

STUDY AND PRELIMINARY DESIGN

# Spot Pond Circumferential Trail Study

Stoneham/Medford, Massachusetts

**PREPARED FOR**



Town of  
**STONEHAM** | MA

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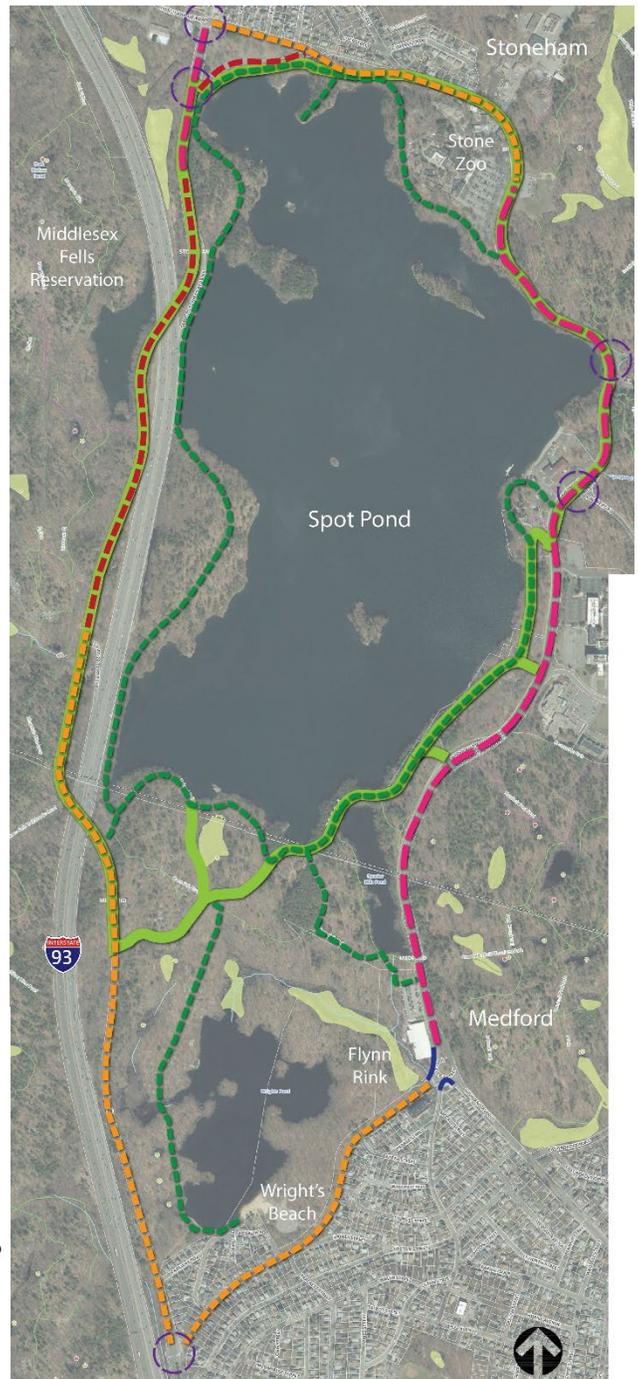
# ES

## Executive Summary

The purpose of this report is to summarize the analysis and recommendations for a potential circumferential trail/trail network around Spot Pond. The report summarizes the analysis of existing conditions, verification of right-of-way (ROW) impacts, high-level environmental due diligence, and the development of preferred routes for a fully accessible, shared-use path and a nature trail for walking, running, and hiking. The Study Area includes Spot Pond, the parkway system that surrounds it, and a portion of the City of Medford south of the pond to Elm Street.

### LEGEND

- Designated road diet with buffered bike lanes
- Buffered bike lanes
- Standard 5' wide bike lanes
- Turn lane and/or shared lane
- Accessible shared-use path loop
- Nature trail loop
- Wider sidewalk
- Intersection redesign



## Project Goals

Helping to guide the planning work, the team established project goals. The five goals support the future proposal to incorporate both an **accessible, shared-use path** around Spot Pond, as well as a **nature trail loop**. They also help to establish the policy foundation to encourage the Department of Conservation and Recreation (DCR) to implement **long-term changes to the DCR parkways** that surround the pond on all four sides.

- **Safety:** develop a safe and comfortable non-motorized route around Spot Pond that minimizes the need for on-street bike facilities and improves crossing opportunities at intersecting roadways
- **Connectivity:** create a fully-connected, ADA-accessible route—along with a nature trail—around Spot Pond that improves links to downtown Stoneham, other parts of the Fells Reservation, nearby transit, and neighborhoods in Medford, and Melrose
- **Efficiency:** incorporate existing shared-use paths and trails within the Fells Reservation, along with repurposing the pavement width within DCR’s surrounding parkways to lower costs, minimize impact on the surrounding landscape, & create a better balance for all users
- **Environmental:** design shared-use path and nature trail routes that minimize permitting and mitigates impact on wetlands, habitat areas, and environmental and cultural resources
- **Aesthetics:** integrate existing environmental features, trailheads, and pond views into the preferred routes to enhance the aesthetic experience of circumnavigating Spot Pond

## Accessible, Shared-use Path

The foundation for a circumferential trail around Spot Pond is the development of an accessible shared-use path (SUP) that provides an opportunity for all users to walk, roll, skate or bicycle around Spot Pond. The accessible SUP would follow a primarily flat grade with a maximum slope of 4.5%. It would include a mix of both paved surface and stonedust treatment with portions incorporating existing and proposed bike lanes, wide sidewalks, and other SUPs. Many of the proposed bike lanes lie on DCR parkways that feature unnecessary vehicular travel lanes for the current traffic volume and/or travel lanes that are wider than necessary. In some cases, recommendations include re-allocating the roadway cross section to provide wide, buffered bike lanes in place of unnecessary travel lanes on the four-lane parkway segments. In aggregate, bicyclists would have the option to use the roughly 4-mile long accessible SUP around the pond, or to travel another mile to the south on bike lanes through portions of Medford.



*Portions of Half Mile Road can be incorporated into the accessible SUP loop around the pond*

## Nature Trail Loop

Paralleling the accessible SUP, a nature trail would provide, in many cases, a quieter experience for

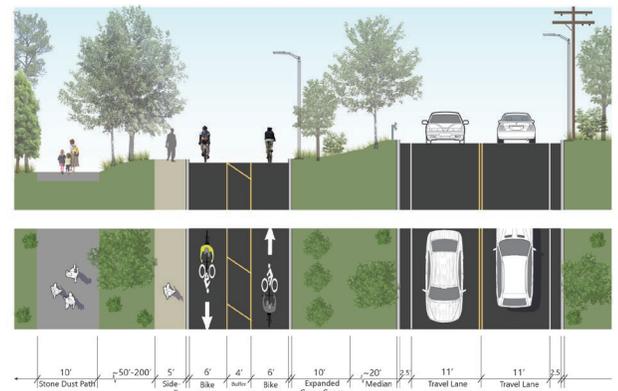
people walking, hiking, or running. In some areas it would utilize portions of the accessible SUP—e.g., a portion of Pond Street between the Stone Zoo parking lot and the Botume House, and a segment of Half Mile Road along the southeast edge of the pond. Some portions of the nature trail incorporate existing footpaths such as the Pickerel Path, while others are proposed. New trail segments would be context sensitive and include design features that take into account drainage, slopes, and erosion issues. Coordination with DCR’s cultural resources team would be expected to minimize impact to historic and archaeological sites.

## Long-term Changes to DCR Parkway

While short- and medium-term recommendations leading to the development of the accessible SUP and the nature trail were the focus of this study, VHB also studied long-term recommendations for the parkway system surrounding Spot Pond. Owned by DCR, the parkways are a mix of two and four-lane roadways. Observations of traffic volumes along the four-lane segments of Woodland Road and Pond Street appear to be far below their designed capacity. After meeting with DCR officials, they were receptive of analyzing segments of four-lane parkways to determine if they would operate efficiently with one lane in each direction.<sup>1</sup> The department expressed strong interest in hosting safe and accessible bike facilities on their parkways, including sidewalk-level bike lanes and other innovative treatments that provided stronger separation between pedestrians and bicyclists, and bicyclists and motor vehicles. (DCR also voiced support for evaluation of alternatives for long-term transformation of four intersections—Stone Zoo parking lot access, Woodland/Pond, Woodland/Highland/Elm, and Fellsway West/Elm—that includes modern roundabouts for enhanced safety for all parkway users.) As such, the planning team developed a series of long-term, higher-cost recommendations for some of the adjacent parkways. In all cases, short/medium term recommendations—typically involving restriping of roadways, new signage, and minor curb-related work—were developed as well as long-term recommendations for more dramatic changes to the roadway corridor, in collaboration with DCR. The sections below, for instance, illustrate VHB’s short and medium term recommendation for a “road diet” along Woodland Lane/Pond Street, along with the long-term transformation of the parkway into a two-way road on one side of the divided highway and pedestrian/bike facilities on the other (along with an expanded landscaped median).



**Short/medium-term recommendation** for one lane of traffic with buffered bike lanes along Woodland Road and Pond Street (currently four travel lanes)



**Long-term recommendation** for consolidating traffic lanes on the east side of Woodland/Pond and reserving the west side for pedestrians, bicyclists & landscaping

<sup>1</sup> Per MassDOT’s Traffic Volume Portal, Woodland Road carries nearly 16,000 cars per day, a comfortable threshold for a two-lane road



# 1

## Introduction

The Town of Stoneham retained VHB to study the feasibility of a developing a circumferential trail around Spot Pond. The work effort included analysis of existing conditions, various trail design and treatment options, development of a recommended alignment, preliminary design concept, and supported with a qualitative environmental due diligence. The study's analysis considered the trail-routing challenges, the required environmental permitting, potential ROW/ownership issues, and ADA accessibility. This report summarizes the findings of the year-long study.

### 1.1 Purpose of the Study

The purpose of this report is to summarize the analysis of the potential trail loop (and associated trail network) around Spot Pond. The loop trail idea was previously incorporated into the Town of Stoneham's Open Space and Recreation Plan. The report summarizes the analysis of existing conditions, verification of right-of-way (ROW)/property impacts, high-level environmental due diligence, and the development of routes for the trail/trail network.

Throughout the process, the planning team evaluated potential trail designs and alignments surrounding the pond, with a variety of facility types, some which may overlap at locations:

- › **Accessible Shared Use Path** – A fully accessible, paved shared-use path (SUP) alignment serving a wide variety of users including walkers, runners, bicyclists, skaters, and people using mobility devices.
- › **Nature Trail**– A separate alignment that does not conform to ADA design standards but provides a primarily natural-surface loop around Spot Pond—in some places, narrow and with steep grades—for walkers, trail runner, hikers, and potentially mountain bikers.
- › **Long-term Changes to DCR Parkways** – In coordination with DCR, the planning team develop longer-term, higher cost options for some of the parkways that surround Spot Pond. The primary

goal is to provide more generous space for non-motorized users, calm motor-vehicle traffic, and provide additional green space, if possible.

For this high-level analysis and subsequent recommendations, GIS-based maps were reviewed and analyzed, and online mapping information was gathered from Google Earth and Nearmap. Additionally, VHB staff conducted in-field reconnaissance. (Note: detailed site inspection visits and topographic survey were not performed as part of this study.)

A series of stakeholder meetings were held with the Town of Stoneham, VHB, and partner agencies and stakeholders. These meetings were critical to help the study team understand the key issues that could impact the trail planning around Spot Pond, including environmental challengers, water quality issues, the presence of historic and archaeological sites, and pedestrian/bike connectivity needs to adjacent neighborhood, commercial areas, parks, and transit stops.

Completion of this study is the initial step in enabling the Town and agency partners to determine the options moving forward to secure design and construction funding for the various phases of the loop trail project. another purpose of this study is to help inform the recommendations for DCR to consider short-term and long-term options for constructing and maintaining a circumferential trail.

*Future trail planning and design work surrounding Spot Pond will require additional research, topographical survey, environmental review, site investigations, and more extensive outreach to abutters and nearby residents and businesses.*

## 1.2 Study Area

Spot Pond is located within the Middlesex Fells Reservation and is a valuable environmental resource for the entire region. It represents an environmental and recreational asset that has not achieved its full potential. The 3.5-to-4-mile-long circumference of the pond runs through the Town of Stoneham and the City of Medford. While dominated by I-93 on the west side, it includes a number of quieter areas and destinations for a variety of users. This includes the Stone Zoo, the Botume House Visitor's Center, a boating center, and a recreation area at Straw Point. Within very close proximity is the Flynn Rink, Wright's Pond Beach, and many miles of mountain biking and hiking trails within the Fells Reservation. The pond is considered a back-up reservoir source by the Massachusetts Water Resources Authority (MWRA) and includes a handful of Native American and early Colonial-era archaeological sites, whose locations are not publicized.



*Portions of the pond's rocky shoreline on the south side are used for fishing and other passive activities.*

Figure 1 Study Area Overview Map



Source: VHB, ESRI

## 1.3 Stakeholder Input

Stakeholder input was an important part of the Spot Pond Circumferential Trail Study process. Meetings were conducted with land-owning state agencies and key stakeholder groups to understand their concerns and aspirations. The Study team met with following stakeholder groups between September 2022 and April 2023:

- › Massachusetts Department of Conservation and Recreation (DCR)
- › Fells State Caucus (on two occasions)
- › The City of Medford
- › Massachusetts Department of Transportation (MassDOT)
- › Massachusetts Water Resource Authority (MWRA)
- › Stone Zoo/Boys & Girls Club/Bike to the Sea/Friends of the Fells
- › Stoneham Transportation Advisory Committee (STAC)

With each stakeholder group, the Town of Stoneham Administrator Dennis Sheehan provided a background of what led to the creation of this project, followed by VHB's description of the project scope and schedule. Attendees provided input on trail and environmental-related needs in the Spot Pond area and offered ideas that ultimately helped to inform project recommendations. A summary of all of the meetings can be found in Appendix A.

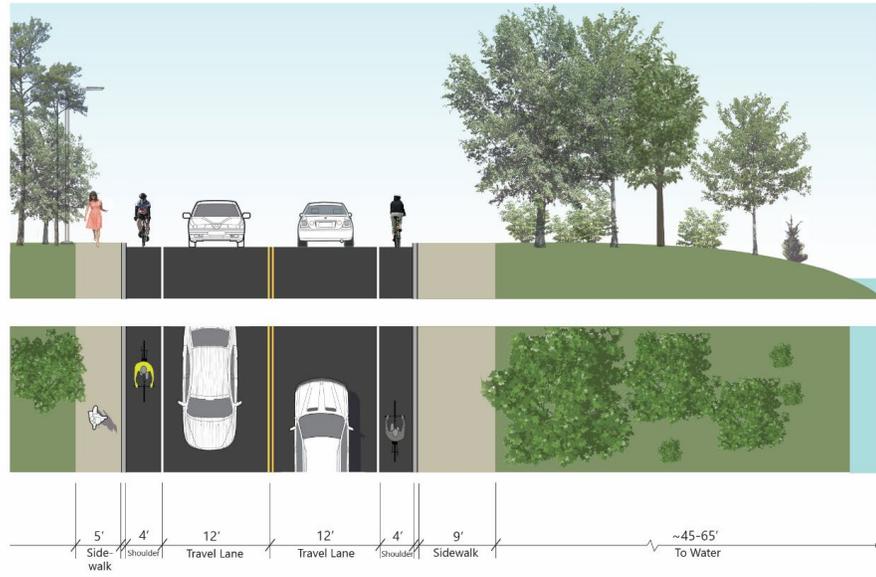
## 1.4 Existing Conditions

Spot Pond is surrounded by land owned or controlled by various state agencies. This includes not only parcels and/or rights of way owned by DCR, MassDOT, and MWRA, but also land owned by the Town of Stoneham or City of Medford. A number of private parcels sit on the opposite sides of the DCR parkways as well. An understanding of parcel ownership is typically required when seeking grant money, and understanding the need for potential easements, if needed.

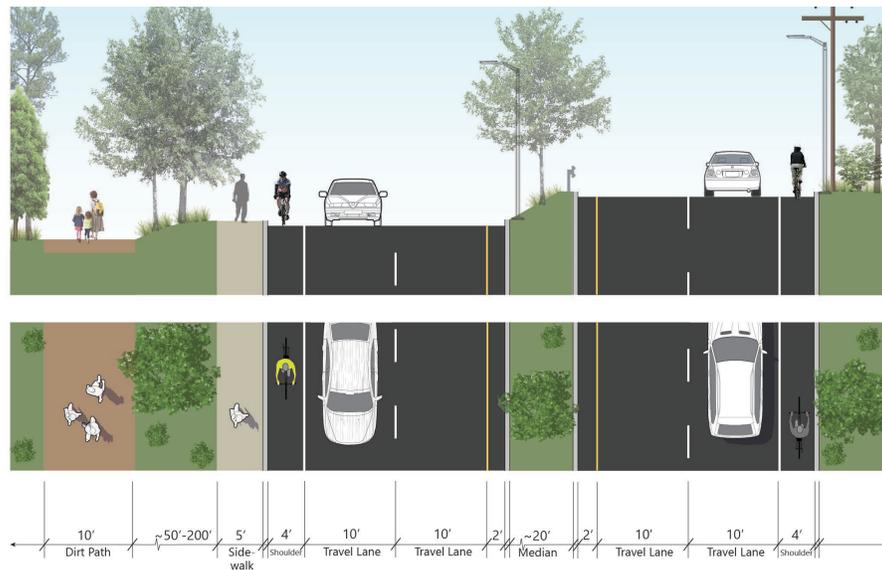
Because of the varied and complex environment at Spot Pond, VHB's existing conditions assessment included the identification, inventory and mapping of critical features. This included wildlife habitat areas, wetlands, significant rock formations, archaeological sites, viewpoints/overlooks, streams, nearby recreational facilities, bike and boat rental businesses, educational features, signage, paved and unpaved paths, mountain bike routes, and other significant natural resource features. These critical features helped to inform VHB's assessment of trail routing options, including the redirection of the trail route options away from a critical feature, e.g., near the presence of archaeological features per DCR's input.

