Trailside Museum building from the pond boardwalk (Pressley Associates 2007).

3. Site/Building Program and Alternatives

The primary challenge of this Master Plan is to set forth a vision for improving the physical facilities of Trailside so that DCR and MAS can continue to provide the extraordinary nature education exhibits and programs that introduce visitors to the Blue Hills. The fundamental guiding principles of this Master Plan are that the Trailside building and its site should function as the "gateway" to the Blue Hills Reservation, through a collaborative partnership between DCR and MAS.

This chapter summarizes issues associated with the existing building, site, and exhibits as an introduction to the recommended building and site program and design alternatives considered. Also included in this chapter is a summary of other nature centers and museums that have attributes in common with Trailside, as a series of benchmarks that highlight ways Trailside can meet and differentiate itself from other similar facilities.

Issues

As discussed in Chapter 2, the condition of the buildings, site features, and both exterior and interior exhibits varies considerably, but the overall impression of the Trailside infrastructure is that it is outdated and deteriorated. Successive renovations to the existing Museum building resulted in a broad range of quality in basic construction and systems. Staff areas are fragmented and public spaces are linked by awkward stairs and ramps. While the Lecture Wing (barn), constructed c.1975, is in relatively good condition the 1956 Exhibit Wing is in the poorest condition, with outdated exhibits, which except for a few temporary displays, have not changed in twenty years. The Visitor Wing (formerly the 1898 Superintendent's House) is in fair to good condition, with some serious issues related to accessibility and the dismal conditions of the animal quarantine area on the lower cellar level. Overall, the entire building and its approach have areas with substantial deterioration that require urgent attention and do not meet current standards for universal access and museum/nature center education facilities. Finally, the entrance to the building faces the hillside, so that it is not visible from Canton Avenue or the south parking lot and, as a result, site orientation is confusing at best.

Similar conditions exist on the site. The north and south parking lots are laid out with a sea of pavement and sub-standard parking spaces. Much of the visitor pedestrian circulation, including the main path to the entrance of the Museum building, does not meet current accessibility standards, although the

animal exhibit paths are currently being rehabilitated to improve this condition. The eight foot (8') high perimeter fence, required by the USDA for the animal enclosure area, presents an unwelcoming appearance to visitors. The pond boardwalk is open solely for interpretive walks under the supervision of Trailside staff because of the need to protect the pond edge and wetland vegetation, and to discourage inappropriate uses, such as picnicking or fishing. The Red Dot Trailhead, the most popular trail in the Blue Hills Reservation, is located off the south parking lot, and its lower section follows the alignment of a former drainageway, which means that stormwater flows directly down the trail.

Improvements implemented in 2008, such as new fencing and vestibules and the Rocky Outcrop exhibit have greatly improved the exterior live animal exhibits with some, but not all, reaching the minimum requirements for enclosure size and keeper access. Still, all of the exhibits lack sufficient habitat amenities, holding areas, and interpretive materials. Despite the varied conditions of the Museum building and site features, Trailside MAS staffs provide a broad spectrum of interesting, exciting, and very popular programs, which present a suitable introduction and incentive to visit the "real museum" – the Blue Hills Reservation.

Benchmarking

Benchmark:

1. A surveyor's mark made on an object of previously determined position and used as a point of reference in observations and surveys.
2. A standard by which something can be measured or judged.

Mountain climbers are especially familiar with benchmarks. Cemented into lofty positions by geological surveying agencies, shiny brass benchmarks signal to climbers that not only have they reached the top, but that the summit of the mountain has been used as a reference point in measuring the elevation of the surrounding landscape. Similarly, benchmarks for exhibition design can be placed on exhibit experiences held in highest regard and therefore be used as a point from which to measure high points and low points in the exhibit field and in the museum visitors' experience. Benchmarking the landscape of exhibition design presents a challenge for several reasons:

1. The measuring device is contested. Unlike measuring mountains, identifying the "summit" of innovation and excellence is a creative exercise rather than a mathematical one.
2. Exhibits to be measured or evaluated spring up regularly at a rate far faster that that of mountains, making the benchmarking process a hugely dynamic one.
3. We cannot possibly know or see everything there is to see. To return to the mountain climbing analogy one last time: we're just not always aware if an even taller mountain lies just out of view.

Notwithstanding, the planning and design team took the widest view possible and set out to survey some of the "peak" experiences in visitor centers, trailhead centers and nature centers. The team did this with the intention of cementing some guiding realizations in place.

The following overviews have been provided by the institutions themselves in brochures and/or websites while the benchmark commentary is provided by objectIDEA.

Brooker Creek Preserve

Tarpon Springs, Florida

Overview

Brooker Creek Preserve is Pinellas County's largest natural area at nearly 8,500 acres. Located in the northeastern corner but extending westward to the Anclote River, the Preserve is roughly seven miles long and one and one-half miles wide and lies within the rapidly developing East Lake region of Pinellas County. Brooker Creek Preserve is a wilderness island surrounded on all sides by urban development. It is comprised mostly of pinelands and freshwater swamps and includes a significant portion of the watershed of Brooker Creek, a major input to Lake Tarpon.

Brooker Creek Preserve is not a park, but a protected natural area. Native wildlife includes Bobcats, Red-shouldered Hawks, Wood Storks, Coyotes, White-tailed Deer, and Gopher Tortoises. Many of these species are abundant in the Preserve but are found nowhere else in the county. Likewise, many less common species such as the endangered Catesby Lily, several varieties of orchids, Bachman's Sparrows, and the Tiger Swallowtail Butterfly find refuge within the Preserve. The size and diversity of the Preserve will ensure that the great diversity

of plants and animals that reside there now will have a home for future generations. Boardwalks and trails (hiking and equestrian) are currently available for public use on the Preserve. The Brooker Creek Preserve Environmental Education Center opened to the public in June 2004, providing numerous interactive exhibits, gift shop, and resource center.

The approach path to Brooker Creek Preserve Environmental Education Center takes visitors across a section of the diverse habitats found on the property (Brooker Creek).

The museum interior features many AV-based theaters and technology-based interactive elements – a high contrast to the experiences gained on the paths of the Preserve. Here, in an immersive 3-d theater, Brooker Creek founders "interact" with new stewards of the land (Brooker Creek).

A centerpiece of the complex is the 6,000 square-foot Exhibit Hall. Visitors here are encouraged to immerse themselves in the various habitats found within the preserve. The Exhibit Hall features 22 discovery-oriented experiences revolving around natural Florida and our local history. There are a variety of hands-on displays designed to be as fun as they are informative. Crawl through a gopher tortoise burrow, wander around an exhibit that illustrates a year of seasonal changes and natural processes in Florida, or step into the Theater's barn and journey into the past. Rotating nature art exhibits featuring paintings, photography and more can also be experienced. The Resource Center contains an environmental library and searchable database aimed at helping visitors research a variety of environmental projects for their backyards or community.

Benchmarks

Brooker Creek is a marvelous outdoor classroom facility that entertains and educates its guests. Comprising a number of buildings (museum, classroom, lab, gallery, multipurpose room) connected by raised boardwalks; Brooker Creek was perhaps the most widespread in its plan and offered the most inspiration for how to offer the most public programs in a compact site. During our visit, we guided ourselves through the museum, viewed an exhibition in the gallery, eavesdropped on a formal class engaged in the classroom, and observed the projects in the lab. While these experiences are admirable, there was little direct encouragement to "get out and see the real thing." Said differently, the motivations we brought with us (to see the center) were not stepped up a notch and we did not venture beyond the campus. We enjoyed the AV pieces and interactive elements but soon grew tired of them. On all corners of the museum building, we found great views to the out-of-doors. These views were enhanced with guidebooks, field glasses, ecology graphics and comfortable seating. At times, the interior experience seemed overly simulated.

Squam Lakes Natural Science Center

Holderness, New Hampshire

Overview

The Squam Lakes Natural Science Center (SLNSC) is a non-profit environmental education organization that has helped visitors get "Nearer to Nature" since 1966. Located in central New Hampshire's Lakes Region, SLNSC's mission is to advance understanding of ecology by exploring New Hampshire's natural world.

Through spectacular live animal exhibits, natural science education programs, and lake cruises, the Science Center has educated and enlightened visitors for forty years about the importance of our natural world. The 200-acre Squam Lakes Natural Science Center campus is located on Route 113 in downtown Holderness, exit 24 off I-93, and is open daily from May 1 through November 1.

At Squam Lakes, the "museum" is the out-of-doors. Animal enclosures, ecological concept exhibits and wayside graphics combine in facility wide interpretive program (Schwarz/Silver Architects, 2007).

In September 2006, SLNSC gained national accreditation from the Association of Zoos and Aquariums (AZA). This accreditation distinguishes SLNSC as among the very finest educational facilities of its kind throughout the nation and the only AZA-accredited institution in all of northern New England.

Squam Lake's large campus has a great diversity of facilities, including buildings, gardens, multiple waterbodies, and animal exhibits that are maintained to AZA standards. Animal exhibits are organized along an exhibit trail loop that connects to the Welcome Center (admissions, gift shop), Webster Building (auditorium), Holderness Inn and Kirkwood Gardens (special event venue), and hiking trails. Live animal exhibits include Mead Discovery Place (Barred Owl, White-footed Mouse), Life Underground, Ecotone Mammals (Red Fox, Fisher, Striped Skunk), Bobcat, Mountain Lion, White-tailed Deer, River Otter, Black Bear, raptors (Bald Eagle, Great Horned Owl, Turkey Vulture, American Kestrel, Red-tailed Hawk, Red-shouldered Hawk, Broad-winged Hawk), and songbirds. An outdoor amphitheater provides program space for animal encounters in July and August.

