

Appendix E. Climate Resiliency Planning for Malden's Parks (2026)

MALDEN Climate Resiliency Planning

*City Parks Resiliency Assessment
and Recommendations*

PREPARED FOR:
City of Malden

PREPARED BY:
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June 2026

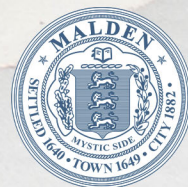


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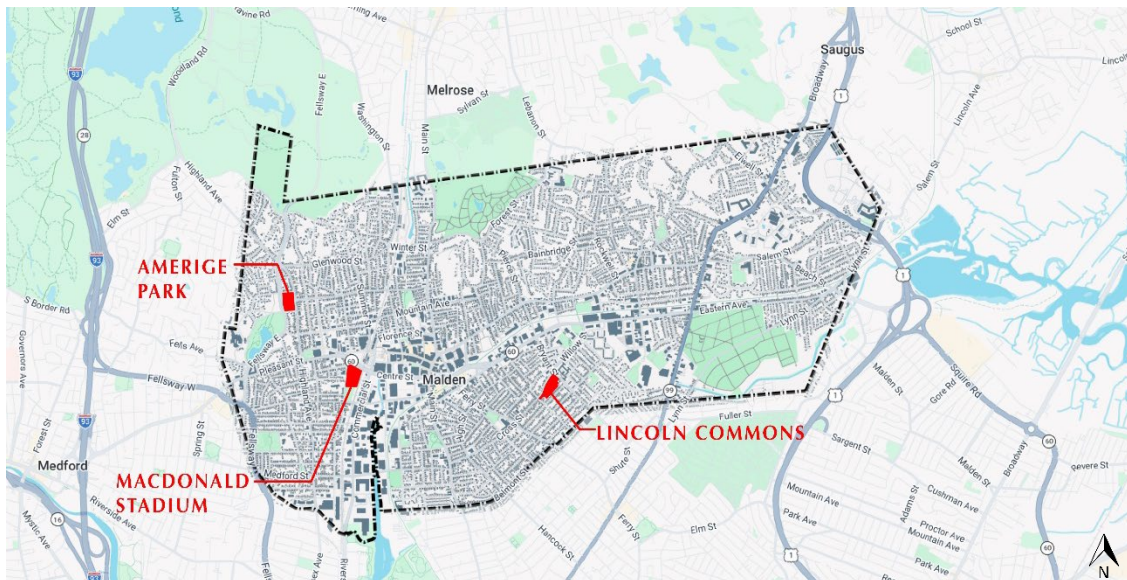
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1. Executive Summary

The City of Malden, through the Office of Strategic Planning and Community Development (OSPCD), contracted with Shadley Associates to provide planning work related to climate resiliency for three parks. The resiliency studies specifically focus on mitigation possibilities for heat and floods at Lincoln Commons, Amerige Park, and MacDonald Stadium. This work is in response to the Planning Assistance Grant from the EEA for efforts to mitigate and adapt to climate change and to build a more resilient Malden. To begin the work, the landscape architects from Shadley Associates visited all three parks and became familiar with the Malden Climate Action Plan – September 2024 and the Draft 2026 Malden Open Space and Recreation Plan + Art.

This document provides overviews of the existing conditions at the three parks as of Spring 2026 including inventory and assessment of existing trees and amenities. It also proposes concepts to mitigate heat and flooding impacts, and provides park maintenance guidelines and implementation guidelines. This report is intended to be a comprehensive document outlining the park conditions, planning and management goals, implementation strategy for achieving resiliency goals, and recommended maintenance to ensure future success of the parks.

This document references information from the following sources: The Draft 2026 Malden Open Space and Recreation Plan + Art, Malden Climate Action Plan – September 2024, Malden GIS, MassMapper, FEMA Flood Maps, the City of Malden website, community outreach performed between August – October 2024 as part of the Open Space and Recreation Plan + Art, and input from municipal staff.



Locations of Amerige Park, Lincoln Commons and MacDonald Stadium within Malden

2. Existing Conditions

This section describes the existing conditions at each of the three parks in Spring 2026.

2.1 Lincoln Commons

Lincoln Commons is a 3.53-acre park located in a dense residential neighborhood of Malden. The park is bordered by Bryant Street to the north, Boylston Street to the east, Henry Street to the south and Cross Street to the west.

Lincoln Commons was created on the former site of Lincoln Junior High School as mitigation for open space losses associated with new school construction projects. Lincoln Junior High School occupied the site from 1869 to 1999, and in 2001 Lincoln Commons was opened to the public. According to the 2020 Census for Environmental Justice Populations, Lincoln Commons is located within a minority, low-income and English isolation neighborhood. Lincoln Commons is an important heat refuge and is a heavily used public open space within the neighborhood.

The park features a network of asphalt walkways with lighting, benches, trash receptacles, a water fountain, an irrigated ballfield, shade shelters over the dugouts, a playground with engineered wood fiber safety surfacing, a splash pad, a large central lawn, a memorial to Lincoln Junior High School, and a Rooted in Service Garden and plaza at the corner of Cross Street and Henry Street. The park has five entrances: two along Cross Street, two along Bryant Street and one connection with the neighborhood on Boylston Street.



Location of Lincoln Commons

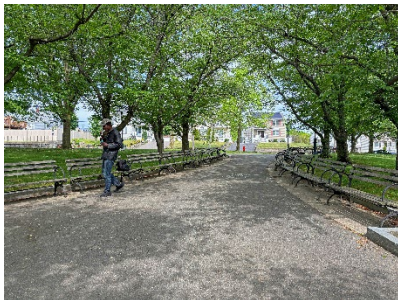
The tree canopy within the park is mature and dense in the southern portion of the site where a network of walkways lined with benches provides ample opportunities to rest in the shade. The canopy consists of deciduous and evergreen trees that are generally in good condition. However, near the playground and ballfield, the tree canopy becomes sparse with a few shade trees located around the playground and within the adjacent streetscape. The park appears to be largely free of

invasive species, with the exception of a stand of Japanese Knotweed on the north side of the playground.

While the walkways within Lincoln Commons provide accessible routes to all portions of the park, the engineered wood fiber safety surfacing within the playground has settled, resulting in no accessible route into the playground itself. Within the playground, due to the depleted elevation of the wood fiber surfacing, it appears that the equipment transfer modules are no longer in compliance, and the existing equipment is deteriorating. Companion spaces for wheelchairs are provided at benches around the playground, but similar shaded seating areas are lacking at the southern end of the site where there is greater shade coverage and more seating opportunities. The park also lacks bicycle parking, which may discourage residents from biking to and within the park. Lincoln Commons is in an English isolation neighborhood meaning 25% or more of households in this area lack an adult over the age of 14 who reports speaking English “very well”. However, all signage within the park is currently in English with no translated information available to residents. The presence of site lighting along the park walkways is valuable for security and improves safety during nighttime hours.

The surfacing of Lincoln Commons is mostly pervious due to the expansive lawn and landscape areas, however, there are no visible green infrastructure systems on site to treat or infiltrate captured stormwater or reduce strain on city drainage systems.

In the 25 years since the park opened there is evidence that portions of the park have become difficult to maintain. At the time of our site visit in May 2026, portions of the lawn had not been mown, weedy vegetation was growing in the plant beds and stabilized aggregate walkway near the memorial, and portions of the concrete engraving at the memorial were cracking. In addition, several benches throughout the site were broken or in poor condition. Sections 3 and 4 of this report will provide recommendations to the City of Malden regarding strategies to improve the resiliency of Lincoln Commons and to address maintenance issues.



Southern portion of park



Ballfield and open lawn



Playground

2.2 Amerige Park

Amerige Park is a 3.5-acre park located in the northwest corner of Malden immediately adjacent to the historic Fellsway East Parkway. The park is bordered by Pine Street to the north, Highland Avenue to the east, Savin Street to the south, and Fellsway East to the west.

