

**FINAL**

**ENVIRONMENTAL ASSESSMENT  
DECONSTRUCTION OF 21 BUILDINGS  
AT NASA LANGLEY RESEARCH CENTER, HAMPTON, VIRGINIA**

**Lead Agency:** National Aeronautics and Space Administration, Langley Research Center (LaRC), Hampton, Virginia

**Proposed Action:** Deconstruction of 21 Buildings at NASA LaRC

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**Abstract:** NASA is proposing the removal of 21 buildings at Langley Research Center (LaRC), located in Hampton, Virginia. Deconstruction of these facilities would begin in 2009 and continue into 2011. The buildings are abandoned or are in the process of being closed, and NASA has determined they are no longer needed. The deconstruction is intended to reduce the Center's infrastructure and allow LaRC to direct limited resources towards facilities that support NASA's overall mission, both currently and in the future. The project would reduce the footprint of LaRC facilities by approximately 6,084 square meters (65,493 square feet) and create additional green space at the Center. This Environmental Assessment evaluates the environmental impacts of the Proposed Action and the No-Action Alternative.

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## **1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION**

### **1.1 INTRODUCTION**

This Environmental Assessment (EA) has been prepared to analyze the potential environmental impacts associated with NASA's proposed deconstruction of 21 buildings at NASA Langley Research Center (LaRC), located in Hampton, Virginia.

This EA was prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code 4321 et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) Parts 1500–1508), NASA's regulations (14 CFR Part 1216 Subpart 1216.3), and NASA Procedural Requirements (NPR) 8580.1, "Implementing the National Environmental Policy Act and Executive Order 12114." Information contained in this EA will be used by NASA and the appropriate regulatory agencies to facilitate the NEPA decision-making process and to determine if the Proposed Action would significantly affect the quality of the natural or human environment. If implementing the Proposed Action is determined to have significant environmental impacts, an Environmental Impact Statement may be prepared. If the implementation of the Proposed Action is determined not to be significant, the NEPA decision-making process would conclude with a Finding of No Significant Impact (FONSI).

Chapter 1 of this EA includes background information, and the purpose and need for the Proposed Action. Chapter 2 includes a description of the Proposed Action, the No-Action alternative, and a description of an alternative that was considered but not carried forward in the EA. Chapter 3 describes the existing conditions of various environmental resources in the areas of the Proposed Action and Chapter 4 describes how those resources would be affected by implementation of the Proposed Action and the No-Action alternative. Chapter 5 addresses the cumulative effects of other past, present, and reasonably foreseeable actions that may be implemented in the area of the Proposed Action. The Appendix includes photographs of the affected buildings. NASA requires that numeric calculations and figures be presented in metric units with the British equivalent provided in parenthesis.

### **1.2 PROJECT LOCATION**

LaRC is situated near the southern end of the lower Virginia Peninsula, approximately 241 kilometers (km) (150 miles) south of Washington, D.C. and 80 km (50 miles) southeast of Richmond, Virginia. LaRC is located within close proximity to several surface water bodies within the tidal zone of the Chesapeake Bay. The cities of Hampton, Poquoson, Newport News, and York County form a major metropolitan statistical area around LaRC. The Center is comprised of research facilities located in two areas which are approximately 4.8 km (3 miles) apart. The two areas, commonly called the West Area and the East Area, are divided by the runways of Langley Air Force Base (LAFB), the headquarters of the Air Combat Command. The East Area is located on 8 hectares (20 acres) of land leased by NASA from LAFB. This area is the original 1917 portion of LaRC and contains several wind tunnels, research facilities, and administrative offices. The West Area occupies 318 hectares (788 acres) of land and contains the major portion of LaRC with the majority of the facilities located there. Figure 1.1 shows LaRC's regional location and relation to LAFB.



Figure 1.1 – Location of NASA Langley Research Center

### 1.3 BACKGROUND

In 1917, the War Department purchased land in what is now Hampton, Virginia, for joint use by the Army and the National Advisory Committee for Aeronautics (NACA), the forerunner organization for NASA. The site was designated the Langley Field after Professor Samuel Pierpont Langley, an early pioneer in flight. Congress had created NACA to “supervise and direct the scientific study of the problems of flight” and the Langley Field served as an experimental airfield and proving ground for aircraft. The facility was renamed Langley Memorial Aeronautical Laboratory in 1920 with the dedication of the first wind tunnel. As the organization grew, NACA concentrated mainly on laboratory studies at Langley, gradually shifting from aerodynamic research to military rocketry. As the Cold War brought an increasing

priority to missile development, major NACA contributions to the military missile programs came in the mid 1950's.

In 1958, as a result of the escalating space race, President Eisenhower signed the National Aeronautics and Space Act establishing the National Aeronautics and Space Administration (NASA). NASA absorbed the NACA intact: its 8,000 employees, an annual budget of \$100 million, the Langley, Ames and Lewis laboratories and two smaller test facilities. Langley Laboratory, which was then officially designated Langley Research Center, was the largest of the new agency's field centers, with 3,368 government employees. NASA quickly incorporated other organizations and eventually created ten research and spaceflight centers located around the United States.

Over the years, LaRC has made significant contributions to NASA's mission. Research performed at LaRC in the 1950's and 1960's helped aircraft break the sound barrier and played a major role in helping Americans reach the moon. In the 1970's, research at the Center focused on aircraft design to cut emissions and noise, and on testing space shuttle concepts. In the 1980's, triggered by the Cold War, LaRC and its complex of over 20 wind tunnels performed critical military aircraft research. From the 1980's to the present, LaRC has continued to provide research support and technological advances in aerospace systems concepts and analysis; aerodynamics, aerothermodynamics, and acoustics; structures and materials; airborne systems; and atmospheric sciences. The majority of LaRC's work has been in aeronautics. Once the largest NASA Center, LaRC is now the fifth largest NASA Center.

Agency-wide, NASA continually evaluates its resources and infrastructure in order to align its capabilities to meet the Agency's evolving mission. NASA has recently undertaken a monumental transformation in both business practices and mission. In 2004, President George W. Bush announced a new exploration initiative (Constellation project) to return humans to the moon by 2020 in preparation for human exploration of Mars and beyond. The Constellation project includes the development of the Orion crew exploration vehicle and Ares 1 launch vehicle. LaRC's contribution to the Constellation project will include acting as the lead on the Launch Abort System integration project. The new mission brings not only technical but also financial challenges to the Agency and its field centers, as planners strive to best allocate and utilize limited resources.

#### **1.4 PURPOSE AND NEED FOR THE PROPOSED ACTION**

The purpose of proposed deconstruction is to streamline LaRC's infrastructure by removing deteriorating facilities that are no longer operational and/or needed to support NASA's critical mission.

