

Community Design Guidelines to Support Old Croton Aqueduct State Historic Park

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Parks, Recreation
and Historic Preservation

Community Design Guidelines to Support Old Croton Aqueduct State Historic Park Westchester County

Prepared by the New York State
Office of Parks, Recreation & Historic Preservation

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*Old Croton Aqueduct at Sing Sing
Harper's Magazine, December 1860*

What Are Design Guidelines?

Design guidelines are written recommendations that concern best practices in architecture, planning, and landscape design. Guidelines encourage creativity in decision-making while also defining a range of responses appropriate to a variety of local land use and preservation challenges.

Design guidelines are not prescriptive; they do not identify a singular treatment that must be applied in the alteration of a structure or landscape, or in the construction of a new building. Instead, guidelines help those who review development proposals to universally apply recognized principles of good design on a case-by-case basis. The discussion and outcomes that derive from the thoughtful consideration of design guidelines during the project review process help to create consistency between structures proposed to be modified, or built, with those already standing. Design guidelines empower communities to better preserve the quality and character of their surrounding environment.

Many town and village boards across the nation formally adopt design guidelines to reinforce the visual and cultural traditions that make their community a desirable place to live, work, and play. Used in conjunction with local ordinance, design guidelines promote the improvement, rehabilitation, or construction of structures and landscapes that integrate more seamlessly within the community's historic fabric to enhance its economic character and unique aesthetic.

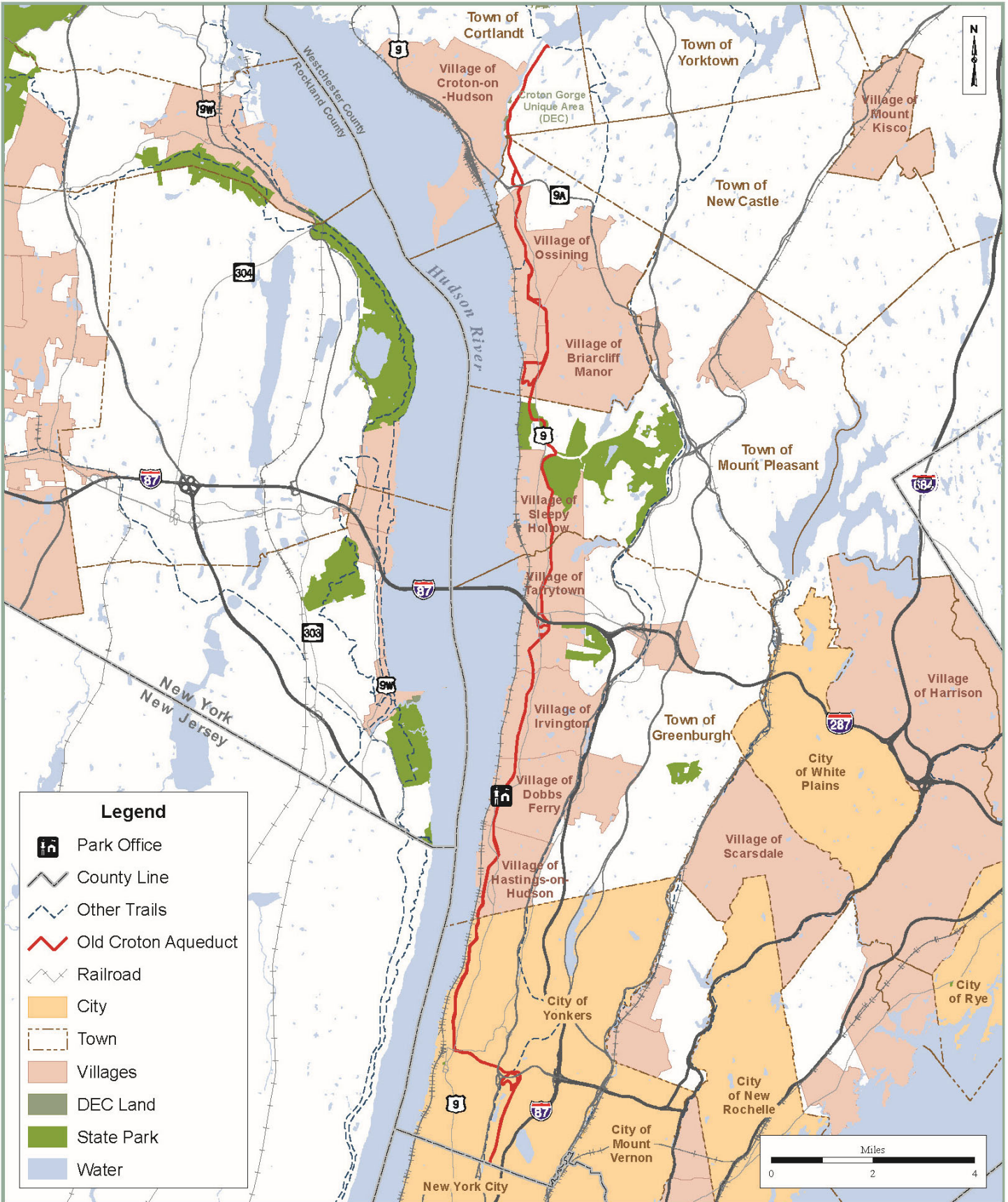
Statement of Purpose

The purpose of the *Community Design Guidelines to Support Old Croton Aqueduct State Historic Park* document is to guide and inform the evaluation and design of development in physical and visual proximity to Old Croton Aqueduct State Historic Park (OCA). It is the position of State Parks that changes made to the landscape surrounding the Park should contribute to—rather than detract from—its historic environment. The conscientious effort to mitigate physically damaging or visually intrusive development will allow the intersection between the OCA and private land to be a pleasant one.

Successful application of these guidelines should yield development that maintains the visual integrity of the OCA—without encumbering the region's growth—and inspire thoughtful, ongoing debate about design and preservation practice throughout Rivertown communities.

Community Design Guidelines to Support Old Croton Aqueduct State Historic Park is written for property owners, architects and design professionals, planning and zoning commission appointees, architectural review board members, and municipal staff and leaders. The guidelines are intended to establish among this community a shared understanding and appreciation for the significance of the Old Croton Aqueduct as a historic, cultural, scenic, and recreational landscape.





Old Croton Aqueduct State Historic Park

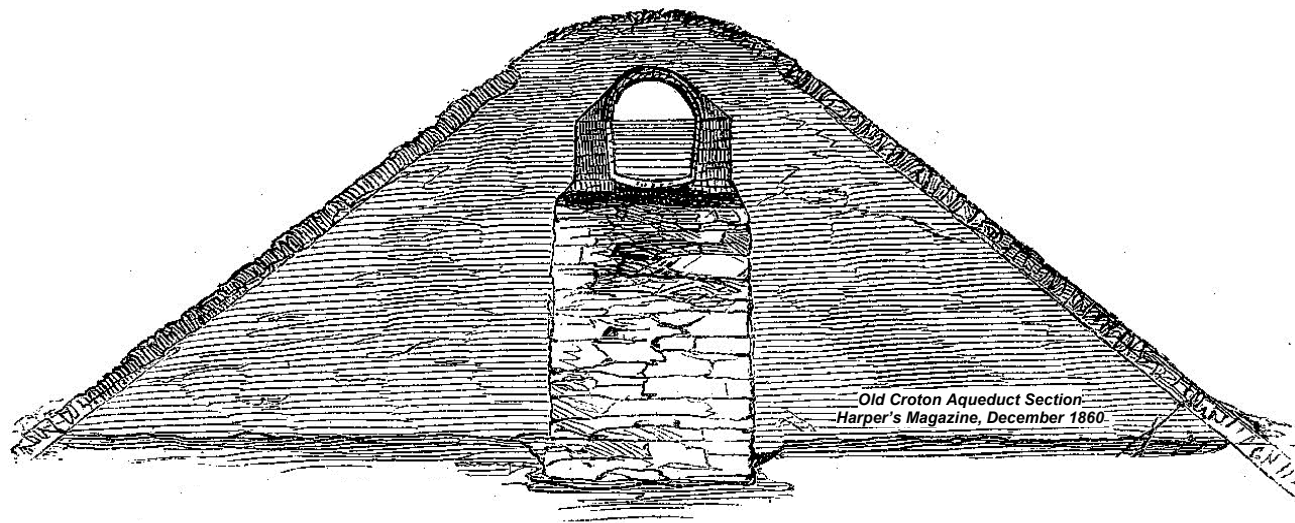
Map produced by NYS OPRHP, February 10, 2020.