Amerige Park was purchased by the City of Malden in 1910 and is heavily used by residents, Malden High School, and Malden Youth Soccer. According to the 2020 Census for Environmental Justice Populations, Amerige Park is located within a minority community.

The park features an expansive irrigated lawn with soccer fields and a ballfield, a playground, basketball court, tennis courts and pickleball courts, benches, picnic tables, players' benches, bleachers, trash receptacles, and one bike rack. There is a central walkway that runs east to west through the site separating the courts to the north and playground and athletic fields to the south. The park is entirely enclosed by chain link fencing and contains multiple entrances. The park has three primary entrances; one in the southwest corner near the ballfield, one on the western edge off Fellsway East just south of the basketball court, and one along the eastern edge off Highland Ave just south of the tennis courts. Additional entrances provide access to the tennis courts, pickleball courts, basketball courts and playing fields. While the soccer field and courts are heavily used, the ballfield in the southwest corner of the site appears to receive less use.



Location of Amerige Park



The tree canopy within the park is sparse and is predominantly located along the south edge of the site. Norway Maples line Savin Street and continue up Highland Avenue. A stand of mature oak trees is located on a grassy knoll on the eastern side of the site near the intersection of Highland Avenue and Clifton Street. The western side of the park benefits from partial shade provided by street trees along Fellsway East; however, there are no trees planted within the park itself on this side, aside from one tree near the park entrance. Within the playground, there is one maple tree in fair condition and another maple in poor condition at the northeast corner of the playground.

Amerige Park lacks accessible connectivity throughout the park. A single east-west walkway provides accessible access to the basketball court; however, there is no accessible route from this walkway into the playground due to the vertical timber curb surrounding the playground. In addition, settling of the engineered wood fiber surfacing has rendered the formerly accessible entrance at the northwest corner of the playground inaccessible. The entrance from the east-west walkway into the tennis courts is also inaccessible due to a set of steps leading down into the courts. The only accessible entrance into the tennis courts is from Pine Street. Picnic tables located at the top of the grassy knoll provide shaded seating and excellent views of the park beneath the mature oak canopy; however, there is no accessible path connecting to these tables.

At the ballfield there are two sets of bleachers and two timber players' benches. Near the entrance from Fellsway East, there are two benches and a bike rack, while the playground contains four benches. Additional non-accessible seating options include picnic tables on the grassy knoll and two wooden benches in poor condition within the tennis courts. These benches have seat heights below 12 inches, which does not comply with the ADA-recommended seat height range of 17 to 19 inches.

There are no visible green infrastructure systems in place at Amerige Park to address stormwater. The existing tennis and pickleball courts drain to two area drains on the eastern edge of the tennis courts. The grassy knoll contains a steep south-facing slope with limited vegetative cover and visible signs of erosion.

Improvements to install new pickleball courts and repair cracks in the courts were completed in 2023. However, accessibility concerns, deteriorating site furnishings, limited vegetative cover, and the lack of green infrastructure present opportunities for resiliency improvements at Amerige Park.



Pickleball courts



Tennis courts



Picnic tables on grassy knoll

2.3 MacDonald Stadium

MacDonald Stadium is a 5.46-acre site located just steps from the Malden Center MBTA Station. The stadium is bordered by Centre Street (Route 60) to the north, MBTA train tracks to the east, Callahan Park and Charles Street to the south, and Pearl Street to the west.

MacDonald Stadium's turf field was installed in 2012 and serves as the home field for Malden High School athletic teams as well as Malden youth sports programs. According to the 2020 Census for Environmental Justice Populations, MacDonald Stadium is located within a minority neighborhood.

MacDonald Stadium is the primary public athletic facility in Malden. It is the only multi-use turf field currently available to the public and the only venue with seating for approximately 5,000 spectators. The stadium includes a synthetic turf field, a rubberized regulation-sized running track, a concession building, home and away stands, a press box, stadium lighting and a scoreboard. There is a small asphalt parking lot at the northwest entrance to the stadium and a larger parking lot with approximately 25 parking spaces at the southwest corner of the site. The stadium is entirely enclosed by metal picket fencing and has two entrances. The main entrance, located at the northwest corner of the stadium, includes the ticket booth and concessions building. A secondary entrance from the southwest parking lot provides access to the playing surface and home stands. An asphalt walkway runs beneath the home stands and connects the two parking lots. Another asphalt walkway follows the perimeter fencing of the track and connects the northwest entrance and concessions building to the away stands.



Location of MacDonald Stadium

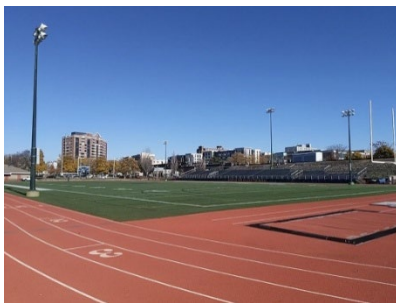


There is limited natural vegetation on the site. Between the home stands and Pearl Street there is a row of mature deciduous trees that shade portions of the home bleachers in the afternoon. On the north side of the concession building there is a plant bed with a mix of trees and shrubs that provides a buffer between the building and Centre Street (Route 60). Along the northern end of the field there are two small plant beds with perennials and ornamental grasses. The largest useable green space on the site is located in the northeast corner where there is a shotput circle and what appears to be an abandoned long jump in lawn. There is a small area of open lawn on the south side of the stadium between MacDonald Stadium and Callahan Park.

MacDonald Stadium generally appears to provide accessible routes and accommodations throughout the facility. Ramps provide access to both home and away stands, and handicap parking is provided in both parking lots.

There are no visible green infrastructure systems in place at MacDonald Stadium. It is assumed that all stormwater is collected in below grade systems. An existing slot drain follows the edge of the perimeter asphalt walkway at the north end of the site. In the parking lot at the southwest corner of the stadium there is a large concrete-encased utility structure in the pavement that, according to Malden GIS, is a drainage structure. It is unclear whether this drainage structure captures stormwater runoff from the stadium, the surrounding neighborhood, or both.

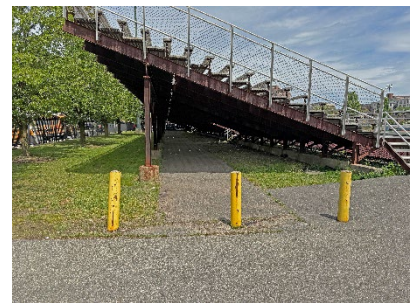
MacDonald Stadium is an important asset to the City of Malden and provides the community with access to modern and well-kept athletic facilities. The synthetic turf field receives regular use and after nearly 15 years of use it will likely need to be replaced. This replacement presents an opportunity to incorporate resiliency improvements into the site which will be discussed in the next section of this report.



MacDonald Stadium track and field



Northeast corner of stadium



Home stands and southwest parking lot

3. Resiliency Recommendations

The recommendations outlined in this section are based on goals identified in the City of Malden's Climate Action Plan (CAP) published in September 2024, which "provides a strategic roadmap for reducing Malden's greenhouse gas emissions while enhancing the City of Malden's ability to prepare for climate change impacts." Planning goals identified in the CAP include reducing the urban heat island effect, expanding tree canopy and green space, reducing flood risk and impacts, improving community resilience, increasing equitable access to resources, improving active transportation access to parks, and improving universal accessibility. None of the three parks studied in this report are within FEMA 100-year flood zones; therefore, recommendations related to flood mitigation focus on reducing stress on drainage infrastructure during severe storm events.

3.1 General Recommendations

All parks included in this study would benefit from an increased focus on climate resilience. The following recommendations provide a "menu" of strategies that may be implemented to improve resiliency, user experience, and long-term sustainability.

Reducing the Urban Heat Island Effect: The goal of reducing the urban heat island effect and expanding tree canopy is consistently supported by community feedback, the Malden CAP, and the Draft 2026 Malden Open Space and Recreation + Art Plan. During public outreach conducted in 2024, community members ranked trees as the most important amenity in Malden's parks. Of the parks evaluated in this study, Lincoln Commons is the most resilient with respect to mitigating the urban heat island effect because of its extensive lawn and planted areas. The mature tree canopy on the southern portion of the site serves as an example of effective park design for climate resilience.

