Memorandum

To: Upper Charles Trail Committee
Town of Hopkinton
18 Main Street
Hopkinton, MA 01748

Date: November 11, 2016

Project #: 13539.00

From: Jack Madden, PE

Re: Phase 2 Upper Charles River Trail
Feasibility Study
Hopkinton, MA

1.1 Project Background

This Feasibility Report includes existing conditions, feasible alternatives, impacts, estimated construction costs, and anticipated permitting actions associated with the design and construction of a Shared Use Path (SUP) connecting the existing EMC Field Complex and Proposed Elementary School site south to the Chestnut Street corridor in the Town of Hopkinton, MA. Completion of this Feasibility Report is the initial step in moving this project through the Town's funding and procurement process. The purpose of this Feasibility Report is to help inform the Town's decision on whether or not to pursue the further design and construction of this facility.

2.1 Project Area Boundaries

The Project Area consists of Town-owned parcels bounded by the EMC Field Complex to the north, Blueberry Lane to east, Chestnut Street to the south, and State Route 85 (SR 85) to the west.

2.2 Project Area General Land Uses

This project proposes to extend the Upper Charles River Trail (UCT) south through the EMC Field Complex onto a Town-owned parcel where a new public elementary school, currently in the design phase, will be constructed. The remainder of the parcel to the south is wooded with existing footpaths. The EMC Field parcel and the southeast corner of the Town-owned parcel are identified as "Conservation Land" by the Massachusetts Geographic Information Systems (MassGIS) database.

3.1 Design Policy Related to Bicycle and Pedestrian Accommodation

The US Department of Transportation (USDOT) policy and the Massachusetts Department of Transportation (MassDOT) policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. The USDOT policy states that every transportation agency, including state DOT's, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

3.2 Definitions of Bikeway Types

The following types of bikeways were considered during the preparation of this memo. These bikeway definitions are taken from the *AASHTO Guide for the Development of Bicycle Facilities 2012 Fourth Edition*.

1 Cedar Street
Suite 400
Providence, RI 02903-1023
P 401.272.8100

Marked Shared Land

Paved Shoulder

Bike Lane

Shared-Use Path

- **Shared Lane Bikeway** – Shared lane bikeways are best used on minor local neighborhood streets with low speeds and low traffic volumes where bicycles can share the road without special provisions. Generally the speed differential between motorists and bicyclist is typically 15 mph or less and motor vehicle speeds of 30 mph or less. Traffic volumes on the roadway are typically less than approximately 1000 vehicles per day.
- **Marked Shared Lane Bikeway** – Marked shared-lane bikeways are best used on local collectors or minor arterials with narrow travel lanes where bike lanes are not feasible due narrow lanes, space constraints and right-of-way limitations. Traffic volumes can be variable but the motor vehicle speed limit should be 35 mph or less.
- **Paved Shoulder** – Paved shoulders are paved areas adjacent to the roadway travel lanes delineated by a longitudinal pavement marking. Paved shoulder bikeways are best used on rural roadways that connect town centers or other attractions but can be used in urban areas. Traffic volumes can be variable but the motor vehicle posted speed should be in the range of 40-55 mph. The width of the shoulder should be dependent on characteristics of the adjacent motor vehicle traffic (i.e. wider shoulders should be used on higher speed roadways) but a shoulder width of 4 feet is considered the minimum for bicycle travel.
- **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. Bike lanes can be used on major roads to provide quick and direct bicycle access to the same destinations as motorists. Bike lanes can also be used on collector roads or congested urban streets. Generally roadway design speeds are more than 25 mph. Traffic volumes can vary as the motor vehicle/bicycle speed differential is generally a more important factor in the decision to provide bike lanes.
- **Shared-Use Path** – A shared-use path (SUP) is a bikeway outside of the roadway traveled way and physically separated from motorized vehicular traffic by a buffer or barrier. The SUP can be either within the roadway right-of-way or on an independent alignment. SUP's are also used by pedestrians including skaters, wheelchairs users and joggers/walkers. The types of design criteria for SUP's (design speed, minimum curve radii, stopping sight distance, etc.) are of similar type for design of roadways but modified based on the operating characteristics of a bicycle as a vehicle and bicyclist as a vehicle operator.

Rail-with-Trail

Rail-with-Trail – A rail-with-trail is a SUP parallel and adjacent to a railroad.

Rail-to-Trail – A rail-to-trail is a SUP constructed within the remaining bed of a former rail line. Often the rail bed had been constructed by cutting and filling the existing terrain to maintain straight alignment and gentle even grades which is compatible with ADA accessibility requirements.

3.3 Design Criteria

The project criteria has been derived based on standard engineering practice and the successful application of regulatory standards and guidelines. The primary references for the project criteria listed include:

- The American with Disabilities Act (ADA) Design Guidelines for Shared-Use Paths;
- The Massachusetts Department of Transportation *Massachusetts Highway Department Project Development and Design Guide*, 2006.
- The Massachusetts Department of Transportation *Separated Bike Lane Planning and Design Guide*, 2012.
- The American Association of State Highway and Transportation Officials (AASHTO) *2012 Guide for the Development of Bicycle Facilities, 4th Edition*, (AASHTO Bike Guide);
- AASHTO *2011 A Policy on Geometric Design of Highways and Streets* (The AASHTO Green Book); and
- The *Manual on Uniform Traffic Control Devices* (MUTCD) 2009 Edition with revisions and applicable Interim Approvals.
- Related DOT Engineering Directives.

4.1 Design Criteria

The Phase 2 Upper Charles River Trail (Phase 2 UCT) would provide a traffic-separated SUP from the EMC Field Complex south to the Chestnut Street corridor. Extending the UCT in such a way would improve access for pedestrians and bicyclists from the Chestnut Street corridor to the proposed elementary school parcel, EMC Field Complex and beyond to the high school, middle school, the existing elementary school location, and north, via the existing Center Trail to Main Street in Hopkinton.