What is the Old Croton Aqueduct?

The Old Croton Aqueduct (OCA) is a 26.2-mile linear State Historic Park managed by the Taconic Region of the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). The OCA—whose width varies from 33 to 66 feet—extends from the Croton Dam in Cortlandt south to the City of Yonkers. It is an important recreation corridor and scenic trail. Annually, the OCA attracts hundreds of thousands of visitors—many from outside the region, including internationally—due to its historic and visual qualities. These visitors contribute an estimated half-million dollars per year to the local economy.

The OCA is considered one of the most ambitious engineering accomplishments and public infrastructure projects of the early 19th century. Recognized for its contributions in the areas of engineering design and urban planning, the OCA was listed on the National Register of Historic Places in 1974 and designated a National Historic Landmark in 1992.



History of the Aqueduct. During the 1830s, New York City (NYC) was devastated by fire and disease. These problems stemmed from a single source: inadequate water supply and contaminated wells. Many corrective measures were examined, most of which recognized the need to import water from outside the City. After numerous proposals and abandoned plans—including damming the Hudson River—construction of an unprecedented magnitude on a large, complex water distribution system began in 1837.

Called the Croton Aqueduct, the 41-mile system—carrying water from a dam on the Croton River in Westchester County into NYC—was designed to operate by gravity. The Aqueduct's principle feature, an underground masonry conduit, measures approximately 8½-feet high by 7½-feet wide and is set at a “hydraulic gradient” to allow for a gravity feed of almost 70,000 gallons of water per minute. The Aqueduct's route was carefully chosen to follow, as closely as possible, the natural topography of the Hudson River's eastern slope and maintains a consistent downward gradient as necessary for the gravity-fed aqueduct to function. The selected route required tunneling through hillsides and spanning small valleys or ravines, which demanded building viaducts—elevated masonry spans—across ravines and stone-faced earthen embankments at filled cross-slopes. More than 70 stone culverts were built to allow for the unimpeded flow of rainwater from areas above the Aqueduct down to the Hudson. The Aqueduct's construction also required building ancillary structures, including ventilators and waste weirs. Overseers in charge of patrolling and maintaining specific sections of the Aqueduct were provided with houses on, or near, the section of the tunnel for which they were responsible. Today, only one such home remains in public ownership; the residence currently houses the Historic Park's Visitor and Education Center. Under the leadership of Chief Engineer John B. Jervis, construction of the OCA was completed in 1842 at a price of \$13 million dollars (approximately \$400 million dollars today).

NYC Public Works officials believed the Aqueduct would provide New Yorkers with fresh water for decades to come. By the early 1880s, however, as the City's population spiraled upward, the Aqueduct no longer met demand. Construction of a *new* Croton Aqueduct began in 1885 and water began to flow by 1890. Although no longer the sole supplier of NYC's water, the *old* Croton Aqueduct continued to provide water for the City until 1965, at which point the gates at the point-source Croton Dam were closed. A northern portion of the OCA returned to service in 1987 and supplies water to the Town and Village of Ossining today.

Public recreational use of the OCA corridor has remained popular throughout history. The Aqueduct corridor quickly became a popular pedestrian trail, although it was not built to function as such. Over the years, NYC public works' principal administrative focus had been maintenance of the OCA's infrastructure and its function as a public water supply; little effort was put into managing the ground surface or trail corridor except as needed to protect and ensure access to the conduit. In 1968, the OPRHP acquired the OCA by purchase and committed to maintaining not only the Aqueduct's underground infrastructure but also the attractiveness of, and safety along, its aboveground path. Through this purchase, OPRHP has ensured ongoing public recreational and interpretive access to the OCA, a beloved intra-community pathway and scenic resource.



Key Preservation Issues

Under Section 3.02 of New York State's Parks, Recreation and Historic Preservation Law, the OPRHP is directed "to conserve, protect and enhance the natural, ecological, historic, cultural and recreational resources contained therein and to provide for the public enjoyment of and access to these resources in a manner that will protect them for future generations."

The OPRHP and OCA staff recognize the following issues as key preservation challenges faced by the Historic Park today:

Cultural Landscape and Viewshed Protection

Old Croton Aqueduct State Historic Park is a distinctive cultural landscape replete with historic structures and archaeological resources that reveal a significant component of our nation's historic growth and development. Continued advocacy, protection, and celebration of the Historic Park and its scenic viewsheds is important and connects people to places and events in our shared past.

The subterranean Aqueduct is an engineering marvel, hailed by many as an unparalleled success. One prominent news publication acclaimed the Aqueduct to be "one of the greatest and most important works of the world, whether we consider the boldness of its plan, or the admirable manner of the execution." Without its construction, and the reliable transport of life-sustaining fresh water, New York City scarcely would have become one of the world's foremost cultural and financial centers.

From the trail corridor atop the underground Aqueduct, panoramic views of the Hudson River and Palisades can be found. Preserving sightlines of these visually striking, and nationally recognized landscapes—many best viewed in winter—is critical.

The Aqueduct was added to the National Register of Historic Places in 1974, and a portion of it designated a National Historic Landmark in 1992. The designation encompasses not only the underground conduit tube and ancillary structures like weirs and ventilators, but the characteristic trail surface, retaining walls, and just about everything that makes it distinctive. State Parks desires to preserve this inimitable structure—as well as the scenic views and path over it—and to provide a consistent appearance to the trail that highlights and preserves its historic importance for generations to come.

Responding to Development Pressure

Surrounded by the beauty of the Hudson River Valley, quality schools, diverse employment opportunities, and efficient transportation access into New York City, many Rivertowns through which the Aqueduct trail passes have been—and will continue to be—under significant development pressure.

The OCA traverses through several different municipalities, each subject to differing zoning regulations and review processes. This creates an inconsistent patchwork of local regulations and procedures effecting development adjacent to the trail. Consideration of the *Community Design Guidelines* document during the local review process will provide some uniformity to project evaluation and help State Parks in its ongoing mission to conserve, protect, and enhance the Historic Park.

Though the Aqueduct side of a property isn't that of a streetscape façade, it should not be treated as a strictly utilitarian or private space. The sorts of things appropriate for an alley—the backs of garages, storage sheds, HVAC equipment, utility buildings, etc.—detract from the public experience in a historic park setting and should be considered carefully along the trail. Light, sightlines, and a sense of openness are critical to the enjoyment and security of trail users and designs that enhance these features should be encouraged.

