DCR SHADE PROJECT

KIT OF PARTS

& DESIGN GUIDELINES

dcr

Massachusetts

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DCR SHADE PROJECT

KIT OF PARTS
& DESIGN GUIDELINES

JUNE 30, 2024

PREPARED FOR:

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ACKNOWLEDGMENTS

DCR would like to recognize the contribution of the following individuals to this project:

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Photography / Image Credits

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EXECUTIVE SUMMARY

This Kit of Parts—a catalogue of DCR shade design standards—has been assembled to facilitate the rapid and effective deployment of shade in our parks and public spaces. Heat is the number one weather-related cause of death in the US, ahead of hurricanes, floods, and tornadoes. Per the 2022 Massachusetts Climate Assessment, the projection for extreme heat is close to 30 days above 90°F per year by 2050. Increasing shade across DCR's parks is a priority in line with DCR's mission, capabilities, and the agency's climate adaptation goals, and it aligns with the Commonwealth's resiliency goals. It is the agency's direct response to this climate hazard and the best next step DCR can take to protect our visitors and staff, and to ensure the well-being of all.

The project began with a data-driven Shade Suitability Assessment to determine the hottest locations in the DCR system that serve Environmental Justice Communities that face disproportionate impacts from heat island effect. The assessment helped inform pilot site selection during the project phase and will continue to inform ongoing shade installation beyond the pilot sites. Please see Section 1 for a description of the assessment methodology. The Appendices have a link to a tabular list of the sites identified in the assessment. DCR will prioritize installation of shade structures at these hottest sites, as the agency also works to incorporate new shade structures and tree plantings in all park and greenway capital projects.

The name "Kit of Parts" reflects DCR's design approach—using multiple strategies to increase shade as we protect park character and resources. This balancing act, protecting DCR's natural and cultural resources as we build shade infrastructure, is key to the success of the design standards project. The Kit of Parts is meant to be used by DCR Operations staff, cultural resource planners, arborists, stormwater engineers, project managers, and design consultants working as a team to provide the best possible park shade design. See Section 1 for the Kit of Parts Goals, and Section 2 for an outline of design guidelines which emphasize the importance of tree canopy, nature-based solutions and low impact design and preservation of our existing historic shade shelters. Section 3 documents the many shade structures in current use in DCR parks as well as new products and technologies. Finally, the shade standards will be piloted at 10 sites across the Commonwealth to understand site installation issues as well as durability and ease of maintenance. The Pilot Project proposals and lessons learned to date are included in Section 4. Input from our visitors and Operations staff will guide us as we move from concepts to design and implementation.

This catalogue is a living document that will continue to be revised as DCR learns from each shade intervention project.

Credit: DCR

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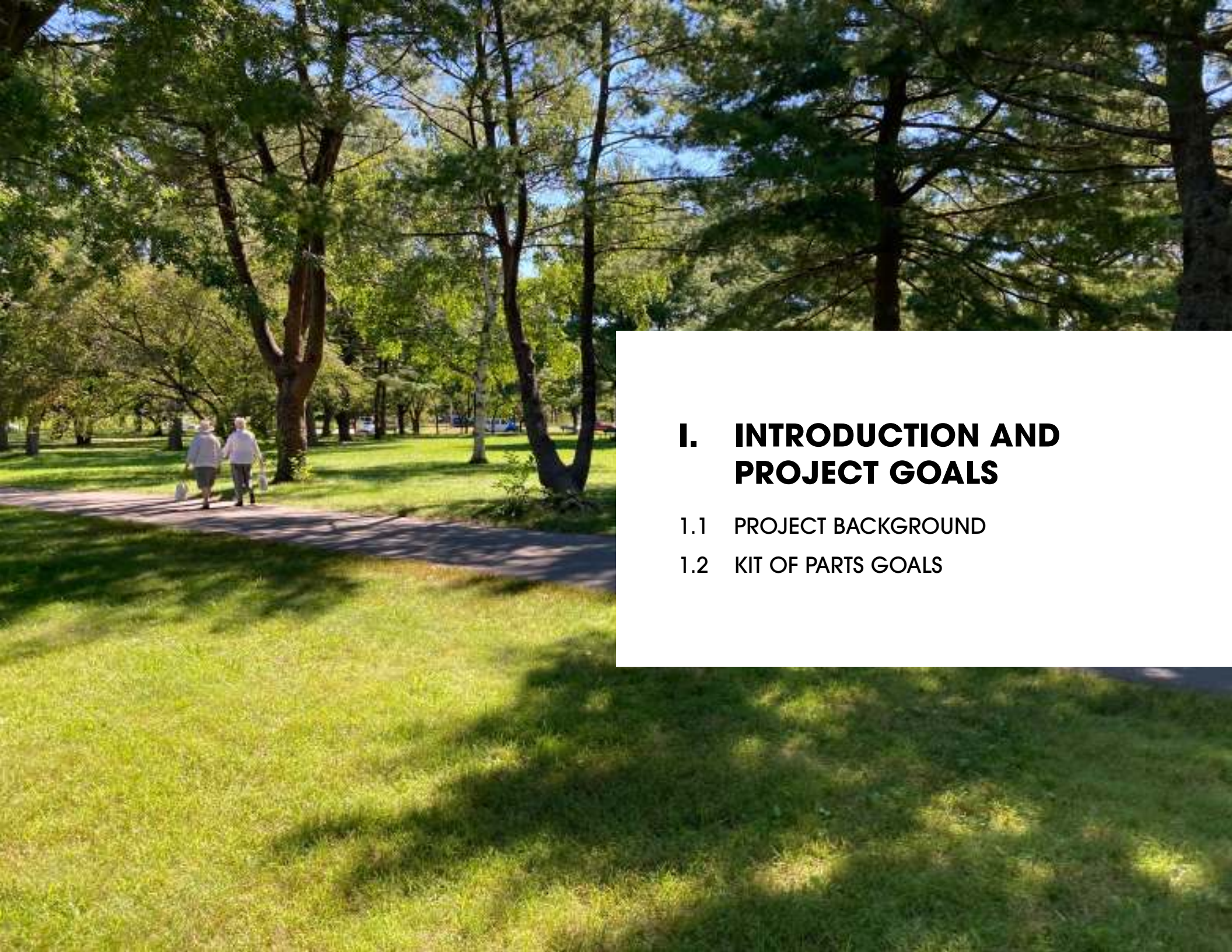

I. INTRODUCTION AND PROJECT GOALS

1.1 PROJECT BACKGROUND

1.2 KIT OF PARTS GOALS

1.1 PROJECT BACKGROUND

Climate Impact: Extreme Heat
The 2023 ResilientMass Plan established climate impact projections for the Commonwealth. The projection for extreme heat is 23 to 29 high heat days (temperatures 90°F and above) by 2050. As extreme heat is a public health issue–the leading cause of weather-related deaths (WHO) and adversely impacting vulnerable populations like the elderly, those with respiratory illness, and environmental justice populations–DCR has prepared the Kit of Parts to enable the agency to install a range of standards that protect visitors and staff as we enhance the character of DCR parks.

Shade Suitability Assessment
As part of the project and to better understand DCR parks' vulnerability to extreme heat, staff from the Asset Management and Modernization Program (AMMP) conducted an in-house Shade Suitability Assessment. The assessment identified parks in close proximity to or used by Environmental Justice populations, proximity to areas experiencing high Urban Heat Island (UHI), and existing park amenities. These are the hottest parks that serve the most vulnerable populations. The analysis yielded a list of optimal locations within the Massachusetts State Parks System where installation of new shade would be most beneficial to increase resiliency of our parks to extreme heat and to lessen the burden of heat impacts on Environmental Justice communities.

The analysis was used as a guide to select 10 pilot sites to help inform shade design guidelines, components of the Kit of Parts, and proof of concepts for particular shade needs within DCR Parks Systems–shade at athletic fields (both for participants and spectators), pools, playgrounds, linear paths, beaches, picnic areas, and others. The 10 Pilot Projects, or case studies, included in Section 4 provide replicable shade solutions and lessons learned for similar sites across the Commonwealth.

To find the parks identified as most suitable for new shade, please visit here. Please refer to the Appendices to find the results of the FY24 analysis in list form. This assessment will be updated to integrate the latest available data, but the FY24 results give DCR a set of data-driven priority locations to advance the agency's heat resiliency work.

Next Steps:
FY25 ResilientMass Plan funding will advance shade implementation at the sites identified by the FY24 analysis to decrease DCR's heat vulnerability. Moving forward beyond this project and to change the status quo, opportunities to provide shade shall be incorporated into capital planning and construction projects to the greatest extent possible. Staff should prioritize installation of new shade and prioritize repairs to existing shade structures at parks and along greenways that are in close proximity to or used by Environmental Justice communities. DCR will identify capital programs and maintenance contracts to furnish shade structures from the Kit of Parts, perform tree maintenance and install new trees, and repair existing shade shelters.

1.2 KIT OF PARTS GOALS

Meet the increased need for shade to protect both DCR visitors and staff.

- Prioritize parks that serve Environmental Justice communities.

Develop a reference for staff and consultants that enables DCR to install shade structures that enhance park character, foster social gathering, protect our natural and cultural resources, and meet and exceed applicable regulations.

- Design for universal accessibility.
- Protect, maintain and extend our tree canopy.
- Meet DCR's Net-Zero and Climate Adaptation Goals.
  - » *Install only net-positive or net-zero facilities.*
  - » *Prioritize nature-based solutions.*
  - » *Manage stormwater responsibly.*
  - » *Plant only species native to the ecoregion.*
- Employ low-impact design principles, including sustainably-sourced materials.
- Develop standards that are durable, resistant to weather, low maintenance and easy to repair.
- Document forward-looking technologies and strategies that meet DCR goals.

Install standards Commonwealth-wide efficiently and effectively.

- Develop capital programs and maintenance contracts to streamline installation of shade projects.
- Develop metrics and data collection procedures to gauge progress on addressing extreme heat in DCR parks.

Credit: DCR

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II. DESIGN GUIDELINES

2.1 APPROACH

The approach to design of shade projects is the same as best management practices (BMPs) for all DCR projects. In addition to complying with environmental regulations and DCR's Stormwater Design Guidelines, CMR 521 for universal accessibility, and DCR's Climate Resilience Goals, DCR project managers and Operations staff should consult the following guidelines as well as the Pilot Projects described in Section 4 to ensure shade projects support DCR's mission and core principles as they meet our goals for shade.

2.2 SITE-SPECIFIC DESIGN

The unique landscape and history of each of DCR's parks are striking and resist standardization. To protect the natural and cultural resources of our parks, each shade intervention project needs to start with a site visit with relevant Park Operations staff and others who can help inform design with important visitor use information, including circulation patterns, active recreation uses, security issues, abutter concerns, and site conditions like property lines, resource areas, localized flooding, and maintenance challenges. Projects should also try to integrate new shade structures with existing amenities—as these are popular destinations for our visitors. Alternatively, in consultation with Operations staff, shade shelters could be placed in park areas that are accessible but currently underutilized by visitors to better distribute activity areas and avoid over-crowding of existing facilities.

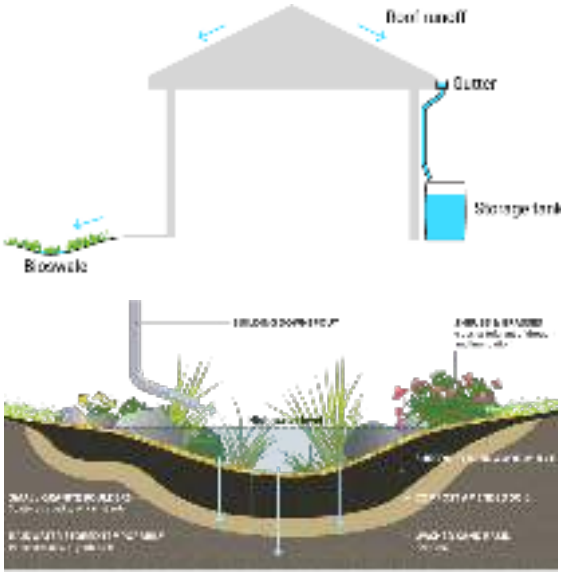
2.3 CO-BENEFITS

An important element of the shade project is to look for co-benefits for each installation. As outlined in the following sections, native canopy trees, and adaptive re-use of historic structures as well as new structures can provide benefits in addition to shade. For instance, a large new pavilion introduces additional impervious surface to a park, but the pavilion roof could be designed to harvest stormwater to irrigate trees in times of drought or support a solar array for net-zero lights, grills and charging stations (especially important in remote locations). Another co-benefit of providing shade is creating new community gathering spaces. Each project should consider how the investment can mitigate for any impacts and further benefit the park and its visitors.

GREEN ROOF

Low-Maintenance Sedum Plants
(Credit: Greenrise Technologies)

STORMWATER MANAGEMENT



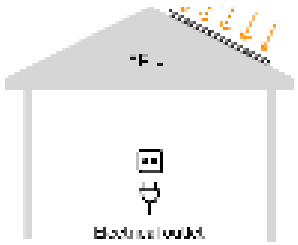
Bio-Swale Illustration
(Credit: Toronto and Region Conservation Authority)

Figure 2-1. *Co-Benefits Diagram*

2.4 NATIVE CANOPY TREES

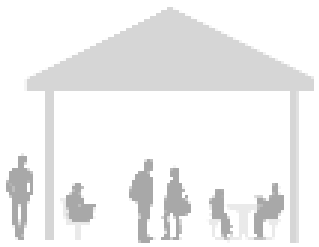
The benefits of native trees are well-known: For the human community, trees filter the pollutants out of air and water, reduce localized flooding by absorbing up to a ton of water a day, and their root systems reduce erosion. Natural communities are a web of interconnected species in which native trees play a critical role as habitat and food source both above ground and in the soil profiles. For DCR's climate resilience initiatives, trees also play an important role in sequestering and storing carbon and of course, providing shade, reducing surface temperatures up to 9°F*.

SOLAR PANEL



- Optimum orientation: due south
- Optimum angle: matching latitude (41-43 degree)

COMMUNITY-BUILDING



- Shared use resources prompting social interaction
- Charging/workstation areas

As structures are installed, each new shade intervention project should follow DCR BMPs for trees, including:

- Protect existing native canopy trees and tree root zones when installing shade structures. Protect drainage patterns to assure healthy trees continue to get water.
- Request a certified arborist provide maintenance to the existing park canopy to improve tree health and visitor safety and if required, make recommendations to amend root zone soils.
- In consultation with Operations staff, locate and request installation of new canopy trees. Protect new tree plantings with split rail fence or post and rope as specified in the Kit of Parts.
- Install hammock poles as specified in the Kit of Parts. By providing an alternative to tying hammocks to trees, which is detrimental to tree bark, hammock poles will help to protect trees.

*Source: https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands

2.5 DCR HISTORIC STRUCTURES

The preservation of historic shade structures—significant cultural resources—is essential not only to providing shade, but to DCR's mission and identity. However, because they are unique, and it would be inappropriate to replicate them, the documentation of existing historic structures is not included in the Kit of Parts. However, these structures provide significant shade and DCR will expand a renovation program for existing and historic shade structures. Historic shade structures and other existing assets can be found here. For a tabular version of this information click here.

For historically significant structures that no longer serve their intended purpose, adaptive reuse could be a means to achieve the DCR mission to protect cultural resources, while meeting contemporary needs. If a structure is historically significant and retains its original character ("historic integrity"), the DCR Office of Cultural Resources may recommend that the structure be sensitively rehabilitated as a site-specific shade structure.

Although adaptive reuse can introduce additional design, permitting, or costs, the preservation of historically significant structures retains embodied energy, keeps waste out of landfills, and may be feasible where new shade structures cannot be permitted. Importantly, these cultural resources may retain a sense of place for the public's enjoyment.

Figure 2-2. *Eliot Pavilion and Tower at Blue Hills Reservation (Credit: DCR)*

Figure 2-3. *Revere Beach Boulevard at Revere Beach Reservation (Credit: DCR)*

Figure 2-4. *Pickle Barrel at Dorchester Shores Reservation (Credit: DCR)*

2.6 NATURE-BASED SOLUTIONS (NBS)

An important element of DCR's Mission is to balance active recreation with the protection of our cultural and natural resources. To this end, all projects should employ nature-based solutions, defined by ResilientMass as "adaptation measures focused on the PROTECTION, RESTORATION, and/or MANAGEMENT of ecological systems to safeguard public health, provide clean air and water, increase natural hazard resilience, and sequester carbon."

NBS is often differentiated as "green" design vs. conventional engineered solutions or "gray" design. Formerly, an area of localized flooding in a lawn area might be addressed by installing a drainage pipe with an outlet into a nearby stream. However, this engineered solution uses manufactured or "gray" components to eliminate a problem—ponding—at one location while potentially creating other problems—increased runoff velocity and streambank scouring—at another location. Nature-based solutions engage natural systems to solve problems. Nature-based solutions might include absorbing runoff by planting a tree that prefers hydric soils like black willow, installing a vegetated swale planted with wetland woody or herbaceous species, or returning the area to forested wetland and reducing the size of the lawn or relocating it.

Likewise, for the shade interventions, it is important that the solution to one climate impact, extreme heat, not create other impacts to a site. Therefore, the design of shade projects will employ NBS in treatment of stormwater management, installation of utilities, and maintenance of the structures.