Three alternatives for the Phase 2 UCT have been identified along the following alignments (**See Figures 1 and 2 and Typical Sections**):

- **Alignment 1a, 1b, 2:** Originating at the southern curbline of the EMC Field Complex parking lot, the 12'-wide SUP would use existing circulation pathways to pass through a playground facility to the south where, utilizing an existing footpath alignment, it would continue to the south for approximately 300 feet before turning to

the east along the edge of the proposed school parking lot. The proposed alignment would then follow the property line in an easterly direction and then southerly and then westerly before heading south again and diverging away from the proposed school access road. At the northern boundary of the Town-owned parcel U23 33 0, the proposed alignments can be described as follows:

- **Alignment 1a** turns to the east along the northern border of Town -owned parcel U23 33 0 for 700 feet before turning south toward Chestnut Street. The proposed path passes through Town-owned Conservation Land before emerging onto Brian Lane.
- **Alignment 1b** turns to the east along the northern border of Town-owned parcel U23 33 0 for 300 feet before turning south toward Chestnut Street. The proposed path passes through a private parcel along a proposed 20'-wide easement before emerging onto Wild Road.
- **Alignment 2** continues south for 200 feet before turning to the west along the southern border of Town-owned parcel U23 33 0 for 300 feet before passing through Town-owned parcel U23 32 0 to SR 85.

5.1 General Applicable Environmental Guidance

This Feasibility Report 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. The findings below are useful for identifying stakeholders and anticipating permitting requirements for the proposed alternatives. Further research, field verification and field survey will be needed to verify the findings of this report before proceeding to final design.

5.2 Anticipated Impacts and Criteria

This section describes the anticipated environmental impacts of the three SUP alignments and other criteria for evaluation, including:

- Relocation Impacts and Right of Way Acquisition
- Considerations Relating to Pedestrians and Bicyclists
- Air Quality Impacts
- Noise Impacts
- Impacts to Outstanding Resource Water
- Impacts to Wetlands
- Floodplain Impacts
- Impacts to Certified Vernal Pools
- Impacts to NHESP Priority and Estimated Habitats
- Impacts to Areas of Critical Environmental Concern
- Impacts to National Register Historic District and Property

- Impacts to Hazardous Waste Sites
- Construction Impacts
- Visual Impacts
- Impacts to Public Utilities
- Public Facilities Connections
- Environmental Justice Impacts
- Construction Costs
- Operations and Maintenance

5.2.1 Relocation Impacts and Right-of-Way Acquisition

The Alternative Alignments under consideration utilize parcels owned by the Town where possible; however, the proposed Phase 2 UCT could potentially encroach on private property where it cannot be avoided.

5.2.2 Considerations Relating to Pedestrians and Bicyclists

Each of the Alternatives considered will improve the pedestrian and bicyclist's connection from the EMC Field Complex to the proposed elementary school site and the Chestnut Street corridor. Each alignment was developed in order to maximize the separation of pedestrians and cyclists from vehicular traffic and to maximize safety at crossing locations.

The Alternatives were ranked based on the amount of path adjacent to a roadway.

Each of the alternative alignments follows the edge of the proposed school parking lot and access road. A minimum 5'-wide grass strip will provide horizontal separation from vehicular traffic. Any necessary crossings of the school access road could be characterized as crossing a low-speed, low-volume roadway. While all three of the alternatives maintain maximum separation of pedestrians and cyclists from vehicular traffic, the terminus of Alternative 2 at SR 85 will most likely require additional improvements to provide adequate sight distances and traffic control for an SUP crossing of the roadway.

5.2.3 Air Quality Impacts

Air quality in the study area would not be substantially affected by project construction because of the temporary nature of bikeway construction and the confined right-of-way.

An air quality analysis has not been performed as part of this Alternatives evaluation report nor is it deemed to be needed.

5.2.4 Noise Impacts

Construction activities would result in a moderate but temporary noise impact to receptors at various locations adjacent to proposed construction. Noise levels would vary depending on the type and number of pieces of equipment active at any one time. Noise impacts during construction can be mitigated by limiting the construction time periods.

5.2.5 Impacts to Outstanding Resource Water

Massachusetts Department of Environmental Protection (DEP) has designated certain waters for protection based on their outstanding socio-economic, recreational, ecological and/or aesthetic values. The Outstanding Resource Water within the vicinity of our project limit has been identified as a Public Water Supply Watershed, specifically the watershed of Echo Lake which serves as the headwaters of the Charles River.

Based on the MassGIS database, the proposed alignments do not impact Outstanding Resource Water.

5.2.6 Impacts to Wetlands

Potential impacts to wetlands falls under the jurisdiction of the 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).

Based on the MassGIS database, the proposed alignments do not impact wetlands.

5.2.7 100 Year Floodplain Impacts

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.

Based on the MassGIS database, the study area is not within the 100-year floodplain.

5.2.8 Certified Vernal Pools

The Natural Heritage and Endangered Species Program (NHESP) certifies vernal pools according to the Guidelines for the Certification of Vernal Pool Habitat (MA Division of Fisheries and Wildlife, 2009). Certified vernal pools are protected under the state Water Quality Certification regulations, the state Title 5 regulations, and the Forest Cutting Practices Act regulations, as well as those certified vernal pools that fall under the jurisdiction of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00).

Based on the MassGIS database, the proposed alignments do not impact certified vernal pools.

5.2.9 NHESP Priority and Estimated Habitat

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.

Based on the MassGIS database, there are no NHESP Priority and Estimated Habitats within the project limits.

5.2.10 Areas of Critical Environmental Concern

The Secretary of Energy and Environmental Affairs (EEA) has designated places in Massachusetts that receive special recognition because of the quality and significance of their natural and cultural resources. These areas, identified as Areas of Critical Environmental Concern (ACEC), require a stricter environmental review of certain

kinds of proposed development administered by the Department of Conservation and Recreation (DCR) on behalf of the EEA.

Based on the MassGIS database, there are no ACEC's identified within the project limits.

5.2.11 National Register Historic Properties and Districts

The historic resources considered in this analysis are those included in the Massachusetts Cultural Resource Information System (MACRIS) maintained by the Massachusetts Historical Commission (MHC). These resources include buildings, burial grounds, structures and objects as well as areas and districts recognized by the National Register of Historic Places and local historic and preservationist agencies.

While Segment 2 passes in close proximity to several buildings associated with an MHC-identified historic district (Hayden Rowe Streetscape II), no buildings are officially designated. Additionally, the MassGIS database indicates there are no National Register impacts anticipated within our project limits.

