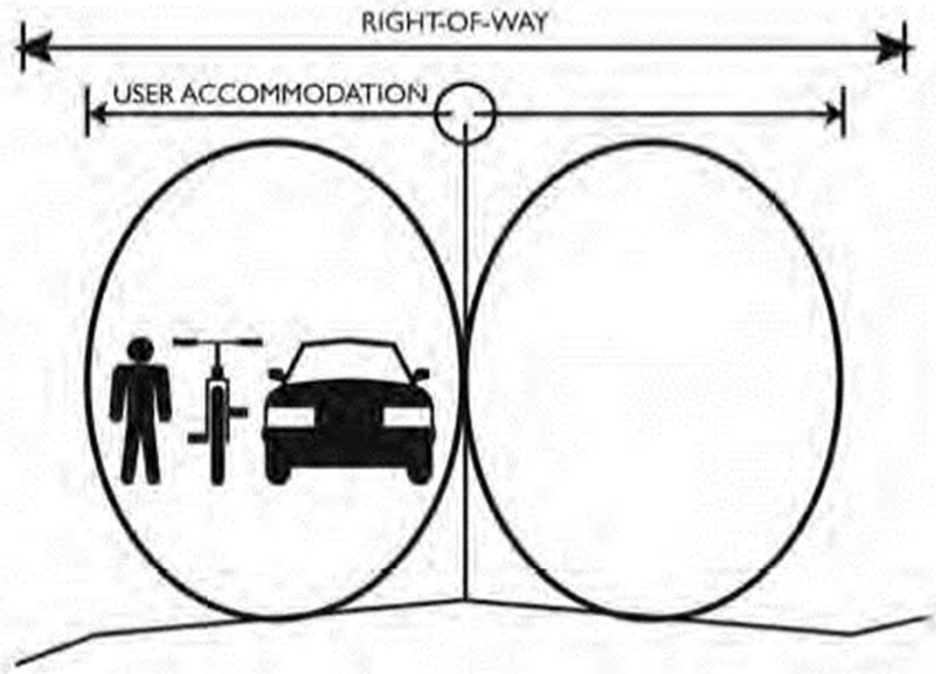
Exhibit 5-4
Case 4: Shared Bicycle/Pedestrian Accommodation



Source: MassHighway

In these areas, pedestrians and cyclists are often accommodated on the roadway shoulder. This type of accommodation may be appropriate for areas with infrequent pedestrian activity. In areas with higher pedestrian volumes (either current or anticipated), the pedestrian accommodation described in Cases 1, 2, and 3 is desirable.

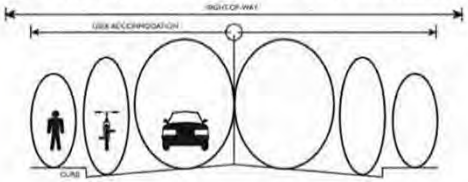
Exhibit 5-5
Case 5: Shared Accommodation for All Users



Source: MassHighway

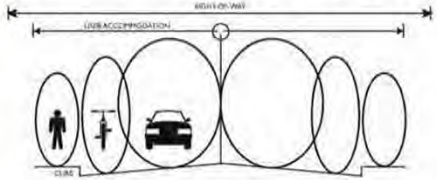
Exhibit 5-6
Summary of Multi-modal Accommodation Options

Case 1: Separate Accommodation for All Users



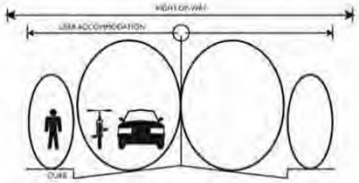
- Often the preferred option to provide safe, convenient, and comfortable travel for all users.
- Appropriate for areas with moderate to high levels of pedestrian and bicycle activity.
- Appropriate for roadways with moderate to high motor vehicle speeds.
- Appropriate in areas without substantial environmental or right-of-way constraints.

Case 2: Partial Sharing for Bicycles and Motor Vehicles



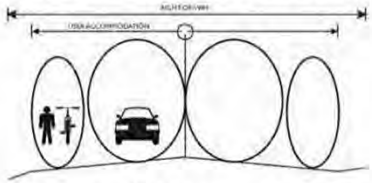
- Used in areas where the width necessary to provide Case 1 accommodation is not available.
- Under Case 2, pedestrians are provided with a sidewalk or separate path while space for bicyclists and drivers overlap somewhat.
- Appropriate in areas with low motor vehicle speeds and low to moderate motor vehicle volumes.

Case 3: Shared Bicycle/Motor Vehicle Accommodation



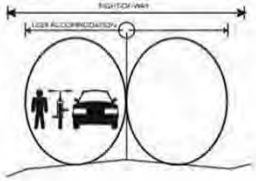
- Under Case 3, pedestrians remain separate but bicycle and motor vehicle space is shared.
- Used in densely developed areas where right-of-way is constrained.
- Also applicable to most residential/local streets where speeds and traffic volumes are low.