Credit: DCR

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III. KIT OF PARTS OVERVIEW

3.1 TREE CANOPY*

3.2 PAVILION

3.3 BENCH SHELTER

3.4 CANOPY

3.5 AWNING

3.6 UMBRELLAS

3.7 GAZEBO

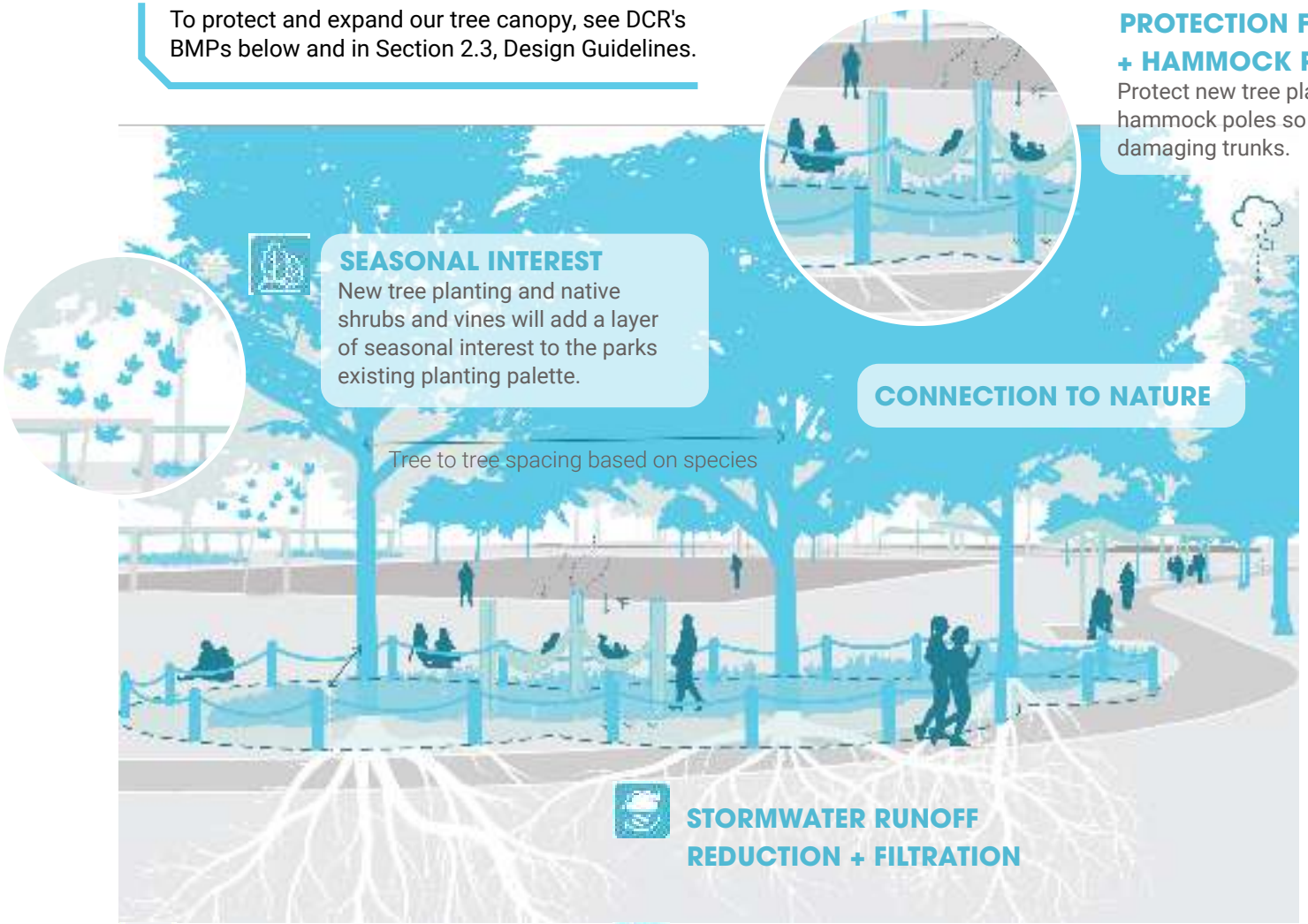
3.8 PERGOLA

3.9 SOLAR CHARGING SHELTER

*See Section 2, Design Guidelines for the importance of native canopy trees, BMPs to protect them and MP to protect them.

3.1 TREE CANOPY

To protect and expand our tree canopy, see DCR's BMPs below and in Section 2.3, Design Guidelines.



PROTECTION FENCING + HAMMOCK POSTS

Protect new tree plantings with fencing and install hammock poles so visitors can enjoy tree shade without damaging trunks.

SURFACE TEMPERATURE & AIR POLLUTION REDUCTION

TREE SPECIES

All tree species specified should be native to the park's ecoregion, see Natural Heritage and Endangered Species (NHESP) *BioMap2* for Mass's 8 ecoregions and crosscheck NHESP's *The Vascular Plants of Massachusetts: A County Checklist*, to confirm native status.

TREE PLANTING

Tree planting locations and species selection are site specific and should be coordinated on site by Operations staff, project managers, and certified arborists.

TREE MAINTENANCE

Existing trees in the vicinity of DCR's priority locations for shade should be evaluated by a certified arborist and maintenance BMPs implemented by the arborist, including fertilization, decompaction, watering, preventive pruning, etc.

TREE + SOIL PROTECTION

Shade structure installation should not destroy soil structure or impact tree rooting zones.

NATIVE HERBACEOUS PLANTING

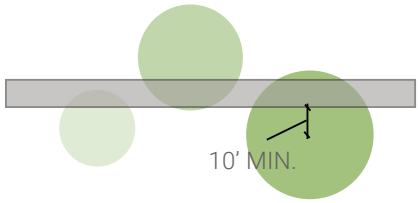
Plant native grasses, wildflowers, and other herbaceous plants where tree spacing doesn't allow for mowing access.

3.1 TREE CANOPY

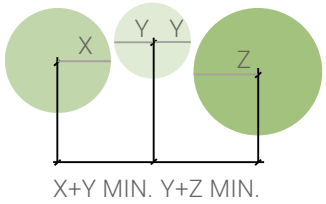
Critical natural resource and priority shade intervention

TREE SPACING:

Min. distance from face of walkway: 10' min.



Min. distance apart= sum of radii of both tree canopies



ADDITIONAL PLANTING CONSIDERATIONS:

- Direction of the sun
- Growth rate of proposed trees
- Soil type/quality
- Provide understory plants for habitat and interest under the proposed shade tree where appropriate.

GENERAL CONDITIONS, MIXED SIZES, GROWTH RATES, FALL COLORS

MIN. MATURE HEIGHT >45'
WHITE BIRCH *(Betula papyrifera)**
SHAGBARK HICKORY *(Carya ovata)*
TULIP TREE *(Liriodendron* tulipifera)
RED OAK (Quercus rubra)

35'-45'
RED MAPLE *(Acer rubrum)*
HACKBERRY *(Celtis occidentalis)*

<35'
BLACK GUM *(Nyssa sylvatica)*

MEDIUM-WET CONDITIONS, LOW, CONSTANTLY WET AREAS

MIN. MATURE HEIGHT >45'
YELLOW BIRCH *(Betula allegheniensis)*
WHITE BIRCH *(Betula papyrifera)*
SWAMP WHITE OAK *(Quercus bicolor)*

35'-45'
RED MAPLE *(Acer rubrum)*
HACKBERRY *(Celtis occidentalis)*

<35'
BLACK GUM *(Nyssa sylvatica)*

URBAN CONDITIONS, AIR POLLUTION

MIN. MATURE HEIGHT >45'
SCARLET OAK *(Quercus coccinea)*
RED OAK *(Quercus rubra)*

35'-45'
RED MAPLE *(Acer rubrum)*
HACKBERRY *(Celtis occidentalis)*

<35'
BLACK GUM *(Nyssa sylvatica)*

DRY-MEDIUM CONDITIONS DROUGHT CONDITIONS

MIN. MATURE HEIGHT >45'
SHAGBARK HICKORY *(Carya ovata)*
WHITE OAK *(Quercus alba)*
SCARLET OAK *(Quercus coccinea)*
RED OAK *(Quercus rubra)*

<35'
BLACK GUM *(Nyssa sylvatica)*
HOP HORNBEAM *(Ostrya virginiana)*

*Note: The species listed are example species; all tree species specified should be native to the park's ecoregion.

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3.2 PAVILION

In large parks, adjacent to grassy fields, consider the placement of a large pavilion for big groups. Size the pavilion and design the accessible route, stormwater runoff, and utilities (water/ power) to meet DCR's climate resilience goals and to protect the natural features of the park. Install a rooftop solar array to power music, devices and electric grills. Coordinate DCR policy for use (first come, first serve or by reservation). Different parks have different pavilion styles including octagonal structures; match existing design elements whenever possible, including roof color and materials.

STORM-WATER MANAGEMENT

Adjacent plant beds provide storage for storm-water recharge, creating a sustainable and attractive rainwater management solution.

SOLAR ENERGY

Provides a comfortable and functional shaded seating area while also promoting sustainability. The solar panels power the charging stations, reducing the need for grid electricity.

SOCIAL GATHERING

Provides a comfortable, shaded space for community gathering. The large footprint allows for a variety of layouts that can support a large range of community events.

ACCESSIBLE TO ALL

Level landings adjacent to pavilion allow for a larger accessible surface and improved user safety.

3.2A RECTANGULAR PAVILION

Picnic / Gathering Space

Large-Scale - Linear

SIZE:

- Small - 20’x30’
- Medium - 30’x48’
- Large - 40’x80’

ROOF OPTION:

- Gable roof

MATERIALS:

- Wood frame
- Shingle roof
- Composite slate

ROOF COLOR:

- Matching existing
- Grey-green

ACCESSIBLE SURFACE TREATMENT:

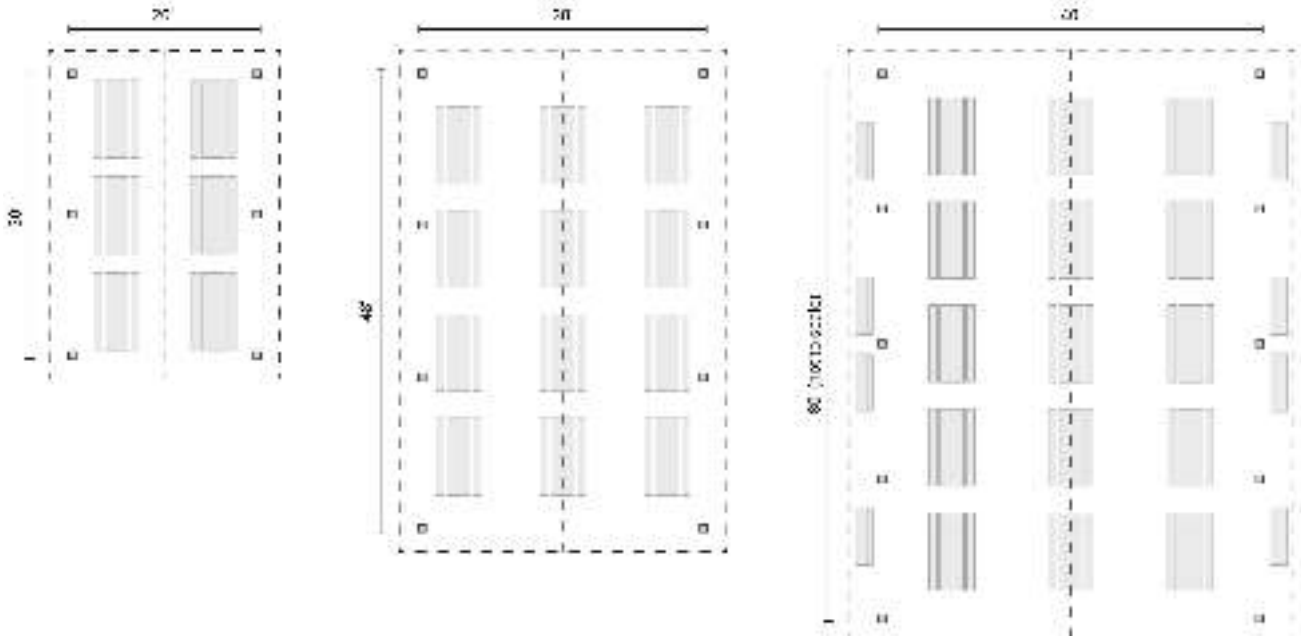
- Concrete
- Permeable pavers
- Stabilized soil

SITE FURNISHINGS:

- DCR standard picnic tables
- DCR perimeter benches

SMALL **MEDIUM** **LARGE**

ELEVATION VIEW



PLAN VIEW

Note: Picnic table and bench arrangement diagrammatic only. Place site furnishings to enhance views, allow ease of movement and provide flexibility for event programming.

3.2B OCTAGONAL PAVILION

Picnic / Social Gathering
Large-Scale
No Railings

SIZE:

- 30'-40' Dia.

ROOF OPTION:

- Hip roof
- Tiered roof

MATERIALS:

- Wood frame
- Shingle roof
- Composite slate

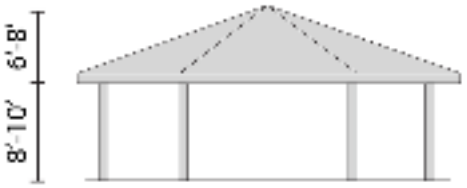
ACCESSIBLE SURFACE TREATMENT:

- Concrete
- Permeable pavers
- Stabilized soil

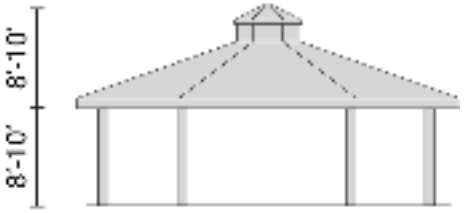
SITE FURNISHINGS:

- May incorporate DCR standard tables and/or perimeter benches, as appropriate

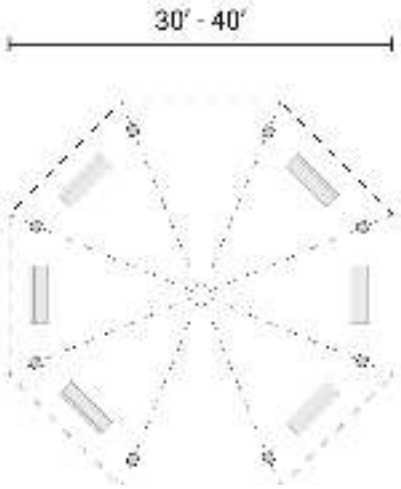
HIP ROOF

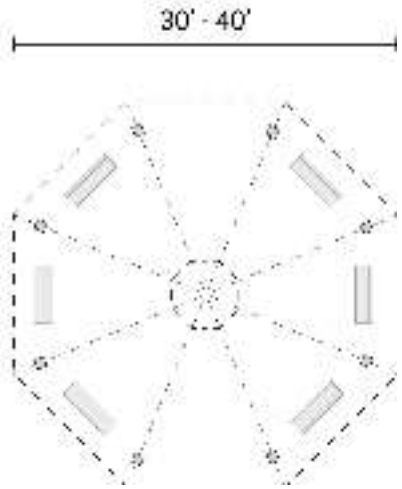


TIERED ROOF



ELEVATION VIEW



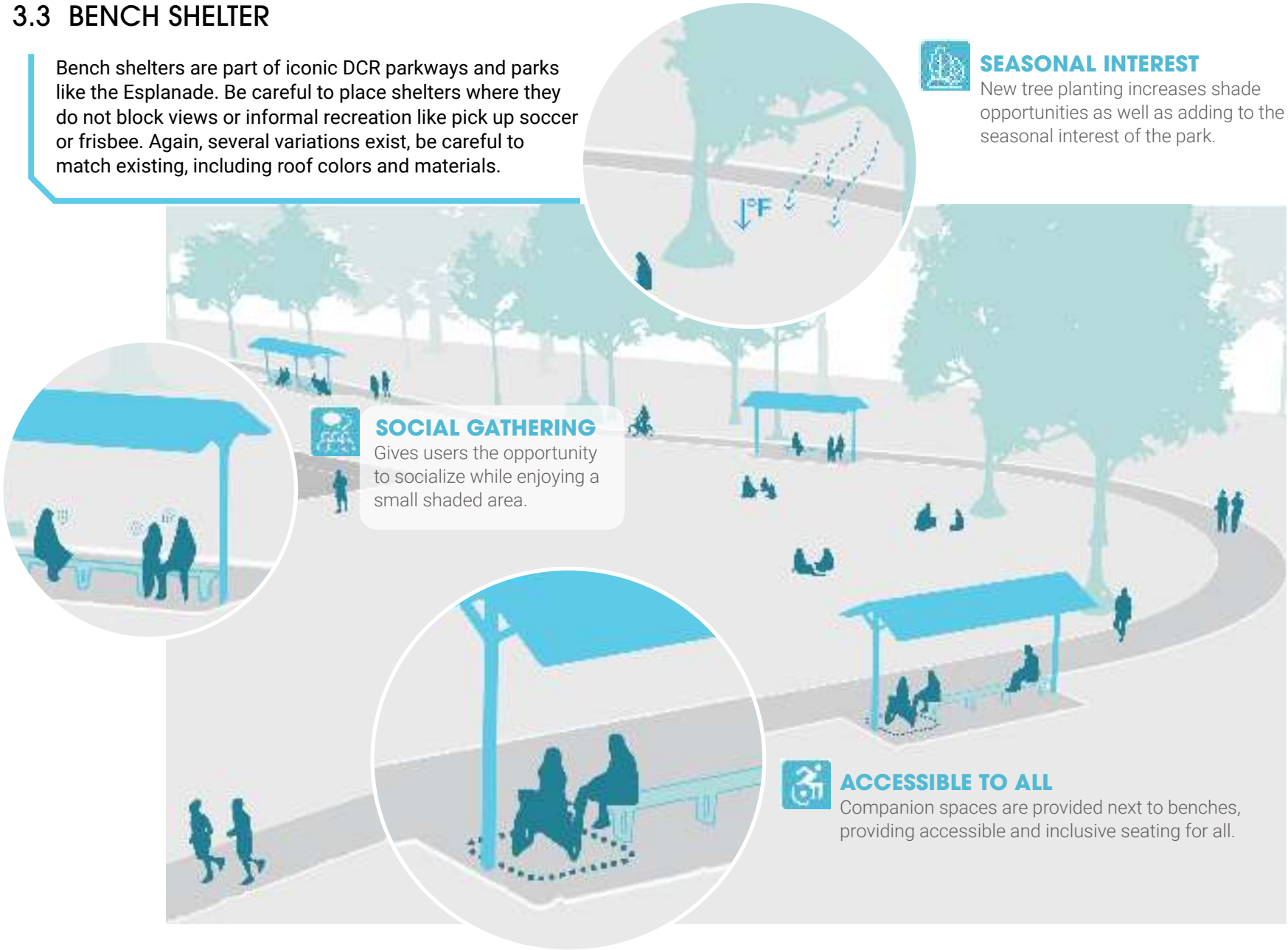


PLAN VIEW

Note: Bench arrangement diagrammatic only. Place site furnishings to enhance views, allow ease of movement and provide flexibility for event programming.