The primary defining feature of the immediate area surrounding Spot Pond are the parkways that create a significant barrier to Spot Pond on all sides for pedestrians and bicyclists. On the west side, I-93 creates an even stronger barrier to the pond and adds a constant din of truck and automobile noise to many areas along the pond. While I-93 is a piece of infrastructure that will likely never become more porous, opportunities exist to mitigate the barrier effect of the parkway network through design. On some of the parkways, DCR has already provided pedestrian and bicycle facilities—including sidewalks, side paths, and bike lanes—that provide for walking and bicycling in parallel. Crossing the parkways is

a much bigger challenge however, as few signalized intersections and safe crosswalks are provided. Some of the planning work in this study aims to alleviate these connectivity problems. Current conditions along some of the parkways are shown below.



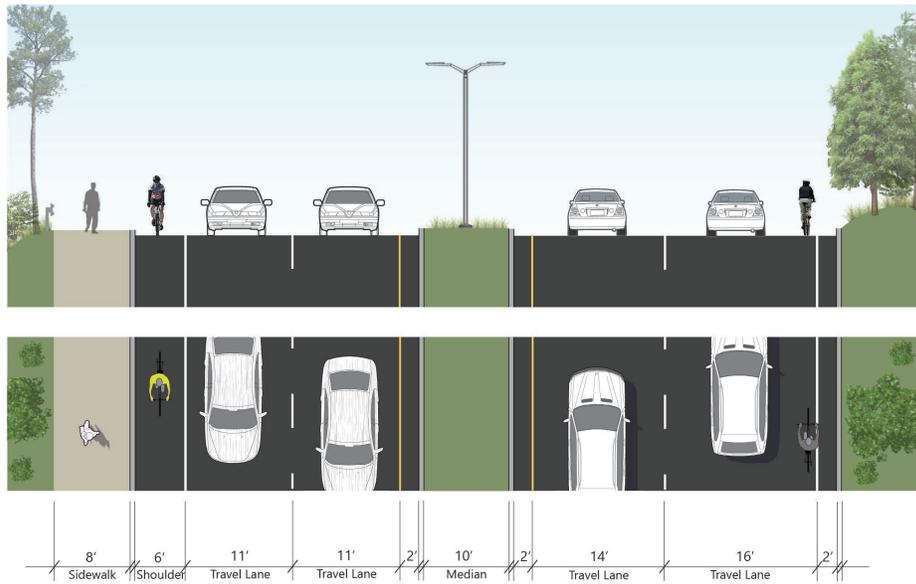
*Cross-section of Pond Street (facing east) showing existing shared use path on the south side*



*Cross-section of Woodland Rd (facing north) showing existing sidewalk and adjacent path to the west*



*Cross-section of Fellsway West (facing north) north of the I-93 overpass showing bike lanes and the existing shared use path on the west side.*



*Cross-section of the four-lane section of Fellsway West (facing north) just south of the intersection with South Street/North Border Rd.*

# 2

## Trail System Routing and Design Recommendations

Considering the lengthier timeline for constructing long-term trail configurations, the study team considered opportunities to recommend both short/medium-term trail routing and long-term trail design options around Spot Pond. This chapter focuses on the detailed recommendations for the two circumferential trail routes, long-term designs for some of the DCR parkways, and options for navigating the two pinch points created by the close proximity of I-93 to the pond.

### 2.1 Introduction

To address the various non-motorized mobility needs throughout the Spot Pond area, the team developed routing and design recommendations for:

- › **Accessible Shared Use Path** – A fully accessible, paved SUP alignment serving a wide variety of users including walkers, runners, bicyclists, skaters, and people using mobility devices.
- › **Nature Trail**– A separate alignment that does not conform to ADA design standards but provides a primarily natural-surface loop around Spot Pond—in some places, narrow and with steep grades—for walkers, trail runner, hikers, and potentially mountain bikers.
- › **Long-term Changes to DCR Parkway** – In coordination with DCR, the planning team develop longer-term, higher cost options for some of the parkways that surround Spot Pond. The primary goal is to provide more generous space for non-motorized users, calm motor-vehicle traffic, and provide additional green space, if possible.

### 2.2 Preliminary Trail System – Routing Maps

To illustrate the routing recommendations for the accessible SUP and the nature trail loop around Spot Pond, the planning team developed a series of map diagrams and cross-section views. The Conceptual

Trail Loop diagram below helps the reader understand the full context of the circumferential trail.



The diagram illustrates the many components that form the conceptual plans developed by VHB:

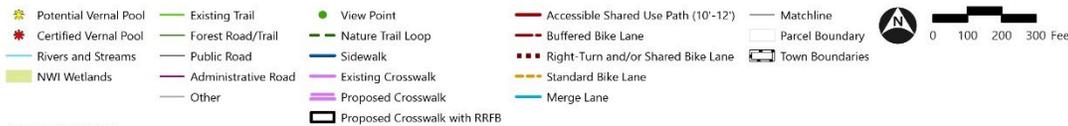
- A mix of bike lanes—both standard striped lanes and buffered bike lanes—frame the loop around Spot Pond (all lie on DCR parkways with adjacent sidewalks)
- Buffered bike lanes on parkway segments that require reduction from four-lanes to two lanes are shown
- The nature trail loop—a mix of existing and new paths—provides a 3.5-mile natural-surface route around the pond
- A bright green highlighted line indicates the accessible SUP that in many cases overlaps with the nature trail and striped bike lanes
- Key locations for intersection enhancements are highlighted
- **All 6 inset maps and cross-section graphics can be seen on the following pages**

LEGEND

- Designated road diet with buffered bike lanes
- - - Buffered bike lanes
- - - Standard 5' wide bike lanes
- . - . Turn lane and/or shared lane
- Accessible shared-use path loop
- - - Nature trail loop
- - - Wider sidewalk
- Intersection redesign

Figure 11 Conceptual Trail Loop Diagram Showing Location of the Inset Maps

Figure 12 Preliminary Recommendations Inset Map 1



Source: MassGIS, VNR, FSI

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## Fellsway West (Route 28) / Straw Point Intersection

With a future shared-use path around Spot Pond, pedestrian and bicycle improvements will be needed at this intersection to accommodate a safer connection from the sidewalk and bike lanes along Fellsway West to the path improvements adjacent to the pond.

### *Current Conditions*

- › Fellsway West/Rt. 28 consists of two lanes in each direction with a sidewalk along the west curb
- › Northbound vehicles access the Straw Point area of the reservation via off-ramp to New South St.
- › No bicycle facilities or crossings are provided at the intersection
- › A crosswalk provides connection across Rt. 28 but does not extend to east side of access drive



*Existing Conditions, Fellsway West/Rt. 28 at Straw Point exit, facing north (Source: Google)*

### *Safety/Accessibility Concerns*

- › Lack of striped biked lanes or bicycle crossing
- › Multiple travel lanes pose safety challenges for bicyclists/pedestrians trying to cross to Straw Pt.
- › Wide roadway segment and large northbound turning radii allow promote high speeds

### *Potential Short-Term Improvements (see plan graphic on following page)*

- › Improve safety for all road users through better traffic organization and alignment:
  - Remove one travel lane in each direction
  - Realign intersection to slow turning vehicles and provide improved pedestrian and bicycle crossing of Fellsway West/Rt. 28
- › Accomodate bicyclists by adding curbside buffered bike lanes in each direction on Fellsway West and along the south side of Straw Point access drive
- › Add rectangular rapid flashing beacons (RRFBs) to improve safety at existing east-west crosswalk, along with the proposed two-way bike crossing
- › Add north-south raised crosswalk and concrete path linking western sidewalk to new stonedust path at Straw Point



*Raised crosswalk example, Cambridge, MA*

Figure 13 Fellsway West (Route 28) / Straw Point Access Drive Concept



Figure 14 Section A-1: Existing Condition on Straw Point access drive, facing east

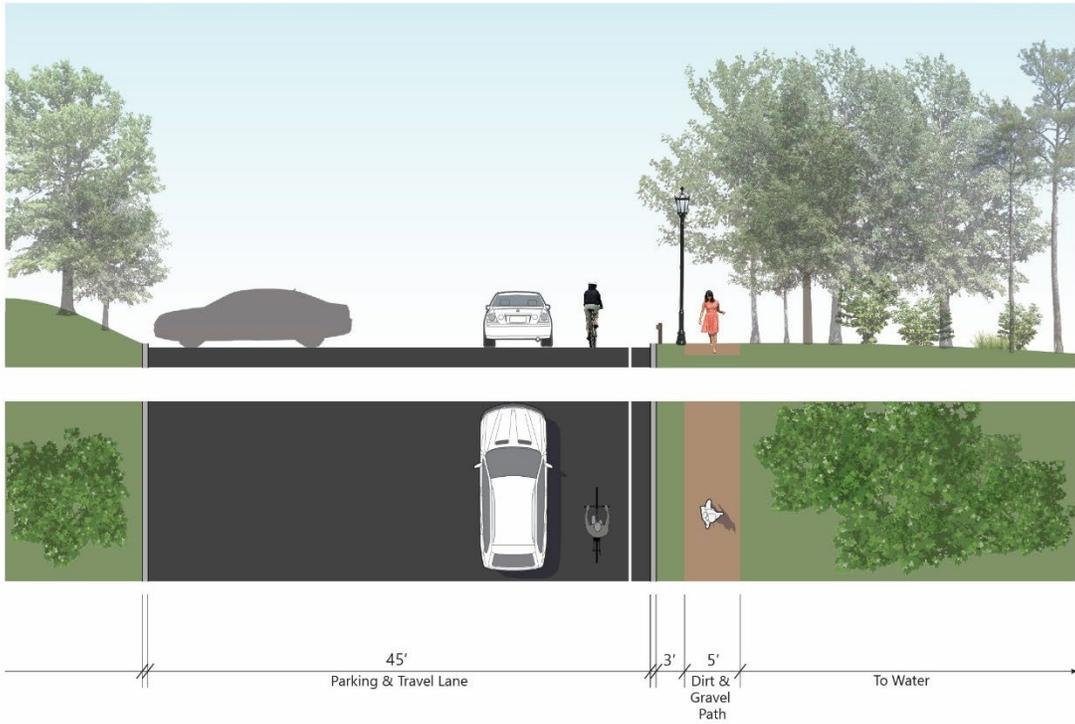
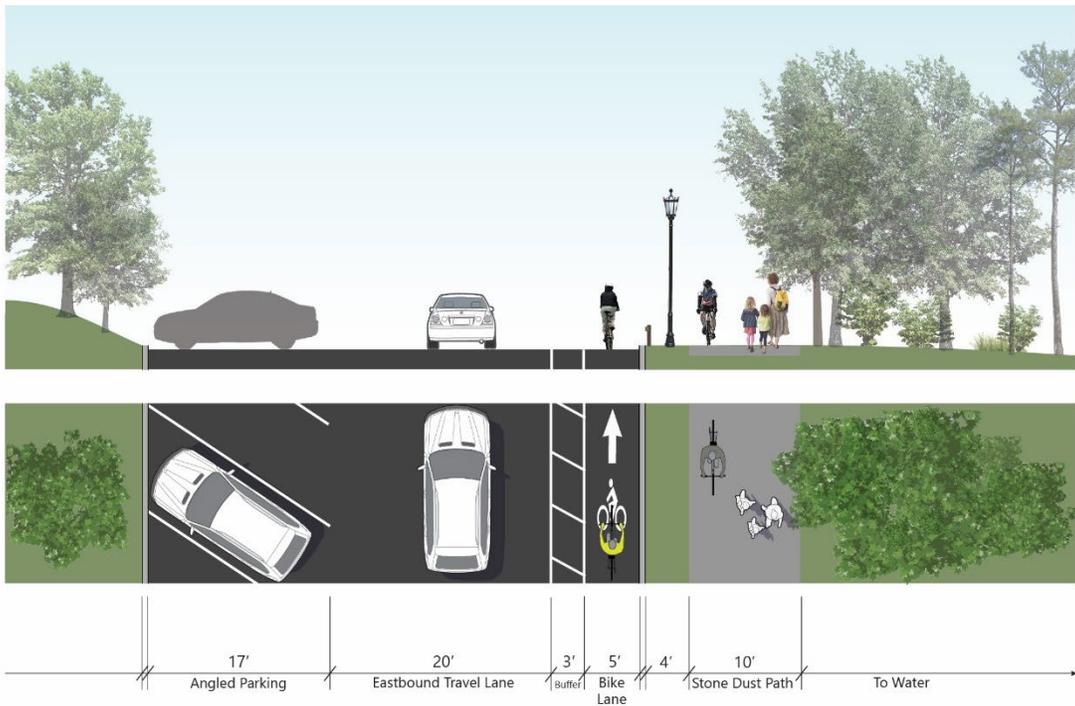
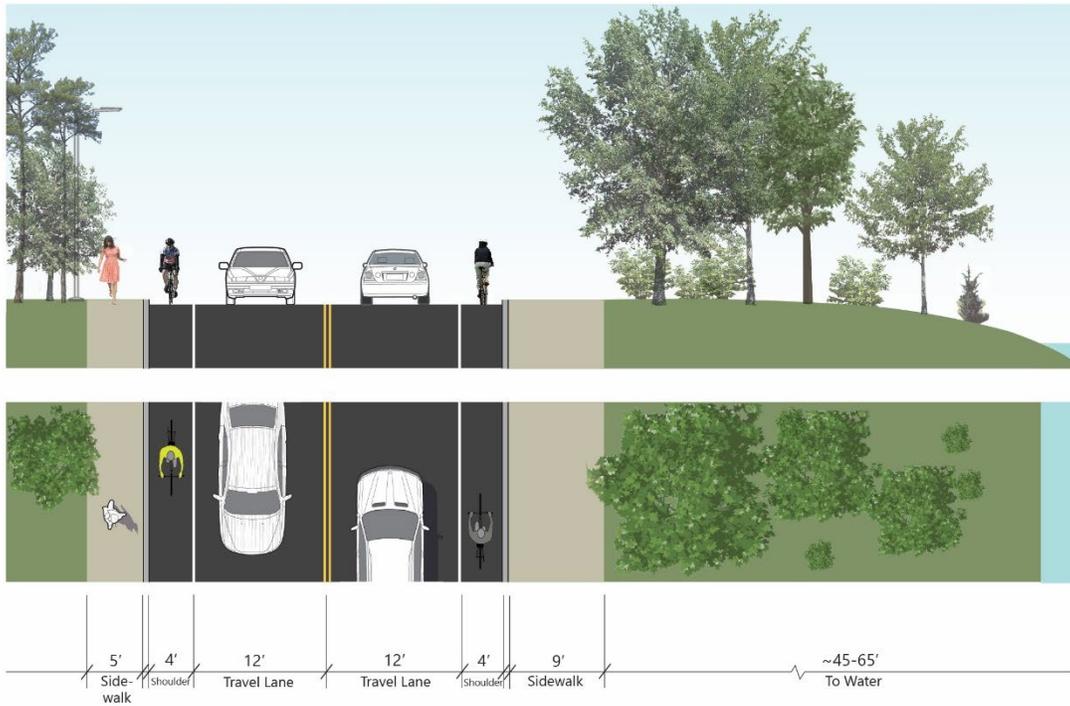


