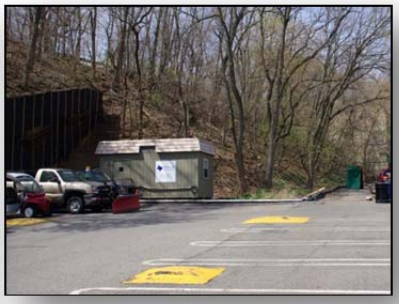
Smithsonian Institution






GENERAL SERVICES BUILDING RETAINING WALL

ENVIRONMENTAL ASSESSMENT

National Zoological Park
Washington, DC

January 25, 2012

GENERAL SERVICES BUILDING RETAINING WALL
ENVIRONMENTAL ASSESSMENT

NATIONAL ZOOLOGICAL PARK
WASHINGTON, DC

JANUARY 2012

PROPONENT ORGANIZATION FOR THE ACTION:
THE SMITHSONIAN INSTITUTION

Office of Facilities Engineering and Operations
Office Project Planning and Management
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LEAD RESPONSIBLE FEDERAL AGENCY:
THE NATIONAL CAPITAL PLANNING COMMISSION

COOPERATING AGENCY:
THE NATIONAL PARK SERVICE

ABSTRACT

The Smithsonian Institution (SI) has prepared this Environmental Assessment (EA), supplemental to the 2008 National Zoological Park Facilities Master Plan EA, to evaluate the potential impacts of a proposed retaining structure between the General Services Building (GSB) and North Road on the National Zoological Park (NZP) campus. This document integrates environmental and cultural resource considerations consistent with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). In the EA, SI analyzes the potential impacts of feasible alternatives (including Alternative A: No Action) for the proposed retaining structure. Government agencies and the public are encouraged to review and comment on this EA. Comments must be submitted during the 30-day public review period, beginning January 25, 2012 and concluding on February 24, 2012.

Written comments on this EA may be submitted via U.S. mail to:
NZP Retaining Wall
c/o Greenhorne & O'Mara, Inc.
810 Gleneagles Court, Suite 300
Baltimore, MD 21286

Comments may also be submitted electronically to:
ZooRetainingWall@greenhorne.com

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the Council on Environmental Quality (CEQ) regulations implementing NEPA [40 CFR Parts 1500-1508], the National Historic Preservation Act (NHPA) of 1966, as amended, and National Capital Planning Commission's (NCPC) *Environmental and Historic Preservation Policies and Procedures* (NCPC 2004) and other applicable laws, regulations, and policies, the Smithsonian Institution's (SI) National Zoological Park (NZP) and the NCPC have prepared this Environmental Assessment (EA), supplemental to the 2008 NZP Comprehensive Facilities Master Plan EA, to evaluate the potential impacts of a proposed retaining structure between the General Services Building (GSB) and North Road on the NZP campus in Washington, DC (Figure 1).

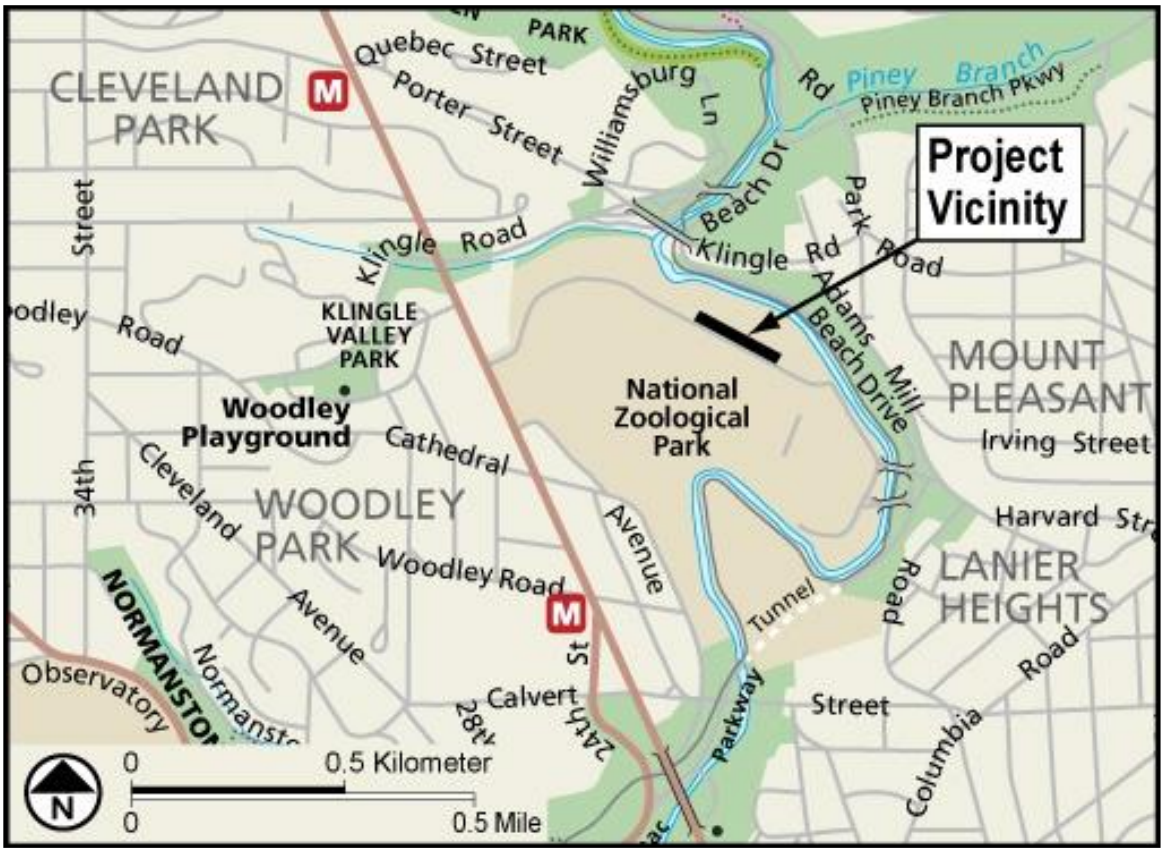

Figure 1: Project Vicinity Map

Recognizing its stewardship responsibility as a trust instrumentality of the federal government, established by Congress, SI is committed to integrating environmental considerations into its planning and decision-making activities consistent with NEPA. SI, along with NCPC as the lead and responsible federal agency for this NEPA action, have prepared this EA. The National Park Service (NPS) has been identified as a cooperating agency in the preparation of this EA. An assessment of effect to cultural resources is underway in accordance with Section 106 of the National Historic Preservation Act (Section 106).

Although SI is not a "federal agency" within the purview meaning of NEPA and CEQ, SI projects that require review and approval by NCPC, the central agency for the federal government in the National Capital Region,

are required to comply with NEPA guidance as outlined in Section 4 (D) of NCPC's *Environmental and Historic Preservation Policies and Procedures*. NCPC's guidelines require applicants to prepare the necessary NEPA and Section 106 documents, in conformance with respective CEQ and Advisory Council on Historic Preservation (ACHP) requirements.

The proposed retaining structure is also subject to review by the U.S. Commission of Fine Arts (CFA). CFA was established in 1910, in part to guide architectural development in Washington, DC.

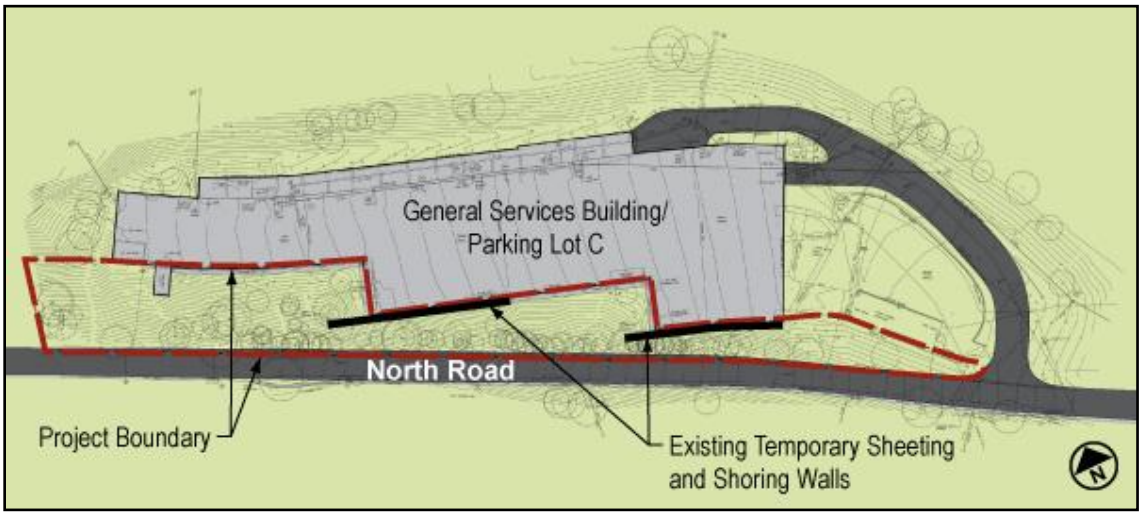

Figure 2: Project Area

PURPOSE AND NEED

The purpose of the proposed action is to construct a permanent retaining structure between North Road and the GSB (Figure 2) to protect the structural integrity of these facilities. A permanent retaining structure is needed because the mass of the hillside is exerting excessive pressure on the existing sheeting and shoring walls and the GSB. This load has resulted in partial failure of the sheeting and shoring walls and GSB structural components, and may lead to building failure if not corrected.

The existing building restraint system against lateral earth pressure (the hillside between North Road and the GSB) consists of two features: temporary wood sheeting and shoring walls and the GSB's south wall, both anchored with temporary high tensile strength deformed steel bar tie backs into the rock within the hillside. Structural investigations performed in 2005 indicated the tie backs to be Dywidag bars in a plastic sheathing with a protective grease coating that has deteriorated and no longer is effective in providing corrosion protection. The tie backs lack double corrosion protection typically found in permanent retaining wall installations, limiting their functional lifespan. The sheeting and shoring walls and tie backs were designed as a temporary measure to stabilize these structures in the interim period before the construction of a planned parking garage on top of the GSB. The parking garage was never constructed. The building was constructed in 1975 and is 36 years old, beyond the expected lifespan of the temporary sheeting and shoring walls and tie backs. The earth pressure has led to multiple cracks within the GSB and has caused the building to shift to the north. Temporary repairs have been made over the years to the sheeting and shoring walls on the south side of the GSB to stabilize soils and minimize the lateral earth pressure. Until the pressure on the GSB is reduced, the building will likely continue to shift north.

Additionally, the current sheeting and shoring walls allow the continued loss of sediment through the wood lagging. This would result in the continued undermining of North Road and would lead to future failure of the roadway if the sediment loss is not addressed. If the existing temporary wood sheeting and shoring walls remain, extensive ground stabilization work would be required.

In 2008 the NZP completed a Comprehensive Facilities Master Plan. The 2008 Comprehensive Facilities Master Plan affirmed SI's mission at the NZP and provided a physical framework for implementing the Strategic Plan for the next 20 to 25 years. Facilities at the NZP are deteriorating due to age. The Master Plan identified infrastructure needs and developed an implementation strategy. Numerous projects were identified in the vicinity of the GSB to be completed as need and funding became available. The 2008 Comprehensive Facilities Master Plan included the construction of a parking garage at existing Parking Lot C that would include the construction of a retaining wall. The garage would consolidate visitor parking, freeing existing surface parking lots for use as exhibit areas. Also included was the widening of North Road from two to three lanes to accommodate a visitor tram and an access lane for the parking garage. Funding for the parking garage and widening of North Road is currently unavailable, but the need for the retaining wall is urgent. The provision of a stand-alone retaining wall was not fully analyzed within the 2008 Comprehensive Facilities Master Plan EA; therefore, the following EA has been completed for the retaining wall.

The selected solution must accommodate improvements identified in the 2008 Comprehensive Facilities Master Plan:

- New mid-point entry in proximity to Parking Lot C
- New parking garage at Parking Lot C
- North Road improvements and widening

BACKGROUND

The project is located at the NZP, a 163 acre campus situated east of Connecticut Avenue in Northwest Washington, DC. The project area is located between the GSB and North Road, near the NZP northeast boundary and adjacent to Rock Creek Park. The GSB is critical to the Zoo's operation. It houses multiple exhibit, maintenance and support workshops and offices, supply storage and distribution operations, as well as a controlled food preparation facility for the NZP's animal population. Parking Lot C is located on the roof of the GSB. North Road transects the northern boundary of the NZP, serving as the principal roadway for service vehicles and visitors vehicular access to the NZP. Pedestrian use of North Road is not permitted. As detailed above, the existing sheeting and shoring walls between North Road and the GSB were constructed in 1975 as a temporary measure to stabilize these structures in the interim period before the construction of a planned parking garage on top of the GSB, which was never constructed.

PUBLIC INVOLVEMENT

A Public Scoping Period was announced by NCPC and the NZP and took place August 1 through September 16, 2011. Advertisements were placed in the Washington Post (July 22, 2011) and The Current newspapers (July 20, 2011) announcing the project and public scoping period as well as to invite the public to attend an open house scoping meeting held on August 9, 2011. The NZP included notification of the project and public scoping in the August 1, 2011 NZP News email, NCPC announced the project and public scoping period on their website, and an email notification of the project was sent to citizen interest groups. The notifications provided a project overview and invited the public to participate in the scoping process. Members of the public

were invited to submit comments on the project electronically, at the public meeting, and by mailing written comments to the project team.

On August 9, 2011 the advertised public scoping meeting was held at the NZP Visitor Center Auditorium. The public scoping meeting provided a forum for the project team to present the proposed action to the public and explain the NEPA and NHPA processes. The scoping meeting began at 6:00 p.m. and continued until 8:00 p.m.. The meeting was held in an open house format. Informational displays were arranged at various stations around the meeting room, with NZP, SI, NCPC and consultant staff on hand through the meeting duration to address questions and listen to the public. Comment forms along with a Scoping Newsletter were available. One (1) individual signed-in at the public scoping meeting. No formal written comments were provided by the public.

AGENCY COORDINATION

Through a series of workshops, presentations and correspondence, SI and NZP staff consulted numerous resource agencies and organizations, including NCPC, NPS, U.S. Fish and Wildlife Service (USFWS), CFA, DC Historic Preservation Office (DC SHPO), and the District Department of the Environment (DDOE) to obtain information and solicit input on the scope of this EA. During these meetings the SI design team identified the project need and presented concepts for the development of a retaining structure. The planning team, including resource agencies and organizations, then brainstormed concept designs for analysis within this EA. Appendix A of this EA contains documentation of this coordination and consultation. USFWS and DDOE coordination is described in Chapter 3 of this EA, under Wildlife. DC SHPO consultation is detailed in Chapter 3, under Cultural Resources.

Workshops/Planning Process

In the winter of 2011 SI forwarded a Project Submission Report to NCPC and CFA for review and comment. This Project Submission Report presented a concept design for the construction of a single straight retaining wall within the project area. Subsequently, NCPC recommended (February 24, 2011), "in the continued development of the Project [SI]:

- Evaluate ways to replace the tree canopy lost due to the construction;
- Evaluate opportunities to screen views of the retaining wall from Rock Creek Park; and
- Continue consultation with the National Park Service to ensure preservation of the natural quality of Rock Creek Park."

In a letter dated, February 25, 2011, CFA requested, "the development of further alternatives and the opportunity to inspect the site." Subsequently, a site visit and meeting was coordinated with CFA March 17, 2011. At this meeting CFA reviewed the concept design. Following this meeting CFA elected to take, "no action on the submission and requested that an alternative design be developed to address their concerns." In a letter dated March 25, 2011, CFA documented their concerns as summarized below:

CFA recommended that careful consideration of the character of the wider context and visitor experience, including NZP and Rock Creek valley, in developing further proposals for the area. The proposed retaining wall should be designed and evaluated independently from the proposed parking garage as a highly visible feature on the landscape. CFA recommended the use of various techniques to break down the wall's large scale and to maintain as much slope and landscape buffer as possible.

Subsequently, NCPC and SI determined that the best method to fully analyze the impacts of multiple designs for the proposed retaining structure would be through the completion of an EA. In a letter dated March 23, 2011, NCPC invited NPS to become a cooperating agency in the development of the EA for the retaining wall project.

On June 30, 2011 a kickoff meeting was held to introduce Project Team members to the project, discuss the process for NEPA compliance for the project, review the purpose and need, and develop a project schedule. Twenty-two individuals attended this meeting, including representatives from SI Office of Facilities Engineering and Operations (OFEO), NPS National Capital Region and Rock Creek Park staff, NCPC, and consultant team members.

Alternatives Development Workshops were conducted on July 19 and July 29, 2011. These meetings were intended to seek concept design input from the various interested agencies, including NCPC, NPS, and CFA for the development of alternatives to be analyzed in this EA. The meeting on July 29 opened with a tour of Beach Drive to discuss the potential visual impacts of the structure and identify areas for viewshed analysis in the EA. During this meeting NPS expressed that their main concern for this project was the visual impact of the proposed structure on users of Beach Drive and the Rock Creek Park Multi-Use Trail. During each of the Alternatives Development Workshops the team identified various conceptual alternatives and explored the advantages and disadvantages of each.

On October 18, 2011, a Concept Alternatives Presentation was held. At this meeting six conceptual designs were presented which were developed as a direct result of the Alternatives Development Workshops. A detailed description of these alternatives is provided in Chapter 2 of this EA. This meeting assisted in the identification of the alternatives for analysis in this EA as well as photo locations for the viewshed analysis discussed in Chapter 3.

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CHAPTER 2: ALTERNATIVES

NEPA requires that federal agencies explore a range of reasonable alternatives. The alternatives under consideration include the "No Action" alternative as prescribed by 40 CFR 1502.14. Alternatives for this project were developed considering the project's purpose and need. In conjunction with the NEPA and NHPA processes for assessing potential impacts of the alternatives, project costs and constructability were also taken into consideration for each of the alternatives.

As discussed in Chapter 1, agency coordination was instrumental in the development of the alternatives. SI held two alternatives development workshops with NCPC, CFA, NPS, and project consultants in July 2011. Based on feedback obtained at the workshops, six preliminary alternatives were developed. These alternatives were presented to the agencies on October 18, 2011. From this meeting, three alternatives and the No Action Alternative were chosen to be evaluated in greater detail in this EA. In addition, one option to be implemented simultaneously with any of the action alternatives was retained for detailed evaluation in this EA. A detailed discussion of Alternatives Considered but Dismissed is included later in this chapter.

In addition to the objectives and laws, regulations, and policies discussed in Chapter 1, development of the alternatives and options for the GSB Retaining Wall considered the following design guidance and manuals:

- District of Columbia Stormwater Guidebook
- *2003 District of Columbia Standards and Specifications for Soil Erosion and Sediment Control* (DOH 2003).

ALTERNATIVE A: NO ACTION

Alternative A: No Action describes the action of continuing the current management operations and conditions. Alternative A: No Action does not imply or direct that the current action or maintenance be discontinued, or that the existing sheeting and shoring be removed. As previously described, the existing sheeting and shoring walls between North Road and the GSB were constructed in 1975 as a temporary measure to stabilize the roadway and GSB until the construction of a planned parking garage on top of the GSB, which was never constructed. One of these walls is approximately 120 feet long by approximately 3 feet tall, at its lowest point, rising to approximately 21 feet in height. This wall consists of wood lagging and landscape fabric with tie backs. The total exposed surface area for this wall is approximately 1,150 square feet. The other wall is approximately 60 feet long by approximately 2 feet tall at its lowest point and rises to approximately 8 feet at its highest point. This wall is also constructed of wood lagging and landscape fabric with tie backs. The total exposed surface area for this wall is approximately 380 square feet. The existing temporary structures have a total exposed surface area of approximately 1,530 square feet.

Additionally, two concrete retaining walls extend above the elevation of Parking Lot C. One wall is approximately 180 feet long by approximately 8 feet tall and consists of reinforced concrete with tie backs and is painted with a colorful mural. The total exposed surface area for this wall is approximately 1,440 square feet. The other wall is approximately 150 feet long by approximately 8 feet tall and consists of reinforced concrete with tie backs. The total exposed surface area for this wall is approximately 1,200 square feet. The two concrete retaining walls have a total exposed surface area of approximately 2,640 square feet.

Under Alternative A: No Action, continued remedial maintenance of the existing sheeting and shoring walls would be required. As the temporary ties continue to deteriorate over time and total replacement of the walls would be unavoidable to prevent continued stresses and potential structural failure of the GSB. Additionally,

extensive ground stabilization work would be required to prevent the undermining of North Road as sediment is lost through the existing wood lagging.

While Alternative A: No Action does not meet the purpose and need of the project, it provides a basis for comparing the management direction and environmental consequences of the proposed action alternatives.

ALTERNATIVE B: STRAIGHT WALL DESIGN

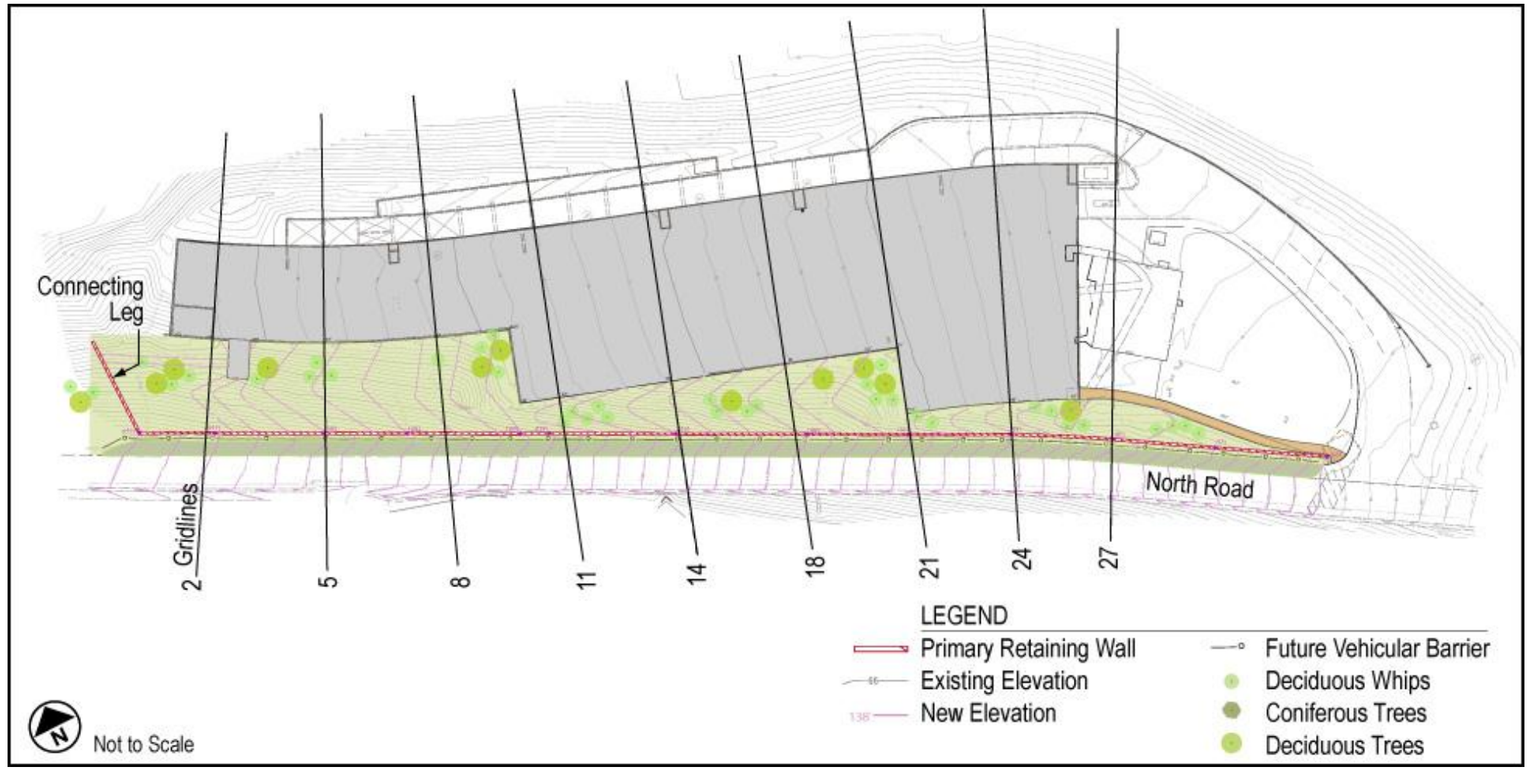
Under Alternative B, a straight retaining wall, approximately 945 feet in length, would be constructed north of the area designated for the future widening of North Road (Figure 3). A connected leg from the western terminus of the retaining wall would extend in a northern direction approximately 80 feet to support the proposed future construction of the parking garage. The distance between the proposed structure and the GSB would vary from approximately 15 feet to 80 feet. The elevation of the proposed retaining wall would vary from approximately 40 feet above the deck of Parking Lot C at its west end to its at grade tie-in at its east end. The top of this vertical wall would be approximately six inches above the existing grade along North Road with a 42-inch high guardrail. This added height would provide a safety barrier between North Road and the steep grades below. The lower visible extent of the retaining wall would be at approximately the same grade as the existing deck of Parking Lot C. Alternative B would include the construction of approximately 30,200 square feet of visible vertical structure.