Case 4: Shared Bicycle/Pedestrian Accommodation



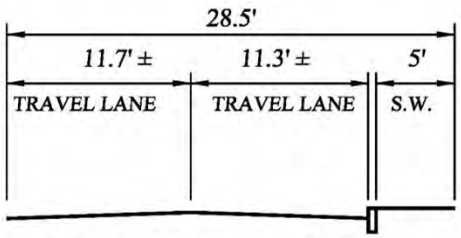
- Under Case 4, pedestrians and bicyclists share the shoulder.
- Common in rural or sparsely developed areas.
- Appropriate for areas with infrequent pedestrian and bicycle use.

Case 5: Shared Accommodation for All Users

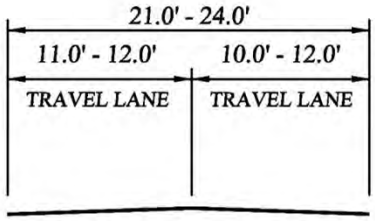


- Under Case 5, all users share the roadway.
- Appropriate where user demands and motor vehicle speeds are very low or when severe constraints limit the feasibility of providing separate accommodation.

Source: MassHighway

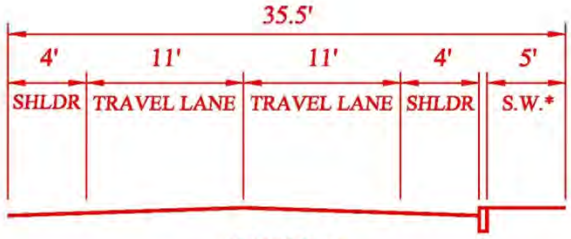


EXISTING TYPICAL SECTION
LOW STREET TO SQUIRES GLENN DRIVE



EXISTING TYPICAL SECTION
SQUIRES GLENN DRIVE TO TURKEY HILL ROAD*

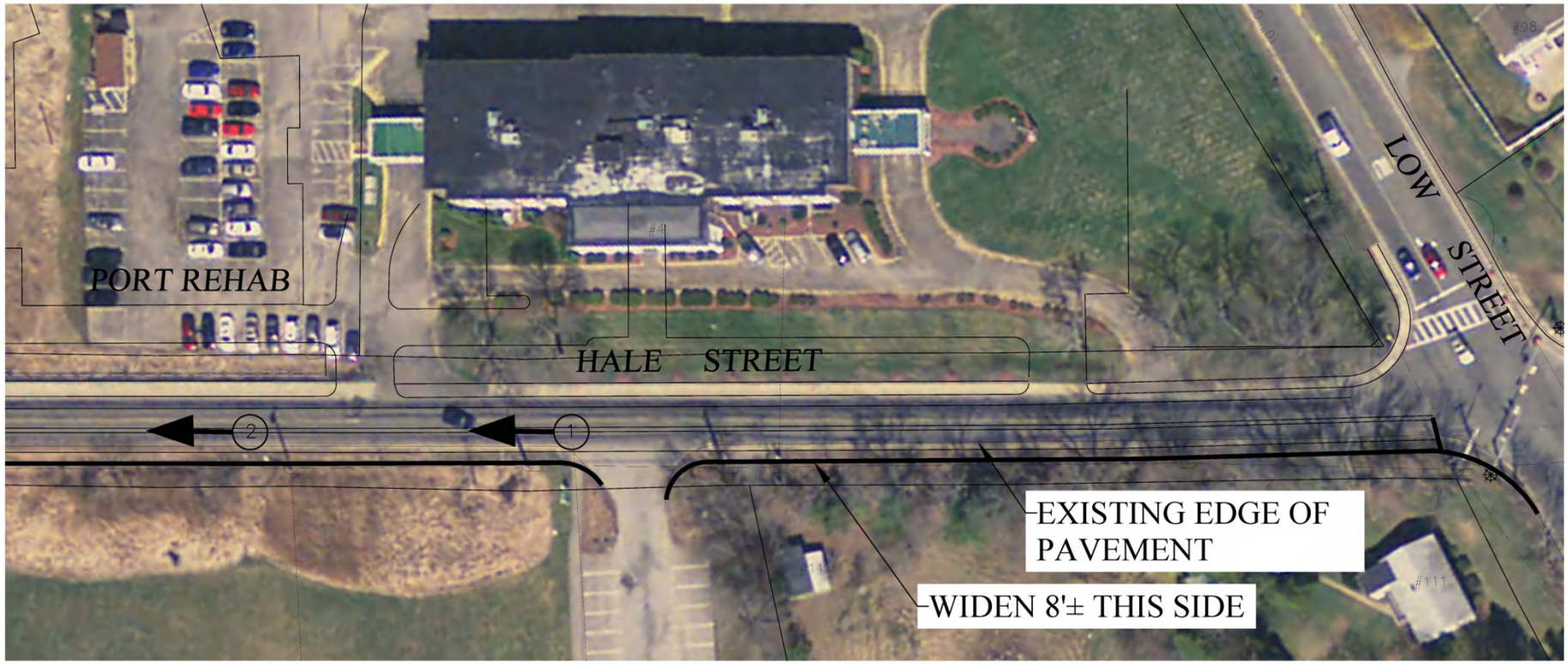
* Excluding the section over Rt. 95



OPTION 1
TYPICAL SECTION - LOW STREET* TO TURKEY HILL ROAD

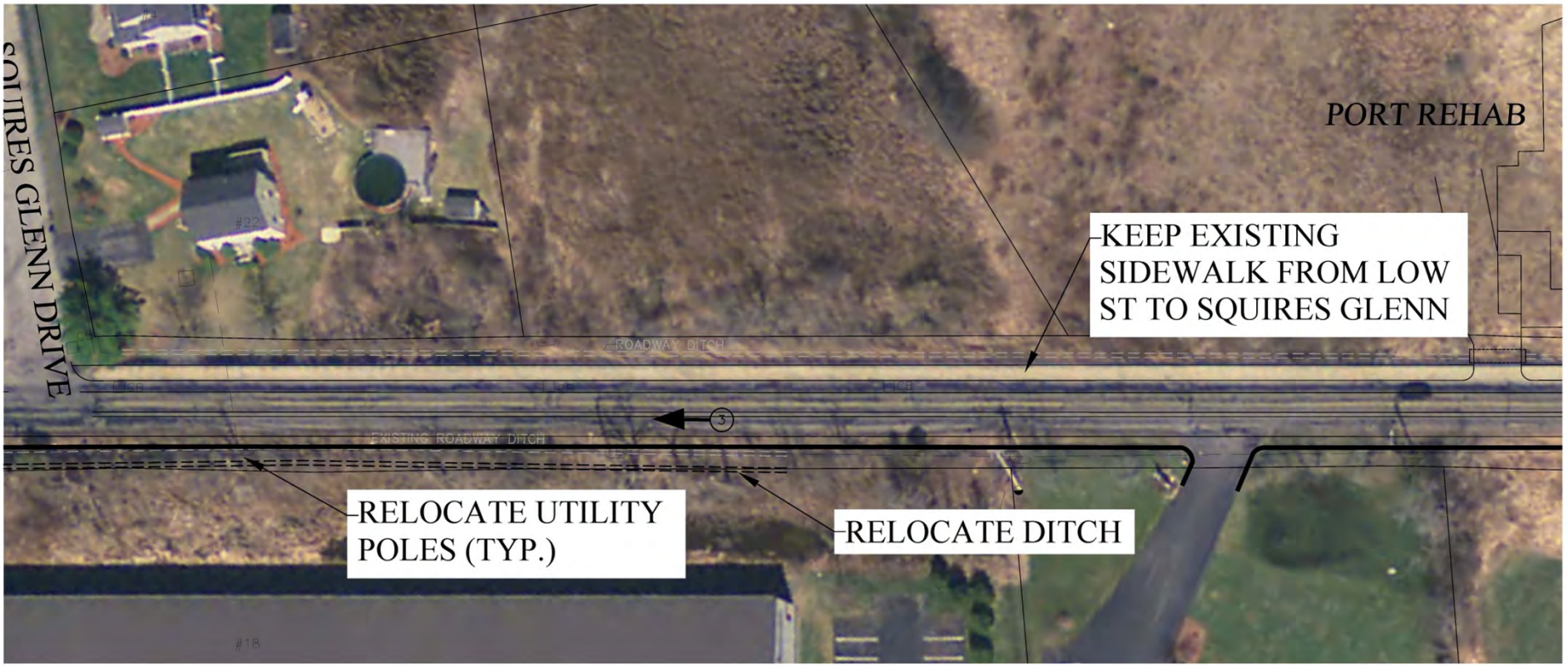
*Use existing sidewalk from Low Street to Squires Glenn Drive