The deconstruction of the 21 buildings is needed to allow LaRC to direct limited funding towards the maintenance and operation of facilities that support the Agency's overall mission, currently and in the future. Funds for general maintenance and operation of facilities at LaRC are provided by the various projects and programs utilizing the facility space. Since the 21 buildings are in the process of closing or already abandoned, no direct funding sources exist for their continued maintenance and upkeep.

## 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

### 2.1 PROPOSED ACTION

The Proposed Action consists of the deconstruction of 21 buildings at LaRC during 2009 and continuing into 2011. The term “deconstruction” as opposed to demolition, emphasizes the commitment to reuse and recycle building materials, as discussed in Section 4.5.1. The 21 facilities are found in various locations throughout LaRC’s West Area as shown in Figure 2.1 and listed in Table 2-1. Photographs of the facilities are provided in [Appendix A](#).

Table 2-1. Proposed Buildings to Be Deconstructed

<b><i>Building Number</i></b>	<b><i>Building Name</i></b>	<b><i>Square Meters</i></b>	<b><i>Square Feet</i></b>	<b><i>Year Built</i></b>	<b><i>Year Closed</i></b>
1133B	NASA TV Earth Station	47	506	1983	2005
1156	General Equipment Storage	61	652	1968	Pending
1162	1162 Office Complex	272	2,929	1976	2005
1162A	1162 Office Complex	673	7,246	1978	2005
1163	Office Facility	324	3,487	1981	2005
1164	Office Facility	251	2,700	1967	2005
1165	Storage Facility	65	698	1978	2005
1203	Storage Facility	163	1,750	1965	Pending
1232B	1232 Office Complex	67	725	1956	2005
1234	Jet Exit Test Facility	295	3,175	1945	Pending
1237A	Foundry & Glass Blowing Shop	888	9,559	1973	Pending
1237B	Lab Facility	472	5,084	1970	Pending
1237C	Lab Facility	247	2,660	1970	Pending
1259	ALDF Complex	297	3,200	1953	2005
1283	Fabrication Facility	1188	12,785	1958	2005
1284A	Security Storage Facility	297	3,200	1960	2005
1284B	1284 Research Lab	156	1,676	1966	Pending
1284C	1284 Research Lab	135	1,458	1966	2004
1287	Flow Impedance Test Lab	104	1,123	1961	Pending
1295A	Vacuum Sphere Facility	45	480	1965	Pending
1295D	Vacuum Sphere Facility	37	400	1970	Pending

The deconstruction would reduce the Center’s operation and maintenance costs, as well as streamline the infrastructure to better align LaRC’s capabilities with the future direction of NASA missions. The deconstruction of the 21 buildings would result in a reduction of LaRC’s total building inventory of approximately 6,084 square meters (65,493 square feet) and the creation of additional green space at the Center.

All buildings would be removed down to and including slabs and foundations. Utilities would be capped below grade, and the properties would be re-graded to match existing site contours.

Deconstruction would be carried out by qualified and properly licensed contractors. All contractors performing work at LaRC are required to comply with applicable safety and health regulations, including Occupational Safety and Health Administration (OSHA) and NASA

regulations. Contractors involved in the deconstruction projects would be required to prepare and follow Health and Safety Plans that comply with the regulations to ensure the safety of human health and the environment during the deconstruction. Prior to deconstruction, hazardous items such as asbestos containing materials and lead-based paints would be removed according to LaRC policy and applicable regulations.