Benchmarks

Most notable is Squam Lakes' high-quality animal enclosures that have long inspired Trailside's staff as they envisioned their future facility. Connected by comfortable and accessible pathways, visitors come across nearly a dozen distinct animal enclosures offering encounters with a diverse group of animals ranging from Black Bears to songbirds. Interpretation at each of the enclosures is fairly light, so as to not compete with the animal views. A centrally located amphitheater provides a venue for staff to showcase program animals like birds of prey or porcupines. The land area and number of buildings associated with Squam Lakes Natural Science Center are much larger than Trailside, and as a result, the diversity of exhibits and facilities is much greater. Squam Lakes is also only open May 1-November 1.

National Mississippi River Museum & Aquarium

Dubuque, Iowa

Overview

The National Mississipi River Museum and Auqarium provides visitors with an entertaining and informative journey on the river. The five-acre campus is the primary interpretive museum for the Mississippi River. Dynamic aquariums, historical exhibits and a stroll through the wetlands and boatyard are possible because of the diversity of features in the museum complex. Each visit is

an interactive experience where visitors can get "up close and personal" with live critters, become barge pilots, tour the steamboat William M. Black, or watch as a boat is launched into the Mississippi River.

The William Woodward Discovery Center features five large fresh water aquariums, live animal exhibits, wet labs, towboat simulators and hands on activities. Visitors can take a trip down the river in the wide screen, high-definition Journey Theater; watch the playful cownose rays from the Gulf of Mexico; or walk into a barge and take the helm in the pilot house.

All outdoor exhibits – including the Woodward Wetland boardwalk and the River Otter exhibit (above) – are ticketed experiences, accessed through the indoor museum. Visitors have an indoor-outdoor-indoor experience (objectIDEA).

In the Woodward Wetlands, visitors explore the natural habitat of the Mississippi, with a boardwalk trail that leads to natural and living history outposts where turtles sun on logs while herons perch nearby. The natural flora of a Mississippi wetland is easily viewed along the boardwalk and visitors can meet and hear the stories of Native Americans, fur traders, fishers, clammers, refuge managers, and early pioneers.

Benchmarks

While the subject of the Mississippi River Museum (MRM) may not seem comparable to Trailside, the organization of the visitors' experience is noteworthy and inspiring. Visitors gain tempting views of the outdoor experiences upon approach to the facility, although the outside is inaccessible without acquiring a ticket. The arrival to the campus is via the main museum where world-class exhibitions detail the ecology of the Mississippi River. At a midway point in the visit, guests are invited to venture outside to appreciate the "real thing." The Woodward Wetlands trail does not feature animals in captivity although its authentic ecology attracts fishing birds, basking turtles and buzzing insects. The museum has embellished the trails with cultural attractions like an original clamming house and a recreated Native American fishing camp, so that the cultural history of the Mississippi River corridor is a significant component of the interpretive experience.

The only mammals on display at the MRM are a pair of River Otters whose habitat is directly tied to the building (see photo left). In this configuration, the otters are viewed from both indoor and outdoor spaces. The aquatic life support system and off-view holding is tied to other exhibit systems.

Cleveland Museum of Natural History (Wildlife Center)

Cleveland, Ohio

Overview

The Cleveland Natural History Museum is considered one of the finest institutions of its kind in North America. Its mission is "to inspire, through science and education, a passion for nature, the protection of natural diversity, the fostering of health, and leadership to a sustainable future."

The Museum offers an extraordinary visitor experience. Permanent exhibits of special interest include the 3 million-year-old human ancestor *Australopithecus afarensis*, known as "Lucy," and the 150 million-year-old *Haplocanthosaurus delfsi,* one of the most complete sauropods on display anywhere in the world. The Museum also features a planetarium, observatory, discovery center, live animal shows and a wildlife center and

woods garden highlighting native Ohio flora and fauna. The Ralph Perkins II Wildlife Center & Woods Garden is a 2.2-acre outdoor gallery that features Ohio's native animals and plants adjoining the Museum. Visitors can see Bald Eagles, owls, deer, foxes, Bobcats, hawks and other creatures in enclosures designed to resemble their natural habitats. The Woods Garden features a rich canopy of towering tulip, oak, beech and maple trees. It highlights several of Ohio's native natural communities: swamp forest, shrub forest, fossil and sand ridge, rich mixed forest, emergent marsh and buckeye opening. A glass-enclosed entrance and heated, paved pathways enhance accessibility for those using wheelchairs and strollers. Traveling exhibitions, lecture series and public programs are offered frequently. Amenities include the Museum Store, Blue Planet Café, outdoor picnic tables and on-site parking.

Benchmarks

The Museum is a large scholarly institution with over a hundred (100) paid staff, multiple curators, and an extensive research program focused on a broad spectrum of natural history and human evolution. The Wildlife Center component is most applicable to Trailside. Here, animal enclosures are nested together at times to give the impression of co-habitation of the animals. The experience is another "in-out-in" experience, accessible only after acquiring a museum ticket.

The Ralph Perkins II Wildlife Center and Woods Garden is located in the museum courtyard. Dense plantings disguise the building and wide paths permit large groups to tour the animal enclosures (objectIDEA).

Nature Centers/Zoos Near Trailside

The Master Plan also considered nature centers or zoos within an approximate hour's drive of the Blue Hills, in part to understand what public nature programs and facilities are available and second, to determine the needs and opportunities for Trailside. This inventory is listed in Table 3.1 below, in order of distance from Trailside.

Table 3.1: Comparison Survey of Nature Centers and Facilities Within a 60-mile Radius of Trailside

Trailside Museum	
Manager	Massachusetts Audubon Society through permit agreement with DCR
Location	Milton, MA
Admission	$3 for nonmember adults; $1.50 for nonmember children (3-12), $2 for nonmember seniors
Acreage	9 acres
Nature Center	Trailside Museum building with indoor exhibits, lecture hall
Live Animals	Indoor: snakes, bees; outdoors: River Otter, Red-tailed Fox, White-tailed Deer, Snowy Owl, Red-tailed Hawk, Turkey Vulture, turtles
Features	▪ Trailside is the interpretive center for the Blue Hills Reservation, Boston's largest urban park ▪ Site provides access to extensive trail system, including the Red Dot Trail, which leads to the summit of Great Blue Hill ▪ Universally accessible facilities: Museum building, Restrooms, sections of the outdoor exhibit loop.

Boston Nature Center	
Manager	Massachusetts Audubon Society in collaboration with the City of Boston
Location	Mattapan, MA; 5 Miles from Trailside
Admission	Suggested Donation: $2 for nonmembers
Acreage	67 acres

Table 3.1 continued

Boston Nature Center	
Nature Center	George Robert White Environmental Conservation Center is one of the "greenest" buildings in Boston, teaching environmentally sustainable design by example.
Live Animals	No
Features	▪ Urban sanctuary, located on the grounds of the former Boston State Hospital ▪ Public programs year-round; through its Boston Schools Initiative, the Boston Nature Center provides weekly environmental education programs to Boston elementary schools. ▪ Clark-Cooper Community Gardens, Boston's oldest and largest community gardens. ▪ Universally accessible facilities include 2 miles of wheelchair accessible trails and boardwalks that traverse meadows and wetlands; Nature Center, Restrooms, Community Gardens.

Franklin Park Zoo	
Manager	Zoo New England
Location	Dorchester, MA; 6 Miles from Trailside
Admission	Adults $12; Seniors $10; Children $7
Acreage	72-acres inside historic Franklin Park (Boston Parks Dept.)
Nature Center	Primarily outdoor and indoor zoological exhibits, rental space, concessions
Live Animals	Extensive animal collection on exhibit with more than 200 different species, including traditional favorites such as lions, gorillas, giraffes, and camels, as well as more exotic offerings like tapirs and tree kangaroos.
Features	▪ Education programs for a diverse audience, including after-school programs, adult lectures, overnight programs, summer camps, and teacher workshops ▪ The zoo offers an Outback Trail, Serengeti Crossing, Kalahari Kingdom, Tiger Tales, Franklin Farm, Giraffe Savannah, Tropical Forest, Bird's World, and Butterfly Landing.

Hale Reservation	
Manager	Hale Reservation
Location	Westwood, MA; 9 Miles from Trailside
Admission	Program fees; family membership beach
Acreage	1,200 acres
Nature Center	Primarily outdoor education; information board, small cabins for programs
Live Animals	No
Features	▪ Educational and recreational programs for schools, scouts, corporations, and other organized groups. ▪ Curriculum- based environmental programs for teachers; ▪ Ropes course and unique, natural setting

Moose Hill Wildlife Sanctuary	
Manager	Massachusetts Audubon Society
Location	Sharon, MA; 11 Miles from Trailside
Admission	$4 for nonmember adults; $3 for nonmember children (3-12) and seniors
Acreage	2,000 acres
Nature Center	Yes
Live Animals	No

Table 3.1 continued

Moose Hill Wildlife Sanctuary	
Features	▪ 25-mile trail system through diverse habitats: red maple swamp, vernal pool, meadows ▪ Bird-feeding station and butterfly garden ▪ Art exhibits are shown September through June, and the gift shop is open year-round

Broadmoor Wildlife Sanctuary	
Manager	Massachusetts Audubon Society
Location	Natick, MA; 17 Miles from Trailside
Admission	$5 for nonmember adults; $4 for nonmember children (3-12) and seniors (65 and over)
Acreage	626 acres
Nature Center	Saltonstall Nature Center, award-winning sustainable “green” design with a tape-recorded tour , which is complete with solar heating and composting toilets
Live Animals	No
Features	▪ 9 miles of walking trails through a variety of field, woodland, and wetland habitats. ▪ ¼ mile accessible trail and boardwalk along the bank of Indian Brook and over the marsh offers great opportunities for birdwatching, photography, and sketching. ▪ 110-foot-long bridge great for viewing wood ducks and signs of beavers and otters ▪ Universally accessible facilities: Nature Center, Restrooms, All Persons Trail.