OPTION 1 – TYPICAL SECTION


PORT REHAB
HALE STREET
LOW STREET
EXISTING EDGE OF PAVEMENT
WIDEN 8'± THIS SIDE

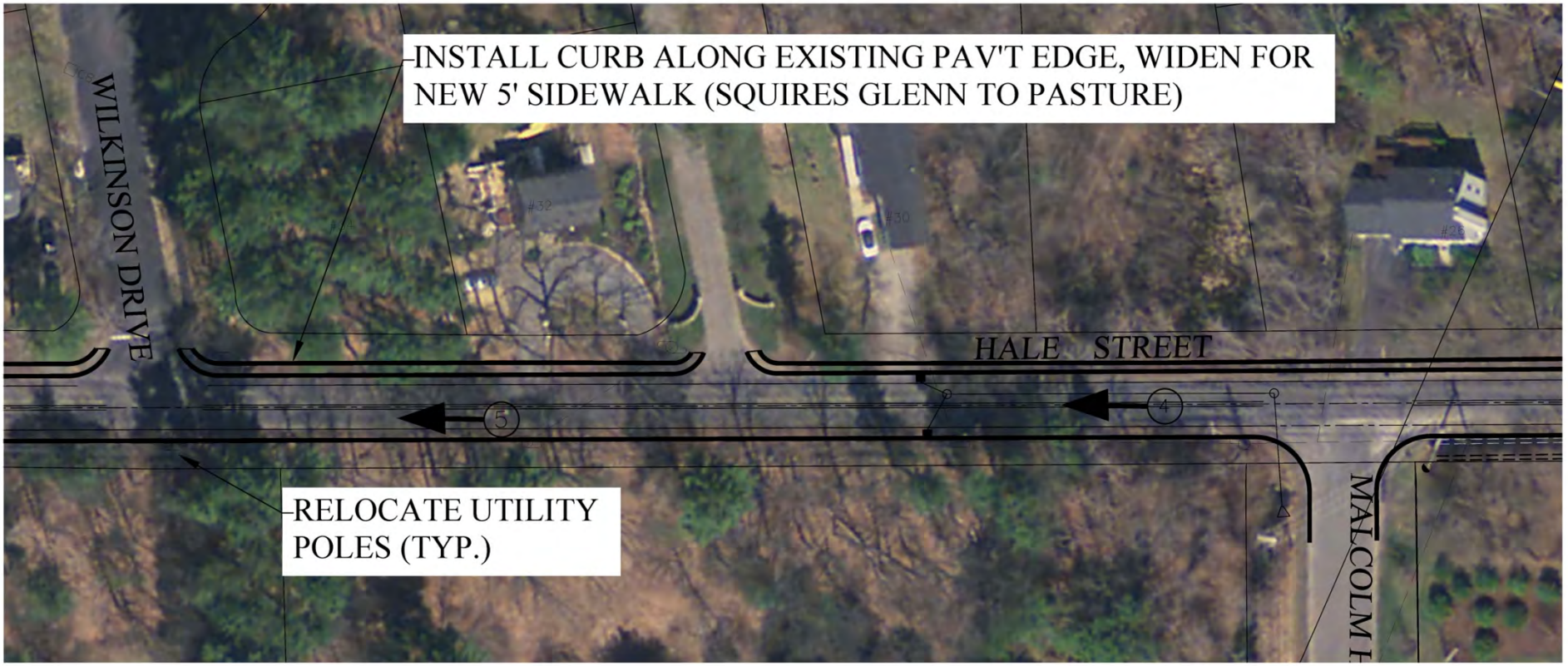

WIDEN THIS SIDE
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
KEEP EXIST. S.W.
4' SHOULDER

OPTION 1


SQUIRES GLENN DRIVE
PORT REHAB
KEEP EXISTING SIDEWALK FROM LOW ST TO SQUIRES GLENN
ROADWAY DITCH
EXISTING ROADWAY DITCH
RELOCATE UTILITY POLES (TYP.)
RELOCATE DITCH

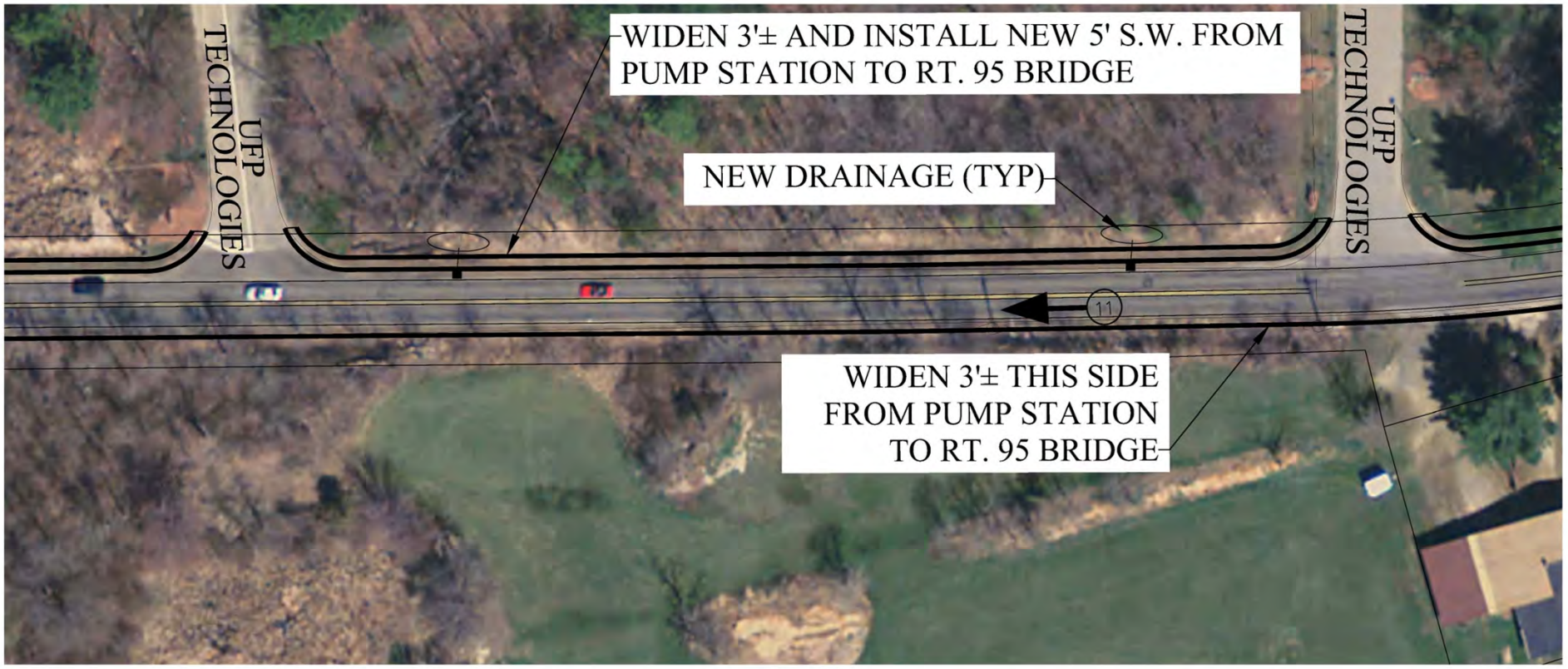

SHIFT EXISTING DITCH
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
KEEP EXISTING S.W.