Alternative B represents the original straight wall concept as presented to NCPC and CFA in the winter of 2010. Construction of the primary retaining wall in Alternative B would allow the removal of earth adjacent to the GSB, reducing lateral pressure and aiding in the stabilization of the structure. Alternative B would fully address the purpose and need for the project. The retaining wall proposed under Alternative B would be a permanent structure, and would not likely require future modification to accommodate the improvements identified in the 2008 Comprehensive Facilities Master Plan, including the construction of the parking garage at Parking Lot C and the proposed North Road improvements and widening.

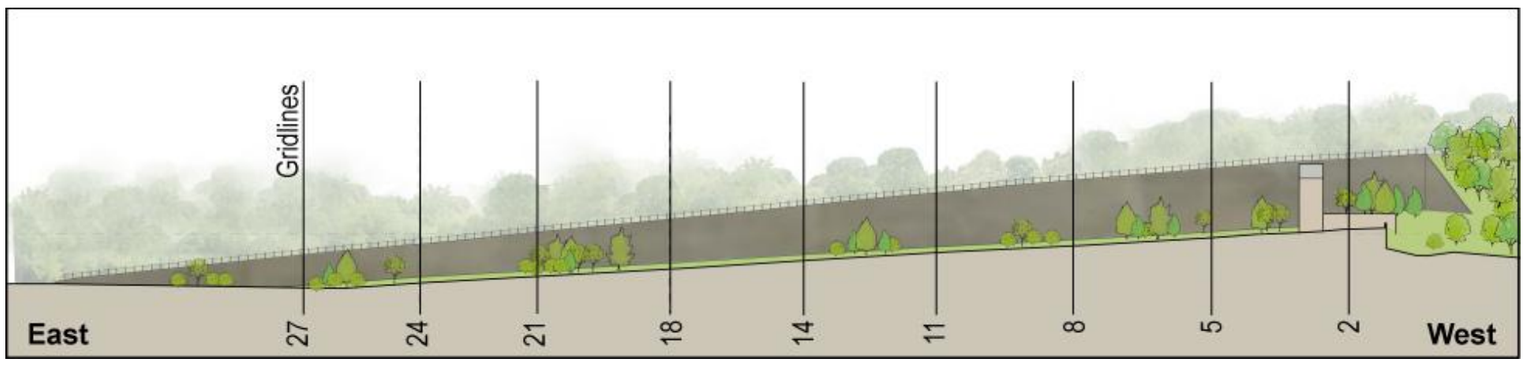
The wall would be constructed of concrete with a formliner finish that uses the random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. CFA, NCPC, NPS, and DC SHPO will be consulted prior to final selection of the pattern and color. Between the GSB and the retaining wall a variety of native tree species would be planted where space and soil type permit. Areas not conducive to tree planting would be planted with native grasses and other plant palettes similar to those found in Rock Creek Park and along the NZP's North Road. Stormwater would be managed through the installation of a swale located between the retaining wall and the GSB.

ALTERNATIVE C: SOIL BERM DESIGN

Alternative C would include the construction of a straight retaining wall north of the area designated for the future widened North Road, similar to the wall proposed under Alternative B. However, Alternative C would not include the construction of the 80-foot long connecting leg. Alternative C would construct a permanent secondary retaining wall east of the existing elevator/stair tower. Under Alternative C, soil berms would be constructed in areas where the distance between the proposed retaining wall and GSB permits (Figure 4). This approach would minimize the visible height and length of the proposed wall. Construction of the aforementioned secondary wall would permit the grading of a slope at the western extent of the primary retaining wall to reduce the visual vertical height of this segment of wall to approximately 13 feet (a wall of 40-foot visible height is proposed under Alternative B).

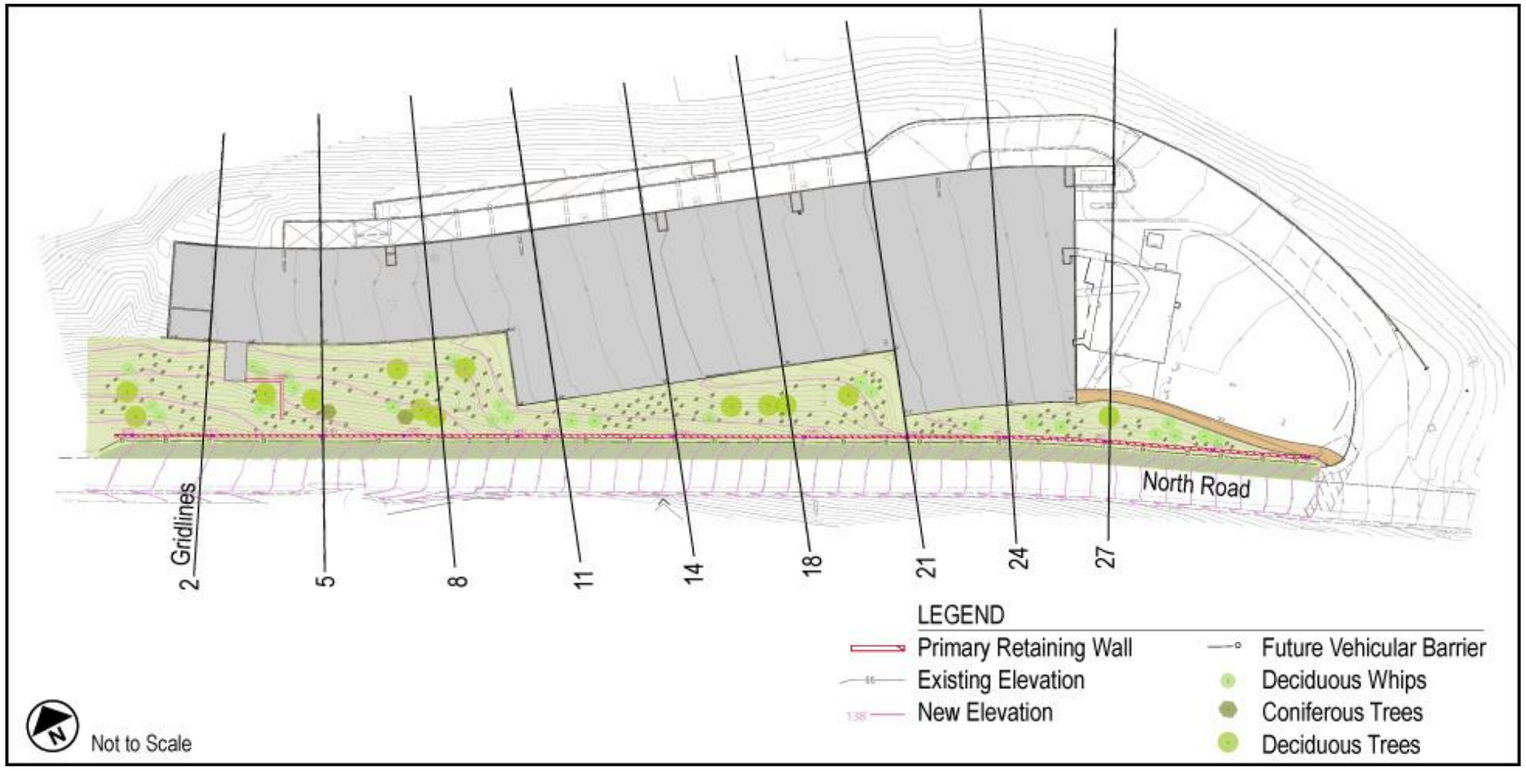


Plan View

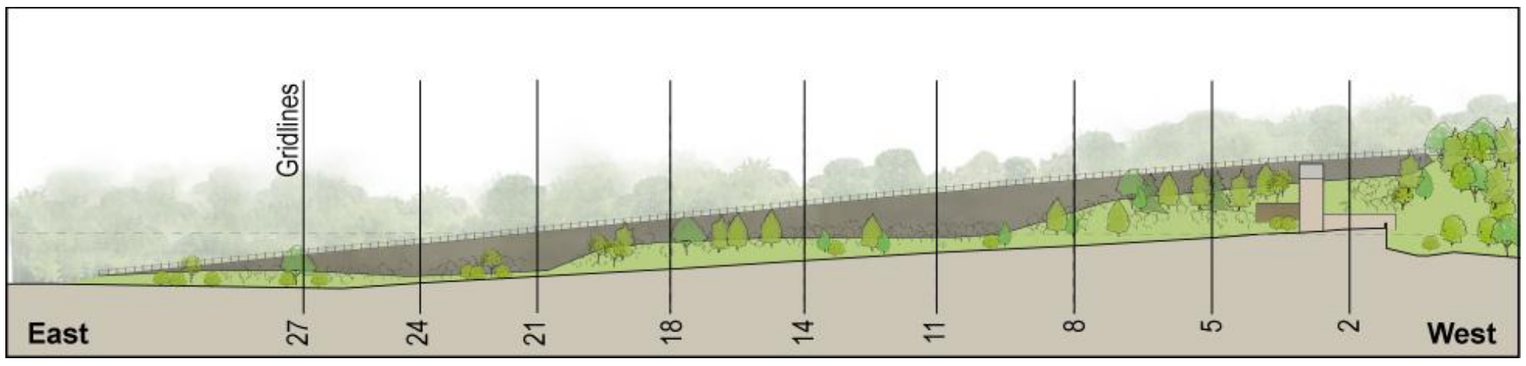


Elevation View

Figure 3: Alternative B - Straight Wall Design. Approximately 945 feet long with an 80 feet long Connecting Leg; Maximum visible height of 40 feet above Parking Lot C.



Plan View



Elevation View

Figure 4: Alternative C - Soil Berm Design. Approximately 945 feet long wall with a Secondary Wall east of elevator/stair tower; Maximum visible height of 30 feet above Parking Lot C.

The maximum visible height of the proposed wall, under Alternative C, would be approximately 30 feet, between Grids 8 and 11. Here, the height of the soil berms would be limited by the distance between the retaining wall and GSB. Under Alternative C, the total visible height of the proposed retaining wall would be approximately 16,750 square feet. The wall would be constructed of concrete with a formliner finish that uses the random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. CFA, NCPC, NPS, and DC SHPO will be consulted prior to final selection of the pattern and color. A variety of native tree species would be planted throughout this area to assist in slope stabilization, naturalize the landscape, and screen the views of the proposed retaining wall. Under Alternative C, stormwater would be managed through the installation of a swale located approximately five feet from the perimeter of the GSB.

Similar to Alternative B, the new primary retaining wall would allow the removal of the slope between the GSB and North Road, reducing the lateral pressure on the GSB. The proposed soil berms would be constructed only in areas where they would not reintroduce significant lateral earth pressure on the GSB. Alternative C would meet the purpose and need for the project, would be a permanent structure, and would not require future modification to accommodate the improvements identified in the 2008 Comprehensive Facilities Master Plan.

ALTERNATIVE D: TERRACED DESIGN

Alternative D would include the construction of a straight retaining wall north of the area designated for the future widened North Road, similar to the wall proposed under Alternative B. Under Alternative D, multiple terraces would be constructed through the project area to break-up the visual mass of a single retaining wall. The terraced walls would extend a length approximately 925 feet through the project area (Figure 5). Up to five separate walls of varying heights would be constructed between North Road and the GSB, creating terraces between the proposed retaining wall structures. Under Alternative D, the total visible height of the proposed retaining structures would be approximately 30 feet, the same as Alternative C. Under Alternative D, the total visible height of the proposed retaining wall would be approximately 22,600 square feet.

While the elevation of the highest proposed wall over the GSB would be the same as that proposed under Alternatives B and C, the stepped terraces would allow for planting of native vegetation at multiple elevations along the slope. The proposed plantings would include native grasses, shrubs, and tree species as soil and site conditions would permit. Further engineering analysis would be required to determine if guard rails or other safety measures would be required to prevent public access to the proposed terraces. Further analysis would also be required to determine if all of the terraces could be safety accessed by NZP staff to maintain the area.

The wall would be constructed of concrete with a formliner finish that uses the random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. CFA, NCPC, NPS, and DC SHPO will be consulted prior to final selection of the pattern and color. A swale for stormwater management would be installed adjacent to the GSB; additional design would be necessary to determine if further stormwater management would be required for the implementation of Alternative D.

Similar to the preceding action alternatives, the new primary retaining wall would allow the removal of the slope between the GSB and North Road, reducing the lateral pressure on the GSB. The proposed smaller retaining walls would be introduced only in areas where the set back from the GSB would allow for their construction without reintroducing significant lateral loads to the GSB. Alternative D meets the purpose and need for the project, would be a permanent structure, and would not require future modification to accommodate the improvements identified in the 2008 Comprehensive Facilities Master Plan.

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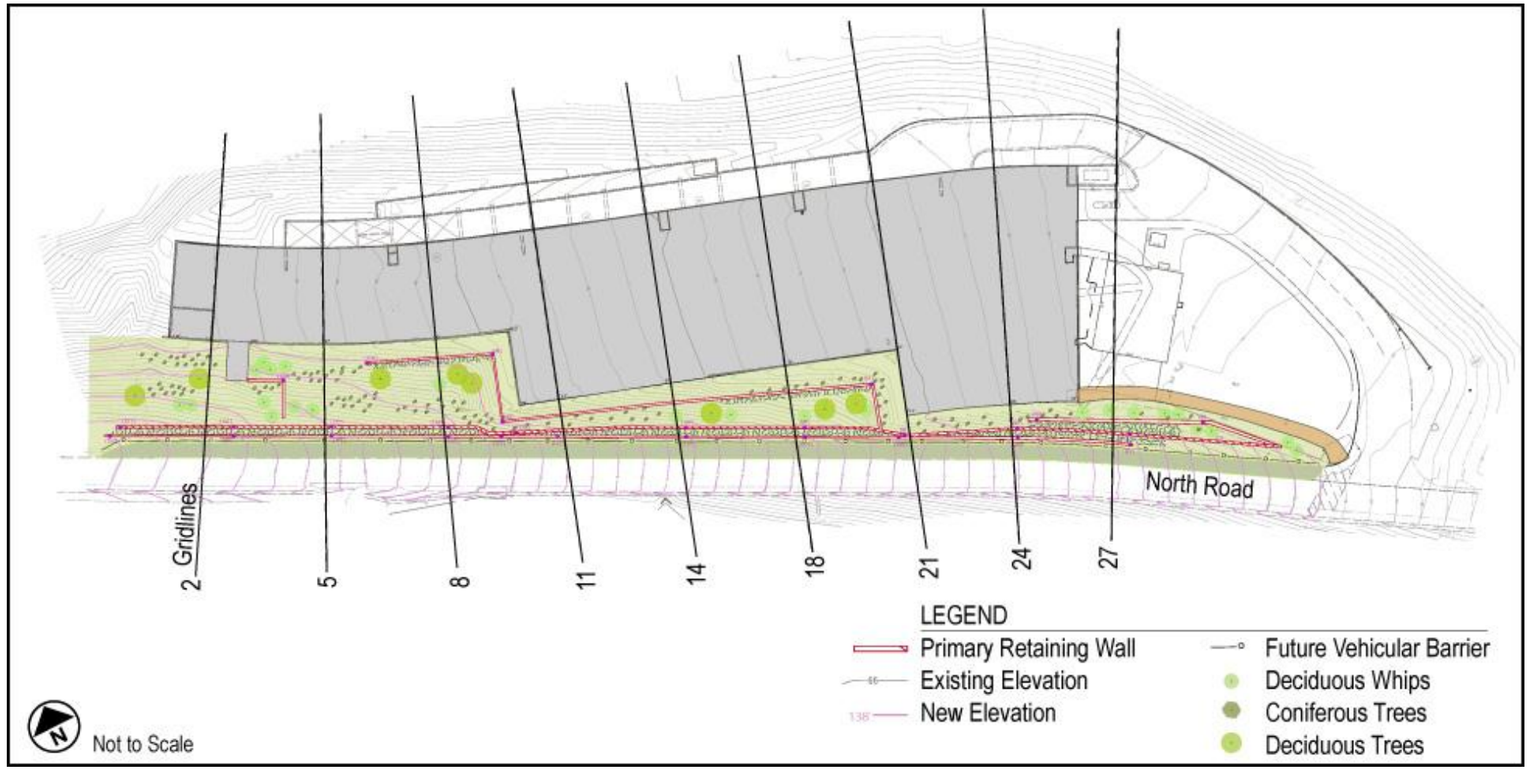
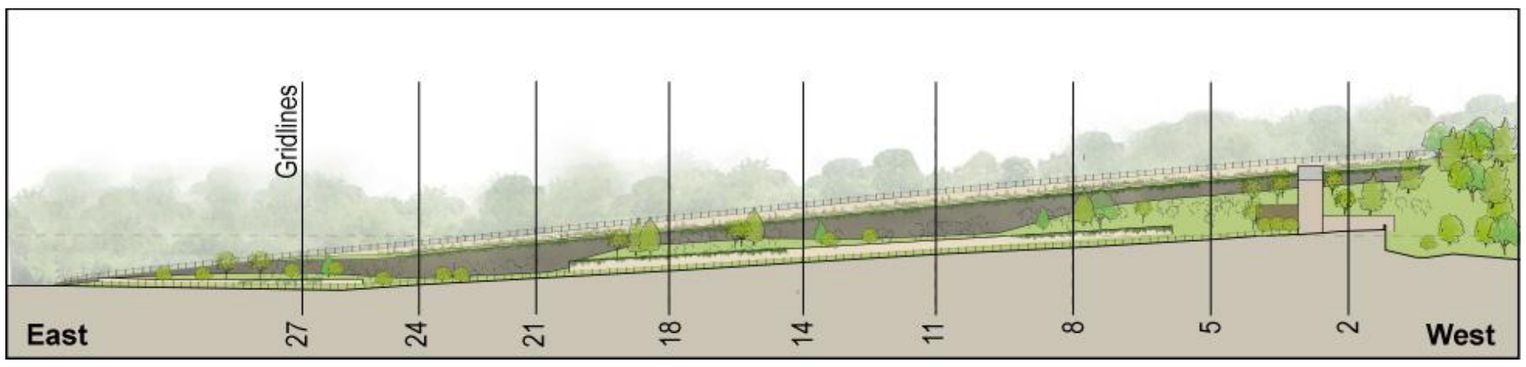


Plan View



Elevation View

Figure 5: Alternative D - Terraced Design. Approximately 945 feet long wall with five additional walls to create stepped terraces of varying heights; Maximum visible height of 30 feet above Parking Lot C.

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NORTH ROAD OPTIONS

In addition to the aforementioned action alternatives, options were developed for treatment along the proposed retaining wall, adjacent to North Road. The following options have been retained for analysis in the EA. Each of these options could be constructed in concert with any of the proposed action alternatives.

Option 1: Minimum Planting Area along North Road

North Road Option 1 would provide approximately 3.5 feet of planting area north of the proposed vehicle barrier and area designated for the future widening of North Road. This would be approximately 17 feet from the existing North Road edge of pavement. The stabilized soil between the vehicle barrier and proposed structure (3.5 feet) would be vegetated with native grasses, small shrubs, or other similar species. This option would provide the maximum width for planting, soil berms and terraces between the proposed retaining wall and the GSB as depicted in the plan views provided in Figures 3 through 5 and the Option 1 Rendering (Figure 6).

Figure 6: North Road Option 1, Rendering

Option 2: Maximum Planting Area along North Road

North Road Option 2 would provide up to 13 feet of planting area between the retaining wall and the proposed vehicle barrier of the future widening of North Road. This option is depicted in the plan view below (Figure 7) and the Option 2 rendering (Figure 8). As shown, the wall indicated is not specific to any of the action alternatives described in Chapter 2: Alternatives. Action alternatives have not been shown in this plan view to allow for independent analysis of this option. Each of the action alternatives would require individual analysis with this option to determine overall design integration and constructability. This option provides sufficient space to allow for the addition of trees and similar vegetation along North Road to replace some of the vegetation that would be lost during construction and soften the views to the north.

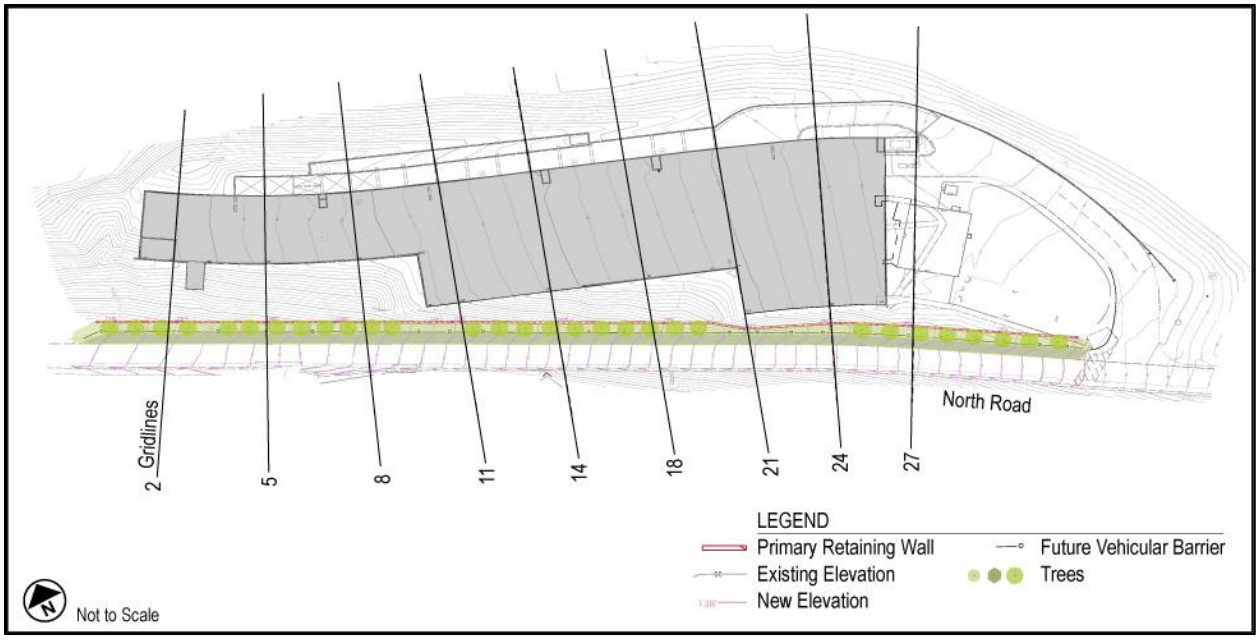

Figure 7: North Road Option 2, Plan View

Figure 8: North Road Option 2, Rendering

ELEMENTS COMMON TO ACTION ALTERNATIVES

Construction staging for the action alternatives would be accommodated onsite adjacent to the project area, east of the GSB. A stabilized construction entrance would provide vehicular access to this staging area from the eastern entrance to Parking Lot C.

It is anticipated that one lane of North Road would need to be closed throughout the duration of construction of any of the action alternatives. Additionally, temporary closures of the remaining travel lane may be necessary during construction. Similar to existing closure procedures for parking overflow days, vehicles entering from Connecticut Ave would be turned around through Lot A, Lot B and/or the Bus lot. Vehicles would also enter from Harvard Street and Beach Drive to access Lots C, D and E, but would not be permitted to proceed west along North Road past Lot C when North Road was closed. There would potentially be a few days when Lot C would be closed to all vehicles. Further details to minimize and mitigate impacts to traffic and transportation within NZP would be developed with a traffic management plan to guide lane closures and vehicular management during construction as design of an action alternative progresses. This plan could include measures such as variable message signs to notify users of construction activities, timed closures to occur in off-peak hours, and project phasing to minimize impacts to traffic, NZP visitors, and staff. Construction noise would be regulated to comply with District of Columbia noise ordinances and regulations as well as the NZP's animal program requirements and restrictions. Additionally, consideration would be made to accommodate special events staged in and around the NZP during construction.

For construction of each of the proposed action alternatives the existing temporary sheeting and shoring walls along with the concrete retaining walls would be removed. These walls are described in detail under Alternative A. This would result in the removal of approximately 4,170 square feet of existing vertical structure from the hillside between North Road and the GSB.

With each action alternative the design team has indicated that the permanent retaining wall will be the first phase of a two phase project to stabilize the structure of the existing GSB. The new permanent retaining wall along North Road will allow for the removal of existing soil overburden loads from the slope immediately adjacent to the structure. Once the soil overburden has been removed, the GSB will be structurally stabilized from the inside. This structural stabilization of the GSB will be the second phase of the two phase project.

Coordination with the CFA, NCPC, NPS, and DC SHPO will continue to identify finishes for the constructed retaining wall to mitigate its appearance. The wall would be constructed of concrete with a formliner finish that uses the random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. Consultations with these agencies have been on-going throughout the planning process and several wall treatment option were considered. CFA, NCPC, NPS, and DC SHPO will be consulted prior to final selection of the pattern and color.

Under each of the action alternatives a connection would be provided between the existing GSB stair/elevator tower and North Road. This access would be a private facility, for use by NZP staff only. The design and construction materials for this connection would be further developed with more detailed design.