3.3 BENCH SHELTER

Bench shelters are part of iconic DCR parkways and parks like the Esplanade. Be careful to place shelters where they do not block views or informal recreation like pick up soccer or frisbee. Again, several variations exist, be careful to match existing, including roof colors and materials.



SEASONAL INTEREST
New tree planting increases shade opportunities as well as adding to the seasonal interest of the park.

SOCIAL GATHERING
Gives users the opportunity to socialize while enjoying a small shaded area.

ACCESSIBLE TO ALL
Companion spaces are provided next to benches, providing accessible and inclusive seating for all.

3.3 BENCH SHELTER

Walkway-adjacent covered seating/trailheads
Small-scale

ROOF OPTION:

- Hip roof
- Gable roof

MATERIALS:

- Wood frame
- Shingle roof
- Composite slate

ROOF COLOR:

- Matching existing
- Grey-green

ACCESSIBLE SURFACE TREATMENT:

- Concrete
- Permeable pavers
- Stabilized soil

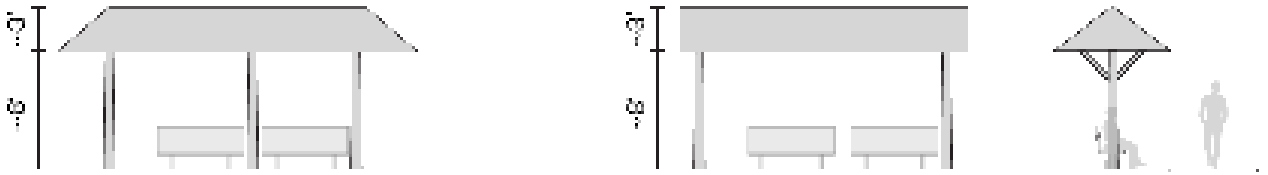
SITE FURNISHINGS:

- DCR standard benches

ROOF OPTIONS:

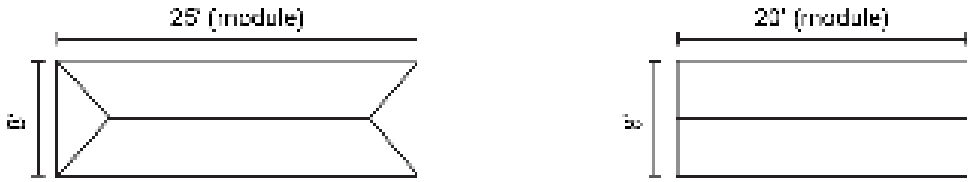
HIP ROOF

GABLE ROOF



ELEVATION VIEW

SIDE ELEVATION



PLAN VIEW

COLUMN OPTIONS:

CENTER POST

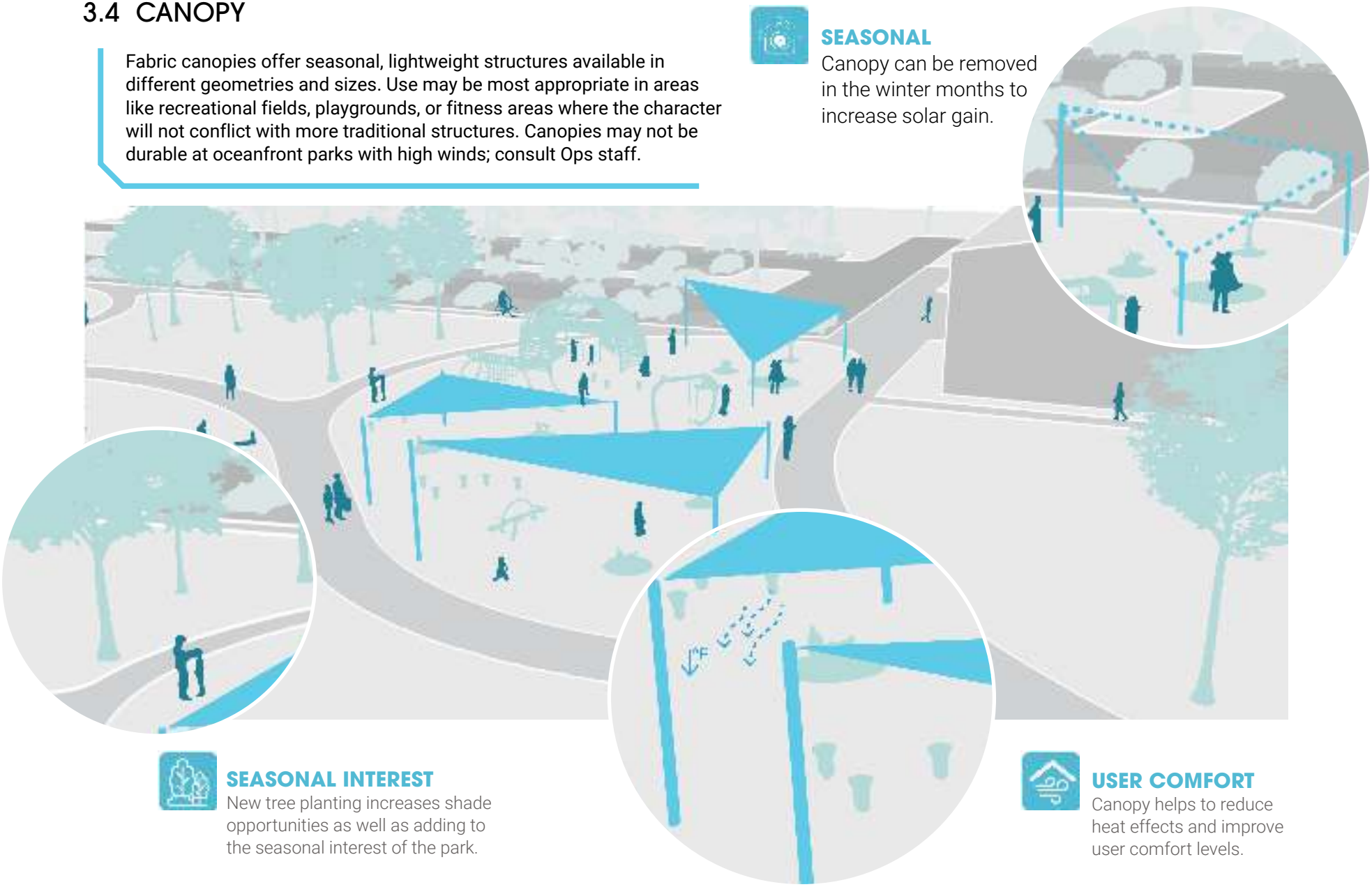
CORNER POST

PLAN VIEW

3.4 CANOPY

Fabric canopies offer seasonal, lightweight structures available in different geometries and sizes. Use may be most appropriate in areas like recreational fields, playgrounds, or fitness areas where the character will not conflict with more traditional structures. Canopies may not be durable at oceanfront parks with high winds; consult Ops staff.

SEASONAL
Canopy can be removed in the winter months to increase solar gain.



SEASONAL INTEREST
New tree planting increases shade opportunities as well as adding to the seasonal interest of the park.

USER COMFORT
Canopy helps to reduce heat effects and improve user comfort levels.

3.4 CANOPY

Lightweight fabric structure
Seasonal applications
Playground / active fitness

SIZE:
- Small/medium/large

ROOF OPTION:
- Fabric

MATERIALS:
- Metal frame

COLOR:
- Match existing
- Off white
- Add DCR logo where appropriate

POSSIBLE MANUFACTURERS:
- USA SHADE
- Shade Systems Inc.
- Poligon
- Apollo Sunguard

SHADE SAILS
(Credit: USA SHADE)

MULTI-SIDED FRAME
(Foss Park; Credit: DCR)

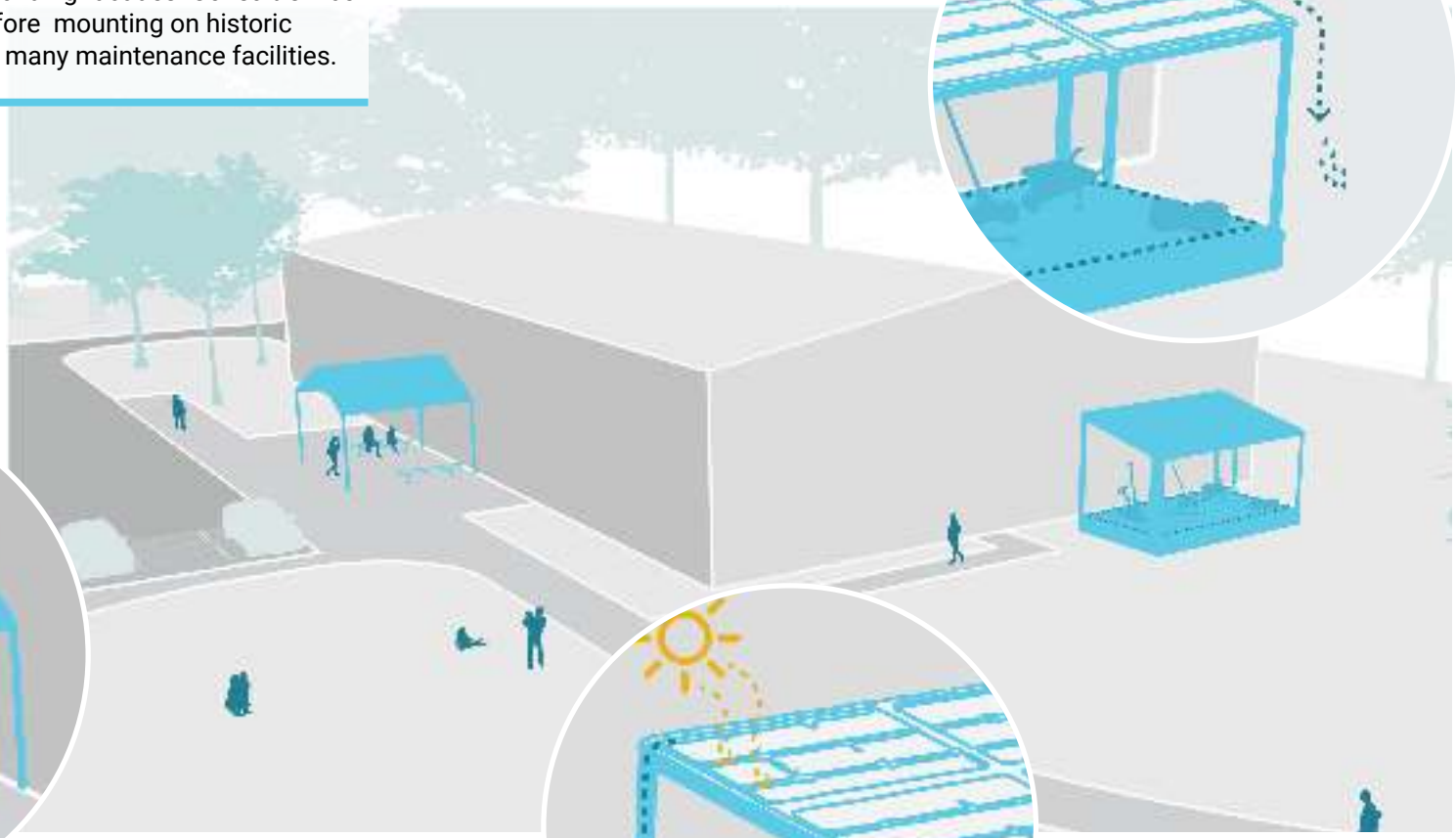
SINGLE-POST / CANTILEVER
(Magazine Beach; Credit: DCR)

3.5 AWNING

Awnings can provide shade for visitor queuing, interpretive programs, or staff break areas. Choose options to complement building facades. Consult Office of Cultural Resources before mounting on historic structures, which include many maintenance facilities.

COVERED STORAGE
Awning provides some protection from the elements for maintenance equipment.

EXISTING STRUCTURES
Underutilized existing awning structures can be evaluated and reprogrammed to better serve the park's shade needs.



SOCIAL GATHERING
Utilizing an existing awning structure creates an opportunity for socialization at building entries.

SOLAR ENERGY
The addition of solar charging to awnings can be used for various maintenance team needs.

3.5 AWNING

Enhancement to existing structure/building
Entry / exit gathering areas
Maintenance / staff areas

MATERIALS:

- Galvanized steel
- Fabric: 100% solution-dyed woven, UV resistant fabrics

COLOR:

- Match existing
- Off white
- Add DCR logo where appropriate

MOUNTING OPTIONS:

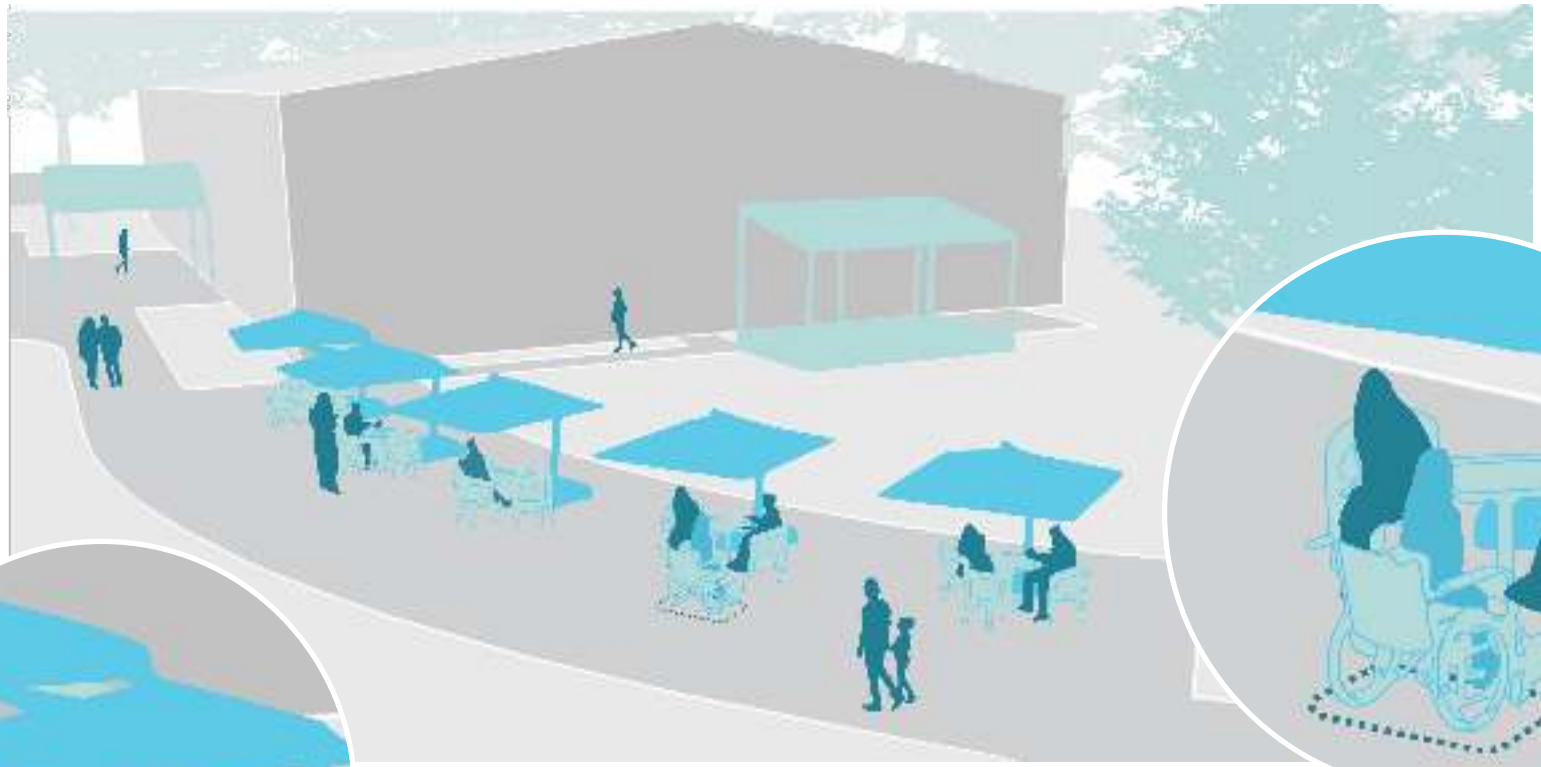
- Wall
- Soffit
- Roof
- Freestanding

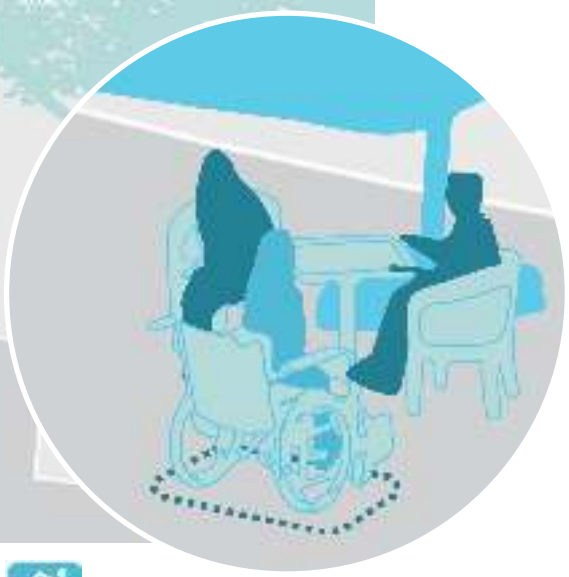
Credit: Pvilion

Source: Google Map

3.6 UMBRELLAS

Umbrellas offer a means to provide angled shade.
Coordinate color selection with park site furnishings.





USER COMFORT

Improves user visual comfort by controlling glare and reducing contrast ratios. Shade lowers thermal sensation, increasing thermal comfort from Spring through Fall.

ACCESSIBLE TO ALL

The umbrella shade structure is designed to be accessible to everyone. The structure can be configured for any location allowing gathering for users of all abilities.