Landscape and Tree Planting: Expanding and enhancing parks and open spaces throughout Malden provides a wide range of environmental, social, and economic benefits. Healthy lawns, native meadows, and diverse tree and shrub plantings help absorb stormwater, reduce flooding, improve air quality, and mitigate urban heat island effects. Replacing unnecessary pavement with planted landscapes increases groundwater infiltration, reduces runoff, and creates more resilient public spaces that can better withstand changing climate conditions. In addition to their environmental benefits, landscaped areas enhance community aesthetics, support pollinators and local wildlife, and provide attractive spaces for recreation and passive enjoyment, contributing to the overall health and quality of life of Malden residents.

It is important to continually monitor and evaluate the health of street trees and trees within parks. Trees that are in poor condition adjacent to walkways, roadways, and utility lines pose a major public safety risk. Continuous monitoring of tree health should be conducted to preserve the existing tree canopy. When tree removal is necessary, site conditions should be evaluated to determine the cause of failure, and replacement trees should be planted. Where feasible, native tree species should be planted because they are generally better adapted to local climate and soil conditions, support native wildlife and pollinators, and require less water, maintenance, and long-term management than many non-native species.

Use of High Albedo Pavements: When tree planting within a park is not feasible because of programmed uses such as athletic fields, adjacent streetscapes should be utilized to provide shade along park edges and roadways. This strategy can help reduce ambient temperatures, improve air quality, absorb stormwater, and potentially reduce energy consumption associated with heating and cooling nearby buildings. Where paved surfaces are necessary for vehicular or pedestrian use, high-albedo pavement materials should be utilized whenever feasible. Albedo or solar reflectivity is an indicator of the reflecting power of a surface measured on a scale from 0 to 1. An albedo of 0 represents a perfectly black surface that absorbs all the sun's solar radiation, while an albedo of 1 represents a perfectly white surface that reflects all the sun's solar radiation. Newly installed asphalt pavement is an example of a material with an albedo rating of nearly zero and white portland cement concrete when installed has an albedo rating ranging from .65 to .87.

Green Infrastructure: The first goal outlined in the Draft 2026 Malden Open Space and Recreation + Art report is to “Protect and preserve Malden’s land and water resources for climate resilience”. Due to Malden’s dense urban development, it is often expensive and impractical to implement conventional stormwater best management practices (BMPs) such as wet and dry detention basins to manage stormwater runoff. However, alternative approaches to green infrastructure such as permeable pavements and rainwater harvesting could reduce the quantity of stormwater runoff and stress on municipal infrastructure.

Permeable Pavement: A recent study conducted by the University of California Davis on reflective and permeable pavements found that interlocking concrete pavers have the highest infiltration rate of approximately .5 cm per second, while porous asphalt pavement has the lowest infiltration rate of approximately .1 cm per second. However, both pavement types are generally capable of draining rainwater without generating surface runoff during typical rain events. The study also found that permeable pavements can help reduce the urban heat island effect through evaporative cooling. Evaporative cooling occurs when water within the

pavement structure absorbs heat from the surrounding air as it evaporates, thereby lowering ambient temperatures.

Additional studies conducted by the EPA have found that permeable pavements can reduce stormwater runoff by up to 90% and lower runoff temperatures by 3-7°F when compared to conventional asphalt pavement. While the initial construction costs of permeable pavements are often higher than those of traditional impervious surfaces, these costs may be offset by reduced requirements for stormwater infrastructure such detention basins, catch basins, and stormwater piping. Permeable pavements are generally suitable for parking lots, pedestrian walkways, and some local roadways but are not recommended for high-speed traffic applications.

Rainwater Harvesting: Rainwater harvesting techniques could be implemented at park spaces and municipal properties within Malden where there is a desire for irrigation at playing fields or plant beds to reduce water consumption and stress on municipal drainage infrastructure. Large underground cisterns could be installed to collect runoff from adjacent roofs, impervious surfaces, and overland flow in landscape areas. The first flush of rainwater, which contains most of the pollutants and debris, is typically diverted into alternative drainage systems. However, all remaining rainwater that is captured is usually suitable for reuse as non-potable water. According to research conducted at the University of Massachusetts Amherst, a 1" rainfall event on one acre of impervious surface amounts to 27,100 gallons of non-potable water. This accounts for losses due to evaporation, wind, leakage of piping systems, and the diversion of the first flush. Implementing rainwater harvesting practices within Malden could reduce stormwater runoff and reduce strain on water supplies for irrigation during prolonged droughts.

Transportation and Accessibility: Public outreach conducted between August and October 2024 indicates that walking is the most common way for community members to access Malden's parks and open spaces, with 90% of survey respondents reporting that they walk to parks. Walking is followed by driving or rideshare services (46%), biking (32%), and public transportation (16%).

Accessible Design: One of the goals outlined in the CAP is to bring all city parks into ADA compliance by 2032. According to the 2024 community outreach 17% of survey respondents have a household member with a disability. These community members identified ADA challenges at park entrances where missing or non-compliant curb cuts and limited ramps make accessing Malden's parks and open spaces difficult.

Bringing parks into ADA compliance requires thoughtful design and ongoing maintenance. Whenever possible all entrances to parks and open spaces in Malden should be made accessible. Due to the New England climate and its frequent freeze thaw cycles, pavements tend to heave and crack resulting in non-accessible sidewalks and walkways. It is important to continually monitor the sidewalks and walkways within Malden to ensure that accessibility requirements are being met. Of the parks studied in this report, no major accessibility concerns were discovered with the exception of playground safety surfacing and some minor cracking in walkways.

Multimodal Transportation: One of the goals outlined in the CAP is to “Accelerate Sustainable Transportation” by expanding access to climate-friendly transportation options such as walking, biking and other modes of mobility such as roller blading, skateboards, wheelchairs etc. To achieve this goal the CAP establishes an objective of installing bicycle parking at 75% of municipal properties, including parks and schools, by 2030.

Of the three parks studied in this report, Lincoln Commons has no bicycle parking, while Amerige Park and MacDonald Stadium each have one bike rack. To encourage the use of sustainable transportation, bicycle parking and/or Bluebike stations should be provided at all parks in quantities sufficient to accommodate peak demand. Where possible, bicycle parking facilities should be located near park entrances and primary destinations.

Site Amenities: Site amenities are an important aspect of parks that encourage users to visit a site and remain there for extended periods. These amenities include restrooms, water fountains, shade structures, bicycle parking, trash receptacles, seating, signage, and more. Based on public outreach completed in 2024, community members ranked benches in the top half of the most important amenities within parks.

All the parks included in this study have benches or seating; however, many of the existing benches are damaged or deteriorating. A variety of seating options can accommodate different user groups and activities. Common seating types include benches, picnic tables, and tables with integrated seating. Additional options include salvaged granite blocks, seat walls, planter ledges, swings and gliders, and individual seating such as Adirondack chairs or movable chairs. These alternative seating options can be integrated into the design of public spaces to navigate grade changes, define gathering spaces, and provide unique user experiences. Seating should be distributed throughout parks to support a range of activities and user needs including locating seating near playgrounds, athletic fields, walking paths, and shaded areas.

As extreme heat events become more frequent, shade structures and drinking fountains play an increasingly important role in supporting public health and climate resilience. These amenities

provide relief from heat, encourage hydration, reduce the risk of heat-related illness, and improve comfort for park users particularly at playgrounds, athletic facilities, and other high-use areas.

Maintenance was a frequently raised concern during public engagement efforts and discussions regarding Malden's parks. To reduce strain on maintenance staff and improve long-term maintenance efficiency, it is recommended that the City establish standardized specifications for site furnishings citywide and regularly repair or replace damaged site furnishings. A standardized family of site furnishings would create visual consistency throughout Malden's parks and open spaces while simplifying maintenance operations. Standardization would also allow the City to stock replacement parts and furnishings. When damaged site furnishings are reported, maintenance staff would have the necessary components readily available to quickly repair or replace the item. There could be two families of standard site furnishings such as modern and traditional, to be used in the many types of spaces Malden is fortunate to have.