5.2.12 Hazardous Materials Sites

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 Alternatives 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.

Based on the MassGIS database, there are no known hazardous materials sites located within our project limits.

5.2.13 Construction Impacts

Construction of the project will result in temporary disruption of vehicle and pedestrian access to the work area. Traffic access to area businesses, residential areas and recreational areas will be maintained throughout construction.

A Traffic Management Plan (TMP) should be developed and included in the construction documents. It is anticipated that potential conflict zones may occur at construction access points in proximity to residential parcels, the EMC field access road and the proposed elementary school site. Access at these locations, including safe pedestrian crossings and bus circulation, should be specifically considered in the TMP. The TMP should be coordinated with school officials and emergency response teams (police and fire).

5.2.14 Visual Impacts

Since the project includes little earthwork, does not propose to construct new buildings, and proposes to occupy cleared ROWs where possible, visual impacts are expected to be minimal for each of the three alternatives due to some tree and brush clearing.

5.2.15 Public Utilities

Based on the location of the proposed alignments and a field review, impact to public utilities is not anticipated.

5.2.16 Public Facilities

Each of the three alternatives will directly connect the EMC Field Complex with the proposed elementary school location and the Chestnut Street corridor with an off-road shared-use path. It is believed that this public facility will be used for transportation and recreational purposes and will enhance the current use as open space.

5.2.17 Environmental Justice

According to the MassGIS database, the project is not located within an area identified as an Environmental Justice Zone.

5.2.18 Construction Cost

Preliminary construction estimates have been calculated based on a typical cross section developed for an SUP alignment along an undeveloped right-of-way. Items include site clearing, excavation for and placement of new pavement structure, loam and seed, and signing and striping.

Anticipated cost for each item was researched using the most current available (9/2015-9/2016) MassDOT Weighted Bid Prices, which are based on actual competitive bid pricing on MassDOT construction contracts. Contingencies for Mobilization (3%), Construction (40%), and additional MassDOT Construction (25%) are based on empirical data and are included in the overall preliminary construction estimates.

The Alternative 2 preliminary construction estimate is the lowest ($640,000), while the Alternative 1a preliminary construction estimate is the highest ($890,000).

For survey and mapping, soil borings, geotechnical design, path design, permitting, and construction bidding services, 15% - 20% of the construction cost should be budgeted.

5.2.19 Maintenance & Operations

Maintenance

Basic maintenance activities include keeping the trail surface free of debris, identifying and correcting surface hazards, keeping signs and pavement markings in good condition and cutting back encroaching vegetation to maintain adequate sight distances on the bikeway and at road crossings. Having a written operations and maintenance plan and an emergency response plan will also enable town officials to determine manpower and budgets needed to implement these plans.

We recommend coordination with the Town Public Safety Officers, School Department and the Department of Public Works regarding access and maintenance so that their recommendations can be incorporated into the project design.

Operations

The project vision for this portion of the Bikeway is a continuous facility for non-motorized travel with portions suitable for use by both bicyclists and pedestrians. The alternatives presented comply with accepted industry standards and criteria for an SUP and encourages users to comply with uniform traffic operations and laws. Thus the signs, pavement markings and other amenities are designed to convey that message through the use of

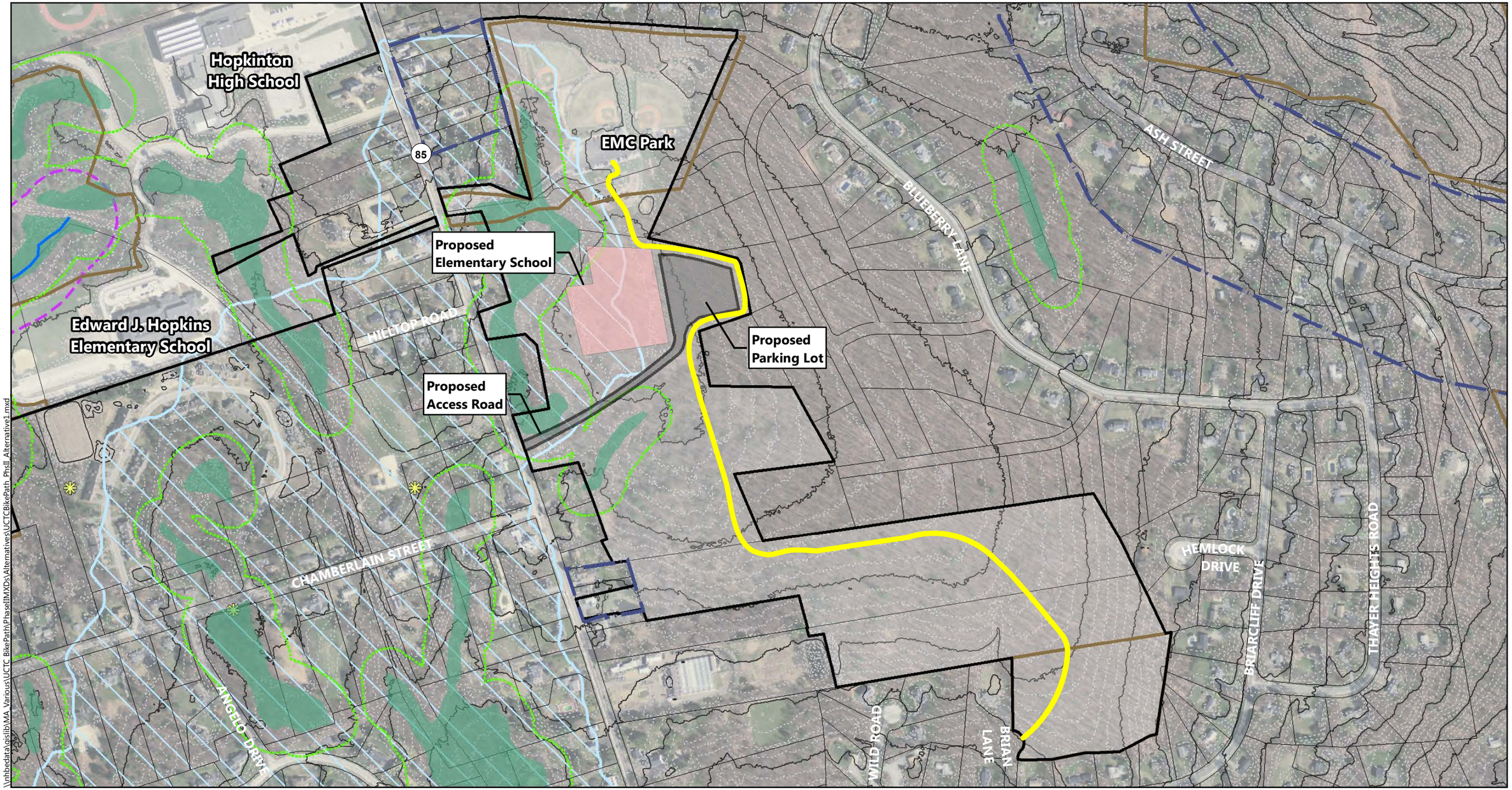
common standards of color, shape and graphics as used on typical roadway signs without "over-signing" the natural landscape.

