The Smithsonian Institution with its Joint-Lead and responsible Federal Agency, the National Capital Planning Commission (NCPC), in cooperation with the National Park Service (NPS), is preparing a Tier I final environmental impact statement (FEIS), which evaluates the potential environmental impacts associated with the construction and operation of a new National Museum for African American History and Culture (NMAAHC) within the Smithsonian Institution to be located between 14th and 15th Streets NW, Constitution Avenue NW, and Madison Drive NW in Washington, D.C.
# Table of Contents

**NMAAHC Tier I Final Environmental Impact Statement**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier I Executive Summary</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>1.0 Introduction</strong></td>
<td>17</td>
</tr>
<tr>
<td><strong>2.0 Purpose and Need</strong></td>
<td>25</td>
</tr>
<tr>
<td>2.1 How did the idea to build a National Museum of African American History and Culture arise?</td>
<td>27</td>
</tr>
<tr>
<td>2.2 What is the purpose and need for the National Museum of African American History and Culture?</td>
<td>28</td>
</tr>
<tr>
<td>2.3 Has a site been selected and where is it?</td>
<td>30</td>
</tr>
<tr>
<td>2.4 What is an EIS and what will it accomplish?</td>
<td>34</td>
</tr>
<tr>
<td>2.5 What agencies are leading the project?</td>
<td>35</td>
</tr>
<tr>
<td><strong>3.0 Public and Agency Involvement</strong></td>
<td>39</td>
</tr>
<tr>
<td>3.1 How have the public and agencies been involved?</td>
<td>41</td>
</tr>
<tr>
<td>3.2 What benefits and concerns were expressed during the Tier I EIS scoping process?</td>
<td>44</td>
</tr>
<tr>
<td>3.3 Topics not included in the Tier I FEIS</td>
<td>47</td>
</tr>
<tr>
<td><strong>4.0 Development of Alternatives</strong></td>
<td>49</td>
</tr>
<tr>
<td>4.1 What process was used to develop alternatives?</td>
<td>51</td>
</tr>
<tr>
<td>4.2 What are the local plans and programs that affect planning in the project area?</td>
<td>52</td>
</tr>
<tr>
<td>4.3 Conceptual alternatives from earlier planning phases</td>
<td>57</td>
</tr>
<tr>
<td>4.4 Overarching Principles</td>
<td>61</td>
</tr>
<tr>
<td>4.5 Viewshed analysis</td>
<td>63</td>
</tr>
<tr>
<td>4.6 How were aesthetic considerations addressed in the alternatives?</td>
<td>65</td>
</tr>
<tr>
<td>4.7 What process was used to bring the alternatives to closure?</td>
<td>66</td>
</tr>
<tr>
<td><strong>4.8 Preferred Alternative</strong></td>
<td>67</td>
</tr>
<tr>
<td><strong>4.9 Design Principles</strong></td>
<td>68</td>
</tr>
<tr>
<td><strong>5.0 Description of Alternatives</strong></td>
<td>71</td>
</tr>
<tr>
<td>5.1 No Build Alternative</td>
<td>73</td>
</tr>
<tr>
<td>5.2 Elements common to all Build Alternatives</td>
<td>73</td>
</tr>
<tr>
<td>5.3 Build Alternatives</td>
<td>76</td>
</tr>
<tr>
<td>5.4 What other alternatives on the site were considered but dismissed?</td>
<td>88</td>
</tr>
<tr>
<td>5.5 Summary of Tier I EIS Alternatives</td>
<td>93</td>
</tr>
<tr>
<td><strong>6.0 The Environment: Project Area Now and Impacts in the Future</strong></td>
<td>95</td>
</tr>
<tr>
<td><strong>6.1 Cultural Resources</strong></td>
<td>99</td>
</tr>
<tr>
<td>6.1.1 What are the key considerations about cultural resources?</td>
<td>99</td>
</tr>
<tr>
<td>6.1.2 What types of cultural resources are likely to be impacted by the project and how have they been identified?</td>
<td>100</td>
</tr>
<tr>
<td>6.1.3 How did historic plans and past development contribute to the site and its surroundings that we see today?</td>
<td>102</td>
</tr>
<tr>
<td>6.1.4 What nearby historic structures, buildings, monuments, landscapes, and districts would be affected by the construction and operation of the museum? How would they be affected?</td>
<td>113</td>
</tr>
<tr>
<td>6.1.5 What archaeological resources may be affected by the project, and how will the Smithsonian Institution compensate for their loss?</td>
<td>144</td>
</tr>
</tbody>
</table>
### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2 <strong>Aesthetics and Visual Resources</strong></td>
<td>155</td>
</tr>
<tr>
<td>6.2.1 What are the key factors and considerations about aesthetics and visual resources?</td>
<td>155</td>
</tr>
<tr>
<td>6.2.2 How were aesthetics and visual resources evaluated for the project?</td>
<td>155</td>
</tr>
<tr>
<td>6.2.3 What are the current site characteristics?</td>
<td>156</td>
</tr>
<tr>
<td>6.2.4 What would this project affect aesthetics and visual resources?</td>
<td>164</td>
</tr>
<tr>
<td>6.2.5 What is the summary of viewshed effects?</td>
<td>182</td>
</tr>
<tr>
<td>6.2.6 What measures are proposed to minimize effects to area aesthetics and visual resources during NMAAHC construction and operation?</td>
<td>183</td>
</tr>
<tr>
<td>6.3 <strong>Distribution and Movement of Groundwater</strong></td>
<td>185</td>
</tr>
<tr>
<td>6.3.1 What are the key considerations about geology, soils, and groundwater?</td>
<td>185</td>
</tr>
<tr>
<td>6.3.2 How were geology, soils, and groundwater evaluated for this project?</td>
<td>185</td>
</tr>
<tr>
<td>6.3.3 What are the geology and soils of the project area?</td>
<td>185</td>
</tr>
<tr>
<td>6.3.4 How do soils and geology influence groundwater?</td>
<td>186</td>
</tr>
<tr>
<td>6.3.5 What are the current groundwater conditions at the site?</td>
<td>187</td>
</tr>
<tr>
<td>6.3.6 How would construction and operation of NMAAHC affect geologic resources and groundwater levels?</td>
<td>187</td>
</tr>
<tr>
<td>6.3.7 What measures are proposed to minimize effects to geology, soils, and groundwater during museum construction and operation of the museum?</td>
<td>197</td>
</tr>
<tr>
<td>6.4 <strong>Surface Water Resources</strong></td>
<td>199</td>
</tr>
<tr>
<td>6.4.1 What are the key considerations about surface waters and floodplains?</td>
<td>199</td>
</tr>
<tr>
<td>6.4.2 How were surface waters and floodplains evaluated for the project?</td>
<td>199</td>
</tr>
<tr>
<td>6.4.3 What are the surface waters and floodplains in vicinity of the project area?</td>
<td>199</td>
</tr>
<tr>
<td>6.4.4 How would the construction and operation of the NMAAHC affect surface waters and floodplains?</td>
<td>201</td>
</tr>
<tr>
<td>6.4.5 What measures are proposed to minimize effects to water quality and floodplains during museum construction and operation?</td>
<td>211</td>
</tr>
<tr>
<td>6.5 <strong>Air Quality</strong></td>
<td>213</td>
</tr>
<tr>
<td>6.5.1 What are the key considerations regarding air quality?</td>
<td>213</td>
</tr>
<tr>
<td>6.5.2 Who regulates air quality issues in Washington, D.C.?</td>
<td>214</td>
</tr>
<tr>
<td>6.5.3 How was air quality evaluated for the project?</td>
<td>215</td>
</tr>
<tr>
<td>6.5.4 What is current air quality?</td>
<td>216</td>
</tr>
<tr>
<td>6.5.5 How would air quality change with the project?</td>
<td>217</td>
</tr>
<tr>
<td>6.5.6 What measures are proposed to minimize air quality effects during museum construction and operation?</td>
<td>222</td>
</tr>
<tr>
<td>6.6 <strong>Noise</strong></td>
<td>223</td>
</tr>
<tr>
<td>6.6.1 How are noise levels measured for the project?</td>
<td>223</td>
</tr>
<tr>
<td>6.6.2 What is the existing noise around the project area?</td>
<td>223</td>
</tr>
<tr>
<td>6.6.3 How would the project affect noise levels?</td>
<td>224</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>6.6.4</td>
<td>What measures are proposed to minimize noise effects during construction?</td>
</tr>
<tr>
<td>6.7</td>
<td>Transportation</td>
</tr>
<tr>
<td>6.7.1</td>
<td>What are the key considerations for traffic assessment?</td>
</tr>
<tr>
<td>6.7.2</td>
<td>How are traffic levels measured for the project?</td>
</tr>
<tr>
<td>6.7.3</td>
<td>What are the existing traffic conditions?</td>
</tr>
<tr>
<td>6.7.4</td>
<td>How would the project affect traffic levels?</td>
</tr>
<tr>
<td>6.7.5</td>
<td>What measures are proposed to minimize effects?</td>
</tr>
<tr>
<td>6.8</td>
<td>Land Use Planning and Policies</td>
</tr>
<tr>
<td>6.8.1</td>
<td>What are the key considerations related to land uses and policies in the project area?</td>
</tr>
<tr>
<td>6.8.2</td>
<td>What plans and policies affect the planning of the project site?</td>
</tr>
<tr>
<td>6.8.3</td>
<td>Contemporary plans and programs</td>
</tr>
<tr>
<td>6.8.4</td>
<td>What land uses currently exist in the project area and who manages these uses?</td>
</tr>
<tr>
<td>6.8.5</td>
<td>How will land use change because of this project?</td>
</tr>
<tr>
<td>6.8.6</td>
<td>What measures are proposed to minimize effects to land use during museum construction and operation?</td>
</tr>
<tr>
<td>6.9</td>
<td>Visitor Use &amp; Experience</td>
</tr>
<tr>
<td>6.9.1</td>
<td>What are the key considerations related to visitors to the Smithsonian Institution and the National Mall?</td>
</tr>
<tr>
<td>6.9.2</td>
<td>How were visitor numbers and characteristics evaluated for this project/visitor projections?</td>
</tr>
<tr>
<td>6.9.3</td>
<td>What are the visitor demographics/characteristics of visitors to the Smithsonian Institution museums?</td>
</tr>
<tr>
<td>6.9.4</td>
<td>How would these visitors affect Smithsonian Institution and National Mall visitation and experience?</td>
</tr>
<tr>
<td>6.9.5</td>
<td>What measures are proposed to minimize adverse effects to visitation and experience to the Smithsonian Institution and National Mall?</td>
</tr>
<tr>
<td>6.9.6</td>
<td>What will be NMAAHC’s impact on African American and other events on the National Mall throughout the year be?</td>
</tr>
<tr>
<td>6.10</td>
<td>Communities and Businesses</td>
</tr>
<tr>
<td>6.10.1</td>
<td>What are the key considerations related to local communities and businesses?</td>
</tr>
<tr>
<td>6.10.2</td>
<td>What types of economic and demographic data were analyzed for this project?</td>
</tr>
<tr>
<td>6.10.3</td>
<td>Who lives in the project area and what characteristics shape the surrounding community?</td>
</tr>
<tr>
<td>6.10.4</td>
<td>What types of businesses provide services to visitors in the project area?</td>
</tr>
<tr>
<td>6.10.5</td>
<td>How would construction and operation of the NMAAHC affect these businesses?</td>
</tr>
<tr>
<td>6.10.6</td>
<td>What measures are proposed to minimize effects to communities and businesses during museum construction and operation?</td>
</tr>
<tr>
<td>6.11</td>
<td>Infrastructure and Utilities</td>
</tr>
<tr>
<td>6.11.1</td>
<td>What are the key considerations regarding utilities?</td>
</tr>
<tr>
<td>6.11.2</td>
<td>What types of utilities data was analyzed for this project?</td>
</tr>
<tr>
<td>6.11.3</td>
<td>What are existing utilities in the project area?</td>
</tr>
<tr>
<td>6.11.4</td>
<td>How would construction and operation of the museum affect infrastructure and utilities?</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

6.11.5 What measures are proposed to minimize effects to infrastructure and urban systems during museum construction and operation? .......................................................... 258

6.12 Public Health and Security .................................................................................. 283

6.12.1 What are the key considerations about public health and security? .................. 285

6.12.2 What are the current protocols for public health and security? ...................... 285

6.12.3 How was public health and security evaluated for the project? ... 286

6.12.4 How would public health and security change with the project? .................. 286

6.12.5 What measures are proposed to minimize public health and security effects during museum construction and operation? .......................................................... 293

7.0 CUMULATIVE EFFECTS .................................................................................. 295

7.1 What are cumulative effects and why are they analyzed? ............................ 297

7.2 What other projects were considered to determine cumulative effects? .................. 297

7.3 What are the results of the cumulative effects analyses? ............................. 300

8.0 SUMMARY AND COMPARISON OF IMPACTS .................................. 307

8.1 Summary and comparison of impacts.......................................................... 309

8.2 What unavoidable significant adverse impacts could occur as a result of the proposed actions? .......................................................... 344

8.3 Short-term uses versus long-term productivity.......................................... 344

8.4 Irretrievable and irreversible resource commitments .............................. 345

9.0 CONSULTATION AND COORDINATION ...................................... 347

9.1 What agencies and organizations have been consulted during development of this Tier I EIS? .......................................................... 349

10.0 LIST OF PREPARERS ........................................................................... 351

11.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS RECEIVING THIS TIER I FEIS .......................................................................................... 355

11.1 Agencies and organizations receiving hard copies .............................. 357

11.2 Places to review the Tier I FEIS ................................................................. 361

11.3 Agencies, organizations, institutions, & individuals receiving notification of the Tier I FEIS release .................................................. 361

12.0 REFERENCES ......................................................................................... 367

13.0 INDEX .................................................................................................. 385

14.0 ABBREVIATIONS, ACRONYMS, & GLOSSARY ................................... 391
List of Tables

Table A: Tier I EIS Build Alternatives .......................................................... 9
Table B: Summary of Viewshed Analysis per Alternative ......................... 13
Table 1.1: Resource Area Analysis within the Tiering Process ............... 21
Table 4.1: Various Sites under consideration ............................................ 60
Table 5.1: Phase 1 Alternatives ................................................................. 89
Table 5.2: Phase 2 Alternatives ................................................................. 90-92
Table 5.3: Tier I EIS Build Alternatives ...................................................... 93
Table 6.2-1: Building Heights Survey ........................................................ 160
Table 6.2-2: Summary of Viewshed Analysis per Build Alternative .......... 182
Table 6.5-1: National Ambient Air Quality Standards ................................ 214
Table 6.5-2: Existing 8-hour Ozone and 24-hour Particulate Matter Monitoring Data within the District of Columbia ....... 216
Table 6.5-3: Total Annual Emissions for All Alternatives ....................... 217
Table 6.5-4: Total Annual Emissions for Alternative 1 ............................. 218
Table 6.5-5: Total Annual Emissions for Alternative 2 ............................. 219
Table 6.5-6: Total Annual Emissions for Alternative 3 ............................. 219
Table 6.5-7: Total Annual Emissions for Alternative 4 ............................. 220
Table 6.5-8: Total Annual Emissions for Alternative 5 ............................. 220
Table 6.5-9: Total Annual Emissions for Alternative 6 ............................. 221
Table 6.5-10: Total Annual Emissions for the Preferred Alternative ...... 221
Table 6.6-1: FHWA Noise Abatement Criteria- for exterior levels only... 223
Table 6.7.1: Capacity Analysis of Existing Conditions ............................. 232
Table 6.7.2: Accident Data Summary (2003 - 2005) ................................. 234
Table 6.7-3: Tour Bus Stops..................................................................... 241
Table 6.9-1: Smithsonian Institution Visitorship 2001-2006 .................... 255
Table 6.9-2: Projected Year 1-10 Visits to NMAAHC ............................ 256
Table 6.9-3: Visitor Demographics, Smithsonian Institution Museums .... 257
Table 6.10-1: Population for ROI and Percent Change between Decades .... 263
Table 6.10-2: Population Characteristics, 2005 ....................................... 263
Table 6.10-3: Economic Characteristics .................................................... 264
Table 6.10-4: Housing Units in the ROI, 2000 ........................................... 264
Table 6.10-4: Housing Units in the ROI, 2000 ........................................... 265
Table 7.2-1: Description of Cumulative Impact Projects ......................... 298-299
Table 8.1-1: Summary and Comparison of Impacts ............................... 310-333
Table 8.1-2: Measures Used to Minimize Impacts .................................. 334-337
Table 8.1-2: Definitions of Significance Thresholds ............................... 338-343

List of Figures

Figure 2.1: The NMAAHC Site in a Regional Context .............................. 30
Figure 2.2: The NMAAHC Site in the context of the Mall and Washington Monument Grounds ........................................ 31
Figure 2.3: Potential NMAAHC Site Locations from the Site Evaluation Study .......................................................... 33
Figure 2.4: NMAAHC EIS Timeline ......................................................... 36
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>Project Agency Structure</td>
</tr>
<tr>
<td>3.1</td>
<td>Tier I EIS Scoping Meetings</td>
</tr>
<tr>
<td>3.2</td>
<td>Road Map for the Section 106 Consultation through the Tier II NEPA Process</td>
</tr>
<tr>
<td>3.3</td>
<td>Contextual Building Setback &amp; Alignment</td>
</tr>
<tr>
<td>4.1</td>
<td>Facilities Program Organization Diagram</td>
</tr>
<tr>
<td>4.2</td>
<td>Outline Facility Program</td>
</tr>
<tr>
<td>4.3</td>
<td>Program Organization Diagram</td>
</tr>
<tr>
<td>4.4</td>
<td>Alternatives from previous studies</td>
</tr>
<tr>
<td>4.5</td>
<td>Example of the Viewshed Analysis</td>
</tr>
<tr>
<td>5.1</td>
<td>Elements Common to all Alternatives</td>
</tr>
<tr>
<td>5.2</td>
<td>Alternative 1, Contextual Building Alignment</td>
</tr>
<tr>
<td>5.3</td>
<td>Alternative 1, Contextual Alignment, isometric view</td>
</tr>
<tr>
<td>5.4</td>
<td>Alternative 2, Washington Monument Orientation</td>
</tr>
<tr>
<td>5.5</td>
<td>Alternative 2, Washington Monument Orientation, isometric view</td>
</tr>
<tr>
<td>5.6</td>
<td>Alternative 3, Free Form</td>
</tr>
<tr>
<td>5.7</td>
<td>Alternative 3, Free Form, isometric view</td>
</tr>
<tr>
<td>5.8</td>
<td>Alternative 4, Terraced Roof</td>
</tr>
<tr>
<td>5.9</td>
<td>Alternative 4, Terraced Roof isometric view</td>
</tr>
<tr>
<td>5.10</td>
<td>Alternative 5, Enframing</td>
</tr>
<tr>
<td>5.11</td>
<td>Alternative 5, Enframing, Isometric view</td>
</tr>
<tr>
<td>5.12</td>
<td>Alternative 6, Low Profile</td>
</tr>
<tr>
<td>5.13</td>
<td>Alternative 6, Low Profile, Isometric view</td>
</tr>
<tr>
<td>6.1-1</td>
<td>Area of Potential Effect (APE)</td>
</tr>
<tr>
<td>6.1.3-1</td>
<td>The Pierre L’Enfant comprehensive plan of Washington, D.C., designed in 1791 as the site of the Federal City</td>
</tr>
<tr>
<td>6.1.3-2</td>
<td>Andrew Ellicott’s Plan of the City of Washington in the Territory of Columbia</td>
</tr>
<tr>
<td>6.1.3-3</td>
<td>Benjamin Banneker</td>
</tr>
<tr>
<td>6.1.3-4</td>
<td>Ellicott’s 1792 map, showing the planned monumental core connecting the Capitol and President’s House with a site for a monument to George Washington</td>
</tr>
<tr>
<td>6.1.3-5</td>
<td>The Proposed Senate Park Commission treatments for the Washington Monument that were never implemented</td>
</tr>
<tr>
<td>6.1.3-6</td>
<td>The McMillan Plan</td>
</tr>
<tr>
<td>6.1.3-7</td>
<td>The 1939 National Capital Parks and Planning Commission published development plan for the National Mall</td>
</tr>
<tr>
<td>6.1.3-8</td>
<td>Aerial view of “tempos” on the western portion of the Washington Monument Grounds, 1943</td>
</tr>
<tr>
<td>6.1.4-1</td>
<td>Plan of the City of Washington: Contributing Streets, Reservations, and Appropriations</td>
</tr>
<tr>
<td>6.1.4-2</td>
<td>Historic Districts and Contributing Properties</td>
</tr>
<tr>
<td>6.1.4-3</td>
<td>Individually Listed Historic Properties</td>
</tr>
<tr>
<td>6.1.6-1</td>
<td>Location of the NMAAHC Site Along Tiber Creek, About 1800</td>
</tr>
<tr>
<td>6.1.6-2</td>
<td>Prehistoric Artifacts from the Washington Monument Site</td>
</tr>
<tr>
<td>6.1.6-3</td>
<td>Detail of the Boschke Map of the City of Washington, 1857</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6.1.6-4</td>
<td>“Beef Depot Monument”</td>
</tr>
<tr>
<td>6.2-1</td>
<td>Existing Conditions Photograph taken from the top of the Washington Monument</td>
</tr>
<tr>
<td>6.2-2</td>
<td>View toward the Washington Monument from 14th Street</td>
</tr>
<tr>
<td>6.2-3</td>
<td>Washington Monument Grounds</td>
</tr>
<tr>
<td>6.2-4</td>
<td>The National Mall Aerial Photo, from Google Earth 2007</td>
</tr>
<tr>
<td>6.2-5</td>
<td>Existing photo of the red terra cotta roofs of the Federal Triangle from the Old Post Office</td>
</tr>
<tr>
<td>6.2-6</td>
<td>Buildings lining the Mall</td>
</tr>
<tr>
<td>6.2-7</td>
<td>The north façade of the National Museum of American History</td>
</tr>
<tr>
<td>6.2-8</td>
<td>Department of Agriculture</td>
</tr>
<tr>
<td>6.2-9</td>
<td>Department of Commerce from 15th Street looking north</td>
</tr>
<tr>
<td>6.7.1</td>
<td>Regional Transportation System</td>
</tr>
<tr>
<td>6.7.2</td>
<td>Local Area Roadway Network</td>
</tr>
<tr>
<td>6.7.3</td>
<td>Public Transportation</td>
</tr>
<tr>
<td>6.8-1</td>
<td>Aerial image of the NMAAHC site</td>
</tr>
<tr>
<td>6.8-2</td>
<td>Existing Land Use of the NMAAHC site &amp; study area</td>
</tr>
<tr>
<td>6.8-3</td>
<td>Existing Zoning of the NMAAHC site &amp; study area</td>
</tr>
<tr>
<td>6.11-1</td>
<td>Mitigation of Effects to Alternative 5</td>
</tr>
</tbody>
</table>
TIER I EXECUTIVE SUMMARY
The Smithsonian Institution with its Joint-Lead and responsible Federal Agency, the National Capital Planning Commission (NCPC), in cooperation with the National Park Service (NPS), has prepared this Tier I environmental impact statement (EIS) to assess the potential environmental impacts of constructing and operating a permanent facility for the National Museum of African American History and Culture (NMAAHC). The site selected for the NMAAHC is a five-acre parcel that is part of the Washington Monument Grounds, bounded by Constitution Avenue on the north, Madison Drive on the south, 14th Street, NW on the east, and 15th Street, NW on the west. The United States owns the parcel, but it is maintained by the NPS. The NPS transferred administrative jurisdiction of the property to the Smithsonian Institution, effective June 1, 2007, but will continue to operate the site as parkland through 2010 or until construction of the NMAAHC commences.

This Tier I Final EIS (FEIS) has been prepared in accordance with the implementing regulations of National Environmental Policy Act (NEPA) and NCPC’s Environmental and Historic Preservation Policies and Procedures. The Tier I EIS process is being run concurrently with the Section 106 consultative process of the National Historic Preservation Act (NHPA).

Both the Tier I EIS and Section 106 processes are being undertaken at an early stage in the NMAAHC’s development, prior to the design phase. One limitation to this timing is that it is difficult to definitively identify effects and mitigations to certain resources in the project area without a more developed or precise design. As a result, the Smithsonian Institution has elected to adopt a tiered NEPA process whereby this FEIS will be part of the product of the first of two tiers.

The Tier I FEIS analyzes the potential effects of a range of massing alternatives with different heights, setbacks and configurations on the natural and manmade environments including cultural resources, aesthetic/visual resources, groundwater and surface water resources, air quality, noise, transportation, land use, visitor use, communities & businesses, infrastructure and utility services, and public health and security.

Following the generation of conceptual designs by the NMAAHC design architect, there will be a second tier EA or EIS that will analyze the historic and aesthetic/visual effects and any other significant effects found to be important to the final decision.

PURPOSE AND NEED

The purpose of the proposed action is to fulfill the mandate of the National Museum of African American History and Culture Act (NMAAHC Act), Public Law (P.L.) 108-184, enacted by the Congress on December 16, 2003. The law states that such a museum

“would be dedicated to the collection, preservation, research, and exhibition of African American historical and cultural materials reflecting the breadth and depth of the experience of individuals of African descent living in the United States.”

Section 2 of the NMAAHC Act set out the findings of Congress as to why such a museum was needed. The findings of the Congress were based in large part on the conclusions of the Presidential Commission, known as the NMAAHC Plan for Action Presidential Commission, in its 2003 study, The Time Has Come: Report to the President and Congress (Interior Systems Inc., 2003a). This Presidential Commission stated that:

“the time has come to establish the National Museum of African American History and Culture because the museum is important not only for African Americans but for all Americans. It is the only institution that can provide a national meeting place for all Americans to learn about the history and culture of African Americans and their contributions to and relationship with every aspect of our national life. Further, the museum is the only national venue that can respond to the interests and needs of diverse racial constituencies who share a common commitment to a full and accurate telling of our country’s past as we prepare for our country’s future. And, even more importantly, it is the only national venue that can serve as an educational healing space to further racial reconciliation.”
The site was selected as a result of a process detailed in Section 8 of the NMAAHC Act titled “Building for the National Museum of African American History and Culture.” This section of the Act directed the Smithsonian Institution Board of Regents to choose among four identified sites: the Monument site, the Arts & Industries Building, the Liberty Loan site, and the Banneker Overlook.

To facilitate the site selection process by the Board of Regents, a two-volume Site Evaluation Study (Plexus Scientific Corporation and PageSoutherlandPage, 2005a & 2005b) was completed by the Smithsonian Institution. Following completion and review of the study, the Smithsonian Institution announced on January 30, 2006, that the Board of Regents had selected the Monument site. The official action recorded in the minutes of the Regents meeting was as follows:

VOTED that the Board of Regents, having fully considered its obligations under Public Law 108-184 and the recommendations it has received from statutory bodies, the Presidential Action Commission of the National Museum of African American History and Culture, and the Council of the National Museum of African American History and Culture, designates the Monument Site, bounded by 14th and 15th Streets, Constitution Avenue, and Madison Drive, for the purpose of building and operating the Smithsonian’s National Museum of African American History and Culture.

The site selection decision was in the exclusive province of the Smithsonian Institution, which is not a "Federal Agency" within the meaning of NEPA or Council on Environmental Quality (CEQ) regulations. As a result, the Smithsonian Institution did not perform a formal NEPA analysis during the site selection process.

This Tier I FEIS, which has been prepared in accordance with the implementing regulations of NEPA, assesses the impacts of constructing and operating a permanent facility for the NMAAHC within the Smithsonian Institution on the National Mall in Washington, D.C., which is necessary to achieve the purpose and need of the NMAAHC.

PROPOSED ACTION & ALTERNATIVES

The proposed action is to construct and operate a permanent facility for the NMAAHC within the Smithsonian Institution on a five-acre parcel bounded by Constitution Avenue on the north, Madison Drive on the south, 14th Street NW on the east, and 15th Street NW on the west.

During the scoping process, seven alternatives, including No Build, were developed for further analysis. Several additional design options were dismissed from further consideration following careful consideration and thorough analyses. Justifications for eliminating these options were based on their inability to sufficiently meet several critical factors and overarching principles that served as the criteria against which the relative success of meeting the purpose and need was measured.

Several critical factors distinguished the range of alternatives:

Massing: The form of a building that conveys proportion and size

Building Height: The vertical distance from the ground plane to the tallest point of the structure; since ground plane varies on the NMAAHC site, the building height is measured from average site grade and leaves a margin of flexibility for articulation and architectural embellishments such as domes and skylights.

Setback & Alignment: Setback is the distance a building is removed from the street (or sidewalk), either for security or to align with other buildings. Alignment refers to the arrangement or relationship of several disparate components along a common vertical or horizontal line or edge.

Outdoor program space: the exterior space of a building used to accommodate additional operations or functions of the building including include courtyards, patios & dining areas, performance space, and gardens

Viewshed: total visible area from a particular fixed vantage point
In order to develop the Build Alternatives, the Smithsonian Institution developed eight overarching principles that provided a foundation for the development of alternatives, guided their refinement, and served as criteria against which the relative success of meeting the purpose and need was measured.

These overarching principles and associated goals include:

**Physical Character/Quality**

The NMAAHC will address the need for a major national facility in which to tell the African American story. The physical character should convey an image that is clean, impressive, and monumental, encourages superior and sustainable building and site design, and allows for a great range of flexibility for the designer.

**Mission and Program**

During the site selection process, the Smithsonian Institution generated a preliminary program for the NMAAHC. Based on this program, the baseline assumption for the NMAAHC’s size was 350,000 gross square feet (gsf). During the subsequent planning phase of the project, in the absence of a detailed architectural program, the Smithsonian Institution determined that a range of 350,000 gsf to 450,000 gsf would be sufficient to accommodate the NMAAHC’s mission and collection. The proposed size of the useable floor space represents an approximate range of building volume of 350,000 to 450,000 gross square feet. As a result, the process to develop a range of sizes for alternatives was based upon this determination. In addition, each alternative provides outdoor space to accommodate museum-related programming, activities, and publicly accessible open space.

**Monumental Context**

The NMAAHC will provide a place for reflecting on the connection to symbols of freedom and democracy, reinforcing strong linkages (physical connections and/or visual connections) with museums, monuments, memorials and other cultural resources.

**Urban Design Principles, Physical context**

Surrounding building heights, massing, and setbacks will be respected and enhanced by emphasizing the contrast between the monuments and museum buildings set within green spaces and the urban fabric of the Federal Triangle, while recognizing the importance of relating to the broader context of the National Mall. The building and site design will provide a transition from the museum row to the Monument, and beyond. The height will not exceed the height of the tallest museum building on the Mall or the cornice height of the Commerce building (about 105’).

**Historic and Cultural Resources Protection Principles**

The NMAAHC will respect and enhance the District’s historic legacy of planning and maintain, reinforce, and enhance key viewsheds and vistas.

**Visitor Use and Access Principles, Public Amenities**

Public use of the NMAAHC site will continue to be provided and public amenities will be enhanced through design and construction of the NMAAHC.

**Visitor Experience and Access**

The visitor experience will enhance connections to the National Mall, monuments, and other Smithsonian Institution museums.

**Functional Principles, Museum Operations**

Museum operations will be efficient and functional while meeting desired standards of excellence appropriate for other symbolic spaces on the Mall.

**NO BUILD ALTERNATIVE**

For the purpose of the Tier I EIS process, the No Build Alternative is the continuation of the current management of the NMAAHC site as parkland with no changes.
ELEMENTS COMMON TO ALL BUILD ALTERNATIVES

The Build Alternatives share common design elements.

Mass
During the initial planning phase of this project, in the absence of a detailed architectural program, the Smithsonian Institution determined that a range of 350,000 gsf to 450,000 gsf would be sufficient to accommodate the NMAAHC’s mission and collection. While the alternatives development was based on this determination, the process was guided more by massing (shape, height, and setback) than gross area. As a result, the largest alternative is 430,000gsf.

Offsite storage
The development of alternatives has been based on the assumption that storage for some collections will be accommodated offsite.

Access – pedestrian, vehicular, and service
In the second tier NEPA process, more precise concept designs will yield more information upon which the Smithsonian Institution may base decision for pedestrian, vehicular, and service access. The concept designs will define a building orientation which will affect the placement of the service and loading access and will determine the best way for pedestrians to access the site. The Smithsonian Institution will explore different options for service access, including placing it underground, and will determine if pedestrian access across 14th Street is feasible, whether above or below grade.

Security setback
While a variety of factors determine building setbacks, including urban design context, a minimum security setback of 50’ from surrounding streets was used as a Tier I planning principle. This distance is deemed by the Smithsonian Institution to be conventional for the purpose of building security. In Tier II, a threat analysis will be performed, and the findings will inform the concept designs to determine the most appropriate setback.

Aesthetics
The NMAAHC will be commensurate in size and stature to other national venues and museums; it will convey a clean, impressive, and monumental image worthy of such a mission. The NMAAHC will represent an aesthetic worthy of and equal to the other landmarks located on the National Mall and in the surrounding area. The building should be a microcosm of African American culture on the Mall.

Outdoor Program Area
The outdoor space for the NMAAHC will be open to the public and support a range of programmed activities while enhancing the open space and landscape of the Mall and Monument Grounds. The exact size and placement of the outdoor space and landscape design will be determined in the Tier II process.

Sustainable Design
To the maximum extent deemed feasible, the NMAAHC will incorporate sustainable design principles, consistent with Executive Order 13423, "Strengthening Federal Environmental, Energy and Transportation Management" issued January 2007. Tier II concept designs will more specifically identify ways in which the building will utilize best sustainable practices.

BUILD ALTERNATIVES
The Table A provides a general comparison of the alternatives presented in this Tier I FEIS based on height, gross area, setback/alignment, and aesthetic qualities.

Preferred Alternative
Because this Tier I FEIS concludes that the Build Alternatives have comparable effects on the majority of resources analyzed, except cultural and visual/aesthetic resources which will be resolved in Tier II, the Smithsonian Institution has chosen to express its Preferred
Alternative as a range of massing options with different heights, setbacks, and configurations defined by the Build Alternatives.

The physical parameters of the Preferred Alternative are bounded by:

- the lowest Build Alternative (60’) and tallest Build Alternative (105’)
- a minimum 50’ building setback from the surrounding streets [shown from inside face of sidewalk] of 14th & 15th Streets, Madison Drive, and Constitution Avenue.
- a subsurface building volume that will not exceed 45’ in depth or the largest subsurface building volume in any of the Build Alternatives
- a building mass that ranges from orthogonal and contextual to free form and non-contextual.

Design Principles

The design principles below are a refinement of the overarching principles that informed the development of the six Build Alternatives for the National Museum of African American History and Culture that are analyzed in this Tier I FEIS. The principles reflect the analysis and discussion of the Section 106 Consulting Parties and others throughout this Tier I EIS process. These design principles are intended to help in setting priorities for key critical issues that must be considered by future design architects.

The Smithsonian Institution has determined, along with the District of Columbia Historic Preservation Office and the Advisory Council on Historic Preservation, that construction of any museum building, as defined in this undertaking’s authorizing legislation, on this site will have an adverse effect on historic resources. As such, the analysis included in this Environmental Impact Statement will be reviewed and understood before a design is initiated. The Design Principles are intended to help ensure a sensitive design for this significant undertaking in Washington, DC.

These principles represent the Smithsonian’s preferred approach to the design of the National Museum of African American History and Culture as informed by the Smithsonian’s consideration of the views expressed in the context of the Section 106 consultations that have taken place during the Tier I NEPA process.Tier I has analyzed the potential effects of the build alternatives and as concept designs are developed they will be assessed to ensure that they have addressed and responded to the Design Principles and other data developed during the Tier II.

A. General Composition of the National Mall:

The National Mall presents a unity of overall spatial design but is composed of distinct parts, including the Mall, the Washington Monument Grounds, and West Potomac Park. Though administratively separate, the Ellipse and White House Grounds are also part of this extended landscape composition. The museum site occupies a highly prominent and pivotal location next to both the continuous east-west axis of the National Mall from the U.S. Capitol to the Lincoln Memorial and the north-south axis from the White House to the Jefferson Memorial.
The design should respect the character and history of the monumental core as it has evolved through seminal plans, most notably the L’Enfant Plan and the McMillan Plan, but also including Victorian-era and mid-20th-century plans.

The spatial organization of the National Mall is cross-axial and the design of the proposed museum should not detract from this central idea.

Impacts on panoramic views that open and widen on the approach to the Washington Monument Grounds from the National Mall or the Ellipse should be minimized.

The design of the museum must consider long views within the National Mall, as well as distant views from higher locations, such as Arlington Cemetery the Old Post Office Pavilion, from the air and from the Washington Monument itself.

B. Context of the Washington Monument Grounds:
The site is located on the Washington Monument Grounds. The setting of the tallest and most prominent structure in the monumental core, this 72-acre reservation is characterized by Olmstedian design principles, notably open lawns, curvilinear paths and roads, and selective groupings of trees.

The design of the museum must be respectful of the prominence of the Washington Monument and its scale and design character.

The design of the museum should be informed by the distinct characteristics of this historic environment, which include picturesque, irregular, and asymmetrical forms, and the topography of the grounds.

The design of the museum and its site should be responsive to other structures and features on the Washington Monument Grounds, such as the Monument Lodge, the Bulfinch Gateposts, the curvilinear pathways, tree placement and landscape features.

The design of the building should take into consideration the physical definition, character, and views of the Washington Monument Grounds as seen and experienced from within the reservation.

C. Relationship to Adjacent Architectural and Urban Context:
The site is located to the west of 14th Street, NW, which forms the western end of the Mall. Between the Mall and Constitution Avenue is a series of museum structures with an established pattern of height, setbacks, and site coverage; these help define the formal landscape of the Mall with its expansive panels of lawn flanked by double allees of trees. The composition of the National Mall landscape and the large museums is further framed by the monumental Federal Triangle to the north.

The museum should not project beyond the existing screening of trees along the southern line of the row of museum structures.

Given the context of the site, setbacks should respect the general character of the National Mall side of Constitution Avenue on the north, the tree buffer along 14th Street and should maximize views of the monument and grounds on the West.

The height of the museum should be compatible with that of the predominant massing of the row of museum structures to the east.

All sides of the building, including the roof, will be highly visible and should be treated as public facades. The appearance of service and support functions should be eliminated to the greatest extent possible by placing them below grade.

Any requisite perimeter security should be designed and integrated into the facility from the earliest concept design and be compatible with the character of the new building and site.
### Table A – FEIS Build Alternatives

<table>
<thead>
<tr>
<th>Height</th>
<th>75'</th>
<th>90'</th>
<th>105'</th>
<th>90'</th>
<th>90'</th>
<th>60'</th>
<th>60' – 105'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Grade</td>
<td>5 floors @ 43,800 gsf</td>
<td>6 floors @ 30,000 gsf</td>
<td>7 floors @ 30,000 gsf</td>
<td>6 floors @ various gsf</td>
<td>6 floors @ 36,000 gsf</td>
<td>2 floors @ 20,000 gsf</td>
<td>Up to 105' @ various gsf</td>
</tr>
<tr>
<td>Below Grade</td>
<td>2 floors @ 98,000 gsf</td>
<td>2 floors @ 98,000 gsf</td>
<td>3 floors @ 67,000 gsf</td>
<td>1 floor @ 111,500 gsf</td>
<td>2 floors @ 78,000 gsf</td>
<td>3 floors @ 76,667 gsf</td>
<td>Max 45' depth Not to exceed volume of 3 floors @ 76,667 gsf</td>
</tr>
<tr>
<td>Total GSF</td>
<td>415,000 gsf</td>
<td>376,000 gsf</td>
<td>411,000 gsf</td>
<td>385,500 gsf</td>
<td>430,000 gsf</td>
<td>350,000 gsf</td>
<td>350,000 gsf - 450,000 gsf</td>
</tr>
<tr>
<td>Setback/Alignment North-South</td>
<td>Aligns with NMHAH main building mass</td>
<td>Aligns with NMHAH main building mass</td>
<td>Does not align with any of the surrounding buildings or frontages; the north boundary does not protrude beyond the NMHAH</td>
<td>Aligns with the north facade of the NMHAH main building mass</td>
<td>Does not align with any of the surrounding buildings or frontages; the north/south boundary will likely protrude beyond the NMHAH</td>
<td>Aligns with NMHAH main building mass to the north</td>
<td>Minimum 50' setback</td>
</tr>
<tr>
<td>Setback/Alignment East-West</td>
<td>Aligns with the projecting portico of the DOC</td>
<td>SW façade faces the Washington Monument</td>
<td>Correspond to the minimum 50' security setback line</td>
<td>East façade aligned to 14th Street</td>
<td>Minimum 50' setback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aesthetic</td>
<td>Contextual massing that explicitly relates to the pattern of buildings facing the National Mall</td>
<td>Less conventional building form can provide an aesthetically appropriate transition that bridges the axis of the National Mall with the north-south axis of open spaces leading to the White House</td>
<td>Generally of a more complex nature, with the potential for a building that looks very different from a variety of locations</td>
<td>Two distinct aesthetic experiences: blending into the landscape towards the Monument; and, more traditional vertical building facades at the intersection of Constitution and 14th</td>
<td>A bifurcated structure with varying heights; the relationship to context is through building and spatial orientation, rather than building or height alignment</td>
<td>This alternative has a minimized visible mass and a soft edge along the southwest façade that is aligned with 15th Street and Madison Drive. Defers to the presence of the Washington Monument.</td>
<td>The aesthetic for the preferred alternative will conform to the Design Principles.</td>
</tr>
</tbody>
</table>

*All alternatives assume a 15 foot floor to floor height*
ENVIRONMENTAL IMPACTS

The following conclusions are supported by elaborated findings in the Tier I FEIS and have been summarized for the purposes of this Tier I Executive Summary.

No Build Alternative

Under the No Build Alternative the NMAAHC would not be built and essentially the status quo would be maintained. The existing land use for concessions and periodic demonstrations would continue, as would basic landscape maintenance. Under this alternative, there would be no new museum that would have the opportunity to expand the present level of cultural ethnic relevance to visitors to the museums on the Mall.

Build Alternatives

The alternatives are located on the same site and vary in their respective massing, height, and setback. Environmental impacts are expected to be similar during the construction phase as the site conditions, site preparation, staging, and excavation would be the same for any of the five alternatives. Each alternative would have similar environmental consequences during the operational phases of the project because the architectural program and service access entry would be identical in each alternative.

The discussion of impacts associated with each alternative is grouped together under each particular resource topic. Where impacts differ between alternatives, the specific alternative and related cumulative impacts are noted.

The projected levels of impact were based on defined significance thresholds specific to each resource, and with the assumption that mitigation measures would be implemented to minimize significant adverse impacts to the greatest extent possible.

Cultural Resources

The cultural resources evaluated for the Tier I FEIS were identified in accordance with regulations for Section 106 of the National Historic Preservation Act (36 CFR § 800.4) for identification of historic properties and (36 CFR § 800.5) for assessment of effects. The assessment of potential effects on historic resources in proximity to the NMAAHC site is based on landscape characteristics defined by the National Park Service’s Guide to Cultural Landscape Reports: Contents, Process, and Techniques (1999). The key character-defining features of historic properties on and surrounding the NMAAHC site are analyzed according to seven main characteristics: views and vistas, spatial organization, land use, circulation, topography, vegetation, and buildings and structures.

Under the No Build Alternative, the construction and operation of the proposed NMAAHC would not take place. There would be no new construction on the northeast corner of the Washington Monument grounds and the existing space would remain open. The overall result of the No Build Alternative would be no effect.

Under the Build Alternatives, there would be short-term effects, which would be temporary in nature and long-term effects that would be permanent to the cultural resources within the Area of Potential Effect (APE). In the short term, adverse effects would be associated with activity and disruption of the NMAAHC site due to construction. The long-term, effects resulting from the construction and operation of the NMAAHC will relate to the loss or alteration of character-defining features that contribute to the historic significance of features located within the Washington Monument grounds and historic resources in proximity to NMAAHC site. Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources contained within the APE. The effects on historic resources range from “no effect” to “significant effect.”
With some distinction between alternatives, similar significant adverse effects are held in common between all six alternatives. Any above-ground resource constructed on the NMAAHC site removes an open portion of the Washington Monument grounds, altering the historic boundaries of the grounds and altering the spatial organization of the grounds by diminishing the prominence of Washington Monument as a central organizing feature. Significant effects would also occur to buildings and structures located within the Washington Monument grounds, including the Monument Lodge and Bulfinch Gateposts as well as the Federal Triangle along Constitution Avenue. Vegetation and land use on the NMAAHC site would also be significantly affected.

The construction of the NMAAHC also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources. In addition, interpretive content of the NMAAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.

Under Alternative 1, significant effects would occur to views and vistas from key threshold panoramas experienced by pedestrians approaching the Washington Monument grounds. These panoramas include: the panorama from 14th Street and Constitution Avenue looking toward the Washington Monument and the panorama from 17th Street and Constitution looking toward the Washington Monument. Additional significant effects would occur to multidirectional views within the Washington Monument to buildings such as the Monument Lodge and Bulfinch Gateposts and views from within the grounds and to surrounding historic buildings, such as the Federal Triangle. Lesser, minor effects would occur to viewsheds to and from the U.S. Auditors complex and the U.S. Department of Agriculture building, the panorama from the World War II Memorial looking toward the Washington Monument, and broad contextual views from the Old Post Office Tower, Arlington Cemetery and Arlington House, as well as from the Capitol and West Potomac Park.

Under Alternative 2, 3, 4 & 5 would have similar significant effects on views and vistas from key threshold panoramas due to their massing and height. These panoramas would be experienced primarily by pedestrians approaching the Washington Monument grounds and include: the panorama from 14th Street and Constitution Avenue looking toward the Washington Monument, the panorama from 17th Street and Constitution looking toward the Washington Monument, and the panorama from the WWII Memorial looking toward the Washington Monument. Additional significant effects would occur to multidirectional views within the Washington Monument to buildings such as the Monument Lodge and Bulfinch Gateposts and views from within the grounds and to surrounding historic buildings, such as the Federal Triangle and Old Post Office Tower. Lesser, minor effects would occur to viewsheds to and from the U.S. Auditors complex and the U.S. Department of Agriculture building, and broad contextual views from Arlington Cemetery and Arlington House, as well as from the Capitol and West Potomac Park.

Under Alternative 6, significant effects would occur to views and vistas from key threshold panoramas experienced by pedestrians approaching the Washington Monument grounds. These panoramas include: the panorama from 14th Street and Constitution Avenue looking toward the Washington Monument and the panorama from 17th Street and Constitution looking toward the Washington Monument. Additional significant effects would occur to multidirectional views within the Washington Monument to buildings such as the Monument Lodge and Bulfinch Gateposts and views from within the grounds and to surrounding historic buildings, such as the Federal Triangle. Lesser, minor effects would occur to viewsheds to and from the U.S. Auditors complex and the U.S. Department of Agriculture building, the panorama from the WWII Memorial looking toward the Washington Monument, and broad contextual views from
the Old Post Office Tower, Arlington Cemetery and Arlington House, as well as from the Capitol and West Potomac Park.

Under the preferred Alternative, as described in detail in the preceding Build Alternatives paragraphs, there would be short-term effects that would be temporary in nature and long-term effects that would be permanent to the cultural resources within the Area of Potential Effect (APE). In the short term, adverse effects would be associated with activity and disruption of the NMAAHC site due to construction. The long-term effects resulting from the construction and operation of the NMAAHC will relate to the loss or alteration of character-defining features that contribute to the historic significance of features located within the Washington Monument grounds and historic resources in proximity to NMAAHC site. Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources contained within the APE. The effects on historic resources range from “no effect” to “significant effect.”

**Aesthetics & Visual Resources**

The impacts to aesthetics and visual resources in the project area were evaluated using nine criteria which include: the Visual Character of Site, Views and Vistas, Urban Design Context, Architectural Context, Landscape Features, Symbolic Values, Ambient Lighting, Building Materials, and Signage.

Under the No Build Alternative, no adverse effects would be created for the site’s aesthetic and visual resources if no action were taken. No construction would occur on the site, so there would be no effect on any of the nine categories previously described that provide a framework for evaluating aesthetics and visual resources.

Under the Build Alternatives, there are short term impacts which would be temporary, and long-term impacts that would be permanent impacts to the visual environment. In the short-term the most negative visual impacts would be related to the activity and disruption associated with construction. The long-term impacts would be related to blocked, disrupted, or enhanced views both to and from the NMAAHC site; visual compatibility of the proposed action with its existing visual surroundings and other proposed actions; the loss or creation of unique visual or aesthetic elements; as well as the general quality of the affected visual environment.

Under the Preferred Alternative, the short and long term impacts would be the same as those described for the Build Alternatives in the preceding paragraph.

The massing impacts on views and vistas and their urban design consequences, vary from “no effects” to “no significant, or minor effects to “significant effects” (including “major” and “minor” categories), depending on the vantage point. All significant effects in this analysis are considered adverse, given the fact that any building at this location will substantially alter the existing visual character and quality of the site. However, the significant adverse effects documented in this study range in intensity, and some lend themselves more readily to potential future mitigations and beneficial side-effects.

Multiple vantage points were studied in detail with 3-D visual simulations and include views from:

- A. the top of the Washington Monument
- B. the tower of the Old Post Office Building
- C. 14th Street looking north
- D. 14th Street looking south
- E. Constitution Avenue looking west
- F. 15th Street looking north
- G. the Washington Monument base looking northeast
- H. the northeast corner of 14th Street and Constitution Avenue
- I. Constitution Avenue looking east
- J. the center of the Ellipse looking southeast
- K. the southwest corner of the Washington Monument grounds
- L. Arlington House, in Arlington National Cemetery
Distribution & Movement of Groundwater

Under the No Build Alternative, there would be no effects to geology, soils, or groundwater associated with the site.

Impacts from the Build Alternatives would not significantly alter the underlying geology, soils, or current groundwater conditions of the project area or affect the recharge capacity such that there would be a reduction in supply or lowering of groundwater levels. None of the Build Alternatives would cause other effects that significantly or irreversibly impair the use or quality of groundwater or create a human hazard on adjacent lands or within the larger geographic context of a town or county.

While impacts to geology, soils, or groundwater would be detectable, the mitigation required to offset adverse impacts would ensure the safety of surrounding structures.

Surface Water Resources

Under the No Build Alternative, there would be no change to surface water or floodplain resources.

Impacts from the Build Alternatives to water quality would not likely be detectable, and would be at or below water quality standard or criteria.

Flooding or sewer overflows could occur near Constitution Avenue and 14th, 15th, and 17th Streets during periods of above average precipitation under either the No Build Alternative or any of the six proposed Build Alternatives. The current storm sewers and combined stormwater/sewer systems in the study area currently have the capacity to handle normal stormwater flows. During above-normal storm events, however, flooding is caused by insufficient capacity of the stormwater systems, which can be caused or exacerbated by excess debris or sediments clogging the system, disrupting flows through the system.

The Tier II NEPA process will incorporate the findings of a full geotechnical survey of the site and include a more detailed analysis of the underlying geology, soils, or groundwater conditions. The survey will be used to identify any potential impacts that could occur to surrounding structures. It will also be used to develop proper engineering methods that will be incorporated into the final design that avoids any impacts to surrounding structures.

Table B - Summary of Viewshed Analysis per Alternative

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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- no effect
O No Significant/Minor Effect
+ Significant Effect (Moderate to Major)

O + represents a visual effect that ranges between minor and significant.
Air Quality
Washington, D.C. is in moderate nonattainment for the criteria pollutant ozone under the 8-hour ozone standard, and in nonattainment for particulate matter (PM$_{2.5}$). Washington, D.C. is in attainment for all other pollutants. The NMAAHC site is located at the convergence of two of Washington D.C.’s major transportation thoroughfares and is subject to the particulate, emissions, and resultant ozone of the vehicles and buses that travel in and around the site.

Under the No Build Alternative, the current land use would remain unchanged on the site. There would be no emissions generated from the site, and emissions from the surrounding areas would likely remain at current levels.

Under the Build Alternatives, at no point would construction emissions or operation of the NMAAHC exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in Washington, D.C.’s State Implementation Plan (SIP). As a result, there would be no additional impacts to air quality beyond the current or projected trends for Washington, D.C.

Noise
The project area is in a non-residential area surrounded by numerous museums, monuments, and buildings. The main source of noise in the area is vehicular traffic along 14th Street and Constitution Avenue, both of which are major thoroughfares within Washington, D.C.

Under the No Build Alternative, the natural and existing sounds around the NMAAHC site would be unchanged.

Under the Build Alternatives, neither the construction nor the operation of the proposed NMAAHC would significantly increase the current ambient noise levels, given the abundance of noise that presently exists in the project area. Noise generated by construction and operations would be infrequent and would exceed natural and existing sounds, but would not exceed applicable noise regulations given that the NMAAHC site is located in a non-residential area.

Transportation
Under the No Build Alternative, there would be no resultant increase in background traffic growth or additional Metro users beyond the current or projected trends for Washington, D.C.

Under the Build Alternatives, neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic beyond the current level of service, reduce vehicular parking beyond current capacity, reduce vehicular-pedestrian-bicycle safety, or produce excess demand on public transportation. The NMAAHC site is located at the convergence of two of Washington D.C.’s major transportation thoroughfares and adjacent to two Metro stops. Surveys on visitor use on museums on the Mall show that most people arrive via public transportation.

Land Use Planning & Policies
The five-acre public open space is property of the United States but it is maintained as a public recreational resource by the NPS. The NPS also regulates the land use, including concessions, public gatherings, and periodic demonstrations. The parcel is designated as a Major Federal Tract by the District of Columbia Office of Zoning and is considered to be part of the Reserve or Commemorative Area under the National Mall Plan by the NPS National Capital Region Office of Lands, Resources, and Planning. While the Commemorative Area designation is intended to discourage development and preserve the cross axis of the National Mall and Washington Monument reservation, Section 8 of the NMAAHC Act stipulates that the Commemorative Area designation will not apply with respect to the NMAAHC.

Under the No Build Alternative, the current management of the NMAAHC site would continue; the site would continue to be designated for public use and would be maintained as parkland.

Under the Build Alternatives, there would be a significant change in land use. The current land use would cease with construction during
which time the site would not be used as a public open space or recreational resource. Following construction, the NMAAHC, including its outdoor programmed space would be available to the public, but not in the same scale or capacity as the existing condition of the site. The NMAAHC would continue to comply with all applicable local regulations in the area as would any future construction. The plot would remain designated as a Major Federal Tract by the D.C. Office of Zoning.

The Build Alternatives provide a long term beneficial impact by ensuring that the land use of the site is preserved in perpetuity for prominent public use, continuing the symbolism of the site within the context of the National Mall, as described in the Cultural Resources section.

**Visitor Use & Experience**

The Smithsonian Institution, one of the most-visited museum complexes in the world, and the National Mall attracts millions of visitors annually. As a result, the civic and transportation infrastructure is already in place to accommodate large numbers of visitors. According to 2004 Smithsonian Institution visitor polls, less than half of minority visitors feel that the current museum subject matter offerings are excellent or superior compared to 62 percent of the white population.

Under the No Build Alternative, there would be no new museum that would have the opportunity to expand the present level of cultural ethnic relevance to visitors to the museums on the National Mall.

Under the Build Alternatives, neither the construction nor the operation of the proposed NMAAHC would substantially alter long term visitorship. Based on the National Museum of the American Indian (NMAI) as a point of reference for a museum with a similar focus on a specific culture, there would be an initial surge in visitation to the Mall, but after several years visitorship would level out and resume a state of natural fluctuation.

The Build Alternatives would provide a beneficial impact improving visitor enjoyment by providing a museum with new subject matter that could increase the feeling of personal relevance to minority visitors. In addition, the NMAAHC would likely provide additional opportunities for synergy between other cultural attractions and special events that cater to minority interests. Although the NMAAHC site would no longer accommodate large scale public demonstrations, the program of the facility will provide public gathering space.

**Communities & Businesses**

The region of influence comprises the area in which the predominant socioeconomic effects of the NMAAHC would take place and includes Washington, D.C. as well as the inner counties and cities in Maryland and Virginia. Although NMAAHC is likely to draw visitors from all over the world, the lasting effects of the construction and operation of the NMAAHC would be felt primarily within the region of influence.

Under the No Build Alternative, there would be no resulting influx into the local economy and no effect on demographics, the demand for or supply of housing, or Community Services and Facilities.

Under the Build Alternatives, neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice, and the protection of children. The incremental increases in tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development.

**Infrastructure & Utilities**

Under the No Build Alternative, there would be no changes to the current use of the site, and as a result no impacts to infrastructure or utilities would occur.
The Build Alternatives are comparable in size and scope with other buildings on the Mall. The effects are predominantly specific to the site and normal for any construction taking place in an already developed area. The majority of the utilities would tie into Washington, D.C.’s services, and would not significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area since the infrastructure is generally in place to support additional growth.

In all Build Alternatives except Alternative 5, the impact to the utility lines and the serviced community due to minor disruptions during the construction phase would be temporary and not substantial. Coordination with service providers for timely extension of utility services to the new building could be an issue and other options would potentially need to be explored.

In Alternative 5, the configuration of the building has a minor conflict with a subsurface 24 foot gas transmission line that runs parallel to Constitution Avenue approximately 45 feet south of the sidewalk. The estimated buffer distance is 10-12 feet and the current configuration leaves only a 4 foot buffer. As a result, either the utility line would need to be relocated or the north face of the northern mass would need to be shaved by approximately 8 feet, reducing the overall mass by 3,000 gsf or less than one percent of the gross building size.

Public Health & Security

Under the No Build Alternative, the existing land use of the site, including concessions and periodic demonstrations, would continue, as would basic landscape maintenance. Therefore, no additional impacts to public health and security would be expected.

Under the Build Alternatives, effects to public health, safety, and security are possible during both construction and operation. During the construction phase, the occupational health of the construction workers and safety of the pedestrians in the vicinity of the site would be preserved. During the operation of the facility, security issues such as bomb threats, terrorist acts, fires, spills, leaks of hazardous material and hazardous waste, and natural disasters would be considered.

Any effects to public safety and security concerns could be safely and adequately managed in accordance with all applicable regulations and policies, thereby limiting exposures or risks.

CONCLUSION

At this stage, it can be determined that none of the alternatives will have a significantly different effect on certain groundwater, surface water, and transportation resources, and on air quality, noise, land use, visitor use, communities & businesses, infrastructure, utility services, public health and security areas.

There will be adverse effects on some visual and aesthetic resources as well as on the historic character of the Washington Monument Grounds, historic views and vistas, and other historic resources in the area of potential effect. Using the Preferred Alternative, the Smithsonian Institution will develop the Tier II concept designs with more refined building parameters against which the impacts to visual and cultural resources can be more accurately assessed. In addition, the Smithsonian Institution will be making decisions on implementing further design principles and characteristics to pursue in further design development, informed by the Tier I process.

The proposed action would have long term beneficial impacts by providing a national venue for the collection, study, preservation, and exhibition of artifacts, documents, and programs relating to African American life, art, history, and culture. The national venue will be a meeting place for all people to learn about the history and culture of African Americans and their contributions to and relationship with every aspect of the collective national life of America. In addition, the NMAAHC would provide a forum for collaboration with other museums, historically black colleges and universities, historical societies, educational institutions, and other organizations that promote the study or appreciation of African American issues.
1.0 INTRODUCTION
1.1 INTRODUCTION

The Smithsonian Institution with its Joint-Lead and responsible Federal Agency, the National Capital Planning Commission (NCPC), in cooperation with the National Park Service (NPS), has prepared a Tier I environmental impact statement (EIS) to assess the potential environmental impacts of constructing and operating a permanent facility for the National Museum of African American History and Culture (NMAAHC).

The site selected for NMAAHC is a five-acre parcel that is part of the Washington Monument Grounds on the National Mall, bounded by Constitution Avenue on the north, Madison Drive on the south, 14th Street, NW on the east, and 15th Street, NW on the west.

This Tier I Final EIS (FEIS) has been prepared in accordance with the implementing regulations of National Environmental Policy Act (NEPA) and NCPC’s Environmental and Historic Preservation Policies and Procedures. The Tier I EIS process is being run concurrently with the Section 106 consultative process of the National Historic Preservation Act (NHPA).

1.1.1 What is the format of the Tier I FEIS?

In recent years, some Federal Agencies have adopted different formats or alternative approaches to preparing NEPA documents. In 2006, the American Association of State Highway and Transportation Officials published a report entitled “Improving the Quality of Environmental Documents” (AASHTO, 2006) which describes a reader-friendly format for NEPA documents. This approach is meant to tell the story of the project to the reader using clear, concise language, effective graphics and visual elements, and discussion of issues and impacts in proportion to their relative importance. The format of this Tier I FEIS was guided by this approach and is intended to be reader-friendly.

1.1.2 What is the structure of the Tier I FEIS?

The first two chapters of the Tier I FEIS provide the foundation of the document and include the Introduction and Purpose and Need of the proposed action. Chapters 3 and 4 describe the role of the public and external agencies, the process used to develop the alternatives, and the preferred alternative. Chapter 6 provides the existing conditions and impact analysis for the various resource areas. Chapters 7 and 8 provide a description of cumulative impacts, a comparison of impacts, and the process of consultation and coordination.

Chapters 9 through 14 contain pro forma information such as the, list of preparers, list of persons and agencies receiving the Tier I FEIS, list of references, and document index.

The Appendix is a separate volume and contains supplementary information. Appendix A through G includes the regulatory framework for the proposed action, letters of consultation, viewsed analysis, air applicability analysis, level of service analyses, economic impact forecast system model, and a summary of Tier I Draft EIS (DEIS) public comments and responses.

1.1.3 What is the timing of this Tier I EIS process?

Both the Tier I EIS and NHPA Section 106 process are being undertaken at an early stage in the NMAAHC’s development, prior to the design phase. One benefit of this timing is that the Tier I EIS alternatives and analysis of associated effects on environmental and historic resources can inform the future design. One limitation is that it is difficult to definitively identify effects and mitigations to certain resources in the project area without a more developed or precise architectural program or building design. As a result, the Smithsonian Institution and NCPC have adopted a two-tiered EIS process.
1.1.4 What is a tiered EIS?
If a Federal Agency anticipates that the proposed project’s timeline will extend over a lengthy period and will require a phased decision making process, a Federal Agency may choose to identify elements to be carried forward in the near term and identify other elements which will warrant more detailed study in a future environmental document.

CEQ regulations, 40 C.F.R. § 1502.20 state that:

*Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review (Sec. 1508.28). Whenever a broad environmental impact statement has been prepared... and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement... and shall concentrate on the issues specific to the subsequent action. The subsequent document shall state where the earlier document is available (CEQ, 1978).*

In order to focus on “issues ripe for decision” and encourage continued dialogue on cultural resource effects and other appropriate effects as architectural design concepts are developed, the Smithsonian and NCPC elected to pursue a two-tiered NEPA process.

1.1.5 How will the Tiered Process work for this project?
The letters describing the terms of the tiered EIS process from the Smithsonian Institution to NCPC, and NCPC’s response, are included in Appendix B.

The Tier I FEIS analyzes the potential effects of a range of massing alternatives with different heights, setbacks and configurations on the natural and manmade environments including cultural resources, aesthetic/visual resources, groundwater and surface water resources, air quality, noise, transportation, land use, visitor use, communities & businesses, infrastructure and utility services, and public health and security.

Following the generation of conceptual designs by the NMAAHC design architect, there will be a Tier II EA or EIS that will analyze the historic and aesthetic/visual effects and any other significant effects found to be important to the final decision.

At this stage, it can be determined that none of the alternatives will have a significantly different effect on certain groundwater, surface water, and transportation resources, and on air quality, noise, land use, visitor use, communities & businesses, infrastructure, utility services, public health and security areas. The Preferred Alternative developed as a result of Tier I analysis will be used by the Smithsonian Institution to make decisions on principles and characteristics that will be used in design development.
Table 1.1 provides a summary of issues that will be resolved in Tier I and Tier II.

Table 1.1 – Resource Area Analysis within the Tiering Process

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<tr>
<th>Resource Area</th>
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<td>Views &amp; Viewsheds</td>
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<tr>
<td>Buildings and Structures</td>
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<tr>
<td>Symbolic Values</td>
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<td>Views &amp; Viewsheds</td>
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<td><strong>Groundwater</strong></td>
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<td>Distribution and Movement of Groundwater</td>
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<tr>
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<td>Effluent/site drainage discharge</td>
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<td>Flooding</td>
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<td>Noise</td>
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<tr>
<td><strong>Public Health &amp; Security</strong></td>
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1.1.6 **How does this Tier I FEIS differ from the Tier I DEIS?**

This document has evolved from the Tier I DEIS in several ways. The Tier I FEIS:

- clarifies the tiering process and articulates the Tier I & Tier II resource area analyses;
- describes the Smithsonian Institution’s preferred alternative;
- includes outcomes of the Section 106 process to date;
- supplements analysis in the following resource areas: Noise, Environmental Justice, Transportation, Air Quality;
- incorporates responses to comments submitted during the Tier I DEIS public comment period in a new Appendix G.

1.1.7 **What were the main issues and concerns identified during the public comment period?**

The Notice of Availability (NOA) for the Tier I DEIS was published in the Federal Register on December 21, 2008. The associated public comment period was initiated by this publication and extended through February 19, 2008. A public hearing was conducted at the Donald W. Reynolds Center for American Art and Portraiture on January 10, 2008. Comments were made in writing, emails, and at the public hearing. In general, the written, oral, and electronic public comments focused on a few common themes, described below (see Appendix G for the complete inventory of comments and responses).

Geotechnical

During this stage of the planning process, analysis was based on the best available existing information including the following documents:

- *Environmental Assessment for the Washington Monument, April 2002*

This document referenced several geotechnical studies conducted of the Washington Monument site (1930, 1962,
1973, 1984, and 1989) and provided generalized descriptions of the geophysical conditions of the of the Washington Monument Site. As stated in the 1973 study, beyond 150-feet from the Monument center, net loading changes should have little effect on monument foundation (the site selected for the NMAAHC is approximately 700 feet from the center of the Monument). As stated in the 1989 study, at the predicted groundwater elevations, the water table would be at least 13 feet above the highest elevation of the wet plastic clay substrate on the Grounds at Elev/-19 MSL. Thus, changes in the water table due to project or factors outside the scope of the proposed action [landscaping and security upgrades] would not likely dewater the clay layer.

- USDA Soil Survey of DC, 1978
  This document provided generalized soil information on the project site.
- Smithsonian Institution soil borings for Constitution Avenue to Madison drive between 14th & 15th Streets NW, 1958
  These borings provided adjacent groundwater information.
- Site Evaluation Study by Plexus Scientific Corporation and PageSoutherlandPage 2005
  This document provided generalized descriptions of the subsurface soil conditions based on the information from the 1958 soil borings.
- Section 106 Archaeological Phase 1 & 2 Reports 2007 & 2008
  These reports provided a description of the subsurface soil conditions from auger samples taken during the 2007 archaeological survey.

The Smithsonian Institution is commissioning a geotechnical evaluation on the site and the Tier II NEPA process will incorporate the findings of this survey including a more detailed analysis of the underlying geology, soils, or groundwater conditions, and the potential impacts that will inform development of viable concept design alternatives that do not jeopardize the structural integrity of adjacent buildings including the Washington Monument.

**Flooding**

The level of analysis included in this Tier I EIS process was based on the best information and current FEMA 100-year floodplain information available (Washington, D.C., Community-Panel Number 1100010020B; effective date November 15, 1985). The Tier I FEIS acknowledges that FEMA proposed modifying the base 100-year and 500-year floodplain elevations in the District in September 2007 (Federal Register Volume 72, Number 186, page 54631-54635), and that if approved, the site for the NMAAHC would be within the 100-year floodplain, which would trigger certain requirements under Executive Order 11988, “Floodplain Management.” The DC Government proposes, by Winter 2009, to conduct studies, develop a design and construct an interim 17th Street levee (with input from other agencies) that could obviate the need for revising the flood maps.

The Tier II NEPA process will incorporate any approved changes to FEMA’s 100-year and 500-year floodplain maps into any further analysis. During this process, the Smithsonian Institution will also take into account the site’s potential to flood in the development of the building design. Accepted flood proofing and other flood protection measures will be applied to protect the NMAAHC building and collections, regardless of its floodplain designation.

**Service Access**

Public comment raised issues with access from 14th and 15th Streets, which were either considered best or inappropriate. In the second tier NEPA process for the NMAAHC, more precise concept designs will yield more information upon which the Smithsonian may base decision for service access. The concept designs will define a
building orientation which will affect the placement of the service and loading access. The Smithsonian Institution will explore different options for access including placing it underground.

Pedestrian Access
In the second tier NEPA process for the NMAAHC, analysis of more precise concept designs will yield more information upon which the Smithsonian may base decision for pedestrian access. The concept designs will define a building orientation, which will determine the best way for pedestrians to access the site. In addition, the Smithsonian Institution will determine if access across 14th Street is feasible, whether on the surface of the street, through an underground connection, or via an elevated bridge.

Other Comments
The remaining comments addressed a wide range of issues including the Build Alternatives, the site selection process, architectural and urban design context, specific Tier I EIS resource areas, sustainability, cumulative impacts, the NMAAHC program or museum collection, and information omitted from the Tier I DEIS. The full list of comments and responses is in Appendix G.

1.1.8 What are the products of the Tier I NEPA process?
Tier I products will include this FEIS and a Smithsonian Institution decision document. NCPC will not issue a Tier I decision document because it will not take action regarding NMAAHC until the Smithsonian submits a concept for NCPC approval, following completion of Tier II.

Included in the Smithsonian Institution’s decision will be design principles, which will inform the subsequent design process and serve as guidance for the design architect. The design principles acknowledge the dialogue between stakeholders and consulting parties that occurred through the Tier I process.

At the Tier I stage, neither the Smithsonian nor NCPC will have irreversibly or irretrievably committed resources to a particular design. The Smithsonian and NCPC will assess a full range of viable alternative concept designs for viewshed impacts, including service area views, possible historic resource effects, and certain geotechnical, transportation, and other effects in Tier II.
2.0 PURPOSE AND NEED
2.1 HOW DID THE IDEA TO BUILD A NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE ARISE?

The effort to build a museum centered on the history and achievements of African Americans dates back more than 90 years to the commemoration of the 50th anniversary of the end of the Civil War as described in *The Time Has Come: Report to the President and Congress* (Interior Systems Inc., 2003a).

In 1915, difficulties in finding accommodation for a contingent of black Civil War veterans planning to join in the conflict’s 50th anniversary victory parade along Pennsylvania Avenue in Washington, D.C. led African American community leaders to collect money and organize a National Memorial Association. The Association’s appeal was as follows:

*It is the purpose of the National Memorial Association; to erect a beautiful building to depict the Negro’s contribution to America in the military service, in art, literature, invention, science, industry, etc. – a fitting tribute to the Negro’s contributions and achievements, and which would serve as an educational center giving inspiration and pride to the present and future generations …*

A series of starts was made over the course of nearly a century to realize the proposal. Each one advanced further, but none resulted in a dedicated facility. Congress held hearings in 1919 but did not act. Then in 1929, Congress passed legislation to create a national commission to build the memorial, but no seed money was included. Claims were advanced unsuccessfully by the national commission for financial support in connection with the unclaimed pay to black Civil War soldiers and the collapse of the Freedmen’s Bank in 1874. Nonetheless, by 1933 little had been accomplished and the commission’s duties were transferred to the Interior Department, a tacit acknowledgement of its lack of progress.

Nothing of further importance to the matter occurred until 1968 when, in the midst of the civil rights movement and the wake of the assassination of Dr. Martin Luther King, Jr., legislative initiatives resumed. In 1986, under the leadership of Representative Mickey Leland, Congress passed a Joint Resolution “to encourage and support” private efforts to build what was now thought of as both a memorial and a museum in Washington.

In 1988 and 1989, bills were introduced to create a "National African American Heritage Museum and Memorial" within the Smithsonian Institution. Also in 1989, the Smithsonian Institution hired Claudine K. Brown to create its Center for African American History and to lead the "African American Institutional Study," to be performed by a blue-ribbon commission appointed by the Smithsonian Institution. In 1991, the commission recommended the creation of a national museum, concluding that "[t]here exists no single institution devoted to African Americans which collects, analyzes, researches, and organizes exhibitions on a scale and definition comparable to those of the major museums devoted to other aspects of American life." The blue-ribbon commission recommended that the NMAAHC be temporarily located in the Arts and Industries Building until a new, larger facility could be built. Nevertheless, controversy about funding and the appropriateness of the Arts and Industries Building prevented passage of legislation.

In 2001, Representative John Lewis, Representative J.C. Watts, Jr., Senator Sam Brownback, and Senator Max Cleland led a new bipartisan coalition to establish a National Museum of African American History and Culture within the Smithsonian Institution. Renewed questions about funding and the feasibility of using the Arts and Industries Building resulted in the formation of the NMAAHC Plan for Action Presidential Commission (Commission) on December 28, 2001 by P.L. 107-106 (See Appendix A) to develop a feasible plan to move forward on the NMAAHC.
In April 2003, after a yearlong study and the convening of more than 50 national and local meetings, the Commission released its first report, *The Time Has Come, Report to the President and to the Congress* (Interior Systems Inc., 2003a). The Report included some of these findings:

- The Commission found that there were many nationally significant art and cultural history collections available for loan or purchase to support the programming of the NMAAHC.
- The Commission's survey of regional African American museums found strong support for the National Museum with 87 percent reporting that they supported the idea of establishing the NMAAHC.
- The Commission studied several possible sites for the NMAAHC and recommended the site on the Capitol Grounds between Pennsylvania Avenue, Constitution Avenue, and 1st and 3rd streets, NW (the marshalling point for the 1915 march of the African American Civil War veterans and their white comrades in arms). As an alternative, the Commission recommended the “Monument” site immediately west of the National Museum of American History between Constitution Avenue, Madison Drive, and 14th and 15th Streets, NW.
- The Commission studied the possibility of using the Arts and Industries Building for the NMAAHC. The cost to use the building for the NMAAHC was estimated to be approximately $379 million in 2003 dollars and $480 million in 2011 dollars. Because of the excessive cost and general unsuitability of the structure, the Commission did not recommend using the Arts and Industries Building.
- The Commission recommended that the NMAAHC be part of the Smithsonian Institution with certain governance provisions designed to ensure strong community participation in the NMAAHC's programs.
- The Commission found that a 350,000 gross square foot (gsf) program represented a “reasonable need” and was neither “too conservative nor unnecessarily generous.”

In September, 2003, the Commission issued its *Final Site Report* (Interior Systems Inc., 2003b) which presented detailed planning analysis of the four possible sites for the NMAAHC: the Capitol Grounds site, the Monument site, the Liberty Loan site, and the Banneker Overlook site, having already discounted the feasibility of using the Arts and Industries Building. The report confirmed the Commission’s preference for the Capitol Grounds site and the Monument site as an alternative.

Following the completion of the *Final Site Report*, The NMAAHC Act, P.L. 108-184, enacted by the Congress on December 16, 2003, established a museum within the Smithsonian Institution to be known as the National Museum of African American History and Culture (see Appendix A). The Act required the Smithsonian Institution Board of Regents to select a final site.

### 2.2 WHAT IS THE PURPOSE & NEED FOR THE NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE?

The purpose of the proposed action is to fulfill the mandate of the NMAAHC Act by creating a world-class setting for visitors and collections. The NMAAHC Act recognizes that the Museum "would be dedicated to the collection, preservation, research, and exhibition of African American historical and cultural materials reflecting the breadth and depth of the experience of individuals of African descent living in the United States."
As set out in Section 4 of the law, the NMAAHC must provide for:

1. The collection, study, and establishment of programs relating to African American life, art, history, and culture that encompass:
   - the period of slavery
   - the era of Reconstruction
   - the Harlem Renaissance
   - the Civil Rights movement
   - other periods of the African American diaspora

2. The creation and maintenance of permanent and temporary exhibits documenting the history of slavery in America, and African American life, art, history, and culture; and

3. The collection and study of artifacts and documents relating to African American life, art, history, and culture; and

4. Collaboration between the NMAAHC and other museums, historically black colleges and universities, historical societies, educational institutions, and other organizations that promote the study of or appreciation of African American life, art, history, or culture, including collaboration concerning:
   - development of cooperative programs and exhibitions
   - identification, management, and care of collections; and
   - training of museum professionals

Section 2 of the NMAAHC Act set out the findings of Congress as to why such a museum was needed.

1. Since its founding, the United States has grown into a symbol of democracy and freedom around the world, and the legacy of African Americans is rooted in the very fabric of the democracy and freedom of the United States.

2. There exists no national museum within the Smithsonian Institution that:
   - is devoted to the documentation of African American life, art, history, and culture; and

The findings of Congress were based in large part on the conclusions of the Presidential Commission in its 2003 study *The Time Has Come: Report to the President and Congress*. This Commission, known as the NMAAHC Plan for Action Presidential Commission, stated that

“the time has come to establish the National Museum of African American History and Culture because the NMAAHC is important not only for African Americans but for all Americans. It is the only institution that can provide a national meeting place for all Americans to learn about the history and culture of African Americans and their contributions to and relationship with every aspect of our national life. Further, the NMAAHC is the only national venue that can respond to the interests and needs of diverse racial constituencies who share a common commitment to a full and accurate telling of our country’s past as we prepare for our country’s future. And, even more importantly, it is the only national venue that can serve as an educational healing space to further racial reconciliation.”

This Tier I FEIS assesses the impacts of constructing and operating a permanent facility for the NMAAHC within the Smithsonian Institution on a five-acre parcel bounded by Constitution Avenue on the north, Madison Drive on the south, 14th Street NW on the east, and 15th Street NW on the west, which is necessary to achieve the purpose and need of the NMAAHC.
2.3 HAS A SITE BEEN SELECTED AND WHERE IS IT?

2.3.1 Site Selected

The site selected for NMAAHC is a five-acre parcel that is part of the Washington Monument Grounds on the National Mall, bounded by Constitution Avenue on the north, Madison Drive on the south, 14th Street, NW on the east, and 15th Street, NW on the west (see Figures 2.1 & 2.2). It is a public open space that is a component of a much larger commemorative landscape that is designated as a parkland for a variety of uses, including recreation, special events, and celebrations.

The United States owns the parcel, but it is maintained by the National Park Service. The NPS transferred administrative jurisdiction of the property to the Smithsonian Institution, effective June 1, 2007, but will continue to operate the site as parkland through 2010 or until construction of the NMAAHC commences.

The parcel is largely vacant, although a large blue concessionaire’s temporary tent is currently present at the site’s southern end as well as a few small structures and walkways. The site’s immediate neighbors are the Commerce Building to the north, the central spine of the National Mall to the south, the National Museum of American History NMAH to the east, and the grounds of the Washington Monument to the west. The topography is gently rolling as the elevation declines from south to north. Mature trees are concentrated at the site’s northeast corner as well as along Constitution Avenue and 14th Street.
Figure 2.2: The NMAAHC Site in the context of the Mall and Washington Monument Grounds
2.3.2 Site Selection Process

The NMAAHC site was selected in accordance with Section 8 of the NMAAHC Act titled “Building for the National Museum of African American History and Culture” (see Appendix A). This section of the Act directed the Smithsonian Institution Board of Regents to choose among four identified sites: the Monument site, the Arts and Industries Building, the Liberty Loan site, and the Banneker Overlook site (see Figure 2.3 – Four Sites included in Site Evaluation Study). The Capitol Grounds site was removed from further consideration and was not included in the Act.

To help guide its decision, the Board of Regents commissioned a thorough engineering study to examine the four locations. Because the site selection decision was in the exclusive province of the Smithsonian Institution, which is not a "Federal Agency" within the meaning of NEPA or Council on Environmental Quality (CEQ) regulations, the Smithsonian Institution did not perform a formal NEPA analysis during the site selection process.

The site evaluation study, conducted by Plexus Scientific Corporation and PageSoutherlandPage, examined each site, analyzing location; size; site history and relationship to African American history; vehicular and pedestrian traffic; issues concerning the existing structure itself, where applicable (Arts and Industries Building); availability of utilities; environmental factors (such as soil, topography and existing landscape); availability of public transportation and parking; surrounding attractions and entertainment; archeological significance; noise levels; and ease of providing security for visitors, staff, and collections.

In addition to the engineering study, as required by section 8 of the NMAAHC Act, the Regents consulted with a variety of groups, including members of Congress; the museum’s Council; the National Capital Planning Commission (NCPC); the Commission of Fine Arts; the National Museum of African American History and Culture Plan for Action Presidential Commission and Federal agencies, as well as the District of Columbia mayor and the public. The official consultation documentation can be found in the Appendix of the Site Evaluation Study (PageSoutherlandPage, 2005a). The Regents visited each site and received public comments via the Smithsonian Institution’s web site and a November 2005 town hall meeting as part of their efforts to conduct a comprehensive and objective review of the locations.

The engineering study detailed at least two development scenarios and a cost analysis for each site. The scenarios were based on two potential build-outs, a minimum build-out and a maximum build-out. The minimum build-out scenario could be comfortably accommodated on a particular site. The maximum build-out scenario allowed the greatest amount of gross square footage (gsf), on a particular site while still taking into account site lines, building height limitations, security setbacks, and pedestrian and vehicular access to the site. The 350,000 gsf originally proposed by the NMAAHC Plan for Action Presidential Commission, was used as a baseline model and as a point of departure in developing the minimum and maximum scenarios.

The NMAAHC Act further directed that the four potential sites remain available and that the Federal Agency having administrative jurisdiction over the selected site transfer that jurisdiction to the Smithsonian Institution as soon as practicable. Pursuant to the NMAAHC Act, the Monuments and Commemorative Works Act, 89 U.S.C. 40 was not applicable.
Figure 2.3: Potential NMAAHC Site Locations from the Site Evaluation Study
Following completion and review of the study, the Smithsonian Institution announced on January 30, 2006 that the Board of Regents had selected the Monument site. The official action recorded in the minutes of the Regents meeting was as follows:

VOTED that the Board of Regents, having fully considered its obligations under Public Law 108-184 and the recommendations it has received from statutory bodies, the Presidential Action Commission of the National Museum of African American History and Culture, and the Council of the National Museum of African American History and Culture, designates the Monument Site, bounded by 14th and 15th Streets, Constitution Avenue, and Madison Drive, for the purpose of building and operating the Smithsonian Institution’s National Museum of African American History and Culture.

This decision by the Smithsonian Institution Board of Regents completed the site selection process as directed by Congress in the NMAAHC Act.

2.4 WHAT IS AN EIS AND WHAT WILL IT ACCOMPLISH?

NEPA was passed by Congress in 1969 and took effect on January 1, 1970. This legislation established this country’s environmental policies, including the goal of achieving productive harmony between human beings and the physical environment for present and future generations. It provided the tools to implement these goals by requiring that every Federal Agency prepare an in-depth study of the impacts of “major Federal actions having a significant effect on the environment” and alternatives to those actions, and requiring that each agency make that information an integral part of its decisions. NEPA also requires that agencies make a diligent effort to involve the interested and affected public before they make decisions affecting the environment.

Besides setting environmental planning policy goals, NEPA created the CEQ, an agency of the President’s office, to oversee the implementation of NEPA. CEQ published NEPA regulations in 1978 (40 CFR 1500-1508) and added to them in 1981. These regulations apply to all Federal Agencies, and in them CEQ requires each Federal Agency to “implement procedures to make the NEPA process more useful to agency decision-makers and the public” (40 CFR 1500.2). Agencies are to review and update these regulations as necessary.

2.4.1 The Relationship between NEPA and the EIS Process

There are three levels of NEPA analysis depending on whether or not an undertaking could significantly affect the environment. A categorical exclusion may be prepared if the undertaking meets certain criteria which a Federal Agency has previously determined as having no significant environmental impact. An Environmental Assessment (EA) is prepared to determine whether or not a Federal undertaking would significantly affect the environment. If the answer is no, the agency issues a Finding of No Significant Impact (FONSI). But if the EA determines that the environmental consequences of a proposed Federal undertaking may be significant, an EIS is prepared if the significant impacts cannot be mitigated to the point that they would no longer be significant. An EIS is a more detailed evaluation of the proposed action and alternatives. The public, other Federal Agencies and outside parties may provide input into the preparation of an EIS and then comment on the FEIS when it is published.

If a Federal Agency anticipates that a proposed project may significantly impact the environment, is environmentally controversial, or is of significant interest to the public, a Federal Agency may choose to prepare an EIS without first preparing an EA. Because of the importance of the setting of the NMAAHC site on the National Mall and the public interest in the site, the Smithsonian Institution made the decision with NCPC to prepare an EIS, as suggested by NCPC's Environmental Policies and Historic Preservation Policies and Procedures.

Following the Tier I FEIS wait period, the Smithsonian Institution will prepare a public Decision Document addressing how the findings of the Tier I FEIS, including consideration of alternatives, were incorporated into the agency's decision-making process. A Record of Decision (ROD) will be the end product of the Tier II NEPA process.
2.4.2 What is Section 106 of the National Historic Preservation Act? How Does It Relate to the EIS Process?

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment (see Appendix A). The historic preservation review process mandated by Section 106 is outlined in regulations issued by the ACHP. Revised regulations, "Protection of Historic Properties" (36 CFR Part 800), became effective January 11, 2001 (ACHP, 2002a).

NCPC’s Environmental Policies and Historic Preservation Policies and Procedures require the close coordination of compliance with Section 106 of the NHPA during the development of the EIS process (NCPC, 2007a).

P.L. 108-72 of August 15, 2003 “The Smithsonian Facilities Authorization Act” designated the Smithsonian Institution as an “agency” for the purpose of carrying out Section 106 of NHPA for projects in the District of Columbia that are subject to NCPC review. The Smithsonian Institution initiated consultation on the NMAAHC project at the Monument site under Section 106 of the NHPA with the District of Columbia Historic Preservation Officer (DC HPO) through a March 27, 2006 letter (see Appendix B). The intention of both the Smithsonian Institution and NCPC has been to utilize the public scoping and outreach aspects of the EIS process to achieve public participation under the regulations of 36 CFR 800 implementing NHPA. Information from the public and interested parties on the project’s potential effects upon significant historic resources has been incorporated into the development and analysis of alternatives and mitigation measures in this EIS. Nevertheless, the EIS process is not being substituted for Section 106 of the NHPA, as is possible under recent revisions to 36 CFR 800.

To an extent, NEPA addresses some of the same concerns as NHPA. For instance, under NEPA agencies must assess the impacts of their activities on the environment, including historic properties.

Although Section 106 of NHPA is a separate requirement from NEPA—agencies may coordinate completion of studies and documents prepared under Section 106 with those completed under NEPA. ACHP’s regulations provide guidance on how the NEPA and Section 106 processes can be coordinated [Section 800.8(a)]. They also set forth the manner in which a Federal Agency can use the NEPA process and documentation to comply with Section 106 of NHPA [Section 800.8(c)] (ACHP, 2002b).

2.4.3 Where does the NEPA Process and Section 106 Consultation fit in the NMAAHC Development Process?

Both the Tier I EIS and Section 106 processes are being undertaken at an early stage in the NMAAHC’s development, prior to the design phase (see Figure 2.4). One benefit of this timing is that the EIS alternatives and analysis of associated effects on environmental and historic resources can inform the future design. One limitation is that it is difficult to definitively identify effects and mitigations to certain resources in the project area without a more developed or precise design. As a result, the Smithsonian Institution has elected to adopt a tiered EIS process.
Figure 2.4: NMAAHC EIS Timeline


Enabling Legislation
Site Selection
Tier I EIS
Tier II NEPA
Programming
Construction

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<tr>
<th>2006</th>
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2.5 WHAT AGENCIES ARE LEADING THE PROJECT?

Although the Smithsonian Institution is not a “Federal Agency” within the meaning of NEPA or CEQ’s implementing regulations, the institution’s policy and intent is to inform and involve host communities in the planning of its facilities. Additionally, certain Smithsonian Institution projects in the National Capital Region are subject to review by the NCPC, which is a Federal Agency under NEPA, and which has its own guidance for implementing its NEPA compliance obligations.

The Smithsonian Institution and NCPC are therefore acting as Joint-Lead agencies, with NCPC as the responsible Federal Agency. The NPS is acting as a cooperating agency in the preparation of the Tier I FEIS.

2.5.1 Joint Lead Agencies

According to the CEQ, the governing body that oversees the efforts of Federal agencies to implement NEPA programs, joint lead agencies can be involved in preparation of an EIS when another agency (state, local, or Federal) with a requirement comparable to NEPA is involved in a group of actions directly related to each other because of their functional interdependence or geographical proximity (CEQ, 2004). When a Federal Agency partners with another Federal or local entity, the Federal Agency will take responsibility for reporting the EIS.

The Smithsonian Institution is a trust instrumentality of the United States, established by Congress in 1846 for the increase and diffusion among men. 20 U.S.C. 41.

NCPC is the central planning agency for federal land and buildings in the National Capital Region. The requirements for projects submitted for NCPC approval are outlined in Section 4 (D) of NCPC’s Environmental and Historic Preservation Policies and Procedures (69 Federal Regulation [F.R.] 41299). Because the Smithsonian is not a Federal Agency for the purposes of NEPA, it is following the NCPC’s NEPA guidance, which requires applicants to prepare the necessary NEPA and Section 106 of the National Historic Preservation Act documents, in conformance with respective CEQ and Advisory Council on Historic Preservation requirements. NCPC will be the responsible lead Federal Agency for NEPA purposes. NCPC will make an independent evaluation of the NEPA and NHPA documents.
2.5.2 Cooperating Agency

A Federal, state, tribal or local agency having special expertise with respect to an environmental issue or jurisdiction by law may be a cooperating agency in the NEPA process. A cooperating agency has the responsibility to assist the lead agency by participating in the NEPA process at the earliest possible time; by participating in the scoping process; in developing information and preparing environmental analyses, including portions of the environmental impact statement concerning which the cooperating agency has special expertise; and in making available staff support at the lead agency's request to enhance the lead agency's interdisciplinary capabilities.