Park Specific Recommendations: The following sections provide site-specific recommendations for the three parks evaluated in this study. These recommendations build upon the general recommendations discussed previously and identify site-specific opportunities for their implementation within each park.

3.2 Lincoln Commons

Tree Planting and Vegetation Management: There is an opportunity to expand the tree canopy by installing additional shade trees along the north-south walkway adjacent to the playground and ball fields, as well as along Cross Street. The ballfield would also benefit from ornamental tree plantings behind the backstop and adjacent to the dugouts, providing additional shade for players, spectators, and the adjacent streetscape without negatively impacting field use. Additional shade tree plantings along the southern edge of the playground would improve user comfort and reduce heat exposure.

Several trees in the southern portion of the park are in poor health, and an additional tree in poor condition currently overhangs the playground. These trees should be removed and replaced as they may become a public safety hazard during high wind events. On the northwest corner of the playground, there is a patch of invasive Japanese Knotweed that the city should address immediately. Japanese Knotweed is an aggressive invasive species that is difficult to eradicate once established.

Install Bicycle Parking: There is currently no bicycle parking within Lincoln Commons. It is recommended that the City install bicycle parking and/or Bluebikes stations at the entrance in the northeast corner of the park off Bryant Street, and at the southeast entrance near the intersection of Cross Street and Henry Street. Additional bike parking could be added near the playground.

Utilize Central Lawn for Green Infrastructure: A portion of the large central lawn at Lincoln Commons could be utilized for green infrastructure improvements, such as a small detention basin or rain garden designed to capture and infiltrate stormwater runoff on site before it enters the municipal drainage system.

If the aesthetic of a detention basin or maintenance requirements of a rain garden are not desirable, underground cisterns could be installed under the central lawn to capture stormwater and offset the water demands of the existing irrigation system.

Replace Stabilized Aggregate with Permeable Pavers: There is evidence that the existing area of stabilized aggregate paving adjacent to the Lincoln School Memorial has become a maintenance burden for municipal staff, as weeds are growing throughout the surface. Replacing the stabilized aggregate paving with permeable pavers would maintain the design intent in this area while reducing long-term maintenance requirements.

Renovate Playground: The existing playground at Lincoln Commons is not fully accessible due to settlement and displacement of the engineered wood fiber surfacing. According to community outreach completed in 2024, Lincoln Commons playground is the third most popular playground in Malden. It is recommended that the City renovate the playground and install an accessible safety surface, such as poured-in-place rubber, to ensure accessibility for all users. It would also be advantageous to replace some or all of the existing play equipment as part of the surfacing renovation project. The equipment is dated and exhibits signs of wear and deterioration.

Provide Multilingual Signage: Lincoln Commons is in an English isolation neighborhood meaning 25% or more of households in this area lack an adult over the age of 14 who reports speaking English “very well”. However, all signage within the park is currently in English with no translated information available to residents. It is recommended that the City install signage with translation information similar to that installed at Amerige Park.

3.3 Amerige Park

Tree Planting and Vegetation Management: There is an opportunity to expand the tree canopy by installing additional shade trees within the park along the Fellsway and at the corner of Savin Street and Highland Avenue to provide shade for the soccer fields and spectators. Street trees could also be installed along Pine Street adjacent to the tennis and pickleball courts to provide shade for both the courts and the adjacent streetscape.

The existing stand of mature oaks on the grassy knoll at Amerige Park provides excellent shade for portions of the tennis courts and the picnic tables located on the knoll. However, these trees are in need of pruning, as multiple dead limbs within their canopies may become public safety hazards.

Install Bicycle Parking: There is currently only one bike rack within Amerige Park. It is recommended that the City install bicycle parking and/or Bluebike stations at the entrance in the southwest corner of the park off Savin Street to accommodate peak use and encourage multimodal transportation to Amerige Park. Bicycle parking could also be installed near destinations within the park.

Install Accessible Walkways Throughout Park: It is recommended that the existing fields be reconfigured to incorporate an accessible loop path and connections to the soccer fields. Renovations to the fields would be beneficial to the community as they are currently heavily used by multiple organizations including Malden High School, Malden Youth Soccer, Malden Thrashers, and Malden Catholic High School. There is currently no accessible route providing access to the southern half of the park. In addition, there is no accessible route to the picnic tables located atop the grassy knoll.

Provide Seating Throughout the Park: Amerige Park and its courts lack adequate seating for park users and spectators. Of the eight benches within the park, two are located within the tennis court and are not accessible due to their seat height. These benches are also damaged and deteriorating. The remaining six benches within the park are concentrated near the Fellsway entrance and playground, with all six located within approximately 150 feet of one another. While seating around playgrounds is important, additional seating should be provided throughout the park. The installation of a loop walk around the perimeter of the park would provide numerous opportunities to incorporate seating at strategic locations.

Capture and Infiltrate Stormwater On-site: Installing a border of porous concrete outside the playing surfaces of the existing tennis, pickleball, and basketball courts would help capture stormwater runoff before it enters the municipal drainage system and would promote on-site

infiltration. Unfortunately, pervious pavements are not compatible with acrylic sports surfacing systems because the paint can clog the pores of the pavement. A high-albedo porous concrete pavement is recommended in these locations to reduce the urban heat island effect without relying on shade trees.

Additional stormwater runoff not captured by the porous pavement could be directed to drainage structures connected to an underground cistern. The stormwater stored in this cistern could then be used to offset the water demands of the existing irrigation system.

Renovate Playground: The existing playground at Amerige Park is not fully accessible due to settlement and displacement of the engineered wood fiber surfacing. Additionally, the existing play equipment offers few ground level play components limiting play value for users in mobility devices. It is recommended that the City renovate the playground and install an accessible safety surface, such as poured-in-place rubber, to ensure accessibility for all users. Additional shade trees along the southern edge of the playground would help reduce heat exposure and improve user comfort. However, existing utilities in this area may limit the feasibility of tree planting. As part of the playground renovation project, the City should explore opportunities for shade structures or integrated shade features within the play equipment to help mitigate the urban heat island effect.

3.4 MacDonald Stadium

Additional Tree Planting: It is recommended to install new tree planting at the southern end of the stadium between MacDonald Stadium and the adjacent Callahan Park. The existing plant beds on the north side of the stadium could have trees planted in them to help shade the track and walkway outside the fence. Additional tree planting may be feasible in the northeast corner of the site, however tree planting in this area should maintain access for maintenance vehicles from Centre Street (Route 60).

Install Bicycle Parking: There is currently only one bike rack within MacDonald Stadium. It is recommended that the City install bicycle parking and/or Bluebike stations at the main entrance to the stadium by the ticket window and concessions building. Additional bicycle parking would be beneficial near the parking lot on the southwest corner of the stadium. Bicycle parking should be provided in sufficient quantities to accommodate peak use and encourage multimodal transportation to MacDonald Stadium.

Install Permeable Pavements: The city should consider replacing the existing asphalt pavement in the parking lots and along the perimeter walkway with porous asphalt. The existing concrete pavement adjacent to the concession building could be replaced with high-albedo permeable

pavers, maintaining the design intent of the area while reducing the amount of impervious surface within MacDonald Stadium.

Remove Excess Pavement: In the northeast corner of the stadium, there is a long jump facility that appears to be abandoned. The asphalt runway associated with this long jump should be removed to reduce impervious surface area and create opportunities for additional landscaping or green infrastructure improvements.

The existing parking lot on the southwest corner of the stadium could be slightly reduced to accommodate additional tree planting and landscape area along Pearl Street. While these improvements would need to be coordinated with the existing storage shed and drainage infrastructure, they would provide additional shade and help reduce the urban heat island effect.

Install Shade Structures over Bleachers: Installing cantilevered shade structures over the bleachers would improve spectator comfort and reduce heat exposure during athletic events. These structures could utilize either fabric canopies or metal roofs, depending on the existing structure, maintenance, durability, and budget considerations.