Stony Brook Wildlife Sanctuary	
Manager	Massachusetts Audubon Society
Location	Norfolk, MA; 17 Miles from Trailside
Admission	$4 for nonmember adults; $3 for nonmember children (3-12) and seniors
Acreage	116 acres
Nature Center	Stony Brook Nature Center with exhibits and a garden with plants selected especially to attract butterflies
Live Animals	No
Features	▪ An extensive boardwalk system along the edge of Teal Marsh provides views of turtles, fish, muskrats, and Great Blue Herons. ▪ Universally accessible facilities: Nature Center, Restrooms, Pond Loop Trail; a trail for the visually impaired is under construction.

Urban Ecology Institute	
Manager	Urban Ecology Institute
Location	Boston, MA; 17 Miles from Trailside
Admission	NA
Acreage	NA; Located in Boston College’s Newton campus
Nature Center	Program space
Live Animals	No
Features	▪ UEI provides hands-on, inquiry-based urban ecological studies and after-school programs that reach more than 30,000 people. ▪ UEI also plays a leadership role in the larger urban environmental movement, founding coalitions like the Urban Ecology Collaborative, a network of organizations working in eight northeastern cities with the United States Forest Service to promote environmentally healthy cities.

Table 3.1 continued

Museum of Science	
Manager	Museum of Science
Location	Boston, MA; 18 miles from Trailside
Admission	Adults $19.00, Seniors $16.00, Children $16.00; separate admission to special venues and exhibits
Acreage	Information not readily available
Nature Center	Large national museum emphasizing science and technology
Live Animals	The Museum's AZA-accredited Live Animal Center supports a collection of over 120 individual animals and several colonies of invertebrates that make nearly 4,000 program appearances annually. Animals are used primarily for programs, with bees currently on exhibit and invertebrates visible in the Butterfly Garden.
Features	▪ Butterfly Garden, Omni Theater, Planetarium, Laser Shows

Spectacle Island/Boston Harbor Islands	
Manager	DCR, City of Boston, Island Alliance, National Park Service
Location	Boston, MA; 18 Miles from Trailside (by ferry)
Admission	Free; boat ride required
Acreage	105 acres
Nature Center	Primarily a passive use park; minimal Visitor Center has some natural and social history exhibits; solar electric (photo voltaic) system that produces enough energy to keep electric vehicles operational on the island as well as to send clean electricity to the utility power grid
Live Animals	No
Features	▪ Marina, café ▪ Life-guarded swimming beach; supervised swimming is offered daily from June 23 to Labor Day. ▪ 5 miles of walking trails that lead to the crest of a 157 foot-high hill

Belle Isle Marsh	
Manager	DCR
Location	East Boston, MA; 20 Miles from Trailside
Admission	NA
Acreage	252 acres
Nature Center	No
Live Animals	No
Features	▪ Preserves most of Boston's last remaining salt marsh ▪ Hiking ▪ Universal access ▪ Open year-round, 9:00 a.m. to dusk. ▪ 28 acres of landscaped park with pathways, benches and an observation tower

New England Wildlife Center	
Manager	New England Wildlife Center
Location	Hingham, MA; 20 Miles from Trailside Museum
Admission	Memberships, program fees and donations
Acreage	13 acres
Nature Center	3-level 22,000 sf wildlife rehabilitation hospital and education center

Table 3.1 continued

New England Wildlife Center	
Live Animals	Animal rehabilitation; live animals for programs
Features	▪ Native wildlife preservation and educational organization ▪ School programs in the classroom use native species individuals that cannot be released into the wild including owls, hawks, snakes, turtles, lizards, and geese ▪ Summer camp program for elementary and middle school children

South Shore Natural Science Center	
Manager	South Shore Natural Science Center
Location	Norwell, MA; 20 Miles from Trailside
Admission	$5.00/Adult non-member; $3.00/Children (2-15 years) & Senior Citizens; Under 2 years - Free
Acreage	30 acres
Nature Center	Yes, with indoor exhibits
Live Animals	Live animals are exhibited in pond and woodland habitats, including both native and non-native species.
Features	▪ Provides natural science experiences that educate, excite, and commit every generation to preserve the environment and to encourage responsible use, stewardship and enjoyment of our natural resources. ▪ Property consists of meadows, woodland, and a pond; open year round. ▪ Pond and woodland school programs and a complement of subjects and formats for adults, families and organizations. ▪ Interpretive trails

Drumlin Farm	
Manager	Massachusetts Audubon Society
Location	Lincoln, MA; 25 Miles from Trailside
Admission	$6 for nonmember adults; $4 for nonmember children (3-12) and seniors
Acreage	232 acres
Nature Center	Yes
Live Animals	Farmyard animals; live animals in wildlife exhibits
Features	▪ Working farm and a wildlife sanctuary. ▪ Demonstration gardens ▪ Drumlin, one of the highest points in the greater Boston area. ▪ Farm and nature programs ▪ Birthday parties ▪ Family bathrooms, picnicking area, farm stand, gift shop ▪ Universally accessible facilities: Nature Center, Restrooms, Audubon Shop.

Great Meadows National Wildlife Refuge	
Manager	US Fish & Wildlife Service
Location	Sudbury, MA; 26 Miles from Trailside
Admission	Free
Acreage	3,600 acres
Nature Center	No; the USFWS has proposed a Visitor Center serving 8 wildlife refuges in eastern Massachusetts, to be located at the Assabet River National Wildlife Refuge.
Live Animals	No

Table 3.1 continued

Great Meadows National Wildlife Refuge	
Features	▪ 85 % is valuable freshwater wetlands stretching along 12 miles of the Concord and Sudbury Rivers. ▪ Managed as nesting, resting, and feeding habitat for wildlife, with special emphasis on migratory birds. ▪ The diversity of plant and animal life visible from refuge trails provides visitors with excellent opportunities for wildlife viewing and nature study

Habitat Sanctuary and Education Center	
Manager	Massachusetts Audubon Society
Location	Belmont, MA; 28 miles from Trailside
Admission	$4 for nonmember adults; $3 for nonmember children (3-12) and seniors
Acreage	88 acres
Nature Center	The Visitor Center is a brick Georgian-style mansion where monthly art exhibits can be viewed.
Live Animals	No
Features	▪ 2.5 miles of trails through deciduous and evergreen forests, across meadows, around 2 ponds, and along a wetland and vernal pool. ▪ Extensive education programs focused on ecology and the environment for schools, organized groups and adults; extensive summer camp program; Habitat Intergenerational Program (HIP). ▪ Formal garden, which with the house can be reserved on weekends for weddings and other events. ▪ Universally accessible facilities: Nature Center, Restrooms, Garden Terrace.

Stone Zoo	
Manager	Zoo New England
Location	Stoneham, MA; 30 Miles from Trailside
Admission	Adults $9; Seniors $8; Children $6
Acreage	26 acres near Spot Pond Reservoir
Nature Center	Primarily outdoor and indoor zoological exhibits, rental space, concessions
Live Animals	Extensive animal collection on exhibit includes the Snow Leopards of Himalayan Highlands, Bald Eagles of Yukon Creek, Hornbills and Emperor Tamarins of Windows to the Wild, and Jaguars and Cougars of Treasures of the Sierra Madre.
Features	▪ Education programs for a diverse audience, including after-school programs, adult lectures, overnight programs, summer camps, and teacher workshops

Ipswich River Wildlife Sanctuary	
Manager	Massachusetts Audubon Society
Location	Topsfield, MA; 46 Miles from Trailside
Admission	$4 for nonmember adults;$3 for nonmember children (3-12) and seniors
Acreage	2,265 acres
Nature Center	Education Center
Live Animals	No
Features	▪ 10 miles of interconnecting trails; canoeing along eight miles of the Ipswich River ▪ Camping on Perkins Island, located a half-mile up the river; cabin for rent ▪ Wildlife visible include American toads, pickerel frogs, river otters, painted turtles, and great blue herons ▪ Drumlin and esker; huge rocks and exotic trees and shrubs that were part of a former arboretum ▪ Universally accessible facilities: Restrooms, Barn, Education Center.

Table 3.1 continued

Lloyd Center for the Environment	
Manager	Lloyd Center for the Environment
Location	Dartmouth, MA; 47 Miles from Trailside
Admission	Free
Acreage	55 acres
Nature Center	Yes, with indoor exhibits
Live Animals	Salt-water aquarium and touch tank
Features	▪ Dramatic site includes oak-hickory forest, freshwater wetlands, salt marsh, and estuary ▪ 5 walking trails offer scenic views of Buzzards Bay, Demarest-Lloyd State Park, Mishaum Point, islands ▪ The Lloyd Center is the only area organization focused on educating the public about coastal and watershed issues, and conducting research on coastal ecosystems and endangered species ▪ Extensive system of interpretive trails

Joppa Flats Education Center and Wildlife Sanctuary	
Manager	Massachusetts Audubon Society
Location	Newburyport, MA; 60 Miles from Trailside
Admission	Suggested Donation: $2 for nonmembers
Acreage	54 acres
Nature Center	Education Center is located at the gateway to Parker River National Wildlife Refuge and the Plum Island estuary; includes second-floor observation areas—one indoors and one outdoors—a conference center, a guest services area, and interpretive displays.
Live Animals	NO
Features	▪ Highlights for visitors are the many species of birds that utilize the area's extensive salt marshes, mudflats, rivers, bays, and coastal waters ▪ Universally accessible facilities: Nature Center, Restrooms, Garden, Banding Station at PRNWR

Two views of Spectacle Island: Visitor Center (left) and Marina (right).

