Green Routes Bicycle Network Plan

January 2020

Brookline Bicycle Advisory Committee

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1. Vision for a Bicycle Friendly Brookline

Bicycling is a sustainable, economical, and convenient mode of transportation for short and medium distance trips and is a popular form of recreation for young and old. Bicycling is good for the environment, for public health, and for reducing traffic congestion and parking demand. It offers older children a measure of independence and is a practical mode of travel to Brookline High School, sports fields, and other local destinations.

Definition of "Bicycles"
The accommodations described throughout this plan are designated for "bicycles," but that term should be broadly understood to include tricycles, both recumbent and upright bicycles, passenger and cargo cycles, electric-assist cycles, and unicycles.

Brookline already has many conditions conducive to bicycling – compact development, proximity to major employment centers, relatively flat topography, and a temperate climate. At 4% of commuter trips made by bicycle (US Census, 2010), Brookline's percentage has increased from 1.5% since 2000. Bicycle counts conducted during rush hour on weekdays each fall since 2008 show more than 1,000 bicyclists per hour passing major checkpoints, including more than 100 people riding daily to Brookline High School. As many as 70 bicycles may be parked around Coolidge Corner at mid-day on September Saturdays.

Beacon, Harvard, Washington, Carlton Streets, and Longwood Avenue are major connectors for cyclists traveling to and from Brookline, parts of Boston, Cambridge, and Newton to Kenmore Square, downtown Boston, the Longwood Medical Area, across Brookline, and between Jamaica Plain and Brighton. The Emerald Necklace passes through Brookline, and the Town has been and should continue to cooperate in making road crossings within the Necklace safe for its users. Boston and Cambridge have made strong commitments to improving conditions for cyclists and have made major strides in recent years toward this goal. Brookline is centrally located to make a significant contribution to efforts to link bicycle accommodations into a region-wide network through such on-going efforts as "Landline: Metro Boston Greenway Network" of the Metropolitan Area Planning Council and the "Emerald Network" plan of Livable Streets Alliance.

Brookline's improvements in bicycle facilities and accommodations in recent years include more bike racks in commercial areas, additional bike lanes, shared lane markings on some high-traffic streets, contraflow lanes, a buffered bike lane on Beacon outbound from Marion Street to Washington Square, and institution of a $50 fine for motor vehicles blocking bike lanes. Brookline also actively participates in the regional "BlueBike" bike-share program.

Definition of "Motor Vehicles"
Because bicycles are technically considered vehicles, throughout this document, we generally refer to motor vehicles to clarify their difference from bicycles. By motor vehicles, we mean cars, trucks, buses and motorcycles--generally vehicles that are larger, heavier and faster moving (often much larger and faster) than bicycles.

However, bicycle use in Brookline remains well below its potential and does not meet the criteria of the *Complete Streets Policy*, adopted in

2016. For most residents, getting outside their immediate neighborhood requires negotiating heavily trafficked streets, resulting in a level of stress and danger that many people – especially less experienced cyclists – prefer to avoid. Every community with high bicycle use, whether in the Netherlands, Denmark, Davis (CA), Portland (OR), or Boulder (CO), offers an extensive *network of bike routes with low traffic stress*.

Brookline's quiet local streets are ideal for bicycling, but they are not connected in a network that facilitates cross-town travel, and some of these are increasingly threatened by cut-through motor vehicle traffic. Many of the town's dedicated bicycle facilities subject cyclists to high traffic stress. The bicycle lanes on Beacon and Harvard Streets disappear at intervals, leaving cyclists in heavy traffic, particularly at intersections. Bike lanes often occupy the "door zone" of high turnover parking lanes and are seldom protected from moving traffic. Double parking and curbside parking by motor vehicles are also problems as they block bike lanes and force cyclists to stop abruptly or swerve into traffic. A 2017 study of bike lane violations showed that bike lanes on 18 segments of Harvard and Beacon Streets were blocked by motor vehicles 27% of the time. Thus, even recent improvements to bicycle facilities must be viewed as transitional; further improvements are needed to make them truly safe and low stress.

As part of Brookline's Climate Action Plan (CAP), the Select Board recommends prioritizing planning to achieve zero emissions by 2050 Town-wide. The Climate Action Plan identified five strategies to mitigate greenhouse gases, including "Improved Transportation Options." To this end, improving cycling infrastructure provides an opportunity for the Town to work towards its zero emissions goal while also providing residents a safe and healthy way to move around town.

Brookline's favorable urban structure offers the potential to create a network of low traffic stress and "green" bicycle routes. Other communities' experiences suggest that Brookline can have up to 10% of its trips being made by bicycle within a few years. Young people will routinely cycle to school and to athletic fields for games and practice. Residents will shop and run errands by bicycle, reducing motor vehicle traffic and parking demand. New greenways will better connect South Brookline to the rest of town, a boon to walkers, joggers, and bicyclists alike. Families will enjoy riding along Brookline's green routes, with easy access to the Town's open spaces and to regional off-road paths. More adults will bicycle to work and to do errands, getting exercise and fresh air while saving money, enjoying their commute, and contributing to a sustainable environment. Safe

> Town Meeting passed WA 31 (November 2019, 191-YES, 1-NO) laying out the basis for and actions toward making safer infrastructure for bicycles and other non-vehicular forms of traffic. In part, it states:
> NOW, THEREFORE, BE IT RESOLVED that Town Meeting calls upon the Town of Brookline to leverage its pre-existing strengths, to: 1) Prioritize safe, space-efficient, and energy-efficient movement of people and goods over the movement and parking of private vehicles when designing and improving our public ways, with particular focus on high-traffic routes, connectivity and directness. This should be accomplished in a manner that gives particular consideration to equity of access and safety for (i) people of a broad range of ages, abilities and financial means, and (ii) use of healthful and sustainable

routes to Green Line T stops, some of which have nearby BlueBike stations and many of which have bike racks, could help to encourage combining cycling and transit use.

Creating this network of green routes requires deliberate planning, budgeting, and refocused priorities. Some of the network can be created at minimal capital expense using road markings and traffic management changes such as parking restrictions. Particularly when changing parking, attention should be given to maintaining or increasing parking for those with mobility limitations. Other parts of the network will require modest capital improvements such as curb ramps and extensions. Some streets, notably in South Brookline and along the town's busiest thoroughfares, will require major new infrastructure, possibly requiring state or federal funding.

This master plan should be complemented by other Town efforts to improve conditions for cycling, including provisions for bicycle parking, safety education, traffic law enforcement, and ensuring that every street project undertaken or permitted by the Department of Public Works includes reasonable accommodation for bicyclists, pedestrians, and those with mobility limitations. One particularly important effort is the Massachusetts Safe Routes to School (SRTS) Program, designed to increase safe biking and walking for elementary and middle school students by using a collaborative, community-focused approach that bridges the gap between health and transportation. (https://www.mass.gov/safe-routes-to-school) SRTS efforts are underway in Brookline.

The network evolution should be coordinated with regional plans including those for Boston, Newton, and Cambridge to maximize its benefit to the entire region.

2. Network Plan

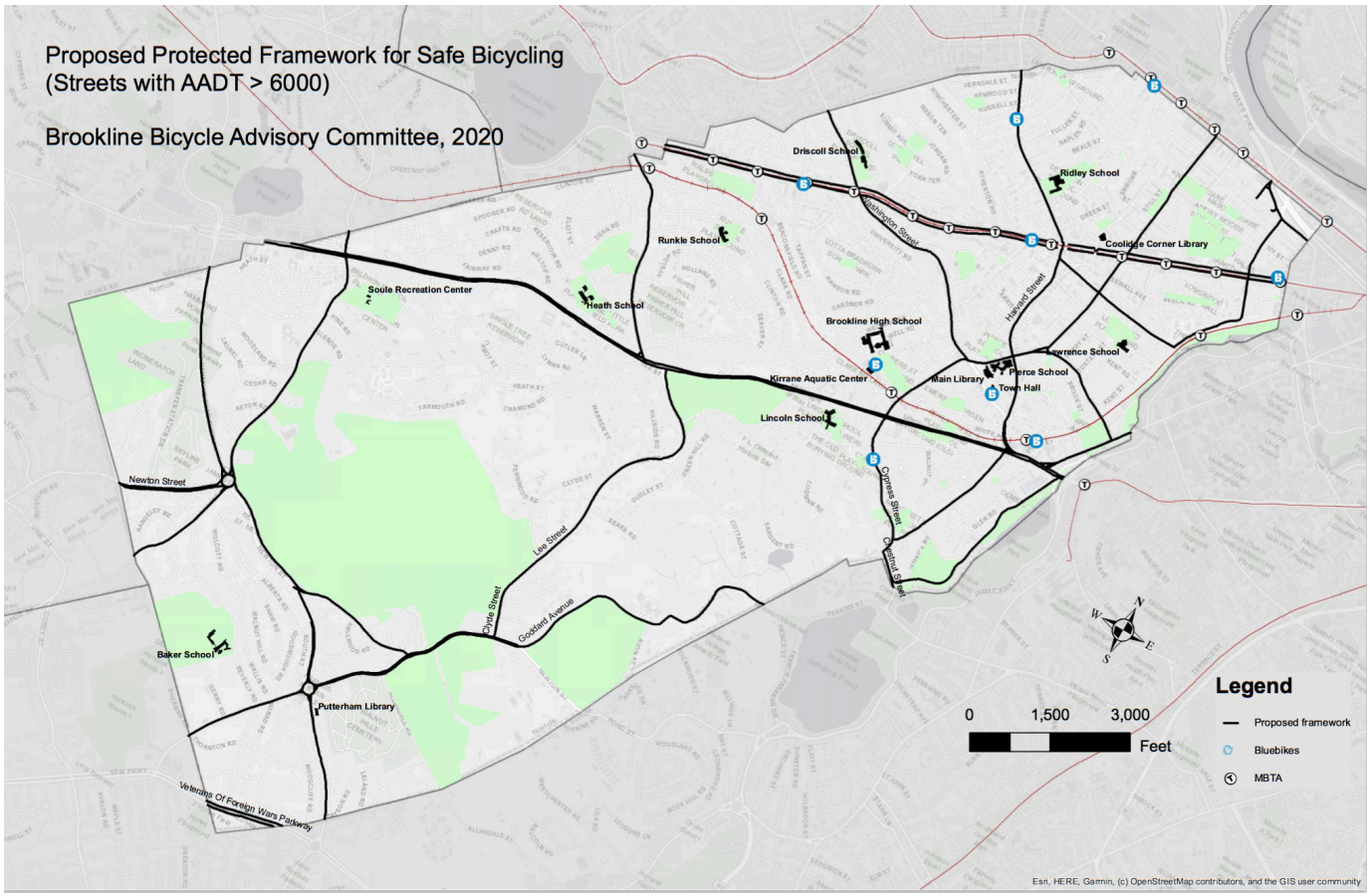
For the Town to plan and implement bicycle-related safety improvements, the Bicycle Advisory Committee has designed a network of safe, pleasant, and connecting routes. The network connects neighborhoods with important local destinations including schools, libraries, parks, and commercial districts; it also connects to Green Line T stops and to important bicycling routes at the Town limits, including Beacon Street in Boston and Newton, Commonwealth Avenue, Perkins Street, West Roxbury Parkway, and the Charles River off-road paths.

The major protected framework is comprised of routes that traverse the Town in all directions. A second level of connecting streets provides access to and from these major routes, to Town neighborhoods and key destinations such as schools and parks. Recommendations for achieving a high-quality network, including the framework and the connecting streets, are laid out in this section, and proposals for specific streets are detailed in below. These are based generally on guidelines of the National Association of City Transportation Officials (NACTO) as noted in the references and summarized in the appendices.

Protected Framework

Projects that establish the framework of a safe cycling network throughout Brookline are assigned the highest priority. Of necessity, this framework consists of the streets with the highest motor traffic volumes, since Brookline's road network lacks low-traffic, low-speed alternatives for crossing town. This means that these projects call for treatments providing physically separate greenways or protected bicycle lanes. Accordingly, we call this the *Protected Framework*. The following list and map outline the proposed Protected Framework, which consists of nearly all streets in town with Annual Average Daily Traffic (AADT) in excess of 6,000 motor vehicles. In Section 6, the street list of proposed projects, those that would help achieve the Protected Framework are marked with a caret (^).