## Environmental Assessment for Deconstruction of 21 Buildings

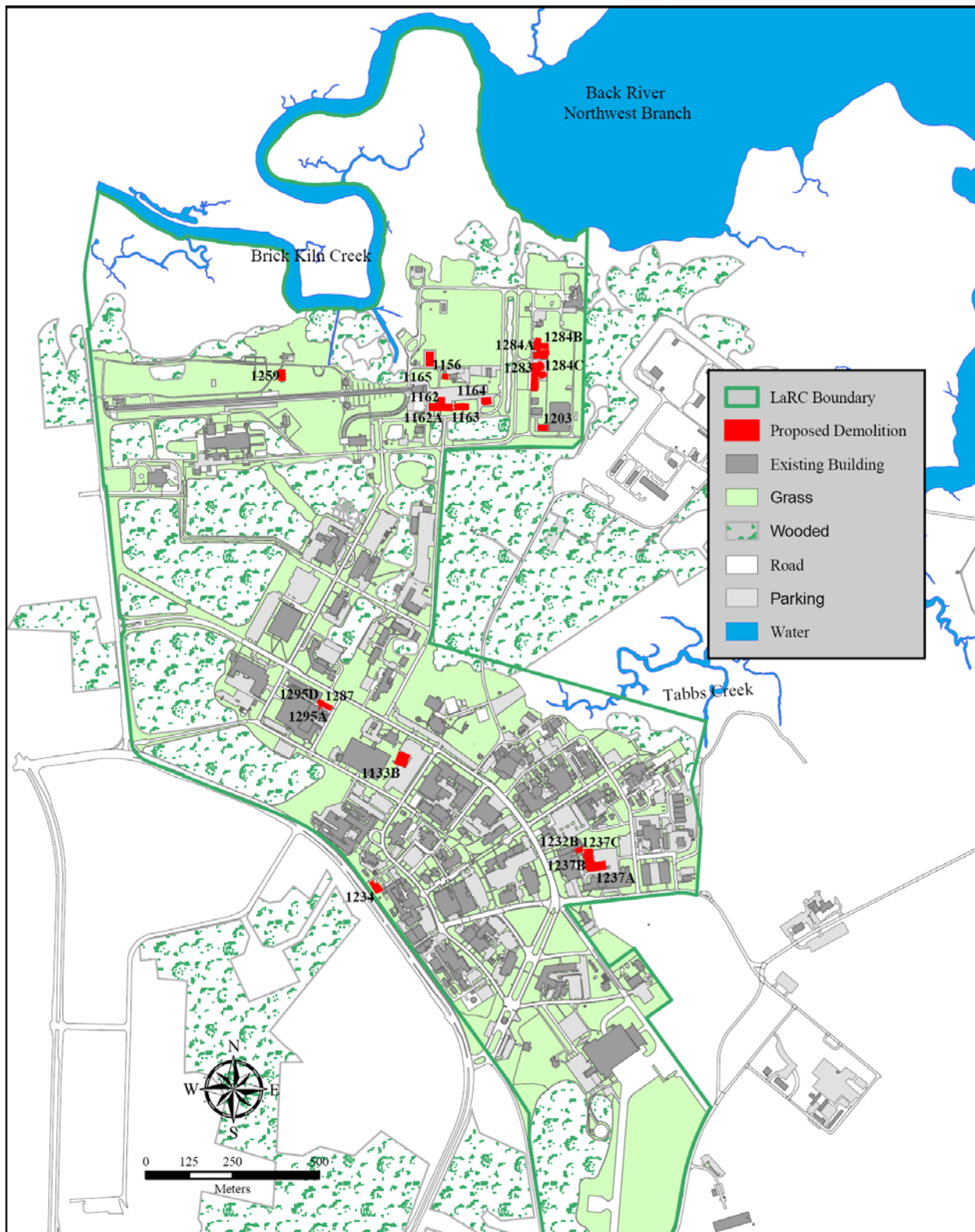


Figure 2.1 – Location of 21 Buildings Proposed for Deconstruction

The debris material resulting from deconstruction would be disposed of according to LaRC's policy for the disposal of construction/demolition debris. LaRC would require that the deconstruction contractor recycle to the maximum extent possible, debris such as concrete and steel. Hazardous or other regulated wastes would be disposed of in accordance with LaRC's established hazardous waste management procedures and following all applicable safety and environmental regulations. All other debris would be removed by the deconstruction contractor and disposed of offsite at a permitted landfill.

## **2.2 NO-ACTION ALTERNATIVE**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings and they would remain closed and unused. The Center would continue to monitor and maintain the buildings' emergency utilities, but the facilities would continue to deteriorate. The No-Action alternative would forego the opportunity to streamline the Center's infrastructure and to refocus limited resources on the infrastructure that would meet LaRC's mission requirements. Resources would be spent to sustain aging and abandoned infrastructure, which could potentially compromise the Center's mission capabilities.

## **2.3 ALTERNATIVE ELIMINATED FROM FURTHER CONSIDERATION**

One alternative was considered but eliminated from detailed analysis because it would fail to meet the purpose and need of the Proposed Action. The option of leasing the buildings to outside tenants would not allow LaRC to streamline its infrastructure or to remove deteriorating facilities that are no longer needed to support NASA's critical mission. In addition, this alternative is not practical due to security issues and the age and poor condition of the buildings. Most of the buildings are very small with limited utilities and office space. NASA LaRC contacted Langley Air Force Base and the City of Hampton regarding possible lease options, however, both parties declined.

### 3.0 AFFECTED ENVIRONMENT

This chapter describes relevant environmental conditions at LaRC for resources potentially affected by the Proposed Action and the No-Action alternative described in Chapter 2.0. In compliance with guidelines contained in NEPA and the Council on Environmental Quality (CEQ) regulations, and NASA Procedural Requirements (NPR) 8580.1, the description of the existing environment focuses on those environmental resources potentially subject to impacts. The environment includes all areas and lands that might be affected, as well as the natural, cultural, and socioeconomic resources they contain or support.

#### **Resources Eliminated From Detailed Consideration**

Several resources were not evaluated in this EA because it was determined unlikely that implementation of either the Proposed Action or the No-Action alternative would have any impacts to these areas of concern. A brief explanation of the reasons why each resource has been eliminated from further consideration in this EA is provided below.

**Virginia Coastal Zone Programs.** The following Virginia Department of Environmental Quality (DEQ) enforceable programs and policies are not applicable to the Proposed Action because the deconstruction activities would not have any effect on the resources. Additionally, the No-Action alternative would not have any effect on the resources. The programs and policies include:

**Fisheries Management.** The Proposed Action would have no effect on the conservation and enhancement of finfish and shellfish resources or the promotion of commercial and recreational fisheries.

**Subaqueous Lands Management.** The Proposed Action would not involve encroachment into, on or over state-owned subaqueous lands.

**Dunes Management.** There are no sand covered beaches or sand dunes in the vicinity of the Proposed Action.

**Shoreline Sanitation.** The Proposed Action would have no effect on shoreline sanitation.

**Tidal and Nontidal Wetlands Management.** The US Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA) 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. NASA has a 2005 Corps-confirmed delineation of wetlands for LaRC's West Area. Based on LaRC's maps showing the 2005 wetlands delineation, the 21 buildings associated with the Proposed Action are not located in designated wetlands.

Other Virginia Coastal Zone Program areas that are applicable are addressed in Chapters 3 and 4.

*Soils and Geology.* The deconstruction activities would involve existing structures and previously developed areas. There would be minimal ground disturbance to remove pile caps,

foundations and slab sections during deconstruction and the areas would be backfilled and graded to match existing surroundings. Since implementation of either the Proposed Action or the No-Action alternative would have a negligible effect on soils and geology, these resources were eliminated from further analysis.

*Socioeconomic.* The No-Action alternative would have no effect on the socioeconomic character of the communities surrounding LaRC. There would be no change in the number of NASA employees as a result of the Proposed Action. The deconstruction work would be performed by contractors from the regional work force. There is a sufficient pool of regional workers to accomplish these tasks in the anticipated timeframe. Because these are temporary jobs that would be filled by the existing work force, there would be no effect on area population or increase in the demand for housing or public services in the region. Therefore, the Proposed Action would have a negligible effect on the socioeconomic character of the surrounding communities and this resource was eliminated from further analysis.

*Climate.* Climate is the prevalent long-term weather conditions in a particular area. Climatic elements include precipitation, temperature, humidity, sunshine and wind velocity and other natural occurrences such as fog, frost, and hail storms. Implementation of either the Proposed Action or the No-Action alternative would have no measurable effect on the local climate and as such, this resource was eliminated from further analysis.

*Environmental Justice.* Low-income populations and minority populations that are subject to environmental justice considerations are not located within or near the location of the Proposed Action. Since implementation of either the Proposed Action or the No-Action alternative would not have disproportionately high or adverse human health or environmental effects on low-income populations or minority populations, this resource was eliminated from further analysis.

*Wild and Scenic Rivers.* None of the waterways within the LaRC property qualify for the provisions of the Wild and Scenic Rivers Act, therefore, analysis of this resource was not carried forward in this EA.

*Threatened and Endangered Species.* A few threatened and endangered species (mostly birds) were identified at LaRC during a wildlife survey performed in the mid-1990's. Based on the results of this survey, no threatened or endangered species would be expected in the proposed project areas. As such, this resource was eliminated from further analysis.

*Transportation.* Implementation of the Proposed Action would not change the use of transportation resources in the region. Local highways currently accommodate the traffic generated by LaRC employees and other individuals traveling the roads on a daily basis. Transportation of the deconstruction materials would be along an established haul route leading off the Center. The increase in truck traffic would be minimal because the deconstruction activities would be phased over time. Implementation of the No-Action alternative would not affect transportation resources. Therefore, this resource was eliminated from further analysis.