Although some features like bridges and culverts required more land, the Historic Park property is typically only 66 feet (or less) in width—about half that of a residential street—and its narrow scale requires special attention when considering adjacent development. Municipal setback requirements for properties abutting the Historic Park are important, but they alone cannot be expected to take the place of good design. Furthermore, enforcing setbacks is critical to allowing proper maintenance of Aqueduct structures and features, such as slope and retaining walls, waste weirs and culverts, by Park staff or other preservation specialists. Sensitive, thoughtful design, with buildings similar in scale and massing to existing neighborhood structures, is one key to the successful intersection of public and private space.

New construction set immediately adjacent to the OCA's manmade embankments (both earthen and stone-faced) can also undermine the structural integrity of the OCA embankment and prevent, or severely limit, access for routine maintenance.

Accordingly, State Parks is committed to encouraging the sort of development adjacent to the Historic Park which has been shown to positively impact the environs of both the Historic Park and its surrounding neighborhood. A linear park like the Aqueduct requires a uniform appearance to help patrons easily navigate unfamiliar communities. A recognizable appearance is also consistent with State Parks' policy of identifying its facilities as part of the Parks system.

Education and Awareness

General lack of either awareness or appreciation of the OCA as a State Historic Park has led to encroachments onto parkland by private property owners. While some encroachments were allowed by formal permit prior to State Parks' acquisition of the property, more recent encroachments are an unauthorized and illegal use of publicly owned land. Such intrusions—including the installation of gardens, fencing, patios, structures and utilities on or across the Historic Park property—are problematic as they often discourage (or even prevent) public access and use of the trail, mitigate the landscape's beauty, destroy natural habitat, bring about erosion and increase flooding.

The same lack of awareness also incites dumping and graffiti along many trail sections. While these incidents are more prevalent in urban areas, dumping occurs in suburban neighborhoods too, especially in the form of yard debris. These activities further contribute to a lower sense of safety and user enjoyment while traveling the OCA.

The best way to foster an appreciation of the Aqueduct is to enhance knowledge of its significant role in the growth of New York State as well as the social, economic, and ecological benefits enjoyed by its host communities. As bordering municipalities undertake climate change planning, they will increasingly find the Aqueduct's linear green space an asset to treasure and conserve.

The Aqueduct's future depends not only upon proactive municipal leadership and ordinance revision, but education of communities' youngest residents as well. The Park has made a concerted effort to engage the next generation of trail users and stewards by developing and delivering programming that uses the Aqueduct to better understand issues of water generally. Aqueduct educators work with schools from surrounding districts to provide curriculum that demonstrates the connections between the urban need for water and the social costs borne by the rural areas that supply it; the threats of pollution to waterways and oceans; public policy issues relating to the management, conservation, and distribution of water, and more. Aqueduct education programming costs, transportation expenses, and all site visit fees are currently eligible for reimbursement through the Connect Kids to Parks program. This grant program is available to school districts, municipalities, and some not-for-profits.



Developing the Guidelines

The *Community Design Guidelines to Support Old Croton Aqueduct State Historic Park* are neither technical nor prescriptive but are intended to promote responsible development and design practices that better protect the Aqueduct and the sense of place the Park creates within the surrounding community.

The Guidelines help to familiarize stakeholders with the significance of the landscape and how best to care for it. Recommendations within the document are informed by a detailed study of the Rivertowns' current and historic land development patterns, their municipal codes, professional scholarship and best practice. In all cases where these Guidelines conflict with local ordinance, state, or federal law, the ordinance or law supersedes.

Applying the Guidelines

The OCA passes through five distinct environmental settings:

- Natural
- Suburban
- Village Center
- City Center
- Special Districts

These environmental settings have been identified based on the character and intensity of development adjacent to the Historic Park. A narrative description of each setting is provided in the pages that follow. Each narrative includes a summary of the setting's defining features and recommendations on how development proposed in the setting can best respect the OCA's historic character.

To apply the Guidelines, users should first identify the environmental setting in which the proposed project exists. Users should familiarize themselves with the setting's defining characteristics and the recommendations associated with protecting and preserving the setting's character.

Second, users should reference page 13 of this document—"Preserving Historic Character Through the Application of Design Principles"—and incorporate a discussion of the listed design principles into their deliberations. A series of discussion prompts is included under each design principle to facilitate meaningful dialogue on development and preservation practice along the Aqueduct trail.

This iterative process should help property owners and decisionmakers build a shared understanding of how the proposed design fits into or complements the surrounding landscape and identify any opportunities to improve the design as to better respect the Historic Park and Aqueduct features.



Development in a Natural Landscape

Setting Description: Areas are marked by minimal recent disturbance from human activity. The area may have remained undeveloped forest because it was preserved by a private owner, or because of landforms that prevented economic development. Some landscapes identified as natural have experienced agricultural uses in the distant past for purposes of grazing, crops, or woodlots, but these uses have been abandoned, resulting in a naturally regenerated forest involving minimal human intervention.

Recommendations:

Building Setback – Communities that successfully preserve and maintain the OCA's visual continuity within this environmental setting have implemented an ample 50-foot (on average) setback requirement. Where a structure is developed in proximity to the OCA, particularly near an embankment or culvert, the new structure's placement should not compromise the OCA's structural integrity, nor preclude access to it for structural maintenance and repair.

Viewshed Preservation – Protecting sightlines and viewsheds from the trail corridor, as well as the view of the trail from the Hudson River, is a Park priority. In pursuit of this goal, one- and two-story structures are often most appropriate for this setting. Three-story structures may be appropriate should roof ridgelines not be visible at, or above, the treeline; however, seasonality may have a significant impact on how a building of this height is perceived. When discussing new construction's height, consideration for how a viewshed changes with the seasons should take place. Thoughtful manipulation of design elements, such as orientation and massing, in new construction can also help to protect the OCA. In this setting, scenic views—particularly those of the Hudson River and Palisades—should be protected to the greatest degree reasonably practical.

Landscaping – Plantings or fencing for the purposes of screening private property or accessory buildings from the OCA should not be installed on State parkland. Landscaping adjacent to the trail should comprise native species and be naturalistically clustered. Trees and woody shrubs should not be placed adjacent to earthen or stone-faced embankments. Fencing should be of a design and material compatible with the natural landscape.

Communication Infrastructure – As population and demand for speedy wireless data transmission grows throughout Westchester County, interest from wireless providers to erect new cell towers is likely to increase. To achieve optimal performance, a cell tower generally requires an unobstructed path to the antenna transmitting the provider's signal to personal devices. The signal's quality is further enhanced if a tower is sited in proximity to open water. Accordingly, the integrity of the scenic quality of the OCA may be compromised if new cell towers are constructed without special concern for the visual integrity of the trail and views of it from the River. To mitigate potential adverse visual impacts of new towers on the historic landscape, a tower's location, size/height, and appearance should be discussed. If communities install a concealed cell tower—one that appears to 'camouflage' itself within the environment—tree density, types of tree, and seasonal changes in vegetation around the tower location should be evaluated. Enclosures surrounding towers should be properly screened with natural landscaping appropriate to the environment.

Roadways – The OCA is crossed by scores of municipal roads over its length. Should municipalities consider widening roadways—many segments of which function as an alternate or extension of the trail—public works officials and traffic engineers should bear in mind that wide lanes and shoulders encourage higher vehicular speeds. Consequently, there is less time for drivers to respond to walkers, cyclists, and others enjoying the trail. There is also a decreased awareness and enjoyment by motorists of the area's scenic nature. Good highway planning starts with the 'design speed,' which results in a roadway on which drivers comfortably drive at or near the posted speed. Where new construction is proposed, vegetation removal should be minimized. Not only does vegetation preserve the OCA's historic landscape, but it works to slow drivers. Municipalities should give equal value to pedestrian safety and the travel experience.