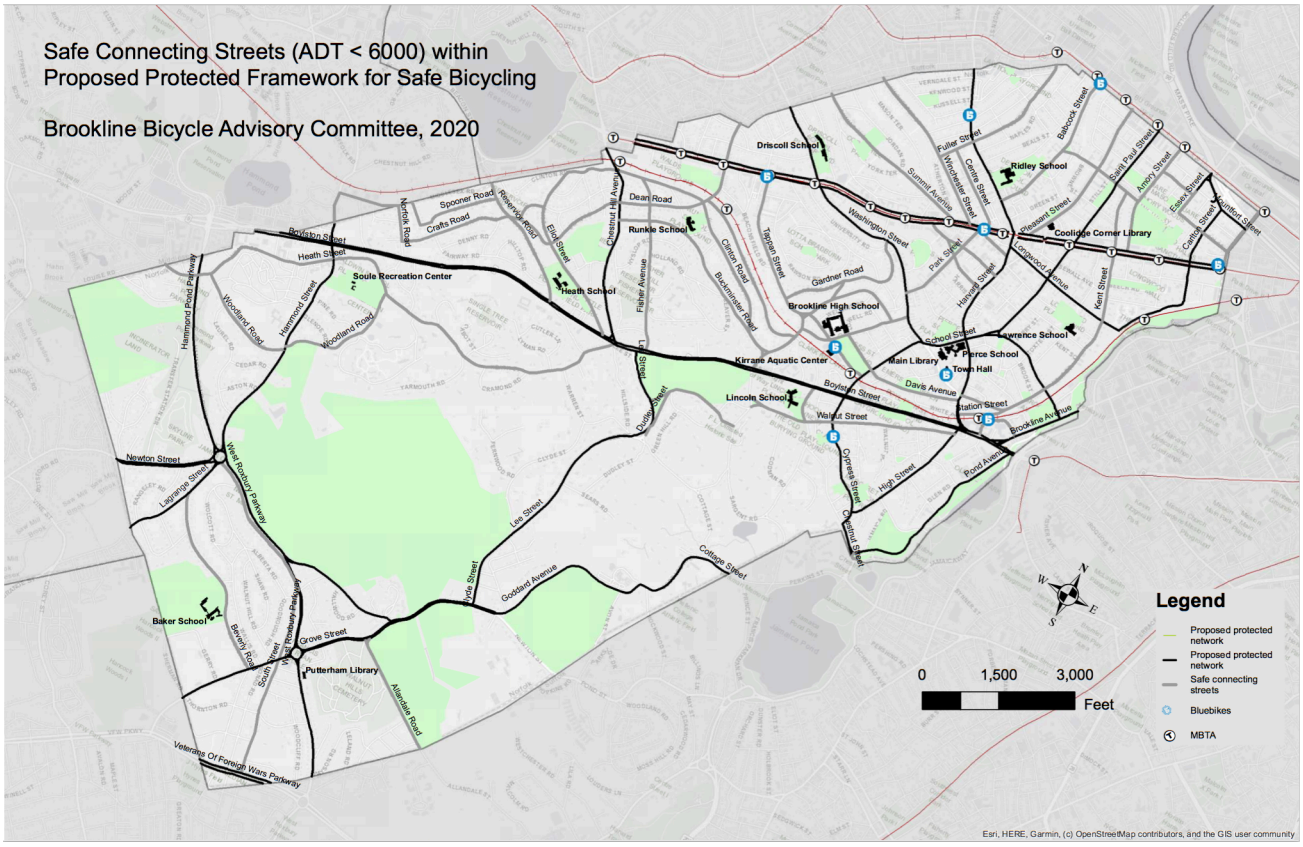
Aspinwall Avenue
Beacon Street
Brookline Avenue
Carlton Street
Chapel Street
Chestnut Hill Avenue
Chestnut Street
Clyde Street
Cottage Street
Cypress Street
Goddard Avenue
Grove Street
Hammond Pond Parkway
Hammond Street
Harvard Street
High Street
Horace James Circle
Independence Drive
Lagrange Street
Lee Street
Longwood Avenue
Mountfort Street
Newton Street
Route 9 (Boylston Street)
School Street
St. Paul Street
Washington Street
West Roxbury Parkway



Safe Connecting Streets

The Protected Framework by itself does not provide safe access to and from all the Town's neighborhoods and key destinations such as schools, parks, and commercial areas. This requires projects to make a set of connecting streets safe for cycling. These streets, which usually carry a medium volume of motor traffic (3,000-6,000 AADT), should be retrofitted with protected bike lanes. However, some streets are so narrow that protected lanes might not be feasible. In such cases, they should be traffic-calmed to slow motor traffic to 20 mph or less or converted to one-way streets so that a protected bike lane can be installed. The following list identifies the proposed Safe Connecting Streets, and the map adds them to the Protected Framework. In Section 6, the street list of proposed projects, those that would implement Safe Connecting Streets are marked with a double caret (^^).

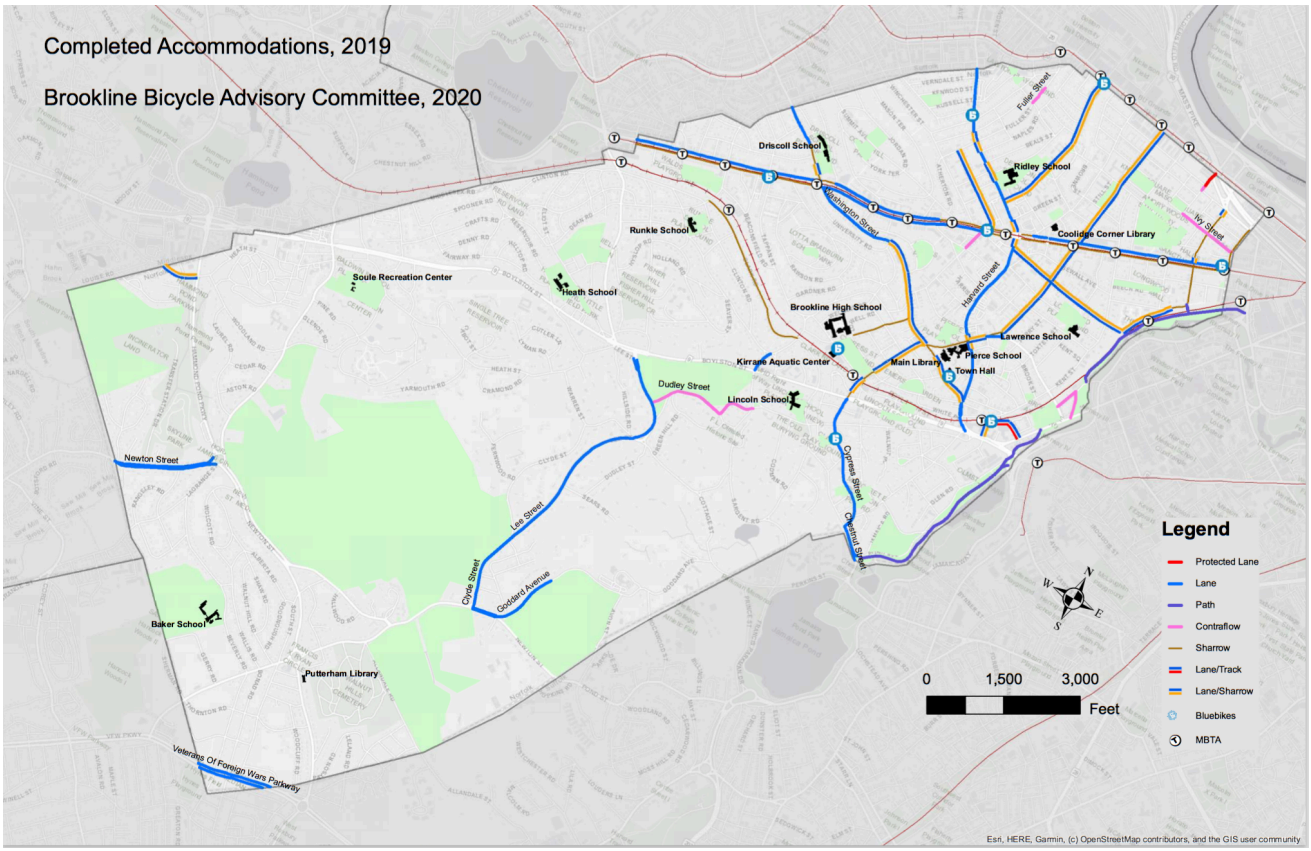
Allandale Road
Amory Street
Babcock Street
Beverly Road
Blake Road
Buckminster Road
Centre Street
Clark Road
Cleveland Road
Clinton Road
Corey Road
Crafts Road
Davis Avenue
Dean Road
Dudley Street
Eliot Street
Essex Street
Fisher Avenue
Freeman Street
Gardner Road
Greenough Street
Heath Street
Ivy Street
Kennard Road
Kent Street
Marion Street
Middlesex Road
Norfolk Road
Park Street
Pearl Street
Pleasant Street
Powell Street
Reservoir Road
St. Mary's Street
Station Street
Somerset Road
South Street
Summit Avenue
Sumner Road
Tappan Street
Vernon Street
Walnut Street
Webster Street
Winchester Street
Woodland Road



3. Steps to Achieving the Network Plan

Existing Bicycle Accommodations

The map below shows the current status of bicycle accommodations in Brookline, and Section 9 lists completed projects that have contributed to this progress. Despite these improvements, bicycling in Brookline is not safe and viable for persons of all ages and abilities; thus, to help meet Brookline's emissions goals and complete streets standards, it is important to continue improving current bicycle accommodations, especially on busy streets. For example, some bike lanes need to be widened, buffered, or physically protected to reduce the perceived and real risk of crashes such as dooring. Engineering standards for bicycle accommodations are changing rapidly as indicated by the NACTO table in the appendices, and additional improvements should be made to Brookline's streets to reflect best practices. Furthermore, the map below clearly indicates that existing accommodations do not form a network.



Plan and Implement New Accommodations

As new bicycle accommodations are planned for and implemented, priority should be given to the Protected Framework described above and to the following caveats:

- Intersections are the most dangerous locations for all street users—pedestrians, cyclists and motorists—and the sites of many crashes and injuries. Therefore, special attention should be given to safe passage across

and through intersections for all users. This may require special traffic signals and/or pavement markings for crosswalks and bicycle crossings.
- All traffic signals should either be on a regular cycle that provides opportunities for all road users to cross in all directions OR sensors should be set in such a way so that a cyclist in the road can trigger them.
- Cyclists should be permitted to cross streets with advance pedestrian walk signs, as long as doing so does not endanger pedestrians.
- Streetlights should be adequate (and appropriately aimed) on all streets to make the right of way visible to pedestrians and cyclists.
- Changes such as bulb outs that force cyclists to temporarily merge with motor traffic should be avoided.

One way to test proposals for new bicycle accommodations is to set up temporary trials to assess their value for and impact on all street users. Such pilot projects might last for as little as a few days to as long as a year (as on Beacon Street outbound from Marion to Westbourne Terrace). Many can be accomplished with traffic cones, water-soluble paint, or other inexpensive and temporary materials and can provide invaluable information on safety for cyclists, impact on pedestrians, and effect on traffic flow.

Fill in the Gaps

Bicycle lanes that disappear at intersections or that start and stop along a major road as they do on Harvard Street, do not offer safe, continuous routes. Major gaps are delineated in the street list and can be seen on the map of existing accommodations, but it should be noted that there are also gaps that need to be filled to knit together safe, continuous bike routes. A few examples:

- Safe crossing of Netherlands Road between Parkway Road and the Muddy River Path
- Multiple interruptions of the bike lanes along the length of Harvard Street, where bike lanes repeatedly turn into shared bicycle/motor vehicle travel lanes
- Beacon Street outbound from Pleasant Street to Marion Street
- Washington Street, where bike lanes turn into shared bicycle/motor vehicle lanes, e.g., near and across the intersection with Beacon Street
- Beacon Street inbound from Webster Street to St. Mary's Street

Replace and Maintain Bicycle Accommodations

Once put in place, bicycle accommodations on Brookline's streets must be adequately maintained. Whether in the form of painted lines, stencils, bollards,

curbs, or other means of providing safety for cyclists sharing roads with vehicular traffic, it is essential that these accommodations be promptly replaced or maintained when damaged or removed by road/construction projects or by regular wear and tear. Monitoring of utility and other construction work should assure that trenches or other pavement cuttings do not leave dangerous ridges in bike lanes. It is also important that bike lanes be kept clear of overhanging vegetation, debris and snow. Road surface conditions along heavily used streets/corridors that have separate/protected bicycle lanes are of particular concern. Examples include nearly all of Washington St. (pictured above) between the Boston town line at Whole Foods and Brookline Village, St. Paul St., much of Harvard Street, and Chestnut Hill Ave. between Rt. 9 and Beacon St. The bike lanes along these streets are characterized by large cracks, major potholes, sewer dips, and other hazards. This is unpleasant at best and life-threatening at worst. In some situations, bicyclists are forced out of the lane into traffic in order to avoid a major hazard.

Historically, the default solution to this situation is to repair the bike lane in line with the schedule of the repair of that road. However, the situation has become increasingly dangerous on some critical roads, and the schedule for their repair might be several years away in some instances. Need for bike lane repair should be assessed to prioritize areas of greatest need.

An inventory of bicycle accommodations could (1) identify streets, or portions of streets, in most urgent need of repair; (2) assess the schedule for the repair of the overall street. If a bike lane is in fair condition or worse and the schedule for that street's repair/resurfacing is two years away or more, then a temporary repair of that bicycle lane should be undertaken, such as aggressive patching, or a temporary resurfacing of the bike lane. An example of such a bike lane resurfacing is shown in the photo on Beacon St. in Newton, between Grant Ave. and Hammond St.

A specific budget and priority list should be established each year for the repair of bicycle lanes like the program for sidewalk repairs. A resolution was passed by Town Meeting (November 2019) on maintaining existing street markings designed for safety, including bicycle and pedestrian markings, but repair of dangerous pavement should also be undertaken.

Brook-on-Line is an app for reporting problems that need to be addressed by various Town Departments; new categories directly related to bicycle issues would be useful.

Provide Wayfinding Signage

Wayfinding signage for cyclists provides information on distances/directions to key locations and the optimal cycling routes to those destinations. Besides guiding cyclists, destination signs advertise the Town's bike routes, tourist sites, and commercial areas, promoting bicycling and economic growth. An additional benefit of wayfinding is that it increases awareness for automobile drivers as well. When they see a cycle/wayfinding sign, it indicates that this is a cycling route/corridor/bicycle friendly road. See appendices for examples of wayfinding signage and pavement markings.

We recommend three signage guidelines as part of the *Green Routes Plan*:

- Improved signage and wayfinding to destinations in Brookline (i.e. Coolidge Corner), and commuting corridors (to downtown, medical area, river, etc.)
- Wayfinding should be destination oriented but also best route oriented (i.e., where there are bike lanes and markers)
- Signage should be large enough to be visible to cyclists and to drivers

4. Micromobility

Micromobility: Wikipedia defines micromobility as "a category of modes of transport that are provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles and electric pedal assisted, pedelec, bicycles." The definition generally focuses on shared use (rental) bicycles and scooters, as a means of travelling the "last mile," e.g., from a train/transit stop to a destination in dense urban areas. For the purposes of this plan, the definition is broader and encompasses bicycles and stand-up scooters of all types with or without motor-assist and whether privately owned or shared/rented, as well as motorized wheelchairs and other modes for people with mobility limitations.

In 2016, transportation made up more than 40% of greenhouse gas emissions in Massachusetts (https://www.mass.gov/service-details/ma-ghg-emission-trends). In an effort to mitigate some of these emissions, there is a growing emphasis on shifting away from single occupancy motor vehicles to new, lightweight, human- or electrically powered means of transportation. Innovations in micromobility technologies can be expected to continue. Many of these modes share accommodations originally designed primarily for bicycles, hence their relevance to this plan.

Accommodating Micromobility Devices

Motorized micromobility devices generally run on electric power as well as pushing/pedaling. Generally, a small motor using rechargeable batteries allows travel at up to 16-20 mph. In planning to safety accommodate these micromobility devices the following should be considered:

- Micromobility modes will increase the total number and variety of bicycles, scooters, etc. of micromobility vehicles on the road.
- They will lead to an increased number of people using them, representing a wider breadth of age groups, physical conditions, road awareness, and experience.
- They will often use the same infrastructure as bicycles, both on the road and for parking/locking, etc.
- They can travel substantially faster than most bicyclists, especially uphill.
- Eventually, there will also be a need for charging stations (possibly solar-powered); these can be either standalone or combined with electric motor vehicle (EV) charging stations.