CONCEPTUAL ALTERNATIVES CONSIDERED BUT DISMISSED

Throughout the alternatives development process, multiple conceptual alternatives were considered for analysis in this EA. The following is a discussion of conceptual alternatives that are not recommended for detailed engineering or analysis because they have been deemed impractical or not feasible, are not compatible with the project purpose and need, or are too similar to other alternatives analyzed in detail in this EA.

A conceptual alternative that would include the replacement of the existing temporary sheeting and shoring walls in their current locations was considered. Engineering analysis indicated that the replacement wall would need to be significantly taller than the existing sheeting and shoring walls as the existing slope exceeds the steepness allowed by the *2003 District of Columbia Standards and Specifications for Soil Erosion and Sediment Control* (DOH 2003). The resulting taller wall, given its close proximity to the GSB, would lead to a large increase in earth pressure forces on the GSB and a corresponding increase in the required internal strengthening work.

A conceptual alternative consisting of a more extensive internal strengthening of the GSB was considered. With provision of sufficiently sized internal retaining walls, sufficiently sized shear walls and additional tie backs it would be possible to carry the existing earth pressure without removal of the slope. However, the required work would greatly limit the functional use of space within the GSB. Additionally, the addition of more extensive internal GSB strengthening without re-grading the external slope would not address the deteriorated condition of the above grade temporary wood sheeting and shoring walls.

A conceptual alternative consisting of adding additional ties to the current structure was considered. Rock anchors could be added to the existing south wall to carry the earth pressure loading. However, during site investigations it was found that the condition of the concrete in several areas of the south wall was poor and deteriorating, therefore, this solution would be temporary and would require concrete repair and strengthening at the worst affected areas. Additional rock anchors without re-grading the slope would not address the deteriorated condition of the above grade temporary wood sheeting and shoring walls.

A conceptual alternative of demolishing the GSB and providing a new building was analyzed. The design of the new building could incorporate additional internal strengthening and a more extensive rock anchor system to handle the lateral earth pressure. A temporary building on NZP grounds would be needed to accommodate NZP's on-site operations. This option would have significant impacts on the operational capability of NZP for a period of years while the new building was constructed and would greatly exceed available budgets. Replacement of the building without re-grading the existing slope would also fail to address the deteriorated condition of the above grade temporary wood sheeting and shoring walls.

A conceptual alternative consisting of a straight retaining wall, similar to Alternative B, with soil berms constructed between the wall and GSB, similar to Alternative C, was developed and presented at the October 18 Concept Alternatives Presentation. This alternative was the direct result of discussions at the Alternatives Workshops. While this alternative would meet the project purpose and need and would be feasible to construct, it will not be carried forward for detailed analysis in this EA due to similarities in design and impacts to Alternatives B and C, which are being analyzed in detail in this EA.

A conceptual alternative was developed which would introduce temporary timber terraces to break-up the singular mass of the proposed retaining wall and reduce the overall height of the wall. However, the placement of these terraces would significantly limit future design plans for the parking garage on top of the GSB. In addition, this alternative would be a temporary, rather than a permanent, solution to address the mass of the

hillside being exerted on the GSB. Because this conceptual alternative does not meet the need of the project, because it would provide a temporary solution, this conceptual alternative has been dismissed from detailed analysis in this EA.

A conceptual alternative was considered to use the two existing concrete retaining walls that extend above the existing Parking Lot C to form terraced levels in front of the proposed main retaining wall. Based on inspections of the integrity of these existing concrete retaining walls, it was determined that a large area of the existing walls would need to be reconstructed and the remaining areas would need to be repaired including introduction of new retaining wall tiebacks. Additional structural analysis determined that not enough hillside mass would be removed in these areas to address the immediate degradation of the GSB. Therefore, this conceptual alternative does not meet the need of the project and has been dismissed from detailed analysis in this EA.

Throughout the development of alternatives, different wall treatment options were assessed and considered by the design team and consulting parties. The surface finish preferred for the wall is one that closely matches the Rock Creek Park context with a stone, or faux stone, pattern and coloring which closely matches other stone work within the Park. A total of six surface options were considered. Option 1 is the Rock Creek Park Stone Ashlar option that would reproduce the Rock Creek Park stone pattern and coloring using a formliner finish. Option 2 considered the use of the Asia Trail Formline finish that is used in various locations throughout the NZP. Option 3 considered the use of a smooth, non-patterned panel form with visible joints. Option 4 would use wood board forms to replicate a wooden wall context. Option 5 would utilize a smooth form finish similar to a smooth concrete finish. Option 6 would provide a bush hammered panel resembling vertical slabs of cut stone. Since the team has determined that the finish should match the Rock Creek stone pattern and color, Options 2 through 5 as described above have been dismissed from further consideration. The Rock Creek stone finish option (Option 1) will be developed in greater detail during design in continued consultation with the CFA, NCPC, NPS, and DC SHPO to identify the final finish that adequately replicates the Rock Creek pattern and color context.

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SUMMARY OF IMPACTS

Included in Table 1 is a summary of the impacts of each of the alternatives. A detailed description of the affected resources and impact analysis is provided in Chapter 3.

Table 1: Summary of Impacts

Resource	Alternative A No Action	Alternative B	Alternative C	Alternative D	North Rd Option 1	North Rd Option 2	Proposed Mitigation
NATURAL AND BIOLOGICAL RESOURCES							
Soils, Topography, and Geology	No short-term impact. Long-term minor adverse impacts as a result of the continued erosion of soil and the undermining of North Road.	Short-term negligible adverse impacts. Long-term minor adverse impacts due to the excavation of approximately 30,000 cubic yards of soil. No cumulative impacts.	Short-term negligible adverse impacts. Long-term minor adverse impacts due to the excavation of approximately 11,300 cubic yards of soil. No cumulative impacts.	Short-term negligible adverse impacts. Long-term minor adverse impacts due to the excavation of approximately 12,000 cubic yards of soil. No cumulative impacts.	No additional impact is anticipated.	No additional impact is anticipated.	Erosion and sediment control BMP's would be implemented during construction.
Water Quality	No short-term impact. Long-term negligible adverse impacts from continued erosion and sediment loss.	Short-term negligible adverse impacts. No long-term impacts would occur because slope would be stabilized and no impervious would be added. No cumulative impacts.	Short-term negligible adverse impacts. Long-term negligible beneficial impacts because slope would be stabilized, no impervious would be added, and stormwater management would be provided. Long-term minor adverse cumulative impacts would occur.	Short-term negligible adverse impacts. Long-term negligible beneficial impacts because slope would be stabilized, no impervious would be added, and stormwater management would be provided. Long-term minor adverse cumulative impacts would occur.	No additional impact is anticipated.	No additional impact is anticipated.	Erosion and sediment control BMP's would be implemented during construction. Stormwater management would be provided under Alternatives C and D.

Resource	Alternative A No Action	Alternative B	Alternative C	Alternative D	North Rd Option 1	North Rd Option 2	Proposed Mitigation
Vegetation	No short-term impact. Long-term negligible adverse impacts as a result of the continued erosion and resultant impacts to existing vegetation.	Short-term and long-term minor adverse impacts would occur due to 1.25 acres of vegetative removal. Long-term minor adverse cumulative impacts would occur.	Short-term and long-term minor adverse impacts would occur due to 1.25 acres of vegetative removal. Long-term minor adverse cumulative impacts would occur.	Short-term and long-term minor adverse impacts would occur due to 1.25 acres of vegetative removal. Long-term minor adverse cumulative impacts would occur.	No additional impact is anticipated.	No additional impact is anticipated.	Revegetation with native species would be provided for mitigation. Based on the preliminary designs, 45 trees would be provided under Alt B; 45 trees would be provided under Alt C; and 32 trees would be provided under Alt D. An additional 30 trees would be planted under North Road Option 2.
Wildlife (Including Rare, Threatened and Endangered Species)	No impacts to wildlife are anticipated.	Short-term negligible impacts. No long-term impacts to wildlife. No cumulative impacts.	Short-term negligible impacts. No long-term impacts to wildlife. No cumulative impacts.	Short-term negligible impacts. No long-term impacts to wildlife. No cumulative impacts.	No additional impact.	No additional impact.	Revegetation of the area would provide mitigation for the impacts to habitat.
Air Quality	Alternative A would have no impact on air quality.	Minor short-term and no long-term adverse impacts on air quality. No cumulative impacts.	Minor short-term and no long-term adverse impacts on air quality. No cumulative impacts.	Minor short-term and no long-term adverse impacts on air quality. No cumulative impacts.	No additional impact.	No additional impact.	BMP's to minimize dust and emissions would be implemented during construction.
Noise	No direct or indirect impacts.	Short-term minor adverse impacts and no long-term impacts to noise levels. No cumulative impacts.	Short-term minor adverse impacts and no long-term impacts to noise levels. No cumulative impacts.	Short-term minor adverse impacts and no long-term impacts to noise levels. No cumulative impacts.	No additional impact.	No additional impact.	Noise generating activities would be limited to the restrictions imposed by D.C. regulations and NZP animal curators.

Resource	Alternative A No Action	Alternative B	Alternative C	Alternative D	North Rd Option 1	North Rd Option 2	Proposed Mitigation
CULTURAL RESOURCES							
Historic Structures	*No effect.*	Negligible short-term and long-term adverse impacts to historic structures. Long-term negligible adverse cumulative impacts to historic structures. For the purposes of Section 106, the determination of effect would be *no adverse effect.*	Negligible short-term and long-term adverse impacts to historic structures. Long-term negligible adverse cumulative impacts to historic structures. For the purposes of Section 106, the determination of effect would be *no adverse effect.*	Negligible short-term and long-term adverse impacts to historic structures. Long-term negligible adverse cumulative impacts to historic structures. For the purposes of Section 106, the determination of effect would be *no adverse effect.*	No additional impact.	No additional impact.	Revegetation to screen the wall(s) and the use of compatible wall finishes is proposed as mitigation.
Cultural Landscapes	*No effect.*	Short-term and long-term minor adverse impacts would occur from the visible intrusion of the wall during construction and at certain times of the year. Long-term minor adverse cumulative impacts would occur. *No adverse effect.*	Short-term minor and long-term negligible adverse impacts would occur as a result of the new retaining wall. Long-term negligible adverse cumulative impacts would occur. *No adverse effect.*	Short-term minor and long-term negligible adverse impacts would occur as a result of the new retaining wall. Long-term negligible adverse cumulative impacts would occur. *No adverse effect.*	No additional impact.	No additional impact.	Revegetation to screen the wall(s) and the use of compatible wall finishes is proposed as mitigation.
Archeological Resources	*No effect*	*No effect.*	*No effect.*	*No effect.*	*No effect.*	*No effect.*	No mitigation proposed.

Resource	Alternative A No Action	Alternative B	Alternative C	Alternative D	North Rd Option 1	North Rd Option 2	Proposed Mitigation
SOCIOECONOMIC RESOURCES							
Aesthetic/Visual Resources	No short-term impact. Long-term negligible adverse impacts due to views of the temporary sheeting and shoring structures from Parking Lot C.	Short-term minor adverse impacts. Long-term minor adverse impacts due to impacts to views from areas outside of the NZP through the addition of approximately 26,030 square feet of vertical structure. From Parking Lot C viewpoint, the wall would have a long-term minor adverse impact due to the large continuous linear structure and tree removal. No cumulative impacts.	Short-term minor adverse impacts. Long-term minor adverse impacts as a result of impacts to views from areas outside of the NZP through the addition of approximately 12,580 square feet of vertical structure, in combination with the overall improved view of the project site from within the National Zoo (Parking Lot C). No cumulative impacts.	Short-term minor adverse impacts. Long-term minor adverse impacts as a result of impacts to views from areas outside of the NZP through the addition of approximately 18,430 square feet of vertical structure, in combination with the overall improved view of the project site from within the National Zoo (Parking Lot C). No cumulative impacts.	No additional short-term impacts. Long-term minor adverse impacts as a result of the opening of currently filtered views of Rock Creek Park.	No additional short-term impacts. Long-term negligible adverse impacts.	Revegetation to screen the wall(s) and the use of compatible wall finishes is proposed as mitigation.
Traffic, Transportation, and Parking	No short-term impact. Long-term moderate adverse impacts due to the eventual closure of the GSB and Parking Lot C and continued undermining of North Road.	Short-term moderate adverse impacts due to construction activity. No long-term impacts are anticipated. No cumulative impacts.	Short-term moderate adverse impacts due to construction activity. No long-term impacts are anticipated. No cumulative impacts.	Short-term moderate adverse impacts due to construction activity. No long-term impacts are anticipated. No cumulative impacts.	No additional impact.	No additional impact.	A traffic management plan to guide lane closures and vehicular management during construction will be developed. Consideration would be made to accommodate NZP special events. Construction traffic would be required to access the project site from Conn Ave onto North Road.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The description of the affected environment is intended to document the existing conditions of the retaining wall site, and includes those resource disciplines that have the potential to be affected by the proposed alternatives. These descriptions provide a technical baseline standard for the subsequent evaluation of impacts of each proposed action alternative and the no-action alternative. The analysis of the environmental consequences, or "impacts", of the three action alternatives as well as the No Action Alternative immediately follows the existing conditions description of each resource discipline.

Alternatives are described in Chapter 2 of this Environmental Assessment (EA). The No Action Alternative (Alternative A) provides a baseline for assessing the environmental effects of the action alternatives. In this EA, SI has made a reasonable effort consistent with NEPA to assess the potential effects of the feasible and practical alternatives for construction of a permanent retaining structure. The alternatives described in Chapter 2 are preliminary and site layouts and/or construction plans have not been finalized. Therefore, impacts in this EA have been assessed assuming that development activities could affect all the resources within the proposed development zone. As more detailed design proceeds, SI would seek to further minimize impacts.

Direct, indirect, and cumulative impacts have been assessed in this chapter. Potential impacts are described in terms of:

- *Duration*, the effects are short-term, lasting through construction or less than one year, or long-term, lasting more than one year;
- *Intensity*, the effects are negligible, minor, moderate, or major;
- *Type*, the effects are beneficial or adverse;
- *Context*, the effects are site specific, local, or regional.

The thresholds of change for the intensity of impacts are defined as follows:

- *Negligible*, the impact is localized and not measureable or at the lowest level of detection
- *Minor*, the impact is localized and slight but detectable;
- *Moderate*, the impact is readily apparent and appreciable; or
- *Major*, the impact is severely adverse and highly noticeable.

Cumulative Impacts Analysis Method

The CEQ regulations to implement NEPA require the assessment of cumulative impacts in the decision making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). As stated in the CEQ handbook, "Considering Cumulative Effects" (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans within Rock Creek Park and, where applicable, the surrounding area. Table 2 summarizes these actions that could affect the various resources of the region, along with associated plans and policies.

Table 2: Cumulative Impacts Projects

Agency	Cumulative Impact Project	Description	Status
Smithsonian Institution	National Zoological Park Facilities Master Plan	In the Facilities Master Plan, SI has identified facilities and infrastructure needs at the National Zoological Park. The Plan proposes to implement strategies for the next two decades through a master planning process. Specific projects outlined in the Plan include new mid-point entry in proximity to Parking Lot C, a new parking garage at Parking Lot C, and North Road improvements and widening. **Affected Resource Areas:** Water Quality, Wildlife, Traffic and Transportation	Present; approved in 2008 and to be used for 20-25 years
NPS	Blagden Avenue Hiker/Biker Trail (NPS 2008)	A hiker/biker trail is proposed along Blagden Avenue between Matthewson Drive and Beach Drive, primarily in Rock Creek Park. The Preferred Alternative includes a six-foot wide trail constructed on the southern side of Blagden Avenue. **Affected Resource Areas:** Water Quality, Wildlife, Traffic and Transportation	Present, currently in the planning phase.
NPS	Peirce Mill Rehabilitation (Friends of Peirce Mill 2008)	Rehabilitation of Peirce Mill was completed in 2011 and resulted in preservation of a 19th century water mill adjacent to Rock Creek. The project included removal of an asphalt parking lot, restoration of the historic millwheel, construction of a bus parking area, and improvements to trails on site. **Affected Resource Areas:** Wildlife, Historic Structures, Cultural Landscapes	Completed in 2011.
NPS	Rock Creek Park and the Rock Creek and Potomac Parkway General Management Plan (NPS 2007)	A General Management Plan was prepared by NPS which sets long-term goals for park resources. Generally, the Plan focuses on provisions to enhance visitor use of the Rock Creek Park and the RCPP. In addition to visitor improvements, the Plan identifies traffic calming and speed enforcement measures to better control through-traffic in the park. **Affected Resource Areas:** Historic Structures, Cultural landscapes, Traffic and Transportation	Present; approved in 2007
NPS	Rehabilitation of Broad Branch Road, NW	Rehabilitation of Broad Branch Road is proposed between Linnean Avenue and Beach Drive, NW. Objectives of the project are to address infrastructural deficiencies, community concerns, and safety concerns. **Affected Resource Areas:** Traffic and Transportation	Future; currently undergoing agency and public review

NPS	Klingle Valley Trail (DDOT 2010)	Construction of a multi-use trail facility is proposed within the 0.7 mile barricaded portion of Klingle Road between Porter Street, NW and Cortland Place, NW. The Preferred Alternative involves a 10-foot wide multi-use trail which would be constructed using permeable pavement/materials. Full stream channel and bank stabilization of Klingle Creek is also included in the Preferred Alternative. **Affected Resource Areas:** Soils, Water Quality, Wildlife, Traffic and Transportation	Present, currently in the design phase.
DDOT	Rock Creek Park Multi-Use Trail Rehabilitation	The Preferred Alternative for the multi-use trail rehabilitation includes resurfacing and widening of the Rock Creek trail. Additional improvements to infrastructure, road crossings, new connections, and safety measures would be included in the proposed actions, and natural resources would be preserved to the extent feasible. **Affected Resource Areas:** Vegetation, Wildlife, Traffic and Transportation	Environmental Assessment released in 2011.
DDOT	Rehabilitation of Oregon Avenue, NW (DDOT 2011)	Rehabilitation of a 1.7 mile segment of Oregon Avenue between Military Road and Western Avenue is proposed, which would repair the road surface, provide stormwater controls, and restore aging infrastructure. Proposed actions would bridge gaps in system linkage for pedestrians and bicyclists to parks, schools and residential areas adjacent to Oregon Avenue. **Affected Resource Areas:** Traffic and transportation, Archeology, Historic Structures	Future; currently undergoing agency and public review

Impact Topics

Impact topics are resources of concern that could be affected either beneficially or adversely by the range of alternatives. The impact topics were considered in accordance with all applicable federal and state environmental regulations, policies, and orders. The project team identified potential impacts associated with the project during the scoping process and determined that the following impact topics would be addressed in the EA: Soils, Topography, and Geology; Water Quality; Vegetation; Wildlife; Air Quality; Noise; Cultural Resources including Historic Structures and Districts, Cultural Landscapes, and Archeological Resources; Aesthetic and Visual Resources; and Traffic, Transportation and Parking. The following impact topics were considered but dismissed from further consideration in the EA: Human Health and Safety; Groundwater; Surface Water; Wetlands; Floodplains; Land Use and Zoning; Demographics; Environmental Justice; and Community Facilities and Services.

This EA is a supplement to the Smithsonian *National Zoological Park Facilities Master Plan EA*, dated May 2008. Many of the impact topics not addressed in this EA are addressed in the Facilities Master Plan EA.

NATURAL AND BIOLOGICAL RESOURCES

Soils, Topography, and Geology

In general, soils throughout the Zoo have been excavated and filled in order to construct park facilities. In some cases soils are covered with impervious material. In other areas, soils were mixed with rock to provide stabilization for steep slopes (SI 2008). According to the USDA Soil Survey, soils in the project site and

surrounding areas consist of Manor series soils and Udorthents. The Manor series is made up of deep, well-drained soils located along the side slopes and ridges of uplands. Properties of this series include rapid runoff and a severe hazard of erosion. Udorthents are made up of fill materials that are placed in floodplain areas in order to provide sites for buildings, roads, or other uses. Fill materials can include sands, gravels, clays, silts, and nonsoil materials such as brick, concrete and stone. As a result, properties of this series are variable (USDA 1976).

The NZP campus is a moderately sloping basin descending to the north and to the east, from Connecticut Avenue to Rock Creek. The topographic setting of the campus has been modified in order to accommodate Zoo facilities. However, incorporation of existing landforms into site design has preserved some of the original topography. The project site consists of a steep hillside (up to 50% slopes) descending north from North Road to the roof of the GSB and Parking Lot C. The temporary sheeting and shoring walls constructed to maintain this hillside are described in detail in Chapter 1. Beyond the GSB to the north, the land slopes down to Rock Creek. The stream valley features several rock outcrops.

The NZP is located within the outer section of the Piedmont Plateau physiographic province. The region is characterized by rolling topography, weathered bedrock, and small rock outcrops found in stream valleys. The bedrock is comprised of various igneous and metamorphic rocks. To the east of the region, elevations generally range from 200 to 300 feet above sea level. To the west, topography becomes more rugged and elevations generally range from 600 to 1,000 feet above sea level (W&M n.d.).

Impacts of Alternative A: No Action

Under Alternative A: No Action, no large scale construction activities would occur; therefore, no short-term impacts to soils, topography, and geology are anticipated. However, remedial maintenance of the existing sheeting and shoring walls would continue to occur. The continued deterioration of the temporary ties and sheeting and shoring walls, along with stormwater percolation into the hillside, would result in continued sediment loss and erosion between North Road and the GSB. This erosion would further undermine North Road and increase earth pressure on the GSB, leading to possible future failure of the roadway if the erosion were not addressed through continued ground stabilization work. The continued maintenance of the sheeting and shoring walls is not expected to have a significant impact on soils. As a result of the continued maintenance to reduce the erosion of sediment, Alternative A: No Action would have a long-term minor adverse impact on soils and topography within the project area. No impacts to geology would occur.

Impacts of Alternative B

Alternative B proposes the construction of a straight retaining wall, approximately 945 feet in length adjacent to North Road, with a connecting leg from the western terminus of the retaining wall extending in a northern direction approximately 80 feet. A detailed description of Alternative B is provided in Chapter 2. Construction of Alternative B would result in the excavation of approximately 30,000 cubic yards of soil from the project area.

Erosion and sediment control measures and other best management practices (BMPs) would be implemented during construction to minimize soil erosion and prevent soils from leaving the project area. Construction access and staging would be designed to avoid and minimize impacts to undisturbed soils. Short-term negligible adverse impacts to soils would occur as a result of the construction of Alternative B because construction activities would occur in areas that have been previously disturbed, protective measures would be employed during construction, and the disturbed soils would be stabilized immediately following construction activities.

Through implementation of Alternative B, the construction of the retaining wall and associated excavation and grading would permanently alter the topography within the project area. As proposed, 30,000 cubic yards of soil, forming the hillside between the proposed retaining wall and the GSB, would be excavated to the same elevation as the surface of Parking Lot C. This area would be landscaped with a variety of tree species and native grasses to stabilize the soil and reduce future erosion. Stormwater would be managed through the installation of a swale located between the retaining wall and the GSB, reducing onsite erosion. Soils and topography throughout the remainder of the NZP would remain unchanged. As a result of the project site excavation and permanently modified topography, Alternative B would have long-term minor adverse impacts to soils and topography. No impacts to geology would occur as a result of the proposed action.

In summary, Alternative B would have short-term negligible adverse impacts to soils, topography and geology. Long-term minor adverse impacts would occur as a result of the excavation of approximately 30,000 cubic yards of soil.

Impacts of Alternative C

Alternative C proposes the construction of a straight retaining wall, similar to Alternative B; however Alternative C would not include the construction of the 80-foot long connecting leg. Alternative C would construct a permanent secondary retaining wall east of the existing elevator/stair tower. Under Alternative C, soil berms would be constructed in areas where the distance between the proposed retaining wall and GSB permits. A detailed description of Alternative C is provided in Chapter 2. Construction of Alternative C would result in the excavation of approximately 11,300 cubic yards of soil from the project area.

Construction impacts to soils would be minimized as described under Alternative B. Short-term negligible adverse impacts to soils would occur as a result of the construction of Alternative C as a result of the implementation of BMPs.

Similar to Alternative B, the implementation of Alternative C would result in excavation and grading to permanently alter topography within the project site. As proposed, 11,300 cubic yards of soil, forming the hillside between the proposed retaining wall and the GSB would be excavated. Alternative C would result in the reconstruction of the hillside in some areas. However, the reconstructed hillside would have lesser grades than existing conditions. The amount of grading would be approximately 18,700 cubic yards less than what is proposed under Alternative B. As with Alternative B, the space between the retaining wall and GSB would be landscaped with a variety of tree species and native grasses to stabilize soil and reduce future erosion. Stormwater would be managed through the installation of a swale located between the retaining wall and the GSB, reducing onsite erosion. While these changes would occur within the immediate project site, soils and topography throughout the NZP would remain unchanged. Under Alternative C, long-term minor adverse impacts to soils would occur as a result of the permanently modified topography.

In summary, Alternative C would have short-term negligible adverse impacts to soils, topography and geology. Long-term minor adverse impacts would occur as a result of the excavation of approximately 11,300 cubic yards of soil.

Impacts of Alternative D

Under Alternative D, multiple terraces would be constructed through the project area, extending in length approximately 925 feet. Up to five separate walls of varying heights would be constructed between North Road and the GSB. A detailed description of Alternative D is provided in Chapter 2. Construction of Alternative D would result in the excavation of approximately 12,000 cubic yards of soil from the project area.