Croton Dam, Mile 1



Sleepy Hollow, Mile 8



Hastings-on-Hudson, Mile 18



Cortlandt, Mile 2

Development in a Suburban Landscape

Setting Description: "Suburban landscape" denotes an area that is principally residential in character, typically with houses located at some distance (50 feet or more) from one another. The Aqueduct trail often forms the backyard boundary of these properties. In some cases, stone walls or fences mark the division, and in others the distinction is lacking, with lawns melding seamlessly into the Park.

Recommendations:

Building Setback and Lot Coverage – Communities that successfully preserve and maintain visual continuity along the Aqueduct within this setting have implemented a 35-foot (on average) setback requirement.

Building placement may vary among parcels in this setting. To promote visual harmony along the trail and maintain compatible sightlines, it may be appropriate to calculate the average depth of yards on either side of the subject property prior to siting a new structure or landscape feature.

Lot coverage—the area of a parcel covered by impervious surfaces including the building footprint—in this setting should not be out of proportion relative to coverage on adjacent lots. Excessive lot coverage not only results in a loss of open space or mature trees but leads to development that appears out of scale in proportion to the landscape and its historic features.

Any changes to land contiguous to the Historic Park, particularly in proximity to an embankment or culvert, must ensure the Aqueduct's structural integrity and function is not compromised. New construction must allow access to the Aqueduct for maintenance and repair.

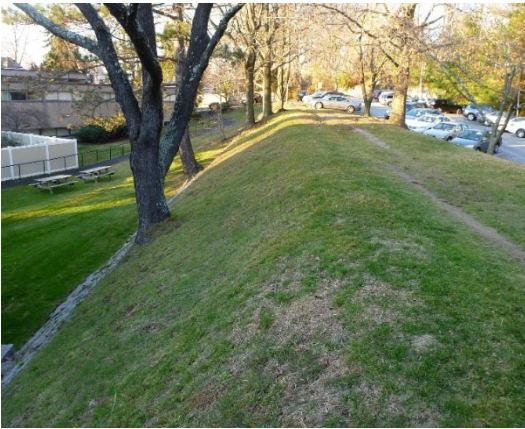
Façade Treatment – Materials and some architectural elements used on front or street-facing elevations should continue to side and rear building elevations that confront the trail. The elevation facing the Aqueduct, however, should not be "stage-set" or a false façade.

Viewshed Preservation – Protecting sightlines from the trail corridor is a priority for the Historic Park. One- and two-story structures are often most appropriate for this environmental setting. Three-story structures may be appropriate should roof ridgelines not be visible at or above the treeline and if portions of the building's third story are recessed or stepped back. It is important that the height of buildings adjacent to the trail not contribute to a canyon-like feel where buildings 'loom' overhead. Thoughtful manipulation of design elements such as scale and massing in new construction can help to protect the OCA and its aesthetic character.

In many instances along the trail, there is a significant change in elevation from the Aqueduct trailbed to the streetscape below. Under these conditions, new developments—as well as utility infrastructure—should avoid unnecessary protrusions into the trail viewshed. The space between adjacent homes or buildings, known as a side yard, may also need to be considered to protect sightlines of attractive landscapes—such as green spaces or main streets—from the OCA. In particular, views of the Hudson River and Palisades should be protected to the greatest degree practical in order to preserve the visual relationship between two of Westchester County's premier heritage landmarks.

Landscape Screening and Fencing – Landscape screening may be an appropriate treatment to help visually buffer new development from the trail or provide homeowners with additional privacy. Screening plantings are not permitted on park property and must be installed on private property. If planted, landscaping should employ a mix of types and sizes of native species. Plantings should not be installed in long, narrow borders of a lone species but instead, layered or naturally clustered. Trees and woody shrubs should not be placed adjacent to earthen or stone-faced embankments. At maturity, plants should not overwhelm the space. New plantings should require minimal irrigation and maintenance.

Fencing should be of a design and material compatible with the historic landscape as well as the principal architecture on a lot. Fencing is not permitted on park property and must be installed on private property. Fencing parallel to the trail to secure a yard should allow for some visibility, but not foreclose property owners' privacy. Fencing should avoid a flat or monotonous appearance that suggests a service alley rather than a linear Park corridor.



Tarrytown, Mile 12



Mill River Culvert, Sleepy Hollow, Mile 9
Historic American Engineering Record



Hastings-on-Hudson, Mile 17.5



Yonkers, Mile 21

Development in a Village Center



Ossining (Main Street), Mile 5



Irvington (Main Street), Mile 14.5



Dobbs Ferry (Cedar Street), Mile 15



Dobbs Ferry (Chestnut Street), Mile 16

Setting Description: The Aqueduct passes through several village centers, most of which existed when the Aqueduct was constructed. Land use in these areas tends to be mixed residential and commercial. Homes can be single-family or multi-family or cooperatively owned complexes, but proximity to one another and higher density than suburban areas is a hallmark. Commercial uses are generally restricted to offices, light retail, and small restaurants, although small industrial firms and larger shopping centers can be found. Adjacent roads are often heavily travelled and, in many cases, access to rail transit is nearby.

Recommendations:

Building Setback and Viewshed Preservation – Within this setting, communities that successfully contribute to the OCA, preserving its sightlines and viewsheds, have implemented a 15- to 20-foot (on average) setback requirement. Respecting the setback is also paramount to preventing encroachment onto parkland. Encroachments compromise enjoyment of the public trail and needlessly channel travel into a narrow corridor, creating the sense that a park patron is trespassing when they are in fact on public land.

Communities that better steward the trail and its scenic viewsheds permit structures that are, on average, no greater than 35 feet (three stories) in height. The space between buildings, also known as side yards, may also need to be considered to protect sightlines of the Hudson River or village main streets. To prevent development abutting the OCA from creating a canyon-like feel where buildings 'loom' overhead, floors above the second should be recessed or stepped back. There also may be other architectural approaches—the addition of windows or use of capping features like projecting cornices and mouldings—that mitigate the perceived bulk of a single multistory building.

Building Placement and Façade – Adjacency to the OCA is an asset and building design should reflect as much. For new development, discussion of these recommendations early in the design phase can help to ensure that structures are sited in a manner that embraces the OCA. Where feasible, the trail should not be conceived of as the building's natural backside where trash and storage receptacles reside. Proper consideration of the trail during the design phase can promote a building layout that more appropriately locates these necessities or uses deliberate design to better mask them. In general, elevations that confront the trail should not lack architectural interest. Materials and some design elements used on front or street-facing planes should continue to side or rear elevations that confront the trail. The trail-facing elevation should not be "stage-set" or have a false front.

Any changes to the landscape contiguous to the Historic Park, particularly in proximity to an embankment or culvert, must ensure that the Aqueduct's structural integrity and function is not compromised.

Landscaping and Screening – Plantings for the purposes of screening private property from the OCA should not be installed on State parkland. The Park's right-of-way needs to remain open and accessible. Plantings in proximity to the trail perimeter should employ a mix of types, and sizes, of native species. Vegetation should not be planted in long, narrow borders of a single species, but arranged in natural clusters. Trees and woody shrubs should not be placed adjacent to the Aqueduct's earthen or stone-faced embankments. New plantings should require minimal irrigation and maintenance. Combinations of landscaping, berms, walls, and fencing may be appropriate to screen trash containers, grease containers, or outside storage areas of existing buildings. Collectively, screening materials should be consistent in design and color with materials of the associated principal structure. Screening interventions should avoid a flat, monotonous appearance that creates the sense the trail is an alleyway rather than linear park.