Stand-up electric scooters are becoming prevalent in cities around the world, operated similarly to dockless bike share systems by companies such as Bird and Lime. In some cities, the use of electric scooters is already outpacing that of bicycles in shared systems.

Brookline ran an eight-month trial program of e-scooters from April to November 2019; this included inviting e-scooter share companies to community events to introduce the micromobility device to residents and allow test drives. The program generated about 200,000 trips--an average of nearly 1,000 per day. More than 20,000 people used e-scooters. Approximately 20% of these scooter trips replaced short motor vehicle trips (and, also, presumably, some bicycle trips and some walking). Those who used the scooters were satisfied with their operation and as a form of micromobility. There were relatively few reported injuries or accidents (fewer than 10 at the six-month mark). The success of the program shows the demand for micromobility solutions and alternatives to motor vehicles.

However, there were some issues during the trial. The most significant problem/complaint was scooter riders using sidewalks rather than roadways. Pedestrians considered this unnerving and unsafe. The primary reason for e-scooter users using sidewalks is that using the road was considered unsafe in those situations--either because of the lack of a dedicated or protected lane, or because of

dangerous road surface conditions. There were also complaints about inappropriate parking of scooters.

Addressing the Demand for E-scooters
As has been demonstrated by their popularity in other locales as well as by Brookline's trial program, there is significant demand for e-scooters. They should be considered as part of the bigger desire to find alternatives to motor vehicles as a form of transportation, along with bikes and e-bikes. The demand for and popularity of e-scooters places a greater imperative on the Town to accelerate plans to increase the number of dedicated, and especially protected, bike lanes.

Brookline has been working with Boston, Cambridge, and the Metropolitan Area Planning Council (MAPC) to develop both pilot programs and legislation to allow for scooters' legal use and regulation in Massachusetts.

5. Major Destinations

The purpose of a good bicycle network is to provide safe routes for cyclists of all abilities to be able to reach major destinations. This section identifies some high priorities within the context of aiming for a Protected Framework with Safe Connecting Streets. Routes to schools, parks, business districts and other frequently visited destinations that connect existing paths, bike lanes and quiet streets are assigned a high priority. Completing bike routes on major streets that are heavily used by commuting or shopping cyclists—such as Beacon Street, Harvard Street, and Longwood Avenue—are also high priority. When reviewing projects on one street, attention should be given to intersecting streets to ensure connectivity within the network.

Note: *For some of the destinations listed below, specific recommendations for safe access have been made; for others, work is underway to identify access roads, many of which are already listed as part of the Protected Framework or Safe Connecting Streets.*

Schools

In conjunction with Safe Routes to School programs and to assure the safety of students, special consideration should be given to pedestrian and bicycle safety in and around all school grounds, particularly to separating motor vehicle pick-up/drop-off areas from walking and bicycle routes. With plans currently underway for new/remodeled/expanded schools to accommodate increased enrollment, it is important that plans for new/remodeled schools include sidewalk improvements, bicycle accommodations and safe pick-up and drop-off areas to enhance the ability of students

to walk or bike safely to schools. Suggestions for two current projects are provided here as examples.

Driscoll School: Ideally, students would be able to approach Driscoll School from every direction and enjoy safe sidewalks and protected, separated bike lanes on all adjacent streets.

- **Beacon Street westbound/Westbourne Terrace:** Beacon Street currently has a buffered bike lane. As cyclists take a right from Beacon Street onto Westbourne Terrace, they would ideally merge onto a protected two-way cycle track adjacent to the sidewalk on the left (west) side of Westbourne Terrace. Entrance to the playground area and rear entrance of the building via a short flight of stairs could be improved with a bicycle channel or ramp. Maintenance or expansion of bike parking on the Westbourne Terrace side of the school would also allow students convenient ingress via this route.
- **Westbourne Terrace from north** is a relatively narrow but quiet street that is used by students from Corey Hill. From the intersection of Westbourne Terrace and Bartlett Street, students should be able to either continue straight onto a raised separated two way cycle track adjacent to the school to the Westbourne Terrace entrance, or turn right onto a raised cycle track along the south side of Bartlett Street and then turn left into the parking lot/rear entrance bike parking area.
- **Washington Street from south** currently has a bike lane on the outside of metered parking. Ideally this would be replaced by a raised cycle track adjacent to the sidewalk, to allow students to either turn into a walkway (walking bikes) adjacent to the playground, or into the parking lot. A bicycle channel on the steps up to the bike racks on the upper level parking lot, or installation of more bike parking on the lower level parking lot would allow students to access parking.
- **Washington Street from north** currently has sharrows, and students can approach the protected crosswalk with crossing guard at Salisbury Road and Washington Street and enter into either lower parking lot or walk their bikes along the walkway adjacent to playground to reach bike parking.
- **Bartlett Street** could have a raised contraflow option that would not put students in conflict with cars.
- **Other quiet streets** leading to Driscoll can serve as important safe routes for students on bikes (Bartlett Street, Bartlett Crescent, Salisbury Road).

Other schools: Routes to other schools should receive similar consideration, including Baldwin (Heath Street), Baker (Beverly Street), Heath (Eliot Street), Lawrence (Francis Street), Lincoln (Kennard Road), Pierce (School Street), Ridley (Harvard Street), and Runkle (Druce Street)

Brookline High School (BHS) serves students, teachers, swimmers, ball players, Town Meeting Members, and playground visitors. This renovation/construction in

this area provides an opportunity to set the example in "prioritizing safe, space-efficient, and energy-efficient movement of people and goods over the movement and parking of private vehicles when designing and improving our public ways, with particular focus on high-traffic routes, connectivity and directness." (Warrant Article 31 Fall 2019 Town Meeting)

A treatment that would be far superior to the existing bicycle accommodations, without requiring major changes to existing curbs, would provide for two-way bike movements on the one-way streets in the vicinity of BHS. This could be done by implementing protected contra-flow lanes, accompanied by sharrows in the with-flow direction and designating all these streets as 20 mph safety zones. The design would include the following features:

- Two-way bike path connecting Davis and Tappan between the Cypress ball fields and playground
- Protected contra-flow lane next to Cypress Field on Greenough from Tappan to Davis
- Protected contra-flow lane next to Cypress Field on Davis from Greenough to Cypress
- Protected contra-flow lane next to Cypress Field on Tappan from Cypress to Greenough
- Protected contra-flow lane on Tappan from Blake to Greenough
- Protected contra-flow lane on Sumner from Greenough to Blake with traffic flow sharrow markings on the above-noted street segments
- Rear-angle parking on Tappan Street to replace the current head-in angle parking

A better and safer design would provide for protected bike lanes in both directions on all streets in the above list, or possibly turning Greenough and Tappan along the BHS campus buildings from Davis to Cypress into a pedestrian mall where cars, while allowed, would be required to move at speeds under 15 mph.

Given that BHS serves the entire town, the streets in the envisioned Protected Framework with Safe Connecting Streets that provide access to and from BHS (especially Harvard, Park, Washington, Tappan, Cypress and Greenough) should be high priority for improvement and maintenance.)

Brookline Town Center: Town Hall, the Public Safety Building, the Public Health Building, and the Brookline Village Library are all located on or just off Washington Street near Harvard Street and School Street, so improvements to those main roads—part of the Protected Framework, will improve safe access to these important public buildings.

Commercial Areas: All of Brookline's commercial areas are on or near major streets that are part of the Protected Framework: Coolidge Corner (Beacon and Harvard Streets), Brookline Village (Washington and Harvard Streets), Washington Square (Washington and Beacon Streets), so the priority improvements to those streets will facilitate safe access via micromobility modes to these important commercial/cultural destinations.

Parks, Conservation Areas, and Recreational Facilities are important destinations. Many are on school grounds or adjacent to schools. Many are on streets already included in the Protected Framework and Safe Connecting Network.

> *Brookline Complete Streets Policy* was adopted by the Board of Selectmen in 2016 and states:
>
> The Town of Brookline shall plan, construct, and maintain its public ways to enhance safety, access, inclusion, convenience and comfort for all users, thereby creating "complete Streets." The Town will create a comprehensive transportation network that sufficiently accommodates people of all ages and abilities, whether traveling by foot, bicycle, wheelchair, mass transit, or motor vehicle.
>
> …the Town's transportation projects shall be designed and implemented to provide safe and comfortable access for healthful transportation choices such as walking, bicycling, and mass transit. The needs and safety of the town's most vulnerable users shall be given special consideration during project planning. Users may be considered vulnerable by virtue of their mode of transportation, such as bicycling or walking, or because of their age or mobility.

6. Street List of Proposed Projects

Bicyclists are entitled to use all streets in Brookline. Whenever changes or improvements in roads are planned, consideration should be given to bicycle and pedestrian safety in accordance with the "Brookline Complete Streets Policy."

Projects are listed below alphabetically by street name. Asterisks (*) highlight projects and intersections that are particularly important and/or dangerous as currently configured. These should have high priority for reconfiguration, repair, or other appropriate attention. Single carets (^) mark projects that contribute to the proposed Protected Framework; double carets (^^) mark those that are safe connecting roads that are key to completing the Green Routes Network.

Abbottsford Road: Abbottsford Road, Beals Street, Coolidge Street, Fuller Street, Kenwood Street, Russell Street, Thorndike Street, and Verndale Street are all streets in the JFK Crossing neighborhood that have portions that were at some point made one-way, apparently to discourage cut-through traffic. These are all wide enough to provide buffered or protected contra-flow lanes that would allow for easier and more direct bicycle navigation and would have some traffic-calming effect.

^^Allandale Road: Allandale provides an important connection to Allandale Farm, to the Arboretum, and other Boston locations. With its medium traffic volume (3514 AADT), it needs protected bike lanes or it should be traffic-calmed to slow motor traffic to 20 mph or less. Mark bike lanes in both directions between Grove Street and the Town Line; keep brush cut back from sides of the road where it currently impedes on the existing shoulder. At the Brookline/Boston line, the road narrows suddenly, and there should be warning signs at a minimum. Preferably Brookline and Boston could work together to improve the bicycling conditions toward the Arboretum in Boston.

Alton Place between Harvard Street and St. Paul Street: Add a contra-flow bike lane.

^^Amory Street: Amory, with its medium traffic volume (3514 AADT), should be traffic-calmed to slow motor traffic to 20mph or less.

^Aspinwall Avenue: Aspinwall provides an important connection between Harvard Street and both St. Paul to the north and Brookline Avenue to the east. It has a high level of traffic (10043 AADT), so protected bike lanes in both directions are necessary.

***Atherton Road:** Add contraflow lane from Winchester Street to Summit Avenue to provide a quiet, safe route to the buffered bike lane on Beacon Street (just beyond Summit), allowing some cyclists to avoid the heavy traffic of Coolidge Corner.

^^Babcock Street: Because of its medium traffic volume (3555 AADT), Babcock Street should be made more bicycle and pedestrian friendly for its entire length by providing protected bike lanes in both directions, or else calming motor traffic to 20mph or less. Babcock Street's importance as a connector for bicycles will only grow in the future because it will provide a direct route between Brookline and Commonwealth Avenue, the projected MBTA West Station, and newly created parkland and bicycle paths along the Charles River (all part of the I-90 Allston/West Station project).

Bartlett Street: Install contraflow lane from Washington Street to Westbourne Terrace on south side of street, closest to school to improve access to Driscoll School. Consider safe ways to access school grounds—perhaps with shared use paths around the school grounds themselves and safe areas for bicycle parking. (Also see "Driscoll School" above)

^Beacon Street (Beacon Bridleway):

The possibility of reclaiming the former bridle path in the center of Beacon Street along the C line tracks as a two-way protected multi-modal path should be actively pursued. The Bridle Path, designed by the Olmsted firm, is shown as the dark gray strip by the side of the train tracks in the accompanying historical photo. (Collected by Jules Milner-Brage, courtesy of the Archives of American Gardens, Smithsonian Institution, Washington, D.C.) This proposal would significantly enhance the safety of a major route through Brookline and would connect to bicycle accommodations in the regional network at Boston and Newton. The proposal is to reclaim the Olmsted designed bridle path, on the wide side of Beacon Street through the length of Brookline to provide a two-way protected multi-modal path with cross-overs at intersections where the wide side of Beacon Street shifts from one side of the MBTA tracks to the other (Coolidge Corner and Washington Square). Plans are being developed to accomplish this without

much—if any—loss of parking or travel lanes. The contemporary photo shows how a ten+ foot wide two-way cycle track could be installed while maintaining angled parking.

***^Beacon Street outbound from Boston City line to Carlton Street, and further to Harvard Street:** Upgrade bicycle facilities to protect cyclists better from moving motor vehicles and the door zone of parked cars by moving the bike lane between the curb and the parking lane, as has been done in Boston just to the east of the Town line. The stretch from St. Mary's Street to Carlton Street is very high priority because it experiences the worst incidence in Brookline of motor vehicles obstructing the bike lane and it can be implemented inexpensively. The remaining stretch to Coolidge Corner is lower priority as long as plans move forward to implement the Beacon Bridleway.

^Beacon Street inbound at Pleasant Street: See Pleasant Street.

^Beacon Street at Charles Street: Traffic signal for left/U-turn from Beacon Street inbound to Beacon Street outbound or from Charles Street to turn left on Beacon should be triggered by a bicycle.

***^Beacon Street outbound from Pleasant to Marion Street:** Design safe passage for bicycles from the end of the Beacon Street bike lane to start of bike lane at Marion Street.

^Beacon Street at Marion Street: Traffic signal for left turn from Beacon onto Marion should be triggered by bicycle.

Beacon Street outbound from Westbourne Terrace to Washington Square: Improve transition from the end of the bike lane near Westbourne Terrace to Washington Street intersection. Increasingly important due to planned renovation of Driscoll School.

^Beacon Street Morning Rush Hour Bicycle Lane (inbound) via parking restrictions on sections of Beacon Street inbound where parking is allowed and there is no bike lane. Time-limited restrictions during the morning commuting period would effectively create a 7' wide bicycle lane to the right of the two lanes of motor vehicle traffic, thereby increasing safety and throughput for both cyclists and motorists.

Beals Street: See Abbottsford Road.