Install Turf Cooling Measures: Research conducted in the Netherlands suggests that open water storage systems under the surface of the turf can reduce surface temperatures, bringing them closer to those of natural grass during hot weather. Additional research from Michigan State University suggests that irrigating the field on hot days can rapidly cool the playing surface however, temperatures quickly rebound within approximately 20 minutes after irrigation stops. The use of water based cooling measures should be carefully evaluated to determine if the cost of installing these systems and excess water consumption outweighs the desire to reduce the surface temperature of the synthetic turf field.

Maintain Synthetic Turf Field for Emergencies and Maintenance: Due to its central location, large capacity, public address system, and expansive open space, MacDonald Stadium is well suited to function as a resiliency hub. Resiliency hubs are trusted community spaces that support residents before, during, and after emergencies by serving as gathering places, distribution centers, and locations for community services.

In this context, the existing synthetic turf field provides several advantages. Unlike natural grass, synthetic turf remains usable following heavy rainfall and can support large crowds, emergency vehicles, and temporary emergency operations. For these reasons, it is not recommended that the synthetic turf field be converted back to natural grass. In addition to reducing the site's ability to function as a resiliency hub, a natural grass field would require

more maintenance and would be more susceptible to flooding and weather related closures, potentially resulting in cancelled practices and games.

4. Implementation and Cost

The recommendations outlined in this section are intended to guide the strategic planning and phased implementation of the resiliency measures presented in the previous section.

4.1 General Prioritization

It is recommended that the city implement these recommendations through a phased approach. Generally, recommendations should be prioritized in the following order.

Accessibility Improvements: Ensuring that parks and open spaces throughout Malden are accessible to all community members should be a top priority for the City. This includes repairing existing walkways and sidewalks and replacing non-compliant curb ramps.

Tree Planting and Vegetation Management: Installing new trees and performing regular tree maintenance is critical to ensuring that parks and open spaces are safe and comfortable for users. Establishing and maintaining a healthy tree canopy is critical to reducing the urban heat island effect, and community members have consistently expressed a desire for additional tree planting throughout Malden.

Site Amenities: Providing adequate site amenities for all park users including seating, bicycle parking, shade, and water will enhance users' experiences within Malden's parks and open spaces.

Green Infrastructure: While it may be difficult to implement the green infrastructure approaches outlined in this report, future park projects should incorporate applicable measures whenever feasible. These green infrastructure measures are intended to reduce flood risk and alleviate strain on municipal utilities throughout Malden, not solely within parks and open spaces.

4.2 Park Specific Prioritization

The following are recommendations for the first phase of work at each of the three parks evaluated in this study. These improvements are intended to be easily implemented and include repairs and upgrades that address accessibility concerns, encourage multimodal transportation, reduce the urban heat island effect, and improve the resiliency of these parks. The estimated costs provided are based on 2026 unit prices and are intended to provide planning level estimates of probable construction cost.

Lincoln Commons Phase 1:

- Replace damaged benches
- Repair walkways (cracks and pavement adjacent to the water bottle filler)
- Remove damaged trees and provide invasive species management
- New tree planting
- Install bicycle parking
- Replenish wood fiber surfacing in the playground

ESTIMATED COST: \$70,000 - \$85,000



Lincoln Commons Concept Diagram

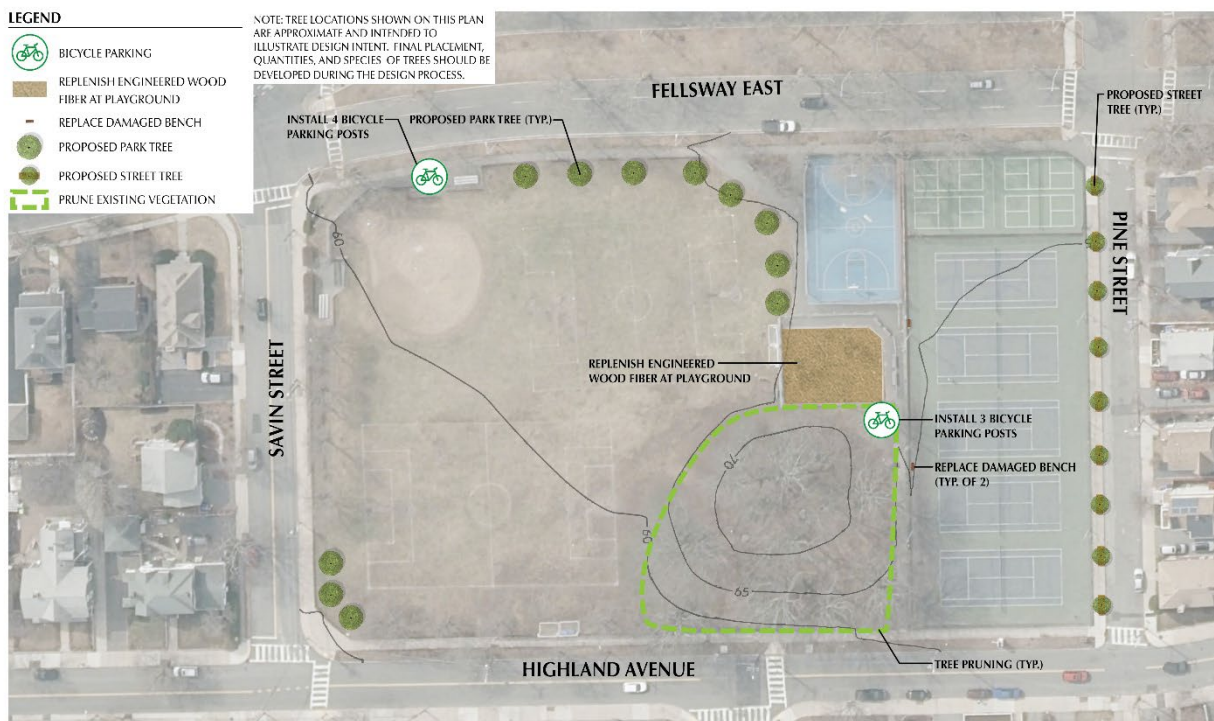


The initial phase of work at Lincoln Commons is intended to address the tree planting and vegetation management and bicycle parking recommendations outlined in Section 3.2 of this report. The remaining resiliency recommendations, including green infrastructure improvements, multilingual signage, and playground accessibility upgrades, should be addressed in future phases of work.

Amerige Park Phase 1:

- Replace benches at tennis courts
- Tree pruning
- New tree planting within park
- Street tree planting along Pine Street
- Install bicycle parking
- Replenish wood fiber surfacing in the playground