Because of the NPS’s role in managing this property and managing the open space and Monuments on the National Mall surrounding the NMAAHC, the Smithsonian Institution invited the NPS to be a cooperating agency for the Tier I EIS process. The NPS accepted on September 18, 2006 (see Appendix A). Effective June 1, 2007, the NPS transferred administrative jurisdiction of the site to the Smithsonian Institution. As a result, the National Park Service will continue to operate the site as a public recreational resource and parkland through 2010 or until construction of the NMAAHC commences, whichever comes first (see Appendix B).
3.0 PUBLIC AND AGENCY INVOLVEMENT
3.1 HOW HAVE THE PUBLIC AND AGENCIES BEEN INVOLVED?

The Smithsonian Institution has engaged the public and Federal and local agencies in a series of meetings to help define the Tier I EIS scope and range of alternatives as required by CEQ (Section 1501.7) and NCPC procedures. Figure 3.1 identifies the different scoping meetings that have occurred to date.

3.1.1 Internal, Agency, and Public Scoping Process

According to CEQ regulations, the purpose of the scoping process is to determine the scope of the Tier I EIS so that preparation of the document can be effectively managed. Scoping helps ensure that problems (often termed “issues”) are identified early and thoroughly studied, that issues of little significance are dismissed and do not consume time and effort, that the EIS is thorough and balanced, and that delays that could result from an inadequate EIS are avoided. This is accomplished during the scoping process by identifying public and agency concerns; clearly defining the environmental issues and alternatives to be examined in the EIS; identifying related issues which result from separate legislation, regulation, or Executive Order (E.O.), such as historic preservation or endangered species concerns; and identifying state and local agency requirements which must be addressed.

To initiate scoping, a Notice of Intent (NOI) to prepare an EIS was published by the Smithsonian Institution in the Federal Register on November 20, 2006 (Vol. 71, No. 223). The NOI provided background information on the NMAAHC, described the preliminary range of alternatives, and presented the preliminary topics for analysis in the Tier I DEIS. A later notice in the Federal Register on December 26, 2006, published simultaneously in The Washington Post, announced a public meeting on January 4, 2007 and extended the public scoping period 30 additional days until February 4, 2007.

Because of the participation of NCPC and NPS in this Tier I EIS process and the need to obtain their initial comments even prior to the official internal, agency, and public scoping meetings, early meetings were held in September and October, 2006 to discuss each agency’s role and the Tier I EIS scope. Following these initial meetings and in concert with the NOI publication, a series of internal, agency, and public meetings were held beginning in November of 2006 and continuing through January of 2007 as delineated in Figure 3.1. Preliminary model scenarios developed in earlier studies and varying aspects of the Tier I EIS scope were presented, discussed, and refined at each of these meetings. Technical experts were present at each meeting to answer questions and capture the comments for their respective disciplines.

Formal internal scoping meetings among staff from the Joint-Lead agencies, Smithsonian Institution and NCPC, and the cooperating agency, NPS, were held in mid-November, 2006. A more extensive group of agencies was invited to the agency scoping meeting held in late November and December, 2006. Local and Federal agencies that attended the meeting and provided comments included:

- NPS
- Federal Highway Administration
- District of Columbia Department of Transportation
- Washington Metropolitan Area Transit Authority
- NCPC
- Commission of Fine Arts
- D.C. Historic Preservation Office
- Advisory Council on Historic Preservation
- District of Columbia Office of Planning
Several other agencies were invited but did not attend. Their input was solicited separately, after the formal scoping meetings. These agencies included:

- United States Secret Service
- White House Military Office
- District of Columbia Department of Health
- US Park Police
- District of Columbia Metropolitan Police Department
- District of Columbia Water & Sewer Authority
- District of Columbia Metropolitan Police Department

A public scoping meeting was held on January 4, 2007 for individuals and organizations interested in learning more about NMAAHC, providing comments about the preliminary alternatives, and expressing issues and concerns. Following an initial project presentation, the Smithsonian Institution and the consultant team were available to answer questions and to solicit comments. Meeting attendees were also provided the opportunity to submit comments via a standard form or directly to a court reporter. The public scoping period remained open until February 4, 2007, an additional 30 days from the date of the meeting.

These meetings were held in concurrence with official consultation meetings under Section 106 of the NHPA, the first of which occurred on January 30, 2007. This first meeting was incorporated as part of the Tier I EIS scoping effort.

The Notice of Availability (NOA) for the Tier I DEIS was published in the Federal Register on December 21, 2008. The associated public comment period was initiated by this publication and extended through February 19, 2008. A public hearing was held on January 10, 2008. Comments were made in writing, emails, and at the public hearing. The complete inventory of comments and responses is listed in Appendix G.

3.1.2 Consulting Parties

In the Spring of 2007, pursuant to Section 106 regulations implemented by the Advisory Council on Historic Preservation (ACHP) that encourage early coordination with groups or individuals who have a demonstrated interest in historic properties that may be affected by a proposed project, the Smithsonian Institution invited a number of constituents to participate in the Section 106 process as consulting parties.

These agencies and constituents include:

- National Capital Planning Commission
- National Park Service
- District of Columbia Historic Preservation Officer
- Advisory Council on Historic Preservation
- National Park Service Liaison to the White House
- U.S. Commission of Fine Arts
- District of Columbia Preservation League
- District of Columbia Office of Planning
- National Coalition to Save Our Mall
- Committee of 100 on the Federal City
- U.S. Capitol Historical Society
- Afro American Historical and Genealogical Society
- The Guild of Professional Tour Guides of Washington, D.C.*
- Association for the Study of African American Life and History
- Mary Annette McQuirter, Independent Scholar on African American issues in DC*
- National Trust for Historic Preservation*
- Advisory Neighborhood Commission 2A
- Advisory Neighborhood Commission 2F*

*Invited but did not attend official consulting party meetings
Following the release of the Tier I DEIS, the National Trust for Historic Preservation (NTHP) requested to participate in the Section 106 process as a consulting party. The letter welcoming the NTHP as a consulting party for the remainder of the Section 106 process can be found in Appendix G, Section G.2.

Due to the complex and extensive nature of the historic resources in the project area and the importance of views and viewsheds (both historic and non-historic but prominent), the Section 106 consulting parties played a key part in shaping the development of the alternatives and determining effects on historic resources. Following the Tier I DEIS public comment period, the consulting parties continued to propose strategies to avoid, minimize, or mitigate adverse effects to historic resources.

Their input was incorporated into the overarching principles (see Section 4.4). Following the publication of the Tier I DEIS, in the Spring of 2008 over the course of several meetings, the consulting parties developed Design Principles to ensure that the Tier II conceptual designs follow the principles of good contextual design. These principles are fully described in Section 4.8.

In addition, the Smithsonian Institution and the consulting parties finalized a road map for the continuing Section 106 consultation that will extend through the Tier II NEPA process (see Figure 3.2).

Figure 3.2: Road Map for the Section 106 Consultation through the Tier II NEPA Process

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3.2 WHAT BENEFITS AND CONCERNS WERE EXPRESSED DURING THE TIER I EIS SCOPING PROCESS?

The following are the major benefits and concerns expressed by topic during the various internal, agency, and public scoping meetings (Berger, 2007b) as well as the Section 106 consultation meetings:

3.2.1 Image and Character
The NMAAHC must be “clean, impressive, and monumental.” It will not necessarily portray an African American image in architectural style. It will be suitable to house a museum portraying the African American story and its contribution to the American story. It will be worthy of the Smithsonian Institution and of the Mall. Image and character do not imply that any design decisions have been made at this point.

3.2.2 Site Context and Building Constraints
The site is surrounded by a major concentration of monuments, historic buildings, designed landscapes, and streets influenced by historic urban plans. The National Mall, the Washington Monument, and the White House are not just historic properties; they are national symbols. The relation of the NMAAHC site to these features is of great concern. The interaction of the future NMAAHC with them will be impacted by their distance from the NMAAHC, the topography, the intervention of other features (planned and unplanned), and even their perceived symbolic value. Some examples include:

- **Height.** Are there nearby buildings that the NMAAHC’s height should not exceed, such as the NMAH to the east or the Commerce Building to the north? Which is the appropriate reference point?
- **Setback.** A minimum setback of 50 feet from surrounding streets is was used as a planning principle for building security in the Tier I EIS. Additional hardening of the NMAAHC structure could reduce this distance. However, set back is also an urban design issue. Neighboring buildings, particularly the NMAH to the east, provide reference points for setback, depending upon how the line is calculated (from the NMAH podium, consistent with the other museum buildings along Constitution Avenue, or from its principal building mass). Some comments on this issue favored taking into account the wider context of all the museums along the north side of the Mall, not just NMAH (see Figure 3.3 Contextual Building Setback & Alignment).
- **Massing.** The mass could transition between that of the museums on the Mall and the adjacent open space. The building could be designed so as to minimize the massiveness of its appearance by inclusion of features such as a courtyard, open space, or amphitheater rather than a solid mass.
- **Context.** A large amount of discussion focused on the urban design context for the NMAAHC. Comments consistently indicate that the NMAAHC site should relate more closely to the open character of the National Mall and Washington Monument Grounds than a continuation of the historic Mall (see Section 14.2 – Glossary of Terms for definitions of the Mall). The line of trees along some sides of the site provides a natural buffer. The character of the northern edge of the Mall is seen as a series of pavilion-like structures centered in green space. This aesthetic is in direct contrast to the more dense scale of the buildings of the Federal Triangle which lie north of Constitution Avenue.

Commenters indicated that there are urban design context issues that are essentially symbolic in nature, such as the symmetry of the National Mall and the primacy of the Washington Monument, White House and the U.S. Capitol Building. These are landmarks to which other structures must defer.

Similar to the eastern “end pieces” of the Mall, the National Gallery of Art East Wing and the NMAI, the NMAAHC will terminate the row of museums on the west. The East Wing and NMAI achieve this termination with buildings that are more individual than rectilinear. This individualistic aesthetic can be attributed, in part, to their non-rectangular sites. Although it is different, the NMAAHC site is also not rectangular; therefore, the site may call for a more iconic, irregular building.
- **Scale.** Although scale may be considered a product of the previous factors, several comments expressed were addressed to this issue alone. Some participating agencies indicated a desire for a monumental scale befitting a national museum defined as similar to the NMAI, while others preferred a more pavilion like scale defined as similar to the above grade portions of the Sackler or the Freer Galleries. Given a program of magnitude recommended and assumed in earlier planning studies (350,000 gsf), this conflict had implications for the parallel issue of how much of the NMAAHC might be below grade.

**Vistas and Viewsheds**
Many concerns were expressed about the potential impact of the NMAAHC on familiar views. Many commenters struggled with the issue of how to classify different types of views and vistas and suggested the development of a typology of views. There was concern about the potential of the NMAAHC to block familiar views of the Mall, neighboring historic buildings, and the Washington Monument and to adversely affect the 14th Street and Constitution Avenue gateways to the city’s monumental core.

*Figure 3.3: Contextual Building Setback & Alignment*
3.2.3 Groundwater, Soils, and Flooding
There were interrelated concerns about groundwater, floodplain, storm water runoff, and soil conditions at the NMAAHC site that were raised repeatedly throughout the meetings by agencies and the public. They included:

- Concerns about how the potential for water infiltration affects the practicality of constructing portions of the NMAAHC facility below grade;
- Concerns that construction of the NMAAHC could adversely affect the stability of the Washington Monument; and
- Concerns that the NMAAHC is in an area prone to flooding and could add to the overtaxing of the storm water sewer system.

3.2.4 Transportation
There were concerns regarding the existing transportation patterns for pedestrians and vehicles and a suggestion that additional analysis needed to be performed for public transportation as well as alternate forms of transportation. The Smithsonian Institution clarified that only three to four parking spaces will be required.

Commenters suggested that service access should be hidden. Since the service access must allow for a security check prior to entering the building, the Tier I EIS process should address heavy traffic volumes along 14th and Constitution Avenue that could conflict with queues of service vehicles.

Commenters suggested that the possibility of a pedestrian below-grade link between NMAAHC and NMAH under 14th Street needs to be considered.

3.2.5 Economic Impacts of Visitation
Commenters suggested that visitor statistics from other similar national museums on the Mall should be examined to construct a predicted visitation pattern for the NMAAHC which will be the basis for assessing its socioeconomic impact on the city and region, as well as traffic and public transportation demand generation.

3.2.6 Ambient Lighting
Lighting should ensure that principal landmarks such as the U.S. Capitol Building and the Washington, Jefferson, and Lincoln Monuments are lit more brightly in the nighttime sky.

3.2.7 Archaeology
Preliminary (Phase I) archaeological investigations indicate the presence of an intact landscape on portions of the NMAAHC site. Relevant contexts may be prehistoric settlement and the evolution of the Tiber Creek Canal. This should be appropriately addressed following further Section 106 consultations.

3.2.8 Noise
Noise from traffic may limit use of outdoor space for activities like performances. Landscaping and berms might provide buffering.

3.2.9 Public Health & Security
The NMAAHC will have risks and security features similar to other major buildings on the Mall. Bollards and other visible barriers should be minimized. Security should be governed by performance criteria, not pre-selected security devices.

3.2.10 Sustainability
Incorporating sustainable design features such as a “green” roof was seen as an opportunity.
3.3 TOPICS NOT INCLUDED IN THE TIER I FEIS

An issue was removed from further analysis if a preliminary impact analysis using the best available scientific evidence indicated that the resource associated with that issue would experience only negligible impacts. The issues considered but dismissed from further analysis in the Tier I EIS process were eliminated for the following reasons:

3.3.1 Biological Resources

During internal scoping, the Smithsonian Institution, NCPC, and NPS concluded that wetlands, wildlife (including rare, threatened and endangered species), and vegetation would be dismissed from further analysis in the Tier I EIS process. The site of the proposed NMAAHC is a flat, five-acre urban park with a maintained lawn and scattered trees around the periphery. There are no wetlands located on the site and due to the site’s urban context, attendant human activity, and its close proximity to highly utilized roads and attendant vehicle noise, the site provides little habitat value to wildlife. In addition, in a letter dated March 20, 2007 (see Appendix B), the U.S. Fish and Wildlife Service confirmed that no proposed or Federally listed endangered or threatened species are known to occur within the project area, and no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service would be required.

Vegetation was also dismissed as an impact topic due the site’s urban context and the fact that the vegetation on the site is highly maintained. The potential removal of trees associated with the proposal will be analyzed on the basis of its impacts to cultural resources and its effect on the overall landscape of the National Mall.

3.3.2 Socioeconomic Issues

Due to the existing land use of the site and the lack of any adjacent housing, the analysis of this resource area is not relevant for analysis in the Tier I EIS process.
4.0 DEVELOPMENT OF ALTERNATIVES
4.1 WHAT PROCESS WAS USED TO DEVELOP ALTERNATIVES?

The development of the Tier I EIS alternatives was an iterative process, one which took place from the September of 2006 through November 2007.

To ensure that the Tier I EIS alternatives would meet the purpose and need of the project, respond to the concerns identified, and represent a reasonable range of feasible alternatives, the Smithsonian Institution and NCPC invited the agencies that participated in Agency Scoping, as well as the official consulting parties for consultation under Section 106 of the NHPA, to refine the Tier I EIS alternatives based on scoping and other input.

As a point of departure, these numerous agencies evaluated the conceptual alternatives from the previous planning documents (The Commission’s The Time Has Come and The Final Site Report as well as the Site Evaluation Study Volume I & II). Each conceptual alternative was evaluated based on the critical factors of massing, height above grade, depth below grade, outdoor program space, setback (alignment & security). The box to the right provides clarification of these terms.

Based on these criteria, the project team developed a series of principles and goals that guided the development of alternatives. The range of alternatives either partially or fully meets these principles and goals.

The final step in developing alternatives involved an extensive Viewshed Analysis and consideration of aesthetic criteria.

The following sections describe the Plans and Programs that affect the planning area, the conceptual alternatives that were developed in the earlier planning studies and presented during scoping, the principles and goals, Viewshed Analysis, and the framework for developing alternatives based on aesthetic resources.

<table>
<thead>
<tr>
<th>EVALUATION CRITERIA FOR ALTERNATIVES</th>
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<tbody>
<tr>
<td><strong>Massing</strong></td>
</tr>
<tr>
<td>Massing is the form of a building that conveys proportion and size.</td>
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<tr>
<td><strong>Building Height</strong></td>
</tr>
<tr>
<td>The vertical distance from the ground plane to the tallest point of the structure. Since ground plane varies on the NMAAHC site, the building height is measured from average site grade and leaves a margin of flexibility for articulation and architectural embellishments such as domes and skylights.</td>
</tr>
<tr>
<td><strong>Setback &amp; Alignment</strong></td>
</tr>
<tr>
<td>Setback is the distance a building is removed from the street (or sidewalk), either for security or to align with other buildings.</td>
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<tr>
<td>Alignment refers to the arrangement or relationship of several disparate components along a common vertical or horizontal line or edge.</td>
</tr>
<tr>
<td><strong>Outdoor program space</strong></td>
</tr>
<tr>
<td>The exterior space of a building is used to accommodate additional operations or functions of the building. Several examples of outdoor programmed space include courtyards, patios &amp; dining areas, performance space, and gardens.</td>
</tr>
<tr>
<td><strong>Viewshed</strong></td>
</tr>
<tr>
<td>A viewshed includes a total visible area from a particular fixed vantage point.</td>
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</table>
4.2 WHAT ARE THE LOCAL PLANS AND PROGRAMS THAT AFFECT PLANNING IN THE PROJECT AREA?

The following plans and programs address important planning issues facing the National Capital Region, the monumental core, and the National Mall. These plans and programs have also affected the design and selection of the site for the NMAAHC.

4.2.1 L’Enfant Plan (1791)

The original comprehensive plan of Washington, D.C. was designed by Peter (Pierre) Charles L’Enfant in 1791 as the site of the Federal City. L’Enfant developed a plan that featured ceremonial spaces and grand radial avenues while respecting the natural contours of land. The resulting plan was a system of orthogonal streets with intersecting diagonal avenues radiating from the two most significant buildings sites – the Capitol and the White House (Robinson & Associates, 2001). A monument dedicated to George Washington, in the form of an equestrian statue, was to be placed at the terminus of the east-west axis from the Capitol to the western horizon and the north-south axis from the President’s house to the southern horizon. The area would later become the site of the Washington Monument. Section 6.2 Cultural Resources provides a more detailed description.

4.2.2 The McMillan Plan (1901)

The ambitious McMillan Plan, created by the Senate Park Commission in 1901, sought to re-establish elements of the L’Enfant Plan, which included the restoration of the east end of the Mall, the correction of the awkward off-axis placement of the Washington Monument, the inclusion of the new “Potomac Park” (i.e., East and West Potomac Parks), and the removal of railroad tracks from the monumental core (Robinson & Associates, 1999). The Commission envisioned the Mall as a formal tree-lined walk flanked by classical buildings, creating an unbroken vista between the Capitol and Washington Monument. The visual focal point of the McMillan Plan was the Mall, which the Commission proposed to extend westward and enhance as a formal, axial greensward. The McMillan Commission members interpreted the L’Enfant Plan as calling for treating the entire Mall as a continuous space that was set aside entirely for public use. A specific landscape treatment plan for the Mall consisted of a greensward flanked on either side by four rows of elm trees (Moore, 1902).

Implementation of the McMillan Plan continued throughout the 1930s; however formal plans for the Washington Monument Grounds were abandoned and the site remained as an open landscape characterized by the prominent knoll with curvilinear circulation paths throughout the grounds.

Section 6.1 Cultural Resources provides a more detailed description of these historic plans.

4.2.3 NPS Master Plan for the Washington Mall (1976)

In 1976, Skidmore Owings Merrill prepared a Master Plan for the NPS that delineated how the McMillan Plan was actually realized in the Mall of the 1970s with an emphasis on pedestrian use.

4.2.4 NPS National Mall Plan

Previously known as the National Mall Comprehensive Management Plan, the NPS National Mall Plan is an update to the previous 1960s management plan and is a long-term vision plan to guide resource conservation and management and operations on portions of the Mall under NPS jurisdiction, as well as individual monuments and Pennsylvania Avenue between 3rd and 15th Streets. The National Mall hosts more than 25 million visitors a year, and as a result there are significant impacts to its natural and cultural resources. The National Mall Plan, the associated EIS, and Section 106 process will address issues related to landscape maintenance and visitor use. The National Mall Plan recognizes the future NMAAHC and three different elements related to it:

- The possible depression of 14th Street under the Mall at Madison Drive
The possible creation of an underpass on the south side by the Sylvan Theater
The possible creation of a pedestrian bridge over 14th St. at Madison Drive.

4.2.5 Memorials and Museums Master Plan (2001)
In September 2001, the NCPC in cooperation with the U.S. Commission of Fine Arts (CFA), and the National Capital Memorial Commission, completed the Memorials and Museums Master Plan. This Master Plan covers various sites throughout the Washington, D.C. area. The Memorials and Museums Master Plan lists the 102 sites that are considered to be likely sites of future memorials or museums.

The Master Plan defines a framework of three main elements:
• The Waterfront Crescent that covers the shores of the Anacostia and Potomac Rivers
• The monumental corridors that extend from the White House and the Capitol Building
• The Commemorative Focus Areas that mark the intersections of the Waterfront Crescent and major streets and corridors

The two anchor points of the plan, which will remain the focus of the city, are the White House and the Capitol Building. The Plan designates site acquisition policies that require Federal and District governments to identify key parcels as a location for new commemorative features, and for Federal and District governments to utilize land management programs to preserve lands for commemorative resources at recommended sites.

The Plan also designates site selection policies that should consider: preserving the integrity of the monumental core (vistas, open space and recreation areas); encouraging new memorials and museums to be in all quadrants of the city as a way of reinforcing local community and revitalization efforts; locating only museums and memorials of the "highest history and national significance" within this sensitive area; designating commemorative works of preeminent historic and national significance in this area to be limited to sites identified in this master plan; and reserving all new memorial and museum sites to be appropriate to their subject and respectful of the immediate surroundings.

The Commemorative Zone Policy of the Memorials and Museums Master Plan encourages the location of museums and memorials in all quadrants of the city to enhance local neighborhoods and support revitalization efforts. The policy established three commemorative zones:
• Reserve, the cross axis of the Mall, is where no new memorials will be permitted.
• Area I, a sensitive area, is designated for commemorative works of preeminent historic and national significance.
• Area II, the remainder the city, is where development of new memorials and museums is encouraged.

Chapter 89 of Title 40 of the Commemorative Zone Policy of the Memorials and Museums Master Plan discourages development on the National Mall and Washington Monument reservation and designates a “Reserve” area on the cross-axis of the Mall where no new memorials will be permitted. Nevertheless, it is important to note that the NMAAHC Act Section 8 states under the “Non-Applicability of Provisions Relating to Monuments and Commemorative Works” that Chapter 89 of title 40, “shall not apply with respect to the Museum” (see Appendix A).

In August 2004, NCPC adopted the Comprehensive Plan for the National Capital: Federal Elements. The Plan is a statement of goals, principles, and planning policies for the growth and development of the National Capital during the next twenty years. The Plan encompasses all Federal lands in Washington, D.C. and the surrounding areas, including Montgomery and Prince George's Counties in Maryland; Arlington, Fairfax, Loudoun, and Prince
William Counties in Virginia; and all cities within the boundaries of those counties. The Federal Elements of the Comprehensive Plan for the National Capital identify and address the current and future needs of Federal employees and visitors to the Nation’s Capital; provide policies for locating new Federal facilities and maintaining existing ones; guide the placement and accommodation of foreign missions and international agencies; promote the preservation and enhancement of the region’s natural resources and environment; protect historic resources and urban design features that contribute to the image and functioning of the Nation’s Capital; and, working with local, state, and national authorities, support access into, out of, and around the Nation’s Capital that is as efficient as possible for Federal and non-Federal workers. The seven Federal Elements are: Federal Workplace; Foreign Missions and International Organizations; Transportation; Parks and Open Space; Federal Environment; Preservation and Historic Features; and Visitors. (NCPC, 2004b).

In October 2002, NCPC developed a National Capital Urban Design and Security Plan (NCUDSP). This Plan was developed in cooperation with Federal agencies, the District of Columbia government, security experts, the professional planning and design community, the Architect of the Capitol, and the public, as well as the U.S. Secret Service. The NCUDSP outlines the need to improve security in the National Capital but to do so in a manner that is aesthetically pleasing to residents, workers, and tourists visiting the area. The temporary security structures put into place after the Oklahoma City bombings and increased after the September 11th, 2001 attacks are often criticized for being unsightly and limiting pedestrian access. The Plan focuses exclusively on perimeter building security designed to protect employees, visitors, and Federal functions and property from threats generated by unauthorized vehicles approaching or entering sensitive buildings.

The plans outlined in NCUDSP include using architectural elements to enhance the security around Federal buildings. These elements include decorative lighting, planters that are also benches, bollards, fencing and lawns. The Plan does not address issues such as building hardening, operation procedures, or surveillance. Initial findings from the NCUDSP state that many of the buildings along Constitution Avenue and Independence Avenue do not meet the minimum setback distance from the curb. Curbs or parking lanes might have to be removed to meet the setback requirement (NCPC, 2002).

4.2.8 Smithsonian National Museum of African American History and Culture Site Evaluation Study (2005)
The purpose of this study was to thoroughly evaluate the four candidate museum sites designated by the NMIAHC Act. The four potential sites under consideration are the Smithsonian Institution’s Arts and Industries Building site at 900 Jefferson Drive, NW; the Monument site area on the National Mall bounded by Constitution Avenue, Madison Drive, and 14th and 15th Streets, NW; the U.S. General Services Administration (GSA) Liberty Loan site at 14th Street, SW, at the north terminus of the 14th Street Bridge; and the Banneker Overlook site on 10th Street, SW, at the south terminus of the L’Enfant Plaza Promenade. This site evaluation study was organized into two phases.

Phase I: Data Gathering Report
Phase I occurred between January 2005 and August 2005. This first phase consisted of two major activities—developing the study methodology and approach, and gathering data on each of the four potential sites. The methodology and approach was completed on February 10, 2005. The second part of Phase I efforts produced a record of the data-gathering efforts on the four potential NMIAHC sites. In September 2005, the Plexus Scientific Corporation and PageSoutherlandPage completed the NMIAHC Site Evaluation Study for Phase I: Data Gathering. This report provides a record of data gathering efforts under this study and is a precursor to follow-on
work that will be used to evaluate the site data (Plexus Scientific Corporation and PageSoutherlandPage, 2005a).

4.2.8.1 Phase II: Analysis and Modeling
Phase II occurred from April 2005 through October 2005 and analyzed the applicability of gathered data, the relative importance of the site attributes and site characteristics obtained during Phase I. On November 15, 2005, the Plexus Scientific Corporation and PageSoutherlandPage completed the NMAAHC Site Evaluation Study for Phase II: Analysis and Modeling. The study takes an in-depth look at the four potential sites looking to meet criteria for the NMAAHC building. Each site was evaluated based on potential gross square footage of completed building, access to public transportation, site lines of important buildings, proximity to other museums, potential for security issues, compatibility with existing plans for the area, and recommendations about site selection from prominent members in the community (Plexus Scientific Corporation and PageSoutherlandPage, 2005b).

4.2.9 District of Columbia Comprehensive Plan Update (2006)
In December 2006, the District Office of Planning for the District of Columbia completed the Comprehensive Plan for the National Capital: District Elements. This plan focuses on Washington, D.C. as a whole, including Federal elements, the framework of many established neighborhoods, and the role of transportation. The plan focused on resource areas, such as Land Use, Transportation, Housing, Environmental Protection, Economic Development, Parks Recreation and Open Space, Urban Design, Historic Preservation, Community Services and Facilities, Educational Facilities, Infrastructure, and Arts and Culture. The Comprehensive Plan is not intended to be a substitute for more detailed plans nor dictate precisely what other plans must cover. Rather it is the one document that bridges all topics and is cross-cutting in its focus. It is the only Plan that looks at the “big picture” of how change will be managed in the years ahead. One initial finding within the Transportation element reads, “Ensure that the redesign and/or reconstruction of bridges includes improved provisions for pedestrians, including wider sidewalks, adequate separation between vehicle traffic and sidewalks, guard rails, pedestrian-scaled lighting, and easy grade transitions.” It also states that some of the roadway and bridge investments the city plans to make within the next 5-8 years include: constructing a tunnel between I-295 east of the Anacostia River and the existing I-395 Third Street Tunnel for thru-traffic underneath the South Capitol Street corridor, and replacing the Southeast Freeway. This also involves reconfiguring the underpass at the intersection of M and South Capitol Streets.

4.2.10 Extending the Legacy Plan (1997)
In 1997, NCPC completed the plan entitled Extending the Legacy: Planning America’s Capital for the 21st Century, which is the current guiding document for the monumental core. This Plan provides a framework that expands upon the L’Enfant Plan and the McMillan Plan, but it is distinguished from the latter because it does not propose a building on the NMAAHC site. Rather, the Plan favors preserving the open landscape of the Washington Monument Grounds. The Plan also redefines the monumental core, extending its boundaries along North Capitol, South Capitol, and East Capitol Streets.

The Plan calls for economic development in every section of the city including new parks, offices, and transit centers throughout. The Plan acknowledges the division of the city by elevated highways and railroad tracks and calls for the removal of obsolete tracks and roads and relocation of active tracks and roads into tunnels beneath the city and the Potomac and Anacostia Rivers. This will allow for the broad avenues envisioned by the L’Enfant plan to be restored and increase aesthetic value in the city. With an expected 70 percent increase in automobile traffic expected by 2025, the Legacy Plan suggests that behavioral patterns need to change in regards to commuting options. Two-thirds of the employees working in D.C. commute from outside of the city. Many use single occupancy vehicles. The Legacy Plan states that transportation initiatives will only work if employers develop transportation management programs that allow employees to have flexible schedules and carpooling incentives.
Besides transportation initiatives, the Legacy Plan calls for restoring the waterfront of the city. Pierre L’Enfant envisioned a great city that focused its attention on the Potomac and Anacostia Rivers. The rivers are not visible in some locations due to buildings situated directly on the banks. The Legacy Plan outlines plans for a waterfront stretching from Georgetown to the National Arboretum, with quiet open spaces and other areas used for festivals, concerts, and other urban activities. The Anacostia waterfront would have a relaxed neighborhood feel and would focus on the environment and ecology that will ultimately help reduce the amount of pollution in the Anacostia River. The west bank of the Potomac will have improved pedestrian access by diverting traffic away from the George Washington Memorial Parkway.

The Plan discusses the revitalization of South Capitol Street and M Street and is considered the first major initiative of the Legacy Plan. However, there are smaller projects that will take place during this time. The Legacy Plan outlines guidelines and implementation plans and even includes the possibility of relocating the Supreme Court to a location along the waterfront. The Legacy Plan is now the general framework for Washington, D.C. and all plans since then have been based on this document.

Because intense construction of memorials and museums in the monumental core would overwhelm the historic open space on the National Mall and surrounding area, this plan encourages new construction away from the National Mall and towards geographically significant areas in other quadrants of the city to generate more dispersed economic development.


The District of Columbia is required by Federal regulations to have a long-range transportation plan and to update the plan regularly. The District chose to meet this requirement by developing a vision and strategic plan for developing a transportation system that would support the city. A Transportation Vision, Strategy, and Action Plan for the Nation’s Capital was published in 1997 (DDOT, 1997).

The Plan set a list of proposals for the transportation system aimed at enhancing the District of Columbia’s quality of life and its attractiveness for residents, business, and visitors. These include:

- Developing sufficient and consistent funding to sustain a world-class infrastructure and an exemplary multimodal project planning and institutional coordination process.
- Improving the efficiency, safety, and attractiveness of the existing transportation system through improved maintenance, streetscaping, and signage.
- Focusing transit investment on internal circulation to provide city residents and visitors with improved alternatives to the automobile.
- Reducing the impacts of suburb-to-city travel on district residents by intercepting automotive traffic at key locations and providing excellent alternatives to city driving.
- Promoting business in the District by addressing goods movement through improved loading facilities and by improving rail as an alternative method for moving goods into and out of the city.
- Developing non-traditional “signature” transportation for the district, including a water-taxi system, light rail, and a world-class bicycle transportation network.

The 1997 plan also includes recommendations on improving signage and traveler information, public and tour bus parking, light rail, Metrorail and bus fare structure, airport and waterway connections, bicycle and pedestrian movement, truck and rail movement, and expanded multimodal funding.

The plan addresses transportation assets as sidewalks and pedestrian trail systems, bicycle routes and off-road trails, in addition to several other modes of transportation. Due to the fact that some bicycle and pedestrian trails in the District under this plan are under NPS jurisdiction, the plan represents an agreement by the NPS with the public on how the park and parkway will be used and managed. The trails under NPS jurisdiction include the Rock Creek Trail, the C/O Towpath, the Capital Crescent Trail, the Fort Circle Hiker/Biker...
Trail, the Oxon Cove Trail, the Anacostia Trail, and the National Mall Multi-Use Walkways. The Plan does not propose specific actions or describe how particular programs or projects should be prioritized or implemented. Those decisions will be addressed during the more detailed planning associated with strategic plans, annual performance plans, and implementation plans.

4.2.12 Proposed Federal Capital Improvements Program

In 2006, the NCPC completed the Federal Capital Improvements Program (FCIP) for fiscal years 2007 – 2012. This document lays out the proposed budgetary commitments as reviewed and evaluated by the NCPC regarding federal activities in Washington, D.C. and the surrounding Maryland and Virginia counties. The FCIP plans the budget for a six fiscal year cycle. Projects listed in this document are not assumed to be approved, but rather the document includes the NCPC’s comments and recommendations for future projects. The NCPC drafted a FCIP for fiscal years 2008 – 2013 on June 7th, 2007; it was subsequently approved in September 2007. Projects relevant to the NMAAHC include:

- Reconfiguring South Capitol Street corridor into an urban boulevard, providing a gateway to the Nation’s Capital
- Storm water management system replacement throughout Washington, D.C.
- Washington, D.C. and vicinity flood control projects, including:
  - A levee between the Lincoln Memorial and the Washington Monument
  - Raising a section of P Street, SW, adjacent to Fort McNair
  - Permanent closure of 23rd Street & Constitution Ave., NW
  - Permanent closure of 2nd & P Streets, SW
  - Temporary closure at 17th Street, NW
- Southeast Federal Center remediation
- Repairs to seawalls in West Potomac Park
- Improved pedestrian linkages between the National Mall attractions and the Anacostia/Potomac River waterfronts
- National Mall road improvements – resurfacing, replacement, streetscaping, etc.
- Perimeter security and streetscape improvements to Constitution Avenue, Independence Avenue, and Southwest Federal Center
- South Capitol Street reconstruction

4.2.13 National Capital Framework Plan (Planning Initiative)

The National Capital Framework Plan is a multi-agency effort led by NCPC with the Commission of Fine Arts. This planning effort, by both agencies, shows how to create new and accessible destinations for cultural attractions throughout the city. The Framework Plan provides a comprehensive approach to easing demand for construction on the National Mall, in addition to creating attractive urban locations throughout the city. A preliminary plan was released in Fall 2007, accentuating the Extending the Legacy Plan and the Malls and Memorials Master Plan

4.2.14 Commemorative Works Act (1986)

The Commemorative Works Act (CWA) provides guidance for location and design of new memorials and monuments in the District and directly references Areas I and II in the Memorials and Museums Master Plan, including the NMAAHC site in Area I. The Act distinguishes between the close-in portions of the District where the commemorative works of "pre-eminent historical and lasting significance" to the Nation may locate, and areas outside this zone where works of "lasting historical significance" can be placed. It also seeks to preserve the urban design legacy of the L'Enfant and McMillan Plans by protecting public open space and ensuring that future museums and memorials in areas administered by the NPS and GSA are appropriately located and designed (NCPC, 1996).

4.2.15 Commemorative Works Clarification and Revision Act 2003

Similar to the Commemorative Zone Policy of the Memorials and Museums Master Plan, the Commemorative Works Clarification and Revision Act 2003 states that the cross-axis of the Mall is “a substantially completed work of art” and established the Reserve on
the cross axis of the Mall where no new memorials will be permitted. Nevertheless, the NMMAHC Act Section 8 states under the “Non-Applicability of Provisions Relating to Monuments and Commemorative Works” that Chapter 89 of title 40, “shall not apply with respect to the Museum” (see Appendix A).

### 4.3 CONCEPTUAL ALTERNATIVES FROM EARLIER PLANNING PHASES


The Presidential Commission engaged a prominent museum programming and design firm to develop a museum building program. Based on their professional understanding of museum functional use organization, they developed a schematic diagram showing proper adjacencies (see Figure 4.1) and a basic museum building program, which the Presidential Commission recommends as representing “reasonable needs” that were neither “too conservative or unnecessarily generous” and was a “critical benchmark in evaluating sites” (see Figure 4.2).

The total useable or “net” area needed was about 270,000 square feet (sf). This compilation did not include the space taken up by walls, hallways, stairwells, elevators, atriums, or the like. To develop the entire area needed for a museum building, or the “gross” area, a common “net to gross” or “grossing” factor was applied. Typically gross area is between 1.25 and 1.6 times the net for common building types. In the President Commission reports, a 1.3 gross to net factor was used, resulting in an estimated museum area of 350,000 gsf. This factor is appropriate and is comparable with other museums on the Mall.

*Figure 4.1: Facilities Program Organization Diagram (Interior Systems Inc., 2003a)*
In its Site Evaluation Study, the Smithsonian Institution and its consultants validated the Presidential Commission overall program, while adjusting the space categories and associated areas slightly based on the Smithsonian Institution’s long experience in developing and operating museums on a national scale. Figure 4.3 best illustrates the adapted program and adjacencies. Both the net and gross areas are essentially the same as the Presidential Commission recommendation.

In their report documents, both the Presidential Commission and the Smithsonian Institution tested their program “models” on each of the sites being considered using a method called “block and stacking.” Planners using this tool showed the major program elements in the preceding figures as proportional blocks and then stack them beside or on top of each other in logical arrangements similar to buildings but very diagrammatic and intending to show mass, not a building design.

The Presidential Commission reports show two massing alternatives for the Monument Site. One showed at least three levels above grade and support, storage, and mechanical space on a level below grade. The other showed a smaller building footprint in two levels above grade and many museum functions in two levels below grade. Both held to the 350,000 gsf building program.

The Site Evaluation Study differed from the Presidential Commission studies in that it also examined square footage program on the basis of what could be accommodated by each site and in this way testing for the building potential (see Table 4.1). The result of this analysis was that each of the sites under consideration could accommodate the “reasonable need.”
The Site Evaluation Study considered a minimum build-out for the Monument site to be 414,600 gsf with five levels above grade and one below, and a maximum build-out of 804,000 gsf with seven levels above grade and one below. Both the minimum and the maximum assumed a building placed along a north-south axis with the Commerce Building to the north and an east-west axis with the NMAH to the east. The difference between the minimum and maximum square footage was based upon two references from the urban design context: setback and height. While both conformed to the eastern and western setbacks of the adjacent Commerce Building, the minimum based its northern and southern setbacks on the main block of the NMAH to the east, while the maximum based these setbacks on the NMAH’s larger podium. The resulting building footprints were 72,300 gsf and 103,000 gsf, respectively. The other urban design reference was the height of the neighboring buildings, 75’ for the NMAH and 105’ for Commerce. The combination of these two factors along with a uniform assumption of only one below grade level produced the minimum and maximum totals of stories and square footage.

The result for the Tier I EIS process is that the two massing alternative diagrams for the NMAAHC at the Monument site from the Smithsonian Institution’s 2005 Site Evaluation Study and the two from the Presidential Commission’s 2003 Final Site Report became the four preliminary alternatives or scenarios that were exhibited at internal, agency, and public scoping meetings to stimulate comments and initiate the generation of the EIS alternatives.

Figure 4.4 illustrates these alternatives. Option 1-a and 1-b are from the Presidential Commission reports and Option 2 and Option 3 are from the Smithsonian Institution’s 2005 Site Evaluation Study.
4.4 OVERARCHING PRINCIPLES

The following principles and goals articulate what must be achieved for the proposed action to be considered a success. All alternatives selected for detailed analysis in this Tier I EIS process were considered to meet these principles and goals to a large degree and fulfill the purpose and need for action described in Chapter 2. The principles and goals are grounded in past planning studies for the NMAAHC, the site selection process, the anticipated program requirements of the future museum, and the context of its prominent site, and were refined through input from public scoping and Section 106 consultation.

4.4.1 Overarching Principles

**Physical Character/Quality:**
The NMAAHC will address the need for a major national facility in which to tell the African American story because “there exists no national museum within the Smithsonian Institution that is devoted to the documentation of African American life, art, history, and culture; and encompasses on a national level the period of slavery, the era of Reconstruction, the Harlem Renaissance, the civil rights movement, and other periods associated with African American life, art, history, and culture.” (NMAAHC Act, see Appendix A)

**Goals:**
- The NMAAHC will be “clean, impressive, and monumental.”
- The NMAAHC building and site design will be superior and sustainable, while ensuring flexibility for the NMAAHC designer.

**Mission and Program:**
The NMAAHC will be dedicated to the “collection, preservation, research, and exhibition of African American historical and cultural material reflecting the breadth and depth of the experience of individuals of African descent living in the United States.” (NMAAHC Act)

**Goals:**
- During the site selection process, the Smithsonian Institution generated a preliminary program for the NMAAHC. Based on this program, the baseline assumption for the NMAAHC’s size was 350,000 gross square feet (gsf). During the subsequent planning phase of the project, in the absence of a detailed architectural program, the Smithsonian Institution determined that a range of 350,000 gsf to 450,000 gsf would be sufficient to accommodate the NMAAHC’s mission and collection. The proposed size of the useable floor space represents an approximate range of building volume of 350,000 to 450,000 gross square feet. As a result, the process to develop a range of sizes for alternatives was based upon this determination.
- Outdoor space will be provided to accommodate museum-related programming and activities, and provide publicly accessible open space.

**Monumental Context:**
The NMAAHC will provide a place for reflecting on the connection to symbols of democracy and freedom reinforcing the idea that “since its founding, the United States has grown into a symbol of democracy and freedom around the world, and the legacy of African Americans is rooted in the very fabric of the democracy and freedom of the United States”. (NMAAHC Act, see Appendix A)

**Goals:**
- Strong linkages (physical connections and/or visual connections) will be reinforced with museums, monuments, memorials and other cultural resources.
- While maintaining the sense of openness and accessibility reflective of democracy and freedom, security risks associated with a building of its national and symbolic importance will be addressed, similar to other major facilities on the Mall (for example, with a recommended 50’ minimum setback on all sides.)
4.4.2 Urban Design Principles

Physical context:
The characteristic hierarchy of surrounding building heights, massing, and setbacks will be respected and enhanced by emphasizing the contrast between the monuments and museum buildings set within green spaces and the urban fabric of the Federal Triangle and while recognizing the importance of relating to the broader context of the National Mall.

Goals
- The NMAAHC building and site design will provide a transition from the museum row to the Monument and beyond.
- The NMAAHC’s mean height will not exceed the height of the tallest museum building on the Mall (the National Gallery of Art East Building) or the cornice height of the Commerce building immediately opposite the NMAAHC site, both about 105’.
- The NMAAHC building will have a minimum height that is not out of character (too horizontal) with its surroundings.
- The characterization of “mean height” will allow for building-height variation. Domes, penthouses, or architectural embellishments may exceed that height.

4.4.3 Historic and Cultural Resource Protection Principles

Historic Plans and Resources:
The NMAAHC will respect and enhance the District’s historic legacy of planning and maintain and reinforce key viewsheds and vistas.

Goals
- The NMAAHC massing, setback, and height will respect principal views related to the L’Enfant and McMillan Plans and the Washington Monument Grounds and other important views in the Area of Potential Effect. Key views are deemed to be the reciprocal views to and from the Washington Monument, including views of the rise from the grounds to the base of the Monument and from the top and base of the Monument, views of the Mall from the north and south along 14th Street, serial views from Constitution Avenue; the view toward the Monument from the northeast corner of 14th Street and Constitution Avenue; and from the Ellipse [or White House].
- Service access will be located so as not to diminish views from adjacent open spaces; from the Washington Monument (base and top); or from the broad, landscaped setback of Constitution Avenue.
- Views from the top of the Washington Monument will be protected and enhanced when designing and placing mechanical equipment and functions typically located on a museum roof.
- Existing landscape features, including trees, paths and topography, will be protected and enhanced.
- Opportunities will be created to respect and enhance the experience of the Mall with building and site lighting, solids and voids, and materials selection.
- The Smithsonian Institution will retain and become custodian for any archeological resources and provide related educational opportunities for the public.
4.4.4 Visitor Use and Access Principles

Public Amenities:
Public use of the NMAAHC site will continue to be provided and public amenities will be enhanced through design and construction of the NMAAHC.

Goals
- Ample outdoor space for NMAAHC programs and activities and opportunities for programming outside of typical hours will be provided.
- Landscape features such as themed landscaping that connects with the NMAAHC program will enhance the site.

Visitor Experience and Access:
The visitor experience will enhance connections to the National Mall, monuments, and Smithsonian Institution museums.

Goals
- Connections from NMAAHC to other cultural attractions will be enhanced through visual interest, including signage.
- Opportunities will be explored for pedestrian connections to the National Museum of American History.
- Multiple entrances to NMAAHC will be provided that accommodate different group purposes and that facilitate public circulation from the Mall and Monuments and other museums, and from public transportation.

4.4.5 Functional Principles:

Museum Operations:
Museum operations will be efficient and functional while meeting desired standards of excellence appropriate for other symbolic spaces on the National Mall.

Goals
- Effective museum operation will be accomplished through independent loading and service facilities, while also addressing any opportunities for efficiencies.
- Adequate flood protection will be ensured through selected design and construction techniques, such as limiting underground facilities in the area of high water table.
- Opportunities will be explored and implemented for sustainable use of water resources.

4.5 VIEWSHIP ANALYSIS

4.5.1 Viewshed Methodology
A viewshed analysis was undertaken by the Louis Berger Group, Inc. (Berger) and its subconsultant, Beyer Blinder Belle, Architects and Planners to analyze different building heights and mass as illustrated in Figure 4.4. The viewshed analysis consisted of a three step process. First, the Berger Team carried out a visual reconnaissance of the views of the NMAAHC site from spots in the city and from across the Potomac River in Virginia. Each major location from which the NMAAHC might be visible, both close up and from afar, was included. Digital photographs with the point of origin noted were taken to serve as backgrounds upon which simple wire diagrams representing the NMAAHC at a certain height or scale could be electronically superimposed.

Secondly, a 3D modeling technique was used to simulate the volume of build-out for each alternative considered. (The Build Alternatives are described in Chapter 5.) The 3D volumes analyzed for each of the alternatives are diagrams. These diagrams are meant to represent: 1) an approach to the distribution of building mass on the site; and 2) the maximum potential volume as represented by height and building footprint; this maximum volume includes potential building projections like mechanical penthouses, but may not include potential architectural embellishments and features like domes (see the “Building Height” description for each alternative in Chapter 4). These diagrams do NOT represent specific design concepts.
Finally, the volume (shown in transparent white, as in Figure 4.5) was transposed over the existing photograph to simulate the area of impact and the degree to which adjacent historic resources would be obscured.

Figure 4.5: Example of the Viewshed Analysis, 14th Street & Constitution Avenue

The viewshed analysis was performed on all options for the following views:

A. From the top of the Washington Monument
B. From the top of the Old Post Office
C. 14th Street looking north
D. 14th Street looking south
E. Constitution Avenue looking west
F. 15th Street looking north
G. Washington Monument grounds looking east towards Department of Commerce
H. Northeast corner of 14th Street & Constitution Avenue looking toward the Washington Monument
I. Constitution Avenue looking east
J. From the center of the Ellipse looking southeast
K. From the southeast corner of the Washington Monument Grounds
L. From the Arlington House

4.5.2 Viewshed Categorization

Views were categorized by five main categories:

Historic & Urban Planning Viewsheds are reciprocal between one landmark and another. In Washington’s French influenced street plan these would be along major avenues, especially when they are terminated by monuments or other landmarks. The view from Washington Monument to the US Capitol Building along the Mall is an example.

Iconic Viewsheds are so familiar that they are a shorthand identification of their location. Most Monuments and important buildings such as the White House or US Capitol Building often provide the backdrop for iconic viewsheds.

Setting or Contextual Viewsheds are close-in in scale and relate to architectural, landscape, or environmental compatibility. Buildings and structures that are anomalies can be inserted without harming the setting but they must be designed with a fairly high degree of architectural sensitivity to the scale, massing, height, and material composition of their surroundings.

Wide Angle Viewsheds most often pertain to landscapes or panoramas. The view from the Arlington House toward the monumental core of Washington, D.C. is an example.

Sequential Viewsheds are not perceived from a fixed point but rather unfold to observers in motion (at varying speeds: pedestrians, bicyclists, drivers, and bus riders, etc.). An example of a sequential viewshed is the ever changing view as one penetrates or leaves the heart of the monumental core along Constitution Avenue or 14th Street.

The goal of the viewshed analysis was to provide an easily accessible answer to the question of how the addition of a building at a given height and width would affect the view of the site from all the most
historically significant and/or familiar vantage points. These views inform the effects analysis for the Alternatives within both the Aesthetic/Visual and the Cultural Resources sections.

Appendix C contains the full viewshed analysis.

4.6 HOW WERE AESTHETIC CONSIDERATIONS ADDRESSED IN THE ALTERNATIVES?

There are nine categories that provided an aesthetics framework for developing a range of alternatives.

4.6.1 Visual Character of Site

The visual character of the site influenced the development of all five build alternatives. Each of the alternatives attempts to present a massing, height, and setback that is compatible with the site's context, visual relationships, landscape features, and overall character.

4.6.2 Views and Vistas

Views and vistas were analyzed for each of the build alternatives. Numerous vantage points were analyzed; these were then narrowed down to the twelve with the most measurable visual impacts, which were analyzed as ‘before’ and ‘after’ representations by inserting the mass of each alternative into the existing conditions photographs (see Chapter 4, Figure 4.3 – Example of the Viewshed Analysis or Appendix C). The view and vista analysis occurred simultaneously with the development of alternatives and, based on project team evaluation and comments from multiple agencies and constituents within the scoping process, led to the elimination of a number of potential build alternatives before determining the six included in this report.

This portion of the study was conducted during the winter months when the significant tree canopy in the area is bare of leaves. The following descriptions of visual impacts are at a period of maximum visual exposure. From April through October all views will be further obstructed by the dense and expanded tree canopies in full bloom.

4.6.3 Urban Design Context

The urban design context played a major role in developing the range of alternatives. The varying building heights of the alternatives utilize the heights of the adjacent Department of Commerce building (DOC) and NMAH as points of reference (either aligning or deliberately not aligning). The varying building setbacks of the alternatives utilize the building façade lines of the Mall buildings to the east and the DOC building to the north as points of reference either aligning or deliberately not aligning. The varying open space configurations and locations for the alternatives were determined in relation to the open spaces of the Mall and Washington Monument Grounds.

4.6.4 Architectural Context

The architectural context played a minor role in developing the range of alternatives. While the buildings around the NMAAHC are well documented and will ultimately influence the visual character of the new museum, at this very early stage the range of alternatives does not attempt to represent architectural styles or concepts. Rather, they represent distinct approaches in terms of massing, height, and setback to placing a building of a certain size on the given site. All of the alternatives may be developed in contextual or non-contextual architectural styles, with varying visual and aesthetic relationships to the architectural context.

4.6.5 Landscape Features

Landscape features were addressed in the alternatives mainly in an attempt to minimize potential damage to or removal of existing trees. This affected the placement of the building and the extent of below-grade building levels.

4.6.6 Symbolic Values

The notion of the symbolic value of the NMAAHC, as it relates to aesthetic and visual resources, affected the alternatives primarily in terms of building scale and massing (see Section 4.4.1, "Monumental Context" for an explanation of project goals relating to the connection to symbols of democracy and freedom).
4.6.7 Ambient Lighting
The issue of ambient lighting played a minor role in developing the range of alternatives. While lighting will ultimately influence the visual character of the NMAAHC, the range of alternatives at this very early stage does not attempt to represent architectural styles or concepts. Each of the alternatives may be developed with any number of lighting approaches, depending on the architectural concepts and building materials. Ultimately, lighting should conform to a Mall-wide plan in which principal landmarks such as the U.S. Capitol Building and the Washington Monument, Jefferson Memorial, and Lincoln Memorial remain the principal beacons in the District’s nighttime skyline. Ambient lighting will be discussed in Tier II of the NMAAHC NEPA process.

4.6.8 Building Materials
The issue of building materials played a minor role in developing the range of alternatives. While materials will ultimately influence the visual character of the NMAAHC, the range of alternatives does not attempt to represent architectural styles or concepts, especially relating to building materials; this level of analysis would ultimately result in some type of design guideline with a specificity deemed unnecessary at this early stage. Each of the alternatives may be developed with any number of building material combinations, depending on the architectural concept. Building materials will be discussed in Tier II of the NMAAHC NEPA process.

4.6.9 Signage
The issue of signage played a minor role in developing the range of alternatives. While signage will ultimately influence the visual character of the NMAAHC, the range of alternatives does not attempt to represent the visual character of the site with a level of detail specific enough to cover signage. Each of the alternatives may be developed with a variety of signage concepts that address wayfinding to the NMAAHC from the many museums on the Mall. Signage will be discussed in Tier II of the NMAAHC NEPA process.

4.7 WHAT PROCESS WAS USED TO BRING THE ALTERNATIVES TO CLOSURE?

The Smithsonian Institution and NCPC invited the agencies that participated in the scoping process and the official NHPA Section 106 consulting parties to participate in a charrette, conducted on April 3, 2007, where they reviewed and commented upon a set of tools for developing alternatives to be analyzed in the Tier I EIS process, based on prior conceptual alternatives. The set of tools focused on variations in massing, height, and setback.

Based on feedback received at this charrette and a subsequent meeting between the Joint-Leads, the Berger Team produced twelve draft alternatives. On April 20, 2007, the Joint-Leads narrowed the list from twelve to five build alternatives. These five draft alternatives were presented on May 2, 2007 at a Section 106 meeting along with the overarching principles expressing objectives for the alternatives. These participants and representatives of agencies deemed the alternatives to represent an adequate and sufficient range for analysis within the Tier I DEIS. On May 7, 2007 the Smithsonian Institution, NCPC, and the Berger Team convened to refine the draft alternatives. Based on comments provided by the Joint-Lead agencies, the Berger Team revised the “Enframing” alternative and distributed it to the team on May 15, 2007. At the May 30 Section 106 Consulting Party meeting, the Berger Team presented the draft alternatives and several agencies provided comments and feedback. As a result, the Berger Team again revisited the “Enframing” alternative. On June 5, 2007 the Smithsonian Institution decided to proceed with five build alternatives for analysis in the Tier I DEIS. However, on October 30, 2007, in response to comments from the consulting parties to incorporate a lower profile option, one additional alternative (Alternative 6 – Low Profile) was presented. On November 16, 2007, Alternative 6 was revised and adopted. As a result, six final Build Alternatives and the No Build Alternative were analyzed in this Tier I EIS process. Chapter 5 includes full descriptions and images of each Build Alternative.
4.8 PREFERRED ALTERNATIVE

CEQ Section 1502.14(e) requires the agency responsible for preparing an EIS to identify a preferred alternative in the FEIS. Within NEPA, the agency is directed to select a preferred alternative based on its ability to best fulfill the agency's statutory mission and responsibilities, or in this case, the purpose and need of the proposed action. In selecting a preferred alternative, the Smithsonian Institution must consider the associated impacts to natural and cultural resources.

4.8.1 What factors affect the Selection of a Preferred Alternative?

Three main issues influenced the selection of the FEIS preferred alternative: public and agency comments, the degree of impacts for the various resource areas (particularly adverse or unavoidable), and the ability of the alternatives to satisfy the purpose and need.

Public and Agency comments

The Smithsonian Institution, in conjunction with NCPC, NPS, and the consulting parties in the NHPA Section 106 process, evaluated each alternative based, in part, on the comments received during the public comment period. These comments related to the effects of the physical characteristics of specific alternatives in terms of massing, height, and setback.

Resource Area Impacts

The range of Build Alternatives enabled analysis of a sufficient spectrum of environmental impacts. In the Tier I EIS process, the alternatives were evaluated against levels of significance in numerous resource areas including cultural resources, visual resources, water, air, noise, transportation, land use, socioeconomics, infrastructure, visitor use, public health, and security.

Ability to Satisfy Purpose and Need

To ensure that the alternatives sufficiently meet the purpose and need, the process to develop a range of Build Alternatives began with past planning studies for the NMAAHC which include the site selection process and the previous planning documents that detail the program requirements of the future museum.

4.8.2 What is the Smithsonian Institution’s Tier I Preferred Alternative?

The Preferred Alternative encapsulates the issues “ripe for decision” in the Tier I level of environmental review. The Tier I Preferred Alternative will inform the subsequent design process and serve as instructions to the design architect. Tier II will evaluate concept design alternatives.

Because this Tier I FEIS concludes that the Build Alternatives have comparable effects on the majority of resources analyzed, except cultural and visual/aesthetic resources which will be resolved in Tier II, the Smithsonian Institution has chosen to express its Preferred Alternative as a range of massing options with different heights, setbacks, and configurations defined by the Build Alternatives. Table 5.3 provides a summary of the Build Alternatives as well as the principles that each fulfills.

The physical parameters of the Preferred Alternative are bounded by:

- the lowest Build Alternative (60’) and tallest Build Alternative (105’)
- a minimum 50’ building setback from the surrounding streets [shown from inside face of sidewalk]14th & 15th Streets, Madison Drive, and Constitution Avenue.
- a subsurface building volume that will not exceed 45’ in depth or the largest subsurface building volume in any of the Build Alternatives
- a building mass that ranges from orthogonal and contextual to free form and non-contextual.
4.9 DESIGN PRINCIPLES

The design principles below are a refinement of the overarching principles that informed the development of the six Build Alternatives for the National Museum of African American History and Culture that are analyzed in this Tier I FEIS. The principles reflect the analysis summarized in the overarching principles matrix and supporting documents (Robinson & Associates, 2008) that are the result of discussions with the Section 106 Consulting Parties and others, and that are intended to help in setting priorities for key critical issues that must be considered by future design architects.

The Smithsonian Institution has determined, along with the District of Columbia Historic Preservation Office and the Advisory Council on Historic Preservation, that construction of any museum building, as defined in this undertaking’s authorizing legislation, on this site will have an adverse effect on historic resources. As such, the analysis of the site and the restriction and/or benefits of scale and massing established by the six Build Alternatives and any variations on, or combinations of, the Build Alternatives studied in this Tier I FEIS should be understood and considered by those developing concept designs for consideration by the Smithsonian Institution.

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The design of a new National Museum of African American History and Culture is an opportunity to respond to the symbolic landscape and the prominent location of this site on the National Mall, the centerpiece of the monumental core of our nation’s capital. The site, a five-acre parcel of the approximately 72 acres of the Washington Monument grounds, is unique and has its own character-defining aspects.

Consistent with the goal of Section 106 of the National Historic Preservation Act to consider historic properties in project planning, it is important to acknowledge and recognize that the views and vistas to and from the site will change with the introduction of a physical structure on the site. As such, the Smithsonian wishes to emphasize that the analysis included in this Environmental Impact Statement will be reviewed and understood before a design is initiated. The Design Principles are intended to help ensure a sensitive design for this significant undertaking in Washington, DC.

These principles represent the Smithsonian’s preferred approach to the design of the National Museum of African American History and Culture as informed by the Smithsonian’s consideration of the views expressed in the context of the Section 106 consultations that have taken place during the Tier I NEPA process. Tier I has analyzed the potential effects of the build alternatives and as concept designs are developed they will be assessed to ensure that they have addressed and responded to the Design Principles and other data developed during the Tier II.

A. General Composition of the National Mall:

The National Mall presents a unity of overall spatial design but is composed of distinct parts, including the Mall, the Washington Monument Grounds, and West Potomac Park. Though administratively separate, the Ellipse and White House Grounds are also part of this extended landscape composition. The museum site occupies a highly prominent and pivotal location next to both the continuous east-west axis of the National Mall from the U.S. Capitol to the Lincoln Memorial and the north-south axis from the White House to the Jefferson Memorial.

- The design should respect the character and history of the monumental core as it has evolved through seminal plans, most notably the L’Enfant Plan and the McMillan Plan, but also including Victorian-era and mid-20th-century plans.
- The spatial organization of the National Mall is cross-axial and the design of the proposed museum should not detract from this central idea.
• Impacts on panoramic views that open and widen on the approach to the Washington Monument Grounds from the National Mall or the Ellipse should be minimized.
• The design of the museum must consider long views within the National Mall, as well as distant views from higher locations, such as Arlington Cemetery the Old Post Office Pavilion, from the air and from the Washington Monument itself.

B. Context of the Washington Monument Grounds:

The site is located on the Washington Monument Grounds. The setting of the tallest and most prominent structure in the monumental core, this 72-acre reservation is characterized by Olmstedian design principles, notably open lawns, curvilinear paths and roads, and selective groupings of trees.

• The design of the museum must be respectful of the prominence of the Washington Monument and its scale and design character.
• The design of the museum should be informed by the distinct characteristics of this historic environment, which include picturesque, irregular, and asymmetrical forms, and the topography of the grounds.
• The design of the museum and its site should be responsive to other structures and features on the Washington Monument Grounds, such as the Monument Lodge, the Bulfinch Gateposts, the curvilinear pathways, tree placement and landscape features.
• The design of the building should take into consideration the physical definition, character, and views of the Washington Monument Grounds as seen and experienced from within the reservation.

C. Relationship to Adjacent Architectural and Urban Context:

The site is located to the west of 14th Street, NW, which forms the western end of the Mall. Between the Mall and Constitution Avenue is a series of museum structures with an established pattern of height, setbacks, and site coverage; these help define the formal landscape of the Mall with its expansive panels of lawn flanked by double allees of trees. The composition of the National Mall landscape and the large museums is further framed by the monumental Federal Triangle to the north.

• The museum should not project beyond the existing screening of trees along the southern line of the row of museum structures.
• Given the context of the site, setbacks should respect the general character of the National Mall side of Constitution Avenue on the north, the tree buffer along 14th Street and should maximize views of the monument and grounds on the West.
• The height of the museum should be compatible with that of the predominant massing of the row of museum structures to the east.
• All sides of the building, including the roof, will be highly visible and should be treated as public facades. The appearance of service and support functions should be eliminated to the greatest extent possible by placing them below grade.
• Any requisite perimeter security should be designed and integrated into the facility from the earliest concept design and be compatible with the character of the new building and site.
4.9.1 How will the Tier I Preferred Alternative be used in Tier II NEPA?

The Tier I Preferred Alternative includes the range of all reasonable alternatives which were rigorously explored and objectively evaluated in the first tier. As long as the Tier II concept designs fit within the physical envelope defined by the Tier I Build Alternatives and conform to the design principles developed in Tier I, it will be unnecessary to revisit, in Tier II, the analysis of effects resolved in Tier I. By carrying forward this analysis, Tier II can “eliminate repetitive discussions of the same issues” and focus on “the actual issues ripe for decision” (CEQ Section 1502.20).

4.9.2 Does NCPC select a Preferred Alternative?

Although NCPC is the responsible Federal Agency, it is an independent regulatory agency and therefore, it is not directed under NEPA to make decisions in any particular way or in a way inconsistent with its statutory charter. As a result, NCPC does not state a preferred alternative in its EIS document development.
5.0 DESCRIPTION OF ALTERNATIVES
5.1 NO BUILD ALTERNATIVE

Section 1502.14(d) of CEQ requires the alternatives analysis in the FEIS to “include the alternative of no action.” The “No Build” alternative is defined by CEQ as considering the environmental consequences of not undertaking the action or project proposed. This alternative is a snap-shot of the current condition and represents the current management of the site. The purpose of describing and analyzing a “No Build” Alternative is to allow decision makers to better understand the environmental consequences of continuing to operate a project under the terms and conditions of its existing situation. These consequences can then be compared to those associated with the proposed alternatives. That is to say, the No Build Alternative provides a baseline for Analysis.

The “No Build” Alternative has environmental impacts. Generally, these would include the environmental impacts of not satisfying the underlying purpose and need of the action taken by the agency.

For the purpose of the Tier I EIS process, the No Build Alternative is the continuation of the current management of the NMAAHC site as parkland with no changes. Under this alternative, the NMAAHC would not be built and essentially the status quo would be maintained. The existing land use for concessions and periodic demonstrations would continue, as would basic landscape maintenance. Nevertheless, under the No Build Alternative, there would be no new museum that would have the opportunity to expand the present level of cultural ethnic relevance to visitors to the museums on the Mall.

5.2 ELEMENTS COMMON TO ALL BUILD ALTERNATIVES

Since neither definitive programming nor architectural design for the NMAAHC has been accomplished, the resulting alternatives that were analyzed in the Tier I EIS process remain general and schematic in nature, but are considered to be both reasonable and capable of fulfilling the purpose of the NMAAHC as envisioned by Congress.

5.2.1 Mass

Size of building and a brief description of museum program

As described in Section 4.3, the area used for a point of departure for the massing alternatives is approximately 350,000 gsf. Although the actual programming of functions for the future NMAAHC with resulting interior space requirements has not yet taken place, a proposed breakout of the program can be seen in Figure 4.2.

While the Site Evaluation Study generated an Outline Facility Program of approximately 270,000 net square feet (nsf), or 350,000 gsf for the NMAAHC, an architectural program for the NMAAHC has not been completed. As a result, to provide the future design maximum flexibility, the Smithsonian Institution elected to use a range of 350,000 gsf to 450,000 gsf for planning purposes. This became the key requirement for any alternative deemed acceptable for achieving the purpose of the NMAAHC as authorized by Congress. While the alternatives development was based on this determination, the process was guided more by massing (shape, height, and setback) than gross area. As a result, the largest alternative is 430,000 gsf.

Building Height

Similar to the massing scenarios developed for the Site Evaluation Study, the rationale for building heights in the range of alternatives is borrowed from the buildings that surround the NMAAHC site, specifically, the adjacent DOC building and the NMAH.
Offsite storage

The development of alternatives has been based on the assumption that storage for some collections will be accommodated offsite. While the NMAAHC will have a certain amount of space in its program reserved for exhibition, exhibit support, collection storage and management, and so on, objects not actively in use may be housed offsite.

5.2.2 Access – pedestrian, vehicular, and service

The NMAAHC’s prominent site creates the unusual circumstance of high visibility on all sides of the block. The NMAAHC will have four (or more) fronts, creating the need for shielded or underground service access and a well-considered pedestrian network of open space, building entrances, and visual orientation.

In the second tier NEPA process, more precise concept designs will yield more information upon which the Smithsonian Institution may base decision for pedestrian, vehicular, and service access. The concept designs will define a building orientation which will affect the placement of the service and loading access and will determine the best way for pedestrians to access the site. The Smithsonian Institution will explore different options for service access, including placing it underground, and will determine if pedestrian access across 14th Street is feasible, whether above or below grade.

5.2.3 Security setback

While a variety of factors determine building setbacks, including urban design context, a minimum security setback of 50' from surrounding streets was used as a Tier I planning principle. This distance is deemed by the Smithsonian Institution to be conventional for the purpose of building security. In Tier II, a threat analysis will be performed, and the findings will inform the concept designs to determine the most appropriate setback.
5.2.4 Aesthetics – how the building would blend in with the environment

The NMAAHC Plan for Action Presidential Commission concluded that there is a need to establish a museum that can provide a national meeting place for all Americans to learn about the history and culture of African Americans. The NMAAHC will serve as a national venue that can respond to the interests and needs of diverse racial constituencies who share a common commitment to a full and accurate telling of the country’s past and will serve as an educational healing space to further racial reconciliation. Pursuant to these findings, the NMAAHC will be commensurate in size and stature to other national venues and museums conveying a clean, impressive, and monumental image worthy of such a mission.

It is not envisioned that the NMAAHC aesthetic will represent an African American image in architectural style, but rather it will represent an aesthetic worthy of and equal to the other landmarks located on the National Mall and in the surrounding area. The building should be a microcosm of African American culture on the Mall.

5.2.5 Outdoor Program Area

The outdoor program for the NMAAHC has not yet been fully developed and will be better defined through the architectural programming phase (see Figure 2.5) and the Tier II process. However, the outdoor space for the NMAAHC will be open to the public and support a range of programmed activities while enhancing the open space and landscape of the Mall and Monument Grounds. The exact size and placement of the outdoor space and landscape design will be determined in the Tier II process.

5.2.6 Sustainable Design

To the maximum extent deemed feasible, the NMAAHC will incorporate sustainable design principles, consistent with Executive Order 13423, "Strengthening Federal Environmental, Energy and Transportation Management" issued January 2007 (see Appendix A). Tier II concept designs will more specifically identify ways in which the building will utilize best sustainable practices.
5.3 BUILD ALTERNATIVES

5.3.1 Alternative 1- Contextual Building Alignment

The mass of Alternative 1 is aligned with the main mass of the NMAH to the east and the centerline of the Department of Commerce to the north. The height of Alternative 1 matches the main mass of the NMAH (75') which yields five floors\(^1\) above grade. The above ground volume occupies only 219,000 gsf; to satisfy the program requirement, there are two basement levels providing an additional 196,000 gsf. The total size of Alternative 1 is 415,000 gsf. Alternative 1 would be consistent in scale with other Mall buildings and monumental in character.

Building Height

The NMAH building, to the east of the NMAAHC site, has an estimated elevation above mean sea level of 85' at the top of the main wings (EDAW, 1993). The mean sea level of the NMAAHC site ranges from 6.6' above sea level to 19.7' above sea level, with an average of approximately 13' (Plexus Scientific Corporation and PageSoutherlandPage, 2005a). Therefore, the difference between average site grade at the NMAAHC site and the top of NMAH’s wing is approximately 72'. Since the concept of Alternative 1 is a contextual building alignment and a relationship to the surrounding context, the height from Alternative 1 is derived from the 75' height of the NMAH, as a point of reference.

Alternative 1 has an average building height of 75' above average site grade, leaving some flexibility for architectural embellishment.

---

\(^1\) Assuming a 15' floor to floor height
Floors above grade
The building height of 75' allows for five floors at 15' per floor¹.

Floors below grade
The site is located in a floodplain and borings taken from adjacent sites show a soil profile with perched water present at approximately 12' below the ground surface and sustained ground water present at approximately 20'. Alternative 1 has two levels underground that in total shall not exceed 30' in depth.

Aesthetics
Alternative 1 responds to the goal of representing an aesthetic worthy of and equal to the other surrounding landmarks by aligning both building façade lines and building height with adjacent buildings (see “Building Height” and “Building Alignment”). This sets the stage for a contextual massing that explicitly relates to the pattern of buildings fronting the National Mall. From a building-massing perspective, the NMAAHC will appear as another building in a “family” of buildings; development of architectural concepts and style will eventually lead to either a reinforcement of this contextual alignment, or the introduction of distinctive elements to differentiate the building from its neighbors.

¹ Using the NMAAHC Site Evaluation Study for Phase II as a baseline, a 15' floor to floor height was used to develop the range of Build Alternatives. This previous report considered floor to floor height both in the context of surrounding structures and for interior space, finding that a minimum of 15 feet is required for office, administration and exhibition support areas, 30 feet for exhibition, and 45 feet to accommodate a theater (Plexus Scientific Corporation and PageSoutherlandPage, 2005b). Therefore, as an outcome of the scoping process, a 15' floor to floor height was deemed reasonable to accommodate the double-height or greater in volume exhibition, performance, and main circulation spaces required by museums.

Building Alignment
Alternative 1 is aligned so that the north and south building façades of NMAAHC align with the north and south façades of the NMAH main building mass, while the east and west building façades of NMAAHC align approximately with the projecting portico feature of the DOC building.

Figure 5.3: Alternative 1, Contextual Alignment isometric view
5.3.2 Alternative 2 - Washington Monument Orientation

The north façade of Alternative 2 is aligned with the main mass of the NMAH to the east and the centerline of the DOC to the north. The west and south façades are primary and are orientated to the Washington Monument. As a result, a distinctive building form would be created that appropriately signifies the end (or beginning) of the row of buildings lining the Mall’s northern edge. The height of Alternative 2 matches the height of the Department of Commerce DOC portico to the north (90’) which yields six floors above grade. The above ground volume occupies only 180,000 gsf; to satisfy the program requirement, there are two basement levels providing an additional 196,000 gsf. The total size of Alternative 2 is 376,000 gsf. Alternative 2 would be consistent in scale with other Mall buildings, and monumental in character.

Building Height

Alternative 2 has an average building height of 90’ above average site grade, leaving some flexibility for architectural embellishment. Existing site grade ranges from 6.6’ above sea level on the north side of the site, to 19.7’ above sea level on the south side of the site (Plexus Scientific Corporation and PageSoutherlandPage, 2005b). This alternative does not seek to match the heights of adjacent structures, but it does attempt to relate to the surrounding context. The building height of 90’ represents the median height between the two adjacent structures.

Floors above grade

The building height of 90’ allows for six floors at 15’ per floor.
Floors below grade

The site is located in a floodplain and borings taken from adjacent sites show a soil profile with perched water present at approximately 12' below the ground surface and sustained ground water present at approximately 20'. Alternative 2 will have two levels underground that in total, shall not exceed 30' in depth.

Aesthetics

Alternative 2 presents a more literal approach to the contextual massing strategy of Alternative 1, with the addition of a massing relationship that responds to its most prominent neighbor: the Washington Monument. This sets the stage for an aesthetic for the building that is more varied, with the opportunity for an exceptional façade treatment oriented towards the Monument. This orientation, unique to the surrounding buildings, will possibly create the impression of a building that not only continues the progression of landmark Mall buildings, but also ends the progression. The less conventional building form, with further architectural development, can provide an aesthetically appropriate transition that bridges the axis of the National Mall with the north-south axis of open spaces leading to the White House.

Building Alignment

Alternative 2 is aligned so that the north building façade of NMAAHC aligns with the north façade of the NMAH main building mass, while the east and west limits of the north façade of NMAAHC align approximately with the projecting portico feature of the DOC building. The southwest façade of NMAAHC is oriented toward the Washington Monument.
5.3.3 Alternative 3- Free Form

Alternative 3 departs from the concept of contextual building alignment and establishes a distinct identity through a lack of conformity to setbacks. It does not reinforce a continuous northern Mall edge; rather, it proposes a free form building with a pavilion-like expression. It would follow in the tradition of Mall buildings that are anomalies, such as the Hirshhorn and the Castle. The height of Alternative 3 matches the height of the DOC portico to the north (90') which yields six floors above grade. The above ground volume occupies only 210,000 gsf; to satisfy the program requirement, there are three basement levels providing an additional 67,000 gsf. The total size of Alternative 3 is 411,000 gsf.

Building Height

The DOC building, to the north of the NMAAHC site, is a component of the Federal Triangle, an area with a distinct architectural image characterized by relatively uniform massing, building height, and other features. The Federal Triangle’s assemblage of buildings creates a strongly defined architectural edge and backdrop along the north side of Constitution Avenue. With a strong cornice line, red-tile roof, and prominent architectural features (such as the projecting portico of its south façade), the DOC building is the closest significant building to the NMAAHC site. Its approximate height is 105' above average site grade (Plexus Scientific Corporation and PageSoutherlandPage, 2005b).

Alternative 3 has an average building height of 105' above average site grade, leaving some flexibility for architectural embellishment. Existing site grade ranges from 6.6' above sea level on the north side of the site, to 19.7' above sea level on the south side of the site (Plexus Scientific Corporation and PageSoutherlandPage, 2005b). This alternative does not necessarily seek to match the heights of adjacent structures, but it does attempt to relate to the surrounding context and the height of the DOC presents point of reference.
Floors above grade
The building height of 105' allows for seven floors at 15' per floor.

Floors below grade
The site is located in a flood plain; borings taken from adjacent sites show a soil profile with perched water present at approximately 12' below the ground surface and sustained ground water present at approximately 20'. Alternative 3 has three levels underground that in total shall not exceed 45' in depth.

Aesthetics
In urban locations with strong existing contextual patterns and/or background buildings, an alternate approach to achieve monumentality and a strong aesthetic impact is through contrast. In the case of Alternative 3, a contrast in massing would differentiate its form from that of the adjacent buildings. The free form or blob-shaped example shown in the illustration is merely a diagram of a single potential iteration of this idea. The concepts of non-alignment of building frontages and multi-directional orientation may be extended upward into a more complex 3-dimensional form than is illustrated here. The aesthetic effect is generally of a more complex nature, with the potential for a building that looks very different from a variety of locations. The overall mass, shape and size will be more difficult to discern from a single vantage point, unlike Alternative 1.

Building Alignment
Alternative 3 does not align with any of the surrounding buildings or building frontage lines. However, the northernmost building boundaries do not protrude beyond the building line of the northern façade of NMAH.
5.3.4 Alternative 4- Terraced Roof

Alternative 4 relates to the building setback lines and architectural features of the NMAH and DOC buildings to the east and west, and simultaneously relates to the Washington Monument and landscape features of the Monument grounds to the west and southwest. The gradual stepping down of the building from the intersection of Constitution Avenue and 14th Street (highest point) to 15th Street (lowest point) suggests a building “rising” out of the ground, with the potential for a “green”, or landscaped series of roof terraces that relate to the Monument grounds and defer to the Washington Monument. Similar to Alternative 3, the Free Form Alternative, this building type would be an anomaly on the Mall, in the tradition of the Hirshhorn and others. The upper limit height of Alternative 4 matches the height of the DOC portico to the north (90’) which yields six partial floors above grade with an average height of 45’. The above ground volume occupies only 274,000 gsf; to satisfy the program requirement, there is only one basement level providing an additional 111,500 gsf. The total size of Alternative 4 is 385,500 gsf.

Building Height

The NMAH building, to the east of the NMAAHC site, has an estimated elevation above mean sea level of 85’ at the top of the main wings and an average site grade at the NMAAHC site and the top of NMAH’s main wings is 72’. The DOC building, to the north of the NMAAHC site, has a building height of approximately 105’ above average site grade (Plexus Scientific Corporation and PageSoutherlandPage, 2005b).

Alternative 4 has an average building height, at its highest point, of 90’ above average site grade, leaving some flexibility for architectural embellishment. Existing site grade ranges from 6.6’ above sea level on the north side of the site, to 19.7’ above sea level on the south side of the site (Plexus Scientific Corporation and PageSoutherlandPage, 2005b). This alternative does not seek to match the heights of
adjacent structures, but it does attempt to relate to the surrounding context. The average building height of 90' represents the median height between the two adjacent structures. The gradual stepping of the building results in an overall median building height much less than 90'. In the configuration shown, the median height is approximately 45'.

**Floors above grade**
The building height of 90' allows for six floors (of varying areas) at 15' per floor.

**Floors below grade**
The site is located in a floodplain and borings taken from adjacent sites show a soil profile with perched water present at approximately 12' below the ground surface and sustained ground water present at approximately 20'. Since the above ground mass is larger than the other Alternatives, Alternative 4 has one level underground that in total, shall not exceed 30' in depth.

**Aesthetics**
Alternative 4 incorporates landscape features into the overall building form. The building is configured to maintain strong building façade/edges along Constitution Avenue and 14th Street, while stepping down with terraces/slopes/other techniques, towards the Washington Monument. The aesthetic effect is that of a gradually rising plane (perhaps with amphitheater or terraced seating facing the Washington Monument) that emerges from the ground and culminates in a high point at the intersection of Constitution Avenue and 14th Street. The terraced areas may be used for programmed outdoor space, for ‘green’ roof elements, or other integrated landscape solutions. The overall effect will contain two distinct aesthetic experiences: blending into the landscape towards the monument; and more traditional vertical building façades at the intersection of Constitution Avenue and 14th Street.

**Building Alignment**
Alternative 4 is aligned so that the north building façade of NMAAHC aligns with the north façade of the NMAH main building mass. The other façades correspond to the minimum 50' security setback line, and do not align with adjacent building façade lines.
5.3.5 **Alternative 5- Enframing**

Alternative 5 breaks the building line along the northern edge of the Mall. The allowable building envelope of the proposed action exceeds the building setback lines of the NMAH. To create a more internalized outdoor public space, between two wings of the structure, the outer boundaries of the building envelope would push further in the north and south directions than the other alternatives. To minimize the impact of exceeding the established building façade lines, the building envelope would be designed to soften the apparent projections, potentially by curving the façade and eliminating the expressions of hard-edged corners. In addition, Alternative 5 would create a dual-height building, with distinctly varied heights for each of the two wings.

The height of the northern mass is 30' and the height of the southern mass matches the height of the DOC portico to the north (90') which yields six partial floors above grade. The combined above ground volume occupies only 236,000 gsf; to satisfy the program requirement, there are two basement levels providing an additional 174,500 gsf. The total size of Alternative 5 is 430,000 gsf.

**Building Height**

The NMAH building, to the east of the NMAAHC site, has an estimated elevation above mean sea level of 85' at the top of the main wings and an average site grade at the NMAAHC site and the top of NMAH’s main wings is 72'. The DOC building, to the north of the NMAAHC site, has a building height of approximately 105' above average site grade (Plexus Scientific Corporation and PageSoutherlandPage, 2005b).

Alternative 5 has two wings with different average building heights: 90' (for the south wing) and 30' (for the north wing) above average site grade, leaving some flexibility for architectural embellishment. Existing site grade ranges from 6.6' above sea level on the north side...
of the site, to 19.7' above sea level on the south side of the site (Plexus Scientific Corporation and PageSoutherlandPage, 2005b). This alternative does not seek to match the heights of adjacent structures, but it does attempt to relate to the surrounding context. The building height of 90' represents the median height between the two adjacent structures.

Floors above grade
The building height of 90' allows for six floors at 15’ per floor.

Floors below grade
The site is located in a flood plain and borings taken from adjacent sites show a soil profile with perched water present at approximately 12' below the ground surface and sustained ground water present at approximately 20'. Alternative 5 has two levels underground that in total, shall not exceed 30' in depth.

Aesthetics
Alternative 5 incorporates outdoor public space into a centralized area enframed by two separate building wings. The enframed open space is directionally oriented towards the Washington Monument. In orienting towards the monument, a key view corridor looking towards the monument from the intersection of Constitution Avenue and 14th Street is preserved. The main aesthetic effect is of a bifurcated structure with varying heights; the relationship to context is through building and spatial orientation, rather than building or height alignment.

Building Alignment
Alternative 5 does not intentionally align with any of the surrounding buildings or building frontage lines. It is likely that, with the location of the main outdoor space towards the center of the enframing building masses, the northern and southern building lines of NMAAHC will protrude beyond the northern and southern building facade lines of NMAH.
5.3.6 Alternative 6- Low Profile

The mass of Alternative 6 is aligned with the main mass of the NMAH to the east and the east façade of the DOC to the north. The height of Alternative 6 is lower than adjacent buildings at 60' and yields four floors above grade. The above ground volume occupies only 120,000 gsf with a floor plate of 30,000 square feet (the minimum functional floor area to meet the Purpose and Need.). To satisfy the program requirement, there are three basement levels providing an additional 230,000 gsf. The total size of Alternative 6 is 350,000 gsf. Alternative 6 would be smaller in scale than other Mall buildings, but monumental in character.

Building Height

Since the concept of Alternative 6 is a low profile building, the height of Alternative 6 is lower than the surrounding buildings. While this alternative does not seek to match the heights of adjacent structures, it does attempt to relate to the surrounding context. Alternative 1 has an average building height of 60' above average site grade, leaving some flexibility for architectural embellishment.

Floors above grade

The building height of 60' allows for four floors at 15' per floor. This 15' floor-to-floor height is deemed by the Smithsonian Institution as reasonable to accommodate the double-height or greater in volume exhibition, performance, and main circulation spaces required by museums.

Floors below grade

The site is located in a floodplain and borings taken from adjacent sites show a soil profile with perched water present at approximately 12' below the ground surface and sustained ground water present at approximately 20'. Alternative 6 has three levels underground that in total shall not exceed 45' in depth.
**Aesthetics**
Alternative 6 responds to the goal of complimenting the site and deferring to the presence of the Washington Monument. This alternative has a minimized visible mass and a soft edge along the southwest façade that is aligned with Madison Drive. The minimum functional building footprint, along with a significant percentage of below-grade space, allows for a lower building that when pushed as far east on the site as possible, seems to pull back from the Monument while still maintaining the façade aligned with the row of buildings along Constitution Avenue. This mass results in more open space on the site with a direct relationship to the remaining open space of the Washington Monument grounds and Madison Drive.

**Building Alignment**
Alternative 6 is aligned so that the north building façade of NMAAHC align with the north façade of the NMAH main building mass. The east façade is pushed as close to 14th Street as possible, maintaining the required 50-foot security setback. The west façade responds to the shape of the site along 15th Street and Madison Drive.

*Figure 5.13: Alternative 6, Low Profile isometric view*
5.4 WHAT OTHER ALTERNATIVES ON THE SITE WERE CONSIDERED BUT DISMISSED?

Under NEPA, Federal agencies are required to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Reasonable alternatives include those that are practical or feasible from a common sense, technical, and economic standpoint. CEQ guidance also states that for an EIS, the number of reasonable alternatives considered in detail should represent the full spectrum of alternatives for meeting the agency's purpose and need, but an EIS need not discuss every unique alternative when an unmanageably large number is involved. The agency does not have to look at every conceivable alternative, only those reasonable ones that will meet the same goals and objectives of the proposed one.

As part of this Tier I EIS process, several additional design options were dismissed from further consideration following careful consideration and thorough analyses. Justifications for eliminating these options were based on their inability to sufficiently meet the eight overarching principles (see Section 4.4.1). These principles served as the criteria against which the relative success of meeting the purpose and need was measured.

5.4.1 Phase 1 Alternatives

Following the analysis of the four Preliminary Modeling Scenarios described in Section 4.3, the following options were developed as tools for analyzing the key issues related to the ongoing alternative-development process. These options, or “tools”, were presented to agency representatives and consulting parties at the Agency Charrette (see Section 4.7) as simple rectangular “boxes” on the site, and illustrated the wide range of massing possibilities available for the base program of 350,000 gsf (see Figure 4.3 Alternatives from previous studies). The options were based on an architectural program with certain criteria that would meet reasonable needs, would be neither too conservative or unnecessarily generous, would be a critical benchmark in evaluating sites, and would recognize that the museum will grow and evolve overtime.

Option 1a & 1b, each with 45' building heights, were not considered appropriate due to the low, horizontal nature of their massing. The scale, along with the resulting amount of necessary underground space (and associated flood-prevention costs), does not meet the purpose and need of the NMAAHC. A height of 45' was used as the lowest height studied, since it was the lowest achievable height that could accommodate the 350,000 gsf base program.

Option 2a & 2b, each with 75' building heights, came closer to representing a scale that would both meet the purpose and need of the NMAAHC and create harmonious relationship to the surrounding context. The approaches in each of these options related to the north and south building-line setback(s) of the NMAH (located east of the NMAAHC site). A height of 75' was used to align with the cornice of the main volume of NMAH. These options were not sufficient in exploring opportunities for multi-height massing, multi-building massing, other setback relationships (or non-relationships), and outdoor programmed areas.

Option 3a, 3b, 3c and 3d, each with 105' building heights, presented too great of a visual environmental impact in their present forms. While options 3a, 3b, and 3d have identical gross square footages, they represent different building configurations, alignments, setbacks, and orientations on the site. A height of 105' was used as the highest height studied, because it aligns with the cornice line of the DOC building to the north of the NMAAHC site. The taller building heights, while creating greater visual impacts from some vantage points, allowed for viewshed preservation from several key ground-level approaches and created more open-space possibilities on the site.
Through public and agency scoping, numerous comments emerged; and ultimately, these critiques and suggestions led to the development of Phase II Alternatives (see Table 5.2). In general, none of the above schemes were deemed sufficient to carry forward in their present state; however, elements of several of the schemes were seen as possible building blocks for the next round of alternatives.

All of the alternatives exhibited some common elements that would be maintained in the development of the next round of alternatives: service access along 14th Street, a minimum 50' security setback on all sides (taken from inner-edge of sidewalks); and the potential for a strong pedestrian connection to NMAH (above or below-grade).

**Table 5.1: Phase I Alternatives**

<table>
<thead>
<tr>
<th>Option 1a</th>
<th>Option 3a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height</td>
<td>45 feet</td>
</tr>
<tr>
<td>Above Ground</td>
<td>3 floors @ 60,000 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>1 floor @ 111,500 sf</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 1b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 2a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height*</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 3b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 3c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 3d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Height</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
</tbody>
</table>
5.4.2 Phase 2 Alternatives

Following the analysis and comment on the Phase I alternatives, a new round of thirteen alternatives was developed. Of these thirteen, six were selected for further refinement to become the Build Alternatives. The remaining alternatives that were considered but dismissed and are presented in the following table.