Construction impacts to soils would be minimized as described under Alternative B. Short-term negligible adverse impacts to soils would occur as a result of the implementation of BMPs during construction of Alternative D.

Alternative D would result in excavation and grading to permanently alter topography within the project site. As proposed, 12,000 cubic yards of soil, forming the hillside between the proposed retaining wall and the GSB would be excavated and terraces would be installed at varying elevations within the project area. The amount of grading proposed under Alternative D would be approximately 18,000 cubic yards less than what is proposed under Alternative B and approximately 700 cubic yards more than what is proposed under Alternative C. Alternative D would replace the existing sloped topography with a series of engineered terraces. Where the terrace structures allow, landscaping including a variety of tree species and native grasses would be planted to stabilize soil and reduce future erosion. Stormwater would be managed through the installation of a swale located between the retaining wall and the GSB, reducing onsite erosion. Additional design would be necessary to determine if further stormwater management would be required for the implementation of Alternative D. Alternative D would have long-term minor adverse impacts to soils as a result of the permanently modified topography and soil excavation.

In summary, Alternative D would have short-term negligible adverse impacts to soils, topography and geology. Alternative D would have long-term minor adverse impacts to soils, topography, and geology as a result of the excavation of approximately 12,000 cubic yards of soil.

Impacts of North Road Options 1 and 2

North Road Option 1 would provide approximately 3.5 feet of planting area north of the proposed vehicle barrier and area designated for the future widening of North Road. This would be approximately 17 feet from the existing North Road edge of pavement. The stabilized soil between the vehicle barrier and proposed structure (3.5 feet) would be vegetated with grass, small shrubs, or other similar species. This option would require the placement of approximately 3,300 cubic yards of fill material along North Road to bring the existing slopes up to grade with the roadway. However, the footprint for the construction of this option in concert with any of the action alternatives would remain the same.

North Road Option 2 would provide up to 13 feet of planting area between the retaining wall and the proposed vehicle barrier of the future widening of North Road. This option would require the placement of approximately 7,100 cubic yards of fill material along North Road to bring the existing slopes up to grade with the roadway. However, the footprint for the construction of this option in concert with any of the action alternatives would remain the same.

Since the resulting excavation of soil and changes to topography and geology would be no greater than that described under the action alternatives through the implementation of either North Road option, no additional impact to geology, topography, or soils is anticipated with either North Road option.

Cumulative Impacts

Projects identified in the cumulative impact study area were reviewed to determine potential impacts to soils, topography, and geology. Among the past, present and foreseeable future projects, no impacts to geologic resources were identified. Trail construction projects such as the Blagden Avenue Hiker/Biker Trail, and roadway restoration projects such as the Rehabilitation of Broad Branch Road would have local effects on soils and topography. Short-term negligible adverse impacts to soils would occur during construction, due to minor clearing and grading activities. However, once construction was complete, there would be no detectable changes in soils or topography at the various project sites. Therefore, because there would be no long-term

impacts to soils, topography, and geology among projects in the cumulative impact study area, there would be no cumulative impacts.

Water Quality

Rock Creek is the primary surface water feature within the vicinity of the project area. Rock Creek flows in a generally south direction for 33 miles from its headwaters near Laytonsville, Maryland to its confluence with the Potomac River at Georgetown. The segment of Rock Creek adjacent to NZP has degraded due to increased flooding from rapid runoff, abnormal stream bed scouring in some places and sedimentation in others, bank erosion, organic and chemical pollution, and accumulation of litter and other solid waste (DDOE 2010). Rock Creek is designated as "Special Waters of the District of Columbia" (SWDC) according to the Water Quality Standards, 21 DC Municipal Regulations (DCMR) Section 1102.5, as amended (DCOS 2011). The water quality in SWDC waters shall be maintained at or above the current level by implementing the following:

- Existing nonpoint source discharges, storm water discharges and storm sewer discharges to SWDC segments shall be controlled through implementation of BMPs and regulatory programs;
- Construction or development projects, such as roads, bridges, and bank stabilization of the streams in which a SWDC designated segment is located, which may lead to pollution of the water, shall be permitted on a case-by-case basis to ensure that there are no long-term adverse water quality effects and that no impairment of the designated uses of the segment occurs; or

Short-term degradation of water quality in a SWDC segment due to construction projects may be permitted provided that prior notice is given to the public and other local and federal government agencies, and provided that the builder of the construction project submits a report to the Department which summarizes the views, major comments, criticisms and suggestions of the public and other local and federal government agencies; and sets forth the specific responses in terms of modifications of the proposed action or an explanation for rejection of proposals made by the public and other local and federal government agencies.

Impacts of Alternative A: No Action

Under Alternative A: No Action, no large scale construction activities would occur; therefore, no short-term impacts to water quality are anticipated. The continued deterioration of the temporary ties and sheeting and shoring walls, along with continued erosion, would continue to negatively impact the water quality of receiving waters. As a result, Alternative A: No Action would have long-term negligible adverse impacts to water quality.

Impacts of Alternative B

Land clearing activities during construction would result in exposure of soils and increased risk for sediment transport to receiving waters. Erosion control measures, and stormwater best management practices (BMPs) would be implemented during construction to minimize soil erosion and prevent soils or sediment-laden water from leaving the project area. Construction access and staging would be designed to avoid and minimize impacts to undisturbed soils. Short-term negligible adverse impacts to water quality would occur as a result of the construction of Alternative B because of increased potential for sedimentation.

Immediately following construction, the soils would be stabilized and the area would be revegetated. The proposed wall would not add to the amount of impervious area and would not increase stormwater runoff. Therefore, Alternative B would not result in long-term impacts to water quality.

In summary, Alternative B would have short-term negligible adverse impacts to water quality due to increased sedimentation during construction. No long-term impacts would occur because impervious area would not be added.

Impacts of Alternative C

Alternative C proposes the construction of a straight retaining wall, similar to Alternative B; however Alternative C would not include the construction of the 80-foot long connecting leg but would construct a permanent secondary retaining wall east of the existing elevator/stair tower. Under Alternative C, soil berms would be constructed in areas where the distance between the proposed retaining wall and GSB permits. A detailed description of Alternative C is provided in Chapter 2.

Land clearing activities during construction would result in exposure of soils and increased risk for sediment transport to receiving waters. Erosion control measures, and stormwater best management practices (BMPs) would be implemented during construction to minimize soil erosion and prevent soils or sediment-laden water from leaving the project area. Construction access and staging would be designed to avoid and minimize impacts to undisturbed soils. Short-term negligible adverse impacts to water quality would occur as a result of the construction of Alternative C because of increased potential for sedimentation.

Immediately following construction, the soils would be stabilized and the area would be revegetated. The proposed wall would not add to the amount of impervious area and would not increase stormwater runoff. However, stormwater would be managed through the installation of a swale located between the retaining wall and the GSB, reducing the amount of un-managed water that leaves the site. Therefore, Alternative C would result in short-term negligible beneficial impacts to water quality because it would reduce the amount of un-managed stormwater that leaves the site.

In summary, Alternative C would have short-term negligible adverse impacts to water quality due to increased sedimentation during construction. Because Alternative C would not result in increased impervious area, and stormwater management facility would be implemented, long-term negligible beneficial impacts would occur.

Impacts of Alternative D

Under Alternative D, multiple terraces would be constructed through the project area, extending in length approximately 925 feet. Up to five separate walls of varying heights would be constructed between North Road and the GSB. A detailed description of Alternative D is provided in Chapter 2.

Construction impacts to water quality would be minimized as described under Alternative B through the implementation of erosion and stormwater BMP's. Short-term negligible adverse impacts to water quality would occur as a result of the implementation of BMPs during construction of Alternative D.

Alternative D would replace the existing sloped topography with a series of engineered terraces. Where the terrace structures allow, landscaping including a variety of tree species and native grasses would be planted to stabilize soil and reduce future erosion. Stormwater would be managed through the installation of a swale located between the retaining wall and the GSB, further reducing erosion. Additional design would be necessary to determine if further stormwater management would be required for the implementation of Alternative D. Alternative D would result in a reduction of erosion and un-managed stormwater runoff, resulting in long-term negligible beneficial impacts to water quality.

In summary, Alternative D would have short-term negligible adverse impacts to water quality due to the increased potential for stormwater runoff during construction. Alternative D would have long-term negligible beneficial impacts to water quality as a result of the stabilization of the hillside and incorporation of a stormwater management facility.

Impacts of North Road Options 1 and 2

North Road Option 1 would provide approximately 3.5 feet of planting area north of the proposed vehicle barrier and area designated for the future widening of North Road. This would be approximately 17 feet from the existing North Road edge of pavement. The soil would be stabilized between the vehicle barrier and the proposed structure, and would be vegetated with grass, small shrubs, or other similar species. This option would require the placement of approximately 3,300 cubic yards of fill material along North Road to bring the existing slopes up to grade with the roadway. However, the footprint for the construction of this option in concert with any of the action alternatives would remain the same.

North Road Option 2 would provide up to 13 feet of planting area between the retaining wall and the proposed vehicle barrier of the future widening of North Road. This option would require the placement of approximately 7,100 cubic yards of fill material along North Road to bring the existing slopes up to grade with the roadway. However, the footprint for the construction of this option in concert with any of the action alternatives would remain the same. Since the resulting area of soil disturbance would be no greater than that described under the action alternatives through the implementation of either North Road option, no additional impact to water quality is anticipated with either North Road option.

Cumulative Impacts

Projects identified in the cumulative impact study area were reviewed to determine potential impacts to water quality. Among the past, present and foreseeable future projects, impacts to water quality are likely to result from the increase in impervious surface within the watershed. Trail construction projects such as the Blagden Avenue Hiker/Biker Trail, and roadway restoration projects such as the Rehabilitation of Broad Branch Road would have local effects on water quality. Short-term negligible adverse impacts to water quality would occur during construction, due to increased soil exposure and increased sedimentation. The minor increase in impervious surface would result in a detectable change in water quality due to increased runoff at the various project sites. Therefore, because there would be negligible long-term adverse impacts to water quality among projects in the cumulative impact study area, there would be negligible long-term adverse cumulative impacts.

Vegetation

The NZP is planted with a variety of native and nonnative species within its horticultural collections and exhibits. Outside of the Zoo's landscaping, vegetation is primarily a mixture of deciduous forest resources in the mid-successional stage. Rock Creek Park and the NZP make up the largest unbroken forest in the Washington metropolitan area. Most of the original forest was cleared prior to the establishment of Rock Creek Park, through timber cutting, farming, and clearing during the Civil War (NPS 2009).

In order to characterize vegetation within the project area, data obtained from the NZP Office of Horticulture was reviewed to identify plant species and abundance; this data was visually verified in a site visit conducted October 18, 2011. Approximately 60% of the trees are native species. Black locust (*Robinia psuedoacacia*), box elder (*Acer negundo*), and Tree-of-Heaven (*Ailanthus altissima*) dominate the hillside between North Road and the GSB. Additional species found within the project area include Paulownia (*Paulownia tomentosa*), white mulberry (*Morus alba*), American elm (*Ulmus americana*), black walnut (*Julgans nigra*), red maple (*Acer rubrum*), and sugar maple (*Acer saccarum*). The majority of these trees (approximately 90 percent) have a diameter at breast height of 15 inches or less and many (approximately 73 percent) are dead or in critical to poor condition. Three (3) trees exceed a diameter at breast height greater than 21 inches (up to 24 inches). These trees are of poor health. Figure 9 provides a view of the hillside during construction of the existing sheeting and shoring wall in 1975. Figure 10 and Figure 11provides views of the existing vegetation within the project area.

Figure 9: View of Hillside during 1975 Wall Construction

Figure 10: View of Existing Vegetation from North Road

Figure 11: View of Existing Vegetation from Parking Lot C.

Impacts of Alternative A: No Action

Under Alternative A: No Action, no large scale construction activities would occur; therefore, no short-term impacts to vegetation are anticipated. The continued deterioration of the temporary ties and sheeting and shoring walls, along with stormwater percolation into the hillside, would continue to negatively impact the existing vegetation on the hillside. As a result, Alternative A: No Action would have long-term negligible adverse impacts to vegetation within the project area.

Impacts of Alternative B

With implementation of each of the action alternatives and North Road options, land clearing activities during construction would impact vegetation. It is currently estimated that approximately 1.25 acres of forested area would be cleared as a result of the proposed construction. SI would implement tree protection measures to the extent practicable to save larger tree specimens that are indigenous to Rock Creek Park and the surrounding area.

Upon construction, revegetation of the cleared areas would occur within context of the action alternative. Between the GSB and the retaining wall approximately 45 nursery caliper (1.5 to 3 inch DBH) trees of native and adaptive non-invasive species would be planted where space and soil type permit. Tree and whip planting would be limited under Alternative B as a result of the quantity of soil excavation leaving minimal soil conditions for additional plantings. Further site analysis will be conducted to determine if the project site can sustain additional trees and selecting specific locations for trees or other vegetation to screen views of the retaining wall from Rock Creek Park. Whips will be considered as an option to help stabilize the hillside. The need for deer protection and deer tolerant species of trees and other vegetation will also be considered in the analysis. The ground plane between trees would be planted with native perennial and shrub groundcover complementary and similar to those found in Rock Creek Park. The visual impact of these plantings is

discussed in greater detail in the Aesthetics and Visual Resources section of this EA. Alternative B would result in short-term and long-term minor adverse impacts to vegetation. The proposed native and adaptive non-invasive revegetation would mitigate for tree removal, effectively replacing vegetative losses in a short time.

The proposed vegetation will be implemented strategically in relationship to the various site conditions between the existing GSB and North Road to address site topography, vertical height of the wall, screening views towards the wall and the existing edge of the GSB. Vegetation placement will create an aesthetically inviting site which supports positive stormwater management and provides visual interest for visitors while mitigating the perceived height of the wall.

The proposed vegetation consists of native and non-invasive species adaptable to the environmental conditions adjacent to the GSB north-oriented site: moisture variance along the slope (moist to occasional drought tolerance), varying soil/root depth ratio due to the high rock profile of the site, deer browsing tolerance, high wind conditions and a partial to densely shaded environment. The proposed vegetation will be chosen to support and express the plant community and native species within the National Zoological & Rock Creek Park systems. The general aesthetic of the hillside will be populated in a naturalistic, non-uniform, randomized distribution of species, similar to the character of the current hillside and much of the adjacent vegetated corridors around the GSB and within the Zoo. Mitigation planting zones outside of the project site will be identified and considered to help screen the views from Rock Creek Park, as specified and addressed in the NZP Facilities Master Plan EA.

All vegetation, specifically large and woody plant materials will be placed bearing in mind any potential build-out for future development. Vegetation in areas to be impacted by future development will either be restricted to large shrubs and herbaceous plant material or trees that will be able to be relocated as part of future projects.

Past, present and future projects identified in the cumulative impacts scenario would result in a net adverse impact to vegetation due to removal for construction. The incremental adverse effect of Alternative B would provide a small contribution toward this cumulative impact. Therefore, Alternative B would have a long-term minor adverse cumulative impact to vegetation.

In summary, Alternative B would have short-term and long -term minor adverse impacts as a result of the removal of 1.25 acres of vegetation for construction. A minimum of 45 nursery caliper trees of native and adaptive non-invasive species would be planted, the ground plane between trees would be planted with native perennial and shrub groundcover similar to those found in Rock Creek Park and native trees or other vegetation would be planted to screen views of the retaining wall from Rock Creek Park. Alternative B would have a long-term minor adverse cumulative impact to vegetation.

Impacts of Alternative C

Similar to Alternative B, Alternative C would result in the clearing of approximately 1.25 acres of forested area. SI would implement tree protection measures to the extent practicable to save larger tree specimens that are indigenous to Rock Creek and the surrounding area.

Upon construction, revegetation of the cleared areas would occur within context of the action alternative. Between the GSB and the retaining wall a minimum of 45 nursery caliper (1.5 to 3 inch DBH) trees of native and adaptive non-invasive species would be planted where space and soil type permit. Further site analysis will be conducted to determine if the project site can sustain additional trees and selecting specific locations for trees or other vegetation to screen views of the retaining wall from Rock Creek Park. Whips will be considered as an option to help stabilize the hillside. Mitigation planting zones outside of the project site will

be identified and considered to help screen the views from Rock Creek Park, as specified and addressed in the NZP Facilities Master Plan EA. The need for deer protection and deer tolerant species of trees and vegetation will also be considered in the analysis. Areas not conducive to tree planting would be seeded with native grasses and other plant palettes similar to those found in Rock Creek Park. The visual impact of these plantings is discussed in greater detail in the Aesthetics and Visual Resources section of this EA. Alternative C would result in long-term minor adverse impacts to vegetation because the proposed native and adaptive non-invasive revegetation would mitigate for tree removal, effectively replacing vegetative losses in a short time.

The proposed vegetation will be implemented strategically in relationship to the various site conditions between the existing GSB and North Road to address site topography, vertical height of the wall, screening views towards the wall and the existing edge of the GSB. Vegetation placement will create an aesthetically inviting site which supports positive stormwater management and provides visual interest for visitors while mitigating the perceived height of the wall.

The proposed vegetation consists of native and non-invasive species adaptable to the environmental conditions adjacent to the GSB north-oriented site: moisture variance along the slope (moist to occasional drought tolerance), varying soil/root depth ratio due to the high rock profile of the site, deer browsing tolerance, high wind conditions and a partial to densely shaded environment. The proposed vegetation will be chosen to support and express the plant community and native species within the National Zoological & Rock Creek Park systems. The general aesthetic of the hillside will be populated in a naturalistic, non-uniform, randomized distribution of species, similar to the character of the current hillside and much of the adjacent vegetated corridors around the GSB and within the Zoo.

All vegetation, specifically large and woody plant materials will be placed bearing in mind any potential build-out for future development. Vegetation in areas to be impacted by future development will either be restricted to large shrubs and herbaceous plant material or trees that will be able to be relocated as part of future projects.

As described under Alternative B, past, present and future projects identified in the cumulative impacts scenario would result in a net adverse impact to vegetation due to removal for construction. The incremental adverse effect of Alternative C would provide a small contribution toward this cumulative impact. Therefore, the Alternative C would have a long-term minor adverse cumulative impact to vegetation.

In summary, Alternative C would have short-term and long-term minor adverse impacts to vegetation as a result of the removal of 1.25 acres of vegetation for construction. A minimum of 45 nursery caliper trees of native and adaptive non-invasive species would be planted in addition to native grasses and other plant palettes similar to those found in Rock Creek Park and native trees or other vegetation would be planted to screen views of the retaining wall from Rock Creek Park. Alternative C would have a long-term minor adverse cumulative impact to vegetation.

Impacts of Alternative D

Similar to the preceding action alternatives, Alternative D would result in the clearing of approximately 1.25 acres of forested area. SI would implement tree protection measures to the extent practicable to save larger tree specimens that are indigenous to Rock Creek and the surrounding area.

Upon construction, revegetation would occur. A minimum of 32 nursery caliper (1.5 to 3 inch DBH) trees of native and adaptive non-invasive species would be planted where space and soil type permit. Further site analysis will be conducted to determine if the project site can sustain additional trees and selecting specific locations for trees or other vegetation to screen views of the retaining wall from Rock Creek Park. Whips will

be considered as an option to help stabilize the hillside. The need for deer protection and deer tolerant species of trees and vegetation will also be considered in the analysis. Mitigation planting zones outside of the project site will be identified and considered to help screen the views from Rock Creek Park, as specified and addressed in the NZP Facilities Master Plan EA. Areas not conducive to tree planting would be seeded with native grasses and other plant palettes similar to those found in Rock Creek Park. The visual impact of these plantings is discussed in greater detail in the Aesthetics and Visual Resources section of this EA. Alternative D would result in long-term minor adverse impacts to vegetation because the proposed native and adaptive non-invasive revegetation would mitigate for tree removal, effectively replacing vegetative losses in a short time.

The proposed vegetation will be implemented strategically in relationship to the various site conditions between the existing GSB and North Road to address site topography, vertical height of the wall, screening views towards the wall and the existing edge of the GSB. Vegetation placement will create an aesthetically inviting site which supports positive stormwater management and provides visual interest for visitors while mitigating the perceived height of the wall.

The proposed vegetation consists of native and non-invasive species adaptable to the environmental conditions adjacent to the GSB north-oriented site: moisture variance along the slope (moist to occasional drought tolerance), varying soil/root depth ratio due to the high rock profile of the site, deer browsing tolerance, high wind conditions and a partial to densely shaded environment. The proposed vegetation will be chosen to support and express the plant community and native species within the National Zoological & Rock Creek Park systems. The general aesthetic of the hillside will be populated in a naturalistic, non-uniform, randomized distribution of species, similar to the character of the current hillside and much of the adjacent vegetated corridors around the GSB and within the Zoo.

All vegetation, specifically large and woody plant materials will be placed bearing in mind any potential build-out for future development. Vegetation in areas to be impacted by future development will either be restricted to large shrubs and herbaceous plant material or trees that will be able to be relocated as part of future projects.

As described under Alternative B and C, past, present and future projects identified in the cumulative impacts scenario would result in a net adverse impact to vegetation due to removal for construction. The incremental adverse effect of Alternative D would provide a small contribution toward this cumulative impact. Therefore, the Alternative D would have a long-term minor adverse cumulative impact to vegetation.

In summary, Alternative D would have short-term and long-term minor adverse impacts to vegetation as a result of the removal of 1.25 acres of vegetation for construction. A minimum of 32 nursery caliper trees of native and adaptive non-invasive species would be planted in addition to native grasses and other plant palettes similar to those found in Rock Creek Park and native trees or other vegetation would be planted to screen views of the retaining wall from Rock Creek Park. Alternative D would have a long-term minor adverse cumulative impact to vegetation.

Impacts of North Road Option 1

The aesthetic of North Road is envisioned to act as a grassy screen of upright grasses running continuously along North Road between the vehicle barrier and the retaining wall. The three foot wide thicket of various grass species of similar height (3’ +/-) provides a lower maintenance vegetation solution with seasonal color and interest along the roads edge. Regardless of the North Road Option selected for construction, the same quantity of vegetative clearing would occur. The revegetation quantity provided above for the Action Alternatives is consistent with what would be provided with the selection of North Road Option 1.

Impacts of North Road Option 2

Similar to Option 1, the aesthetic of North Road is envisioned to act as a grassy screen with several types of upright grasses interspersed amongst groups of shade trees overhead. The trees 'lining' North Road will be of varying species and character, following the existing varied canopy and character. The trees will be placed rhythmically and staggered, with greater distances between the trees in areas of potential build-out in future phases to minimize the quantity of future tree removal.

With the implementation of North Road Option 2 it is assumed that the revegetation occurring between the retaining wall and edge of the GSB would be slightly less for each of the Action Alternatives. This reduction in planting area between the retaining wall and the GSB would be offset by the street trees proposed for planting along North Road. Based on conceptual design, up to 30 individual trees could be planted in this area.

Cumulative Impacts

Various developments proposed in the cumulative impact study area would have minor adverse impacts on vegetation, based on clearing activities and conversion of vegetated areas to new uses. Construction of the Klingle Valley Trail and rehabilitation of the Rock Creek Park Multi-use Trail would involve removal of vegetation, but the removal would not affect large areas of trees or forest canopy coverage.

Under the Action Alternatives, there would be short-term and long-term minor adverse impacts due to the removal of vegetation from the project area. The collective effects of vegetation removal under the Action Alternative and the nearby trail projects would be detectable, but would be small, based on the relatively large amount of forest and riparian areas in Rock Creek Park. The future construction of the GSB garage structure is not anticipated to result in further removal of forest, but minor clearing of trees along the perimeter of the building may be necessary to accommodate construction activities. Therefore, based on the context of the cumulative impact study area, there would be a long-term minor adverse cumulative impact on vegetation.

Wildlife (Including Rare, Threatened, and Endangered Species)

The NZP provides habitat for a number of transient wildlife species. According to the NPS, there are 36 species of mammals, 13 species of amphibians, 6 species of reptiles, and 181 species of birds within the Rock Creek Park corridor (NPS 2009). For birds, forests of the region provide a suitable location for breeding and wintering, or a stop-over site along a route of migration. Undesirable feral animals such as wild dogs and cats have also been documented within the Zoo. The feral animals are attracted to the Zoo in search of food and have been known to prey upon captive wild animals (SI 2008).

The Endangered Species Act provides for the protection of ecosystems upon which threatened and endangered species of fish, wildlife and plants depend. Section 7 of the Endangered Species Act requires federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat (USFWS 2011). The USFWS and DDOE-Fisheries and Wildlife Division are responsible for the protection of federally-listed species under the Endangered Species Act. In addition, the DDOE has identified wildlife species in greatest need of conservation in the District. Conservation actions are described in the *District of Columbia Wildlife Action Plan* (DDOE 2008). The agencies were contacted on September 28, 2011 for information regarding protected species in the project area and vicinity.

On October 26, 2011, USFWS responded, "except for the occasional transient individuals, no proposed or federal listed endangered or threatened species are known to exist within the project impact area." Additionally, the DDOE response dated November 28, 2011 indicated, "DDOE has no knowledge of or documented verification for any District species of greatest conservation need or critical habitat."