ESTIMATED COST: \$75,000 - \$100,000



Amerige Park Concept Diagram

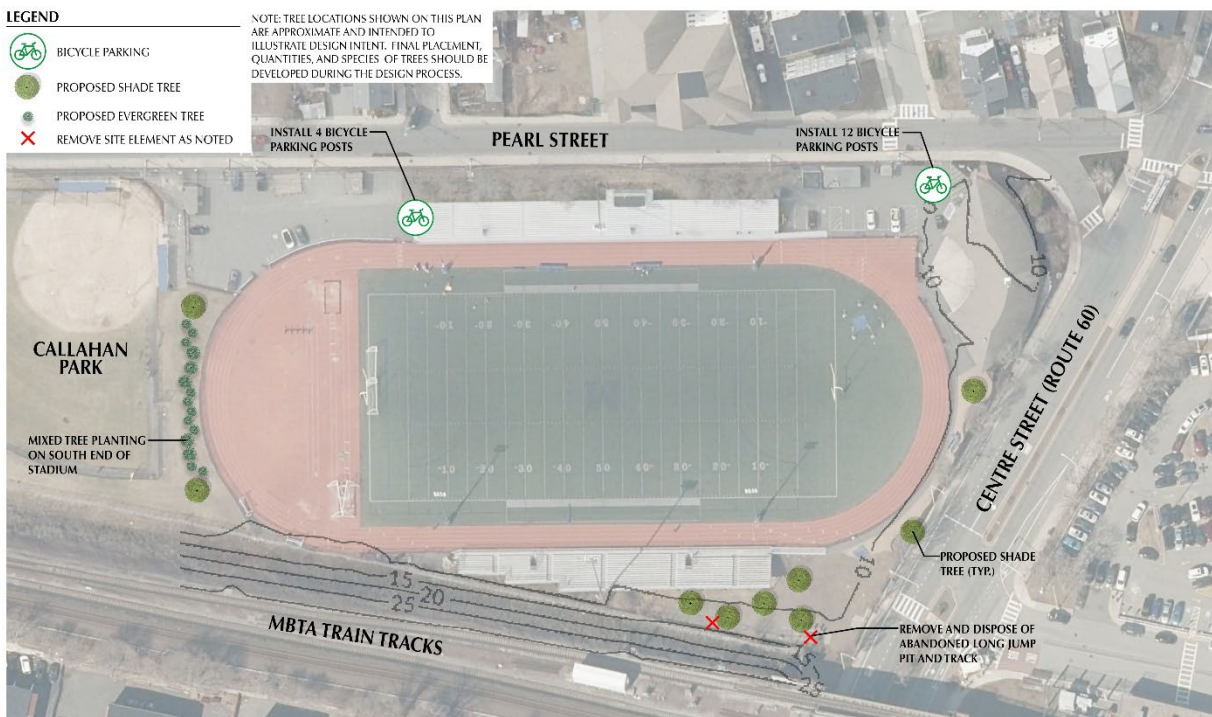


The initial phase of work at Amerige Park is intended to address the tree planting and vegetation management and bicycle parking recommendations outlined in Section 3.3 of this report. The remaining resiliency recommendations, including green infrastructure improvements, accessibility upgrades to the playground and walkways, and additional seating throughout the park, should be addressed in future phases of work.

MacDonald Stadium Phase 1:

- Remove abandoned long jump area and install lawn and tree plantings
- New tree planting
- Install bicycle parking at stadium entrances

ESTIMATED COST: \$70,000 - \$85,000

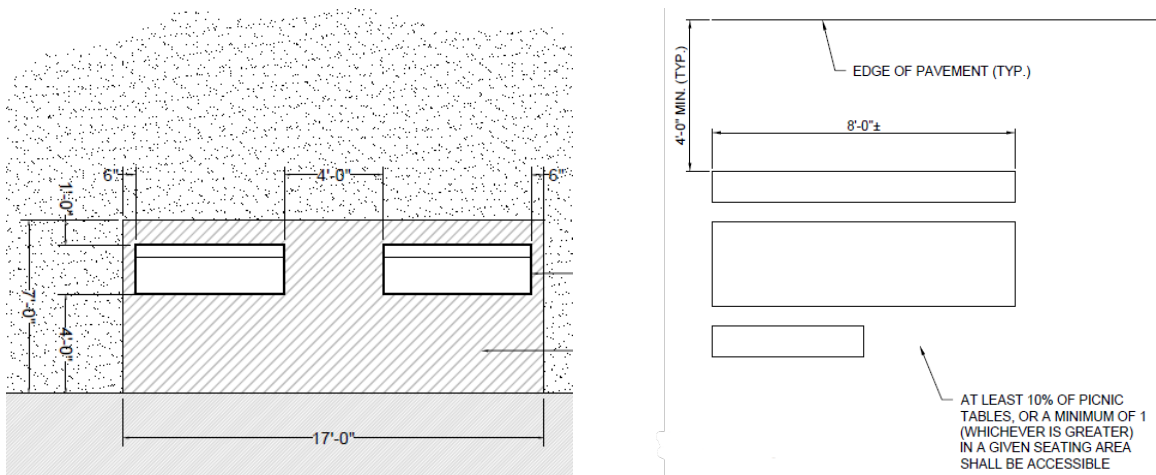


MacDonald Stadium Concept Diagram

The initial phase of work at MacDonald Stadium is intended to address the tree planting and bicycle parking recommendations outlined in Section 3.4 of this report. These initial upgrades aim to reduce the urban heat island effect and encourage multimodal transportation in a cost-effective manner. The remaining resiliency recommendations, including green infrastructure improvements, turf cooling measures, and shade structures over the stands, should be addressed in future phases of work.

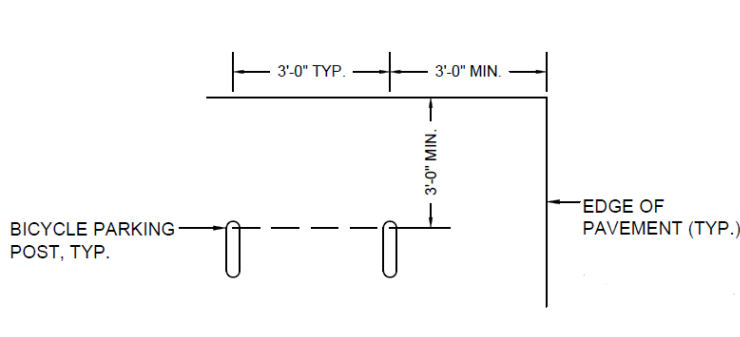
4.3 Implementation Techniques

Accessible Seating Layout: All bench pads within parks and open spaces should include a companion space. If there are two benches on a pad, the companion space should be located between the two benches, as shown below. The Architectural Access Board requires that at least 10 percent of tables, or a minimum of one table (whichever is greater), within a seating area be accessible. This can be accomplished in a variety of ways including eliminating a seat at a table, shortening a bench at a picnic table, providing 4'-0" of clear space between seats, or extending the tabletop to accommodate a wheelchair at the end of the table.



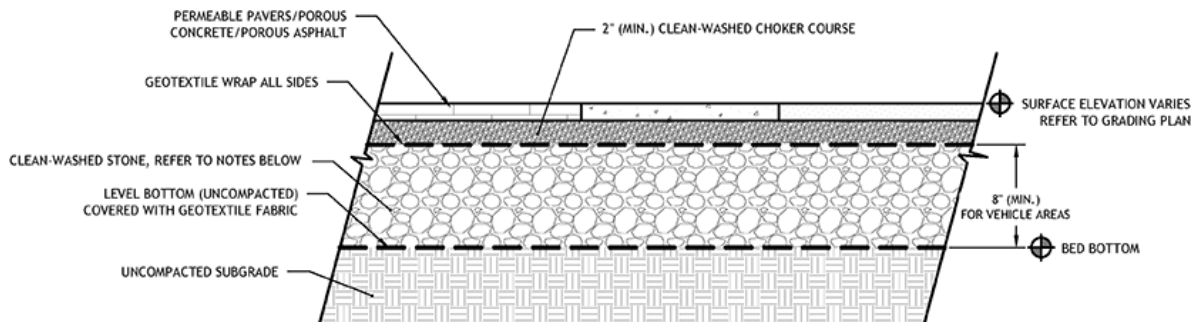
Typical bench pad and picnic table layout

Bicycle Parking: Bicycle parking should be provided at all parks and municipal properties to support the city's goal of installing bicycle parking at 75% of municipal properties by 2032. Bicycle parking should be individual bicycle parking posts as opposed to continuous bike racks. Individual bicycle parking posts provide greater flexibility and are generally easier to use than continuous bicycle racks. When bicycle parking is provided near playgrounds, bicycle parking posts should be at least 6'-0" from the edge of the walkway to accommodate bikes with tow behind trailers for children.



Typical bicycle parking layout

Permeable Pavements: Permeable pavements may not be suitable for all park locations, as underlying soils generally need to have an infiltration rate of at least .3 inches per hour. In addition, groundwater should be at least 3'-0" below finished grade, and bedrock should be at least 4'-0" below finished grade to ensure adequate drainage. Permeable pavements have been successfully installed at multiple municipal properties around Massachusetts including the Forest Dale Cemetery in Malden, MA, Walden Pond parking lot in Concord, MA, and the Silver Lake Beach parking lot in Wilmington, MA. It is important to note that permeable pavements should not be sanded and generally require limited salt application during winter months. Research conducted by the University of New Hampshire has shown that permeable pavements can perform as well as, or better than, conventional pavements under winter conditions. Permeable pavement can be plowed the same as impervious pavement. Sunshine acts quickly to melt snow and ice sooner than on frozen standard pavement and melting snow and ice quickly infiltrates from the surface through the open-graded permeable pavement.