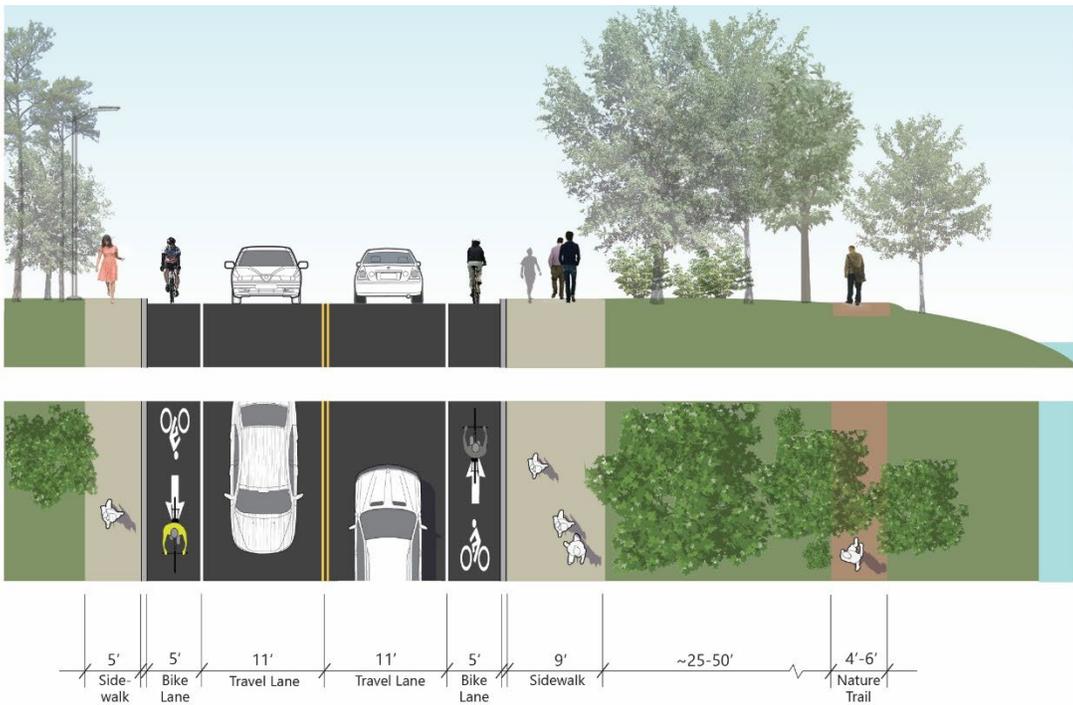
Figure 15 Section A-2: Proposed Straw Point access drive, facing east (DRAFT CONCEPT)



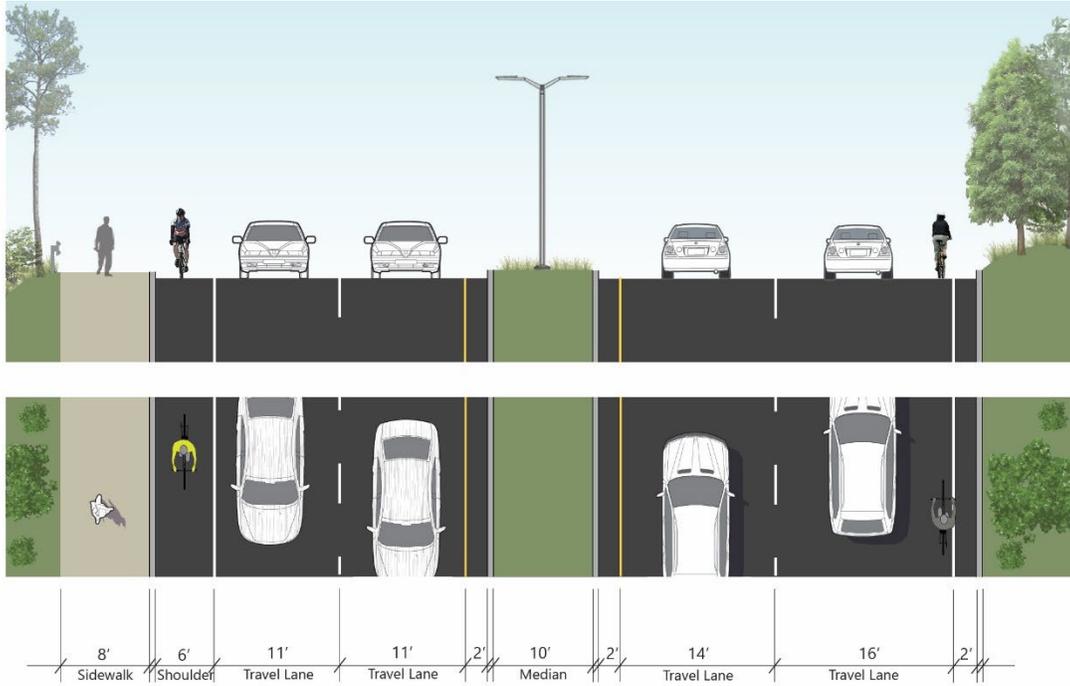
**Figure 16 Section B-1: Existing Condition on South Street, facing east**



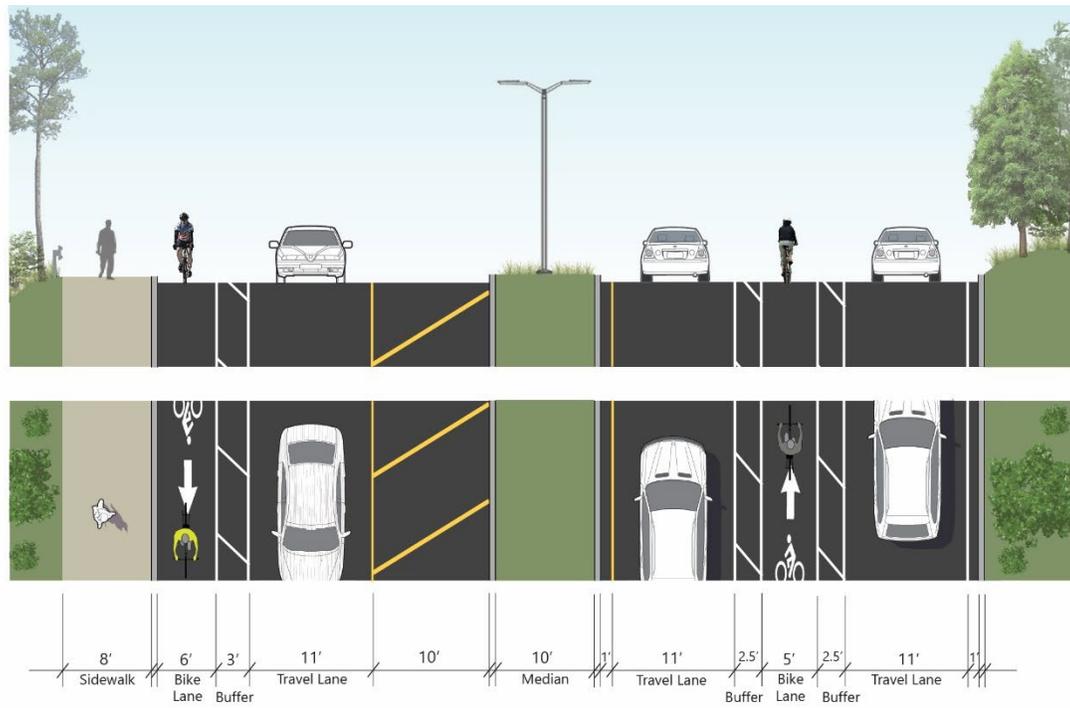
**Figure 17 Section B-2: Proposed South Street, facing east (DRAFT CONCEPT)**



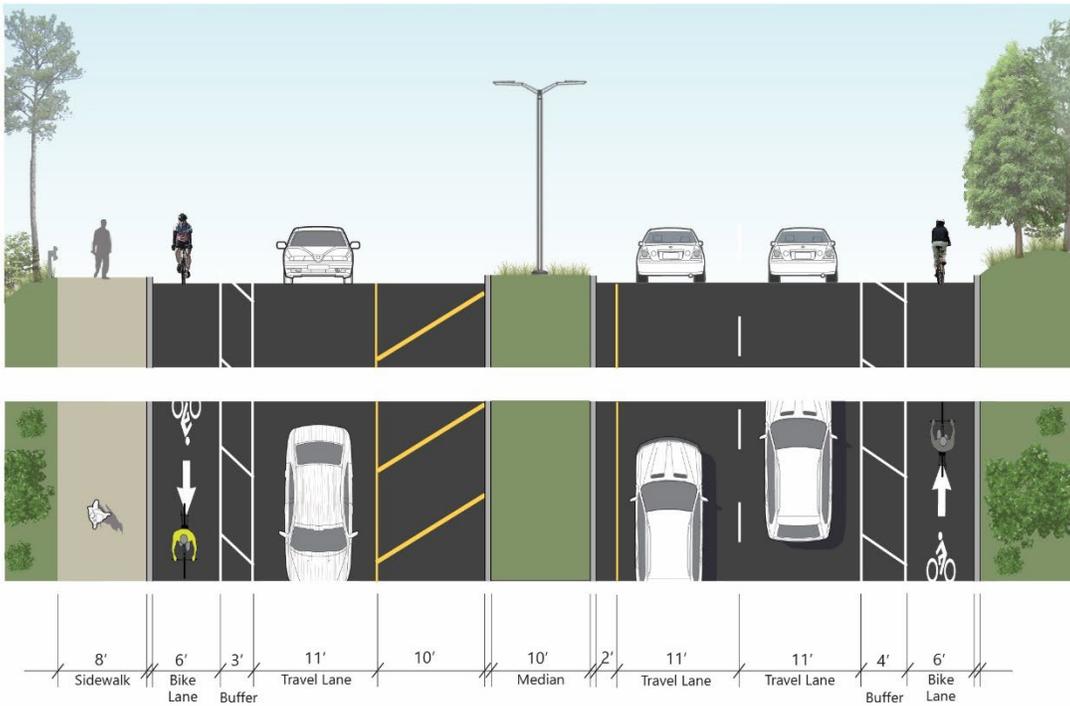
**Figure 18 Section G-1: Existing Condition on Fellsway West (at I-93 off-ramp), facing north**



**Figure 19 Section G-2A: Proposed Fellsway West (at I-93 off-ramp merge zone), facing north (DRAFT CONCEPT)**



**Figure 20 Section G-2B: Proposed Fellsway West (just north of the I-93 off-ramp merge zone), facing north (DRAFT CONCEPT)**



**Figure 21 Section G-3: Long-term Concept for Fellsway West (just north of the I-93 off-ramp merge zone), facing north (DRAFT CONCEPT)**





## Woodland Rd. / Pond St. Intersection

With a future shared-use path around Spot Pond, improvements are needed at the Woodland / Pond intersection to accommodate pedestrian and bike connections from Melrose and points east.

### *Current Conditions*

- › Woodland Road and portions of Pond Street consist of two lanes in each direction with a sidewalk along the west curb
- › No pedestrian crossings or bicycle facilities are currently provided at the intersection
- › A path lies along Pond St. from Lynn Fells Parkway but terminates before reaching the intersection



*Existing Conditions, Woodland Rd. at Pond St., facing north (Source: Google)*

### *Safety/Accessibility Concerns*

- › Lack of pedestrian crossings or bicycle facilities, especially where the Pond St path terminates
- › Current quasi-rotary lacks signage and clarity on which users have the right of way
- › Multiple travel lanes pose safety challenges for bicyclists or pedestrians to cross the street
- › Wide roadway segments and turning radii allow for speeding and unsafe turning speeds

### *Potential Short-Term Improvements (see plan graphic on following page)*

- › Improve safety for all road users through better organization and traffic delineation
  - Remove one travel lane in each direction
  - Add stop controls within breaks in the median to improve sightlines and clarify right of way
- › Pedestrian improvements include:
  - New E/W crosswalk, RRFB's, and median cut on the north leg of the intersection
  - Extend the existing Pond St. path west to the new crossing
- › Accomodate bicyclists by adding curbside buffered bike lanes in each direction



*Example Rectangular Rapid Flashing Beacon (RRFB), Greenfield, MA*

### *Potential Long-Term Improvements*

- › Per discussions with DCR, the department is interested in transforming the Woodland / Pond intersection into a modern roundabout with pedestrian and bike crossings on all legs

Figure 23 Woodland Road at Pond Street Concept Plan

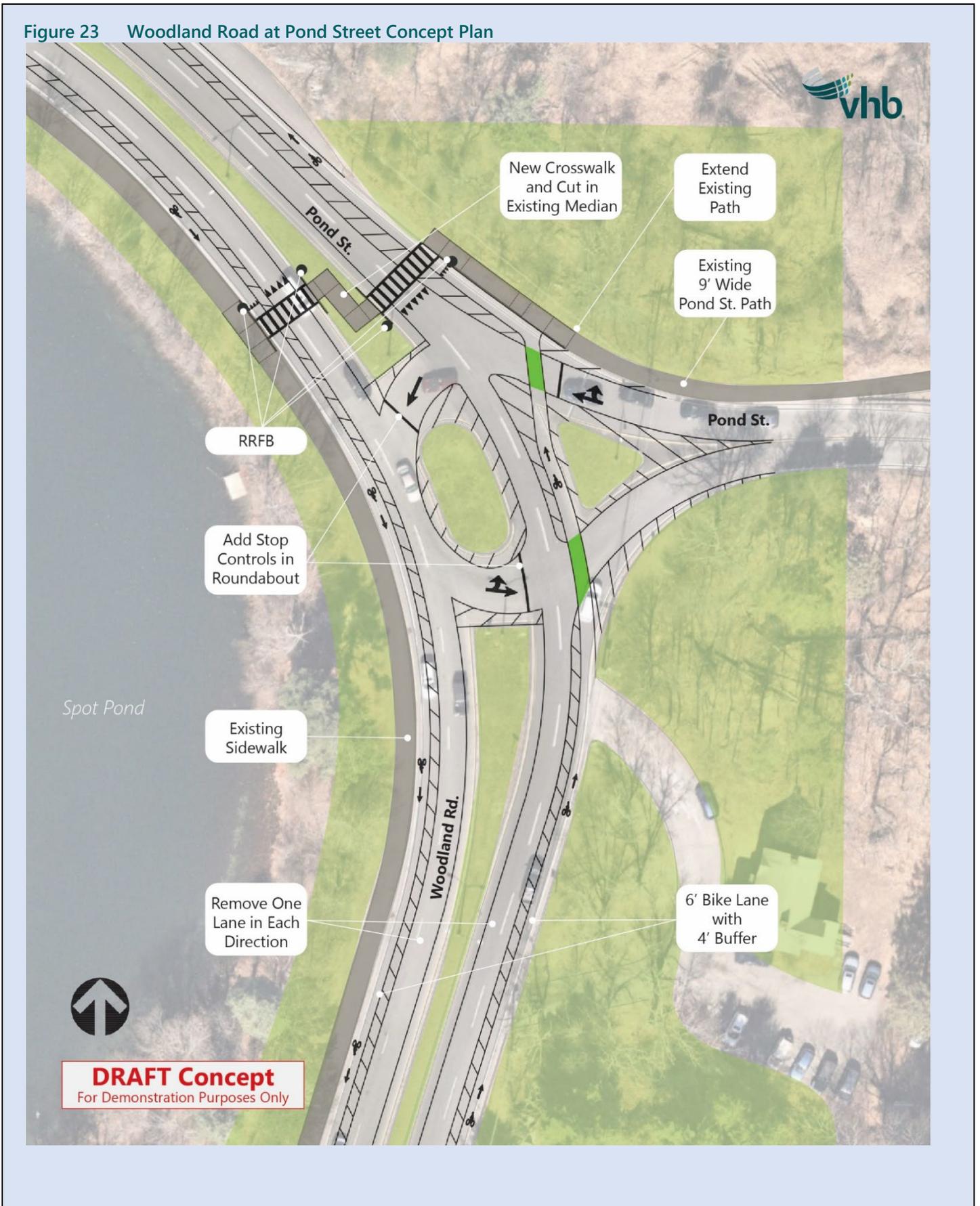


Figure 24 Preliminary Recommendations Inset Map 3



Figure 25 Section C-1: Existing Condition on Woodland Road, facing north

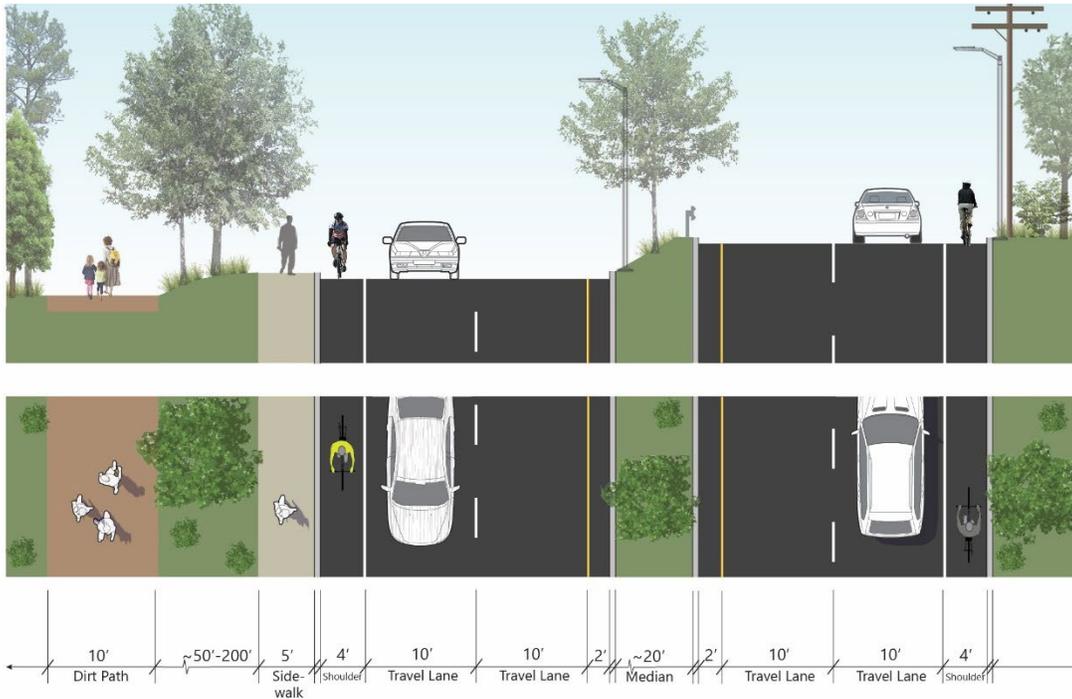


Figure 26 Section C-2: Proposed Woodland Road, facing north (DRAFT CONCEPT)