Since LaRC does not have any *prime or unique farmland*, or *conservation areas*, these resources were also eliminated from further analysis.

### 3.1 LAND USE

#### *Coastal Zone Management Act*

LaRC is located within the coastal zone of the Commonwealth of Virginia. Federal agency activities within the coastal zone must be carried out in a manner that is consistent to the maximum extent practicable with Virginia's applicable enforceable policies. All federal actions are subject to this consistency requirement if they would affect natural resources, land uses, or water uses in the coastal zone. The Virginia DEQ oversees activities in the coastal zone of the State through a number of enforceable programs. In reviewing the Proposed Action, DEQ may require agencies to coordinate with its specific divisions or other agencies for consultation or to obtain permits; they also may comment on environmental impacts and mitigation. Virginia DEQ enforceable programs and policies pertain to Fisheries Management, Subaqueous Lands Management, Tidal and Nontidal Wetlands Management, Dunes Management, Non-Point Source Pollution Control, Point Source Pollution Control, Shoreline Sanitation, Air Pollution Control, and Coastal Lands Management. Not all of these enforceable programs are applicable to the Proposed Action, as explained in Section 3.0. The remaining programs (coastal lands management, air pollution control, non-point source pollution control, and point source pollution control) are discussed in relevant resource sections (e.g., air quality and water resources).

The Coastal Lands Management program establishes authority for the oversight of activities in the Chesapeake Bay Resource Management Areas (RMAs) and Resource Protection Areas (RPAs). RPAs include tidal shores, tidal wetlands, and non-tidal wetlands that are contiguous to and connected by surface flow to tidal wetlands and perennial streams, and a 30-meter (100-foot) buffer located landward of these features (shown in Figure 3.1). RMAs include floodplains, highly erodible soils, highly permeable soils, steep slopes, and areas 30 meters (100 feet) landward of an RPA. Certain development activities within these zones are restricted in order to protect the quality of state waters. Both RMA and RPA features exist on LaRC property. Building 1156 is in an RMA, but all other buildings proposed for deconstruction are outside the designated RPAs or RMAs.

#### *Functional Zones*

Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of uses that are allowable or protect specially designated or environmentally sensitive areas. LaRC has a current Center Master Plan (CMP) (<http://gis-www.larc.nasa.gov/masterplan/index.html>) that supports the Center's strategic approach to programmatic facility planning and prioritization. The CMP identifies the following functional zones (shown in Figure 3.2):

*Administration* - The LaRC administrative core, which contains the Center's Headquarters building, is distinguishable by its executive character. No buildings proposed for deconstruction are located in this zone.

*Center Operations and Services* - Most of the Center's oldest assets and most dense development are included in these areas. This heavy traffic zone either borders or embraces Langley Boulevard, the primary Center traffic artery. Building 1232B is located within the Center Operations functional zone.