The federally endangered Hay's Spring Amphipod (*Stygobromus hayi*) was discovered in five groundwater springs in Rock Creek Park in 1998. The Hay's Spring Amphipod ranges from one-half to 1-inch long. It is colorless, eyeless, and has adaptive hairs for sensing currents and food. They have life spans of eight years or more and a low reproductive rate. Hay's Spring Amphipods spend the majority of their lives in groundwater below the surface, feeding on detritus. Amphipods are subject to a number of predators when they are at surface springs, such as stonefly larvae and salamanders, but probably have few if any predators below the surface. Threats to groundwater amphipods include alterations of groundwater flows, groundwater pollution, loss of detritus as a food source, and disturbance of spring sites. Common pollution problems for amphipods are nitrates in fertilizers (which can result in groundwater oxygen depletion), pesticides, and petroleum leaking from underground storage tanks. Through desktop review, verification with NPS and USFWS staff, and field observation by consultant environmental scientists in November 2011, no suitable habitat for the Hay's Spring Amphipod was noted within or surrounding the project area.

Impacts of Alternative A: No Action

Under Alternative A: No Action, no new construction would occur; therefore there are no anticipated impacts to natural areas within the project vicinity.

Impacts of Alternatives B, C, D and North Road Options 1 and 2

Under each of the action alternatives and North Road options, a negligible disruption to wildlife during construction is anticipated. The project area is located within a disturbed and human-dominated landscape surrounded by the NZP, access roads, and buildings. While impacts to vegetation for the construction of the action alternatives would occur, these areas provide low habitat value and would be revegetated upon construction completion, as previously described. Therefore, short-term negligible adverse impacts to wildlife are anticipated during construction of any of the action alternatives or North Road options. Long-term effects to wildlife habitat, feeding areas, and nesting habitat are not anticipated.

In summary, the action alternatives would have short-term negligible impacts to wildlife, however these impacts would occur only during construction. Implementation of any of the action alternatives or North Road options would not result in long-term impacts to wildlife.

Cumulative Impacts

Projects identified in the cumulative impact study area would have effects on wildlife, based on temporary disturbances. Projects such as the Klingle Valley Trail and the rehabilitation of the Rock Creek Park Multi-use Trail would require the use of construction equipment and minor clearing activities at the project sites. In response to the disturbances, wildlife is expected to leave areas of construction for more optimal habitat nearby. Because the wildlife is expected to return following construction, there would be short-term negligible adverse impacts. Similarly, implementation of the Action Alternatives would result in short-term negligible adverse impacts due to the effects of construction, but no long-term impacts. The collective effect of the Action Alternatives and nearby construction would be small in the context of the cumulative impact study area. Rock Creek Park provides a relatively large habitat area, and collective loss of habitat due to projects in the area would not result in noticeable effects. Therefore there would be no cumulative impacts on wildlife.

Correspondence with federal and state agencies included in the aforementioned trail projects did not identify any rare, threatened or endangered species within proposed project areas. Agency correspondence in preparation of the Action Alternatives also did not identify RTE species in the project area. Therefore, there would be no cumulative impacts to rare, threatened and endangered species.

Air Quality

The guidelines outlined by the Clean Air Act (23 CFR Part 771, 49 CFR Part 622) and the NEPA require an analysis of existing air quality conditions and an analysis to evaluate any potential impacts to air quality. Under the Act, the U.S. Environmental Protection Agency (EPA) has developed National Ambient Air Quality Standards (NAAQS) for six criteria pollutants deemed harmful to public health and the environment. The pollutants include nitrogen, sulfur dioxide, carbon dioxide, ozone, particulate matter, fine particulate matter, and lead. Areas where concentrations of criteria pollutants are below the NAAQS are designated as being in "attainment" and areas where a criteria pollutant level exceeds the NAAQS are designated as "nonattainment." According to the EPA, the Washington DC region is a nonattainment area for two criteria pollutants: fine particulate matter ($PM_{2.5}$) and ground level ozone (EPA n.d.). In general, vehicle and industrial emissions are sources of $PM_{2.5}$ and ground level ozone.

In response to the nonattainment designations, the Metropolitan Washington Council of Governments (MWCOG) has developed an implementation plan to meet the federal requirements for improving air quality. *The Plan to Improve Air Quality in the Washington, DC-MD-VA Region* (MWCOG 2008) provides an inventory of regional air emissions and outlines control strategies that the region will implement to comply with the NAAQS. Control strategies generally involve the reduction of emissions from vehicles and stationary sources.

Development activities can impact air quality in three ways: 1) through airborne dust generated by the construction process; 2) by introducing new stationary sources of pollutants, such as heating plants and boilers to new facilities; and 3) by increasing vehicular traffic to the site, which raises vehicle emission levels near the site and possibly the region.

Impacts of Alternative A: No Action

Under Alternative A: No Action, regular maintenance of the site would continue however no large scale construction activities would occur in the immediate future. No changes in emissions are expected to occur. Therefore, Alternative A: No Action would have no impact on air quality.

Impacts of Alternatives B, C, and D and North Road Options 1 and 2

In general, the impacts to air quality resulting from the three action alternatives are similar; therefore, these have been grouped together for analysis. Construction activities under each alternative would have an effect on air quality from construction equipment emissions, fugitive dust caused by land disturbances, and additional trips to the site by construction workers. The duration of construction activities for each action alternative is anticipated to be 18 months. With the implementation of BMPs during construction to minimize dust and vehicular emissions, short-term minor adverse impacts from construction activities to air quality would occur.

It is unlikely that the long-term operational activities associated with any of the action alternatives would be measureable. No additional stationary emissions sources or vehicular traffic are proposed with any of the action alternatives. Therefore, Alternative B, C, and D would have no long-term impact to air quality.

Overall, the action alternatives and North Road options would have minor short-term and no long-term adverse impacts on air quality at the NZP or to surrounding properties because emissions and fugitive dust generated during construction would be minimized by BMPs.

Cumulative Impacts

Among proposed developments in the cumulative impact study area, there are no projects which would require large scale construction. No developments are proposed which would result in air quality impacts beyond construction periods. There would be short-term minor adverse impacts to air quality, based on the use of

small scale equipment during construction of proposed trail and roadway improvements. Short-term minor adverse impacts would also occur under the Action Alternatives. Based on the relatively large size of the cumulative impact study area, the combined short-term effects of nearby projects and the Action Alternatives would not be measureable. Therefore there would be no cumulative impacts to air quality.

Noise

In 1972, the federal Noise Control Act (42 U.S.C. §4901 et seq.) was established in order to promote an environment free from unwanted or disturbing sounds. The purpose of the program is to protect public health and welfare by preventing hearing loss, annoyance and activity interference. The major sources of noise addressed in the Act include transportation vehicles and equipment, machinery, appliances and other commercial products. Initially the EPA was responsible for the administration of the Act, but in 1982 the responsibility was transferred to state and local governments (EPA n.d.2).

In accordance with the Noise Control Act, D.C. municipal regulations restrict excessive sound levels in order to promote peace and quiet. Table 3 outlines maximum sound levels as described in 20 DC Code §2700. The "A-weighted" decibel (dB(A)) is the unit of measure used to express the relative loudness of sounds in the air. For example, an alarm clock measures 80 units on the dBA scale.

In addition to these restrictions, Section 5 of the Washington, DC Noise Control Act of 1977 specifies that construction activities shall take place on weekdays between the hours of 7:00 a.m. and 7:00 p.m. Noise levels resulting from construction or demolition shall not exceed 80 dBA. From 7:00 p.m.to 7:00 a.m. construction noise levels are permitted as prescribed in Table 3. No construction noise is permitted in residential, special purpose, and waterfront zones on Sundays or legal holidays. Variance and temporary exemptions from the permissible limits are granted by the Mayor.

Table 3: Sound Level Restrictions in the District of Columbia

Zone	Maximum Noise Level (dBA)	
	Daytime	Nighttime
Commercial or light-manufacturing	65 dBA	60 dBA
Industrial	70 dBA	65 dBA
Residential, special purpose, or waterfront	60 dBA	55 dBA

Additionally, sensitive receptors on the project site include the NZP's animal exhibits. These exhibits are designed to encourage the natural behaviors of their inhabitant such as social interaction, sleeping, and breeding. Presently, the predominant source of noise within the NZP vicinity is vehicular traffic along Connecticut Avenue and surrounding roadways. Other less contributing noise sources at the NZP include small generators, animals, and maintenance activities such as snow blowers, street vacuums, or mowers.

Impacts of Alternative A: No Action

Under Alternative A, SI would maintain its current operations at the NZP and no new noise sources would be created. Therefore, there would be no impacts to noise levels resulting from Alternative A: No Action.

Impacts of Alternatives B, C, and D and North Road Options 1 and 2

In general, similar noise impacts would occur as a result of implementation of any of the three action alternatives; therefore these have been grouped together for analysis. Construction activities under each alternative would have an effect on existing noise levels. As with any large construction project, areas in

proximity to the construction site are likely to experience varied periods and degrees of noise impacts. For construction activities, the contractor would be required to comply with Section 5 of the Washington, DC Noise Control Act of 1977, as described above. Additionally, NZP animal exhibit curators would review detailed construction plans to assess the potential impacts on NZP animals. Should the NZP animal exhibit curators determine that specific construction activities could result in adverse impacts to a specific animal provisions would be made to keep the animal inside during the specified activity or temporarily relocate the animal during construction. The action alternatives and North Road options would, therefore, have a short-term negligible adverse impact to noise levels within the project area.

Operationally, Alternatives B, C, and D would not result in measureable changes to noise levels impacting the NZP or surrounding properties.

Overall, impacts associated with the action alternatives and North Road options would have short-term minor adverse impacts and no long-term impacts to noise levels at the NZP or to surrounding properties because the noise generated during construction would be perceptible within the NZP within the project vicinity, and to a minor extent, from surrounding properties.

Cumulative Impacts

Among proposed developments in the cumulative impact study area, there are no projects which would require large scale construction. No developments are proposed which would result in noise impacts beyond construction periods. There would be short-term minor adverse impacts to air quality, based on the use of small scale equipment during construction of proposed trail and roadway improvements. Short-term minor adverse impacts would also occur under the Action Alternatives. Based on the relatively large size of the cumulative impact study area, the combined short-term effects of nearby projects and the Action Alternatives would not be noticeable. There would be no cumulative impacts involving noise.

CULTURAL RESOURCES

The National Historic Preservation Act of 1966 (NHPA) governs Federal agencies in their handling of historic properties. Section 106 of the Act requires that Federal agencies take into account the effects of their actions on cultural resources. Under this provision, the federal agencies such as NCPC and SI must evaluate impacts to any district, site, building, structure, or object listed in or eligible for listing in the National Register of Historic Places (NRHP). Cultural resources are characterized as historic structures and districts, cultural landscapes, and archeological resources. “Historic properties” as defined by the implementing regulations of the NHPA (36 CFR 800), are any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. This term includes artifacts, records, and the remains that are related to and located within such properties, as well as traditional and culturally significant Native American sites and historic landscapes.

Eligibility for the NRHP is determined by a property’s ability to meet at least one of the four Criteria of Evaluation issued by the Department of the Interior. The criteria are as follows:

- Association with events that have made a significant contribution to the broad patterns of our history; or
- Association with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- That has yielded, or may be likely to yield, information important in prehistory or history.

The historic properties may meet these criteria at the national, state, or local levels. Additionally, in order for a property to be listed in the NRHP, it must possess integrity of those features necessary to convey its significance (location, design, setting, workmanship, materials, feeling, and association).

Section 106 of the NHPA also requires Federal agencies to afford the Advisory Council for Historic Preservation (ACHP) a reasonable opportunity to comment if an undertaking will have an adverse impact on a cultural resource and the agencies must consult with the State Historic Preservation Office (SHPO) and other interested parties to avoid, minimize or mitigate the adverse impacts. An Area of Potential Affect (APE) for this undertaking was delineated by SI in consultation with the DC SHPO. The APE includes the historic structure or districts and cultural resources and landscapes that could potentially be directly or indirectly affected by the undertaking. These include the NZP Historic Site and Rock Creek Park Historic District. The APE for archeological resources includes the project area as directly impacted by construction of any of the proposed action alternatives. These resources are described in detail in the following sections of this EA.

Historic Structures and Districts

For a historic district, site or structure to be listed in the NRHP, it must possess significance, and the features which convey its significance must have integrity. Within the project APE are the NZP Historic Site and the Rock Creek Park Historic District. The project site is physically located within the property boundaries of the NZP Historic Site and there are limited views into the project site from the adjacent Rock Creek Park, therefore, the NZP Historic Site and the Rock Creek Park Historic District are included in the APE.

The 2008 Comprehensive Facilities Master Plan EA summarized the characteristics identified as significant on the 1973 Nomination Form for the NZP listing as a Historic Site on the NRHP. "It is significant under National Register Criteria A and C as one of the earliest zoological parks developed in the United States and as a premier recreational area for Washington, DC." The 2008 Comprehensive Facilities Master Plan EA further identified several individually significant, character-defining resources, including several Public Works era animal houses and administrative buildings, bridges, and other structures. However, none of these are within physical or visual proximity of project site and thus, not within the APE of this project.

Adjacent to the NZP Historic Site, on the other side of Rock Creek, is the Rock Creek Park Historic District. The National Register nomination for the Rock Creek Park Historic District, describes the property as "predominantly picturesque forested valley with sloping hills and meadows;" and that the core of the district is "the creek and its picturesque gorgelike scenery." It is "architecturally and historically significant under National Register criteria A, B, and C." There are a variety of contributing resources such as buildings, bridges, structures or features listed in the nomination's inventory. The trail system, stone walls, and Beach Drive are described in the National Register Nomination Form as contributing to the Historic District and are within the APE. The preliminary APE is shown in Figure 12.

Figure 12: Preliminary Area of Potential Effect.

Impacts of Alternative A: No Action

No historic structures individually eligible for the National Register were identified within the APE and no action would occur under Alternative A: No Action, outside of ongoing maintenance activities. Therefore, Alternative A: No Action would have *no effect* on historic structures.

Impacts of Alternatives B, C, D and North Road Options 1 and 2

Each of the action alternatives and North Road options are in preliminary design; therefore impacts to historic resources for each of these have been assumed to encompass the entire project area. As a result, the action alternatives have been grouped together for analysis. The trail system, stone walls, and Beach Drive are contributing resources to the Rock Creek Park Historic District and within the APE. No significance has been assigned to the GSB, Lot C or North Road. During construction of each of the action alternatives and North Road options land clearing activities would occur. Revegetation of the cleared areas would occur, restoring the area to characteristics compatible with the significant forested components of the NZP Historic Site and Rock Creek Park Historic District settings.

Coordination with the CFA, NCPC, NPS, and DC SHPO will continue to identify finishes for the constructed retaining wall to mitigate its appearance. The wall would be constructed of concrete with a formliner finish

that uses the random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. Consultations with these agencies have been on-going throughout the planning process and several wall treatment option were considered. In coordination with the consulting parties, the formliner finish would need to be reviewed and approved prior to final selection of the pattern and color. Mitigation through topographic stabilization, revegetation, and the use of compatible wall materials would contribute to restoring the area to a healthy, stable, planted state appropriate within context of the NZP Historic Site and Rock Creek Park Historic District.

From historic structures or contributing features to the historic districts within the APE such as the trail system, Beach Drive, or stone walls, the retaining wall is more than 400 feet in distance away from viewers and partially or totally obscured by the topography. The wall is visible during the winter months when there are no leaves on trees within the foreground. During the summer months the views are obstructed by the dense forested buffer. As a result of the small scale of the retaining wall on the landscape from these distances and the forested buffer between the GSB building and Rock Creek Park Multi-Use Trail and Beach Drive, the impacts to views or vistas would be minor. Furthermore, the wall would be constructed of concrete with a formliner finish that uses the random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. SI would continue to consult with CFA, NCPC, and NPS through design reviews on the aesthetic treatments for the wall, which would further reduce the potential impact on views and vistas from Rock Creek Park or nearby Adams Morgan. The visual impact of the action alternatives including graphic renderings and photos simulations are discussed in greater detail in the Aesthetics and Visual Resources section of this EA.

The action alternatives and North Road options would have a negligible long-term adverse impact on historic structures because it would add a new element into the viewshed, but it would not diminish the overall integrity of either property's location, design, setting, materials, workmanship, feeling, or association. For the purposes of Section 106, the determination of effect would be *no adverse effect*.

In summary, the action alternatives would have negligible adverse short-term and long-term impacts to historic structures. For the purposes of Section 106, the determination of effect would be *no adverse effect*.

Cumulative Impacts

Past, present and future projects identified in the cumulative impacts scenario would result in a net adverse impact to historic structures and districts as a result of the removal of vegetation for construction and minor effects to the contributing features of the NZP Historic Site and the Rock Creek Park Historic District. However, the action alternatives and North Road options would provide mitigation for this project by stabilizing the topography, providing appropriate revegetation, introducing a new retaining wall and recreating a native landscape compatible with the significant components of the NZP and Rock Creek Park as described in the next section. Therefore, with mitigation the Action Alternatives and North Road options would have a long-term negligible adverse cumulative impact to historic structures.

Cultural Landscapes

In order for a property to be evaluated as a cultural landscape, it must possess significance (the meaning or value ascribed to the landscape), and the features that convey its significance must have integrity. Character-defining features of a cultural landscape may include spatial organization and land patterns, topography, vegetation, circulation patterns, water features, structures/buildings, and small-scale objects (see The Secretary of the Interior's Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes; NPS 1992). Both the NZP Historic Site and the Rock Creek Park Historic District have character-defining features that convey significance and integrity as cultural landscapes.

The 2008 Comprehensive Facilities Master Plan EA summarized the characteristics identified as significant on the 1973 Nomination Form for the NZP listing as a Historic Site on the National Register of Historic Places. "It is significant under National Register Criteria A and C as one of the earliest zoological parks developed in the United States and as a premier recreational area for Washington, DC." The 2008 Comprehensive Facilities Master Plan EA further evaluated the site as a cultural landscape and noted that the NZP was consciously laid out by a landscape architect (the firm of Frederick Law Olmsted); is associated with historical trends and events defining the growth of zoos as a conservation area; and that NZP set the standard for other zoos in terms of its design features, significantly enhancing the theory of landscape architecture."

Furthermore, the EA states that the interplay of spatial organization and land patterns, topography, vegetation, circulation patterns, water features, structures/buildings, and small-scale objects "adds to the depth and intricacy of [NZP] as a cultural landscape." The majority of the developed NZP property occurs is located on the relatively flat portions of the parcel. Circulation systems connecting the flatter portions often navigate rugged terrain and steep slopes. Portions of the original central circulation spine laid out by the Olmsted firm remain. While its historic integrity is not completely intact, this central circulation spine (called "Olmsted Walk") within the developed, public portion of the zoo remains a significant, contributing element to the cultural landscape. Outside the Olmsted plan portion of the property, the scenic natural setting within Rock Creek valley, historic bridges, and some small-scale stone structures contribute to its cultural landscape.

Adjacent to the National Zoo Historic Site on the other side of Rock Creek is the Rock Creek Park Historic District. The National Register nomination for the Rock Creek Park Historic District describes the property as "predominantly picturesque forested valley with sloping hills and meadows;" and that the core of the district is "the creek and its picturesque gorgelike scenery." It is "architecturally and historically significant under National Register criteria A, B, and C." Some of the predominant architectural characteristics in the District stem from the significant 19th century building and mill complexes. The nomination states that "the influence of these solid vernacular Georgian buildings has been most evident in the use of native brown and grey stone as the appropriate material for subsequent park improvements. This building material has commonly been used for retaining walls, bridge abutments, and buildings throughout the park's history." There are also several examples of contributing bridges and walls that exhibit different architectural styles (such as Neoclassical) and utilize different materials (including concrete and limestone) and patterns.

In terms of landscape architecture, the nomination states: "Rock Creek Park possesses significance as a historic natural landscape, which was adapted and significantly enhanced as a public park by the US Army Corps of Engineers and the National Park Service between 1890 and 1941. The influential 1918 Olmsted report, prepared by acknowledged master landscape architects Frederick Law Olmsted, Jr. and John C. Olmsted, established methods of landscape practice and a general development plan for the park which has guided management of the reservation's natural resources to the present day." Further, "events and historic associations, related to past land uses and activities, are embodied in the park's structures, its spatial organization of recreational facilities, and its circulation pattern. However, it was natural scenic beauty that shaped the history of the park, inspired its conservation as a public landscape, and remains central to its significance. As noted in the Rock Creek Park Historic District National Register Nomination Form, the trail system, stone walls, and Beach Drive are contributing resources to the Rock Creek Park Historic District and within the APE. Rock Creek is also described as an important contributing feature in the nomination.

Impacts of Alternative A: No Action

The trail system, stone walls, and Beach Drive are contributing resources to the Rock Creek Park Historic District and within the APE. Rock Creek is also described as an important contributing feature in the nomination. Under Alternative A: No Action, there would be no impact to land use and activities, spatial

organization, nor circulation networks. No significance has been assigned to the existing landscape of the affected hillside. Under Alternative A: No Action, long-term negligible adverse impacts to non-significant vegetation would occur as a result of the continued onsite erosion of soil and resultant impacts to existing vegetation. However, these negligible impacts would not affect contributing elements of the cultural landscape; therefore, Alternative A: No Action would have *no effect* on cultural landscapes.

Impacts of Alternative B and North Road Options1 and 2

As explained under Alternative A: No Action, the trail system, stone walls, and Beach Drive are contributing resources to the Rock Creek Park Historic District and within the APE. Rock Creek is also described as an important contributing feature in the nomination. The project site is situated within the overall setting and context of the Rock Creek valley. Additionally, through implementation of Alternative B there would be no change in land use and activities, spatial organization, or circulation networks. No significance has been assigned to the landscape of the affected hillside.

With implementation of Alternative B, in concert with either North Road option, land clearing activities during construction would impact the existing vegetation and topography of the hillside landscape. The vegetation along the temporary sheeting and shoring wall is of poor quality, has no historic integrity, and is not a contributing element of the cultural landscape. The existing vegetation and tree canopy along North Road is essentially "scrub" that has grown up along the steep slope since construction of the temporary sheeting and shoring wall in the 1970s. Upon construction, revegetation of the cleared areas would occur as detailed previously. Restoration of a tree canopy and native plant palette along North Road and between the GSB and North Road would enhance the landscape and natural park environment.

The proposed retaining wall would be a new visible component to the cultural landscape of NZP and Rock Creek Park. The steep slopes and ravine topography along Rock Creek have necessitated bridges and large retaining wall elements throughout both parks. Further coordination with CFA, NCPC, NPS, and the DC SHPO would occur later in design to identify finishes for the constructed retaining wall to mitigate its appearance. These finishes would consider the use of random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park, consistent with characteristics described in the National Register Nomination Form. Mitigation through topographic stabilization, revegetation, and the use of compatible wall materials would contribute to restoring the non-significant area to a healthy, stable, planted state appropriate to the cultural landscapes of NZP and Rock Creek Park. The visual impact of the wall and plantings is discussed in greater detail in the Aesthetics and Visual Resources section of this EA. However, the large size of Alternative B is potentially intrusive due to limited views during winter months from view points in the adjacent Rock Creek Park. This impact is minor – localized, slight, but potentially detectable during times of the year when trees are without foliage. As a result, Alternative B would result in a long-term minor impact to a proportionally small area of the cultural landscape. This minor impact does not diminish the overall integrity of cultural landscapes of NZP or Rock Creek Park. For the purposes of Section 106, the determination of effect would be *no adverse effect.*

In summary, long-term minor adverse impacts would occur as a result of the removal of vegetation for construction. For the purposes of Section 106, the determination of effect would be *no adverse effect.*

Impacts of Alternatives C and D and North Road Options1 and 2

Each of Alternatives C and D and the North Road options are in preliminary design; therefore impacts to cultural landscapes for each of these have been assumed to encompass the entire project area. As a result, Alternatives C and D have been grouped together for analysis. As explained under Alternative A: No Action, no character defining features of the cultural landscape are located within the vicinity of the project, although

the project site is situated within the overall setting and context of the Rock Creek valley. Through implementation of the Alternatives C and D and North Road options there would be no change in land use and activities, spatial organization, or circulation networks. No significance has been assigned to the landscape of the affected hillside.

With implementation of Alternatives C and D and the North Road options land clearing activities during construction would impact the existing vegetation and topography of the hillside landscape. The vegetation along the temporary sheeting and shoring wall is of poor quality, has no historic integrity, and is not a contributing element of the cultural landscape. The existing vegetation and tree canopy along North Road is essentially "scrub" that has grown up along the steep slope since construction of the temporary sheeting and shoring wall in the 1970's. Upon construction, revegetation of the cleared areas would occur as detailed previously. Restoration of a tree canopy and native plant palette along North Road and between the GSB and North Road would enhance the landscape and natural park environment.