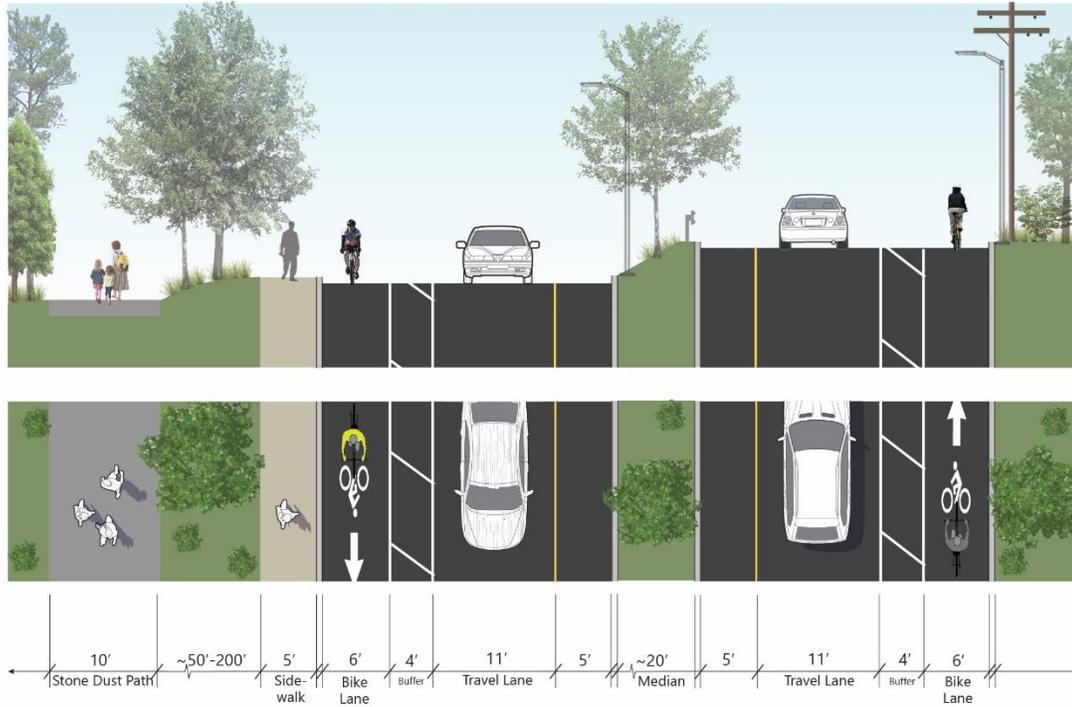


Figure 27 Section C-3: Long-term Recommendation for Woodland Road, facing north (DRAFT CONCEPT)

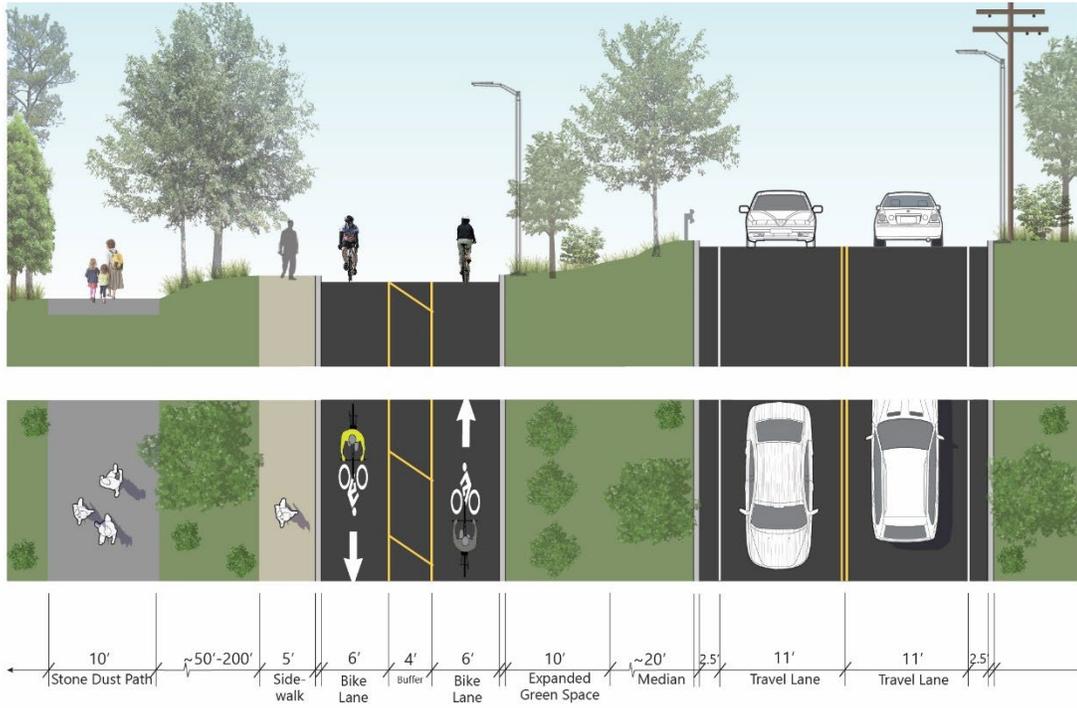
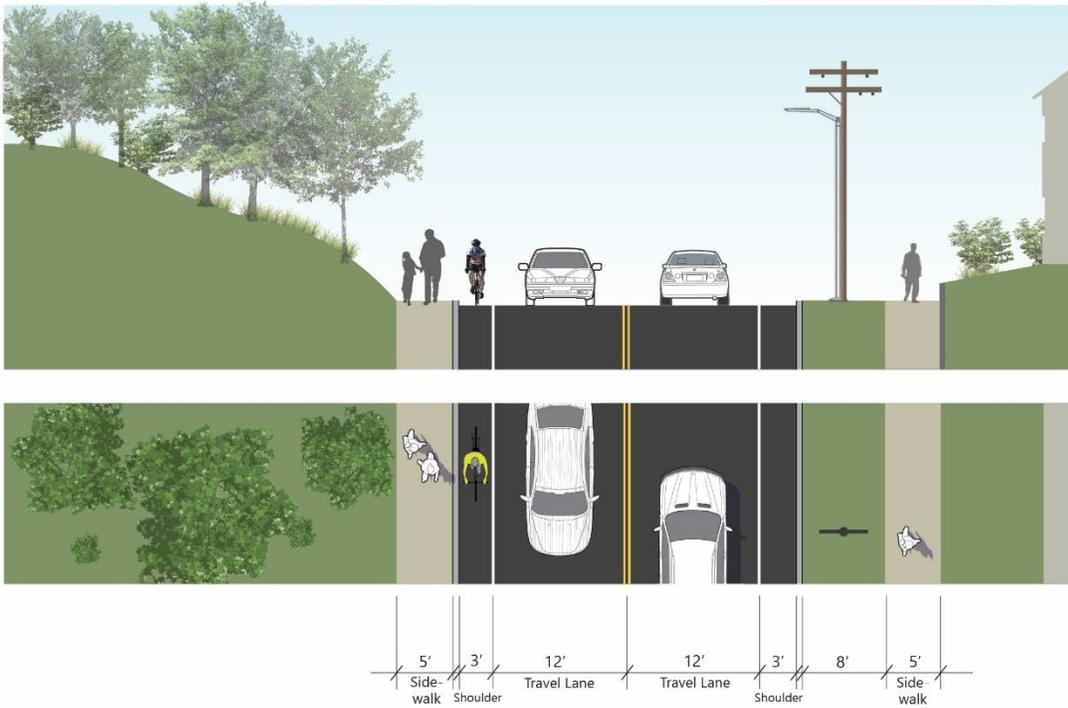


Figure 28 Preliminary Recommendations Inset Map 4



Source: MassGIS, VHB, ESR

**Figure 29 Section D-1: Existing Condition on Elm Street, facing northeast**



**Figure 30 Section D-2: Proposed Elm Street, facing northeast (DRAFT CONCEPT)**

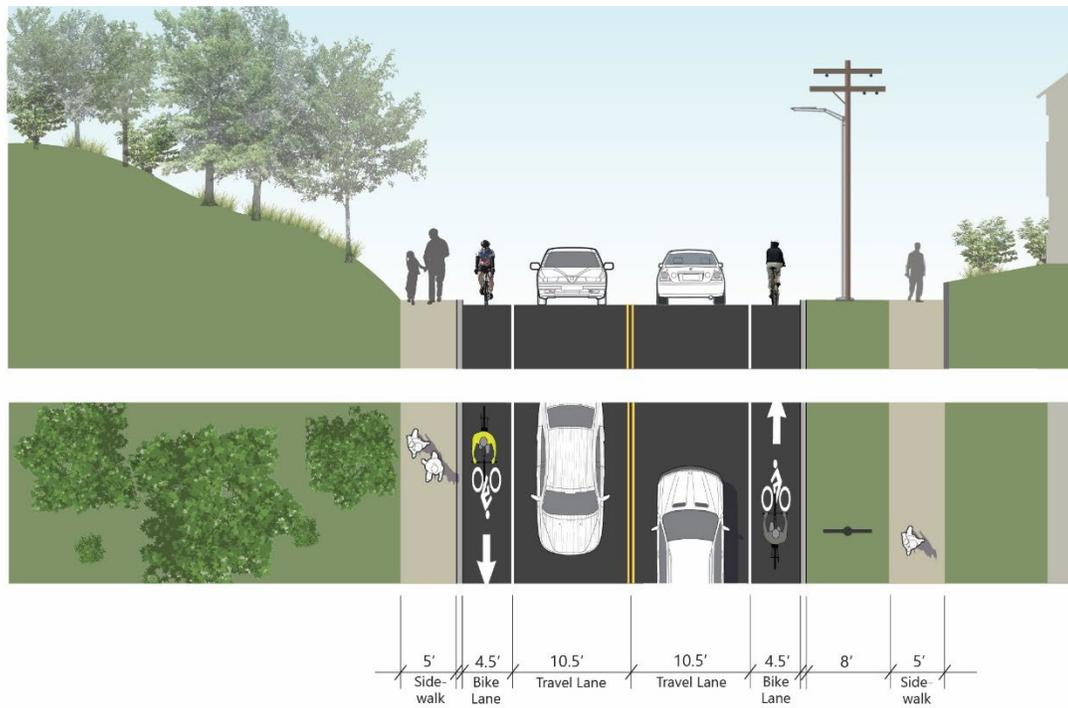


Figure 31 Preliminary Recommendations Inset Map 5

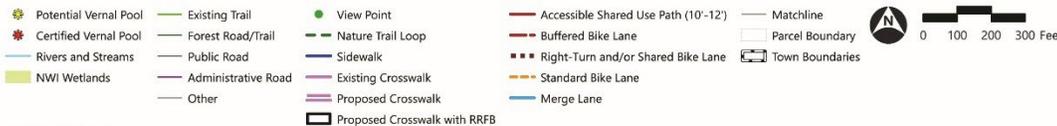
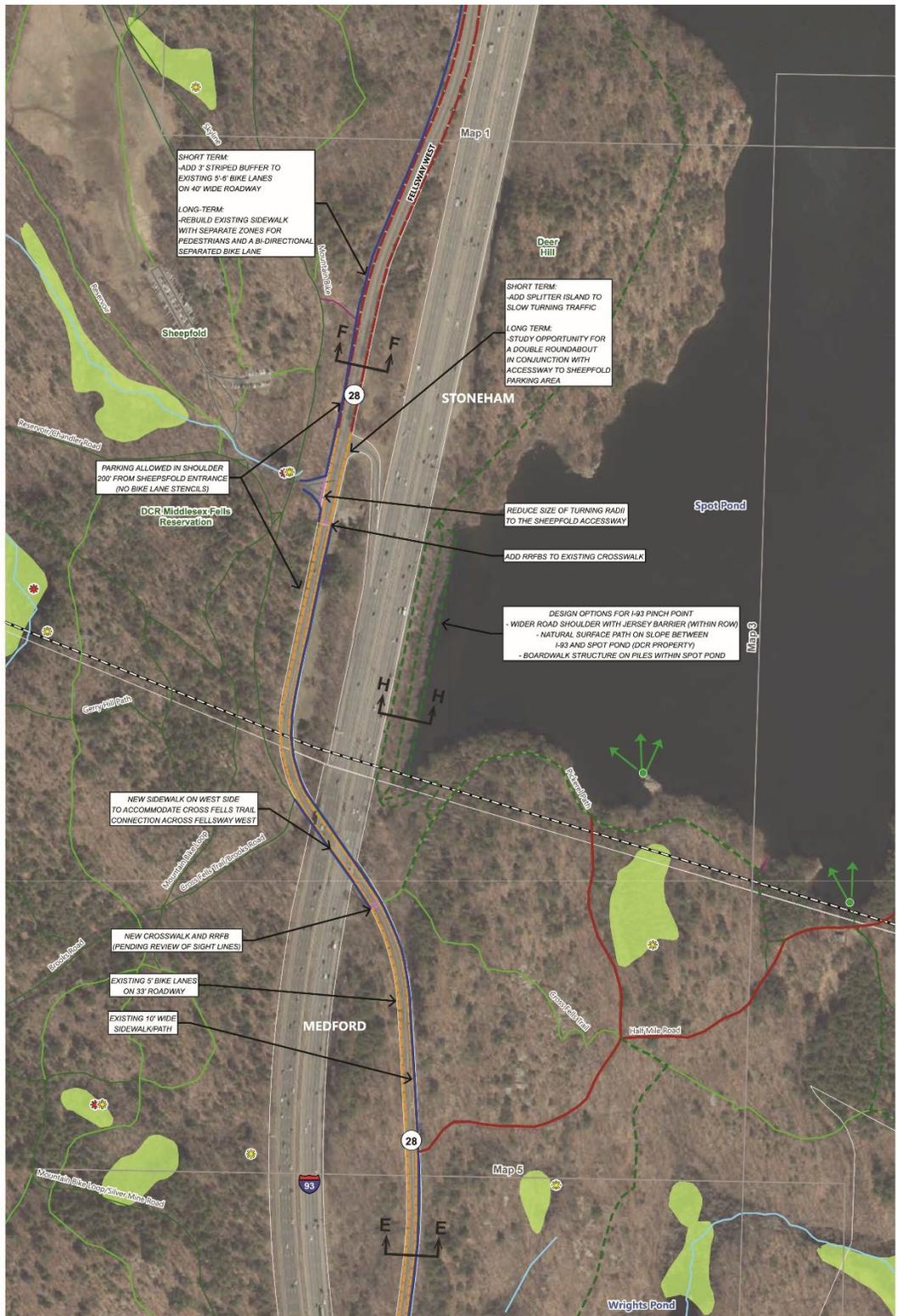


- |                       |                     |                              |                                      |                 |
|-----------------------|---------------------|------------------------------|--------------------------------------|-----------------|
| Potential Vernal Pool | Existing Trail      | View Point                   | Accessible Shared Use Path (10'-12') | Matchline       |
| Certified Vernal Pool | Forest Road/Trail   | Nature Trail Loop            | Buffered Bike Lane                   | Parcel Boundary |
| Rivers and Streams    | Public Road         | Sidewalk                     | Right-Turn and/or Shared Bike Lane   | Town Boundaries |
| NWI Wetlands          | Administrative Road | Existing Crosswalk           | Standard Bike Lane                   |                 |
| Other                 | Proposed Crosswalk  | Proposed Crosswalk with RRFB | Merge Lane                           |                 |