5.4.3 Phase 2 Alternatives

Table 5.2: Phase 2 Alternatives

<table>
<thead>
<tr>
<th>Approximately 350,000 – 420,000 gsf</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 4: “North Diagonal View Preservation”</strong></td>
</tr>
<tr>
<td>Building Height*</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
<tr>
<td>Principles: a. Important view corridor to Washington Monument partially maintained with open space at the north side of the site; b. Preservation of all existing/ historic landscape and paths.</td>
</tr>
<tr>
<td><strong>Description:</strong> Option 4 consists of a structure occupying a roughly triangular footprint. The eastern façade relates to the NMAH across 14th Street. The southern façade aligns with the building setback line of the NMAH main building mass. The northwest-facing, angled façade faces an open space at the north end of the site. The angular building mass maintains an important view corridor looking towards the Washington Monument from the northeast (corner of 14th Street and Constitution Avenue). It also opens up more views towards the Washington Monument for those traveling westward along Constitution Avenue. In addition, the building footprint allows for the preservation of most of the existing and historic elements of the landscape, including pedestrian pathways. <strong>Reasons for Dismissal:</strong> Insufficient above-grade building floor plate; too much priority given to view from a single vantage point (corner of 14th Street and Constitution Avenue).</td>
</tr>
<tr>
<td>Option 6: “South Diagonal View Preservation”</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Building Height*</td>
</tr>
<tr>
<td>Above Ground</td>
</tr>
<tr>
<td>Below Ground</td>
</tr>
<tr>
<td>Principles: a. Important view corridor to Washington Monument partially maintained with open space at the south side of the site; b. Maximize preservation of existing/ historic landscape and paths; c. Priority given to views of Washington Monument from 14th Street (traveling south); d. Substantial open space with relation to both Mall and Washington Monument grounds.</td>
</tr>
<tr>
<td><strong>Description:</strong> Option 6 consists of a structure occupying a roughly triangular footprint. The western and northern facades are pushed close to 15th Street and Constitution Avenue, respectively. For the northern façade, this results in a break from the established building setback line along Constitution Avenue, including that of the NMAH; the proposed museum would project forward (closer to the street) beyond this line. The southeast-facing, angled façade faces a substantial open space at the south end of the site, which visually extends even further south to the open spaces of the Washington Monument Grounds and National Mall. The angular building mass maintains an important view corridor looking towards the Washington Monument from the northeast (corner of 14th Street and Constitution Avenue). It also opens up more views towards the Washington Monument for those traveling southward along 14th Street. In addition, the building footprint allows for the preservation of most of the existing and historic elements of the landscape, including pedestrian pathways.</td>
</tr>
<tr>
<td><strong>Reasons for Dismissal:</strong> Insufficient above-grade building floor plate; too much priority given to view from a single vantage point (corner of 14th Street and Constitution Avenue); north building setback protrudes northward beyond the predominant, established building-setback lines along Constitution Avenue</td>
</tr>
</tbody>
</table>
Option 8: “Circular Hinge”

<table>
<thead>
<tr>
<th>Building Height</th>
<th>90 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>6 floors @ 33,500 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>2 floors @ 95,250 sf</td>
</tr>
</tbody>
</table>

Principles: a. No clear hierarchy of façade importance; b. Multi-directional; c. No setback relationship to adjacent buildings; d. Formal, symmetrical, rigid geometry in character with many other Mall structures.

**Description:** Option 8 considers a circular building form, in the tradition of the Hirshhorn Museum. In this case, the form acts as a hinge that responds to its pivotal position at the intersection of Washington Monument grounds, the National Mall, and the Federal Triangle. The multi-directional qualities of a circular form provide the opportunity for important visual connections in multiple directions, rather than a clear, traditional hierarchy of façade importance. The formal, symmetrical, rigid geometry maintains a common theme among many other Mall structures.

**Reasons for Dismissal:** Accomplishes the same principle as the ‘Free Form’ Alternative and is too visually similar to the existing Hirshhorn Museum.

Option 10: “Courtyard Building”

<table>
<thead>
<tr>
<th>Building Height</th>
<th>75 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>5 floors @ 52,600 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>1 floor @ 111,500 sf</td>
</tr>
</tbody>
</table>

Principles: a. Maximize internal courtyard space by pushing building footprint outward to minimum setbacks (east and west); b. Open space in the form of a well-defined, enclosed “outdoor room”.

**Description:** Option 10 proposes a courtyard building-type, with the outdoor programmed open space in the form an ‘outdoor room’ within the courtyard. To internalize the open space, the building footprint would extend to the minimum allowable setbacks on the east and west sides of the site; and it would extend southward beyond the established building setback line along Madison Drive. The north façade would align with the main mass of the NMAH. From outside of the site, the apparent bulk of the building would be larger than most other schemes, due to the nature of the interior courtyard and resulting massing.

**Reasons for Dismissal:** Internal courtyard of sufficient size creates the largest/bulkiest visual presence from outside the NMAAHC.

Option 9: “Monumental Pavilion”

<table>
<thead>
<tr>
<th>Building Height</th>
<th>105 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>1 floor @ 14,500 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>3 floors @ 111,500 sf</td>
</tr>
</tbody>
</table>

Principles: a. Most program is below grade; b. Above-grade monumental pavilion lets light into lower levels and creates a major landmark; c. Pavilion form is small in footprint and may be designed in any variety of forms; d. Allows for significant amount of open space; e. Preserves views of surrounding landmarks through transparency of pavilion.

**Description:** Option 9 shows a majority of the museum program below grade, with three levels facing into a central, recessed “court”, topped by a transparent, light-filled pavilion. This pavilion would be an iconic, yet transparent, structure at 105 feet high. With the above-grade structure limited to the iconic pavilion, open space would be maximized; and with the transparency of the structure, the preservation of existing views through and around the site would be maximized.

**Reasons for Dismissal:** Too specific for a Tier I EIS-level alternative; this option could be a design-solution/variation of another alternative program space almost entirely below-grade does not meet the purpose and need of the NMAAHC.

Option 11: “Bifurcated Program and Site”

<table>
<thead>
<tr>
<th>Building Height</th>
<th>varies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>varies</td>
</tr>
<tr>
<td>Below Ground</td>
<td>varies</td>
</tr>
</tbody>
</table>

Principles: a. A smaller footprint and profile on the Monument site; b. the majority of the building footprint located east of 14th Street on the NMAH site; c. smaller viewshed impacts; a large portion of the site is open outdoor program space with potential for preserving some of the historic landscape.

**Description:** Option 11 proposes a much smaller footprint on the five-acre Monument site with more outdoor program space. A larger building footprint would be located east of 14 Street adjacent to the NMAH.

**Reasons for Dismissal:** Builds in program inefficiencies, administrative difficulties, and maintenance redundancies; requires offsite storage; does not meet the intent of the NMAAHC Act, which stipulates the selection of one of four designated sites; no legal provisions to select non-designated sites such as the NMAH site; deviations from the Congressional mandate require SI to justify the change to Congress which has schedule implications; implies institutional restructuring; does not consider future plans the NMAH has for use of the land on its west side; implementation would impact negatively on NMAH's interim and long-range plans to more fully utilize their own site.
## 5.5 SUMMARY OF TIER I EIS BUILD ALTERNATIVES

### Table 5.3: FEIS Build Alternatives

**Alternative 1 - Contextual Building Alignment (415,000 gsf)**

<table>
<thead>
<tr>
<th>Building Height</th>
<th>75 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>5 floors @ 43,800 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>2 floors @ 98,000 sf</td>
</tr>
</tbody>
</table>

Principles:  
- a. Building’s north and south façades aligns with NMAH north and south façades;  
- b. Building’s east and west façades align with the DOC building’s portico element;  
- c. Height aligns with cornice of the main building wing of NMAH.

**Alternative 2 - Washington Monument Orientation (376,000 gsf)**

<table>
<thead>
<tr>
<th>Building Height</th>
<th>90 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>6 floors @ 30,000 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>2 floors @ 98,000 sf</td>
</tr>
</tbody>
</table>

Principles:  
- a. Building massing addresses orientation facing the Washington Monument;  
- b. Open space is also oriented towards Washington Monument.

**Alternative 3 - Free Form (411,000 gsf)**

<table>
<thead>
<tr>
<th>Building Height</th>
<th>105 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>7 floors @30,000 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>3 floors @ 67,000 sf</td>
</tr>
</tbody>
</table>

Principles:  
- a. No clear hierarchy of façade importance;  
- b. Multi-directional;  
- c. No setback relationship to adjacent buildings;  
- d. Unique form, perceived differently from every direction.

**Alternative 4 - Terraced Roof (385,500 gsf)**

<table>
<thead>
<tr>
<th>Building Height</th>
<th>90 feet max, 45 feet mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>6 floors, varies</td>
</tr>
<tr>
<td>Below Ground</td>
<td>1 floor @ 111,500 sf</td>
</tr>
</tbody>
</table>

Principles:  
- a. Multi-height roof structure;  
- b. Highest point in northeast corner;  
- c. Inhabitable roof (park/amphitheater/terrace) with significant public open space;  
- d. View from top of Washington Monument reveals combination of building and landscape elements.

**Alternative 5 - Enframing (430,000 gsf)**

<table>
<thead>
<tr>
<th>Building Height</th>
<th>2 heights: 90 feet &amp; 30 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>6 floors @ 36,000 sf; 2 floors @ 20,000 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>2 floors @ 78,000 sf</td>
</tr>
</tbody>
</table>

Principles:  
- a. Important view corridor to Washington Monument from 14th Street and Constitution Avenue is partially maintained and expressed through building massing;  
- b. Public open space is embraced between two separate building masses, internal to the site;  
- c. Two distinct wings of varying heights.

**Alternative 6 - Low Profile (350,000 gsf)**

<table>
<thead>
<tr>
<th>Building Height</th>
<th>60 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>4 floors @ 30,000 sf</td>
</tr>
<tr>
<td>Below Ground</td>
<td>3 floors @ 76,667 sf</td>
</tr>
</tbody>
</table>

Principles:  
- a. Responds to the goal of minimizing the visible mass of the museum, in deference to the presence of the Washington Monument, b. The mass leaves more open space on the site with a direct relationship to the remaining open space of the Washington Monument grounds, c. The west façade responds to the shape of the site along 15th Street and Madison Drive.
6.0 THE ENVIRONMENT: PROJECT AREA NOW AND IMPACTS IN THE FUTURE
The information provided in this chapter is broken out by resource topic. While there are slight variations, the analysis of each resource topic generally follows a similar structure:

- **Key considerations of each resource as it pertains to the proposed alternatives.** The discussion of the key considerations provides the rationale why each resource topic was chosen for analysis and outlines the focus of the description of each resource and impact analysis.

- **A discussion of the methodology used to evaluate how the resource would be affected by the alternatives.** Methodologies used to assess the impacts to each resource topic are described in each resource section.

- **A description of the current condition of the resources affected by the alternatives (the affected environment).** The affected environment describes the existing environmental and social conditions that have the potential to be impacted by the alternatives. The descriptions focus only on those resources and characteristics of the environment most likely to be beneficially or adversely affected. Resource topics likely to be affected by the alternatives described in this chapter include:
  - Aesthetics and Visual Resources
  - Cultural Resources
  - Distribution and Movement of Groundwater (including geology and soils)
  - Surface Water Resources (including floodplains)
  - Air Quality
  - Noise
  - Transportation
  - Land Use Planning and Policies
  - Visitor Use and Experience
  - Communities and Businesses
  - Infrastructure and Urban Systems
  - Public Health and Security

- **An analysis of the environmental consequences the proposed actions would have on each resource.** A detailed discussion of the environmental consequences that could occur from the alternatives, including, the No Build Alternative, is presented after the affected environment has been described.

- **Mitigation measures that could be employed to minimize adverse impacts.** To help ensure the protection of natural, cultural, and social resources, the Smithsonian Institution and NCPC will avoid, minimize, and mitigate potentially adverse environmental impacts associated with the NMAAHC to the best of their abilities where practicable and reasonable. Following the description of environmental consequences, a general description of the measures that could or would be utilized, or are required by law to minimize the intensity or duration of some impacts are presented in each section. Any federal or District laws and regulations or executive orders pertinent to a particular resource impact analysis are described within each resource section and are described in more detail in Appendix A.

Resource topics not affected by the proposed alternatives have been dismissed from analysis in this document. These resources, along with a rationale for their dismissal, are listed in Section 3.3.
General approach and methodology for determining impacts related to the project

Environmental consequences were determined by looking at how the actions associated with each of the alternatives impact each of the resource topics identified in this chapter. For the purposes of this analysis, impacts for the Build Alternatives were considered during both the construction and operational phases of the proposed NMAAHC.

In general, impacts are described in terms of type (beneficial or adverse); context; duration (short- or long-term); and significance (No Effects, No Significant Effect, Significant Effects). Definitions of these descriptors include:

- **Beneficial**: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
- **Adverse**: A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.
- **Context**: The affected environment within which an impact would occur, such as local, regional, global, affected interests, society as whole, or any combination of these.
- **Duration**: Impacts resulting from construction are considered short-term and would occur during the period between initial ground-breaking and the time the museum opens its doors to the public. Operational impacts are considered long-term and are associated with ongoing operation, maintenance, and management of the proposed facility.
- **Intensity**: Because definitions of significance (No Effects, No Significant Effect, and Significant Effects) vary by impact topic, significance definitions are provided separately for each impact topic analyzed.

The discussion of environmental consequences also includes the discussion of the No Build Alternative. The No Build Alternative is defined by CEQ as considering the environmental consequences of not undertaking the action or project proposed. This alternative is the baseline condition of the current condition and represents the current physical condition and management of the site. The purpose of describing and analyzing the No Build Alternative is to allow decision-makers to better understand the environmental consequences of continuing to operate a project under the terms and conditions of its existing situation. The No Build Alternative has environmental impacts. Generally, these would include the environmental impacts of not satisfying the underlying purpose and need of the action taken by the agency. These consequences can then be compared to those associated with the alternatives. For the purpose of this Tier I EIS process, the No Build Alternative is the continuation of the current management of the NMAAHC site without any changes in its overall uses.
6.1 CULTURAL RESOURCES

This section identifies the historic resources that are present on the NMAAHC site, as well as within the surrounding area in accordance with regulations for Section 106 of the National Historic Preservation Act (36 CFR § 800.4) for identification of historic properties and (36 CFR § 800.5) for assessment of effects. The APE was developed through research and analysis, site visits, photographic studies, and discussions with consulting parties (see Figure 6.1-1 for APE boundaries). Due to the prominent location of the NMAAHC site, impacts of the undertaking cover not only part of the monumental core of Washington, but also a broader visual area such as the opposite shore of the Potomac River.

6.1.1 What are the key considerations about cultural resources?

Cultural resources are characterized as archeological resources, historic structures, and cultural landscapes. “Historic properties” as defined by the National Historic Preservation Act (36 CFR § 800), are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (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.

The significance of historic properties is judged against a property’s ability to meet at least one of the four criteria for inclusion in the NRHP:

A) Association with events that have made a significant contribution to the broad patterns of our history; or
B) Association with the lives of persons significant in our past; or
C) 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
D) 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 National Register, it must possess historic integrity of those features necessary to convey its significance (location, design, setting, workmanship, materials, feeling, and association).

The NMAAHC site sits to the northeast of the Washington Monument’s prominent knoll, which serves as a hub for the surrounding cultural landscape. The site occupies a critical position on the monumental cross axis of the L’Enfant and McMillan Plans and is part of the larger Washington Monument grounds, which is defined as the area bounded by 17th Street on the west, 14th Street on the east, Independence Avenue on the south and Constitution Avenue on the north. The Washington Monument grounds is dominated by the towering shaft of the Monument, itself, which serves as a powerful organizing element for the Mall, East and West Potomac Parks, and much of the city of Washington. The Monument grounds and characteristic cultural landscape features are discussed extensively in the National Park Service’s draft Cultural Landscape Report: Washington Monument Grounds.

In order to determine the areas primarily affected by the construction and operation of the NMAAHC, it was necessary to compile the multiple potentially affected historic resources, and the contributing characteristics embodied therein in an organized manner. The large number of historic resources carries strong significance. The primary character-defining features of the Washington Monument grounds and resources within close proximity to the NMAAHC site were analyzed according to the National Park Service’s Guide to Cultural
The key character-defining features are divided into seven main categories that include, but are not limited to:

**Spatial Organization:** The arrangement of elements creating the ground, vertical, and overhead planes that define and create spaces.

**Land Use:** Organization, form, and shape of the landscape in response to land use.

**Circulation:** Spaces, features, and materials that constitute systems of movement.

**Topography:** Three-dimensional configuration of the landscape surface characterized by features and orientation.

**Vegetation:** Indigenous or introduced trees, shrubs, vines, ground covers, and herbaceous materials.

**Buildings and Structures:** Three-dimensional constructs such as houses, barns, garages, stables, bridges, and memorials.

**Views and Vistas:** Features that create or allow a range of vision which can be natural or designed and controlled.

### 6.1.2 What types of cultural resources are likely to be impacted by the project and how have they been identified?

In accordance with Section 106 of the National Historic Preservation Act (CFR 36 § 800.4), the Smithsonian Institution and NCPC have identified historic resources affected by the construction and operation of the NMAAHC within a broad area of potential effect. The undertaking was a complex task aimed at accounting for the multiple layers of historic resources found in the area surrounding the NMAAHC.

Multiple resources were consulted in the identification process, including National Register of Historic Places nominations and determinations of eligibility for properties within the APE, Historic American Building and Historic American Engineering Record Surveys, cultural resource plans produced by the White House Precinct, as well as National Park Service Cultural Landscape Inventories and Cultural Landscape Reports for the Mall and Washington Monument Grounds and multiple other records.

The historically significant features contained within the APE include buildings, streets, historic districts, landscape features, monuments and memorials, and elements of the L’Enfant and McMillan plans, as identified by the National Register of Historic Places, National Historic Landmarks Survey, and the District of Columbia Inventory of Historic Sites.
Figure 6.1-1: Area of Potential Effect (APE)
6.1.3 How did historic plans and past development contribute to the site and its surroundings that we see today?

The site selected for the NMAAHC is historically linked with the development of the monumental core of the Nation’s Capital. The museum site is located on the northeast corner of the Washington Monument Grounds, which is characterized by a prominent knoll upon which the Washington Monument is located. The National Mall has evolved from its initial survey and planned use under the plan of Peter (Pierre) Charles L’Enfant (1791), to major changes proposed in the McMillan (Senate Park) Commission Plan (1901-02), and subsequent plans such as the Skidmore, Owings, and Merrill Plan (1965) – with degrees of implementation throughout site’s history. A more detailed development of the Washington Monument Grounds and its surrounding environs is documented in the NMAAHC Cultural Resources Report: Archaeological Investigation & Historic Preservation Report (July 2007) prepared for the Environmental Impact Statement and Section 106 process for the NMAAHC.

The historic plan of the city of Washington is the foremost example in the United States of two combined nationally significant city planning ideals – the Baroque and the City Beautiful. The plan for the national capital was developed throughout the nineteenth century and substantially amplified in 1901-02 by the McMillan Commission (officially, the Senate Park Commission). Much of the city’s current character can be attributed to the original plans envisioned by L’Enfant and McMillan; however the Washington Monument Grounds, and particularly the NMAAHC site, evolved much more organically over time.

The Washington Monument Grounds, contained historically for many years on the western end by the Tiber Creek and on the north by the Washington City Canal, experienced a unique expansion that affected major northern and western areas of the Monument Grounds. Between 1882 and 1900, the tidal flats west and south of the Washington Monument were reclaimed by the Army Corps of Engineers. Because the NMAAHC site is located on what was originally solid ground rather than fill, it has remained relatively undisturbed in comparison to the rest of the Monument grounds throughout the development history.

Throughout its history, the Washington Monument Grounds has been a public space for recreation, leisure activities, and social gatherings, and has served as a backdrop for parades, protests, and rallies including Marion Anderson’s Lincoln Memorial concert and the 1963 March on Washington for Jobs and Freedom. The Grounds hold a key position in the great cross axis between the White House and Jefferson Memorial, and the Capitol and Lincoln Memorial, set within the expansive tapis verte that defines the National Mall. An overarching theme within the Monument Grounds consistently relies on the concept of the area as an open lawn surrounding the monument with trees and plantings at its periphery.

More than two hundred years since the design of the L’Enfant Plan, and a century after the McMillan Plan, the integrity of the unified plan of Washington is largely intact – boasting a legally enforced building height restriction, landscaped parks, wide avenues, and open space allowing designed vistas (Robinson & Associates, 2001).

**The L’Enfant Plan (1791)**

The original comprehensive plan of Washington was designed by Peter (Pierre) Charles L’Enfant in 1791 as the site of the Federal City (see Figure 6.2.1.3-1). The city was surveyed by Andrew Ellicott (1754-1820) and Benjamin Banneker (1731-1806), measuring ten miles on each side and encompassing the forks of the Potomac River and its Eastern Branch, the Anacostia (see Figure 6.12.1.3-2). Forty stones marked the boundary of the city and were placed based on celestial calculations by Banneker, a self-taught astronomer of African descent and one of few free blacks living in the vicinity (see Figure 6.1.3-3) (Robinson & Associates, 2001). L’Enfant developed a plan that featured ceremonial spaces and grand radial avenues while
respecting the natural contours of land. The resulting plan was a system of orthogonal streets with intersecting diagonal avenues radiating from the two most significant buildings sites – the Capitol and the White House (ibid). A monument dedicated to George Washington, in the form of an equestrian statue, was to be placed at the terminus of the east-west axis from the Capitol to the western horizon and the north-south axis from the President's house to the southern horizon (see Figure 6.1.3-4). The area would later become the site of the Washington Monument. The monument was part of the larger Washington Monument Grounds, which was Original Appropriation No. 3 in L’Enfant’s plan. However, when the construction began in 1848, the monument was sited off axis, perhaps due to unstable ground. (Scott, 1991). Planned along the east-west axis was a tree-lined “grand avenue” that was intended as the focus of economic and cultural life in the city. A principal tenet of L’Enfant’s plan was the “reciprocity of sight” he deliberately incorporated between major public buildings or memorials on elevated points of land throughout the city – such as those currently found on the major cross axis between the White House/Jefferson Memorial and the Capitol/Lincoln Memorial.

McMillan Plan (1901)

Over time the condition of the Mall had gradually changed from a continuous entity to a series of individual park spaces that were unequally developed and strayed from L’Enfant’s original plan. The ambitious McMillan Plan, created by the Senate Park Commission in 1901, sought to re-establish elements of the L’Enfant Plan; this included the restoration of the east end of the Mall, the correction of the awkward off-axis placement of the Washington Monument, the inclusion of the new “Potomac Park” (i.e., East and West Potomac Parks), and the removal of unsightly railroad tracks from the monumental core (Robinson & Associates, 1999). The commission envisioned the Mall as a formal tree-lined walk flanked by classical buildings, creating an unbroken vista between the Capitol and Washington Monument (see Figure 6.1.3-5). The visual focal point of the McMillan Plan was the Mall, which the Commission proposed to extend westward and enhance as a formal, axial greensward. The McMillan Commission members interpreted the L’Enfant Plan as calling for treating the entire Mall as a continuous space that was set aside entirely for public use. A specific landscape treatment plan for the Mall consisted of a greensward flanked on either side by four rows of elm trees (Moore, 1902).

The McMillan Commission also planned to correct the off-axis placement of the Washington Monument by creating a formal landscape of the grounds (see Figure 6.1.3-6). Proposed treatments for the Washington Monument Grounds (never implemented) included a formal sunken garden surrounded by terraces of elms and fountains. The plan attempted to regularize the Washington Monument site within a true square (bounded on the east by what would have been a straight north-south extension of 15th Street), with more symmetrically balanced formal features. The features implemented from the 1901 McMillan Plan are detailed in “The Plan of the City of Washington” National Historic Landmark nomination.

In 1928, a bill was introduced in Congress to appropriate $500,000,000 to complete the McMillan Plan, which included $30,000 for preparing plans and estimates specifically aimed at improving the Monument Grounds (Milner, 2003). An advisory committee was formed to study the stability of the monument, and in 1930 test borings were made to test the subsoil conditions. Extensive studies and debates arose regarding the stability of the Monument during discussions on construction of the proposed sunken terrace. Finally, engineers on the committee concluded that the monument possessed a satisfactory level of stability, but implementing the McMillan Plan on the Washington Monument Grounds would require fill that exceeded ten times the weight of the monument. Two options were given as a result of the test borings: underpin the monument’s foundations to bedrock, or dismantle the entire monument and rebuild
it with a new foundation. Prohibitive costs and effort of stabilizing the monument led the committee to suggest that the McMillan Plan proposals be abandoned for the site – because of its threat to the structural integrity of the Monument, but also due to its lack of planning for the automobile – and that other means of incorporating the grounds into the surrounding Mall should be explored (Grant, 1934). Resultantly the site remained as an open landscape characterized by the prominent knoll with curvilinear circulation paths throughout the grounds (see Figure 6.1.3-7).

**Post-WWII Plans (non historic)**

Numerous attempts to better integrate the Monument Grounds and remove visitors’ cars were initiated following World War II, but none were fully implemented. Thomas Jeffers acted on the improvement of the Monument Grounds with his 1948 plan to eliminate the existing circumferential road. By this time the road had become obsolete due to the Independence Avenue extension, and the National Capital Park and Planning Commission and the Commission of Fine Arts approved the plan as a continuation of Olmsted’s 1931 scheme (Streatfield, 2002). However, like many proposed plans for the grounds, Jeffers’ design was never fully implemented.

Throughout World War II, areas around the Washington Monument and the western section of the mall were occupied by temporary buildings to house government workers. No temporary buildings were placed on the NMAAHC site. The temporaries not only obscured the view toward the west of the city, they also hampered the development of the landscape (Figure 6.1.3-8). The “tempo” east of 17th Street on the Washington Monument Grounds were not removed until 1964 (John Milner Associates, 2003). A circle of permanent flags was erected around the base of the Monument in 1959 (HABS, 1993a).

The Skidmore, Owings, and Merrill (SOM) 1965-66 master plan for the Mall represented a turn from informal, picturesque landscapes to more formal planning principles presented in the earlier McMillan Plan. In conjunction with Dan Kiley, landscape architect, SOM sought to redevelop the National Mall and restore the sense of formality between the Capitol Building and the Lincoln Memorial. The plan included double rows of trees on either side of the tapis vert to provide a shaded walkway along graveled paths and the cross axes of major buildings on the Mall would be marked with fountains and paved courts (Streatfield, 2002). One of the main considerations of the SOM design for the Mall was the fact that tourism had become Washington’s third-largest industry, with approximately 12.8 million visitors in 1965. The master plan, as it was updated through the 1970s, was intended to eliminate the detrimental effects of automobiles on the Mall. Washington and Adams Drives were closed to vehicular traffic and graveled paths were installed for pedestrians. Over a ten-year period, in anticipation of the Bicentennial, more modest aspects of the SOM plan were implemented by the National Park Service (Olszewski, 1970/1971). The German-American Friendship Garden was constructed on the north end of the Washington Monument Grounds in 1987-88 (HABS, 1993a).

Several plans for improving the Monument grounds throughout the 1980s were proposed, but never implemented. In 1993, a plan was prepared to restore the Monument Lodge as the entrance to a new underground visitor’s center. Included in this plan was the realignment of 15th Street, Madison Avenue, and Jefferson Avenue. The restoration of the Monument Lodge was never completed, but the realignment of the three streets was completed in 2000 (John Milner Associates, 2003). The perimeter security project designed by Olin Partnership of Philadelphia was completed in 2001-2003 (ibid).
Figure 6.1.3-1: The original comprehensive plan of Washington, was designed by Peter (Pierre) Charles L’Enfant in 1791 as the site of the Federal City. L’Enfant’s original drawings and manuscript from 1791 were never engraved and have since become almost illegible. This facsimile of the manuscript and drawings was completed by the U.S. Coast and Geodetic Survey in 1887 and details the system of streets and open space as envisioned by L’Enfant. The resulting plan was a system of orthogonal streets with intersecting diagonal avenues radiating from the two most significant buildings sites – the Capitol and the White House – detailed as “I” and “L” in this drawing. The President’s House and gardens were intended to stand on high ground near the western end of the city and overlook the Tiber Creek and Potomac River beyond. The Capitol was planned for Jenkin’s Hill, with a public walk linking the presidential house and grounds with the Capitol building. This “grand avenue” was to be approximately a mile in length, 400 feet in width and terminating at “Monument A,” an equestrian statue dedicated to George Washington – this concept subsequently became the current Washington Monument. (“Plan of the City Intended for the Permanent Seat of the Government of the United States.” Facsimile of a manuscript by Peter Charles L’Enfant in the Library of Congress. Washington, : U.S. Coast and Geodetic Survey, 1887. Reproduced in Reps, Washington on View).
Figure 6.1.3-2: This map was the first publication of Andrew Ellicott’s Plan, Plan of the City of Washington in the Territory of Columbia, engraved by Thackara and Valance of Philadelphia in 1792. Ellicott’s engraving followed closely to L’Enfant’s original scheme with a few minor changes; the elimination of L’Enfant’s name from the maps and the abandonment of a comprehensive directive for the treatment of the city’s open spaces. (“Plan of the City of Washington in the Territory of Columbia, ceded by the States of Virginia and Maryland to the United States of America, and by them established as the Seat of their Government, after the Year MDCCC.” Engraving by Thackara and Vallance, Philadelphia, 1792. Reproduced in Reps, Washington on View).
Figure 6.1.3-3: Benjamin Banneker, a self-taught astronomer of African descent and one of few free blacks living in the vicinity (Junior League of Washington, An Illustrated History: The City of Washington, 1977).
Figure 6.1.3-4: A detail of the Ellicott’s 1792 map shows the configuration of the planned monumental core with a tree-lined avenue connecting the Capitol and President’s House with a mounded site at the terminus for a monument to George Washington. Also shown in the early plans were footprints of buildings intended to house foreign ministries on the perimeter of the tree-lined greensward. One such footprint occurs on the current NMAAHC site. (“Plan of the City of Washington in the Territory of Columbia.” Engraving by Thackara and Vallance, Philadelphia, 1792. Reproduced in Reps, Washington on View).
Figure 6.1.3-5: Proposed Senate Park Commission treatments for the Washington Monument (never implemented) included a formal sunken garden surrounded by terraces of elms and fountains. The plan attempted to regularize the Washington Monument site within a true square (bounded on the east by what would have been a straight north-south extension of 15th Street), with more symmetrically balanced formal features. Wooded areas, or bosks, were placed on elevated terraces around the sunken garden to further accentuate the grandeur of the monument when viewed from the west. It also served as an enclosure for the garden, which emphasized the Monument Grounds as a terminus in the formal plan. The Monument’s reflection in the reflecting pool was intended to further emphasize the important east-west axis. (‘The Mall: The McMillan Plan, 1901’ Senate Park Commission, Plan of 1901).
Figure 6.1.3-6: The McMillan Plan described a round pool west of the Washington Monument (the darkened square to the right of the central circle on this plan) that would intersect with the true north-south axis of L’Enfant’s original plan. The realignment of the intended axis was intended to reestablish the Monument Grounds as the “gem of the Mall system” (Senate Park Commission, Plan of 1901-02, “Plan showing Proposed Treatment of Monument Garden,” rendering by George de Gersdorff. Reproduced in Longstreth, The Mall in Washington: 1791-1991).
Figure 6.1.3-7: The National Capital Parks and Planning Commission published a 1939 development plan for the Mall, which included reconfiguring the circumferential road into a more regular, elliptical shape and repositioning 15th Street to create a more symmetrical curve. The development plan is particularly indicative of the evolution of the western part of the Mall, including the Monument Grounds, and how it diverged in concept from the McMillan Plan over the course of forty years into a naturalistic landscape. Many of these changes were directed by Olmsted with the general spirit of the L’Enfant Plan in mind, but also acknowledging the existing natural conditions in the city (National Capital Parks and Planning Commission, “Study for Development,” 1939. National Archives, RG 328, Records of the National Capital Planning Commission).
Figure 6.1.3-8: Aerial view of “temps” on the western portion of the Washington Monument Grounds, 1943 (Library of Congress, Prints and Photographs Division. LC-USZ62-132352).
6.1.4 **What nearby historic structures, buildings, monuments, landscapes, and districts would be affected by the construction and operation of the museum? How would they be affected?**

As previously determined by the Smithsonian Institution, and agreed upon by the DCHPO office and the ACHP, the construction and operation of the NMAAHC will cause adverse effects on certain historically significant properties, districts, and city plans. The historic structures, buildings, monuments, and districts potentially affected by the construction and operation of the NMAAHC are illustrated in a series of three maps: “Plan of the City of Washington: Contributing Streets, Reservations, and Appropriations,” “Historic Districts and Contributing Properties,” and “Individually Listed Historic Properties.”

The figure entitled “Plan of the City of Washington: Contributing Streets, Reservations, and Appropriations” (Figure 6.1.4-1) relies on the draft National Historic Landmark nomination form, which is currently held at the District of Columbia Historic Preservation Office. This document provides the current definitions for the eligibility of the Plan for the City of Washington, as defined by a culmination of efforts between 1791 and 1942. Original appropriations and reservations were delineated in both the L’Enfant and McMillan Plans as defining characteristics of the city and retain significance as major features of the city plan. Streets and diagonal avenues are identified as significant resources and serve as important axes, cross axes, and boundaries within the plans.

The figure entitled “Historic Districts and Contributing Properties” (Figure 6.1.4-2) defines historic districts and contributing properties therein as determined by the National Register of Historic Places, National Historic Landmark Program, and District of Columbia Inventory of Historic Sites. The historic districts within the project area include:

- The Mall Historic District [NR, DC Inventory]
- Northwest Rectangle Historic District [Determined Eligible for NR]
- Seventeenth Street Historic District [DC Inventory]
- Pennsylvania Avenue National Historic Site [NHS, DC Inventory]\(^1\)
- Federal Triangle Historic District [DC Inventory, part of Pennsylvania Avenue NHS]
- West Potomac Park Historic District [NR]
- East Potomac Park Historic District [NR]

The figure entitled “Individually Listed Historic Properties” (Figure 6.1.4-3) depicts resources that are individually listed in or eligible for the National Register of Historic Places, are designated as National Historic Landmarks, or are listed in the District of Columbia Inventory of Historic Sites. Currently, the Washington Monument is listed as an individual National Register property with boundaries encompassing the entire grounds – the area bounded by Constitution Avenue, 14th Street, Wallenberg Place, East Basin Drive and 17th Street, in the northwest quadrant of Washington, D.C. Some of the most prominent resources include the Mall, Federal Triangle (particularly the U.S. Department of Commerce building), the White House Precinct and Ellipse.

\(^1\) Due to the large number of contributing resources within the Pennsylvania Avenue NHS (over 100), only those contributing features that were considered within reasonable proximity to the NMAAHC site were included in this study.
Figure 6.1.4-1: Plan of the City of Washington: Contributing Streets, Reservations, and Appropriations
Plan of the City of Washington, DC
Contributing Streets, Reservations, and Appropriations

**Streets**

<table>
<thead>
<tr>
<th>Street</th>
<th>Avenue</th>
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</thead>
<tbody>
<tr>
<td>2nd Street</td>
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</tr>
<tr>
<td>3rd Street</td>
<td>Independence Avenue</td>
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<td>22nd Street</td>
<td></td>
</tr>
<tr>
<td>23rd Street</td>
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</tr>
</tbody>
</table>

**Appropriations and Reservations**

- Reservation No. 1: President's Park (Original Appropriation No. 1)
- Reservation No. 2: Washington Monument Grounds (Original Appropriation No. 3, Reservation No. 2)
- Reservation Nos. 3, 3B, 4, 5, 6, and 6A: National Mall (Part of Original Appropriation No. 2)
- Reservation No. 332: West Potomac Park
- Reservation No. 333: East Potomac Park

**Affected Area**
Figure 6.1.4-2: Historic Districts and Contributing Properties
The National Mall Historic District [National Register, October 15, 1966; DC Landmark, November 8, 1964]

Northwest Rectangle Historic District [Determined Eligible for the National Register]

Buildings
1. Old Department of the Interior Building (GSA)
2. Corcoran Gallery of Art
3. Pan American Union (Organization of American States)
4. DAR Memorial Continental Hall
5. DAR Constitution Hall
6. American National Red Cross
7. American Institute of Pharmacist
8. American National Red Cross Administration Building
9. American National Red Cross Office
10. American Red Cross D.C. Chapter House
11. Department of the Interior Building
12. Department of the Interior South Building
13. National Academy of Sciences
14. Federal Reserve Board Building
15. Office of Personnel Management
16. Pan American Union Annex
17. Van Ness House Stable
18. War Department

Statuary
19. Jose Artigas Statue
20. Simon Bolivar Statue
21. General Jose de San Martin Statue
22. Major General John A. Railins Statue
23. Reproduction of Discus Thrower

Seventeenth Street Historic District [DC Inventory, March 7, 1968]

Pennsylvania Avenue National Historic Site [NHS, October 15, 1966; DC Inventory, June 19, 1973] *

Buildings
24. Department of Treasury
25. Department of Commerce, Federal Triangle
26. District Building, Federal Triangle
27. Federal Trade Commission, Federal Triangle
28. Internal Revenue Service Building, Federal Triangle
29. Department of Justice, Federal Triangle
30. Labor Department, Interstate Commerce and Departmental Auditorium, Federal Triangle
31. National Archives, Federal Triangle
32. Old Post Office Building, Federal Triangle
33. U.S. Post Office Building, Federal Triangle

Statuary/Memorials/Monuments
34. Sherman Statue, Sherman Park
35. Benjamin Franklin Statue, SE corner Pennsylvania & 12th
36. Franklin Delano Roosevelt Memorial, Market Square Park
37. General George C. Meade Memorial, Meade Plaza
38. Peace Monument, Pennsylvania Avenue & 1st Street
39. Captain Nathan Hale Statue, Department of Justice

Fountains
40. Andrew W. Mellon Memorial Fountain, Mellon Park

Federal Triangle Historic District [DC Inventory, March 7, 1968; within Pennsylvania Avenue NHS]

Buildings
25. Department of Commerce
26. District Building (see individual listing)
27. Federal Trade Commission
28. Internal Revenue Service
29. Department of Justice
30. Labor Department, ICC, and Departmental Auditorium
31. National Archives (see individual listing)
32. Old Post Office Building (see individual listing)
33. U.S. Post Office Department (Ariel Rios)

Statuary
39. Captain Nathan Hale Statue

West Potomac Park Historic District [National Register, November 30, 1973 (revised November 11, 2001); DC Inventory, November 8, 1964]

41. Lock Keeper’s House (see individual listing)
42. Tidal Basin
43. Number 4 Fountain
44. John Paul Jones Monument
45. Japanese Cherry Trees and Statuary
46. Lincoln Memorial Grounds (see individual memorial listing)
47. John Ericsson Monument
48. DC WWI Memorial
49. Kutz Bridge & Independence Avenue Extension
50. Jefferson Memorial Grounds (see individual memorial listing)
51. Constitution Gardens
52. 56 Signers Memorial
53. Vietnam Veterans Memorial (see individual memorial listing)
54. Vietnam Women’s Memorial
55. Korean War Memorial (see individual memorial listing)
56. Franklin Delano Roosevelt Memorial (see individual memorial listing)
57. Reflecting Pool
58. Stone Seawalls
59. Independence Avenue Extension

East Potomac Park Historic District [National Register, November 30, 1973 (revised November 11, 2001); DC Inventory November 8, 1964]

60. Potomac Railroad Bridge
61. U.S. Engineers Storehouse (900 Ohio Dr., SW)
62. Field House, Golf Course, Mini Golf Course
63. Ohio Drive, SW

*The Pennsylvania Avenue National Historic Site contains approximately 111 contributing sites, buildings, structures and objects. For reasons of clarity, the only historic resources that will be noted in this list and on corresponding maps will be those that could be significantly impacted by the area of potential affect.
Figure 6.1.4-3- Individually Listed Historic Properties
## Individually Listed Historic Properties

[NHL] National Historic Landmark  
[NR] National Register of Historic Places  
[DC] District of Columbia Inventory of Historic Places

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<tr>
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<tr>
<td>1</td>
<td>American National Red Cross</td>
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</tr>
<tr>
<td>2</td>
<td>American Pharmaceutical Institute</td>
<td>[NR, DC]</td>
</tr>
<tr>
<td>3</td>
<td>Arlington Memorial Bridge</td>
<td>[NR, DC]</td>
</tr>
<tr>
<td>4</td>
<td>Arts and Industries Building</td>
<td>[NHL, NR, DC]</td>
</tr>
<tr>
<td>5</td>
<td>Bartholdi Fountain</td>
<td>[NR Exempt, DC]</td>
</tr>
<tr>
<td>6</td>
<td>Bulfinch Gatehouse and Gateposts</td>
<td>[NR, DC]</td>
</tr>
<tr>
<td>7</td>
<td>Constitution Hall (Daughters of the American Revolution)</td>
<td>[NHL, NR, DC]</td>
</tr>
<tr>
<td>8</td>
<td>Corcoran Gallery of Art</td>
<td>[NHL, NR, DC]</td>
</tr>
<tr>
<td>9</td>
<td>DAR Memorial Continental Hall</td>
<td>[NHL, NR, DC]</td>
</tr>
<tr>
<td>10</td>
<td>District of Columbia District Building</td>
<td>[NR, DC]</td>
</tr>
<tr>
<td>11</td>
<td>The Ellipse (President's Park South)</td>
<td>[NR]</td>
</tr>
<tr>
<td>12</td>
<td>Jefferson Memorial Bridge</td>
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<td>13</td>
<td>Federal Reserve Board Building</td>
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<td>Franklin Delano Roosevelt Memorial</td>
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<td>Freer Gallery of Art</td>
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<td>Korean War Veterans Memorial</td>
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<td>17</td>
<td>Lincoln Memorial</td>
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<td>Lock Keeper’s House</td>
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<td>National Gallery of Art West Building</td>
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<td>National Museum of Natural History</td>
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<td>23</td>
<td>Old Post Office Building</td>
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<td>Pan American Union (Organization of American States)</td>
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<tr>
<td>25</td>
<td>Smithsonian Institution Building (Castle)</td>
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<td>[DC]</td>
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<td>U.S. Bureau of Engraving and Printing</td>
<td>[DC]</td>
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<td>U.S. Capitol and Grounds</td>
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<td>U.S. Department of Agriculture (Administration Building)</td>
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</tr>
<tr>
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<td>U.S. Department of the Treasury Building</td>
<td>[NHL]</td>
</tr>
<tr>
<td>35</td>
<td>U.S. State, War, and Navy Building</td>
<td>[NHL, NR, DC]</td>
</tr>
<tr>
<td>36</td>
<td>Van Ness House Stables</td>
<td>[DC]</td>
</tr>
<tr>
<td>37</td>
<td>Vietnam Veterans Memorial</td>
<td>[NR]</td>
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<td>Washington Monument and Grounds</td>
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<td>39</td>
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<td>WWII Memorial</td>
<td>[NR, DC]</td>
</tr>
<tr>
<td>41</td>
<td>The Mall</td>
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</table>
Methodology for Measuring Effects

This section analyzes the potential effects of the proposed construction and operation of the NMAAHC on historic resources within the APE and is evaluated in terms both short-term (lasting through construction or less than one year) and long-term (lasting more than one year). In the short term, the effects will be related to construction activity, while long-term effects will relate directly to loss or alteration of the character-defining features addressed in the following analysis.

The thresholds used for analyzing the intensity of effects are defined as follows:

No Effects: The proposed action will not affect overall integrity, or affect the character-defining feature(s) of the National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property.

No Significant Effect or Minor Effect: The effect will not be significant if the proposed action does not substantially alter primary character-defining feature(s) of a National Register eligible/listed property, including but not limited to, views and vistas, buildings, landscapes, small-scale features, and setting. The effect would be minor if it alters character-defining features in a limited way. By nature, many minor effects are adverse.

Significant Effect: The effect would be significant if the proposed action substantially alters primary character-defining features of a National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property, including but not limited to, views and vistas, buildings, landscapes, small-scale features, and setting. By nature, most significant effects are adverse.

Within the category of “Significant Effect,” a more detailed designation of intensity includes:

Moderate: The effect is apparent and would diminish overall integrity, or alter a character-defining feature(s) of the National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property.

Major Effect: The effect is serious and would greatly diminish overall integrity, or greatly alter a character-defining feature(s) of the National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property.

No Build Alternative

Under the No Build Alternative, the construction and operation of the proposed NMAAHC would not take place. There would be no new construction on the designated site located on the northeast corner of the Washington Monument Grounds and the existing space would remain open.

The overall result of the No Build Alternative would be no effect.

Alternative 1 (Contextual Building Alignment)

Alternative 1 was designed to respect the orthogonal grid of the city and is aligned with the NMAH to the east and portico of the Department of Commerce building to the north. The building height is 75 feet.

Short-term Impacts

There would be significant, moderate, adverse short-term effects on the NMAAH site on the Washington Monument grounds. The effects include the loss of the existing grassy cover and possibly a limited number of existing trees. Alternative 1 was designed to avoid the mature trees on the north and east side of the NMAAHC site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and
materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAHC site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

**Long-term Impacts**

Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

**Views and Vistas**

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified in this section as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.

The height and massing of the NMAAHC will obstruct or impede key views to and from the Washington Monument. The building will also restrict key views of surrounding urban features, such as the Federal Triangle, particularly the Department of Commerce building. The NMAAHC will bring the existing row of museums on the north side of the Mall closer to the Washington Monument, thereby diminishing the monument’s visual prominence as a central organizing feature within its setting.

The construction of the NMAAHC also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources.

Alternative 1’s low height minimizes impact on surrounding historic features from certain vantage points, but the relatively large footprint intrudes on key vistas and panoramas that contribute to the significance of the Washington Monument grounds and features within close proximity.

Primary threshold panoramas within the Washington Monument grounds were identified throughout the Section 106 consultation process. One set of these viewsheds are experienced primarily by pedestrians at the “gateways” to the Washington Monument grounds – 14th Street & Constitution Avenue, 17th Street and Constitution Avenue, and from the WWII Memorial.

- **Alternative 1** will have a significant, major, adverse effect on the panorama from 14th Street and Constitution Avenue toward the Washington Monument. At 75 feet, this building alternative obstructs a key view of the bottom portion of the Washington Monument shaft. The building’s height and massing will diminish the visual prominence of the Washington Monument within the grounds from this vantage point.
- **Alternative 1** will have a significant, moderate, adverse effect on the panorama toward the Washington Monument from 17th Street and Constitution Avenue. The building’s height and mass alter the visual open space of the Washington Monument grounds and the character of surrounding buildings. From this vantage point, the 75 foot height will have less of an impact on the prominence of the Washington Monument.
- **The NMAAHC Alternative 1 will have a minor adverse effect on the panorama from the WWII Memorial. The building is not visible from the WWII Memorial, but comes into view as one approaches Constitution Avenue along 17th Street.**

In addition, multidirectional panoramic views within the Washington Monument grounds were identified as key character-defining features. These multidirectional panoramas include viewsheds to and from the Washington Monument and other buildings/landscape features within the grounds including the Monument Lodge, Bullfinch Gateposts, Survey Lodge, groves of trees throughout the site, and street trees lining Constitution Avenue.
Alternative 1 will have a significant, major, adverse effect on the following multidirectional panoramas within the grounds:

- The broad building footprint and 75 foot height on the NMAAHC site intrude on the visual perception of the Washington Monument situated within an open landscape.
- The rectangular massing of the building conforms to adjacent buildings within the city grid, but does not relate to the Monument grounds to the west and south of the NMAAHC site.

Alternative 1 will also have a significant, major, adverse effect on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The broad building footprint obstructs the viewshed of a large portion of the Federal Triangle buildings, including the Interstate Commerce Commission (ICC) building and Mellon Auditorium from the Washington Monument grounds.
- The building massing and site placement restricts a key continuous viewshed of the Washington Monument when traveling west on Constitution Avenue and alters established open space and setback.

Alternative 1 will have significant, moderate, adverse effects on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The building partially obstructs the view of the Department of Commerce building when traveling north along 14th Street. The rectangular massing of the building also establishes the city grid on the Washington Monument grounds from this viewshed corridor.
- The knoll partially shields the view of the NMAAHC when traveling north on 17th Street, but the building becomes more visible as one approaches Constitution Avenue.

Alternative 1 will have minor adverse affects on multidirectional viewsheds to and from the following surrounding historic buildings and features, as well as citywide contextual views:

- The building causes a minor setting intrusion on the view to the U.S. Department of Agriculture building and U.S. Auditors Complex.
- The 75 foot height is visible from Independence Avenue and causes a minor setting intrusion on the Washington Monument grounds and Federal Triangle. However, the building does not rise above the Federal Triangle’s prominent red roofline.
- Height and massing of the building will alter the visual relationship between the Washington Monument grounds and the White House and grounds and the Ellipse (President’s Park South) by causing a minor setting intrusion on the viewshed from the Washington Monument grounds.
- Height, massing, lighting and materials of the building will alter the viewshed from Arlington Cemetery and Reservation No. 332 (West Potomac Park) by altering the visual impact of the buildings surrounding the Washington Monument.
- Height and massing of the NMAAHC will cause a minor setting intrusion on the Washington Monument grounds from the Old Post Office tower, but does not obstruct the view of the Monument shaft.

The NMAAHC alters the viewshed from the White House and grounds and the Ellipse (President’s Park South) south toward the Jefferson Memorial by altering the visual relationship of open space on the Washington Monument grounds.

Aerial views of the Washington Monument grounds will be altered by visually removing the northwest corner.
Spatial Organization

The NMMAHC Alternative 1 will cause the most adverse affects to the Washington Monument grounds, specifically to its principal organizing features.

Alternative 1 building alignment will have a significant, major, adverse effect on the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMMAHC site.

- Any above-ground resource removes an open portion of the Washington Monument grounds, diminishing the prominence of Washington Monument as a central organizing feature. The large footprint and alignment of the NMMAHC in this alternative encompasses much of the NMMAHC site.
- The NMMAHC alters the spatial conception of the Washington Monument grounds historic boundaries (Original Appropriation no. 3) and the Mall (Original Appropriation No. 2) by extending the existing row of museums onto the Washington Monument Grounds.
- The large footprint and setbacks reinforce the orthogonal city grid on the Washington Monument grounds’ open space.

Alternative 1 will have a significant, moderate, adverse effect on the spatial organization of resources in proximity to the Washington Monument grounds.

- The building alters the perception of the progression of space, particularly along the Mall and from the White House and grounds and the Ellipse (President’s Park South).
- The building alignment would cause a loss of symmetry of the elements designed to flank the Ellipse (President’s Park South) – now open space on the Washington Monument Grounds at 14th Street and 17th Street.
- The NMMAHC will alter the visual boundaries of the west side of the Mall by extending construction onto the Washington Monument Grounds.

The NMMAHC will have a minor adverse effect on the spatial organization of features that contribute to the historic significance of the city.

- The building will introduce a new element into the historically open space of orthogonal grid of the city.

Land Use

The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations. Alternative 1 features a large building footprint that removes a large portion of open space and introduces formalized outdoor programming space on the NMMAHC site.

The construction and operation of Alternative 1 will have a significant, moderate adverse effect on the Washington Monument grounds’ land use.

- The building’s large footprint encompasses much of the NMMAHC site.
- By removing public gathering and recreational space, the building alters the Washington Monument grounds’ function as an informal setting to a more defined, formal space.

Interpretive content of the NMMAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.
Circulation
The construction and operation of Alternative 1 will have a minor adverse effect on circulation on and surrounding the Washington Monument grounds.
- The building will alter the established setback/streetscape of Constitution Avenue along the Mall and Washington Monument grounds.
- The NMAAHC will remove open circulation on the site.

Topography
The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of Alternative 1 will have no known effect on the topography within the APE.

Vegetation
The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.

The construction and operation of Alternative 1 will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.
- The building and outdoor programming space removes a large portion of open turf lawn on the NMAAHC site.

The construction and operation of Alternative 1 will have a minor adverse effect on vegetation within the Washington Monument grounds.
- The building will diminish the visual impact of the trees.

Buildings and Structures
Alternative 1 will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.
- Height and massing of the NMAAHC will diminish the visual impact of the Washington Monument by competing for prominence within the Monument grounds.
- Height and massing will diminish the visual prominence of the Monument Lodge and Bulfinch Gateposts within the setting of the Washington Monument grounds.
- The building will also diminish the visual impact of the Federal Triangle’s five-part composition that is centered on the Mellon Auditorium and will compete with the south portico of the Department of Commerce building. The building will intrude on the setting of the Federal Triangle buildings by altering the buildings’ relationship with open space on the Washington Monument grounds.

The scale and height of Alternative 1 will also have a minor adverse effect on resources in proximity to the Washington Monument grounds.
- The building will intrude on the setting of the U.S. Agriculture Department building, U.S. Auditors Complex, Northwest Rectangle Historic District, and Seventeenth Street Historic District by altering the visual relationship of the buildings with the open space of the Washington Monument grounds along Constitution Avenue.
Alternative 2 (Washington Monument Orientation)

Alternative 2 was designed to respect the orthogonal grid of the city on the east and north side, while responding to the characteristics of the Washington Monument grounds. The building height is 90 feet.

Short-term Impacts

There would be significant, moderate, adverse short-term effects on the NMAAH site on the Washington Monument grounds. The effects include the loss of the existing grassy cover and possibly a limited number of existing trees. Alternative 2 was designed to avoid the mature trees on the north and east side of the NMAAH site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAH site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

Long-term Impacts

Any new above-grade structure on the NMAAH site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

Views and Vistas

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified in this section as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.

The height and massing of Alternative 2 will obstruct or impede key views to and from the Washington Monument. The building will also restrict key views of surrounding urban features, such as the Federal Triangle, particularly the Department of Commerce building. The NMAAH will bring the existing row of museums on the north side of the Mall closer to the Washington Monument, thereby diminishing the monument’s visual prominence as a central organizing feature within its setting.

The construction of the NMAAH also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources.

Primary threshold panoramas within the Washington Monument grounds were identified throughout the ongoing Section 106 consultation process. One set of these viewsheds are experienced primarily by pedestrians at the “gateways” to the Washington Monument grounds – 14th Street & Constitution Avenue, 17th Street and Constitution Avenue, and from the WWII Memorial.

- Alternative 2 will have a significant, major, adverse effect on the panorama from 14th Street and Constitution Avenue toward the Washington Monument. At 90 feet, this building alternative obstructs a key view of the bottom portion of the Washington Monument shaft. The building’s height and massing will diminish the visual prominence of the Washington Monument within the grounds from this vantage point.
- Alternative 2 will have a significant, major, adverse effect on the panorama toward the Washington Monument from 17th Street and Constitution Avenue. The building’s height and mass alter the visual open space of the Washington Monument grounds and the character of surrounding buildings.
- Alternative 2 will have a moderate adverse effect on the panorama from the WWII Memorial. From this vantage point, the building is slightly visible and becomes more visible as one approaches Constitution Avenue along 17th Street.
In addition, multidirectional panoramic views within the Washington Monument grounds were identified as key character-defining features. These multidirectional panoramas include viewsheds to and from the Washington Monument and other buildings/landscape features within the grounds including the Monument Lodge, Bulfinch Gateposts, Survey Lodge, groves of trees throughout the site, and street trees lining Constitution Avenue.

Alternative 2 will have a significant, major, adverse effect on the following multidirectional panoramas within the grounds:

- The taller building height and massing on the NMAAHC site intrudes on the perception of the Washington Monument situated within an open landscape from multiple vantage points within the Monument grounds.

Alternative 2 will also have a significant, major, adverse effect on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The broad building footprint obstructs the viewshed of a large portion of the Federal Triangle buildings, including the Department of Commerce, Interstate Commerce Commission (ICC) building and Mellon Auditorium from the Washington Monument grounds.
- The building massing and site placement restricts a key continuous viewshed of the Washington Monument when traveling west on Constitution Avenue and alters established open space and setback.

Alternative 2 will have significant, moderate, adverse effects on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The building partially obstructs the view of the Department of Commerce building when traveling north along 14th Street. Height and massing of the building also establishes the city grid on the Washington Monument grounds from this viewshed corridor.
- The knoll partially shields the view of the NMAAHC when travelling north on 17th Street, but the building becomes more visible as one approaches Constitution Avenue.
- Height and massing of the NMAAHC alters the viewshed from the White House and grounds and the Ellipse (President’s Park South) south toward the Jefferson Memorial by altering the visual relationship of open space on the Washington Monument grounds.
- The 90 foot building height is visible from Independence Avenue and rises above the Federal Triangle’s prominent red roofline.
- The NMAAHC is visible from the Old Post Office tower, but does not restrict the view of the Washington Monument. The building’s 90' height, however, partially obstructs the view of the Old Post Office tower from the Washington Monument grounds.
- Aerial views of the Washington Monument grounds will be altered by visually removing the northwest corner.

Alternative 2 will have minor adverse affects on multidirectional viewsheds to and from the following surrounding historic buildings and features, as well as citywide contextual views:

- The building causes a minor setting intrusion on the view to the U.S. Department of Agriculture building and U.S. Auditors Complex.
- Height and massing of the building will alter the visual relationship between the Washington Monument grounds and the White House and grounds and the Ellipse (President’s Park South) by causing a minor setting intrusion on the viewshed from the Washington Monument grounds.
- Height, massing, lighting and materials of the building will alter the viewshed from Arlington Cemetery and Reservation No. 332 (West Potomac Park) by altering the visual impact of the buildings surrounding the Washington Monument.
Spatial Organization

Alternative 2 will cause the most adverse affects to the Washington Monument grounds, specifically to its principal organizing features.

Similarly to Alternative 1, this alternative will have a significant, major, adverse effect on the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMAAHC site.

- Any above-ground resource removes an open portion of the Washington Monument grounds, diminishing the prominence of Washington Monument as a central organizing feature.
- The NMAAHC alters the spatial conception of the Washington Monument grounds historic boundaries (Original Appropriation no. 3) and the Mall (Original Appropriation No. 2) by extending the existing row of museums onto the Washington Monument Grounds.
- At 90 feet, the NMAAHC will significantly affect the prominence of the knoll as an organizing feature of the Washington Monument grounds.
- While the smaller footprint of the building removes less open space, the NMAAHC and outdoor programming space remove a corner of the Washington Monument grounds’ open landscape.

Alternative 2 will have a significant, moderate, adverse effect on the spatial organization of resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Alternative 2 will have a minor adverse effect on the spatial organization of features that contribute to the historic significance of the city.

- See effects analysis for Alternative 1.

Land Use

The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations. Alternative 2 is oriented toward the north portion of the NMAAHC site and introduces outdoor programming space toward the Washington Monument.

The construction and operation of Alternative 2 will have a significant, moderate adverse effect on the Washington Monument grounds’ land use.

- See effects analysis for Alternative 1.

Interpretive content of the NMAAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.

Circulation

The construction and operation of Alternative 2 will have a minor adverse effect on circulation surrounding the Washington Monument grounds.

- See effects analysis for Alternative 1.

Topography

The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of Alternative 2 will have no known effect on the topography within the APE.
Vegetation

The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.

The construction and operation of Alternative 2 will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

The construction and operation of Alternative 2 will have a minor adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

Buildings and Structures

Alternative 2 will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.

- Height and massing of the NMAAHC will diminish the visual impact of the Washington Monument by competing for prominence within the Monument grounds.
- Height and massing will diminish the visual prominence of the Monument Lodge and Bulfinch Gateposts within the setting of the Washington Monument grounds.
- The building will also diminish the visual impact of the Federal Triangle’s five-part composition that is centered on the Mellon Auditorium and will compete with the south portico of the Department of Commerce building. The building will intrude on the setting of the Federal Triangle buildings by altering the buildings’ relationship with open space on the Washington Monument grounds.

The height and mass of Alternative 2 will have a minor adverse effect on resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Alternative 3 (Free Form)

Alternative 3 departs from the concept of any contextual building alignment in order to establish a distinct identity on the NMAAHC site. The building’s footprint is minimized on the site and its height is 105 feet.

Short-term Impacts

There would be significant, moderate, adverse short-term effects on the NMAAH site on the Washington Monument grounds. The effects include the loss of the existing grassy cover and possibly a limited number of existing trees. Alternative 3 was designed to avoid the mature trees on the north and east side of the NMAAHC site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAHC site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

Long-term Impacts

Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

Views and Vistas

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified in this section as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.
The height and massing of Alternative 3 will obstruct or impede key views to and from the Washington Monument. The building will also restrict key views of surrounding urban features, such as the Federal Triangle, particularly the Department of Commerce building. The NMAAHC will bring the existing row of museums on the north side of the Mall closer to the Washington Monument, thereby diminishing the monument’s visual prominence as a central organizing feature within its setting.

The construction of the NMAAHC also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources.

Alternative 3 is situated on the south portion of the NMAAHC site, which improves visibility of the Washington Monument from certain vantage points. The building alternative’s height and placement may make it more visible from historic features to the east of the museum, such as the Mall and Capitol building and grounds.

Primary threshold panoramas within the Washington Monument grounds were identified throughout the ongoing Section 106 consultation process. One set of these viewsheds are experienced primarily by pedestrians at the “gateways” to the Washington Monument grounds – 14th Street & Constitution Avenue, 17th Street and Constitution Avenue, and from the WWII Memorial.

- Alternative 3 will have a significant, moderate, adverse effect on the panorama from 14th Street and Constitution Avenue toward the Washington Monument. The building is situated on the south portion of the NMAAHC site and does not obstruct a key view of the Washington Monument from this vantage point.
- Alternative 3 will have a significant, major, adverse effect on the panorama toward the Washington Monument from 17th Street and Constitution Avenue. The building’s height and mass alter the visual open space of the Washington Monument grounds and the character of surrounding buildings.

- Alternative 3 will have a significant, moderate, adverse effect on the panorama from the WWII Memorial. From this vantage point, the top of the building is apparent and becomes more visible as one approaches Constitution Avenue along 17th Street.

In addition, multidirectional panoramic views within the Washington Monument grounds were identified as key character-defining features. These multidirectional panoramas include viewsheds to and from the Washington Monument and other buildings/landscape features within the grounds including the Monument Lodge, Bulfinch Gateposts, Survey Lodge, groves of trees throughout the site, and street trees lining Constitution Avenue.

Alternative 3 will have a significant, major, adverse effect on the following multidirectional panoramas within the grounds:

- Featuring the smallest footprint and tallest height, the building massing intrudes on the perception of the Washington Monument situated within an open landscape from multiple vantage points within the Monument grounds.

Alternative 3 will also have a significant, major, adverse effect on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The greater height has a greater effect on the legibility of the roofline of the Federal Triangle from multiple vantage points within the Monument grounds.

Alternative 3 will have significant, moderate, adverse effects on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The building is situated on the south portion of the NMAAHC site and does not constrain the continuous viewshed of the Washington Monument within the grounds when traveling west along Constitution Avenue.
The building partially obstructs the view of the Department of Commerce building when traveling north along 14th Street.

The knoll partially shields the view of the NMAAHC when travelling north on 17th Street, but the building becomes more visible as one approaches Constitution Avenue.

Height and massing of the NMAAHC alters the viewshed from the White House and grounds and the Ellipse (President’s Park South) south toward the Jefferson Memorial by changing the visual relationship of open space on the Washington Monument grounds. The building height extends beyond the horizontal tree and building line from this vantage point.

The 105 foot building height is very apparent from Independence Avenue and rises above the Federal Triangle’s prominent red roofline.

The NMAAHC is visible from the Old Post Office tower and restricts the view of the Washington Monument shaft. The 105’ building height almost fully obstructs the view of the Old Post Office tower from the Washington Monument grounds.

Aerial views of the Washington Monument grounds will be altered by visually removing the northwest corner.

Alternative 3 will have minor adverse affects on multidirectional viewsheds to and from the following surrounding historic buildings and features, as well as citywide contextual views:

- The building causes a minor setting intrusion on the view to the U.S. Department of Agriculture building and U.S. Auditors Complex.
- Height and massing of the building will alter the visual relationship between the Washington Monument grounds and the White House and grounds and the Ellipse (President’s Park South) by causing a minor setting intrusion on the viewshed from the Washington Monument grounds.
- Height, massing, lighting, and materials of the building will alter the viewshed from Arlington Cemetery and Reservation No. 332 (West Potomac Park) by altering the visual impact of the buildings surrounding the Washington Monument.

Spatial Organization

The NMAAHC will cause the most adverse affects to the Washington Monument grounds, specifically to its principal organizing features.

Similarly to Alternative 1 and 2, this alternative will have a significant, major, adverse effect on the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMAAHC site.

- Any above-ground resource removes an open portion of the Washington Monument grounds, diminishing the prominence of Washington Monument as a central organizing feature.
- The NMAAHC alters the spatial conception of the Washington Monument grounds historic boundaries (Original Appropriation no. 3) and the Mall (Original Appropriation No. 2) by extending the existing row of museums onto the Washington Monument Grounds.
- At 105’, the building will significantly affect the prominence of the knoll as an organizing feature of the Washington Monument grounds.
- While the smaller footprint of the building removes less open space, the NMAAHC and outdoor programming space remove a corner of the Washington Monument grounds’ open landscape.

Alternative 3 will have a significant, moderate, adverse effect on the spatial organization of resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Alternative 3 will have a minor adverse effect on the spatial organization of features that contribute to the historic significance of the city.

- See effects analysis for Alternative 1.
**Land Use**

The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations. Alternative 3 is oriented toward the south portion of the NMAAHC site and introduces outdoor programming space toward Constitution Avenue.

The construction and operation of Alternative 3 will have a significant, moderate, adverse effect on the Washington Monument grounds’ land use.

- The smaller building footprint removes a smaller portion of the open landscape.
- By removing public gathering and recreational space, the building alters the Washington Monument grounds’ function as an informal setting to a more defined, formal space.

Interpretive content of the NMAAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.

**Circulation**

The construction and operation of Alternative 3 will have a minor adverse effect on circulation surrounding the Washington Monument grounds.

- See effects analysis for Alternative 1.

**Topography**

The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of Alternative 3 will have no known effect on the topography within the APE.

**Vegetation**

The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.

The construction and operation of Alternative 3 will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

The construction and operation of the NMAAHC will have a minor adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

**Buildings and Structures**

Alternative 3 will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.

- Height and massing of the NMAAHC will diminish the visual impact of the Washington Monument by creating a new vertical element within the Monument grounds.
- Height of the NMAAHC will diminish the visual prominence of the Monument Lodge and Bulfinch Gateposts within the setting of the Washington Monument grounds.
- The building will also diminish the visual impact of the Federal Triangle’s five-part composition that is centered on the Mellon Auditorium and will compete with the south portico of the Department of Commerce building. The building will intrude on the setting of the Federal Triangle buildings by altering the buildings’ relationship with open space on the Washington Monument grounds.

The height and mass of Alternative 3 will have a minor adverse effect on resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.
**Alternative 4 (Terrace Roof/Amphitheater)**

Alternative 4 relates to the building setback lines of the NMAH to the east and Department of Commerce to the north. The building incorporates a terraced or sloped façade toward the Washington Monument that transitions heights from west to east.

**Short-term Impacts**

There would be significant, moderate, adverse short-term effects on the NMAAH site on the Washington Monument grounds. The effects include the loss of the existing grassy cover and possibly a limited number of existing trees. Alternative 4 was designed to avoid the mature trees on the north and east side of the NMAAHC site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAHC site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

**Long-term Impacts**

Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

**Views and Vistas**

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified in this section as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.

The height and massing of Alternative 4 will obstruct or impede key views to and from the Washington Monument. The building will also restrict key views of surrounding urban features, such as the Federal Triangle, particularly the DOC building. The NMAAH will bring the existing row of museums on the north side of the Mall closer to the Washington Monument, thereby diminishing the monument’s visual prominence as a central organizing feature within its setting.

The construction of the NMAAHC also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources.

Alternative 4’s relatively large footprint and 90 foot height intrudes on key vistas and panoramas that contribute to the significance of the Washington Monument grounds and features within close proximity.

Primary threshold panoramas within the Washington Monument grounds were identified throughout the ongoing Section 106 consultation process. One set of these viewsheds are experienced primarily by pedestrians at the “gateways” to the Washington Monument grounds – 14th Street & Constitution Avenue, 17th Street and Constitution Avenue, and from the WWII Memorial.

- Alternative 4 will have a significant, major, adverse effect on the panorama from 14th Street and Constitution Avenue toward the Washington Monument. At 90 feet, this building alternative obstructs a key view of the bottom portion of the Washington Monument shaft. The building’s height and massing will diminish the visual prominence of the Washington Monument within the grounds from this vantage point.

- Alternative 4 will have a significant, major, adverse effect on the panorama toward the Washington Monument from 17th Street and Constitution Avenue. The building’s height and mass alter the visual open space of the Washington Monument grounds and the character of surrounding buildings.
Alternative 4 will have a significant, moderate, adverse effect on the panorama from the WWII Memorial. The building is visible from the WWII Memorial and becomes more apparent as one approaches Constitution Avenue along 17th Street.

In addition, multidirectional panoramic views within the Washington Monument grounds were identified as key character-defining features. These multidirectional panoramas include viewsheds to and from the Washington Monument and other buildings/landscape features within the grounds including the Monument Lodge, Bulfinch Gateposts, Survey Lodge, groves of trees throughout the site, and street trees lining Constitution Avenue.

Alternative 4 will have a significant, major, adverse effect on the following multidirectional panoramas within the grounds:

- The broad building footprint and 90 foot height on the NMAAHC site intrude on the visual perception of the Washington Monument situated within an open landscape from multiple vantage points within the Monument grounds.
- The rectangular massing of the building conforms to adjacent buildings within the city grid and introduces terraced feature onto Washington Monument grounds.

Alternative 4 will also have a significant, major, adverse effect on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The building partially obstructs the view of the Department of Commerce building when traveling north along 14th Street. The rectangular massing of the building also establishes the city grid on the Washington Monument grounds from this viewshed corridor.
- The NMAAHC alters the viewshed from the White House and grounds and the Ellipse (President’s Park South) south toward the Jefferson Memorial by changing the visual relationship of open space on the Washington Monument grounds. From this vantage point the building’s 90 foot height extends beyond the horizontal tree and building line.
- The 90 foot building is apparent from Independence Avenue and rises above the Federal Triangle’s prominent red rooftop.
- The NMAAHC is visible from the Old Post Office tower, but does not restrict the view of the Washington Monument shaft. The building partially obstructs the view of the Old Post Office tower from the Washington Monument grounds.
- Aerial views of the Washington Monument grounds will be altered by visually removing the northwest corner.

Alternative 4 will have minor adverse affects on multidirectional viewsheds to and from the following surrounding historic buildings and features, as well as citywide contextual views:

- The building causes a minor setting intrusion on the view to the U.S. Department of Agriculture building and U.S. Auditors Complex.
- Height and massing of the building will alter the visual relationship between the Washington Monument grounds and the White House and grounds and the Ellipse (President’s Park.
South) by causing a minor setting intrusion on the viewshed from the Washington Monument grounds.
- Height, massing, lighting and materials of the building will alter the viewshed from Arlington Cemetery and Reservation No. 332 (West Potomac Park) by altering the visual impact of the buildings surrounding the Washington Monument.

Spatial Organization
The NMAAHC will cause the most adverse affects to the Washington Monument grounds, specifically to its principal organizing features.

Alternative 4’s building alignment will have a significant, major, adverse effect on the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMAAHC site.
- Any above-ground resource removes an open portion of the Washington Monument grounds, diminishing the prominence of Washington Monument as a central organizing feature.
- The NMAAHC alters the spatial conception of the Washington Monument grounds historic boundaries (Original Appropriation no. 3) and the Mall (Original Appropriation No. 2) by extending the existing row of museums onto the Washington Monument Grounds.
- At 90°, the NMAAHC will significantly affect the prominence of the knoll as an organizing feature of the Washington Monument grounds.
- The large building footprint encompasses much of the site and removes a corner of the Washington Monument grounds.

Alternative 4 will have a significant, moderate, adverse effect on the spatial organization of resources in proximity to the Washington Monument grounds.
- See effects analysis for Alternative 1.

Land Use
The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations. Alternative 4 features a large building footprint that removes a large portion of open space and introduces minimal outdoor programming space on the NMAAHC site.

The construction and operation of Alternative 4 will have a significant, moderate, adverse effect on the Washington Monument grounds’ land use.
- See effects analysis for Alternative 1.

Interpretive content of the NMAAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.

Circulation
The construction and operation of Alternative 4 will have a minor adverse effect on circulation surrounding the Washington Monument grounds.
- See effects analysis for Alternative 1.

Topography
The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from
the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of Alternative 4 will have no known effect on the topography within the APE.

Vegetation

The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.

The construction and operation of Alternative 4 will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

The construction and operation of Alternative 4 will have a minor adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

Buildings and Structures

Alternative 4 will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.

- See effects for Alternative 1.

The scale and height of Alternative 4 will also have a minor adverse effect on resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Alternative 5 (Enframing)

Alternative 5 is composed of two buildings that enframe a prominent viewshed of the Washington Monument from 14th Street and Constitution Avenue. The smaller building on the north is 30 feet high and the larger building to the south is 90 feet.

Short-term Impacts

There would be significant, moderate, adverse short-term effects on the NMAAHC site on the Washington Monument grounds. The effects include the loss of the existing grassy cover and possibly a limited number of existing trees. Alternative 5 was designed to avoid the mature trees on the north and east side of the NMAAHC site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAHC site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

Long-term Impacts

Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

Views and Vistas

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified in this section as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.
The height and massing of Alternative 5 will obstruct or impede key views to and from the Washington Monument. The building will also restrict key views of surrounding urban features, such as the Federal Triangle, particularly the DOC building. The NMAAHC will bring the existing row of museums on the north side of the Mall closer to the Washington Monument, thereby diminishing the monument’s visual prominence as a central organizing feature within its setting.

The construction of the NMAAHC also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources.

Primary threshold panoramas within the Washington Monument grounds were identified throughout the ongoing Section 106 consultation process. One set of these viewsheds are experienced primarily by pedestrians at the “gateways” to the Washington Monument grounds – 14th Street & Constitution Avenue, 17th Street and Constitution Avenue, and from the WWII Memorial.

- Alternative 5 will have a significant, major, adverse effect on the panorama from 14th Street and Constitution Avenue toward the Washington Monument. At 90 feet and 30 feet, this building alternative preserves a narrow slot view of the Washington Monument shaft, but obstructs key panoramas of the Washington Monument grounds other than from this specific vantage point.
- Alternative 5 will have a significant, major, adverse effect on the panorama toward the Washington Monument from 17th Street and Constitution Avenue. The building’s height and mass alter the visual open space of the Washington Monument grounds and the character of surrounding buildings.
- Alternative 5 will have a minor adverse effect on the panorama from the WWII Memorial. The building is minimally visible from the WWII Memorial, but becomes more visible as one approaches Constitution Avenue along 17th Street.

In addition, multidirectional panoramic views within the Washington Monument grounds were identified as key character-defining features. These multidirectional panoramas include viewsheds to and from the Washington Monument and other buildings/landscape features within the grounds including the Monument Lodge, Bulfinch Gateposts, Survey Lodge, groves of trees throughout the site, and street trees lining Constitution Avenue.

Alternative 5 will have a significant, major, adverse effect on the following multidirectional panoramas within the grounds:

- The broad building footprint and 90 foot and 30 foot building heights on the NMAAHC site intrude on the visual perception of the Washington Monument situated within an open landscape from multiple vantage points within the Monument grounds.
- The split building arrangement does not conform to the established city grid setbacks and the varied height is unprecedented on Constitution Avenue.

Alternative 5 will also have a significant, major, adverse effect on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- Height and placement of the taller mass on the NMAAHC site has a greater impact on the legibility of the cornice and roofline of the Federal Triangle buildings along Constitution Avenue.
- The building massing and site placement restricts a key continuous viewshed of the Washington Monument when traveling west on Constitution Avenue and alters established open space and setback.
- The NMAAHC configuration preserves the vista of the Washington Monument at 14th Street, but restricts key continuous viewshed of the Washington Monument and grounds when travelling west along Constitution Avenue.
• The building alters the established open space along Constitution Avenue and smaller building is somewhat out of scale with the Federal Triangle.

Alternative 5 will have significant, moderate, adverse effects on multidirectional viewsheds to and from the following surrounding historic buildings and features:

• The building partially obstructs the view of the DOC building when traveling north along 14th Street. The building height and massing establishes the city grid on the Washington Monument grounds from this viewshed corridor.
• The knoll partially shields the view of the NMAAHC when travelling north on 17th Street, but the building becomes more visible as one approaches Constitution Avenue.
• The NMAAHC alters the viewshed from the White House and grounds and the Ellipse (President’s Park South) south toward the Jefferson Memorial by changing the visual relationship of open space on the Washington Monument grounds. The diagonal created by the two buildings has a greater effect on the viewshed from the Ellipse (President’s Park South) than any other alternative by creating a perspective that is counter to the important vista from the White House and grounds to the Jefferson Memorial.
• The 90 foot building height is apparent from Independence Avenue and rises above the Federal Triangle’s prominent red roofline.
• The NMAAHC is visible from the Old Post Office tower, but does not restrict the view of the Washington Monument shaft. The taller building partially obstructs the view of the Old Post Office tower from the Washington Monument grounds.
• Aerial views of the Washington Monument grounds will be altered by visually removing the northwest corner.

Alternative 5 will have minor adverse effects on multidirectional viewsheds to and from the following surrounding historic buildings and features, as well as citywide contextual views:

• The building causes a minor setting intrusion on the view to the U.S. Department of Agriculture building and U.S. Auditors Complex.
• Height and massing of the buildings will alter the visual relationship between the Washington Monument grounds and the White House and grounds and the Ellipse (President’s Park South) by causing a minor setting intrusion on the viewshed from the Washington Monument grounds.
• Height, massing, lighting and materials of the building will alter the viewshed from Arlington Cemetery and Reservation No. 332 (West Potomac Park) by altering the visual impact of the buildings surrounding the Washington Monument.

Spatial Organization

The NMAAHC will cause the most adverse affects to the Washington Monument grounds, specifically to its principal organizing features.

Alternative 5 building alignment will have a significant, major, adverse effect on the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMAAHC site.

• Any above-ground resource removes an open portion of the Washington Monument grounds, diminishing the prominence of Washington Monument as a central organizing feature. The large footprint and alignment of the NMAAHC in this alternative encompasses much of the NMAAHC site.
• The NMAAHC alters the spatial conception of the Washington Monument grounds historic boundaries (Original Appropriation no. 3) and the Mall (Original Appropriation No. 2) by extending the existing row of museums onto the Washington Monument Grounds.
• At 90 feet, the NMAAHC will significantly affect the prominence of the knoll as an organizing feature of the Washington Monument grounds.
• The two building footprints encompass much of the NMAAHC site.
Alternative 5 will have a significant, moderate, adverse effect on the spatial organization of resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Alternative 5 will have a minor adverse effect on the spatial organization of features that contribute to the historic significance of the city.

- See effects analysis for Alternative 1.

**Land Use**

The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations. Alternative 5 features two building footprints that remove a large portion of open space and introduces minimal outdoor programming space on the NMAAHC site.

The construction and operation of Alternative 5 will have a significant, moderate, adverse effect on the Washington Monument grounds’ land use.

- See effects analysis for Alternative 1.

Interpretive content of the NMAAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.

**Circulation**

The construction and operation of Alternative 5 will have a minor adverse effect on circulation surrounding the Washington Monument grounds.

- See effects analysis for Alternative 1.

**Topography**

The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of Alternative 5 will have no known effect on the topography within the APE.

**Vegetation**

The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.

The construction and operation of Alternative 5 will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

The construction and operation of Alternative 5 will have a minor adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

**Buildings and Structures**

The NMAAHC will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.

- See effects analysis for Alternative 1.

The scale and height of Alternative 5 will also have a minor adverse effect on resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.
Alternative 6 (Low Profile)

Alternative 6 was designed to minimize footprint and height while respecting the orthogonal grid of the city. The building height is 60 feet.

Short-term Impacts

There would be significant, moderate, adverse short-term effects on the NMAAH site on the Washington Monument grounds. The effects include the loss of the existing grassy cover and possibly a limited number of existing trees. Alternative 6 was designed to avoid the mature trees on the north and east side of the NMAAH site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAH site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

Long-term Impacts

Any new above-grade structure on the NMAAH site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

Views and Vistas

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified in this section as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.
grounds and the character of surrounding buildings. From this vantage point, the 60 foot height will have less of an impact on the prominence of the Washington Monument.

- Alternative 6 will have a minor adverse effect on the panorama from the WWII Memorial. The building is not visible from the WWII Memorial, but comes into view as one approaches Constitution Avenue along 17th Street.

In addition, multidirectional panoramic views within the Washington Monument grounds were identified as key character-defining features. These multidirectional panoramas include viewsheds to and from the Washington Monument and other buildings/landscape features within the grounds including the Monument Lodge, Bullfinch Gateposts, Survey Lodge, groves of trees throughout the site, and street trees lining Constitution Avenue.

Alternative 6 will have a significant, major, adverse effect on the following multidirectional panoramas within the grounds:

- The reduced building footprint and 60 foot height on the NMAAHC site intrudes on the visual perception of the Washington Monument situated within an open landscape from multiple vantage points within the Monument grounds.
- The rectangular massing of the building conforms to adjacent buildings within the city grid, but does not relate to the Monument grounds to the west and south of the NMAAHC site.

Alternative 6 will also have a significant, major, adverse effect on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- The building massing obstructs the viewshed of a large portion of the Federal Triangle buildings, including the ICC building and Mellon Auditorium from the Washington Monument grounds. The lower height is likely to leave cornice and rooftop of the Federal Triangle unobstructed from many viewpoints within the Washington Monument grounds.
- The building massing and site placement restricts a key continuous viewshed of the Washington Monument when traveling west on Constitution Avenue and alters established open space and setback.

Alternative 6 will have significant, moderate, adverse effects on multidirectional viewsheds to and from the following surrounding historic buildings and features:

- See effects analysis for Alternative 1.

Alternative 6 will have minor adverse affects on multidirectional viewsheds to and from the following surrounding historic buildings and features, as well as citywide contextual views:

- The building causes a minor setting intrusion on the view to the U.S. Department of Agriculture building and U.S. Auditors Complex.
- The 60 foot height is only slightly visible from Independence Avenue and may cause a minor setting intrusion on the Washington Monument grounds and Federal Triangle. The building does not rise above the Federal Triangle’s prominent red roofline.
- Height and massing of the building will alter the visual relationship between the Washington Monument grounds and the White House and grounds and the Ellipse (President’s Park South) by causing a minor setting intrusion on the viewshed from the Washington Monument grounds.
- Height, massing, lighting and materials of the building will alter the viewshed from Arlington Cemetery and Reservation No. 332 (West Potomac Park) by altering the visual impact to the buildings surrounding the Washington Monument.
- Height and massing of the NMAAHC will cause a minor setting intrusion on the Washington Monument grounds from the Old Post Office tower, but does not obstruct the view of the Monument shaft.
Spatial Organization

The NMAAHC will cause the most adverse affects to the Washington Monument grounds, specifically to its principal organizing features.

Alternative 6’s building alignment will have a significant, major, adverse effect on the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMAAHC site.

- See effects analysis for Alternative 1.
- The 60 foot building height will have less of an effect on the prominence of the knoll as an organizing feature of the Washington Monument grounds.
- The building’s smaller footprint removes less open space.

Alternative 6 will have a significant, moderate, adverse effect on the spatial organization of resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Alternative 6 will have a minor adverse effect on the spatial organization of features that contribute to the historic significance of the city.

- See effects Analysis for Alternative 1.

Land Use

The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations. Alternative 6 features a reduced building footprint and introduces outdoor programming space on west and south portion of the NMAAHC site.

The construction and operation of Alternative 6 will have a significant, moderate adverse effect on the Washington Monument grounds’ land use.

- The building’s reduced footprint removes less of the open landscape.
- By removing public gathering and recreational space, the building alters the Washington Monument grounds’ function as an informal setting to a more defined, formal space.

Interpretive content of the NMAAHC carries the potential to pull together and focus educational attention on nearby historical African American resources such as the Lincoln Memorial, site of Marian Anderson’s concert, and Martin Luther King, Jr.’s “I Have a Dream” speech within the larger context of American history.

Circulation

The construction and operation of Alternative 6 will have a minor adverse effect on circulation surrounding the Washington Monument grounds.

- See effects analysis for Alternative 1.

Topography

The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of Alternative 6 will have no known effect on the topography within the APE.

Vegetation

The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.
The construction and operation of Alternative 6 will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

The construction and operation of Alternative 6 will have a minor adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

Buildings and Structures

Alternative 6 will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.

- See effects analysis for Alternative 1.

The scale and height of Alternative 6 will also have a minor adverse effect on resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

Preferred Alternative

The physical envelope of the Preferred Alternative is bounded by the range of massing options with different heights, setbacks, and configurations defined by the Build Alternatives and the overarching principles that informed their development. The Preferred Alternative will have a height that ranges between 60’-105’, a minimum 50’ building setback, and a building mass that ranges from orthogonal and contextual to free form and non-contextual. The Preferred Alternative’s effects are determined by the range of massing, height, and setback options that would potentially cause the most significant effect on cultural resources on and within proximity to the Washington Monument Grounds.

Short-term Impacts

There would be significant, moderate, adverse short-term effects on the NMAAHC site on the Washington Monument grounds. The effects include the loss of the existing turf and possibly a limited number of existing trees. The Preferred Alternative was designed to avoid the mature trees on the north and east side of the NMAAHC site, so the loss of trees is inherently minimized. Additional short-term effects include excavation, stockpiling, construction equipment and materials, as well as physical and visual access to the Mall and Washington Monument grounds through the NMAAHC site. Some construction-related activity may be disruptive to activities on the Mall and adjacent destinations including the Washington Monument grounds.

Long-term Impacts

Any new above-grade structure on the NMAAHC site will significantly alter the character-defining features of multiple historic resources on and within direct proximity of the Washington Monument Grounds.

Views and Vistas

Significant effects on the character-defining features of historic resources within the APE result from obstructed or altered views and vistas. The views and vistas identified as significant to the historic character of the Washington Monument grounds, the surrounding historic buildings and districts, as well historic L’Enfant and McMillan plans, were compiled and amended through a series of Section 106 consultation meetings.

The height and massing of the NMAAHC will obstruct or impede key views to and from the Washington Monument. The building will also restrict key views of surrounding urban features, such as the Federal Triangle, particularly the Department of Commerce building. The NMAAHC will bring the existing row of museums on the north side of the Mall closer to the Washington Monument, thereby diminishing
the monument’s visual prominence as a central organizing feature within its setting.

The construction of the NMAAHC also carries potential beneficial effects to provide new vantage points and visual experiences of the National Mall, Washington Monument grounds, and other historic resources.

In the previous Build Alternative sections, the views and vistas were divided into three categories; primary threshold panoramas, multidirectional panoramic views within the Monument grounds, and multidirectional viewsheds to and from historic buildings and features.

Under the Preferred Alternative, there would potentially be a significant, major, adverse effect on the primary threshold panoramas from 14th Street and Constitution Avenue, and the panorama from 17th Street and Constitution toward the Washington Monument. There would potentially be a significant, moderate, adverse effect on the panorama from the WWII Memorial.

The Preferred Alternative would also potentially have significant, major, adverse effects on multidirectional panoramic views within the Washington Monument grounds, and multidirectional viewsheds to and from historic buildings and features.

• See effects analysis for Alternatives 1-6

Spatial Organization

The Preferred Alternative will have a significant, major, adverse effects to the spatial organization of the Washington Monument grounds and buildings in direct proximity to the NMAAHC site.

The Preferred Alternative will potentially also have significant, moderate, adverse effects on the spatial organization of resources in proximity to the Washington Monument Grounds.

• See effects analysis for Alternatives 1-6.

Land Use

The organization and shape of the Washington Monument grounds is a result of its use as a public gathering space. The grounds’ spacious setting serves as an informal space for recreation, celebration, and public demonstrations.

The construction and operation of the Preferred Alternative will have a significant, moderate, adverse effect on the Washington Monument grounds’ land use.

• See effects analysis for Alternative 1.

Circulation

The construction and operation of the Preferred Alternative will have a minor adverse effect on circulation surrounding the Washington Monument grounds.

• See effects analysis for Alternative 1.

Topography

The topography within the Washington Monument grounds is characterized by the gentle rise of the knoll surrounded by a relatively flat landscape. The Mall consists of an overall level topography from the Capitol to 12th Street with a discernable downward slope at 14th Street.

The construction and operation of the Preferred Alternative will have no known effect on the topography within the APE.

Vegetation

The character-defining vegetation of the Washington Monument grounds, particularly the NMAAHC site, is the large open turf lawn with trees planted in groves screening buildings and structures. The northern boundary of the NMAAHC site prominently displays a double row of elms along Constitution Avenue from 17th Street to 14th Street.
The construction and operation of the Preferred Alternative will have a significant, major, adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

The construction and operation of the Preferred Alternative will have a minor adverse effect on vegetation within the Washington Monument grounds.

- See effects analysis for Alternative 1.

**Buildings and Structures**

The Preferred Alternative will have significant, major, adverse effects on buildings and structures in direct proximity of the NMAAHC site.

- See effects analysis for Alternative 1.

The scale and height of the Preferred Alternative will also have a minor adverse effect on resources in proximity to the Washington Monument grounds.

- See effects analysis for Alternative 1.

### 6.1.5 What archaeological resources may be affected by the project, and how will the Smithsonian Institution compensate for their loss?

As part of the Tier I EIS process, the Smithsonian Institution sponsored special archaeological studies of the NMAAHC site and the results of those studies are summarized here. As there were no previous archaeological studies of the site, the Smithsonian Institution completed Phase I and Phase II studies to determine whether the site contained archaeological resources that would be affected by the planned museum construction. The Phase I archaeological study (LeeDecker et al., 2007) was completed in February 2007. Fieldwork for the Phase II study was completed in August 2007 (LeeDecker et al., 2007b). Both studies examined the entire area that is bounded by Constitution Avenue, 14th Street, 15th Street, and Madison Drive. Although the footprint of the NMAAHC will be much smaller, it was assumed that utility work, landscaping, and construction activities might extend over this larger area, so the archaeological studies covered the area within the curb line.