Design Criteria and Considerations

The site, building, and exhibit design criteria and considerations listed below are intended to provide a framework for understanding both the alternatives and recommended plan and to guide design development that will follow in subsequent phases. These criteria represent a number of both qualitative and quantitative attributes that should be incorporated into future projects at Trailside, as well informing more detailed site and architectural design.

Site

Accessibility

The primary approach to the building, pedestrian walks and paths, and outdoor exhibit circulation shall be fully accessible to persons with disabilities, and meet the requirements of the Massachusetts Access Board and The American with Disabilities Act (ADA). The existing Red Dot Trail is not accessible and given the change in grade and difficult topography, all trails leading to the summit of Great Blue Hill will never be fully accessible.

Sustainability

Site improvements shall be implemented using sustainable materials, both to meet the U.S. Green Building Council LEED certification for the building and site discussed below, and to ensure that the site improvements utilize natural materials suitable to the Blue Hills and that are easy to maintain for both DCR and MAS.

Circulation

Vehicular circulation:

- Two parking areas shall be retained, with parking spaces and vehicular turning radii designed to meet current standards.
- Safe vehicular access shall be provided from and onto Canton Avenue.
- Every effort shall be made to both minimize impervious paved surfaces and maximize parking capacity.
- South parking area shall be designed to allow for safe bus drop off during ski season.
- Bus drop off shall be provided for Trailside visitors.

Existing boardwalk along pond (Pressley Associates 2007).

Pedestrian circulation:

- Pedestrian orientation and way-finding should be clear and as direct as possible.
- Major public areas, except for Blue Hills hiking trails, should be universally accessible.
- Permeable materials should be used whenever possible.
- Hiker access to trails will not be impeded.

Public site areas shall have "free" and "paid" zones as follows:

Free public access:[1]

- South and north parking areas
- Pedestrian circulation routes from parking areas to the building
- Pond boardwalk
- Outdoor gathering areas
- Amphitheater
- Blue Hills trails

Paid public access:[2]

- Outdoor animal enclosure area
- Picnic/program area (within enclosure)

Public access to staff areas shall be limited, for security, life safety and protection of animals, as follows:

No public access:

- Service drive
- Service access to enclosure area

- Service areas associated with individual animal enclosures and service area along perimeter enclosure fence.

Landscape Materials

Landscape and site materials should respond to the program requirements for maintenance, durability and appropriateness, including plant materials. The sustainability goals indicated in this document will also affect landscape materials selection.

Vegetation

Plant materials should emphasize, to the greatest extent possible, sustainable native species found in the Blue Hills, particularly primary indicator species associated with the major plant communities of the Blue Hills (see Chapter 4). Individual plant selection in any given location should take into account localized microclimate, slope and aspect, and projected public use so that the vegetation can be sustained over time. Planting design should strive to utilize woody plants to the greatest extent possible, to minimize maintenance requirements.

Paving

Vehicular paved areas should be highly durable and easily plowable in winter. Future design should consider potential for permeable pavement to reduce stormwater run-off and encourage re-charge. If special paving is desired in any area, such as vehicular drop-off areas, it should meet the same sustainability and durability requirements and the rest of the vehicular surface.

Paved pedestrian areas within the Trailside grounds should be durable and meet universal access standards. This includes the approach to the building, pond path and boardwalk, and zoological exhibit path. Opportunities for non-bituminous paving should be explored.

Trailside Building

Accessibility

The building shall be fully accessible to persons with disabilities, through required compliance with the Massachusetts Architectural Access Board Regulations for public buildings, as incorporated in the State Building Code. The Americans with Disabilities Act Architectural Guidelines are also applicable and include minimum requirements for accessibility of areas used only by employees as work areas.

Sustainability

DCR intends to pursue U.S. Green Building Council LEED certification for the building. It is the owner's intent to register this project with the USGBC and document as many green building and site elements from the applicable LEED checklist as possible. The goal is a Platinum or Gold rating, using the LEED for New Construction and Major Renovations rating system.

Boston Nature Center (solar-works).

Structural Design Criteria

Minimum requirements for uniformly distributed live loads are indicated in the Building Code. For seated assembly areas, building lobbies, retail and similar uses, 100 psf is required. For nature centers or museum buildings, higher minimum live load capacities are recommended in order to accommodate high-density storage systems or exhibit construction on floor slabs:

- For storage consider "Storage (Heavy)": 250 psf
- For exhibits consider "Stage Floor": 150 psf

Geotechnical Investigations and Foundation Design

For foundation design, geotechnical investigations are recommended to determine building site soil bearing capacities and the presence of rock, which is considered likely. This information will also help determine the type of excavation required and its cost. It is desirable to place certain program areas in below-grade building space 1) because these spaces require no windows, and 2) in order to minimize the size of the building above grade.

Foundation Drainage

Foundation drainage is required in order to protect below-grade building spaces and structures from surface and subsurface water, originating from storm water and likely perched groundwater on the hillside and from exhibits using water. Recommended drainage system includes foundation wall dampproofing, vertical course of drainage fill, and continuous perforated piping connected to the site storm drainage system.

Circulation

Public areas shall have "free" and "paid" zones as follows:

Free public access:

- Entry lobby with ticket/information desk
- Public restrooms (note that the Canton Ave. Restroom is preferred for non-paying visitors)
- Orientation exhibits
- Gift shop

Paid public access:

- Circulation to upper level
- Exhibit hall
- Classroom
- Lecture hall
- Exterior zoological exhibits

Public access to staff areas shall be limited, for facility security, life safety and protection of animals under care, as follows:

No public access:

- Storage rooms
- Mechanical rooms
- Garage
- Wood Shop
- Animal Quarantine

View only:

- Animal care and outdoor mews

Entry allowed to occupied or supervised areas:

- Administrative offices

Building Security and Operation

Staff supervision:

Entry level lobby shall be capable of being supervised from the reception desk. The gift shop shall have entry and exit to entry level lobby only, within view of reception desk. Subject to meeting other functional requirements, gift shop desk and reception desk would ideally be combined, for coverage by a single staff person at times. However, it is more likely that two staff persons would be required for the building to be safely open. This could include one MAS staff and one volunteer.

Building Operation Modes:

Provide room adjacencies and interior control and closure points in public-access areas to allow building operation modes per the table below. Coordinate with design of exits for life safety. Note that public access to individual spaces such as exhibit and program space is managed through door locking/unlocking.

Building Materials

Building materials should respond to program requirements for maintenance, durability and appropriateness, as schedule below. Sustainability goals indicated in this document will also affect materials selection.

Public reception and circulation spaces, and permanent materials in exhibit spaces:

- Durability: High
- Visual quality: High; related to natural character of the site or of the Blue Hills

Lecture and classroom spaces:

- Durability: High
- Visual quality: Medium to high

Administrative offices:

- Durability: Medium
- Visual quality: Medium; standard office finishes

Animal handling areas:

- Durability: High; washable.
- Visual quality: Medium; primarily a work area

Storage, mechanical, workshop, garage:

- Durability: High

- Visual quality: Low; applied ceiling and floor finishes may be omitted in some areas

Windows:

Provide windows for daylight into all occupied spaces, including live animal housing. A portion of the window area at each space shall be operable. Sustainability requirements also will apply.

Provide room darkening at windows in the following spaces:

- Lecture hall
- Classroom
- Animal care

Design of exhibit hall windows should be coordinated with the following:

- Sustainability requirements
- Exhibit hall operating hours (will it be open after dark?)
- Desirability of integrating daylight and views to outdoors with proposed exhibits
- Sensitivity of exhibit materials to direct sunlight
- Heating and cooling loads

Acoustical Design for Spaces

Room layout, ceiling height and shape, enclosing construction and surface materials should respond to the requirements listed in Table 3.3 below.

Trash and Recycling

Provide space for paper and container recycling in occupied areas. Provide enclosure or room for trash and recyclables storage inside the building.

Systems and Equipment

1. Elevator:

Elevator design requirements:

- Capacity: 4000 lbs
- Cab floor area: 5'-6" x 7'-7"
- Cab clear height: 9'-0"
- Travel speed: 150 fpm

2. Fire Suppression Systems:

- Provide wet-sprinkler type fire suppression system throughout the building (not code-required except for wood [Type 5] construction classification)

3. Plumbing:

- The plumbing systems for the proposed building shall include domestic potable and non-potable hot and cold water, sanitary waste and vent, storm drainage and natural gas.

- The domestic potable hot and cold water systems shall serve the public toilets, kitchen, and interior and exterior building maintenance facilities. A 2-inch metered domestic water service shall serve the building, including a reduced pressure type backflow preventer. A 100 gallon gas-fired water heater shall deliver potable hot water to the public toilet rooms and kitchen; to increase environmental sustainability, solar hot water should also be considered. A 1-1/2" non-potable hot and cold water system shall serve the animal care and interior maintenance facilities. Hot water shall be generated from a 100 gallon gas-fired (or solar) water heater. Future design phases will determine whether or not two separate systems are needed.

- Sanitary waste and vent piping shall connect to all plumbing fixtures requiring drainage, and extend by gravity to outside the building via a 6-inch sanitary main to the exterior sanitary system. Kitchen sink waste piping shall include grease interceptors where required. Floor drains and a gas and sand interceptor shall be included for the maintenance garage.

- The storm drainage system shall consist of roof drains on flat roof areas with interior storm drain piping and exterior downspouts on pitched roof areas, all extending underground to connect to the exterior storm drain system or drywell.

- The natural gas system shall connect to all equipment requiring natural gas. The system shall extend and connect the exterior gas meter and gas service furnished and installed by the gas utility company.