3.6 UMBRELLAS

Flexible/adaptable shade intervention

MATERIALS:

- Fabric: UV, water resistant acrylic
- Stainless steel

COLOR:

- Match existing
- Off white
- Add DCR logo where appropriate

UMBRELLA – GRAINGER (COMMERCIAL GRADE)
ITEM 49XM70
MFR. MODEL 98382031

- 7.5 ft width
- 8.8 ft height base to top of umbrella.
- 6.3 ft height base to bottom of umbrella ribs.
- Fabric is UV, water resistant acrylic.
- Has a pressure release vent.
- Cost of umbrella is $452 plus shipping and tax.
- Note that the base and the table in the link are not included with the umbrella

UMBRELLA BASE – HOME DEPOT
MODEL # CRL070
STORE SKU # 1008084592

- This base is 70 lb weight and can be bolted down to the deck.
- Stainless steel
- Cost of base is $423 plus shipping and tax

3.7 GAZEBO

A centerpiece or focal point of a park. Smaller than the typical octagon pavilion, a Gazebo provides a similar flexible gathering space along an accessible route. Gazebos should have utilities (water/power) where possible to accommodate a wide variety of uses. Coordinate DCR policy for use (first come, first serve or by reservation).

SOLAR ENERGY

Provides a comfortable and functional shaded seating area while also promoting sustainability. The solar panels power the charging stations, reducing the need for grid electricity.

AIR FLOW

Tiered roof on larger structures for increased air flow.

SOCIAL GATHERING

Provides a comfortable, shaded space for community gathering. The large footprint allows for a variety of layouts that can support a large range of community events. Open floor plan for operational flexibility.

3.7 GAZEBO

Elevated, oriented for performance
With railings

SIZE:

- Small - 12'-18' dia.
- Large - 24'-30' dia.

SHAPE:

- Hexagon
- Octagon

ROOF OPTION:

- Hip roof: for small size
- Tiered roof: for large size

MATERIALS:

- Wood frame
- Shingle roof
- Composite slate

ACCESSIBLE SURFACE TREATMENT:

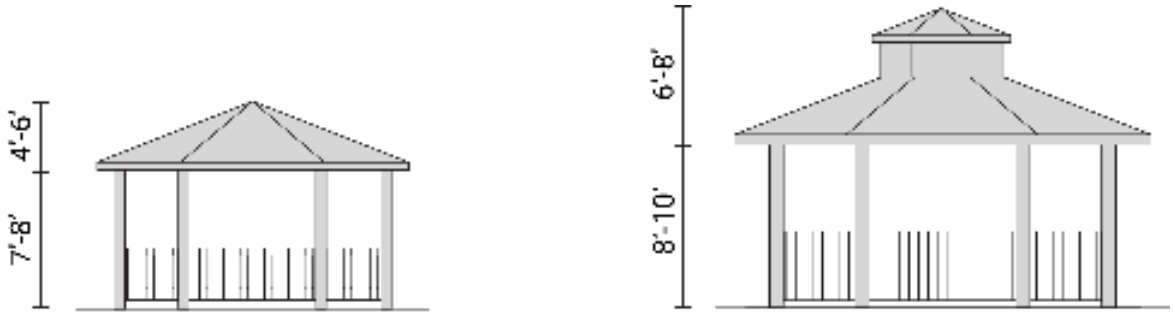
- Concrete
- Permeable pavers
- Stabilized soil

SITE FURNISHINGS:

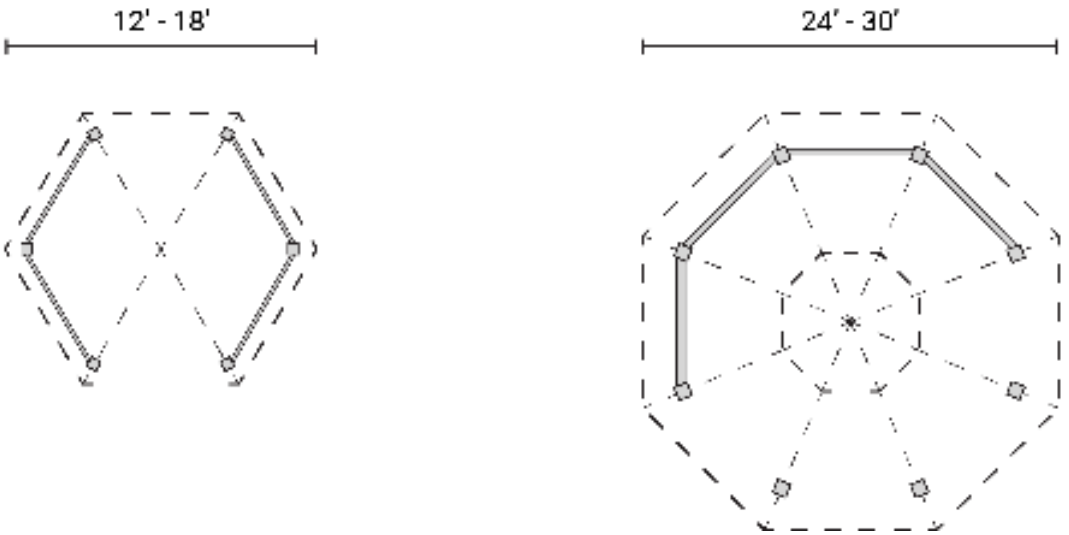
*Not included for program flexibility

SMALL

LARGE



ELEVATION VIEW



PLAN VIEW

3.8 PERGOLA

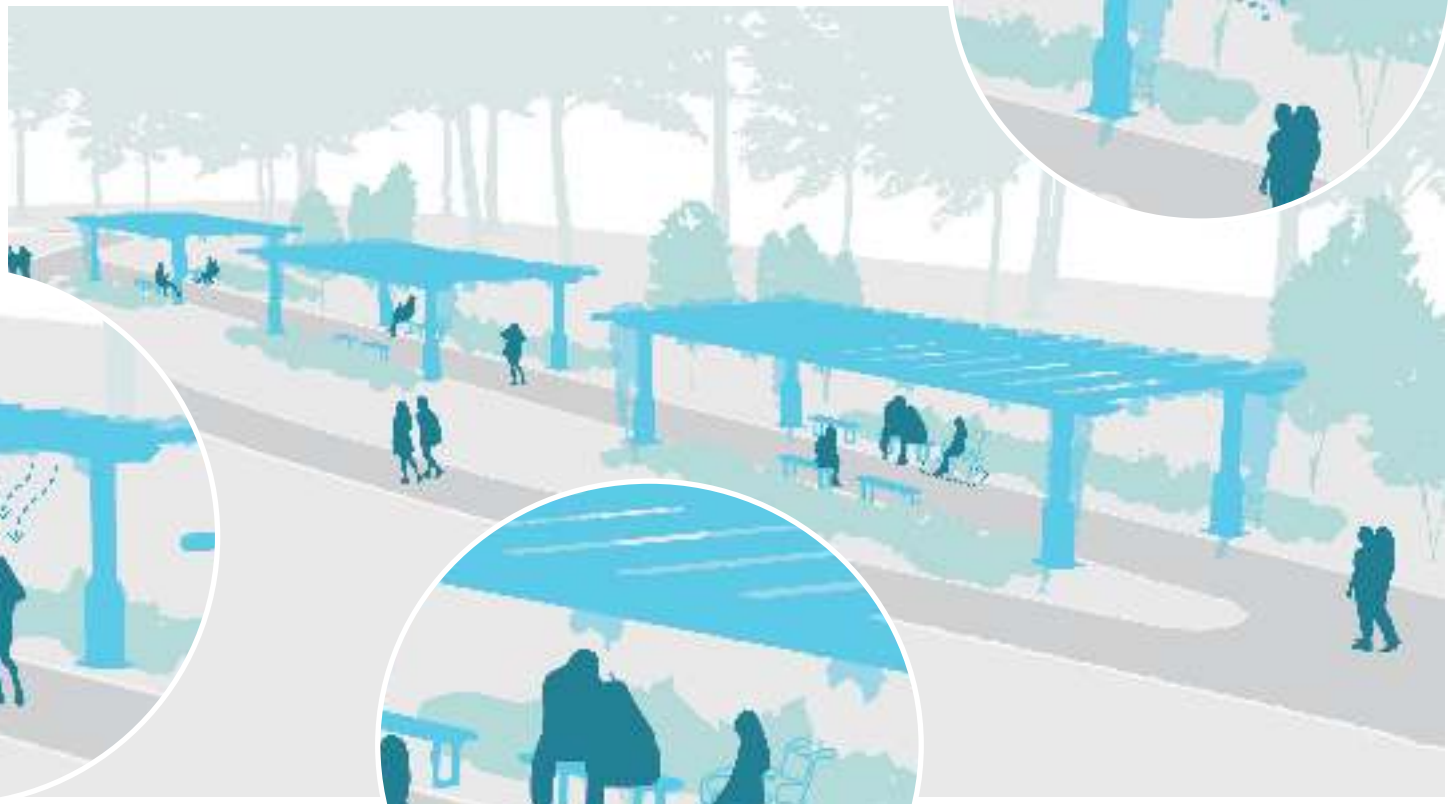
Pergolas are typically custom elements for smaller scale parks, although large-scale pergolas are located at Mary Jeanette Murray Bathhouse at Nantasket Beach Reservation and Holyoke Heritage Park.

SEASONAL INTEREST

New tree planting and native shrubs and vines will add a layer of seasonal interest to the parks existing planting palette.

USER COMFORT

Overhead structure and vegetation help reduce heat effects and improve user comfort levels.



ACCESSIBLE TO ALL

Companion spaces are provided next to benches, providing accessible and inclusive seating for all.

3.8 PERGOLA

Dappled shade
Seating or walkway in garden setting
Integrated planting element

SIZE:

- Small
- Medium

ROOF OPTION:

- Flat roof

MATERIALS:

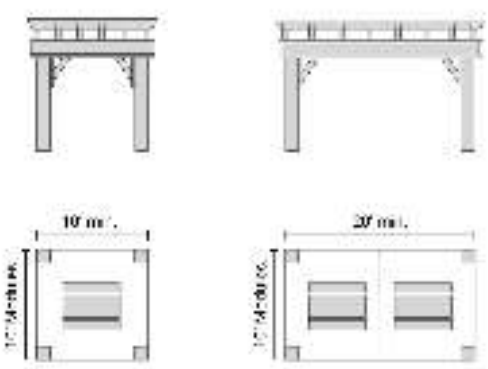
- Wood frame

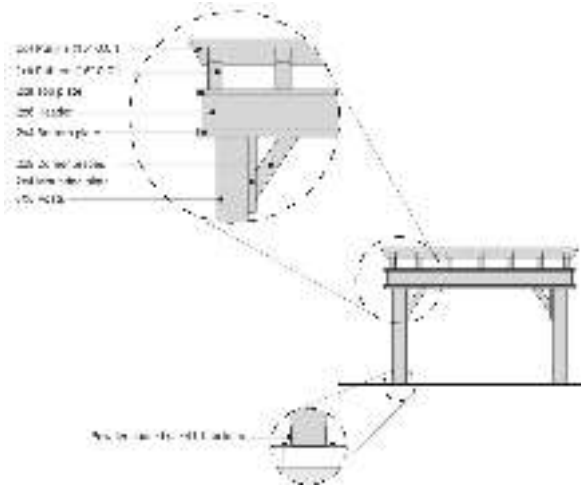
CO-BENEFIT:

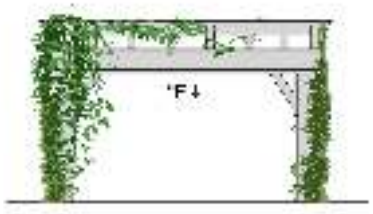
PERGOLA + AT GRADE PLANTING

- Nature-based solution providing habitat and food source for pollinators

SMALL **MEDIUM**







Extents of hardscape below and overhang above

Deciduous, native to Massachusetts,
Fast-growing, attract wildlife

EXAMPLE SPECIES:

WOODBINE
(*Clematis virginiana)*

White blooms, attracts pollinators, twines to climb (may need trellis to climb efficiently)

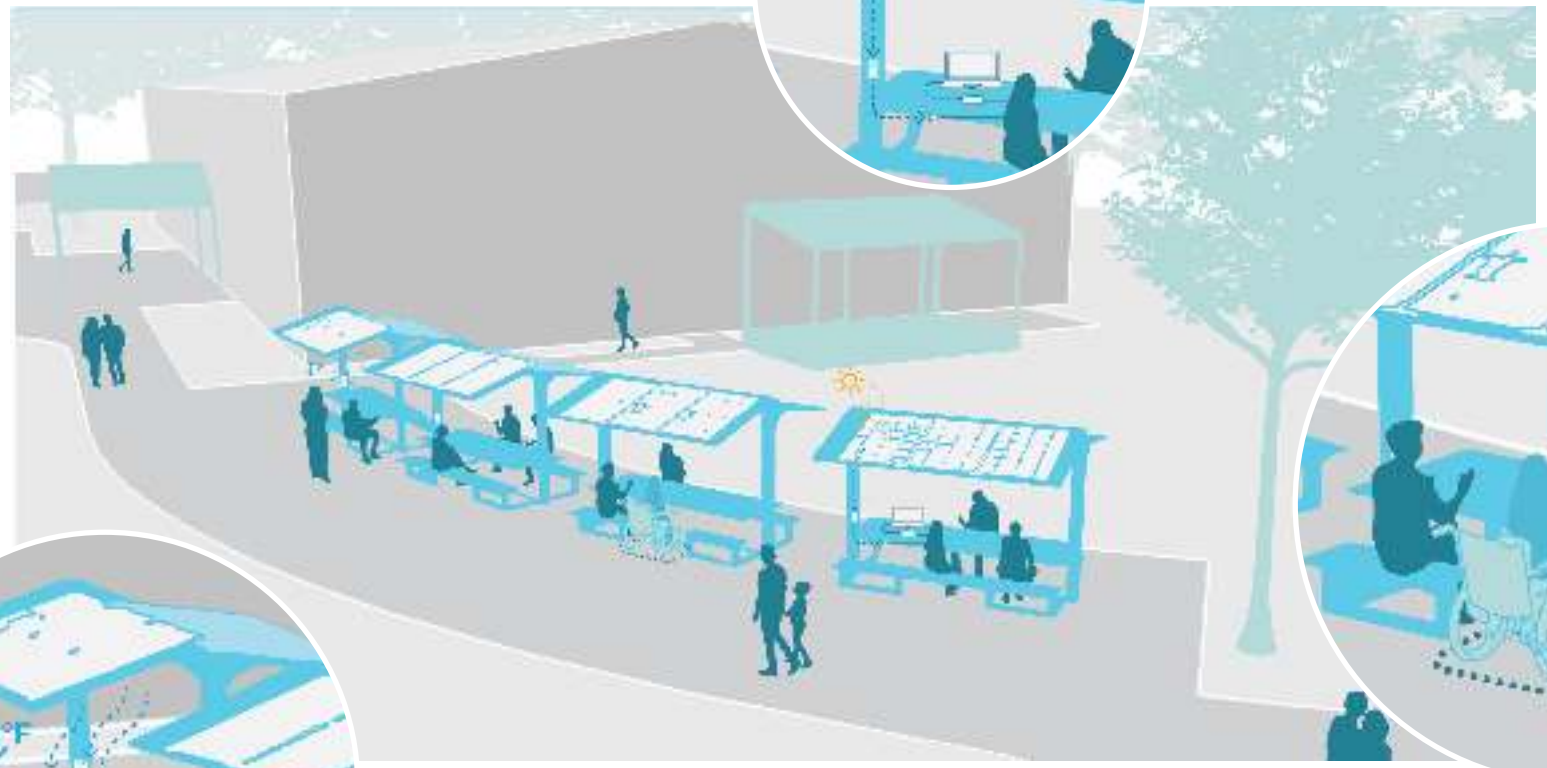
VIRGINIA CREEPER
(Parthenocissus quinquefolia)

Blue berries, attracts birds, tendrils with discs (can destroy climbing surface)

Source: Internet

3.9 SOLAR CHARGING SHELTER

Offering convenient charging and power, shade shelters with solar arrays may inspire gatherings like classes, camps, or remote work as well as picnicking.



SOLAR ENERGY

Provides a comfortable and functional shaded seating while also promoting sustainability. The solar panels power the charging stations, reducing the need for grid electricity.

USER COMFORT

Improves user visual comfort by controlling glare and reducing contrast ratios, leading to increased satisfaction and productivity. Shade lowered thermal sensation, increasing thermal comfort from Spring through Fall.

ACCESSIBLE TO ALL

The solar shade structure is designed to be accessible to everyone. The structure is equipped with optional bench seats that can be configured for any location allowing gathering for users of all abilities.

3.9 SOLAR CHARGING SHELTER

PRODUCT SPECIFICATION

Solar charging shelters shall be the Haven by Spotlight Solar, www.spotlightsolar.com, or approved equal.