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**What is an archaeological resource?**

An archaeological resource, commonly known as an archaeological site, is a place where the remnants of a past culture survive in a physical context that allows for the interpretation of these remains. This physical evidence of past human activity usually takes the form of artifacts (objects such as fragments of stone tools, cooking vessels, etc.), features (such as remnants of walls, cooking hearths, or trash middens), and ecological evidence (such as pollen from plants that were in the area when the activities occurred). In this region, archeological resources are typically buried below ground, so they cannot be identified without some type of subsurface excavation; even then, the archaeological evidence may be very subtle, that is, hard to see and record. It is not only artifacts themselves that are important but also the locations of artifacts relative to one another, which is referred to as archeological context.

What was known about the NMAAHC site before the Smithsonian Institution’s Phase I investigation?

Although there had been no previous archaeological study of the NMAAHC site, there was a great deal of historical information about the area because of its location in the District’s monumental core and its association with the Washington Monument. Understanding the physical development of the Washington Monument Grounds is essential to assessing the archaeology of the museum site. Other than its general topography, the present condition of the site offers little evidence of the natural environment of the District as it existed in the late eighteenth and early nineteenth centuries when the capital city was founded.

Before the City of Washington was laid out in 1791, much of what is now the Mall was the channel of Tiber Creek (also known as Goose Creek), which was one of the District’s natural inland waterways. Obviously, the landscape has changed dramatically over the past 200 years, and those changes are reflected in the site’s archaeological record. The NMAAHC site, now part of the Washington Monument Grounds, was then on the south bank of Tiber Creek, partially on dry land and partially within the creek bed (See figure 6.1.6-1).

Tiber Creek is the landscape feature that forms the basis of the site’s primary archaeological interest. Before European colonization, Native American (Indian) groups camped and built villages along the shores the Potomac and Anacostia Rivers, as well as the inland waterways such as Rock Creek and Tiber Creek.

The Potomac River valley was inhabited by Native Americans for about 13,000 years before the present. Until about 4,000 years ago, the region was used by small transient foraging groups; the archaeological evidence of their camp sites typically consists of the stone tools and the debris that resulted from the manufacture or resharpening of stone tools. Around 2000 BC, people began quarrying huge number of cobbles from the hill-flanks along Rock Creek. These cobbles were shaped into a rough oval form, then carried to campsites for final trimming into broad spearpoints of the Savannah River style. The people who made broadspears also made tub-shaped cooking vessels by carving soapstone, which was hacked out of bedrock in the District of Columbia and nearby areas of northern Virginia and Maryland. A few centuries later (about 1000 BC), ceramic pots replaced these soapstone vessels. The Native American societies were linked by long-distance trade networks, so the stone bowls reached groups living far distant from the soapstone sources.

Figure 6.1.6-1: Location of the NMAAHC Site Along Tiber Creek, About 1800: source: King 1818
Long-distance exchange seems to have alternately waxed and waned over the following 2,000 years. Chipped stone tools, tubular stone smoking pipes, and other distinctive export items from the Adena culture of the Ohio Valley were deposited in well-appointed burials in Delaware in the period from around 400 BC to AD 1. These artifacts presumably were carried down the Potomac eastward from the Adena heartland. After the demise of the Adena mortuary cult, a regional trade network continued in the Middle Atlantic region, circulating items such as purplish argillite from New Jersey and rhyolite from central Maryland.

About AD 600 to 1000, long-distance trade routes were re-established, again in a context of mortuary ritual. This time, the network linked Mid-Atlantic societies to groups in New York, New England, Ontario, Michigan, and Ohio. Distinctive items exchanged among these peoples included moose-antler combs, fossil sharks' teeth, polished stone gorgets, and stone platform pipes with tulip-shaped bowls. A cremation burial containing such artifacts, and dated to about AD 750, was discovered several years ago at the mouth of Rock Creek, beneath a ramp to the Whitehurst Freeway. The same site produced evidence of a later occupation by maize (corn)-growing, Late Woodland (AD 1000-1600) villagers. At the time of first contact with English explorers in 1608, a major village of the Algonquian-speaking Nacotchtanks was located beside the Anacostia River (which was named for this group).

Despite the urban character of the modern environment, many Native American sites have been identified in the District of Columbia. Many artifacts were collected in the late 1800s, before the widespread development of the city, and many of these collections were donated to the U.S. National Museum, the precursor to the Smithsonian Institution. James Krakker (2005) of the Smithsonian Institution recently described a collection of artifacts that came from the Washington Monument Grounds. Although the exact location of the collection site is unknown, it would have been on the south bank of Tiber Creek. The collection includes a variety of artifacts (See Figure 6.1.6-2) that indicate episodic use of the area for at least 7,000 years. Krakker noted that the edges of Tiber Creek would have been a tidal marsh with many natural resources that would have been used for food, such as shellfish, waterfowl, crabs, and fish. During the Colonial period fish such as shad, herring, eels, pike, catfish, and perch were taken from Tiber Creek as far upstream as Pennsylvania Avenue and Second Street.
A recent project in President’s Park (the Ellipse) suggested the possibility that archaeological resources might have survived along the former banks of Tiber Creek. On behalf of the National Park Service, The Louis Berger Group conducted an archaeological investigation prior to the installation of an irrigation system (LeeDecker, 2006). Field testing for this project attempted to identify a bluff along the north bank of Tiber Creek, where it was suspected that a Native American camp may have existed based on projection of the creek bank from historic maps. No remnants of the natural landscape were found; instead, the surface and near-surface soils were fill deposits that included debris from the late 1800s, such as brick, coal, ceramics, bottles, animal bones, and shell. The 2006 archaeological study of the Ellipse provided convincing evidence that the north bank of Tiber Creek, between 15th and 17th streets, had been eliminated. Nonetheless, there was some expectation that the natural landscape of Tiber Creek might be preserved at the NMAAHC site, as the Washington Monument Grounds has a distinct history of landscape development.

Ever since the City of Washington was laid out in 1791, the Washington Monument Grounds have been reserved for public use. So their history is closely linked to the development of the City’s Monumental Core. As the city developed in the nineteenth century, Tiber Creek was transformed first into the Washington City Canal, then into B Street Sewer. In the 1870s, the sewer was paved over and B Street became Constitution Avenue.

In the early 1800s, the landscape along lower Tiber Creek had not changed much from its initial configuration and the museum site remained a poorly drained, undeveloped area that was used primarily for pasture. The Washington City Canal was an important part of Pierre L’Enfant’s plan for the City of Washington. L’Enfant envisioned a canal that would allow goods to easily reach the interior of the city, connecting the Potomac and Anacostia rivers via Tiber and James creeks, thereby facilitating traffic between Georgetown and the deepwater ports on the Anacostia.

The first phase of canal construction, completed by 1815, did not fully realize L’Enfant’s plan; at that time the canal route simply followed the existing channel of Tiber Creek as far upstream as 6th Street, where a lock raised the water level. By 1822 the canal channel had been extended across the northern margin of the NMAAHC site, which required a major effort to reshape the stream channel and build a towpath. The canal channel, or prism, was simply a flat-bottomed ditch with sloping banks. Typical canals of that period were only 22 feet wide, but the Washington City Canal was much larger. In the downtown area, the canal was 80 feet wide and it was flanked on both sides by two 80 foot wide streets. Instead of digging a ditch across dry land, building the canal through lower Tiber Creek would have involved filling the broad stream channel and forming an appropriately sloped bank to support a towpath. The towpath would have been on the inland side of the canal channel, so much of the landfilling would have been on the northern bank of Tiber Creek, which was documented by the previous archaeological investigation of the Ellipse. By the 1850s, the canal channel extended as far as 17th Street (See Figure 6.1.6-3).

Construction of the Washington Monument progressed slowly and the surrounding grounds were largely vacant, used only for pasture. During the Civil War construction of the Monument ceased and the grounds were used for cattle grazing and military maneuvers. The Monument Grounds acquired names such as Beef Depot, the Cattle Meadow, and the Washington National Cattle Yard (See Figure 6.1.6-4). As the war progressed, various quarters, storehouses, stables, pens, sheds, and a slaughterhouse appeared. One observer noted that the buildings were “surrounded by offal rotting two or three feet deep.” Meanwhile, the canal itself was becoming more of a nuisance, as more than a third of the city’s raw sewage drained into it.

During the period of local government in the early 1870s, the Board of Public Works, under Alexander “Boss” Shepherd, completely transformed the city’s landscape. During Shepherd’s tenure (1871-
During the Civil War, the Washington Monument Grounds was used as a cattle yard. At that time, construction of the Monument was incomplete. The buildings on the Monument Grounds included stables, sheds, pens, and a slaughterhouse. Source: Library of Congress.

Figure 6.1.6-3: Detail of the Boschke Map of the City of Washington, 1857. The NMAAHC Site, outlined in red, remained undeveloped through the mid-1800s, used only for pasture. Even a few years after the Civil War, one observer remarked “The Washington Monument reservation still remains in the same unimproved condition. The simple preservation of the fence enclosing it is all that has been done. The grounds are capable of very great adornment, and should not be allowed to present the dull, wide waste that they now do” (Michler 1868:896).
During the final phase of construction of the Monument, the grounds were covered with shops, machinery, a railroad siding, and possibly barracks for workmen. Landscaping of the grounds, completed in the 1880s, included construction of carriageways and pedestrian paths through the NMAAHC site.

World War I returned the city to a wartime mentality, and once again the Washington Monument Grounds were given over, at least partially, to grazing. Recreational demands for the city’s public lands increased during the early twentieth century; one result of this was the appearance of a tennis court on the NMAAHC site. During World War II much of the Mall was taken over by temporary military office buildings. Nevertheless, the NMAAHC site remained open but it was used for special military events. The Age of the Automobile brought a series of changes to the roadway system in the late twentieth century.

**What did we learn about the NMAAHC site from the archaeological studies?**

The underlying purpose of the Phase I archaeological study was to assess the possibility that any important archaeological resources might be present in the development site. The Phase I study examined the general landscape history of the site with specific attention to identifying areas where remnants of the natural or early historic landscape might have been preserved. As is typical for archaeological work in urban areas, the emphasis of the Phase I study was on archival research. The archival research focused on the site’s physical development and historic uses. Archaeology is a fundamentally a research process, so a specific series of research questions was developed to guide the archaeological studies (see text box, on the next page). These questions were developed from general knowledge of the site area, especially the earlier study of the Ellipse (LeeDecker, 2006), and from issues identified during the agency scoping and review process.

**What were the sources and methods for the archaeological studies?**

**Phase I archaeological research questions**

- Does the project area contain areas of natural landscape associated with the bank of Tiber Creek?
- Does the project area contain the remains of a Native American camp?
- Does project area contain archaeological features or deposits associated with the Washington City Canal?
- What is the character of the material that was used to fill the channel of Tiber Creek and the Washington City Canal?
- Does the project area contain elements of earlier historical landscapes associated with the Monument Grounds?
- Are there archaeological resources related to construction of the Washington Monument, such as a workshop, barracks, or masonry debris?
- Are there archaeological resources associated with the Civil War-era occupation of the Monument Grounds?
- Does the site contain any resources that can be specifically associated with African American history?

Historic maps were especially important for the Phase I study, many of which were available from the preceding site selection study (Plexus Scientific Corporation and PageSoutherlandPage, 2005). These were supplemented by the online resources of the Library of Congress (Geography and Map Division), other Internet sites, and secondary literature. Late nineteenth-century utility maps held in the Special Collections Department of the Gelman Library at The George Washington University were also reviewed.

There are many historical studies that describe the City’s natural and early historic environment and its physical development for the urban period (Arnebeck, 1991; Hawkins, 1990, 1991, 2000; Longstreth, 2002; Passonneau, 2004; Reps’s, 1991). The NPS has completed various studies, including a Cultural Landscape Report (CLR) for the Washington Monument Grounds (John Milner Associates, Inc. 2003;

Additional archival research was undertaken during the Phase II study, focusing specifically on the Washington City Canal and issues of African American history. Canal research examined the early development of canal, the nature of labor force, the engineering, and the use and maintenance of the canal, the types of cargoes, and the question of whether the canal was used in the slave trade. Archival sources such as the records of the Washington Canal Company, the papers of the City Commissioners, and other special collections were consulted. Other research focused on the colonial period, when the downtown area was held in large plantations owned by wealthy slave-holding families.

The Phase I field study included a geoarchaeological investigation, followed by a more standard archaeological survey with shovel tests. The geoarchaeological study was conducted by soil scientists by a series of 18 subsurface tests distributed across the site using a manual bucket auger. Auger testing was chosen for the initial survey because it can examine soils that are buried up to 10 feet or more with minimal impact to the landscape. For each auger test, a detailed stratigraphic profile was compiled according to standard techniques and nomenclature for the field description of soils. After the auger tests revealed a well preserved landscape surface in parts of the site, a more intensive archaeological survey was completed by the excavation of shovel tests. Each of shovel tests was 1.5 feet in diameter and dug by recognizable soil layers. Excavated soils were sifted for systematic recovery of artifacts and, with the exception of obviously modern debris, the artifacts were formally cataloged.

The Phase II field investigation involved a combination of manually excavated test pits and mechanical trenching, using a backhoe. Mechanical trenching was necessary because the site contains deep fill deposits that could not be reached easily by hand excavation. The backhoe trenches and test pits were distributed across the site to sample areas where archaeological features were expected to be present, based on the Phase I study. Great care was taken to avoid active utility lines.

Altogether, a total of eight test pits and 7 backhoe trenches were excavated during the Phase II study. The backhoe trenches measured about 5 by 10 feet and reached depths of up to 7 feet below grade. Most of the trenches were concentrated in the northern and western areas of the site where deep fills were identified during the Phase I study. The test pits ranged in size from 3x3-ft to 5x5-ft, depending on the available area. Soils were excavated according to recognizable soil layers and the soils were screened through a 1/4-inch mesh to insure consistent recovery of artifacts. Some test pits were placed within the backhoe trenches after mechanical removal of fill soils, but most were placed in the southeast area of the site where the fill soils were relatively shallow.

**What were the results of the Phase I and Phase II studies?**

The Phase I survey concluded that the site contains areas of a preserved natural landscape surface that corresponds to the south bank of Tiber Creek. There was also an apparent early nineteenth-century landscape surface that was created in conjunction with the extension of the Washington City Canal within the channel of Tiber Creek. The Phase I shovel tests recovered a small collection of both prehistoric and early nineteenth-century artifacts. The prehistoric material was recovered from shovel tests in the southeast area of the site, where the natural landscape is essentially at the present surface. These artifacts are most likely related to the prehistoric site that produced the collection more than a century ago. The historic artifacts include an assortment of early to mid-nineteenth-century domestic material as
well as a concentration of brick rubble that was possibly associated with a building that was located along the canal or temporary barracks or shops that stood on the Monument Grounds during the Civil War or the final phase of construction of the Washington Monument.

Based on the Phase I survey, the Smithsonian Institution proceeded with a Phase II archaeological study to further assess the initial finds. The primary goals of the Phase II study were: (1) to explore more fully the extent of the natural landscape surface, focusing on the identification of intact prehistoric deposits, and (2) more intensive exploration of the buried nineteenth-century surface that appears to have domestic deposits and possible remains of structures associated with the canal or construction of the Washington Monument. The Phase II field study was completed between July 30, 2007 and August 17, 2007.

The findings of the Phase I and Phase II studies are presented as responses to the research questions that guided that study, as stated below.

**Does the project area contain areas of natural landscape associated with the bank of Tiber Creek?**

The most significant finding of the Phase I study is the preservation of prehistoric and early historic landscape surface features associated with the south bank of Tiber Creek and the Washington Monument Grounds. This was somewhat unexpected because previous work on the Ellipse (LeeDecker, 2007) concluded that nineteenth-century canal building and formal landscaping had obliterated the natural landscape on the north bank of Tiber Creek. Although the NMAAHC site is in a heavily urbanized area, the preservation of natural landscape features should perhaps not have been unexpected, as historical records show that the northeast panel of the Washington Monument Grounds has a developmental history that is distinct from other areas of the city’s monument downtown area in that the landscape has not suffered as much disturbance.

The more intensive Phase II field investigations demonstrated that only very small areas of the original landscape surface have survived within the 5-acre museum site. The processes of building the canal and grading the Washington Monument Grounds have left little of the site untouched.

**Does the project area contain the remains of a Native American camp?**

Prehistoric (Native American) occupation of the Monument Grounds was previously known on the basis of artifacts collected in the late nineteenth century, and the Phase I and Phase II did yield a small collection of prehistoric artifacts. These finds, concentrated in the high ground near 14th Street and Madison Drive, probably represent the edge of a campsite that is as yet undiscovered or that may already have been largely destroyed. The few prehistoric artifacts consist of waste flakes that resulted from the manufacture of stone tools.

**Does the project area contain archaeological features or deposits associated with the Washington City Canal?**

It is believed that the actual canal prism or channel was located within the confines of present-day Constitution Avenue and the canal towpath would have been on the inland or north side of the canal in the downtown area. On or near the northern edge of the NMAAHC site, the Boschke map of 1857 (see Figure 6.1.6-3) depicts two structures on the south side of the canal channel. Other than their location, we have no information about these structures, but their placement suggests that they may have been related to the canal. The domestic deposits and architectural debris found in the Phase I shovel tests in the northern part of the site were thought to be possibly related to these structures.

In the Phase II study, brick rubble deposits and domestic artifacts were found throughout the site, so it was concluded that the brick rubble was simply a constituent of the fill deposits that were placed on the site during the late nineteenth century. One backhoe trench was placed
at the location where the structure stood along the canal in the 1850s, and that excavation revealed a sequence of fill deposits to a depth of seven feet. No remains of any buildings were found in that trench or anywhere else on the site.

**What is the character of the material that was used to fill the channel of Tiber Creek and the Washington City Canal?**

The Phase I and Phase II testing showed that the site contains highly variable earthen fill soils, many of which contain domestic debris and architectural rubble. In the northern part of the site, along Constitution Avenue, fill layers more than 7 feet deep were found on top of a layer of marsh muck, the original swampy land along Tiber Creek. The various fill deposits all probably came from a local source, and some were distinguished by dense concentrations of brick rubble and household refuse: oyster shell; dietary bone; fragments of glass bottles and ceramic vessels; tobacco pipes, etc. There is little historical information pertinent to the filling of the canal, other than the dating of this event to the early 1870s. Much of the fill material on the NMAAHC site appears to date from the 1870s, when the entire landscape of the city was transformed under the Territorial Government. At that time many of the street grades were altered, so the fill material may have originated from many locations throughout the city. In some areas, the fill material seemed to include small cartloads of household trash.

**Does the project area contain elements of earlier historical landscapes associated with the Monument Grounds?**

The Phase I and Phase II archaeological investigations have demonstrated that the site contains many soil layers that document the historical development of the site during the nineteenth and twentieth centuries. In a few places, the natural landscape along the south bank of Tiber Creek has been preserved; this is the landscape that would have been used by Native American groups and the plantations that held the land prior to 1791. Some of the fill layers seem to date from the 1870s when citizens used the site for trash disposal, similar to what was found at the Ellipse. A buried gravel layer in one area of the NMAAHC site appears to be the remains of a carriageway that dates to the 1808s or 1890s, when the first formal landscaping of the Monument Grounds was completed. In another area of the site, a buried concrete layer seems to be the remains of a tennis court built in the 1930s.

**Are there archaeological resources related to construction of the Washington Monument, such as a workshop, barracks, or masonry debris?**

Archival resources indicate that there were many shops and possibly barracks on the Monument Grounds during the final phase of construction in the 1880s. Most likely these structures were simple frame structures, built with minimal foundations or ground-set posts. As such they should have low visibility; no physical evidence of these structures was found during the archaeological field studies. There are what appear to be domestic refuse deposits throughout the site, and their origin is ambiguous. Some are clearly contained in fill deposits that originated off-site and some could be associated with on-site occupation by worker households or the Civil War-era barracks. Interpretation of apparent domestic refuse is even more ambiguous when one reviews the Chief of Engineers’ annual reports from the 1870s, when it was reported that great quantities of street sweepings, refuse, and construction debris were deposited by citizens on the Ellipse. Some of the fill deposits found at the NMAAHC site seem to be small cartloads of refuse that would have been dumped by local citizens.

**Are there archaeological resources associated with the Civil War-era occupation on the Monument Grounds?**

A variety of structures were built on the Monument Grounds during the Civil War, most of which were related to the use of the area as a cattle yard. These structures were built as simple frame structures with ground-set posts, with the exception of barracks, which may have had more substantial foundations. The domestic artifacts...
(ceramics, bottle glass, oyster shell, animal bone, etc.) that were found throughout the NMAAHC site could be associated with the Civil War-era occupation of the Monument Grounds. Massive deposits of butchered bone cited in the historical record, if such deposits had been found, would have been unambiguously associated with the Civil War-era Beef Depot. Nothing of this sort has been found on the site.

**Does the site contain any resources that can be specifically associated with African American history?**

Although many historical events important in African American history took place on and around the Mall, the Phase I and Phase II investigations have not produced evidence of any archaeological resources that can be specifically linked to African American history. The very fact that there are so few written records that can inform us about such important elements of African American history elevates the significance of any archaeological remains. Some of the most evocative and historically significant antebellum African American sites are slave jails or slave quarters, and there is some information on the locations of these sites, but none are tied to the Washington Monument Grounds. It is believed that the many slave quarters associated with the Notley Young plantation were located near the Banneker Overlook site, and that site has other important associations with African American history, but the presence of preserved archaeological remains at Banneker Overlook has not been demonstrated. The two best-known slave jails in Washington (Robey’s pen and Williams’ pen) were located at the southeast corner of 8th and B streets, SW, and at the southeast corner of 7th and B streets, SW, according to Clephane (1900). A more contemporary account (American Anti-Slavery Society, 1836) places “Robey’s Old Prison” along 9th Street, NW, between D and E Streets, and another prison or pen at the corner of 7th Street, SE, and Maryland Avenue; the latter is referred to as Neal’s Prison and it was located at the site described by Clephane as Williams’ pen. An extant slave quarter is still preserved at the Decatur House in the District (748 Jackson Place, NW) (Scott and Lee, 1993). Many slaves were imprisoned at the former City Jail at Judiciary Square or similar slave jails in nearby Alexandria, such as the Bruin Slave Jail at 1707 Duke Street and the Franklin and Armfield Slave Market at 1315 Duke Street. Both the latter sites do have archaeological components (Artemel et al. 1987; Berger, 2007).

**Will construction of the NMAAHC result in the loss of any significant archaeological resources?**

The Phase I and Phase II archaeological studies have not identified any significant archaeological resources on the NMAAHC site. In this discussion we have used “significant archaeological resources” as an equivalent term to “historic properties” in the NHPA, because the term “significant” is widely used among professional archaeologists who work in the context of Section 106.

Federal actions that have the potential to affect archaeological resources are subject to a variety of laws and regulations. The NHPA is the principal legislative authority for managing archaeological resources in the context of Federal projects or Federally-funded or – licensed projects. Section 106 of the NHPA requires Federal agencies to consider the effects of their actions on cultural resources listed and/or determined eligible for listing in the NRHP. Such resources are termed “historic properties.” (The term “cultural resources” includes archaeological sites as well as historic structures, historic districts, cultural landscapes, etc.)

The discussion of archaeological resources that is presented in this Tier I FEIS responds to the requirements of both NEPA and Section 106 of the NHPA, and the Smithsonian Institution is engaged in an ongoing process of compliance with Section 106. The formal implementing regulations for Section 106 are published by the Advisory Council on Historic Preservation and are found at 36 CFR Part 800 (Protection of Historic Properties). Section 106 is primarily a consultative process, and the Smithsonian Institution has been engaged in consultation with the DCHPO, as mandated in Section
106, as well as many other agencies and organizations with an interest in historic preservation. For archaeological resources, Section 106 consultations have effectively concluded with the completion of the Phase II archaeological study, because no significant archaeological resources are present at the NMAAHC site.

While the completed archaeological investigations have demonstrated the site contains a physical record of the site’s historical development, including some evidence of Native American occupation, the archaeological resources do not meet the National Register Criteria for Evaluation (36 CFR 63). Under Federal guidelines, resources are eligible for the NRHP (that is, they are significant) if they possess integrity and they meet one or more of the criteria of eligibility for inclusion in the NRHP. Most archeological resources found eligible for the NRHP qualify under criterion D because they have the potential to provide important information about history or prehistory. In some circumstances, archaeological resources might be found significant because (i) they are associated with events that have made a significant contribution to the broad patterns of our history (NRHP criterion A), or (ii) because they are associated with the lives of persons significant in our past (NRHP criterion B), or (iii) because they the distinctive characteristics of a type, period, or method of construction (NRHP criterion C).

To some extent the archaeological record at the NMAAHC expresses the physical development of the Washington Monument Grounds and the surrounding downtown area of Washington, and the Smithsonian’s archaeological studies have added detail to the historical record for the Washington Monument Grounds. But the loss of the archaeological record at the NMAAHC site would not limit the ability of archaeologists or historians to study or interpret this area of the city. As a result, the Smithsonian Institution has determined that there will be no significant impacts on archaeological resources from any of the alternatives under consideration.
6.2 **AESTHETICS AND VISUAL RESOURCES**

6.2.1 **What are the Key Factors and Considerations about Aesthetics and Visual Resources?**

There are nine categories that provide a framework for evaluating aesthetics and visual resources including:

**Visual Character of Site**

The visual character of a site, in very general terms, is like a mental snapshot of the place. It embodies the defining and most memorable site features.

**Views and Vistas**

The patterns of streets and open spaces, and their associated visual corridors bordering the site are critical considerations. These views and vistas have been present since the earliest plans for Washington, D.C. and have been maintained throughout the city's development. In addition, there are critical views to and from key cultural resources, such as the Washington Monument. For this analysis, the term "vista" defines views of primary importance that were specifically planned, designed, and implemented, while the term "view" describes those unplanned views that resulted from the construction of other features.

**Urban Design Context**

The urban design context, in the case of the NMAAHC, consists mainly of: the National Mall (east and southeast of the site), with its defining buildings, landscapes, and open spaces; key streets that serve as main routes into and out of the city (Constitution Avenue, 14th Street, 15th Street); the Federal Triangle District, just north of the site; and the Washington Monument Grounds (west and southwest of the site).

**Architectural Context**

The NMAAHC site has a diverse architectural context, with variety in building type, massing, setback, and style.

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**Landscape Features**

Vegetation is one of the few existing defining visual features of the NMAAHC site.

**Symbolic Values**

The visual qualities of open space are often imbued with symbolic value that would be altered with the presence of a new building.

**Ambient Lighting**

Lighting is a major element in the aesthetic experience of the Mall, and is affected not only by the intensity of exterior building lighting, but also by the amounts of internal building "glow" through transparent and translucent surfaces. As mentioned in Section 4.6.7, Ambient lighting will be discussed in Tier 2 of the NMAAHC NEPA process.

**Building Materials**

The visual experience of the Mall is influenced by the consistency and/or variety of building materials. As mentioned in Section 4.6.8, building materials will be discussed in Tier 2 of the NMAAHC NEPA process.

**Signage**

The role of signage is a critical element of the visual experience in major tourist destination areas, such as the NMAAHC site surroundings. As mentioned in Section 4.6.8, signage will be discussed in Tier 2 of the NMAAHC NEPA process.

6.2.2 **How were Aesthetics and Visual Resources Evaluated for the Project?**

Aesthetics and visual resources were evaluated in several ways:

**Consultant Team Site Visits**

Aesthetic and visual resources are best analyzed through first-person experience. The consultant team made numerous visits to the project area and experienced the NMAAHC site and surrounding areas both...
on foot and by vehicle. The site was visited during late winter, with higher visibility and less obstruction from tree foliage; and during late spring, with less visibility through the full tree canopies. Views of the site from various vantage points were studied, both from stationary perspective, and from more dynamic, in-motion view sequences.

**Photography**

During visits to the NMAAHC site and surroundings the team documented existing site and context conditions, including key vistas and views, through still photography.

**Historical Research**

Through ongoing coordination with the Section 106 process and the Historic Preservation Report, knowledge of the historic importance of key visual resources, views, and vistas was incorporated into the evaluation process.

6.2.3 What are the current site characteristics?

**Visual Character of Site**

The NMAAHC site is located on the National Mall just west of the NMAH and adjacent to the northeast side of the Washington Monument Grounds. The site is an open public space, mainly grassy with a gradual slope that appears relatively flat from some vantage points, and with no permanent buildings or facilities. Groves of mature trees are located at the northeast and southeast corners of the site. Eight benches line the east side of the site, and five benches are aligned on the north end (See Figure 6.2-1 Existing Conditions Photograph).

The site is bounded on all sides by streets. Two of the streets, Constitution Avenue on the north and 14th Street on the east, are major thoroughfares. The other two streets are 14th Street on the west and Madison Drive on the south. A combination of street parking and Tourmobile stops/bus pullover areas are located on the north and south ends of the site, respectively. Vehicular traffic and parking are readily visible from all areas within the NMAAHC site.

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*Figure 6.2-1 Existing Conditions Photograph taken from the top of the Washington Monument*

*Figure 6.2-2 View toward the Washington Monument from 14th Street*
Enclosure and definition of the site are provided on two sides by the DOC building to the north and the NMAH to the east. The significant expanse of the Washington Monument Grounds and the Washington Monument itself, directly west and southwest across 14th Street, are readily viewed from the site (See Figure 6.2-2 View toward the Washington Monument from 14th Street). There is further expanse provided by the Mall open space corridor to the south and southeast, that is viewed partially (in the southeast direction) through the prominent rows of American elm trees.

**Views and Vistas**

There are two main historically significant visual corridors from the L'Enfant Plan (formed by the north-south and east west streets surrounding the site) that inform the development of the NMAAHC site. Similarly, there are three historically significant principal features of the McMillan Plan (other than those in common with the L'Enfant Plan) that inform the development of the NMAAHC site. These features include the public open space and landscape pattern of the Mall and the alignment of and set back of the buildings framing the Mall.

The Visual Analysis in Appendix C provides the existing views analyzed in this report.

**Urban Design Context**

The NMAAHC site is uniquely positioned at the convergence of three distinct urban districts, each with distinct aesthetic characteristics: The National Mall, the Washington Monument Grounds, and the Federal Triangle. The NMAAHC site can be considered a 'hinge', between these three districts.

**Washington Monument Grounds:** The Washington Monument Grounds create an expansive and open feeling to the west and southwest, with the prominent focal point of the Washington Monument, visible in its entirety from the NMAAHC site (See Figure 6.2-3 Washington Monument Grounds).
The National Mall: The unique visual character of the NMAAHC site is a direct result of its location on the National Mall within the monumental core of the Capital City. Much of the following description of the National Mall's urban design features are taken from the Finding of No Significant Impact and Final Environmental Assessment for the National Museum of the American Indian on the National Mall, Washington, D.C. (EDAW, 1993) (See Figure 6.1-4 The National Mall Aerial Photo, from Google Earth 2007). The Mall is characterized by a strong axial, monumental design that provides a formal landscape setting for some of Washington, D.C.'s principal buildings, memorials, museums, and a linking function relating each structure to all the others. The open lawn corridor of the Mall is strongly defined on the north and south by rows of American elms four trees wide, which form a monumental walkway from Third Street (the west lawn of the Capitol) to 14th Street (the Washington Monument grounds); and by the museum and institutional buildings that line the northern and southern boundary of the Mall).

Figure 6.2-4 The National Mall Aerial Photo, from Google Earth 2007
Review of the buildings that line each side of the Mall clearly indicates that although the Mall buildings are perceived as strong, interrelated architectural compositions, there are consistent irregularities in massing, height, roofline treatment, setback, and architectural style. Furthermore, the open space corridor of the Mall, defined by the broad row of American elms, is not diminished by the diverse architecture that occurs beyond these rows.

A monumental architectural massing does predominate along the Mall, although the Freer Gallery is somewhat smaller. Heights of buildings, taken at the top of coping or parapet, range from 46 feet (Freer Gallery), to 107.5 feet [(National Gallery of Art (NGA) East Building). Building heights to the top of domes range as high as 138 feet (NGA West Building) (EDAW, 1993). Table 6.2-1 presents the height of each building on the Mall from its base to its roof. Since the building bases rest at different topographic elevations, it is also important to review the resultant roof elevations (base elevations plus building height) to understand the visual relationships between the buildings.

There is no set pattern of alignment of any of the east or west building setbacks. The only Mall-facing setbacks that are aligned are the façades of the NGA West Building, the NGA East Building, and the NMNH, which are located on the north side of the Mall. Nevertheless, building compositions are consistently centered on those buildings that are located directly across the Mall.

**Federal Triangle:** Directly north of the NMAAHC site is the Federal Triangle District, bound by Pennsylvania Avenue, Constitution Avenue, NW and 15th Street. Major buildings within this District include the Ronald Reagan Building, the National Aquarium and DOC, the Interstate Commerce Commission, the District Building, the Federal Trade Commission, the U.S. Environmental Protection Agency (USEPA), the Internal Revenue Service (IRS), the Department of Justice, the National Archives, the White House Visitor Center, the Old Post Office Building, and the U.S. Post Office Department. The Federal Triangle was planned and designed by the Board of Consulting Architects and is typified by red terra cotta roofs and Indiana limestone exteriors. The design is Classical Revival architecture appropriate for conveying the power and permanence of the National Government (GSA, nd).

*Figure 6.2-5 Existing photo of the red terra cotta roofs of the Federal Triangle from the Old Post Office*

**Architectural Context**

Much of the following description in this section is taken from the EA for the NMAI (EDAW, 1993).

The buildings lining both sides of the Mall, as well as those in close proximity to the NMAAHC site, are diverse in massing, height, setback, and style (see Figure 6.2-6 Buildings lining the Mall). The most prominent structures on the Mall are the U.S. Capitol Building, east of the NMAAHC site and on the outer edge of potential visual impact, and the Washington Monument, 800 feet to the southwest of the site.

The following is a description of the architectural style of each of the buildings that are in direct proximity to the NMAAHC site. Refer to Table 6.2-2 for additional information regarding building heights.
Table 6.2-1: Building Heights Survey

<table>
<thead>
<tr>
<th>Building</th>
<th>Building Height</th>
<th>Base At Mid Building</th>
<th>Roof Elevation</th>
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</thead>
<tbody>
<tr>
<td>U.S. Capitol</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Top of Wings</td>
<td>70 ft</td>
<td>89 ft</td>
<td>159 ft</td>
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<tr>
<td>Top of Domes</td>
<td>219 ft</td>
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<td>308 ft</td>
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<tr>
<td>National Air and Space Museum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top of Roof</td>
<td>84 ft</td>
<td>14 ft</td>
<td>98 ft</td>
</tr>
<tr>
<td>Top of Glazed Galleries</td>
<td>64 ft</td>
<td>14 ft</td>
<td>78 ft</td>
</tr>
<tr>
<td>Hirshhorn Museum</td>
<td>82 ft</td>
<td>23 ft</td>
<td>105 ft</td>
</tr>
<tr>
<td>Arts &amp; Industries Building</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top of Main Roof</td>
<td>55.5 ft</td>
<td>31.5 ft</td>
<td>87 ft</td>
</tr>
<tr>
<td>Top of Cupola</td>
<td>96 ft</td>
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<tr>
<td>Smithsonian Institution Building</td>
<td></td>
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<td></td>
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<tr>
<td>Top of Main Roof</td>
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<td>Top of Cupola</td>
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<tr>
<td>Department of Agriculture</td>
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<tr>
<td>Top of Roof</td>
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<table>
<thead>
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<th>Roof Elevation</th>
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<tr>
<td>National Museum of Natural History (NMNH)</td>
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<td>149 ft</td>
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<tr>
<td>Top of Wing</td>
<td>55 ft</td>
<td>33 ft</td>
<td>88 ft</td>
</tr>
<tr>
<td>Top of Dome</td>
<td>88 ft</td>
<td>33 ft</td>
<td>121 ft</td>
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<td>National Museum of American History (NMAH)</td>
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</tr>
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<td>Wilbur J. Cohen Building</td>
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<tr>
<td>Top of Penthouse</td>
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<td>FOB No. 6</td>
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</tbody>
</table>

Mall and Other Buildings in Direct Proximity to the NMAAHC Site:

The Washington Monument (1848-1885). Designed by Robert Mills, this 555 foot tall white marble obelisk is a Presidential Memorial to George Washington. In 1848, construction of the Washington Monument began but was halted in 1854 due to lack of funds. Tensions leading up to the Civil War prevented further fundraising, and construction did not begin again until 1878. In addition to this setback, the Monument itself was constructed off-axis with the White House and U.S. Capitol Building, sitting about 370 feet east and 123 feet south of the axes’ intersection. This is likely due to the fact that the Monument Grounds at the time of construction encompassed a much smaller land mass than at present and extensive filling would have been necessary to provide stable ground for the foundations (Berger, 2007c).

National Museum of American History (1955-1964), formerly the Museum of History and Technology, was designed by Walker O. Cain of the firm McKim, Mead and White in a modern architectural style (See Figure 6.2-7 The south façade of the National Museum of American History). Described as "Contemporary Classic" by Smithsonian Institution, the monumental building is sheathed in pink Tennessee marble and has large vertical recesses and a setback attic with cornice outrigging and heavy moldings derived from other nearby classical style buildings in the Monumental Core (Wilson, 1991).

The north and south setbacks of the NMAH at the podium level are consistent with other buildings along Constitution Avenue and Madison Drive (See Figure 3.2). The NMAH is centered on the Department of Agriculture, which is located directly across the Mall.

Figure 6.2-6 Buildings lining the Mall, Photo courtesy of Carol Highsmith, NPS

Figure 6.2-7 The south façade of the National Museum of American History.
Department of Agriculture (1904-1908) is the only Federal office building located on the Mall. The neo-classical limestone structure was built in two phases. The wings, designed by Rankin, Kellogg, and Crane, were constructed first, and the central section of the building was added in 1926.

Similar in relationship to the other buildings forming pairs on either side of the Mall, the Department of Agriculture building centerline is aligned with the centerline of the NMAH, which was built at a later date. The east and west setbacks of these two buildings, however, are not aligned (See Figure 6.2-8 Department of Agriculture).

Buildings in Direct Proximity to the NMAAHC Site, Outside the Mall and Across Constitution Avenue:

Department of Commerce (1927-1932) was designed by York & Sawyer, and is officially known as the Herbert C. Hoover building. It is characterized by “Scored walls and a range of pedimented windows [that] give a somewhat...Italianate feel to this building’s 1,000-foot-long 15th Street façade. When new, DOC’s 1,000,000 square feet (sf) of floor space made it the largest office structure in the country” (Weeks, 1994). Figure 6.2-9 shows the south façade that faces the NMAAHC site.

Figure 6.2-8: Department of Agriculture

Figure 6.2-9: Department of Commerce from 15th Street looking north
**Landscape Features**
The site is mainly grassy, with a gradual slope that appears relatively flat from some vantage points. Pockets of trees are clustered on the site in the northeast and southeast corners of the site. The cluster in the northeast corner appears denser and more mature and relates to the tree cluster and sculpture directly across 14th Street on the NMAH site.

There are sidewalks along the streets on all four sides of the site. There are two additional sidewalks that cross each other towards the northeast corner of the site.

**Symbolic Values**
As a visual resource, open spaces such as the NMAAH site, can have a variety of symbolic values. Aside from the pragmatic, functional value the site serves (See Section 6.8 Land Use Analysis), the site's current status as public open space is also linked with deeper values. The site's historic status as a part of the Washington Monument grounds has deep associations with the substantial open space buffer surrounding the Washington Monument. Another symbolic value is linked to the role the site plays for march organizers and rallies, which use the area for staging large gatherings and speeches several times per year. The site is tied to one of the key symbolic roles of the open space network in the National Mall areas, as a democratic space for public gathering (See Section 6.1 Cultural Resources for a detailed description of the historic uses of the NMAAH site).

**Building Materials**
From the *Finding of No Significant Impact and Final Environmental Assessment for the National Museum of the American Indian on the National Mall, Washington, D.C.* (EDAW, 1993): All Mall buildings, except the Hirshhorn Museum, are constructed of native stone. The U.S. Capitol is sheathed in a white marble and sandstone painted to match the marble. The NMAH is sheathed in Pink Tennessee marble, as are the National Air and Space Museum (NASM), the NGA West Building, and the NGA East Building. Other buildings are constructed of compatible stone materials in the pink (granite), red (sandstone and brick), and grey (granite) color ranges. The Hirshhorn Museum is constructed of pre-cast panels; however, the aggregate of pink granite corresponds to the dominant building material of the Mall. The modern style buildings on the Mall also include glazed building elements. The NGA East Building includes a clear glazed skylight and the NASM has bronze-tinted acrylic galleries and a dining pavilion.

The Federal Triangle buildings, directly to the north of the NMAAH site, have limestone exterior finishes and features.

The Washington Monument, located immediately southwest of the site, has a marble exterior cladding. Due to the different construction periods of the Monument, a difference in the type of marble is clearly discernable approximately 150 up the shaft.

**Ambient Lighting**
Lighting on the Mall conforms to a Mall-wide plan in which principal landmarks such as the U.S. Capitol building and the Washington, Jefferson, and Lincoln Monuments are illuminated more brightly than other structures. The glazed components of existing Mall structures (described above) and any future structures contribute to the potential impact of illumination of the Mall at night.
6.2.4 How would this project affect aesthetics and visual resources?

Methodology for Measuring Impacts

The impacts of the proposed action on the visual resources and aesthetic environment are evaluated in terms of both short-term (temporary) and long-term (finished) visual environment. In the short-term, the most negative visual impacts will be related to the activity and disruption associated with construction. The long-term impacts will be related to blocked, disrupted, or enhanced views both to and from the NMAAHC site; visual compatibility of the proposed action with its existing visual surroundings and other proposed actions; the loss or creation of unique visual or aesthetic elements; as well as the general quality of the affected visual environment.

The thresholds used for analyzing the intensity of impacts are as follows:

**No Effects:** The proposed action would not impact the aesthetics or visual viewshed of the proposed project area during construction or operations.

**No Significant Effects, or Minor Effects:** The effects would not be significant if the proposed action did not substantially change the scenic vista; did not substantially change scenic resources; did not substantially change the existing visual character or quality of the site and its surroundings; and did not create substantial lights or glares that would affect day or nighttime views in the area. The adverse (or beneficial) effect is detectable, but slight, and would minimally diminish (or enhance) overall integrity, or affect the character defining feature(s) of the visual resources and aesthetic environment.

**Significant Effects:** The effects would be significant if the proposed action resulted in a substantial effect on a scenic vista; substantially altered scenic resources, including but not limited to, trees and historic buildings; substantially altered the existing visual character or quality of the site and its surroundings; or created a new source of substantial light or glare that would substantially affect day or nighttime views in the area. Most of the significant effects are, by nature, adverse; however, in some instances, there may also be beneficial effects, or a combination of adverse and beneficial effects.

Within the category of “significant effects”, a more detailed designation of intensity is included:

**Major Effect:** The serious adverse (or beneficial) effect would significantly diminish (or enhance) overall integrity, or would significantly alter a character defining feature(s) of the visual resources and aesthetic environment.

**Moderate Effect:** The adverse (or beneficial) effect is apparent and would diminish (or enhance) overall integrity, or would alter a character defining feature(s) of the visual resources and aesthetic environment.

**No Build Alternative**

No adverse effects would be created for the site’s aesthetic and visual resources from the No Build Alternative. No construction would occur on the site, so there would be no effect on any of the nine categories previously described that provide a framework for evaluating aesthetics and visual resources.

**Alternative 1 (Contextual Building Alignment)**

**Short-Term Impacts:**

There would be moderate-significant adverse effects in the short-term. Impacts on the immediate visual environment include the loss of the existing grassy ground cover and a limited number of existing trees. Each Alternative, including Alternative 1, was designed to avoid the mature trees to the north and east of the site, so the loss of trees is inherently minimized with this alternative. Additional short-term impacts include excavation; stockpiling; construction equipment
...and materials; disruption of both physical and visual access to the Mall and Washington Monument Grounds through the NMAAHC site; and construction-related activity that may be disruptive to activities on the Mall and in adjacent destinations including the NMAH and Washington Monument and grounds. Similar impacts may be experienced by other nearby buildings in the Federal Triangle area (DOC, Ronald Reagan Building, and International Trade Center), although to a lesser degree due to the width and existing activity on Constitution Avenue.

Long-Term Impacts
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

Viewshed Analysis
The analysis of views and vistas included a variety of potential impacts: impacts on visual corridors, including those established in the L'Enfant and McMillan plans, and others resulting from unplanned visual relationships; and the potential impacts on major cultural resources, such as the Washington Monument. Other factors included the visual relationships both to and from proposed useable outdoor spaces on the NMAAHC site.

A limited number of representative viewpoints were chosen along major axes and from significant historic and cultural resources surrounding the site. These views present a sufficient variety of conditions and vantage points for analyzing the impacts on visual resources. The views are focused on the building mass, scale and open space relationships to the existing context, not on architectural style or design (which will be the subject of future architectural and landscape studies by the design team ultimately chosen for the site). Visual simulations were created for twelve separate vantage points surrounding the NMAAHC site. Appendix C contains the full Viewshed Analysis.

A. View from the top of the Washington Monument
From this viewpoint, the NMAAHC would be very prominent. The north and south façades align with the north and south façades of NMAH; the east and west façades align approximately with the projecting portico feature of the DOC building; and the building height aligns with the height of the main wings of NMAH. The building would continue the sequence of structures lining the north side of the Mall, and would not block the views of other nearby structures. Overall, there would be a major-significant adverse effect on the existing view. This effect could be partially mitigated in later design phases, provided the ultimate design exhibits high quality architecture, contextual awareness, special attention to the roof treatment, and sensitivity to lighting issues so as not to compete with the Washington Monument.

B. View from the tower of the Old Post Office Building
From this viewpoint, there would be a minor adverse effect on the existing visual resources or aesthetic experience. The 75 foot building height would position the roofline of the NMAAHC below the visible point at which the base of the Washington Monument meets the ground. Any roof protrusions or features above the mean 75 foot height, if carefully placed, would maintain the existing view of the entire monument.

C. View from 14th Street looking north
From this viewpoint, the impacts are noticeable and occur at a major entry point for vehicles entering into the Downtown area. The moderate-significant adverse effect on the view looking north would alter the "gateway" experience that transitions through the Mall's open...
space and into subsequent defined urban streetscape. The progression of space as seen down the main 14th Street corridor is altered, establishing a more rigid urban grid on the Washington Monument grounds open space. The effects could be partially mitigated if the building design avoids making the structure feel out of context.

D. View from 14th Street looking south
From the viewpoint in the photograph, the NMAAHC would be visible, with a minor adverse effect gradually becoming a moderate-significant adverse effect, as the viewpoint moves southward along 14th Street. The building would be partially visible on the right, past the DOC building. The important visual experience from this point – the recognition of a major open space crossing perpendicular to 14th Street in the distance – is maintained, but with a smaller dimension. The progression of space as seen down the main 14th Street corridor is altered, establishing a more rigid urban grid on the Washington Monument grounds open space.

E. View from Constitution Avenue looking west
The NMAAHC would have a significant adverse effect on the sequence of views from vantage points looking westward on Constitution Avenue: a minor adverse effect (from points further east of the vantage point in the simulation), gradually becoming a moderate-significant adverse effect, and finally a major-significant adverse effect, as the viewpoint moves westward along Constitution Avenue (from points west of and including the vantage point of the simulation). This heavily trafficked thoroughfare allows for a dramatic view of the Washington Monument that slowly emerges as the viewer moves westward past the NMAH. The presence of the proposed NMAAHC will delay the point at which the entire monument is visible. Instead, the viewer would have a view of the NMAAHC’s northeast corner. This effect, to varying degrees, is unavoidable regardless of the building form proposed. And, like several of the other proposed view conditions, an exceptional work of high quality architecture may serve as a partial mitigation for the effects of significantly altered views.

F. View from 15th Street looking north
The NMAAHC would have a major-significant adverse effect on the view looking north on 15th Street. It would block the south elevation of the DOC building, with its distinctive portico; much of DOC's tile roof would remain visible in the background. The prominence of this view is evident, and reinforces the importance (for purposes of mitigation of adverse effects) of a future building façade with equal or greater presence than the blocked DOC façade, one which takes full advantage of the critical visual relationship and linkage to the National Mall and Washington Monument grounds.

G. View from Washington Monument base looking northeast
The NMAAHC would have a major-significant adverse effect on the pedestrian-level views from the base of the Washington Monument. The Ronald Reagan Building/International Trade Center complex buildings would be obstructed by the NMAAHC, but the DOC and NMAH buildings, and the more distant Old Post Office tower, would remain visible. The perceived proximity to the row of Mall structures, currently nearest to the NMAH, would become much closer, with the NMAAHC becoming the closest structure to the Monument in this direction.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
The view looking northeast towards the Washington Monument from the area around the intersection of 14th Street and Constitution Avenue, is widely perceived as a memorable and interesting ‘gateway’ view. The NMAAHC would have a major-significant adverse effect on this view. The bottom half of the monument, currently visible, would be obstructed by the north and east façades of the NMAAHC.
I. View from Constitution Avenue looking east
The proposed building would be visible within a fairly wide-angle panorama. If the angle of view is directed primarily eastward, along the Constitution Avenue corridor, there is a moderate-significant-adverse effect; the impact on the current view from this vantage point may be partially balanced by the benefit of further enclosure and reinforcement of the Constitution Avenue street corridor. However, if the viewer is oriented in a more of southeast direction, the proposed museum is much more prominent, with major-significant adverse effects. The height and massing of the building would bring the existing row of museums closer to the Washington Monument, diminishing the prominence of the monument within the grounds.

J. View from the center of the Ellipse looking southeast
Even though the NMAAHC appears distant in the view from the Ellipse, and the large buildings of the Federal Triangle are partially visible, the NMAAHC creates a moderate-significant adverse effect nonetheless. The oblique angle of view creates a wide frontage within the panorama, and can be seen in direct relation to the nearby Washington Monument. It should be noted, though, that the height of this alternative does not project vertically above the predominant tree-line (which would be more evident in a summer-foliage view).

K. View from the southwest corner of the Washington Monument grounds, looking northeast
From this viewpoint, there would be a minor adverse effect on the existing visual resources or aesthetic experience. The rise in topography that constitutes the mound beneath the Washington Monument blocks the view of most of the NMAAHC. A small sliver of the upper level of the NMAAHC would be visible behind the monument and would not obstruct any significant structures behind it.

L. View from Arlington House, in Arlington National Cemetery
From this viewpoint, there would be a minor adverse effect, with very little effect on the existing visual resources and aesthetic experience. The panorama of the city would remain as expansive and encompassing as before. The NMAAHC would be noticeable above the treetops in the foreground and would appear as a contextual addition to the building massing of the area. From this distance, the distinction between National Mall and Washington Monument grounds is difficult to distinguish.

Other vistas and views were considered for this study but were found to illustrate either No effect or minor adverse effect. These views include:
- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

Landscape Features
Significant, unavoidable impacts to the few landscape features are described in Short-Term Impacts above.

Symbolic Values
There are various effects, with varying values, on the site's symbolic (visual and aesthetic) value:

First, there is the significant adverse effect resulting from occupying the land and visual realm associated with the Washington Monument grounds. This has largely been covered in the chapter discussing effects on Historic resources. From a purely visual point of view, the aesthetic experience of the Washington Monument is altered, since the open space surrounding it is reduced; this may, in turn, reduce the symbolic impact of the Monument from certain viewpoints.
Second, the functional uses, such as concessions, and public gatherings and periodic demonstrations associated with the current Washington Monument grounds would be replaced with a building that embodies the mission and goals of the NMAAHC and is an equal partner with the other world class museums on the National Mall. Ultimately, this may result in a beneficial effect to balance the adverse effect described above. The outdoor programmed space will be open to the public and support a range of activities that will enhance the adjacent open space and landscape. The symbolic value would be heightened by the intrinsic (and potentially visible) links between many of the defining events in the history of African American Culture and the actual location of these events in and around the Mall area (See Section 6.2 Cultural Resources for a description of First Amendment activities related to African American culture that transpired on the Mall). The strong visual presence of the NMAAHC on the National Mall has major symbolic significance that ranges from the immediate context to the entire nation.

Building Materials, Ambient Lighting & Signage
Design issues such as architecture, roof treatment, ground plane treatment, building materials, lighting, and signage are not addressed here since these aspects of the NMAAHC will be evaluated during the design review process for the project. In general these elements of architectural design would constitute a few of the tools available to the museum designers to aid in the mitigation of any adverse effects.

Alternative 2 (Washington Monument Orientation)

Short-Term Impacts:
The short-term impacts for Alternative 2 are identical to those of Alternative 1 because each alternative was designed to avoid the mature trees to the north and east of the site, so the loss of trees is inherently minimized. Impacts due to construction and construction activity would be identical to Alternative 1 since the staging and specifications for each alternative are identical.

Long-Term Impacts:
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

Visual simulations for Alternative 2 were created for twelve separate vantage points surrounding the NMAAHC site. Appendix C contains the full Viewshed Analysis.

A. View from the top of the Washington Monument
From this viewpoint, the NMAAHC would be very prominent. The most noticeable building relationship would be the angled façade of the NMAAHC, facing directly towards the Washington Monument. The building would continue the sequence of structures lining the north side of the Mall; however, its unique form, angled towards the monument, would signal an appropriate terminus of the northern row of Mall buildings and transition to the Washington Monument Grounds. It would not block the views of other nearby structures. Overall, there would be a major-significant adverse effect on the existing view. This effect could be partially mitigated in later design
phases, provided the ultimate design exhibits high quality architecture, contextual awareness, special attention to the roof treatment, and sensitivity to lighting issues so as not to compete with the Washington Monument.

B. View from the tower of the Old Post Office Building
The 90 foot building height would position the roofline of the NMAAHC just below the visible point at which the base of the Washington Monument meets the ground. In fact, the point of visual obstruction is so close that it may or may not interfere with the view given the slight margin of error of any digital modeling exercise at this distance. There would be a moderate-significant adverse effect on the existing visual resources or aesthetic experience, provided that the final design was accurately studied in greater detail to be sure that vertical protrusions, including mechanical/penthouse projections, were carefully placed to minimize obstruction of the Monument's base.

C. View from 14th Street looking north
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

D. View from 14th Street looking south
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

E. View from Constitution Avenue looking west
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

F. View from 15th Street looking north
The NMAAHC would have a major-significant adverse effect on the view looking north on 15th Street. It would block the south elevation of the DOC building, with its distinctive portico. The prominence of this view is evident, and reinforces the importance (for purposes of mitigation of adverse effects) of a future building façade with equal or greater presence than the blocked DOC façade, one which takes full advantage of the critical visual relationship and linkage to the National Mall and Washington Monument grounds. Unlike Alternative 1, a large portion of the DOC's tile roof in the background would be blocked from view.

G. View from Washington Monument base looking northeast
The NMAAHC would have a major-significant adverse effect on the pedestrian-level views from the base of the Washington Monument. The Ronald Reagan Building/International Trade Center complex buildings would be obstructed by the NMAAHC, but the DOC and NMAH buildings would remain visible. Unlike Alternative 1, the Old Post Office tower in the far distance would be partially obstructed. The perceived proximity to the row of Mall structures, currently nearest to the NMAH, would become much closer with the NMAAHC becoming the closest structure to the Monument in this direction. The visual impact of this proximity in Alternative 2 would be less significant than Alternative 1, since the primary visible façade of the NMAAHC building would be oriented directly towards the Washington Monument (and viewer); the building configuration lends itself to a mitigating design with stronger visual relationships to this vantage point.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

I. View from Constitution Avenue looking east
The proposed building would be visible within a fairly wide-angle panorama. If the angle of view is directed primarily eastward, along the Constitution Avenue corridor, there is a moderate-significant-adverse effect; the impact on the current view from this vantage point may be partially balanced by the benefit of further enclosure and reinforcement of the Constitution Avenue street corridor. However, if the viewer is oriented in a more of southeast direction, the proposed museum is much more prominent, with major-significant adverse
effects. The height and massing of the building would bring the existing row of museums closer to the Washington Monument, diminishing the prominence of the monument within the grounds. The impacts of Alternative 2 would be less severe than Alternative 1 because the triangular building configuration allows a more open view from Constitution Avenue towards the National Mall in the southeast direction.

J. View from the center of the Ellipse looking southeast
Even though the NMAAHC appears distant in the view from the Ellipse, and the large buildings of the Federal Triangle are partially visible, the NMAAHC creates a moderate-significant adverse effect nonetheless. The NMAAHC is prominently located and can be seen in direct relation to the nearby Washington Monument. The effects of the oblique angle of view seen in Alternative 1 would be less in Alternative 2 because the triangular building configuration allows a more open view towards the National Mall in the southeast direction, and a greater distance between the NMAAHC and the Washington Monument. However, the height of this alternative projects vertically above the predominant tree-line (which would be more evident in a summer-foliage view), drawing more attention to its location from this vantage point.

K. View from the southwest corner of the Washington Monument grounds, looking northeast
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

L. View from Arlington House, in Arlington National Cemetery.
Same effect as Alternative 1.

Other vistas and views were considered for this study but were found to illustrate either no effect or minor adverse effect. These views include:

- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

Landscape Features
Significant, unavoidable impacts to the few landscape features are described in Short-Term Impacts above.

Symbolic Values
Same effect as Alternative 1.

Building Materials, Ambient Lighting & Signage
Same effect as Alternative 1.
Alternative 3 (Free Form)

Short-Term Impacts:
The short-term impacts for Alternative 3 are identical to those of Alternative 1 because each alternative was designed to avoid the mature trees to the north and east of the site, so the loss of trees is inherently minimized. Impacts due to construction and construction activity would be identical to Alternative 1 since the staging and specifications for each alternative is identical.

Long-Term Impacts:
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

Alternative 3 Viewshed Analysis
Visual simulations for Alternative 3 were created for twelve separate vantage points surrounding the NMAAHC site. Appendix C contains the full Viewshed Analysis.

A. View from the top of the Washington Monument
From this viewpoint, the NMAAHC would be very prominent. The lack of alignment with other buildings would be evident, creating the effect of a pavilion-like structure in the landscape. The building would continue the sequence of structures lining the north side of the Mall; however, its unique form, multi-directional in orientation, would signal an appropriate terminus of the northern row of Mall buildings and transition to the Monument Grounds. It would not block the views of other nearby structures. Overall, there would be a major-significant adverse effect on the existing view. This effect could be partially mitigated in later design phases, provided the ultimate design exhibits high quality architecture, contextual awareness, special attention to the roof treatment, and sensitivity to lighting issues so as not to compete with the Washington Monument.

B. View from the tower of the Old Post Office Building
The 105 foot building height would position the roofline of the NMAAHC above the visible point at which the base of the Washington Monument meets the ground, creating a significant alteration to one of the primary, existing visual resources and overall aesthetic experience. One of the primary assets of the view from this tower is the unobstructed view, from mound to base to tip of the entire Washington Monument. There would be a major-significant adverse effect, regardless of the architectural development of the NMAAHC.

C. View from 14th Street looking north
Same effect as Alternative 1, with an increase in magnitude due to an increase in building height of 30 feet.

D. View from 14th Street looking south
Same effect as Alternative 1, with an increase in magnitude due to an increase in building height of 30 feet. With a building height of 105 feet, the effect of the continuation of the 14th Street streetwall is stronger than in previous Alternatives; however, this is somewhat offset by the potential irregularity of the building form, which signals the imminent change of context from streetwall definition to open space.

E. View from Constitution Avenue looking west
The NMAAHC would have a significant adverse effect on the sequence of views from vantage points looking westward on Constitution Avenue: a minor adverse effect (from points further east of the vantage point in the simulation), gradually becoming a moderate-significant adverse effect, as the viewpoint moves westward along Constitution Avenue (from points west of and including the vantage point of the simulation). This heavily trafficked thoroughfare
allows for a dramatic view of the Washington Monument that slowly emerges as the viewer moves westward past the NMAH. The presence of the proposed NMAAHC will delay the point at which the entire monument is visible. Instead, the viewer would have a view of the NMAAHC’s northeast corner. This effect, to varying degrees, is unavoidable regardless of the building form proposed. And, like several of the other proposed view conditions, an exceptional work of high quality architecture may serve as a partial mitigation for the effects of significantly altered views. The adverse effect in this alternative is less severe than in others, due to the location of the freeform building south of the existing northeast-southwest diagonal path; consequently, the views of the entire Washington Monument emerge and open up sooner while traveling west on Constitution Avenue.

F. View from 15th Street looking north
The NMAAHC would have a major-significant adverse effect on the view looking north on 15th Street. It would block the south elevation of the DOC building, with its distinctive portico. The prominence of this view is evident, and reinforces the importance (for purposes of mitigation of adverse effects) of a future building façade with equal or greater presence than the blocked DOC façade, one which takes full advantage of the critical visual relationship and linkage to the National Mall and Washington Monument grounds. Unlike Alternatives 1 and 2, almost the entire tile roof of the DOC building in the background would be blocked from view.

G. View from Washington Monument base looking northeast
The NMAAHC would have a major-significant adverse effect on the pedestrian-level views from the base of the Washington Monument. The Ronald Reagan Building/International Trade Center complex buildings would be partially obstructed by the NMAAHC, and unlike Alternative 1, the Old Post Office tower in the far distance would be partially to mostly obstructed, depending on the final form of the building. Unlike Alternatives 1 and 2, the view of the NMAH would also be partially obstructed. The perceived proximity to the row of Mall structures, currently nearest to the NMAH, would become much closer, with the NMAAHC becoming the closest structure to the Monument in this direction. The visual impact of this proximity in Alternative 3 would be less significant than Alternative 1, since the multi-directional nature of the NMAAHC building would create some degree of a visual relationship between the NMAAHC and Monument. The visual impact would be greater than Alternative 2, since the additional 15 feet in building height would be more imposing.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
The view looking northeast towards the Washington Monument from the area around the intersection of 14th Street and Constitution Avenue is widely perceived as a memorable and interesting ‘gateway’ view. The NMAAHC would have a moderate-significant effect on this view. The building would be located south of the existing northeast-southwest diagonal path, maintaining the prominent view of the Monument in its entirety from this particular vantage point. While the Monument itself is not obstructed by the building, its visual presence is re-defined by the new building immediately adjacent to it.

I. View from Constitution Avenue looking east
Same effect as Alternative 1, with an increase in magnitude due to an increase in building height of 30 feet.

J. View from the center of the Ellipse looking southeast
Same effect as Alternative 1, with an increase in magnitude due to an increase in building height of 30 feet.

K. View from the southwest corner of the Washington Monument grounds, looking northeast
From this viewpoint, there would be a moderate-significant adverse effect on the existing visual resources or aesthetic experience. The rise in topography that constitutes the mound beneath the Washington Monument blocks the view of most of the NMAAHC. A portion of
the upper level of the NMAAHC would be visible behind the monument, and given the higher building height than Alternatives 1 and 2, it would appear more prominent than the buildings around it (DOC and NMAH).

L. View from Arlington House, in Arlington National Cemetery
From this viewpoint there would be a minor adverse effect on the existing visual resources and aesthetic experience. The panorama of the city would remain as expansive and encompassing as before. The NMAAHC would be noticeable above the treetops in the foreground, and, despite being taller than Alternatives 1 and 2, it would appear as a contextual addition to the building massing of the area. From this distance, the distinction between National Mall and Washington Monument grounds is difficult to distinguish.

Other vistas and views were considered for this study but were found to illustrate either No effect or minor adverse effect. These views include:
- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

Landscape Features
Significant, unavoidable impacts to the few landscape features are described in Short-Term Impacts above.

Symbolic Values
Same effect as Alternative 1.

Building Materials, Ambient Lighting & Signage
Same effect as Alternative 1.

**Alternative 4 (Terraced Roof)**

**Short-Term Impacts:**
The short-term impacts for Alternative 4 are identical to those of Alternatives 1, 2 and 3 with the exception that the below-grade levels, in extending further eastward, may require the loss of several more existing trees.

**Long-Term Impacts:**
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

**Alternative 4 Viewshed Analysis**
Visual simulations for Alternative 4 were created for twelve separate vantage points surrounding the NMAAHC site. Appendix C contains the full Viewshed Analysis.

A. View from the top of the Washington Monument
From this viewpoint, the NMAAHC would be very prominent. The most noticeable building relationship would be the terraced, curving façade of the NMAAHC stepping up away from the Washington Monument, with a strong visual relationship, or “dialogue”, with the Monument. With Alternative 4, there would be the potential for the expression, through architectural and landscape design, of a building rising up out of the landscape of the Monument grounds that could be articulated with a 'green' roof, or landscaped terraces, a rooftop amphitheater, or other techniques, all of which would be highly visible from this vantage point. The building would continue the sequence of structures lining the north side of the Mall; however, its unique form, sloping down towards the monument, would signal an appropriate terminus of the northern row of Mall buildings and
transition to the Monument Grounds. It would not block the views of other nearby structures. Overall, there would be a major-significant adverse effect on the existing view. This effect could be partially mitigated in later design phases, provided the ultimate design exhibits high quality architecture, contextual awareness, special attention to the roof treatment, and sensitivity to lighting issues so as not to compete with the Washington Monument.

B. View from the tower of the Old Post Office Building
Same effect as Alternative 2.

C. View from 14th Street looking north
Same effect as Alternative 2.

D. View from 14th Street looking south
From the viewpoint in the photograph, the NMAAHC would be visible, with a minor adverse effect gradually becoming a moderate-significant adverse effect, as the viewpoint moves southward along 14th Street. The building would be partially visible on the right, past the DOC building. It would create an interesting perspectival effect, with the multi-height stepping down from 90 feet to 15 feet, partially visible in the distance. The important visual experience from this point – the recognition of a major open space crossing perpendicular to 14th Street in the distance – is maintained, but with a smaller dimension. The progression of space as seen down the main 14th Street corridor is altered, establishing a more rigid urban grid on the Washington Monument grounds open space.

E. View from Constitution Avenue looking west
Same effect as Alternative 2, with the following difference: the building would step down in height from 90 feet to 15 feet along Constitution Avenue, which would open up the view corridor to the Washington Monument sooner than Alternative 2 when traveling west along Constitution Avenue.

F. View from 15th Street looking north
The NMAAHC would have a major-significant adverse effect on the view looking north on 15th Street. Because of the proposed irregular stepping, or sloping, the NMAAHC would partially block the south elevation of the DOC building, including most of its distinctive portico. The prominence of this view is evident, and reinforces the importance (for purposes of mitigation of adverse effects) of a future building façade with equal or greater presence than the blocked DOC façade, one which takes full advantage of the critical visual relationship and linkage to the National Mall and Washington Monument grounds.

G. View from Washington Monument base looking northeast
The NMAAHC would have a major-significant adverse effect on the pedestrian-level views from the base of the Washington Monument. The Ronald Reagan Building/International Trade Center complex buildings would be partially obstructed by the NMAAHC, and unlike Alternative 1, the Old Post Office tower in the far distance would be partially obstructed. The perceived proximity to the row of Mall structures, currently nearest to the NMAH, would become much closer, with the NMAAHC becoming the closest structure to the monument in this direction. The visual impact of this proximity in Alternative 4 would be less significant than Alternative 1 because the major building feature, the stepping/sloping upwards away from the Monument, is visually oriented towards the Monument and the scale of the building decreases as it gets closer to the Monument.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

I. View from Constitution Avenue looking east
The proposed building would be visible within a fairly wide-angle panorama. If the angle of view is directed primarily eastward, along the Constitution Avenue corridor, there is a moderate-significant-
adverse effect; the impact on the current view from this vantage point may be partially balanced by the benefit of further enclosure and reinforcement of the Constitution Avenue street corridor. However, if the viewer is oriented in a more of southeast direction, the proposed museum is much more prominent, with major-significant adverse effects. The height and massing of the building would bring the existing row of museums closer to the Washington Monument, diminishing the prominence of the monument within the grounds. The impacts of Alternative 4 would be less detrimental than Alternative 1 because the stepped/sloping building configuration allows a more open view from Constitution Avenue towards the National Mall in the southeast direction.

J. View from the center of the Ellipse looking southeast
Even though the NMAAHC appears distant in the view from the Ellipse, and the large buildings of the Federal Triangle are partially visible, the NMAAHC creates a moderate-significant adverse effect nonetheless. The NMAAHC is prominently located and can be seen in direct relation to the nearby Washington Monument. The effects of the oblique angle of view, seen in Alternative 1, would be less in Alternative 4 because the stepped/sloping building configuration allows a more open view towards the National Mall in the southeast direction and a greater distance between the NMAAHC and the Washington Monument. In addition, the unique building form would give the effect of stepping away from and deferring to the Washington Monument. However, the height of part of this alternative projects vertically above the predominant tree-line (which would be more evident in a summer-foliage view), drawing more attention to its location from this vantage point.

K. View from the southwest corner of the Washington Monument grounds, looking northeast
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

L. View from Arlington House, in Arlington National Cemetery
Same effect as Alternative 1.

Other vistas and views were considered for this study but were found to illustrate either no effect or minor adverse effect. These views include:
- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

Landscape Features
Significant, unavoidable impacts to the few landscape features are described in *Short-Term Impacts* above.

Symbolic Values
Same effects as Alternative 1

Building Materials, Ambient Lighting & Signage
Same effects as Alternative 1
Alternative 5 (Enframing)

Short-Term Impacts:
The short-term impacts for Alternative 5 are identical to those of Alternative 1 because each alternative was designed to avoid the mature trees to the north and east of the site, so the loss of trees is inherently minimized. Impacts due to construction and construction activity would be identical to Alternative 1 since the staging and specifications for each alternative are identical.

Long-Term Impacts:
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

Alternative 5 Viewshed Analysis
Visual simulations for Alternative 5 were created for twelve separate vantage points surrounding the NMAAHC site. Appendix C contains the full Viewshed Analysis.

A. View from the top of the Washington Monument
From this viewpoint, the NMAAHC would be very prominent. The most noticeable building feature would be the two-volume massing, framing an outdoor open space oriented axially towards the Washington Monument. The building would continue the sequence of structures lining the north side of the Mall; however, its unique form would signal an appropriate terminus of the northern row of Mall buildings and transition to the Monument Grounds. It would not block the views of other nearby structures. Overall, there would be a major-significant adverse effect on the existing view. This effect could be partially mitigated in later design phases, provided the ultimate design exhibits high quality architecture, contextual awareness, special attention to the roof treatment, and sensitivity to lighting issues so as not to compete with the Washington Monument.

B. View from the tower of the Old Post Office Building
The 90 foot building height would position the roofline of the NMAAHC above the visible point at which the base of the Washington Monument meets the ground, creating a significant alteration to one of the primary, existing visual resources and overall aesthetic experience. The obstruction is greater than in the 90 foot Alternative 2 building because the building in Alternative 5 is located closer to the Monument. One of the primary assets of the view from this tower is the unobstructed view, from mound to base to tip of the entire Washington Monument. There would be a major-significant adverse effect, regardless of the architectural development of the NMAAHC.

C. View from 14th Street looking north
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

D. View from 14th Street looking south
Same effect as Alternative 1, with a slight increase in magnitude due to an increase in building height of 15 feet.

E. View from Constitution Avenue looking west
The NMAAHC would have a significant adverse effect on the sequence of views from vantage points looking westward on Constitution Avenue: a minor adverse effect (from points further east of the vantage point in the simulation), gradually becoming a moderate-significant adverse effect, and finally a major-significant adverse effect, as the viewpoint moves westward along Constitution Avenue (from points west of and including the vantage point of the simulation). This heavily trafficked thoroughfare allows for a dramatic view of the Washington Monument that slowly emerges as
the viewer moves westward past the NMAH. The presence of the proposed NMAAHC will delay the point at which the entire monument is visible. Instead, the viewer would have a view of the NMAAHC’s northeast corner. This effect, to varying degrees, is unavoidable regardless of the building form proposed. For Alternative 5, this view is informed by the two-volume, multi-height massing of the NMAAHC. The NMAAHC would appear as two buildings, stepping down in height from 90 feet to 30 feet, with the indication of an open space between the two. This open space opens up the view corridor to the Monument, as described below, in View from northeast corner of 14th Street and Constitution Avenue looking southwest.

F. View from 15th Street looking north
Same effect as Alternative 3.

G. View from Washington Monument base looking northeast
The NMAAHC would have a major-significant adverse effect on the pedestrian-level views from the base of the Washington Monument. The Ronald Reagan Building/International Trade Center complex buildings would be partially obstructed by the NMAAHC, and the Old Post Office tower would remain visible (though rooftop projections should be carefully placed to avoid the potential for obstruction.). The perceived proximity to the row of Mall structures, currently nearest to the NMAH, would become much closer with the NMAAHC becoming the closest structure to the monument in this direction. The visual impact of this proximity in Alternative 5 would be less significant than Alternative 1, since the focal point of the NMAAHC dual-building composition would be the strongly-defined public open space, oriented axially towards the Washington Monument (and viewer). In addition, the outer corners of the two NMAAHC volumes would be rounded to soften the impact of façades that project beyond adjacent building façade alignments.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
The view looking northeast towards the Washington Monument from the area around the intersection of 14th Street and Constitution Avenue is widely perceived as a memorable and interesting ‘gateway’ view. The NMAAHC would have a moderate-significant effect on this view. The two-volume NMAAHC would define the edges of an open space located towards the center of the site; this open space would be oriented axially towards the Washington Monument. The resulting view would consist of a 90 foot volume and a 30 foot volume, enframing an open space that is anchored by an unobstructed view of the entire Washington Monument. The effect is significant because the memorable monument view would become part of an urban "ensemble" from this particular vantage point and because the view is framed on two sides, the open views to the Monument are limited to a relatively narrow view corridor. The major view corridor would be maintained through the site and the museum would be visually linked to the Monument.

I. View from Constitution Avenue looking east.
The proposed building would be visible within a fairly wide-angle panorama. If the angle of view is directed primarily eastward, along the Constitution Avenue corridor, there is a major significant-adverse effect. Unlike the other Alternatives, the NMAAHC would not further enclose and reinforce the Constitution Avenue street corridor. The building edge along Constitution Avenue is 30 feet high, much lower than other nearby buildings, and much closer to the street than the adjacent buildings. In addition, it would be seen as a foreground building to the 90 foot high volume of the NMAAHC's other volume, set even further back from the street. If the viewer is oriented in a more of southeast direction, the proposed museum remains prominent, with major-significant adverse effects. The height and massing of the building would bring the existing row of museums closer to the Washington Monument, diminishing the prominence of the monument within the grounds.
J. View from the center of the Ellipse looking southeast
Same effect as Alternative 1, except there would be an increase in magnitude due to an increase in building height of 15 feet, and an increase in visual massing complexity due to the visibility of the lower 30 foot wing of the museum in front of the higher 90 foot volume.

K. View from the southwest corner of the Washington Monument grounds, looking northeast
Same effect as Alternative 2.

L. View from Arlington House, in Arlington National Cemetery
Same effect as Alternative 1.

Other vistas and views were considered for this study but were found to illustrate either no effect or minor adverse effect. These views include:
- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

Landscape Features
Significant, unavoidable impacts to the few landscape features are described in Short-Term Impacts above.

Symbolic Values
Same effects as Alternative 1.

Building Materials, Ambient Lighting & Signage
Same effects as Alternative 1.

Alternative 6 (Low Profile)

Short-Term Impacts:
The short-term adverse impacts for Alternative 6 are identical to those of Alternative 1 because each alternative was designed to avoid the mature trees to the north and east of the site, so the loss of trees is inherently minimized. Impacts due to construction and construction activity would be identical to Alternative 1 since the staging and specifications for each alternative are identical.

Long-Term Impacts:
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

Alternative 6 Viewshed Analysis
Visual simulations for Alternative 6 were created for twelve separate vantage points surrounding the NMAAHC site. Appendix C contains the full Viewshed Analysis.

A. View from the top of the Washington Monument
From this viewpoint, the NMAAHC would be very prominent. As in Alternative 2, there would be a noticeable building relationship with the angled façade of the NMAAHC, following the curve of 15th Street, and facing towards the Washington Monument. The building would continue the sequence of structures lining the north side of the Mall; however, its form, angled towards the monument and derived from the unique block configuration, would signal an appropriate terminus of the northern row of Mall buildings and transition to the Washington Monument Grounds. With a smaller building footprint and a location pushed further eastward than the other alternatives, there would be greater distance between the museum and Monument,
and, consequently, a greater amount of open space continuous with the Washington Monument Grounds. It would not block the views of other nearby structures. Overall, there would be a major-significant adverse effect on the existing view. This effect could be partially mitigated in later design phases, provided the ultimate design exhibits high quality architecture, contextual awareness, special attention to the roof treatment, and sensitivity to lighting issues so as not to compete with the Washington Monument.

B. View from the tower of the Old Post Office Building
From this viewpoint, there would be a minor adverse effect on the existing visual resources or aesthetic experience. The 60 foot building height would position the roofline of the NMAAHC below the visible point at which the base of the Washington Monument meets the ground (at a point lower than in all of the other alternatives). Any roof protrusions or features above the mean 60 foot height, if carefully placed, would maintain the existing view of the entire monument.

C. View from 14th Street looking north
Similar effect as Alternative 1, with a slight decrease in magnitude due to a decrease in building height of 15 feet.

D. View from 14th Street looking south
Similar effect as Alternative 1, with a slight increase in magnitude. Even though the building is lower than Alternative 1 by 15 feet, its location closer to 14th Street results in slightly greater visibility for Alternative 6.

E. View from Constitution Avenue looking west
Similar effect as Alternative 1, with a slight decrease in magnitude due to a decrease in building height of 15 feet.

F. View from 15th Street looking north
The NMAAHC would have a moderate-significant adverse effect on the view looking north on 15th Street. The NMAAHC would partially block the south elevation of the DOC building, including about two thirds of its distinctive portico. This Alternative blocks less of the DOC façade than any of the other Alternatives, allowing for an unobstructed portion of the façade to be seen from the ground to the roof. The prominence of this view is evident, and reinforces the importance (for purposes of mitigation of adverse effects) of a future building façade with equal or greater presence than the blocked DOC façade, one which takes full advantage of the critical visual relationship and linkage to the National Mall and Washington Monument grounds.

G. View from Washington Monument base looking northeast
The NMAAHC would have a major-significant adverse effect on the pedestrian-level views from the base of the Washington Monument. The Ronald Reagan Building/International Trade Center complex buildings would be obstructed by the NMAAHC, but the DOC and NMAH buildings, and the more distant Old Post Office tower, would remain visible. The perceived proximity to the row of Mall structures, currently nearest to the NMAH, would become much closer, with the NMAAHC becoming the closest structure to the Monument in this direction. Unlike the other alternatives, the pedimented sections of the distinctive portico features would remain unobstructed.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
Similar effect as Alternative 1, with a slight decrease in magnitude due to a decrease in building height of 15 feet.

I. View from Constitution Avenue looking east
Similar effect as Alternative 1, with a slight decrease in magnitude due to a decrease in building height of 15 feet.
J. **View from the center of the Ellipse looking southeast**
Similar effect as Alternative 1, with a slight decrease in magnitude due to: a decrease in building height of 15 feet; and a decreased building-mass footprint, appearing smaller and farther away from the Washington Monument.

K. **View from the southwest corner of the Washington Monument grounds, looking northeast**
Similar effect as Alternative 1, with a slight decrease in magnitude due to a decrease in building height of 15 feet.

L. **View from Arlington House, in Arlington National Cemetery**
Similar effect as Alternative 1, with a slight decrease in magnitude due to a decrease in building height of 15 feet.

Other vistas and views were considered for this study but were found to illustrate either no effect or minor adverse effect. These views include:
- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

**Landscape Features**
Significant, unavoidable impacts to the few landscape features are described in *Short-Term Impacts* above.

**Symbolic Values**
Same effects as Alternative 1.

**Building Materials, Ambient Lighting & Signage**
Same effects as Alternative 1.

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**Preferred Alternative**

**Short-Term Impacts:**
The short-term adverse impacts for the Preferred Alternative are identical to those of Alternative 1 because each alternative was designed to avoid the mature trees to the north and east of the site, so the loss of trees is inherently minimized. Impacts due to construction and construction activity would be identical to Alternative 1 since the staging and specifications for each alternative are identical.

**Long-Term Impacts:**
A new, above-grade structure occupying existing open space on the Washington Monument Grounds will have a significant adverse effect on the current visual character of the site. This is an unavoidable effect on the visual environment, since a building would stand where currently there is none, occupying a significant commemorative landscape currently designated, and visually understood, as a parkland with multiple uses.

**Viewshed Analysis:**
Using the visual simulations created for the twelve separate vantage points surrounding the NMAAHC site, the Preferred Alternative effects were determined based on the viewsheds most likely to cause the most significant effect (i.e., highest height, smallest setback, most non-uniform or a-contextual massing) and the Alternatives with the greatest effect on these viewsheds. Appendix C contains the full Viewshed Analysis.

A. **View from the top of the Washington Monument**
All six of the Build Alternatives would cause a major-significant adverse effect on the existing view. Consequently, the Preferred Alternative, bound by the range of these six alternatives, would also cause a major-significant adverse effect.
B. View from the tower of the Old Post Office Building
Two of the Build Alternatives would cause a minor adverse effect; two of the Build Alternatives would cause a moderate-significant adverse effect; and, two of the Build Alternatives would cause a major-significant adverse effect. Consequently, the Preferred Alternative’s most significant effect (major-significant adverse) would be most similar to those described in Build Alternatives 3 and 5.

C. View from 14th Street looking north
All six of the Build Alternatives would cause a moderate-significant adverse effect on the existing view. Consequently, the Preferred Alternative, bound by the range of these six alternatives, would also cause a moderate-significant adverse effect.

D. View from 14th Street looking south
All six of the Build Alternatives would cause a combination of minor adverse effect to moderate-significant adverse effect on the existing view (gradually changing as one the viewpoint moves southward along 14th Street). Consequently, the Preferred Alternative, bound by the range of these six alternatives, would also cause a combination of minor adverse effect to moderate-significant adverse effect.

E. View from Constitution Avenue looking west
Five of the Build Alternatives would cause a range of effects from minor adverse to major-significant adverse (changing as the viewpoint moves westward along Constitution Avenue); and, one of the Build Alternatives would cause a range of effects from minor adverse to moderate-significant adverse. Consequently, the Preferred Alternative’s most significant effects (major-significant adverse) would be most similar to those described in Build Alternatives 1, 2, 4, 5 and 6.

F. View from 15th Street looking north
Five of the Build Alternatives would cause a major-significant adverse effect; and, one of the Build Alternatives would cause a moderate-significant adverse effect. Consequently, the Preferred Alternative’s most significant effect (major-significant adverse) would be most similar to those described in Build Alternatives 1, 2, 3, 4 and 5.

G. View from Washington Monument base looking northeast
All six of the Build Alternatives would cause a major-significant adverse effect on the existing view. Consequently, the Preferred Alternative, bound by the range of these six alternatives, would also cause a major-significant adverse effect.

H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
Four of the Build Alternatives would cause a major-significant adverse effect; and, two of the Build Alternatives would cause a moderate-significant adverse effect. Consequently, the Preferred Alternative’s most significant effect (major-significant adverse) would be most similar to those described in Build Alternatives 1, 2, 4 and 6.

I. View from Constitution Avenue looking east.
Five of the Build Alternatives would cause a range of effects from moderate-significant adverse to major-significant adverse (changing as the viewpoint moves from an east direction to a southeast direction); and, one of the Build Alternatives would cause a continuous major-significant adverse effect (consistent as the viewpoint moves from an east direction to a southeast direction). Consequently, the Preferred Alternative’s most significant effects (continuous major-significant adverse) would be most similar to those described in Build Alternative 5.
J. View from the center of the Ellipse looking southeast
All six of the Build Alternatives would cause a moderate-significant adverse effect on the existing view. Consequently, the Preferred Alternative, bound by the range of these six alternatives, would also cause a moderate-significant adverse effect.

K. View from the southwest corner of the Washington Monument grounds, looking northeast
Five of the Build Alternatives would cause a minor adverse effect; and, one of the Build Alternatives would cause a moderate-significant adverse effect. Consequently, the Preferred Alternative’s most significant effect (moderate-significant adverse) would be most similar to those described in Build Alternative 3.

L. View from Arlington House, in Arlington National Cemetery
All six of the Build Alternatives would cause a minor adverse effect on the existing view. Consequently, the Preferred Alternative, bound by the range of these six alternatives, would also cause a minor adverse effect.

Other vistas and views were considered for this study but were found to illustrate either no effect or minor adverse effect. These views include:

- View from the Air Force Memorial
- View from the top step of the Thomas Jefferson Memorial
- View from the top step of the Lincoln Memorial
- View from the steps of the U.S. Capitol building
- View from the Mall open space, near the Smithsonian Castle building

Landscape Features
Significant, unavoidable impacts to the few landscape features are described in Short-Term Impacts above.

Symbolic Values
Same effects as Alternative 1.

### Building Materials, Ambient Lighting & Signage
Same effects as Alternative 1.

#### 6.2.5 What is the summary of viewshed effects?
The following table shows the summary of effects per Build Alternative.

**Table 6.2-2 Summary of Viewshed Analysis per Build Alternative**

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</table>

- **O** + represents a visual effect that ranges between minor and significant.

A. View from the top of the Washington Monument
B. View from the tower of the Old Post Office Building
C. View from 14th Street looking north
D. View from 14th Street looking south
E. View from Constitution Avenue looking west
F. View from 15th Street looking north
G. View from Washington Monument base looking northeast
H. View from northeast corner of 14th Street and Constitution Avenue looking southwest
I. View from Constitution Avenue looking east
J. View from the center of the Ellipse looking southeast
K. View from the southwest corner of the Washington Monument grounds, looking northeast
L. View from Arlington House, in Arlington National Cemetery
6.2.6 What measures are proposed to minimize effects to area aesthetics and visual resources during NMAAHC construction and operation?

**Short-Term Impacts**

To mitigate short term adverse impacts, concealment screens could be designed and implemented around the site during construction. The screens could be used to convey information relating to background and mission of NMAAHC, including elements of African American history and culture.

**Long-Term Impacts**

Each Build Alternative, while inevitably introducing significant adverse effects, responds to the urban design context in different ways, opening up opportunities in later design phases for the potential mitigation, or partial mitigation, of some of these adverse impacts.

Review of the urban design and architectural context of the Mall reveals that the Mall is lined with buildings diverse in massing, height, and setback that range in style from neo-classical to modern. Although the actual architectural form and style of the proposed action will not be determined until the design phase, there is no contextual precedent that would dictate its architectural expression. Without a more detailed design of the exterior envelope, it is difficult to determine the exact nature of effects to visual resources. Nevertheless, superior architectural design could minimize effect of the NMAAHC on the architectural context of the Mall.

**Alternative 1 (Contextual Building Alignment)**

Alternative 1 would provide additional spatial definition along the northern edge of the Mall. The allowable building envelope of Alternative 1 is defined by building setback lines and architectural features established from adjacent buildings; it would be consistent in scale with other Mall buildings, and monumental in character. Provided the final design fits into the historic character of the Mall and conforms to the goals and design intent resulting from debate and discussion at the various design reviews following this study, this contextual approach has the potential, through exceptional, high quality design, to mitigate, or partially mitigate, some of the adverse impacts.

**Alternative 2 (Washington Monument Orientation)**

Alternative 2 would be consistent in scale with other Mall buildings and monumental in character. Nevertheless, in orienting a primary façade towards the Washington Monument a distinctive building form would be created that appropriately signifies the end (or beginning) of the row of buildings lining the Mall’s northern edge. Provided the final design fits into the historic character of the Mall and conforms to the goals and design intent resulting from debate and discussion at the various design reviews following this study, this Monument-facing approach has the potential, through exceptional, high quality design, to mitigate, or partially mitigate, some of the adverse impacts.

**Alternative 3 (Free Form)**

Alternative 3 would be consistent in scale with other Mall buildings, and monumental in character. Alternative 3 departs from the concept of contextual building alignment and establishes a distinct identity through a lack of conformity to setbacks. It does not reinforce a continuous northern Mall edge; rather, it proposes a free form building with a pavilion-like expression. It would follow in the tradition of Mall buildings that are anomalies, such as the Hirshhorn and the Smithsonian Institution Building, the Castle. Provided the final design fits into the historic character of the Mall and conforms to the goals and design intent resulting from debate and discussion at the various design reviews following this study, this multi-directional, free-form approach has the potential, through exceptional, high quality design, to mitigate, or partially mitigate, some of the adverse impacts.
Alternative 4 (Terraced Roof)
Alternative 4 would create a building that relates to the building setback lines and architectural features of the NMAH and DOC buildings to the east and west, and simultaneously relates to the Washington Monument and landscape features of the Monument Grounds to the west and southwest. The gradual stepping down of the building from the intersection of Constitution Avenue and 14th Street (highest point) to 15th Street (lowest point) suggests a building “rising” out of the ground, with the potential for a “green”, or landscaped series, of roof terraces that relate to the Monument Grounds and defer to the Washington Monument. Like Alternative 3, this building type would be an anomaly on the Mall in the tradition of the Hirshhorn and others. Provided the final design fits into the historic character of the Mall and conforms to the goals and design intent resulting from debate and discussion at the various design reviews following this study, this terraced approach has the potential, through exceptional, high quality design, to mitigate, or partially mitigate, some of the adverse impacts.