Source: MassGIS, VFB, ESRI

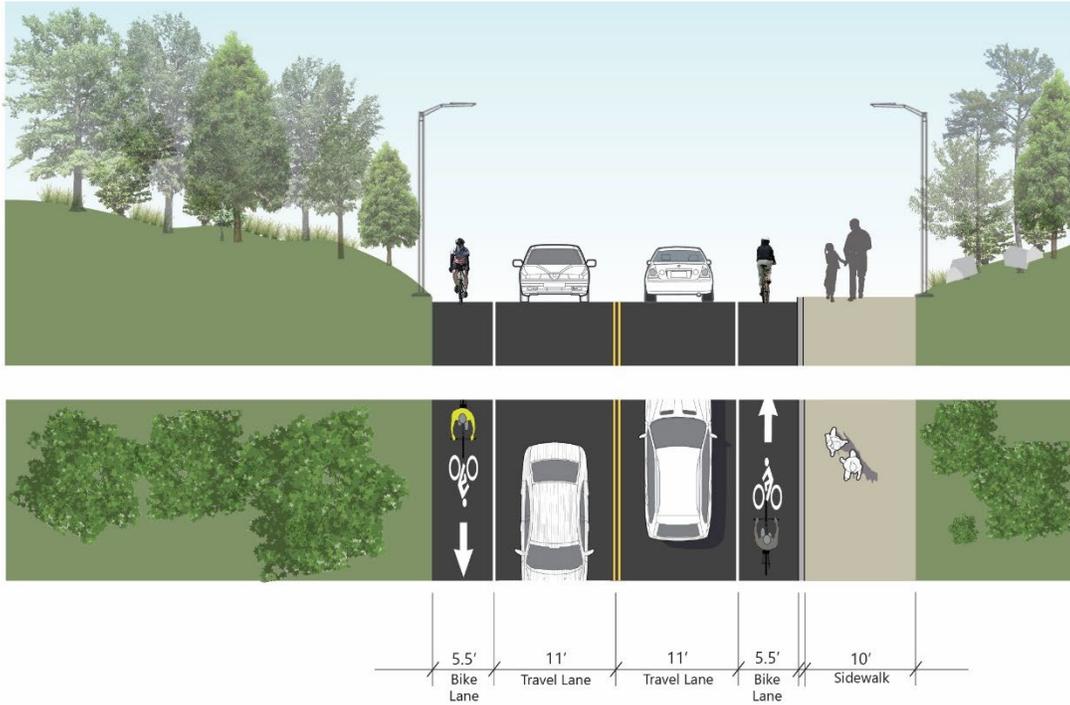
Path: \\fbl.com\g5\proj\Wair-15\158600.00\_Spot\_Pond\Trail\_Study\aprx (User: eboth, Date: 4/27/2023)

Figure 32 Preliminary Recommendations Inset Map 6



Source: MassGIS, VHB, ESRI

**Figure 33 Section E-1: Existing Condition on Fellsway West, facing north (Proposed to remain as currently designed)**



**Figure 34 Section F-1: Existing Fellsway West (north of Sheepfold), facing north (DRAFT CONCEPT)**

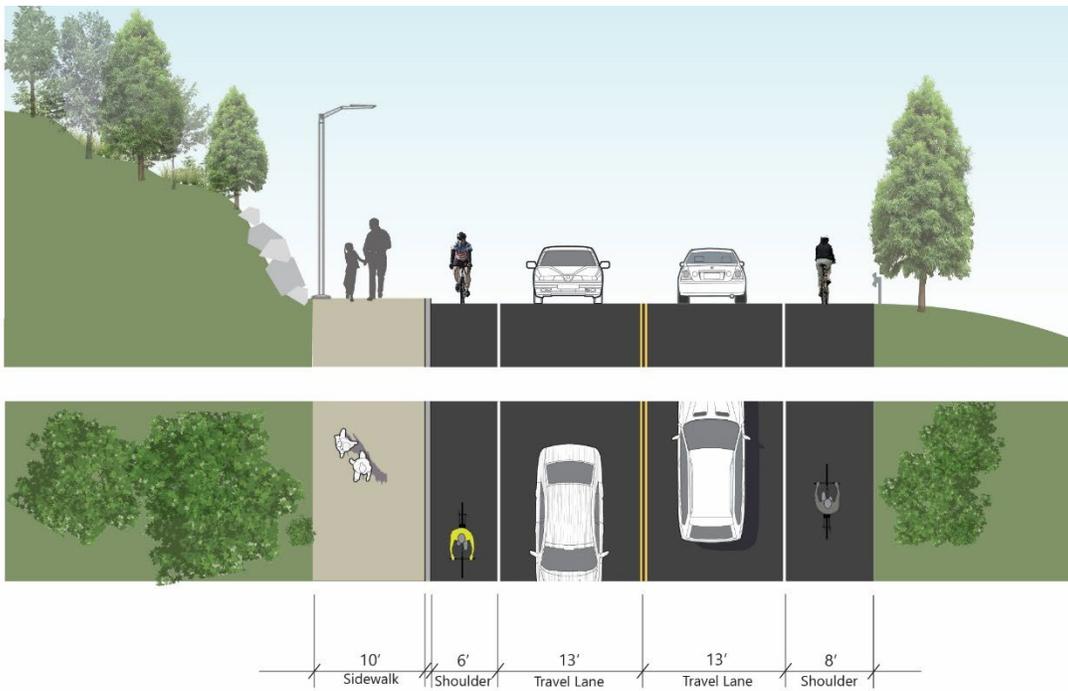


Figure 35 Section F-2: Proposed Fellsway West (north of Sheepfold), facing north (DRAFT CONCEPT)

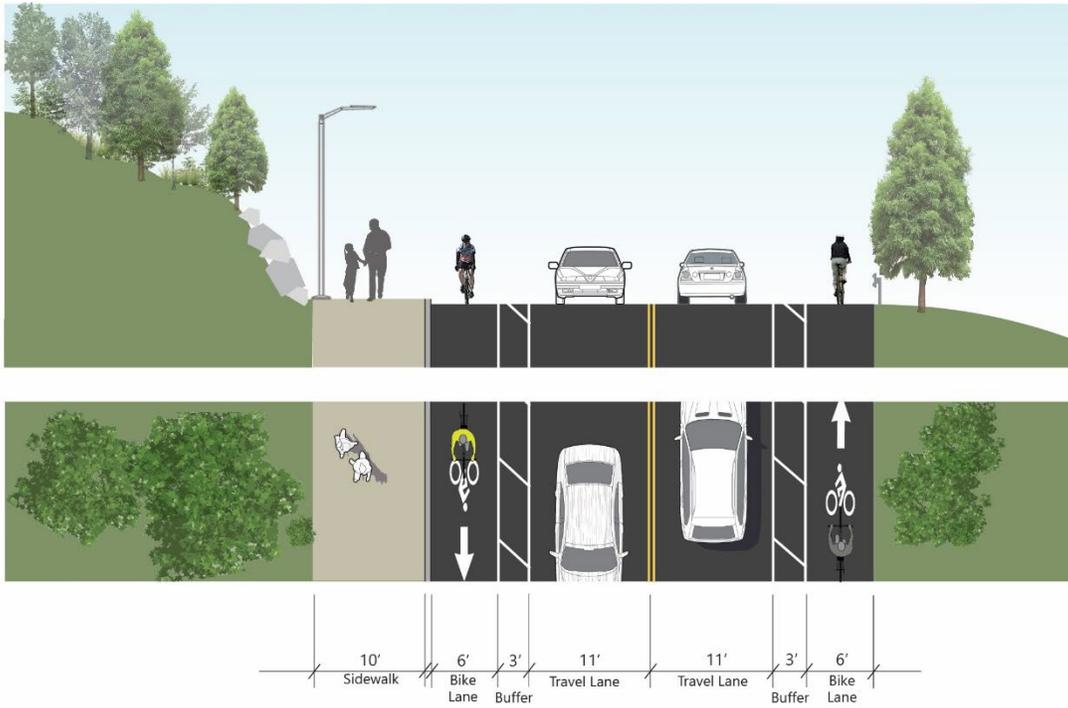


Figure 36 Section F-3: Long-term Concept for Fellsway West (north of Sheepfold), facing north (DRAFT CONCEPT)

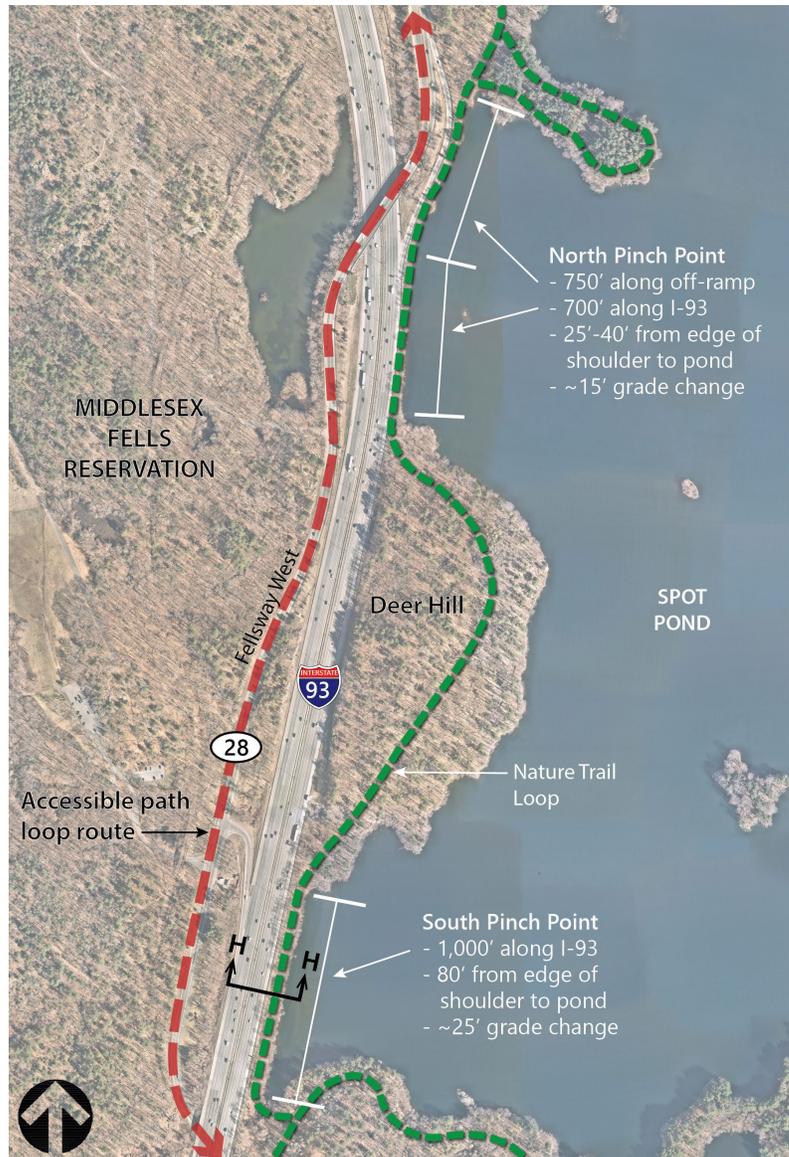


## 2.3 Interstate 93 Pinch Points

Perhaps the most challenging design element for the roughly 3.5-mile Nature Trail Loop around Spot Pond is contending with the close proximity of Interstate 93 to the pond in two locations. The project team develop a trio of design options to accommodate a continuous trail, and evaluated each to help inform an ultimate recommendation to provide access at the two pinch points.

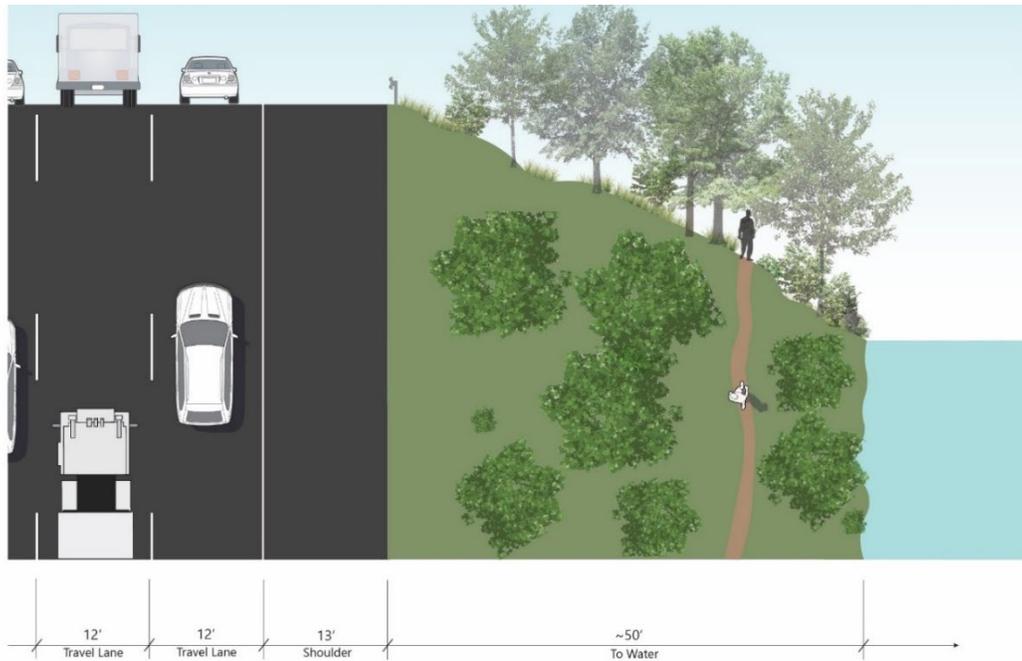
### Existing Conditions

When I-93 was built in the 1960's portions of Spot Pond were impacted by construction. As such, I-93 lies immediately adjacent to the pond in two locations. As shown in the graphic at right, a nearly 1,500-foot-long segment of the interstate and the northbound off-ramp sit less than 40 feet from the water's edge. South of the Deer Hill peninsula, a 1,000-foot-long segment sits roughly 80 feet from the pond. Because of the roughly 25-foot grade change, a steeply wooded slope lies between the edge of the highway and the water. While not formally designated by DCR, an informal walking path is evident along the sloping bank. Thick vegetation makes the path nearly impossible to use when vegetation has grown out in warmer months. Deer Hill is reported to be a beautiful spot along the edge of the pond and could be a destination for walkers and runners wanting to do a full loop around Spot Pond on a designated Nature Trail.



*Existing Conditions Diagram of the I-93 pinch points relative to the proposed nature trail loop.*

**Figure 37 Section H-1: Existing Condition, I-93 Pinch Point, facing north**



*View of the south pinch point facing north with I-93 at top left*

### Option A: Widen I-93 Shoulder

Option A widens I-93’s paved shoulder (within MassDOT’s ROW) to provide continuous access for the Nature Trail Loop through the pinch point zone. While the Nature Trail is not intended as an accessible facility and/or a shared use path—intended to accommodate walkers, hikers, and potentially mountain bikers—coordination with MassDOT will be required to understand their design preferences. The

anticipated 8-foot-wide path would be separated from the interstate shoulder by a secure concrete barrier with fencing to limit debris from being blown onto the trail. Access from the trail adjacent to Spot Pond up to the I-93 shoulder requires a switchback ramp structure to accommodate the 20-25 foot grade change at either end of the south pinch point. At the north pinch point, a shorter ramp switchback would be required to ascend the roughly 15-foot grade change. Although rare, case studies of trails adjacent to interstate highways exist in New England, including I-295 in Portland ME and across the I-95 Whittier Bridge in Newburyport MA.

### Tukey's Bridge, Portland ME



8-foot-wide shared-use path adjacent to a segment of I-295 in Portland, including Tukey's Bridge (not seen)

### Whittier Bridge, Newburyport, MA



14-foot-wide shared-use path along the I-95 Whittier Bridge between Rt. 113 and Rt. 110 in Newburyport MA

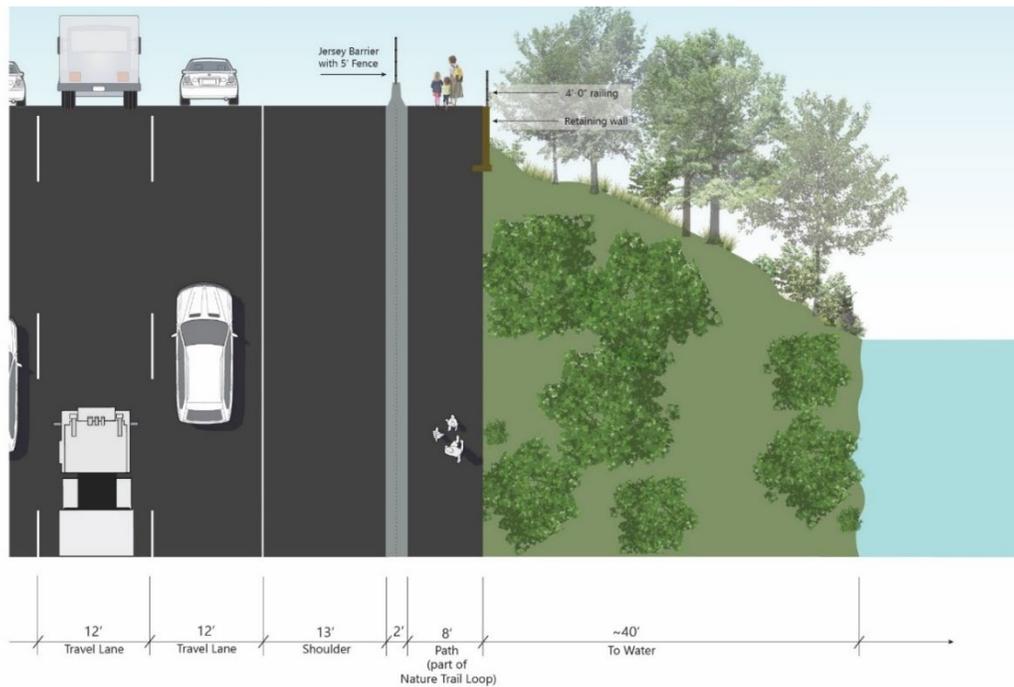


Figure 38 Section H-2 (facing north): Proposed Option 1: Wider Shoulder in I-93 ROW

## Option B: Mid-slope Path

Option B formalizes the informal path that currently exists along portions of the two pinch points. Because of the steep slope, regrading in the form of a “bench cut”—likely flanked by small retaining walls—will be needed to accommodate a 6-to-8-foot-wide stone dust path. A handrail would be needed on the pond side of the path for safety. Per the graphic below, placing the path closer to the pond places it on DCR property and maximizes the offset from I-93’s noise and pollution. Given the dense vegetation and trees, along with the steep slope, the environmental impact of path construction would need to be taken into account in the scoping and design phase.