In areas of Village Centers where the OCA may intersect other public spaces—such as plazas or memorial parks—landscaping should not obstruct the relationship between the spaces; instead, planting placement should encourage social interaction between the two and create a pleasant wayside.

Lighting – The installation of exterior lighting, including building-mounted lights, should be carefully designed to preserve the naturalistic character of the trail and avoid light pollution.

Development in a City Center

Setting Description: This area is characterized by dense construction and mixed uses: commerce, offices, and multi-story and multi-family residences. Few detached houses are present; land values are high, and vacant land tends to be municipally owned and developed as parkland or preserved as open space. Transit is widely available.

Recommendations:

Building Setback and Lot Coverage – In this setting, communities that most successfully preserve and maintain visual continuity along the Aqueduct have implemented a 25-foot (on average) setback requirement. It is recommended that no special exceptions permitting development with a non-conforming setback of less than 10-feet be permitted as sufficient setback is necessary to allow State Parks to access built features of the Aqueduct—such as retaining walls, berms—and underground structures—including culverts and culvert outlets—for maintenance.

Lot coverage—the area of a parcel covered by impervious surfaces, including the building footprint—in this setting should not be out of proportion relative to coverage on adjacent lots. Excessive lot coverage—generally in excess of 60% of the parcel—in a city center not only results in a loss of limited open space but leads to development that appears out of scale in the historic landscape. For some parcels, it may be preferable to gain square footage by building vertically rather than horizontally, as long as view impacts are considered.

Building Height (Including Rooftop Additions) and Proximity – The perceived size of a building is largely influenced by its height. Communities that better steward the OCA permit structures that are, on average, no greater than 45 feet (four stories) in height. To determine the appropriate height of new construction, both the dimensions of the trail and adjacent municipal streets should be considered. As a general rule, a building's height should not exceed 1 ½ times the width of associated travel lanes. New construction should also arrive at its own height calculations using the average height of adjacent structures.

In areas where the built environment is particularly dense, the proximity of one structure to the next can also influence the perceived size of a structure. Of particular concern along the OCA are trail segments where buildings appear to line the trail, one after another. Here, the environment can take on a canyon-like and unwelcoming appearance. This contributes to a sense of unease and discomfort and is cited by patrons and public safety officers alike as something to be avoided. When siting new development, the ability to avoid this situation by considering a reorientation of the building should be considered. Where, in a single parcel, the development of multiple structures on a single lot is being proposed, space between buildings on the lot should maintain at least a 40-foot separation from one another.

Façade Treatment and Form – There should be some architectural interest to facades facing the OCA. Materials and design elements used on front or street-facing elevations (windows, balconies, mouldings, etc.) should continue to elevations overlooking the trail. The extent of an unbroken façade plane parallel to the trail edge should also be considered. New buildings may be more appropriate to the historic landscape if their form is more pronounced, with the “bulk” of a large, rectangular block being clearly articulated through the use of multiple bays, or other interruptions in the elevation (e.g. recesses, projections, courtyards, etc.).

The ground elevation of the OCA varies dramatically across its 26.2 miles and in certain sections of the trail, flat roofs with building mechanicals are readily in the viewshed. With new construction, this equipment should be located out of the critical viewshed or properly screened to mitigate the adverse visual impact.



Yonkers (Ashburton and Palisade Ave.), Mile 21



Yonkers (Lamartine Avenue), Mile 21



Yonkers (Wicker Street), Mile 21



Arch Over Nepperhan Avenue Prior to Road Widening, Yonkers, Mile 22
Historic American Engineering Record

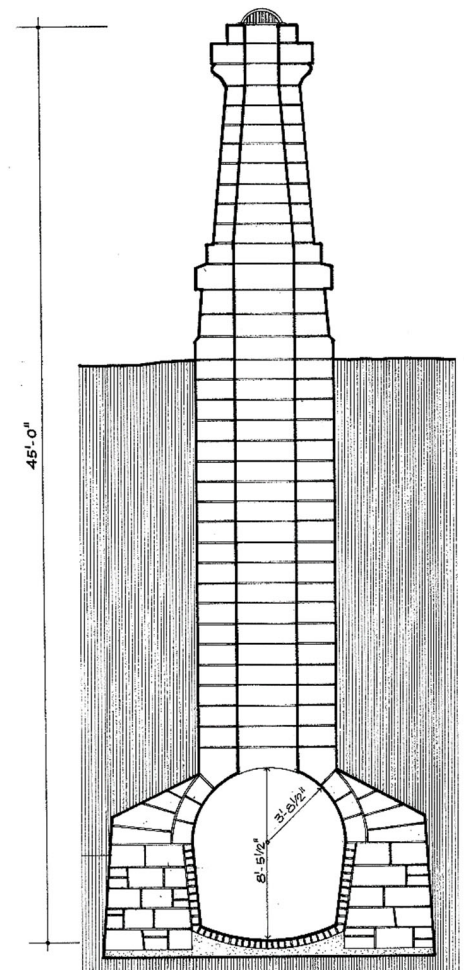
Screening – Landscaping can soften the visual impact of new development abutting the trail. Landscape screening as an approach to mitigate visual impacts of new development is, however, secondary to the discussion of a project’s architectural design. Building design should be foremost in deliberations on how to protect the OCA and its aesthetic character. Plantings complementary to thoughtful design and construction can give the OCA and the surrounding landscape a more natural appearance without foreclosing opportunities for private development and community growth.

Screening plantings are not permitted on park property and must be installed on private property. Plantings should be a mix of types and sizes of native species; they should not be installed in long, narrow borders but layered or naturally clustered. Trees and woody shrubs should not be placed adjacent to the Aqueduct’s earthen or stone-faced embankments. At maturity, plantings should create a pleasant vegetative screen. They should not appear overgrown or to obstruct sightlines along the trail but should establish a feeling of comfort and security. New plantings should require minimal irrigation and maintenance. Diseased, unhealthy, or dead plant material on private property should be removed and replaced.

Lighting – The installation of exterior lighting, including building-mounted lights, should be carefully designed to preserve the naturalistic character of the trail and avoid light pollution.

Drainage – As the density of land use in this setting has continued to increase, so has the number of impervious surfaces. These impervious surfaces contribute significantly to the amount of stormwater runoff on the OCA and adjacent properties. Adding impervious surfacing should be avoided whenever possible except where required for erosion control, accessibility requirements, safety, or other specific reasons.

Within the OCA property boundaries, site design should allow for on-site stormwater infiltration wherever practical. Where surface drainage is collected, appropriate erosion controls shall be implemented to control and slow water movement and potentially disperse it into sheet flow. Any adjacent properties should not be permitted to create excessive stormwater trespass onto the OCA via point or non-point sources. In some scenarios, coordination may be required with adjacent landowners, municipalities, or other agencies to mitigate existing stormwater issues or to avoid future complications.



*Old Croton Aqueduct, Ventilator 9 (1840)
National Park Service, Office of Archaeology
and Historic Preservation*

Development in a Special District

Setting Description: These are areas of the park that are characterized by uses that are ancillary to, or incongruous with, the use of the Aqueduct as a footpath. Many of these arrangements are longstanding and the result of agreements made when the Aqueduct was municipal infrastructure, and most are parking lots, either private or municipal. Others are areas where parkland was lost, and detours are required to rejoin the trail. Some of the Special Districts are on the periphery of the trail and do not materially interfere with the Park's use, but adjacent development must be monitored as carefully as anywhere else.