It is recommended that for the off-road SUP sections, "trail use rules" be posted at trail access points, as appropriate. Additionally, it is recommended that the Town review their existing by-laws as they relate to trails and shared-use facilities to verify if changes or additions are needed.

6.1 Conclusion

The three alternative alignments were scored based the favorability of the 19 criteria described above. Scoring was based on which alternative was the most effective or had the least impact for each of the criteria. A score of 3 was the most favorable, while a score of 1 was the least favorable. The scores were totaled for each to arrive at the final score to determine the most favorable alternative overall.

Alignment 1a with a score of 22 points was the most favorable in this analysis, while Alternative 2 was the least favorable with 19 points. Alternative 1b scored 21 points.

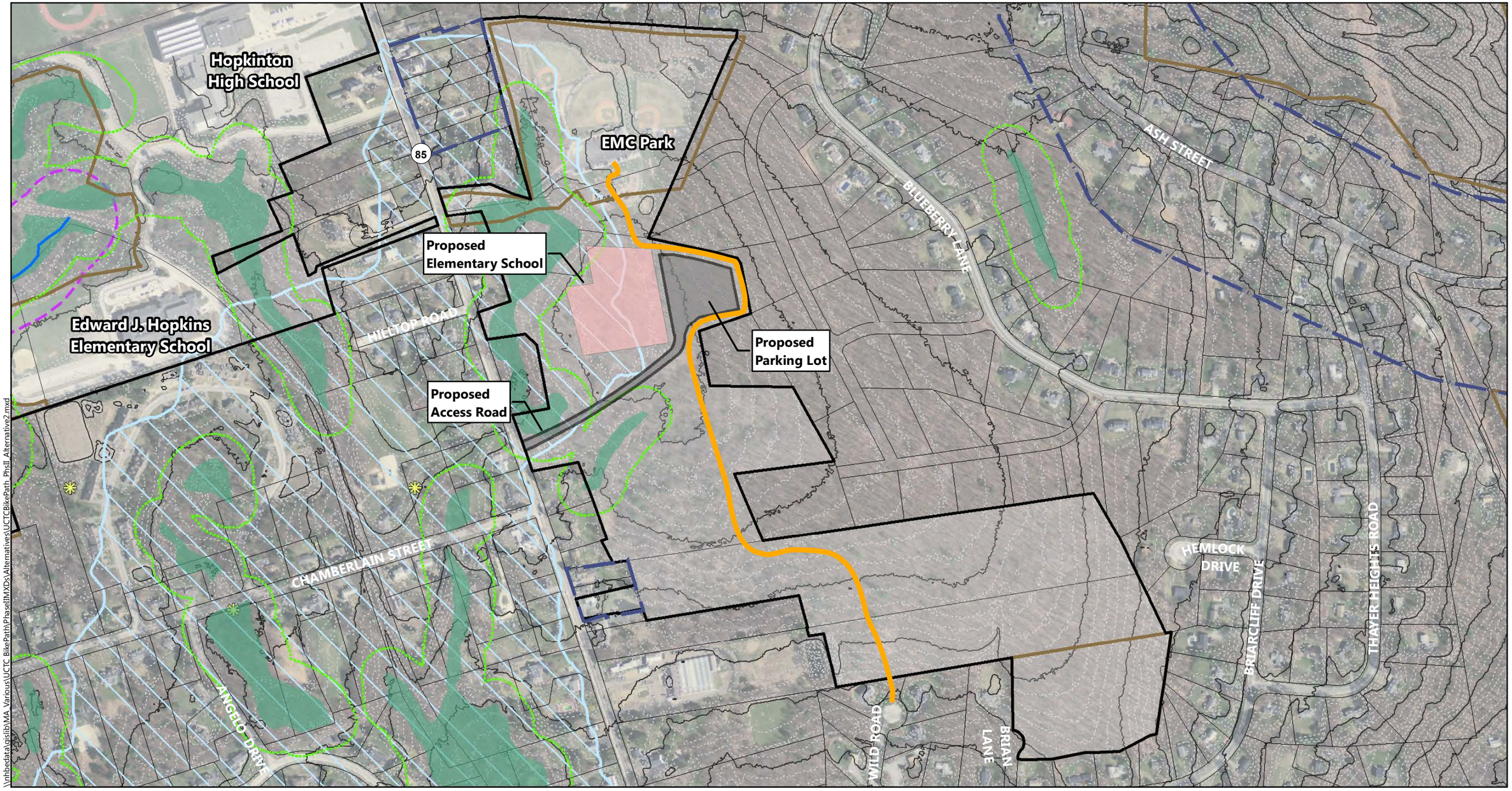


0 200 400 800 Feet

- Alternative 1A
- Proposed Elementary School
- Proposed Parking
- Town Property Boundary
- Assessor's Tax Parcel
- River/Stream
- MassDEP Wetland
- 100-ft Wetland Buffer
- Riverfront Area
- NHESP Certified Vernal Pools
- Conservation/Public Land
- MHC Historic District
- Outstanding Resource Water
- 2-ft Contour Intervals
- 10-ft Index Contour