### Pogue Loop Trail, Woodstock VT



Example of an 8-foot-wide “bench cut” dirt path in Woodstock VT

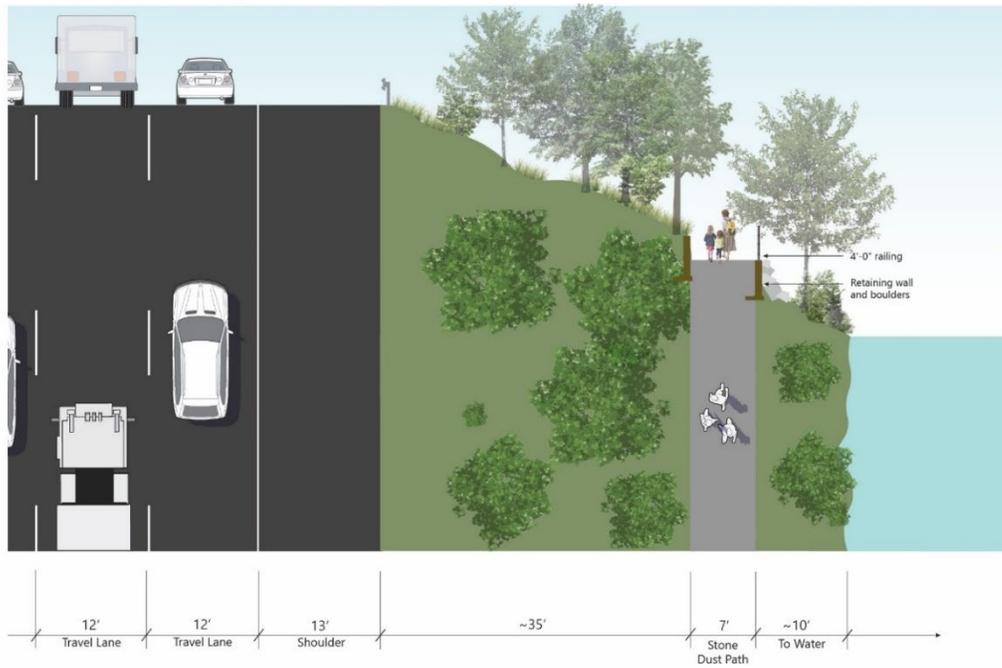


Figure 39 Section H-3 (facing north): Proposed Option 2: Mid-slope Path on DCR Property

## Option C: Off-shore Boardwalk

Option C maximizes the path's offset from I-93 and minimizes any permanent environmental impact to the pond's steep bank by incorporating a boardwalk structure. Anticipated to be 10-feet wide (including railings), the boardwalk would provide a unique experience within the context of the Nature Trail Loop around Spot Pond. The option is not without its challenges however, as permitting requirements will be significant. Much coordination will be needed with not only DCR but with the Massachusetts Water Resources Authority (MWRA) as well. The boardwalk may be an especially attractive option at the north pinch point, since so little land is available for either the shoulder widening option or a mid-slope path option.

### Sylvester Baxter Riverfront Trail, Under Rt. 28/Fellsway, Somerville MA



Example of a 12-foot-wide boardwalk structure on piles in Somerville MA

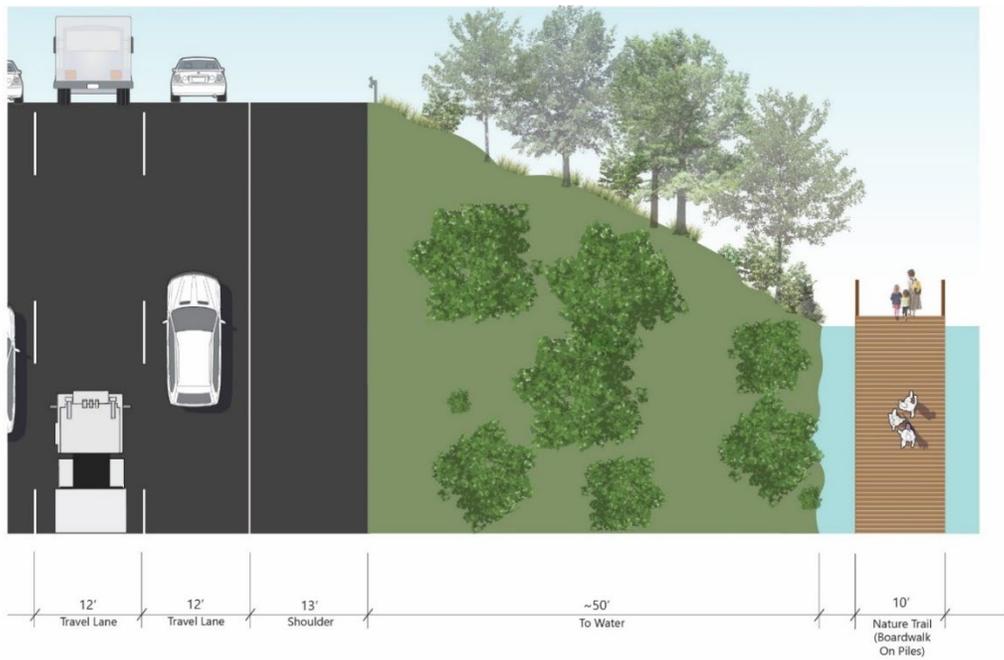


Figure 40 Section H-4 (facing north): Proposed Option 3: Off-shore Boardwalk Structure on Piles

## Evaluation of the Design Options

To help inform the preferred route alignment for the Nature Trail past the two pinch points, the planning team evaluated the three options based on common criteria. The criteria reflect the project goals for the Circumferential Trail. The scoring shown below is qualitative and intended to guide decision making and during future planning and fund-raising efforts. Per the evaluation:

- Option A scores the most poorly primarily because of the uncomfortable experience of walking adjacent to motor vehicle traffic travelling at 65 or more mph. The segment of the Nature Trail would be loud and would not feel “safe” for some. Not shown in the scoring is the possibility that widening the shoulder of the I-93 off-ramp segment at the North Pinch Point could be a more reasonable sub-option due to the width constraints of the sloping bank down to the pond. Because traffic volume and speed is lower on the off-ramp, the user experience would be far better than a path adjacent to the main line.
- Option B scores the best as it provides a quality user experience that will feel safe and comfortable for nearly all users. The environmental impact of the trail construction may be significant however, so permitting may be a challenge to moving forward. In the North Pinch Point, the narrow space between the off-ramp and the pond could make construction of the trail’s bench cut even more difficult.
- Option C would be the most user-friendly option and could provide a unique experience within Spot Pond that would likely encourage more people to engage the Nature Trail and perhaps complete the full 3.5-mile loop. The engineering challenges, permitting, and the need to coordinate with MWRA and potentially other agencies could bog this option down and increase the cost and timeline significantly.

**Routing Options**

Evaluation Criteria		A: Widen I-93 shoulder	B: Mid-slope path	C: Off-shore boardwalk	Notes
1	<b>Safety and Comfort</b> <i>Does the option provide a feeling of safety and comfort for trail users?</i>				A: proximity to high levels of traffic noise and pollution B: Significant offset from I-93 traffic C: large offset from I-93 traffic
2	<b>Connectivity</b> <i>Does the option provide a convenient and direct connection, including avoiding steep grades?</i>				A: 15-25-foot grade change from pond to I-93 shoulder will require switchbacks at end of the two pinchpoints B + C: requires minimal grade change at linkage points
3	<b>Engineering Challenges</b> <i>Does the option include engineering challenges that would lead to complexities and cost problems?</i>				A: widening I-93 shoulder will require retaining wall B: bench cut for path will require multiple, small retaining walls C: unknown challenges re: driving piles into bottom of pond
4	<b>Permitting</b> <i>Will the option trigger significant permitting requirements prior to implementation?</i>				A + B: requires coordination/permitting from DCR & MassDOT C: permitting for the boardwalk will be needed from DCR & MWRA, plus potential coordination with MassDEP and others
5	<b>User Experience</b> <i>Does the option provide an aesthetically pleasing and enjoyable experience for users?</i>				A: two pinch points amount to ~1,500' of travel adjacent to I-93 B: I-93 may feel like it is "looming" over the trail route C: walking on a boardwalk with water on both side of the trail!
<b>Summary Score</b>					Depending on the unknowns for criteria #3 and #4, route option C may be elevated into the "good" category

Scoring Options:

Excellent	Good	Average	Mediocre	Poor
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**Table 1: Aggregated List of Recommendations (Organized by Short, Medium, and Long-term)**

Project #	Project Type	Location	Recommendation / Notes	Accessible Shared Use Path Route?	Nature Trail Route?	Timeframe (Term)	Reference Map(s)
1	Bike Lanes	Route 28/Fellsway West	Add 3-foot striped buffer to existing 5-foot to 6-foot bike lanes on 40-foot wide roadway.	Yes	No	Short	1, 6
2	Bike Lanes	Route 28/Fellsway West, north of northbound I-93 off-ramp	Provide bike lane transition adjacent to I-93 off-ramp merge. Minimum 400-foot long northbound merge lane.	Yes	No	Short	1
3	Crosswalk	Intersection of Route 28/Fellsway West and New South Street	Add RRFBs (rectangular rapid flashing beacons) to existing Fellsway West/Rt 28 crosswalk just north of access point to Straw Point parking area	Yes	No	Short	1
4	Bike Lanes	South Street east of Route 28/Fellsway West/Main Street	Narrow travel lanes to 10.5-11 feet to accommodate 5-foot bike lanes on 32-foot roadway.	Yes	No	Short	1
5	Bike Lanes	New South Street, between Route 28/Fellsway West and South Street	Buffered bike lane along south edge of Straw Point parking area	Yes	No	Short	1
6	Bike Lanes	South Street/Pond Street transition, north of Stone Zoo	Narrow travel lanes to 10.5-11 feet to accommodate 5-foot bike lanes on 32-foot roadway.	Yes	No	Short	2
7	Intersection	Pond Street at Woodland Road intersection	Restripe intersection to accommodate two-lane roadways, buffered bike lanes, and new crosswalk on the north leg of the intersection	Yes	No	Short	2
8	Bike Lanes	Woodland Road south of Pond Street	Proposed reduction of Woodland Road to one lane in each direction with buffered bike lanes and turn lanes as needed.	Yes	No	Short	2
9	Intersection	Woodland Road at Ravine Road intersection	Restripe intersection to accommodate two-lane road, buffered bike lanes, and new crosswalk in one to two locations.	Yes	No	Short	2
10	Crosswalk	Woodland Road at Executive Drive (North)	New crosswalk to connect existing sidewalks with shared use path closer to the pond.	Yes	No	Short	2, 3
11	Crosswalk	Woodland Road at Cross Fells Trail	In coordination with the lane reduction described above, add RRFB's (Rectangular Rapid Flashing Beacon) to existing crosswalk.	Yes	Yes	Short	3, 4
12	Sidewalk	Woodland Road at Elm Street and Highland Avenue	Widen adjacent sidewalks (as indicated in inset map 4) to accommodate pedestrians and bicycles.	Yes	No	Short	4
13	Bike Lanes	Elm Street, Brackett Street to Woodland Road/Highland Avenue	Proposed 6-foot bike lanes on 34-foot wide roadway (coordination with City of Medford required)	Yes	No	Short	4
14	Nature Trail	Aquavia Road at Wright's Beach	Consider Seasonal Hours for Aquavia Road gate to accommodate pedestrian access (in coordination with DCR and the City of Medford).	No	Yes	Short	4, 5
15	Crosswalk	Elm Street at Brackett Street	Add RRFB's (Rectangular Rapid Flashing Beacons) to existing crosswalk.	Yes	No	Short	4, 5
16	Bike Lanes	Elm Street, west of Brackett Street	Proposed 4.5-foot bike lanes on 30-foot wide roadway (shared lane markings at existing crosswalk locations).	Yes	No	Short	4, 5
17	Crosswalk	Route 28/Fellsway West at Elm Street	Add RRFB's for both crosswalks and a pedestrian refuge island between Fellsway West northbound through traffic, and right turns to Elm Street.	Yes	No	Short	5
18	Crosswalk	Route 28/Fellsway West, at Sheepfold Accessway	Add RRFBs (rectangular rapid flashing beacons) to existing south crosswalk.	Yes	No	Short	6
19	Intersection	Route 28/Fellsway West at Sheepfold Accessway	Reduce size of turning radii to the Sheepfold accessway.	Yes	No	Short	6
20	Intersection	Route 28/Fellsway West north and south of Sheepfold Entrance	Parking allowed in shoulder 200-feet from Sheepfold Entrance (no bike lane stencils).	Yes	No	Short	6
21	Intersection	Route 28/Fellsway West at southbound on-ramp to I-93	Add precast curbs and delineator posts as a short-term splitter island to slow turning traffic.	Yes	No	Short	6
22	Bike Lanes	Route 28/Fellsway West	Add 3-foot striped buffer to existing 5-foot to 6-foot bike lanes on 40-foot wide roadway.	Yes	No	Short	6
23	Road Diet	Route 28/Fellsway West, south of New South Street	Proposed reduction of Fellsway West to one lane in each direction with buffered bike lanes (turn lanes, as needed, on the approach to and from the South Street and Main Street intersection).	Yes	No	Medium	1
24	Intersection	Intersection of Route 28/Fellsway West and New South Street	Realign intersection to slow turning traffic and provide improved bicycle and pedestrian crossing of Fellsway West	Yes	Yes	Medium	1
25	Shared Use Path	New South Street, east of Route 28/Fellsway West, at Section A	Bike loop uses the shared use path westbound and buffered bike lane eastbound	Yes	Yes	Medium	1
26	Shared Use Path	New South Street, between Route 28/Fellsway West and South Street	Shared use path along south edge of Straw Point parking area	Yes	Yes	Medium	1
27	Nature Trail	Park land east of Route 28/Fellsway West, south of Straw Point, north of I-93 pinch point.	Nature trail from Straw Point to north limit of I-93 pinch point	No	Yes	Medium	1
28	Nature Trail	Park land south of South Street, between Straw Point and Stone Zoo parking lot	Nature trail from Straw Point to Stone Zoo parking lot	No	Yes	Medium	1, 2
29	Nature Trail	Waterfront parkland west of Woodland Road South at Executive Drive	Nature trail around Botume house	No	Yes	Medium	2
30	Intersection	Pond Street just east of South Street	Future relocated driveway to DCR maintenance facility; ensure intersection design accommodates bike lanes.	Yes	No	Medium	2
31	Road Diet	Pond Street, south of Stone Zoo	Proposed reduction of Pond Street (south of Stone Zoo parking lots) to one lane in each direction and buffered bike lanes and turn lanes as needed.	Yes	No	Medium	2
32	Crosswalk	Woodland Road at Executive Drive (South)	New crosswalk with small switchback needed in median to accommodate ADA.	Yes	No	Medium	3
33	Road Diet	Woodland Road north of Flynn Rink	Proposed reduction of Woodland Road to one lane in each direction with buffered bike lanes and turn lanes as needed	Yes	No	Medium	3, 4
34	Sidewalk	Route 28/Fellsway West, north of Cross Fells Trail	New sidewalk on west side to accommodate Cross Fells Trail connection across Fellsway West	No	Yes	Medium	6
35	Crosswalk	Route 28/Fellsway West, north of Cross Fells Trail	New crosswalk and RRFB (pending review of sight lines)	No	Yes	Medium	6