- Finishes shall be as follows:
- Table Top – Recycled Solid Surface Acrylic
- Bench – Thermally Modified Ash
- Frame – Powder-coat Aluminum
- Bench layout shall provide an ADA space on one side of the table.
- Color shall be selected by owner from the full range of color options, including custom.
- Lighting option to be determined by Owner based on site specific conditions.
- Order of Magnitude Cost: $28,000 (varies based on final accessory selections)

Figure 3.9. *Solar charging shelters at Melnea A.Cass Recreational Complex (Credit: DCR)*

Installation Notes

- Self-assembly from shipped parts (Max weight 150lbs)
- Forklift required for offload
- Accessible, durable ground plane surface for placement
- No footings or ground mounting required

Operations and Maintenance Notes

- Re-sealing of wood bench surface as needed
- Buffing of table top surface for any markings /graffiti
- 15+ year expected battery life (6 year warranty)

DCR Reference Projects

- Melnea A. Cass Recreational Complex

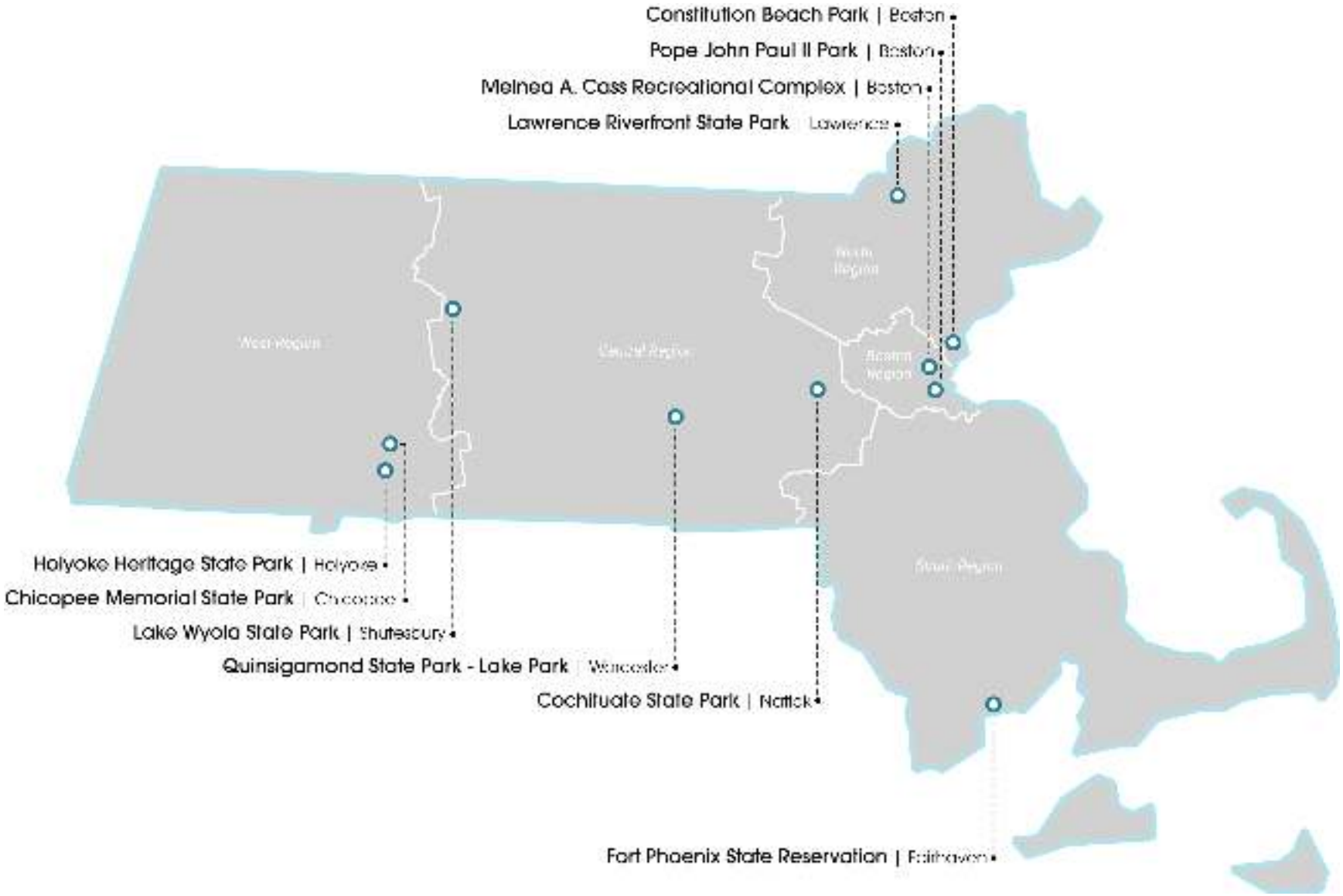


Figure 4-1. *Key map of ten pilot project sites*

IV. PILOT PROJECTS*

*The methodology used to identify the 10 Pilot Project sites is described in Section 1.1. Concept plans, descriptions of the proposals and lessons learned for each site follow.

4.1 LAKE WYOLA STATE PARK | SHUTESBURY

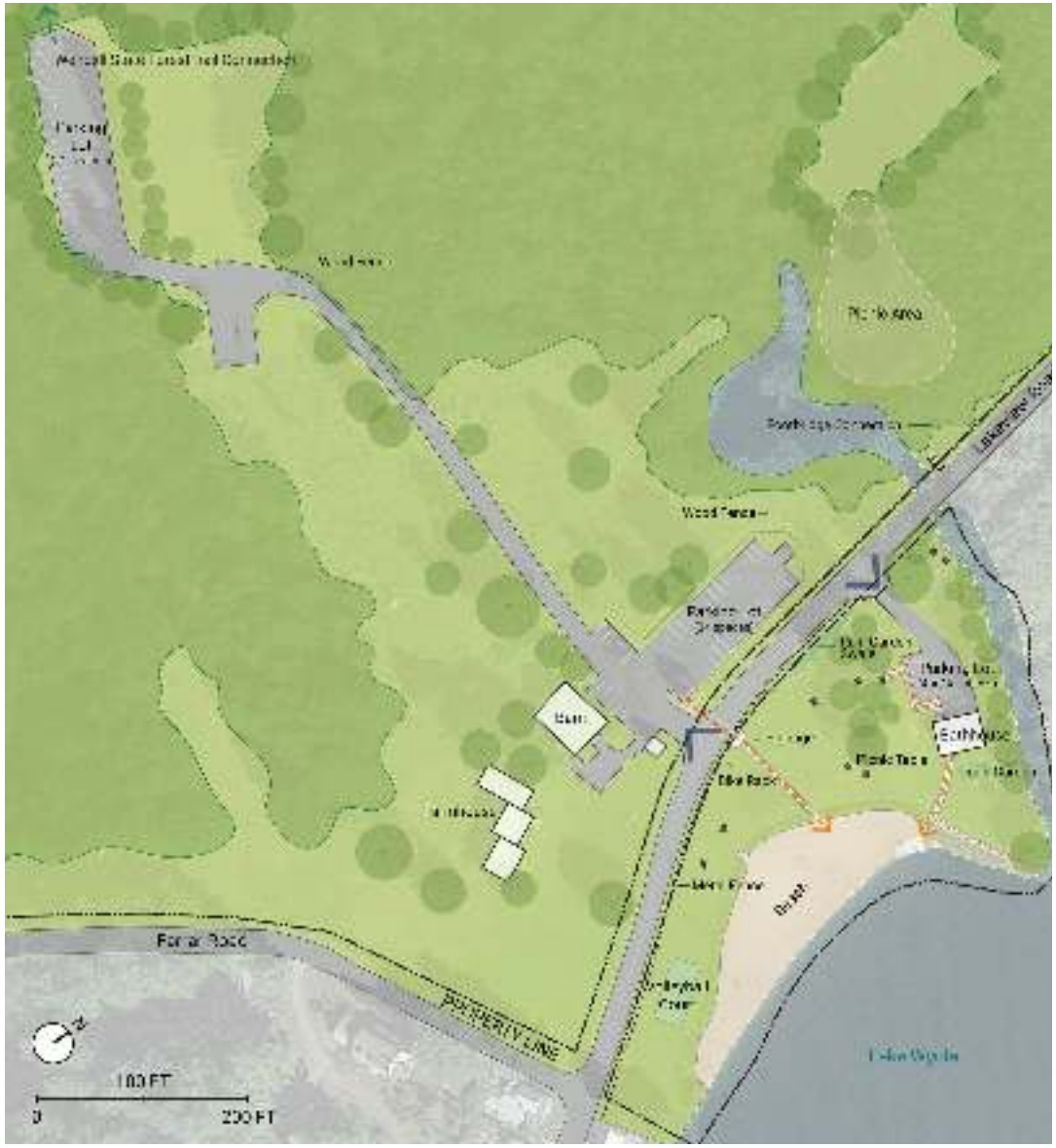


Figure 4.1-1. *Existing conditions plan*

Proposed:

- (1) Small pavilion
- (2) Medium pavilions
- Tree planting

A small pavilion is proposed adjacent to the waterfront and restrooms and along an accessible route; pavilion to match the existing restroom architecture. Tree plantings proposed to enlarge the existing grove of trees. Per the guidelines, the trees will be protected by a fence. In addition, medium pavilions are proposed for 2 locations that are currently underutilized but offer beautiful views, a grassy area adjacent to the remote parking and a woodland clearing. Both locations would require the installation of accessible paths.

Lessons Learned:

An abutter to the park has complained about noise; structures were not proposed in that vicinity at this time. Accessible connections in resource areas may be expensive to permit and construct. Some beachfront area was formerly a parking lot, which may impact current drainage and planting. The farmhouse may become a Historic Curatorship Project, therefore, increased coordination with Office of Cultural Resources will be essential to balance future improvements and appropriate shade installations in the area.

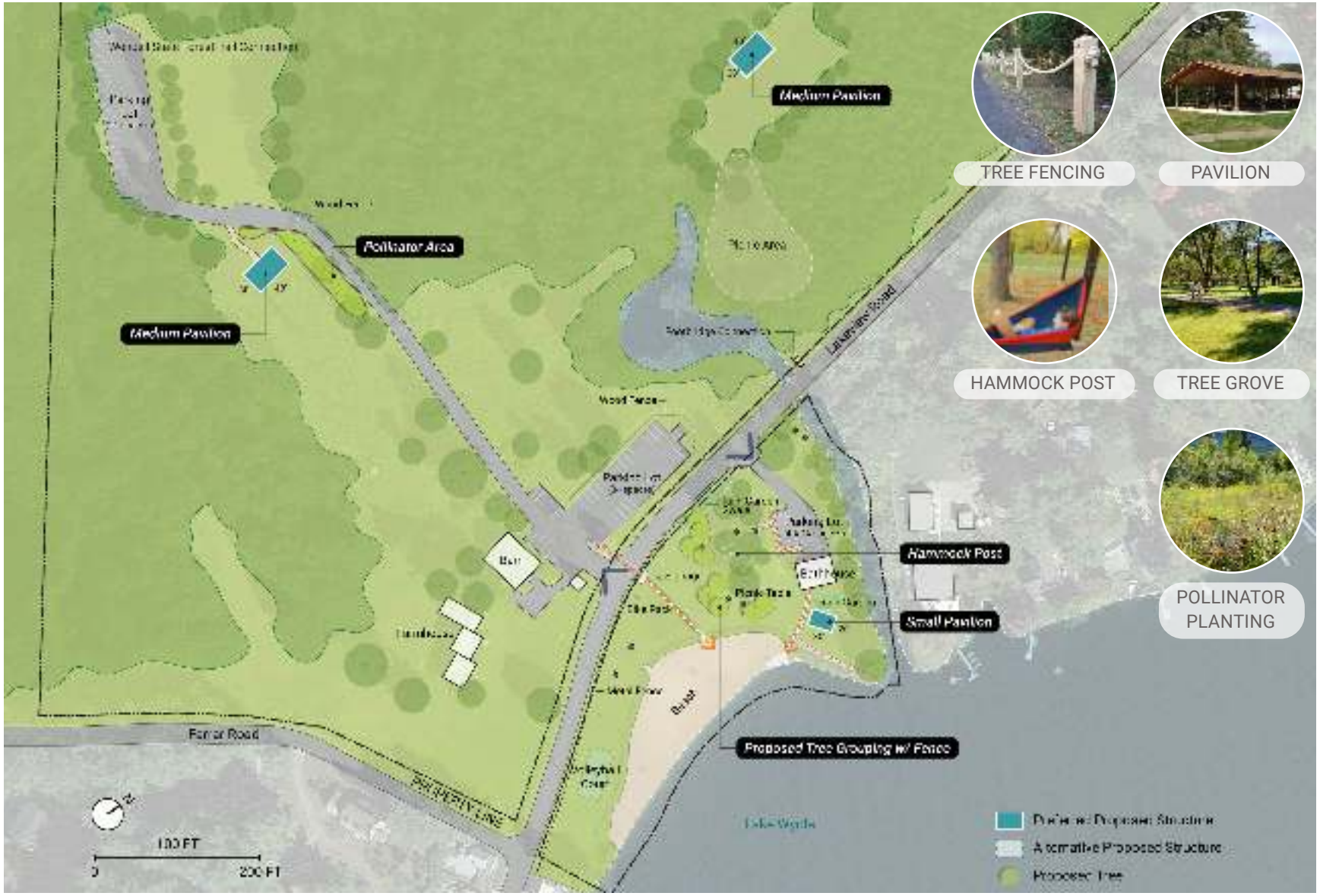


Figure 4.1-2. *Site plan with proposed elements*

4.2 HOLYOKE HERITAGE STATE PARK | HOLYOKE

Figure 4.2-1. *Existing conditions plan*

Proposed:

- (1) Custom large pergola
- (1) Custom small pergola
- (2) Shelters

One of the hottest areas shown by the data-driven suitability assessment was the grassy lawn on site, however during the site visit it was revealed that modifications to the grassy lawn would be in conflict with staging for annual summer concerts. Following Operations staff recommendations, bench shelters around the lawn perimeter were proposed for this area. A large pergola to match existing is proposed at the west end of the park, overlooking the canal, as a senior housing project is under development across the street. In the center of the park, a small pergola is proposed between 2-5- and 5-12-year-old play areas.

Lessons Learned:

Proposed shade structures will need to match very distinctive custom pergolas which reference the industrial history of the site. Community events like concerts—and the staging and sight lines they require—may preclude installing shade structures.

Figure 4.2-2. *Site plan with proposed elements*

PERGOLA
(To match existing)

CUSTOM SHADE STRUCTURE
(Existing)

SHELTER

Preferred Proposed Structure

Alternative Proposed Structure

4.3 CHICOPEE MEMORIAL STATE PARK | CHICOPEE

Figure 4.3-1. *Existing conditions plan*

Proposed:

- (2) Medium pavilions
- (2) Shelters

Two pavilions are proposed, one along the reservoir, adjacent to amenities and the other next to remote parking to activate a lawn. In addition, bench shelters are proposed along the road to the restrooms.

Lessons Learned:
The pavilions should match the CCC-inspired existing pavilions on site. DCR considered eliminating this design, as birds and bees can roost on the joists, but Ops felt this is not a concern and design consistency is a priority. Areas close to amenities are crowded and siting shade structures is a challenge. The riverfront area is next to freshwater wetlands, which should be reviewed by Office of Natural Resources.

Figure 4.3-2. *Site plan with proposed elements*

4.4 QUINSIGAMOND STATE PARK - LAKE PARK | WORCESTER

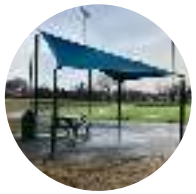
Figure 4.4-1. *Existing conditions plan*

Proposed:

- (1) Large canopy
- (2) Cantilevered canopies
- Tree planting

One large canopy is proposed for spectators and practices at the west end of the field. Two canopies are proposed for sports participants. Tree planting is proposed along Lake Ave. and adjacent to parking.

Lessons Learned:
Tree planting adjacent to synthetic turf field increases maintenance significantly. Proposed scope of capital projects required coordination. Spectator seating coordinated with Recreational Fields Program. Some tree planting coordinated with Greening the Gateway Cities demonstration planting.



LARGE CANOPY

FLOWERING TREE

CANTILEVERED CANOPY

COLUMNAR TREE

TULIP TREE

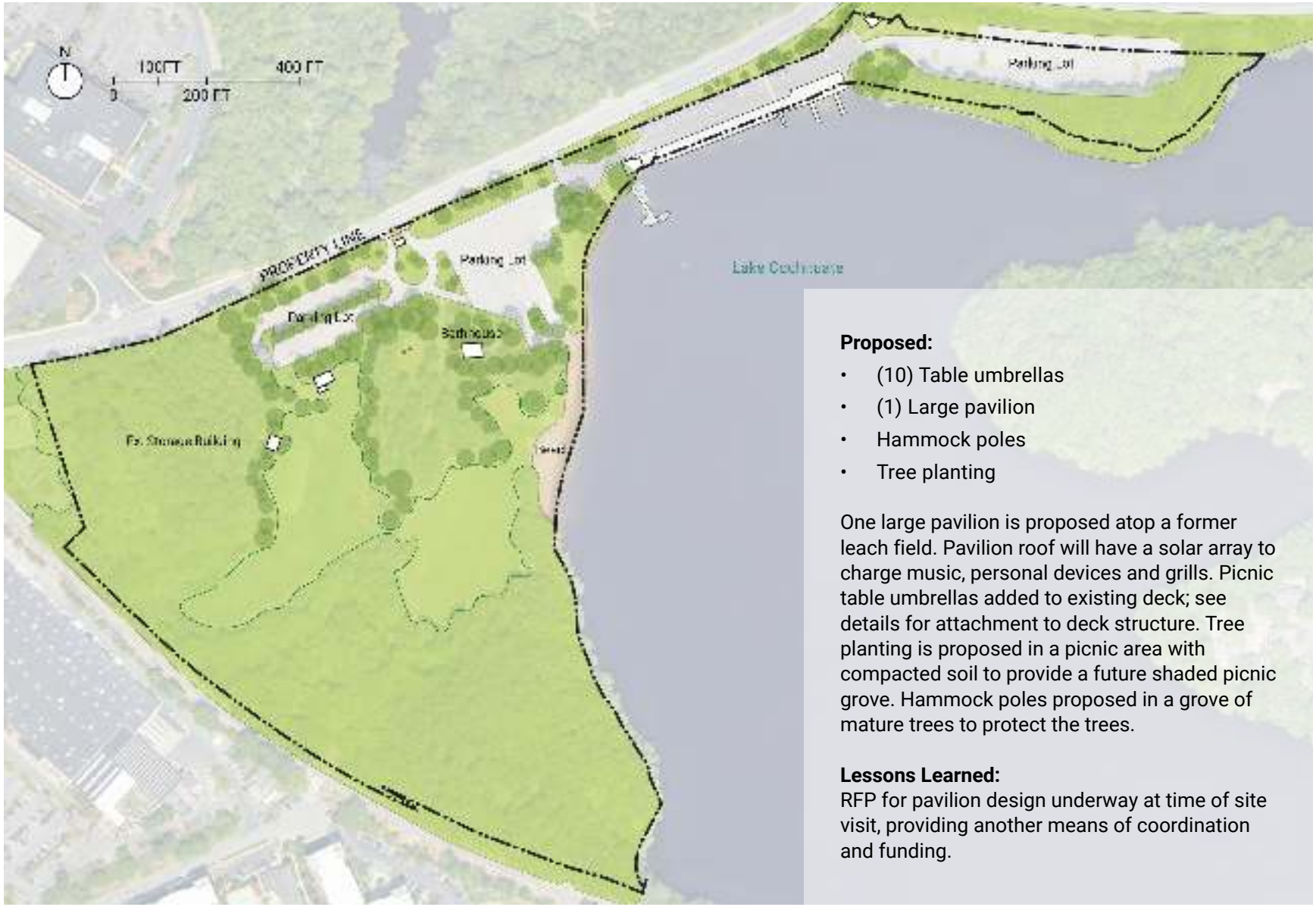
Preferred Proposed Structure

Alternative Proposed Structure

Proposed Tree

Figure 4.4-2. *Site plan with proposed elements*

4.5 COCHITUATE STATE PARK | NATICK



Proposed:

- (10) Table umbrellas
- (1) Large pavilion
- Hammock poles
- Tree planting

One large pavilion is proposed atop a former leach field. Pavilion roof will have a solar array to charge music, personal devices and grills. Picnic table umbrellas added to existing deck; see details for attachment to deck structure. Tree planting is proposed in a picnic area with compacted soil to provide a future shaded picnic grove. Hammock poles proposed in a grove of mature trees to protect the trees.