Upper Charles Trail | Hopkinton, Massachusetts

Upper Charles Trail Phase II
Alternative 1A Overview

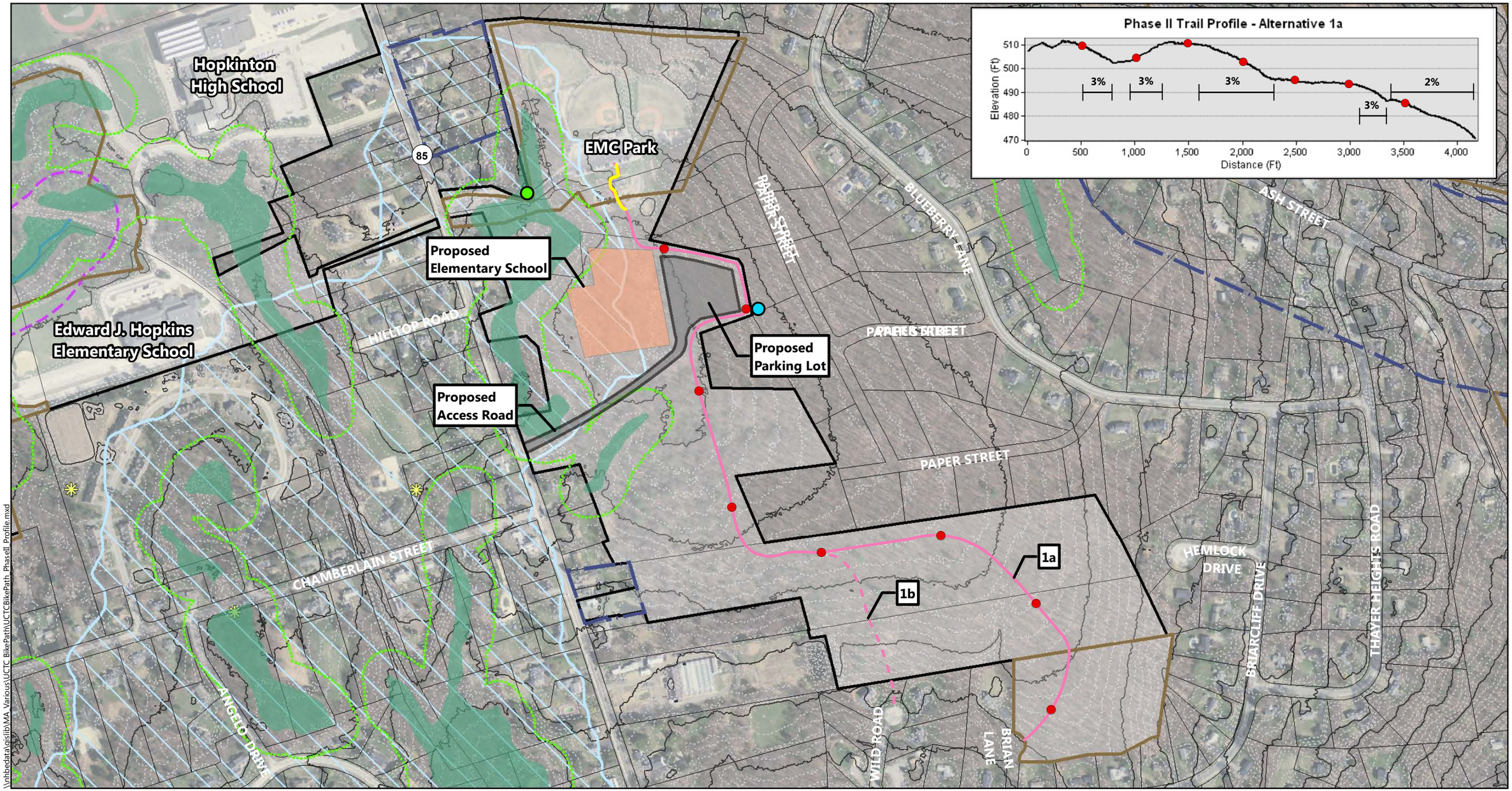


0 200 400 800 Feet

- Alternative 1B
- Proposed Elementary School
- Proposed Parking
- Town Property Boundary
- Assessor's Tax Parcel
- River/Stream
- MassDEP Wetland
- 100-ft Wetland Buffer
- Riverfront Area
- NHESP Certifield Vernal Pools
- Conservation/Public Land
- MHC Historic District
- Outstanding Resource Water
- 2-ft Contour Intervals
- 10-ft Index Contour

Upper Charles Trail | Hopkinton, Massachusetts

Upper Charles Trail Phase II
Alternative 1B Overview



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0 200 400 800 Feet

- Profile Path/Proposed UCT 1a
- Proposed UCT 1b
- Existing Path
- 500-Ft Stations
- EMC Park Acess Road
- Stone Wall Coner
- Proposed Elementary School
- Proposed Parking and Access Road
- Assessor's Tax Parcel
- Town Property Boundary
- Conservation/Public Land
- MHC Historic District
- Outstanding Resource Water
- NHESP Certifield Vernal Pools
- River/Stream
- MassDEP Wetland
- 100-ft Wetland Buffer
- Riverfront Area