- Public toilet plumbing fixtures shall consist of electronic eye, flushometer type, water saving water closets and urinals. Faucets on lavatories shall be either metered or electronic eye type.

- Hot and or cold non-potable water system shall be provided for animal care areas and shall include wash-down, feeding areas and fountains. It shall also serve cage cleaning and wash-down facilities. Additional water systems will likely be required for exterior zoological exhibits.

4. HVAC:

- The proposed HAVC system will include a new variable air volume split system air-handler with associated outdoor condensing unit. The air-handler would be located on the roof or within a mechanical room inside the building. The unit would include:
  - Supply fan with variable speed drive.
  - Supply and Return Smoke Detectors
  - All sections will be double wall construction
  - Economizer and return fan with variable speed drive.
  - 2" thick throw away pre-filters
  - Direct Expansion (DX) cooling coil
  - Hot water heating coil
  - 65% Efficient filters
  - Discharge Plenum
  - Supply and Return Sound attenuators
  - Completely ducted return
- A fully ducted medium velocity variable air volume (VAV) system will be provided for the Exhibit Hall, Lecture Hall, Classroom, Offices and Animal areas. This will include variable air volume terminals with hot water re-heat coils, supply and return duct distribution system and supply and return diffusers and grilles to serve each room. The Animal Quarantine and Animal Care spaces will be provided with a single pass supply with all air exhausted to the outdoors via roof mounted exhaust fans.
- Hot water for re-heat coils, fintube radiation and terminal heating units will be provided by modular hot water boilers and associated pumping systems located in the Mechanical Room. The system will be provided with 35% glycol for freeze protection.
- Areas requiring specific humidity control will be provided with localized electric steam humidifiers piped to absorption tubes within the ductwork serving the space.
- A central exhaust system to serve the toilets and janitors closet will be provided via roof mounted exhaust fans.
- The wood shop will be provided with a small dust collection system. This space will be heated only.
- The Maintenance Garage will be provided with an exhaust system controlled by a carbon monoxide detection system. This space will be heated only.
- A direct digital control (DDC) system will be provided for the building.

5. Electrical:

Electrical Service:

- A new electrical service will be provided in a new main electrical room. The new electrical service will be provided at 480/277V 3Ph 4W 60 hertz. The exact size (amperage) will depend upon selected HVAC systems, elevator, lifts, animal care area exhaust and environmental controls systems, etc.

Emergency Power:

- A small emergency generator to supply life-safety lighting, power to the fire alarm system, heating system, animal care area ventilation and exhaust units and domestic water system (well and street service) will be provided.

Interior Lighting:

- New energy-efficient lighting and controls will be provided – T5, T8 and compact fluorescent lamps in combination with electronic (less than 10% THD) ballasts. Also the introduction of lighting controls, occupancy sensors, etc. will be provided and will increase energy savings. A building/campus wide lighting control system will be implemented to more efficiently control and manage lighting.

Exterior Lighting:

- Provide new exterior lighting with consistent lamp color and more energy efficient fixtures. New light fixtures shall be night sky approved. Photoelectric control should be

considered for exterior lighting to compliment time clock control, this will result in additional energy savings.

Electrical Devices and Cover Plates:

- Provide new devices and cover plates to insure consistent color and labeling. New devices shall be grounded/polarized type. Introduce GFCI devices or circuit breakers where appropriate.

Fire Alarm System:

- The extent of fire alarm work will vary based on the extent of sprinkler work performed throughout the building. For example less fire alarm coverage is required in a fully-sprinklered building and vice-versa. A new analog addressable fire alarm system is recommended throughout. Provide new fire alarm devices – pull stations, horn/strobe units, smoke detectors, heat detectors, etc. Provide ADA compliant devices. If a sprinkler system is added the tamper, flow, alarm and pressure switches will need to be connected to the fire alarm system. Include a municipal connection direct to the fire department by utilizing a master or radio call box. Include an auto-dialer for a central station connection; the auto-dialer will page assigned staff with all supervisory, trouble and alarm signals.

Public Address System:

- A new public address/music system could be added throughout and include overhead speakers and a telephone system connection. The public address system can be used for paging staff, parents of lost children and background music, and should be incorporated into the outdoor exhibit area as well.

Raceway Support System:

- A raceway support system consisting of back boxes, conduits, cable tray or cable management systems will be provided to support voice, data, video, security and audio-visual systems provided by the Low-Voltage or Information Technology consultant.

Table 3.2: Building Modes

Mode	Open	Closed	Staffing	Notes
"Lobby only"	Lobby, reception desk, orientation exhibits, public toilets	All other areas	2*	To serve hikers and other Reservation visitors when rest of the building is closed
"Lobby and shop"	Lobby, reception desk, orientation exhibits, public toilets, gift shop	All other areas	2	Expanded to serve Reservation visitors when exhibits are closed
"Museum evening event"	Lobby, reception desk, orientation exhibits, public toilets; second floor lobby, lecture room, exhibit hall	Administrative offices	2-3	For lectures or social events when the nature center building is closed.
"Museum day mode"	All areas	NA	Fully staffed	For hours when the nature center building is open to visitors.

* For safety, a minimum of two (2) persons are needed to open the building; this could be one staff and one volunteer.

Table 3.3: Acoustical Design Requirements

	Enclose to isolate from surrounding noisy areas	Enclose to isolate surrounding areas from noise originating in this room	Design for spoken presentations to groups	Provide sound absorption for noise generated in this room
Lobby, circulation, shop		■		■
Exhibit	■			■
Lecture, classroom	■	■	■	■
Animal care	■	■		
Mechanical, wood shop		■		

Exhibits

Comfort

Does the exhibit help the visitor feel comfortable, physically and psychologically? Good comfort opens the doors to other positive experiences; lack of comfort prevents them.

Summary of Goals:

- Physical and conceptual orientation devices are present.
- There are convenient and sufficient places to rest.
- The lighting, temperature, and sound levels are appropriate.
- Everything is well-maintained, functioning, and in good repair.
- There is a good ergonomic fit. Exhibit elements can be read, viewed, and used with ease by persons of different sizes or physical ability.
- Choices and options for things to do are clear. Visitors are encouraged to feel in control of their own experiences.
- Authorship, biases, intent, and perspectives of the exhibition are revealed, identified, or attributed. The exhibit reveals who is talking, and separates fact from fiction or opinion, the real from the not real.
- The exhibit welcomes people of different cultural backgrounds, economic classes, educational levels and physical abilities.

Engagement

Is the exhibit is engaging for visitors? Does it entice them to pay attention? Engagement is the first step toward finding meaning, and the layering of ideas and themes captivates different audiences.

Summary of Goals:

- The physical environment looked interesting and invited exploration.
- Components catch attention, enticed visitors to slow down, to look, interact, and spend time attending to many of them.
- Exhibit components are fun - pleasurable, challenging, amusing, intriguing, and intellectually or physically stimulating.
- Components encourage and promote social behaviors. They encourage visitors to call one another over, read out loud, point at, and converse about the material.
- Experiences come in a variety of formats (e.g. graphics, text, objects, AV, computers, living things, models, phenomena) and a variety of sensory modalities - sight, sound, motion, touch, etc.
- Regardless of a visitor's prior knowledge or interests, there are interesting things to do.

Reinforcement

Do components provide visitors with abundant opportunities to be successful and to feel intellectually competent, beyond the "wow" of engagement? In addition, do the elements reinforce each other, providing multiple means of accessing similar bits of information that are all part of a cohesive whole?

Summary of Goals:

- The exhibit is not overwhelming. There are "just enough" things to do.
- Challenging or complex experiences are structured so that visitors who try to figure them out are likely to say, "I got it," and feel confident and motivated to do more.
- The presentation has logic. It holds together intellectually in ways that are easily followed and understood.
- The information and ideas in different parts of the exhibition are complementary and reinforce each other.

Meaning

Do the exhibitions provide personally relevant experiences for visitors? Beyond being engaged and feeling competent, visitors can find themselves changed, mentally and emotionally, in immediate and long-lasting ways.

Summary of Goals:

- Ideas and objects of the exhibit (natural specimens, living collections, cultural artifacts, demonstrations, and activities) are made relevant to and easily integrated into the visitors' experience, regardless of their levels of prior knowledge or motivation.
- The exhibit makes a case that its content has value. The material is timely, important, and resonates with the visitors' values. Meaningfulness is the "so what."

- The exhibition content touches on universal human concerns and doesn't shy away from deep or controversial issues.
- The exhibit experience promotes change in people's thinking and feeling, even transcendence. Exhibits give visitors the means to make generalizations, change beliefs and attitudes, and/or take action.

Live Animal Exhibits

Please refer to Appendix C: Zoological Exhibit Appendices for design criteria and considerations regarding enclosure requirements for individual animals (fact sheets). Additional information related to the Association of Zoos and Aquariums (AZA) Accreditation Standards and Zoo Standards for Keeping Otters in Captivity was included in Phase 1 submittal.

Building, Site and Zoological Exhibit Program

Table 3.4 - 3.5 summarize general program requirements for the existing Trailside facility and a new nature education center that responds to MAS and DCR program needs, and which meets health, safety and animal husbandry standards. The sizes indicated in these tables are intended as a guide and would likely vary in the final building and site plan.