The proposed retaining wall would be a new visible component to the cultural landscape of the National Zoo and Rock Creek Park. The steep slopes and ravine topography along Rock Creek have necessitated bridges and large retaining wall elements throughout both parks. Alternative C introduces soil berms to help minimize the visible structure of the proposed retaining wall. Alternative D uses multiple terraces to accomplish a similar minimization of the visible structure of the proposed retaining wall. The effect of this minimization is more fully analyzed in the Aesthetics and Visual Resources portion of this EA. Further coordination with CFA, NCPC, NPS, and the DC SHPO would occur later in design to identify finishes for the constructed retaining wall to mitigate its appearance. These finishes would consider the use of a random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park. Mitigation through topographic stabilization, revegetation, and the use of compatible wall materials would contribute to restoring the non-significant area to a healthy, stable, planted state appropriate to the cultural landscapes of NZP and Rock Creek Park. The visual impact of the wall and plantings is discussed in greater detail in the Aesthetics and Visual Resources section of this EA. As a result, the Alternatives C and D and the North Road options would result in long-term negligible adverse impacts to the natural setting and cultural landscapes. For the purposes of Section 106, the determination of effect would be *no adverse effect*.

In summary, under each of the Alternatives C and D and the North Road options, long-term negligible adverse impacts would occur as a result of the removal of vegetation for construction. For the purposes of Section 106, the determination of effect would be *no adverse effect.*

Cumulative Impacts

Past, present and future projects identified in the cumulative impacts study area would result in a net adverse impact to cultural resources due to removal of vegetation for construction and effects to the contributing features of NZP and Rock Creek Park cultural landscapes. Under Alternative B, there would be a long-term minor adverse impact, because on the large size of the retaining wall would be visually intrusive during winter months. As a result, when combined with the effects of nearby projects, Alternate B would have a minor adverse cumulative impact on cultural landscapes. The minor and localized impact would not diminish the overall integrity of cultural landscapes of the National Zoo or Rock Creek Park.

Under Alternatives C or D, the design of the retaining wall would not be visually intrusive. There would be long-term negligible adverse impacts to cultural landscapes, based on retaining wall design features which would be compatible with the cultural landscape of the NZP and Rock Creek Park. In the context of the cumulative impact study area, impacts of Alternative C or D would be barely noticeable. When combined with the effects of nearby projects, there would be negligible adverse cumulative impacts.

Archeological Resources

An archeological investigation was conducted to assist the NZP in complying with Section 106 of the NHPA, as amended, by identifying resources within the APE that may be eligible for listing on the National Register of Historic Places (NRHP) (JMA 2011). The purpose of the work was to investigate the project area for the presence or absence of archeological resources and to assess the integrity of deposits that will be impacted. Field methods included pedestrian (visual) survey, subsurface testing (shovel test [ST] excavation), and hand-operated soil auguring.

The Retaining Wall project involves the removal of the hillside along North Road, south of Parking Lot C and the General Services Building (GSB), and the construction of a retaining structure between North Road and Parking Lot C. Beneath Lot C is the subterranean GSB. The project area is a wooded hillside, approximately 260 feet long and varies between 40 feet and 80 feet wide. The undertaking proposes to remove the hillside between the GSB and North Road and construct a retaining wall.

A total of two shovel tests were excavated within the project area. Additionally, five auger holes were excavated to investigate thick colluvial deposits which occurred within the project area. Topography within the project area is subject to rapid erosion and slow soil development. The investigation showed that much of the ground surface within the project area had been affected by erosion or previous ground-disturbing activities. No natural soil profiles were identified in the shovel tests excavated within the project area. Testing recovered one piece of whiteware from an auger sample in the Retaining Wall project area. Deposits with low artifact frequencies are unlikely to yield important information on past occupations of the NZP.

Based on these findings no further archeological investigation within the APE was recommended at this time (JMA 2011). However, any construction activities that would be performed at the site, whether during maintenance, as in Alternative A: No Action or during implementation of the Action Alternatives, would be halted immediately in the event that unanticipated archeological resources are discovered. SI would notify the DC SHPO to assess the archeological resources prior to construction activities resuming.

Impacts of Alternative A: No Action

Under Alternative A: No Action maintenance activities would continue within the project area; however, the only ground disturbance anticipated would occur as a result of continued loss of sediment due to the deteriorated condition of the temporary wood sheeting and shoring walls. This minor sediment loss in combination with the DC SHPO's *no effect* determination has led to the determination that Alternative A: No Action is not likely to impact archeological resources.

Impacts of Alternatives B, C, D and North Road Options 1 and 2

As described under geology, topography and soils, each of the action alternatives and North Road options would result in the excavation of soil for the construction of the proposed retaining wall. However, based on the findings of the archeological investigation and the DC SHPO's *no effect* determination it is not likely that the construction of any of the action alternatives or North Road options would have a resulting impact to archeological resources.

SOCIOECONOMIC RESOURCES

Aesthetic and Visual Resources

Aesthetics and visual resources are those natural and cultural features of the environment that elicit one or more sensory reactions and evaluations by the observer, particularly in regards to pleasurable effects (Canter, 1996). Views and vistas are composed of foreground and background elements and are taken from a certain

point of view. The term "view" describes those unplanned views that result from the construction of other features. The term "vista" defines views of primary importance that were specifically planned, designed and implemented.

The area of visual influence a project may have on its surrounding environs is determined by estimating the visibility of the proposed action to viewers from public places. Factors that help determine the viewshed include the scale and mass of the project on the landscape, its proposed location, and the surrounding topography. The location of the visual resources can be described in terms of foreground, middleground, and background. Resources that may have particular sensitivity include historic structures and districts, recreational and park facilities, and public open spaces. In consultation with the CFA, NPS, and NCPC, the study team identified a number of potential views of importance that should be evaluated. The views considered were selected based on the potential for the proposed action to alter views to and from the NZP, Rock Creek Park, and surrounding resources. Please note that these photos depict winter views toward the project area. Winter views were selected so that a worst case scenario could be evaluated for impacts. To evaluate potential changes to views and vistas on the landscape, the multi-disciplinary team identified the following views to study in detail:

- Views from Parking Lot C of the proposed retaining wall (see Photo Location 1);
- Views from North Road near Parking Lot B toward the project area (see Photo Location 2);
- Views from Rock Creek Park Multi-Use Trail toward the western extent of the project area (see Photo Location 3);
- Views from Rock Creek Park Multi-Use Trail toward the approximate center of the project area (see Photo Location 4);
- Views from Beach Drive toward the eastern extent of the project area (see Photo Location 5); and
- Views from Adams Mill Road toward the approximate center of the project area (see Photo Location 6).

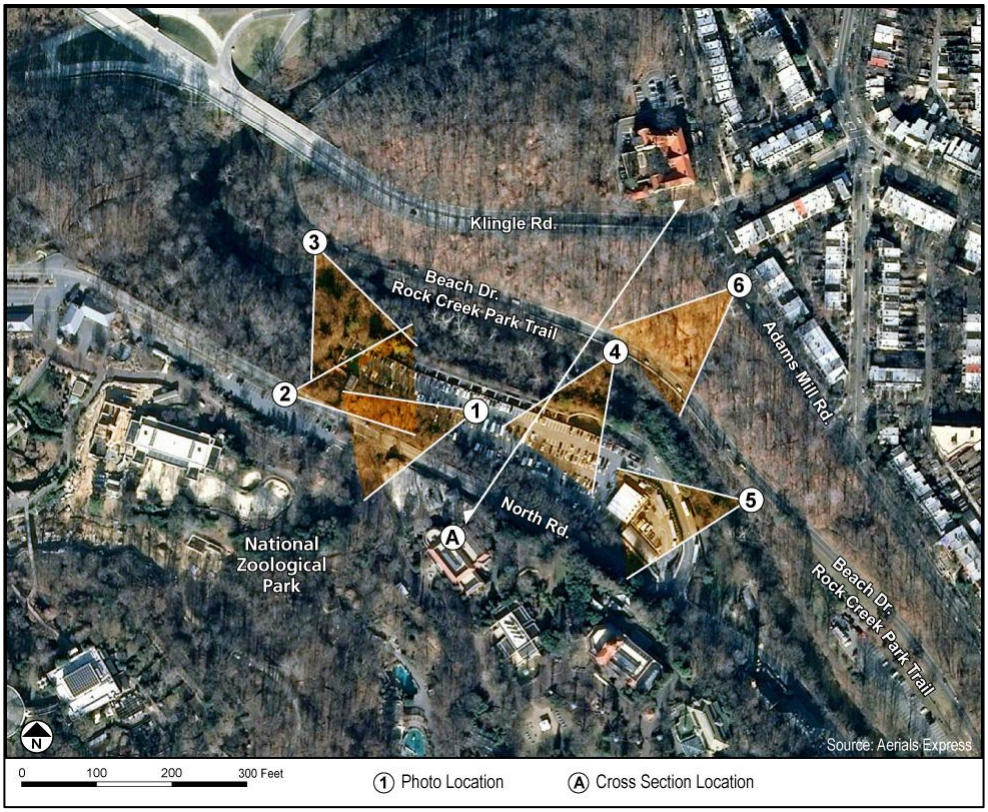

Figure 13: Viewshed Photo Key

To gain an overall idea of the location in reference to the NZP campus, Figure 13 provides a photo key showing the location and direction of these views. Existing views from each of these locations are shown on pages 53-55. Additionally, a cross section rendering was developed (Figure 17) illustrating the project area topography, the distance from various locations to the retaining wall, and scale of the project in relation to the landscape.

In the following impact analysis the study team developed the renderings, cross sections, and ghost line photo simulations to assess the potential effect of the project on views to and from the NZP, Rock Creek Park (Beach Drive and the Rock Creek Park Multi-Use Trail), and other area resources.

Location 1

Location 2

Figure 14: Photo Locations 1 and 2

Location 3

Location 4

Figure 15: Photo Locations 3 and 4

Location 5

Location 6

Figure 16: Photo Locations 5 and 6

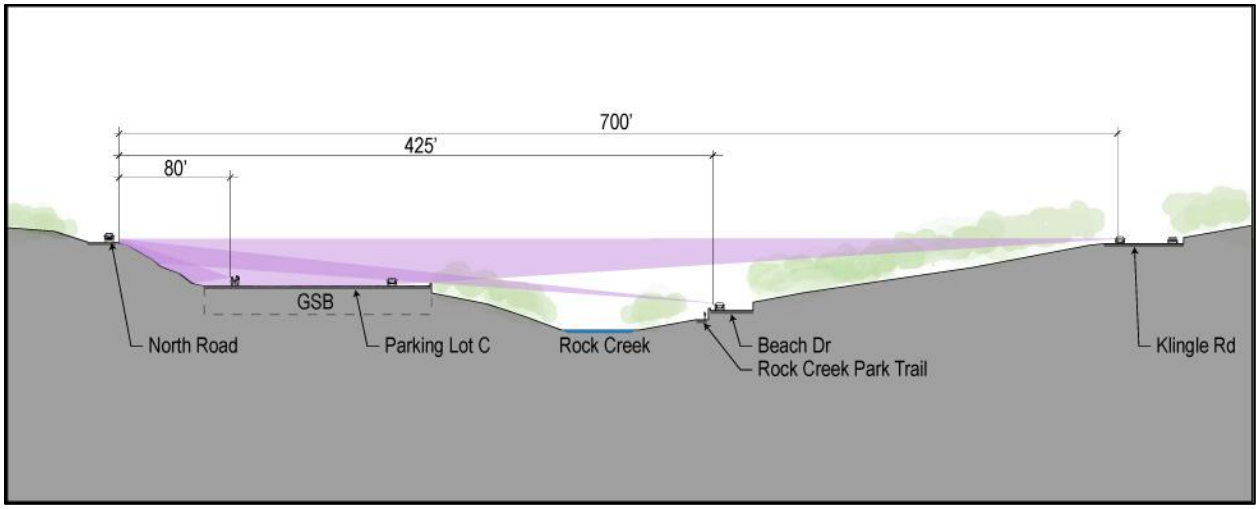

Figure 17: Cross Section A

Impacts of Alternative A: No Action

Under Alternative A: No Action, on-going maintenance activities would continue along the hillside between the North Road and GSB and the temporary sheeting and shoring would remain. There would be no change to the landscape that would diminish or alter existing views of the project area or to the surrounding neighborhoods, Rock Creek Park, or the Washington, DC skyline. The temporary sheeting and shoring used to retain the hillside would remain slightly visible from Rock Creek Park Multi-Use Trail and Beach Drive during the winter months. Based on a review of the viewshed analysis photos, the temporary measures are barely perceptible and are not viewed in most locations and by the majority of users. The one view where the temporary retaining measures are most noticeable is from the top of the GSB on Parking Lot C. Visitors using Parking Lot C would continue to be exposed to a background setting not consistent with the high quality landscape areas found throughout the NZP. Therefore, Alternative A: no Action would have long-term negligible adverse impacts on aesthetic or visual resources due to views of the temporary sheeting and shoring structures from Parking Lot C.

Impacts of Alternative B

Alternative B proposes the construction of a single straight retaining wall, approximately 945 feet in length. A connected leg from the western terminus of the retaining wall would extend in a northern direction approximately 80 feet to support the proposed future construction of the parking garage. The elevation of the proposed retaining wall would vary from approximately 40 feet above the deck of Parking Lot C at its west end to its at grade tie-in at its east end. The lower visible extent of the retaining wall would be at approximately the same grade as the existing deck of Parking Lot C. As proposed, Alternative B would include the construction of approximately 30,200 square feet of visible vertical structure. This would result in the introduction of approximately 26,030 square feet of vertical structure to the hillside between North Road and the GSB. A variety of native tree species would be planted throughout this area to assist in soil stabilization, naturalize the landscape, and screen the views of the proposed retaining wall. Species would be selected within the context of existing landscaping along North Road. In addition, the wall finish would use random patterns and stone-like finishes compatible with other retaining walls throughout Rock Creek Park consistent with characteristics described in the National Register Nomination Form. Coordination with the CFA, NCPC, NPS, and DC SHPO will continue to identify finishes for the constructed retaining wall to mitigate its appearance.

Impacts during the construction of Alternative B would include the installation of a staging area at the eastern end of the project site. The staging area would be fenced off from the public. Public access to North Road and

Parking Lot C would be maintained throughout construction. The presence of ongoing construction activities and machinery within the project area, as well as the removal of the existing vegetation, would impact the aesthetics and viewsheds of the NZP in proximity of the project site, primarily the segment of North Road abutting the project site and Parking Lot C. Additionally, views toward the NZP from locations along Beach Drive, Rock Creek Park Multi-Use Trail, and to a lesser extent, from Adams Mill Road would also be affected. However, due to the relatively small size, distance from, and the short duration of the construction activities, short-term minor adverse impacts would occur.

To help visualize the retaining wall on the landscape, renderings of the project alternatives were developed by the project team. A rendering of the proposed wall configuration with landscaping for Alternative B is depicted in Figure 18, as seen from Parking Lot C (Photo Location 1). The structures to the far right of the rendering depict the existing GSB stair/elevator tower and the proposed connection to North Road. Vegetative plantings are shown approximately ten years after installation. Under Alternative B, up to 45 nursery caliper native tree species would be planted where space and soil type permit. No whips are proposed due to the extensive site grading and remaining soil conditions. Native groundcover and shrub plantings are proposed along with trees. The proposed plantings would help soften views of the proposed retaining wall. Additionally, further agency coordination would occur to identify finishes for the constructed retaining wall to mitigate its appearance. These finishes would consider the use of random patterns and stone-like surfaces compatible with the other retaining walls throughout Rock Creek Park.

The primary difference from an aesthetics standpoint between the three action alternatives would be viewed from Photo Location 1 (top of Parking Lot C). From this location, visitors and staff park their vehicle and proceed to a designated cross walk and stairs at the south end of the GSB. The retaining wall under all the alternatives would be highly noticeable to visitors. The removal of the vegetation would also have impact to the landscape. When compared to existing conditions (temporary sheeting and shoring with no to limited aesthetic treatments), Alternative B could be considered an improvement to the landscape as perceived by most visitors; however the new retaining wall in Alternative B is considerably larger than the temporary measures. Alternative B would introduce a large continuous linear structure. As a result, this alternative is less naturalistic and sensitive to the surroundings when compared to Alternatives C and D. The addition of landscaping trees would provide some visual screening of the wall from this vantage point. However, Alternative B would provide less screening than Alternatives C or D, as further discussed in their individual impact analysis.

Figure 18: Photo Location 1, Alternative B – Rendering

Views from Photo Location 2 are thoroughly analyzed under North Road Options aesthetics and visual resources analysis.

To help determine the potential visual impacts from points outside the NZP, ghost line photo simulations were developed using the winter scape photographs previously identified. The location and size of the ghost line image was determined based on the appropriate mass and scale by the project designers. Ghost line images of the proposed structure, simulated from Photo Locations 3, 4, 5 and 6 (Figure 19 and 17), provide a point of reference to determine how much of the hillside between North Road and the GSB would be visible from these points, located north of the project site. These simulations are not alternative specific. They are referenced in the analysis of each of the alternatives.

Through the review of the various visual assessment tools used for this analysis, the study team concluded that the retaining wall is highly visible to patrons of the NZP only from the top of the GSB Building/Parking Lot C (Photo Location 1). This view would be noticeably changed from the temporary sheeting and shoring and vegetated hillside to a more permanent landscaped retaining wall such as that represented in Figure 18. As a result, visitors to the NZP would gain a pleasurable visual experience when arriving at Parking Lot C. Because of the aesthetic improvements, a beneficial impact would occur. Impacts to views from North Road are evaluated in detail under the North Road options. Improvements related to the individual action alternatives would not be noticeable to zoo patrons because of the steep grade.

Location 3

Location 4

Figure 19: Photo Locations 3 and 4, Ghost Line Photo Simulations

Location 5

Location 6

Figure 20: Photo Locations 5 and 6, Ghost Line Photo Simulations

From other points such as Rock Creek Park Multi-Use Trail and Beach Drive, the retaining wall is more than 400 feet in distance away from viewers and partially or totally obscured by the topography (see Figure 17 – Cross Section A). The wall is visible during the winter months when there are no leaves on trees within the foreground. During the summer months the views are obstructed by the dense forested buffer. As a result, the simulations were performed using winter month photos. The approximate area of tree removal was included in the production of these simulations. In each representative photo, the project area for the new retaining wall and landscaping represents less than 5% of the areal coverage of the photograph. As a result of the small scale of the retaining wall on the landscape from these distances and the forested buffer between the GSB building and Rock Creek Park Multi-Use Trail and Beach Drive, the impacts to views or vistas would be minor. In addition, SI would continue to consult with CFA, NCPC, and NPS through design reviews on the aesthetic treatments for the wall, which would further reduce the potential impact on views and vistas from Rock Creek Park or nearby Adams Morgan. Alternative B would have long-term minor adverse impacts to aesthetics and visual resources as a result of impacts to views of the project site from areas outside of the NZP, in combination with the overall improved view of the project site from within the Nation Zoo (Parking Lot C).

In summary, Alternative B would have short-term minor adverse impacts to aesthetics and visual resources due to the relatively small size, distance from, and the short duration of the construction activities. Alternative B would have long-term minor adverse impacts to aesthetics and visual resources as a result of impacts to views of the project site from areas outside of the NZP through the addition of approximately 26,030 square feet of vertical structure. From the Parking Lot C viewpoint, the retaining wall would have a long-term minor adverse impact because Alternative B would introduce a large continuous linear structure and tree removal, which is less naturalistic or aesthetically pleasing.

Impacts of Alternative C

Alternative C would include the construction of a straight retaining wall similar to that proposed under Alternative B; however, Alternative C would not include the construction of the 80-foot long connecting leg. Instead, Alternative C would construct a permanent secondary retaining wall east of the existing elevator/stair tower. Under Alternative C, soil berms would be graded in areas where the distance between the proposed retaining wall and GSB permits. This approach would minimize the visible height and length of the proposed wall. Construction of the aforementioned secondary wall would permit the grading of a slope at the western extent of the primary retaining wall to reduce the visual vertical height of this segment of wall to approximately 13 feet. The maximum visible height of the proposed wall, under Alternative C, would be approximately 30 feet. As proposed, Alternative C would include the construction of approximately 16,750 square feet of visible vertical structure. This would result in the introduction of approximately 12,580 square feet of vertical structure to the hillside, over existing conditions. A variety of native tree species would be planted throughout this area to assist in slope stabilization, naturalize the landscape, and screen the views of the proposed retaining wall.

Alternative C is depicted in Figure 21, as seen from Parking Lot C (Photo Location 1). The structures to the far right of the rendering depict the existing GSB stair/elevator tower and the proposed connection to North Road. The vegetative plantings are shown approximately ten years after installation. As with Alternative B, up to 45 nursery caliper native tree species would be planted where space and soil type permit. Additionally, Alternative C proposes the planting of 400-500 whips, covering over half the proposed soil berms. Native groundcover and shrub plantings would also be planted. The proposed plantings would help soften views of the proposed retaining wall through screening. Additionally, further agency coordination would occur to identify finishes for the constructed retaining wall to mitigate its appearance. These finishes would consider

the use of a random patterns and stone-like surfaces compatible with the other walls throughout Rock Creek Park.

In general, the impacts to aesthetics and visual resources are similar to, but considerably less than, those described in Alternative B. The primary difference between the alternatives is the amount of retaining wall visible on the hillside. Alternative C would introduce approximately 13,450 square feet less visible vertical structure to the hillside than that proposed under Alternative B. This is a result of the introduction of the soil berms, which also provide a more naturalistic setting through the construction of a contouring elevation, consistent with the topography of the existing hillside. From the review of the various visual assessment tools used for this analysis, the study team concluded that only from Parking Lot C (Photo Location 1) is the retaining wall highly visible to patrons of the NZP. This view would be noticeably changed from the temporary sheeting and shoring to a more permanent landscaped retaining wall such as that represented in Figure 21. As a result, visitors to the NZP would gain a pleasurable visual experience when arriving at Parking Lot C because of the aesthetic improvements; therefore, a beneficial impact would occur. From North Road, improvements would not be noticeable to NZP patrons because of the steep grade.

Figure 21: Photo Location 1 - Alternative C Rendering

From points outside the park, Alternative C would not change or result in a noticeable difference in the views to and from Rock Creek Park or Adam Mill because the views are filtered by existing vegetation, are more than 400 feet in distance, and represent a very small percent (less than 5%) of the viewshed. As a result of the small scale of the retaining wall on the landscape from these distances and the forested buffer between the GSB building and Rock Creek Park Multi-Use Trail and Beach Drive, the impacts to views or vistas would be minor. In addition, SI would continue to consult with CFA, NCPC, and NPS through design reviews on the aesthetic treatments for the wall, which would further reduce the potential impact on views and vistas from Rock Creek Park or nearby Adams Morgan. As a result, Alternative C would have long-term minor adverse impacts to aesthetics and visual resources.

In summary, Alternative C would have short-term minor adverse impacts to aesthetics and visual resources due to the relatively small size, distance from, and the short duration of the construction activities. Alternative C would have long-term minor adverse impacts to aesthetics and visual resources as a result of impacts to views of the project site from areas outside of the NZP through the addition of approximately 12,580 square feet of vertical structure, in combination with the overall improved view of the project site from within the National Zoo (Parking Lot C).

Impacts of Alternative D

Under Alternative D, multiple terraces would be constructed through the project area to break-up the visual mass of a single retaining wall. The terraced walls would extend a length approximately 925 feet through the project area. Up to five separate walls of varying heights would be constructed between North Road and the GSB, creating terraces between the proposed retaining wall structures. While the elevation of the highest proposed wall over the GSB would be the same as that proposed under Alternatives B and C, the stepped terraces would allow for planting of vegetation at multiple elevations along the slope. The proposed plantings would include native grasses, shrubs, and tree species to soften views of the terraces hillside from points north. Under Alternative D, approximately 22,600 square feet of visible vertical structure would be constructed on the hillside between North Road and the GSB. This would result in the introduction of approximately 18,430 square feet of vertical structure.

Alternative D is depicted in Figure 22, as seen from Parking Lot C (Photo Location 1). The structures to the far right of the rendering depict the existing GSB stair/elevator tower and the proposed connection to North Road. The vegetative plantings are shown approximately ten years after installation. As with the preceding action alternatives, nursery caliper native tree species would be planted where space and soil type permit. However, based on initial landscape designs it is assumed that approximately 35 of these trees would be planted under Alternative D, potentially 15 fewer trees than those proposed under Alternatives B and C. Alternative D also proposes the planting of 200-300 whips, covering over half the proposed soil berms, and native groundcover and shrub plantings. These plantings would help screen the views of the proposed retaining wall.

Figure 22: Photo Location 1 - Alternative D Rendering

In general, the impacts to aesthetics and visual resources are similar to those described under Alternative C. The primary difference between the alternatives is the amount of retaining wall structure visible from Parking Lot C. Alternative D would introduce approximately 7,600 square feet less vertical structure to the hillside than that proposed under Alternative B, but approximately 5,850 square feet more vertical structure than that proposed under Alternative C. Alternative D is more naturalistic when compared to Alternative B because of the tiering of the retaining wall and contouring of the hillside. However, the additional structures introduced under Alternative D would be less naturalistic than berms alone, as presented in Alternative C. This view would be noticeably changed from the temporary sheeting and shoring to a more permanent landscaped retaining wall such as that represented in Figure 22. As a result, visitors to the NZP would gain a pleasurable visual experience when arriving at Parking Lot C because of the aesthetic improvements; therefore, a beneficial impact would occur. From North Road, improvements would not be noticeable to NZP patrons because of the steep grade.