^^Beverly Road: Beverly Road provides access to and from Baker School. With its medium traffic volume (3549 AADT), it should either have protected bike lanes or be traffic-calmed to 20mph or less. Additional safety measures, such as wider crosswalks at the Baker School grounds should be considered to improve safety during the busy times of school opening and closing.

Bicycle Racks: Additional bicycle racks are requested for Town Hall, particularly under the parking lot side of the overhang outside the entrance to provide some protection from weather; at some public schools; lower Beacon Street between Carlton and St. Mary's Streets on the inbound side of Beacon Street; Cypress/School/Washington business area; at parks throughout town that have few if any bicycle parking racks. Specific requests have been made for Gibbs Street between Beals Street and Naples Road.

^^Blake Road: Blake Road provides access to and from Brookline High School. With its medium traffic volume (3632 AADT), it should either have protected bike lanes or be traffic-calmed to 20mph or less.

^Brookline Avenue: Bike lanes between Town line and Washington Street (Route 9) would continue lanes and sharrows already installed by Boston through the Longwood Medical Area and provide an important connection to the Emerald Necklace paths and Brookline Village. However, given Brookline Avenue's high traffic level (19524 AADT), protected bike lanes are needed.

***Brookline Avenue crossing for Emerald Necklace/Muddy River Path** at Parkway Road requires new signals, signal synchronization, curb extension, and curb ramps. The Muddy River Path is an attractive greenway for cyclists traveling between the Landmark Center and Jamaica Pond. Brookline Avenue bisects the path, and it is difficult to cross this four-lane road due to heavy traffic, physical barriers, and the lack of a dedicated crossing. This project requires a traffic signal installed at the intersection of Brookline Avenue and Parkway Road with a sequence tied to the signal at the corner of Aspinwall Avenue and Brookline Avenue. This would allow for to safely cross between Parkway Road (with its contraflow lane) and the Emerald Necklace. Additionally, a curb extension and ramps are necessary to allow bicycles to safely queue on the southeast side of Brookline Ave and to ascend onto the greenway. (In 2011, Brookline received a grant to proceed with planning of this and other connections for the Emerald Necklace.)

^^Buckminster Road: Buckminster Road, Clark Road and Clinton Road connect residential areas with Boylston Street, Chestnut Hill Avenue and Beacon Street corridors, and with Runkle School and Brookline High School. With their medium traffic volumes (3600+ AADT), they should either have protected bike lanes and/or be traffic-calmed to 20 mph or less.

^Carlton Street: Together with Longwood Avenue, and Chapel, Ivy and Essex Streets, Carlton Street provides an important link in both directions between the BU Bridge and the Longwood Medical Area, as well as a link to the soon-to-be-restored Carlton Street Footbridge. With its high traffic volume (9619 AADT) it should have protected bike lanes in both directions.

^^Centre Street: Install flex posts to prevent parking in the bike lane; paint bike lane markers in the lane.

^Chapel Street: Together with Longwood Avenue, and Carlton, Ivy and Essex Streets, Chapel Street provides an important link in both directions between the BU Bridge and the Longwood Medical Area, as well as a link to the soon-to-be-restored Carlton Street Footbridge. With its high traffic volume (9605 AADT) it should have protected bike lanes in both directions.

Charles Street: Install a contraflow lane for cyclists southbound beyond the garage entrance to Sewall Avenue; then a contraflow lane on Sewall Avenue to Longwood Avenue to provide safe access to the rear of businesses.

^Chestnut Hill Avenue between Route 9 and Beacon Street at Cleveland Circle: Chestnut Hill Avenue is a major route from South Brookline (extending the bike lanes on Lee/Clyde Streets) to Dean Road, Clinton Road, and Beacon Street at Cleveland Circle. It is a high traffic street (17007 AADT) and needs protected bike lanes in both directions. It is approximately 38 feet wide from Boylston Street (Rt 9) to Clinton Road. In this area, car travel lanes should be reduced to 10 feet wide to help reduce car speeds to the posted speed limit of 25 mph. The rest of the lane width can be split evenly on both sides for protected bike lanes. From Clinton Road to Beacon Street, bike lanes should be continued with the car lane width being reduced and the buffered area being reduced or removed as necessary. In order to accommodate the bike lane, the additional northward car travel lane should not be provided until the entrance to the MBTA depot is reached since this is where the road widens. Finally, paint that directs bikes to cross the tracks in the safest way should be added.

^Chestnut Hill Avenue at Clinton is a difficult crossing for cyclists and pedestrians, with poor sight lines. A median refuge is recommended to allow crossing half of Chestnut Hill Avenue at a time.

^Chestnut Hill Commercial District: This project helps to make the Chestnut Hill shopping area safer and more accessible for bicyclists. It takes advantage of the relative safety of both Middlesex Road on the north side of Route 9 and Heath Street on the south. The project involves creating bike lanes on Hammond Street from Middlesex Road to the shopping center and then extending a bike path through the shopping center connecting to the traffic light at Tully Street, thence to Heath Street and to and from Hammond Pond Parkway. Some of the bike path would be built as a sidewalk extension. Coordination with the City of Newton is essential. An additional accommodation could be to re-stripe the Hammond Street/Route 9 intersection to make it safer for bicyclists to go from Middlesex, across Route 9 to a right turn on Heath Street.

^Chestnut Street: Portions of Chestnut Street are very high traffic (15909 AADT) while other portions are moderate traffic (3735 AADT). The high traffic section that connects Cypress and High Streets to Pond Avenue, Leverett Pond Path and Jamaica Plain at Paul Pender Rotary (aka Riverdale Parkway Rotary) needs protected bike lanes.

^^Clark Road: See Buckminster Road.

^^**Cleveland Road:** This short road is an important connection between Eliot Street and Reservoir Road; it may not need special accommodations since it is a low traffic volume street.

^^**Clinton Road:** See Buckminster Road.

^Clyde Street: See Lee/Clyde.

Coolidge Corner: This is a major crossroads and commercial area for Brookline and should be made safe for all users. See comments for Beacon and Harvard Streets for specific recommendations.

Coolidge Street: See Abbottsford Road.

^^Corey Road: Corey Road provides an important connection between Beacon Street and Dean Road in the south, and Washington Street. With its medium traffic volume (3952 AADT) and narrow width, it should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic. Half this stretch of Corey is in Boston and half is in Brookline, so the treatment should be coordinated with the City of Boston.

^Cottage Road from Goddard Avenue to Warren Street: Bike lane or traffic calmed to 20 mph to ease uphill travel for bicyclists. For section of Cottage Road that merges with Goddard, see treatment for Goddard.

^^Crafts Road: Crafts Road, along with Middlesex Road and Dean Road, connects Hammond and Boylston Streets in South Brookline with Cleveland Circle, Washington Square and other parts of North Brookline. With its medium traffic volume (3630 AADT) and narrow width, it should have sharrows and be traffic calmed to 20mph or less.

^Cypress Street from High Street near the Jamaica Plain border to Washington Street: Cypress Street provides an important connection from south of Route 9 to Brookline High School and, along with School Street, to all points north and east. Because it has a high volume of traffic (10043 AADT), it should have protected bike lanes in both directions.

^Cypress Street (near Washington Street, CVS): Improve southbound approach to Washington Street.
See appendices.

^^Davis Avenue at Cypress Street: Traffic signal should be triggered by cyclists waiting to cross Cypress Street.

^^ Davis Avenue: Install contra-flow bike lane from Greenough Street to Cypress Street to increase safety for cyclists egressing from the High School. Sharrows should be provided in the direction of traffic. From Cypress Street to Washington Street, if a protected bike lane can be provided in only one direction, traffic should be calmed and sharrows provided in the other direction so that cyclists can ride in the traffic lane.

^^Dean Road: Dean Road provides an important connection between Beacon Street and routes to the Runkle School and the High School. With Crafts Road and Middlesex Road it also connects Hammond and Boylston Streets in South Brookline with Cleveland Circle, Washington Square and other parts of North Brookline. With its medium traffic volume (3630 AADT), it should have protected bike lanes. If a protected bike lane can be provided in only one direction, traffic should be calmed and sharrows provided in the other direction so that cyclists can ride in the traffic lane.

^^Dudley Street: With its contra-flow lane between Lee and Warren, Dudley Street (along with Walnut Street) provides a two-way alternative to Boylston Street

between Brookline Village and Lee Street. Because of its narrow width it should have sharrows and be traffic-calmed to 20mph or less so that cyclists can safely travel in the motor vehicle lane.

Dummer Street: As 24 feet wide that drops then rises gently in the westbound direction. Westbound it carries heavy rush hour traffic from the BU Bridge into North Brookline, and eastbound it carries traffic to the BU Bridge and Commonwealth Avenue, so bike accommodations would be beneficial. The most heavily trafficked section is between Essex and Amory, where a bike lane westbound and sharrows eastbound should be possible. The same treatment might be possible between Amory and St Paul, although there are some loading docks perpendicular to traffic flow that might frequently block the westbound bike lane. Between St Paul and Pleasant, bike treatments would be difficult because the street primarily serves as a parking lot, with parallel parking for the BHA in the eastbound direction and commercial parking westbound.

Dwight Street is Y shaped; on the stem of the Y, Dwight has parking on the north side and is about 24 feet wide. The arms of the Y are about 20 feet wide--one arm has parking south side (one travel lane going east) and the other on the north side (one travel lane going west). There is two-way traffic on the stem. Add sharrows for the length of the street.

^^Eliot Street: With its medium traffic volume (3630 AADT), protected bike lanes are recommended on Eliot Street. If a protected bike lane can be provided in only one direction, traffic should be calmed to 20mph or less and marked with sharrows in the other direction so that cyclists can ride safely in the traffic lane.

^^Essex Street: Together with Longwood Avenue, Chapel, Carlton and Ivy Streets, Essex Street provides an important link in both directions between the BU Bridge and the Longwood Medical Area, as well as a link to the soon-to-be-restored Carlton Street Footbridge. With its low traffic volume, protected bike lanes are not needed, but because of its importance as a through route, it should have bike lanes in both directions and be traffic-calmed to 20mph or less.

^^Fisher Avenue: With its medium traffic volume (3610 AADT), protected bike lanes on Fisher Avenue are recommended.

^^Freeman Street: Along with Babcock, Powell and Kent, Freeman Street connects residential areas north of Beacon with destinations south of Beacon. With its medium traffic volume (3530 AADT) it should either have protected bike lanes or be traffic-calmed to 20mph or less. Improve design of intersection with Babcock Street to slow vehicular turns. One possibility is to reconfigure and enlarge the small park to make one T-intersection of Freeman with Babcock rather than the two current intersections on either side of the park. Implement traffic calming to discourage cars from speeding to beat the traffic lights at Pleasant and St Paul Streets or change the

signals at Pleasant and at St Paul Streets to be 4-way stop controlled. Besides reducing speeding, this would reduce pedestrian waits at the intersections.

Fuller Street: See Abbottsford Road.

^^Gardner Road: This can be an important connector across Aspinwall Hill between Washington Street and Tappan Street. Because it is a relatively low-traffic volume street, it may not need special accommodations.

^Goddard Avenue, in combination with Cottage Avenue from Goddard to the Jamaica Plain line, provides a direct connection between South Brookline and Boston at Jamaica Pond. In its present configuration, it is narrow and winding, but should reconstruction be possible in the future, it should be considered for bicycle accommodations. Given its high traffic volume (9857 AADT), the accommodation should be protected, such as an off-road side path for bicyclists and pedestrians. In the meantime, sharrows and "no passing of bicycles" signs could improve safety for those cyclists who do use it.

Green Street: Add a commercial loading and unloading zone at the intersection with Harvard Street to reduce the incidence of motor vehicles standing in the bicycle lane on Harvard Street between Beacon Street and Green Street.

Green Street: Stripe and sign Green Street for a contraflow lane for bicycles from Dwight Street to Harvard Street (southbound), add sharrow markings safely out of the door zone in the northbound direction, remove the existing fog line separating the motor traffic lane from the parking lane, and provide adequate provisions to enhance pedestrian and bicycle safety where the contraflow lane meets the crosswalk at Harvard Street. Provide a green-painted bike lane adjacent to the crosswalk to allow cyclists to cross or turn left onto Harvard Street. This would provide substantially improved access to Coolidge Corner for cyclists coming from the north. It would also provide greater safety in the northbound direction, serving as a lower stress alternative to the sharrows on northbound Babcock. (We are concerned that the current fog line between the parking and travel lanes encourages inexperienced cyclists to bike in the door zone, rather than at a safe distance from parked cars.) Because Green Street connects to the quiet streets north of it (Dwight Street, Pleasant Street, etc.), this contraflow lane is all that is needed to create a safe two-way route connecting the Boston University bridge area (access to Commonwealth Avenue, university areas, Cambridge, and the Esplanade), as well as the dense Coolidge Corner/Northeast residential area, to the bike lanes on Harvard Street (leading toward the center of Coolidge Corner, the Pierce School, town center and the high school).

^^Greenough Street: Greenough Street provides important access to Brookline High School. It should be traffic-calmed to 20mph or less.

^^Greenough Street at the High School: Create a separate shared path between the benches along Greenough Street in front of the High School and Cypress Field that would allow cyclists to travel from Sumner Road onto Greenough Street at Davis. Ramps already exist at each end of the path. Signage and/or green paint would make path use clear to all. Alternatively, a parking-protected contra-flow lane could be provided. This allows cyclists access to bike racks at the high school as well as a direct route past the high school to Washington Street (and Washington Square) and Park Street (to Coolidge Corner).

***^Grove Street:** Bike lanes in both directions between Newton Street and the Newton line at Russett Road, through Putterham Circle. Because of high traffic volumes (9646 AADT), the bike lanes should be protected.

^Grove Street and Allandale Road: Traffic signal should include a protected/dedicated left turn from Grove to Allandale. Motor vehicles coming inbound from Putterham Circle come very fast over a rise, making the left turn dangerous for all road users.

^Hammond Pond Parkway: Hammond Pond Parkway has high traffic volume (9634 AADT), which calls for protected bicycle facilities. A multi-use path would provide Newton-West Roxbury connection and recreational access to Brookline parks and conservation areas. Install multi-use path along the entire length of the Parkway, with connection to Skyline Park. (MA Department of Conservation and Recreation project)

***^Hammond Street Greenway** is a critical thoroughfare through South Brookline, which connects West Roxbury Parkway with Boylston and Beacon Streets. Use a road diet for Hammond between the rotary and Route 9 for one lane in each direction (except at Route 9 junction); provide protected bike lanes in both directions; install a median refuge and traffic signal at Woodland Road (currently in progress) to allow safe crossing and access to Woodland Road for pedestrians and cyclists; install additional crosswalks for safer pedestrian crossing at other points (e.g., near Dane Park and the Fire Station). For the stretch from Route 9 north to the Newton town line, it would be good to coordinate the implementation with the City of Newton's improvements on Hammond Street north to Beacon Street.