## Environmental Assessment for Deconstruction of 21 Buildings

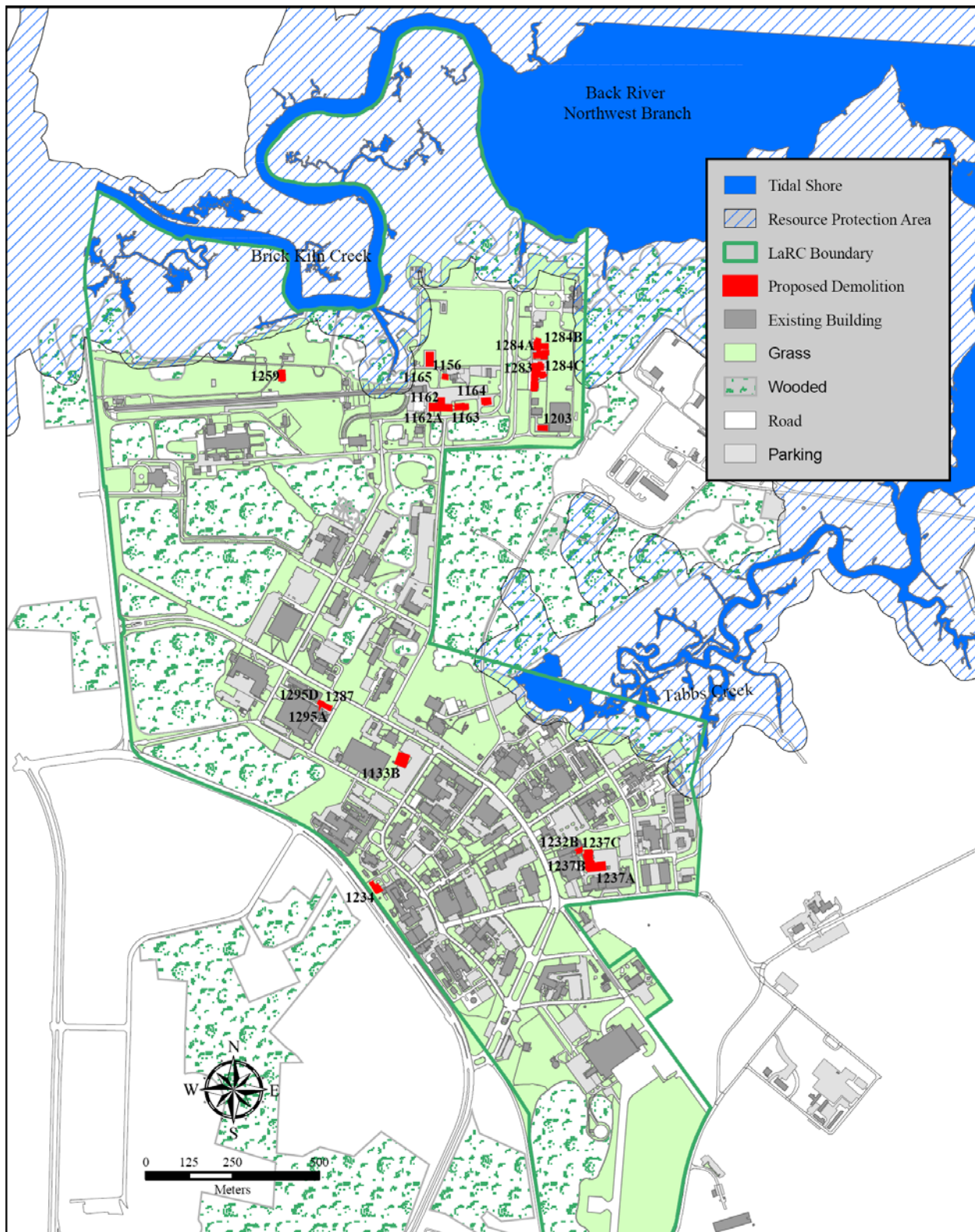


Figure 3.1 – LaRC Resource Protection Areas

## Environmental Assessment for Deconstruction of 21 Buildings

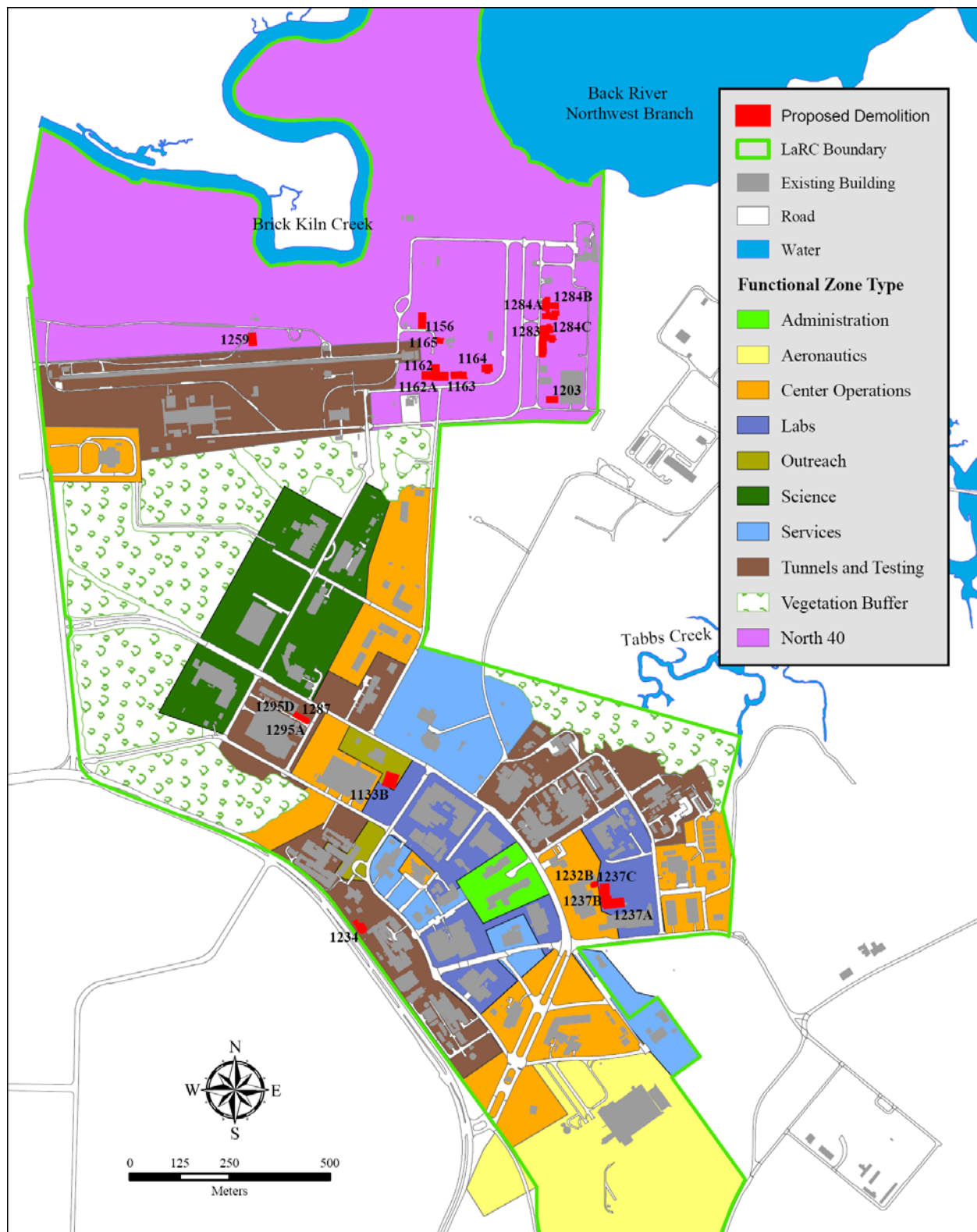


Figure 3.2 – LaRC Functional Zones

*Labs and Science* - Labs are located in two main areas on either side of Langley Boulevard. Buildings in this zone include 1237A, 1237B, and 1237C. Science offices are grouped along Dryden Avenue. No buildings proposed for deconstruction in this group.

*Tunnels and Testing* - LaRC's large-scale tunnels are contained in this zone. These large tunnel complexes along the property boundary form a compact and strongly related functional grouping. The zone is characterized by noisy exhausts, vibration, and the remote, well-regulated potential for uncontrolled energy release. This zone includes Buildings 1234, 1287, 1295A and 1295D.

*Aeronautics* - This area contains the aircraft hangar and associated site improvements and required open space. Considerable undeveloped land area exists here and is strictly utilized for functions directly connected to the hangar and flight line operations. No buildings proposed for deconstruction are located in this zone.

*Outreach* - Outreach offices include training facilities, student programs, the offices of public affairs, legislative affairs, news media, and affiliated universities/institutions. This zone includes Buildings 1133B.

*North 40* - This area includes approximately 220 acres of largely undeveloped land. Various small facilities and structures are scattered throughout the area, many of which have been abandoned. This zone includes Buildings 1156, 1162, 1162A, 1163, 1164, 1165, 1203, 1259, 1283, 1284A, 1284B, and 1284C.

*Vegetation Buffer* - Undeveloped areas are maintained as vegetation buffers along some portions of the LaRC fence line. No buildings proposed for deconstruction are located in this area.

### **3.2 NOISE**

The fighter aircraft operating from LAFB are by far the dominant and most widespread noise source in the area. The Noise Contour Map (Figure 3.3) was derived from the Air Installations Compatible Use Zone report prepared by LAFB. The decibel (dBA) contours on the map are calculated using the "Ldn" parameter, which is preferred by the EPA for assessing environmental noise impacts. It accounts for all the noise occurring throughout the 24-hour day but with a 10-decibel penalty added to the nighttime hours to account for people's greater sensitivity to noise at night. Ldn levels up to 65 dBA are generally considered acceptable for residences. Buildings 1133B, 1232B, 1234, 1237A, 1237B, 1237C, 1287, 1295A and 1295D are located in the 70 dBA noise contour zone. Buildings 1156, 1162, 1162A, 1163, 1164, 1165, 1203, 1283, 1284A, 1284B, and 1284C are located in the 65 dBA noise zone, while building 1259 is outside the LAFB noise contours zones.