Recommendations:

Encroachments – Where possible, segments of the trail should be reclaimed or historic boundaries made visible through markers, special paving or similar hardscape or landscape improvements.

Circulation – Where parking lots have disrupted the historic trail route, special attention should be given to how trail users move within the lot relative to the vehicular traffic. Where possible, internal pedestrian circulation in the lot should be provided via clearly delineated paths that safely convey trail users through the lot into the friendly confines of the Historic Park. Paths may be indicated in the lot with pavement striping or materials of a different color or texture appropriate to the surrounding environment.

Landscaping – Where the trail is interrupted by a parking lot, landscaping may help to make travel through the lot more pleasant, providing interest and separation from the parcel's parking surface, and contribute to public use of the trail. Plantings should employ a mix of types, and sizes, of native species, and not be installed in long, narrow borders. At maturity, plantings should create a pleasant vegetative screen, but not appear overgrown or to obstruct sightlines within the lot. New plantings should require minimal irrigation and maintenance.

Lighting – The installation of exterior lighting, including building-mounted lights, should be carefully designed to preserve the naturalistic character of the trail and avoid light pollution.

Cooperative Maintenance Agreements – OPRHP has a long and successful history of entering into partnerships and securing management agreements. These mutually-beneficial arrangements have resulted in substantial contributions to the diversity and excellence of recreational, stewardship and preservation activities within the State Parks and Historic Sites System, inspiring demonstrable improvements within communities. Where appropriate, the Park and municipalities should explore formalized agreements that facilitate and standardize routines that support the preservation, maintenance, and care of the Aqueduct.



Irvington (Main Street), Mile 14.5



Dobbs Ferry (Cedar Street), Mile 16



Hastings-on-Hudson (Washington Avenue), Mile 17



Yonkers (Walnut Street), Mile 23.5

Preserving Historic Character Through the Application of Design Principles

There is a balance between change and continuity in all cultural resources. Change is inherent in cultural landscapes; it results from both natural processes and human activities (National Park Service, *Guidelines for the Treatment of Cultural Landscapes*). Without thoughtful observation and stewardship, however, this dynamism can run amok, jeopardizing—or even destroying—one-of-a-kind cultural landscapes.

Change in cultural landscapes, however, can be managed and their distinctive characteristics preserved without foreclosing the opportunity for community growth. Development in physical and visual proximity to Old Croton Aqueduct State Historic Park should be sensitive to issues of compatibility and continuity with other features of the historic environment. The long-term vitality of the Historic Park is, in many ways, dependent upon the interest and support of Rivertown communities in protecting and celebrating the Park through ensuring careful review of development projects within the Park's viewshed.

Designing a building or landscape that contributes to, rather than detracts from, the character of the Historic Park begins with an analysis of the proposed project's character-defining features. Compatibility and continuity of development is achieved through careful attention to the following design principles. Where appropriate, these principles should be discussed for each project proposed in physical or visual proximity to the OCA:

1) Setbacks

Definition: The distance between a building, or accessory structure, and the property line. This distance is regulated by local zoning ordinance.

Discussion Prompt(s): The extent of a structure's setback and the treatment of open space adjacent to it is the primary way in structure relates to the Aqueduct trail.

- Does the proposed setback help the structure to maintain natural light and visual access to the trail?
- Is the proposed setback mindful of a building's proximity to Aqueduct structures such as retaining walls and culverts? Does it allow appropriate access for maintenance and related activities?
- Does the proposed setback appear to respect the existing pattern of setbacks established by neighboring structures?

2) Scale

Definition: The relative or apparent size of a building or structure in relation to its neighbors or some common object. Scale is also the relative or apparent size of building elements, such as windows, doors, cornices, and other features with respect to each other and the building.

Discussion Prompt(s): Many residential buildings are designed to be of human scale, that is, they are designed to relate to the size of an average human being.

- Does the scale of the building appear to overwhelm trail users as they pass by?
- Does the proposed scale of the structure appear similar to that of other structures in the surrounding environment?

3) Height

Definition: The measurement from the base of a structure to its top. In some instances, height measurements may include antennae, flag poles, signage or building mechanical equipment.

Discussion Prompt(s): In most instances, new development should not exceed the height of neighboring architecture by a significant amount or impede sightlines of defining landscape features and scenic views.

- Would the height and form of the building have a positive relationship with the trail and surrounding buildings when viewed from the trail?
- Does the proposed development introduce a building or new roof line that alters the dominance of other architecture in the area that helps to define the area's character?
- Is there an alternate siting or three-dimensional form for the proposed development that has less impact on important or character-defining views from the Aqueduct?

4) Massing

Definition: The perception of the shape, form, and size of a building, often influenced by its relationship to surrounding structures and/or landscape features.

Discussion Prompt(s): A building's massing significantly contributes to the character of a place. Massing is of particular concern in areas with dense, contiguous development.

- Do the relative proportions of the building's width to height to length feel equal?
- Does the structure play with architectural elements and materials to avoid a flat or monotonous façade along the trail?
- Does the building's massing effectively mediate between it and adjacent buildings that may be of greater height? For example, do changes in height feel incremental, like steps?
- Does the building's architecture take advantage of the surrounding topography to reduce the scale of the structure relative to the trail (if appropriate)?

5) Façade Composition

Definition: The primary or secondary exterior face of a structure, including the overall arrangement of solids and openings and the choice of materials.

Discussion Prompt(s): The character of the façade and materials can compete with, reinforce, or defer to adjacent structures and landscape features.

- Does the proposed façade open to or otherwise acknowledge the presence of the trail?
- Does the façade call attention to itself or does it settle into its context?
- Will lighting from, or of, façade elements reach, or be highly visible from, the trail?
- Are the proposed materials consistent with neighboring buildings and landscape features?

6) Rhythm

Definition: The spacing and repetition of architectural elements on a structure. Fenestration, for example: the relationship and proportioning of windows and doors on a structure. Rhythm can also be created from the spacing of multiple structures in proximity to one another and the sightlines created by the series of buildings.

Discussion Prompt(s): When similar patterns occur between architectural elements of a building, or patterns among buildings together, a sense of affinity and visual continuity can emerge, even if there is variation among architectural forms and styles.

- Are building elements spaced in a way that feels natural?
- How does the proposed development appear relative to adjacent development? Does it have a similar spacing or follow staggering?
- Do any features of the proposed development disturb uniform sightlines or consistent visual patterns as to feel obtrusive?

7) Viewshed Preservation

Definition: A viewshed is the geographical area that is visible from a location. It includes all surrounding points that are in line-of-sight with that location and excludes points that are beyond the horizon or obstructed by terrain and other features (e.g., buildings, trees). Conversely, it can also refer to areas from which an object can be seen (US Department of Transportation, *Visual Impact Assessment*).

Discussion Prompt(s): The OCA trail corridor is visually engaging and also offers views of the Hudson River and the Palisades, some of the most visually striking and nationally recognized landscapes in the United States. Other important views include townscapes, distant woodlands or green spaces, and the alternating distant and close-in views.

- Does the proposed height or massing of development ensure that the trail corridor, as well as views along it—particularly those of the River of Palisades—are not obscured by new construction?
- If a visual buffer is proposed to screen development and preserve a view, how might that buffer be affected by seasonal changes (e.g. the loss of foliage in winter)? Will the buffer be effective year-round? Many trail users are particularly enamored of winter views and buffering efforts must consider winter appearances and the dynamic viewshed from the Historic Park as it evolves throughout the seasons.
- If new construction obstructs a viewshed, could the construction take advantage of the surrounding topography to preserve the vista?