*^**Harvard Street:** Harvard Street is home to the two largest commercial centers in Brookline (Coolidge Corner and Brookline Village), as well as the fast-growing JFK Crossing. It is also a major north-south through street connecting with Allston and Cambridge in the north and Washington Street in the South. Because of its high traffic volume (20530 AADT) it should have protected bike lanes in both directions along its entire length. The entries for Harvard Street immediately below should be considered as short-term measures.

Incorporate recommendations of the "Bicycle and Pedestrian Infrastructure Assessments, Brookline, MA Harvard Street Corridor: Longwood Avenue to Shailer

Street." (This report was prepared through the cooperation of the Massachusetts Department of Transportation, Walk Boston, and Mass Bike. Its goal was to study this section of Coolidge Corner and make recommendations to improve pedestrian and bicyclist safety and convenience. Several of the recommendations could be implemented on a short-term trial basis to quickly evaluate their effects. These include:

- "Install additional bike parking or on-street bike corrals."
- "Install pedestrian countdown indications at signalized intersections" (such as Harvard and Beacon streets).
- "Extend leading pedestrian intervals at Harvard and Beacon streets."
- "Install a bicycle box for the Harvard Street southbound approach to Beacon Street."
- "Install wayfinding signage on southbound Harvard Street north of Beacon Street to inform drivers of the need to position for a left turn onto Longwood Avenue prior to Beacon Street."
- "Evaluate adding a contraflow bicycle lane on Green Street" (now in progress).
- "Close the exit driveway from Centre Street parking lot onto Beacon Street" (at Babcock Street)

Additional engineering variations could be considered in this way, such as prohibiting all left turns at the Longwood Avenue intersection to make it safer by simplifying the traffic pattern.

***^Harvard Street:** Upgrade bicycle facilities and make them continuous for the length of Harvard Street through Brookline to better protect cyclists from moving motor vehicles and the door zone of parked cars. See appendices for detailed recommendations on possible bicycle accommodation improvements on Harvard Street.

^Harvard Street at Babcock Street: The left turn signal from Harvard Street southbound to Babcock Street should be triggered by a bicycle.

***^^Heath Street**: Heath Street runs east/west roughly parallel to Route 9 from the Brookline Reservoir to the Newton border. As such, it's a very attractive route for cyclists commuting, seeking recreation, or shopping. Heath Street's width makes passing impossible without crossing substantially into oncoming traffic or without coming dangerously close to cyclists. This project calls for signage to prohibit motorists from passing bicycles between Warren and Hammond. Also, given its medium traffic volume (3647+ AADT), it should have sharrows and traffic calming to slow vehicular speed to 20mph or less.

^High Street between Chestnut Street and Cypress Street: High Street has a high volume of traffic (9999 AADT). The short section between Chestnut Street and Cypress Street links Cypress and points surrounding it to the Leverett Pond path and Jamaica Plain. Because of the high traffic volume it should have protected bike lanes.

^Horace James Circle: Horace James Circle is a high volume (16364 AADT) major node connecting various high-volume routes in South Brookline. Redesign this circle when Hammond Street Greenway or Newton Street Greenway is implemented, to provide safe protected passage in all directions for people on bicycles as well as safe pedestrian crossings. In the short term, provide a green carpet bike lane around the entire circle to the right of the motor traffic lane, and provide signs for motor vehicles to yield to bicycles. On all approaches where bike lanes or wide shoulders are dropped, mark the merger with stripes, green paint, bike symbols, and signs for motor vehicles to yield to bikes.

^Independence Drive: Bike lanes in both directions between Putterham Circle and Town line to improve safe access to Baker School. Because traffic levels are high (10022 AADT) the bike lanes should be protected.

^^**Kennard Road**: Kennard Road provides an important connection to Lincoln School. With its medium traffic volume (3735 AADT) and narrow width, it should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^^Kent Street: Along with Babcock, Freeman, and Powell, Kent Street connects Brookline Village and other areas south of Beacon Street with areas north of Beacon. With its medium traffic volume (3392 AADT) it should either have protected bike lanes or be traffic-calmed to 20mph or less.

Kenwood Street: See Abbottsford Road.

^Lagrange Street, Horace James Circle to Town Line: Lagrange Street is wide with room for bike lanes in both directions, due to high traffic volumes (9912 AADT), protected bike lanes need to be protected. Cycling facilities within the Circle should be improved at the same time.

*^**Lee/Clyde segment of South Brookline Greenway:** This includes Lee Street between Route 9 and Clyde Street, together with Clyde Street continuing on to Newton Street. This stretch is a major route between south Brookline and north Brookline. Because of high traffic volumes (9800+ AADT), it needs protection. A major project could create a "greenway" by moving motorized traffic to the west side (one lane in each direction) and constructing a mixed-use path and service road on the east side. In the short-term improve bike facilities as described in section 6. Reduce the motor traffic lane width and use the freed-up width to buffer and protect the existing bike lanes; where the bike lane is dropped as Clyde approaches Newton, mark the merger with stripes, green paint, bike symbols, and signs for motor vehicles to yield to bikes.

^Longwood Avenue: Longwood Avenue is a major high traffic (9600 AADT) connector between Brookline and the Longwood Medical area. It needs protected bike lanes in both directions.

^Longwood Avenue at Chapel Street: Enhance the bike lane toward the Medical Area through the Chapel Street intersection to the bridge across the Muddy River by narrowing the motor traffic lanes and separating them from the bike lane with a buffer zone and flex posts or other barriers to prevent cars from using the bike lane as they queue up waiting for the Riverway light to turn green. Buffer the bike lane along the entire length of Longwood where feasible. Maintain sharrows from Chapel Street westbound (toward Coolidge Corner).

^Longwood—left turn onto Chapel Street: The left turn from Longwood Avenue southbound onto Chapel Street (toward the Longwood T-stop, the ramp to the Muddy River path and Longwood Towers) is both heavily used and difficult for both cyclists and motorists because traffic moves steadily on Longwood from the Longwood Medical Area. Although there is a light at this intersection, left turning traffic has no opportunity for a protected turn. Cyclists waiting to turn have moving traffic on both sides of them. It would be beneficial to have an option to allow bicycles and other vehicles queued at the light to turn left without oncoming traffic at the beginning of the light cycle. Install don't block the box street markings in the intersection.

^^Marion Street: With its medium traffic volume (3499 AADT) and adequate width (33ft), the one-way portion of Marion Street should have protected bike lanes in both directions. The two-way portion should either have protected lanes in both directions or have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

Marion at Beacon St: Traffic signal to allow left turn onto Beacon Street should be triggered by bicycle.

^^Middlesex Road: Middlesex Road is an important link for travel to and from the Chestnut Hill commercial district. This plan has four essential parts. First, it calls for a contraflow lane from Circuit Road to Reservoir Road. Second, it calls for bicycle priority lanes between Hammond Street and Circuit Road. Third, it calls for a curb ramp to access the Reservoir Road Bridge from the reservoir side over the D line, which is in Boston. Finally, with its medium traffic volume (3696 AADT), Middlesex Road should have marked sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^Mountfort Street: This short street is part of the major traffic connection between Beacon Street and the BU Bridge. It is the third most heavily trafficked street in Brookline (29K AADT). Beacon Street and the BU Bridge are becoming bicycle friendly. A protected bicycle lane should be installed for the entire length of Mountfort in cooperation with Boston since the street crosses the town line.

^Monmouth Street: Move parking to north side of street and install contraflow bike lane from Hawes Street to St. Mary's Street.

Netherlands Road: Provide safe passage from Parkway contraflow lane to Muddy River Path. Provide a bike lane from Brookline Avenue to the Muddy River Path. Paint the contraflow lane green; as it stands now (with small signs and fading lines and bike symbols), it is often not seen/violated by motorists.

***^Newton Street, Goddard Circle to Town line:** Install bike lanes in both directions on this wide street with fast moving traffic to connect to the Newton Street entrance to Larz Anderson Park and to Boston (Jamaica Pond area).

***^Newton Street Greenway** will improve conditions for commuter and recreational riders traversing South Brookline around the Country Club and Putterham Golf Course between Brookline, Newton and West Roxbury. Given Newton Street's high traffic volume (9710 AADT), protected bike facilities (roadside bike paths or protected bike lanes) are needed along all high traffic stretches from the eastern end at Pond Street, through the intersections with Goddard Avenue, Clyde Street, Grove Street, South Street, West Roxbury Parkway, and Horace James Circle to the Newton line. Install roadside bike paths on both sides of Newton Street from Clyde/Newton intersection to West Roxbury Parkway. Provide safe crossing of Newton Street at South Street with either a median refuge for cyclists and pedestrians and/or traffic signal to allow safe access to Putterham Circle, Independence Drive, and VFW Parkway. Along Putterham Golf Course, a major project would create a "greenway" by moving motorized traffic to the west side of this separated parkway (one lane in each direction) and constructing a mixed-use path and service road on the east side. Intersections will need to be redesigned.

In the short-term, improve bike facilities as described in Section 6: Reduce the motor traffic lane width and use the freed-up width to enhance bike facilities such as bike lanes between Clyde and Grove. Where the bike lanes are dropped as Newton approaches Grove at the intersection, mark the merger with stripes, green paint, bike symbols, and signs for motor vehicles to yield to bikes. On Newton between Grove and West Roxbury Parkway, provide bike lanes westbound and provide bike lane eastbound. On Newton between West Roxbury Parkway and Horace James Circle, provide bike lanes.

^^Norfolk Road: With its medium traffic volume (3,750 AADT) and narrow width (24ft), Norfolk Road should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

***^^Park Street:** Park Street connects North Brookline to Brookline High School, the Kirrane Aquatic Center, and the rest of the Brookline Hills area and is a quieter alternative to cycling on Harvard Street. With its medium traffic volume (3,600+

AADT) and narrow width (26ft), it should have marked sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^^Pleasant Street is about 25 feet wide, has parking on the east side, and two-way traffic for most of its length. Between Waldo and James Streets, Pleasant is about 30 feet wide and has parking on both sides between Waldo and John Streets. Riding northbound, cyclists are in the door zone or in traffic. With its medium traffic volume (3,543 AADT) and narrow width, Pleasant Street should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

At the intersection with Beacon Street, provide a green contraflow bike lane on the one-way section of Pleasant from inbound Beacon across the MBTA tracks, across the outbound side of Beacon St. to Waldo Street. This would provide a more direct turn from Beacon Street inbound onto Pleasant Street for cyclists (a frequent maneuver) and better visibility as cyclists join the flow of traffic on Pleasant Street northbound. These changes should be coordinated with changes to the traffic signal timing/coordination to assure greater safety for pedestrians and cyclists using the intersection.

^^Powell Street: Along with Babcock, Freeman and Kent, Powell Street connects Brookline Village and other areas south of Beacon Street with areas north of Beacon. With its medium traffic volume (3,392 AADT) it should either have protected bike lanes or be traffic-calmed to 20 mph or less.

^^Reservoir Road: Reservoir Road provides access across Route 9, and between Route 9 and Beacon Street. It also passes alongside the Heath School, allowing bicycle and walk access from the west. With its medium traffic volume (3,645 AADT) it should either have protected bike lanes or be traffic-calmed to 20mph or less. In addition, the intersection with Route 9 should be engineered to allow bicycles to cross Route 9 safely.

^Route 9 Crossing at Chestnut Hill Avenue: Improve bicycle use and safety in this intersection by adding lanes connecting Chestnut Hill Avenue, Heath Street, and Lee Street.

^Route 9, Washington/High Street intersection to Chestnut Hill: Continue the new Gateway East cycle tracks west to Chestnut Hill, on this most heavily traveled and highest speed road in Brookline.

^Route 9 grade-separated crossing for Muddy River Path: Even with an at-grade crossing of Route 9 for the Muddy River path, a grade-separated crossing using the existing highway bridge is a useful option to consider. See appendices.

Russell Street: See Abbottsford Road.

^School Street from Harvard Street to Washington Street: School Street, along with Cypress Street, provides an important connection from north Brookline to the High School and areas south of Route 9. Because it has a high volume of traffic (10,043 AADT), it should have protected bike lanes in both directions.

Sewall Avenue: Provide contraflow lane from Charles St. to Longwood Avenue for cyclists to access businesses without using Beacon St.

^^Somerset Road: With its medium traffic volume (3,632 AADT) and narrow width (24ft) Somerset Road should be traffic-calmed to 20mph or less. In addition, the one-way portion should have a protected contra-flow lane.

^^**South Street**: South Street provides a north-south link between Newton Street and West Roxbury that has far less traffic than West Roxbury Parkway. With its medium traffic volume (3506 AADT) and narrow width (24 ft) South Street should be marked with Sharrows and traffic calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^^St. Mary's Street: St Mary's links neighborhoods in North Brookline with the St Mary's commercial district and MBTA stop. Along with Ivy Street and others, it can provide access to Commonwealth Avenue and across the BU Bridge to Cambridge. With its medium traffic volume (3,648 AADT) and narrow width (27ft), St. Mary's Street should have sharrows (approved in 2018) **and** be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^St. Paul Street: St. Paul Street provides a major connection between Brookline Village and Allston. Given its high traffic volume (16,889 AADT), protected bike lanes are needed in both directions.

^^Station Street: Kent Street and Station Street, both of which are one-way (in opposite directions) near Washington Street in Brookline Village, together provide access between Brookline Village and neighborhoods to the north via Kent Street. With its medium traffic volume (3,890 AADT) it should be traffic-calmed to 20mph or less. However, because Station Street is one-way, bicycle access from Kent Street to the Brookline Village MBTA station is awkward. Therefore, a protected contra-flow lane is needed. Also, replace the cobblestone crosswalks, which are a hazard to cyclists, with alternate crosswalk treatment, preferably raised crosswalks.

Stedman Street: Provide a safe contraflow from Harvard Street towards Gibbs Street, taking into account the entire right of way width. This might be accomplished by a protected contraflow bicycle track, by a multi-use path for both cyclists and pedestrians or some other means. This is important for the safety of students using bicycles to travel to and from school because without a safe way of moving from the school into the neighborhood to the north and east, they would be required to bike to Harvard Street and interact with the busy traffic there.