Primary noises generated at LaRC include the wind tunnels, the compressor stations, and the substations. Most of the wind tunnels are closed-loop tunnels in which the test gas medium is recirculated and the noise generated by the tunnel is contained largely within the building. The daily operation of motor vehicles in and around LaRC is considered a minor source of noise.

## Environmental Assessment for Deconstruction of 21 Buildings

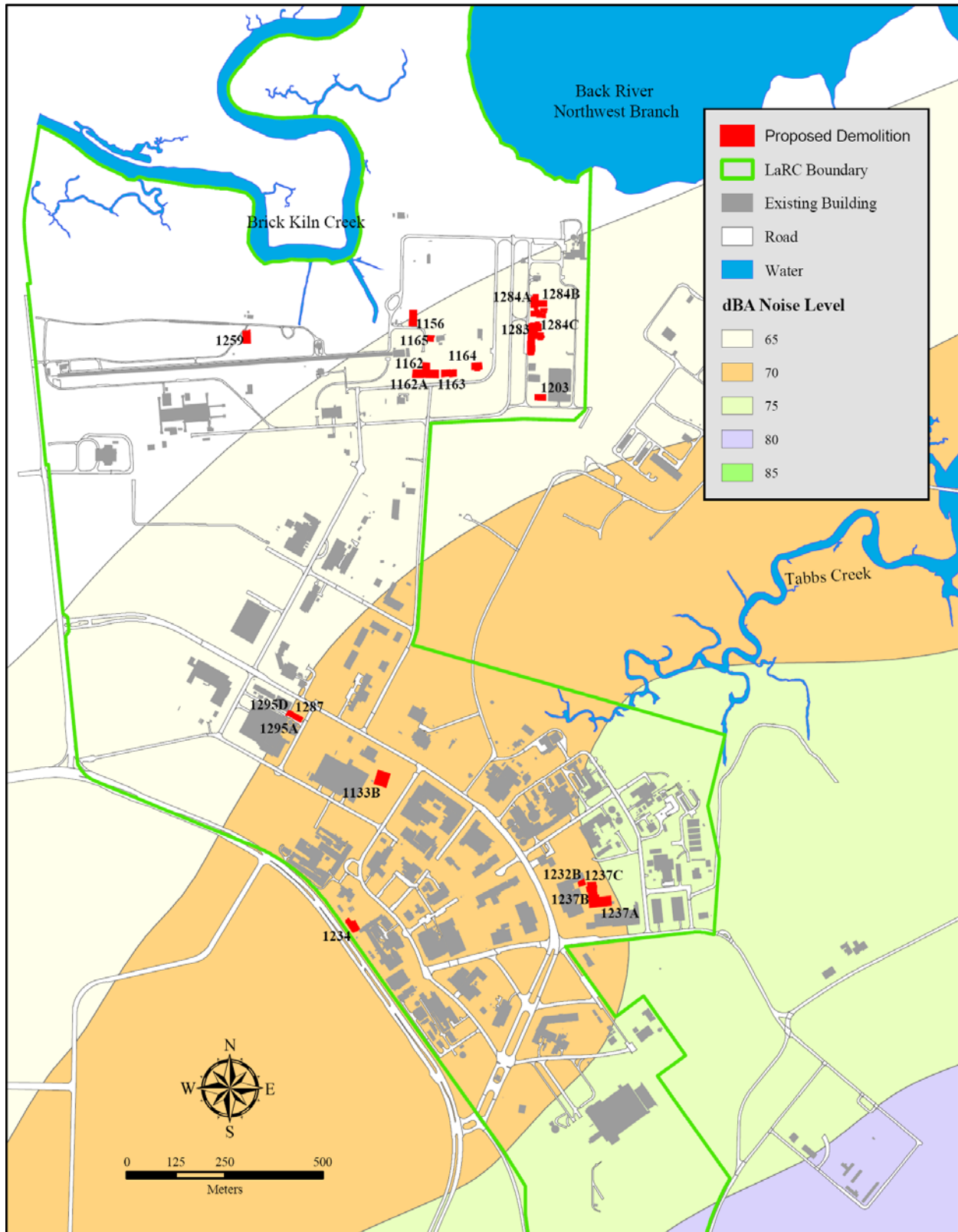


Figure 3.3 – LaRC Noise Contours

Although Virginia does not have noise control regulations, the City of Hampton has enacted a Noise Ordinance (Hampton City Code, Section 22) which prohibits creating any unreasonably loud or disturbing noise of such character, intensity, or duration that may be detrimental to the life or health of any individual or which disturbs the public peace and welfare. LaRC's Industrial Hygiene staff monitors noise levels both inside and outside of the Center facilities to ensure excessive noise does not harm human health or the environment. In addition, the Industrial Hygiene staff ensures proper controls are in place to protect Center personnel from exposure to excessive noise levels in accordance with Occupational Safety and Health Administration (OSHA) requirements.

### **3.3 CULTURAL RESOURCES**

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious or other purposes. They include archaeological resources, traditional resources, and historic architectural resources. Traditional resources are associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Historic architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Historic properties (as defined in 36 CFR 60.4) are significant archaeological, architectural, or traditional resources that are either eligible for listing, or listed in, the National Register of Historic Places (National Register).

The management of cultural resources is primarily regulated by the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties. Impacts to cultural resources may be considered adverse if the resources have been determined to be eligible for listing in the National Register. Section 110 of the NHPA advocates proactive management of resources through the incorporation of historic preservation into the comprehensive plans of agencies, facilities, or programs. The act requires agencies to compile cultural resource inventories which should be integrated into systems for property administration, land use planning and project planning.

The Archaeological Resources Protection Act (ARPA) preserves and protects resources and sites on Federal and Indian lands by prohibiting the removal, sale, receipt, or interstate transportation of archaeological resources obtained illegally (i.e., without permits) from public or Indian lands. ARPA permits are not required for archaeological work conducted by or on behalf of LaRC; however, the specific requirements of ARPA may be addressed in contract documents or other documentation authorizing the work.

For activities on Federal lands, the Native American Graves Protection and Repatriation Act (NAGPRA) requires consultation with "appropriate" Indian tribes or Native Hawaiian organizations prior to the intentional excavation or removal after inadvertent discovery, of

several kinds of cultural items. Native American cultural items include human remains, associated funerary objects, unassociated funerary objects, sacred objects, and cultural patrimony. Native American cultural items are the property of Native American groups. For activities on Native American or Native Hawaiian lands, which are defined in the statute, NAGPRA requires the consent of the Indian tribe or Native Hawaiian organization prior to the removal of cultural items. The law also provides for the repatriation of such items from Federal agencies and federally assisted museums and other repositories. Agencies must inventory Native American cultural items, repatriate Native American cultural items, and consult with Native American groups about permits to excavate.