OPTION 1


INSTALL CURB ALONG EXISTING PAV'T EDGE, WIDEN FOR NEW 5' SIDEWALK (SQUIRES GLENN TO PASTURE)
WILKINSON DRIVE
HALE STREET
RELOCATE UTILITY POLES (TYP.)
MALCOLM H


PIC 5
WILKINSON DRIVE
5' SIDEWALK
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER

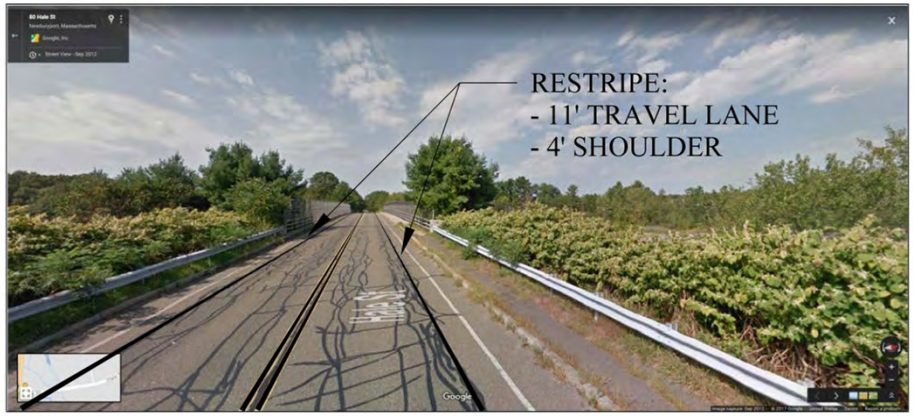
OPTION 1


WIDEN 3'± AND INSTALL NEW 5' S.W. FROM PUMP STATION TO RT. 95 BRIDGE
NEW DRAINAGE (TYP)
UFP TECHNOLOGIES
UFP TECHNOLOGIES
11
WIDEN 3'± THIS SIDE FROM PUMP STATION TO RT. 95 BRIDGE


PIC 11
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
5' SIDEWALK

OPTION 1


I-95 NORTH
KEEP EXISTING S.W.,
NO WIDENING REQ'D
THIS SECTION
MEET EXISTING S.W. HERE
REET
HALE STREET
12

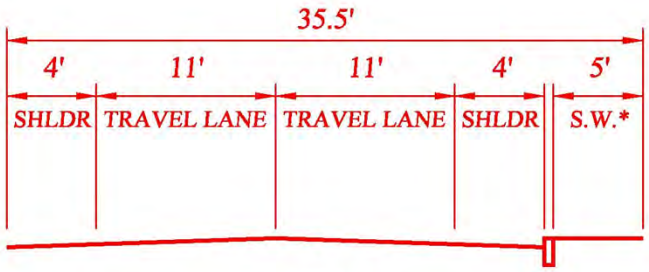

RESTRIPE:
- 11' TRAVEL LANE
- 4' SHOULDER

OPTION 1

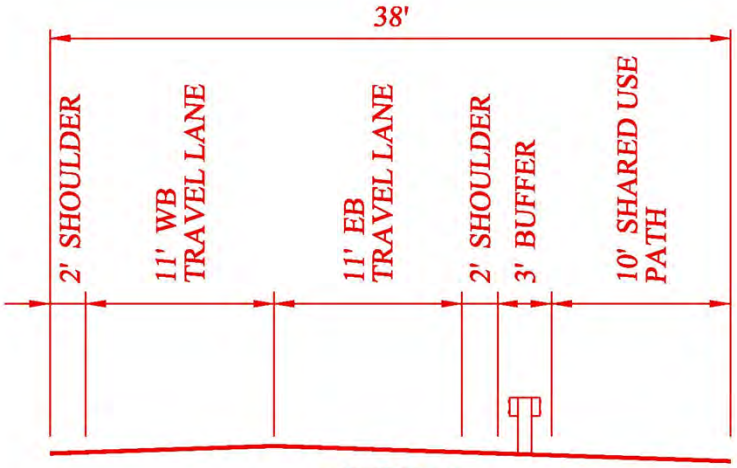

PATH TO FRANCIS DR
WIDEN ROAD 4'± AND
INSTALL NEW 5' S.W.
TO LAVALLEY LANE
HALE STREET
14
CITY FOREST
WIDEN ROAD 4'± THIS SIDE,
INSTALL NEW G-RAIL & SWALE


4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
5' SW

OPTION 1



OPTION 2
TYPICAL SECTION - LOW STREET* TO PASTURE
* Use existing sidewalk from Low Street to Squires Glenn Drive