Alternative 5 (Enframing)
Alternative 5 would provide additional definition along the northern edge of the Mall. The allowable building envelope of Alternative 5 exceeds the building setback lines of adjacent buildings. To create a more internalized outdoor public space, between two wings of the structure, the outer boundaries of the building envelope would push further in the north and south directions than the other alternatives. In order to minimize the impact of exceeding the established building façade lines, the building envelope would be designed to soften the apparent projections by potentially curving the façade and eliminating the expressions of hard-edged corners. In addition, Alternative 5 would create a dual-height building with distinctly varied heights for each of the two wings. Alternative 5 would be consistent in scale with other Mall buildings, and monumental in character. Provided the final design fits into the historic character of the Mall and conforms to the goals and design intent resulting from debate and discussion at the various design reviews following this study, this lower-profile, smaller-footprint approach has the potential, through exceptional, high quality design, to mitigate, or partially mitigate, some of the adverse impacts.

Preferred Alternative
Mitigations for the Preferred Alternative are consistent with the mitigations prescribed for the range of Build Alternatives. The Design Principles, which were developed by the consulting parties, are meant to ensure that the Tier II concept designs will conform to a number of key considerations, such as responsiveness to context and surroundings.
6.3 DISTRIBUTION AND MOVEMENT OF GROUNDWATER

6.3.1 What are the key considerations about geology, soils, and groundwater?

Key considerations regarding the geology, soils, and groundwater from the construction and operation of the proposed NMAAHC include:

- Whether appropriate measures would be taken during constructions to contain the soils on-site to prevent accelerated erosion and transport of sediment to receiving waters;
- If temporary or permanent dewatering associated with construction or operation could lower groundwater levels, which could affect the stability of soils within the immediate vicinity of the site;
- If new surface development could create impervious surfaces on the site, reducing the amount of water allowed to infiltrate into the soil and recharge the aquifer; and
- Whether the quality of the groundwater could be impacted by the construction and operation of the proposed facility.

6.3.2 How were geology, soils, and groundwater evaluated for this project?

Information on the known existing characteristics of these resources was compiled and compared to the location and configuration of the proposed development. Predictions about impacts of these resources on the site of the proposed NMAAHC were based upon previous studies and recommendations regarding engineering of the proposed facility on the site.

6.3.3 What are the geology and soils of the project area?

The site selected for the NMAAHC is located on a roughly five-acre parcel delineated by Constitution Avenue to the north, 14th Street to the east, Madison Drive to the south, and 15th Street to the west. The site is relatively flat and rises north to south about 10 vertical feet at slopes between approximately one and two percent grade. The site lies within a geologic province known as the Coastal Plain. The wide Coastal Plain belt of Late Cretaceous to Holocene deposits, extends from New Jersey to Texas and is made up of sedimentary rocks, deposited mostly in a marine environment (Southworth and Denenny, 2006).

Soil survey maps of the District of Columbia (1976), and later confirmed by shovel tests conducted during the 2007 archaeological survey, confirm that the soils found within the site selected for the NMAAHC are made up entirely of fill material (U.S. Department of Agriculture [USDA] 1976 and Wagner 2007). Originally, the site selected for the NMAAHC and most of downtown Washington, D.C., was made up of swamplands and tidal marshes and marked by the drainage systems of Tiber Creek. During the mid- to late-nineteenth century the main channel of Tiber Creek was replaced by a trunk sewer and the area was filled to create buildable land, which now encompasses downtown Washington, D.C. and the National Mall (Wagner 2007).

Auger samples taken during the 2007 archaeological survey show the general fill patterns of the site and an approximation of the general topography of the original site (Wagner 2007). The survey revealed two landscape types, consisting of an upland area as well as the apparent floodplain of Tiber Creek. The upland area was seen on the southern two thirds of the site, while the floodplain area was contained in the remaining northern portion. The thickness of the fill ranges increases from south to north and ranges from less than a foot to depths of as much as 8 feet in the former valley of Tiber Creek. The overall nature of fill distribution effectively results in a modern artificial grade that is more uniform and, over the southern upland, somewhat less sloping than that of the original landscape (Wagner 2007).
The fill material found on the site is made up of very heterogeneous, earthen and rubble fill that has been placed on poorly drained to somewhat excessively drained soils on upland terraces and the former floodplains of Tiber Creek (USDA 1976). The materials directly beneath the fill are stiff plastic clays or very compact clayey sands (Wagner 2007). A layer of dense to very dense variable textures of sand and gravel with some boulders underlie the clay.

Due to heavy visitor use, the soils on the proposed NMAAHC site have become highly compacted. As the soils become compacted, the permeability of the soil is reduced, effectively rendering the site an impervious surface. As a result, the water tends to either pond on the surface or runoff after heavy rainfall.

6.3.4 How do soils and geology influence groundwater?

The upper surface of groundwater is known as the water table. The saturated zone beneath the water table is where groundwater is present. Within this zone all the pore spaces, cracks in soil and rocks, are completely saturated with water. In the top (surficial) layers of soil, unconsolidated sediments or bedrock pore spaces may not be completely filled with water. The surficial layer is the layer of sediment that directly underlies the land surface and is where all recharge and most contaminants enter the groundwater system. Some may contain water, some air, and some may only be partly filled with water. This is known as the unsaturated zone. After heavy rainfall, this zone may be almost saturated, while during a long dry spell, it may become almost dry. Precipitation infiltrates downwards through the unsaturated zone and into the groundwater. The depth of the groundwater table varies from place to place, ranging from a few feet to several hundred feet.

The vertical distance from the ground surface to the water table is dependant upon a number of physical characteristics including topography, geology, soil materials, proximity to water bodies, and climate of that particular area within the watershed. Groundwater levels can be recharged directly from streams and rivers, or from the percolation through soil of rainwater or melted snow. Recharge through percolation is reduced when the ground is compacted or when it is covered by development (impervious surfaces) and less water is allowed to seep into the soil.

Groundwater found beneath the site selected for the NMAAHC is recharged through both precipitation percolation and from infiltration from the Potomac River. Limited percolation is expected, as the soils on the site are compacted and much of the ground surface in the study area is paved or developed with impermeable materials such as asphalt and concrete. The proximity of the Potomac River to the project site creates the potential for abundant groundwater recharge (D.C. WRRC 1995).

Groundwater movement on the NMAAHC site is predicted to be relatively slow since the water table occurs in the layer below the surficial layer, consisting primarily of artificial fill material, which sits upon soil layers of primarily clays, along with mixed with sand, and gravel (Wagner 2007). Groundwater movement through clay is relatively slow.\(^1\)

In addition, while the sewering of Tiber Creek resulted in the rerouting of some surface water runoff from the Potomac River to the Anacostia River, groundwater may still follow the natural topographic gradient and discharge directly to the Potomac River (D.C. WRRC 1995).

\(^1\) Clay particles are the smallest soil particle, behind sand (the largest) and silt and the openings between these microscopic particles are extremely small. The friction created when water moves through these small openings effectively slows or, depending upon the total percentage of clays found within the soil, halts groundwater movement altogether.
6.3.5 What are the current groundwater conditions at the site?

To date, no geotechnical survey has been conducted on the NMAAHC site to determine groundwater conditions (i.e., depth to groundwater table, groundwater quality). Information regarding predicted groundwater conditions of the site was obtained from geologic literature reviews and published geotechnical information on adjacent sites from surveys conducted in response to the permanent security improvements for the Washington Monument (NPS 2002), the Comprehensive Plan and Draft EIS for the White House and President’s Park (NPS 1999), and for the Smithsonian Museum of History and Technology (now known as the American History Museum) (McKim Mead & White Architects 1955). Based on this geotechnical data, groundwater on the site is predicted to occur between 15 to 25 feet below the surface. While the water table will naturally fluctuate over time, this estimated groundwater depth represents the best technical estimate based on adjacent borings. Groundwater quality within the site is not known at this time.

The Tier II NEPA process will incorporate the findings of a full geotechnical survey of the site and include a more detailed analysis of the underlying geology, soils, or groundwater conditions. The survey will be used to identify any potential impacts that could occur to surrounding structures. It will also be used to develop proper engineering methods that will be incorporated into the final design that avoids any impacts to surrounding structures. The survey would include drilling test borings at designated locations to evaluate subsurface geology and groundwater conditions, followed by field tests and geotechnical laboratory tests on recovered samples to evaluate the physical and engineering properties of the strata encountered.

6.3.6 How would construction and operation of NMAAHC affect geologic resources and groundwater levels?

For the purpose of defining whether any of the proposed alternatives could potentially affect the geology and soils of the site, several criteria are considered.

- **No Effects** - The geology or soils of the site would not be impacted or the impact to these resources would be below or at the lower levels of detection.

- **No Significant Effect** - Impacts to geology or soils would be detectable. Mitigation would be needed to offset adverse impacts and would be relatively simple to implement and would likely be successful.

- **Significant Effect** - Impacts on geology or soils would be readily apparent and result in a change to the character of the resource over a relatively wide area. Mitigation needed to offset adverse impacts may or may not be successful.

For the purpose of defining whether any of the proposed alternatives could potentially affect groundwater, several criteria are considered.

- **No Effects** - No change to current groundwater conditions.

- **No Significant Effect** - Impacts to groundwater would be detectable, however they would be negligible and localized. Mitigation would be needed to offset adverse impacts and would be relatively simple to implement and would likely be successful.

- **Significant Effect** - Potentially significant adverse effects may occur directly, indirectly, or cumulatively if the action is likely to:
  - Affect the recharge capacity such that there would be a reduction in supply or lowering of groundwater levels;
  - Cause other effects that significantly or irreversibly impair the use or quality of groundwater or create a human hazard on adjacent lands or within the larger geographic context of a town or county.
No Build Alternative
Under the No Build Alternative, the current condition of the site would remain unchanged and there would be no adverse impacts to geophysical resources of the site.

Alternative 1 (Contextual Building Alignment)
Under Alternative 1, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. Alternative 1 would require the development of a five-story structure, with a proposed footprint of approximately 43,800 gsf or approximately 1-acre. The structure would have two underground levels covering approximately 98,000 gsf (approximately 2.3 acres) at an overall depth of construction at approximately 30 feet. Under this Alternative, approximately 326,650 cubic yards of soils would be excavated for the proposed facility. In addition, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the Smithsonian Institution Museum of American History may also be built. This would require the additional excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

Geology and Soils
Implementation of Alternative 1 would not impact local geology, because construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Of the five acres on the site, the total amount of previously undeveloped land proposed for development is approximately one acre. In preparing the site for construction, heavy machinery would be used for excavation, grading and leveling of the site, construction of the proposed facility, and the digging of trenches for the necessary utility lines. As a result:

- soils would be compacted
- soil layer structure would be disturbed and modified
- soils would be exposed, increasing the overall potential for erosion.
- Soil productivity (i.e., the capacity of the soil to produce vegetative biomass) would decline in disturbed areas and be completely eliminated for those areas within the footprint of structure.

To minimize these impacts an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program (Erosion and Sedimentation Control Act of 1977), which regulates all land-disturbing activities to prevent accelerated erosion and transport of sediment to receiving waters. The plan would outline appropriate and site-specific Best Management Practices (BMPs) for controlling runoff, erosion, and sedimentation during construction activities. Site-specific BMPs would be based on proper design, run-off calculation, slope factors, soil type, topography, and construction activities involved. The District strengthened its sediment control law by enacting Law 10-166 (Erosion and Sedimentation Control Amendment Act of 1994) to specifically remove the exemption provision for sediment control compliance associated with construction activities by Federal agencies.

Groundwater
Construction that requires excavation below the groundwater table carries the risk of impacts on existing structures from soil displacement. Excavation activities have the potential to affect soil stability in areas where the water table is higher than the depth of the new excavation. As excavations progress, unbalanced water (hydrostatic) pressure can cause flooding of the excavation and lower the nearby groundwater elevation. Where buildings are supported by spread footings, or where basement slabs are founded on subsurface soil, substantial settlement may occur if no precautionary measures
are taken. For the purposes of this analysis, it is assumed that during the construction process the contractor would be responsible for implementation of measures aimed at minimizing or preventing groundwater draw-downs. Minimizing the draw-down of groundwater to the greatest extent possible would protect the overall soil stability of the area surrounding the site, which would protect the foundations of neighboring structures, including the Washington Monument and the Smithsonian Institution Museum of American History.

Under this alternative, the depth of construction is approximately 30 feet. Because the proposed construction would likely go below the depth of the groundwater table, the NMAAHC design and specifications should limit the drawdown of groundwater in the vicinity of the project site during excavation through the use of construction techniques designed to limit the influx of groundwater into the excavation. Soldier piles and lagging\(^1\) or sheet piles\(^2\), and slurry walls\(^3\) are construction techniques commonly used to divert groundwater flows and minimize groundwater draw-downs. When excavations are shallow and do not go too far beneath the depth of the groundwater table, soldier piles and lagging or sheet piles are commonly used. Slurry walls are commonly used when construction excavation is deeper and goes well below the depth of the groundwater table. The specific technique used in the construction proposed under this alternative is dependent upon the results of the geotechnical survey. Based on the assumptions of groundwater depth, it is assumed that soldier piles and lagging would likely be utilized under this alternative.

Following construction, the volume of the proposed structure occurring below the groundwater table would impede groundwater flows and would likely cause minor variations in the depth of groundwater to occur within the immediate vicinity of the proposed structure. The depth of the groundwater table would rise on the up gradient side and lower it on the down gradient side. Any variations in the depth of groundwater would return to normal levels the farther it moves away from the structure. Because the greatest depth of construction under this Alternative is approximately 30 feet, and the predicted depth to groundwater is between 15 and 25 feet, the total amount of groundwater displaced would be minimal, and would only likely have negligible impacts to groundwater levels within the general vicinity of the site. Impacts to surrounding structures resulting from groundwater draw-down are not likely.

After construction is completed, continuous dewatering of the site would not likely be necessary based on the fact that groundwater flows on the site would be permanently diverted by either sheet piles or slurry walls, and because the soils beneath the groundwater table are primarily clays and prohibit the rapid movement of groundwater.

The amount of impervious surface on the site would increase to about 2.3-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsobered. The majority of groundwater recharge in the area comes from infiltration from the Potomac River.

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\(^1\) Soldier piles of varying materials and sections are used, often in conjunction with some form of lagging to support soils as a continuous wall above the depth of excavation

\(^2\) Sheet piling consists of a series of panels, with interlocking connections, that are driven into the ground to form a barrier that blocks groundwater flows into the construction area. Sheet piling would most likely be used when the depth of construction is either at or slightly below groundwater levels.

\(^3\) Slurry walls are subsurface barriers that impede or stop groundwater flow. They consist of trenches filled with a mixture of soil, bentonite clay and water, poured in the trenches as a “slurry.” The trenches form a filter cake that serves as a barrier. Slurry walls are used to contain contaminated groundwater, divert uncontaminated groundwater flow, and/or provide barriers for groundwater treatment systems.
While groundwater in Washington, D.C. is not currently used as a potable water source, District of Columbia Municipal Regulations requires that groundwater be protected for beneficial uses, including surface water recharge, drinking water in other jurisdictions, and potential future use as a raw drinking water source in the District, where attainable. Pursuant to these directives, during the construction of the proposed facility, the contractor would incorporate specific mitigation measures and construction protocols aimed at minimizing the overall potential for groundwater contamination from hazardous materials associated with construction activities (i.e., oils, lubricants, antifreeze, and fuels). As a result, groundwater contamination within the proposed project site would not likely occur, and groundwater quality would not likely degrade beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.

**Alternative 2 (Washington Monument Orientation)**

Under Alternative 2, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the study area. Alternative 2 consists of six-story structure, with a proposed footprint of approximately 30,000 sf (approximately 0.7-acres). The structure would have two underground levels covering approximately 98,000 sf (approximately 2.2 acres), at an overall depth of construction at approximately 30 feet. Under this Alternative, approximately 109,000 cubic yards of soils would be excavated for the proposed facility. In addition, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the NMAH may also be built. This would require the additional excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

**Geology and Soils**

Overall impacts to the geology and soils resulting from the construction and operation of the NMAAHC, as proposed under Alternative 2, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land and the proposed depth of construction under each alternative would be approximately 30 feet. Implementation of Alternative 2 would not impact local geology, due to the fact that construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Impacts to soils would occur as a result of site preparation, resulting in soil disturbance, compaction, and the loss of soil productivity. As discussed in Alternative 1, impacts to soils would be minimized through the implementation of an approved erosion and sediment control plan, pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program (Erosion and Sedimentation Control Act of 1977).

**Groundwater**

Overall impacts to groundwater conditions resulting from the construction and operation of the NMAAHC, as proposed under Alternative 2, would be similar to those impacts described under Alternative 1. Under this alternative, the total depth of construction would be approximately 30 feet, the same as described under Alternative 1, and would likely be below the predicted depth of the groundwater table. As a result, NMAAHC design and specifications should limit the drawdown of groundwater in the vicinity of the project site through the use of either sheet piles or slurry walls, or any other appropriate technology designed to control and divert groundwater flows. Minor variations in the depth of groundwater would occur within the immediate vicinity of the proposed structure, as a result of the structure impeding groundwater flows. Any variations in the depth of groundwater would return to normal levels the farther it moves away from the structure. In addition, because the
soils on the site are primarily clays that prohibit the rapid movement of groundwater, proper construction techniques (based on the results of the geotechnical survey) would be utilized to seal out groundwater from the project site, continuous dewatering of the site would not be necessary after proposed construction is completed, and there would be no permanent lowering of the groundwater table. As a result, overall impacts to surrounding structures as a result of groundwater draw-down would not likely occur during either the construction or operation of the proposed facility.

The amount of impervious surface on the site would increase to about 7.5-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsorbed. The majority of groundwater recharge in the area comes from infiltration from the Potomac River.

As described in Alternative 1, because of proper planning and the use of appropriate protocols for protecting against groundwater contamination during construction, impacts to the quality of groundwater found within the proposed project site would not likely occur beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.

**Alternative 3 (Free Form)**

Under Alternative 3, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the study area. Alternative 3 consists of a seven-story structure, with a proposed footprint of approximately 30,000 sf (approximately 0.7-acres). The structure would have three underground levels covering approximately 67,000 sf (approximately 1.5 acres), at an overall depth of construction at approximately 45 feet. Under this Alternative, approximately 335,000 cubic yards of soils would be excavated for the proposed facility. In addition, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the NMAH may also be built. This would require the additional excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

**Geology and Soils**

Overall impacts to the geology and soils resulting from the construction and operation of the NMAAHC, as proposed under Alternative 3, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land. The proposed depth of construction under this alternative, however, would be approximately 45 feet, 15-feet deeper than proposed under Alternative 1.

Implementation of Alternative 3 would not impact local geology, because construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Impacts to soils would occur as a result of site preparation, resulting in soil disturbance, compaction, and the loss of soil productivity. After construction, soil productivity would be lost in those areas covered in structure or other impervious surfaces. As discussed in Alternative 1, impacts to soils would be minimized through the implementation of an approved erosion and sediment control plan, pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program, (Erosion and Sedimentation Control Act of 1977).
Groundwater

Overall impacts to groundwater conditions resulting from the construction and operation of the NMAAHC, as proposed under Alternative 3, would be similar to those impacts described under Alternative 1. Under this alternative, however, the total depth of construction would be approximately 45 feet, and would be below the predicted depth of the groundwater table. As a result, the NMAAHC design and specifications would limit the drawdown of groundwater in the vicinity of the project site through the use of either sheet piles or slurry walls, or any other appropriate technology designed to control and divert groundwater flows. Minor variations in the depth of groundwater would only occur within the immediate vicinity of the proposed structure, as a result of the structure impeding groundwater flows. Any variations in the depth of groundwater would return to normal levels the farther it moves away from the structure. In addition, because the soils on the site are primarily clays that prohibit the rapid movement of groundwater, proper construction techniques (based on the results of the geotechnical survey) would be utilized to seal out groundwater from the project site, continuous dewatering of the site would not be necessary after proposed construction is completed, and there would be no permanent lowering of the groundwater table. As a result, overall impacts to surrounding structures as a result of groundwater draw-down would not likely during either the construction or operation of the proposed facility.

The amount of impervious surface on the site would increase to about 1.5-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsorbed. The majority of groundwater recharge in the area comes from infiltration from the Potomac River.

As described in Alternative 1, because of proper planning and the use of appropriate protocols for protecting against groundwater contamination during construction, impacts to the quality of groundwater found within the proposed project site would not likely occur beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.

Alternative 4 (Terraced Roof)

Under Alternative 4, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the study area. Alternative 4 consists of a tiered six-story structure, with a proposed footprint of approximately 85,000 sf (approximately 1.9-acres). The structure would have one underground level covering approximately 111,500 sf (approximately 2.6 acres), at an overall depth of construction at approximately 15 feet. Under this Alternative, approximately 185,800 cubic yards of soils would be excavated for the proposed facility. In addition, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the NMAH may also be built. This would require the additional excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

Geology and Soils

Overall impacts to the geology and soils resulting from the construction and operation of the NMAAHC, as proposed under Alternative 4, would be similar to those impacts described under Alternative 1. The total area disturbed is approximately one-acre greater than under Alternative 1 and the proposed depth of construction under this alternative would be approximately 15 feet.
Implementation of Alternative 4 would not impact local geology, due to the fact that construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Impacts to soils would occur as a result of site preparation, resulting in soil disturbance, compaction, and the loss of soil productivity. As discussed in Alternative 1, impacts to soils would be minimized through the implementation of an approved erosion and sediment control plan, pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program, (Erosion and Sedimentation Control Act of 1977).

Groundwater
There would not likely be any adverse impacts to groundwater conditions resulting from the construction and operation of the NMAAHC, as proposed under Alternative 4. Under this alternative, the overall depth of construction would likely be above the depth of the groundwater table, the proposed construction would have little impacts to groundwater. No displacement of groundwater would occur, and it would not be likely that there would be any changes to the current depth to the groundwater table. Because no geotechnical survey has yet been conducted, and the actual depth of groundwater is not yet known, it is possible that the depth of construction could occur either above or below the predicted depth to groundwater. If the depth of construction is at or below the depth of the groundwater table, construction techniques and overall impacts would be similar to those described under Alternative 1.

The amount of impervious surface on the site would increase to about 2.6-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsorbed.

As described in Alternative 1, because of proper planning and the use of appropriate protocols for protecting against groundwater contamination during construction, impacts to the quality of groundwater found within the proposed project site would not likely occur beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.

Alternative 5 (Enframing)
Under Alternative 5, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the study area. Alternative 5 consists of one a six-story structure and one two-story structure, with a combined proposed footprint of approximately 56,000 sf (approximately 1.3-acres). The structure would have two underground levels covering approximately 78,000 sf (approximately 1.8 acres), at an overall depth of construction at approximately 30 feet. Under this Alternative, approximately 260,000 cubic yards of soils would be excavated for the proposed facility. In addition, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the NMAH may also be built. This would require the additional excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

Geology and Soils
Overall impacts to the geology and soils resulting from the construction and operation of the NMAAHC, as proposed under Alternative 5, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land, and the proposed depth of construction under each alternative would be approximately 30 feet. Implementation of
Alternative 5 would not impact local geology, due to the fact that construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Impacts to soils would occur as a result of site preparation, resulting in soil disturbance, compaction, and the loss of soil productivity. As discussed in Alternative 1, impacts to soils would be minimized through the implementation of an approved erosion and sediment control plan, pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program (Erosion and Sedimentation Control Act of 1977).

Groundwater

Overall impacts to groundwater conditions resulting from the construction and operation of the NMAAHC, as proposed under Alternative 5, would be similar to those impacts described under Alternative 1. Under this alternative, the total depth of construction would be approximately 30 feet, the same as described under Alternative 1, and would likely be below the predicted depth of the groundwater table. As a result, the NMAAHC design and specifications would limit the drawdown of groundwater in the vicinity of the project site through the use of either sheet piles or slurry walls, or any other appropriate technology designed to control and divert groundwater flows. Minor variations in the depth of groundwater would occur within the immediate vicinity of the proposed structure, as a result of the structure impeding groundwater flows. Any variations in the depth of groundwater would return to normal levels the farther it moves away from the structure. In addition, because the soils on the site are primarily clays that prohibit the rapid movement of groundwater proper construction techniques (based on the results of the geotechnical survey) would be utilized to seal out groundwater from the project site, continuous dewatering of the site would not be necessary after proposed construction is completed, and there would be no permanent lowering of the groundwater table. As a result, overall impacts to surrounding structures as a result of groundwater draw-down would not likely during either the construction or operation of the proposed facility.

The amount of impervious surface on the site would increase to about 1.8-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsorbed. The majority of groundwater recharge in the area comes from infiltration from the Potomac River.

As described in Alternative 1, because of proper planning and the use of appropriate protocols for protecting against groundwater contamination during construction, impacts to the quality of groundwater found within the proposed project site would not likely occur beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.

Alternative 6 (Low Profile)

Under Alternative 6, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the study area. Alternative 6 consists of a four-story structure, with a proposed footprint of approximately 30,000 sf (approximately 0.7-acres). The structure would have three underground levels covering approximately 76,670 sf (approximately 1.76 acres), at an overall depth of construction at approximately 45 feet. Under this Alternative, approximately 383,350 cubic yards of soils would be excavated for the proposed facility. In addition, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the NMAH may also be built. This would require the additional
excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

**Geology and Soils**
Overall impacts to the geology and soils resulting from the construction and operation of the NMAAHC, as proposed under Alternative 6, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land. The proposed depth of construction under this alternative, however, would be approximately 45 feet, 15-feet deeper than proposed under Alternative 1.

Implementation of Alternative 6 would not impact local geology, because construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Impacts to soils would occur as a result of site preparation, resulting in soil disturbance, compaction, and the loss of soil productivity. After construction, soil productivity would be lost in those areas covered in structure or other impervious surfaces. As discussed in Alternative 1, impacts to soils would be minimized through the implementation of an approved erosion and sediment control plan, pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program, (Erosion and Sedimentation Control Act of 1977).

**Groundwater**
Overall impacts to groundwater conditions resulting from the construction and operation of the NMAAHC, as proposed under Alternative 6, would be similar to those impacts described under Alternative 1. Under this alternative, however, the total depth of construction would be approximately 45 feet, and would be below the predicted depth of the groundwater table. As a result, the NMAAHC design and specifications would limit the drawdown of groundwater in the vicinity of the project site through the use of either sheet piles or slurry walls, or any other appropriate technology designed to control and divert groundwater flows. Minor variations in the depth of groundwater would only occur within the immediate vicinity of the proposed structure, as a result of the structure impeding groundwater flows. Any variations in the depth of groundwater would return to normal levels the farther it moves away from the structure. In addition, because the soils on the site are primarily clays that prohibit the rapid movement of groundwater, proper construction techniques (based on the results of the geotechnical survey) would be utilized to seal out groundwater from the project site, continuous dewatering of the site would not be necessary after proposed construction is completed, and there would be no permanent lowering of the groundwater table. As a result, overall impacts to surrounding structures as a result of groundwater draw-down would not likely during either the construction or operation of the proposed facility.

The amount of impervious surface on the site would increase to about 1.76-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsorbed. The majority of groundwater recharge in the area comes from infiltration from the Potomac River.

As described in Alternative 1, because of proper planning and the use of appropriate protocols for protecting against groundwater contamination during construction, impacts to the quality of groundwater found within the proposed project site would not likely occur beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.
Preferred Alternative
Under the Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the study area. Under this Alternative the NMAAHC would be built up to a maximum height of 110-feet with a proposed footprint ranging from approximately 30,000 sf (approximately 0.7-acres) to approximately 85,000 sf (approximately 1.9-acres). The structure could have up to three underground levels, and could cover up to approximately 111,500 sf (approximately 2.6 acres), however, under this Alternative, the total amount of soil that could be excavated would be for the proposed facility not exceed 383,350 cubic yards. In addition, like the other alternatives described, a pedestrian tunnel connecting the first basement levels of the proposed NMAAHC with the NMAH may also be built. This would require the additional excavation of approximately 4,000 cubic yards of soils, assuming the tunnel would be no more than 15 feet in depth, and 20 feet wide, and would not likely be greater than 350 feet in length.

Geology and Soils
Overall impacts to the geology and soils resulting from the construction and operation of the NMAAHC, as proposed under the Preferred Alternative, would be similar and not exceed those impacts described under Alternatives 1 through 6. The proposed depth of construction would not exceed 45-feet in depth.

Implementation of the Preferred Alternative would not impact local geology, because construction activities would not come into direct contact with bedrock and there are no significant geologic features on the site. Impacts to soils would occur as a result of site preparation, resulting in soil disturbance, compaction, and the loss of soil productivity. After construction, soil productivity would be lost in those areas covered in structure or other impervious surfaces. As discussed in Alternative 1, impacts to soils would be minimized through the implementation of an approved erosion and sediment control plan, pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program, (Erosion and Sedimentation Control Act of 1977).

Groundwater
Overall impacts to groundwater conditions resulting from the construction and operation of the NMAAHC, as proposed under Preferred Alternative, would be similar to those impacts described under Alternatives 1 through 6. Under this alternative the total depth of construction could be between approximately 15 - 45 feet. If the construction goes below the predicted depth of the groundwater table, the NMAAHC design and specifications would limit the drawdown of groundwater in the vicinity of the project site through the use of either sheet piles or slurry walls, or any other appropriate technology designed to control and divert groundwater flows. Minor variations in the depth of groundwater would only occur within the immediate vicinity of the proposed structure, as a result of the structure impeding groundwater flows. Any variations in the depth of groundwater would return to normal levels the farther it moves away from the structure. In addition, because the soils on the site are primarily clays that prohibit the rapid movement of groundwater, proper construction techniques (based on the results of the geotechnical survey) would be utilized to seal out groundwater from the project site, continuous dewatering of the site would not be necessary after proposed construction is completed, and there would be no permanent lowering of the groundwater table. As a result, overall impacts to surrounding structures as a result of groundwater draw-down would not likely during either the construction or operation of the proposed facility.

The amount of impervious surface on the site would not surpass approximately 1.9-acres. This increase, however, would have negligible effects on current ability of the site to recharge groundwater levels. This is because the soils on the site are compacted through visitor use, which slows the rate that precipitation...
is allowed to infiltrate into the soil, allowing much of the precipitation to runoff unabsorbed. The majority of groundwater recharge in the area comes from infiltration from the Potomac River.

As described in Alternatives 1 through 6, because of proper planning and the use of appropriate protocols for protecting against groundwater contamination during construction, impacts to the quality of groundwater found within the proposed project site would not likely occur beyond its current condition. Outside of proposed project site, the overall quality of the groundwater would not be degraded beyond its current condition because the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls.

6.3.7 What measures are proposed to minimize effects to geology, soils, and groundwater during museum construction and operation of the museum?

Site-specific BMPs would be developed for controlling runoff, erosion, and sedimentation during construction in accordance with the Erosion and Sedimentation Control Act of 1977 (amended in 1994). The BMPs used would be based on proper design, run-off calculation, slope factors, soil type, topography, construction activities involved, and proximity to water bodies. As part of these BMPs, sedimentation and erosion control devices would be installed to retain sediment generated by land-disturbing activity within the boundaries of construction area. BMPs could include, but are not limited to:

- Using erosion containment controls such as silt fencing and sediment traps to contain sediment on site where necessary;
- Covering disturbed soil or soil stockpiles with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material, where applicable;
- Inspecting erosion and sediment control BMPs on a regular basis and after each measurable rainfall to ensure that they are functioning properly, and maintain BMPs (repair, clean, etc.) as necessary to ensure that they continue to function properly; and
- Sequencing BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities.
- Prohibiting sediments from entering storm drain inlets by surrounding or covering the inlet with a filtering material. Several types of filters are commonly used for inlet protection: silt fence, rock filled bags, or block and gravel. The type of filter used depends on the inlet type (for example, curb inlet, drop inlet), slope, and volume of flow.
- Stabilizing construction exit with gravel to reduce the amount of mud transported onto paved roads by vehicles, which can then be transported to storm drains via stormwater runoff. The construction exit does this by removing mud from vehicle tires before the vehicle enters a public road.

Areas disturbed outside of the footprints of the new construction would be aerated and reseeded, replanted, and/or re-sod following construction activities, which would decrease the overall erosion potential of the site and improve soil productivity. Inspections would be conducted at the construction site to ensure that control devices are constructed in accordance with approved plans and are functioning properly.

While the groundwater within the project site would be isolated from the groundwater surrounding the site as a result of using sheet pilings or slurry walls, to protect against potential groundwater contamination during construction protocols would be developed for the proper on-site refueling, the storage and handling of hazardous materials, and notification and containment procedures in the event of a spill. Containment devices and absorbent pads or other materials would be available to ensure that any spills that may occur are contained and do not enter any surface waters via either overland flows or stormwater conveyance systems.
6.4 SURFACE WATER RESOURCES

6.4.1 What are the key considerations about surface waters and floodplains?
The key considerations concerning surface water and floodplains resources include:

- Whether the proposal would affect the overall water quality of surface water bodies within the Potomac and Anacostia Rivers; and
- Whether the construction and operation of the proposed NMAAHC would alter the floodplains of the Potomac River and Anacostia Rivers and/or create additional flooding risks to downtown Washington, D.C.

6.4.2 How were surface waters and floodplains evaluated for the project?
This section considers the effects of construction and operation of the alternatives on surface water characteristics and considers potential effects of increased impervious surfaces and stormwater flows and their potential effects on surface water and floodplains.

6.4.3 What are the surface waters and floodplains in vicinity of the project area?
The five-acre NMAAHC site is mostly covered by a manicured grassy area, with some trees, and sidewalks. No permanent water bodies are present on or near the site. The nearest water body is the Tidal Basin, which is located approximately 2,000 feet to the southwest, which connects to the Potomac River. At its nearest point, the Potomac River is approximately 4,500 feet west of the site. All surface waters in Washington, D.C. flow to the Potomac River either directly or through tributaries, such as Rock Creek or the Anacostia River. The Potomac River watershed area includes a total of 14,679 square miles in four states and the District of Columbia, with 3,818 square miles in Maryland, 5,723 square miles in Virginia, 3,490 square miles in West Virginia, 1,570 square miles in Pennsylvania, and 69 square miles in the District of Columbia (ICPRB 2007).

Water Quality within Surface Waters in the Project Area Vicinity
The entire Potomac River in the District, including the Tidal Basin, is listed as impaired\(^1\) for bacteria, organics, and pH. The Clean Water Act Section 303(d) requires all States to list all impaired water bodies that are not expected to meet water quality standards, even after the application of technology based pollution controls required by the Clean Water Act. Additionally, in the upper sections of the Potomac River, toxics in the sediment and elevated levels of contaminants such as Chlordane and Polychlorinated Biphenyls (PCBs) in fish sampled tissues have been observed (DOH, 2002).

The quality of water within the Potomac River and contributing tributaries is affected by activities throughout the watershed, including stormwater runoff, point source pollutants from wastewater treatment plants and industrial discharges, and combined sewer overflows (CSO). Combined sewers carry both sanitary waste and stormwater drainage. During storm events, CSO outlets dump excess water from the sewers into streams and rivers in order to keep the sewers from backing up into homes, businesses and streets. Approximately a third of Washington, D.C. is served by combined sewers D.C. Water and Sewer Authority (DCWASA 2007). CSOs adversely affect water quality by contributing high levels of bacteria and organic materials to receiving waters. DCWASA has studied this issue and is preparing a plan to address the replacement of combined sewers with separate storm and sanitary sewer lines.

All wastewater carried via either sanitary sewer lines or combined sewers are treated at the Blue Plains Wastewater Treatment Plant. This facility operates in compliance with the permitting criteria of the National Pollutant Discharge Elimination System (NPDES).

\(^1\) A stream or water body that does not meet applicable water quality standards is considered 'impaired'.

199
**Floodplains**

Floodplains are typically described as areas likely to be inundated by a particular flood. For example, a flood that has a one percent chance of occurring in any one year is the 100-year flood. The 100-year floodplain includes those lands that are flooded by small and often dry watercourses. The 500-year floodplain includes those lands having a 0.2 percent chance of flooding in any given year. Executive Order 11988, Floodplain Management, instructs Federal agencies to consider the risks, danger, and potential impacts of locating projects within floodplains. In situations where alternatives are impractical, the agency must minimize potential harm to or within the floodplain and take appropriate steps to notify the public.

According to the current FEMA flood insurance rate map (Washington, D.C., Community-Panel Number 1100010020B; effective date November 15, 1985), the NMAAHC site is located outside the limits of the 100-year and 500-year floodplains (FEMA 1985). In September 2007, however, FEMA proposed modifying the base 100-year floodplain elevations in the District (Federal Register Volume 72, Number 186, page 54631-54635). If approved, the site for the NMAAHC would be within the 100-year floodplain, which would trigger certain requirements under Executive Order 11988, “Floodplain Management.”

The site selected for the NMAAHC has very limited natural resources and does not provide any attributes considered significant to floodplain ecosystem quality. These attributes include soils, vegetation, wildlife habitat, dissipation of flood energy, sedimentation processes, and groundwater recharge.

**Flooding and Flood Controls**

Floods on the Potomac River are caused by both tidal flooding from the Chesapeake Bay and increased upstream flood flows caused by precipitation and snow melt. Record flood flows combined with high tide elevations occurred at about the same magnitude (approximately 484,000 cubic feet per second) in 1889 and 1936. Existing flood controls in Washington, D.C. were put in place as a result of the 1936 flood.

The primary flood control structure constructed to protect downtown Washington, D.C., including the area of the site of the NMAAHC, is an earthen levee that runs east from the Lincoln Memorial to the Washington Monument. To supplement this levee during flood warnings, the NPS constructs large temporary levees with fill and sandbags at 23rd Street and Constitution Avenue and 17th Street, NW, just south of Constitution Avenue. Other controls during flood warnings include floodgates on sewer outlets and temporary closures at P and Canal Streets, SW. These measures are designed to contain a coincidental tidal flood and river discharge of 700,000 cubic feet per second, which would protect downtown Washington, D.C. and the White House (NPS 1999).

Flooding has occurred in recent history within the downtown area despite the current flood controls and the fact that the area is outside of the currently designated FEMA flood hazard zone. This flooding, however, did not occur as a result of the Potomac River overrunning its banks. It occurred as a result of insufficient overland drainage; the Potomac River remained below flood stage (NCPC 2007). An example of this type of flooding occurred in June of 2006, during a 200-year storm event. During this storm, the northern half of the NMAAHC site flooded, along with many areas of downtown Washington, D.C. The flooding and related issues shut down operations at several Smithsonian Institution buildings along Constitution Avenue as well as several Federal office buildings, including the IRS Headquarters, the DOC, the Department of Justice, and the National Archives (NCPC 2007).
While this flooding was caused by insufficient drainage of overland runoff the exact cause of this flooding has yet to be determined. Some research has speculated that the flooding was caused when the amount of stormwater runoff generated exceeded the capacity of the stormwater sewer systems in the downtown area (NCPC 2007). Insufficient capacity, however, was probably not the sole source of this problem as it was determined that the flooding started prior to the time runoff would have exceeded capacity, and the floodwaters dissipated at a speed greater than would be expected. Other factors that could have contributed to this situation include excess debris in the stormwater sewers that slowed or halted water movement through the system and/or an insufficient number of stormwater drains in the downtown area to handle overland flows draining into this topographically lower area of downtown Washington, D.C.

The current storm sewers and combined stormwater/sewer systems in the study area currently has the capacity to handle normal flows. When excessive runoff enters the system during periods of above average precipitation, however, the excess runoff is diverted directly into local streams and rivers. Flooding or sewer overflows sometimes occur near Constitution Avenue and 14th, 15th, and 17th Streets during periods of above average precipitation. These storm sewer backups are not solely based in insufficient capacity of the systems, and can be caused or exacerbated by excess debris or sediments clogging the system and halting or slowing flows through the system (NPS 1999).

6.4.4 How would the construction and operation of the NMAAHC affect surface waters and floodplains?

For the purpose of defining whether any of the proposed alternatives could potentially affect surface water, several criteria are considered.

No Effects – No change to surface water resources

No Significant Effect – Impacts (chemical, physical, or biological effects) would be detectable, but at or below water quality standard or criteria. Alterations in water quality and hydrologic conditions relative to historical baseline may occur, however, only on a localized and short-term basis.

Significant Effect – Impacts (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical physical, or biological water quality standards or criteria would be locally, slightly and singularly, exceeded on either a short-term or prolonged basis.

The proposed NMAAHC site has very limited natural resources and does not provide any attributes considered significant to a quality floodplain ecosystem. For the purpose of defining whether any of the proposed alternatives could potentially affect or be affected by flooding, several criteria are considered.

No Effects – No change to floodplains resources

No Significant Effect – Impacts to floodplains would be detectable; however the overall impacts would be negligible, and not expose people or structures to any appreciable risk of loss, injury, or death from floods.

Significant Effect – Impacts to floodplains were considered significant if activities associated with the proposal would:
- Place structures within a 100-year or 500-year flood hazard area, which could redirect flood flows, and/or expose people or structures to a significant risk of loss, injury or death from floods;
- Create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that created added burden on the capacity of a storm sewer)

No Build Alternative

Under the No Build Alternative, there would be no earth disturbing activities conducted on the NMAAHC site. The current use of the site would remain unchanged, and as a result, there would be no new impacts to water resources or floodplains.
Alternative 1 (Contextual Building Alignment)

Under Alternative 1, there would be no significant adverse impacts to water quality associated with the Potomac River or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, and would not:

- impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C.,
- create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), nor
- expose people or structures to the potential dangers of flooding.

Surface Waters

During construction of the proposed facility, soils would be exposed, creating an increased potential for erosion and/or transport of surface pollutants into adjacent storm sewers, and ultimately into the Potomac River. The erosion and sediment control plan, developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program, would outline measures and protocols that would be implemented during construction aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. Proper implementation of these measures would reduce the potential for adversely impacting water quality. Because of the site’s flat topography, its distance to the Potomac River, and with planning efforts and mitigation measures implemented, adverse impacts to the water quality of the Potomac River during the construction would be negligible, occurring primarily during storm events.

Protocols developed to protect against potential groundwater contamination during construction, including implementing proper on-site refueling techniques, properly storing and handling of hazardous materials, and developing notification and containment procedures in the event of a spill, would also provide protection to the overall quality of surface waters. These protocols would help ensure that any spills that may occur are contained and cleaned up prior to entering any surface waters via either overland flows or stormwater conveyance systems.

After construction, the amount of impervious surface on the site would increase to about 2.3-acres. Increasing the total amount of impervious surfaces can increase both the volume of stormwater runoff and the amount of sediments and pollutants transported to the Potomac River via the stormwater sewer systems during storm events. As part of Alternative 1, however, there would be no noticeable permanent change in the volume of stormwater discharge generated on the site. In accordance with the District of Columbia’s Stormwater Management Guidebook (2001) and 21 D.C. Municipal Regulations (DCMR), Chapter 5 (Sections 526-535: The District of Columbia-Storm Water Management Regulations), stormwater discharge generated on a newly developed site must be equal or below pre-development peak discharge. Prior to construction, a stormwater management plan would be implemented by the Smithsonian Institution for the operation of the proposed new facility. This plan would address the increase in impervious surfaces and subsequent increases in overland runoff by incorporating stormwater control designs into the project to manage the rate at which runoff leave the site. Prior to construction, the amount of stormwater discharge generated from the site would be determined in order to determine the amount of stormwater control that would be required after construction is completed. Specific stormwater controls that could be incorporated into the project design to maintain these pre-construction baseline conditions include, but are not limited to:
• adding underground storage where possible; and
• incorporating “green engineering” in the design of the proposed structure such as:
  o Green Roofs - Green roofs, vegetated rooftops, reduce stormwater runoff, increase evapotranspiration, prolong roof life, reduce roof temperature, and decrease overall energy costs of the building.
  o Rain Gardens - Rain gardens are a man-made depression in the ground that is used as a landscaping tool to reduce stormwater runoff and improve water quality. Rain gardens form a bioretention area by collecting stormwater runoff and storing it, permitting it be filtered and slowly absorbed by the soil.
  o Pervious Pavements - Pervious pavements is a term used to describe paving methods that are used to reduce stormwater runoff by allowing the movement of water and air through the paving material.
  o Bioretention Cells - Bioretention cells are designed to function similar to rain gardens except that they collect larger volumes of runoff generated at sites with a high percent of impervious surfaces. The cells are designed with more temporary storage to accommodate larger volumes of runoff and consequently will have more depth compared to a typical rain garden.

Because stormwater controls would need to be incorporated into the overall site design to prohibit stormwater discharge from the NMAAHC site from surpassing the current stormwater discharge, there would be no added burdens to the current stormwater conveyance systems, or CSOs, beyond what is currently required.

Flooding and Floodplains
The proposed NMAAHC site is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. Flood control structures are in place and designed to protect downtown Washington, D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage; however, the actual cause of this inadequate drainage has yet to be determined. This flooding affected access to several roads and buildings in the downtown Washington, D.C. area and inundated the northern half of the site. Under this alternative, stormwater controls would need to be incorporated into the overall site design to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape design that would restrict floodwaters from entering the site. An example of such a design element could include earthen berms built along the perimeters of the site that would effectively act as a levee, keeping flood waters out of the site and protecting the proposed structure. The overall building design could also be modified to provide features aimed at protecting interiors to potential flooding. Any flood controls incorporated into the landscape or building design of the proposal would require further studies of the area to determine exactly how flooding, during different storm events scenarios, affects the site.

While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This conclusion is based on the fact that in the event of a flood, floodwaters diverted by the proposal would be spread out over the entire floodable area. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded, which includes a large portion of downtown Washington, D.C. As a result, the
potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not be expected to create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

**Alternative 2 (Washington Monument Orientation)**

Under Alternative 2, there would be no significant adverse impacts to surface water quality or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, would not impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C., would not create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), and would not expose people or structures to the potential dangers of flooding.

**Surface Waters**

Overall impacts to surface water resulting from the construction and operation of the NMAAHC, as proposed under Alternative 2, would be similar to those impacts described under Alternative 1. Under Alternative 2, prior to construction, an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program that would outline measures and protocols aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. In addition, protocols developed to protect against potential groundwater contamination during construction would also provide protection to the overall quality of surface waters.

Under Alternative 2, approximately 2.3 acres of impervious surfaces would be created (See Section 6.3.6 Soils and Geology, Alternative 2 Washington Monument Orientation). Stormwater controls would be incorporated into the project design, in accordance with the District of Columbia’s Stormwater Management Guidebook (2001) and 21 DCMR, Chapter 5 (Sections 526-535: The District of Columbia-Storm Water Management Regulations), to maintain stormwater discharge generated on the site at pre-construction baseline conditions. As a result, both the volume of stormwater runoff and the amount of sediments and pollutants transported to the Potomac River via the stormwater sewer systems from the site would remain at, or below, the current, pre-development conditions.

**Floodplains**

As described in Alternative 1, the site of the proposed NMAAHC is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. There are also flood control structures in place designed to protect downtown Washington D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site has occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage.

Under this alternative, stormwater controls would be built into the overall design of the proposed facility to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape design that would restrict floodwaters from entering the site. Any flood controls incorporated into the landscape design would be based on hydrological studies of the area to determine exactly how flooding affects the site during different storm events scenarios.
While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded which includes a large portion of downtown Washington, D.C. As a result, the potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

**Alternative 3 (Free Form)**

Under Alternative 3, there would be no significant adverse impacts to surface water quality or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, would not impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C., would not create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), and would not expose people or structures to the potential dangers of flooding.

**Surface Waters**

Overall impacts to surface water resulting from the construction and operation of the NMAAHC, as proposed under Alternative 3, would be similar to those impacts described under Alternative 1. Under Alternative 3, prior to construction, an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program that would outline measures and protocols aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. In addition, protocols developed to protect against potential groundwater contamination during construction would also provide protection to the overall quality of surface waters.

Under Alternative 3, approximately 1.5 acres of impervious surfaces would be created (See Section 6.3.6 Soils and Geology Alternative 3, Free Form). Stormwater controls would be incorporated into the project design, in accordance with the District of Columbia’s Stormwater Management Guidebook (2001) and 21 DCMR, Chapter 5 (Sections 526-535: The District of Columbia-Storm Water Management Regulations), to maintain stormwater discharge generated on the site at pre-construction baseline conditions. As a result, both the volume of stormwater runoff and the amount of sediments and pollutants transported to the Potomac River via the stormwater sewer systems from the site would remain at, or below, the current, pre-development conditions.

**Floodplains**

As described in Alternative 1, the site of the proposed NMAAHC is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. There are also flood controls structures are in place designed to protect downtown Washington, D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site has occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage.

Under this alternative, stormwater controls would be built into the overall design of the proposed facility to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape
design that would restrict floodwaters from entering the site. Any flood controls incorporated into the landscape design would be based on hydrological studies of the area to determine exactly how flooding, during different storm events scenarios, affects the site.

While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded which includes a large portion of downtown Washington, D.C. As a result, the potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

**Alternative 4 (Terraced Roof)**

Under Alternative 4, there would be no significant adverse impacts to surface water quality or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, would not impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C., would not create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), and would not expose people or structures to the potential dangers of flooding.

**Surface Waters**

Overall impacts to surface water resulting from the construction and operation of the NMAAHC, as proposed under Alternative 4, would be similar to those impacts described under Alternative 1. Under Alternative 4, prior to construction, an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program that would outline measures and protocols aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. In addition, protocols developed to protect against potential groundwater contamination during construction would also provide protection to the overall quality of surface waters.

Under Alternative 4, approximately 2.6 acres of impervious surfaces would be created (See Section 6.3.6 Soils and Geology Alternative 4, Terraced Roof). However, stormwater controls would be incorporated into the project design, in accordance with the District of Columbia’s Stormwater Management Guidebook (2001) and 21 DCMR, Chapter 5 (Sections 526-535: The District of Columbia Storm Water Management Regulations), to maintain stormwater discharge generated on the site at pre-construction baseline conditions. As a result, both the volume of stormwater runoff and the amount of sediments and pollutants transported to the Potomac River via the stormwater sewer systems from the site would remain at, or below, the current, pre-development conditions.

**Floodplains**

As described in Alternative 1, the site of the proposed NMAAHC is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. There are also flood controls structures are in place designed to protect downtown Washington, D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site has occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage.

Under this alternative, stormwater controls would be built into the overall design of the proposed facility to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for
flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape design that would restrict floodwaters from entering the site. Any flood controls incorporated into the landscape design would be based on hydrological studies of the area to determine exactly how flooding, during different storm event scenarios, affects the site.

While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded which includes a large portion of downtown Washington, D.C. As a result, the potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

**Alternative 5 (Enframing)**

Under Alternative 5, there would be no significant adverse impacts to surface water quality or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, would not impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C., would not create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), and would not expose people or structures to the potential dangers of flooding.

**Surface Waters**

Overall impacts to surface water resulting from the construction and operation of the NMAAHC, as proposed under Alternative 5, would be similar to those impacts described under Alternative 1. Under Alternative 5, prior to construction, an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program that would outline measures and protocols aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. In addition, protocols developed to protect against potential groundwater contamination during construction would also provide protection to the overall quality of surface waters.

Under Alternative 5, approximately 1.8 acres of impervious surfaces would be created (See Section 6.3.6 Soils and Geology Alternative 5, Enframing). However, stormwater controls would be incorporated into the project design, in accordance with the District of Columbia’s Stormwater Management Guidebook (2001) and 21 DCMR, Chapter 5 (Sections 526-535: The District of Columbia-Storm Water Management Regulations), to maintain stormwater discharge generated on the site at pre-construction baseline conditions. As a result, both the volume of stormwater runoff and the amount of sediments and pollutants transported to the Potomac River via the stormwater sewer systems from the site would remain at, or below, the current, pre-development conditions.

**Floodplains**

As described in Alternative 1, the site of the proposed NMAAHC is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. There are also flood controls structures are in place designed to protect downtown Washington, D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site has occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage.
Under this alternative, stormwater controls would be built into the overall design of the proposed facility to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape design that would restrict floodwaters from entering the site. Any flood controls incorporated into the landscape design would be based on hydrological studies of the area to determine exactly how flooding during different storm events scenarios affects the site.

While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded which includes a large portion of downtown Washington, D.C. As a result, the potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

**Alternative 6 (Low Profile)**

Under Alternative 6, there would be no significant adverse impacts to surface water quality or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, would not impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C., would not create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), and would not expose people or structures to the potential dangers of flooding.

**Surface Waters**

Overall impacts to surface water resulting from the construction and operation of the NMAAHC, as proposed under Alternative 6, would be similar to those impacts described under Alternative 1. Under Alternative 6, prior to construction, an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program that would outline measures and protocols aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. In addition, protocols developed to protect against potential groundwater contamination during construction would also provide protection to the overall quality of surface waters.

Under Alternative 6, approximately 1.5 acres of impervious surfaces would be created (See Section 6.3.6 Soils and Geology Alternative 6, Low Profile). Stormwater controls would be incorporated into the project design, in accordance with the District of Columbia’s Stormwater Management Guidebook (2001) and 21 DCMR, Chapter 5 (Sections 526-535: The District of Columbia-Storm Water Management Regulations), to maintain stormwater discharge generated on the site at pre-construction baseline conditions. As a result, both the volume of stormwater runoff and the amount of sediments and pollutants transported to the Potomac River via the stormwater sewer systems from the site would remain at, or below, the current, pre-development conditions.
Floodplains
As described in Alternative 1, the site of the proposed NMAAHC is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. There are also flood controls structures in place designed to protect downtown Washington, D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site has occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage.

Under this alternative, stormwater controls would be built into the overall design of the proposed facility to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape design that would restrict floodwaters from entering the site. Any flood controls incorporated into the landscape design would be based on hydrological studies of the area to determine exactly how flooding, during different storm events scenarios, affects the site.

While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded which includes a large portion of downtown Washington, D.C. As a result, the potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

Preferred Alternative
Under the Preferred Alternative, there would be no significant adverse impacts to surface water quality or floodplain resources. The proposal would not have any detectable impacts to the water quality of the Potomac River beyond the current baseline. The proposed structure would not be placed within the currently designated 100-year or 500-year flood hazard area as delineated by FEMA, would not impede or redirect flood flows to the point where they would noticeably alter or affect flooding in other parts of downtown Washington, D.C., would not create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that could place an added burden on the capacity of a storm sewer), and would not expose people or structures to the potential dangers of flooding.

Surface Waters
Overall impacts to surface water resulting from the construction and operation of the NMAAHC, as proposed under Preferred Alternative, would be similar to those impacts described under Alternatives 1 through 6. Under this Alternative, prior to construction, an erosion and sediment control plan would be developed pursuant to the District of Columbia’s Soil Erosion and Sediment Control Program that would outline measures and protocols aimed at reducing erosion of exposed soils, slowing the rate at which water leaves the site, and capturing eroded soils and concentrated nutrients before entering the downstream water flow. In addition, protocols developed to protect against potential groundwater contamination during construction would also provide protection to the overall quality of surface waters.

Floodplains
As described in Alternative 1, the site of the proposed NMAAHC is located outside of the 100-year and 500-year floodplains as delineated by the current FEMA flood insurance rate map. There are also flood controls structures in place designed to protect downtown Washington, D.C. against coincident tidal flood and river discharge of 700,000 cubic feet per second. Despite this, flooding on the site has
occurred in June of 2006, during a 200-year storm event as a result of inadequate stormwater drainage.

Under this alternative, stormwater controls would be built into the overall design of the proposed facility to prohibit stormwater discharge from the site from surpassing the current stormwater discharge. By maintaining the current stormwater discharge, the potential for flooding caused by stormwater runoff exceeding the capacity of the storm sewer would not increase beyond its current potential.

To protect the site against a flooding event similar to the one that occurred in 2006, elements could be added into the overall landscape design that would restrict floodwaters from entering the site. Any flood controls incorporated into the landscape design would be based on hydrological studies of the area to determine exactly how flooding during different storm events scenarios affects the site.

While the proposal may alter floodwater flows in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself, the changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. This volume of floodwaters diverted by the NMAAHC would be relatively small when compared to the entire area that could be potentially flooded which includes a large portion of downtown Washington, D.C. As a result, the potential for flooding in areas surrounding the site would only be slightly increased beyond its current potential. This increase would not create conditions where people or structures are exposed to a significant risk of loss, injury, or death from floods.

### 6.4.5 What Measures Are Proposed To Minimize Effects To Water Quality And Floodplains During NMAAHC Construction And Operation?

During construction, project contractors would be responsible for adhering to all specified permitting requirements, and developing appropriate site specific stormwater control and erosion and sediment control plans to minimize surface erosion and runoff of pollutants. The District strengthened its sediment control law by enacting Law 10-166 (Erosion and Sedimentation Control Amendment Act of 1994), which specifically removes the exemption provision for sediment control compliance associated with construction activities by Federal agencies.

Implementation of erosion and sediment control plans, as directed by the Erosion and Sediment Control Program (See discussion in Section 6.3.6), would minimize erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter the downstream water flow. Increases in surface stormwater runoff during construction would be controlled by stormwater BMPs as well as erosion and sedimentation controls to reduce potential impacts to adjacent land and waters (See proposed mitigation measures for minimizing affects to soils in Section 6.3.7).

Effluent created by dewatering practices associated with construction of the proposed facility would also be managed in a way that minimizes the potential impacts to water quality within the Potomac River Watershed. Dewatering practices are used to remove groundwater or accumulated rain water from excavated areas. The muddy water pumped from these excavations, would be diverted to an on-site temporary sedimentation basin or to an area completely enclosed by silt fence in a flat vegetated area where discharges can infiltrate into the ground. Effluent would never be discharged directly into storm drains unless the sediment has been removed before discharge.
All dewatering practices would be in compliance with all local and federal permits, and DCWASA permitting processes. DCWASA allows for the discharge of construction/dewatering projects to the public sewer system on a case-by-case basis. However, prior to discharge, the contractor must submit a Temporary Discharge Authorization (TDA) Permit Application. The application submittal shall include an analysis of the wastewater, a copy of any engineering plans or documents, and a site map showing the discharge location. Once a permit is obtained, the permittee must submit periodic monitoring reports to the Pretreatment Coordinator as required under site-specific conditions in the TDA permit. Unscheduled random inspections of project sites may also be conducted.

E.O. 11988 encourages executive agencies to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplain and to avoid direct or indirect support of floodplain development whenever there is a practicable alternative. On September 17, 1981, NCPC adopted floodplain management procedures that apply to all actions that “have the potential for adversely impacting floodplains...or which are subject to potential harm by location in floodplains.” According to the procedures, if NCPC finds that an action meets flood impacting characteristics, then the Commission is required to (1) identify the full range of potential direct or indirect adverse impacts, and (2) identify and evaluate practicable alternatives to avoid adverse effects and incompatible development in the floodplain.

Regardless of whether the FEMA proposal becomes final, the Smithsonian Institution will take into accounts the site’s potential to flood in its building design. Accepted flood proofing and other flood protection measures will be applied to protect the NMAAHC building and collections.
6.5 AIR QUALITY

The USEPA defines ambient air in 40 CFR Part 50 as “that portion of the atmosphere, external to buildings, to which the general public has access.” In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAA), the USEPA has promulgated National Ambient Air Quality Standards (NAAQS). The NAAQS were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the EPA has issued NAAQS for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), particles with a diameter less than or equal to a nominal 10 micrometers (PM₁₀) and particles with a diameter less than or equal to nominal 2.5 micrometers (PM₂.₅), ozone (O₃), nitrogen dioxide (NO₂), and lead (Pb). Federal regulations designate Air-quality Control Regions (AQCRs) in violation of the NAAQS as nonattainment areas. According to the severity of the pollution problem, nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme.

6.5.1 What are the key considerations regarding air quality?

Under the NAAQS, primary and secondary standards are designated for each pollutant. Primary standards are designed to protect sensitive populations within the public, such as children and the elderly, from adverse health effects due to exposure to the pollutant. Secondary standards are designed to protect the environment, both natural and manmade, from known adverse effects from a pollutant.

In 1997, the NAAQS were revised and more stringent standards were created for both ozone and particulate matter. Ozone had previously been held to a one hour standard of 0.12 parts per million (ppm). Under these revisions, the USEPA supplanted the one hour standard with an 8 hour standard of 0.08 ppm. Additionally, the PM₁₀ standards were left in place but 24 hour and annual standards were created for PM₂.₅ at 65 and 15 micrograms per cubic meter (µg/m³), respectively. The new standards were challenged in the courts and in December 2006, a Federal appellate court remanded the EPA’s 8-hour ozone standard. No final decision has been reached on the outcome for this decision. Also in December 2006, the annual PM₁₀ standard was revoked and the 24-hour average standard for PM₂.₅ was dropped to 35µg/m³. Table 6.5-1 provides the NAAQS set forth by USEPA. The Washington, D.C. standards for these pollutants are identical, except no secondary standard has been established for PM₂.₅.
6.5.2 Who Regulates Air Quality Issues in Washington, D.C.?

Metropolitan Washington Council of Governments

Recognizing that air quality is a regional resource, the Metropolitan Washington Council of Governments (MWCOG) is the agency responsible for coordinating air quality planning initiatives. As part of this responsibility, elected officials of the MWCOG member jurisdictions make up the Metropolitan Washington Air Quality Committee (MWAQC). This committee is certified by the Mayor of the District of Columbia and the governors of Maryland and Virginia to prepare an air quality plan for the DC-MD-VA Metropolitan Statistical Area under Section 174 of the CAAA. Other members of the committee include: the air management and transportation directors of the District of Columbia, Maryland, and Virginia; members of the Maryland and Virginia General Assemblies; and the chair of the Transportation Planning Board. A primary purpose of the committee is to coordinate air quality planning activities among MWCOG, other external committees, and the Transportation Planning Board; review policies; resolve policy differences; and adopt an air quality plan for transmittal to the District, Maryland, and Virginia. As part of a greater regional air basin, the District must work within this regional framework.

Interstate Air Quality Council (IAQC)

In 2005, the Mayor of the District of Columbia and the Governors of Maryland and Virginia established the Interstate Air Quality Council (IAQC) in an effort to improve air quality in the Washington, D.C. region. The council, composed of six secretaries of the Environment and Transportation from Maryland, Virginia, and the District, will review and improve the regional air quality planning process to ensure that the jurisdictions effectively meet new federal standards for ozone and fine particulates. Maryland will chair the council (Ehrlich, 2005).

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**Table 6.5-1: National Ambient Air Quality Standards**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>35 ppm</td>
<td>--</td>
</tr>
<tr>
<td>1-hour Average</td>
<td>9 ppm</td>
<td>--</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO₂)</td>
<td>--</td>
<td>1300 µg/m³</td>
</tr>
<tr>
<td>3-hour Average</td>
<td>0.14 ppm</td>
<td>--</td>
</tr>
<tr>
<td>24-hour Average</td>
<td>0.03 ppm</td>
<td>--</td>
</tr>
<tr>
<td>Particulates (PM₁₀)</td>
<td>150 µg/m³</td>
<td>--</td>
</tr>
<tr>
<td>Particulates (PM₂.₅)*</td>
<td>35 µg/m³</td>
<td>--</td>
</tr>
<tr>
<td>24-hour Average</td>
<td>15 µg/m³</td>
<td>15 µg/m³</td>
</tr>
<tr>
<td>Ozone (O₃)</td>
<td>0.08 ppm</td>
<td>0.08 ppm</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
<td>100 µg/m³</td>
<td>100 µg/m³</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>1.5 µg/m³</td>
<td>1.5 µg/m³</td>
</tr>
</tbody>
</table>

ppm = parts per million
µg/m³ = micrograms per cubic meter
Annual Standards never to be exceeded; short-standards not to be exceeded more than once a year.

*: Standards attained when the highest 99th percentile of 24-hour concentration over 3 years is below 35 µg/m³
**: Standards attained when the 3-year average of 4th-highest maximum 8-hour concentration is below 0.08 ppm

Source: EPA, 2007c
**Ozone Transport Commission (OTC)**

The Ozone Transport Commission (OTC) is a multi-state organization created under the CAA responsible for advising the EPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions (OTC, nd).

**District of Columbia Department of Health (DOH)**

Within the District, the DOH Environmental Health Administration’s Air Quality Division is responsible for monitoring source and criteria pollutants in order to maintain compliance with the CAA and issuing permits to facilities within Washington, D.C. Daily monitoring results are submitted to the USEPA on a monthly basis, and daily measurements taken each morning and afternoon are provided to MWCOG to determine the area's daily Air Quality Index (AQI), or level of air quality. The MWCOG index creates a uniform regional system of ambient air quality measure.

In addition to daily air quality monitoring, DOH also has permitting responsibilities for air quality pollutant sources. For stationary source pollutants, each source must submit a written report stating all names and amounts of chemicals used. For sources that emit over 25 tons a year of a criteria air pollutant, records must be submitted annually stating pertinent operating information, emissions, methods for obtaining emissions, a statement of accuracy, and the control equipment currently in use.

6.5.3 How was air quality evaluated for the project?

**General Conformity Applicability Analysis**

To regulate the emission levels resulting from a project, Federal actions located in nonattainment areas are required to demonstrate compliance with the general conformity rule established in 40 CFR Part 93 Determining Conformity of Federal Actions to State or Federal Implementation Plans (the Rule). Section 93.153 of the Rule sets the applicability requirements for projects subject to the Rule through the establishment of de minimis levels for annual criteria pollutant emissions. These de minimis levels are set according to criteria pollutant nonattainment area designations. Projects below the de minimis levels are not subject to the Rule. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The de minimis levels apply to emissions that can occur during the construction and operational phases of the action.

Washington, D.C. is in nonattainment for ozone and PM$_{2.5}$. As such, the methodology for the Tier I FEIS Air Quality resource section required the generation of a General Conformity Rule applicability analysis to evaluate any impact to air quality. The basic overview results are available within the body of this Tier I FEIS while an expanded version of all calculations can be found in Appendix D. Emissions have been estimated for the ozone precursor pollutants nitrogen oxides (NO$_x$) and volatile organic compounds (VOC), and PM$_{2.5}$. Annual emissions for these compounds were estimated for each of the project actions (construction and operation) to determine if they would be below or above the de minimis levels established in the Rule. The de minimis for moderate ozone nonattainment areas is 100 tons per year (TPY) for NO$_x$ and 50 TPY for VOC. Sources of NO$_x$ and VOC associated with the proposed project would include emissions from construction equipment, construction crew commuting vehicles, painting of interior building surfaces and parking spaces (VOC only), and stationary units (boilers and generators). There are no emissions from demolition or renovation as these activities are not expected under any alternative.

The future of the 8-hour ozone standard, however, is uncertain following the decision by the appellate court. The previous standard, which the 8-hour standard replaced, was the one-hour ozone standard under which Washington, D.C. was classified as in severe nonattainment. With the outcome of the court decision uncertain, it’s the air analysis for this Tier I FEIS, was conducted as though either
standard might eventually be approved. Under severe nonattainment, the *de minimis* levels for NO\textsubscript{x} and VOC are 25 TPY.

On July 11, 2006 EPA established *de minimis* levels for PM\textsubscript{2.5}. The final rule established 100 TPY as the *de minimis* emission level for directly emitted PM\textsubscript{2.5} and each of the precursors that form it (sulfur dioxide [SO\textsubscript{2}], NO\textsubscript{x}, VOC, and ammonia). This 100 TPY threshold applies separately to each precursor. This means that if an action’s direct or indirect emissions of PM\textsubscript{2.5}, SO\textsubscript{2}, NO\textsubscript{x}, VOC, ammonia exceed 100 TPY, a General Conformity determination would be required. Neither USEPA nor the District has found PM\textsubscript{2.5} problems in AQCR 47 caused by VOC or ammonia, which eliminates the need to evaluate them for PM\textsubscript{2.5}. Ammonia is not further addressed by the Tier I FEIS (VOC is addressed as an ozone precursor).

**Regional Significance**

In addition to evaluation of air emissions against *de minimis* levels, emissions are also evaluated for regional significance. A Federal action that does not exceed the threshold emission rates of criteria pollutants may still be subject to a general conformity determination if the direct and indirect emissions from the action exceed ten-percent of the total emissions inventory for a particular criteria pollutant in a nonattainment or maintenance area. If the emissions exceed this ten-percent threshold, the Federal action is considered to be a “regionally significant” activity, and thus, the general conformity rules apply.

**6.5.4 What is current air quality?**

The site selected for the NMAAHC is located on the National Mall and Washington Monument Grounds in Washington, D.C. (AQCR 47). Washington, D.C. is in moderate nonattainment for the criteria pollutant ozone, under the 8-hour ozone standard, and in nonattainment for PM\textsubscript{2.5}. The District is in attainment for all other pollutants. The NAAQS for all criteria pollutants are presented in Table 6.5-2.

Ambient air quality is monitored in the District by three monitoring stations for ozone. These monitors are located throughout Washington, D.C. (locations are shown on Table 6.5-2) and average 15 days above the standard each in 2002. In 2006, each monitor averaged six days above the NAAQS standard for eight hour attainment levels. Additionally, there are five monitors for PM\textsubscript{2.5} located at three sites across Washington, D.C. None of the monitors exceeded the original 24-hour standard of 65 µg/m\textsuperscript{3}, however several stations exceeded the annual average standard. Under the new standard of 35 µg/m\textsuperscript{3}, nearly all of the monitors exceed the standard. Table 6.5-2 shows the existing 8-hour ozone monitoring data within Washington, D.C.

<table>
<thead>
<tr>
<th>Monitoring Station</th>
<th>Ozone</th>
<th>PM\textsubscript{2.5}</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>#110010025 – Takoma School @ Pinney Branch Rd and Dahlia St S</td>
<td>0.113/0.109</td>
<td>59/56</td>
<td>2002</td>
</tr>
<tr>
<td>#110010041 – 34\textdegree and Dix St, NE</td>
<td>0.128/0.114</td>
<td>56/56</td>
<td>2003</td>
</tr>
<tr>
<td>#110010043 – S.E. End McMillian Reservoir</td>
<td>0.129/0.120</td>
<td>56/52</td>
<td>2004</td>
</tr>
<tr>
<td>#110010042 – Park Services Office 1100 Ohio Drive</td>
<td>0.112/0.101</td>
<td>53/41</td>
<td>2005</td>
</tr>
<tr>
<td></td>
<td>0.101/0.092</td>
<td>61/54</td>
<td>2006</td>
</tr>
</tbody>
</table>

Table 6.5-2: Existing 8-hour Ozone and 24-hour Particulate Matter Monitoring Data within the District of Columbia

*Source: EPA, 2007b*
The USEPA calculates the AQI for five major air pollutants regulated by the CAA: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. Data collected for Washington, D.C. are released in the form of the AQI, which ranges from zero to 300, with zero indicating no air pollution and 300 representing severely unhealthy air pollution levels. An AQI value between 101 and 150 indicates that air quality is unhealthy for sensitive groups who may be subject to negative health effects. Sensitive groups may include those with lung or heart disease who will be negatively affected by lower levels of ground level ozone and particulate matter than the rest of the general public. An AQI value between 151 and 200 is considered to be unhealthy, and may result in negative health effects for the general public, with more severe effects possible for those in sensitive groups. AQI values above 200 are considered to be very unhealthy (CAP, nd).

According to the EPA’s AQI Report for Washington, D.C., in 2002 the city experienced 18 days where air quality was considered “unhealthy for sensitive groups” and 7 days that were classified as unhealthy for the general public. In 2003, the area experienced five days that were considered unhealthy for sensitive groups and two unhealthy days. In 2004, the area experienced six days that were considered unhealthy for sensitive groups. In 2005, the area experienced five days that were unhealthy for sensitive groups, and in 2006, the area experienced 12 days that were unhealthy for sensitive groups and 1 unhealthy day. So far in 2007, the area has experienced one day that is considered unhealthy for sensitive groups, indicating that although air quality appears to be improving in the region, there are significant fluctuations seen from year to year, leaving the overall picture of air quality somewhat inconsistent (USEPA, 2007a).

6.5.5 How would air quality change with the project?
A General Conformity Applicability Analysis was performed for the Build Alternatives, which estimated the level of potential air emissions (NO\textsubscript{x}, VOC, SO\textsubscript{2}, and PM\textsubscript{2.5}). Appendix D contains a detailed description of the assumptions and methodology used to estimate the potential emissions for the construction and operational phases of the Build Alternatives.

Table 6.5-3 summarizes the total emissions associated with the construction and operation phases of the Build Alternatives. Construction related emissions related to the Build Alternatives would be temporary and only occur during the construction period; however, a conservative approach was initially employed in the applicability analysis to assure that construction scheduling would not result in higher levels of emissions than predicted. The analysis first assumed that the construction emissions for all of the buildings would occur concurrently over the same one-year period. These results were further added to estimated data for one year of operations, bounding the potential emissions that might result for any overlap between construction and operations emissions.

<table>
<thead>
<tr>
<th>Construction and Operations</th>
<th>Total Emissions (TPY)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO\textsubscript{x}</td>
</tr>
<tr>
<td>Moderate 8-Hour de minimis levels</td>
<td>100</td>
</tr>
<tr>
<td>Severe 1-Hour de minimis levels</td>
<td>25</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>14.39</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>13.02</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>13.98</td>
</tr>
<tr>
<td>Alternative 4</td>
<td>13.30</td>
</tr>
<tr>
<td>Alternative 5</td>
<td>14.57</td>
</tr>
<tr>
<td>Alternative 6</td>
<td>11.81</td>
</tr>
<tr>
<td>Preferred Alternative</td>
<td>11.81 to 14.57</td>
</tr>
</tbody>
</table>

* Fluctuations in levels of emissions are due to the variations in gsf of the alternatives.
Regional Significance

Air emissions were also evaluated to determine regional significance. The Plan to Improve Air Quality in the Washington, DC-MD-VA Region: SIP, “Severe Area SIP” Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington DC-MD-VA Nonattainment Area (MWCOG, 2004) sets forth daily target levels of 339.3 tons per day of VOC and 539.0 tons per day of NOx for the Washington Metropolitan ozone nonattainment area. Although the eight-hour ozone standard has been approved for use instead of the one-hour ozone standard, the eight-hour SIP has not yet been finalized. Therefore, pursuant to EPA regulations and in accordance with the MWAQC, the one-hour SIP remains valid as a basis for comparison of emissions (MWCOG, 2005). Additionally, there is no SIP in place for the newly promulgated PM\textsubscript{2.5} regulations. The DC-MD-VA region has three years to implement a SIP that will create a regional emission inventory for the pollutant PM\textsubscript{2.5}.

Impacts to air quality were identified using the following criteria:

**No Effects** – No impacts to air quality from the proposed project.

**No Significant Effect** – Impacts to air quality do not exceed the \textit{de minimis} levels for a pollutant or exceed ten percent of the daily limits laid out in the Plan to Improve Air Quality In The Washington, DC-MD-VA Region: SIP, “Severe Area SIP” Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington, DC-MD-VA Nonattainment Area.

**Significant Effect** – Impacts to air quality exceed the \textit{de minimis} levels for a pollutant or exceed ten percent of the daily limits laid out in the Plan to Improve Air Quality In The Washington, DC-MD-VA Region: SIP, “Severe Area SIP” Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington, DC-MD-VA Nonattainment Area.

**No Build Alternative**

Under the No Build Alternative, the current land use would remain unchanged on the site. There would be no emissions generated from the site, and emissions from the surrounding areas would likely remain at current levels. As a result, there would be no additional impacts to air quality.

**Alternative 1 (Contextual Building Alignment)**

No significant effects to air quality are expected on either a local or regional level from Alternative 1. As shown in Table 6.5-4, at no point will construction or operations emissions exceed \textit{de minimis} levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under Alternative 1, the building would have a footprint of 98,000 sf with an entire building square footage of 415,000. There would be five floors above grade with an additional two below grade. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-4.

<table>
<thead>
<tr>
<th>Construction Activity</th>
<th>Total Emissions (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO\textsubscript{x}</td>
</tr>
<tr>
<td>Emissions from Construction</td>
<td>13.05</td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>0.19</td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>NA</td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
</tr>
<tr>
<td>Emissions from Operation</td>
<td>1.152</td>
</tr>
<tr>
<td>Heating</td>
<td>14.39</td>
</tr>
</tbody>
</table>
The increase in annual emissions from the construction activities of the Alternatives 1 would not make up ten-percent or more of the available regional emission inventory for VOC or NO\textsubscript{x} and would not be regionally significant.

**Alternative 2 (Washington Monument Orientation)**

No significant effects to air quality are expected on either a local or regional level from Alternative 2. As shown in Table 6.5-5, at no point will construction or operations emissions exceed \textit{de minimis} levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under Alternative 2, the building would have a footprint of 98,000 sf with an entire building square footage of 376,000. There would be six floors above grades with an additional two below grade. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-5.

**Table 6.5-5: Total Annual Emissions for Alternative 2**

<table>
<thead>
<tr>
<th>Construction Activity</th>
<th>NO\textsubscript{x}</th>
<th>VOC</th>
<th>PM\textsubscript{2.5}</th>
<th>SO\textsubscript{2}</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emissions from Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>11.78</td>
<td>1.06</td>
<td>5.24</td>
<td>2.58</td>
<td>6.709</td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>0.19</td>
<td>0.35</td>
<td>0.00</td>
<td>0.00</td>
<td>5.32</td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
<td>0.94</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Emissions from Operation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>1.043</td>
<td>0.057</td>
<td>0.079</td>
<td>0.01</td>
<td>0.876</td>
</tr>
<tr>
<td>Total Emissions</td>
<td>13.02</td>
<td>2.41</td>
<td>5.33</td>
<td>2.59</td>
<td>12.91</td>
</tr>
</tbody>
</table>

The increase in annual emissions from the construction activities of the Alternatives 2 would not make up ten-percent or more of the available regional emission inventory for VOC or NO\textsubscript{x} and would not be regionally significant.

**Alternative 3 (Free Form)**

No significant effects to air quality are expected from Alternative 3. As shown in Table 6.5-6, at no point will construction or operations emissions exceed \textit{de minimis} levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under Alternative 3, the building would have a footprint of 67,000 sf with an entire building square footage of 411,000. There would be seven floors above grade with an additional two below grade. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-6.

**Table 6.5-6: Total Annual Emissions for Alternative 3**

<table>
<thead>
<tr>
<th>Construction/Operation Activity</th>
<th>NO\textsubscript{x}</th>
<th>VOC</th>
<th>PM\textsubscript{2.5}</th>
<th>SO\textsubscript{2}</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emissions from Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>12.99</td>
<td>1.14</td>
<td>5.61</td>
<td>2.78</td>
<td>7.23</td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>0.16</td>
<td>0.35</td>
<td>0.00</td>
<td>0.00</td>
<td>5.32</td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
<td>1.03</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Emissions from Operation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>1.141</td>
<td>0.063</td>
<td>0.087</td>
<td>0.01</td>
<td>0.958</td>
</tr>
<tr>
<td>Total Emissions</td>
<td>13.98</td>
<td>2.58</td>
<td>5.70</td>
<td>2.79</td>
<td>13.51</td>
</tr>
</tbody>
</table>

The increase in annual emissions from the construction activities of the Alternatives 3 would not make up ten-percent or more of the available regional emission inventory for VOC or NO\textsubscript{x} and would not be regionally significant.
**Alternative 4 (Terraced Roof)**
No significant effects to air quality are expected from Alternative 4. As shown in Table 6.5-7, at no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under Alternative 4, the building would have a footprint of 111,500 sf with an entire building square footage of 385,500. There would be six floors above grade with an additional floor below grade. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-7.

Table 6.5-7: Total Annual Emissions for Alternative 4

<table>
<thead>
<tr>
<th>Construction/Operation Activity</th>
<th>Total Emissions (Tons)</th>
<th>NOx</th>
<th>VOC</th>
<th>PM2.5</th>
<th>SO2</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions from Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>12.11</td>
<td>1.09</td>
<td>5.38</td>
<td>2.65</td>
<td>6.88</td>
<td></td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>0.16</td>
<td>0.35</td>
<td>0.00</td>
<td>0.00</td>
<td>5.32</td>
<td></td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
<td>0.96</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Emissions from Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>1.006</td>
<td>0.059</td>
<td>0.081</td>
<td>0.01</td>
<td>0.428</td>
<td></td>
</tr>
<tr>
<td>Total Emissions</td>
<td>13.30</td>
<td>2.46</td>
<td>5.46</td>
<td>2.66</td>
<td>12.63</td>
<td></td>
</tr>
</tbody>
</table>

The increase in annual emissions from the construction activities of the Alternatives 4 would not make up ten-percent or more of the available regional emission inventory for VOC or NOx and would not be regionally significant.

**Alternative 5 (Enframing)**
No significant effects to air quality are expected from Alternative 5. As shown in Table 6.5-8, at no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under Alternative 5, the building would have a footprint of 78,000 sf with an entire building square footage of 430,000. There would be one building with six floors above grade and a second building with two floors above grade. Below grade would be two floors, connecting the two above grade structures. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-8.

Table 6.5-8: Total Annual Emissions for Alternative 5

<table>
<thead>
<tr>
<th>Construction/Operation Activity</th>
<th>Total Emissions (Tons)</th>
<th>NOx</th>
<th>VOC</th>
<th>PM2.5</th>
<th>SO2</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions from Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>13.26</td>
<td>1.20</td>
<td>5.88</td>
<td>2.91</td>
<td>7.57</td>
<td></td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>0.16</td>
<td>0.35</td>
<td>0.00</td>
<td>0.00</td>
<td>5.32</td>
<td></td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
<td>1.08</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Emissions from Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>1.122</td>
<td>0.066</td>
<td>0.091</td>
<td>0.01</td>
<td>0.477</td>
<td></td>
</tr>
<tr>
<td>Total Emissions</td>
<td>14.57</td>
<td>2.69</td>
<td>5.97</td>
<td>2.92</td>
<td>13.37</td>
<td></td>
</tr>
</tbody>
</table>

The increase in annual emissions from the construction activities of the Alternatives 5 would not make up ten-percent or more of the available regional emission inventory for VOC or NOx and would not be regionally significant.
**Alternative 6 (Low Profile)**

No significant effects to air quality are expected from Alternative 6. As shown in Table 6.5-9, at no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under Alternative 6, the building would have a footprint of 76,667 sf with an entire building square footage of 350,000 gsf. There would be one building with four floors above grade and three floors below grade. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-9.

**Table 6.5-9: Total Annual Emissions for Alternative 6**

<table>
<thead>
<tr>
<th>Construction/Operation Activity</th>
<th>NOx</th>
<th>VOC</th>
<th>PM$_{2.5}$</th>
<th>SO$_2$</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions from Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>10.65</td>
<td>0.96</td>
<td>1.03</td>
<td>2.34</td>
<td>6.11</td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>NA</td>
<td>NA</td>
<td>3.71</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
<td>1.08</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Emissions from Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>0.97</td>
<td>0.05</td>
<td>0.07</td>
<td>0.01</td>
<td>0.39</td>
</tr>
<tr>
<td>Total Emissions</td>
<td>11.81</td>
<td>3.99</td>
<td>4.81</td>
<td>2.35</td>
<td>11.82</td>
</tr>
</tbody>
</table>

The increase in annual emissions from the construction activities of the Alternatives 6 would not make up ten-percent or more of the available regional emission inventory for VOC or NO$_x$ and would not be regionally significant.

**Preferred Alternative**

No significant effects to air quality are expected from the Preferred Alternative. As shown in Table 6.5-10, at no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. Under the Preferred Alternative, the entire building square footage would range between 350,000 gsf and 450,000 gsf. Emissions due to construction and operations actions, which are summed in Table 6.5-3, are broken out by contributing actions in Table 6.5-10.

**Table 6.5-10: Total Annual Emissions for the Preferred Alternative**

<table>
<thead>
<tr>
<th>Construction/Operation Activity</th>
<th>NOx</th>
<th>VOC</th>
<th>PM$_{2.5}$</th>
<th>SO$_2$</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions from Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Heavy Equipment</td>
<td>13.26 to 10.65</td>
<td>1.20 to 0.96</td>
<td>5.88 to 1.03</td>
<td>2.91 to 2.34</td>
<td>7.57 to 6.11</td>
</tr>
<tr>
<td>Construction Crew Workers</td>
<td>NA</td>
<td>NA</td>
<td>3.71</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Painting</td>
<td>NA</td>
<td>1.08</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Emissions from Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>0.97</td>
<td>0.05</td>
<td>0.07</td>
<td>0.01</td>
<td>0.39</td>
</tr>
<tr>
<td>Total Emissions</td>
<td>11.81 to 14.57</td>
<td>2.09 to 2.69</td>
<td>4.81 to 5.97</td>
<td>2.35 to 2.92</td>
<td>11.82 to 13.73</td>
</tr>
</tbody>
</table>

The increase in annual emissions from the construction activities of the Preferred Alternative would not make up ten-percent or more of the available regional emission inventory for VOC or NO$_x$ and would not be regionally significant.
6.5.6 What measures are proposed to minimize air quality effects during museum construction and operation?

Mitigations that could be utilized during construction to minimize impact to local air quality during the construction of the proposed NMAAHC:

- Use ultra low sulfur diesel fuel in construction equipment.
- Limit unnecessary idling times on diesel powered engines to three to five minutes.
- Locate diesel powered exhausts away from fresh air intakes.
- Utilize water or appropriate liquids for dust control during demolition, land clearing, grading, on materials stockpiled on the ground surfaces, and other activities.
- Cover open-body trucks for transporting materials.

Pursuant to District regulations and to the maximum extent feasible, the Smithsonian Institution will utilize construction equipment with pollution control devices to lower the impact on air quality.
6.6 NOISE

Noise is generally defined as unwanted sound. Sound is everywhere; it becomes noise when it interferes with normal activities such as speech, concentration, or sleep.

6.6.1 How are noise levels measured for the project?

Sound or noise levels are measured in A-weighted decibels (dBA), a unit of sound pressure adjusted to the range of human hearing, with an intensity greater than the ambient or background sound pressures. Normal speech has a noise level of approximately 60 dBA; sound levels above 110 dBA begin to be felt inside the human ear as discomfort. Sound levels much above 140 dBA are felt as pain. Because most noise is generated in patterns (location, duration, timing and frequency) or is intermittent, the calculations of noise levels are typically averaged over a 24-hour period. Numerous “sound exposure events,” the total sound exposure for single events expressed in one second of time, are totaled and averaged. This averaging of sound exposure events results in the Day-Night Level (DNL) noise average.

The EPA regulates noise levels at the source for sources such as vehicles, construction equipment, and aircraft. Noise levels are further controlled by local authorities, which regulate noise from single sources.

6.6.2 What is the existing noise around the project area?

The project area is located on the National Mall and is surrounded by numerous museums, monuments, and buildings. There are no nearby residences. The main source of noise in the area is vehicular traffic along 14th Street and Constitution Avenue, both of which are major thoroughfares within Washington, D.C. The noise produced by the congestion and traffic on these streets is not just confined to rush hour, but occurs throughout the weekdays and, unlike other areas in downtown Washington, D.C., on the weekends as well. The American Speech-Language-Hearing Association estimates noise levels on a busy street to be between 65-80dB (ASHA 2007).

The land uses around the project area are consistent with noise levels between 67-72dB based on the FHWA Noise Abatement Criteria (23 CFR 772).

Table 6.6-1 FHWA Noise Abatement Criteria- for exterior levels only

<table>
<thead>
<tr>
<th>Activity Level</th>
<th>Level (dBA)</th>
<th>Description of Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57</td>
<td>Lands on which serenity and quiet are of extraordinary significance and serve an important public need where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.</td>
</tr>
<tr>
<td>B</td>
<td>67</td>
<td>Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.</td>
</tr>
<tr>
<td>C</td>
<td>72</td>
<td>Developed lands, properties, or activities not included in Categories A or B above</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>Undeveloped Lands</td>
</tr>
</tbody>
</table>

While Ronald Reagan Washington National Airport is located in the vicinity of the project area, and previous NEPA documents for other Federal actions on the National Mall considered flights a contributor to noise levels, the September 2004 Noise Compatibility Program Update report for the airport indicates that the project site is currently located outside of the airport’s higher noise exposure contours, but the site is still subject to noise attributable to flights in and out of the airport (Airports Authority, 2004).

The proximity to the Mall and adjacent Monuments and their associated recreational and special events, motorcades, police response, and emergency services also contribute to noise in the project area.
6.6.3 How would the project affect noise levels?

Impacts to noise were identified using the following criteria:

**No Effect** – Natural and existing sounds would prevail; noise generated by construction and operations would be infrequent or absent, mostly immeasurable.

**Not Significant Effect** – Noise levels would exceed natural and existing sounds, as described under no effect, but would not exceed applicable noise regulation.

**Significant Effect** – Noise levels would exceed applicable noise regulations on a temporary, short-term, or permanent basis or for a prolonged period of time.

**No Build Alternative**

Under the No Build Alternative, there would be no changes to the current site and background noise sources would remain the same. As a result, there would be no effects to the current noise levels on either a local or regional scale.

**Alternative 1 (Contextual Building Alignment)**

Under Alternative 1, the construction or the operation of the proposed NMAAHC would not significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 1 consists of a five-story structure of approximately 415,000 gsf.

**Noise from Construction**

Significant effects related to noise would not be expected during construction or once the Museum opens to the public. Short-term effects related to noise would be expected during construction. Noise producing project tasks such as trenching, pavement removal and replacement, and land clearing would occur, but the noise produced by these events would not be expected to last for prolonged periods, nor exceed applicable noise standards (See Appendix A).

**Noise from Museum Operations and Vehicular Transportation**

Significant effects would not be expected from museum operations or vehicular transportation. Once the NMAAHC becomes operational, noise from Heating, Ventilation, and Cooling (HVAC) equipment would be minimal. If on-site chillers are determined necessary, they would likely be screened to help reduce noise impacts, as well visual impacts. In terms of vehicular transportation, only three to four parking spots are to be provided at the NMAAHC and the use of an underground loading dock is expected. The majority of visitors are expected to use Metro. Those driving would use existing parking on the National Mall or nearby downtown. As such, additional noise related to vehicular transportation would be minimal.