LaRC has a Cultural Resource Management Plan (CRMP) that contains information on LaRC's historic background, cultural resources and historic properties. It provides information on cultural resource surveys and investigations that have been performed at the Center and the types of LaRC activities that may affect cultural resources. The CRMP also provides information and guidelines necessary for proper preservation and management of LaRC's cultural resources and historic properties. Although oversight of the cultural resource program at LaRC is primarily the responsibility of LaRC's Historic Preservation Officer (HPO), all persons involved in project planning and implementation at the Center also have a responsibility to be aware of the cultural resource management goals of both NASA and LaRC, and to see that NASA complies with the pertinent historic preservation laws and regulations. Sections of LaRC's CRMP are integrated with the Center's Master Plan and Geographic Information System (GIS) database in order to facilitate project planning and ensure historic preservation issues are addressed in project planning at the Center.

### **3.3.1 Architectural Resources**

LaRC has five properties that are National Historic Landmarks (NHLs): the Variable Density Tunnel, the 8-Foot High Speed Tunnel (Building 641), the Full Scale Tunnel (Building 643), the Rendezvous Docking Simulator, and the Lunar Lander Facility (Building 1297). These properties were identified during a 1985 survey performed by the National Park Service as part of the "Man in Space" theme study. The wind tunnels provided the technological base from which the early space program was initiated, and the training facilities played an important role in preparing astronauts to operate in space and land on the moon.

LaRC recently completed a center-wide reconnaissance level survey of 164 architectural resources. The survey identified that most of LaRC's architectural resources are not individually eligible for the National Register. The survey determined that 69 resources are potentially eligible as contributing resources to a proposed LaRC Historic District. The proposed district is discontinuous, consisting of four defined areas separated by non-significant areas. Two areas are located in LaRC's West Area, and two are located in LaRC's East Area.

Ten of the 21 buildings proposed for deconstruction are located within the proposed historic district. Figure 3.4 shows the location of the buildings in relation to the historic district boundaries. Only the Back 40 buildings (Building 1156, 1162, 1162A, 1163, 1164, 1165, 1203, 1283, 1284A, 1284B, and 1284C) are outside the proposed historic district boundaries. Table 3-1 below provides the National Register eligibility for each facility that would be affected by the Proposed Action.

Table 3-1 Architectural Resources Affected by Proposed Deconstruction

<b>Building Number</b>	<b>Name of Building</b>	<b>Year Built</b>	<b>National Register Eligibility*</b>
1133B	NASA TV Earth Station	1983	Noncontributing
1156	General Equipment Storage	1968	Not Surveyed
1162	1162 Office Complex	1976	Not Surveyed
1162A	1162 Office Complex	1978	Not Surveyed
1163	Office Facility	1981	Not Surveyed
1164	Office Facility	1967	Not Surveyed
1165	Storage Facility	1978	Not Surveyed
1203	Storage Facility	1965	Not Surveyed
1232B	1232 Office Complex	1956	Contributing
1234	Jet Exit Test Facility	1945	Contributing
1237A	Foundry & Glass Blowing Shop	1973	Noncontributing
1237B	Lab Facility	1970	Noncontributing
1237C	Lab Facility	1970	Noncontributing
1259	ALDF North Arresting Gear House	1953	Contributing
1283	Fabrication Facility	1958	Not Surveyed
1284A	Security Storage Facility	1960	Noncontributing
1284B	1284 Research Lab	1966	Not Surveyed
1284C	1284 Research Lab	1966	Not Surveyed
1287	Flow Impedance Test Lab	1961	Noncontributing
1295A	Vacuum Sphere Facility	1965	Not Surveyed
1295D	Vacuum Sphere Facility	1970	Noncontributing
<p><b>*National Register Eligibility</b>  <i>Contributing</i> – identified as potentially eligible for listing in the National Register as a contributing resource to the proposed historic district  <i>Noncontributing</i> – determined to be a non-contributing resource  <i>Not Surveyed</i> – due to the age, location and type of structure, the facility was not included in the architectural survey, however LaRC has determined that the facility is not an historic property</p>			

Three of the buildings that are proposed for deconstruction are potentially eligible for listing in the National Register as contributing resources to the proposed historic district.