Lessons Learned:
RFP for pavilion design underway at time of site visit, providing another means of coordination and funding.

Figure 4.5-1. *Existing conditions plan*

Figure 4.5-2. *Site plan with proposed elements*

4.6 LAWRENCE RIVERFRONT STATE PARK | LAWRENCE

Figure 4.6-1. *Existing conditions plan*

Proposed:

- (1) Gazebo
- (1) Playground canopy
- (3) Shelters

To provide additional shade at the playground, a gazebo (to match existing) is proposed placed on axis at the north end (in turn creating another entry point). Inside the playground fence, two options are proposed, a fabric canopy or playground post and metal roof. Shelters are proposed around the perimeter of the lawn.

Lessons Learned:
Ops staff did not want shade structures to encourage illicit use in areas that could not be monitored from Everett Street. Property line/ management of riverfront area—Fish and Game or DCR—is not apparent.

Figure 4.6-2. *Site plan with proposed elements*

OCTAGONAL PAVILION
(To match existing)

SHELTER

CANOPY

SHADE TREE

4.7 CONSTITUTION BEACH PARK | BOSTON

Figure 4.7-1. *Existing conditions plan*

Proposed:

- (2) Large octagonal pavilions
- (1) Canopy
- Tree planting

Two locations for octagonal pavilions to match existing are proposed. Playground renovation now underway, canopy proposed for eastern end of new play area. Next generation tree planting proposed along northeast fence line.

Lessons Learned:
The pavilions will need to match the existing octagonal pavilion on site. Existing pavilion in need of pavement and roof repairs. Be certain to match roof colors and materials.

OCTAGONAL PAVILION
(To match existing)

CANOPY

OAK TREE

WILLOW TREE

Figure 4.7-2. *Site plan with proposed elements*

4.8 MELNEA A. CASS RECREATIONAL COMPLEX | BOSTON

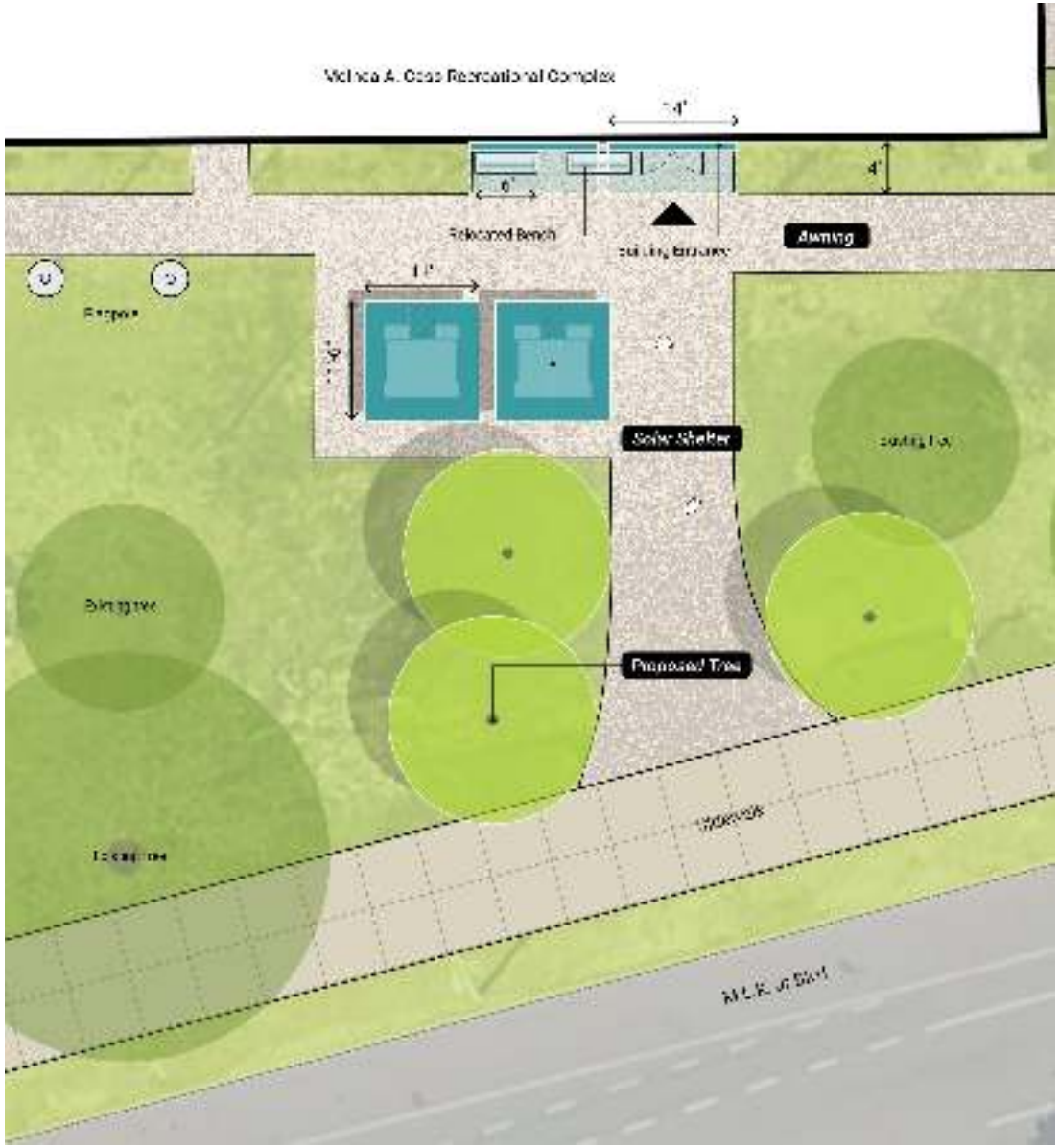


Figure 4.8-1. *Existing conditions plan*

Proposed:

- (2) Solar tables
- (2) Entry awnings
- Tree planting

Two solar picnic tables are proposed in the entry plaza. Awnings are proposed at the entry where visitors may queue for admittance.

Lessons Learned:
No additional impervious surfaces added. Benches reset by PSO. Tree pruning completed by Tree Maintenance Contract. Tree planting to be installed by Landscape Improvements Contract. Solar picnic tables, which can power laptops and cell phones, will be used for after school programs and summer camps.

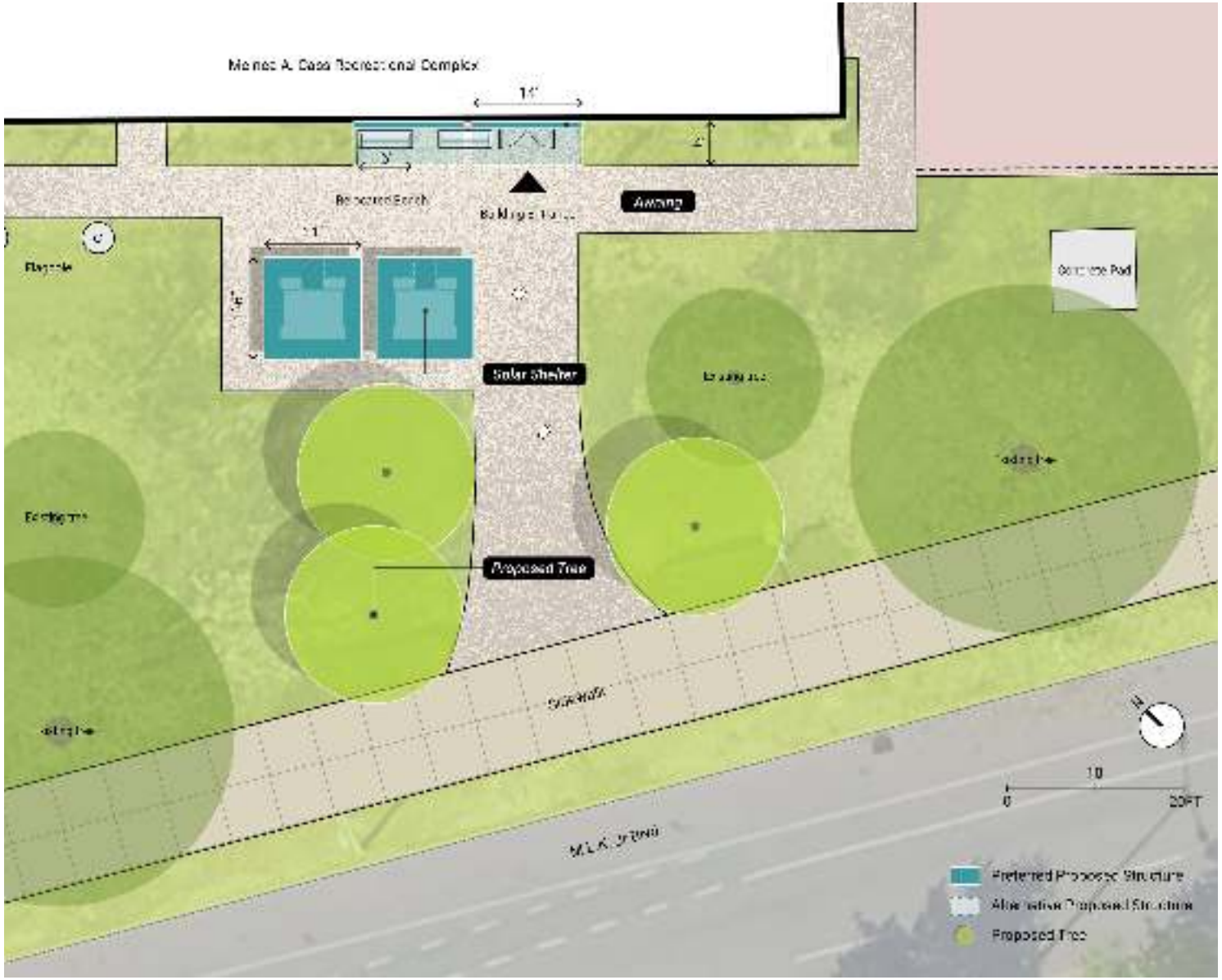


Figure 4.8-2. *Site plan with proposed elements*

SOLAR SHELTER

AWNING

TREE

A. Cercis canadensis (No cultivars)
B. Ostrya virginiana

4.9 POPE JOHN PAUL II PARK | BOSTON

Figure 4.9-1. *Existing conditions plan*

Proposed:

- (1) Medium pavilion
- (2) Bench shelters
- Tree planting

Proposed pavilion to match popular pavilion at playground. Shelters proposed for spectator seating at soccer fields.

Lessons Learned:
Similar to Holyoke Heritage, these structures will need to match custom designs on site, which may add to cost. Similar to Lawrence, Ops did not want structures located along Neponset River Greenway where police could not observe potential illicit activity. Ops requested tree planting continue the pattern of planting in clumps with mixed native species like oak, Eastern red cedar and bayberry, rather than single stem trees.

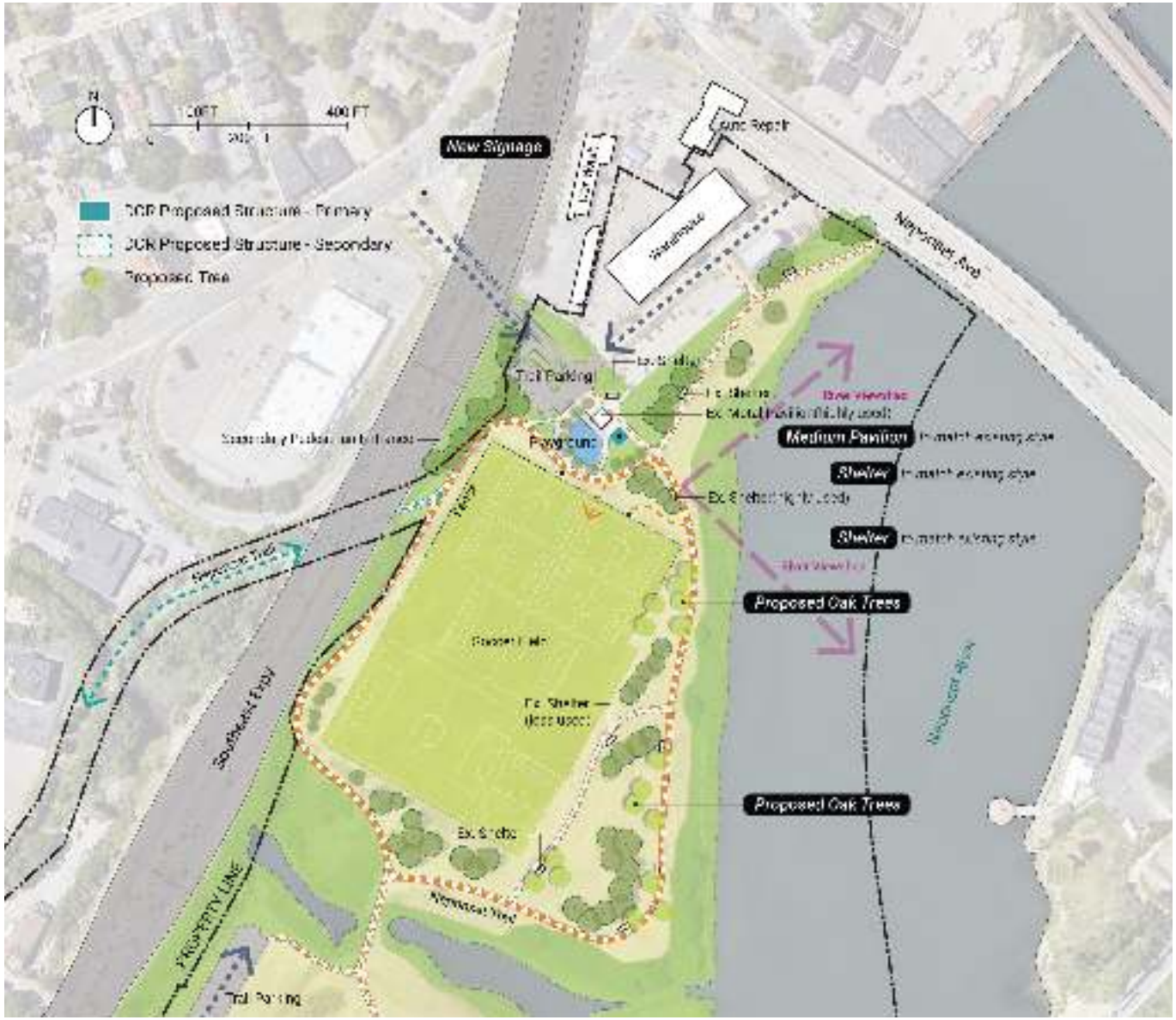


Figure 4.9-2. *Site plan with proposed elements*

MEDIUM PAVILION
(To match existing)

SHELTER
(To match existing)

OAK TREE

4.10 FORT PHOENIX STATE RESERVATION | FAIRHAVEN

Figure 4.10-1. *Existing conditions plan*

Proposed:

- (1) Large octagonal pavilion
- (1) Solar awning
- (1) Large pavilion
- (1) Medium pavilion, tree planting

Octagonal pavilion is proposed next to existing octagonal pavilion. Building awning is proposed to shade staff break area.

Locations for additional pavilions proposed at north end of lawn area (adjacent to future location for playground) and at east end of site to activate the east end of the beach.

Lessons Learned:

Wind is too strong at this coastal location for canopies. Abutters do not want views of Buzzards Bay blocked by trees or structures. Localized flooding eliminates some locations. People picnic/ lounge in and adjacent to parking lots.