From points outside the park, Alternative D would not change or result in a noticeable difference in the views to and from Rock Creek Park or Adam Mill because the views are filtered by existing vegetation, are more than 400 feet in distance, and represent a very small percent (less than 5%) of the viewshed. As a result of the small scale of the retaining wall on the landscape from these distances, and the forested buffer between the GSB building and Rock Creek Park Multi-Use Trail and Beach Drive, the impacts to views or vistas would be minor. In addition, SI would continue to consult with CFA, NCPC, and NPS through design reviews on the aesthetic treatments for the wall, which would further reduce the potential impact on views and vistas from Rock Creek Park or nearby Adams Morgan. As a result, Alternative D would have long-term minor adverse impacts to aesthetics and visual resources.

In summary, Alternative D would have short-term minor adverse impacts to aesthetics and visual resources due to the relatively small size, distance from, and the short duration of the construction activities. Alternative D would have long-term minor adverse impacts to aesthetics and visual resources as a result of impacts to views of the project site from areas outside of the NZP through the addition of approximately 18,430 square feet of vertical structure, in combination with the overall improved view of the project site from within the Nation Zoo (Parking Lot C).

Impacts of North Road Option 1

North Road Option 1 would provide approximately 3.5 feet of planting area north of the proposed vehicle barrier and area designated for the future widening of North Road. The stabilized soil between the vehicle barrier and proposed structure (3.5 feet) would be vegetated with native grasses, small shrubs, or other similar species. This option would provide the maximum width for planting, soil berms and terraces between the proposed retaining wall and the GSB. For the purpose of analyzing impacts to aesthetics and visual resources of North Road Option 1, impacts have primarily been assessed from Photo Location 2 (Figure 23).

Figure 23: Photo Location 2 - North Road Option 1 Rendering

No additional short-term impact to aesthetics and visual resources are anticipated since the resulting construction associated with implementation of North Road Option 1 would be no greater than that described under the action alternatives.

Each of the action alternatives would result in the removal of the existing trees and vegetation abutting the northern edge of North Road. Under North Road Option 1, these trees would be replaced with grass species and other low-profile shrubs. This would open currently filtered views from this segment of North Road towards points north including Rock Creek Park. Generally, these views are momentary as vehicles travel along North Road. This facility is not authorized for pedestrian use. From Rock Creek Park the sight line toward North Road would be obstructed by the topography and forested buffer. As a result of these opened views, North Road Option 1 would have a long-term minor adverse impact to aesthetics and visual resources.

In summary, North Road Option 1would have no additional short-term impacts to aesthetics and visual resources other than those described under the action alternatives. North Road Option 1 would have long-term minor adverse impacts to aesthetics and visual resources as a result of the opening of currently filtered views of Rock Creek Park.

Impacts of North Road Option 2

North Road Option 2 would provide up to 13 feet of planting area between the retaining wall and the proposed vehicle barrier of the future widening of North Road. This option provides sufficient space to allow for the addition of trees and similar vegetation along North Road to replace some of the vegetation that would be lost during construction and soften the views from North Road toward the north. Similar to North Road Option 1,

impacts to aesthetics and visual resources resulting from the implementation of North Road Option 2 have primarily been assessed from Photo Location 2 (Figure 24).

No additional short-term impact to aesthetics and visual resources are anticipated since the resulting construction associated with implementation of North Road Option 2 would be no greater than that described under the action alternatives.

As discussed under North Road Option 1, each of the action alternatives would result in the removal of the existing trees and vegetation abutting the northern edge of North Road. North Road Option 2 would allow revegetation along North Road in the form of up to 30 street trees to help screen views of Parking Lot C as well as Rock Creek Park. From Rock Creek Park the sight line toward North Road would be obstructed by the topography and forested buffer. Additionally, views of the top edge of the retaining wall would be softened by the installed vegetation. The resulting views would be similar to the existing experience provided to vehicular traffic along North Road; therefore, North Road Option 2 would have long-term negligible adverse impacts to aesthetics and visual resources.

In summary, North Road Option 2 would have no additional short-term impacts to aesthetics and visual resources than those short-term impacts described under the action alternatives. North Road Option 2 would have long-term negligible adverse impacts to aesthetics and visual resources as a result of the opening of currently filtered views of Rock Creek Park.

Figure 24: Photo Location 2 - North Road Option 2 Rendering

Cumulative Impacts

Past, present and future projects were reviewed to determine potential effects on aesthetics and visual resources in the cumulative impact study area. No impacts were identified among nearby trail and roadway improvement projects; however, future developments included in the NZP Facilities Master Plan include a parking structure at Parking Lot C. To assess the compatibility of the future parking structure with surrounding resources, a line diagram of the parking structure showing the potential mass and scale of the project was developed. The line diagram is included in Appendix B. Based on this projection, the parking structure would extend well above the height of the proposed wall, and there would be readily apparent effects to each of the viewsheds assessed in this EA. Therefore, the future parking structure proposed in the NZP Facilities Master Plan would likely result in long-term moderate impacts to aesthetics and visual resources.

The proposed Action Alternatives would result in long-term minor adverse impacts to aesthetics and visual resources, due to changes in views of the project site from areas outside of the NZP. Review of projects in the cumulative impact study area identified a potential long-term moderate impact, resulting from construction of a parking structure at parking lot C described in the NZP Facilities Master Plan. Construction of the Action Alternatives combined with the future parking structure would not have a collective effect on aesthetics and visual resources. Due to its size, the parking structure would block views of the retaining wall from neighboring areas completely; therefore there would be no cumulative impact. It should be noted that in addition to the analysis conducted in this EA, the Preferred Alternative would undergo additional design reviews and approval from NCPC and CFA. The design review process could include more detailed renderings that would be consistent with the construction of a new parking structure at Parking Lot C.

Traffic, Transportation and Parking

Transportation in Washington, DC is comprised of a complex network of pedestrian, bicycle, vehicle, and mass transit systems. Generally, the City's transportation systems are developed and maintained by the District Department of Transportation (DDOT). However North Road is located entirely within the boundary of NZP and is therefore maintained by NZP.

The NZP was created by an Act of Congress in 1889 for the "advancement of science and instruction and recreation of the people." With more than 100 years of the public circulating the site in various ways to view animals and exhibits, the NZP has transformed from horse and buggy paths to fully modern roads, parking lots, bus stops, and various walking paths including Olmsted Walk. The NZP is open to the public every day of the year except December 25 beginning at 8:30 a.m. Admission to the NZP is free. Animal exhibit buildings are open from 10 a.m. to 6 p.m. April through October and 10 a.m. to 4:30 p.m. November through March. In addition to educating visitors through exhibits, the NZP's facilities are utilized for multiple purposes. Over 2 million individuals visit the NZP every year (SI/FONZ 2011). This number is expected to increase with the continued revitalization efforts of the NZP (SI 2008).

Access by vehicles to the NZP is provided by three main points. These are located at the intersection of Connecticut Avenue and North Road, the intersection of Harvard Street and North Road, and by way of Beach Drive. Additionally, pedestrian visitors may arrive at the NZP from the west via Connecticut Avenue or the two entrances at the east side of the NZP, near Rock Creek Park. North Road is the primary vehicular route, providing east-west access through the NZP campus. This road is a two-lane, undivided route that provides access to all five of the NZP's designated parking locations. Pedestrian use of North Road is not permitted.

Presently there are 868 parking spaces available at the NZP. Twenty of these spaces are designated as handicapped parking. These spaces must be shared by visitors, NZP staff, and volunteers (RKK 2008) and are distributed through 5 separate parking locations through the NZP. A portion of Parking Lot B is currently

unavailable for public use due to construction. Based on the findings of the Transportation Management Program developed in 2008, up to 87 parking overflow days occur per year. On these days NZP closes the Connecticut Avenue, Harvard Street Bridge, and Beach Drive gates to vehicular traffic.

Impacts of Alternative A: No Action

Under Alternative A: No Action, no large construction projects are anticipated within the project area; therefore, there would be no short-term impacts to traffic, transportation, and parking. However, continued lateral earth pressure on the GSB would result in further degradation of the building, potentially leading to the eventual closure of the GSB and Parking Lot C. This would result in a parking reduction of approximately 263 spaces. Additionally, the loss of sediment through wood lagging, due to the deteriorated condition of the temporary sheeting and shoring walls, would continue to undermine North Road. This would potentially result in the collapse of this principle access route within the NZP. As a result of these impacts, Alternative A: No Action would have a long-term moderate adverse impact to the NZP.

Impacts of Alternatives B, C, D, and North Road Options 1 and 2

In general, similar impacts to traffic, transportation, and parking would occur as a result of implementation of any of the three action alternatives or North Road options; therefore these have been grouped together for analysis. Construction activities under each alternative would have a temporary effect on existing traffic, transportation and parking. Construction staging for the action alternatives would be accommodated adjacent to the project area, east of the GSB. It is anticipated that the staging area would result in the loss of 55 parking spaces for the duration of construction. As Parking lot C is closed to the public except for during peak periods, which according to NZP's Comprehensive Facilities Master Plan would occur for 87 days during each calendar year, this loss of parking spaces would result in a short-term minor inconvenience to the NZP visitors.

A stabilized construction entrance would provide vehicular access to this staging area from the eastern portion of Parking Lot C. It is anticipated that one lane of North Road would be closed throughout the duration of construction with any of the action alternatives and temporary closure of the remaining through traffic lane may occur. Similar to existing closure procedures for parking overflow days, vehicles entering from Connecticut Ave would be turned around through Lot A, Lot B and/or the Bus lot. Vehicles would also enter from Harvard Street and Beach Drive to access Lots C, D and E, but would not be permitted to proceed west along North Road past Lot C when North Road was closed. There would potentially be a few days when Lot C would be closed to all vehicles. Further details to minimize and mitigate impacts to traffic and transportation within NZP would be developed with a traffic management plan to guide lane closures and vehicular management during construction as design of an action alternative progresses. Additionally, consideration would be made to accommodate special events staged in and around the NZP during construction. Construction vehicles would be required to utilize the North Road entrance and Connecticut Avenue to minimize traffic within the interior portions of the NZP. As a result of construction activities, the action alternatives and North Road options would result in short-term moderate adverse impacts to traffic, transportation, and parking.

Each of the proposed action alternatives and North Road options have been developed consistent with the 2008 Comprehensive Facilities Master Plan and the supporting Transportation Management Plan (RKK 2008). It is unlikely that the long-term operational activities associated with any of the action alternatives would result in measurable changes to traffic, transportation, or parking. Therefore, Alternatives B, C, and D would have no long-term impact to traffic, transportation or parking.

In summary, the action alternatives and North Road options would have short-term moderate adverse impacts to traffic, transportation, and parking as a result of construction activity. No long-term impacts are anticipated with any of the action alternatives.

Cumulative Impacts

In general, projects identified in the cumulative impact study area would have beneficial impacts on traffic and transportation, through the improvement of area roads and trails. There would be short-term adverse impacts associated with road closures and detours during construction periods. However, long-term benefits would result from projects such as the rehabilitation of Broad Branch Road, Oregon Avenue, and the Rock Creek Park Multi-use Trail. At the NZP, proposed actions under the Facilities Master Plan include a new garage at Lot C and North Road improvements which would have long-term benefits. Under the Action Alternatives, construction activities such as temporary staging would have adverse effects, but there would be no long-term impacts. When combined with the results of construction periods among projects in the cumulative impact study area, the Action Alternatives are not expected to have an incremental effect on traffic and transportation. Therefore there would be no cumulative impacts.

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APPENDICES

APPENDIX A

AGENCY CONSULTATION AND COORDINATION

[redacted]

Smithsonian Institution

January 28, 2011

Marcel Acosta, Executive Director
National Capital Planning Commission
401 9th Street NW
North Lobby, Suite 500
Washington, DC 20004

Dear Mr. Acosta:

This is to request that the Concept Design for the *Smithsonian National Zoo's North Road/ GSB Retaining Wall* be included on the Commission's agenda for review and comment at its March 3 meeting.

The following submission package is being forwarded to you under separate cover by the project's architect, Quinn Evans:

- One CD containing the Project Submission Report
- Three printed copies of the Project Submission Report

The proposed retaining wall is located between the existing North Road and General Services Building at the location proposed for a future parking garage in our 2008 Comprehensive Facilities Master Plan, reviewed and approved by the Commission at its July and November 2008 meetings. In the Master Plan, the retaining wall was expected to be incorporated as part of the parking garage structure itself, supporting the widening of the North Road above as well as relieving the existing GSB below from lateral forces. However, more recent structural engineering investigations led to our decision to separate and expedite the retaining wall project to protect the GSB from failure.

We are submitting this Concept Design to the US Commission of Fine Arts for review and comment at their February 17 meeting and expect to submit our Final design to CFA and NCPC for review at your respective April and May meetings. Prior to submission of the combined Preliminary and Final Design, we will complete an Amendment to the Environmental Assessment prepared for the Zoo Master Plan which resulted in a Finding of No Significant Impact, as well as a Section 106 review.

We appreciate the Commission's staff taking time to visit the site and meet with the Smithsonian staff and its design team to review this project.

If you have any questions concerning this submission, please call Michelle Spofford at 202.633.6558.

Sincerely,

Ann Trowbridge, AIA
Associate Director for Planning, Office of Planning and Project Management

cc: Dennis Kelly, Director, Smithsonian National Zoological Park
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Smithsonian Institution

Architectural History and Historic Preservation

14 February 2011

Mr. C. Andrew Lewis
Senior Historic Preservation Specialist
District of Columbia Historic Preservation Office
1100 4th St, NW, Suite E650
Washington, D.C. 20024

Dear Mr. Lewis,

As you know, the Smithsonian Institution (SI) proposes to erect a retaining wall at the National Zoo outside its General Services Building (GSB). The proposed location of the wall is between the north road and the GSB. The wall will replace the existing timber sheeting and shoring wall that was constructed in 1976 as a temporary measure and is part of a multi-phase project needed to structurally stabilize the existing GSB, also erected in 1976. The project will also include replacement of a rickety wooden stair tower used by staff with a new stair connection. The maximum height of the retaining wall is 52 feet and 10 feet for the stair tower.

Pursuant to 36 CFR 800.3(a), the SI has determined that the proposed construction of the retaining wall is an undertaking as defined in 800.16(y) and that is has the potential to cause effects on historic properties, in particular, the National Zoological Park, a site listed on the National Register of Historic Places. Although the SI has had discussions with the District of Columbia Historic Preservation Office (DCSHPO) about the project, this letter will serve as the formal initiation of the Section 106 review process.

The SI has met with the National Capital Planning Commission, the Commission of Fine Arts and the National Park Service to discuss the project. Comments have been favorable and the need for this wall understood. The National Park Service in particular has been helpful in advising us what materials to use for the wall to complement the stone at the Zoo and in Rock Creek Park. We also informed our colleagues that the proposal originally in the Zoo's Master Plan (presented to the public several years ago) to erect an adjacent parking garage to consolidate all parking lots has recently been deferred because there is no money. The land has previously been disturbed because of the erection of the 1976 GSB; however, we have sent Ruth Trocolli documentation of the archaeological

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202. 633.6535 Telephone
202.633.6233 Fax

survey of the National Zoo so she can make her decision.

The SI has applied the criteria of adverse effect (800.5) to determine the effect the retaining wall have on historic properties. We feel that the wall will have no adverse effect on the National Zoological Park's historic building and archaeological resources and hope that you will concur.

I enclose documentation for your review. I am glad to answer any questions you may have about the project.

Sincerely yours,

Amy Ballard

Amy Ballard
Senior Historic Preservation Specialist

Smithsonian Institution
P. O. Box 37012 MRC 511
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202.633.6233 Fax

STAFF RECOMMENDATION

C. Kelly

NCPC File No. 7214

NATIONAL ZOOLOGICAL PARK
NORTH ROAD RETAINING WALL

3001 Connecticut Avenue, NW
Washington, DC

Submitted by the Smithsonian Institution

February 24, 2011

Abstract

The Smithsonian Institution has submitted a concept design for a retaining wall adjacent to North Road at the National Zoo. The proposed retaining wall would replace temporary hillside stabilization measures that have been in place since 1976. The current stabilization measures were put in place as part of the General Services Building and parking construction. These measures are now failing and as a result causing the General Services Building to become structurally unstable.

Commission Action Requested by Applicant

Approval of comments on concept design pursuant to 40 U.S.C. § 8722(b)(1) and (d).

Executive Director's Recommendation

The Commission:

Comments as follows on the proposed North Road retaining wall at the National Zoological Park in Washington, DC, as shown on NCPC Map File No. 2.00(38.00)43262:

Recommends that in the continued development of the project the Smithsonian Institution:

- Evaluate ways to replace the tree canopy lost due to the construction;
- Evaluate opportunities to screen views of the retaining wall from Rock Creek Park; and
- Continue consultation with the National Park Service to ensure preservation of the natural quality of Rock Creek Park.

Requests that for the next submission the Smithsonian Institution submit:

- Detailed landscape plans; and
- Massing views of the proposed retaining wall from Beach Drive, points along Adams Mill Road, and the Rock Creek Trail.

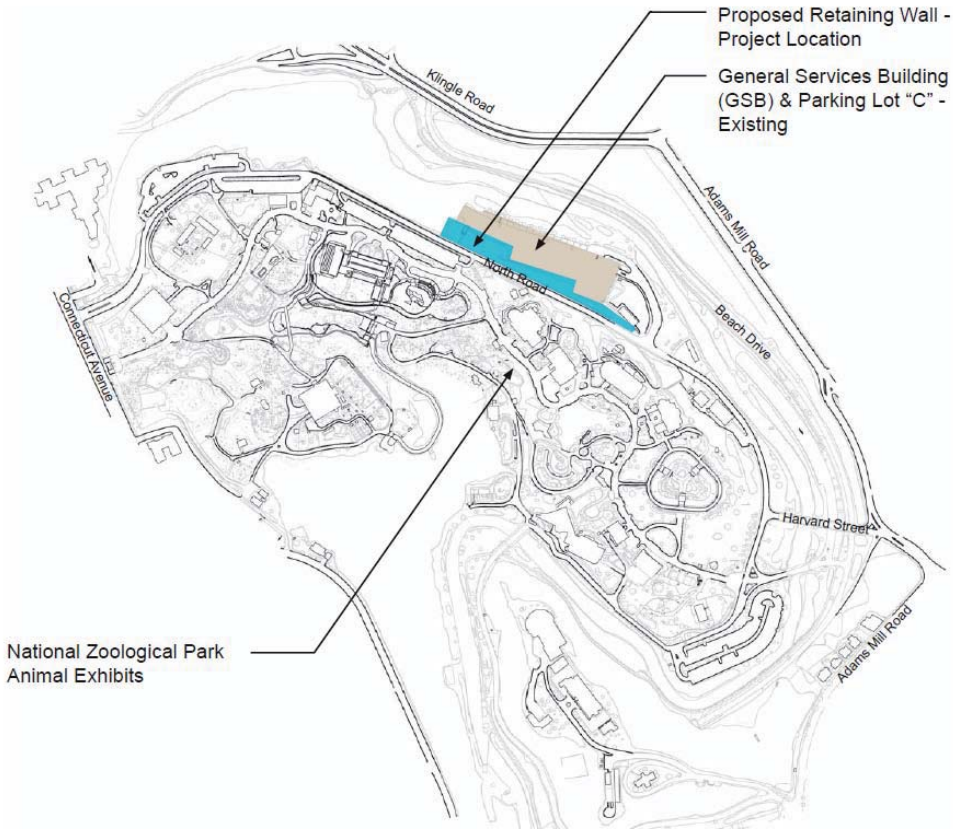
* * *

PROJECT DESCRIPTION

Site

North Road traverses the northern edge of the National Zoo from Connecticut Avenue, NW on the west to just below Harvard Street, NW on the east. The proposed retaining wall would be located approximately at the mid-point of North Road between the roadway and the General Services Building. Adjacent to the General Services Building is Rock Creek Park with Rock Creek trail and Beach Drive, NW in close proximity. The site slopes significantly downward from North Road to Rock Creek. On the opposite side of Rock Creek, the valley slopes up to the intersection of Klingle Road, NW and Adams Mill Road, NW.

Project Location



Background

In 1975, the Commission approved the General Services Building and Parking Facility (NCPC File #1362) and commended the Smithsonian Institution for, "the design of the facility, which through its sensitivity to the environment, accommodates parking requirements for the National Zoological Park with minimal visual impact on the Zoo and the adjacent Rock Creek Parkway." The final development plans approved by the Commission included a 515,000 square foot facility containing 127,000 square feet of service space and offices, 7,500 square feet for Protective Services, 368,000 square feet of parking and access, including 76,500 square feet of open decks, and 30,500 square feet of planting spaces. The parking garage would provide parking for 956 vehicles.

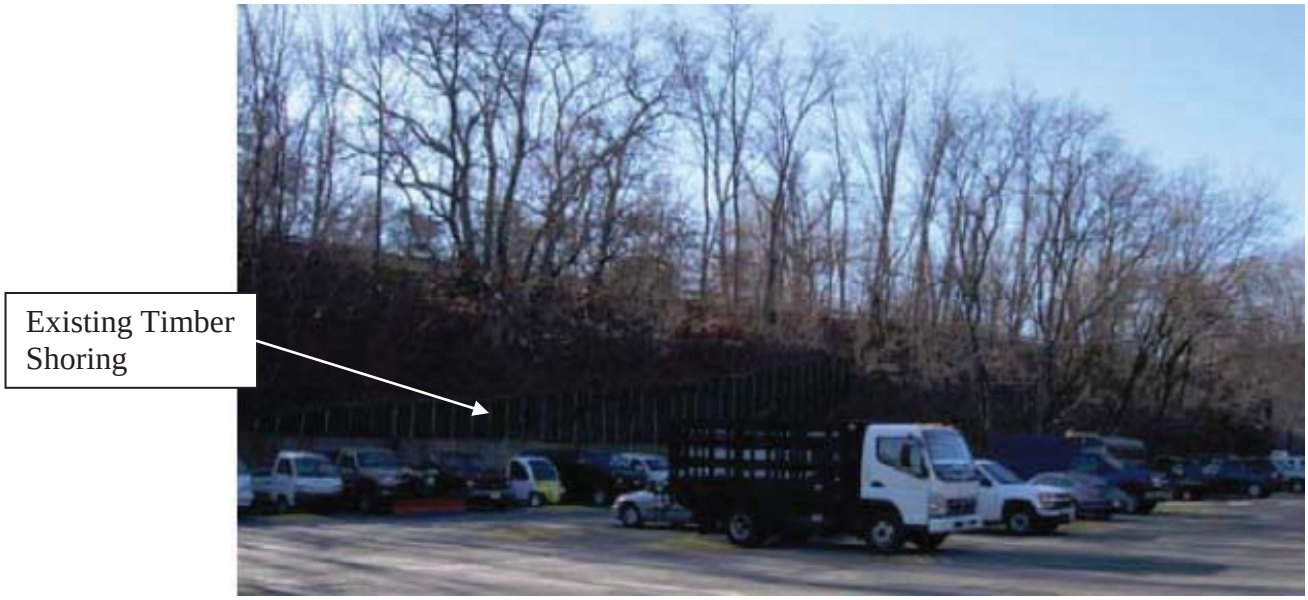
For the final design of the General Services Building, the Smithsonian Institution worked closely with the National Park Service to ensure views of the building and parking garage from the park and adjacent roadways would be minimized. To achieve this, the final design of the General Services Building and parking garage included an earthen berm and additional vegetation to help screen the building from the Rock Creek Park.

Existing General Services Building and Parking

View of General Services Building from Rock Creek Trail

Due to budgetary constraints, the Smithsonian Institution only built the General Services Building with parking only on the roof of the building. To support the hillside until the remainder of the parking structure could be constructed, the Smithsonian used temporary timber sheeting and shoring walls. These temporary measures are now failing and as a result causing the General Services Building to be structurally unstable; this necessitates the need for the proposed retaining wall.

Temporary Retaining Measures



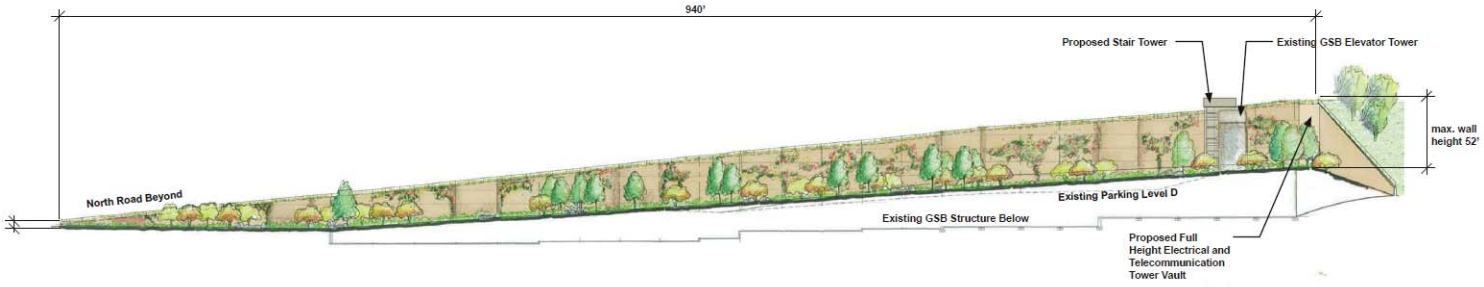
Proposal

The Smithsonian Institution proposes to construct a retaining wall to stabilize the hillside adjacent to North Road in the National Zoo. The proposed retaining wall will be a concrete wall with an architectural finish and with steel tie backs. The architectural finish will resemble a stone pattern used in other parts of the Zoo. The wall will follow the alignment of North Road for 940 feet then extend northward 85 feet. The proposed retaining wall will follow the alignment and slope of North Road and maintain a constant height of approximately one foot above the existing grade of North Road. Along the General Services Building side of the retaining wall, a maximum height of 52 feet will occur at the western side of the project site and sloping down to one foot on the eastern side.