Stedman Street at Harvard Street: Traffic signal should be triggered by a bicycle.

^^Summit Avenue: Summit Avenue provides access for residents of the Corey Hill neighborhood to Beacon Street and to Brighton. With its medium traffic volume (3585+ AADT) and narrow width (26 ft) Summit Avenue should be traffic-calmed to 20mph or less.

^^Sumner Road: Sumner Road provides access to Brookline High School from the south and west. It also provides access to South Brookline from the Aspinwall Hill neighborhood. Sumner Road between Blake and Route 9 already has sharrow markings, but with its medium traffic volume (3632 AADT) it should also be traffic - calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic. **At the intersection with Route 9, the** traffic signal should be triggered by a bicycle and the intersection should be engineered to allow safe bicycle crossing. In the one-way section between Greenough and Blake a protected contra-flow lane should be provided to allow direct egress from the high school to the southwest.

^^**Tappan Street**: Tappan Street provides access to Brookline High School from the northwest, and also movements among the various BHS campus buildings. With its medium traffic volume (3,526+ AADT) and narrow width (26ft) it should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic. Of special concern are two sections with poor sight lines on the inside of blind curves in the northwest direct from Blake Road to Gardner Road and from approximately 260 Tappan Street to Garrison Road From Greenough to Cypress the angle parking should be changed from pull-in to back-in to improve safety. The traffic signal for turns from Tappan Street onto Cypress Street should be triggered by a bicycle. A protected contra-flow lane is needed from Cypress to Greenough to allow direct egress from the 9th grade building to the west, and to allow access from the south (along Cypress) to the parking locations along Tappan. A protected contra-flow lane is also needed from Blake to Greenough to allow direct access to the campus from the northwest (Tappan, Welland and Blake).

Thorndike Street: See Abbottsford Road.

Verndale Street: See Abbottsford Road.

^^Vernon Street: With its medium traffic volume (3,499 AADT) and narrow width (22ft), Vernon Street should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^^Walnut Street: With its medium traffic volume (3,731 AADT) and narrow width (24ft), Walnut Street should have sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

Washington Square Intersection of Beacon and Washington Streets: Options for improving safety through the intersection, especially for left turns, are being

discussed by the Bicycle Advisory Committee and the Transportation Department engineer to come up with recommendations.

***^Washington Street** is a major artery in Brookline. It connects the Driscoll School, the Pierce School, the Brookline Village Library, Town Hall, the Public Safety building, two commercial districts, and is immediately connected to Brookline High School via the recently improved Greenough St. It intersects both the C Line and the D Line and is served by the Route 65 bus. As a result, it has considerable use by motorists, public transit users, bicyclists, and pedestrians. The program to renovate and expand Driscoll School (and, soon, the Pierce School) will increase traffic in the area, increasing the imperative for improved bicycle accommodations from the Brookline town line near Whole Foods and Brookline Village. Excluding the Route 9 section, traffic ranges between 9,844 and 17,476 AADT. This project would implement a complete streets treatment of the entire length of Washington Street between the north town line and Route 9, including protected bike lanes in both directions. See description in the appendices.

^^Webster Street: With its medium traffic volume (3,485 AADT) Webster Street should have Sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic. The existing traffic calming is probably adequate, but should be verified by speed measurement.

^West Roxbury Parkway: Install bike lanes in both directions on this wide road, which will require restricting parking in what is now a very wide shoulder. The bike lanes should be protected because of very high traffic volumes (21,927 AADT), because it connects to Putterham Library, and because it connects Brookline with West Roxbury. (Controlled by Department of Conservation and Recreation)

Westbourne Terrace: Install two-way raised cycle track adjacent to sidewalk from Bartlett Street to Beacon Street on the west side of street nearest to the school to improve access to Driscoll School without increasing conflicts with cars dropping off students at the Westbourne terrace entrance.

Williams and Centre Street: Change signalized intersection to stop-controlled intersection

Willow Pond Road: Bicycle accommodations should be provided to make a safe connection through Olmsted Park, connecting bike paths on the two sides of the park. (Would require cooperation with Massachusetts Department of Conservation and Recreation and with Boston because the road crosses the town border.)

^^Winchester Street: Winchester Street provides important access from Coolidge Corner neighborhoods to Brighton. With its medium traffic volume (3,580+ AADT) it should have protected bike lanes in both directions or else have bike lanes or sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

^^Woodland Road: From Heath Street (near Hammond Pond Parkway) to Hammond Street, Woodland Road is a fairly wide, relatively quiet residential street without curbs or consistent sidewalks; there are large trees right at the road's edge on both sides for its whole length. It probably does not warrant bike lanes, except as it approaches the intersection with Hammond Street, where a demarcated lane might help with the approach to a difficult intersection. This section might be a candidate for traffic calming to slow cut-through motor traffic. From Hammond Street to Heath Street (near Pine Manor College), Woodland is a one-way street that is a highly used motor vehicle cut through. The feasibility of installing a protected bike lane should be explored. If that is not feasible, it should receive sharrows and be traffic-calmed to 20mph or less so that cyclists can ride safely mixed with motor traffic.

7. Projects Approved/Awaiting Funding

Freeman Street at Browne Street: Eliminate parking for 30' westbound before crosswalk. Restripe the center line from the triangular park at Babcock to Pleasant Street for a westbound 17-foot travel/parking lane, and a 10-foot eastbound travel lane with a striped 3-foot shoulder. *Approved by Transportation Board, October 2017*

Naples Road: Bike lane on north side but *without* a double yellow center line; absence of a center line has been shown to slow traffic. *Approved, by Transportation Board, March 2016*

8. Projects Awaiting Construction or In Progress

Carlton St. Footbridge: Repair and reopening of the Carlton St. Footbridge to provide a direct connection for cyclists and pedestrians between the Muddy River Path and Carlton St., including a safe crossing of Carlton St. at the footbridge site. We request the installation of bike channels on each side of the stairs at each end of the bridge to make it easier for bicyclists who would prefer to use the stairs instead of the accessibility ramps. This would allow them to shorten their crossing by 315 feet. The channel installation should be designed and supervised by an expert in bicycle facility design, to avoid the inadvertent installation of channels that don't work effectively. The bike channel itself should have a bike symbol in the channel trough at the beginning of the bike channel, making the purpose of the channel obvious. *(Being prepared for bid by MassDOT, 2019)*

Gateway East is the area surrounding the intersection of Washington Street and Route 9 It includes cycle tracks in both directions from the Washington-High Street intersection to the Boston border. Walnut Street is being realigned with Pearl Street, with a traffic signal to provide bicycle and pedestrian crossing of Route 9. *Work in progress, summer 2019*

St. Mary's Street: Stripe and sign for a contraflow lane for bicycles from Mountfort Street to Commonwealth Ave. upon completion of St. Mary's Street bridge project. MassDOT has included with flow and contraflow bike lane striping on the St. Mary's Street bridge. *Pending construction by Mass DOT*

Walnut/Juniper Streets as reconfigured at Route 9 should include bicycle lanes in both directions. (Part of Gateway East Project)

Winchester Street: Install bike lane from Town line to Beacon (west side of street); reconfigure speed humps to be gentler. Install crosswalks at Williams and Wellman; remove 6-8' of parking at Fuller and Williams to improve sightlines. Establish 20mph safety zone in both directions around Senior Center. *In progress, 2018-19*

9. Completed Projects

The following projects have been completed. AS CONDITIONS CHANGE AND ENGINEERING PRACTICES ADVANCE, ADDITIONAL IMPROVEMENTS WILL BE WARRANTED FOR MANY BROOKLINE STREETS. For example, consideration can be given to replacing bicycle lanes with cycle tracks or protected lanes.

Aspinwall Avenue from Harvard to St. Paul: Bike lanes and sharrows*. Completed, Summer 2014.*

Babcock Street: Southbound (from Commonwealth Avenue to Harvard Street): on-street bike lane for full length of the street, with painted buffer and green lane and bike boxes to facilitate turns at Harvard Street; sharrows in northbound direction. Pedestrian improvements include crosswalks at all intersections and bulbouts at some intersections. *Completed, 2019.*

Beacon Street extension of bike lane inbound and bike box at Webster for left turns to Centre St. *Completed Fall 2015*

Beacon Street outbound from Marion St. to Westbourne Terrace: Buffered bike lane *installed 11/14/16 for a one-year trial.* Approved for permanent installation. *Completed 2019.*

Beacon Street priority lanes: Bicycle lanes are ***not*** continuous along the entire length of Beacon Street within Brookline, and this creates a serious hazard for cyclists and uncertainty among cyclists and motorists on sharing the road. Bicycle priority lanes provide a minimal connection of the bike lane segments. (*Approved by Transportation Board, 2013; completed summer 2015)*

Brookline Avenue Path Repairs, Ramps to Street at Aspinwall and signalized crosswalks: *(Department of Conservation and Recreation, Completed 2018)*

Centre Street bike and priority lanes: *Approved by Transportation Board; completed Summer 2018*

Centre Street at Beacon: Traffic signal to be triggered by cyclists. *Approved by Transportation Board, 2017; completed 2018*

Chapel/Colchester/Carlton/Ivy/Essex Street bike lanes: *Completed, Summer 2013*

Chapel Street at Longwood: Bike box for cyclists' left turns from Chapel Street to Longwood Avenue; camera-activated turn signal. *Completed, 2014.*

Clark Road bicycle priority lanes: Marked for bicycle priority lanes in both directions.

Clyde Street at Lee Street: Intersection narrowed; dedicated, protected slip lane for cyclists turning right where Clyde turns south. *Completed Spring 2017*

Cypress Street bike lanes: **South Cypress** from Paul Pender Circle along Chestnut, High and Cypress to Boylston Street *Completed, Summer 2013* **North Cypress Street** from Boylston Street to Washington Street *Completed Summer 2014*.

Dudley Street: Contraflow lane along the south side of the Brookline Reservoir (Lee St. to Warren St.). *Completed, Summer 2013*

Essex Street crossing Dummer Street safety improvements *Completed, 2019*

Essex to Commonwealth connector crosses traffic island to facilitate access to BU Bridge. *Completed, 2013*

Fuller Street: Contraflow lane between Gibbs St and Abbottsford Road. *Completed 2019.*

Goddard Avenue from Newton Street to Avon Street: Bike lanes and sharrows. *Approved by Transportation Board, 2014; completed 2015*

Greenough Street: "Except bicycles" sign added to the restriction on Greenough St. in front of Brookline High School.

Greenough Street between Washington Street and Lowell Street: Sharrows; curb extension. *Approved by Transportation Board, 2015; completed 2017*

Harvard Street bike lanes/sharrows (School to Beacon) *Completed, Summer 2013*

Harvard Street at Washington (Brookline Village): "Except bicycles" sign added to the "no right turn" restriction.

^^Ivy Street: Contraflow lane between Carlton Street and St. Mary's Street. *Approved by Transportation Board, 2018; completed 2019.*

Longwood Avenue bicycle lane eastbound, bicycle priority lane westbound. *Completed 2010 and 2013*

Netherlands Road contraflow lane from Parkway to Aspinwall *Completed 2009*

Newton Street from Clyde to Goddard Avenue: Bike lanes, including bollards along the south side and a bike box at Goddard. *Approved by Transportation Board, 2014; completed 2015*

Newton Street between Horace James Circle and Town line: Bike lanes. *Approved by Transportation Board, 2015; completed 2017*

Park Street contraflow from Marion Street to Beacon Street *Completed, Summer 2013*

Park Street westbound, Harvard Ave to Washington St: No parking, 7:00-8:30 AM. *Approved by Transportation Board, 2018; completed 2019.*

Parkway Road contraflow lane from Brookline Avenue to Netherlands Road *Completed 2009*

Pearl Street: Raised cycle track from Brookline Avenue to raised crossing at the Brookline Village T-stop; buffered bike lane from the raised crossing to Brookline Avenue. Sharrows in both directions between the T-stop and Washington Street. *Approved by Transportation Board, 2017; completed, 2019.*

Pearl St and River Road/Emerald Necklace Path: A traffic signal installed at this intersection. C*ompleted, 2019.*

River Road/Muddy River Path: Muddy River path paved along River *Completed, 2016*

Route 9 Crossing for Muddy River Path (at grade): Curbs reconfigured, median widened, traffic signal installed. *Completed 2016*

School Street repaved from the public parking lot to Washington St. to remove dangerous hump. *Completed 2012*

School Street bike/priority lanes from Washington Street to Harvard Street. *Completed 2014*

St. Mary's Street (Beacon Street-Mountfort Street): Sharrows in both directions. *Completed 2019.*

St. Paul Street from Aspinwall Avenue to Beacon Street: Bike lane and sharrows. *Completed 2014.*

St. Paul Street from Beacon Street to Commonwealth Avenue: Bike lane and sharrows. *Approved by the Transportation Board, 2014; completed 2015*

St. Paul and Beacon Street Intersection: "Except bikes" signs added to the "No turn on red" signs.

Sumner Road from Buckminster to Route 9: Bike lane and shared vehicular right turn with through bike lane at Route 9. *Completed 2014*.

Washington Street bike lanes and sharrows from Davis to School and Cypress Streets. *Completed 2010*

Washington Street: Bicycle lanes and sharrows from School and Cypress Streets to the town line. *Completed 2013*

10. References

"Brookline Complete Streets Policy" adopted by the Board of Selectmen (May 17, 2016).

Cambridge Transportation Department, Cambridge Bicycle Plan: Toward a Bikeable Future (2015); now being updated; see https://www.cambridgema.gov/CDD/Projects/Transportation/2020bikeplanupdate

Federal Highway Administration, *Manual on Uniform Traffic Control Devices (MUTCD)*.

Massachusetts Department of Transportation, *Bicycle and Pedestrian Infrastructure Assessments, Brookline, MA, Harvard Street Corridor: Longwood Avenue to Shailer Street* (16 August 2016).

Massachusetts Department of Transportation, *Draft Municipal Resource Guide for Bikeability* (November 2018).