Table 3.4: Building Program

Component/Space	Existing SF (net)	Proposed SF (net)	Proposed Floor Level	Public/ Private	Notes
Trailside Nature Education Center					
Public Areas and Associated Support – Existing and Proposed					
Weather Vestibule	65	65	Lower	Public	Keep same SF
Visitor orientation/lobby	758	1,500	See Note	Public	New Trailside "hub"; existing SF includes map room
Gift Shop	268	400	Lower	Public	Increase size and add vending area
Gift Shop Office	121	151	Lower	Private	Increase by 25%; locate adjacent to Gift Shop; includes SF for shop storage
Exhibit Hall	1,976	2,000	Upper	Private	Same size
Mens Public Restroom	121	250	Lower	Public	Assumes a 4 fixture bathroom
Womens Public Restroom	115	250	Lower	Public	Assumes a 4 fixture bathroom
Lecture Hall	1,672	2,090	Upper	Public	Increase by 25% to allow for MAS staff meetings, seating for 200
Lecture Hall Storage	65	111	Upper	Private	Increase by 70% to allow for program props; locate near Lecture Hall.
Multipurpose Room (Birthdays)	0	500	Upper	Public	Private room with washable floor and sink; new space not in existing building
Public Areas – Existing but Not Recommended in New Facility					
Lecture Mezzanine	267	0	See Note	Private	Eliminate space in new building
Lecture Mezzanine Loft	222	0	See Note	Private	Eliminate space
Staff Areas – Existing and Proposed					
Office #1	247	180	Lower	Private	Large office
Office #2	88	120	Upper	Private	Small Office
Office #3	186	120	Upper	Private	Small Office
Office #4	144	120	Upper	Private	Small Office

Table 3.5 continued

Component/Space	Existing SF (net)	Proposed SF (net)	Proposed Floor Level	Public/ Private	Notes
Additional Office Space	0	420	Upper	Private	Office space for 7 additional staff (allow 60 SF each)
Office Supply Storage	9	40	Upper	Private	Walk in storage room
Conference Room	204	400	Upper	Private	Enlarge and incorporate library/teacher resources
Staff + Volunteer Lounge / Lunch Room	0	200	Upper	Private	Lounge or Lunchroom space adjacent to the staff kitchen - 12 person table
Staff Kitchen	181	120	Upper	Private	Could be smaller if staff lunchroom / lounge area is provided
Staff Bathroom(s)	60	300	Upper	Private	Assumes 2 fixtures per bathroom
Locker Room	84	150	Lower	Private	Lockers for volunteers and staff - 20 full height lockers
Laundry	121	80	Lower	Private	same size - 1washer, 1 dryer
Public Areas – Existing but Not Recommended in New Facility					
Mens Staff Restroom	35	0	See Note	Private	Existing are in basement; only need one set of staff restrooms in new building
Womens Staff Restroom	28	0	See Note	Private	Same as above
Animal Care Facilities and Support Areas					
Animal Care	974	1,550	Lower	Private	Increase size by 50% - provide visitor viewing area and kitchenette
Animal Care Office #5	42	120	Lower	Private	Small Office
Animal Quarantine Area	1,020	1,000	Lower	Private	Keep same SF, but increase efficiency
Service and mechanical					
Wood Shop	771	617	Lower	Private	Decrease by 20%
Maintenance Garage + Program Vehicle Storage	489	800	Lower	Private	Lower level of museum building; increased for transportation of program animals and program vehicles; allow for indoor storage of at least two vehicles.
Mechanical Spaces	319	1,385	Lower	Private	10% of total estimated for new building
Circulation					
Circulation	1,064	1,385	Lower+Upper	Private+Public	10% of total estimated for new building
General storage					
General storage areas	1,938	1,000	Lower	Private	Existing SF includes basement crawl space and general storage closet; provide more useful and efficient general storage space - decrease by 50%
Total Building net Square Footage	13,654	17,424			
Total Building gross Square Footage (*1.25)	17,068	21,780	Total recommended increase: 27.6% from existing conditions		

Table 3.5: Site and Zoological Exhibit Program

Component/Space	Existing SF (net)	Proposed SF (net)	Proposed Floor Level	Public/ Private	Additional Information
Site Features					
Accessible Visitor Drop-off	0	3,500	NA	Public	Add area for vehicles and pedestrians at north parking lot
Outdoor Visitor Arrival / Orientation/Outdoor Gathering	4,027	4,450	NA	Public	New area included in outdoor gathering / group staging at building entrance; existing SF is at building entrance
Outdoor Classroom / Amphitheater	0	1,220	NA	Public	Add to accommodate approximately 100 people
Picnic / Program Area	3,020	1,425	NA	Public	In paid outdoor exhibit area
North Parking Lot	51,191	42,515	NA	Public	Including vehicular circulation and parking spaces, excluding planted areas
South Parking Lot	48,938	48,163	NA	Public	Including vehicular circulation and parking spaces, excluding planted areas
Walks + Paths	1,904(LF)	1,895 (LF)	NA	Public	Excluding outdoor exhibit areas
Boardwalk and pond loop	82 (LF)	315 (LF)	NA	Public	Free area
Trailhead Entrance Areas	1,080	1,945	NA	Public	
New Trails and Connector Trails	NA	1,315	NA	Public	Provides for continuity and improved site orientation to Blue Hills Reservation
Pond	18,537	18,537	NA	Public	Maintain size of pond
Service Drive to Building / Outdoor Exhibits	4,925	4,295	NA	Private	Eliminates visitor / service conflicts
Maintenance Access Behind Exhibits	0	615 (LF)	NA	Private	Eliminates visitor / service conflicts
Total area	131,718	127,365	Total decrease: 97% of existing		
Total LF walks, paths, drives	1,986	2,825	Total increase: 42% increase over existing		
Outdoor Exhibit Areas / Program Animals					
Outdoor Exhibit Paths	677 (LF)	1180 (LF)	Access from upper level	Public	Increase to expand collection
River Otter Enclosure	1,119	4,250	Visible at upper level	Public View	Increase to meet AZA Standards; needs off-exhibit area (holding); family group
Turtle Enclosure	178	700	Access from upper level	Public View	Increase to meet AZA Standards; multiple animals and species
Virginia Opossum	0	150	Access from upper level	Public View	New exhibit, meet AZA Standards; family group
White-tailed Deer Enclosure	4,042	12,400	Access from upper level	Public View	Increase to meet AZA Standards; needs off-exhibit area (holding); two does minimum to a small herd (1 male + 3 females)
Red-tailed Hawk Enclosure	756	800	Access from upper level	Public View	Increase to meet AZA Standards; pair of birds

Table 3.5 continued

Component/Space	Existing SF (net)	Proposed SF (net)	Proposed Floor Level	Public/ Private	Additional Information
Snowy Owl Enclosure	756	400	Access from upper level	Public View	Meets AZA Standards; pair of birds
Barn Owl	interior	160	Access from upper level	Public View	Meets AZA Standards
Turkey Vulture Enclosure	652	1,800	Access from upper level	Public View	Increase to meet AZA Standards
Turkey Enclosure	0	1,800	Access from upper level	Public View	New exhibit, meet AZA Standards; small flock (1 male + 3 females)
Red Fox Enclosure	3,780	1,800	Access from upper level	Public View	Meet AZA Standards; needs off-exhibit area (holding); existing is estimated from new NSTAR exhibit plans
Fisher	0	800	Access from upper level	Public View	New exhibit, meet AZA Standards; family group
Skunk	0	200	Access from upper level	Public View	New exhibit, meet AZA Standards
Barn	270	480	Access from upper level	Private	Individual holding structures should be provided for all exhibits
Program Animal Mews	480	1,025	Lower	Private	New existing holding area; proposed includes outdoor areas for all program raptors adjacent to animal care.
Duck Blind	118	0	NA	Public	Eliminate space in Recommended Plan
Subtotal exhibit area	14,471	26,756			
Exhibit Expansion Loop	0	443 (LF)	Access from upper level	Public	Future exhibit expansion
Coyote Enclosure	0	9,600	Access from upper level	Public View	Future exhibit expansion; needs off exhibit area (holding)
Black Bear Enclosure	0	4,000	Access from upper level	Public View	Future exhibit expansion; needs off exhibit area (holding)
Lynx (or other species) Enclosure	0	1,200	Access from upper level	Public View	Future exhibit expansion; needs off exhibit area (holding)
Bobcat Enclosure	0	1,200	Access from upper level	Public View	Future exhibit expansion; needs off exhibit area (holding)
Subtotal exhibit expansion area	0	16,000			
Total exhibit area	14,471	42,765	Total with expansion area is nearly three times the size of existing exhibit area.		

Alternatives Considered

Using the design criteria and program data discussed above, along with the principles and objectives defined for Trailside, the consultant team developed three design alternatives – first as a conceptual approach to siting the building, and second, more fully developed site and building plans, which were presented to DCR and MAS on April 10, 2008. Appendix D: Alternatives Evaluation contains 11x17" building and site plans, and a comparison of the alternatives.

These three alternatives (including two variations on Alternative #3) strive to meet all of the objectives outlined by DCR and MAS related to the function and management of Trailside including the building and its associated site. They all are viable alternatives, and when evaluated at a preliminary level do not appear to be dramatically different in cost. As directed by DCR, based on a discussion of conceptual alternatives, the consultant team considered renovating the existing museum, building a new building in the current location, and constructing a new building accessible from the north parking lot. These three approaches are summarized in Alternatives 1-3 below.