Project #	Project Type	Location	Recommendation / Notes	Accessible Shared Use Path Route?	Nature Trail Route?	Timeframe (Term)	Reference Map(s)
36	Intersection	Intersection of Route 28/Fellsway West/ Main St and South St/North Border Rd	Future intersection project (separate MassDOT/Town project)	Yes	No	Long	1
37	Shared Use Path	Route 28/Fellsway West, west sidewalk	Widen 8' west sidewalk to 10-12-feet to accommodate a shared use path (coordination w/ 2025 MassDOT bridge deck replacement project required).	Yes	No	Long	1
38	Shared Use Path	Route 28/Fellsway West	Rebuild existing sidewalk with separate zones for pedestrians and bi-directional separated bike lanes.	Yes	No	Long	1, 6
39a	Shared Use Path	I-93 pinch points adjacent to the pond	Design option A for I-93 pinch point: Wider road shoulder with jersey barrier (within MassDOT right of way).	No	Yes	Long	1, 6
39b	Nature Trail	I-93 pinch points adjacent to the pond	Design option B for I-93 pinch point: Natural surface path on slope between I-93 and Spot Pond (DCR property).	No	Yes	Long	1, 6
39c	Boardwalk	I-93 pinch points adjacent to the pond	Design option C for I-93 pinch point: Boardwalk structure on piles within Spot Pond	No	Yes	Long	1, 6
40	Intersection	Pond Street at Greenwood Park and Stone Zoo parking lot entrances	Potential location of roundabout (in coordination with the Road Diet projects described above to better accommodate access to the Stone Zoo's parking lots and to slow traffic speeds.	Yes	No	Long	2
41	Shared Use Path	Pond Street, west curb	Where current sidewalk is less than 8 feet, widen to 10-12-feet to accommodate shared use with light poles at back of curb.	Yes	Yes	Long	2
42	Intersection	Pond Street at Woodland Road intersection	Rebuild intersection as a modern, one-lane roundabout with separated bike lanes and sidewalks.	Yes	No	Long	2
43	Shared Use Path	Woodland Road south of Pond Street	Both directions of traffic on east side of the current divided parkway, with expanded median and pedestrian and bicycle facilities on the west side of the parkway.	Yes	Yes	Long	2, 3, 4
44	Intersection	Woodland Road at Ravine Road intersection	Rebuild intersection as a modern one-lane roundabout with separated bike lanes and sidewalks.	Yes	Yes	Long	2
45	Shared Use Path	Woodland Road, west curb	Where current sidewalk is less than 8 feet, widen to 10-12-feet to accommodate shared use with light poles at back of curb.	Yes	No	Long	3
46	Shared Use Path	Path west of Woodland Road, between Botume House and Historic Pump House	Shared use path regrading and repair as needed	Yes	No	Long	3
47	Shared Use Path	Path west of Woodland Rd, between Woodland Rd and Half Mile Rd	Shared use path regrading and repair as needed (between Woodland Road and Half Mile Road shared use path)	Yes	No	Long	3
48	Sidewalk	Woodland Road South, west curb at Elm Street	Widen sidewalk to accommodate shared use.	Yes	No	Long	4
49	Sidewalk	Elm Street and Highland Avenue intersection, south curb	Widen sidewalk to accommodate shared use.	Yes	No	Long	4
50	Intersection	Woodland Road at Elm Street and Highland Avenue	Rebuild rotary as a modern, one-lane roundabout with separated bike lanes and sidewalks (centerpoint may need to shift to the north with Fulton "T-ing" into Elm Street).	Yes	No	Long	4
51	Intersection	Route 28/Fellsway West at Elm Street	Conduct traffic and preliminary design study to determine if either a smaller, signalized intersection or a roundabout would be most appropriate.	Yes	No	Long	5
52	Nature Trail	Parkland at Wright's Pond, west side	Nature trail from Wrights Beach to Cross Fells Trail	No	Yes	Long	5
53	Intersection	Route 28/Fellsway West at southbound on-ramp to I-93	Study opportunity for a double roundabout in conjunction with accessway to Sheepfold parking area.	Yes	No	Long	6
54	Shared Use Path	Route 28/Fellsway West	Rebuild existing sidewalk with separate zones for pedestrians and a bidirectional separated bike lane.	Yes	No	Long	6
55	Nature Trail	Park land east of Route 28/Fellsway West (opposite Sheepfold area)	Deer Hill Nature Trail between the two, I-93 Pinch Point segments	No	Yes	Long	6
56	Shared Use Path	Half Mile Road Path	Shared use path regrading and repair as needed (from Historic Pump House to Route 28/Fellsway West)	Yes	No	Long	6

## 2.4 Design Assumptions and Criteria

Both FHWA policy and MassDOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — state and municipal transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes. The Spot Pond Circumferential Trail Study includes an overview of the design assumptions used for the various recommendations and a definition of the types of ped/bike infrastructure that is recommended around the pond.

### Design Assumptions/Construction Guidelines

For this Study, a number of design assumptions have been made about the future accessible SUP and the nature trail typologies that are incorporated into the recommendations. Assumptions include:

- › 10-12-foot-wide SUP is ideal, with 8 feet minimum when topographic, environmental or right-of-way constraints are evident
- › When adjacent to a roadway, the path buffer is to be 5' wide (landscaped) or 2' wide with a solid barrier or guardrail
- › For the accessible SUP loop, an asphalt paved surface is typical when adjacent to a roadway, with crushed limestone within a wooded context or environmentally sensitive zone
- › 4.5% (with 0.5% tolerance) running slope for full accessibility and to meet ADA (some portions of SUP or ramps may be as steep as 8.3% (with no tolerance), but would need a level landing every 30-feet)
- › For the nature trail loop, crushed limestone is the preferred surface; in more remote areas with significant topography, a dirt/gravel/woodchip path is permissible
- › Trailheads with sign kiosk, benches, and bike racks anticipated in various locations (trailhead parking to utilize existing parking lots or street parking).
- › On-street bike lanes are to be 5-foot minimum (6 foot ideal) with striped buffer width of at least 3 feet where space is available (e.g., along Fellsway West or a reconfigured Woodland Road)
- › Lime green pavement markings should demarcate conflict zones where motor vehicles pass over the designated bicycle lane
- › Erosion control & topography preservation techniques
  - Grading options to integrate the SUP into the surrounding topography include:
    - Stone masonry walls
    - Rockfill slopes for reinforcing steep slopes
    - Rockfill slopes with compost and seed to vegetate the reinforced slope
  - Runoff during construction – compost filter tubes are typically used by contractors to contain sediment runoff within the disturbed area for path construction

Ultimately, project design criteria will be derived from the above guidelines, standard engineering practice and the successful application of regulatory standards and guidelines.

## Definitions of Trail Types

The following trail and bikeway typologies were considered for this study.



Typical Bike Lane



Typical Sidepath (Paved)



Typical Shared Use Path (Stonedust)



Typical Nature Trail

- › **Bike Lane** – A bike lane is a portion of a roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and if used, signs. Around Spot Pond, bike lanes are recommended on many of the surrounding parkways with traffic volumes in the 5,000 – 15,000 range with typical speeds 25 to 40 mph. Where space is available—e.g., along the north half of Fellsway West—a min. 3-foot-wide striped buffer should be provided to provide additional separation.
- › **Shared-Use Path/Sidepath (paved)** – A shared use path (SUP) or sidepath lies outside of a roadway surface and is physically separated from motorized vehicular traffic by a landscaped buffer, 6-inch curb, or barrier. The ADA-accessible, min. 10-foot-wide SUP can be either within the roadway right-of-way or on an independent alignment. Paved SUPs are used by pedestrians, runners, skaters, wheelchairs users, and bicyclists. Design criteria for SUP's (design speed, minimum curve radii, stopping sight distance, etc.) are similar for design of roadways but modified based on the operating characteristics of a bicycle as a vehicle and bicyclist as a vehicle operator.
- › **Shared Use Path (stonedust)** – Most of the recommended SUPs that do not lie within a road ROW are intended to have a stonedust surface. Similar to their paved cousins, these are designed to be fully accessible with grades at 4.5% slope and typically 10 feet wide. In most instances, recommended stonedust SUPs incorporate existing or former gravel roads within the Fells Reservation. This minimizes impact to environmental and cultural resources.
- › **Nature Trail** – The nature trail loop also incorporates a number of existing natural-surface and dirt path within the Fells Reservation. Most of these are 3-to-4 feet wide and at times, include relatively steep slopes, tight turns, and obstacles created by large rocks. New segments of the nature trail loop should minimize tree removal, regrading, and/or proximity to wetland areas.

## 2.5 Environmental Due Diligence Review

This trail study was developed using data provided by the Massachusetts Office of Geographic Information Systems (MassGIS). This database is a compilation of information acquired from a broad base of public and private agencies and serves as a useful tool for the purposes of planning and assessing potential suitability of land use and development. Further research, field verification and field survey will be needed to verify the findings of this report before proceeding to final design.

An environmental review was conducted using the aforementioned resources and included endangered species, wetlands, FEMA floodplain area, cultural, archeological & historic considerations, any hazardous material sites, water supply and land dedicated to open space preservation.

See below table of likely permitting requirements prior to development of the trail system, and Appendix B for an expanded table further detailing the trail segments.

The evaluation of the potential trail segments was placed into the table, in which the impacts were scored on a scale of 1 to 5, with 1 being least favorable and 5 being most favorable. The scores were then averaged to determine which segments of the accessible shared use path, the reconfigured roadways, and the nature trail loop provide the least impact.

**Table 2 Trail Segment Evaluation Matrix / Impact Matrix**

Segment Number	Segment (From / To)	Environmental Resource Area Impact								Total Average Weighted Score (Out of 5)	Ranking
		NHESP	Wetlands	FEMA Floodplain	Water Supply Protection Areas	Historic	Archaeological	Open Space [Article 97, Section 4(f)/6(f)]	OHM (Hazardous Materials)		
WEIGHTING (1-10)		10	10	10	10	10	10	10	10		
<b>Accessible Path Segments</b>											
A1	Straw Point Path adjacent to parking area (Main St/Rt. 28 to South St)	5	3	5	5	2	2	1	5	1.87	12
A2	Spot Pond East Path (Botume House to historic Pump House)	4	3	5	5	4	4	1	5	2.07	4
A3	Half Mile Road Path (Historic Pump House to Fellsway West)	1	4	5	5	4	4	1	5	1.93	7
A4	Pickerell Rock Path Extension (Half Mile Road Path to Pickerell Path)	1	4	5	5	2	2	1	5	1.67	20
<b>Roadway Segments</b>											
R1	South St/Pond St (Main St/Rt. 28 to just N of Stone Zoo)	5	5	5	5	2	4	4	5	2.33	1
R2	Pond St/Woodland Rd (just N of Stone Zoo to Elm St)	3	3	5	5	2	4	1	5	1.87	12
R3	Woodland/Elm/Highland rotary (Woodland Rd Highland Ave)	5	3	5	5	2	4	2	5	2.07	4
R4	Elm St (Woodland Rd to Fellsway West)	4	4	5	5	2	4	1	5	2.00	6
R5	Fellsway West (Elm St to Sheepfold access drive)	3	4	5	3	4	4	1	5	1.93	7
R6	Fellsway West (Sheepfold access drive to I-93 off-ramp)	5	4	5	4	4	4	1	5	2.13	2
R7	Fellsway West (I-93 off-ramp to N Border Rd/South St)	5	3	5	5	4	4	1	5	2.13	2
<b>Nature Trail Segments</b>											
N1	Stone Zoo nature trail segment (South St to Pond St)	5	3	5	5	2	2	1	5	1.87	12
N2	Botume House nature trail segment (Woodland Rd to Spot Pond East Path)	5	4	5	5	2	2	1	5	1.93	7
N3	Quarter Mile Pond nature trail segment (Flynn Rink P lot to historic pump house)	1	4	5	5	4	4	1	5	1.93	7
N4	Pickerell Path (Half Mile Road path to Fellsway West)	2	2	5	5	4	4	1	5	1.87	12
N5	Wright's Pond-Spot Pond Path (Wright's Beach to the Woodland Path)	2	2	3	5	2	2	1	5	1.47	21
N6	I-93 southern pinch-point nature trail segment (Pickerell Path to Deer Hill)	5	3	5	5	2	2	1	5	1.87	12
N7	Deer Hill nature trail segment (I-93 southern to northern pinch points)	5	4	5	5	2	2	1	5	1.93	7
N8	I-93 northern pinch-point nature trail segment (Deer Hill to peninsula view pt.)	5	2	5	5	2	2	1	5	1.80	18
N9	Peninsula View Pt. nature trail segment (I-93 northern point point to Straw Point)	5	1	5	5	2	2	1	5	1.73	19
N10	Straw Point Peninsula Path (path adjacent to South St to Spot Pond)	5	3	5	5	2	2	1	5	1.87	12

Ranking 1-5, with 5 as high (favorable) and 1 as low (unfavorable).

## Environmental Resource Impact Area definitions

### Natural Heritage and Endangered Species Program (NHESP) Impacts

The NHESP maintains a database of the habitats of State-listed rare species in Massachusetts based on observations documented in the last 25 years. Areas delineated as Priority Habitats include wetlands, uplands and marine habitats. The Estimated Habitats of Rare Species are based on occurrences of rare wetland wildlife observed within the last 25 years and entered into the NHESP database.

### Impacts to Wetlands

Potential impacts to wetlands fall under the jurisdiction of the Massachusetts Department of Environmental Protection (DEP). The wetlands boundary information used in the Alternatives Analysis was derived from aerial infrared photography and field checked by the DEP's Wetlands Conservancy Program (WCP).

### Impact to FEMA Floodplains

The most current National Flood Insurance Program (NFIP) data was used to determine the potential flood hazard for the area of study. The primary risk classifications used are the 1-percent-annual-chance flood event, the 0.2-percent-annual-chance flood event, and areas of minimal flood risk.

### Impact to Water Supply Protection Areas

Massachusetts Department of Environmental Protection (DEP) has designated certain areas for protection based on the presence of source water for human consumption. These areas are divided into different zone types depending on the water source type (surface water, well water, etc.), and are important to consider when any development is proposed.

### Impact to National Register Historic Properties and Districts

The historic resources considered in this analysis are those designated as listed in, or eligible for listing in, the National/State Registers of Historic Places, as reported in the Massachusetts Historical Commission's (MHC) Massachusetts Cultural Resource Information System (MACRIS). These historic resources include buildings, burial grounds, structures and objects as well as areas and districts.

### Archeological

Archaeological resources are considered in this analysis when there is potential for new ground disturbance. This disturbance may be the result of new construction, installation of circulation outside of current path boundaries, and/or the establishment of access/laydown areas during construction.

### Impacts to Open Spaces

The State of Massachusetts designates certain areas dedicated to land conservation or outdoor recreation as Open Spaces, and these lands require special consideration before any development or infrastructure project can begin. The Open Space designation can protect lands used for conservation purposes, such as national/state forests and habitats, recreational purposes, such as parks and public golf courses, and other uses such as agriculture and cemeteries.

### Impact to OHM Hazardous Materials

The DEP's Bureau of Waste Site Cleanup (BWSC) maintains a database of all reported releases of oil or hazardous material into the environment. The dataset reviewed in this analysis includes confirmed Hazardous Material Sites with Activity and Use Limitation (AUL). The AUL is a legal document that identifies activities and uses of the property that may or may not occur and the owner's obligation and maintenance conditions that must be followed to ensure the safe use of the property.

## 2.6 Opportunities for Implementation

The summary below outlines opportunities for advancing the project, including permitting needs, further coordination with other agencies, potential early-phase projects, and funding options.

- Endorsement of the trail study by the Stoneham Select Board (*complete!*)
- Draft a scope of work for a more detailed feasibility study and conceptual design report that would include cost estimates, preliminary traffic analysis, trail-use estimates, design details, a maintenance plan, and more detailed environmental analysis related to water resources, soils, vegetation, wildlife, and archeology.
- Develop a fundraising strategy with corresponding timeline, starting with funding for the follow-up study via MassTrails grant or a Legislative earmark from Stoneham's state delegation
- As a stand-alone or an outgrowth of the Friends of the Fells organization, promote the establishment of a "Friends of the Spot Pond Loop Trail" non-profit organization. The non-profit can assist with private fundraising, coordinate volunteers, and develop an 'adopt-a-mile' program. The "Friends of" group can also develop a Spot Pond Trail Loop logo that helps to 'brand' the vision and build public support.
- Set up a Spot Pond Loop Trail Steering Committee that meets on a quarterly basis. The committee should include representatives from Town of Stoneham (Chair), DCR, MassDOT, MWRA, City of Medford, State Reps/Senators, and key stakeholders to be determined by the Town (e.g., Stone Zoo). Subcommittees can be set up to study:
  - Use of underutilized parkway space
  - Environmental/water quality issues
  - Fundraising
  - Ongoing community engagement
- Focus on low-cost "early-win" projects, in coordination with DCR. Even small, incremental progress can help built support for the loop trail idea and create media attention and support from elected officials. Early-win projects could include:
  - Using the Spot Pond Trail Loop logo described above and other wayfinding signs to demarcate a route to walk or bike around Spot Pond
  - Restriping of portions of some parkways to provide designated bike lanes or buffered bike lanes that would not require a traffic study
- Ongoing advocacy and capacity building by stakeholders and state agencies and department who are the primary property owners surrounding Spon Pond

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# APPENDICES

# Appendix A:

## Summary of Stakeholder Input

## Stakeholder Input

Stakeholder input was an important part of the Spot Pond Circumferential Trail Study process. Meetings were conducted with land-owning state agencies and key stakeholder groups to understand their concerns and aspirations. Meetings were held between September 2022 and April 2023 and are summarized below.

### Summary of Stakeholder Meetings

The Study team met with following stakeholder groups:

- › Massachusetts Department of Conservation and Recreation (DCR)
- › Fells State Caucus (on two occasions)
- › The City of Medford
- › Massachusetts Department of Transportation (MassDOT)
- › Massachusetts Water Resource Authority (MWRA)
- › Stone Zoo/Boys & Girls Club/Bike to the Sea/Friends of the Fells
- › Stoneham Transportation Advisory Committee (STAC)

With each stakeholder group, the Town of Stoneham Administrator Dennis Sheehan provided a background of what led to the creation of this project, followed by VHB's description of the project scope and schedule.