Massachusetts Department of Transportation, *Separated Bike Lane Planning Design Guide* (2015)

(https://www.massdot.state.ma.us/highway/DoingBusinessWithUs/ManualsPublicationsForms/SeparatedBikeLanePlanningDesignGuide.aspx)

National Association of City Transportation Officials, *Bike Share Station Siting Guide*, https://nacto.org/publication/bike-share-station-siting-guide/

National Association of City Transportation Officials, *NACTO Urban Bikeway Design Guide* (http://nacto.org/cities-for-cycling/design-guide/)

National Association of City Transportation Officials, *Designing for All Ages and Abilities* (December 2017). https://nacto.org/wp-content/uploads/2017/12/NACTO_Designing-for-All-Ages-Abilities.pdf

National Association of City Transportation Officials, *Urban Street Design Guide* https://nacto.org/publication/urban-street-design-guide/

John Pucher and Ralph Buehler, editors, *City Cycling* (Cambridge, MA: MIT Press, 2012).

Appendix A: Bicycle Friendly Community Report Card From the League of American Bicyclists

Bicycle Friendly Community Status: Moving from Bronze to Silver

In the spring of 2016 Brookline received a bronze Bicycle Friendly Community designation from the national League of American Bicyclists. The report card that accompanied the designation shows how Brookline matches up to national standards of bike friendliness and indicates key steps toward the next level.

BROOKLINE, MA

BICYCLE FRIENDLY COMMUNITY
Spring 2016
BRONZE
THE LEAGUE OF AMERICAN BICYCLISTS

TOTAL POPULATION
58,732

POPULATION DENSITY
8637

TOTAL AREA (sq. miles)
6.8

OF LOCAL BICYCLE FRIENDLY BUSINESSES 0

OF LOCAL BICYCLE FRIENDLY UNIVERSITIES 0

10 BUILDING BLOCKS OF A BICYCLE FRIENDLY COMMUNITY

	Average Silver	Brookline
Arterial and Major Collector Streets with Bike Lanes	45%	29%
Total Bicycle Network Mileage to Total Road Network Mileage	30%	11%
Public Education Outreach	GOOD	SOME
Share of Transportation Budget Spent on Bicycling	7%	5.8%
Bike Month and Bike to Work Events	GOOD	SOME
Active Bicycle Advocacy Group	ACTIVE	YES
Active Bicycle Advisory Committee	ACTIVE	MONTHLY
Bicycle-Friendly Laws & Ordinances	SOME	SOME
Bike Plan is Current and is Being Implemented	YES	YES
Bike Program Staff to Population	1 PER 70K	1 PER 293,660

CATEGORY SCORES

ENGINEERING *Bicycle network and connectivity*	2/10
EDUCATION *Motorist awareness and bicycling skills*	1/10
ENCOURAGEMENT *Mainstreaming bicycling culture*	1/10
ENFORCEMENT *Promoting safety and protecting bicyclists' rights*	4/10
EVALUATION & PLANNING *Setting targets and having a plan*	2/10

KEY OUTCOMES

	Average Silver	Brookline
RIDERSHIP *Percentage of Commuters who bike*	3.5%	4.1%
SAFETY MEASURES **CRASHES** *Crashes per 10k bicycle commuters*	180	444
SAFETY MEASURES **FATALITIES** *Fatalities per 10k bicycle commuters*	1.4	1.6

KEYSTEPSTOSILVER

» Hire a Bicycle Program Manager to ensure that developments and projects incorporate bicycle facilities, assess impacts of bicycle facilities and programming, and implement your bike plan.

» Leverage your proximity to Boston to bring more education and encouragement activities currently taking place in Boston to the Brookline area. Adult bicycle education in particular could be improved.

» Complete and expand upon the network of Green Routes to provide safe and accessible bicycle routes for riders of all ages and abilities. To provide a connected network, use a variety of tools from the NACTO Guide to address issues of limited right of way and a lack of street grid connectivity.

» Continue work to develop and implement a Traffic Demand Management Plan that will expand end-of-trip facilities and ensure that developments benefit people who bike and walk.

» Develop a Complete Streets policy. This means that every transportation project will make the street network better and safer for drivers, transit users, pedestrians, and bicyclists - making your community a more desirable place to live and do business.

» Install a bicycle wayfinding system with distance and destination information at strategic locations around the community, integrating preferred on street routes and off-street facilities.

LEARN MORE » WWW.BIKELEAGUE.ORG/COMMUNITIES

SUPPORTED BY TREK

Appendix B: NACTO Guidance for Inclusive Bicycle Designs

In 2017, the National Association of City Transportation Officials (NACTO) added guidance to their *Urban Bikeway Design Guide* for selecting context-appropriate roadway treatments that are suitable for bicyclists of all ages and abilities. The most appropriate treatment depends on motor vehicle speeds, volumes, and other factors. As can be seen from the table, taken from the NACTO Guide, streets with speeds above 20 mph and volumes above 1,500 ADT should have some form of dedicated bike lane. In such cases, if providing a bike lane is not feasible, a regulatory 20 mph Safety Zone speed limit should be established where allowed by MA law. Source: NACTO (https://nacto.org/publication/urban-bikeway-design-guide/designing-ages-abilities-new/choosing-ages-abilities-bicycle-facility)

See table on the next page for guidance from NACTO on designs needed for inclusive bicycling infrastructure based on motor vehicle volumes and speed.

Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed	**Target Motor Vehicle Volume (ADT)**	**Motor Vehicle Lanes**	**Key Operational Considerations**	
		Any	*Any of the following:* high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts	**Protected Bicycle Lane**
< 10 mph	Less relevant	No centerline, or single lane one-way	Pedestrians share the roadway	**Shared Street**
≤ 20mph	≤ 1,000 – 2,000		< 50 motor vehicles per hour in the peak direction at peak hour	**Bicycle Boulevard**
≤ 25 mph	≤ 500 – 1,500			
	≤ 1,500 – 3,000	Single lane each direction, or single lane one-way	Low curbside activity, or low congestion pressure	**Conventional or Buffered Bicycle Lane, or Protected Bicycle Lane**
	≤ 3,000 – 6,000			**Buffered or Protected Bicycle Lane**
	Greater than 6,000			**Protected Bicycle Lane**
	Any	Multiple lanes per direction		
Greater than 26 mph	≤ 6,000	Single lane each direction	Low curbside activity, or low congestion pressure	**Protected Bicycle Lane, or Reduce Speed**
		Multiple lanes per direction		**Protected Bicycle Lane, or Reduce to Single Lane & Reduce Speed**
	Greater than 6,000	*Any*	*Any*	**Protected Bicycle Lane**
High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts		*Any*	High pedestrian volume	**Bike Path with Separate Walkway or Protected Bicycle Lane**
			Low pedestrian volume	**Shared-Use Path or Protected Bicycle Lane**

[*] While posted or 85th percentile motor vehicle speed are commonly used design speed targets, 95th percentile speed captures high-end speeding, which causes greater stress to bicyclists and more frequent passing events. Setting target speed based on this threshold results in a higher level of bicycling comfort for the full range of riders.

[†] Setting 25 mph as a motor vehicle speed threshold for providing protected bikeways is consistent with many cities' traffic safety and Vision Zero policies. However, some cities use a 30 mph posted speed as a threshold for protected bikeways, consistent with providing Level of Traffic Stress level 2 (LTS 2) that can effectively reduce stress and accommodate more types of riders.

Operational factors that lead to bikeway conflicts are reasons to provide protected bike lanes regardless of motor vehicle speed and volume.

Appendix C: Roadway Treatments and Other Bicycle Accommodations

Public ways that carry bicycles may be divided into four levels:

- Level One: Off-road paths such as the Muddy River/Emerald Necklace Paths.

- Level Two: Slow traffic streets. Much of Brookline's road network consists of low speed streets where parking turnover is minimal. In 2017, Brookline made 25 mph the statutory speed limit on all public ways in thickly settled and business districts unless otherwise posted. Where traffic volumes are low, bicycles can share space with motor traffic; where traffic volumes are higher, bicyclists should be offered accommodations such as those described below.

  Traffic calmed streets are a special case of slow traffic streets. These are streets where special measures have been taken to slow traffic for the safety of pedestrians, using such measures as speed humps, speed tables, raised crosswalks, raised intersections, median refuges, and bulb-outs. These can be excellent streets for cyclists as well. However, care should be taken in designing pedestrian safety measures so that they do not increase risks for cyclists or preclude later additions of bicycle accommodations.

- Level Three: Greenways. Because it lacks a dense street grid, many streets in South Brookline are arteries carrying high speed motor traffic. Physically separate facilities offer the best and safest alternative for bicycle accommodations in this environment and can often be achieved by means of "road diets" that reduce pavement, decrease storm water runoff, and permit development of tree-lined greenways that benefit both pedestrians and cyclists. This part of the network requires extensive roadway changes, entailing considerable expense and planning effort. A successful example of this approach is the Leverett Pond bike and pedestrian paths, where a street was converted to park and paths, diverting motor traffic to the parallel Pond Avenue and providing separate paths for pedestrians and cyclists.

- Level Four: Main streets. Beacon Street, Harvard Street, Washington Street (which joins Route 9) and Route 9 are Brookline's main streets that carry through traffic and host busy commercial centers with high turnover parking. These streets are the most important to improve for safe and low stress bicycling.

Although some bicyclists mix comfortably with moderate speed motor traffic, most of the bicycling (or potential bicycling) population is "traffic-intolerant": people who can follow the rules of the road, and who don't mind riding on low-speed, low-traffic local streets, but who elsewhere want to be separated from the stress of sharing space with motor traffic. The *Green Routes Bicycle Network* aims to accommodate traffic-intolerant cyclists by offering the separation from traffic that they need, using a variety of designs. In addition to

off-road paths such as the Muddy River/Emerald Necklace path and directing cyclists along residential streets with low traffic volumes and speeds, the *Green Routes Bicycle Network* includes the following roadway treatments:

Roadway Treatments

- ***Cycle tracks and separated bike lanes*** are parallel to a road but are physically protected from motor traffic lanes by a curb or other physical barriers, such as parked cars or delineator posts. Some are raised to the level of the adjacent sidewalk. They are the most common bicycle accommodation in the Netherlands and Denmark, countries that have set the standard for high levels of bicycle use and safety. Increasingly, they are considered necessary to make the busiest streets safe and low stress for bicycling.

1. ***Shared use paths*** are trails permitting more than one type of user. Ideally, roadside bike paths are distinct from the sidewalk. However, in a park or greenway, a bike path can also be shared with people walking, jogging, scooting, or inline skating.

- ***Buffered bike lanes*** are bike lanes designated exclusively for bicyclists, separated from the adjacent motor vehicle travel lane and/or parking lane by a buffer lane of some width—usually designated by striped painted lines in the buffer area. Buffers increase cyclists' safety by designating an area adjacent to a bike lane to highlight a safe door opening area and/or motor vehicle passing distance.
- ***Bike lanes*** designate exclusive space for bicyclists. Lanes are appropriate on moderate speed streets with low turbulence, i.e., without high turnover parking lanes and intersections with heavy right turning traffic. Where there is parallel parking, bike lanes must be wide enough and adequately engineered to discourage bicyclists from riding in the "door zone," where opening motor vehicle doors can create a significant hazard to cyclists. Bike lanes that terminate abruptly, for example to make space for a turning lane, make roads dangerous for bicyclists.
- ***Bus-bike lanes*** dedicate standard width traffic lanes to the exclusive use of public busses and bicyclists, enabling busses to proceed with less delay while protecting bicyclists from cars and trucks.
- ***Contraflow bike lanes*** allow two-way bicycle traffic on streets designated as one-way for motor traffic. On a contraflow street, all traffic stays to the right of a yellow "center" line; however, the lane in the contraflow direction is narrow because only bikes are permitted in that direction. "One Way" and "Do Not Enter" signs on such streets require a supplementary plaque on "Do Not Enter" signs: "Except Bicycles."

  One-way restrictions are often applied in Brookline to keep through traffic off residential streets, making those streets ideal for contraflow bicycling. In many situations, contraflow offers bicyclists safer and more direct routes. Contraflow bike travel has an excellent safety record in Europe and the United States. Several of Brookline's one-way streets already carry considerable contraflow bicycle traffic. Formally designating such streets two-way for bicycles using signs and markings would improve safety as it raises motorists' expectations of finding opposing bicycle traffic. Contraflow lanes were implemented on Netherlands and Parkway Roads and have been used successfully since 2009. Formal designation is necessary before any route with contraflow can be marked with signs or on a map.

- ***One-Way Streets with end-marked bike contraflow:*** One-way streets often offer cyclists quiet connections or routes around busy streets and intersections. In northern Europe, cyclists are permitted to bike against the one-way flow of traffic on low volume one-way streets without the formality of a painted lane. Signs are used at the beginning and end of the street: on the "no entry" end, an additional sign is added— "except bicycles." On the other end, a sign is added to alert drivers to "Expect two-way bicycle traffic."
- ***Bicycle priority lanes*** are shared travel lanes (bike and motor vehicle) indicated by "Bikes may use full lane" signs and/or roadway markings. These lanes are not recommended, nor are they considered adequate to satisfy the *Complete Streets Policy* without the granting of an exception, because if traffic speeds or volumes are great enough to require special signage or road markings, then they are great enough to require bike lanes (see NACTO table below). Nevertheless, in Brookline, sharrows are in use on Longwood Avenue and Washington Street, for example. Markings that delineate a bicycle priority zone allow cyclists to travel more confidently on street segments where a full bike lane is not feasible.
- ***No passing bicycles zones*** are appropriate on short sections of streets that are too narrow for a car to pass a bike without crossing the center line, and where crossing the center line is dangerous because of frequent intersections or limited sight distance. One example is Carlton Street southbound from Beacon Street, where motorists frequently squeeze past bicyclists with little clearance, and often drive on the wrong side of the road as they approach the sharp turn onto Colchester Street. Another example is on curved sections of Heath Street. A posted passing restriction encourages bicyclists to ride at a safe distance from the curb, making the restriction self-enforcing, and relieving motorists of the stress of seeking an opportunity to pass when it isn't safe to do so.
- ***Road diets (pavement reductions)*** reduce the number of lanes on a road, usually to one in each direction, plus short extra lanes where needed for capacity at intersections. Candidates include Lee Street, Clyde Street, Hammond Street, Newton Street, and West Roxbury Parkway bordering the Putterham Golf Course. The reclaimed space can be used to create greenways with tree lawns and shared use paths, benefitting both pedestrians and cyclists.
- ***Intersections*** are the most dangerous locations for all road users and the sites of many crashes. For the safety of cyclists, it is important to continue bicycle lanes through intersections and sometimes paint them green to alert motorists (particularly turning motorists) of the presence of bicyclists. Bike boxes can also be useful at signalized intersections. (See References for the NACTO recommendations on intersections.)
- ***Detours during construction:*** At construction sites that block normal sidewalks and bicycle paths, safe accommodations for pedestrians and cyclists should be provided.
- ***20mph regulatory speed zone:*** Massachusetts law (MGL c90 section 18B) allows municipalities to establish regulatory 20mph safety zones in certain cases to make a street safer.