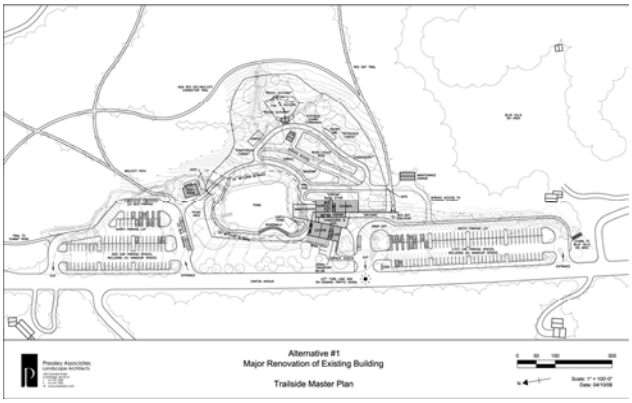
Alternative #1: Major Renovation of Existing Museum Building

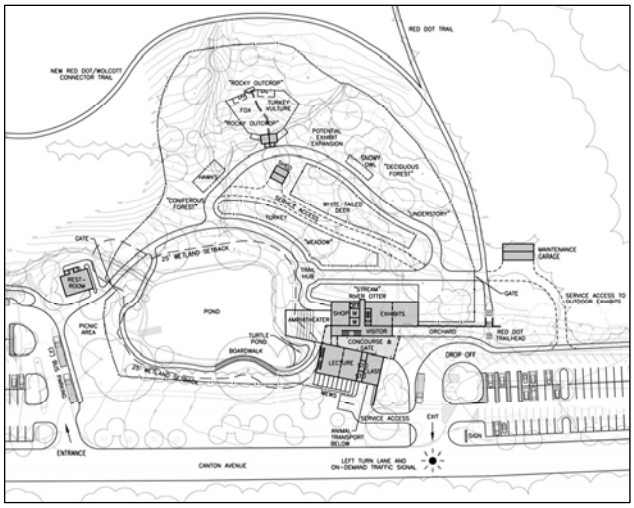
Site

Alternative 1 retains the existing visitor arrival sequence and general organization of animal enclosures, and therefore reflects the least change to the overall visitor experience as expressed in the landscape. Both the north and south parking lots are retained with improved configurations. Bus circulation and drop-off is accommodated in the south lot with a vehicular turn-around at the building entrance. Service access to the building is provided off of the south lot via a vehicular service drive. A maintenance garage is also located adjacent to the south lot, which is accessed by a separate service drive that leads to the outdoor animal exhibits.

The outdoor exhibit loop retains the new NSTAR exhibit, but is largely re-configured to allow for universal access. The River Otter pool is relocated adjacent to the building to be visible from outdoor gathering, outdoor exhibit loop, and interior exhibits. Alternative 1 is designed with flexibility to introduce a paid outdoor exhibit experience or maintain a free experience.

Outdoor gathering is accommodated between the building entrance and the Red Dot trailhead, including the covered concourse at the entrance and the Amphitheater overlooking the pond. A new trail hub outside the building entrance connects to the Red Dot Trail, Wolcott Path and animal exhibit loop. The pond walk and boardwalk are retained, and the walk from the north parking lot to the building entrance is converted into a fully accessible route. This alternative also retains existing vegetation to the greatest extent possible, and introduces an orchard and vernacular stone walls at the museum entrance to recall the Blue Hills area agricultural history.

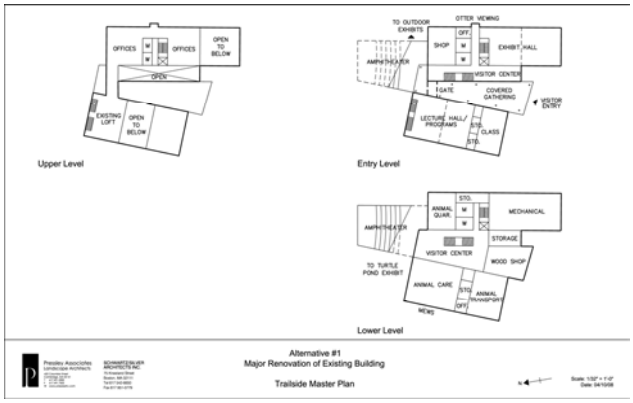




Small diagram showing Alternative #1 site plan and detail around building (Pressley Associates).

Building

Given the condition and unsuitability of much of the existing building, Alternative #1 retains only a portion of the existing Lecture Wing for its current uses, and replaces the Visitor Wing and Exhibit Wing with new construction. The building complex retains its public approach from the south parking lot and its orientation to the pond towards the north. Visitors enter through a covered "gathering" space between the existing and new wings of the building, with most visitor services and information in the new wing to the right (east). The two wings connect at the upper level (for staff) and at the lower level (for visitors and staff); this alternative occupies three building levels. An amphitheater facing the pond, for outdoor programs, is located near the indoor program areas. In retaining the existing Lecture Wing, this alternative makes the most use of existing facilities; demolition and construction for the new wing would require Trailside to either substantially restrict its operations for one to two years, or to close during that period.



Alternative #1 building plans (Schwartz/Silver Architects).

Alternative #2: New Nature Education Center on the Existing Building Site

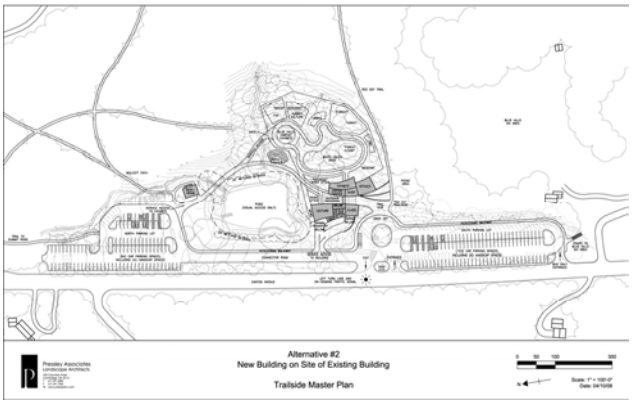
Site

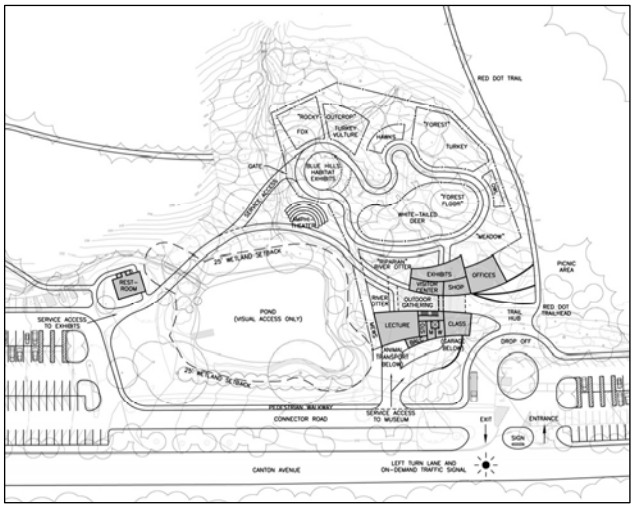
Alternative 2 is the most compact approach to the site, with less land area devoted to site features. This alternative retains existing vegetation to the greatest extent possible, while returning the pond walk to natural habitat.

Both the north and south parking lots are retained in their entirety with a new connector road between the lots. A single vehicular entrance/exit at the front of the building accommodates both parking lots and is designed to facilitate bus and vehicular drop-off at a turn-around. A restricted-use entrance at the south end of the south lot allows for one-way bus circulation. Service access to the building is accommodated off of the two-way connector road and service access to the outdoor exhibits is accommodated from the north parking lot along the shared pedestrian walk/off-hours service drive.

Outdoor exhibits become a fully paid experience, accessed through the building. Exhibits are arranged according to the 'plant communities of the Blue Hills' with a curving path system that creates multiple perspectives for viewing the animals. The NSTAR exhibit is removed and replaced with individual enclosures for the Fox and Turkey Vulture. The White-tailed Deer and Turkey are housed in the same enclosure habitat. A new River Otter enclosure is designed adjacent to the building near outdoor gathering, providing a "walk through" experience.

Outdoor gathering is accommodated in the uncovered area between the two pavilions. A new amphitheater is located along the path leading to the nature education center from the north parking lot. Pedestrian circulation eliminates the interpretive pond walk and creates a fully accessible walk from the north lot to the entrance, including an extension along the east side of the north parking lot. A new trail hub between the Red Dot trailhead and building entrance connects to a walk along the east side of the south lot. Pedestrian circulation between then north and south lots occurs along the connector road.

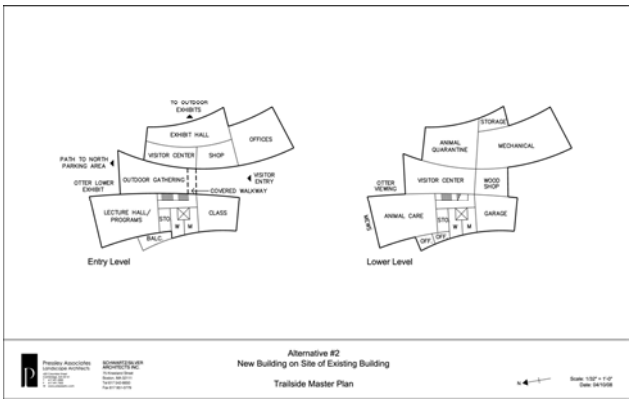




Alternative #2 site plan (Pressley Associates).

Building

Alternative #2 demolishes the existing buildings and constructs a new building on the same site. This alternative has two floor levels only. The public approach is from the south parking lot and the new building is oriented towards the view to the pond, at the north. Visitors enter a covered "gathering space" between the two building wings. Division of the apparent "above-ground" parts of the building may reduce the perceived mass of the building and preserve views to the pond; however the divided entry level areas will require more staff supervision than a single area. Animal care and lecture hall/programs are at the west (left) wing, where they can be conveniently accessed at the lower level by a service drive; visitor and exhibit areas are at the east (right) wing, adjacent to outdoor exhibits at the wooded upland areas. By re-using the existing building location this alternative minimizes overall construction impacts on the site, although it presents more complications for operation and management, as demolition and construction would require Trailside to close completely for one to two years or operate out of trailers.



Alternative #2 building plans (Schwartz/Silver Architects).