**Noise Inside the NMAAHC**

The designer would be expected to consider the internal noise environment for all functional spaces within the museum. Sound attenuation surrounding any theatre(s), areas where large crowds assemble, or areas for study or reflection would be expected.
Alternative 2 (Washington Monument Orientation)
Under Alternative 2, the construction or the operation of the proposed NMAAHC would not significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 2 consists of a six-story structure of approximately 376,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

Noise from Construction/Demolition
Overall noise impacts resulting from the construction of the NMAAHC, as proposed under Alternative 2, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land and require similar building construction efforts. Implementation of Alternative 2 would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

Noise from NMAAHC Operations and Vehicular Transportation
Noise impacts resulting from the operation of the NMAAHC would also be similar to the impacts described under Alternative 1. Employee and visitor traffic would be expected to remain the same with most users relying on Metrorail and Metrobus for transportation. Additionally, if an on-site chiller were necessary, it would be expected to be the same size as a chiller used in Alternative 1. No significant effects are expected.

Noise inside the NMAAHC
Noise effects inside the NMAAHC would be similar to Alternative 1, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.

Alternative 3 (Free Form)
Under Alternative 3, the construction or the operation of the proposed NMAAHC, as described under Alternative 3, would not significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 3 consists of a seven-story structure of approximately 410,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

Noise from Construction/Demolition
Overall noise impacts resulting from the construction of the NMAAHC, as proposed under Alternative 3, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land and require similar building construction efforts. Implementation of Alternative 3 would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

Noise from NMAAHC Operations and Vehicular Transportation
Noise impacts resulting from the operation of the NMAAHC would also be similar to the impacts described under Alternative 1. Employee and visitor traffic would be expected to remain the same with most users relying on Metrorail and Metrobus for transportation. Additionally, if an on-site chiller were necessary, it would be expected to be the same size as a chiller used in Alternative 1. No significant effects are expected.

Noise inside the NMAAHC
Noise effects inside the Museum would be similar to Alternative 1, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.
**Alternative 4 (Terraced Roof)**

Under Alternative 4, the construction or the operation of the proposed NMAAHC would not significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 4 consists of a tiered six-story structure of approximately 385,500 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

**Noise from Construction/Demolition**

Overall noise impacts resulting from the construction of the NMAAHC, as proposed under Alternative 4, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land, and require similar building construction efforts. Implementation of Alternative 4 would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

**Noise from NMAAHC Operations and Vehicular Transportation**

Noise impacts resulting from the operation of the NMAAHC, as described under Alternative 4, would also be similar to the impacts described under Alternative 1. Employee and visitor traffic would be expected to remain the same with most users relying on Metrorail and Metrobus for transportation. Additionally, if an on-site chiller were necessary, it would be expected to be the same size as a chiller used in Alternative 1. No significant effects are expected.

**Noise inside the NMAAHC**

Noise effects inside the NMAAHC would be similar to Alternative 1, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.

**Alternative 5 (Enframing)**

Under Alternative 5, the construction or the operation of the proposed NMAAHC would not significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 5 consists of one six-story structure and one two story structure of approximately 430,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

**Noise from Construction/Demolition**

Overall noise impacts resulting from the construction of the NMAAHC, as proposed under Alternative 5, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land, and require similar building construction efforts. Implementation of Alternative 5 would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

**Noise from NMAAHC Operations and Vehicular Transportation**

Noise impacts resulting from the operation of the NMAAHC, as described under Alternative 5, would also be similar to the impacts described under Alternative 1. Employee and visitor traffic would be expected to remain the same with most users relying on Metrorail and Metrobus for transportation. Additionally, if an on-site chiller were necessary, it would be expected to be the same size as a chiller used in Alternative 1. No significant effects are expected.

**Noise inside the NMAAHC**

Noise effects inside the NMAAHC would be similar to Alternative 1, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.
Alternative 6 (Low Profile)
Under Alternative 6, the construction or the operation of the proposed NMAAHC, as described under Alternative 6, would not significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 6 consists of a four-story structure of approximately 350,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

Noise from Construction/Demolition
Overall noise impacts resulting from the construction of the NMAAHC, as proposed under Alternative 6, would be similar to those impacts described under Alternative 1. Both alternatives would affect approximately the same area of land and require similar building construction efforts. Implementation of Alternative 6 would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

Noise from NMAAHC Operations and Vehicular Transportation
Noise impacts resulting from the operation of the NMAAHC would also be similar to the impacts described under Alternative 1. Employee and visitor traffic would be expected to remain the same with most users relying on Metrorail and Metrobus for transportation. Additionally, if an on-site chiller were necessary, it would be expected to be the same size as a chiller used in Alternative 1. No significant effects are expected.

Noise inside the NMAAHC
Noise effects inside the Museum would be similar to Alternative 1, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.

Preferred Alternative
Under the Preferred Alternative, the construction or the operation of the proposed NMAAHC, as described under the Preferred Alternative, would not significantly affect noise levels given the abundance of noise that presently exists in the project area. The Preferred Alternative consists of an above ground structure between 60’-105’ tall with a total gross building area ranging from approximately 350,000 gsf to 450,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

Noise from Construction/Demolition
Overall noise impacts resulting from the construction of the NMAAHC, as proposed under the Preferred Alternative, would be similar to those impacts described under any one of the Alternatives 1 through 6. The Preferred Alternative would affect approximately the same area of land and require similar building construction efforts. Implementation of the Preferred Alternative would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

Noise from NMAAHC Operations and Vehicular Transportation
Noise impacts resulting from the operation of the NMAAHC would also be similar to the impacts described under any one of the Alternatives 1 through 6. Employee and visitor traffic would be expected to remain the same with most users relying on Metrorail and Metrobus for transportation. Additionally, if an on-site chiller were necessary, it would be expected to be the same size as a chiller used in Alternative 1. No significant effects are expected.

Noise inside the NMAAHC
Noise effects inside the Museum would be similar to Alternative 1, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.
Noise inside the NMAAHC

Noise effects inside the Museum would be similar to under any one of the Alternatives 1 through 6, with a designer considering the internal noise environmental for all functional spaces within the NMAAHC.

6.6.4 What measures are proposed to minimize noise effects during construction?

The District of Columbia Municipal Regulations (DCMR) Chapter 27 requires that noise levels from construction or demolition activities must not exceed 80 dBA at the boundaries of the construction/demolition site during daytime hours (i.e., 0700-1500 hours). From 3:00 p.m. to 7:00 a.m. the maximum noise level of 55 dBA shall apply (DCMR, 1979).

All construction activities associated with proposed alternatives would apply for and obtain all applicable permits to assure all planned construction complies with all noise limitations (DCMR, 1979). Occupational Safety and Health Administration (OSHA) standards for occupational noise exposure associated with construction (29 CFR 1926.52) would also be applicable.

Noise during the construction could be mitigated by confining activities to normal working hours, and by employing noise-controlled construction equipment to the greatest extent possible. Construction contractors would adhere to the District of Columbia requirements. Furthermore, arrival of heavy equipment and materials could be scheduled to occur during normal work hours to the greatest extent possible.
6.7 TRANSPORTATION

This section presents an overview of the existing and future transportation system serving the proposed NMAAHC site and the surrounding area. This assessment is based primarily on relevant information obtained through various document reviews, field observations and data analyses.

6.7.1 What are the Key Considerations for Traffic Assessment?

Key considerations for traffic assessment include: site location and accessibility, traffic operational and safety characteristics of the adjacent roadway network, future traffic forecasts including planned area land use changes, planned/programmed roadway improvements, projected site vehicular trip generation and traffic assignment, network evaluation, and mitigation of identified impacts.

6.7.2 How are traffic levels measured for the project?

The primary purpose of this assessment is to determine the potential traffic impacts of the Build Alternatives on the adjacent roadway network (consisting of three intersections), and to identify improvements needed to mitigate any identified impacts. To prepare this assessment, the following key tasks were undertaken:

- Undertook a field reconnaissance of existing roadway and intersection geometrics, traffic controls, speed limits and operations during the period April - May 2007;
- Performed morning and afternoon peak period turning movement counts at the project area intersections;
- Determined the existing levels of service (LOS) at the project area intersections;
- Developed background traffic forecasts for project build-out in 2012 based on existing counts, traffic generated by other planned developments, and traffic pattern changes as a result of roadway improvements (where applicable);
- Determined background LOS for the project area intersections based on background traffic forecasts and existing traffic controls;
- Estimated the AM and PM peak hour and daily trips that would be generated by the proposed development, including mode split assumptions;
- Projected the total future traffic volumes for project build-out in 2012 based on background future traffic forecasts and site traffic assignments; and
- Calculated total future (2012) LOS at the project area intersections based on total future traffic forecasts, existing and future traffic controls, and existing and future intersection geometrics.

Sources of information for this assessment include traffic counts conducted by Gorove/Slade; Institute of Transportation Engineers (ITE)’s Trip Generation, 7th Edition, data from the District Department of Transportation (DDOT), and the files/library of Gorove/Slade.

6.7.3 What are the existing traffic conditions?

The existing LOS/capacity analyses were based on: (1) the existing lane use and traffic controls; (2) the peak hour turning movement volumes; and (3) the Highway Capacity Manual 2000 (HCM) methodologies (using Synchro 6 software). Copies of the LOS calculation worksheets are included in Appendix E. The capacity analysis results for the existing traffic conditions indicate that all project area intersections operate at acceptable Levels of Service.
Roadways and Traffic

The NMAAHC site is situated on the National Mall within Northwest Washington, D.C. The site also falls within the National Monumental Core. Regional access to the site is served by the I-66 and I-395 freeway systems and several principal arterials that radiate from the city core to suburbs within Maryland and Virginia. Four roadways provide immediate site access. These are Constitution Avenue to the north, Madison Drive to the south, 14th Street to the east, and 15th Street to the west. In the immediate vicinity of the site, Constitution Avenue and 14th Street function also as major gateways to the District Downtown Area. The regional transportation system perspective is shown in Figure 6.7-1. The functional and service characteristics of the local access roadways are described below.

Constitution Avenue, Northwest (NW)

This is an eight-lane, two-way principal arterial running east-west along the northern frontage of the site. It is designated U.S. 1/50 east of 14th Street. West of 14th Street, it is U.S. 50 and connects directly with the I-66 freeway system. This avenue provides access to the site and a number of Federal buildings, museums and other visitor attractions. It therefore serves significant commuter and tourist traffic volumes. Curbside parking is provided along both sides of Constitution Avenue, with restrictions during the morning and afternoon peak periods. This roadway serves an Average Daily Traffic (ADT) volume of 32,700 vehicles per weekday in the vicinity of the site, with significantly lower volumes on weekends. The posted speed limit is 25 miles per hour (mph).

Fourteenth Street, NW

This is a seven-lane, two-way principal arterial running north-south along the eastern site frontage. South of Constitution Avenue, it is designated U.S. 1 and connects with the I-395 freeway system providing linkages to areas in Virginia. Fourteenth Street provides access to the site and several important land uses including museums, Federal buildings and visitor attractions. This facility is therefore a major commuter and visitor travel route. Parking is restricted along 14th street in the immediate vicinity of the site. This roadway serves an ADT volume of 37,200 vehicles per weekday, with substantially less volumes on weekends. The posted speed limit is 25 mph.

Fifteenth Street, NW

This is a four-lane roadway facility running north-south along the west side of the site. It is classified as a Principal Arterial by DDOT to the north of Constitution Avenue; and to the south, it is classified as a local park road by the National Park Service. Fifteenth Street provides access to the site and several important land uses including museums, Federal buildings and visitor attractions. Parking is restricted along 15th Street in the immediate vicinity of the site. This roadway serves an ADT volume of 9,000 vehicles per weekday, with fewer vehicles on weekends. The posted speed limit is 25 mph.

Madison Drive

This is a local two-lane, one-way westbound street situated south of the site. It is classified as a local park road by the National Park Service. Madison Drive traverses the Mall from Third Street to 15th Street and provides access to the Smithsonian Institution museums and the National Gallery of Art. No parking is permitted between 14th and 15th streets; however, the north side of this segment is provided with a lay-by for use by the D.C. Tourmobile. This facility currently serves an ADT volume of 8,000 vehicles per weekday. The posted speed limit is 15 mph.

The primary intersections providing immediate access to the site are as follows:

- Constitution Avenue at 14th Street, NW (signalized)
- Constitution Avenue at 15th Street, NW (signalized)
- 14th Street at Madison Drive, NW (signalized)
Figure 6.7-1 – Regional Transportation System

Legend

- The NMAAHC Site

Source: Mapquest, 2007
The 15th Street at Madison Drive NW intersection also provides immediate access to the site. This T-configured intersection is signalized, and the streets involved are classified as park roads under the jurisdiction of the National Park Service. Fifteenth Street is provided with two-lane northbound and southbound approaches; and Madison Drive is one-way westbound with two approach lanes. Therefore, the 15th Street at Madison Drive intersection has less vehicular conflict points, compared with the typical T- or 4-legged intersections providing two-way directional movements on all roadways. In addition, the ADT volumes served by 15th Street and Madison Drive are approximately 25 percent lower than those for Constitution Avenue and 14th Street which are classified as principal arterials. It is anticipated (as noted later in this study) that the museum would generate a low volume of passenger vehicle trips, and that these trips would use primarily Constitution Avenue and 14th Street to access the museum. Based on the above considerations, the evaluation of this intersection was not considered critical for assessing the potential traffic impacts of the museum on the surrounding roadway network.

Figure 6.7-2 shows the local area roadway network, and the lane configuration and traffic control characteristics of the key project area intersections.

**Intersection Levels of Service and Safety**

Level of Service (LOS) analyses were undertaken to determine the existing capacity and operational efficiency of the project area intersections during the weekday morning and afternoon peak hours. The Synchro 6.0 capacity analysis software was used and the base data input was obtained from morning and afternoon peak period traffic counts conducted at the project area intersections in May 2007. The counts included vehicular and pedestrian traffic volumes which were analyzed to determine the intersection LOS.

The term “Level of Service” is a qualitative measurement of traffic flow through an intersection or roadway link, in terms of average delay, speed, and travel time, freedom of maneuver, comfort and convenience. LOS is designated as A through F, representing the best and worst traffic conditions, respectively, based on average control delay (in seconds). For signalized intersections, Level of Service A is equivalent to an average delay of 10 seconds or less, whereas Level of Service F indicates an average delay greater than 80 seconds. Level of Service D/E is generally considered acceptable for major arterials within the Washington, D.C.

The existing LOS for the project area intersections included the existing roadway lane configuration, traffic control and peak hour vehicular and pedestrian traffic volumes. The analyses also included bus volumes. The LOS results are shown in Table 6.7-2 and calculation worksheets are included in Appendix A.

The LOS results show that the project area intersections currently operate without significant congestion and delay during the both the morning and afternoon peak hours. These findings are consistent with the field observations undertaken as part of this Tier I EIS process.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constitution Ave. at 15th St., NW</td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>Constitution Ave. at 14th St., NW</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Madison Dr., at 14th St., NW</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

The above LOS describe the operational efficiency of intersections situated along major arterials and serving higher traffic volumes, compared to the 15th Street at Madison Drive intersection. Based on this finding and other considerations noted above, it is concluded that the 15th Street at Madison Drive intersection also operates efficiently.
Figure 6.7-2 – Local Area Roadway Network

[Image of a map showing the local area roadway network with a highlighted site area.]

Source: DC Office of Zoning
Historical traffic accident data was obtained from DDOT to assess safety conditions at the project area intersections. The data covered the three-year period from 2003 to 2005. A summary of the key accident statistics is presented in Table 6.7.2 following.

Table 6.7-2: Accident Data Summary (2003 - 2005)

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Total</th>
<th>Accident Rate</th>
<th>Dominant Accident Type (Rear End)</th>
<th>Pedestrian Related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constitution Ave. at 15th St., NW</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td>33</td>
<td>0.75</td>
<td>9 (27%)</td>
<td>1</td>
</tr>
<tr>
<td>Constitution Ave. at 14th St., NW</td>
<td>35</td>
<td>38</td>
<td>39</td>
<td>112</td>
<td>1.57</td>
<td>34 (30%)</td>
<td>1</td>
</tr>
<tr>
<td>Madison Dr., at 14th St., NW</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>8</td>
<td>0.18</td>
<td>2 (25%)</td>
<td>0</td>
</tr>
</tbody>
</table>

Accident Rate = # of Accidents per Million Entering Vehicles

Vehicle Parking

Previous studies of visitation to the National Mall have shown that there are approximately 2,000 parking spaces within a convenient distance from the National Mall. The parking supply within the immediate area of the site is limited to metered on-street parking. Most are priced at $0.25 per 20-minute period with a two-hour maximum. Metered parking is available along Constitution Avenue, Madison Drive and Jefferson Drive. On Constitution Avenue, metered parking is provided along both sides of the roadway except during the peak periods and peak directions of flow (i.e., south side between 7:00 – 9:30 am; and north side between 4:00 – 6:00 pm). Outside of the 7:00 am to 6:30 pm period, weekday parking is free of charge. This area also contains a number of on-street spaces which are restricted to specific users that display a permitted decal associated with a government agency and therefore are not open to the general public.

In addition to the on-street public parking, 2,000 garage spaces are provided in the Ronald Reagan Building. Access is available via 13½ Street (off Pennsylvania Avenue) and via two entrances on 14th Street from 5:00 am until 2:00 pm.

Public Transportation

The site is situated within an area that is well served by public transportation systems. These include the Washington Metropolitan Area Transit Authority (WMATA) Metrorail and Metrobus systems with connections to other regional and national rail lines, as well as tourist-oriented transit services.

The WMATA Federal Triangle and Smithsonian Metrorail Stations, on the Orange and Blue Lines, are situated within a half-mile of the site. These rail lines connect with Union Station (via the Red Line), which serves as the terminus for the Maryland Rail Commuter Service (MARC), Virginia Railway Express (VRE) commuter service and the nationwide passenger rail system (Amtrak).

Several Metrobus routes run along Constitution Avenue (7 routes) and 14th Street (3 routes), with stops located next to the site. The Smithsonian/National Gallery of Art Loop of the D.C. Circulator system, provided by the DDOT Mass Transit Administration, runs from west to east along Constitution Avenue, with a stop located just east of 14th Street. The National Park Service Tourmobile also serves the site with routes along 14th Street, 15th Street and Madison Drive, in the vicinity of the site. Figure 6.7-3 shows the public transportation facilities and services.
Figure 6.7.3 – Public Transportation
Pedestrian and Bicycle Circulation

The site is surrounded by an extensive on-street sidewalk and off-street path network providing connections to the National Mall’s museums and monuments, downtown, and the nearby Metrorail stations. The sidewalks on the far side of 15th Street from the site, and the south side of Jefferson Drive, are both designated as bicycle routes and provide bicycle connections to the rest of the National Mall and the Potomac River. Marked crosswalks, curb-ramps, and pedestrian count-down timers help facilitate safer and more comfortable pedestrian crossings to the site at all four of its intersections.

Most pedestrians within the vicinity of the site appear to be tourists, with a large number of student groups. The dominant pedestrian flows occur east-west along Constitution Avenue as well as north-south along 14th and 15th Streets; which are key connections between downtown and the Metro stations and the museums and monuments on the National Mall.

Slug Lines

Slugging is a term used to describe a unique form of commuting within the Washington Metropolitan Area. Its uniqueness lies in that commuters stop to pick up passengers who are total strangers. However, this method of transportation is an organized system with its own set of rules and specific pick-up and drop-off locations and moves thousands of commuters daily, free of charge. The system of slugging operates as follows: a car needing additional passengers to meet the required three-person high occupancy vehicle (HOV) minimum pulls up to one of the designated slug lines and the driver either displays a sign indicating the destination of the car or simply calls it out; the slugs first in line for that destination then enter the vehicle and confirm the destination; the carpool then continues to the desired destination.

Currently, an afternoon slug line exists near the site at the intersection of 14th Street, NW and Constitution Avenue. Though the location name is 14th and Constitution, the line is actually located approximately 150 feet south of Constitution Avenue on the west side of 14th Street, NW, co-located with a bus stop. The slug line begins to form just prior to 4 pm and lasts to about 6 pm for destinations in the Springfield, VA area. Drivers are only allowed to pick up passengers in the southbound direction on 14th Street, NW.

Other Alternate Modes of Personal Transportation

It is assumed that alternative modes of transportation are and would remain available to supplement transit access to the site, as well as recreational use within the National Mall. Currently, there are 16 miles of multi-use trails within the National Mall and Memorial Parks which support pedestrians, bicycles, water transport/excursion and personal transportation vehicles. The Segway® HT is a new mode of personal transportation and is a motorized two-wheeled vehicle with a maximum speed of up to 12.5 miles per hour. Access for persons with disabilities by Segway® HT and electric scooters are available throughout the National Mall. All other uses of Segway® HTs or electric scooters would be considered as recreational use. Recreational use is restricted to specific north-south sidewalks crossing the National Mall. By specific revision of park policy, recreational Segway® HT riders may cross the National Mall on sidewalks adjacent to streets managed by the District of Columbia, including 3rd, 4th, 7th, and 14th Streets NW/SW.

Segway® HT rentals and tours of District sites are available through private companies. Segway® HTs are also allowed on the Metro during evening and weekend periods, as well as during midday off-peak hours.
In addition, the NPS has integrated the use of Segway® HTs for its staff and U.S. Park Police throughout their sites within the District to increase mobility while reducing transportation impacts on NPS resources.

**Tour buses**

Tour bus operations are concentrated within the National Mall between the Lincoln Memorial and the Capitol. Major routes through the project area are along Constitution Avenue NW and Independence Avenue SW, and the main access routes are New York Avenue NW, Pennsylvania Avenue NW, George Washington Memorial Parkway, I-66, Connecticut Avenue NW, Wisconsin Avenue NW, Arlington Memorial Bridge and South Capitol Street. Madison Drive NW and Jefferson Drive SW along the National Mall are used as drop-off areas (Figure 6.7-3). In addition, there are an estimated 300 tour bus spaces throughout the District of Columbia and at other visitor destinations such as Arlington National Cemetery and the National Cathedral (DDOT 2005). The Union Station garage provides tour bus parking in the central part of the city. Additional parking facilities are being developed at the old Convention Center site and at RFK Stadium.

### 6.7.4 How would the project affect traffic levels?

Total future peak hour levels of service were calculated based on: (1) existing lane use and traffic controls; (2) the total future traffic volumes; and (3) the HCM methodologies (using Synchro 6 software). Copies of LOS calculation worksheets are included in Appendix D. The capacity analysis results for the total future situation indicate that all project area intersections would operate at acceptable Levels of Service. The provision of additional mitigation (i.e., a pedestrian tunnel across 14th Street, NW connecting NMAAHC to NMAH) would provide a safe alternative for pedestrians.

This section evaluates the transportation impacts of each. This assessment also includes an evaluation of the cumulative effects of implementing each alternative and other planned area developments.

Impacts to transportation were identified using the following criteria:

- **No Effects** – No change to the current roadway network, traffic, parking, existing public transportation, or pedestrian or bicycle circulation.

- **No Significant Effect** – A change that would not:
  - alter roadway network and traffic beyond the current level of service;
  - reduce vehicular parking beyond current capacity;
  - produce excess demand on public transportation;
  - or reduce vehicular-pedestrian-bicycle safety

- **Significant Effect** – A change that would:
  - alter the roadway network and traffic beyond the current LOS;
  - reduce vehicular parking beyond current capacity;
  - produce excess demand on public transportation; or
  - reduce vehicular-pedestrian-bicycle safety
No Build Alternative

Roadways and Traffic
No effects are expected under the No Build Alternative, which would include background traffic growth. This is based on an assessment of the factors that could contribute to such growth, including regional land use changes and other developments planned for the immediate area within the District.

The effects of regional land use changes were determined by applying an annual growth factor of two percent to the study intersections onto the year 2012, as recommended by DDOT for planning purposes. Among the planned area developments listed below, only a few would have any reasonable traffic impacts with respect to the project area roadway network. These include:

- Relocation of the National Aquarium
- U.S. Peace Institute
- 14th Street Bridge Traffic Studies
- National Museum of American History expansion
- Vietnam Veterans Memorial Visitors Center
- American Veterans Disable Life Memorial
- Dwight D. Eisenhower Memorial
- Martin Luther King, Jr. Memorial
- City Center Action Agenda
- National Park Service Mall Access revision

Based on the locations of these developments within the National Monumental Core and their proximity to rail and bus transit services, it is expected that the greater proportion of trips associated with the developments would utilize walk and transit modes. The vehicular trips are also likely to be concentrated during the off-peak periods on weekdays. Therefore, vehicular trip generation and effects of those sites would not be significant. The background traffic forecast would be attributed to the regional growth assumption noted above. Analysis of the background traffic volumes do not indicate any significant changes from the existing LOS noted in Table 6.7.1.

Vehicular Parking
This alternative would have no effects on vehicle parking. Parking demand would not be increased within the immediate area of the site. The available on-street and structured parking supply would remain unchanged.

Public Transportation
The No Build Alternative would have no effects on public transportation. The existing bus and rail transit usage would not be increased within the vicinity of the site.

Pedestrian and Bicycle Circulation
Under the No Build Alternative, there would be no effect as pedestrian volumes and circulation would remain unchanged.

Alternative 1 (Contextual Building Alignment)
Under Alternative 1, the construction or the operation of the proposed NMAAHC would not significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions.

Roadways and Traffic
No significant effects on the project area roadway network and traffic would be expected from implementing Alternative 1.

The assessment of the potential traffic effects of this alternative was based on the morning and afternoon peak hour vehicular trips that would be generated by the NMAAHC itself, or as part of multi-purpose trips associated with visits to other adjacent attractions within the Monumental Core. The DDOT stipulates that trip estimates for planned land uses be based on trip rates recommended in the ITE Trip Generation document (ITE, 2004).
Trip estimates for museum facilities are not included in this document or in any other local or national publication. The projected vehicular trip generation for the NMAAHC was therefore derived from the projected annual visitor person trips (900,000), based on the following assumptions:

- Daily visitor person trips would constitute approximately 1.5 percent of the annual visitation
- AM peak hour trips would be quite minimal or negligible
- PM peak hour trips would constitute approximately 10 percent of the daily trips
- Peak hour modal splits would be approximately 10 percent (passenger vehicle), 25 percent (transit), 55 percent (walk) and 10 percent (other), based on NPS Visitor Transportation Survey findings (NPS, 2006).

It should be noted that while there are other sources of data available (i.e., Metropolitan Washington Council of Governments, DC Circulator and WMATA Metrobus and Metrorail), only the NPS study was used because it is comprehensive and specific to the transportation characteristics and needs of visitors to attractions in and around the National Mall/Memorial Core.

Based on the above considerations, the planned museum would produce a low volume of weekday peak hour vehicular trips. The expected trip distribution was determined based on information presented in the NPS Visitor Transportation Survey regarding where visitors stayed during their trips to the National Mall, the existing travel patterns and general familiarity with the District and the adjacent Maryland and Virginia suburbs. It is estimated that approximately 30 percent of the vehicular trips would generally approach from the north via 14th and 15th Streets, 20 percent from the east via Constitution and Independence Avenues, 25 percent from the south primarily via 14th Street and 25 percent from the west via Constitution Avenue. The vehicular trip generation would therefore be well distributed, minimizing effects on the project area roadway network. Intersection capacity analyses indicate that building the NMAAHC would not lower levels of service and would thus have no significant effects.

The effects from construction traffic and lane closures that would be associated with the NMAAHC construction would be temporary and not significant on the roadway network surrounding the site. As part of the construction permitting process, the contractor will comply with all applicable DDOT requirements. This would include the submission of a Public Space Permit Application along with the appropriate Traffic Control Plans to DDOT for their review and approval, prior to any lane closures. The Traffic Control Plans would be developed in accordance with the City’s recommended guidelines and standards (DDOT, 2006).

Parking
No significant effects on vehicle parking within the immediate project area would be expected from implementing Alternative 1. On-site parking would not be provided to visitors of the NMAAHC. The available parking supply surrounding the site, however, would adequately accommodate the NMAAHC demand. This is due primarily to the projection that a significant proportion of the visitors would walk and use transit to access the Museum. A large proportion of the walkers would park several blocks away from the site to visit other attractions along the National Mall and vicinity prior to visiting the NMAAHC. It is also anticipated that parking regulations would be implemented and enforced by the City on prevent adverse impacts on other roadway users, including transit.

Public Transportation
No significant effects on existing public transportation would be expected from implementing Alternative 1. The public transit systems in proximity to the project area that would be utilized to access the NMAAHC include the Federal Triangle and Smithsonian Metrorail
Stations, Metrobus services along the adjacent roadways, and tourist oriented services including those provided by the Tourmobile and inter-city buses. Field observations and reports from WMATA indicate that there are no existing capacity deficiencies and operational improvements could be made to accommodate increases in demand due to additional land use developments or special events within the area of the site and the National Mall. Funding for such improvements could be obtained through the Federal Surface Transportation Program, Urbanized Area Formula Grant, Transit Discretionary Program, Congressional Earmark, Congestion Mitigation Air Quality and other programs. However, it is not proposed within the scope of this project, or within this Tier I FEIS, that there will be any additional public transit services provided specifically to the NMAAHC.

The museum site is situated along Constitution Avenue (to the north) and 14th Street (to the east) which are major transit corridors. Construction activity could have short-term effects on transit operations, due to additional truck traffic associated with site excavation and other activities, and the potential closure of adjacent lanes and sidewalks. In order to mitigate these potential impacts, Traffic Control Plans would be developed and submitted to DDOT for their review and approval prior to implementing any measures that could likely have an impact on transit operations at and along Constitution Avenue and 14th Street. It is anticipated that these measures would include the restriction of construction truck traffic to weekday off-peak periods when bus transit frequencies are lower.

The museum is not expected to have any long-term effects on transit operations along the adjacent streets.

Pedestrian and Bicycle Circulation

No significant effects on the existing pedestrian and bicycle circulation and safety would be expected from implementing Alternative 1. Pedestrian activity at the adjacent intersections and sidewalks would increase significantly with the operation of the proposed NMAAHC. The majority of visitors would likely include pedestrians coming from the National Mall across both 14th and 15th Streets, and crossing Constitution Avenue at 14th and 15th Streets. These locations would likely experience increased vehicular-pedestrian conflicts, which could be addressed by enhanced signalization, signage and pavement marking improvements. Based on traffic accident data obtained from DDOT, it is noted that only two accidents involving pedestrians have occurred over the last three-year period for which data is available. These accidents occurred at Constitution Avenue and 14th Street. To mitigate any adverse impacts to pedestrian safety, the potential for an underground pedestrian tunnel across 14th Street connecting NMAAHC with NMAH is being considered.

In order to mitigate any short-term construction impacts to pedestrian and bicycle traffic flows, Traffic Control Plans would be developed and submitted to DDOT for their review and approval prior to implementing any measures that could likely have an impact on those traffic movements. Due to the existing and expected high volumes of pedestrian traffic in this area, and because the sidewalks will remain open to pedestrian traffic, efforts would be made to maintain safe pedestrian movements with measures including posting appropriate signage near the site to notify pedestrians and bicyclists and redirect them safely away from the construction area during the construction period. In addition, covered walkways around the site could be implemented during the construction period.

Slug Lines

The slug line is co-located with the bus stop located on the south side of 14th Street just south of Constitution Avenue. The Traffic Control Plans would include measures, such as appropriate work schedules and covered walkways to maintain the slug line operation safely during the construction period. Therefore the NMAAHC construction or operation would have no effects on the slug line operations.
Other Alternate Modes of Personal Transportation
Currently, Segway® HTs are permitted throughout the National Mall for use as a mobility aid for person with disabilities along with restricted recreational usage. This access would not be changed under any alternative.

Tour Buses
Numerous tour bus companies operate within the project area, in addition to several private sightseeing operators that provide hop-on and off services. The addition of the NMAAHC would increase the number of tour bus trips to the project area; however these additional trips would not have significant impacts. According to the District Office of Tourism and Promotions Tour Guide to Washington, approximately 32 long-term and four short-term parking spaces for tour buses are available within the immediate area of the site. The tour bus parking locations and regulations are summarized in the table below.

Table 6.7-3 Tour Bus Stops

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200-1300 block, D Street SW</td>
<td>10 spaces 4-hour limit</td>
</tr>
<tr>
<td>200 14&lt;sup&gt;th&lt;/sup&gt; Street SW</td>
<td>4 spaces 15-minute limit</td>
</tr>
<tr>
<td>1700 block Virginia Avenue NW</td>
<td>5 spaces 2-hour limit</td>
</tr>
<tr>
<td>200-400 block 15&lt;sup&gt;th&lt;/sup&gt; Street</td>
<td>10 spaces</td>
</tr>
<tr>
<td>1700-1900 block</td>
<td>7 spaces 2-hour limit</td>
</tr>
<tr>
<td>Total</td>
<td>36 Spaces</td>
</tr>
</tbody>
</table>

Tour bus would be accommodated on the curb lanes along 14<sup>th</sup> and 15<sup>th</sup> Streets and in the existing lay-by facility located along Madison Drive to the south of the museum site. The lay-by lane would also accommodate school and shuttle buses, automobiles, and taxis accessing the site. The use of the curb lanes along 14<sup>th</sup> Street would be restricted to the southbound direction during the off-peak periods when excess roadway capacity would be available to prevent any significant adverse impacts to through traffic movements.

Service Access
Service access and loading for the NMAAHC will be determined in the second tier NEPA process once more precise concept designs are generated. The concept designs will define a building orientation which will affect the placement of the service and loading access. The Smithsonian Institution will explore options different options for access including placing it underground.

For short term impacts, 15<sup>th</sup> Street would provide truck access for excavation activities. Field observations confirm that traffic volumes are considerably less along the adjacent segment of 15<sup>th</sup> Street compared with 14<sup>th</sup> Street that pedestrian crossing activity would be concentrated at the signalized intersections around the site. The truck access point would be located along the roadway tangent situated immediately south of Constitution Avenue; and the truck route would be to and from Constitution Avenue to minimize impacts on the park roads and all users.

Alternative 2 (Washington Monument Orientation)
Under Alternative 2, the construction or the operation of the proposed NMAAHC would not significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing this alternative would be the same as for Alternative 1 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.
Alternative 3 (Free Form)
Under Alternative 3, the construction or the operation of the proposed NMAAHC would not significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing this alternative would be the same as for Alternative 1 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.

Alternative 4 (Terraced Roof)
Under Alternative 4, the construction or the operation of the proposed NMAAHC would not significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing this alternative would be the same as for Alternative 1 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.

Alternative 5 (Enframing)
Under Alternative 5, the construction or the operation of the proposed NMAAHC would not significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing this alternative would be the same as for Alternative 1 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.

Alternative 6 (Low Profile)
Under Alternative 6, the construction or the operation of the proposed NMAAHC would not significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing this alternative would be the same as for Alternative 1 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.

Preferred Alternative
Under the Preferred Alternative, the construction or the operation of the proposed NMAAHC would not significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing the Preferred Alternative would be the same as for any one of the Alternatives 1 through 6 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.

6.7.5 What measures are proposed to minimize effects?
As part of the construction permitting process, the contractor will submit Traffic Control Plans to DDOT for their review and approval, prior to the implementation of any changes (lane or sidewalk closures, temporary truck access for site excavation, etc.). The Traffic Control Plans would include measures, such as appropriate work schedules and covered walkways, to maintain safe pedestrian and bicycle traffic flows, transit access and slug line operations along the adjacent sidewalks during the museum construction period. It is anticipated that the City Department of transportation would provide any signalization, signage, and pavement marking improvements required at the adjacent intersections to accommodate increased vehicular and pedestrian traffic resulting from the museum and other land use changes within the local area. Additionally, an underground pedestrian connection across 14th Street would also decrease pedestrian-vehicle conflicts. The service area access will be resolved in the second tier NEPA process for the NMAAHC. During this phase, concept designs will define a building orientation which will affect the placement of the service and loading access. In addition, the Smithsonian Institution will determine if operations such as service access can be shared with the NMAH and placed underground.
6.8 LAND USE PLANNING AND POLICIES

6.8.1 What are the key considerations related to land uses and policies in the project area?

During the processes of internal scoping, agency scoping and open sessions for public comment, several key issues related to land use were considered.

The land use analysis should:

- Consider additions and expansions to buildings within the larger project area including the NMAH, projects listed in the NCPC Federal Capital Improvements Plan, the 14th Street Bridge project, the City Center Agenda and the DOC Building.

- Address the location of the NMAAHC on the Washington Monument Grounds and why it should therefore not be considered an extension of the National Mall, or symmetrical to other areas of the National Mall. The difference between these areas is the landscape design of the Washington Monument and the McMillan Plan design of the National Mall.

- Not consider the McMillan Plan as a basis for this site selection because it was not implemented.

- Address the importance of locating the proposed NMAAHC site in the Monumental Core and recognize the open space layout of its setting.

- Take into consideration the numerous historic events that have impacted the site and designate which plan or event is most significant to the site planning process.

- Take into consideration the current location of the NPS tent on the site and address mitigating factors for relocating this structure (Berger, 2007b).

6.8.2 What plans and policies affect the planning of the project site?

Historical Plans

The NMAAHC site is on the Washington Monument Grounds, located on the National Mall. The United States' control of the original public reservation for the NMAAHC site was issued in 1791 but was never given a formal title and has never been used for a permanent structure since being acquired (Plexus Scientific Corporation and PageSoutherlandPage, 2005a). The site was approved for a new headquarters for the State Department in 1910, discussed as a potential site for the African American Museum during the 1990s and considered for the World War II Memorial in 1995 (NCPC, 2001).

The National Mall was originally designed by L'Enfant in 1791 as the "Grand Avenue" of the city. In 1902 the McMillan Plan, a continuation of the L'Enfant Plan, was submitted to Congress and included development of L'Enfant's "Grand Avenue." (Plexus Scientific Corporation and PageSoutherlandPage, 2005a). The McMillan Plan designated the placement of "scientific buildings and for great museums," on the Mall, reserving the north side for "museums and other buildings containing collections in which the public is generally interested, but not by Department buildings" (NCPC, 2004b). Both the L'Enfant and McMillan Plans designated the proposed NMAAHC site as a potential building site at the intersection of a proposed row of Monumental buildings north of the National Mall and the similar row of buildings proposed east of the Ellipse (Plexus Scientific Corporation and PageSoutherlandPage, 2005a). More information regarding historical plans and policies relating to the NMAAHC site can be found in Section 6.1, Cultural Resources of this document.
6.8.3 Contemporary Plans and Programs

The Comprehensive Plan for the Nation’s Capital, the Memorials and Museums Master Plan and the Monumental and Design Landscape Park Policies are used to guide development and programming of historic sites in the area. Among these documents, major guidelines for development include:

- “The preservation and maintenance of the Mall Complex, which includes the U.S. Capitol to the Lincoln Memorial and White House to the Jefferson Memorial, by considering the area to be essentially complete and that any improvements necessary should be limited in scope and sensitively designed”
- “The preservation of open space, recreation lands and the scenic quality of the Monumental Core”
- “To enhance the great cross-axes of the Mall and protect them from inappropriate development”
- “To use monumental parks and landscapes for public buildings, memorials, and to create special environments for limited activities”

In 1997, NCPC completed the Extending the Legacy Plan, which is current guiding document for the monumental core (a full list of the local plans and programs that affect planning in the project area can be found in Section 4.2). This Plan provides a framework that expands upon the L’Enfant Plan and the McMillan Plan, but it is distinguished from the latter because it does not propose a building on the NMAAHC site. Rather, the Plan favors preserving the open landscape of the Washington Monument Grounds.

6.8.4 What land uses currently exist in the project area and who manages these uses?

The five-acre public open space is a component of a much larger commemorative landscape that is designated as a parkland for a variety of uses, including recreation, special events, and celebrations. It is currently used for concessions, public gathering, and periodic demonstrations and is property of the United States, but maintained as a public recreational resource by the NPS. The parcel is designated as a Major Federal Tract by the District of Columbia Office of Zoning and is considered to be part of the Reserve or Commemorative Area under the National Mall Plan by the NPS National Capital Region Office of Lands, Resources, and Planning.

While the Commemorative Area designation is intended to discourage development and preserve the cross axis of the National Mall and Washington Monument reservation, Section 8 of the NMAAHC Act stipulates that the Commemorative Area designation will not apply with respect to the NMAAHC (see section 4.2.4 for more detailed information).

The NPS currently regulates land use on the site for recreation and a variety of activities, as found in the 36 CFR 7.96 (see Appendix A). The site has been used for staged protests and periodic demonstrations, public gatherings, speeches, athletic events, and a medi-vac helicopter landing site. Organized athletic events and demonstrations are allowed on the site per 36 CFR 7.96 (Plexus Scientific Corporation and PageSoutherlandPage, 2005a).

The NMAAHC site is broken into smaller spaces by groupings of trees at the northeast corner of 14th Street and Constitution Avenue, NW, and southeast corner of Madison Drive and 14th Street. Eight benches, twenty feet apart, line the eastern edge of the five-acre site while five benches line the northern edge. Sidewalks surround the site on all four sides and two intersect the site in its northeastern quadrant, one going northeast/southwest and the other going northwest/southeast. The slug line is co-located with the bus stop located on the south side of 14th Street just south of Constitution Avenue (see Section 6.7.3- Transportation). A temporary tent at the southwest corner of the site, owned by the NPS and operated as a concessions venue for the National Mall and Washington Monument, has been approved for relocation by the NPS (see Figure 6.8-1 for an aerial image of the proposed NMAAHC site).
Figure 6.8-1  Aerial image of the NMAAHC site

Legend

The NMAAHC Site

Source: Google Earth
Land Use and Zoning
The NMAAHC site is located in Ward 2 of Washington, D.C., which includes the National Mall, Haines Point, and a portion of the Potomac River. Ward 2 is bounded by Glover Archbold Park to the west; Whitehaven Park, Dumbarton Park, Rock Creek Park, U Street, NW and S Street, NW to the north; New Jersey Avenue, 6th Street, and Pennsylvania Avenue to the east; and the I-395 Southwest Freeway and the Potomac River to the South. Its eastern boundary extends to include part of the Capitol and its grounds (D.C. ANC, 2007).

National Mall Historic District
The National Mall Historic District comprises monuments, museums and the Mall (see Figure 6.8-2). This entire district is zoned Government with public open space and civic/institutional land uses. Buildings in this district include the National Museum of American History, the NMNH, the National Sculpture Garden, the National Gallery of Art East and West buildings, the National Museum of the American Indian, the National Air and Space Museum, the Hirshhorn Museum and Sculpture Garden, the Arts and Industries Building, the Smithsonian Castle, the Dillon Ripley Center, the Freer Gallery, the Sackler Gallery, the National Museum of African Art, and the U.S. Department of Agriculture.

Federal Triangle Historic District
Directly north of the site is the Federal Triangle Historic District. This area is bounded by Pennsylvania Avenue, Constitution Avenue, NW, and 15th Street (see Figure 6.8-2). The entire district is zoned Government with civic/institutional land uses. Major buildings within this district include the Ronald Reagan Building, the National Aquarium and DOC, the Interstate Commerce Commission, the District Building, the Federal Trade Commission, the U.S. EPA, the Internal Revenue Service, the Department of Justice, the National Archives, the White House Visitor Center, the Old Post Office Building, and the U.S. Post Office Department.

The Federal Triangle Historic District is located within a larger geographical context, north of the NMAAHC site, known as the Pennsylvania Avenue National Historic Site. This area is bounded by Pennsylvania Avenue, Constitution Avenue, NW, 3rd Street, E Street, G Street, F Street, East Executive Avenue, and 15th Street. Zoning within the Pennsylvania Avenue District, not including the Federal Triangle District, includes Government, commercial, commercial/retail, sparse residential, and mixed use (see Figure 6.8-3).

Buildings in this district include the Department of Treasury, the Department of Commerce (Federal Triangle), the District Building (Federal Triangle), the Federal Trade Commission (Federal Triangle), the Internal Revenue Service (Federal Triangle), the Department of Justice (Federal Triangle), the Labor Department-Interstate Commerce and Departmental Auditorium (Federal Triangle), National Archives (Federal Triangle), the Old Post Office Building (Federal Triangle), the U.S. Post Office Building (Federal Triangle), the U.S. District Court House, the Canadian Embassy, the Municipal Center, the Court House, the U.S. Navy Memorial and Naval Heritage Center, the Federal Bureau of Investigation, the House Where Lincoln Died, the White House Visitor Center, Ford's Theatre National Historic Site, the International Spy Museum, the American Art Museum and National Portrait Gallery, and the National Building Museum.

Seventeenth Street Historic District
Northwest of the NMAAHC site is the Seventeenth Street Historic District. This area is bounded by 17th Street, E Street, 18th Street, and Constitution Avenue, NW Zoning in this district is residential with commercial land use (see Figure 6.8-3). Buildings in this district include the Corcoran Gallery of Art, the Pan American Union, the DAR Memorial Constitution Hall and the American National Red Cross.
The Seventeenth Street Historic District is located within the Northwest Rectangle Historic District, also northwest of the NMAAHC site. This area is bounded by Constitution Avenue NW, 17th Street, 23rd Street, F Street and Eye Street. Zoning in this district, not including the Seventeenth Street Historic District, Government, residential, commercial and civic/institutional land uses. R-5-D residential zoning includes medium- to high-density development of single family dwellings, flats and apartment buildings. R-5-E residential zoning includes high-density development of single family dwellings, flats and apartment buildings.

Southwest and south of the NMAAHC site is the West Potomac Park Historic District. This area is bounded by 17th Street, Constitution Avenue NW, the Potomac River and Rock Creek Parkway, and Maine Avenue (see Figure 6.8-2). Zoning in the entire district is Government, with public open space land use. Major buildings and landmarks in this district include the Tidal Basin, the Lincoln Memorial grounds, the WWI Memorial, the Jefferson Memorial grounds, Constitution Gardens, the Franklin Delano Roosevelt Memorial, the Reflecting Pool and West Potomac Park. Please refer to Figure 6.8-3 for an image of existing zoning and Figure 6.8-2 for an image of existing land use of the NMAAHC site and project area.

East of the NMAAHC site are the National Museum of American History, the National Museum of Natural History, the National Gallery of Art (East and West buildings), the National Sculpture Garden and the U.S. Capitol Building. Southeast of the site are the United States Department of Agriculture, the Freer Gallery, the Smithsonian Institution Castle, the Dillon Ripley Visitor Center, the Arts and Industries Building, the Hirshhorn Museum and Sculpture Garden, the Sackler Gallery, the National Museum of African Art, the National Air and Space Museum and the National Museum of the American Indian. South of the site are the U.S.D.A. Forest Service Museum, the United States Holocaust Memorial Museum and the Bureau of Engraving and Printing. Southwest of the site are West Potomac Park, the Franklin Delano Roosevelt Memorial, the Tidal Basin, the Thomas Jefferson Memorial, and the Washington Monument. West of the site are the Organization of American States Annex, the Department of the Interior South, the Federal Reserve Board, the National Academy of Science and Engineering, the American Pharmaceutical Institute, the National Mall, Constitution Gardens, the Reflecting Pool, and the Lincoln Memorial. Northwest of the site are the Ellipse, the White House, the Corcoran Gallery of Art, the Daughters of the American Revolution/Constitution Hall, and the Organization of American States. North of the site are the Department of Commerce, the National Aquarium and Pershing Park. Northeast of the site are the Federal Trade Commission, the National Archives, the Department of Justice, the Internal Revenue Service, the Old Post Office Tower, and the Ronald Reagan Building and International Trade Center. Approximately all of the aforementioned sites and locations are within a one mile radius of the NMAAHC site.
Figure 6.8-2 Existing Land Use of the NMAAHC site & study area
Figure 6.8-3: Existing Zoning of the NMAAHC site & study area
6.8.5 How will land use change because of this project?

Chapter 2.3.2 of this Tier I FEIS describes the site selection process for the proposed action. In short, the site was selected as a result of a process detailed in Section 8 of the NMAAHC Act titled “Building for the National Museum of African American History and Culture.” This section of the Act directed the Smithsonian Board of Regents to choose among four identified sites and mandated that the four potential sites remain available and that the Federal agency having administrative jurisdiction over the site which was selected transfer that jurisdiction to the Smithsonian Institution as soon as practicable. On January 30, 2006, the Smithsonian Board of Regents selected the Monument site. On June 1, 2007, transfer of administrative jurisdiction of the site was passed from the National Park Service to the Smithsonian Institution.

As a result, the Smithsonian Institution and the National Park Service have entered into an agreement whereby the National Park Service will continue to operate the site as a public recreational resource and parkland through 2010 or until construction of the NMAAHC commences, whichever comes first (see Appendix B). As stated in the agreement, the NPS Park Police will be responsible for law enforcement activities at the Monument Site but will not be responsible for any temporary structures erected by the Smithsonian Institution on the site, be it maintenance or contents. The NPS will regulate use of the NMAAHC site pursuant to the applicable regulations contained in 36 CFR 7.96, including the processing of special events and demonstrations. NPS shall be responsible for the general maintenance of the site, except for any Smithsonian Institution structures or facilities on the site. NPS will continue to operate the concession facility located on the Monument Site but will discontinue operation when the concession is relocated to another location on the National Mall, or December 31, 2010 when the Smithsonian Institution begins construction of the Museum, whichever comes first. The Smithsonian Institution agrees that it will not establish a general food and beverage concession on the NMAAHC site while the Concession Facility is operating (see Appendix B).

Impacts to land use were identified using the following criteria:

- **No Effects** indicates that no change in current land use conditions would be expected.
- **No Significant Effect** indicates that a change in land use would not be expected to affect the context or intensity of the land use.
- **Significant Effect** indicates that a change in land use would be expected to affect the context or intensity of the land use.

**No Build Alternative**
The No Build Alternative would result in the continuation of the current management of the NMAAHC site as parkland with no changes. Under this alternative, the NMAAHC would not be built and essentially the status quo would be maintained. The existing land use for concessions and periodic demonstrations would continue, as would basic landscape maintenance.

**Alternative 1 (Contextual Building Alignment)**
Under Alternative 1, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

**Short Term Impacts**
During construction, the land use of the NMAAHC site would not accommodate public or recreational use. In addition, the on site concessions would no longer be available and would be moved to another location within the project area. Once the NMAAHC is operational, concessions would be available on site.

Although the NMAAHC site would not be available for recreational use, significant, adverse, or direct effects are not expected during construction of Alternative 1 due to the abundance of adjacent recreational space and concessions available on the National Mall. No significant effects on surrounding land use would be expected during the construction phase of the project.
The slug line that is co-located with the bus stop located on the south side of 14th Street just south of Constitution Avenue would not be affected by the NMAAHC construction.

Long Term Impacts
Once construction commences, the sidewalks, footpaths, and benches currently on the NMAAHC site would be permanently removed. The existing mature trees would remain to the extent possible, as the range of Alternatives has been designed to accommodate their preservation. Nevertheless, the remaining trees on site would be permanently removed.

Following construction, the land use of the NMAAHC site would continue to be designated for public use and the Smithsonian Institution would be responsible for the operation and maintenance of the building and its grounds. Large scale public demonstrations would no longer be permitted on the site as a result of the proposed action, although aspects of the NMAAHC indoor and outdoor program will allow for public gatherings. Significant, adverse, or direct effects would not be expected following construction of Alternative 1 due to the abundance of adjacent recreational space available on the National Mall. Nevertheless, the construction of a permanent facility will provide a long term beneficial impact by ensuring that the land use of the site is preserved in perpetuity for prominent public use, continuing the symbolism of the site within the context of the National Mall as described in Section 6.1 Cultural Resources.

The planned construction and operation of a building on the project site is in compliance with land use designations and zoning, and any future construction of the museum would comply with all applicable local regulations in the area. The plot would remain designated as a Major Federal Tract by the D.C. Office of Zoning. The outdoor programmed space on the south side of the museum will be available to the public, but not in the same capacity as the existing condition of the site.

Alternative 2 (Washington Monument Orientation)
Under Alternative 2, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

Alternative 2 contains the same characteristics as Alternative 1 with the exception of the outdoor programming area, which would be positioned on the southwest side of the museum for this design. The effects from implementing Alternative 2 would be expected to be the same as Alternative 1 since the land use is identical.

Alternative 3 (Free Form)
Under Alternative 3, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

Alternative 3 contains the same characteristics as Alternative 1 with the exception of the outdoor programming area, which would be positioned on the northwest side of the museum for this design. The effects from implementing Alternative 3 would be expected to be the same as Alternative 1 since the land use is identical.

Alternative 4 (Terraced Roof)
Under Alternative 4, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

Alternative 4 contains the same characteristics as Alternative 1 with the exception of no outdoor programming area and a larger setback from Constitution Avenue, NW. The effects from implementing Alternative 4 would be expected to be the same as Alternative 1 since the land use is identical.

Alternative 5 (Enframing)
Under Alternative 5, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.
Alternative 5 contains the same characteristics as Alternative 1, with the exception of the outdoor programming area, which would be positioned in between the two structures of the museum. The effects from implementing Alternative 5 would be expected to be the same as Alternative 1 since the land use is identical.

**Alternative 6 (Low Profile)**
Under Alternative 6, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

Alternative 6 contains the same characteristics as Alternative 1 with the exception of the outdoor programming area, which would be positioned on the northwest side of the museum for this design. The effects from implementing Alternative 6 would be expected to be the same as Alternative 1 since the land use is identical.

**Preferred Alternative**
Under the Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

The Preferred Alternative contains the same characteristics as Alternative 1 with the exception of the positioning of the outdoor programming area. This area would be in the southwest or northwest side of the museum or in between two structures, depending on the option that would best provide the required space for NMAAHC programs and activities. The effects from implementing the Preferred Alternative would be expected to be the same as Alternative 1 since the land use is identical.

**What measures are proposed to minimize effects to land use during museum construction and operation?**
The potential loss of landscape features and vegetation could be mitigated by providing landscape design and an outdoor programmed area that enhances the adjacent open space of the Monument Grounds and Mall.

The loss of a public space for large scale gatherings and demonstrations will be mitigated by providing outdoor space on the grounds of NMAAHC (except for Alternative 4) that is open to the public and supports a range of programmed activities. However, the specificity of activity or degree of enhancement to the NMAAHC and the National Mall will be determined in the design phase of the project.

Relocation of the NPS concessions tent could be mitigated if the programming for the museum allows for a concession area. NPS will continue to operate the concession facility located on the Monument Site but will discontinue operation when the concession is relocated to another location on the National Mall, or December 31, 2010 when the Smithsonian begins construction of the Museum, whichever comes first. The Smithsonian Institution agrees that it will not establish a general food and beverage concession on the Monument Site while the Concession Facility is operating (Agreement between the Smithsonian Institution and the United States Department of the Interior National Park Service, 2007). Relocation of the medi-vac site could be transferred to adjacent Washington Monument property or another designated property.
6.9 VISITOR USE & EXPERIENCE

6.9.1 What are the key considerations related to visitors to the Smithsonian Institution and the National Mall?

Key considerations related to visitor use and experience as it relates to the Smithsonian Institution and National Mall include accessibility, convenience, visiting hours, time required for visitation, prices, exhibitions and special programs, and special events.

**Accessibility/Parking**

Access to parking, Metro and other public transportation has a substantial correlation with museum attendance. In Washington, D.C., off-street parking is not widely available, and many visitors who drive to the Mall must resort to parking garages. Limited two hour parking is available on Constitution Avenue at 15th Street and on city streets during non-rush hour times.

Long-term parking is available along Ohio Drive under the 14th Street Bridge. Section 6.7 Transportation provides additional information. However, with limited long-term and inexpensive parking in low supply, convenience to Metro is of high importance to museum visitors. Nearly half of all the District’s museum visitors access their destination by Metro (Anderson, 2006).

**Convenience to Metro and other public transportation**

The site of the NMAAHC is less than ½ mile from the Smithsonian Metro station serving the Blue and Orange lines, with two entrances located at 12th Street at Jefferson Drive SW (The Mall entrance) and the SW corner 12th Street & Independence Avenue SW, respectively. The ½ mile walking distance takes an average person approximately seven to 15 minutes.

The Circulator bus also offers convenient service to Smithsonian Institution museums in a loop along Constitution Avenue, 4th Street, Independence Avenue, and 17th Street. Section 6.7 Transportation provides additional information on public transportation.

**Convenience to snacking/eating opportunities**

The site for the NMAAHC currently has one food cart and one souvenir cart along Constitution Avenue, in addition to a concession tent with tables, benches, and restroom facilities, operated by NPS. An informal survey of the existing adjacent Smithsonian Institution museums (National Museum of Natural History, National Museum of American History, National Air & Space Museum, Sackler, Freer, Arts & Industries, Hirshhorn, Smithsonian Castle, National Museum of African Art, and the National Museum of the American Indian) showed an average of two food carts and one souvenir cart per museum on the Constitution Avenue side. The Madison Drive side generally only featured fixed concession stands or smaller, specialty carts either on the property of the respective museum, or on the National Mall. There are fewer carts per museum on the south side of the Mall, for museums located between Jefferson Drive, SW and Independence Avenue, SW. In addition, six Smithsonian Institution museums have cafes, restaurants, and snack bars. Section 6.10 Communities and Businesses provides additional information on businesses in the project area.

**Visiting hours and queuing times**

With so many attractions at the National Mall and other sites of interest in and around Washington, D.C., one of the key considerations for visitors is museum opening hours and queuing times. There are minimal waiting times to enter Smithsonian Institution museums due to security. Depending on visitor demand and in order to handle crowds and maximize visitor experience, some museums utilize timed visits. The Washington Monument, for example, requires visitors to obtain timed tickets that must be reserved in advance through the NPS. The Holocaust Museum also restricts visitors through a timed-entry pass. In the initial years of operation, the NMAI also utilized a timed-entry pass method to manage visitation.

On average, museums in Washington, D.C. are open 6.1 days per week for an average of 6.8 hours per day (Anderson, 2006). Some museums offer special nighttime opening hours either one or more
days of the week, with many museums opening their facilities to private functions. Only 17 percent of museums in Washington, D.C. have opening hours past 7 pm (Anderson, 2006). The most well-known examples museums with extended opening hours (varied by season) are the National Museum of Natural History (Jazz Café), the National Museum of American Art, and the National Portrait Gallery.

**Approximate visitation time per museum**

With so many attractions in Washington, D.C. and on the National Mall, visitors would be concerned with the amount of time it takes to visit all or most of the exhibits in the museum. Theoretically, it takes more time to go through all the exhibits in any given museum during peak hours (usually mid-day to afternoon).

**Prices (of expenses besides museum entrance)**

All of the museums on the Mall offer free admission to visitors; the only museum in the immediate vicinity of the project area that anticipates charging a fee is the Newseum, which is not on the Mall, but across from the National Gallery at 6th Street NW and Pennsylvania Avenue NW. The main concern with visitors to the museum is prices of other services such as food/meals, souvenirs, gifts, and the cost of transportation to and from the museum. For the Smithsonian Institution as a whole, the sales of movie tickets, food and souvenirs have been rising rapidly. In 2004, Smithsonian Institution museums made $26.7 million in profits which comprises almost half of the Smithsonian Institution’s total unrestricted funds. This shows that museum shopping opportunities are important to visitors, and continue to be a lucrative market for the Smithsonian Institution.

**Exhibitions and (Special) Programs**

Many visitors to the Smithsonian Institution museums come to see specific programs or exhibits. According to the 2004 *Smithsonian-wide Survey of Museum Visitors* (Smithsonian, 2004), the five aspects that visitors consider most important to their experience include:

- seeing the “real thing”
- opportunities to learn something
- pride in country
- feeling awe and wonder
- activities for families and kids

Also important for ethnic minority groups is that the museum exhibitions are of personal relevance to them, and 54 percent of visitors from ethnic minority groups rated current museum offerings (in 2004) as superior or excellent compared to 62 percent of the white population. This statistic indicates that visitor experience for minority groups is not rated as high as for the white population for cultural and ethnic relevance. Due to this discrepancy, the Smithsonian Institution is challenged with finding ways to better serve minority communities through its museums, exhibits, and special programs.

**Special Events**

There are several special events occurring on the Mall throughout the year, the most well known of which is the 4th of July celebrations which is a one-day event. Other one to several day events include:

- Cinco de Mayo Festival (Latin American Family Reunion), May
- National Book Festival, September/October
- World Children’s Festival, June
- Folklife Festival, June/July
- Cherry Blossom Festival, April
- Black Family Reunion on the Mall, September
- Art Night at the Sackler and Freer Galleries of Art, and sometimes the African Art and Hirshhorn Museum, Thursday evenings in the summer months.

These events draw a large number of visitors, and would likely attract additional visitors to the museum than would normally be expected on a day when there is no special event on the National Mall.

The NMAAHC site is an open recreational space adjacent to the Mall that has been used for concessions, staged protests, periodic demonstrations, public gatherings, speeches, athletic events.
Organized athletic events and demonstrations are permitted on the site by the NPS per 36 CFR 7.96 (see Appendix A). Section 6.8 Land Use Planning & Policies provides more detailed information on the existing land use on the site and Section 6.1 Cultural Resources provides more detail on the historical use of the site for large scale demonstrations and public events.

6.9.2 How were visitor numbers and characteristics evaluated for this project/visitor projections?

The methodology for evaluating visitor projections included a two-fold process. First, similar American subject museums for minority groups and their visitor representation were used to generate assumptions for the visitation of the NMHAAC for the first year. In this case, the NMAI was used as a point of reference for a museum with a similar focus on a specific culture. Secondly, the NPS Public Use Statistics Office for the National Capital Parks, Central database was used to analyze annual and monthly visitorship to the National Mall and Memorial Parks.

<table>
<thead>
<tr>
<th>Smithsonian Museum</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Museum of African Art</td>
<td>179,000</td>
<td>179,000</td>
<td>170,000</td>
<td>165,000</td>
<td>158,000</td>
<td>211,000</td>
</tr>
<tr>
<td>National Museum of American History</td>
<td>5,200,000</td>
<td>4,200,000</td>
<td>2,600,000</td>
<td>2,900,000</td>
<td>3,000,000</td>
<td>2,400,000</td>
</tr>
<tr>
<td>National Museum of the American Indian</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>820,000*</td>
<td>2,200,000</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Anacostia Museum</td>
<td>N/A</td>
<td>31,000*</td>
<td>29,000</td>
<td>22,000</td>
<td>25,000</td>
<td>46,000</td>
</tr>
<tr>
<td>Smithsonian Institution, Total Visits**</td>
<td>31.7 million</td>
<td>26.3 million</td>
<td>24.0 million</td>
<td>20.4 million</td>
<td>24.0 million</td>
<td>23.2 million</td>
</tr>
</tbody>
</table>

*Indicates first year of operation  
**Total number represents visitors to all Smithsonian Institution museums.

**Smithsonian Institution Visitation**

The National Mall and Smithsonian Institution draws millions of visitors each year. In 2006, there were 23.2 million visits to all of the museums of the Smithsonian Institution, down from a high of 31.7 million visits in 2001. The year with the lowest visitorship in this timeframe was in 2004, where there were a total of 20.4 million visitors. During this period, the only museum of the sample that had an increase in the number of visitors was the National Museum of African Art. Despite this, overall visits to Smithsonian Institution museums have increased slowly at an average rate of 2.1 percent. Table 6.9-1, shows the general visitation trends for several Smithsonian Institution Museums, including total visits for all Smithsonian Institution facilities (Smithsonian, nd).
Visitor Projections/Visitor Demand

To project the number of visitors that could be expected for the first year of operations of the NMAAHC, the following assumptions were made:

- The NMAI was used for comparison to generate first and second year visitor projections for NMAAHC because it is the most recent museum on the National Mall to open of both similar size and focus on a specific culture.\(^1\) In its first full year of operations (2005), the museum experienced 2.20 million visits\(^2\), and in 2006, the museum experienced 1.60 million visits (Smithsonian nd.) – a 27 percent decrease.

- The first year of NMAAHC operations would see a high number of visitors due to the newness factor, and then would likely experience a decrease in the following year (year 2), similar to what NMAI experienced.

- This would be followed, after year two, by a period of leveling out, and/or a pattern of growth and natural fluctuation, similar to the trend Smithsonian Institution museums experienced on the whole - an average increase of 2.1 percent per year from 1970 to 2006 (Smithsonian, nd).

Visitor projections were based on the assumptions above. NMAI visitorship in 2006 was used as the year one baseline (2.2 million). From 2005 to 2006, NMAI experienced a 27 percent decrease in visitorship. A similar decrease in visitorship could be expected for NMAAHC from year 1 to year 2. After year 2, fluctuation in visitor use would likely slow, with average annual visitation changing by a smaller (2.1) percentage each year. Table 6.9-2 shows the projected visitor numbers for NMAAHC, using NMAI visitorship as the model.

Table 6.9-2 Projected Year 1-10 Visitorship to NMAAHC

<table>
<thead>
<tr>
<th>Year after Opening</th>
<th>Projected Visitorship*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>2.20 million</td>
</tr>
<tr>
<td>Year 2</td>
<td>1.61 million</td>
</tr>
<tr>
<td>Year 3</td>
<td>1.64 million</td>
</tr>
<tr>
<td>Year 4</td>
<td>1.67 million</td>
</tr>
<tr>
<td>Year 5</td>
<td>1.71 million</td>
</tr>
<tr>
<td>Year 6</td>
<td>1.75 million</td>
</tr>
<tr>
<td>Year 7</td>
<td>1.78 million</td>
</tr>
<tr>
<td>Year 8</td>
<td>1.82 million</td>
</tr>
<tr>
<td>Year 9</td>
<td>1.86 million</td>
</tr>
<tr>
<td>Year 10</td>
<td>1.90 million</td>
</tr>
</tbody>
</table>

*Projected visitorship is based on initial visitorship to the NMAI and the overall rate of visitorship since 1970. This is an estimate only. No formal visitor use study for the proposed NMAAHC has yet been completed.

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\(^1\) Although the NMAI at the National Mall is one of three facilities that include The George Gustav Heye Center, in New York City; and the Cultural Resources Center in Suitland, Maryland, only the NMAI facility at the National Mall is considered in this discussion.

\(^2\) The NMAI opened in September 2004 and had 820,000 visitors through December 31, 2004 (Smithsonian, 2004).
6.9.3 What are the visitor demographics/characteristics of visitors to the Smithsonian Institution Museums?

According to the results of the 2004 Smithsonian-wide Survey of Museum Visitors (Smithsonian, 2004), the Smithsonian Institution received a total of 20.4 million visitors. Of these, only seven percent, or approximately 1.4 million, identified themselves as African Americans. If visitor numbers continue to increase, Smithsonian Institution museums could expect to continue to see similar levels of visitation increase among African Americans. Three percent of visitors, or 612,000, identified themselves as “other”. Table 6.9-3 summarizes the visitor demographics to Smithsonian Institution Museums in 2004.

<table>
<thead>
<tr>
<th>Geographic</th>
<th>Education Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 90% from the US:</td>
<td>• Among individuals over age 25:</td>
</tr>
<tr>
<td>‒ 26% from the Southeast,</td>
<td>‒ 31% bachelors degree</td>
</tr>
<tr>
<td>‒ 17% from the Mid Atlantic,</td>
<td>‒ 42% graduate of other professional degree</td>
</tr>
<tr>
<td>‒ 15% from the District,</td>
<td>‒ 12% 1 or more years of college</td>
</tr>
<tr>
<td>‒ 12% from the Midwest,</td>
<td>‒ 7% associate degree</td>
</tr>
<tr>
<td>‒ 9% from the West,</td>
<td>‒ 9% high school</td>
</tr>
<tr>
<td>‒ 8% from the Mountain states, and</td>
<td></td>
</tr>
<tr>
<td>‒ 3% from New England.</td>
<td></td>
</tr>
<tr>
<td>• 10% International</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Group Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 52% male</td>
<td>• 19% of visitors come with parents or relatives</td>
</tr>
<tr>
<td>• 48% female</td>
<td>• 8% come as part of a school group</td>
</tr>
<tr>
<td></td>
<td>• 14% visited alone</td>
</tr>
<tr>
<td></td>
<td>• 40% come with other adults</td>
</tr>
<tr>
<td></td>
<td>• 40% are adults with children/teens</td>
</tr>
<tr>
<td></td>
<td>• 7% come with friends/other adults/etc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnic/Race</th>
<th>First Time Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 9% Hispanic or Latino</td>
<td>• 40% - Visitors to American subject matter and science museums make up a large proportion of this group (rather than art museums)</td>
</tr>
<tr>
<td>• 74% White</td>
<td></td>
</tr>
<tr>
<td>• 7% Black</td>
<td></td>
</tr>
<tr>
<td>• 7% Asian</td>
<td></td>
</tr>
<tr>
<td>• 3% other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Repeat Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Average age of visitors is 37 years old:</td>
<td>• 60% are repeat visitors,</td>
</tr>
<tr>
<td>‒ 37% 39 to 58 years old,</td>
<td>• Of which, 32% of adults had visited before the age of 18.</td>
</tr>
<tr>
<td>‒ 24% 28 to 38 years old,</td>
<td></td>
</tr>
<tr>
<td>‒ 30% 12 to 27 years old,</td>
<td></td>
</tr>
<tr>
<td>‒ 9% 59 years or older.</td>
<td></td>
</tr>
</tbody>
</table>

Smithsonian 2004

Table 6.9-3 2004 Visitor Demographics, Smithsonian Institution Museums
6.9.4 How would NMAAHC visitors affect Smithsonian Institution and National Mall visitation and experience?

Impacts to visitor use and experience were identified using the following criteria:

**No Effects** – Visitors would not be affected and/or changes in the experience would be below levels of detection. Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.

**No Significant Effect** – Some characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be altered. The visitor would be aware of the effects associated with implementation of the alternative. Visitor satisfaction would begin to either decline or increase as a direct result of the effect.

**Significant Effect** – Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly decline or increase.

**No Build Alternative**

There would be no effect on National Mall visitorship and visitor experience as a result of the No Build Alternative. The NMAAHC would not be built, and there would be no resulting additional influx of visitors to the National Mall. The site would continue to be used as an open public recreational resource for large scale protests and public demonstrations, permitted through the NPS through December 31, 2010 after which time the Smithsonian Institution would regulate the permitting process (See Section 6.8 Land Use Planning & Policies for more detailed information).

According to visitor polls, less than half of visitors considered to be minorities feel that the current museum subject matter offerings are excellent or superior. Under the No Build Alternative, there would be no new museum that would have the opportunity to expand the present level of cultural ethnic relevance to visitors to the museums on the Mall.

**Alternative 1 (Contextual Building Alignment)**

No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project. Large scale public demonstrations would no longer be permitted on the site, but the effects are not expected to be significant or adverse due to the abundance of adjacent recreational space available on the National Mall. Similarly, the inconvenience to snacking/eating opportunities would not be significantly affected as the existing concessions tent at the southwest corner of the site would be relocated by the NPS (See 6.8 Land Use Planning & Policies for more detailed information).

No significant adverse impacts to visitor experience would be expected during construction. While construction activities may increase noise and dust, and may affect a person’s overall experience, due to the aesthetic impacts caused by the construction area, visitorship to the National Mall would not be expected to change.

Beneficial effects on Smithsonian Institution and National Mall visitorship would be expected during the first few years the NMAAHC is in operation. With the addition of another attraction to the National Mall, the NMAAHC would increase the choices of sites to visit, and would draw visitors who may not otherwise visit the National Mall. This could increase visitorship to the other museums on the National Mall. For example, when NMAI first opened, overall Smithsonian Institution museum visitorship, including museums on the National
Mall, increased by 18 percent. This exceeds the 2.1 percent average year to year increase in visitorship overall. While it is not likely that this large increase in visitorship is based solely on the opening of the NMAI, it is probably a contributing factor in the increase.

It is also possible that with more choices, visitors may choose to extend their stay in Washington, D.C., or spend less time in each museum due to time constraints and varying interests, although the number of visits would not necessarily change. The attractions closest to the NMAAHC may benefit from increased visitor use (the Washington Monument, Lincoln Memorial, National Museum of Natural History, and the National Museum of American History). Those attractions farthest away from the site may have the largest drop in demand, if any.

No significant effects on National Mall visitorship would be expected in the long term. After the initial “newness” of the NMAAHC wears off, it would be expected that the normal fluctuations in visits to the National Mall and Smithsonian Institution museums would resume.

The NMAAHC would likely have minor beneficial impacts on the annual Black Family Reunion, which is a special three day weekend event in September on the National Mall that specifically targets African American families. The event attracts over 500,000 people each year. It is more likely that this event would have a significant impact on the NMAAHC, drawing more visitors than would be expected for an average day. A number of these visitors would find the NMAAHC to be of interest and would likely visit at some point over the three day event duration.

Beneficial effects on visitor experience would be expected as the NMAAHC would provide those visitors who do not feel the current offerings are excellent or superior (Smithsonian, 2004). A museum that responds to a new and different focus on a specific culture may improve the sense of personal relevance. In addition, the NMAAHC would likely provide additional opportunities for synergy between other cultural attractions and special events that cater to minority interests.

Following construction, large scale public demonstrations would no longer be permitted on the site, although aspects of the NMAAHC indoor and outdoor program would allow for public gatherings, but not in the same scale and capacity as can presently occur (See 6.8 Land Use Planning & Policies for more detailed information). No significant effects are expected following construction due to the abundance of adjacent recreational space available on the National Mall. In addition, because the site is set apart from other museums by roads, there would be no effects to other museums in terms of accessibility, convenience, visiting hours, or prices.

**Alternative 2 (Washington Monument Orientation)**

The effects for this alternative would be the same as for Alternative 1 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.
Alternative 3 (Free Form)
The effects for this alternative would be the same as for Alternative 1 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.

Alternative 4 (Terraced Roof)
The effects for this alternative would be the same as for Alternative 1 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.

Alternative 5 (Enframing)
The effects for this alternative would be the same as for Alternative 1 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.

Alternative 6 (Low Profile)
The effects for this alternative would be the same as for Alternative 1 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.

Preferred Alternative
The effects for the Preferred Alternative would be the same as under any one of the Alternatives 1 through 6 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.

6.9.5 What measures are proposed to minimize adverse effects to visitation and experience to the Smithsonian Institution and National Mall?
Concealment screens would be designed and implemented around the site during construction to decrease impacts to visitor experience from increased noise and dust generated from the construction activities. As described in Section 6.1 Visual & Aesthetic Resources, the screens could be utilized to convey information relating to background and mission of NMAAHC, including elements of African American history and culture.

The proposed NMAAHC would be made accessible to people of all ages, backgrounds, and abilities. The goals of barrier-free accessibility would be met and an emphasis would be placed on affording visitors with disabilities the same experiences and opportunities as other visitors. Access improvements would conform to the requirements of the Uniform Federal Accessibility Standards and the Americans with Disabilities Act.

6.9.6 What will the NMAAHC’s impact on African American and other events on the National Mall throughout the year be?
The loss of a public space for large scale gatherings and demonstrations would be mitigated by providing outdoor space on the grounds of NMAAHC (except for Alternative 4) that is open to the public and supports a range of programmed activities. The specificity of activity or degree of enhancement to the NMAAHC and the National Mall, however, would be determined in the design phase of the project.
6.10 COMMUNITIES AND BUSINESSES

6.10.1 What are the key considerations related to local communities and businesses?

To understand and properly address the impacts of the NMAAHC on local communities and businesses, the Region of Influence (ROI) must first be identified. The ROI comprises the area in which the predominant socioeconomic effects of the NMAAHC would take place. The NMAAHC would be constructed in Washington, D.C., therefore the ROI has been determined to be the inner counties and cities in the Washington, D.C. Metro Area, which include Montgomery County, MD, Prince George’s County, MD, Fairfax County, VA, Arlington County, VA, and the independent cities of Alexandria, VA, Falls Church, VA, and the City of Fairfax, VA. Although NMAAHC is likely to draw visitors from all over the world, the lasting effects of the construction and operation of the museum would be felt primarily within the ROI as defined.

There are multiple characteristics of the ROI that may be affected by the implementation of the Alternatives. These characteristics include:

- Population characteristics/demographics
- Local economic characteristics – employment, wages, total labor force, per capita income, unemployment rates
- Housing characteristics – total units, owner-occupied units, vacancy rates, average home price
- Community services or facilities: schools, fire and rescue, police protection, medical facilities
- Environmental justice – disproportionate effects on low-income and/or minority communities
- The types of local businesses that operate in proximity to the NMAAHC site

6.10.2 What types of economic and demographic data were analyzed for this project?

Data to characterize the ROI were gathered from numerous sources, including the U.S. Census Bureau, the Office of Planning, the Department of Housing and Community Development, the Virginia Employment Commission, the Maryland Department of Statistics, the Smithsonian Institution, the Washington, D.C. Convention and Visitors Bureau, and various other sources.

6.10.3 Who lives in the project area and what characteristics shape the surrounding community?

The ROI is composed of diverse communities. Information about the different characteristics of demographics, the local economy, housing, community services, and local businesses is presented below.

Population Characteristics

The NMAAHC would be located in the District of Columbia. The District of Columbia has an estimated population density of 9,471 persons per square mile, as compared with 2,558 for Fairfax County and 1,881 for Montgomery County. The City’s population, estimated at 581,530 during the 2000 census, has been declining historically as residents have moved to surrounding counties in Maryland and Virginia. The population was 606,900 in 1990, marking a 5.7 percent decline in population between 1990 and 2000.
Montgomery County, MD has a population of 932,131 and has experienced rapid growth in recent years. The population was 757,027 in 1990 and is expected to grow to 990,000 by 2010, as shown below in Table 6.10-1. Although growth is expected to slow, from 15.3 percent between 1990 and 2000 to 13.3 percent between 2000 and 2010, and then to 8.5 percent between 2010 and 2020, the county is expected to remain the second most populous in the ROI behind Fairfax County. Prince George’s County, one of the most affluent predominantly African-American counties in the United States, has a population of 841,315 with a population density of 1,651 persons per square mile, making it the least densely populated county in the ROI (U.S. Census, 2005; MSDC, 2006; CDC, 2006).

Fairfax County, Virginia, the most populous area in the ROI with an estimated 2005 population of 1,010,443, has experienced the strongest growth in the ROI from 1990 to 2000, at a rate of 18.4 percent and is expected to continue growing strongly. The rate of growth, however, is projected to decline in the future, a trend projected throughout the ROI. The City of Fairfax, with a population of 21,498 in 2000, has the slowest growth rate in the ROI, although it still grew by 9.5 percent between 1990 and 2000. It is the fifth most densely populated area in the ROI, with a density of 3,412 persons per square mile in 2000. The City of Falls Church, VA has a population of 10,377 and has experienced moderate growth in comparison to the rest of the ROI, which is expected to decline slightly. It is the fourth-most densely populated area in the ROI, with a density of 6,485 persons per square mile in 2000.

Arlington County, Virginia, with a 2005 population of 199,776, is the third most densely populated area in the ROI, with a population density of 7,722 persons per square mile. Arlington experienced 10.8-percent growth between 1990 and 2000, a number that is expected to decline to 8.2-percent growth by 2010. Finally, the City of Alexandria, Virginia, with a 2003 population of 128,923 is the third least-populous area of the ROI, with a population density of 8,594 persons per square mile. Alexandria has experienced strong growth in recent years, with the 2000 Census showing a population increase of more than 15 percent from 1990 to 2000. Although growth is expected to remain strong, at more than 15 percent between 2000 and 2010, it is projected to taper off, as is in keeping with the rest of the ROI, down to slightly under 9 percent (VEC, 2007; U.S. Census, 2007). A breakdown of population for each county in the ROI is provided below in Table 6.10-1. Population breakdown by race is shown in Table 6.10-2.

**Economic Characteristics**

Economic development within the ROI is expected to remain strong in the coming years. It is expected to experience robust economic growth and continued development opportunities across multiple sectors. Montgomery and Prince George’s County, MD, and Fairfax County, the City of Fairfax, the City of Falls Church, Arlington County, and the City of Alexandria, VA all have median household incomes that are substantially higher than the state and national averages, while Washington, D.C. falls far behind the rest of the ROI (See Table 6.10-3).
Table 6.10-1: Population for ROI and Percent Change between Decades

<table>
<thead>
<tr>
<th>Location</th>
<th>Year 1990</th>
<th>% Change</th>
<th>Year 2000</th>
<th>Pct Change</th>
<th>Year 2010</th>
<th>Pct Change</th>
<th>Year 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montgomery County, MD</td>
<td>757,027</td>
<td>15.3%</td>
<td>873,341</td>
<td>14.5%</td>
<td>1,000,000</td>
<td>7.0%</td>
<td>1,070,000</td>
</tr>
<tr>
<td>Prince George's County, MD</td>
<td>729,268</td>
<td>9.9%</td>
<td>801,515</td>
<td>9.9%</td>
<td>881,100</td>
<td>5.8%</td>
<td>932,300</td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>606,900</td>
<td>-5.7%</td>
<td>572,059</td>
<td>9.6%</td>
<td>627,000</td>
<td>8.9%</td>
<td>688,100</td>
</tr>
<tr>
<td>Fairfax County, VA</td>
<td>818,584</td>
<td>18.4%</td>
<td>969,749</td>
<td>14.8%</td>
<td>1,114,100</td>
<td>5.4%</td>
<td>1,174,600</td>
</tr>
<tr>
<td>City of Fairfax, VA</td>
<td>19,622</td>
<td>9.5%</td>
<td>21,498</td>
<td>7.0%</td>
<td>23,000</td>
<td>2.6%</td>
<td>23,600</td>
</tr>
<tr>
<td>City of Falls Church, VA</td>
<td>9,578</td>
<td>8.3%</td>
<td>10,377</td>
<td>8.9%</td>
<td>11,300</td>
<td>5.3%</td>
<td>11,900</td>
</tr>
<tr>
<td>Arlington County, VA</td>
<td>170,936</td>
<td>10.8%</td>
<td>189,453</td>
<td>12.0%</td>
<td>212,200</td>
<td>9.8%</td>
<td>233,100</td>
</tr>
<tr>
<td>City of Alexandria, VA</td>
<td>111,183</td>
<td>15.4%</td>
<td>128,283</td>
<td>11.4%</td>
<td>142,900</td>
<td>12.8%</td>
<td>161,298</td>
</tr>
</tbody>
</table>


Table 6.10-2: Population Characteristics, 2005

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Population</th>
<th>% Race in Population</th>
<th>% Below 18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>White</td>
<td>African American</td>
</tr>
<tr>
<td>National*</td>
<td>299,398,484</td>
<td>80.2%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Maryland*</td>
<td>5,615,727</td>
<td>64.0%</td>
<td>29.3%</td>
</tr>
<tr>
<td>Montgomery County, MD*</td>
<td>932,131</td>
<td>67.9%</td>
<td>16.4%</td>
</tr>
<tr>
<td>Prince George's County, MD*</td>
<td>841,315</td>
<td>27.7%</td>
<td>66.1%</td>
</tr>
<tr>
<td>District of Columbia*</td>
<td>581,530</td>
<td>38.0%</td>
<td>57.0%</td>
</tr>
<tr>
<td>Virginia*</td>
<td>7,642,884</td>
<td>73.6%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Fairfax County, VA*</td>
<td>1,010,443</td>
<td>72.5%</td>
<td>9.3%</td>
</tr>
<tr>
<td>City of Fairfax, VA*, ***</td>
<td>21,498</td>
<td>72.9%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Falls Church, VA*, ***</td>
<td>10,377</td>
<td>85.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Arlington County, VA*</td>
<td>199,776</td>
<td>80.0%</td>
<td>8.8%</td>
</tr>
<tr>
<td>City of Alexandria, VA*, ****</td>
<td>128,923</td>
<td>59.8%</td>
<td>22.5%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2000, 2007. *Percent totals may not add to 100 due to rounding. **Included in totals of other races. *** 2005 data not available, 2000 Census data used. **** 2003 population estimate, per U.S. Census Bureau
The primary industry in Washington, D.C. is government and government enterprises, accounting for almost 32 percent, using North American Industry Classification System (NAICS) standards. The second most common industry in Washington, D.C. is professional and technical services, accounting for almost 16 percent of all employment.

Although government and government enterprises does not constitute as large a majority in the rest of the ROI, it remains in the top three industries for all areas of the ROI (Stats Indiana, 2007).

**Housing Characteristics**

Multifamily housing and row houses are the predominant form of housing in Washington, D.C., comprising 26 percent and 31 percent of total housing units, respectively. Arlington County and the City of Alexandria show a high percentage of units in multi-unit structures as well, 59.1 percent and 63.8 percent, respectively. By contrast, in Montgomery, Prince George’s, and Fairfax Counties, single unit detached housing accounts for more than half of all housing available. Although single family detached homes account for more than half of all housing units in the City of Falls Church, almost 30 percent of housing units are within structures with more than 20 units in the building.

**Table 6.10-3: Economic Characteristics**

<table>
<thead>
<tr>
<th>Location</th>
<th>Median Household Income</th>
<th>% Below Poverty (individuals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National*</td>
<td>$44,334</td>
<td>12.4%</td>
</tr>
<tr>
<td>Maryland*</td>
<td>$52,868</td>
<td>9.2%</td>
</tr>
<tr>
<td>Montgomery County, MD*</td>
<td>$71,551</td>
<td>6.5%</td>
</tr>
<tr>
<td>Prince George’s County, MD*</td>
<td>$55,256</td>
<td>9.3%</td>
</tr>
<tr>
<td>District of Columbia*</td>
<td>$46,211</td>
<td>18.3%</td>
</tr>
<tr>
<td>Virginia*</td>
<td>$51,103</td>
<td>9.5%</td>
</tr>
<tr>
<td>Fairfax County, VA*</td>
<td>$83,890</td>
<td>5.3%</td>
</tr>
<tr>
<td>City of Fairfax, VA*, ***</td>
<td>$67,642</td>
<td>5.7%</td>
</tr>
<tr>
<td>Falls Church, VA*, ***</td>
<td>$74,924</td>
<td>4.2%</td>
</tr>
<tr>
<td>Arlington County, VA*</td>
<td>$66,626</td>
<td>7.1%</td>
</tr>
<tr>
<td>City of Alexandria, VA*, ****</td>
<td>$56,054</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

Sources: U.S. Census, 2000; U.S. Census, 2007

**Table 6.10-4: Housing Units in the ROI, 2000**

<table>
<thead>
<tr>
<th>ROI</th>
<th>Total Units</th>
<th>Percent Change 1990-2000</th>
<th>Occupied Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>% Owner Occupied</td>
<td></td>
</tr>
<tr>
<td>Montgomery County, MD</td>
<td>334,632</td>
<td>13.1%</td>
<td>324,565</td>
</tr>
<tr>
<td>Prince George’s County, MD</td>
<td>302,378</td>
<td>11.9%</td>
<td>286,610</td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>274,845</td>
<td>-1.3%</td>
<td>248,338</td>
</tr>
<tr>
<td>Fairfax County, VA</td>
<td>359,411</td>
<td>16.7%</td>
<td>350,714</td>
</tr>
<tr>
<td>City of Fairfax, VA</td>
<td>8,204</td>
<td>6.9%</td>
<td>8,035</td>
</tr>
<tr>
<td>City of Falls Church, VA</td>
<td>4,725</td>
<td>1.2%</td>
<td>4,471</td>
</tr>
<tr>
<td>Arlington County, VA</td>
<td>90,426</td>
<td>6.6%</td>
<td>86,352</td>
</tr>
<tr>
<td>City of Alexandria, VA</td>
<td>64,251</td>
<td>10.3%</td>
<td>61,889</td>
</tr>
<tr>
<td>United States</td>
<td>115,904,641</td>
<td>13.3%</td>
<td>105,481,101</td>
</tr>
<tr>
<td>Maryland</td>
<td>2,145,283</td>
<td>13.3%</td>
<td>1,980,859</td>
</tr>
<tr>
<td>Virginia</td>
<td>2,904,192</td>
<td>16.3%</td>
<td>2,699,173</td>
</tr>
</tbody>
</table>

Montgomery County, Fairfax County, and the City of Fairfax are the only areas in the ROI with a homeownership rate higher than that of the national average of 66.2 percent (See Table 6.10-4). Montgomery County has a homeownership rate of 68.7 percent, with a median home value of $221,800, far above the national median of $119,600. Prince George’s County has a homeownership rate of 61.8 percent with a median home value of $145,600. Washington, D.C. lags far behind in homeownership with a rate of 40.8 percent, however median home values are $157,200. Fairfax County has a homeownership rate of 70.9 percent and a median home value of $233,300, far above the state average of $125,400. The City of Fairfax has a homeownership rate of 69.1 percent and a median home value of $192,100. The City of Falls Church has a median home value of $277,100, the highest in the ROI, with a homeownership rate of 60.6 percent. Although both Arlington County and the city of Alexandria have homeownership rates far below the national average, at 43.3 percent and 40.0 percent respectively, they also both have a median home value far above both state and national averages, at $262,400 and $252,800, respectively (Census, 2007).

Increases in housing units between Census years are not dramatic because there is a decreasing supply of available and buildable land in the ROI.

**Community Services and Facilities**

**Schools**

District of Columbia Public Schools have seen a decline in enrollment in recent years, likely the result of both an increase in the popularity of public charter schools, which have seen increases in enrollment in recent years, and a decrease in the urban population as a whole. The ROI is home to some of the largest school districts in the country, with Fairfax County ranking as the 13th largest school district in the nation, and the largest in Virginia. Montgomery County and Prince George’s County, MD are the 16th and 18th largest in the nation respectively, and the 1st and 2nd largest in the state of Maryland, respectively.