Figure 4.10-2. *Site plan with proposed elements*

PAVILION

OCTAGON PAVILION

SOLAR AWNING

SHADE TREE

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APPENDICES

APPENDIX A SHADE SUITABILITY ASSESSMENT SITES

APPENDIX B DETAILS

APPENDIX C SPECIFICATIONS, OPERATIONS & MAINTENANCE PLANS

APPENDIX A SHADE SUITABILITY ASSESSMENT SITES

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ Block Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
1	Inside EJ Block Group	Minority	BOSTON	Ed Burns Arena	
5	Inside EJ Block Group	Minority and English isolation	BOSTON	Alewife Brook Reservation	Dilboy stadium and courts area
3	Inside EJ Block Group	Minority	BOSTON	Francis J. McCrehan Swimming Pool	Pool-Cambridge
1	1,010.42	Minority	BOSTON	City Square Park	Charlestown Park, Paths
1	Inside EJ Block Group	Minority	BOSTON	Mystic River Reservation	Draw Seven Park, Somerville-Park, Path, activity field
5	Inside EJ Block Group	Minority	BOSTON	Foss Park	Somerville Pool, Playground, Park
3	Inside EJ Block Group	Minority	BOSTON	Foss Park	Somerville-Playing fields
1	Inside EJ Block Group	Minority and income	BOSTON	Charles River Reservation	Paul Dudley White Bike Path Parking
1	Inside EJ Block Group	Minority	BOSTON	Charles River Reservation	Herter Park parking area
4	32.037	Minority	BOSTON	Charles River Reservation	Artesani, Playground, Spray Deck
1	Inside EJ Block Group	Minority and income	BOSTON	Charles River Reservation	Paul Dudley White Bike Path Parking
1	Inside EJ Block Group	Minority	BOSTON	Southwest Corridor Park	Carleton Street Playground
1	Inside EJ Block Group	Minority	BOSTON	Charles River Reservation	Cannalonga Park, Parking area
1	Inside EJ Block Group	Minority	BOSTON	Charles River Reservation	Watertown Veterans Memorial

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ BLock Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
4	Inside EJ Block Group	Minority	BOSTON	Charles River Reservation	Daly Playing fields
1	Inside EJ Block Group	Minority	BOSTON	Birmingham Parkway	Vacant lot
1	Inside EJ Block Group	Minority	BOSTON	Lieutenant James C Reilly Memorial Recreation Center	Reilly Pool area
3	Inside EJ Block Group	Minority and income	BOSTON	Southwest Corridor Park	Basketball courts behind BPD HQ
3	Inside EJ Block Group	Minority and income	BOSTON	Southwest Corridor Park	Jackson Square Playground, Courts
3	Inside EJ Block Group	Minority and income	BOSTON	Melnea A. Cass Recreational Complex	Pool
3	Inside EJ Block Group	Minority and income	BOSTON	Melnea A. Cass Swimming Pool	Pool
3	Inside EJ Block Group	Minority and income	BOSTON	Melnea A. Cass Recreational Complex	Parking area, front entry
3	Inside EJ Block Group	Minority and income	BOSTON	Melnea A. Cass Swimming Pool	Front entry
3	Inside EJ Block Group	Minority	BOSTON	Corporal Joseph E. Johnson Playground	Playground
3	Inside EJ Block Group	Minority	BOSTON	Southwest Corridor Park	Playground
1	Inside EJ Block Group	Minority	BOSTON	Southwest Corridor Park	Park, Paths adjacent to English HS
3	Inside EJ Block Group	Minority and English isolation	BOSTON	McMorrow Playground	Playground, Playing field, Courts
1	Inside EJ Block Group	Minority	BOSTON	Squantum Point Park	Parking area
1	Inside EJ Block Group	Minority and English isolation	BOSTON	McMorrow Playground	Parking area

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ BLock Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
5	Inside EJ Block Group	Minority	BOSTON	Dorchester Shores Reservation	Tenean Beach, Parking, Courts
3	632.704	Income	BOSTON	Toohig Park	Playground, Playing field, Courts
2	Inside EJ Block Group	Income	BOSTON	Neponset River Reservation	Path, Park near Granite Ave
1	19.154	Minority	BOSTON	Stony Brook Reservation	Maintenance area
3	Inside EJ Block Group	Minority	CENTRAL	Leominster State Pool	Pool-managed by town
1	Inside EJ Block Group	Minority	CENTRAL	Wachusett Reservoir Watershed	Clinton Field Office
3	Inside EJ Block Group	Minority and income	CENTRAL	Shine Pool	Worcester/Vernon Hill pool
1	Inside EJ Block Group	Minority	CENTRAL	Callahan State Park	Paths, parking area
3	1,397.07	Minority	CENTRAL	Cochituate State Park	Park, Pond, Parking area
2	604.294	Minority	CENTRAL	Cochituate State Park	Park, Pond, Parking area
5	Inside EJ Block Group	Minority	CENTRAL	Quinsigamond State Park	Regatta Point-Pond, Park
3	Inside EJ Block Group	Minority	CENTRAL	Petro Pool	Pool-Southbridge
1	Inside EJ Block Group	Minority	CENTRAL	Honorable Charles J. Buffone Skating Rink	
3	Inside EJ Block Group	Minority	CENTRAL	Hopkinton State Park	Pond, Park, Parking area
1	Inside EJ Block Group	Minority	CENTRAL	Hopkinton State Park	Pond, Park, Parking area

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ BLock Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
4	Inside EJ Block Group	Minority	CENTRAL	Quinsigamond State Park	Lake Park-Athletic fields, Paths, Park, Pond
1	Inside EJ Block Group	Minority	CENTRAL	Quinsigamond State Park	Lake Park-Parking area
2	Inside EJ Block Group	Minority	CENTRAL	Senator P. Eugene Casey Memorial Pool	Milford Pool
2	Inside EJ Block Group	Minority	CENTRAL	Bennett Field Pool	Worcester/Bennett Pool
1	2,135.60	Income	CENTRAL	Southern New England Trunkline Trail	Blackstone-Path, Parking Area
1	Inside EJ Block Group	Minority	NORTH	Veterans Memorial Skating Rink - Haverhill	
1	Inside EJ Block Group	Minority	NORTH	Veterans Memorial Skating Rink - Haverhill	
3	Inside EJ Block Group	Minority	NORTH	Geisler Memorial Pool	North Lawrence Pool
4	Inside EJ Block Group	Minority and English isolation	NORTH	Lawrence Riverfront State Park	Path, Playground, Courts
3	Inside EJ Block Group	Minority and English isolation	NORTH	Lieutenant Colonel Edward J. Higgins Memorial Swimming Pool	South Lawrence Pool, installs pop up canopies
3	Inside EJ Block Group	Minority, income and English isolation	NORTH	Lord Pool	Lowell Pool, installs pop up canopies
1	1,234.55	Income	NORTH	James E McVann and Louis F OKeefe Memorial Skating Rink	Peabody rink,

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ BLock Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
1	761.98	Minority	NORTH	Breakheart Reservation	Baseball field behind rink
1	849.031	Minority	NORTH	Breakheart Reservation	Parking area near rink
2	479.186	Minority	NORTH	Lawrence W. Lloyd Swimming Pool	Melrose Pool,
1	1,410.81	Minority	NORTH	Middlesex Fells Reservation	Parking area near Jerry Jingle gazebo
2	Inside EJ Block Group	Minority	NORTH	Lynn Shore Reservation	Parking area, coastal beach, near Ward bathhouse Nahant
1	Inside EJ Block Group	Minority and income	NORTH	Revere Beach Reservation	Coastal beach, picnic
3	Inside EJ Block Group	Minority	NORTH	Lieutenant Dennis C. Holland Memorial Pool	Malden Pool
3	Inside EJ Block Group	Minority and income	NORTH	Everett Allied War Veterans Memorial Recreation Center	Pool, Rink, Parking area
2	Inside EJ Block Group	Minority	NORTH	Revere Beach Reservation	Coastal beach, picnic
3	Inside EJ Block Group	Minority	NORTH	Vietnam Veterans Pool - Chelsea	Chelsea Pool
1	Inside EJ Block Group	Minority	NORTH	Revere Beach Parkway	Cronin Rink area,
5	Inside EJ Block Group	Minority	NORTH	Constitution Beach	Coastal beach, picnic
1	Inside EJ Block Group	Minority	NORTH	Winthrop Shore Reservation	Coastal beach, picnic, a plover beach

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ BLock Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
1	Inside EJ Block Group	Minority	SOUTH	Blue Hills Reservation	Quarry Hills athletic fields
1	Inside EJ Block Group	Minority	SOUTH	Neponset River Reservation	Moynihan ball field
2	Inside EJ Block Group	Minority	SOUTH	Blue Hills Reservation	Shea Rink-parking area, courts
2	Inside EJ Block Group	Minority	SOUTH	Camp Meigs	Playground, basketball court
1	Inside EJ Block Group	Minority	SOUTH	Camp Meigs	Athletic Field
2	Inside EJ Block Group	Minority	SOUTH	Blue Hills Reservation	Shea Rink-parking area, courts
1	2,131.57	Income	SOUTH	Pilgrim Memorial State Park	Park, path
3	Inside EJ Block Group	Minority and income	SOUTH	Vietnam Veterans Pool - Fall River	Pool
1	Inside EJ Block Group	Minority and income	SOUTH	Fall River Heritage State Park	Parking area
1	Inside EJ Block Group	Minority and income	SOUTH	Fall River Heritage State Park	Parking area
2	Inside EJ Block Group	Minority	WATERSHED	Wachusett Aqueduct	Wachusett Watershed Maintenance area
2	Inside EJ Block Group	Minority	WATERSHED	Wachusett Reservoir Watershed	Wachusett Watershed Maintenance area
1	Inside EJ Block Group	Income	WEST	Clarksburg State Forest	Park (inholding in residental area)
1	Inside EJ Block Group	Income	WEST	Western Gateway Heritage State Park	outdoor area

Number of DCR Assets within 50 ft of Area	Nearest Distance of an EJ BLock Group(Feet)	EJ Criteria of Nearest Block Group	DCR Region	DCR Site Name	Areas of Interest
1	Inside EJ Block Group	Income	WEST	Western Gateway Heritage State Park	outdoor area
1	Inside EJ Block Group	Income	WEST	Peter W. Foote Vietnam Veterans Memorial Rink	Parking area
1	Inside EJ Block Group	Income	WEST	Peter W. Foote Vietnam Veterans Memorial Rink	Parking area
1	Inside EJ Block Group	Income	WEST	Connecticut River Greenway State Park	Great Falls Discovery Center
1	Inside EJ Block Group	Minority and income	WEST	Connecticut River Greenway State Park	Damon Road HQ
1	Inside EJ Block Group	Minority, income and English isolation	WEST	Holyoke Heritage State Park	Spray deck, paths
1	Inside EJ Block Group	Income	WEST	Otis State Forest	Stone Manufacturing
1	Inside EJ Block Group	Minority, income and English isolation	WEST	Holyoke Heritage State Park	Spray deck, Park
1	Inside EJ Block Group	Minority and income	WEST	Henry J. Fitzpatrick Skating Rink	Parking area-Chicopee
1	Inside EJ Block Group	Minority, income and English isolation	WEST	Sarah Jane Sherman Swimming Pool	Chicopee Pool
2	Inside EJ Block Group	Minority and income	WEST	Chauncey Allen Park	Park, paths in Westfield
1	Inside EJ Block Group	Minority and income	WEST	Ray Smead Memorial Skating Rink	Parking area, basketball courts
1	Inside EJ Block Group	Minority and income	WEST	John H. Thomas Memorial Pool	Springfield Parking area

Table A. *DCR shade suitability assessment sites (Credit: DCR)*

APPENDIX B DETAILS

Table B. *List of plans with pages numbers*

Figure B-1. *Tree protection fencing* (Source: Internet)

Figure B-2. *Hammock post* (Source: Internet)