Typical permeable pavement section

Detention Basins and Rain Gardens: Detention basins and rain gardens require dedicated green space within a park or open space that is not intended for active public use. The size of a rain garden is generally determined by dividing the impervious area to be treated by the sizing factor or depth of the rain garden. For example, if you have 1,000 square feet of impervious surface and want to treat it in a 10" deep rain garden, the bottom of the rain garden would need to be 100 square feet. In addition to size requirements, groundwater elevations should be at least 2'-0" below the bottom of the basin or rain garden to allow for adequate filtration, and soil infiltration rates should generally be at least .3 inches per hour. Detention basins have similar size requirements, however they are typically seeded and maintained as turf areas rather than planted with woody and herbaceous vegetation like a rain garden.

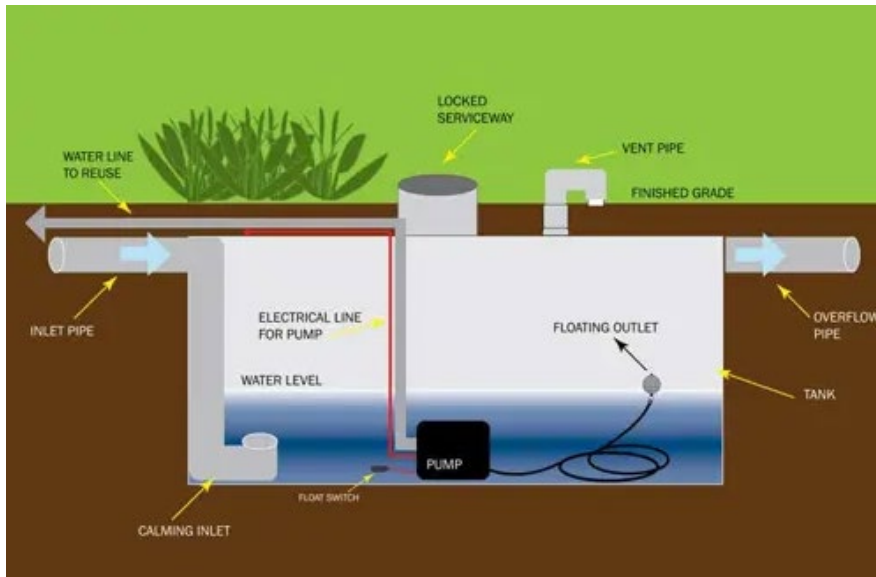


Example of a rain garden



Example of a detention basin

Underground Cisterns: Underground cisterns are available in a variety of sizes and materials ranging from small above-ground rain barrels to large underground concrete or plastic cisterns with capacities from several hundred gallons to more than 12,000 gallons. The installation of large cisterns in parks and municipal properties should be carefully evaluated to determine whether stormwater collection and reuse are feasible and cost-effective.



Shade Structures: Shade structures should be incorporated into parks and open spaces where tree planting may not be feasible, particularly in high use areas, and where a roof is an advantage for public use. These structures are available in many shapes and sizes and can often be integrated with play equipment, seating, and other site amenities. In addition to providing shade, they offer protection from inclement weather, can serve as outdoor classrooms, and may become focal points within a park or open space. Shade structures may incorporate solar panels to power lighting and other park amenities and can be designed to direct runoff to underground cisterns. The engineering requirements of shade shelters vary significantly, and feasibility studies should be explored early in the design process.

Playground Renovations: The City of Malden OSPCD has extensive experience planning playground projects. Numerous play equipment options are available to accommodate a variety of age groups and accessibility needs.

4.4 Estimated Unit Prices

The following figures are planning-level estimates and may not reflect the actual cost of implementing the proposed improvements. Pricing on publicly bid projects is often influenced by project size, item quantities, market conditions, and the time of year bids are solicited. These figures are intended to serve as a guide for strategic implementation of the resiliency recommendations outlined in this report.

Permeable Pavement: The chart below, developed by the EPA, provides a general cost comparison between conventional pavement systems and permeable pavement alternatives. The unit costs presented are not intended to represent current local construction costs or project-specific estimates. Rather, they illustrate the relative cost differences between pavement types and provide a general indication of the premium typically associated with permeable pavement installations.

Basic Pavement Types	Example Cool Approaches	Approximate Installed Cost, \$/square foot*	Estimated Service Life, Years
New Construction			
Asphalt (conventional)	Hot mix asphalt with light aggregate, if locally available	\$0.10–\$1.50	7–20
Concrete (conventional)	Portland cement, plain-jointed	\$0.30–\$4.50	15–35
Nonvegetated permeable pavement	Porous asphalt	\$2.00–\$2.50	7–10
	Pervious concrete	\$5.00–\$6.25	15–20
	Paving blocks	\$5.00–\$10.00	> 20
Vegetated permeable pavement	Grass/gravel pavers	\$1.50–\$5.75	> 10

Underground Cisterns: The cost of underground cisterns varies significantly depending on material, size, and the number of connections and pumps required for the intended use. For large commercial and municipal applications, steel-reinforced polyethylene is often among the most cost-effective materials. Steel-reinforced polyethylene cisterns have an estimated service life of approximately 75 years with proper maintenance and typically range in cost from approximately \$25,000 to more than \$75,000 depending on size, site conditions, and installation requirements.

5. Maintenance and Operations Considerations

Malden's Department of Public Works (DPW) and the Parks and Recreation Commission oversee the maintenance of the city's parks. Malden has approximately 40 park sites offering a variety of amenities, including ball fields, courts, playgrounds and open spaces.

While the maintenance of each park depends on its amenities, there are fundamental actions that are typical across all parks. Below is a Maintenance Specification that can be adapted to each park site:

General Maintenance Requirements:

1. Debris – all debris and litter should be removed from the entire park weekly. Miscellaneous litter shall be removed from the site and disposed of off-site.
2. Service vehicles – all vehicles should remain on pavements so that landscaped areas are not damaged. Damage to any turf or planted edges shall be repaired immediately.
3. Trim all bed edges, pavement edges, and curb edges.
4. Install new loam at depressed or compacted areas and remulch or reseed.
5. Planted Areas:
 - a. Provide weekly (as necessary) weeding, edging, dead branch and trash removal of planted areas.
 - b. Monitor trees and plants for disease and pest control. Coordinate with City's Tree Warden.
 - i. Dead trees that are a public safety hazard should be removed as soon as possible.
 - c. Prune plant material (trees and shrubs) at least twice annually to remove dead/dying/diseased or rubbing branches. Pruning shall be performed by a Certified Arborist in accordance with industry standards. Prune in the spring during spring cleanup and again in the fall.
6. Lawn Areas:
 - a. Lawn repair: reloam and reseed bare spots to maintain a consistent and healthy stand of grass.

- b. Lawns should be mown weekly during active growing seasons, and biweekly or as necessary to meet the lawn height requirements during less active growing periods. Assume a typical active growing season is 30 weeks.
- 7. All chemical applications shall be applied by licensed applicators and in accordance with current State and Federal Regulations.
- 8. Pavements:
 - a. Inspect all pavements for damage or cracks, especially the pavements needed for universal accessibility. Repair or replace pavements as needed.
 - b. Permeable pavements should be vacuumed twice per year, ideally in the spring after the snow melts and fall after leaf drop. Mechanical broom sweepers should be avoided because the bristles push debris deeper into the pores and clog the surface. Instead, regenerative air and pure vacuum sweepers should be used.
- 9. Irrigation:
 - a. Monitor all irrigation systems. Repair or replace components. Adjust heads. Adjust time clocks as appropriate for early, mid and late growing seasons.
- 10. Splashpads and Playgrounds:
 - a. Splashpads shall be started in the spring and all components tested. The clocks and controls shall be verified and adjusted as needed.
 - b. Playgrounds shall be inspected at least once per year, preferably in the spring before the summer use season. Replace components that are damaged including swing seats. Contact the equipment supplier if major repairs are needed.
- 11. Fields:
 - a. Repair turf and infield areas, scoreboards, players benches.
 - b. Re – line playing areas. Inspect and repair fencing.