Preserving the Aqueduct's Structural Integrity

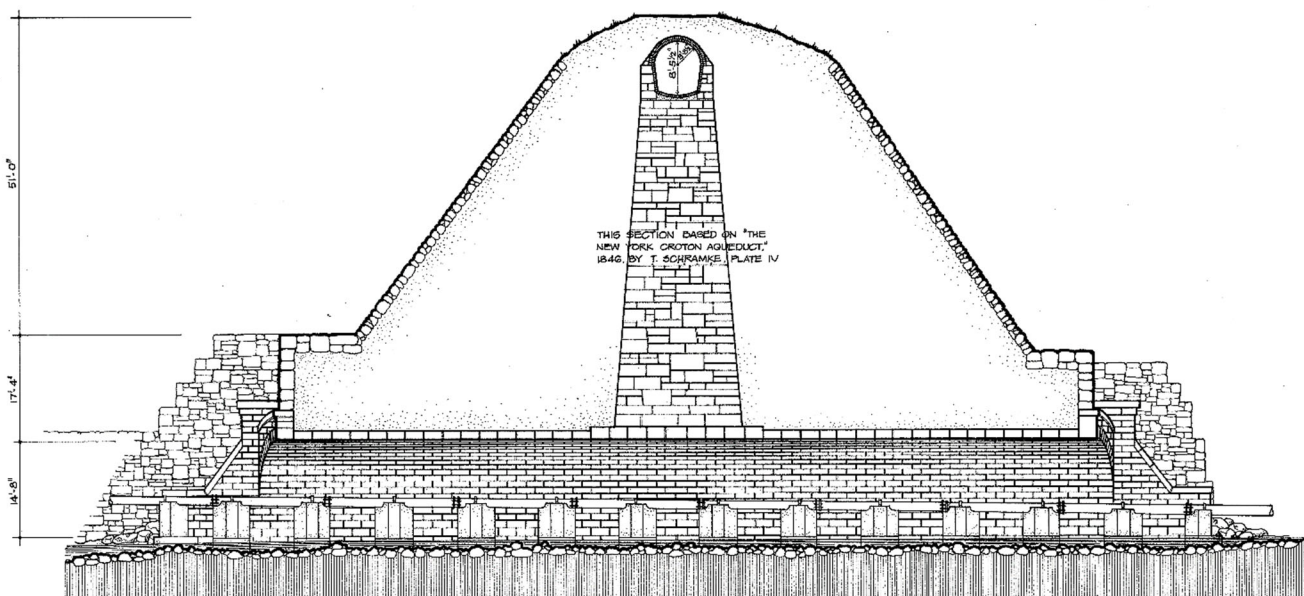
Many visitors to Old Croton Aqueduct State Historic Park are familiar with the Aqueduct's aboveground features, from its modest masonry ventilator shafts, gatehouses, and culverts, to its more substantial features, such as its large bridges and viaducts. The Aqueduct, however, is principally an *underground* structure, the primary feature of which is a brick-lined, horseshoe-shaped tunnel (*National Register of Historic Places Registration Form*). With the most sensitive structural components of the historic resource belowground, it can be easy to overlook the impacts of aboveground changes upon the OCA's subsurface resources.

Typically, forces that contribute to the deterioration of historic structures take decades, even centuries, to exact their toll. Demolition activities, new construction, and the planting of new trees and vegetation on sites abutting the Aqueduct—specifically those set immediately adjacent to the OCA's manmade earth and stone-faced embankments—however, can cause immediate damage to the structure's physical integrity. Effective planning and protective measures initiated before construction can prevent such harm.

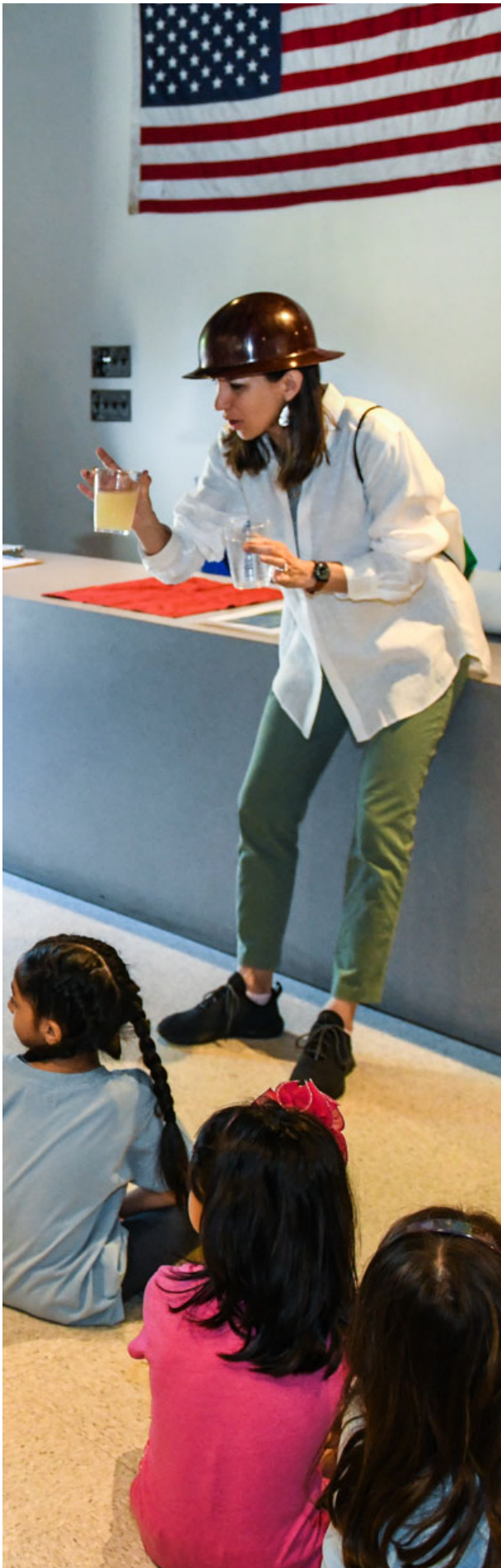
To reduce compromising the structural integrity of the historic Aqueduct, the following recommendations are presented.

Recommendations:

- New construction should maintain a *minimum* distance of 10 feet from the Aqueduct. Property owners should work with structural engineers to ensure work does not involve excavation or digging within this distance.
- Property owners should minimize soil erosion during construction, or while conducting other ground-disturbing activities. Generalized erosion can remove soils that support buildings and so undermine their structural integrity. As a general rule, soil below the building foundation and out from the 45-degree angle of repose—the steepest angle on a horizontal plane at which a material can be piled without slipping—should remain undisturbed. This angle may vary given the variations among soil types.
- The construction of any retaining walls should carefully consider the potential physical and structural impacts on existing structures as well as drainage of surface water, including runoff from the OCA.
- Vibrating machinery and blasting is potentially damaging to masonry; such work in the vicinity of the Aqueduct may require seismic monitoring or limitations on the use of vibrating machinery.
- Caution should be used when performing work in proximity to culvert outlets. Alterations and new construction impact water flows and can cause structural damage to culverts or embankments as well as adjacent private property. In some instances, municipal storm drains discharge into culverts that were not designed to carry the increased flows.
- The OCA Park Manager should be consulted prior to the planting of any new trees, shrubs, or other vegetation near the Aqueduct or associated retaining walls. This is critical in order to avoid the potential future infiltration of roots into the structures' masonry and to prevent unnecessary maintenance costs.