OPTION 2
TYPICAL SECTION - PASTURE TO TURKEY HILL ROAD*

*Excluding the section over Rt. 95

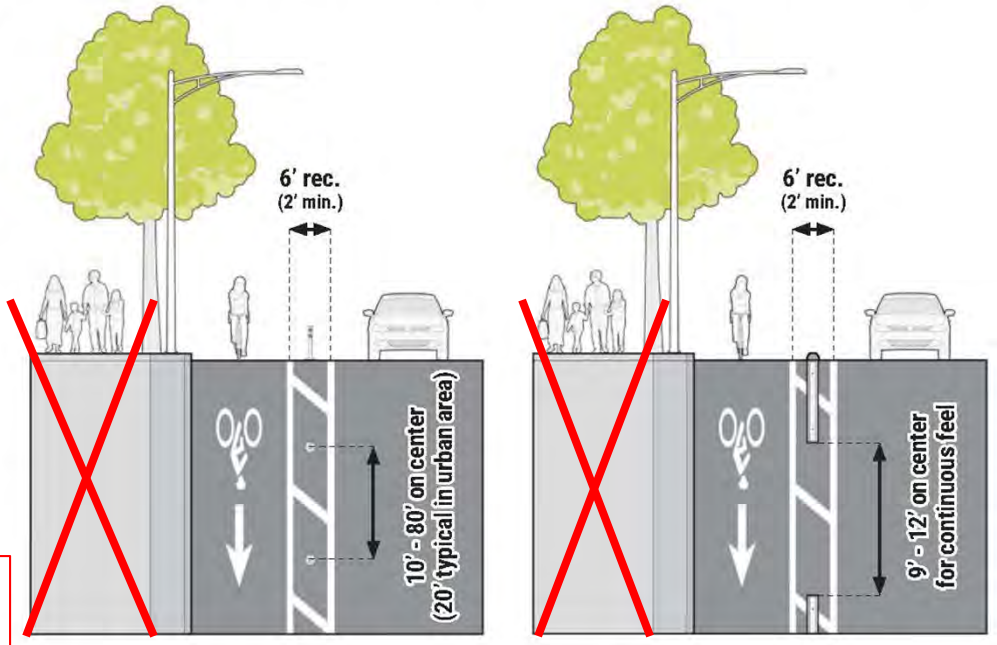
OPTION 2 – TYPICAL SECTION

Capital costs for vertical objects are typically lower than raised medians, making them ideal for retrofit projects. However, vertical objects may require routine maintenance and replacement, increasing long-term costs. Some vertical objects may be temporarily removed to accommodate standard sweeping and snow clearance (see Section 7.3). Most vertical objects are non-continuous, which facilitates positive drainage along the established roadway crown to existing catch basins.

Ensuring the vertical separation is visible to approaching bicyclists and motorists should be considered. Vertical objects in the street buffer are considered delineators and must be retroreflective, per the MUTCD.

SIDEWALK NOT INCLUDED IN OPTION 2

EXHIBIT 3L: VERTICAL OBJECTS IN THE STREET BUFFER ZONE



Flexible Delineator Posts

- Removable
- Lowest initial capital costs
- May require closer spacing where parking encroachment is likely
- Small footprint compatible with variety of buffer designs
- Low durability
- May need routine replacement, increasing long-term maintenance costs.

Parking Stops

- Maintain consistent spacing between parking stops
- Removable
- Highly durable
- May need supplemental vertical objects or on-street parking to increase visibility

3.4 STREET BUFFER ZONE

The street buffer zone is one of the most important elements of separated bike lane design. The goal of the street buffer is to maximize the safety and comfort of people bicycling and driving by physically separating these roadway users with a vertical object or a raised median. The width of the street buffer also influences intersection operations and bicyclists safety, particularly at locations where motorists may turn across the bike lane (see Chapter 4). Many factors influence design decisions for the street buffer including number of travel lanes, mot vehicle speeds and volumes, bike lane elevation, right-of-way constraints, drainage patterns and maintenance activities. Aesthetics, durability, cost, and long-term maintenance needs should be considered as well.

The street buffer can consist of parked cars, vertical objects, raised medians, landscaped medians, and a variety of other elements. Elements that must be accessed from the street (e.g., mailboxes) should be located in the street buffer. The minimum