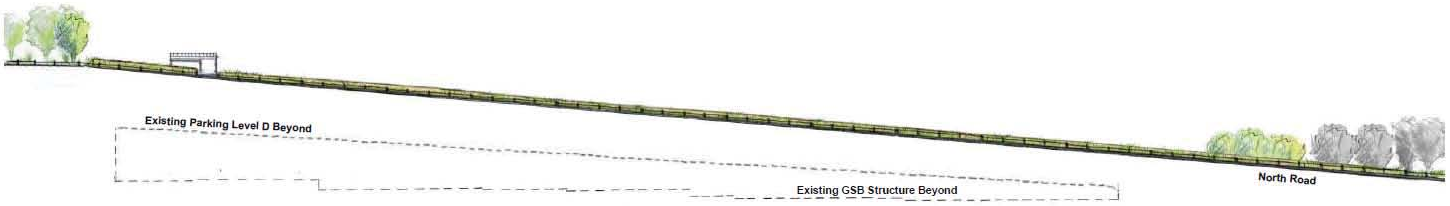
According to the submission materials, the Smithsonian Institution evaluated multiple wall geometries and determined that the straight wall would be best due to its simplicity of design and ease of site preparation and construction. It provides the maximum flexibility for design and placement of the future parking garage and access points.

STONE PATTERNED CAST-IN-PLACE CONCRETE

Proposed Retaining Wall Elevations



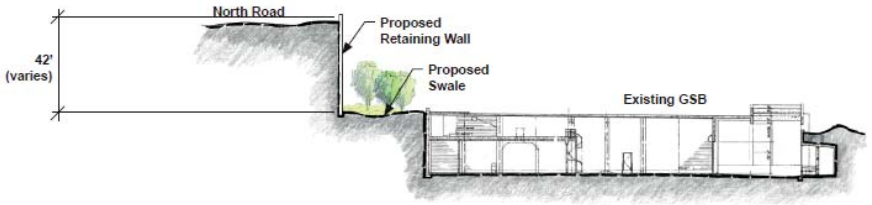
ELEVATION - PROPOSED RETAINING WALL WITH LANDSCAPING



ELEVATION - PROPOSED RETAINING WALL FROM NORTH ROAD - SOLID WALL OPTION

Proposed Retaining Wall Section

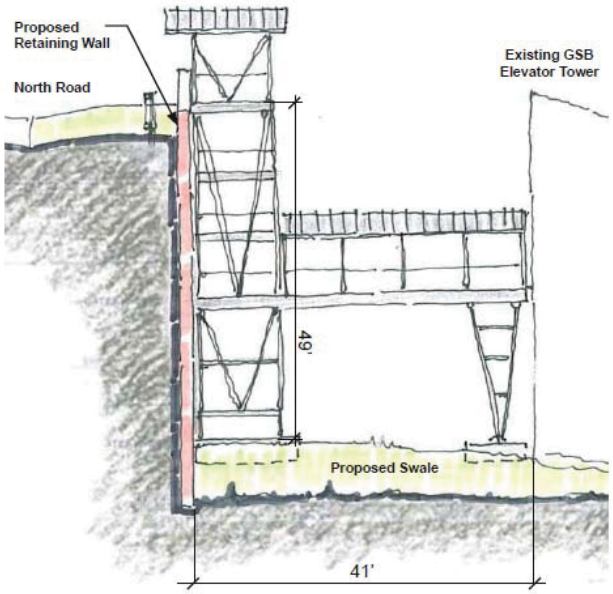
SECTION - EXISTING CONDITION



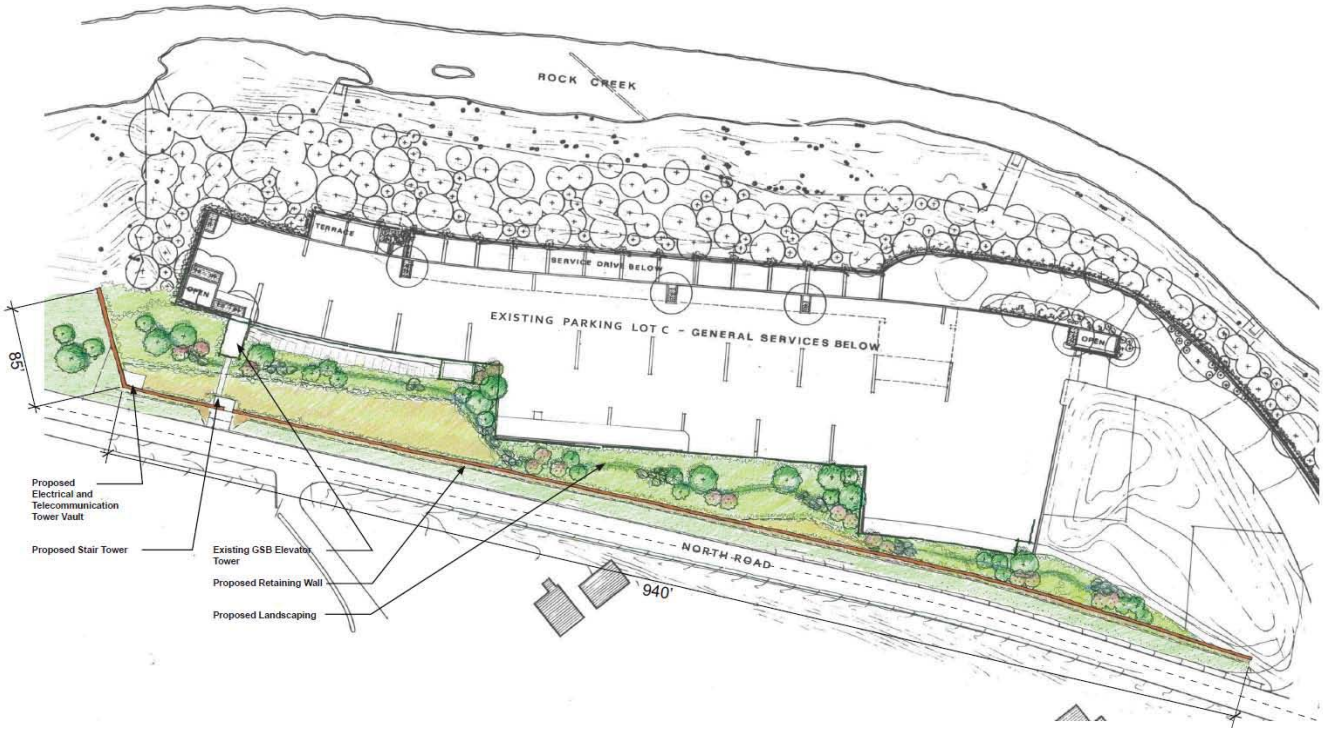
SECTION - PROPOSED RETAINING WALL

The Smithsonian Institution also proposes to construct a new pedestrian bridge that will allow access from the General Services Building to North Road on the west side of the project site. Currently, there is a timber stair leading from the General Services Building elevator tower to North Road. As a result of the proposed retaining wall excavation, the existing stair will need to be removed. The Smithsonian Institution is proposing a new bridge to maintain access from the building to the road. The new bridge would connect to the existing elevator tower with a new switchback stair tower adjacent to the proposed retaining wall.

Proposed Bridge Connection from the General Services Building to North Road



Landscaping is proposed for the area between the retaining wall and the General Services Building in order to soften the walls appearance. The Smithsonian Institution proposes to plant species that have a water filtering root system, provide screening, and have ornamental characteristics. In addition, support cables will be integrated into the retaining wall to accommodate the growth of vertical vines. Small boulders removed during construction may also be placed within the planting area.



Development Program

The Smithsonian Institution anticipates that the proposed project will be federally funded in fiscal year 2012. The project is estimated to cost 4.5 million dollars and is anticipated to take between 12 and 14 months to construct. Quinn Evan Architects is the architects for the project.

PROJECT ANALYSIS

Staff has reviewed the project submission and the proposed wall is necessary to retain the hillside and alleviate the loads on the General Services Building. The placement of a structure in this location was recommended and analyzed in the National Zoo Master Plan. Staff recommends that the Commission **as follows** on the proposed North Road retaining wall at the National Zoological Park in Washington, DC:

Recommends that in the continued development of the project the Smithsonian Institution:

- Evaluate ways to replace the tree canopy lost due to the construction;
- Evaluate opportunities to screen views of the retaining wall from Rock Creek Park; and
- Continue consultation with the National Park Service to ensure preservation of the natural quality of Rock Creek Park.

According to the submission documents, the proposed project will remove the hillside vegetation comprised of various native and invasive deciduous woodland tree species, understory shrubbery, and groundcover; approximately 100 existing trees would be removed. Staff recommends that the Smithsonian Institution evaluate ways to replace the trees lost due to construction as they move forward with the project's landscape plans. The Federal and District Elements of the Comprehensive Plan for the National Capital and the District government include policies that encourage the preservation of trees and the increase of the District's tree canopy. Opportunities to intensify the vegetation adjacent to the project site to minimize views of the retaining wall from Rock Creek Park and adjacent roadways should be evaluated. Furthermore, staff encourages the Smithsonian Institution to continue consultation with the National Park Service to ensure the protection of the natural qualities of Rock Creek Park.

Staff requests that the Smithsonian Institution submit information for the next submission to the Commission:

- Detailed landscape plans; and
- Massing views of the proposed retaining wall from Beach Drive, points along Adams Mill Road, and the Rock Creek Trail.

The Smithsonian Institution has submitted current views of the project site from various locations including along Adams Mill Road and the Rock Creek Trail. The photos, taken in winter season, indicates that there will be minimal views of the retaining wall due to vegetation and the earthen berm; however, staff requests that the Smithsonian submit photo simulations of the proposed retaining wall to permit an evaluation of the effects of the retaining wall. Views along Beach Drive are especially important to understand as it is the roadway directly adjacent to the General Services Building and has the most potential to be affected by the project.

CONFORMANCE

Comprehensive Plan for the National Capital

The proposed project will comply with the policies of the Federal Workplace Element of the Comprehensive Plan for the National Capital, which encourages agencies to:

- Ensure that safe and healthy working conditions continue to be provided and maintained at all sites and in all buildings occupied by the federal government.

Federal Capital Improvements Plan

For the 2011- 2016 Federal Capital Improvements Plan (FCIP) for fiscal years 2011 – 2116, the Smithsonian submitted a project under the title Repair Structural Systems, National Zoological Park General Services Building and provided the following description:

> "This project will strengthen and repair structural deficiencies such as cracked concrete, deteriorated steel reinforcement and degraded tie-back tension rods in the General Services Building and in the retaining wall that supports the North Road, the major thoroughfare through the Zoo. Internal strengthening is needed at the lower level of the building along the backside and for the full length of the loading and storage bay areas.

The project includes underpinning the back foundation wall, installing a new all interior of the perimeter wall with waterproofing membrane, adding shear walls and tie-backs into the hillside, replacing and reconfiguring structural mezzanines, and strengthening interior columns."

Relevant Federal Facility Master Plan

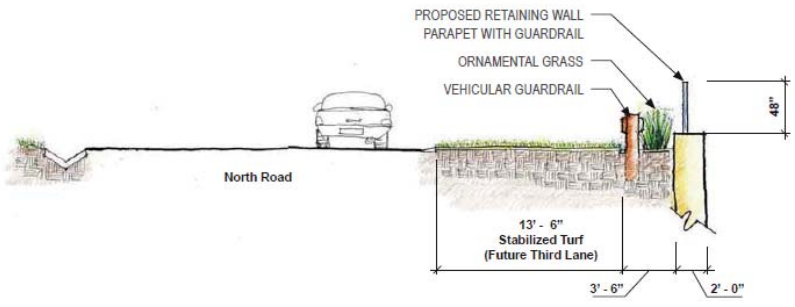
The proposed project is located within the Middle Olmsted precinct of the National Zoo Master Plan, approved by the Commission in 2008. The master plan includes the future construction of the parking garage atop the General Services Building; a carryover project from the 1972 National Zoo Master Plan. The current master plan anticipates the proposed parking garage would act as the retaining wall to support the weight of the hillside; however, due to budgetary constraints and an urgent need to stabilize the hillside, the Smithsonian needs to construct the retaining wall separate from the parking garage. Although the parking garage has not been designed, the Smithsonian Institution has submitted drawings and elevations showing future potential massing and layout of the parking garage.

Future Parking Garage Elevations in Relationship to the Retaining Wall

ELEVATION - *FUTURE PARKING GARAGE WITH RETAINING WALL BEHIND

The National Zoo Master Plan also recommends widening North Road from two lanes to three lanes to provide a left turn lane into the future parking garage access points. The proposed retaining wall will not hinder the widening of North Road.

North Road Section



BARRIER- GUARDRAIL OPTION (PREFERRED)

National Environmental Policy Act (NEPA)

In accordance with the National Environmental Policy Act, the Smithsonian Institution prepared an Environmental Assessment (EA) in July 2008 for the National Zoo Master Plan. The EA resulted in a Finding of No Significant Impact for the Plan by the Executive Director on October 31, 2008. The Master Plan and associated EA assumed that the necessary retaining wall would be part of the parking garage project and implemented with it. The Smithsonian Institution is now in the process of preparing a supplemental EA for the project to evaluate the potential environmental impacts from building the retaining wall prior to the parking garage.

National Historic Preservation Act (NHPA)

The completion of Section 106 review is not required by the Commission at the concept review. The Smithsonian Institution initiated consultation with the District of Columbia State Historic Preservation Officer in August 2010 with a site visit on December 20, 2010. The Smithsonian is currently conducting an archeological investigation for the site. Section 106 review will need to be completed prior to the Commission taking a final action on the project.

CONSULTATION

Coordinating Committee

The Coordinating Committee reviewed the proposal at its February 9, 2011 meeting and forwarded it to the Commission with the statement that the proposal has been coordinated with all participating agencies. The participating agencies were the NCPC; the National Park Service; the General Services Administration; the District of Columbia Office of Planning; the District of Columbia Department of Housing and Community Development; the District of Columbia Fire and Emergency Medical Services; the District of Columbia Department of Transportation; and the Washington Metropolitan Area Transit Authority.

Commission of Fine Arts

The proposed retaining wall was reviewed by the Commission of Fine Arts at its February 24, 2011 meeting.

CFA.gov

Print Close Window

25 February 2011

Dear Ms. Trowbridge:

In its meeting of 17 February, the Commission of Fine Arts reviewed the design for a proposed retaining wall along North Road in the Smithsonian Institution's National Zoological Park. The Commission took no action on the project, requesting the development of further alternatives and the opportunity to inspect the site in conjunction with its next meeting.

The Commission members acknowledged the intention to construct a parking garage that will largely conceal the retaining wall from view; however, they prefer to consider the wall as a stand-alone feature since it is not known when the parking garage might be built. They questioned the decision to use cast-in-place concrete mimicking the appearance of stone, commenting that such a treatment—with its visible seams and repetitive patterning—seldom looks convincing. Noting the great length and height of the wall, they encouraged the design team to consider a more authentic treatment of the material. They also suggested developing a design that would incorporate repeated buttresses to modulate the extensive planar surface and allow control joints to be hidden at inside corners.

The Commission requested a site visit in March to assess the impact of the proposal on the context of the zoo and Rock Creek Park, and asked for options for articulating the wall with samples of material finishes. As always, the staff is available to assist you.

Sincerely,

/s/Thomas E. Luebke, FAIA
Secretary

Ann Trowbridge, Associate Director for Planning
Office of Facilities Engineering and Operations
Smithsonian Institution
P.O. Box 37012, MRC 5508
Washington, DC 20013-7012

cc: Jeffrey Luker, Quinn Evans Architects

Last Modified: February 25, 2011

National Capital Planning Commission

401 9th Street, NW North Lobby, Suite 500 Washington, DC 20004 Tel 202.482.7200 Fax 202.482.7272 www.ncpc.gov

IN REPLY REFER TO:
NCPC File No. 7214

March 23, 2011

Ms. Tara Morrison
Superintendent of Rock Creek Park
3545 Williamsburg Lane, NW
Washington, DC 20008

Dear Ms. Morrison:

The National Capital Planning Commission (NCPC) and the Smithsonian Institution (SI) are preparing a supplemental Environmental Assessment (EA) for a retaining wall at the National Zoological Park in accordance with the National Environmental Policy Act (NEPA). The process will also include an assessment of historic resources in accordance with Section 106 of the National Historic Preservation Act. The project is located in the northern section of the Zoo adjacent to Rock Creek Park. The purpose of the project is to stabilize the hillside that is placing loads on an existing services building.

Given the adjacency of Rock Creek Park and Beach Drive to the project area, NCPC invites the National Park Service to become a Cooperating Agency in the development of the supplemental EA for the retaining wall project, which may impact Rock Creek Park. Please respond in writing prior to April 15, 2011. If you have any questions regarding the project, please contact Cheryl Kelly at (202) 482-7291 or cheryl.kelly@ncpc.gov. Thank you for your cooperation and interest in the project.

Sincerely,

David W. Levy, RA, AICP
Director, Urban Design and Plan Review

cc: Ann Trowbridge, Associate Director for Planning, Smithsonian Institution
Peter May, Associate Regional Director for Lands, Resources and Planning, NPS

U.S. COMMISSION OF FINE ARTS

ESTABLISHED BY CONGRESS 17 MAY 1910

401 F STREET NW SUITE 312 WASHINGTON DC 20001-2728 202 504 2200 FAX 202 504 2195 WWW.CFA.GOV

25 March 2011

Dear Ms. Trowbridge:

In its meeting of 17 March, the Commission of Fine Arts reviewed the concept design for a new retaining wall between North Road and the General Services Building (GSB) in the Smithsonian Institution's National Zoological Park. The Commission appreciated the opportunity to inspect the site in the morning before its public meeting, as requested at the initial review of this project the previous month. Commenting on the difficult circumstances of this proposal, the Commission took no action on the submission and requested that an alternative design be developed to address their concerns.

The project team's presentation emphasized the proposed wall's relationship to a future multi-level parking structure to be placed above the GSB and in front of the wall, an addition that has been planned for decades but is not currently designed or funded. In their discussion, the Commission members noted that either the wall alone or the planned parking garage would constitute a large and potentially intrusive element adjacent to Rock Creek Park. They recommended careful consideration of the character of the wider context and the visitor experience—not only within the Zoo but also in the Rock Creek valley—in developing any further proposals for this area, expressing regret that the Zoo has typically located its support facilities adjacent to the National Park.

The Commission members emphasized the awkwardness of evaluating the current proposal: if the garage is to be constructed in the near future, they observed that the appropriate solution would be a simple, efficient design for the retaining wall—perhaps incorporating it into the garage design—with resources to be invested instead in the visible features of the garage. Under these circumstances, a consolidated design presentation of the wall and garage would allow an overall evaluation of the permanent appearance of a comprehensive project. In the absence of such a submission, the Commission members concluded that the proposed retaining wall should be designed and evaluated independently as a highly visible feature in the landscape.

Accordingly, while endorsing the goals of protecting the GSB from damage and the potential widening of the road—proposed to provide turning lanes and queuing for the possible garage—the Commission members requested that the Smithsonian develop an alternative design to address more sensitively the wall's relationship to the context. They recommended using various techniques to break down the wall's large scale—more than 1,000 feet long and up to 52 feet high—to maintain as much slope and landscape buffer as possible, which could be accomplished with such elements as berms and a series of smaller retaining walls.

The Commission looks forward to the review of a revised concept design that minimizes the visual impact of the retaining wall within the context of the Rock Creek valley. As always, the staff is available to assist you with the next submission.

Sincerely,

Thomas E. Luebke, FAIA
Secretary

Ann Trowbridge
Associate Director for Planning
Smithsonian Institution
P.O. Box 37012, MRC 511
Washington, DC 20013-7012

cc: Don Pruitt, Quinn Evans Architects
Peter May, National Park Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

October 26, 2011

Greenhorne & O'Mara
810 Gleneagles, Suite 106
Baltimore, MD 21286

RE: The National Zoological Park – General Services Building Retaining Wall Environmental Assessment Washington DC

Dear Alexis Morris:

This responds to your letter, received September 28 2011, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened in the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no proposed or federally listed endangered or threatened species are known to exist within the project impact area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or should additional information on the distribution of listed or proposed species become available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. Limited information is currently available regarding the distribution of other rare species in the District of Columbia. However, the Nature Conservancy and National Park Service (NPS) have initiated an inventory of rare species within the District. For further information on such rare species, you should contact Mary Pfaffko of the National Park Service at (202)-535-1739.

Effective August 8, 2007, under the authority of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (Service) removed (delist) the bald eagle in the lower 48 States of the United States from the Federal List of Endangered and Threatened Wildlife. However, the bald eagle will still be protected by the Bald and Golden Eagle Protection Act, Lacey Act and the Migratory Bird Treaty Act. As a result, starting on August 8, 2007, if your project may cause "disturbance" to the bald eagle, please consult the "National Bald Eagle Management Guidelines" dated May 2007.

If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), please contact the Chesapeake Bay Ecological Services Field Office at 410-573-4573 for technical assistance. The Eagle Management Guidelines can be found at: **http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.**

In the future, if your project can not avoid disturbance to the bald eagle by complying with the Eagle Management Guidelines, you will be able to apply for a permit that authorizes the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally where the take to be authorized is associated with otherwise lawful activities. This proposed permit process will not be available until the Service issues a final rule for the issuance of these take permits under the Bald and Golden Eagle Protection Act.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if alterations of wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Devin Ray at (410) 573-4531.

Sincerely,

Leopoldo Miranda
Field Supervisor

GOVERNMENT OF THE DISTRICT OF COLUMBIA

District Department of the Environment

November 28, 2011

Alexis Morris, Environmental Scientist
Greenhorne and O'Mara
810 Gleneagles Court, Suite 106
Baltimore, Maryland 21286

RE: National Zoological Park – General Services Building Retaining Wall

Dear Mr./Ms. Morris:

The District Department of the Environment, Fisheries and Wildlife Division (FWD) has completed its evaluation for the proposed retaining structure between the General Services Building (GSB) and North Road on the National Zoo campus in Washington, D.C. The project proposes to construct a permanent retaining structure to protect the structural integrity of the GSB.

Upon review, the District Department of the Environment (DDOE) has no knowledge of or documented verification for any Federal rare, threatened or endangered species.

However, the District of Columbia is required to manage and protect all wildlife species (Title 19, District of Columbia Municipal Regulations, §1560). To facilitate the management of these resources, DDOE created a Wildlife Action Plan (WAP) as required by a Congressional mandate. The approved plan is being implemented and lists known species in need of conservation and priority (critical) habitat in need of protection.

Upon review, DDOE has no knowledge of or documented verification for any District species of greatest conservation need (SGCN) or critical habitat.

Your awareness of and concern for wildlife resources in the District of Columbia is appreciated. If you have additional questions or concerns, please contact me at 202.535.2276 or email me at sylvia.whitworth@dc.gov.

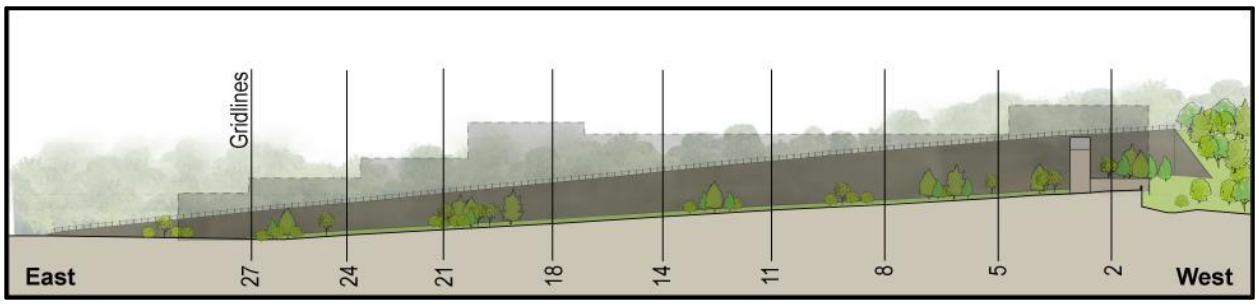
Sincerely,

Sylvia D. Whitworth
Sylvia D. Whitworth, Chief
Wildlife Management Branch

APPENDIX B

PARKING STRUCTURE – INITIAL STUDY LINE DIAGRAMS

[redacted]



Parking Structure – Initial Study, Elevation View

Photo Location 2 – North Road Option 1 Parking Structure Initial Study Rendering

Photo Location 2 – North Road Option 2 Parking Structure Initial Study Rendering