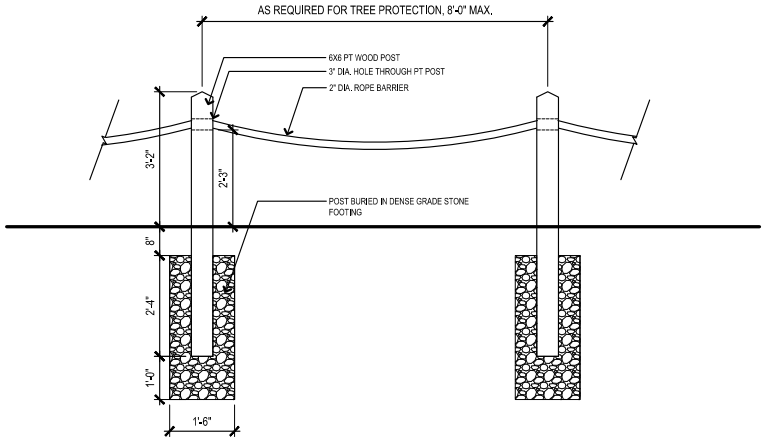

Figure B-3. *Tree protection fencing - Typical section*

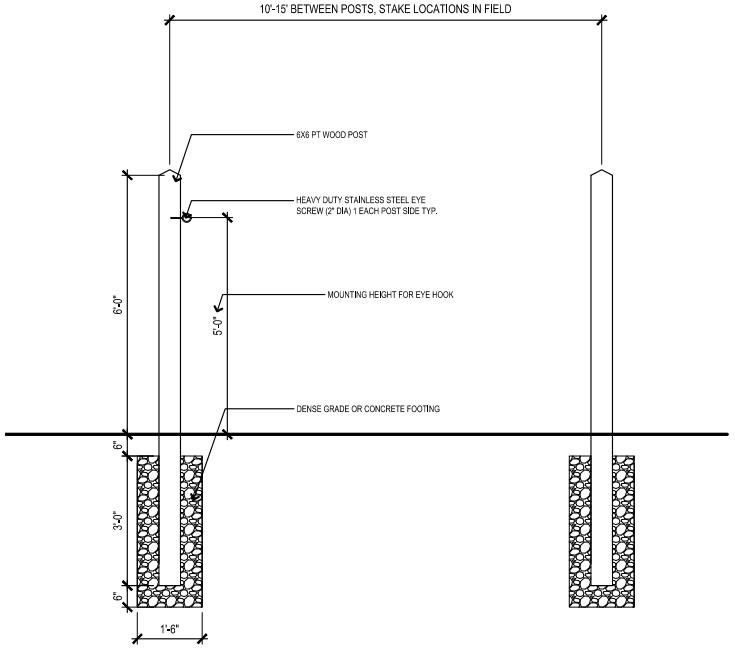

Figure B-4. *Hammock post - Typical section*

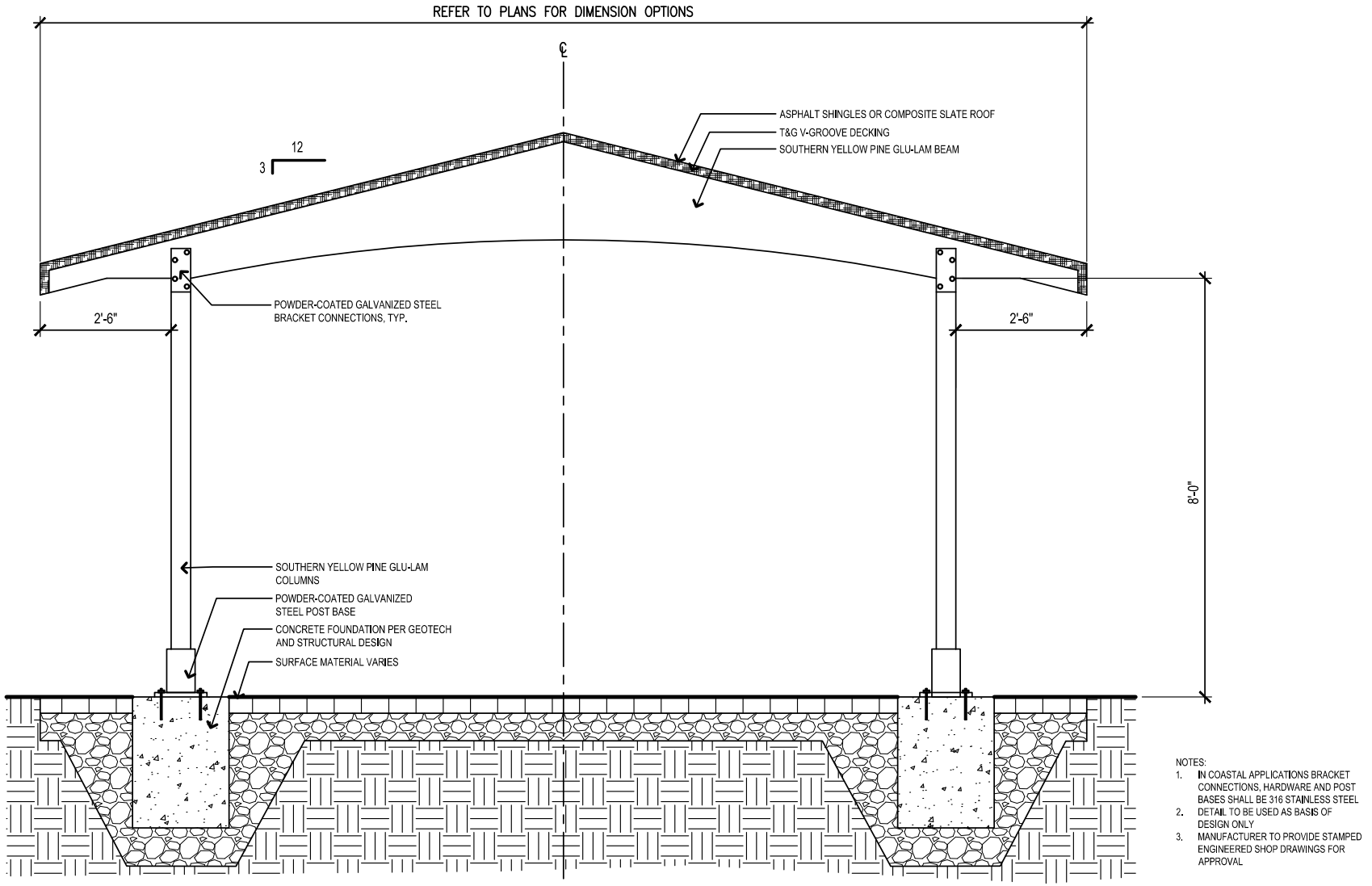

Figure B-5. *Pavilion - Typical section*

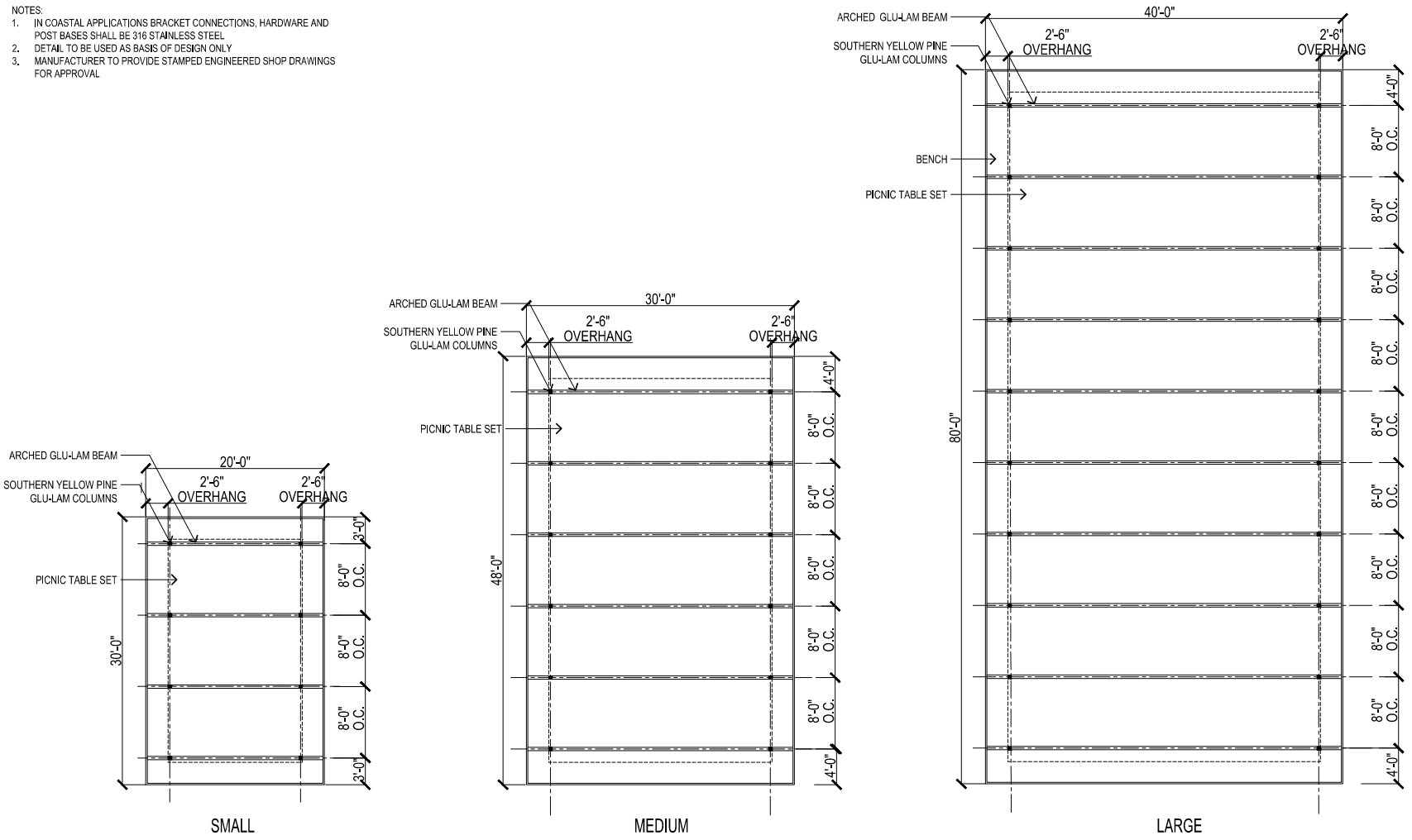

Figure B-6. *Pavilion - Plan layout*

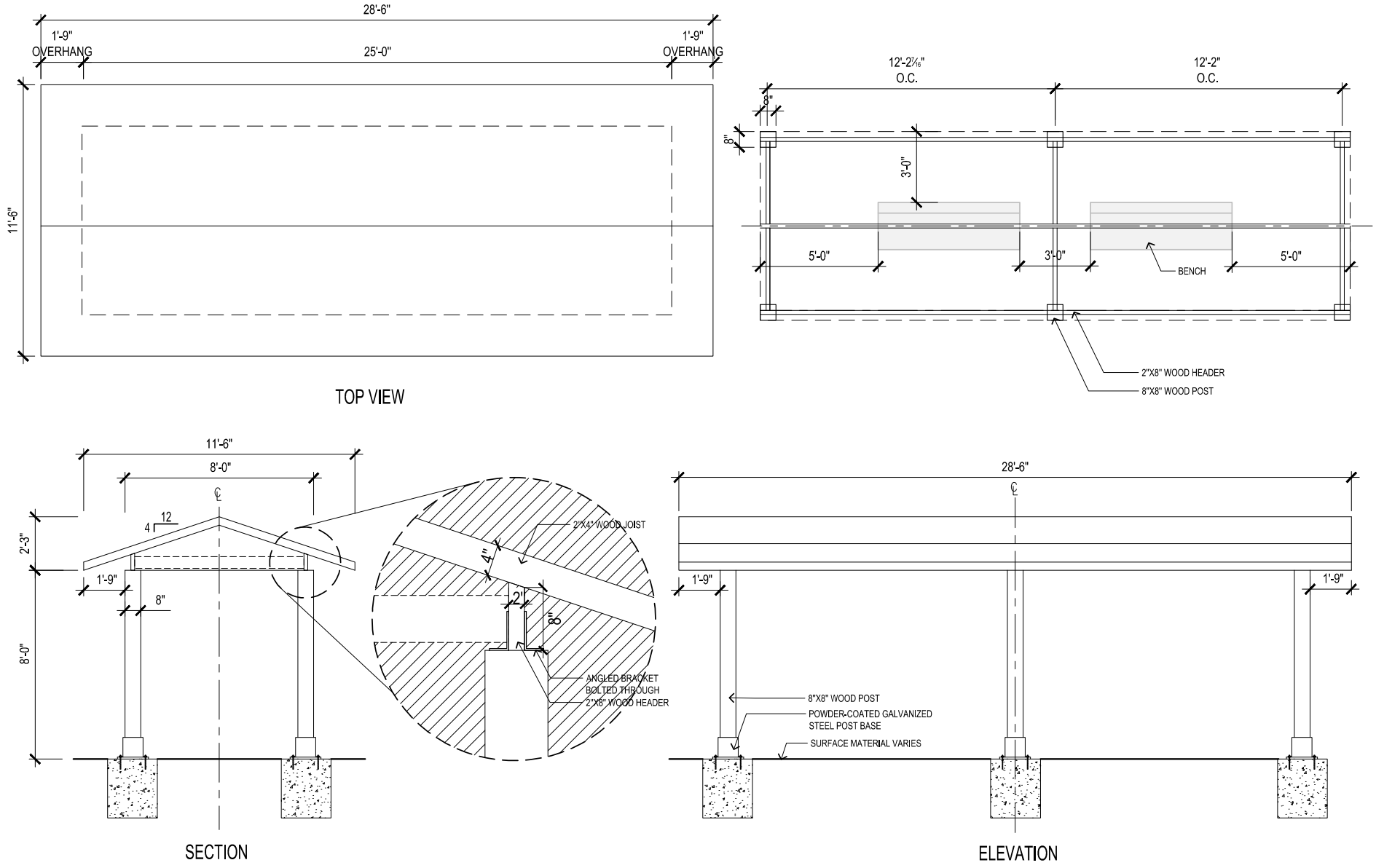

Figure B-7. *Shelter details - gable roof*

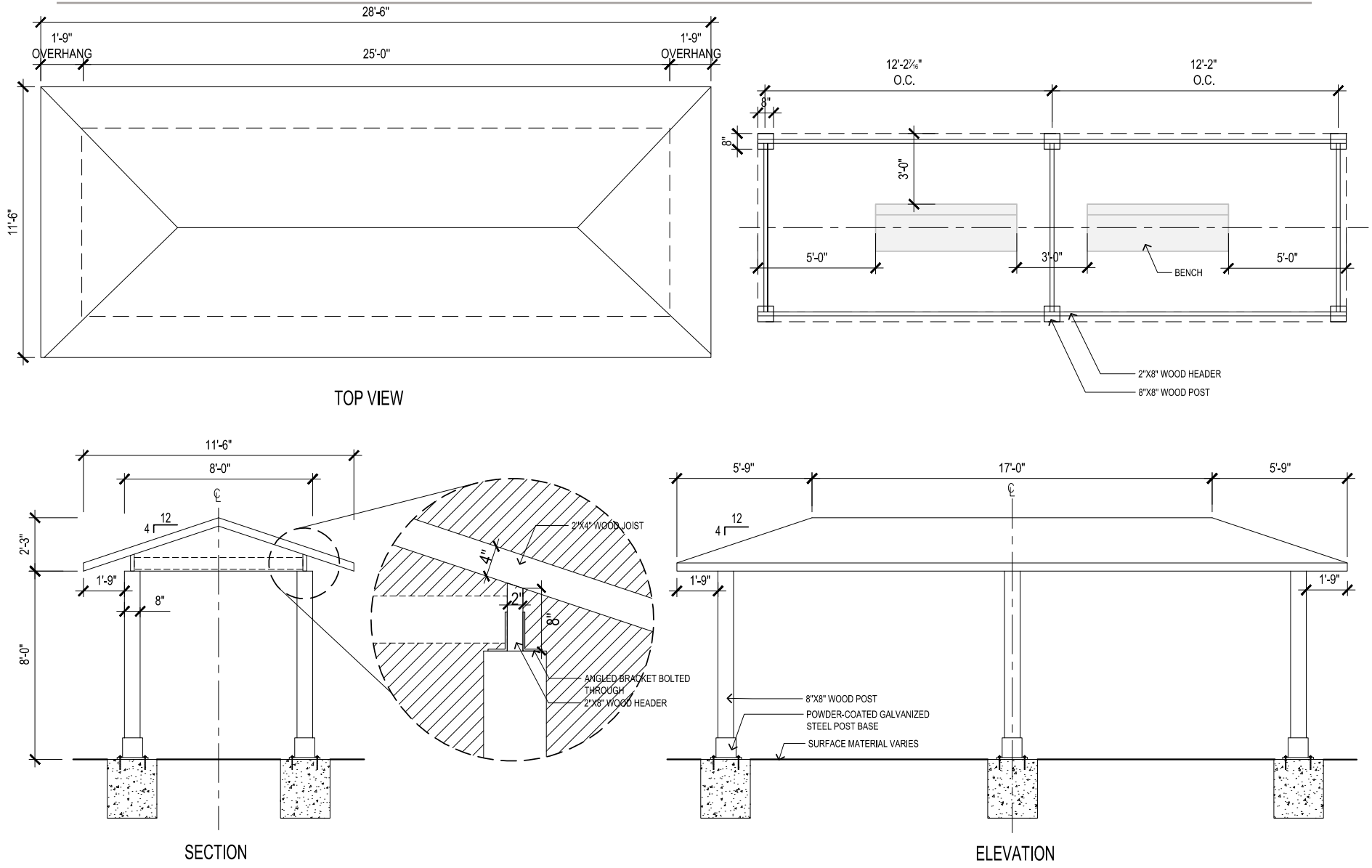

Figure B-8. *Shelter details - hip roof*

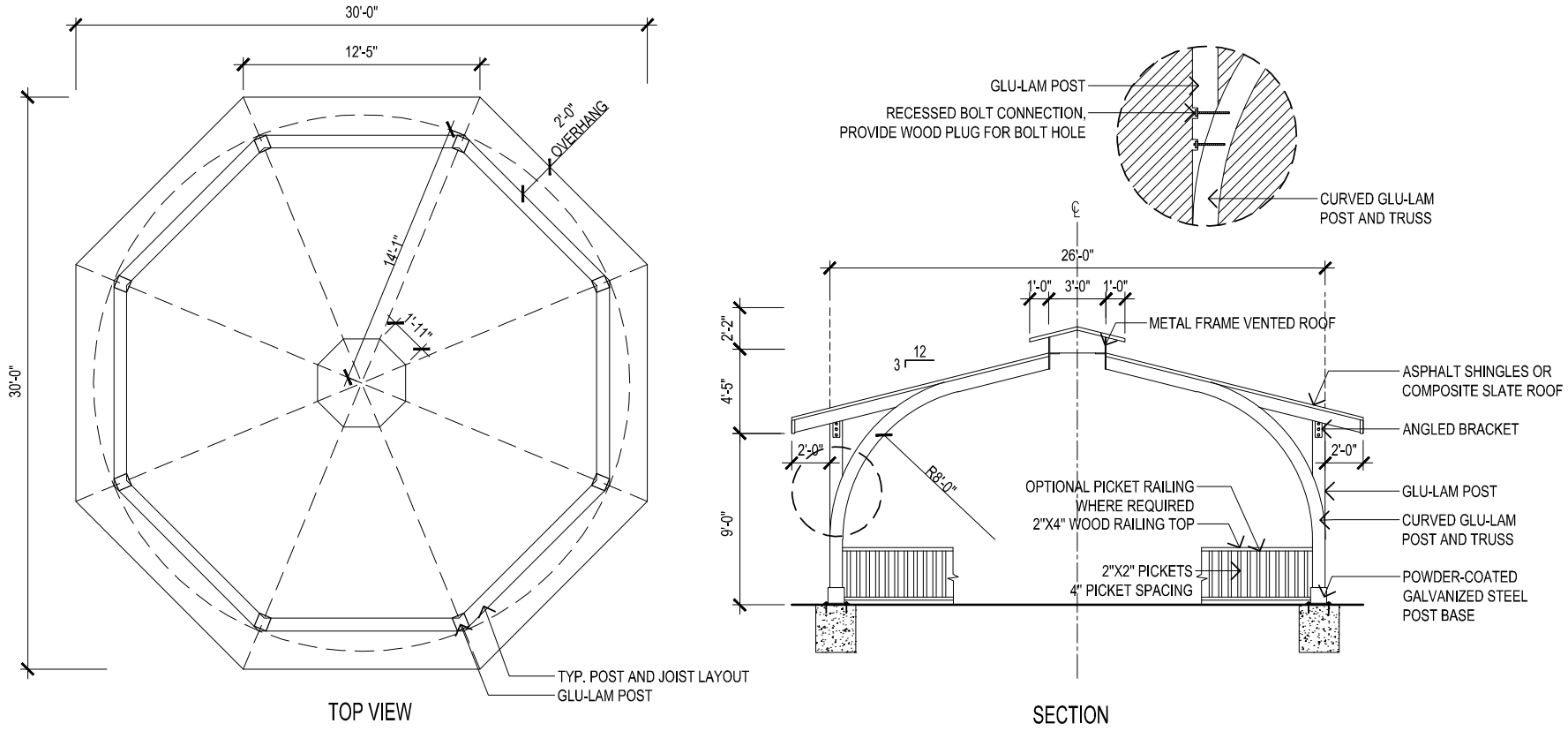

Figure B-9. *Gazebo details - tiered roof*

APPENDIX C SPECIFICATIONS, OPERATIONS & MAINTENANCE PLANS

CANTILEVER CANOPY

Cantilever Canopies shall be Shade Walk by Shade Systems Inc, www.shadesystemsinc.com or approved equal.

- Dimensions as shown on drawings (standard 10'x30')
- Quantity as shown on drawings
- Cool-Net canopy fabric color shall be selected by Owner from full range of color options
- Posts and Frame shall be powder-coat steel, color to be selected by Owner from full range of color options
- Mounting shall be direct embedment, reinforced concrete footings min. 2' dia. x 4'-6" depth. Or as required by manufacturer.
- Product shall have Turn-n-Slide feature for canopy removal and re-attachment. Alternate equal products shall have comparable feature.

Installation Notes

- Install per manufacturers recommendations

Operations and Maintenance Notes

- Canopy shall be removed each Fall and re-installed in Spring based on DCR maintenance schedule
- 10 year warranty on Cool-Net fabric and Turn-n-Slide feature
- Touch-up paint provided by manufacturer for scratch repair of posts and structure
- Tears to Cool-Net fabric must be sent back to manufacturer for repair

DCR Reference Projects

- Magazine Beach Spray Deck

Figure C-1. *Single-post / cantilever canopy at Magazine Beach (Credit: DCR)*

MULTI-SIDED FRAME CANOPY

Multi-Sided Frame Canopies shall be Shade Kite by Shade Systems Inc, www.shadesystemsinc.com or approved equal.

- Dimensions as shown on drawings (15'x15' min, 30'x30' max)
- Quantity as shown on drawings
- Cool-Net canopy fabric color shall be selected by Owner from full range of color options
- Posts and Frame shall be powder-coat steel, color to be selected by Owner from full range of color options
- Mounting shall be direct embedment, reinforced concrete footings min. 2' dia. x 4'-6" depth. Or as required by manufacturer.

Installation Notes

- Install per manufacturers recommendations

Operations and Maintenance Notes

- Canopy shall be removed each Fall and re-installed in Spring based on DCR maintenance schedule
- 10 year warranty on Cool-Net fabric and Turn-n-Slide feature
- Touch-up paint provided by manufacturer for scratch repair of posts and structure
- Tears to Cool-Net fabric must be sent back to manufacturer for repair

DCR Reference Projects

- Foss Park

Figure C-2. *Multi-sided frame canopy at Foss Park (Credit: DCR)*

RETRACTABLE AWNING

Retractable awnings shall be Pro Series 87 with Flexi-pitch by SummerSpace, www.summerspace.com or approved equal.

- Dimensions as shown on drawings (max 26’ wide x 13’-2” projection)
- Awning shall be marine-grade Tempotest® high-performance Italian fabric
- Frame, hood, and front bar shall have Proprietary SummerShieldTM powder coat component finish

Installation Notes

- Install per manufacturers recommendations for existing structure attachment.
- Wall-mount, soffit, or roof-mounted options

Operations and Maintenance Notes

- 15-year frame warranty
- 10-year fabric warranty
- 7-year motor warranty

DCR Reference Projects

- Melnea A. Cass Recreational Complex

Figure C-3. *Retractable awnings at Melnea A.Cass Recreational Complex (Source: Google Map)*

SOLAR CANOPY

Solar Canopies shall be the Heavy Duty Solar Canopy by Pvilion, www.pvilion.com, or approved equal.

- Module dimensions are 10'L x 12'W x 11'H, refer to plans for overall dimensions
- Quantity as shown on drawings
- Frame shall be anodized aluminum (optional powder coat finish)
- Canopy shall be Pvilion patented high strength PVC coated polyester fabric. Color shall be selected by Owner from full range of color options.
- Order of Magnitude Cost: $25,000 (varies based on final accessory selections)

Installation Notes

- Surface mount, ballast and footing options for installation

Operations and Maintenance Notes

- 2 Year warranty on PV Fabric technology
- 20 Year pro-rated warranty on base fabric

DCR Reference Projects

- Fort Phoenix State Reservation

Figure C-4. *Heavy duty solar canopy (Credit: Pvilion)*

dcr

Massachusetts