For descriptions and photos of the various bicycle facilities being built and planned in the metro Boston area, see the City of Cambridge's Bicycle Facility Toolbox Booklet:

https://www.cambridgema.gov/~/media/Files/CDD/Transportation/Projects/bicycleplan2020/bicyclefaclitytoolboxbooklet_forweb.pdf

Other Bicycle Accommodations

Bicycle Parking is essential to making it convenient to use bicycles for transportation.

Single and multiple use racks have been installed in many locations around Brookline, but additional bike parking is needed. "Hitching posts" installed on parking meters (and parking meters themselves) are useful for bicycle parking. Town residents have noted a need for additional bike parking at such locations as Town Hall, the Public Safety Building, the small commercial area at Washington and School/Cypress Streets, at schools and parks, and in some residential areas where there are no parking meters and few sign posts available to secure bicycles. Seasonal bike corrals are successfully installed each year in Coolidge Corner and on Washington St. at Station St.

Bicycle Channels at Stairways: Brookline has several stairways that connect one street to another through the center of blocks. It is recommended to have channels next to the stairs for bicycle wheels, so that a rider could push a bike up or down a stairway to avoid a long ride around or having to carry their bicycle up the stairs. This is particularly important on the stairs between the C Line trolley tracks and the outbound section of Beacon Street at the Brandon Hall and Fairbanks T stops.

Automatic Bicycle Counters have been installed in many cities and prove a useful source both of bicycling data and as points of interest and encouragement for cycling. The one at the left is in Portland, Oregon; the one at the right is at Staniford and Causeway Streets in Boston.

Appendix D: Signage and Pavement Markings

Wayfinding Signage

Compared to other cities, Brookline and Boston have very little wayfinding signage. On the Riverway/Olmsted park path, for example, there is not one sign that indicates "this way to destination X" (Fenway, Jamaica Pond, MFA, etc.), or "path continues over there."
Some efforts are underway in downtown Boston and in Cambridge with signage pointing to Alewife T Station, Harvard Square, and so on.

Other Bicycle Signage

Other bicycle specific signs and pavement markings may include "sharrows" (see explanation below), "bikes may use full lane," and "except bicycles" (where bicycles are permitted to make maneuvers or enter areas not permitted for motorists). Green paint can be used to highlight bike areas, particularly at intersections. Another way to guide cyclists is to mark the pavement with a double chevron (>>) on intersection approaches, tilting the chevrons to the right where the bike route turns. This kind of marking, used in Brussels, is especially valuable on bike routes that follow side streets.

Sharrows

Shared lane markings ("sharrows") indicate where cyclists should ride in a shared travel lane to be safe from opening doors on parked cars or other hazards. Motorists drive as normal in a shared lane when no cyclists are present; when cyclists are present, motorists should slow down and pass with care, at a safe distance, and only when it can be done without endangering the cyclist or oncoming traffic. As discussed in Section 3 on roadway treatments, sharrows are not recommended, nor are they considered adequate to satisfy the *Complete Streets Policy* without the granting of an exception.

Except Bikes

Signs indicate that bicyclists are permitted to make maneuvers or enter areas not permitted for motorists, such as traveling both ways on a street restricted to one-way motorist traffic.

Change lanes to pass

This sign reminds motorists to pass cyclists at a safe distance by changing lanes.

Share the Road

Share the road signs are generally not considered to be useful; this one may be the best one to use—if any.

Bikes May Use Full Lane

Research has shown that this sign communicates more clearly than either Sharrows or Share the Road signs.

Walk Your Bike

"Walk your bike" signs have been installed in Brookline's commercial areas to remind cyclists to walk their bikes on sidewalks in business districts.

Colored Pavement Markings

Green painted "carpets" in bike lanes, bike boxes and at intersections alert motorists to the presence of bicycle routes and cyclists of the safest areas for riding.

Bike boxes

A bike box is a marked queuing area for bikes in front of the stop line for motor vehicles at a signalized intersection. Bike boxes improve safety by putting stopped bikes ahead of cars and providing suggested two-stage left turns for bicyclists. Setting the motor vehicle stop line back from the intersection also improves pedestrian comfort and visibility.

Appendix E:
Detailed Recommendations for Bicycle Accommodations (By Street)

Beacon Street

Beacon Street outbound from Boston City line to Harvard Street: Upgrade bicycle facilities to protect cyclists better from moving motor vehicles and the door zone of parked cars. Install a curb-side bicycle lane protected from moving motor vehicles by the parking lane and separated from the parking lane by a three-foot buffer. This would require the following adjustments: (1) Narrow the motor travel lanes to 10 or perhaps 10.5 feet; (2) remove the three foot rumble strip and shift the two motor vehicle lanes to the left; (3) remove parking on the intersection approaches where left-turn lanes exist, and on the stretch between Pleasant and Harvard. Additionally, convert 4-6 parking spaces between St. Mary's and Carlton to very short-term loading and unloading zones, since illegal double standing occurs frequently on that stretch.

Cypress and Washington, near CVS

- Extend southbound bike lane toward Washington, to the CVS entrance. It's wide enough there to begin with a buffered bike lane.
- "Bend" the double yellow line before Searle so it better aligns with the double yellow after Searle.

Harvard Street

- 220 Washington: Change curb in no parking zone from gentle triangle to sharp S curve to discourage illegal parking that obstructs the bike lane with rear left portion of car.

- Washington and Harvard: Install a dashed bike lane through the intersection northbound. The geometry and desire line pulls autos into the bike lane.

- Washington and Andem: Narrow northbound rumble from right side so that northbound autos don't drift rightward into the bike lane to avoid strip, both before and after Andem Pl.

- 39 Harvard St: Paint a solid white bike lane line, not dashed. These may former bus stop locations in need of design update.

- 77 Harvard St: The northbound bike lane disappears with the addition of a left turn only lane. It's possible that combining the south bound bike and bus lane could create enough space for a northbound bike lane when combined with removal of several parking spaces on the southbound side.

- 100 Harvard St: Existing south bound bike lane paint worn down. Bicycle rider and arrow stencil remain. Need repaint, preferably solid to dashed.

- South bound just after Harvard Ave: Bike lane disappears; eliminate 2-4 parking spots to continue bike lane.

- Harvard St at Stop & Shop: Paint dashed line across north bound intersection (it is a signal controlled intersection).

- Harvard St at United Parish Church: South bound bike lane should have solid white line before crosswalk. This may be a former bus stop location.

- 251 Harvard St: Paint solid white line on both sides of bike lane all the way to crosswalk. Dashed insufficient.

- Harvard St at Beacon St: Consider installing paint to help organize bicycles. Perhaps a bike box. Perhaps arrows and language that indicate the left lane for turning left onto Longwood, right lane for straight movement. Again, this is for bicyclists turning left onto Longwood.

- 281 Harvard St: Install 9-month delineator posts to protect bike lane.

- Harvard and Green Street: Install a loading zone on Green St to provide a safe and legal loading zone to replace unsafe, illegal use of Harvard St.

- 284 Harvard St: Install 12-month parking. Perhaps bulb the curb and crosswalk here. Consider new Hubway station locations before determining permanent bike parking installation.

1.313A Harvard St: North bound bike lane lost to right turn lane due to painted yellow wedge in middle of road. Eliminating or reducing the north bound bulb out would allow for bike lanes in both directions, as would some "wiggle" of the double yellow lines at the Beacon St intersection. Alternatively, eliminating the north bound right hand turn lane would provide adequate space.

1. Harvard St Arcade Building: Southbound bike lane should have solid white lane through intersection. Because it is a T intersection and autos can never travel through bike lane to turn, drive, or park, the lane should be solid all the way through.

- 315 Harvard St: North bound should have painted a solid white line, not dashed. South bound should have a painted solid white line, not dashed.

- 322 Harvard St: Southbound bikes should have a left turn bike box to turn left onto Babcock St. Could extend left turn queue backward with slight repaint of double yellow. Add left turn sharrows in left turn queue lane.

- Harvard St Devotion School: Northbound bike lane disappears. Perhaps move red brick curb and hydrant inward, remove Stedman Street bulb out. Move handicap parking spot elsewhere. Could achieve bike lane continuity by just moving the handicap spot and shave down the Stedman Street bulb out. Would have to realign crosswalk.

- 369 Harvard St: Painted yellow wedge far too wide. The north bound bike lane could be preserved on this side of Stedman Street, perhaps requiring bulb out removal/shave and elimination of one parking space.

- Harvard St Kehillath Israel: Paint solid white line, not dashed. This may be a former bus stop location.

- Harvard St at Beals: Bike lane north bound near intersection should be solid, not dashed. South bound should be continuous solid.

- 405 Harvard St: No north bound bike lane between Naples and Fuller. Would have to eliminate a parking lane or north bound left turn lane.
    - Harvard St and Fuller St: Consider removing left turn lane from Harvard north bound to Fuller. If it can be eliminated, there becomes room for bike lanes on both sides of intersection. Could use a leading green in one direction (with green arrow) to clear left turning motor vehicles.
    - Harvard St between Fuller St and Coolidge St: If left hand turn lanes at Fuller can't be removed, consider eliminating the north bound bike lane and installing a south bound bike lane. The south bound direction is much more continuous than the north bound; performing this change would preserve a nearly-continuous southbound lane.
    - Harvard St and Verndale: Paint a solid white line north bound before Verndale stop bar, not dashed. This may be a former bus stop location. Install dashed white lines through Verndale signalized intersection in both directions. Shave south bound bulb outs both before and after Verndale St to allow for full bike lane width across intersection.
    - Harvard St, Boston: All long white lines have been lost. Repaint.

Route 9 grade-separated crossing for Muddy River Path

Even with an at-grade crossing of Route 9 for the Muddy River path, a grade-separated crossing using the existing highway bridge is a useful option to consider. Project elements include: (a) Re-deck the existing highway bridge carrying the Riverway/Jamaicaway over Route 9, shifting travel lanes in order to create a barrier-separated two-way shared-use path along the western edge of the bridge. (b) South of the bridge, regrade the southwest island and build a path that winds down from the bridge to the existing crosswalk that crosses the on-off ramp and leads to the existing paths around Leverett Pond. (c) Reconfigure the junction of River Rd with Riverway, closing the off-ramp (creating more green space) and having the on-ramp meet Riverway at 90 degrees. (d) North of the bridge, this path will have no direct access to Route 9. Continue it from the bridge as a barrier-separated path within space now occupied by the highway, curving it away from the highway onto the existing bridge over the Muddy River, and then curving it back again to cross the on-ramp from River Road to Riverway. A Northeastern University senior design project details the design and shows it to be feasible and cost-effective. There is a $600,000 federal earmark for this path crossing. Various parts of this route are controlled by different governmental entities, and cooperation would be necessary to plan and construct this project. This link is also very important to Boston's bicycle program.

Washington Street

The section of Washington Street northwest of Beacon Street appears to be in the best condition for bicyclists and pedestrians, although the preservation of parking and a turn lane results in no westbound lane for the ~200 feet west of Beacon, and no eastbound bicycle lane at all, merely sharrows. A complete streets approach to Washington Street would include continuous protected bike lanes in both directions on this portion. It would also maintain safe crossings at Beacon, near Driscoll School, and elsewhere as needed, with curb bulb-out adjustments to eliminate the hazard to bicyclists. A review of bus station accommodations is also appropriate.

The section between Beacon Street and Cypress Street is in poor condition. The pavement is poor, the bicycle conditions sporadic, some crosswalks have poor sight lines, and there are no bus station accommodations. The crosswalk along Washington Street crossing the one-way Weybridge Rd. is too long, on the order of 100 feet, and should be shortened considerably. The bicycle lane heading northwest-bound (uphill) is frequently obstructed by parked cars when it is curbside, and the southeast-bound bicycle lane (downhill) is nonexistent in portions where preserving parking in front of homes was given priority. A recent project to improve Greenough Street resulted in a better unsignalized pedestrian crossing at Greenough and Beacon. A complete streets treatment of this section would include continuous protected bicycle lanes in both directions, from Beacon Street all the way to Cypress Street. It would calm traffic between Park Street and Beacon Street, improve crosswalks, and provide bus stop accommodations.

The portion of Washington Street between Cypress/School and Route 9 has well marked crosswalks, although crossing both at Harvard Street and at Station Street present challenges for pedestrians. This portion contains a bicycle lane on the northwest-bound direction, and on the southeast-bound portion between Harvard Street and Route 9. Although there are not frequently observed obstructions on the portion between School and Harvard Streets, there are obstructions due to poorly or illegally parked cars on the bike lanes between Harvard Street and Route 9. Due to the interest in preserving parking on both sides of the street, sharrows exist for a portion of the southeast-bound direction. This portion of Washington Street contains both Route 65 and, in some places, Route 66 bus lines, but also lacks accommodations for passengers waiting for bus arrival. Implementing a complete streets treatment will be a challenge in this section of Washington Street, as the right of way simply doesn't allow for two motor vehicle travel lanes, two bicycle lanes, two parking lanes, and two sidewalks. However, in order to achieve a continuous network of bicycle friendly streets, a serious complete streets effort is needed, including protected bike lanes. In the short term, a few minor adjustments that would improve this section for bicyclists include the following:

- At 220 Washington, change curb in no parking zone from gentle triangle to sharp S curve to discourage illegal parking that obstructs the bike lane with rear left portion of car.
- At Washington and Harvard, Install a dashed bike lane through the intersection northbound. The geometry and desire line pulls autos into the bike lane.
- At Washington and Andem Place, narrow the northbound rumble strip from right side so that northbound autos don’t drift rightward into the bike lane to avoid strip, both before and after Andem Place.
- Establish a 20mph Safety Zone along this section.
- On Washington Street southbound, provide a protected left turn onto Station Street: This left turn is both heavily used and difficult for both cyclists and motorists because

traffic on Washington Street northbound crests a hill while coming around a bend. Although there is a light at this intersection, left turning traffic cannot see when the northbound traffic has a red and when it is therefore safe to turn. A protected left turn would increase safety at this busy intersection that provides access to the Brookline Village T Station (with its Hubway station), to Kent Street, Aspinwall and beyond.