Alternative #3: New Nature Education Center Building Accessed from North Parking Lot

This alternative locates the building on the east (uphill) side of the pond, with primary pedestrian access from the north parking lot. Because this presented an entirely new approach for the new nature education center and site, the consultant team developed two variations (Alternative #3A and #3B).

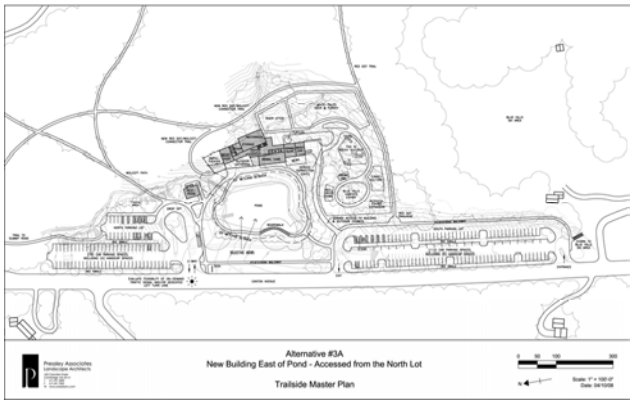
Alternative #3A

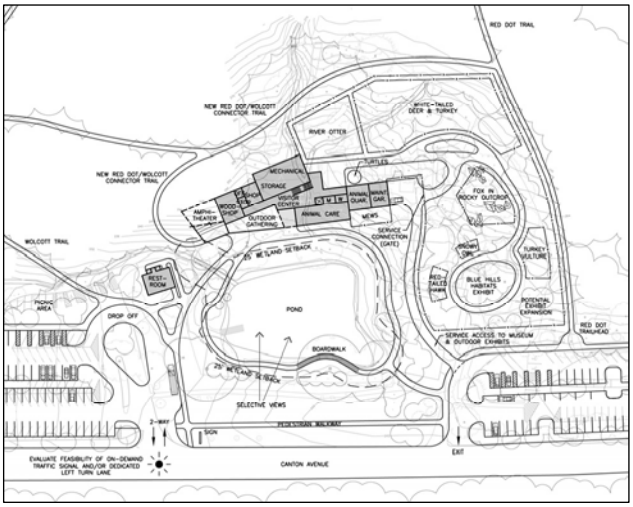
Site

Alternative #3A utilizes a new building location with a dramatic setting overlooking the pond. After the existing building is demolished, its site would be re-vegetated with some of the exterior exhibits relocated down the slope toward the former building site. This alternative retains vegetation to the greatest extent possible while introducing new vegetation to emphasize plants native to the Blue Hills.

The primary vehicular entrance to Trailside is a single entrance/exit off of Canton Avenue to the north parking lot. Circulation in the north lot includes a new turn-around with drop-off for vehicles and busses with a pull-off area for two busses. The north parking lot primarily serves the new nature education center to establish an new identity separate from the Blue Hills Ski Area. In this alternative, the south lot primarily serves the Blue Hills Ski area and Red Dot Trail. The south lot is retained with improved layout and includes a separate entrance and exit, as it currently functions. Service access to the building and outdoor animal exhibits is accommodated by a service drive off the south parking lot.

Outdoor animal exhibits are reconfigured to a fully paid experience along a spine that curves down-slope from the new building to the area near the location of the existing building. Alternative 3A removes the NSTAR exhibit and replaces it with separate enclosures for the Fox and Turkey Vulture. This alternative also provides a new River Otter pool inside the exhibit area adjacent to the lecture hall. Deer and Turkey are housed together in a habitat-based enclosure.



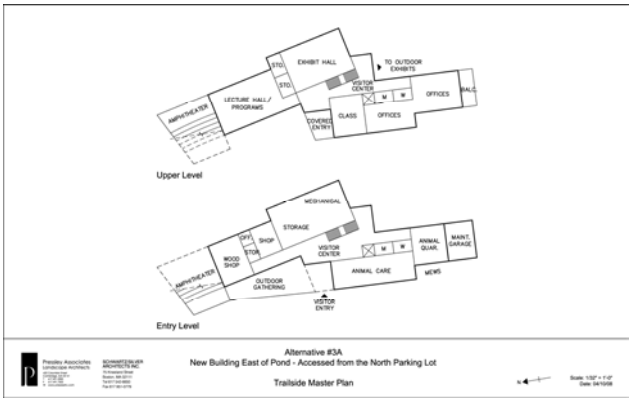


Alternative #3A site plan (Pressley Associates).

Primary pedestrian access to the new nature education center is accommodated from the north parking lot with a new accessible walk from the vehicular drop-off to the outdoor gathering area at the museum entrance. The outdoor gathering area includes an amphitheater and a spur path leading from the gathering area to the new Wolcott Path/Red Dot connector trail. Pedestrian circulation around the pond is retained along with the boardwalk. Individual trail entrances are retained at both parking lots. A connector path along Canton Avenue provides pedestrian access from the north to south lot.

Building

Alternative #3A proposes a new two-story building on the slope east of the pond, in the area of the existing outdoor exhibits. Public approach is from the north parking lot, with entry facing the pond, which establishes a separate identity for Trailside apart from the Blue Hills Ski Area. The entry is to the lower level, to a lobby which contains a stair and elevator for transition to the upper level where program rooms, exhibits and the entrance to the outdoor exhibits are located. Because the site slopes down from east to west, part of the entry level is built into the hillside. Service is by a separate drive serving the entry level at the south, and most of the entry level (other than lobby and gift shop) is devoted to staff-only areas. Because it proposes to build in a new location, this alternative has a relatively high construction impact on the site, but it will allow Trailside to remain in nearly continuous operation throughout the construction, move, demolition and site renovation phases.



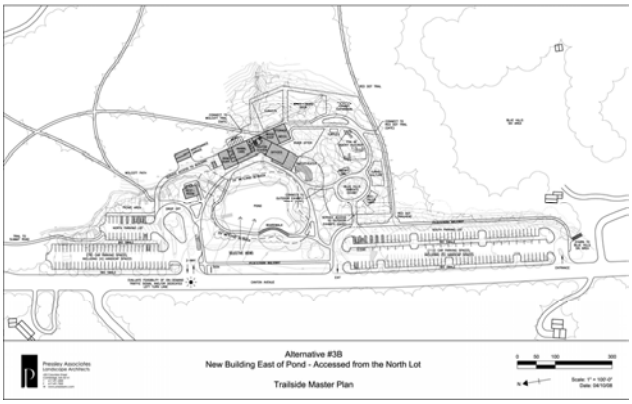
Alternative #3A building plans (Schwartz/Silver Architects).

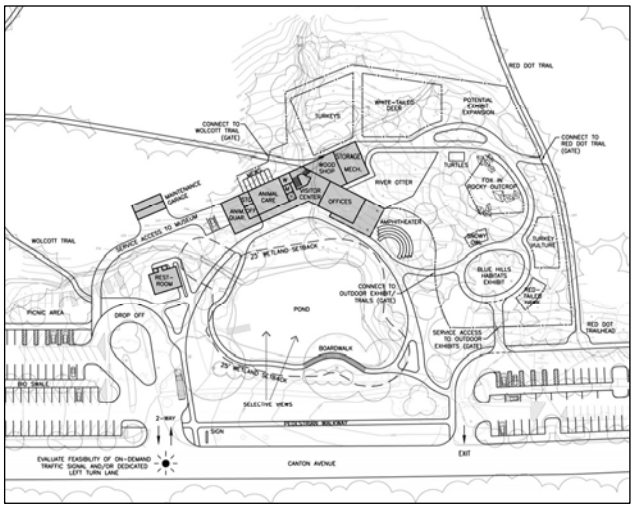
Alternative #3B

Site

Alternative #3B is a variation of Alternative 3A, with the most significant changes to the outdoor exhibit area and service access routes to both the building and the exhibits. In this alternative, the outdoor exhibit area is designed as a free experience with multiple points of entry from the nature education center, pond walk, Red Dot Trail, and Wolcott Path connector trail. The outdoor exhibit area layout is the same as Alternative #3A, curving gently down-slope from the building. A new amphitheater is also added at the south end of the new building overlooking the pond. Service access to the animal exhibits is accommodated by a short service drive from the south parking lot leading directly into the animal enclosure area.

Service access to the building is accommodated by a longer service drive that leads from the north lot, across the stream, behind the comfort station to a service garage and the new building.

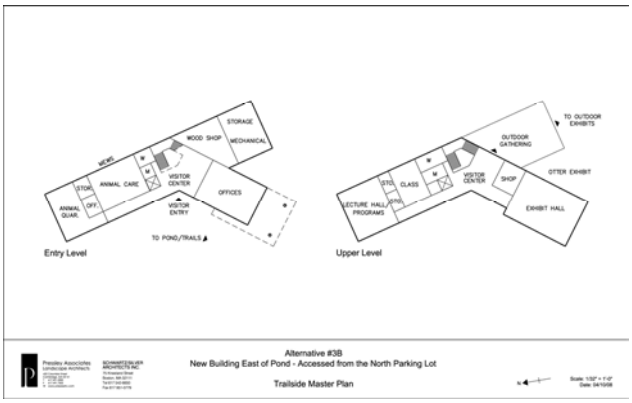




Alternative #3B site plan (Pressley Associates).

Building

Alternative #3B is similar to #3A in most respects except that the service access is from the north parking lot, with a separate garage sited along the drive. Public approach is from either north or south parking lot. The alternative substitutes a "bent" building plan layout in place of the relatively 'straight" layout of #3A, but without a substantially different distribution of the building program other than the service access.



Alternative #3B building plans (Schwartz/Silver Architects).

Endnotes

[1] Note that the discussion of free vs. paid areas reflects decisions associated with the final plan, which is illustrated in Chapter 4.

[2] As above.