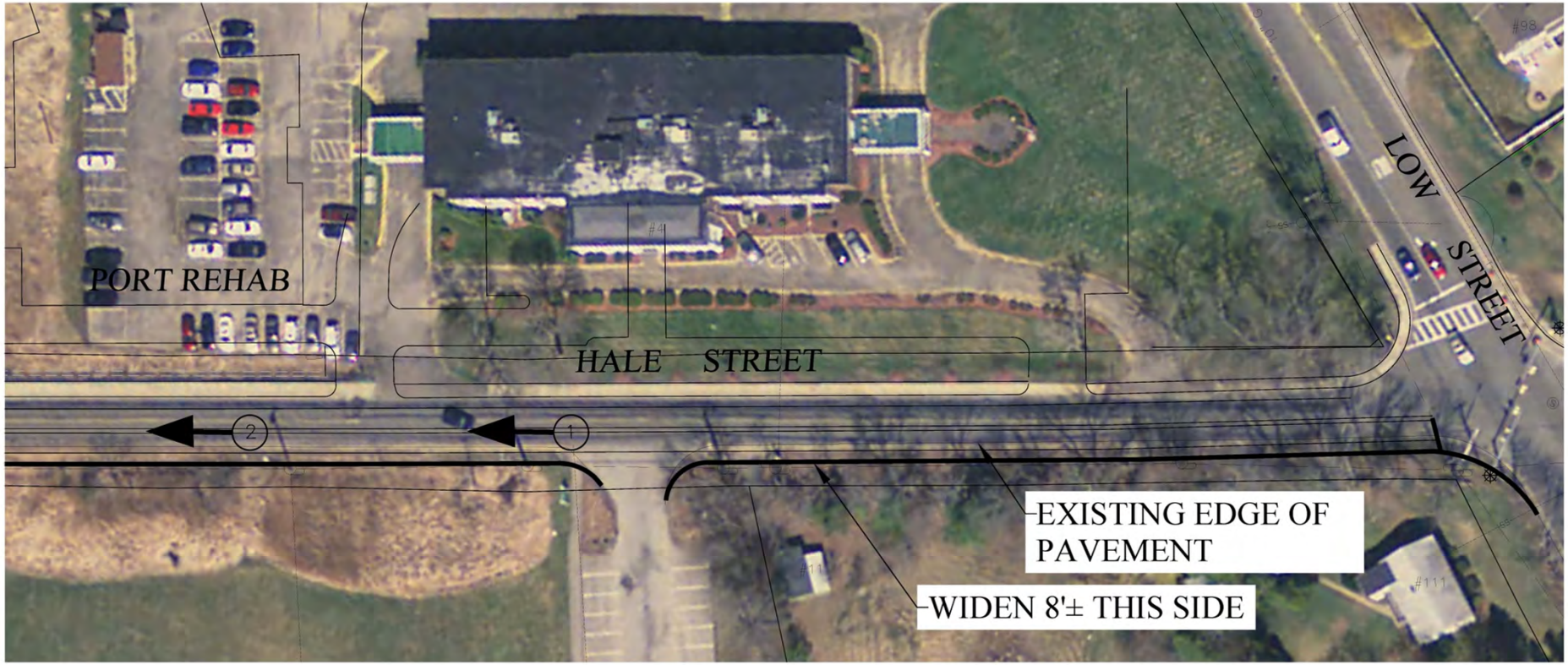
3.4.1 STREET BUFFER WIDTH

Central to the design of the street buffer is its width. Appropriate street buffer widths vary greatly depending on the degree of separation desired, right-of-way constraints, and the types of structures or uses that must be accommodated within the buffer. In general, the recommended width of a street buffer is **6 ft.**, regardless of the type of street buffer. Street buffers may be narrowed to a minimum of **2 ft.** in constrained conditions, or a minimum of **1 ft.** alongside a raised bike lane.