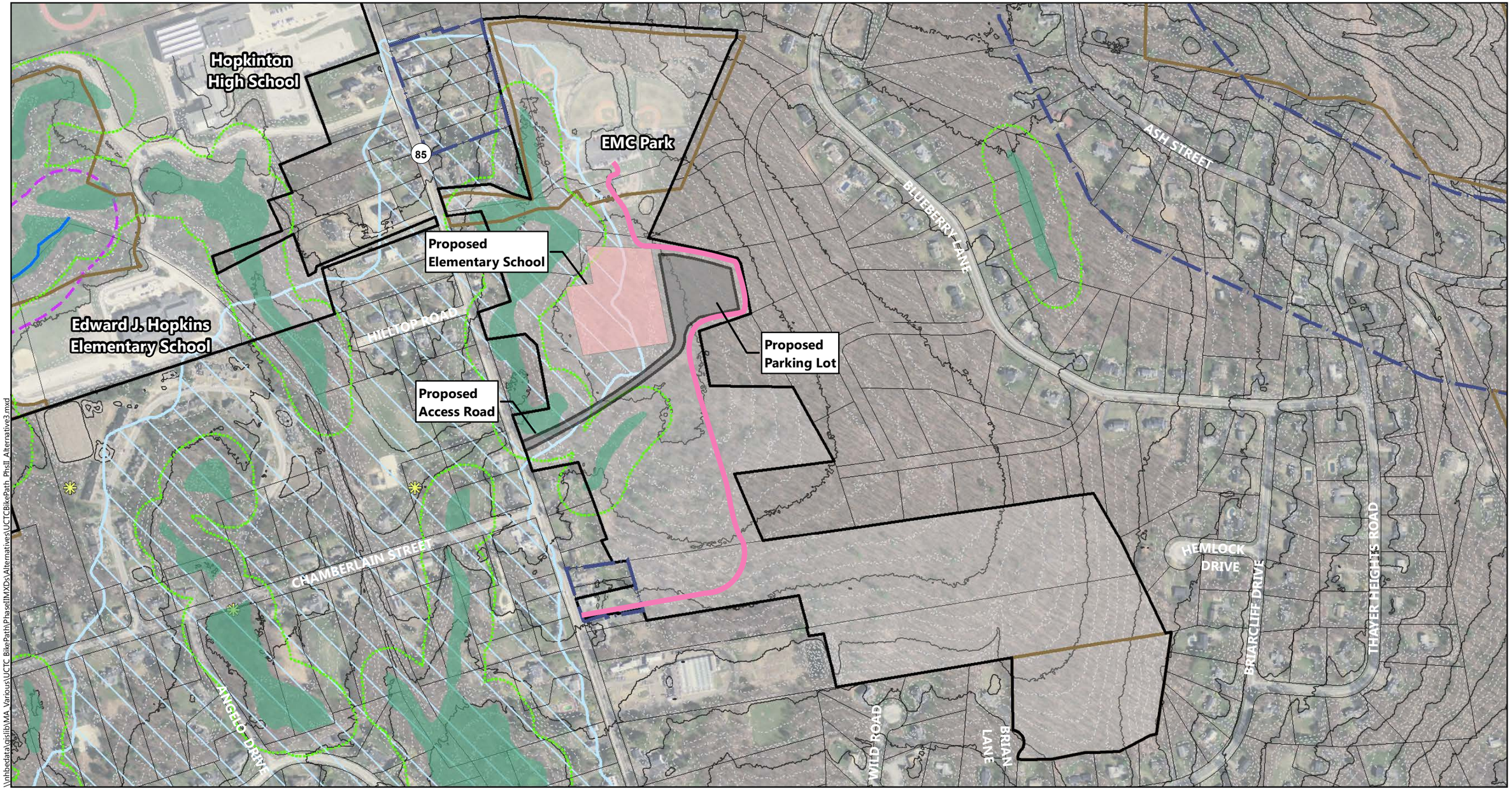
Upper Charles Trail | Hopkinton, Massachusetts

The following resources are not present within the vicinity of the Property Area:

1. Areas of Critical Environmental Concern (ACEC)
2. NHESP Potential Vernal Pools and Priority Habitat
3. Chapter 21E Sites
4. Hazardous Waste Generators
5. National Register Buildings
6. Zone II Public Water Supplies
7. FEMA 100- Year Floodplain

Upper Charles Trail Phase II Alternative 1

Source Info: MassGIS, VHB



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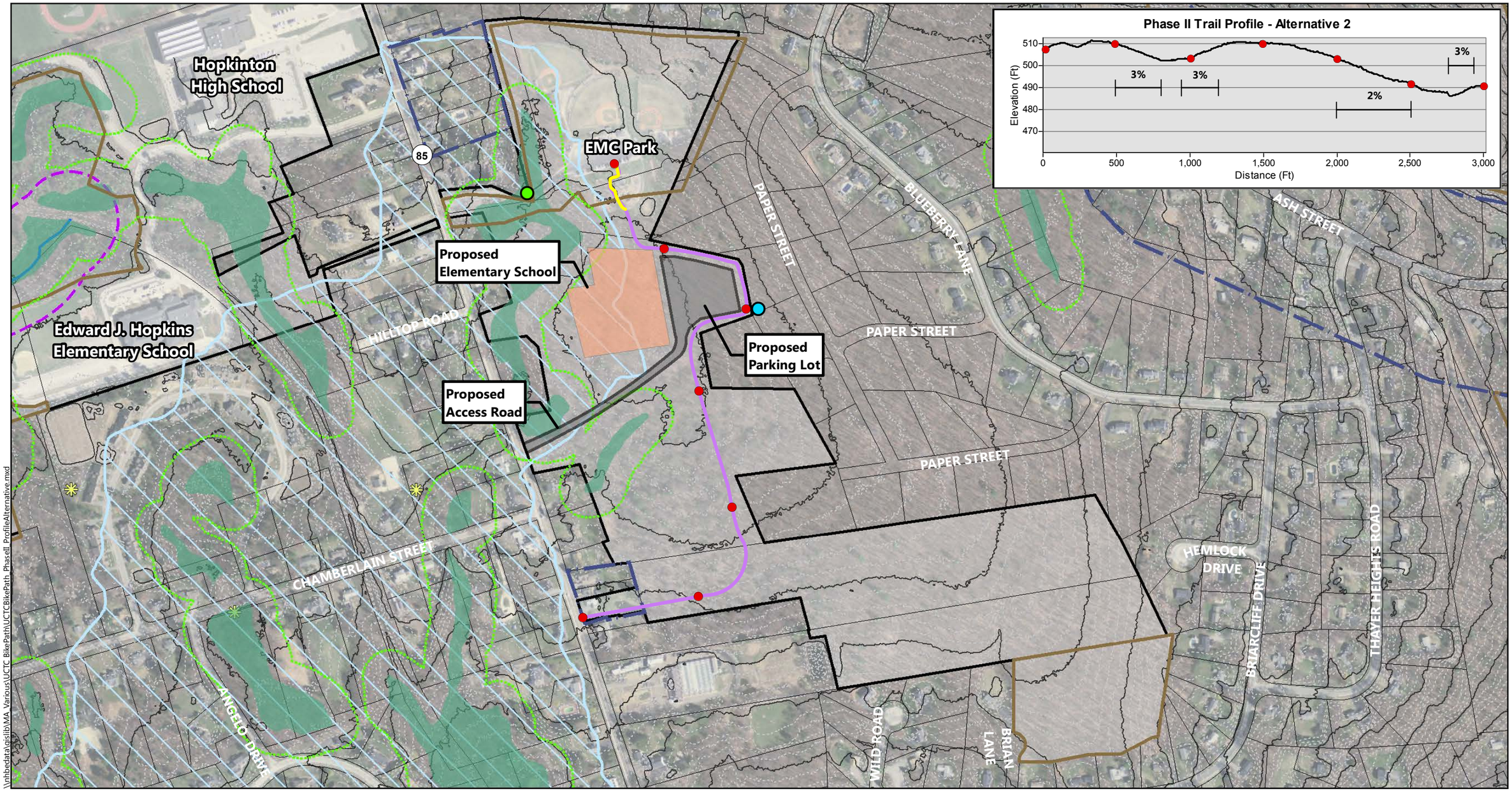
0 200 400 800 Feet