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Schools</th>
<th>Elementary Schools</th>
<th>Middle or Secondary Schools</th>
<th>High Schools</th>
<th>Alternative or Special Schools</th>
<th>Total Enrollment 2005/06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montgomery County, MD</td>
<td>199</td>
<td>129</td>
<td>38</td>
<td>25</td>
<td>7</td>
<td>137,798</td>
</tr>
<tr>
<td>Prince George’s County, MD</td>
<td>205</td>
<td>138</td>
<td>32</td>
<td>24</td>
<td>11</td>
<td>134,412</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>167</td>
<td>101</td>
<td>20</td>
<td>20</td>
<td>26</td>
<td>52,000</td>
</tr>
<tr>
<td>Fairfax County, VA</td>
<td>402</td>
<td>137</td>
<td>26</td>
<td>21</td>
<td>19</td>
<td>164,295</td>
</tr>
<tr>
<td>Falls Church, VA</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1,873</td>
</tr>
<tr>
<td>Arlington County, VA</td>
<td>32</td>
<td>22</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>18,252</td>
</tr>
<tr>
<td>City of Alexandria, VA</td>
<td>18</td>
<td>13</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>10,057</td>
</tr>
</tbody>
</table>
Fire and Rescue Services

The District of Columbia Fire Department (DCFD) operates 33 engine companies, 16 truck companies, and three heavy-duty rescue vehicles. They also offer 33 Emergency Medical Services (EMS) – Basic Life Support (BLS) units, 15 EMS – Advanced Life Support (ALS) units, and two rapid response units. Furthermore, the department also offers the services of a HAZMAT unit and two fireboats, among other specialized units (DCFD, 2007). The DCFD is the first responder to the Mall area, including the NMAAHC site, in the event of an emergency. The nearest local engine company that serves the area near the site is Engine 2 located at 500 F Street, NW. Other units of the District of Columbia Fire and Emergency Services near the National Mall include Engine Company 13 at 450 6th Street, SW; Engine 7 at 1101 Half Street, SW; Engine Company 3 at 439 New Jersey Avenue, NW; and Engine Company 16 at 1018 13th Street, NW. The Montgomery County Fire and Rescue Department comprises 1,100 career firefighters and approximately 1,100 volunteers who work out of 40 sites and 19 Local Fire and Rescue Departments (MCFRS, 2007). The Prince George’s County Fire/EMS Department comprises 720 uniformed personnel divided among seven battalions, as well as 48 community-based fire and rescue stations. They also work with a volunteer force of approximately 1,100 firefighters and offer both BLS and ALS emergency medical services, through 40 ambulances and 12 paramedic units (PGCFED, 2006).

The Fairfax County Fire and Rescue Department offers multiple services, such as ALS EMS, technical rescue, hazardous materials, water rescue, life safety education, fire prevention, and arson investigation services, in addition to traditional fire suppression services. The Department is staffed by 1,358 uniformed firefighters out of 36 fire stations, as well as 326 volunteers (FCFRD, 2006.) The City of Fairfax also runs a separate Fire Department with more than 60 uniformed firefighters, 45 active volunteers, and another 90 supporting volunteers operating out of two stations (CFFD, 2007).

Arlington County Fire Department employs 302 firefighters and support staff and offers fire, EMS, and environmental response services. Furthermore, the Department was among the first to partner with the U.S. Public Health Service to develop a Metropolitan Medical Strike Team, to respond in a mass casualty event, such as a chemical, radiological, or biological terrorist attack (ACFD, 2007). Arlington County career firefighters staff the City of Falls Church Fire and Rescue Department, which is supplemented by the Falls Church Volunteer Fire Department (FCFR, nd). The Alexandria Fire Department employs 300 firefighters, paramedics, code enforcement officials, and support staff, operating out of eight fire stations throughout the city. The Department offers hazardous materials, technical rescue, and marine operations services (AFP, nd). Arlington, Alexandria, and Fairfax are all participants in an Interjurisdictional Response Agreement, meaning that the closest engine will respond to a given incident, regardless of jurisdictional boundaries.

Police Protection

The District of Columbia Metropolitan Police Department (MPD) is one of the largest police departments in the United States. Approximately 3,800 officers serve as the primary law enforcement body in Washington, D.C. MPD has multiple specialized units to deal with myriad issues, ranging from sexual assault to fraud to units specializing in working with minorities or the disabled (MPDC, nd). For all NPS property, including the National Mall, the NPS Park Police would be the first responders on site, and would have jurisdiction in the NMAAHC if called by Smithsonian Institution personnel. The Montgomery County Department of Police is comprised of 1,050 sworn officers and numerous civilian support staff. The department is divided geographically into six districts, each with a Field Service Bureau; National Naval Medical Center (NNMC) is located in District 2, Bethesda. MCDP also has a Special Investigative Services Bureau comprised of nine divisions (MCDP, 2007). The Prince George’s County is composed of 1,420 sworn officers, and operates 871 patrol cars, and more than 600 unmarked or special purpose vehicles (PGPD, 2006).
The Fairfax County Police Department (FCPD) is the largest local law enforcement agency in Virginia, with 1200 sworn police officers and more than 500 civilian personnel. FCPD has multiple specialized units that deal with issues such as homicide, financial crimes, sex crimes, and organized crime and narcotics (FCPD, 2006). The City of Fairfax operates its own police department which offers community policing, crime solvers, and senior citizen’s specialty services (CFPD, 2007). The City of Falls Church Police Department is staffed by 32 officers and offers a K-9 program among other services (CFCPD, nd.)

The City of Falls Church Police Department employs more than 360 sworn officers and 110 civilians (ACPD, 2006). Its crime rate has fallen steadily in recent years, and is currently at its lowest point since 1960. The Department offers such specialized services as a Special Victims Unit to investigate sex crimes and an auto theft unit, and it participates in the Northern Virginia Gang Task Force (ACPD, 2007). The City of Alexandria maintains a police force with an authorized strength of 302 officers as well as additional civilian and other staff. The department places an emphasis on community policing within the city, and has introduced Segways as a way for officers to be more mobile in highly pedestrian areas of the city (CAPD, 2006).

Medical Facilities

Hospitals in the District of Columbia include Georgetown University Hospital, George Washington University Hospital, Howard University Hospital, Washington Hospital Center, and Sibley Memorial Hospital. George Washington University Hospital is the closest to the NMAAHC site, and would be the likely first choice destination of any emergency medical services needed. There are many other hospitals in the rest of the ROI, such as Suburban Hospital, Shady Grove Adventist Hospital, Montgomery General Hospital, and Holy Cross Hospital, all in Montgomery County, MD. Prince George’s County hospitals include Doctor’s Community Hospital, Laurel Regional Hospital, Prince George’s Hospital Center, and Bowie Health Center. Northern Virginia hospitals include the Inova Hospital System, with locations in Fairfax, Alexandria, Falls Church, and Mount Vernon, in addition to Virginia Hospital Center, and Dominion Hospital. The closest hospital to the site is George Washington University Hospital located on 23rd Street, NW, approximately twelve blocks northwest of the project site.

Environmental Justice and Protection of Children

On 11 February 1994, President Clinton issued Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. E.O. 12898 directs agencies to address environmental and human health conditions in minority and low-income communities so as to avoid the disproportionate placement of any adverse effects from Federal policies and actions on these populations. The general purposes of this E.O. are as follows:

- To focus the attention of federal agencies on human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice.
- To foster nondiscrimination in federal programs that substantially affects human health or the environment.
- To give minority communities and low-income communities greater opportunities for public participation in, and access to, public information on matters relating to human health and the environment.

As defined by the “Environmental Justice Guidance Under NEPA” (CEQ, 1997), “minority populations” include persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, black (not of Hispanic origin), or Hispanic. Race refers to Census respondents’ self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American.
A minority population exists where the percentage of minorities in an affected area either exceed 50 percent or is meaningfully greater than in the general population. Low-income populations are identified using the Census Bureau’s statistical poverty threshold, which is based on income and family size. The Census Bureau defines a “poverty area” as a census tract with 20 percent or more of its residents below the poverty threshold and an “extreme poverty area” as one with 40 percent or more below the poverty level. Although there are poverty and extreme poverty areas within the ROI, none are adjacent to the NMAAHC site.

E.O. 13045, Protection of Children from Environmental Health and Safety Risk, requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. This EO, dated 21 April 1997, further requires Federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. E.O. 13045 defines environmental health and safety risks as “risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on and the products we use or are exposed to).”

6.10.4 What types of businesses provide services to visitors in the project area?

There is a diverse array of businesses that provide services to visitors in the project area. Since the project area is also adjacent to the central business district in Washington, D.C., many of these services are also used by the local population during the business week. Businesses include:

- Travel and tourist information
- Currency exchange
- T-shirt/souvenir vendors
- Food vendors
- Hotels
- Restaurants
- Movie theaters
- Theaters
- Parking garages
- Retail stores
- National Aquarium

Most Smithsonian Institution Museums on the Mall that lie between Constitution Avenue and Madison Drive have food carts and souvenir carts on the Constitution Avenue side. As described in Section 6.9 Visitor Use & Experience, the site for the NMAAHC currently has one food cart and one souvenir cart along Constitution Avenue, in addition to a concession tent with tables, benches, and restroom facilities, operated by NPS. An informal survey of the existing Smithsonian Institution museum sites showed an average of two food carts and one souvenir cart per museum on the Constitution Avenue side. The Madison Drive side generally only featured fixed concession stands or smaller, specialty carts either on the property of the respective museum, or on the National Mall. There are fewer carts per museum on the south side of the Mall, for museums located between Jefferson Drive, SW and Independence Avenue, SW. Each Smithsonian museum also houses additional food service outlets and gift shops.

Other businesses associated with the tourism industry in Washington, D.C. include NPS Tourmobile Sightseeing and Old Town Trolley Tours, both of which offer sightseeing tours to tourist attractions in Washington, D.C.
6.10.5 How would construction and operation of the NMAAHC affect these businesses?

In order to analyze the effects of the Alternatives on socioeconomic resources in the ROI, a model was used that would allow for the evaluation of the significance of the impact to the ROI. The result of construction spending in the ROI was examined for both direct effects, such as employment and the salaries that employment provides to construction workers, and indirect effects, or the effect of those salaries and associated spending on the larger economy in the ROI. Subsequent changes in local economic activity are computed as the product of initial changes in sales volume, either increases or decreases, and a local impact multiplier. In total, the model examines changes in sales volume, income, employment, and population in the ROI, accounting for the direct and indirect effects of the action. Appendix F discusses this methodology in more detail and presents the model input and output tables developed for this analysis.

To determine the historical range of economic variation, the model calculates a rational threshold value (RTV) profile for the ROI. This analytical process uses historical data for the ROI and calculates fluctuations in sales volume, income, employment, and population patterns. The historical extremes for the ROI become the thresholds of significance (i.e., the RTVs) for social and economic change. If the estimated effect of an action falls above the positive RTV or below the negative RTV, the effect is considered to be significant.

Impacts to socioeconomics were identified using the following criteria:

**No Effects** – No change to socioeconomic conditions.

**No Significant Effect** – A change that does not fall outside the historic range of ROI economic variation.

**Significant Effect** – A change is considered significant if it falls outside the historical range of ROI economic variation.

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**No Build Alternative**

**Economic Development**

There would be no effect on economic development as a result of the No Build Alternative. The NMAAHC would not be built, and there would be no resulting influx into the local economy of the ROI.

**Demographics**

There would be no effect on demographics as a result of the No Build Alternative.

**Housing**

There would be no effect on the demand for or supply of housing within the ROI resulting from the No Build Alternative.

**Community Services and Facilities**

There would be no effect on Community Services and Facilities as a result of the No Build Alternative.

**Environmental Justice and Protection of Children**

There would be no effect on Environmental Justice and the Protection of Children as a result of the No Build Alternative.

**Alternative 1 (Contextual Building Alignment)**

Under Alternative 1, neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities environmental justice and the protection of children. The incremental increases in tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant.
Economic Development
The model was run using both low and high income and expenditure scenarios, generated using minimum and maximum building cost estimates, and by estimating the pay grade of the 294 personnel expected to be employed by NMAAHC. No personnel were assumed to relocate for the purposes of this analysis. Under both income scenarios, which derive average income based on the lowest and highest step within each General Schedule (GS) or Wage Grade (WG) pay grade for all personnel, there would be no significant effect to socioeconomic resources.

The implementation of Alternative 1 would generate an increase in local sales volume ranging from $601,631,000 to $1,064,073,000, of which approximately 40% would result directly from the construction and operation of the NMAAHC. Furthermore, an increase in local employment ranging from 2,894 in the low income scenario to 4,892 in the high income scenario would be expected to result from the Alternative 1, approximately 43 percent to 48 percent of which would be the direct result of the construction and operation of the NMAAHC. Although these prospective increases in local employment and sales volume would be beneficial to the ROI, they would not produce any significant effects on economic development. The model inputs and outputs are available in Appendix F.

Museum visitorship would further contribute to the economic development of the region, both in direct spending by tourists, and in local and Federal tax revenue received by the District of Columbia. More than 15 million tourists came to Washington, D.C. last year, spending more than five million dollars at local businesses (WCTC, nd). Tourists to the National Mall rarely, however, only travel to visit a single museum or attraction. Typically several venues are visited in a single trip, particularly for those traveling from outside the ROI. Using the most recently opened Smithsonian Institution Museum as a model, the National Museum of the American Indian which opened September 24, 2004, initial visitor numbers in the first year would be expected to be high, tapering off over subsequent years (SI, 2007). In addition, since visitors to the NMAAHC would be likely to visit more than one venue in Washington, D.C., those who make the museum the primary reason for their trip are still likely to spend money at other local businesses, visit other museums, and generate some additional revenue overall. Therefore, incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant.

Demographics
There would be no significant effect on demographics as a result of the Alternative 1. Little to no migration into the ROI would be expected as a result of the construction and operation of the NMAAHC. Furthermore total staff expected to be hired constitute a small fraction of the total population of the ROI and would not have any significant effect on demographics within the ROI.

Housing
There would be no significant effect on housing demand or supply within the ROI as a result of Alternative 1. Since little to no migration is expected as a result of the construction and operation of the NMAAHC, the local demand for housing would remain unchanged, and the supply would not be impacted.

Community Services and Facilities
There would be no significant effect on the availability and quality of community services and facilities in the ROI as a result of Alternative 1. Since there is little to no migration expected as a result of the construction and operation of the NMAAHC, there would be no additional burden on local schools, police, fire and rescue services, or medical facilities.
Environmental Justice
There would be no effect on environmental justice as a result of Alternative 1. Although there are poverty tracts within the ROI, none of the tracts directly surrounding the site for the NMAAHC qualify as poverty or extreme poverty areas. Therefore there would be no potential to impact a poverty or severe poverty area. In addition, the NMAAHC will not be constructed in a residential area, therefore Alternative 1 would not have any disproportionate effects on any low-income or minority populations within the ROI.

Protection of Children
The construction and operation of the NMAAHC would not have any disproportionate effects that would negatively affect the health and welfare of children; therefore there would be no significant effects expected to environmental justice and the protection of children.

Alternative 2 (Washington Monument Orientation)
Under Alternative 2, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for Alternative 1, since the total expenditure and expected number of personnel would be the same, regardless of site orientation.

Alternative 3 (Free Form)
Under Alternative 3, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for Alternative 1.

Alternative 4 (Terraced Roof)
Under Alternative 4, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for Alternative 1.

Alternative 5 (Enframing)
Under Alternative 5, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for Alternative 1.

Alternative 6 (Low Profile)
Under Alternative 6, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for Alternative 1.

Preferred Alternative
Under the Preferred Alternative, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for any one of the Alternatives 1 through 6.
6.10.6 What measures are proposed to minimize effects to communities and businesses during museum construction and operation?

Since implementation of the NMAAHC would take place on a currently undeveloped site, construction would not interfere directly with the operation of most local businesses. The two vendor carts currently located on Constitution Avenue, adjacent to the NMAAHC site may need to explore alternative site locations. The vendor carts, however, may be able to generate an acceptable level of business from construction staff and regular tourist traffic, so effects would not be significant. The existing concession facility on the Monument Site would continue to be operated by NPS until it is relocated elsewhere on the National Mall, or until December 31, 2010 when construction would begin on the NMAAHC, per an existing agreement between NPS and the Smithsonian Institution. The Smithsonian Institution will not open any competing food and beverage concession on the site while the NPS facility remains in operation. Therefore, since no competing concession would be established, and the concession would be moved prior to the start of construction to a site on the Mall, where sales are likely to be comparable due to the amount of pedestrian traffic, no mitigation would be required.

Since effects of the operation of the museum are expected to be beneficial to the ROI, no mitigation would be required.
6.11 INFRASTRUCTURE AND UTILITIES

This section discusses the utilities that currently service the NMAAHC site and other infrastructure or utilities that are on the property or adjacent to the site.

6.11.1 What are the key considerations regarding utilities?

Key considerations regarding utilities located within the project area are related to the possible removal or relocation of subsurface utility lines due to construction and any subsequent disruption of services that could occur. The current project site has existing subsurface utility lines and two existing structures, a concession stand and a convenience area that would be affected by the proposed construction. Relocation of certain utilities would also be contingent on adjacent space and would likely incur the burden of excessive cost and coordination.

Coordination with service providers for timely extension of utility services to the new building can also be an issue and potentially other options would need to be explored. A majority of the utilities for the NMAAHC project would tie into the Washington, D.C.’s services, thus there would be no foreseeable issues associated with capacity since the infrastructure is generally in place to support additional growth.

6.11.2 What types of utilities data was analyzed for this project?

Data analyzed for this project includes The D.C. Comprehensive Plan (DCOP, 2006), NEPA documentation developed for projects occurring on adjacent parcels, including the permanent security improvements for the Washington Monument (NPS 2002), the Comprehensive Plan and Draft EIS for the White House and President’s Park (NPS, 1999), EA for the National Museum for the American Indian on the National Mall (EDAW, 1993), EA for Lincoln Memorial Circle Rehabilitation and Security project (NPS 2002), as-built utility drawings from service providers (Potomac Electric Power Company [Pepco] and DC WASA) for the vicinity of the project area, NPS provided Computer-Aided Design (CAD) drawings for existing utilities within the site boundary, other Geographic Information System (GIS) information from DC Office of Planning (DCOP), Smithsonian National Museum of African American History and Culture Site Evaluation Study: Data Gathering Report (Plexus Scientific Corporation and PageSoutherlandPage, 2005a), Combined Sewer System Long Term Control Plan (DCASA, 2002), Twenty-Year Water Demand Forecast and Resource Availability Analysis for the Washington Metropolitan Area (ICPRB, 2000), and applicable USEPA, District, and local regulations.

Information gathered through data analysis and internet research was verified against and supplemented with information collected from phone interviews and e-mail communication with the Smithsonian Institution, Pepco, DCWASA, GSA, Washington Gas, and NPS.

6.11.3 What are existing utilities in the project area?

Existing utilities that occur within the proposed project area, or those that could be impacted by the proposal include potable water, sewer (sanitary and storm), electricity, gas, steam and chilled water, communications (fiber optics, cable, and telephone), solid waste, and hazardous waste. The following section discusses each of these infrastructure and utilities in detail.

Potable Water

The NMAAHC site would be serviced by District of Columbia Water and Sewer Authority (DCWASA) for its potable water. DCWASA purchases treated water from the U.S. Army Corps of Engineers (USACE) Washington Aqueduct, which in turn gets its raw water supply from the Potomac River, a surface water source, near the Great Falls and Little Falls area. Raw water is treated at two water treatment plants (WTP), Dalecarlia and McMillan, and distributed within Washington, D.C. by DCWASA.

The distribution system is divided into seven water Distribution Zones (also known as Service Areas) based on differences in ground elevation. The NMAAHC site is located in the Low Service Area, which also includes other areas around the Mall and has ground elevations ranging between 0 to 70 feet.
The Low Service Area is serviced by the Washington Aqueduct’s Dalecarlia pumping station and DCWASA’s Bryant Street pumping station. The Brentwood Reservoir holds most of the treated water supplied to this area. DCWASA’s projected long term demand, based on historical pumpage data for each service area and demographic projections of household and employment, up to the year 2020 for the Low Service Area indicates availability of more than adequate treatment capacities at the WTPs (DCOP, 2006). In addition, the Interstate Commission on the Potomac River Basin (ICPRB)’s analysis for water demand and resource availability in the Washington metropolitan region suggests availability of sufficient adequate resources to meet demands of the highest growth scenario up to the year 2020 (ICPRB, 2000).\(^1\)

There are several underground water utility lines within the NMAAHC site boundary. A 20-inch water main runs north-south along 14\(^{th}\) Street to the east of the NMAAHC site and connects to a 24-inch water main running along Constitution Avenue to the north of the site. These water mains are owned and operated by DCWASA, which in turn would be responsible for providing water service connections to the NMAAHC site based on loading requirements submitted by the contractor during the design phase. The concession stand currently located on the site is serviced by DCWASA. There is an existing 20-inch water main along 14\(^{th}\) Street that would not be available for servicing the site. At several locations within the site, there are existing water utility lines owned by the NPS, but some of these lines are no longer in service as they provided water to facilities that are no longer located on the property (Plexus Scientific Corporation and PageSoutherlandPage, 2005a).

The NMAAHC site is located in an area that is neither part of the combined sewer system (CSS) system nor part of the separate system. A 10-foot by 11-foot combined sewer line runs along Constitution Avenue to the north of the site and 12-inch combined sewer laterals from this line run along 15\(^{th}\) and 14\(^{th}\) Street. A 9-foot by 6-foot 9-inch storm sewer line runs along Constitution Avenue, turns south as a 6-foot by 4-foot 9-inch line along 16\(^{th}\) Street that finally runs diagonally along the Mall into the Tidal Basin near 17\(^{th}\) Street. Laterals from this storm sewer line run along 14\(^{th}\) Street, partially along 15\(^{th}\) Street, and through the center of the NMAAHC site. To the south of the site near the Tidal Basin, along 14\(^{th}\) and 15\(^{th}\) Street, a network of separate sewer lines service the Bureau of Engraving and Printing and the Department of Agriculture buildings (DC WASA, 2007 & Plexus Scientific Corporation and PageSoutherlandPage, 2005a).

**Sewer (Sanitary and Storm)**

DCWASA owns and operates the sewer and stormwater lines within Washington, D.C., which are part of either a separate or combined sewer system. The separate system has two independent piping systems, one for sanitary sewage and the other for stormwater. Currently, approximately two-thirds of Washington, D.C. is served by separate sewer systems.\(^2\) The remaining one-third (approximately 12,478 acres) of Washington, D.C. is served by a CSS. A combined sewer system conveys both sanitary sewage and stormwater in one piping system.\(^3\)

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1. High estimates of future growth were based on MWCOG demographic forecasts for high growth. A high growth scenario results in an increase of annual water use from 480 mgd to 606 mgd, an increase of 126 mgd (26 percent).
2. The separate system transfers sanitary waste from the sewers to the Blue Plains Wastewater Treatment Plant for treatment after which the treated wastewater is released into the Potomac River. Stormwater is collected by separate pipes and released directly into the Anacostia River, Rock Creek, the Potomac River, or tributary waters without treatment.
3. The CSS system collects sanitary sewer and stormwater via a combined system and diverts it to the Blue Plains Advanced Wastewater Treatment Plant. During normal dry weather conditions, sanitary wastes collected in the combined sewer system are diverted at facilities called regulators, however, during periods of heavy rainfall, the capacity of a combined sewer may be exceeded. In case of such an event, the regulators discharge the excess flow (consisting of a mixture of stormwater and sanitary wastes) directly into the Anacostia River, Rock Creek, the Potomac River, or tributary waters. This excess flow is called Combined Sewer Overflow.
The projected growth in population and jobs in Washington, D.C. up to the year 2020, could add an estimated 17 to 20 million gallon per day (MGD) of total wastewater demand, of which approximately two-thirds is expected to occur within the combined sewer area. While the wastewater transmission system has adequate capacity for this volume, land use changes would require localized additions and pipeline extensions.

The NMAAHC site is located in an area that is neither part of the CSS system nor part of the separate system. A 10-foot by 11-foot combined sewer line runs along Constitution Avenue to the north of the site and 12-inch combined sewer laterals from this line run along 15th and 14th Street. A 9-foot by 6-foot 9-inch storm sewer line runs along Constitution Avenue, turns south as a 6-foot by 4-foot 9-inch line along 16th Street that finally runs diagonally along the mall into the Tidal Basin near 17th Street. Laterals from this storm sewer line run along 14th Street, partially along 15th Street, and through the center of the NMAAHC site. To the south of the site near the Tidal Basin, along 14th and 15th Street, a network of separate sewer lines service the Bureau of Engraving and Printing and the Department of Agriculture buildings (DC WASA, 2007 & Plexus Scientific Corporation and PageSoutherlandPage, 2005a).

**Electricity**

The Pepco supplies energy to Washington, D.C. and would be responsible for servicing the NMAAHC site. Pepco operates two power plants located at Benning Road (550 megawatts (MW) and Buzzard Point (256 MW), where high voltage electricity is generated and released along transmission lines into the power grid to substations located throughout Washington, D.C. From these substations, distribution lines deliver the electricity to transformers on the ground or on utility poles that reduce the voltage so it can be safely used by District consumers. Pepco currently maintains 135 electric substations that distribute power to roughly 1400 overhead and underground feeder cables that carry power to its consumers (DCOP 2006).

The NMAAHC site has 4 kilovolt (KV) and 13 KV feeders along 14th Street and Constitution Avenue and a low voltage secondary around the site. In addition, based on information from Pepco plat maps 790F385 and 790F384, two 69KV lines run along Constitution Avenue and turn south along 14th Street. Street and traffic light feeder lines also exist around the site. Within the NMAAHC boundary, Pepco provides service to the concession stand and has an easement to locate and operates a transformer and associated service cables. There are several other unspecified subsurface dormant electric lines within the NMAAHC boundary that belong to NPS.

Pepco would provide discounted service via high voltage connection to the NMAAHC site. The Smithsonian would need to provide transformers and switchgear to step down the power to the usable voltage. During the design phase of the NMAAHC, the Smithsonian Institution would be required to complete a class of service application and provide a letter to Pepco estimating the facility demand and associated type of services required. Currently Pepco has sufficient service capacity available to satisfy current and projected loads in Washington, D.C. Consequently, Pepco would be able to provide adequate power supply to the NMAAHC (Pringle, Pepco 2007).

**Gas**

Washington Gas is the main supplier of natural gas to Washington, D.C. and would also be responsible for providing an adequate connection to the NMAAHC site.

There are few existing service gas lines in the northwest and northeast along 15th and 14th Streets which would likely service the NMAAHC site. During the design phase of the NMAAHC, the Smithsonian Institution would be required to complete and submit a service information request to Washington Gas estimating the facility demand. Based on the estimated natural gas demand, Washington Gas would make a determination of the required service and would be responsible for providing an adequate connection to the site. Currently, Washington Gas has adequate capacity available to service the proposed NMAAHC building.
A 24-inch, 200 psi subsurface elevated pressure gas transmission line passes east to west along the northern edge of the site, approximately 45 feet from the southern edge of the sidewalk facing Constitution Avenue (or approximately 75 feet from the Constitution Avenue curb line). This transmission line would require a service easement of approximately 10-12 feet (Melliza, Washington Gas 2007).

**Steam and Chilled Water**

There are two options for steam and chilled water service to the NMAAHC. The first option is to utilize GSA’s infrastructure. The second option is for the Smithsonian Institution to incorporate a chiller plant and cooling tower and a natural gas-fired boiler into the design of the mechanical systems. The decision to utilize GSA’s infrastructure or pursue an independent plant with a cooling tower will be made later in the design phase of the project.

Currently, a 6.5-foot by 6.5-foot GSA steam tunnel runs north to south along 15th Street adjacent to the NMAAHC site. Additionally, a GSA owned 3.5-foot by 5-foot water intake brick culvert runs diagonally along the northern third of the site, south of the 24-inch Washington Gas transmission line and continues eastward in the middle of Constitution Avenue servicing buildings in the Federal Triangle area. The portion of the culvert located within the proposed NMAAHC site boundary is not currently in use (Westphal and Mbonu, GSA 2007).

Existing GSA chilled water lines run south along 7th Street and turn west along Independence Avenue up to 9th Street. The closest building currently serviced by GSA chilled water is the National Gallery of Art. There is a possibility that the existing chilled water lines would be extended to the National Museum of American History, which would easily enable service to the NMAAHC, but this would require a substantial financial investment for the Smithsonian Institution. Steam would be provided via the steam tunnel on 15th Street (Westphal and Mbonu, GSA 2007).

**Communications (Fiber Optics, Cable, and Telephone)**

Both the telephone and fiber optic systems have been designed to accommodate current and future development requirements (Uzel, Smithsonian 2007).

The Local Exchange Carrier (LEC), Verizon, provides private and commercial voice, data, and cable to Washington, D.C. and would be contracted to service the NMAAHC site. Copper and Fiber Optic lines provided by Verizon would be extended to NMAAHC from the nearest existing communication lines manhole in the area. An existing Verizon-owned clay duct bank runs along Constitution Avenue to the north of the site. Verizon also provides service to the existing concession stand located within the NMAAHC boundary (Alvarez, NPS 2007).

The Smithsonian Institution owned and operated SI-NET fiber optic network would be extended to the NMAAHC. SI-NET lines would be extended via conduit from either the National Museum of American History located to the east of the NMAAHC site or from any other nearby Smithsonian-owned building. GSA steam tunnels can possibly be used to accommodate SI-NET lines for extending service to the NMAAHC (Uzel, Smithsonian 2007).

There is an existing NPS owned active telephone line that runs diagonally through the site from the southwest to the northeast corner.

**Solid Waste**

**Disposable Solid Waste**

All Smithsonian Institution museums on the Mall have a central contract for trash collection, removal, and disposal with Allied Waste Industries; however other companies can be solicited if required by NMAAHC. The removal times and frequency are based upon individual museum needs. Each individual museum building manager is responsible for the arrangements (Vaughn, Smithsonian 2007). Allied Waste transports solid waste from the museums on the Mall.
for disposal at the I-95 landfill located in Lorton, Virginia. The portion of the waste that can be incinerated is taken to the large mass-burn incinerator located there; the remainder is deposited in the landfill. Both the incinerator and the landfill currently meet all permitting requirements.

**Recyclable Solid Waste**
Each museum on the Mall area contracts its own recycling based upon its individual needs. Each building manager is responsible for choosing the removal company, time, and frequency.

**Hazardous Waste**
All Smithsonian Institution museums on the Mall have a central contract for hazard waste collection, removal, and disposal with Clean Ventures Incorporated; however other companies can be solicited if required by NMAAHC. The Office of Safety Health and Environmental Management (OSHEM) audits all Smithsonian Institution buildings on the Mall on an annual basis for compliance with USEPA and District regulations. As per the Resource Conservation and Recovery Act (RCRA), the NMAAHC building would more than likely be categorized as a Conditionally Exempt Small Quantity Generator (CESQG) for hazardous waste. However, it is the policy of the Smithsonian Institution to meet the “more protective or stringent” regulatory requirements (SD419, 2006). Therefore, Smithsonian Institution incorporates best management practices through the implementation and administration of hazardous waste management protocols that are either more stringent or broader in scope than Federal or District requirements for CESQG. An example is the Smithsonian Institution policy that CESQG adhere to the off site shipment schedule of a Small Quantity Generator even though the quantity of hazardous wastes generated is below the Federal or District regulatory threshold (Hughes, OSHEM 2007).

NMAAHC would be responsible for determining the quantity and type of hazardous waste generated. The following are some examples of operations or activities that might generate hazardous wastes:
- Maintenance of motor vehicles
- Electroplating
- Printing and reproduction
- Photographic processing and printing laboratories
- Construction, renovation and maintenance activities
- Manufacturing or refinishing furniture
- Chemical applications to treat lawns, yards, or gardens
- Preservation/handling of preserved specimens
- Pest management
- Using oils or other petroleum products
- Using dyes, paints, printing inks, thinners, solvents, or cleaning fluids
- Using acids or caustics
- Using flammable liquids
- Building maintenance

NMAAHC would be responsible for adequate manifests, documentation, and transportation of the hazardous waste. Additionally, all generators of hazardous waste would be required to have a facility contingency plan and emergency procedures that conforms to 40 CFR 264 Subpart D (SI Safety Handbook, Chapter 26, 2001). In addition, NMAAHC would be required to follow container management standards for accumulation of hazardous waste, including secondary containment for any hazardous waste containing free liquids. Hazardous waste would be managed in accordance with applicable USEPA and District laws and regulations (Hughes, OSHEM 2007).
6.11.4 How would construction operation of the NMAAHC affect infrastructure and utilities?

The following criteria have been used to assess impacts to the infrastructure and utilities for each alternative:

- **No Effect** – No temporary or permanent disruption to utilities and serviced community during construction and occupation of the NMAAHC.

- **Not Significant Effect** – The impact to the utility lines and the serviced community would be temporary and not substantial due to minor disruptions during the construction phase.

- **Significant Effect** – The impact to the utility lines and the serviced community would be substantial. There would be long-term permanent changes experienced by the system and the serviced community.

**No Build Alternative**

Under the No Build Alternative, there would be no changes to the current use of the site, and as a result no impacts to infrastructure or utilities would occur.

**Alternative 1 (Contextual Building Alignment)**

Under Alternative 1, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. This alternative proposes a building footprint of approximately 43,800 gsf and a basement footprint of 98,000 gsf and locates the building in the center of the site.

Based on load determinations by utility service providers based on a service request submitted by Smithsonian Institution, adequate connections would be extended to the site from the nearest available service lines.

DCWASA would provide water connections to the site from water lines in the vicinity. For sewer and stormwater service, new construction on the NMAAHC site would need to either tie into the CSS system or the separate sewer/stormwater system based on determination made by DCWASA in the design phase of the NMAAHC. If the site is serviced by the separate sewer/stormwater system, additional sewer lines would need to be extended to service the site. Stormwater runoff would be collected via the existing lines along 14th Street and Constitution Ave and drained into the Tidal Basin. While it is unlikely that the sanitary or stormwater would tie into the CSS, it remains a possibility. If the site is serviced by the CSS there is existing infrastructure around the site that can be used. The site would be part of the B Street/New Jersey Avenue (B ST/NJ) drainage area of the CSS and would drain via a trunk sewer line into the Main pumping station located on the Anacostia River.

Pepco would extend adequate electric laterals to the site from existing utility lines around the site. Electricity would be provided at high voltage and Smithsonian Institution would need its own transformers to step it down to usable levels.

Washington Gas would provide gas to the NMAAHC property line through gas lines in the vicinity of the site. The 24-inch transmission line passing through the site would not be tapped for service. The proposed new construction would maintain a minimum setback of 10-ft from the transmission line measured to the edge of construction. The setback distance would vary depending upon the depth of construction and also the quality of the soil. Before the design phase, a geotechnical study would likely be required to determine internal soil friction. In addition, during construction the contractor would be required to provide adequate shielding to minimize damage to or dislocation of existing utility lines and to maintain at least a 3-ft to 4-ft protective soil cover over the top of the transmission line. The proposed design would need to maintain adequate access for servicing and maintenance work of the transmission line as per
federal regulations, which require a survey of these lines every three years (Melliza, Washington Gas 2007).

Steam and chilled water would be provided either by GSA or alternatively incorporated as a self-sufficient component in the design of the building’s mechanical systems. In the case of scenario one, GSA would provide steam to the site through the steam tunnel on 15th Street and chilled water would be extended from the NMAH site. In scenario two, the site plan would incorporate space for a chiller plant, a cooling tower, and a natural gas-fired boiler and the mechanical systems would be designed to provide in situ heating and cooling.

Fiber and telephone network would be provided by Verizon and the Smithsonian Institution owned and operated SI-NET fiber optic network would be extended to the site.

Smithsonian Institution would contract with appropriate agencies for disposable and recyclable solid waste removal. Hazardous waste management, storage and disposal would be managed by the Smithsonian Institution as per USEPA and District regulations. There would be temporary and permanent effects on subsurface water, electric, telephone, chilled water, and stormwater utility lines passing from within the NMAAHC site boundary during construction and operation of the museum. The proposed project however, is comparable in size and scope with other buildings on the Mall. The effects are predominantly specific to the site and normal for any construction taking place in already developed area; therefore effects are not considered significant.

The building footprint would cover the NPS-owned subsurface utility lines, some of which are active and service other structures in the vicinity, and some are abandoned. The footprint also covers the GSA owned 3-5-foot by 5-foot water intake brick culvert, which is not currently in use. Construction on the site would require rerouting the active utility lines and would cause temporary disruption to operations. The abandoned utility lines would be removed and disposed as per regulation and the water intake brick culvert would be truncated. There would be permanent loss of future opportunities to connect to these utility lines or to use the culvert for extending services to other buildings.

Existing utilities around the site would be tapped to extend services to the NMAAHC site. During the construction and linkup stages there would be temporary, but not significant, disruptions to utility services in surrounding buildings.

There would be no significant effects on stormwater drainage due to construction of Alternative 1; new construction would follow D.C.’s stormwater management and erosion and sediment control regulations that would require the submission of a stormwater plan by the Smithsonian Institution that meet several requirements, including an important directive that stormwater flow from the site not increase after development over the pre-construction baseline. A detailed discussion of stormwater issues can be found in the Section 6.4.

There would be an increase in solid waste collection and disposal due to construction of Alternative 1. The site is currently unoccupied and generates very little solid waste. The new museum building would generate municipal and other solid waste related to day to day operations. In addition, there would be construction debris generated during construction (415,000 sf or 757 tons) of the museum under Alternative 1 (Franklin Associates, 1998). As a result, there would be an increase in solid waste generation and collection at the existing site due to construction and operation of the new museum. Solid waste disposal however, would be done by external contracting agencies at a collective landfill as per regulation. Additional loads would not be significant in comparison to the larger disposal operations. Additionally, the generation of construction debris would take place over five years and consequently, disposal would occur over a five year period.

1 Solid waste generation from construction under Alternative 1 has been estimated based on the estimated total square footage of the buildings and the assumption of 4.02 pounds of construction debris per square foot.
Hazardous waste generated due to construction and operation of the new museum would be stored, transported, and disposed as per a hazardous waste disposal program conforming to applicable EPA and District regulations and thus there would be no significant effects.

There would be no significant effects on water, sewer, electric, gas, and telephone and fiber optic capacities due to added loads consequent to the construction and operation of the museum. There are adequate capacities available for servicing the NMAAHC buildings.

**Alternative 2 (Washington Monument Orientation)**

Under Alternative 2, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. This alternative proposes a building footprint of approximately 30,000 gsf and a basement footprint of 98,000 gsf and locates the building in the central northeastern part of the site.

Utility discussion for Alternative 2 is the same as previously discussed under Alternative 1. In Alternative 2, the basement footprint is well outside the required buffer for the gas transmission line that parallels Constitution Avenue. In addition, the infrastructure demand is similar as Alternative 1. Since supplying capacity to the NMAAHC is not problematic, Alternative 2 contains the same effects as Alternative 1.

Construction debris related to Alternative 2 (376,000 sf) would be 686 tons; however, the net difference from Alternative 1 is negligible. As a result, the effects for solid waste collection and disposal would be the same as discussed under Alternative 1.

**Alternative 3 (Free Form)**

Under Alternative 3, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. This alternative proposes a building footprint of approximately 30,000 gsf and a basement footprint of 67,000 gsf and locates the building in the southern half of the site.

Utility discussion for Alternative 3 is the same as previously discussed under Alternative 1. In Alternative 3, the basement footprint is well outside the required buffer for the gas transmission line that parallels Constitution Avenue. In addition, the infrastructure demand is similar as Alternative 1. Since supplying capacity to the NMAAHC is not problematic, Alternative 3 contains the same effects as Alternative 1.

Construction related effects would be less since the building and basement footprint for Alternative 3 is smaller than Alternative 1. It would not involve construction over the GSA owned 3.5-foot by 5-foot water intake brick culvert. There would thus be less disruption of existing subsurface utility lines within the NMAAHC site boundary during construction and occupations under Alternative 3. Effects on other NPS owned subsurface utilities like water, electric, telephone, and stormwater would be the same as discussed under Alternative 1.

Construction debris related to Alternative 3 (411,000 gsf) would be 750 tons, however the net difference from Alternative 1 is negligible. As a result, the effects on solid waste collection and disposal would have similar overall effects as discussed under Alternative 1.
Alternative 4 (Terraced Roof)
Under Alternative 4, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. This alternative proposes a building footprint of approximately 84,000 gsf and a basement footprint of 111,500 gsf and locates the building in the center of the site.

Utility discussion for Alternative 4 is the same as previously discussed under Alternative 1. In Alternative 4, the basement footprint is located directly on the required buffer for the gas transmission line that parallels Constitution Avenue. The infrastructure demand is similar as Alternative 1 and since supplying capacity to the NMAAHC is not problematic, Alternative 4 contains the same effects as Alternative 1.

Alternative 4 has a larger footprint than Alternative 1 and the basement footprint provides for a 12 foot buffer from the 24-inch gas transmission line located in the north of the site. Should further analysis require an additional buffer in excess of 12 foot, effects to gas transmission would be greater.

Construction debris related to Alternative 4 (385,500 gsf) would be 703 tons, however the net difference from Alternative 1 is negligible. As a result, the effects on solid waste collection and disposal would be the same as discussed under Alternative 1.

Alternative 5 (Enframing)
Under Alternative 5, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. This alternative proposes a building footprint of approximately 60,000 sf and a basement footprint of 90,000 sf and locates the building in the northwest and southeast quadrants of the site.

Utility discussion for Alternative 5 is the same as previously discussed under Alternative 1. In Alternative 5, the infrastructure demand is similar as Alternative 1. Since supplying capacity to the NMAAHC is not problematic, Alternative 5 contains the same effects as Alternative 1.

Alternative 5 has a larger footprint than Alternative 1 and the smaller massing to the north of the site as well as the basement footprint provides for a only a 3-4 foot buffer from the 24-inch gas transmission line located in the north of the site. As a result, implementing Alternative 5 would require the gas transmission line to be relocated, which could involve temporary disruptions to the community being serviced. The relocation would require adequate space in the vicinity and might require the new construction of a routing station. In addition, the relocation must be undertaken during periods of low use, for example the summer months. Smithsonian Institution would be responsible for the associated costs.

Construction debris related to Alternative 5 (390,000 gsf) would be 711 tons; however the net difference from Alternative 1 is negligible. As a result, the effects on solid waste collection and disposal would be the same as discussed under Alternative 1.
Alternative 6 (Low Profile)

Under Alternative 6, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. This alternative proposes a building footprint of approximately 30,000 gsf and a basement footprint of 76,670 gsf and locates the building in the central northeastern part of the site.

Utility discussion for Alternative 6 is the same as previously discussed under Alternative 1.

In Alternative 6, the basement footprint is well outside the required buffer for the gas transmission line that parallels Constitution Avenue. In addition, the infrastructure demand is similar as Alternative 1. Since supplying capacity to the NMAAHC is not problematic, Alternative 6 contains the same effects as Alternative 1.

Construction debris related to Alternative 6 (350,000 sf) would be 640 tons; however, the net difference from Alternative 1 is negligible. As a result, the effects for solid waste collection and disposal would be the same as discussed under Alternative 1.

Preferred Alternative

Under Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the project area. The preferred alternative proposes an above ground building between 60’- 105’ in height and a below ground volume not deeper than 45’ nor greater than the subsurface volume of and of the Build Alternatives 1-6.

Utility impacts for Preferred Alternative would be similar to any one of the Alternatives 1 through 6. Construction debris related to Preferred Alternative (350,000 to 450,000 sf) would be from 640 to 822 tons. The effects for solid waste collection and disposal would be the same as discussed under any one of the Alternatives 1 through 6.

Hazardous waste generated due to construction and operation of the new museum would be stored, transported, and disposed as per a hazardous waste disposal program conforming to applicable EPA and District regulations and thus there would be no significant effects.

There would be no significant effects on water, sewer, electric, gas, and telephone and fiber optic capacities due to added loads consequent to the construction and operation of the museum. There are adequate capacities available for servicing the NMAAHC buildings.
6.11.5 What measures are proposed to minimize affects to infrastructure and urban systems during NMAAHC construction and operation?

Utility Lines

Adverse effects to the serviced community, dependent upon NPS owned subsurface utilities within the NMAAHC boundary, could be mitigated by adequately rerouting the utility lines through the site’s periphery away from construction limits. Disruption to existing utility lines during construction can be mitigated by providing adequate setbacks, shielding, and embankments to prevent accidental damage or earth shifting from around the utility lines. Coordination with different service providers would help to reduce the construction and utility laying time within and around the NMAAHC site.

In order to mitigate disruption to the existing gas transmission line in Alternative 5, the Constitution Avenue façade of the north two-story mass is moved back eight feet (See Mitigation of Effects to Alternative 5) resulting in a net loss of approximately 750 gsf per floor. The placement of the six-story southern mass (216,000 gsf) remains the same. Since there are two basement levels and two above ground levels affected, there would be a net loss of 3,000 gsf or less than 1 percent to the total gross area of this Alternative (see Figure 6.11-1).

Other Infrastructure systems

Stormwater management as per regulation and applicable criteria would minimize any adverse effects to the environment. During the construction phase, erosion and sediment control plans would be incorporated to minimize runoff and any potential pollution of the surrounding water bodies. Construction and building operations would fully comply with the Washington, D.C.’s stormwater laws and requirements and the Stormwater Pollution Prevention Plan as mandated by EPA for sites greater than one acre (See Section 6.4.5).

Solid and hazardous waste management as per regulation and applicable criteria would minimize any adverse effects to the environment. The use of toxic and hazardous substances should be discouraged during construction, design, and operations. Hazardous waste storage, transportation, disposal and accidental spills would be addressed in accordance with the EPA and District regulations. Adequate contaminant monitoring systems like chlorine monitoring system for potable water and toxic and combustible gas sensors would be considered and incorporated in the building systems design where appropriate. Hazardous waste would be stored, transported and disposed in accordance with Smithsonian Institution procedures and polices and applicable laws and regulations.
6.12 PUBLIC HEALTH AND SECURITY

6.12.1 What are the key considerations about public health and security?

The key considerations regarding public health and safety during the construction of the NMAAHC include the occupational health of the construction workers and safety of the pedestrians in the vicinity of the site. The area experiences high volumes of pedestrian traffic, as the NMAAHC site is surrounded by an extensive on-street sidewalk and off-street path network providing connections to the National Mall’s museums and monuments, downtown and the nearby Metrorail stations. The sidewalks on the far side of 15th Street from the site, and the south side of Jefferson Drive are both designated as bicycle routes and provide bicycle connections to the rest of the National Mall and the Potomac River. Therefore, pedestrian and bicycle safety would be of concern during construction. Occupational health and safety of the construction workers during the construction activities are other aspects of public health and safety concern during construction.

The key concerns regarding the operation of the NMAAHC is the security of the building and grounds and the overall safety of museum employees and visitors and pedestrians in the immediate vicinity of the site. Safety and security concerns for the NMAAHC building include multi-hazard events such as bomb threats, terrorist acts, fires, spills or leaks of hazardous material and hazardous waste, and natural disasters.

6.12.2 What are the current protocols for public health and security?

Internal Smithsonian Institution Safety and Security

The Smithsonian Institution Office of Facilities, Engineering, and Operations (OFEO) is responsible for two offices that regulate the safety and security of Smithsonian Institution organizations, facilities, visitors, and employees.

The Office of Safety, Health and Environmental Management (OSHEM) is responsible for the safety, occupational health, environmental management, and fire protection services in the Smithsonian Institution facilities. It is the responsibility of the OSHEM to ensure that the Smithsonian Institution organizations and facilities operate and sustain a safe and healthful environment for employees, volunteers, and the visiting public, and to assure Smithsonian Institution collections and property are protected (Smithsonian, 2007). OSHEM provides the safety, occupational health, environmental management, and fire protection education, technical support and consultation services to the SI community.

Likewise, the Office of Protection Services (OPS) is responsible for the operations security of the Smithsonian Institution facilities. The OPS provides security services in the facilities and currently has seventeen security units (OPS, 2007a).

Police Jurisdiction: Federal and local

The Central District personnel of the U.S. Park Police of the National Park Service have day to day jurisdictional duties in the Monumental Core area and Smithsonian Institution facilities. The U.S Park Police are called upon to make arrests and enter the Smithsonian Institution facilities only on the Smithsonian Institution’s request. Between May 1, 2006 and April 30, 2007, there were a total of 13 requests for U.S. Park Police (OPS, 2007a).

Specific to the NMAAHC site, on May 30, 2007, a transfer of administrative jurisdiction of the site was passed from the National Park Service to the Smithsonian Institution. In an agreement between the National Park Service and the Smithsonian Institution it was stated that the U.S. Park Police shall be responsible for law enforcement activities at the NMAAHC site, including but not limited to, arrest, transportation, processing of persons arrested, and the handing of motor vehicle accidents, traffic control, or traffic enforcement. In the event that the Smithsonian erects a temporary
building on site, however, the Smithsonian Institution will be solely responsible for such building and shall maintain all control of such building and its contents.

Local Police
The area surrounding the site is served by the 1st District Metropolitan Police Department, Police Service Area (PSA 101). Police Service Areas are basic building blocks of community policing in Washington, D.C.

Fire and Emergency Medical Services
The District of Columbia Fire and Emergency Services Department provides fire safety services, medical ambulance, and rescue services at the Smithsonian Institution facilities (D.C. MPD, 2007).

As described in Section 6.10 Communities & Businesses, the District of Columbia Fire and Emergency Services Department is the first responder to the Mall area including the site in the event of an emergency. The nearest local engine company that serves the area near the project site is Engine 2 located at 500 F Street, NW. Other units of the District of Columbia Fire and Emergency Services near the National Mall include Engine Company 13 at 450 6th Street, SW; Engine 7 at 1101 Half Street, SW; Engine Company 3 at 439 New Jersey Avenue, NW; and Engine Company 16 at 1018 13th Street, NW. Between May 1, 2006 and April 30, 2007, there were a total of 45 requests for Fire and Emergency Medical services (OPS, 2007a).

The closest hospital to the site is George Washington University Hospital located on 23rd Street, NW, approximately twelve blocks northwest of the project site. In addition, the National Air and Space Museum has a Public Health Unit, which provides first aid service to the museum visitors and employees (OPS, 2007b).

As described in Section 6.8 Land Use Planning & Policies, the NMAAHC site is currently used as a medi-vac helicopter landing site.

Public Demonstrations
The site is a currently vacant area with a concession stand and comfort stations. It is used for periodic public demonstrations and public gatherings, which are regulated and permitted through the NPS. Pursuant to 36 CFR 7.96: Permit revocation, which states a permit may be revoked by a U.S. Park Police supervisory official in charge if a demonstration or event presents a clear and present danger to the public safety, good order or health or for any violation of applicable law or regulation.

6.12.3 How was public health and security evaluated for the project?
Public health and security was evaluated for the different alternatives in terms of the requirements for the physical safety and security of the building. The impacts on visitor and employee safety and security were evaluated in terms of the potential increase in demand for safety and security services and impacts on pedestrian and bicycles from the potential increase in traffic.

6.12.4 How would public health and security change with the project?
Construction of the NMAAHC on the site and the subsequent operation of the NMAAHC would require safety and security measures for the building. The safety and security measures for the museum employees and visitors include safety and security requirements internal to the building as well as external measures such as the potential increase demand for police patrol, fire protection, and emergency medical services.
The following criteria have been used to assess impacts to the public health and security for each alternative:

**No Effect** – No temporary or permanent public safety and security concerns during construction and operation of the NMAAHC.

**No Significant Effect** – The construction and operation of the NMAAHC could result in an increase in public safety and security concerns; however, those could be safely and adequately managed in accordance with all applicable regulations and policies, with limiting exposures or risks.

**Significant Effect** – The construction and operation of the NMAAHC could result in an increase in public safety and security concerns; those could not be safely or adequately handled or managed in accordance with all applicable regulations and policies, resulting in unacceptable risk.

**No Build Alternative**
Under the No Build Alternative, the existing land use of the site, including concessions and periodic demonstrations, would continue, as would basic landscape maintenance. Therefore, no additional impacts to public health and security would be expected.

**Alternative 1 (Contextual Building Alignment)**
Under Alternative 1, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. This alternative proposes a building footprint of approximately 43,800 gsf and a basement footprint of 98,000 gsf. The NMAAHC is located in a heavily visited area between the U.S. Capitol and Washington Monument at the corner of 14th Street and Constitution Avenue, two of the busiest transportation corridors. The addition of the NMAAHC to this location will not place any additional significant demands on emergency or security personnel nor will it significantly increase the coincidence of pedestrian vehicular conflicts. In addition, as long as the NMAAHC construction and operation complies with applicable regulations and guidance and would ensure the safety and health of the workers, no significant effects to external security, public health, or safety are anticipated due to the proposed action.

**Public Health and Security Impacts during Construction**
As discussed in the Transportation Impacts Section (See Section 6.7.4), construction activities associated with the proposed activities could pose safety hazards. Short-term impacts to public safety could occur as public use of the area is altered, forcing users to take alternate routes, which could result in increased conflict with cars.

During construction, the sidewalks will remain open to pedestrian traffic. To minimize safety concerns, appropriate signage would be posted near the site to notify pedestrians and bicyclists and redirect them safely away from the construction area during the construction period. Therefore, impacts to pedestrian and bicycle safety is not anticipated to be significant.

Construction activities would be in conducted in compliance with the applicable regulations and guidance and would ensure the safety and health of the workers during construction. In Directive 419 (SD419), the Smithsonian Safety & Health Program, OSHEM states that it is Smithsonian Institution policy to provide a safe and healthful environment for its staff, volunteers, visitors, and collections. The policy is consistent with the requirements of the Occupational Safety and Health Act of 1970 and Executive Order 12196, "Occupational Safety and Health Programs for Federal Employees." In addition, the Smithsonian Institution Safety Handbook, which is referred to in SD 419, provides guidance on the protection of the all construction workers working on Smithsonian Institution projects. Per Smithsonian Institution policy, all construction, alteration, and renovation work is conducted pursuant to 29 CFR 1926, Safety and Health Regulations for Construction, and applicable subparts of 29 CFR 1910, Occupational Safety and Health Standards.
Public Health and Security Impacts during Operation

Building Safety and Security

It is assumed that the NMAAHC would incorporate risks and security features into the final design of the museum similar to other major buildings on the Mall, including a minimum setback of 50 feet from the inner edge of the sidewalk of the surrounding streets is used as a planning principle. This distance is deemed by the Smithsonian Institution OPS to be conventional for the purpose of building security. The setback along the northern edge of the NMAAHC site would be in line with the NMAH, therefore, would be at a greater distance than the minimum 50-foot setback. To the south, there is also room for a setback greater than the minimum of 50 foot. The 50-foot setback would be met on the east and west sides.

For the purposes of the Tier I EIS process, Ammann & Whitney Consulting Engineers (A&W) performed a preliminary Blast Effects Analysis (BEA) of the future NMAAHC Building. The preliminary BEA was performed to Smithsonian Institution requirements and provides qualitative estimates of the potential structural, architectural, construction and cost impacts on the future conventional building design (A&W, 2007).

Throughout the analysis, information about the building site, footprint, architectural, and structural systems was assumed based on available resources and engineering judgment. The analysis has the limited scope of performing a blast effects analysis of an assumed NMAAHC Building configuration, using the provided standoff distances and considering only potential improvised explosive device (IED) detonation sources located within surrounding site roads. Other potential sources of blast threat like parking garages or internal blast within the building were not considered. Also, no Forced Entry and Ballistic Resistance (FE/BR) requirements were addressed and no threat-independent progressive collapse analyses were performed.

For the preliminary BEA, Blast/FX, an explosive effects analysis software was used. Blast/FX is a graphical, PC based software tool used to determine the effects of explosives against facilities and the people inside them.

The preliminary BEA considered a basic design threat of the potential detonation of an improvised explosive device (IED) at the curb of the public roads at the edges of the property and analyzed north and east faces of the proposed building assuming different set backs from the curb for each side, at a 50- and 170-foot set backs on east and north, respectively. The analysis assumed a conventional building construction and that the perimeter security would be in place.

The preliminary BEA generated results for the detonations at the east and north facades. The results follow the Interagency Security Criteria (ISC) damage level descriptions.

East Face - The results indicate that the east face would be anticipated to experience low to medium damage. Low to medium damage would result in approximately ten percent of glass windows breaking and destruction or severe damage to ten percent of masonry wall panels. Approximately ten percent of the glass fragments and wall debris would fly into the building causing slight injuries. Both the north and south faces would experience very low to no damage with less than one percent of glass windows and masonry wall panel

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1 The (ISC) for New Federal Office Buildings and Major Modernization Projects, published in September 29, 2004 was developed to ensure that security issues are addressed during the planning, design, and construction of all new Federal Courthouses, new Federal Office Buildings, and major renovations (GSA, 2007). In an effort to minimize the likelihood of mass casualties from terrorist attacks, the ISC was established to guide owners and responsible parties in the implementation of suitable measures that appropriately balance facility construction and use with improved safety and security of the facility occupants (WBDG, 2007).
damage and glass fragments or wall debris would not be generated. Neither the west face nor the building roof would experience any damage. The potential for local or global progressive collapse due to such an incidence would be improbable. Finally, no human fatalities or severe injuries would be expected; however, almost one percent of the building occupants may suffer minor injuries, mainly due to glass fragments.

**North Face** - The results indicate that the north face would be anticipated to experience low damage with approximately three percent of glass windows breaking and destruction or severe damage to three percent of masonry wall panels. No glass fragments or wall debris would be generated. None of the other building faces or the roof would experience any damage. The potential for local or global progressive collapse due to such an incidence would be highly improbable. Finally, no human fatalities, severe, or even slight injuries would be expected.

Based on the preliminary BEA, the following represents the anticipated impacts that blast resistant design requirements may have on the overall building construction (A&W, 2007):

- Exterior window and glass systems would have to be designed with a modest blast-resistance. For a medium level of protection, a GSA hazard level 4 (glazing cracks, fragments enter space and land on floor and impact a vertical witness panel at a distance of no more than 10 feet from the window at a height no greater than 2 feet above floor) represents the acceptable protection level. If required, glass thicknesses and framing sizes on each building face and along the building height can be varied according to the applicable blast loading.

- Based on the level of estimated blast pressures/impulses, special exterior doors that have adequate blast capacity would have to be considered.

- Exterior wall panels should be designed to withstand directly applied blast loads in addition to dynamic reactions from window frames transferred through anchorage systems. Conventional metal stud wall systems can be reinforced to increase their blast resistance to be able to resist the directly applied blast loading within the acceptable response limits. At window locations, additional reinforcement to the wall system would be required to accommodate the additional dynamic reactions from window frames.

- Other exterior wall systems can be used to provide better blast resistance such as reinforced masonry and reinforced concrete wall systems. A one-way wall system spanning vertically between floors, supported laterally by floor slabs, and providing a considerably rigid support to window frames is considered to be a more robust, reliable and economic option for blast resistance.

- The preliminary BEA also determined that in general blast-resistant design requirements would have minor impacts on the building components constructed below grade. With perimeter security in place, the cratering effect of a stationary vehicle bomb detonation would be restricted to an area of a few feet radius from site perimeter, having no practical impact on building construction underground. However, the above ground blast would affect the parts of the building underground via the mechanism of ground shock, a much less severe loading condition when compared to that of an air blast. Ground shock effects could be handled with minor adjustments to the design and detailing of building perimeter walls and basement floor and roof slabs.
Therefore, based on the results, the preliminary BEA concluded that there are no specific restrictions to conventional construction and that modest blast pressures must be accommodated (A&W, 2007). It also concluded that while the 50-foot building setback is a sensible distance, the basement level need not follow that same setback. However, the preliminary BEA recommends that a formal threat assessment be conducted for the design phase. Specific mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment.

**Building Safety**
Compliance with the applicable national health and safety standards would ensure building safety. The building would be designed to achieve fire, life safety and environmental criteria prescribed in applicable building codes and Smithsonian Institution criteria. The Smithsonian Institution Safety Handbook, which is referred to in SD419, implements and supplements the requirements of the applicable safety and health standards. Specifically, SD419 is consistent with the requirements of National Fire Codes published by the National Fire Protection Association (NFPA), the USEPA, the Nuclear Regulatory Commission (NRC), and other applicable Federal, State, and local safety and health regulations.

**Public Health and Security**
As stated in Section 6.9 Visitor Use & Experience, it can be expected that the museum would likely attract a peak number of visitors during the initial years of operation, followed by a return to the natural levels of visitor fluctuation. In the long term, visitorship would follow a similar pattern of overall growth that the Smithsonian Institution museums have experienced since 1970. As a result, the long-term operation of the NMAAHC would not result in a significant increase in demand on external security and safety. The proposed action could potentially increase the need for police, fire protection, and emergency medical services. However, based on the data for the demand on those services for the existing Smithsonian Institution facilities, the increase is not expected to be significant. In addition, it is anticipated that for internal security, a new security unit under the OPS would be created for the NMAAHC (OPS, 2007a). The loss of the NMAAHC site as a medi-vac helicopter landing site is not anticipated to be significant due to the availability of the adjacent open parcels to the south.

Due to the NMAAHC location on the Monument Grounds on the Mall, pedestrian activity at the adjacent intersections and sidewalks is not anticipated to increase significantly with the operation of the NMAAHC because the volume of pedestrians crossing 14th Street from the Mall to the Washington Monument as well as pedestrians crossing Constitution Avenue is already high. In addition, the proposed underground pedestrian connection between the NMAAHC and NMAH would reduce potential pedestrian-vehicular conflict. Additional safety concerns would be addressed by enhanced signalization, signage, and pavement marking improvements; therefore, the impacts are not anticipated to be significant. Transportation Section, Section 6.7, provides detailed discussion of the pedestrian-vehicle conflict impacts and proposed mitigation measures.

It should be noted that in response to Smithsonian Institution consultation regarding security concerns due to the proximity of the site to the White House, the White House Military Office has stated that it does not foresee any impacts to the White House associated with the construction or operation of the NMAAHC (Jackson, 2007).

**Alternative 2 (Washington Monument Orientation)**
Under Alternative 2, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. This alternative proposes a building footprint of approximately 30,000 sf and a basement footprint of 98,000 sf and locates the building in the central northeastern part of the site.
Public Health and Security Impacts during Construction
Since the location, program, construction, and operation of Alternative 2 are nearly identical to Alternative 1, the impacts to public health and security during construction would be the same and would not be significant.

Public Health and Security Impacts during Operation
Impacts public health and security during the operation of NMAAHC would be similar to those described under Alternative 1; for the physical security of the building, a formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.

Alternative 3 (Free Form)
Under Alternative 3, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. This alternative proposes a building footprint of approximately 30,000 gsf and a basement footprint of 67,000 gsf and locates the building in the southern half of the site.

Public Health and Security Impacts during Construction
Since the location, program, construction, and operation of Alternative 3 are nearly identical to Alternative 1, the impacts to public health and security during construction would be the same and would not be significant.

Public Health and Security Impacts during Operation
Alternative 3 impacts would be similar to those under Alternative 1; however, compared to Alternative 1 and 2, the setback in the south would be closer to the minimum 50-foot setback and the based on the results of the preliminary BEA, it is anticipated that the damages to that side of the building would be within the range of damages of the 50 and 170-foot setbacks. A formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.

Alternative 4 (Terraced Roof)
Under Alternative 4, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. This alternative proposes a building footprint of approximately 84,000 gsf and a basement footprint of 111,500 gsf and locates the building in the center of the site. This alternative proposes the largest footprint of all the alternatives.

Public Health and Security Impacts during Construction
This alternative proposes the largest footprint of the five build alternatives; however, since the location, program, construction, and operation of Alternative 2 are nearly identical to Alternative 1, the impacts to public health and security during construction would be the same and would not be significant.

Public Health and Security Impacts during Operation
This alternative proposes the largest footprint of the five build alternatives. For the most part Alternative 4 impacts would be similar to those under Alternative 1; however, the setback in the south would be at the minimum 50-foot setback and the based on the results of the preliminary BEA, it is anticipated that the damages to that face of the building would be similar to the damages of the 50-foot setback on the east face of the building. A formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.
Alternative 5 (Enframing)
Under Alternative 5, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. This alternative proposes a building footprint of approximately 60,000 sf and a basement footprint of 90,000 sf and locates the building in the northwest and southeast quadrants of the site.

Public Health and Security Impacts during Construction
Since the location, program, construction, and operation of Alternative 3 are nearly identical to Alternative 1, the impacts to public health and security during construction would be the same and would not be significant.

Public Health and Security Impacts during Operation
Impacts to public health and security during operation of NMAAHC would be similar to those described under Alternative 1; however, the setback in the north would be at the minimum 50-foot setback and the based on the results of the preliminary BEA, it is anticipated that the damages to that side of the building would be similar to the damages of the 50-foot setback on the east face of the building. A formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.

Alternative 6 (Low Profile)
Under Alternative 6, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. This alternative proposes a building footprint of approximately 30,000 gsf and a basement footprint of 76,667 gsf and locates the building in the central northeastern part of the site.

Public Health and Security Impacts during Construction
Since the location, program, construction, and operation of Alternative 6 are nearly identical to Alternative 1, the impacts to public health and security during construction would be the same and would not be significant.

Public Health and Security Impacts during Operation
Impacts public health and security during the operation of NMAAHC would be similar to those described under Alternative 1; for the physical security of the building, a formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.

Preferred Alternative
Under the Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns.

Public Health and Security Impacts during Construction
Impacts to public health and security during construction of the Preferred Alternative would be the same as under any of the Alternatives 1 through 6 and would not be significant.

Public Health and Security Impacts during Operation
Impacts to public health and security during construction of the Preferred Alternative would be the same as under any of the Alternatives 1 through 6. For the physical security of the building, a formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.
6.12.5 What measures are proposed to minimize public health and security effects during museum construction and operation?

As noted previously, Smithsonian has policies and the standards and guidelines that implement them in place to address the public health and security concerns. These guidelines are consistent with the applicable federal, state and local regulations and industry standards.

**Mitigation Measures for Public Health and Security Impacts during Construction**

Appropriate signage would be posted near the site to redirect pedestrians and bicyclists away from the construction area during the construction period.

Construction activities would be conducted in compliance with the applicable regulations and guidance and would ensure the safety and health of the workers during construction. As discussed previously, SD419, the Smithsonian Safety & Health Program, OSHEM provides Smithsonian policy to provide a safe and healthful environment for its staff, volunteers, visitors, and collections. The policy is consistent with the requirements of the Occupational Safety and Health Act of 1970, Executive Order 12196, "Occupational Safety and Health Programs for Federal Employees." In addition, the Smithsonian Safety Handbook, which is referred to in SD 419, provides guidance on the protection of the construction workers in the Smithsonian Institution. Per Smithsonian Institution policy, all construction, alteration, and renovation work is conducted pursuant to 29 CFR 1926, Safety and Health Regulations for Construction, and applicable subparts of 29 CFR 1910, Occupational Safety and Health Standards. It is Smithsonian Institution policy that where more stringent occupational safety and health standards are set forth in these requirements and regulations, the more stringent standards may apply.

Among the construction safety concerns addressed in the Safety Handbook include but are not limited to, the following:

- Chapter 9, Electrical Safety
- Chapter 10, Powered Hand Tools
- Chapter 14, Hazardous Materials Storage and Handling Practices
- Chapter 18, Construction Safety
- Chapter 20, Ladders and Scaffolds
- Chapter 33, Hearing Conservation Program
- Chapter 49, Fire Safety During Construction

**Mitigation Measures for Public Health and Security Impacts during Operation**

**Building Safety and Security:** As discussed previously, compliance with the applicable health and safety standards would ensure building safety. Specifically, SD419 is consistent with the requirements of NFPA, the Environmental Protection Agency, the Nuclear Regulatory Commission, and other applicable Federal, State, and local safety and health regulations. The Smithsonian Institution Safety Handbook, which is referred to in SD419, implements and supplements the requirements of the applicable safety and health standards. Building safety concerns addressed in the Safety Handbook include, but are not limited to, the following:

- Chapter 29, Indoor Air Quality
- Chapter 38, Fire Protection Program
- Chapter 39, Life Safety
- Chapter 40, Fire Prevention
- Chapter 41, Automatic Fire Alarm & Detection Systems
- Chapter 42, Automatic Sprinkler & Standpipe Systems
- Chapter 43, Water Distribution Systems for Fire Protection
- Chapter 44, Special Fire Suppression Systems
- Chapter 45, Fire Extinguishers
- Chapter 46, Interior Finish, Insulation and Decorative Materials
- Chapter 50, Fire Rated Construction
• Chapter 53, Fire System Inspections, Testing and Maintenance

In addition to the 50-foot setback, potential mitigation measures for building security could include:
• Hardening of the museum structure and façade; and
• Using appropriate materials for the construction.

Potential perimeter security measures, pursuant to the Smithsonian Mall Wide Perimeter Security Project (See Section 3.3), include:
• Hardening of the furniture that would typically be installed along a streetscape such as benches, bus shelters, and newspaper stands; and
• Installing low plinth walls, planters, and curbside hedges with embedded security.

In addition to the Mall Wide Perimeter Security Project, the NCPC 2005 National Capital Urban Design and Security Plan provide detailed guidance on the placement and design of perimeter security barriers while encouraging a multi-faceted approach to security measures. However, the appropriateness of these building security and perimeter security measures as well as the design and specification of building materials and landscape furniture and features would depend on a formal threat assessment analysis for the NMAAHC in the design phase of the project.

The Office of Engineering Design & Construction (OEDC), under the OFEO, is the Smithsonian Institution's point of contact for all engineering, design, and construction operations for its facilities and the Director of OEDC is charged with the selection of and the compliance with appropriate codes and regulations to serve as minimum design standards for facilities at the Smithsonian Institution.

Public Health and Security

While there would be no significant increase in vehicular-pedestrian conflicts due to the proposed action, the NMAAHC would require enhanced signalization, signage and pavement marking improvements.

As stated previously, the goal of SD 419 and the Smithsonian Safety Handbook is to provide a safe and healthful environment for its staff, volunteers, visitors, and collections. Other applicable Smithsonian Directives include, but are not limited to:
• SD 109 Disaster Management Program
• SD 220 Occupational Health Services
• SD 420 Security Operations and Policies

The 2007 Security Handbook published by the OPS provides the Smithsonian staff with policy and guidance covering programs relating to physical security and protection information and is applicable to Smithsonian Institution’s employees, visitors, facilities, equipment, and collection.
7.0 CUMULATIVE EFFECTS
7.1 WHAT ARE CUMULATIVE EFFECTS AND WHY ARE THEY ANALYZED?

The CEQ regulations, which implement the NEPA (42 USC 4321 et seq.), require 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 non Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts occur as a result of the combined effects of several proposed project actions that may take place in the project area before, during, or after the project timeframe.

Generally, the scope of cumulative analysis is often broader than the scope of analysis used in analyzing the direct or indirect effects for each particular resource area of concern. To avoid extending data and analytical requirements beyond those relevant to decision making, a practical delineation of the spatial and temporal scales is needed. The selection of geographic boundaries and time period should be, whenever possible, based on the natural boundaries of resources of concern and the period of time that the proposed action's impacts will persist (EPA 1999).

The sum total of past development within areas in and around the NMAAHC site and the Metro Washington, D.C. area over the years has resulted in substantial changes in the environment and numerous environmental impacts to aesthetic and visual resources, cultural resources, air quality, noise, transportation, land use planning, visitor use and experience, public health and security, and urban systems.

The discussions regarding affected environment provided throughout Chapter 6 help reflect the cumulative impacts associated with previous development in the region. Several projects and plans have been identified and included in the evaluations of current and reasonably foreseeable future cumulative impact evaluations.

7.2 WHAT OTHER PROJECTS WERE CONSIDERED TO DETERMINE CUMULATIVE EFFECTS?

The following actions were identified as having the potential for impacts to the resources that are evaluated in this Tier I FEIS (Table 7.2-1). These projects include present and reasonably foreseeable projects within the national recreation area and in the surrounding area.
<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Museum of American History, Kenneth E. Behring Center Public Space Revitalization</td>
<td>The building is currently undergoing modernization of key public safety systems, public services, and public space renewal. (NCPC, 2007). Initial studies for the Comprehensive Facilities Development Plan for the NMAH, Behring Center identify a building opportunity for the future on the west side of the building that might potentially be two levels above grade, possibly for public amenities.</td>
<td>2007-2012</td>
</tr>
<tr>
<td>National Mall Road Improvements</td>
<td>This project will improve roadway surfaces, drainage, sidewalks, wheelchair ramps, lighting, traffic control devices, landscaping, and other road features in the National Mall area. Some streets will be resurfaced while others will be completely rebuilt. The reconstruction of the L'Enfant Promenade (10th Street, SW between Independence Avenue, SW and the Benjamin Banneker Park overlook), and the rehabilitation of the inlet and outlet bridges on Ohio Drive from 15th Street to 23rd Street, are also included in this project. Existing parking spaces will be retained with the exception of curbside parking on north-south roads crossing the Mall between Madison and Jefferson Drives (NCPC, 2007).</td>
<td>2007-2012</td>
</tr>
<tr>
<td>Smithsonian Mall Wide Perimeter Security Project</td>
<td>This project consists of designing and constructing perimeter security streetscape components that include a variety of special bollards, benches, guardhouses, and plinth walls.</td>
<td>2004-2009</td>
</tr>
<tr>
<td>Department of Commerce, Herbert C. Hoover Building Modernization</td>
<td>This project will upgrade and replace major building systems in a sixty nine-year-old building located at 14th Street and Constitution Avenue, NW. Changes proposed include an infill structure in one courtyard to provide swing space for each phase of the modernization and streetscape upgrades including perimeter security (NCPC, 2007).</td>
<td>2007-2012</td>
</tr>
<tr>
<td>Martin Luther King Jr. National Memorial</td>
<td>Dr. King's Memorial site is a four-acre plot on the northeast corner of the Tidal Basin in West Potomac Park, south of Independence Avenue, SW within the precinct of the Jefferson Memorial and north of the proposed Dwight D. Eisenhower Memorial. The building of the Memorial will not have a significant effect on traffic patterns due to its location. The Ceremonial Groundbreaking occurred on November 13, 2006. After construction, the National Park Service would maintain and operate the memorial. The Dedication of the Memorial is scheduled for 2008 (NPS, 2006; KCI Technologies, 2007).</td>
<td>2006-2008</td>
</tr>
<tr>
<td>American Veterans Disabled for Life Memorial</td>
<td>The National Park Service and the Disabled Veterans’ Life Memorial Foundation have proposed a national memorial for disabled veterans at on a 1.16 acre triangular piece of land located at Washington Avenue and 2nd Street SW near the National Mall. The NCPC approved this site in August 2001. There are also two smaller parcels of land that will also be used for supporting services for the Memorial. The Memorial will consist of a grove of trees, a reflecting pool and a central fire in middle of a water element. There will also be stone and glass walls that will enclose the site and define pathways. The Memorial will be completely accessible to disabled visitors. (NPS, 2006; KCI Technologies, 2007).</td>
<td>2001-2010</td>
</tr>
<tr>
<td>Project</td>
<td>Description</td>
<td>Year</td>
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<td>----------------------------------------------</td>
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<tr>
<td>Proposed Dwight D. Eisenhower Memorial</td>
<td>Plans are in progress for the development of a Dwight D. Eisenhower Memorial. The memorial would honor and educate the public on the accomplishments of the late President. The site for the memorial covers approximately four acres of land, and is located at the intersection of Maryland and Independence Avenues, SW. The site is further bounded by Independence Ave to the north, 4th Street to the east, the U.S. Department of Education Building to the south and 6th Street to the west. The site is bisected by an altered segment of Maryland Avenue, which extends diagonally from Independence Avenue to 6th Street (Dwight D. Eisenhower Memorial Commission, 2006; KCI Technologies, 2007).</td>
<td>2005-2012</td>
</tr>
<tr>
<td>Vietnam Veterans Memorial Visitors Center</td>
<td>The Vietnam Veterans Memorial Center will provide a thought-provoking educational experience with exhibits working in synergy with the Memorial located in the northwestern corner of the National Mall. The center would educate students and visitors about the Vietnam War and about the Memorial itself, and would be designed to be a self guided tour. The preferred site is located west of the Vietnam Veterans Memorial along 23rd Street. The site would be on the east side of 23rd Street, NW and is bounded by formal walks and tree plantings. The open space consists of approximately 2.2 acres of open space with appropriate setbacks (Vietnam Veteran Memorial Fund, 2007).</td>
<td>2007-2010</td>
</tr>
<tr>
<td>United States Institute of Peace Headquarters</td>
<td>The United States Institute of Peace (USIP) will locate its permanent headquarters facility on the northwest corner of the National Mall at the intersection of Constitution Avenue and 23rd Street, NW. The site encompasses approximately two acres of land, bordered by the Navy’s Potomac Annex to the north, and three main roadways: Constitution Avenue, NW; 23rd Street, NW; and the on-ramp to Interstate 66 leading to the Theodore Roosevelt Memorial Bridge. The building will contain working spaces for program and administrative staff and research fellows, a research library and archives, a state-of-the-art conference center that includes classrooms and professional training rooms, and a public education center (USIP, 2007).</td>
<td>2007-2010</td>
</tr>
<tr>
<td>14th Street Bridge Corridor Traffic Studies</td>
<td>The 14th Street Bridge Corridor serves as a main gateway into the Nation’s Capital and Northern Virginia. It is a critical commuter link for automobile, transit, freight and passenger users. The corridor provides important access and egress for sports, entertainment, public, political, parade and special events on the National Mall, Constitution Avenue, Capitol Grounds, Lincoln Memorial, Verizon Center, RFK Stadium, East Potomac Park, Potomac River, Pentagon, and Arlington National Cemetery. It also functions as a major evacuation route for the District of Columbia and Arlington County in the event of natural or manmade disasters. In 2000, legislation was introduced by the Virginia congressional delegation to address congestion in the 14th Street Bridge Corridor, including the section in Washington, D.C. Corridor improvements recommended through this process are intended to focus on reducing congestion and improving mobility, traffic operations, and safety for all movements in the 14th Street Bridge Corridor (KCI Technologies, 2007).</td>
<td>2007-</td>
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</table>
7.3 WHAT ARE THE RESULTS OF THE CUMULATIVE EFFECTS ANALYSES?

The No Build Alternative and the proposed Build Alternatives is located on the same site and varies in their respective massing, height, and setback. Environmental consequences are expected to be similar during the construction phase as the site conditions, site preparation, staging, and excavation will be the same for all of the build alternatives. Each alternative would have similar environmental consequences during the operational phases of the project because the architectural program and service access entry will be identical in each alternative. As a result, the discussions of cumulative impacts associated with each alternative are grouped together under each particular resource topic. Where impacts differ between alternatives, the specific alternative and related cumulative impacts are noted. The level of impact presented in the following cumulative impact discussions are determined using the same significance thresholds presented for each resource topic in Chapter 6.

7.3.1 Analysis of Cumulative Impacts for Cultural Resources

The NMAAHC is one of a number of anticipated projects in the vicinity of the NMAAHC site that will cumulatively affect the historic character of the National Mall. The potential cumulative effects of the build alternatives for the NMAAHC are apparent when the proposed project is examined in the context of planned, and proposed projects on or in the vicinity of the National Mall. Examples of key projects:

- The U.S. Peace Institute
- The National Museum of American History expansion westward toward 14th Street
- The Vietnam Veterans Visitors Center
- The National Museum of African American History and Culture

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relocation of the National Aquarium</td>
<td>Plans to relocate the National Aquarium are currently in the concept design phase and no environmental review has been completed. The new public access points would be located on Constitution Avenue centered on the Commerce Building’s façade. The actual entrances would be one level below Constitution Avenue with ramps and stairs leading down to that level. It is envisioned that people would arrive to the site from the National Mall and from the Federal Triangle Metro Station. The General Services Administration is directing this effort (See Appendix B).</td>
<td>2011</td>
</tr>
<tr>
<td>City Center Action Agenda</td>
<td>The DC Office of Planning, in conjunction with the Downtown Business Improvement District, is facilitating a planning process to develop a new action agenda for Washington's center city. The purpose of this new agenda is to develop a list of key strategic initiatives that need to be implemented from July 2006 to Jan 2008 in order to ensure Central Washington develops as a vibrant center that is the symbolic heart of the region and the Nation’s Capital. It will help coordinate the public and private investments needed to create the vibrant, mixed-use, walkable distinctive neighborhoods that will make the Center City thrive. The six fundamental aspects that the Action Agenda plans to achieve are a walkable urbanity, a model green city, distinctive districts, remarkable open spaces, transportation options, and an inclusive culture (DCOP, 2007)</td>
<td>2006-2008</td>
</tr>
</tbody>
</table>
The accumulation of these projects on the National Mall and surrounding monumental core would have an adverse effect on the Plan of the City of Washington and the logic for the design of the National Mall.

7.3.2 Analysis of Cumulative Impacts for Aesthetic and Visual Resources

There are no current projects in the vicinity of the NMAAHC that would influence any measurable cumulative impacts on aesthetics or visual resources. Any estimation of future cumulative impacts would be highly speculative, and dependent upon unknown future variables.

For example, it is known that the NMAH is contemplating a western expansion, which would extend the museum’s presence closer to 14th Street and the NMAAHC site. This would likely have some level of visual effect on the NMAAHC site, but would depend on the myriad of potential massing, access, and architectural design solutions employed. If the addition took the form of a free-form “pavilion” in a landscaped “park” setting, this would have an indirect impact on the NMAAHC, especially if the “free form” massing alternative (Alternative 3) was ultimately implemented; the pavilion form would no longer be an anomaly along the Mall, an impact that would surely lead to significant debate.

The No Build Alternative would not result in any impacts to the aesthetic and visual resources, and as a result, there would be no cumulative impacts associated with this alternative.

7.3.3 Analysis of Cumulative Impacts for Geology and Soils and the Distribution and Movement of Groundwater

Impacts to geology and soils are site specific and are not affected by cumulative development in the region. Cumulative impacts would only occur if development immediately adjacent to the site affected these resources on the site, or if development on the site affected geologic resources of the site where other development may occur. Because the site is surrounded by roads, and the only development on the site would be that of the proposed action, no cumulative impacts to either geology or soils would occur under any of the proposed alternatives.

Based on their proximity, impacts to groundwater caused by the proposed construction and operation of the NMAAHC would not contribute to groundwater impacts caused by the current and proposed future actions described in Table 7.2-1. However, groundwater impacts associated with the urban character of the watershed could add to these impacts. In the surficial aquifer of downtown Washington, D.C., underground utilities (i.e., utility lines, stormwater, and sanitary sewer systems), the Metro subway system, and below-ground building structures (i.e., basements and parking garages) disrupt the natural flow of groundwater. These unnatural features effectively serve as barriers to groundwater flow, raising the water table on the up gradient side and lowering it on the down gradient side. Also, the presence of coarser-grained materials around pipelines may result in preferred flow paths along the pipelines. Where permanent dewatering systems, such as sump pumps are required, a permanent lowering of the water table may occur. When water tables are lowered, the overall course of the natural groundwater flow can be changed. Decreased water table elevations in the vicinity of streams can reverse the hydraulic gradient, causing streams to lose water to the groundwater instead of gaining water. Lowered water tables can also affect soil stability, which could cause substantial settlement in building foundations.

Activities proposed under the Build Alternatives, including the Preferred Alternative, are not expected to have any significant impacts to groundwater quantity or flows. Slurry walls and pile sheeting would be used during both the construction and operation of the proposed NMAAHC so that there would be no groundwater drawdown outside of the construction area that could affect local water courses or building foundations. Groundwater flows would be altered as the volume of the structure located below the groundwater...
table would impede groundwater flows and would likely cause minor variations in the depth of groundwater within the immediate vicinity of the proposed structure. The depth of the groundwater table would rise on the up gradient side and become lower on the down gradient side. Any variations in the depth of groundwater would return to normal levels the further it moves away from the structure. In addition, permanent dewatering of the site would not likely be necessary given the depth of groundwater and construction techniques. Given the impacts to groundwater resulting from the Build Alternatives combined with the impacts to groundwater created by the overall urban characteristics; the overall cumulative impacts to groundwater would be negligible, and not considered significant.

No impacts to groundwater are expected under Alternative 4 because the greatest depth of construction is 15 feet, and would likely be above the height of the groundwater table.

The No Build Alternative would not result in any impacts to geology, soils, or groundwater, and as a result, there would be no cumulative impacts associated with this alternative.

7.3.4 Analysis of Cumulative Impacts for Surface Water and Floodplain Resources

The quality of water within the Potomac River and its tributaries has been and is currently being negatively affected by intense urbanization throughout the entire watershed. Increased stormwater runoff from increased impervious surfaces, point source pollutants from wastewater treatment plants and industrial discharges, and CSO are all factors that contribute to the degrading water quality of the watershed. While the current and proposed future development projects described in Table 7.2-1, and any other development project within the Potomac River Watershed, would be conducted in accordance with all applicable regulatory requirements for erosion and sediment control and stormwater management, each project has the potential to incrementally degrade water quality by:

- Increasing the transport of sediments and other pollutants through overland runoff;
- Increasing the total percentage of impervious surfaces; and
- Increasing the total amount of wastewater and stormwater generated.

Under each of the proposed Build Alternatives, the overall potential to adversely impact surface water quality is negligible. While these potential negligible impacts would contribute to the overall water quality degradation caused by other past, current, and future development within the watershed, the actions proposed under these alternatives would not result in measurable changes to the overall quality of the Potomac River Watershed. Overall adverse cumulative impacts to surface waters would be negligible and not considered significant.

While the site selected for the proposed NMAAHC is presently located outside the limits of the currently delineated 100-year and 500-year floodplains (FEMA 1985)\(^1\), flooding of the site did occur during a 200-year storm event as a result of insufficient overland drainage. Implementation of any of the proposed Action Alternatives may alter floodwater flows from similar flooding events in the downtown Washington, D.C. area by either diverting floodwaters from the site or from the actual structure itself. These changes in floodwater flows would not noticeably increase the potential for flooding in other portions of downtown Washington, D.C. and would not create conditions where people or structures are

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\(^1\)In September 2007, however, FEMA proposed modifying the base 100-year floodplain elevations in the District (Federal Register Volume 72, Number 186, page 54631-54635). If approved, the site for the NMAAHC would be within the 100-year floodplain, which would trigger certain requirements under Executive Order 11988, “Floodplain Management.”
exposed to a significant risk of loss, injury, or death from floods. Nevertheless, these impacts in combination with the total amount of impervious surfaces that has already occur from past development, the current capacity of both the storm sewer and combined sewer system, and also the additional impervious surfaces that would be created from proposed future actions, such as the Vietnam Veterans Memorial Visitors Center, the American Veterans Disabled for Life Memorial, the Martin Luther King Jr. National Memorial, and the National Museum of American History Kenneth E. Behring Center Public Space Revitalization, could result in noticeable changes in floodwater flows in the downtown Washington, D.C. area. These changes could expose new structures to flood damage, but would not likely pose significant risk to injury or death. Overall, adverse cumulative impacts to floodplains would not be considered significant.

The No Build Alternative would not result in any additional impact to surface water quality or floodplains, and as a result, there would be no cumulative impacts associated with this alternative.

7.3.5 Analysis of Cumulative Impacts for Air Quality

The metropolitan Washington D.C. area is currently in nonattainment for ozone (O₃) and PM₂.₅. This in itself is a cumulative impact, resulting from use of cars and stationary sources, as well as from construction of new projects in and around the area. This cumulative impact is a result of past development that has generated the populations and land use patterns that have led to heavy reliance on automobiles and the urban infrastructure that generates air pollution.

Any project that is constructed in this region has the potential to add traffic and other pollution emitting sources that would contribute to the cumulative degradation of air quality in the region.

There would be adverse impacts to air quality from construction activities. Although the project’s impacts would be temporary, would not exceed NAAQS standards, and would be reduced through mitigation measures, the project would add to the continued exceedance of regional standards for ozone and PM₂.₅. The proposed action, in combination with other cumulative projects, such as the construction of future memorials, road improvements, and other construction projects, would cumulatively contribute to the continued exceedance State and Federal ambient air quality standards. Overall, adverse cumulative impacts to air quality would not be considered significant.

Under the No Build Alternative, there would be no emissions generated from the site, and emissions from the surrounding areas would likely remain at current levels; no adverse or beneficial cumulative impacts to air quality would occur.

7.3.6 Analysis of Cumulative Impacts for Noise

As the NMAAHC site is located in an already noisy commercial and public area and not in close proximity to any residential use, there would be little if any cumulative adverse impacts to noise under any of the proposed Build Alternatives. In addition, there is little opportunity of major growth or development within the immediate area of the National Mall, therefore, adverse cumulative impacts to noise under any of the proposed Build Alternatives would not be significant.

Because noise levels would not change as a result of the No Build Alternative, no adverse or beneficial cumulative impacts to air quality would occur.

7.3.7 Analysis of Cumulative Impacts for Transportation

While each of the projects in described Table 7.2-1 has the potential to influence transportation conditions within the project area (i.e., vehicular trip generation, parking, and Metro use), the overall impacts of these projects would not likely to be considered significant. The vehicular trip generation for these facilities would be well distributed, minimizing effects on the roadway network. The effects from construction traffic and lane closures that associated with these projects would be temporary and not significant. No significant effects on vehicle parking within the immediate site area would be
expected, and no significant effects on existing public transportation would be expected.

Under each of the proposed Build Alternatives, neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The resultant adverse cumulative that would occur when these impacts are combined with the impacts associated with the projects described in Table 7.2-1 would not be significant.

7.3.8 Analysis of Cumulative Impacts for Land Use Planning and Policies

The projects described in Table 7.2-1 would not likely have any significant impacts to current land uses and zoning of the National Mall and downtown Washington D.C. area, and all of the planned construction would be in compliance with land use designations and applicable zoning laws.

Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns. The proposed construction would be in compliance with land use designations and applicable zoning laws. The land use of the project site would continue to be designated for public use with the Smithsonian Institution taking over administrative jurisdiction of the site from the National Park Service. Some uses of surrounding land may be altered to accommodate movement of vehicles, supplies, and people during the construction phase of the project, which may impact the use of surrounding sites in addition to other projects in the study area.

Under the No Build Alternative, there would be no changes in the site with regards to either use or zoning, and as a result, there would be no cumulative effects.

7.3.9 Analysis of Cumulative Impacts for Visitor Use and Experience

The addition of Martin Luther King Jr. National Memorial, American Veterans Disabled for Life Memorial, Proposed Dwight D. Eisenhower Memorial, and the Vietnam Veterans Memorial Visitors Center would likely increase visitorship to the National Mall. Many of these visitors would likely also visit museums associated with the Smithsonian Institution, resulting in overall beneficial impact to visitor use and experience to Washington, D.C.

No significant effects would be expected to visitorship or visitor experience during either the construction or operation of the proposed NMAAHC. After construction is complete, as the proposed NMAAHC becomes established, it is expected that the normal fluctuations in visitorship to the National Mall and Smithsonian Institution museums would level out. There would be minor beneficial impacts on the annual Black Family Reunion, and significant beneficial effects on visitor experience would be expected with a museum that responds to a new and different cultural subject matter which may improve the sense of personal relevance. The NMAAHC would likely have minor beneficial impacts on the annual Black Family Reunion. In addition, because the site is set apart from other museums by roads, there would be no effects to other museums in terms of accessibility, convenience, visiting hours, or prices.

The beneficial cumulative impacts of the actions associated with the Build Alternatives, when combined with the beneficial impacts to visitor use and experience from the additions of the proposed Martin Luther King Jr. National Memorial, American Veterans Disabled for Life Memorial, Proposed Dwight D. Eisenhower Memorial, and the Vietnam Veterans Memorial Visitors Center, would not likely be significant. Cumulative impacts to visitor use could include the increase in visitorship per year to Smithsonian Institution museums. However, the increase in choices of sites to visit around the National Mall may lead to a reduction in the demand for visitorship of other
non-Smithsonian Institution facilities. The proposed museum may possibly be substituted for another museum or monument given an individual visitor’s time constraints. Overall, the total visitorship for the Smithsonian Institution would possibly increase due to the opening of other museums of the Smithsonian Institution.

Under the No Build Alternative, there would be no changes in the current visitor use of the site, and as a result, there would be no adverse or beneficial cumulative effects.

7.3.10 Analysis of Cumulative Impacts for Communities and Businesses

Ongoing and planned projects in the vicinity of the site could result in cumulative effects when considered together with each of the proposed alternatives for the construction of the NMAAHC. Projects in the area include the ongoing Lincoln Memorial Circle Rehabilitation and Security Improvements; the proposed Vietnam Veterans Memorial Visitor Center; construction of the Dwight D. Eisenhower Memorial; the National Academy of Sciences addition; and nearby road improvements such as improvements to the 14th Street Bridge.

Each of the projects in described Table 7.2-1 has construction timelines that may overlap at least partially with that of the NMAAHC, resulting in a greater simultaneous influx of spending into the local economy. Although this would increase the amount of economic growth in the region of influence, the growth experienced would not be cumulatively significant. Furthermore, none of these projects are expected to have any effects on demographics, housing, or community services since there is not expected to be any significant in-migration as a result of any of these projects. In addition, there are no significant cumulative effects expected to local businesses; although there may be a temporary increase in local spending, there would be no long-term cumulative effects, and short-term cumulative effects, while beneficial, would not be significant. Finally, there would be no cumulative effects expected on environmental justice and protection of children, due to the proximity of these projects to the National Mall; they are not adjacent to any census tracts that may be characterized as low-income or minority. Therefore there would be no cumulative socioeconomic effects as a result of these projects.

7.3.11 Analysis of Cumulative Impacts for Infrastructure Utility Systems

There would be no adverse significant cumulative effects on utilities as a result of the proposed NMAAHC. While the proposed NMAAHC would add to the service requirements of the projects listed in Table 7.2-1, however, since a majority of the service providers will be regional agencies, comparative loading numbers would not be significant and adequate capacities would be available.

Under the No Build Alternative, there would be no changes to the site, and no additional utility or public service requirements, as a result, there would be no beneficial or adverse cumulative impacts would occur.

7.3.12 Analysis of Cumulative Impacts for Public Health and Security

Those ongoing or proposed future projects located within the immediate vicinity of the proposed NMAAHC and considered for the cumulative impacts analysis for public health and safety and include: NMAH Kenneth Behring Center Public Space Revitalization; Department of Commerce Modernization; National Mall Road Improvements; 14th Street Bridge Corridor Traffic Project, and Relocation of the National Aquarium. Similarly, Smithsonian Mall-Wide Perimeter Security Project includes the NMAH.

There is a potential for cumulative effects on pedestrians and bicyclists within the area surrounding the site during construction activities should the construction of NMAAHC initiate during latter
part of the 2007-2012 time frame scheduled for the National Mall Road Improvements, NMAH Kenneth Behring Center Public Space Revitalization, and Department of Commerce Modernization. Although the initiation of the NMAAHC construction not been defined at this point, it is assumed that it would be in the 2012 timeframe. The completion of the construction is projected at 2015. The level of the cumulative effects would depend upon the extent of the construction activities of the other actions in the proximity to the area of the NMAAHC construction activities. The level of cumulative effects would also depend on the duration in which the construction activities of the other actions and those of the NMAAHC coincide. However, it is anticipated that with proper coordination with the applicable Federal and local agencies, the adverse cumulative effects would be addressed by enhanced signalization, signage and pavement marking improvements; therefore, the effects are not anticipated to significant.

The perimeter security measures to be put in place for the NMAH under the Smithsonian Mall-Wide Perimeter Security Project are scheduled for completion by 2009. Therefore, there would be no cumulative effects of the NMAAHC construction activities on the pedestrians and bicyclist using the area.

Long-term, it is anticipated that the NMAAHC site would benefit from the improvements to the streets in the surrounding area from other actions such as National Mall Road Improvements Project, which would provide beneficial effects for pedestrian, bicyclists, and vehicles by improving lighting, roadway, traffic control devices, sidewalks, etc. Likewise, the purpose of the 14th Street Bridge Corridor Traffic Project is to reduce congestion and improve mobility, traffic operations, and safety for all movements in the corridor. Therefore, the NMAAHC site would benefit from the improvements.

Based on the existing demand for the U.S. Park Police and District of Columbia Fire and Emergency services, the construction and operation of the NMAAHC as proposed under any of the build alternatives is not anticipated to contribute significantly to the cumulative effects of the increase in demand for such services.
8.0 SUMMARY AND COMPARISON OF IMPACTS
8.1 SUMMARY AND COMPARISON OF IMPACTS

This chapter provides a summary level comparison of the potential impacts of implementing each of the proposed alternatives, and a discussions pertaining to unavoidable significant adverse impacts (Section 8.2); short-term uses versus long-term productivity (Section 8.3); and irretrievable and irreversible resource commitments (Section 8.4).

8.1.1 Summary of Project Impacts (tabular form by alternative)

The summary of potential impacts is presented in Table 8.1-1 and has been organized to correspond with the analysis of environmental issues and mitigations provided in Chapter 6.0. The summary table is arranged in four basic columns and lists the impacted resource and effects per Alternative.

Table 8.1-2 lists the recommended feasible mitigation measures that would be implemented regardless of which alternative is chosen.

Table 8.1-3 presents the projected level of impact significance, after implementation of mitigation measures, based on the significance thresholds which correspond with the thresholds presented in Chapter 6.0.
Table 8.1-1

<table>
<thead>
<tr>
<th><strong>CULTURAL RESOURCES</strong></th>
<th><strong>No Build Alternative</strong></th>
<th><strong>Alternative 1</strong></th>
<th><strong>Alternative 2</strong></th>
<th><strong>Alternative 3</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Under the No Build Alternative, the construction and operation of the proposed NMAAHC would not take place. There would be no new construction on the designated site located on the northeast corner of the Washington Monument Grounds and the existing space would remain open. The overall result of the No Action Alternative would be no effect.</td>
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<td>Under Alternative 1, effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., and 17th Street and Constitution Ave. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
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<tr>
<td>Under Alternative 2, effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., and 17th Street and Constitution Ave., and from the WWII Memorial looking toward the NMAAHC site. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
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<tr>
<td>Under Alternative 3, effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., and 17th Street and Constitution Ave., and from the WWII Memorial looking toward the NMAAHC site. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
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### CULTURAL RESOURCES

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<th>Alternative 4</th>
<th>Alternative 5</th>
<th>Alternative 6</th>
<th>Preferred Alternative</th>
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<tr>
<td>Under Alternative 4, effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., and 17th Street and Constitution Ave., and from the WWII Memorial looking toward the NMAAHC site. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
<td>Under Alternative 5, effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., and 17th Street and Constitution Ave. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
<td>Under Alternative 6, effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., and 17th Street and Constitution Ave. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
<td>Under the Preferred Alternative, the effects to cultural resources would be long-term and considered significant. Significant adverse effects would occur to key threshold panoramas from 14th and Constitution Ave., 17th Street and Constitution Ave, and depending on height, from the WWII Memorial looking toward the NMAAHC site. The NMAAHC will also have significant adverse effects on multidirectional panoramas within the Washington Monument grounds and viewsheds to and from historic features in proximity to the NMAAHC site. The alternative will also significantly affect the spatial organization of the Washington Monument grounds by altering its historic boundaries and diminishing the prominence of the Washington Monument as the primary organizing feature. Buildings and structures within the grounds and direct proximity to the NMAAHC, such as the Federal Triangle, are adversely affected.</td>
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Table 8.1-1 (continued)

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<thead>
<tr>
<th>Alternative</th>
<th>No Build Alternative</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
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<td></td>
<td>No adverse effects would be created for the site’s aesthetic and visual resources if the NMAAHC was not built. No construction would occur on the site, so there would be no effect on any of the nine categories previously described that provide a framework for evaluating aesthetics and visual resources. Under this alternative, no adverse cumulative impacts would occur.</td>
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<td>Alternative 1 resulted in major-significant adverse effects from four vantage points: from the top of the Washington Monument; from 15th Street looking north; from the Washington Monument base looking northeast; and, from the northeast corner of 14th Street and Constitution Avenue looking southwest. There were moderate-significant adverse effects from two vantage points: from 14th Street looking north; and, from the center of the Ellipse looking southeast. There were minor adverse effects from three vantage points: from the top of the Old Post Office Building; from the southwest corner of the Washington Monument grounds looking northeast; and, from Arlington House in Arlington National Cemetery. There were varying effects related to a single view (depending on angle of view within a panorama and/or position within a sequence) from three vantage points: from 14th Street looking south (which ranged from minor adverse to moderate-significant adverse effects); from Constitution Avenue looking west (which ranged from minor adverse to major-significant adverse effects); and, from Constitution Avenue looking east (which ranged from moderate-significant adverse to major-significant adverse effect).</td>
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<td>Alternative 2 resulted in major-significant adverse effects from four vantage points: from the top of the Washington Monument; from 15th Street looking north; from the Washington Monument base looking northeast; and, from the northeast corner of 14th Street and Constitution Avenue looking southwest. There were moderate-significant adverse effects from three vantage points: from the top of the Old Post Office Building; from 14th Street looking north; and, from the center of the Ellipse looking southwest. There were moderate-significant adverse effects from four vantage points: from the top of the Old Post Office Building; from 14th Street looking north; and, from the northeast corner of 14th Street and Constitution Avenue looking southwest; from the center of the Ellipse looking southeast; and, from the southwest corner of the Washington Monument grounds looking northeast. There were minor adverse effects from one vantage point: from Arlington House in Arlington National Cemetery. There were varying effects related to a single view (depending on angle of view within a panorama and/or position within a sequence) from three vantage points: from 14th Street looking south (which ranged from minor adverse to moderate-significant adverse effects); from Constitution Avenue looking west (which ranged from minor adverse to major-significant adverse effects); and, from Constitution Avenue looking east (which ranged from moderate-significant adverse to major-significant adverse effect).</td>
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<td>Alternative 3 resulted in major-significant adverse effects from four vantage points: from the top of the Washington Monument; from the top of the Old Post Office Building; from 15th Street looking north; and, from the Washington Monument base looking northeast. There were moderate-significant adverse effects from four vantage points: from 14th Street looking north; from the northeast corner of 14th Street and Constitution Avenue looking southwest; from the center of the Ellipse looking southeast; and, from the southwest corner of the Washington Monument grounds looking northeast. There were minor adverse effects from three vantage points: from 14th Street looking south (which ranged from minor adverse to moderate-significant adverse effects); from Constitution Avenue looking west (which ranged from minor adverse to major-significant adverse effects); and, from Constitution Avenue looking east (which ranged from moderate-significant adverse to major-significant adverse effect).</td>
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Due to their similar north and east alignments and building heights, **Alternative 4** and Alternative 2 share the same effects.

**Alternative 5** resulted in major-significant adverse effects from five vantage points: from the top of the Washington Monument; from the top of the Old Post Office Building; from 15th Street looking north; from the Washington Monument base looking northeast; and, from Constitution Avenue looking east. There were moderate-significant adverse effects from three vantage points: from 14th Street looking north; from the northeast corner of 14th Street and Constitution Avenue looking southwest; and, from the center of the Ellipse looking southeast. There were minor adverse effects from two vantage points: from the southwest corner of the Washington Monument grounds looking northeast; and, from Arlington House in Arlington National Cemetery. There were varying effects related to a single view (depending on angle of view within a panorama and/or position within a sequence) from two vantage points: from 14th Street looking south (which ranged from minor adverse to moderate-significant adverse effects); from Constitution Avenue looking west (which ranged from minor adverse to major-significant adverse effects).

Due to their similar north and east alignments, **Alternative 6** and Alternative 1 share the same effects with a slight decrease in magnitude due to a decrease in building height of 15 feet.

The **Preferred Alternative** resulted in major-significant adverse effects from five vantage points: from the top of the Washington Monument; from the top of the Old Post Office Building; from 15th Street looking north; from the Washington Monument base looking northeast; from the northeast corner of 14th Street and Constitution Avenue looking southwest; and, from Constitution Avenue looking east. There were moderate-significant adverse effects from three vantage points: from 14th Street looking north; from the center of the Ellipse looking southeast; and, from the southwest corner of the Washington Monument grounds looking northeast. There were minor adverse effects from one vantage point: from Arlington House in Arlington National Cemetery. There were varying effects related to a single view (depending on angle of view within a panorama and/or position within a sequence) from two vantage points: from 14th Street looking south (which ranged from minor adverse to moderate-significant adverse effects); from Constitution Avenue looking west (which ranged from minor adverse to major-significant adverse effects).
Under the No Build Alternative, the current condition of the site would remain unchanged, and there would be no adverse impacts to geophysical resources of the site. Under this alternative, no adverse or beneficial cumulative impacts would occur.

Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.

<table>
<thead>
<tr>
<th>No Build Alternative</th>
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<th>Alternative 3</th>
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<tbody>
<tr>
<td>Under the No Build Alternative, the current condition of the site would remain unchanged, and there would be no adverse impacts to geophysical resources of the site. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
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### DISTRIBUTION AND MOVEMENT OF GROUNDWATER (Including Geology and Soils)

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<tr>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter the underlying geology, soils, or current groundwater conditions of the project area. No cumulative impacts to either geology or soils would occur. The negligible adverse cumulative impacts that would occur to groundwater under this alternative would not be considered significant.</td>
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Table 8.1-1(continued)

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<td>Under the No Build Alternative, there would be no earth disturbing activities conducted on the NMAAHC site. The current use of the site would remain unchanged, and as a result, there would be no new impacts to water resources or floodplains. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect the water quality associated with the Potomac River or floodplain resources. Adverse cumulative impacts to surface waters and floodplains would be negligible and not considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect the water quality associated with the Potomac River or floodplain resources. Adverse cumulative impacts to surface waters and floodplains would be negligible and not considered significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect the water quality associated with the Potomac River or floodplain resources. Adverse cumulative impacts to surface waters and floodplains would be negligible and not considered significant.</td>
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### Table 8.1-1 (continued)

<table>
<thead>
<tr>
<th>SURFACE WATER AND FLOODPLAIN RESOURCES</th>
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<tbody>
<tr>
<td><strong>Alternative 4</strong></td>
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<tr>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect the water quality associated with the Potomac River or floodplain resources. Adverse cumulative impacts to surface waters and floodplains would be negligible and not considered significant.</td>
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### AIR QUALITY

<table>
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<tbody>
<tr>
<td>There would be no emissions generated from the site, and emissions from the surrounding areas would likely remain at current levels. As a result, there would no additional impacts to air quality. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>No significant effects to air quality would occur as a result of the proposal. At no point will construction or operations emissions exceed <em>de minimis</em> levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the District’s SIP. Adverse cumulative impacts to air quality would not be considered significant.</td>
<td>No significant effects to air quality would occur as a result of the proposal. At no point will construction or operations emissions exceed <em>de minimis</em> levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the District’s SIP. Adverse cumulative impacts to air quality would not be considered significant.</td>
<td>No significant effects to air quality would occur as a result of the proposal. At no point will construction or operations emissions exceed <em>de minimis</em> levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the District’s SIP. Adverse cumulative impacts to air quality would not be considered significant.</td>
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</table>
Image of Table 8.1-1 (continued) showing air quality impacts for Alternative 4, Alternative 5, Alternative 6, and the Preferred Alternative.

For Alternative 4:
No significant effects to air quality would occur as a result of the proposal. At no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the District’s SIP. Adverse cumulative impacts to air quality would not be considered significant.

For Alternative 5:
No significant effects to air quality would occur as a result of the proposal. At no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the District’s SIP. Adverse cumulative impacts to air quality would not be considered significant.

For Alternative 6:
No significant effects to air quality would occur as a result of the proposal. At no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the District’s SIP. Adverse cumulative impacts to air quality would not be considered significant.

For Preferred Alternative:
No significant effects to air quality are expected from the Preferred Alternative. At no point will construction or operations emissions exceed de minimis levels for any pollutant. Additionally, emissions would not exceed the daily limits set forth in the Washington, D.C. SIP. The increase in annual emissions from the construction activities of the Preferred Alternative would not make up ten-percent or more of the available regional emission inventory for VOC or NOx and would not be regionally significant.
Under the No Build Alternative, there would be no changes to the current site and background noise sources would remain the same. As a result, there would be no effects to the current noise levels on either a local or regional scale. Under this alternative, no adverse or beneficial cumulative impacts would occur.

Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels, given the abundance of noise that presently exists in the project area. **Alternative 1** consists of a five-story structure of approximately 415,000 gsf. Adverse cumulative impacts to noise would not be significant.

Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels, given the abundance of noise that presently exists in the project area. **Alternative 2** consists of a six-story structure of approximately 376,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.

Neither the construction nor the operation of the proposed NMAAHC, as described under **Alternative 3**, would significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 3 consists of a seven-story structure of approximately 410,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.

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<tr>
<td>Under the No Build Alternative, there would be no changes to the current site and background noise sources would remain the same. As a result, there would be no effects to the current noise levels on either a local or regional scale. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels, given the abundance of noise that presently exists in the project area. <strong>Alternative 1</strong> consists of a five-story structure of approximately 415,000 gsf. Adverse cumulative impacts to noise would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels, given the abundance of noise that presently exists in the project area. <strong>Alternative 2</strong> consists of a six-story structure of approximately 376,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC, as described under <strong>Alternative 3</strong>, would significantly affect noise levels given the abundance of noise that presently exists in the project area. Alternative 3 consists of a seven-story structure of approximately 410,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.</td>
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Table 8.1-1 (continued)

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<tr>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels given the abundance of noise that presently exists in the project area. <strong>Alternative 4</strong> consists of a tiered six-story structure of approximately 385,500 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels given the abundance of noise that presently exists in the project area. <strong>Alternative 5</strong> consists of one six-story structure and one two story structure of approximately 430,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly affect noise levels given the abundance of noise that presently exists in the project area. <strong>Alternative 6</strong> consists of a four-story structure of approximately 350,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Adverse cumulative impacts to noise would not be significant.</td>
<td>Under the <strong>Preferred Alternative</strong>, the construction or the operation of the proposed NMAAHC, would not significantly affect noise levels given the abundance of noise that presently exists in the project area. The Preferred Alternative consists of an above ground structure between 60’-105’ tall with a total gross building area ranging from approximately 350,000 gsf to 450,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program. Overall noise impacts resulting from the construction of the Preferred Alternative would be similar to those impacts described under any one of the Alternatives 1 through 6. The Preferred Alternative would affect approximately the same area of land and require similar building construction efforts. Implementation of the Preferred Alternative would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1. Adverse cumulative impacts to noise would not be significant.</td>
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Under the **Preferred Alternative**, the construction or the operation of the proposed NMAAHC, would not significantly affect noise levels given the abundance of noise that presently exists in the project area.

The Preferred Alternative consists of an above ground structure between 60’-105’ tall with a total gross building area ranging from approximately 350,000 gsf to 450,000 gsf. The basic size of the structure would require similar construction efforts and house a similar program.

Overall noise impacts resulting from the construction of the Preferred Alternative would be similar to those impacts described under any one of the Alternatives 1 through 6. The Preferred Alternative would affect approximately the same area of land and require similar building construction efforts. Implementation of the Preferred Alternative would not significantly impact noise in the project area, due to the fact that construction activities would be temporary and would adhere to D.C. noise regulations, as discussed in Alternative 1.

Adverse cumulative impacts to noise would not be significant.
Table 8.1-1 (continued)

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<tr>
<td>No effects are expected. Analysis of the background traffic volumes do not indicate any significant changes from the existing levels of service. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. Adverse cumulative to transportation would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. Adverse cumulative to transportation would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. Adverse cumulative to transportation would not be significant.</td>
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Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions.

Adverse cumulative to transportation would not be significant.

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<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. Adverse cumulative to transportation would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. Adverse cumulative to transportation would not be significant.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly alter roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. Adverse cumulative to transportation would not be significant.</td>
<td>Under the Preferred Alternative, the construction or the operation of the proposed NMAAHC would significantly alter the roadway network and traffic, vehicle parking, existing public, transportation, and existing pedestrian and bicycle circulation and safety beyond their existing conditions. The effects of implementing the Preferred Alternative would be the same as for any one of the Alternatives 1 through 6 because the parking, service access, visitation, and associated trip generation and public access are identical in each alternative.</td>
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Table 8.1-1 (continued)

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<tr>
<th>LAND USE PLANNING AND POLICIES</th>
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<tr>
<td><strong>No Build Alternative</strong></td>
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<tr>
<td>No impacts to land use would occur as a result of the No Build Alternative. Under the No Build Alternative, there would be no changes in the site with regards to either use or zoning, and as a result, there would be no cumulative effects.</td>
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</tbody>
</table>
Under Alternative 4, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns.

Under Alternative 5, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns.

Under Alternative 6, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns.

Under the Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses.

The Preferred Alternative contains the same characteristics as Alternative 1 with the exception of the positioning of the outdoor programming area. This area would be in the southwest or northwest side of the museum or in between two structures, depending on the option that would best provide the required space for NMAAHC programs and activities. The effects from implementing the Preferred Alternative would be expected to be the same as Alternative 1 since the land use is identical.

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<td>Under Alternative 4, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns.</td>
<td>Under Alternative 5, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns.</td>
<td>Under Alternative 6, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. Construction and operation of the proposed NMAAHC would not have any significant adverse cumulative impacts to land use or zoning as they relate to development and development patterns.</td>
<td>Under the Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would significantly alter current land uses. The Preferred Alternative contains the same characteristics as Alternative 1 with the exception of the positioning of the outdoor programming area. This area would be in the southwest or northwest side of the museum or in between two structures, depending on the option that would best provide the required space for NMAAHC programs and activities. The effects from implementing the Preferred Alternative would be expected to be the same as Alternative 1 since the land use is identical.</td>
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<tbody>
<tr>
<td>There would be no effect on National Mall visitorship and visitor experience. The site would continue to be used as an open public recreational resource for large scale protests and public demonstrations. According to visitor polls, less than half of visitors considered to be minorities feel that the current museum subject matter offerings are excellent or superior. Under the No Build Alternative, there would be no new museum that would have the opportunity to expand the present level of cultural ethnic relevance to visitors to the museums on the Mall. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>No significant effects are expected to visitorship or visitor experience during the construction phase of the proposed project. During the first few years of the operation of the NMAAHC, there would be beneficial effects to overall visitorship and visitor experience as a result of the addition of a new Smithsonian Institution museum to the National Mall. As the proposed NMAAHC becomes established, it is expected that the normal fluctuations in visitorship to the National Mall and Smithsonian Institution museums would level out. As a result, long-term impacts to visitorship and visitor experience; however, would not be considered significant. There would be minor beneficial impacts on the annual Black Family Reunion, and significant beneficial effects on visitor experience would be expected with a museum that responds to a new and different cultural subject matter which may improve the sense of personal relevance. The NMAAHC would likely have minor beneficial impacts on the annual Black Family Reunion. In addition, because the site is set apart from other museums by roads, there would be no effects to other museums in terms of accessibility, convenience, visiting hours, or prices. Beneficial cumulative impacts that would occur as a result of this alternative would not be considered significant.</td>
<td>No significant effects are expected to visitorship or visitor experience during the construction phase of the proposed project.</td>
<td>Same as Alternative 1.</td>
</tr>
</tbody>
</table>
Table 8.1-1 (continued)

<table>
<thead>
<tr>
<th>Alternative 4</th>
<th>Alternative 5</th>
<th>Alternative 6</th>
<th>Preferred Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant effects are expected to visitorship or visitor experience during the construction phase of the proposed project. Same as Alternative 1.</td>
<td>No significant effects are expected to visitorship or visitor experience during the construction phase of the proposed project. Same as Alternative 1.</td>
<td>No significant effects are expected to visitorship or visitor experience during the construction phase of the proposed project. Same as Alternative 1.</td>
<td>The effects for the Preferred Alternative would be the same as under any one of the Alternatives 1 through 6 because visitorship to NMAAHC is influenced mostly by subject matter and building design would not have any impact on visitor demand. No significant effects would be expected to visitorship or visitor experience during the construction phase of the proposed project.</td>
</tr>
</tbody>
</table>
Table 8.1-1 (continued)

<table>
<thead>
<tr>
<th>No Build Alternative</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>There would be no effect on economic development, demographics, housing, community services and facilities, or environmental justice issues as a result of the No Build Alternative. The NMAAHC would not be built, and there would be no resulting influx into the local economy of the ROI. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice and the protection of children. The incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant. There are no significant adverse cumulative effects expected to communities and local businesses.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice and the protection of children. The incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant. There are no significant adverse cumulative effects expected to communities and local businesses.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice and the protection of children. The incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant. There are no significant adverse cumulative effects expected to communities and local businesses.</td>
</tr>
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<th>Alternative 6</th>
<th>Preferred Alternative</th>
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<tr>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice and the protection of children. The incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant. There are no significant adverse cumulative effects expected to communities and local businesses.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice and the protection of children. The incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant. There are no significant adverse cumulative effects expected to communities and local businesses.</td>
<td>Neither the construction nor the operation of the proposed NMAAHC would significantly impact local economic development, demographics, housing, additional burden on local schools, police, fire and rescue services, or medical facilities, environmental justice and the protection of children. The incremental increases to tourism and tourist spending that would directly result from the opening of the NMAAHC would have a beneficial effect on local economic development, but it would not be significant. There are no significant adverse cumulative effects expected to communities and local businesses.</td>
<td>Under the Preferred Alternative, the effects on economic development, demographics, housing, community services and facilities, and environmental justice and protection of children would be the same as for any one of the Alternatives 1 through 6.</td>
</tr>
</tbody>
</table>
Table 8.1-1(continued)

<table>
<thead>
<tr>
<th>UTILITIES AND INFRASTRUCTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build Alternative</td>
</tr>
<tr>
<td>No new impacts or additional burdens to current utilities and infrastructure would be expected. Under this alternative, no adverse or beneficial cumulative impacts would occur.</td>
</tr>
<tr>
<td>Alternative 4</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>Under <strong>Alternative 4</strong>, neither the construction nor the operation of the proposed NMAAHC would significantly alter the existing infrastructure or utilities or exceed the existing capacities of these systems within the study area. There would be no adverse significant cumulative effects on utilities or public services.</td>
</tr>
</tbody>
</table>
**Table 8.1-1 (continued)**

<table>
<thead>
<tr>
<th></th>
<th>No Build Alternative</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUBLIC HEALTH AND SECURITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| No additional impacts to public health and security would be expected.  
Under this alternative, no adverse or beneficial cumulative impacts would occur | | | | |
| Neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns.  
Adverse cumulative effects would not be considered significant. | | | | |
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Adverse cumulative effects would not be considered significant. | | | | |
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### Table 8.1-1 (continued)

<table>
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<tr>
<th>Alternative 4</th>
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<tr>
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<td>Neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. Adverse cumulative effects would not be considered significant.</td>
<td>Under the Preferred Alternative, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. Impacts to public health and security during construction of the Preferred Alternative would be the same as under any of the Alternatives 1 through 6 and would not be significant. Impacts to public health and security during construction of the Preferred Alternative would be the same as under any of the Alternatives 1 through 6. For the physical security of the building, a formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.</td>
</tr>
</tbody>
</table>

Overall, neither the construction nor the operation of the proposed NMAAHC would create any significant public safety or security concerns. Adverse cumulative effects would not be considered significant. Impacts to public health and security during construction of the Preferred Alternative would be the same as under any of the Alternatives 1 through 6. For the physical security of the building, a formal threat assessment would have to be conducted for the design phase and appropriate mitigation measures such as the building materials, landscape, and perimeter security would be dependent upon the results of such assessment. Overall impacts are not anticipated to be considered significant.
### Table 8.1-2 Measures Used to Minimize Impacts

<table>
<thead>
<tr>
<th>Cultural Resources</th>
<th>The exact nature of mitigations for adverse impacts on cultural resources will be determined through ongoing consultation within the Section 106 process. In addition, the tiered EIS process allows for more precise mitigations to be defined following approval of a final design.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual/ Aesthetic Resources</td>
<td>In the short term, concealment screens could be designed and implemented around the site during construction. The screens could be utilized to convey information relating to background and mission of NMAAHC, including elements of African American history and culture.</td>
</tr>
<tr>
<td></td>
<td>As with Cultural Resources, the exact nature of mitigations for adverse impacts on visual and aesthetic resources will be determined through ongoing consultation within the Section 106 process and Tier II Scoping Process. The tiered EIS process allows for more precise mitigations to be defined following approval of a final design.</td>
</tr>
<tr>
<td></td>
<td>Each Build Alternative, while inevitably introducing significant adverse effects, responds to the urban design context in different ways, opening up opportunities in later design phases for the potential mitigation, or partial mitigation, of some of these adverse impacts.</td>
</tr>
<tr>
<td></td>
<td>Mitigations for the Preferred Alternative are consistent with the mitigations prescribed for the range of Build Alternatives. The Design Principles, which were developed by the consulting parties, are meant to ensure that the Tier II concept designs will conform to a number of key considerations, such as responsiveness to context and surroundings.</td>
</tr>
<tr>
<td>Distribution and Movement of Groundwater (including geology and soils)</td>
<td>Site-specific BMPs would be developed for controlling runoff, erosion, and sedimentation during construction in accordance with the D.C. Erosion and Sedimentation Control Act of 1977 (amended in 1994). BMPs could include, but are not limited to:</td>
</tr>
<tr>
<td></td>
<td>▪ Using erosion containment controls such as silt fencing and sediment traps to contain sediment on site where necessary;</td>
</tr>
<tr>
<td></td>
<td>▪ Covering disturbed soil or soil stockpiles with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material, where applicable; Inspecting erosion and sediment control best management practices (BMPs) on a regular basis and after each measurable rainfall to ensure that they are functioning properly, and maintain BMPs (repair, clean, etc.) as necessary to ensure that they continue to function properly;</td>
</tr>
<tr>
<td></td>
<td>▪ Sequencing BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during, and after earth disturbance activities.</td>
</tr>
<tr>
<td></td>
<td>▪ Prohibiting sediments from entering storm drain inlets by surrounding or covering the inlet with a filtering material. Several types of filters are commonly used for inlet protection: silt fence, rock filled bags, or block and gravel. The type of filter used depends on the inlet type (for example, curb inlet, drop inlet), slope, and volume of flow.</td>
</tr>
<tr>
<td></td>
<td>Stabilizing construction exit with gravel to reduce the amount of mud transported onto paved roads by vehicles, which can then be transported to storm drains via stormwater runoff. The construction exit does this by removing mud from vehicle tires before the vehicle enters a public road.</td>
</tr>
<tr>
<td>Surface Water Resources (including floodplains)</td>
<td>Implementation of erosion and sediment control plans, as directed by the Erosion and Sediment Control Program (See discussion in Section 6.3.6), would minimize erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter the downstream water flow. Increases in surface stormwater runoff during construction would be controlled by stormwater BMPs as well as erosion and sedimentation controls to reduce potential</td>
</tr>
</tbody>
</table>
### Surface Water Resources (including floodplains)

Impacts to adjacent land and waters (See Distribution and Movement of Groundwater mitigations above).

Effluent created by dewatering practices associated with construction of the proposed facility would also be managed in a way that minimizes the potential impacts to water quality within the Potomac River Watershed. Dewatering practices are used to remove groundwater or accumulated rain water from excavated areas. The muddy water pumped from these excavations, would be diverted to an on-site temporary sedimentation basin or to an area completely enclosed by silt fence in a flat vegetated area where discharges can infiltrate into the ground.

Effluent would never be discharged directly into storm drains unless the sediment has been removed before discharge.

All dewatering practices would be in compliance with all local and federal permits, and DCWASA permitting processes. DCWASA allows for the discharge of construction/dewatering projects to the public sewer system on a case-by-case basis. However, prior to discharge, the contractor must submit a Temporary Discharge Authorization (TDA) Permit Application. The application submittal shall include an analysis of the wastewater, a copy of any engineering plans or documents, and a site map showing the discharge location. Once a permit is obtained, the permittee must submit periodic monitoring reports to the Pretreatment Coordinator as required under site-specific conditions in the TDA permit. Unscheduled random inspections of project sites may also be conducted.

### Air Quality

<table>
<thead>
<tr>
<th>Impacts to air quality would be minimized during construction by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Using low ultra sulfur diesel fuel in off-road construction equipment.</td>
</tr>
<tr>
<td>▪ Limiting unnecessary idling times on diesel powered engines to three to five minutes.</td>
</tr>
<tr>
<td>▪ Locating diesel powered exhausts away from fresh air intakes.</td>
</tr>
<tr>
<td>▪ Utilizing water or appropriate liquids for dust control during demolition, land clearing, grading, on materials stockpiled on the ground surfaces, and other activities.</td>
</tr>
<tr>
<td>▪ Covering open-body trucks for transporting materials.</td>
</tr>
<tr>
<td>▪ Controlling dust related to the construction site through a soil erosion sediment control procedure that includes, among other things:</td>
</tr>
<tr>
<td>▪ Spraying of a suppressing agent on dust pile (non-hazardous, biodegradable);</td>
</tr>
<tr>
<td>▪ Containment of fugitive dust; and</td>
</tr>
<tr>
<td>▪ Adjustment for meteorological conditions as appropriate.</td>
</tr>
</tbody>
</table>

### Noise

<table>
<thead>
<tr>
<th>Noise during the construction would be mitigated by confining activities to normal working hours, and by employing noise-controlled construction equipment to the greatest extent possible;</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Construction contractors would adhere to the District of Columbia noise standard requirements;</td>
</tr>
<tr>
<td>▪ Arrival of heavy equipment and materials would be scheduled to occur during normal work hours to the greatest extent possible; and</td>
</tr>
<tr>
<td>▪ Air compressors and construction equipment would meet current EPA noise emission exhaust standards.</td>
</tr>
</tbody>
</table>

### Transportation

The effects from construction traffic and lane closures that would be minimized by conducting constructions activities and transporting materials during the weekday off-peak periods, and utilizing the lower volume streets (15th Street and Madison Drive) whenever possible, in keeping with the District and Federal regulations. To address the increase amount of pedestrian-vehicular conflicts that would occur, enhanced signalization, signage and pavement marking improvements could be made.
Additionally, the discussed underground pedestrian connection across 14th Street would also decrease pedestrian-vehicle conflicts.

**Land Use**

Except for Alternative 4, outdoor space on the grounds of NMAAHC will be open to the public and support a range of programmed activities that will enhance the adjacent open space and landscape. However, the specificity of activity or degree of enhancement to the NMAAHC and the National Mall will be determined in the design phase of the project.

NPS will continue to operate the concession facility located on the Monument Site but will discontinue operation when the concession is relocated to another location on the National Mall, or December 31, 2010 when the Smithsonian begins construction of the Museum, whichever comes first. The Smithsonian Institution agrees that it will not establish a general food and beverage concession on the Monument Site while the Concession Facility is operating (Agreement between the Smithsonian Institution and the United States Department of the Interior National Park Service, 2007). Relocation of the medi-vac site could be transferred to adjacent Washington Monument property or another designated property.

**Visitor Use & Experience**

Concealment screens would be designed and implemented around the site to decrease impacts to visitor experience from increased noise and dust generated from the construction activities. As described in Section 6.1 Visual & Aesthetic Resources, the screens could be utilized to convey information relating to background and mission of NMAAHC, including elements of African American history and culture.

The proposed NMAAHC will be made accessible to people of all ages, backgrounds, and abilities. The goals of barrier-free accessibility will be met and an emphasis will be placed on affording visitors with disabilities the same experiences and opportunities as other visitors. Access improvements will conform to the requirements of the Uniform Federal Accessibility Standards and the Americans with Disabilities Act. The loss of a public space for large scale gatherings and demonstrations would be mitigated by providing outdoor space on the grounds of NMAAHC (except for Alternative 4) that is open to the public and supports a range of programmed activities. However, the specificity of activity or degree of enhancement to the NMAAHC and the National Mall will be determined in the design phase of the project.

**Communities and Business**

Since effects of the operation of the museum are expected to be beneficial to the ROI, no mitigation would be required.

**Utilities and Infrastructure**

Disruption to existing utility lines during construction would be mitigated by providing adequate setbacks, shielding, and embankments to prevent accidental damage or earth shifting from around the utility lines. Any utilities occurring in the construction area would be adequately rerouted to the site’s periphery and away from construction limits.

Prior to construction, coordination with different service providers would help to reduce the construction and utility laying time within and around the site.

In order to avoid disruption to the existing gas transmission line in Alternatives 4 & 5, the configuration of the basement levels could be slightly modified to avoid the minimum required setback. The configuration of basement levels can be extended to the property line of the site assuming that the design process takes into account the ground shock effects and adequately details the design of building perimeter walls and basement floor slabs.

Stormwater management would be conducted in the same manner as described in Section 6.4.5 (Surface Water Resources).

Proper solid and hazardous waste management as per regulation and applicable criteria would minimize any adverse effects to
### Utilities and Infrastructure (continued)

Hazardous waste storage, transportation, disposal and accidental spills would be addressed in accordance with the EPA and District/state/local regulations. Adequate contaminant monitoring systems like chlorine monitoring system for potable water and toxic and combustible gas sensors would be considered and incorporated in the building systems design where appropriate. Hazardous waste would be stored, transported and disposed in accordance with Smithsonian Institution procedures and polices and applicable laws and regulations.

### Public Health and Security

Appropriate signage would be posted near the site to redirect pedestrians and bicyclists away from the construction area during the construction period.

Construction activities would be conducted in compliance with the applicable regulations and guidance and would ensure the safety and health of the workers during construction.

- In addition to the 50-foot setback, potential mitigation measures for building security could include:
  - Hardening of the museum structure and façade; and
  - Using appropriate materials for the construction.

Potential perimeter security measures, pursuant to the Smithsonian Mall Wide Perimeter Security Project (See Section 3.3), include:

- Hardening of the furniture that would typically be installed along a streetscape such as benches, bus shelters, and newspaper stands; and
- Installing low plinth walls, planters, and curbside hedges with embedded security.

In addition, the NMAAHC would require enhanced signalization, signage and pavement marking improvements to increase pedestrian safety.
### Cultural Resources – Significance Thresholds

<table>
<thead>
<tr>
<th>No Effect</th>
<th>No Significant Effect or Minor Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The proposed action will not affect overall integrity, or affect the character-defining feature(s) of the National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property.</td>
<td>The effect will not be significant if the proposed action does not substantially alter primary character-defining feature(s) of a National Register eligible/listed property, including but not limited to, views and vistas, buildings, landscapes, small-scale features, and setting. The effect would be minor if it alters character-defining features in a limited way. By nature, many minor effects are adverse.</td>
</tr>
</tbody>
</table>

### Aesthetics and Visual Resources – Significance Thresholds

<table>
<thead>
<tr>
<th>No Effect</th>
<th>No Significant Effect or Minor Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The proposed action would not impact the aesthetics or visual viewshed of the proposed project area during construction or operations.</td>
<td>The effects would not be significant if the proposed action did not substantially change the scenic vista; did not substantially change scenic resources; did not substantially change the existing visual character or quality of the site and its surroundings; and did not create substantial lights or glares that would affect day or nighttime views in the area. The adverse (or beneficial) effect is detectable, but slight, and would minimally diminish (or enhance) overall integrity, or affect the character defining feature(s) of the visual resources and aesthetic environment.</td>
</tr>
</tbody>
</table>

### Distribution and Movement of Groundwater (including geology and soils) – Significance Thresholds

<table>
<thead>
<tr>
<th>No Effect</th>
<th>No Significant Effect or Minor Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The geology or soils of the site would not be impacted or the impact to these resources would be below or at the lower levels of detection. No change to current groundwater conditions.</td>
<td>Impacts to geology or soils would be detectable. Mitigation would be needed to offset adverse impacts and would be relatively simple to implement and would likely be successful. Impacts to groundwater would be detectable; however they would be negligible, localized, and only last for a short duration. Mitigation would be needed to offset adverse impacts and would be relatively simple to implement and would likely be successful.</td>
</tr>
</tbody>
</table>
Table 8.1-3 Definitions of Significance Thresholds (continued)

### Cultural Resources – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The effect would be significant if the proposed action substantially alters primary character-defining features of a National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property, including but not limited to, views and vistas, buildings, landscapes, small-scale features, and setting. By nature, most significant effects are adverse. Within the category of “Significant Effect,” a more detailed designation of intensity includes:</td>
</tr>
<tr>
<td>Moderate: The effect is apparent and would diminish overall integrity, or alter a character-defining feature(s) of the National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property.</td>
</tr>
<tr>
<td>Major Effect: The effect is serious and would greatly diminish overall integrity, or greatly alter a character-defining feature(s) of the National Register, National Historic Landmark, or D.C. Inventory of Historic Sites eligible/listed property.</td>
</tr>
</tbody>
</table>

### Aesthetics and Visual Resources – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The effects would be significant if the proposed action resulted in a substantial effect on a scenic vista; substantially altered scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings; substantially altered the existing visual character or quality of the site and its surroundings; or created a new source of substantial light or glare that would substantially affect day or nighttime views in the area. Most of the significant effects are, by nature, adverse; however, in some instances, there may also be beneficial effects, or a combination of adverse and beneficial effects.</td>
</tr>
<tr>
<td>Major Effect: The serious adverse (or beneficial) effect would significantly diminish (or enhance) overall integrity, or would significantly alter a character defining feature(s) of the visual resources and aesthetic environment.</td>
</tr>
<tr>
<td>Moderate Effect: The adverse (or beneficial) effect is apparent and would diminish (or enhance) overall integrity, or would alter a character defining feature(s) of the visual resources and aesthetic environment.</td>
</tr>
</tbody>
</table>

### Distribution and Movement of Groundwater (including geology and soils) – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts on geology or soils would be readily apparent and result in a change to the character of the resource over a relatively wide area. Mitigation needed to offset adverse impacts may or may not be successful. Potentially significant adverse effects may occur directly, indirectly, or cumulatively if the action is likely to:</td>
</tr>
<tr>
<td>Affect the recharge capacity such that there would be a reduction in supply or lowering of groundwater levels;</td>
</tr>
<tr>
<td>Cause other effects that significantly or irreversibly impair the use or quality of groundwater or create a human hazard on adjacent lands or within the larger geographic context of a town or county.</td>
</tr>
</tbody>
</table>
Table 8.1-3 Definitions of Significance Thresholds

| Surface Water Resources (including floodplains) – Significance Thresholds |
|---|---|
| **No Effect** | **No Significant Effect or Minor Effect** |
| No change to surface water or floodplain resources. | Impacts (chemical, physical, or biological effects) would be detectable, but at or below water quality standard or criteria. Alterations in water quality and hydrologic conditions relative to historical baseline may occur, however, only on a localized and short-term basis. Impacts to floodplains would be detectable; however the overall impacts would be negligible, and not expose people or structures to any appreciable risk of loss, injury, or death from floods. |

| Air Quality – Significance Thresholds |
|---|---|
| **No Effect** | **No Significant Effect** |
| No impacts to air quality from the proposed project. | Impacts to air quality do not exceed the de minimis levels for a pollutant or exceed ten percent of the daily limits laid out in the Plan to Improve Air Quality In The Washington, DC-MD-VA Region: State Implementation Plan (SIP), “Severe Area SIP” Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington DC-MD-VA Nonattainment Area. |

| Noise – Significance Thresholds |
|---|---|
| **No Effect** | **No Significant Effect** |
| Natural and existing sounds would prevail; noise generated by construction and operations would be infrequent or absent, mostly immeasurable. | Noise levels would exceed natural and existing sounds, as described under no effect, but would not exceed applicable noise regulation. |

| Transportation – Significance Thresholds |
|---|---|
| **No Effect** | **No Significant Effect** |
| No change to the current roadway network, traffic, parking, existing public transportation or pedestrian or bicycle circulation. | A change that would not:  
- alter roadway network and traffic beyond the current level of service  
- reduce vehicular parking beyond current capacity  
- produce excess demand on public transportation and reduce vehicular-pedestrian-bicycle safety |
### Surface Water Resources (including floodplains) – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical physical, or biological water quality standards or criteria would be locally, slightly and singularly, exceeded on either a short-term or prolonged basis. Impacts to floodplains were considered significant if activities associated with the proposal would:</td>
</tr>
<tr>
<td>• Place structures within a 100-year or 500-year flood hazard area, which could redirect flood flows, and/or expose people or structures to a significant risk of loss, injury or death from floods;</td>
</tr>
<tr>
<td>• Create conditions that could exacerbate flooding (i.e., increasing stormwater discharge from a site that created added burden on the capacity of a storm sewer)</td>
</tr>
</tbody>
</table>

### Air Quality – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts to air quality exceed the de minimis levels for a pollutant or exceed ten percent of the daily limits laid out in the Plan to Improve Air Quality In The Washington, DC-MD-VA Region: State Implementation Plan (SIP), “Severe Area SIP” Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington DC-MD-VA Nonattainment Area.</td>
</tr>
</tbody>
</table>

### Noise – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise levels would exceed applicable noise regulations on a temporary, short-term, or permanent basis or for a prolonged period of time.</td>
</tr>
</tbody>
</table>

### Transportation – Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>A change that would:</td>
</tr>
<tr>
<td>• alter roadway network and traffic beyond the current level of service</td>
</tr>
<tr>
<td>• reduce vehicular parking beyond current capacity</td>
</tr>
<tr>
<td>• produce excess demand on public transportation and reduce vehicular-pedestrian-bicycle safety</td>
</tr>
<tr>
<td><strong>Land Use – Significance Thresholds</strong></td>
</tr>
<tr>
<td>--------------------------------------</td>
</tr>
<tr>
<td><strong>No Effect</strong></td>
</tr>
<tr>
<td>No change in current land use conditions would be expected.</td>
</tr>
</tbody>
</table>

**Visitor Use and Experience – Significance Thresholds**

<table>
<thead>
<tr>
<th><strong>No Effect</strong></th>
<th><strong>No Significant Effect or Minor Effect</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors would not be affected and/or changes in the experience would be below levels of detection. Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.</td>
<td>Some characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be altered. The visitor would be aware of the effects associated with implementation of the alternative. Visitor satisfaction would begin to either decline or increase as a direct result of the effect.</td>
</tr>
</tbody>
</table>

**Communities and Businesses – Significance Thresholds (continued)**

<table>
<thead>
<tr>
<th><strong>No Effect</strong></th>
<th><strong>No Significant Effect or Minor Effect</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>No change to socioeconomic conditions.</td>
<td>A change that does not fall outside the historic range of ROI economic variation.</td>
</tr>
</tbody>
</table>

**Public Services and Urban Systems – Significance Thresholds (continued)**

<table>
<thead>
<tr>
<th><strong>No Effect</strong></th>
<th><strong>No Significant Effect or Minor Effect</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>No temporary or permanent disruption to utilities and serviced community during construction and occupation of the NMAAHC.</td>
<td>The impact to the utility lines and the serviced community would be temporary and not substantial due to minor disruptions during the construction phase.</td>
</tr>
</tbody>
</table>

**Public Health and Security – Significance Thresholds (continued)**

<table>
<thead>
<tr>
<th><strong>No Effect</strong></th>
<th><strong>No Significant Effect or Minor Effect</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>No temporary or permanent public safety and security concerns during construction and operation of the NMAAHC.</td>
<td>The construction and operation of the NMAAHC could result in an increase in public safety and security concerns; however, those could be safely and adequately managed in accordance with all applicable regulations and policies, with limiting exposures or risks.</td>
</tr>
</tbody>
</table>
Table 8.1-3 Definitions of Significance Thresholds (continued)

<table>
<thead>
<tr>
<th>Land Use – Significance Thresholds (continued)</th>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>A change in land use would be expected to affect the context or intensity of the land use.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visitor Use and Experience – Significance Thresholds (continued)</th>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly decline or increase.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communities and Businesses – Significance Thresholds (continued)</th>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>A change is considered significant if it falls outside the historical range of ROI economic variation.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Services and Urban Systems – Significance Thresholds (continued)</th>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The impact to the utility lines and the serviced community would be substantial. There would be long-term permanent changes experienced by the system and the serviced community.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Health and Security – Significance Thresholds (continued)</th>
<th>Significant Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>The construction and operation of the NMAAHC could result in an increase in public safety and security concerns; those could not be safely or adequately handled or managed in accordance with all applicable regulations and policies, resulting in unacceptable risk.</td>
<td></td>
</tr>
</tbody>
</table>
8.2 WHAT UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS COULD OCCUR AS A RESULT OF THE PROPOSED ACTIONS?

Unavoidable adverse impacts occur when a proposed project results in significant adverse impacts for which there are no reasonable or practicable solutions, and for which there are no reasonable alternatives that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts (See Table 8.1-2 for significance thresholds). This section is not meant to repeat the environmental impacts detailed in Chapter 6, but rather summarizes the significant impacts that cannot be avoided, as required under 40 CFR, Part 1502.16.

After implementation of the proposed project, based on the analysis of impacts discussed in Chapter 6, it has been determined that the following environmental issues can be feasibly mitigated below the level of significance:

- Geology, Soils, and the Distribution and Movement of Groundwater;
- Surface Water and Floodplain Resources;
- Land Use and Planning;
- Air Quality;
- Noise;
- Transportation;
- Land Use Planning and Policies;
- Visitor Use and Experience;
- Communities and Businesses;
- Public Health and Security; and
- Public Services and Urban Systems.

Unavoidable significant adverse impacts could occur to both aesthetics and visual resources, and cultural resources (TBD) from the construction and operation of the proposed NMAAHC.

Cultural Resources

With some distinction between alternatives, unavoidable significant impacts are held in common between all six alternatives. Any above-ground resource constructed on the NMAAHC site removes an open portion of the Washington Monument grounds, and alters the historic boundaries of the grounds. Under Alternatives 1 through 6, the established spatial organization of the Washington Monument grounds is altered by removing the northeast corner, resulting in a significant, major, adverse effect.

Under Alternatives 1-6, due to massing and/or height, the building masses impede, alter, or obstruct key views and vistas of historic resources within the Washington Monument grounds and surrounding historic fabric. These key views and vistas include threshold panoramas experienced by pedestrians approaching and entering the Washington Monument grounds, multidirectional panoramas experienced within the grounds, and multidirectional viewsheds to historic features surrounding the NMAAHC site.

Aesthetics and Visual Resources

Based on the viewshed analysis, all six alternatives create some unavoidable significant adverse impacts. By placing a building into a previously unoccupied open space, views from multiple vantage points are affected. Levels of significance are discussed in more detail in Chapter 6.2.

8.3 SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

Pursuant to National Environmental Policy Act (NEPA) regulations (40 CFR 1502.16) an Environmental Impact Statement must consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This section discusses short-term impacts, resource use, and maintenance and enhancement of long-term productivity of the proposed project.
Construction and operation of any of the Build Alternatives would result in short- and long-term impacts and benefits, as discussed below.

Construction is always accompanied by temporary disturbances. The construction of the NMAAHC will create temporary earth disturbances, construction noise, visual impacts, and air quality impacts, and will require the suspension or relocation of the existing NPS concession services and comfort stations. Short-term project costs include the commitment of substantial financial and material resources. Short-term uses of human environment include project impacts considered substantial and temporary. These impacts include construction effects on local air quality, ambient noise levels, water quality, potential transportation and circulation impacts, and effects on land use, cultural resources, and visual resources. Many of these impacts are mitigated; the construction impacts associated with each alternative are described in further detail in Chapter 6. The proposed project would meet the overall purpose and need of the NMAAHC Act, Public Law 108-184.

These short-term adverse impacts after the implementation of mitigation measures, however, are of minor concern when compared with the overall long-term beneficial impacts of the proposed project, which include:

- A new monumental, world-class museum that recognizes the contributions of African Americans to American history, life, & culture;
- Outdoor programmed space that is publicly accessible and provides a range of uses that enhances the adjacent landscape and open space; and
- A clean, impressive, and monumental building that enhances the Washington Monument grounds and National Mall.

Overall, any short-term impacts would that could occur as a result of any of the proposed action alternatives would be acceptable in view of long-term benefits of the project.

8.4 IRRETRIEVABLE AND IRREVERSIBLE RESOURCE COMMITMENTS

Under the proposed Build Alternatives, both natural and man-made resources would be expended in the construction and operation of the NMAAHC. These resources include the building materials used during construction; energy in the form of gas and electricity consumed during construction and operation of buildings by various mechanical and processing systems; and the human effort required to design, construct, and operate the proposed facility. These are considered irrevocably committed because their reuse for some other purpose would be highly unlikely.

The land use changes associated with the proposed action alternative may also be considered an irreversible or irrevocable commitment of land. The proposal constitutes a long-term commitment of land resources, thereby rendering land use for other purposes infeasible. However, given the generally underutilized nature of the site and that the reuse of this land would lend to the preservation, research, and exhibition of historical and cultural materials, this proposed use of land is a positive impact.

In addition, the public services required for this potential development (i.e., police, fire protection, and other city resources) also constitutes District, National Park Service, and Smithsonian Institution resource commitments that might otherwise be used for other programs or projects. While the proposed action would not generate tax revenues or provide a new source of public funds to offset these expenditures, the NMAAHC would serve as a destination and attractor for visitors from all over the world.
9.0 CONSULTATION AND COORDINATION
This chapter provides a list of Federal and local agencies and interested parties that were involved in the development of this Tier I EIS through either coordinated efforts or as a consulted party.

9.1 WHAT AGENCIES AND ORGANIZATIONS HAVE BEEN CONSULTED DURING DEVELOPMENT OF THE TIER I EIS?

The location for the NMAAHC is in Washington, D.C., however multiple Federal and local agencies have jurisdiction over the environmental review and planning, land use, and design process for the proposal. Other agencies or semi-autonomous regional entities will have jurisdiction over permits that would be required to construct and operate the NMAAHC, and/or have expertise concerning elements of the environment addressed in the Tier I EIS process.

Consultations and coordination with Federal and local agencies, and non-governmental interested parties were conducted in coordination with the scoping that has occurred as part of this Tier I EIS process and from subsequent requests for information, clarification of management policies, and planning efforts related to mitigation, including the adherence to Section 106 of the National Historic Preservation Act (See Section 2.5.2 for a complete discussion of the Section 106 process). A full list of agencies that participated in the Scoping Process is listed in Section 3.1. Additional agency and non-governmental organizations consulted in the preparation of this Tier I EIS included the following agencies and organizations:

- National Park Service (NPS)
- White House Military Office (WHMO)
- Smithsonian Institution, Office of Policy & Analysis (OPA)
- Smithsonian Institution, Office of Protection Services (OPS)
- Smithsonian Institution, Office of Facilities Management & Reliability (OFMR)
- Smithsonian Institution, Office of Facilities and Engineering Operations (OFEO)
- Smithsonian Institution, Office of the Chief Information Officer (OCIO)
- Advisory Council on Historic Preservation (ACHP)

Local Agency Coordination

The following local agencies and entities provided project input through internal scoping, individual meetings and contacts.

- District of Columbia Historic Preservation Office (DC HPO)
- District of Columbia Preservation League (DCPL)
- District of Columbia Department of Health, Fisheries and Wildlife (DC DOH)
- District of Columbia Office of Planning (DCOP)
- District of Columbia Department of Environment (DC DOE)
- District of Columbia Water & Sewer Authority (DCWASA)
- District of Columbia Department of Transportation (DDOT)
- District Commission of Fine Arts (CFA)
- Potomac Electric Power Company (Pepco)
- Washington Gas & Light (Washington Gas)

Federal Agency Coordination

The following Federal agencies were consulted over the course of the environmental analysis process for the proposed project.

- U.S. Fish and Wildlife Service (USFWS)
- U.S. Secret Service (USSS)
- General Services Administrator (GSA)
Consultation with Interested Parties

- National Coalition to Save Our Mall
- Committee of 100 on the Federal City
- Association for the Study of African American Life and History (ASALH)
- Mary Annette McQuirter, Independent Scholar on African American issues in DC
- National Trust for Historic Preservation
- Capitol Historical Society
- Advisory Neighborhood Commission (ANC) 2A
- U.S. Capitol Historical Society
- The Guild of Professional Tour Guides of Washington, D.C.
10.0 LIST OF PREPARERS
The Louis Berger Group, Inc. (Tier I EIS Coordinators)
Jess Commerford, AICP, Project Manager
Jill Cavanaugh, Deputy Project Manager
Catherine Price, PE, NEPA Technical Lead
Larry Earle, AICP, Section 106 Technical Lead
Erin Andersen, Production Specialist
Najja Bracey, Economist
Rebecca Byron, Environmental Scientist
Tim Canan, AICP, Senior Planner
Amanda Goebel, AICP, Urban and Regional Planner
Joel Gorder, AICP, Planner/Environmental Scientist
Charlie LeeDecker, Archeologist
Karen Lusby, Senior Planner
Anu Parmar, Architect/Planner
Kasey Pearson, Senior Environmental Scientist
Suni Shrestha, Environmental Scientist
Frank Skidmore, PE
Julia Yuan, Environmental Scientist

Beyer Blinder Belle Architects & Planners (Visual/ Aesthetics)
Hany Hassan, AIA, Architect, Partner-in-Charge
Kevin Storm, AIA, AICP, Architect
Ya Wang, Architect

Robinson & Associates, Inc. (Historic Preservation)
Judith Robinson, Principal
Erin Brasell, Associate

Gorove Slade Associates, Inc. (Transportation)
Louis Slade, PE, Vice President and Principal
Cullen E. Elias, PE, Transportation Engineer
Deanna M. Donahoo, PE, Transportation Engineer

Rhodeside Harwell Landscape Architecture & Planning (Land Use)
Elliot Rhodeside, Principal, Landscape Architect
Emily Broadhag, Landscape Architect

Amman & Whitney (Structural Engineers)
Bal Cherwoo, PE, Vice President
Brian Eaton, PE, Structural Engineer
Tarek H. Kewaisy, PE, Principal Engineer

Justice and Sustainability
Mencer Donahue “Don” Edwards, Principal and CEO
Matt Larsen, Mediator
Gary Willoughby, Mediator
11.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS RECEIVING THIS TIER I FEIS
11.1 AGENCIES AND ORGANIZATIONS RECEIVING HARD COPIES

11.1.1 FEDERAL AGENCIES

National Capital Planning Commission (NCPC)
Marcel C. Acosta, AICP
Executive Director
401 9th Street, NW
North Lobby, Suite 500
Washington, DC 20576

National Park Service - National Capital Region
Peggy O'Dell
Superintendent - National Mall and Memorial Parks
900 Ohio Drive, SW
Washington, DC 20024

United States Environmental Protection Agency (EPA)
Bill R. Arguto
1650 Arch Street
Philadelphia, PA 19103

Commission of Fine Arts (CFA)
Thomas Luebke, Secretary
401 F Street, NW, Suite 312
Washington, DC 20001

United States Department of Interior
Director, Office of Environmental Policy and Compliance
Main Interior Building, MS 2342
1849 C Street, NW
Washington, DC 20240

United States Secret Service (USSS)
Lydia M. Canda
Office of Government Liaison & Public Affairs
245 Murray Drive, Building 410,
Washington, DC 20223

Federal Highway Administration
Jack VanDop
21400 Ridgetop Circle
Sterling, VA 20166

Advisory Council on Historic Preservation (ACHP)
Martha Catlin
1100 Pennsylvania Avenue, NW, Suite 809
Washington, DC 20004-2211
11.1.2 DISTRICT AGENCIES

District of Columbia Office of Planning
Harriet Tregoning, Director
District of Columbia Office of Planning
801 North Capitol Street, NE
Suite 4000
Washington, DC 20002

District of Columbia Department of the Environment
Mary Pfaffko
District of Columbia Department of the Environment
51 N Street, NE, Room 5025
Washington, DC 20002

District of Columbia Water and Sewer Authority (DC WASA)
Ivy Smith
District of Columbia Water and Sewer Authority
5000 Overlook Drive
Washington, DC 20032

District of Columbia Office of Planning/State Historic Preservation Office (SHPO)
David Maloney
State Historic Preservation Officer
801 North Capitol Street, NE
Suite 3000
Washington, DC 20002

Patsy Fletcher
Community Liaison, Office of Planning Historic Preservation Office
801 North Capitol Street, NE
Suite 3000
Washington, DC 20002

Department of Transportation (DDOT)
Emeka C. Moneme, Director
c/o Faisal Hameed
2000 14th Street, NW, 7th Floor
Washington, DC 20009

11.1.3 REGIONAL ENTITIES

Washington Metropolitan Area Transit Authority
John Magarelli
Office of Planning and Project Development
600 Fifth Street, NW
Washington, DC 20001

Potomac Electric Power Company
Mr. James Pringle
3400 Benning Road, NE
Bldg 59, Room 200-B
Washington, DC 20019

Washington Gas
Allan Melliza
6801 Industrial Road
Springfield, VA 22151

11.1.4 ORGANIZATIONS

American Institute of Architects
Washington Chapter
1777 Church Street
Washington, DC 20036
American Society of Landscape Architects
Potomac Chapter
P.O. Box 18184
Washington, DC 20037

American Association of Museums
Kim Igoe
1575 Eye Street NW,
Suite 400
Washington DC 20005

Association for the Study of African American Life and History
Dreck Wilson
525 Bryant Street,
Suite C142
Washington, DC 20005

Alexandria Black History Museum
902 Wythe Street
Alexandria, VA 22314

Committee of 100 on the Federal City
Don A. Hawkins, Chairman
1317 G Street NW,
Washington, DC 20005

DC Preservation League (DCPL)
Rebecca Miller
401 F Street, NW
Room 324
Washington, D.C. 20001

National Coalition to Save Our Mall
Dr. Judy Scott Feldman
P.O. Box 4709
Rockville, MD 20849

National Trust For Historic Preservation
Rob Nieweg
1785 Massachusetts Avenue, NW
Washington, DC 20036

U.S. Capitol Historical Society
Felicia Bell
525 Bryant Street,
Suite C142
Washington, DC 20005

National Organization of Minority Architects
R. Steven Lewis, AIA, President
College of Engineering, Architecture & Computer Sciences
Howard University
2366 6th Street, NW, Room 10
Washington, DC 20059

National Organization of Minority Architects, DC Chapter
William Ngutter
P.O. Box # 77174
Washington, DC 20013-7174

The Guild of Professional Tour Guides of Washington, D.C.
Tom Whitley
P.O. Box 242
Washington, DC 20044-0242
The Humanities Council of Washington, D.C.
Dr. Marya McQuirter
925 U Street NW
Washington, DC 20001

11.1.5 EDUCATIONAL ORGANIZATIONS

Howard University
Harry G. Robinson, III
School of Architecture and Design
Department of Architecture
College of Engineering, Architecture and Computer Sciences
2366 Sixth Street, NW
Washington, DC 20059

The Catholic University of America
Dean Randall Ott, AIA
School of Architecture & Planning
620 Michigan Ave NE
Washington, DC 20064

University of the District of Columbia
Dr. Rachel M Petty
College of Arts & Sciences
4200 Connecticut Ave NW
Washington DC 20008

11.1.6 INDIVIDUALS

Robert L. Wright
Dimensions International, Inc.
2800 Eisenhower Avenue, Suite 300
Alexandria, VA 22314

Robert Wilkins
African American Cultural Complex, Inc.
Venable LLP
575 7th St., NW
Washington, DC 20004
11.2 PLACES TO REVIEW THE TIER I FEIS

Martin Luther King Jr. Memorial Library
901 G Street NW
Washington, DC 20001

Northeast Branch Library
330 7th Street NE
Washington, D.C. 20002

Southeast Branch Library
403 7th Street SE
Washington, D.C. 20003

Southwest Branch Library
900 Wesley Place SW
Washington, D.C. 20024

National Capital Planning Commission
401 9th Street, NW
North Lobby, Suite 500
Washington, DC 20576

Smithsonian Institution Planning Library and Resource Room
Capital Gallery
600 Maryland Avenue SW, Suite 5001
Washington, DC 20013

11.3 AGENCIES, ORGANIZATIONS, INSTITUTIONS, & INDIVIDUALS RECEIVING NOTIFICATION OF THE TIER I FEIS RELEASE

11.3.1 AGENCIES

United States Fish and Wildlife Service
Director H. Dale Hall
177 Admiral Cochrane Drive
Annapolis, MD 21401

United States Corps of Engineers, Baltimore District
John Dinne
PO Box 1715
Baltimore, MD 21203

White House Military Office
Paul Jackson
Director or Policy, Plans, & Requirements
1600 Pennsylvania Ave. NW
Washington, DC 20500

District Department of Health
Dr. Gregg A. Pane, Director
District of Columbia Department of Health
825 North Capitol Street, NW
Washington, DC 20002

District of Columbia Department of Parks and Recreation
Clark Ray, Director
District of Columbia Department of Parks and Recreation
3149 16th Street, NW
Washington, DC 20010
11.3.2 ORGANIZATIONS

African American Cultural Complex
Dr. Elliott B. Palmer, CEO
119 Sunnybrook Road
Raleigh, NC 27610

African American Heritage Preservation Foundation
420 Seventh Street NW Suite 501
Washington, DC 20004-2211

Arts Associates LLC
Claudia Polley, President
104 Quincy Place NW
Washington, DC 20002

Association for Black Cultural Centers
Dr. Fred L. Hord
Executive Director/Founder
North Carolina State University
355 Witherspoon Student Center
Campus Box 7318
Raleigh, NC 27695-7318

Association of African American Museums
Dr. Lawrence J. Pijeaux, Jr.
1575 Eye Street NW. Suite 400
Washington DC 20005

Blacks In Government
James Wilson
3005 Georgia Avenue, NW
Washington, D.C. 20001

The Cafritz Foundation
Calvin Cafritz, Chairman of the Board
1825 K Street NW Suite 1400
Washington, DC 20006

Concerned Black Men
George Garrow
1816 12th Street NW
Washington, D.C. 20009

Conference of Presidents of Major American Jewish Organizations
Harold Tanner, Chairman
633 3rd Avenue, 21st Floor
New York, NY 10017

Congress of National Black Churches
Joe Leonard, Jr.
910 17th Street NW, Suite 317
Washington, DC 20006

Council on Foundations
Steve Gunderson, President and CEO
1828 L Street NW Suite 300
Washington, DC 20036

Downtown DC Business Improvement District
Richard H. Bradley
1250 H Street NW, Suite 1000
Washington, DC 20005
Federal City Council
John W. Hill
1156 15th Street NW
Suite 600
Washington, DC 20005

Greater Washington Urban League
Maudine Cooper
Headquarters Building
Executive Office
2901 14th Street, NW
Washington, DC 20009

Institute of Museum and Library Services
Nancy Weiss
General Counsel
1800 M St, NW, 9th Floor
Washington, DC 20036-5802

Latrobe Chapter, Society of Architectural Historians
Karin Alexis
2449 Villanova Drive
Vienna, VA 22180

The Meyer Foundation
Amy K. Harbison
1400 16th Street NW Suite 360
Washington, DC 20036

Muslim American Society
P.O. Box 1896
Falls Church, VA 22041

NAACP, Washington DC Branch
Lorraine Miller
1000 U Street N.W.,
Washington, D.C. 20001

National Association of Congregational Christian Churches
8473 South Howell Avenue
PO Box 288
Oak Creek, WI 53154-0288
The National Urban League
Marc Moria
120 Wall Street, 8th Floor,
New York, NY 10005

National Society of Black Engineers
Carl Mack
205 Daingerfield Road
Alexandria, Virginia 22314

National Association of Black Journalists
Karen Wynn Freeman
University of Maryland,
8701-A Adelphi Road,
Adelphi, MD 20783-1716

National Council of Negro Women
Dorothy I. Height
633 Pennsylvania Avenue NW
Washington, DC 20004
11.3.3 LOCAL ADVISORY NEIGHBORHOOD COMMISSIONS

ANC-2A
West End Library
1101 24th Street NW
Washington, DC 20037

ANC-2C
PO Box 26182, Ledroit Park Station
Washington, DC 20001

ANC-2F
5 Thomas Circle
Washington, D.C. 20005

11.3.4 Elected Officials

Mayor Adrian Fenty
Washington DC Office of the Mayor
1350 Pennsylvania Avenue NW
Washington, DC 20005

Eleanor Holmes Norton
2136 Rayburn HOB
Washington, D.C. 20515

11.3.5 D.C. COUNCIL MEMBERS

Vincent C. Gray
Chairman
1350 Pennsylvania Avenue NW, Suite 504
Washington, D.C. 20004
Jack Evans
Chairman pro tempore
1350 Pennsylvania Avenue NW, Suite 106
Washington, D.C. 20004

Kwame R. Brown
Council Member At-Large
1350 Pennsylvania Avenue NW, Suite 406
Washington, D.C. 20004

Carol Schwartz
Council Member At-Large
1350 Pennsylvania Avenue NW, Suite 105
Washington D.C. 20004

David A. Catania
Council Member At-Large
1350 Pennsylvania Ave. NW, Suite 110
Washington, D.C., 20004

Phil Mendelson
Council Member At-Large
1350 Pennsylvania Ave. NW Suite 402
Washington, D.C., 20004

Jim Graham
Ward One Council Member
1350 Pennsylvania Ave. NW, Suite 105
Washington, D.C., 20004

Mary M. Cheh
Ward Three Council Member
1350 Pennsylvania Avenue NW Suite 108
Washington, D.C. 20004

Muriel Bowser
Ward Four Council Member
1350 Pennsylvania Avenue NW
Washington, D.C. 20004

Harry Thomas Jr.
Ward Five Council Member
1350 Pennsylvania Avenue NW, Suite 107
Washington, D.C. 20004

Tommy Wells
Ward Six Council Member
1350 Pennsylvania Ave. NW Suite 408
Washington, D.C., 20004

Yvette Alexander
Ward Seven Council Member
1350 Pennsylvania Ave. NW
Washington, D.C. 20004

Marion Barry
Ward Eight Council Member
1350 Pennsylvania Ave. NW Suite 102
Washington, D.C. 20004

11.3.6 NEWSPAPERS

The Washington Post Express
1150 15 Street NW
Washington, DC 20071

The Washington Informer Newspaper
3117 Martin Luther King Jr. Avenue SE
Washington DC 20032
11.3.7 INDIVIDUALS

Frank Morgan  
2046 S. 6th Street  
Arlington, VA 22204

Richard E. Barnes  
6818 Middlefield Terrace  
Fort Washington, MD 20744-1518

Camille Cosby  
P.O. Box 239  
New York, New York 10021

Dr. Kellie Jones  
History of Art Department  
Yale University  
New Haven, Connecticut 06520

Claudine K. Brown, Director  
The Nathan Cummings Foundation  
Arts and Culture Program  
475 Tenth Avenue, 14th Floor  
New York, NY 10018
12.0 REFERENCES
Arlington County Fire Department (ACFD, 2007)  
2007 Accessible at:  
Accessed on June 14, 2007

Advisory Council on Historic Preservation (ACHP, 2002a)  
2002 Section 106 Regulations Users Guide. Accessible at:  
www.achp.gov.

Advisory Council on Historic Preservation (ACHP, 2002b)  
2002 Relationship of Section 106 to Other Laws.  
Accessible at: www.achp.gov.

Arlington County Police Department (ACPD, 2007)  
2006 2006 Annual Report. Accessible at:  
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13.0 INDEX
<table>
<thead>
<tr>
<th>Term</th>
<th>Pages</th>
</tr>
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<tbody>
<tr>
<td>National Capital Planning Commission</td>
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</tr>
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**Scoping**

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</tr>
</thead>
<tbody>
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**Section 106**

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**Security**

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**Smithsonian Institution**

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**Transportation**

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**Utilities**

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**Viewshed**

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</table>

**Visitor Experience**

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<tr>
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<tbody>
<tr>
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</tr>
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</table>

**Visitorship**

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14.0 ABBREVIATIONS, ACRONYMS, & GLOSSARY
### 14.1 ACRONYMS & ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>3-D</td>
<td>Three-dimensional</td>
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<td>A&amp;W</td>
<td>Ammann &amp; Whitney Consulting Engineers</td>
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<tr>
<td>ACHP</td>
<td>Advisory Council on Historic Preservation</td>
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<tr>
<td>ADA</td>
<td>Americans with Disabilities Act</td>
<td></td>
</tr>
<tr>
<td>ADT</td>
<td>Average Daily Traffic</td>
<td></td>
</tr>
<tr>
<td>ACFD</td>
<td>Arlington County Fire Department</td>
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<tr>
<td>ACPD</td>
<td>Arlington County Police Department</td>
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<tr>
<td>AFP</td>
<td>Alexandria Fire Department</td>
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</tr>
<tr>
<td>ALS</td>
<td>Advanced Live Support</td>
<td></td>
</tr>
<tr>
<td>ANC</td>
<td>Advisory Neighborhood Commission</td>
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</tr>
<tr>
<td>APE</td>
<td>Area of Potential Effect</td>
<td></td>
</tr>
<tr>
<td>AQCRs</td>
<td>Air Quality Control Regions</td>
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<tr>
<td>AQI</td>
<td>Air Quality Index</td>
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<td>ARPA</td>
<td>Archaeological Resources Protection Act</td>
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<tr>
<td>ASALH</td>
<td>Association for the Study of African American Life and History</td>
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<td>ASHA</td>
<td>American Speech-Language-Hearing Association</td>
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<td>BEA</td>
<td>Blast Effects Analysis</td>
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<td>Berger</td>
<td>The Louis Berger Group, Inc.</td>
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<tr>
<td>BLS</td>
<td>Basic Life Support</td>
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<tr>
<td>BMPs</td>
<td>Best Management Practices</td>
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</tr>
<tr>
<td>CAA</td>
<td>Clean Air Act</td>
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</tr>
<tr>
<td>CAAA</td>
<td>Clean Air Act Amendments</td>
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<tr>
<td>CAD</td>
<td>Computer Aided Design</td>
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<tr>
<td>CAPD</td>
<td>City of Alexandria Police Department</td>
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</tr>
<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
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<tr>
<td>CESQG</td>
<td>Conditionally Exempt Small Quantity Generator</td>
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<tr>
<td>CFA</td>
<td>Commission of Fine Arts</td>
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<tr>
<td>CFCPD</td>
<td>City of Falls Church Police Department</td>
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<tr>
<td>CFFD</td>
<td>County of Fairfax Fire Department</td>
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<tr>
<td>CFPD</td>
<td>County of Fairfax Police Department</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CLI</td>
<td>Cultural Landscapes Inventory</td>
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<tr>
<td>CLR</td>
<td>Cultural Landscape Report</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
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</tr>
<tr>
<td>CR</td>
<td>Cultural Resources</td>
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</tr>
<tr>
<td>CRM</td>
<td>Cultural Resources Management</td>
<td></td>
</tr>
<tr>
<td>CSO</td>
<td>Combined Sewer Overflows</td>
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</tr>
<tr>
<td>CSS</td>
<td>Combined Sewer System</td>
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<tr>
<td>CWA</td>
<td>Commemorative Works Act</td>
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<tr>
<td>DAR</td>
<td>Daughters of the American Revolution</td>
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<tr>
<td>dB</td>
<td>decibel</td>
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</table>
dBA | A-weighted Decibels | FCFRD | Fairfax County Fire and Rescue Department|
<p>|DC DOE | District of Columbia Department of Environment | FCPD | Fairfax County Police Department|
|DC HPO | District of Columbia Historic Preservation Office | FE/BR | Forced Entry and Ballistic Resistance|
|DC WASA | District of Columbia Water &amp; Sewer Authority | FEMA | Federal Emergency Management Agency|
|D.C. | District of Columbia | FHWA | Federal Highway Administration|
|DCFD | District of Columbia Fire Department | FCIP | Federal Capital Improvements Program|
|DCMR | District of Columbia Municipal Regulations | FEIS | Final Environmental Impact Statement|
|DCOP | District of Columbia Office of Planning | FONSI | Finding of No Significant Impact|
|DCPL | District of Columbia Preservation League | ft | Feet|
|DDOT | District Department of Transportation | GAO | Governmental Accountability Office|
|DEIS | Draft Environmental Impact Statement | GIS | Geographic Information System|
|DNL | Day-Night Level | GPS | Global Positioning System|
|DOC | Department of Commerce | GS | General Schedule|
|DOD | Department of Defense | GSA | General Services Administration|
|DOE | Department of Energy | gsf | Gross Square Feet|
|DOH | District of Columbia Department of Health | HABS | Historic American Buildings Survey|
|DOI | Department of the Interior | HAZMAT | Hazardous Material|
|E.O. | Executive Order | HCM | Highway Capacity Manual 2000|
|EA | Environmental Assessment | HOV | High Occupancy Vehicle|
|EIS | Environmental Impact Statement | HT | Human Transporter|
|EMS | Emergency Medical Service | HVAC | Heating, Ventilation, Air Conditioning|
|FBI | Federal Bureau of Investigation | IAQC | Interstate Air Quality Council|</p>
<table>
<thead>
<tr>
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<td>Interstate Commerce Commission</td>
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<td>Interstate Commission on the Potomac River Basin</td>
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<td>IED</td>
<td>Improvised Explosive Device</td>
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<td>IRS</td>
<td>Internal Revenue Service</td>
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<td>ISC</td>
<td>Interagency Security Criteria</td>
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<td>ISR</td>
<td>Internal Scoping Report</td>
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<tr>
<td>ITE</td>
<td>Institute of Transportation Engineers</td>
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<tr>
<td>KV</td>
<td>kilovolt</td>
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<td>LEC</td>
<td>Local Exchange Carrier</td>
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<td>LEED</td>
<td>Leadership in Energy and Environmental Design</td>
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<tr>
<td>LOS</td>
<td>Level of Service</td>
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<tr>
<td>μg/m3</td>
<td>Micrograms per cubic meter</td>
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<td>MARC</td>
<td>Maryland Rail Commuter Service</td>
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<td>MCDP</td>
<td>Montgomery County Department of Police</td>
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<td>MGD</td>
<td>million gallons per day</td>
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<td>MOA</td>
<td>Memorandum of Agreement</td>
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<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>District of Columbia Metropolitan Police Department</td>
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<td>mph</td>
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<td>NAICS</td>
<td>North American Industry Classification System</td>
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<td>National Ambient Air Quality Standards</td>
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<td>National Capital Region</td>
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<td>National Capital Urban Design and Security Plan</td>
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<td>National Fire Protection Association</td>
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<td>National Gallery of Art</td>
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<td>National Historic Landmark</td>
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<td>National Historic Preservation Act of 1966</td>
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<td>NNMC</td>
<td>National Naval Medical Center</td>
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<td>NO₂</td>
<td>Nitrogen dioxide</td>
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<td>NOA</td>
<td>Notice of Availability</td>
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<td>NOI</td>
<td>Notice of Intent</td>
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<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<td>NRC</td>
<td>Nuclear Regulatory Commission</td>
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<td>Natural Resource Conservation Service</td>
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<td>National Register of Historic Places</td>
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<td>Net Square Feet</td>
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<td>The National Trust for Historic Preservation</td>
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<td>O₃</td>
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<td>Smithsonian Institution, Office of the Chief Information Officer</td>
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<td>Office of Engineering Design &amp; Construction</td>
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<td>The Smithsonian Institution Office of Facilities, Engineering, and Operations</td>
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<td>Office of Safety Health and Environmental Management</td>
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<tr>
<td>PEPCO</td>
<td>Potomac Electric Power Company</td>
</tr>
<tr>
<td>PGCFED</td>
<td>Prince George’s County Fire/EMS Department</td>
</tr>
<tr>
<td>P.L.</td>
<td>Public Law</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>Particulate Matter less than or equal to 10 microns in diameter</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>Particulate Matter less than or equal to 2.5 microns in diameter</td>
</tr>
<tr>
<td>ppm</td>
<td>Parts per Million</td>
</tr>
<tr>
<td>PSA</td>
<td>Police Service Area</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>ROD</td>
<td>Record of Decision</td>
</tr>
<tr>
<td>ROI</td>
<td>Region of Influence</td>
</tr>
<tr>
<td>RTV</td>
<td>Rational Threshold Value</td>
</tr>
<tr>
<td>S106</td>
<td>Section 106 of the National Historic Preservation Act</td>
</tr>
<tr>
<td>SE</td>
<td>Southeast</td>
</tr>
<tr>
<td>sf</td>
<td>Square Feet</td>
</tr>
<tr>
<td>SI</td>
<td>Smithsonian Institution</td>
</tr>
<tr>
<td>SIP</td>
<td>State Implementation Plan</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulfur Dioxide</td>
</tr>
<tr>
<td>SOM</td>
<td>Skidmore, Owings, and Merrill</td>
</tr>
<tr>
<td>SPL</td>
<td>Sound Pressure Level</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>SQG</td>
<td>Small Quantity Generator</td>
</tr>
<tr>
<td>STP</td>
<td>Shovel Test Pit</td>
</tr>
<tr>
<td>SVOCs</td>
<td>Semi Volatile Organic Compounds</td>
</tr>
<tr>
<td>SW</td>
<td>Southwest</td>
</tr>
<tr>
<td>TBD</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>TDA</td>
<td>Temporary Discharge Authorization</td>
</tr>
<tr>
<td>TPY</td>
<td>Tons Per Year</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
</tr>
<tr>
<td>USC</td>
<td>United States Capitol</td>
</tr>
<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
</tr>
<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
</tr>
<tr>
<td>USIP</td>
<td>United States Institute of Peace</td>
</tr>
<tr>
<td>USSS</td>
<td>United States Secret Service</td>
</tr>
<tr>
<td>VOCs</td>
<td>Volatile Organic Compounds</td>
</tr>
<tr>
<td>VRE</td>
<td>Virginia Railway Express</td>
</tr>
<tr>
<td>WAMO</td>
<td>Washington Monument</td>
</tr>
<tr>
<td>WASA</td>
<td>Water and Sewer Authority</td>
</tr>
<tr>
<td>WBDG</td>
<td>Whole Building Design Guide</td>
</tr>
<tr>
<td>WCTC</td>
<td>Washington Convention and Tourism Corporation</td>
</tr>
<tr>
<td>WG</td>
<td>Wage Grade</td>
</tr>
<tr>
<td>WGL</td>
<td>Washington Gas &amp; Light</td>
</tr>
<tr>
<td>WHMO</td>
<td>White House Military Office</td>
</tr>
<tr>
<td>WMATA</td>
<td>Washington Metropolitan Area Transit Authority</td>
</tr>
<tr>
<td>WTP</td>
<td>Water Treatment Plants</td>
</tr>
<tr>
<td>WWI</td>
<td>World War I</td>
</tr>
<tr>
<td>WWII</td>
<td>World War II</td>
</tr>
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</table>
14.2 GLOSSARY OF TERMS

Affected Environment — The existing environment to be affected by a proposed action and alternatives.

Alignment — The arrangement or relationship of several disparate components along a common vertical or horizontal line or edge.

Allee — A feature of the French formal garden that served as both a promenade and an extension of the view. It either ended in a terminal feature, such as a garden temple, or extended into apparent infinity at the horizon.

Best Management Practices — Methods that have been determined to be the most effective, practical means of preventing or reducing pollution or other adverse environmental impacts.

Building Height — The vertical distance from the ground plane to the tallest point of the structure. Since ground plane varies on the NMMAHC site, the building height is measured from average site grade and leaves a margin of flexibility for articulation and architectural embellishments such as domes and skylights.

Commercial Services — Any activity or service that occurs in a park for which compensation is made.

Contributing Resource — A building, site, structure, or object that adds to the historic significance of a property or district.

Council on Environmental Quality (CEQ) — Established by Congress within the Executive Office of the President with passage of the National Environmental Policy Act of 1969. CEQ coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives.

Cultural Resources — Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason.

Cumulative Impacts — Under NEPA regulations, the incremental environmental impact or effect of an action together with the effects of past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR Part 1508.7).

Decibels — A unit of relative sound loudness, electric voltage, or current equal to ten times the common logarithm of the ratio of two readings.

Enabling Legislation — Legislation that gives appropriate officials the authority to implement or enforce the law.

Endangered Species — Any species that is in danger of extinction throughout all or a significant portion of its range. The lead Federal agency, U.S. Fish and Wildlife Service, for the listing of a species as endangered is responsible for reviewing the status of the species on a five-year basis.

Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) — An Act to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide a program for the conservation of such endangered species and threatened species.

Environmental Assessment (EA) — An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement (EIS).
**Environmental Impact Statement** — A report that documents the information required to evaluate the environmental impact of a project. It informs decision makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the environment.

**Executive Order** — Official proclamation issued by the President that may set forth policy or direction or establish specific duties in connection with the execution of federal laws and programs.

**Finding of No Significant Impact (FONSI)** — A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement. A FONSI is based on the results of an Environmental Assessment.

**Floodplain** — The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.

**Greensward** — A surface layer of ground covered with grass or turf.

**Gross Area** — The total area enclosed within the exterior surface of the outside walls.

**Gross Square Feet** — See Gross Area.

**Height** — See Building Height.

**Mall** — The area west of the United States Capitol between Madison and Jefferson Drives from 1st to 14th streets NW/SW. The east end of the Mall from 1st to 3rd streets NW/SW between Pennsylvania Avenue and Maryland Avenue and is also known as Union Square. The Mall is characterized by the east-west stretch of lawn bordered by rows of American elm trees.

**Massing** — The conceptual form of a building that conveys proportion and size.

**Monumental core** — The monumental core currently includes the Mall and the areas immediately beyond it, including the United States Capitol, the White House and President’s Park, Pennsylvania Avenue and the Federal Triangle area, East and West Potomac Parks, the Southwest Federal Center, the Northwest Rectangle, Arlington Cemetery, and the Pentagon.

**National Environmental Policy Act (NEPA)** — The Act as amended articulates the federal law that mandates protecting the quality of the human environment. It requires federal agencies to systematically assess the environmental impacts of their proposed activities, programs, and projects including the “no build” alternative of not pursuing the proposed action. NEPA requires agencies to consider alternative ways of accomplishing their missions in ways which are less damaging to the environment.


**National Mall** — The area comprised of the Mall, the Washington Monument, and West Potomac Park. It is managed by the National Park Service’s National Mall & Memorials Parks.

**National Register of Historic Places (National Register)** — A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.
Net Area — The total area enclosed within the interior surface of the outside walls minus vertical penetrations and indoor parking.

Net Square Feet — See Net Area.

Outdoor program space — The exterior space of a building is used to accommodate additional operations or functions of the building. Several examples of outdoor programmed space include courtyards, patios & dining areas, performance space, and gardens.

Record of Decision (ROD) — The ROD closes the EIS process. The ROD presents the basis for the decision, summarizing any mitigation measures that are be incorporated in the project and document any required section 4(f) approval.

Remediation — The removal of contaminants or pollution from soil, groundwater, sediment, or surface water for the protection of human health and the environment.

Scoping — Scoping, as part of NEPA, requires examining a proposed action and its possible effects; establishing the depth of environmental analysis needed; determining analysis procedures, data needed, and task assignments. The public is encouraged to participate and submit comments on proposed projects during the scoping period.

Setback — The distance of a building from the street or sidewalk. The distance is often dictated by security considerations; the security setback is 50’ for NMAAHC planning purposes.

Tapis Vert — Literally meaning “green carpet,” but refers to the greensward, or grassy area, that composes the Mall.

Threatened Species — Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Useable Square Feet — The total area enclosed within the interior surface of the outside walls minus vertical penetrations and indoor parking.

Wetlands — The U.S. Army Corps of Engineers and the Environmental Protection Agency jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Viewshed — A viewshed includes a total visible area from a particular fixed vantage point.