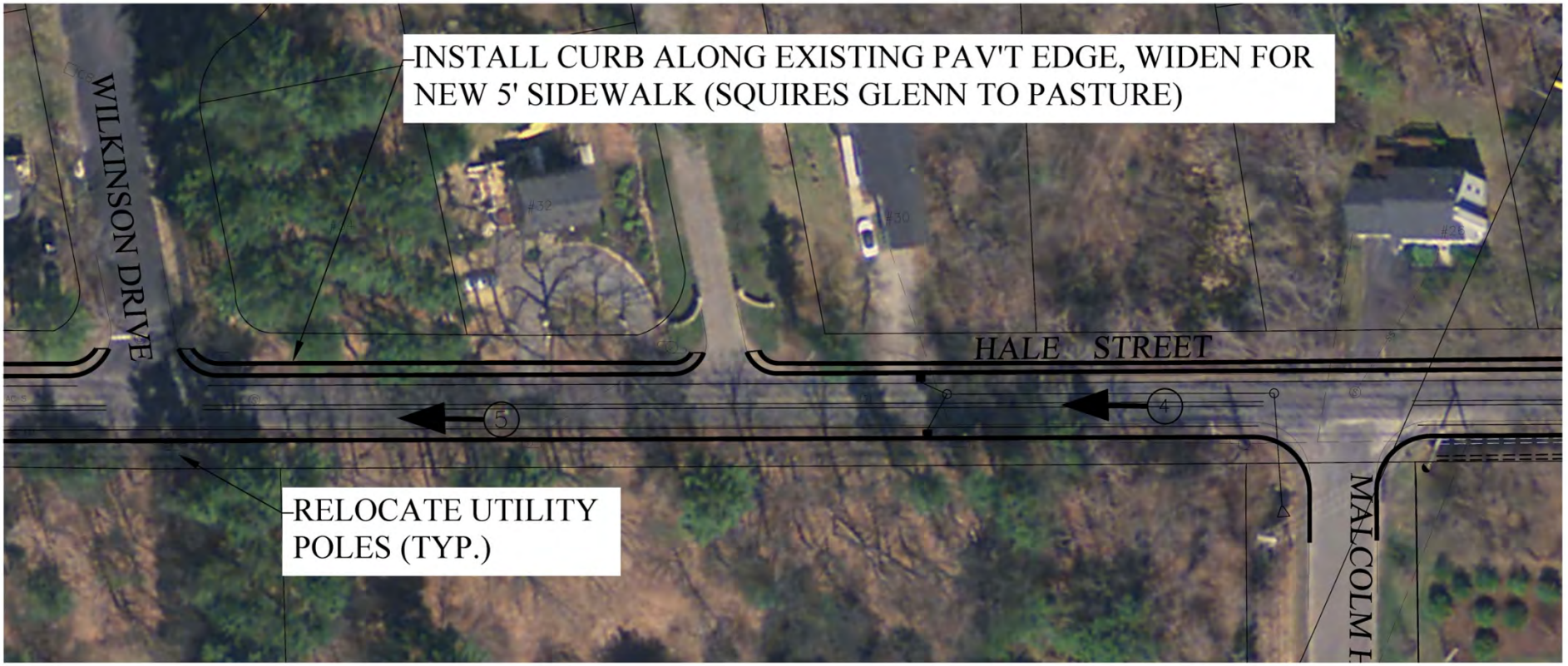
EXAMPLES OF OPTION 2 BUT OPTION 2 PROPOSES GUARD RAIL FOR PROTECTION


San Francisco, CA

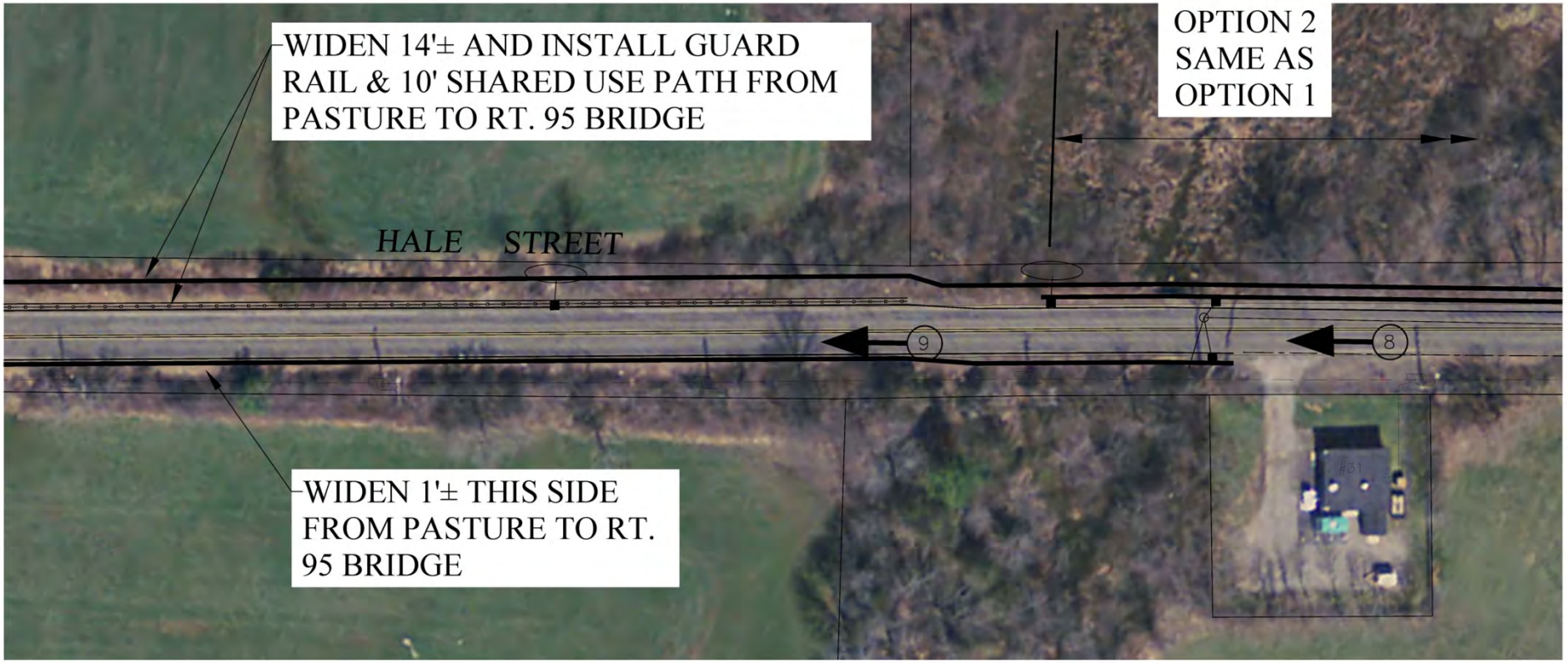

Vancouver, Canada



OPTION 2
(SAME AS OPTION 1 FROM LOW ST TO PASTURE)



OPTION 2
(SAME AS OPTION 1 FROM LOW ST TO PASTURE)



OPTION 2

(SAME AS OPTION 1 FROM LOW ST TO PASTURE)

TRANSITION INTO SHARED USE PATH (UNACCEPTABLE – CREATES HEAD ON COLLISION)

OPTION 2

- CONFLICTS AT TRAILHEAD AND PARKING AREA -

OPTION 2

(SAME AS OPTION 1)

Presentation uploaded onto website:

https://www.cityofnewburyport.com/department-of-public-services/engineering

DISCUSSION
AND
PUBLIC PARTICIPATION