- Alternative 2
- Proposed Elementary School
- Proposed Parking
- Town Property Boundary
- Assessor's Tax Parcel
- River/Stream
- MassDEP Wetland
- 100-ft Wetland Buffer
- Riverfront Area
- NHESP Certifield Vernal Pools
- Conservation/Public Land
- MHC Historic District
- Outstanding Resource Water
- 2-ft Contour Intervals
- 10-ft Index Contour

Upper Charles Trail | Hopkinton, Massachusetts

Upper Charles Trail Phase II
Alternative 2 Overview



0 200 400 800 Feet

- Profile Path/ Proposed UCT
- Existing Path
- 500-Ft. Stations
- EMC Park Acess Road
- Stone Wall Coner
- Proposed Elementary School
- Proposed Parking and Access Road
- Assessor's Tax Parcel
- Town Property Boundary
- Conservation/Public Land
- MHC Historic District
- Outstanding Resource Water
- NHESP Certifield Vernal Pools
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Upper Charles Trail | Hopkinton, Massachusetts

The following resources are not present within the vicinity of the Property Area:

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3. Chapter 21E Sites
4. Hazardous Waste Generators
5. National Register Buildings
6. Zone II Public Water Supplies
7. FEMA 100- Year Floodplain

Upper Charles Trail Phase II Alternative 2

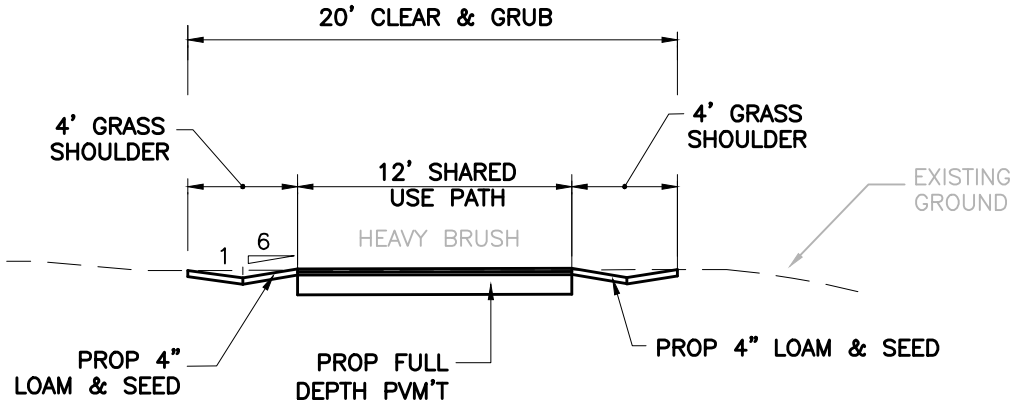
Source Info: MassGIS, VHB

Alternatives Ranking Matrix

#	Impact Criteria	Alternative 1a	Rank[1]	Alternative 1b	Rank[1]	Alternative 2	Rank
1.	Relocation Impacts and ROW Acquisition	There are no relocation or ROW impact anticipated with this alignment.	3	May require minor property acquisition/easement.	1	May require temporary easement for construction.	2
2.	Considerations Relating to Pedestrians and Bicyclists	Improved accommodations for recreation and transportation connecting the existing Center Trail with schools and EMC Field. There is maximum separation with vehicular traffic with this alignment.	3	Improved accommodations for recreation and transportation connecting the existing Center Trail with schools and EMC Field. There is maximum separation with vehicular traffic with this alignment.	3	Improved accommodations for recreation and transportation connecting the existing Center Trail with schools and EMC Field. This alignment terminates at State Route 85 which has sidewalks but no separated bicycle path north of Chestnut Street.	2
3.	Air Quality Impacts	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2
4.	Noise Impacts	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2
5.	Outstanding Resource Water (ORW) Impacts	There are no impacts to Outstanding Resource Water with this alignment.	0	There are no impacts to Outstanding Resource Water with this alignment.	0	There are no impacts to Outstanding Resource Water with this alignment.	0
6.	Wetlands	There are no impacts to wetlands with this alignment.	0	There are no impacts to wetlands with this alignment.	0	There are no impacts to wetlands with this alignment.	0
		0 SF Direct Impacts	0	0 SF Direct Impacts	0	0 SF Direct Impacts	0
		0 SF 100' Buffer Area Impacts	0	0 SF 100' Buffer Area Impacts	0	0 SF 100' Buffer Area Impacts	0
		0 SF 200' Riverbank Impacts	0	0 SF 200' Riverbank Impacts	0	0 SF 200' Riverbank Impacts	0
7.	Floodplain Impacts	Project limits are not in floodplain.	0	Project limits are not in floodplain.	0	Project limits are not in floodplain.	0
8.	Certified Vernal Pools	There are no certified vernal pools within the project area.	0	There are no certified vernal pools within the project area.	0	There are no certified vernal pools within the project area.	0
9.	Threatened or Endangered Species (NHESP)	There are no Priority Habitats within the project limits.	0	There are no Priority Habitats within the project limits.	0	There are no Priority Habitats within the project limits.	0
10.	Areas of Critical Environmental Concern (ACEC)	There are no ACEC's within the project limits.	0	There are no ACEC's within the project limits.	0	There are no ACEC's within the project limits.	0
11.	National Register Districts	Insignificant impact[2]	2	Insignificant impact[2]	2	Insignificant impact[2]	1
12.	Hazardous Waste Sites	There are no Hazardous Materials Sites within our project limits.	0	There are no Hazardous Materials Sites within our project limits.	0	There are no Hazardous Materials Sites within our project limits.	0
13.	Construction Impacts	Temporary.	2	Temporary.	2	Temporary.	2
14.	Visual Impacts	Minor impacts due to some clearing and vegetation removal.	2	Minor impacts due to some clearing and vegetation removal.	2	Minor impacts due to some clearing and vegetation removal.	2
15.	Public Utilities	There are no impacts to public utilities anticipated with this project.	0	There are no impacts to public utilities anticipated with this project.	0	There are no impacts to public utilities anticipated with this project.	0
16.	Public Facilities Connections	Connects EMC Field and proposed elementary school to Chestnut Street corridor.	3	Connects EMC Field and proposed elementary school to Chestnut Street corridor.	3	Connects EMC Field and proposed elementary school to Chestnut Street corridor via State Route 85.	1
17.	Environmental Justice	There are no Environmental Justice areas within our project limits.	0	There are no Environmental Justice areas within our project limits.	0	There are no Environmental Justice areas within our project limits.	0
18.	Construction/Design Cost	$890,000/$134,000 - $178,000	1	$820,000/$123,000 - $164,000	2	$640,000/$96,000 - $128,000	3
19.	Operations and Maintenance	Recommend a written operations and maintenance plan and an emergency response plan.	2	Recommend a written operations and maintenance plan and an emergency response plan.	2	Recommend a written operations and maintenance plan and an emergency response plan.	2
	Final Score		22		21		19
	Final Ranking		3		2		1