*Old Croton Aqueduct, Mill River Culvert 1836-1841
Historic American Engineering Record, Library of Congress*



Local Government Support for the OCA

Communities reap significant benefits from the recognition and preservation of their historic, cultural, scenic, and recreational resources. In fact, heritage tourism and outdoor recreation are among the nation's largest economic sectors. In Westchester County, travel and tourism continue to be significant drivers of the local economy. In 2018 alone, local and state taxes generated \$233 million from these industries. From higher property values to increased tourism revenues, assets like the Old Croton Aqueduct enrich a community both aesthetically and financially.

Municipalities have at their discretion a variety of regulatory and planning tools with which to preserve and support the OCA. The following list of tools is by no means exhaustive, but it offers a series of alternatives to consider. Many of these tactics are in place throughout Rivertown communities today.

Comprehensive Plan

A Comprehensive Plan communicates a municipality's long-range objectives and goals, functioning as its principal land management plan. Provisions made within the Plan often help communities to better accomplish their goals, including those for preservation, recreation, and development. The specific acknowledgement of the Aqueduct's cultural and recreational significance in a Comprehensive Plan helps to ensure that local development practices and zoning ordinance take into consideration the presence of the trail and its conservation needs. The 2011 Comprehensive Plan for the Village of Hastings-on-Hudson, for example, identifies the OCA as a "gateway" into the community, and has made it an explicit community goal to "protect and enhance" this entrance point. Through this goal, the Village defines the Aqueduct as an integral part of their community, promoting the trail's historical significance and preserving it for decades to come.

To better provide for the Aqueduct, the OPRHP recommends a municipality include language in its Comprehensive Plan that acknowledges the Aqueduct as a treasured State Historic Park and National Historic Landmark known to attract heritage travelers and recreationists worldwide. OPRHP also recommends that a Comprehensive Plan advise that the OCA Park Manager or OPRHP be consulted on all development and maintenance matters related to the Aqueduct.

Local Design Guidelines

Many communities—including the City of Yonkers and the Villages of Hastings-on-Hudson, Irvington, and Ossining—have developed design guidelines and recommendations specific to the architectural styles and streetscapes of the municipality. Guidelines tailored to a community, or specific neighborhood, facilitate judicious decision-making that improves the quality of restoration and renovation work and ensures new construction is appropriate to an area's historic character. Such guidelines also help protect the value of public—and private—investment which may be compromised by undesirable consequences of poorly managed growth. Establishing, or amending, these guidelines to include specific acknowledgement and consideration for the OCA—its presence and import—is further opportunity for municipalities to support the trail as a community resource.

Zoning Ordinance Amendments

Buffers

Several communities—including the Villages of Dobbs Ferry, Irvington, Tarrytown, and Ossining—have established specific setback requirements for properties adjacent to the Aqueduct. Within these

buffer areas, no buildings may be erected. The extent of the buffer varies among the communities, but this deliberate consideration of the OCA helps to ensure the scenic attributes of the trail remain intact and create a more pleasant user experience.

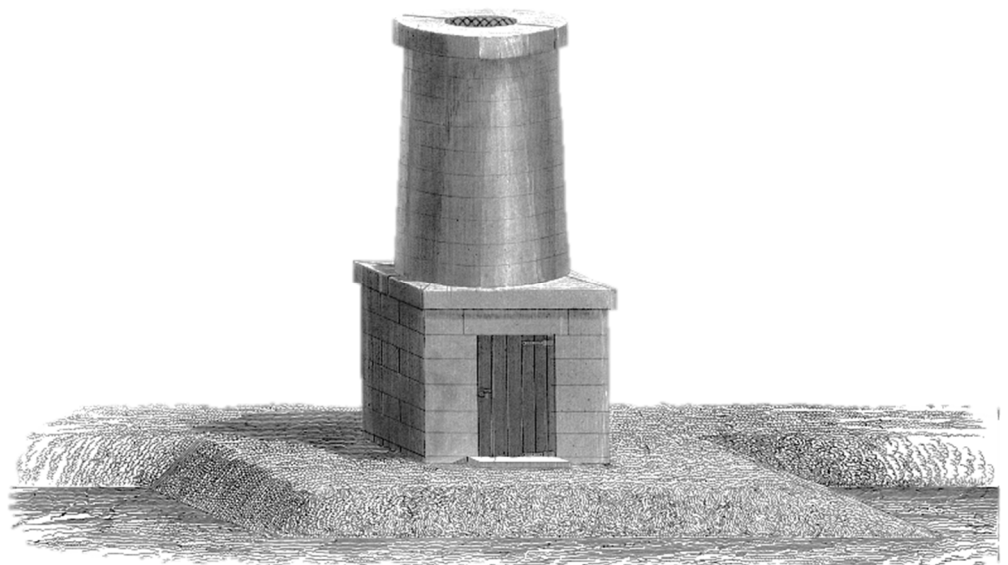
Overlays

Overlays function as special zoning districts, placed atop an existing district to supplement its underlying regulations and provide special provisions. Overlays allows a community to maintain current zoning code while addressing distinct needs of particular areas. Two of the most common overlay types are historic district overlays and viewshed corridor overlays. The Village of Irvington has established a Historic District Overlay “to protect and enhance the historic and architectural character” of the community. The Village of Hastings-on-Hudson has established a viewshed protection overlay, the purpose of which is “to protect and preserve the character of the community, to preserve and enhance property values and to promote improved visual relationships between the Village and the Hudson River and the Palisades.”

Land Acquisitions and Easements

The purchase of land abutting the Aqueduct trail—by a municipality or non-for-profit partner—may be a viable alternative for purposes of protecting the Historic Park’s scenic qualities from adverse impacts of future development. In many communities, the purchase of land by a municipality or non-profit not only increases the sum of green space available for enjoyment by residents but also increases property values of land adjacent to the acquired parcel and thus boosts tax rolls.

Establishing an easement between a private property owner and a municipality, or non-for-profit partner, is a second property-based alternative that stands to protect the Aqueduct’s historic landscape for continued public enjoyment. Unlike other real estate transactions, easements—be they categorized as a scenic, conservation, or preservation easement—provide assurance to a property owner in proximity to land of historic or cultural value that the parcel will be preserved regardless of a change in ownership.



*Old Croton Aqueduct Entrance Ventilator (1843)
Historic American Engineering Record, Library of Congress*

Regulatory Requirements

Where applicable, projects in proximity to the Aqueduct should take the following regulations and their legal implications into consideration:

State Environmental Quality Review Act (SEQRA)

Any project that requires a variance or other non-magisterial action by a municipal zoning board or planning commission requires a SEQRA review.

Such a review must identify the OCA as a historic resource for any project on property that adjoins the site. OPRHP must be provided an opportunity to review and comment on the proposed action during the SEQRA review process.

State Historic Preservation Act

Applies to any undertaking (defined as funding, licensing, or permitting) by any State agency. This law requires State agencies to assess the impacts of their actions upon historic resources and consult with the State Historic Preservation Office accordingly.

Any project that requires a permit issued by OPRHP is subject to the requirements of Section 14.09 of Parks, Recreation and Historic Preservation Law.

National Historic Preservation Act (NHPA)

Applies to any undertaking (defined as funding, licensing, or permitting) by any Federal agency. This law requires federal agencies to assess the impacts of their actions upon historic resources, including consulting with the State Historic Preservation Office.

Section 110(f) of the NHPA requires that before approval of any federal undertaking which may directly and adversely affect any National Historic Landmark, the head of the responsible agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council a reasonable opportunity to comment on the undertaking (National Park Service, *Federal Effects of National Historic Landmark Designation*).





**Parks, Recreation
and Historic Preservation**