Landscape Maintenance Requirements by Season:

Spring Work

- 1. Provide spring startup/test for the irrigation system. Replace and adjust components as necessary to provide fully operational system.
- 2. Install new wood fiber safety surfacing to match existing material in all playgrounds that have wood fiber safety surfacing. Blow debris off playgrounds with poured-in-place rubber surfacing.

3. Sweep and clean all pavements. Note cracks and damage to pavements for repair list.
4. Planted Areas:
 - a. Spring Cleanup: Rake out all shrub beds. Remove all trash, debris, sand, sticks, branches and leaves, and dispose of legally off - site. Install planting soil as necessary to replace low spots or damaged soil. Install NO MORE THAN 2" depth aged pine bark mulch in shrub beds and existing tree saucers. Root flares of trees shall not be covered with mulch.
 - b. Provide spring fertilization.
 - c. Cut back spring bulbs after die back.
5. Lawn Spring Cleanup: Dethatch, rake and aerate lawn areas. Remove all trash, debris, sand, sticks, branches and leaves, and dispose of legally off-site.
 - a. In the spring take soil samples at parks of concern and send to UMass for lawn care recommendations. Upon receipt of recommendations, coordinate with maintenance operations schedule for implementation.
 - b. Early spring lawn fertilization on or around April 15th depending on weather conditions (per soil recommendations). Pre-emergent crabgrass control as required.
 - c. Late spring lawn fertilization as well as weed, fungus and insect control as needed. On or around June 1st or 6 weeks after previous application.

Summer Work

1. For the irrigation system, check soil moisture to a depth of 6" and observe irrigation system in operation. Replace or adjust heads as required to maintain fully operational system.
2. Cut grass as needed to maintain height of no less than 1-3/4" and no more than 2-1/2". The lawn shall be cut once every 7 (seven) days from start date of contract until mid-November or until growth ceases.
3. Apply summer slow release fertilizer on lawn, on or around July 21st or 7 weeks after previous application.

Fall Work

1. Fall Cleanup: Remove all leaves from landscape areas. Assume this will be required twice for each park site, once on approximately October 13th-17th and once on approximately November 17th-21st.
2. Provide fall blowout/shutdown for the irrigation system.

3. Provide fall fertilization and cut back perennials in the fall after hard frost.
4. Fall fertilization / liming per soil recommendations. On or around September 1st or 5 weeks after previous application.

General Maintenance Considerations for Design and Materials:

Sound design of public parks and thoughtful selection of materials contribute to the ease of maintenance for a public park. The following are some thoughts on material design and selection:

Pavements: Standard pavements such as asphalt and standard cast-in-place concrete are materials that are readily available for the repair or replacement of park pavement. Consider permeable pavements wherever possible.

Lawns and Seeded Areas: Assess if the square footage of lawn area can be reduced and replaced with meadow or conservation areas. This reduces maintenance requirements and increases habitat/pollinator area.

Planting: Establish an annual tree planting program to replace dead trees and to increase the number of trees and tree canopy cover. With the Tree Warden evaluate the current cycle of pests and diseases and adapt the tree plant list in response.

Site Amenities: When designing a new or replacement park, choose materials for their longevity and vandalism-resistance attributes. Replace or remove damaged site amenities such as benches, tables/chairs, trash receptacles, bicycle parking.

Signage: Review and replace signage annually. Add signage in multiple languages and designed to be universally accessible.

6. Funding Opportunities

The Draft of Malden's 2026 Open Space and Recreation Plan + Art includes a Ten Year Action Plan. It identifies the vision, guiding values, goals and strategies for implementing improvements in all of Malden's public open spaces.

The following is a table of potential funding sources to implement the plan, which includes the three parks identified in this report.

POTENTIAL FUNDING SOURCES	
ACR: MAPC Accelerating Climate Resilience Grant BRIC: FEMA Building Resilient Infrastructure and Communities CB: City Budget CCIT: Community Compact IT Grant CFP: USFS Community Forest Program CPC: Community Preservation Commission - CPA: MA CPC Community Preservation Act DCR: MA Department of Conservation and Recreation - MTG: MA DCR MassTrails Grant Program - UCF: MA DCR Urban and Community Forestry Grant DCS: MA Division of Conservation Services: - CP: MA DCS Conservation Partnership Grant - LAND: MA DCS DCS Local Acquisitions of Natural Diversity Grant - LWCF: MA DCS Federal Land and Water Conservation Fund - PARC: MA DCS Parkland Acquisitions and Renovations for Communities Grant - ORLPP: MA DCS Outdoor Recreation Legacy Partnership Grant Program - LPGP: MA DCS Landscape Partnership Grant Program - DWSP: MA DCS Drinking Water Supply Protection Grant Program DEP: MA Department of Environmental Protection 604b: MA DEP Section 604b Water Quality Management Planning - WURP: MA DEP Water Utility Resilience Program - CWSRF: MA DEP Clean Water State Revolving Fund Clean Water Program - SMRP: Sustainable Materials Recovery Program Municipal Grant - RRRMG: Reduce, Reuse, Repair Micro-Grants - WRIG: Waste Reduction Innovation Grants DER: MA Division of Ecological Restoration - SR: MA DER Streamflow Restoration Programs - DR: MA DER Dam Removal Program - URR: MA DER Urban River Revitalization Program - WR: MA DER Wetlands Restoration Program - CRMA: MA DER Culvert Replacement Municipal Assistance Grant DHCD: MA Department of Housing and Community Development - CDBG: MA DHCD Community Development Block Grant Program	EEA: MA Executive Office of Energy and Environmental Affairs - DSR: MA EEA Dam and Seawall Repair or Removal Program - GCPP: MA EEA Gateway City Parks Program - MET: MA EEA Environmental Trust General Grant - MTG: MA EEA MassTrails Grant - MVP: MA EEA Municipal Vulnerability Preparedness Program - PAG: MA EEA Planning Assistance Grant FMS: US ACoE Floodplain Management Services Program FWS: MA Fish and Wildlife Service - LIP: MA FWS Landowner Incentive Program Grant HC: MA Historical Commission - HCSP: MA Historical Commission Survey and Planning Grant - HCPP: MA Historical Commission Preservation Projects Fund HMA: FEMA Hazard Mitigation Assistance Grant Program MADA: Municipal Americans with Disabilities Act (ADA) Improvement Grant MDAR: Massachusetts Department of Agricultural Resources Urban Agriculture MDOT: MA Department of Transportation - Ch90: MA DOT Chapter 90 Program - SRTS: MA DOT Safe Routes to School Infrastructure Funding Program - SSS: MA DOT Shared Streets & Spaces Program Funding MGC: Massachusetts Gaming Commission Community Mitigation Fund MCC: Massachusetts Cultural Council Grant Programs LCC: Malden Cultural Council MOOR: Massachusetts Office of Outdoor Recreation - IAOR: MA Inclusive and Accessible Outdoor Recreation Events Grant Program - ORAI: MA Regional Outdoor Recreational Asset Inventory Grants NEFA: New England Foundation for the Arts NFWF: National Fish and Wildlife Foundation - FSUW: Five Star and Urban Waters Restoration Grant - NEFRF: NFWF New England Forests and Rivers Fund - NCRF: NFWF National Coastal Resiliency Fund NEAOT: National Endowment for the Arts Our Town Placemaking Grant SF: Stanton Foundation TIP: Boston Region Metropolitan Planning Organization Transportation Improvement Program

The city will seek funds to implement the improvements shown in this report, particularly for the early implementation items.