[1] 3=Most Preferred, 1=Least Preferred

[2] Segment 2 is in close proximity to several buildings associated with a MHC identified historic district (Hayden Rowe Streetscape II), but no buildings are designated.



LOOKING SOUTH

EXISTING SECTION
LOOKING SOUTH

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT
SURFACE: 1–3/4" SUPERPAVE SURFACE COURSE 12.5 (SSC–12.5) OVER
2–1/4" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC–19.0) OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b

Typical Section
Upper Charles River Trail
Phase II
Town of Hopkinton, MA

9/19/2016

1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail Phase 2
Hopkinton, Massachusetts
September 30, 2016

Total Construction Cost Alignment 1a		Total Cost
4200 LF		
	Construction Total	$884,736.72
	SAY*:	$890,000.00

Total Construction Cost Alignment 1b		Total Cost
3850 LF		
	Construction Total	$812,256.48
	SAY*:	$820,000.00

Total Construction Cost Alignment 2		Total Cost
3000 LF		
	Construction Total	$632,975.28
	SAY*:	$640,000.00

*Estimate is for comparison puposes only. Estimate does not include costs of design, permitting, ROW acquisition, utility work, lighting improvements. Estimate does include contingency allowances for Mobilization (3%), Construction (40%), and MassDOT (25%)

1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail - Phase II
Alternative 1a (4,200 LF+/-)
Hopkinton, Massachusetts
September 30, 2016

Description	Unit Price	Quantity	Total Cost
Full Depth Pavement - Bikeway (Including Excavation)	$60.00 /SY	5,600 SY	$336,000.00
Loam Borrow & Seed	$8.00 /SY	3,733 SY	$29,864.00
Signing, Striping & Pavement Markings	$2,100.00 /LS	1 LS	$2,100.00
Clearing and Grubbing	$5.00 /SY	9,333 SY	$46,665.00
Erosion Control Barrier	$7.50 /FT	8,400 FT	$63,000.00
Additional Earthwork (25% of total length)	$35.00 /CY	1,400 CY	$49,000.00
		SUBTOTAL:	$526,629.00
		Mobilization @ 3%	$15,798.87
		Contingency (40%)	$210,651.60
		MassDOT Construction Contingency (25%)	$131,657.25
		Construction Total	$884,736.72
		SAY:	$890,000.00

1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail - Phase II
Alternative 1b (3,850 LF+/-)
Hopkinton, Massachusetts
September 30, 2016

Description	Unit Price	Quantity	Total Cost
Full Depth Pavement - Bikeway (Including Excavation)	$60.00 /SY	5,133 SY	$307,980.00
Loam Borrow & Seed	$8.00 /SY	3,422 SY	$27,376.00
Signing, Striping & Pavement Markings	$2,100.00 /LS	1 LS	$2,100.00
Clearing and Grubbing	$5.00 /SY	8,556 SY	$42,780.00
Erosion Control Barrier	$7.50 /FT	7,700 FT	$57,750.00
Additional Earthwork (25% of total length)	$35.00 /CY	1,300 CY	$45,500.00
		SUBTOTAL:	$483,486.00
		Mobilization @ 3%	$14,504.58
		Contingency (40%)	$193,394.40
		MassDOT Construction Contingency (25%)	$120,871.50
		Construction Total	$812,256.48
		SAY:	$820,000.00

1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail - Phase II
Alignment 2 (3,000 LF+/-)
Hopkinton, Massachusetts
September 30, 2016

Description	Unit Price	Quantity	Total Cost
Full Depth Pavement - Bikeway (Including Excavation)	$60.00 /SY	4,000 SY	$240,000.00
Loam Borrow & Seed	$8.00 /SY	2,667 SY	$21,336.00
Signing, Striping & Pavement Markings	$2,100.00 /LS	1 LS	$2,100.00
Clearing and Grubbing	$5.00 /SY	6,667 SY	$33,335.00
Erosion Control Barrier	$7.50 /FT	6,000 FT	$45,000.00
Additional Earthwork (25% of total length)	$35.00 /CY	1,000 CY	$35,000.00
		SUBTOTAL:	$376,771.00
		Mobilization @ 3%	$11,303.13
		Contingency (40%)	$150,708.40
		MassDOT Construction Contingency (25%)	$94,192.75
		Construction Total	$632,975.28
		SAY:	$640,000.00