VHB described existing features of the study area such as existing paths, wetlands, viewpoints, and rock formations. Trail planning and design assumptions were discussed, such as the desire for a nature trail and an ADA compliant shared use path (SUP). The team would consider all existing features and permitting needs for the main route alignment. Potential spurs off of the main route of the SUP would be explored for opportunities to connect to notable features in the vicinity of the pond, such as transit or commercial features. The need to incorporate on-road links for the trail was emphasized as well.

## Massachusetts Department of Conservation and Recreation (DCR)

Purpose: to gauge concerns about impact to, and/or management of, the Fells Reservation, adjacent parkways, recreational opportunities, and mountain bike access.

### September 28<sup>th</sup>, 2022; October 3<sup>rd</sup>, 2022 – Archaeology Meeting; February 27<sup>th</sup>, 2023

DCR concerns and comments:

- › General comments:
  - Interest in providing better pedestrian access to Spot Pond where there is currently none.
  - Plan could provide DCR clarity on priorities, phasing, and supported concepts, and to help in form DCR's capital planning work.
  - DCR natural resource/cultural resource staff should weigh in on First Nations sites, endangered species, special planting areas, and water quality.
- 1. Middlesex Fells Planning Unit water resource management plan should be consulted.
- › Archaeological concerns: The site is sensitive archaeologically. Some sites are within the top two feet of existing grade, as such, a 10–12-foot-wide SUP through wooded areas along the pond would not be supported by DCR.
  - Requested coordination with DCR's staff archaeologist. Only a MA Historic certified archeologist has access to the site locations.
  - The site is mostly a national register historic district. Recommended conducting an Archaeological Resource inventory with a cultural resource sensitivity consultant. Noted that ground impacts of the existing trails will need to be studied.
  - There is an opportunity to interpret the landscape including the indigenous history, and the inclusion of an interpretive trail.
  - If the alignment follows the existing trail footprint and construction impacts are minimal and just additive, they recommend minimizing permitting and environmental impacts. Boardwalks with helical piers should be assumed in some areas.
- › Roadway reconfiguration opportunities: Constraints and opportunities were noted throughout the study area's roadways in terms of ownership (DCR owns nearly all of the on-street portions of the loop surrounding the pond), traffic patterns and capacity, and in-progress roadway redesigns to potentially modify.
  - Opportunities were highlighted such as road diets overall and on specific corridor segments, and that nearly all over the parkways were overbuilt from a vehicular perspective. Pond Street was noted as potentially one on-road segment that should retain current vehicular capacity.
  - Roundabouts were also recommended at multiple locations, along with MassDOT Roundabout Design Guide as reference.
  - DCR experimented with road closures on sections of Route 28 in 2020.
  - Exploring big ideas such as converting dual roadways to two-way vehicular traffic on one roadway and shared use or bike facilities on the other roadway

## Fells State Caucus

### September 20<sup>th</sup>, 2022 and April 25<sup>th</sup>, 2023

In September 2022, the Study was briefly introduced with statements from Senator Jason Lewis and Representative Paul Donato. VHB and DCR were present. VHB delivered a presentation to introduce the project, and noted the ongoing stakeholder meetings, agency coordination, and future meetings.

During a follow-up presentation in April 2023, Senator Jason Lewis made introductory statements, and VHB presented project updates:

- › Review of materials presented in 2022, along with the accessible trail and shared use path loop, the nature trail closer to the pond, illustrated with inset maps throughout the study area.
- › The accessible SUP loop along Fellsway West would be on-road/sidewalk. Short-term vs. long-term recommendations for this segment were discussed.

City Councilor Ryan Williams noted interest in providing connectivity to the Fells from the east, which aligns with the City's goal, and inquired about the timeline for the short term vision:

- › Town of Stoneham staff noted the deliberate nature of short vs. long term options, and that the Town of Stoneham would likely not contribute major construction funding. DCR may choose to move forward with long-term options rather than short term, and Town of Stoneham find that acceptable.

Senator Jason Lewis inquired about construction cost estimates (VHB confirmed they are expected by end of June 2023) and looks forward to working with the new commissioner of DCR, the Caucus, and Friends groups to move the project forward.

## City of Medford

### September 30<sup>th</sup>, 2022

Discussion with the City of Medford included:

- › Various roadways and segments throughout the study area were discussed in terms of conceptual redesign opportunities, including locations with ongoing or pending coordination with other stakeholder agencies such as DCR, MBTA, MassDOT:
  - General preferences for on-road vs. off-road facilities (several locations discussed)
  - Bus stop coordination including integration with Better Bus Network recommendations
  - Pedestrian improvements, bicycle connections, traffic impacts, and traffic calming
  - Considerations of grade change in terrain for route selection (i.e. Wrights Pond to Flynn Rink)
  - Consider widening existing paths vs. constructing new paths to minimize impacts.
  - Key locations discussed included Flynn Rink, Cross Fells Pathway, Stone Zoo, Woodland Circle, Woodland Road, Elm Street
  - Connections to Malden should be considered, also with regard to traffic impacts
- › The City has projects planned throughout the area and agreed to provide the Study team a list of projects for roadways, bicyclists, pedestrians within the study area.

## Massachusetts Department of Transportation (MassDOT)

Purpose: to discuss constraints within the I-93 State Highway Layout, designation of Route 28 as part of the formal Spot Pond Loop Trail, and safety related issues.

### October 3<sup>rd</sup>, 2022

Discussion with MassDOT included the I-93 right of way, accessibility adjacent to I-93, and tree impacts/removals.

- › I-93 ROW: Limits of the ROW were discussed in this portion, along with design considerations.
  - MassDOT would likely not be very interested in a nature trail along the fill slope between I-93 and Spot Pond (north and south of Deer Hill). DCR would be likely the applicable stakeholder if such a trail were included.
  - Project examples for this segment were noted such as the Wellington Greenway and Whittier Bridge, along with applicable design approaches with regard to the barrier and wall separation to potentially minimize environmental impacts of an alternate nature trail on the slope.
- › Accessibility adjacent to I-93: If a non-ADA compliant nature trail was included between I-93 and Spot Pond (separated by barrier), providing an ADA compliant connection to Straw point and Route 28/Fellsway West would theoretically be necessary.
- › The importance of minimizing tree removal on DCR sections was emphasized.

## Massachusetts Water Resource Authority (MWRA)

Purpose: to understand water quality issues, desired restriction to pondside access, and concerns about the potential presence of horses, and other environmental issues.

### October 18<sup>th</sup>, 2022

Discussion with the MWRA noted critical infrastructure in the study area for the Study team to be aware of, various potential routing and design options, and what MWRA's needs would be with regard to the interaction between path users and MWRA infrastructure.

- › Security, water quality, and access needs were discussed with regard to potential trail alignments and infrastructure and MWRA's infrastructure, for example the boardwalk design, avoiding the perimeter of the Pump House.
- › Potential for MWRA to implement wayfinding/interpretive signage, educational opportunities.

## Stone Zoo / Boys & Girls Club / Bike to the Sea / Friends of the Fells

### October 25<sup>th</sup>, 2022

General comments noted a desire for quick build interventions, and a reference that demographic shifts in Melrose and other towns may generate more walking and biking in the area.

- › Importance of accessibility was emphasized (for trails and restrooms), along with an interest in lookout points that are not necessarily a loop, but rather an out and back trail segment to an overlook. A recent Audubon center was referenced for accessible trail features. Town staff noted

the loop could be the foundation for future recommendations for spurs/existing trail use that connects to the viewpoints (and is accessible).

- › Concerns with potential stress to animals if a trail is too close to the zoo perimeter fence, particularly near the wolf exhibit (and wheeled trail users), were noted. Town staff offered signage to direct bicyclists and people with dogs to use alternate sidewalks to avoid the wolf exhibit area.
- › Traffic safety and visibility concerns were noted nearby such as the Zoo parking lot at Pond Street.

## Stoneham Transportation Advisory Committee (STAC)

### November 3<sup>rd</sup>, 2022

The discussion with DCR's STAC included:

- › Project timeline and funding responsibility: Funding will likely go through the MPO process, and other funding sources such as the MassTrails grant program may also be used (i.e. for design/engineering).
- › General project routing and design questions, including:
  - Boundaries and locations of wetlands
  - Improvements needed for safety and access for all modes, especially pedestrians and bicyclists
  - Desire for pedestrian access point at Woodland Road/Executive Drive area and others
  - The potential need for winter bike lane maintenance
- › The Lake Quannapwoitt loop trail in Wakefield, MA was referenced as a potential precedent
- › Discussion of whether a popular trail could induce increased parking demand

# Appendix B:

## Trail Segment Impact Matrix

## Trail Segment Evaluation Matrix / Impact Matrix

Segment Number	Segment (From / To)	Environmental Resource Area Impact								Total Average Weighted Score (Out of 5)	Ranking	Resource Area Impact Notes
		NHESP	Wetlands	FEMA Floodplain	Water Supply Protection Areas	Historic	Archaeological	Open Space [Article 97, Section 4(f)/(6)(f)]	OHM (Hazardous Materials)			
WEIGHTING (1-10)		10	10	10	10	10	10	10	10			
<b>Accessible Path Segments</b>												
A1	Straw Point Path adjacent to parking area (Main St/Rt. 28 to South St)	5	3	5	5	2	2	1	5	1.87	12	Wetlands: 60% of segment is w/in 100ft buffer and 40% is w/in 25ft NDZ. Historic/Archaeological: Proposed path segment outside official existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Middlesex Fells Reservation (DCR).
A2	Spot Pond East Path (Botume House to historic Pump House)	4	3	5	5	4	4	1	5	2.07	4	NHESP: 10% of segment is located in Priority Habitat (PH) 1453. Wetlands: 40% of segment is w/in 100ft buffer and 2% is w/in 25ft NDZ. Article 97: Middlesex Fells Reservation (DCR).
A3	Half Mile Road Path (Historic Pump House to Fellsway West)	1	4	5	5	4	4	1	5	1.93	7	NHESP: 100% of segment is located in PH 1453. Wetlands: 10% of segment is w/in 100ft buffer, 2% is w/in 25ft NDZ. Article 97: Middlesex Fells Reservation (DCR) and Wright's Pond (City of Medford).
A4	Pickerell Rock Path Extension (Half Mile Road Path to Pickerell Path)	1	4	5	5	2	2	1	5	1.67	20	NHESP: 100% of segment is located in PH 1453. Wetlands: 40% of segment is w/in 100ft buffer. Historic/Archaeological: Proposed path segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Middlesex Fells Reservation (DCR) and Wright's Pond (City of Medford).
<b>Roadway Segments</b>												
R1	South St/Pond St (Main St/Rt. 28 to just N of Stone Zoo)	5	5	5	5	2	4	4	5	2.33	1	Wetlands: 10% of segment is w/in 100ft buffer. Historic: Upgrade of roadway included in Middlesex Falls Reservation Parkways historic district. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate impacts to contributing features such as medians, , miters, roundabouts, and granite curbing. Article 97: Middlesex Fells Reservation (DCR).
R2	Pond St/Woodland Rd (just N of Stone Zoo to Elm St)	3	3	5	5	2	4	1	5	1.87	12	NHESP: 40% of segment is located in PH 1453. Wetlands: 25% of segment is w/in 100ft buffer and 5% is w/in 25ft NDZ. Existing wetland crossing. Historic: Upgrade of roadway included in Middlesex Falls Reservation Parkways historic district. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate impacts to contributing features such as medians, , miters, roundabouts, and granite curbing. Article 97: Middlesex Fells Reservation (DCR).
R3	Woodland/Elm/Highland rotary (Woodland Rd Highland Ave)	5	3	5	5	2	4	2	5	2.07	4	Wetlands: 30% of segment is w/in 100ft buffer and 20% is w/in 25ft NDZ. Historic: Upgrade of roadway included in Middlesex Falls Reservation Parkways historic district. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate impacts to contributing features such as medians, , miters, roundabouts, and granite curbing. Article 97: Middlesex Fells Reservation (DCR).
R4	Elm St (Woodland Rd to Fellsway West)	4	4	5	5	2	4	1	5	2.00	6	NHESP: 45% of segment adjacent to PH 1453. Wetlands: 10% of segment is w/in 100ft buffer. Potential 200ft RA. Historic: Upgrade of roadway included in Middlesex Falls Reservation Parkways historic district. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate impacts to contributing features such as medians, , miters, roundabouts, and granite curbing. Article 97: Middlesex Fells Reservation (DCR).
R5	Fellsway West (Elm St to Sheepfold access drive)	3	4	5	3	4	4	1	5	1.93	7	NHESP: 50% of segment adjacent to PH 1453. Wetlands: 10% of segment is w/in 100ft buffer and 1% is w/in 25ft NDZ. Potentially w/in 200ft RA. WSPA: 30% overlap with North Reservoir PWSW and Zone A and C SWSP areas. Article 97: Middlesex Fells Reservation (DCR).
R6	Fellsway West (Sheepfold access drive to I-93 off-ramp)	5	4	5	4	4	4	1	5	2.13	2	Wetlands: 30% of segment is w/in 100ft buffer. WSPA: 20% overlap with North Reservoir PWSW and Zone A SWSP areas. Article 97: Middlesex Fells Reservation (DCR).
R7	Fellsway West (I-93 off-ramp to N Border Rd/South St)	5	3	5	5	4	4	1	5	2.13	2	Wetlands: 25% of segment is w/in 100ft buffer and 5% is w/in 25ft NDZ. Potential wetland crossing. Article 97: Middlesex Fells Reservation (DCR).
<b>Nature Trail Segments</b>												
N1	Stone Zoo nature trail segment (South St to Pond St)	5	3	5	5	2	2	1	5	1.87	12	Wetlands: 30% of segment is w/in 100ft buffer and 5% is w/in 25ft NDZ. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Middlesex Fells Reservation (DCR).
N2	Botume House nature trail segment (Woodland Rd to Spot Pond East Path)	5	4	5	5	2	2	1	5	1.93	7	Wetlands: 40% of segment overlaps w/100ft buffer. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Middlesex Fells Reservation (DCR).
N3	Quarter Mile Pond nature trail segment (Flynn Rink P lot to historic pump house)	1	4	5	5	4	4	1	5	1.93	7	Wetlands: 10% of segment overlaps w/100ft buffer. NHESP: 80% of segment is located w/in PH1453. Article 97: Overlap w/Middlesex Fells Reservation (DCR).
N4	Pickerell Path (Half Mile Road path to Fellsway West)	2	2	5	5	4	4	1	5	1.87	12	Wetlands: 60% of segment is w/in 100ft buffer and 20% is w/in 25ft NDZ. Wetland crossing. NHESP: 70% of segment is located w/in PH1453. Article 97: Overlap w/Middlesex Fells Reservation (DCR).
N5	Wright's Pond-Spot Pond Path (Wright's Beach to the Woodland Path)	2	2	3	5	2	2	1	5	1.47	21	Wetlands: 25% of segment is w/in 100ft buffer and 20% is w/in 25ft NDZ. Potentially in 200ft Riverfront Area. Wetland crossing. FEMA: 26% of segment located w/in Zone A. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. NHESP: 75% of segment is located w/in PH1453 & 1435. Article 97: Overlap with Wright's Pond property (City of Medford).
N6	I-93 southern pinch-point nature trail segment (Pickerell Path to Deer Hill)	5	3	5	5	2	2	1	5	1.87	12	Wetlands: 100% of segment is w/in 100ft buffer. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Overlap w/Middlesex Fells Reservation (DCR).
N7	Deer Hill nature trail segment (I-93 southern to northern pinch points)	5	4	5	5	2	2	1	5	1.93	7	Wetlands: 15% of segment is w/in 100ft buffer. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Overlap w/Middlesex Fells Reservation (DCR).
N8	I-93 northern pinch-point nature trail segment (Deer Hill to peninsula view pt.)	5	2	5	5	2	2	1	5	1.80	18	Wetlands: 100% of segment is w/in 100ft buffer and 60% is w/in 25ft NDZ. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Overlap w/Middlesex Fells Reservation (DCR).
N9	Peninsula View Pt. nature trail segment (I-93 northern point point to Straw Point)	5	1	5	5	2	2	1	5	1.73	19	Wetlands: 60% of segment is w/in 100ft buffer and 30% is w/in 25ft NDZ. Wetland crossing. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Overlap w/Middlesex Fells Reservation (DCR).
N10	Straw Point Peninsula Path (path adjacent to South St to Spot Pond)	5	3	5	5	2	2	1	5	1.87	12	Wetlands: 80% of segment overlaps w/100ft buffer. Historic/Archaeological: Proposed trail segment outside existing path. Coordination with DCR/MHC necessary to avoid, minimize, or mitigate adverse effects to Middlesex Falls Reservoirs Historic District and potential archaeological sites. Article 97: Overlap w/Middlesex Fells Reservation (DCR).

Ranking 1-5, with 5 as high (favorable) and 1 as low (unfavorable).