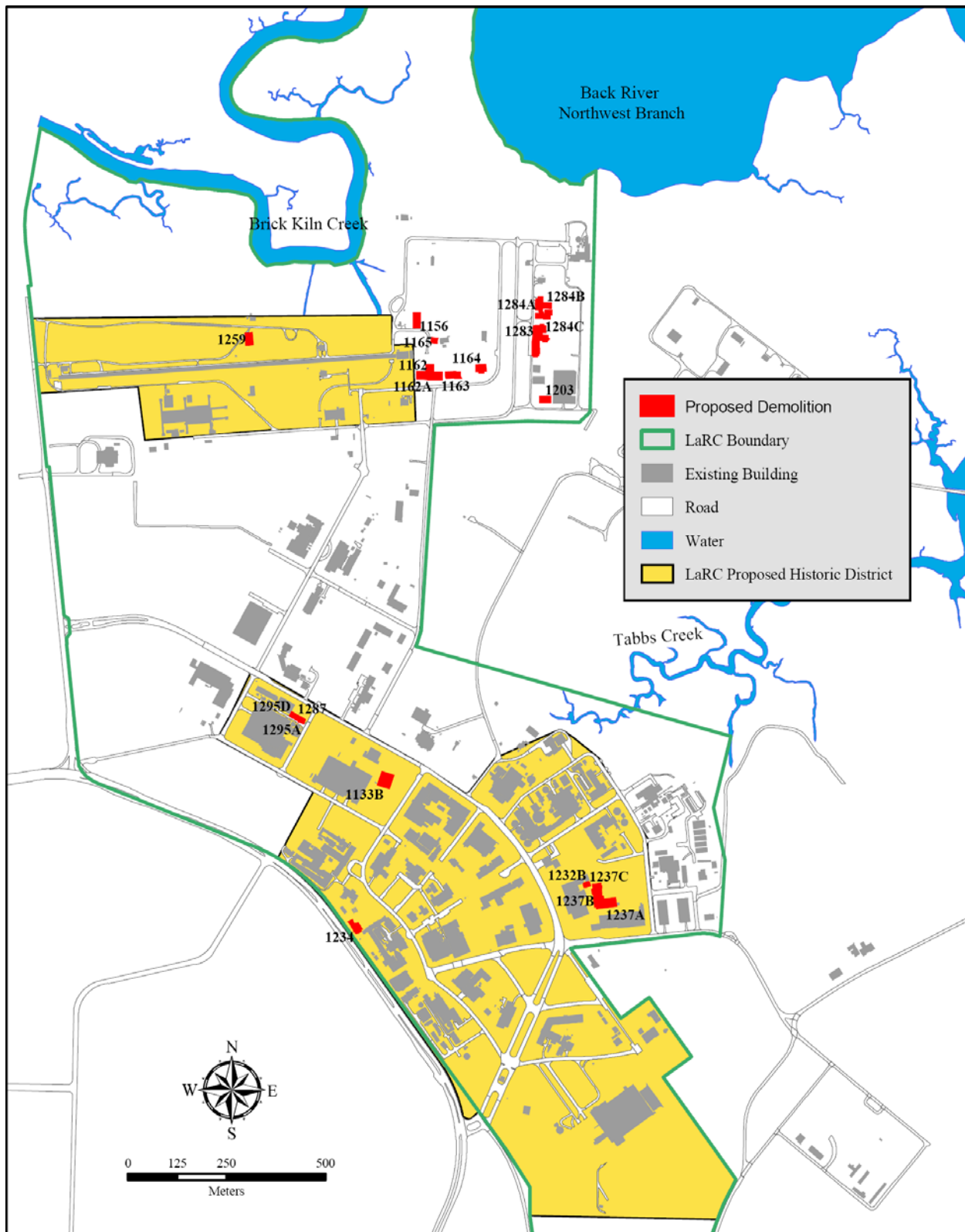


Figure 3.4 – Proposed LaRC West Area Historic District

### **3.3.2 Archaeological Resources**

Since the mid-1970s, LaRC has conducted eleven archaeological surveys, which have identified more than 20 archaeological sites located throughout LaRC. Native American artifacts have been discovered as well as the remains of colonial and early American plantations. One of the sites, Site 44HT1 known as the Chesterville Plantation, is listed in the National Register, as it was the birthplace of George Wythe, an original signer of the Declaration of Independence. The site has been preserved in place in the northern part of the LaRC West Area. At least ten other archaeological sites are potentially eligible for listing in the National Register. These sites would require additional survey work if any future LaRC activity involving ground disturbance were planned at or near any of the sites.

Building 1259 is located at the southern edge of the Chesterville Plantation site. The large “box-like” boundary for the site was established in 1973 when the site was placed in the National Register. The southern edge of the boundary was drawn to follow the linear definition of the Landing Loads Facility Track, a testing complex which was built by LaRC in 1956. Building 1259 is located approximately 50 meters (164 feet) from any positive shovel tests performed in the early 1970’s.

### **3.3.3 Traditional Resources**

Several State-recognized tribes reside in eastern Virginia; however, American Indian traditional resources have not been identified in at LaRC.

## **3.4 HAZARDOUS, REGULATED AND SOLID WASTE**

LaRC has established a pollution prevention policy with the goal of minimizing the volume and toxicity of wastes generated at the Center to the extent technically and economically feasible. Source reduction, recycling, recovery and reuse are utilized whenever possible.

Hazardous wastes generated at LaRC are managed and disposed of according to established Center policies and applicable laws and regulations. LaRC is considered a large quantity generator of hazardous waste. The Center is not authorized to transport hazardous waste off-site, store hazardous waste beyond a 90-day accumulation period, or treat or dispose of hazardous waste on site. The hazardous and regulated wastes generated at LaRC include of a wide variety of items, such as solvents, fuels, oils, gases, batteries, fluorescent light bulbs and laboratory chemicals. Waste generated from remediation projects such as paint removal and spill cleanup are sampled and analyzed to ensure proper waste characterization and disposal. Any materials that contain hazardous waste or exhibit hazardous characteristics are transported by an appropriately permitted contractor to a permitted hazardous waste disposal facility.

LaRC ensures the proper management and disposal of materials containing polychlorinated biphenyls (PCBs). All large transformers at the Center that contained PCBs have been retrofilled or removed. Many of the older facilities at the Center still have small PCB light ballasts or capacitors. LaRC ensures that PCB materials are properly packaged, transported and disposed of at an approved disposal facility. Similar requirements apply for the management of Asbestos Containing Materials (ACM). ACM have been identified in Buildings 1133B, 1156, 1203, 1232B, 1234, 1237A, 1237B, 1237C, 1283, 1284A, 1284B, 1284C, and in the transite siding on

the exterior of 1287. All contractors performing asbestos work at LaRC must be appropriately licensed, and the waste must be properly packaged, labeled and transported to a permitted landfill.

LaRC has one active remediation site under the Comprehensive Environmental Responsibility Compensation and Liability Act (CERCLA): a Construction Debris Landfill located in the northern part of the Center. No activities associated with the Proposed Action would occur near this remediation site.

LaRC maintains an Integrated Spill Contingency Plan that provides information on applicable regulatory requirements and procedures related to oil and hazardous material spill control at LaRC. In addition it documents the policies and procedures regarding the management of underground and aboveground storage tanks. There are no storage tanks located at the buildings proposed for deconstruction.

LaRC generates large volumes of municipal solid waste. The major items are paper, wood, metals, cardboard, plastics, grass and tree clippings, glass, and maintenance wastes. LaRC recycles white and mixed paper, cardboard, toner cartridges, plastic bottles, aluminum cans, scrap metal, used oil, batteries, fluorescent light bulbs, and used tires. Non-hazardous, non-regulated, solid materials that are not collected for recycling are consolidated and transported for disposal to a local landfill or for energy recovery at Hampton's Refuse-Fired Steam Generating Facility.

### **3.5 POLLUTION PREVENTION**

Pollution prevention (P2) is a multimedia approach to environmental management based on the priorities outlined in the Pollution Prevention Act of 1990. When applying P2 methodologies to LaRC activities (e.g. operations generating air emissions, wastewater, or solid/hazardous waste), priority is given to the use of source reduction techniques. Source reduction is the prevention of waste generation through process modifications or material substitutions. Where source reduction is not feasible, other environmentally preferable methods such as reuse or recycling may be appropriate. Remaining wastes are then managed to minimize potential present and future environmental impacts. LaRC developed a P2 Plan in 1992 to document P2 initiatives and has been implementing a Center-wide P2 Program since that date.

Over the last few years LaRC's P2 Program has been integrated into the broader Environmental Management System (EMS) program that:

1. incorporates people, procedures, and work practices in a formal structure to ensure that the important environmental impacts of the organization are identified and addressed,
2. promotes continual improvement including periodically evaluating environmental performance,
3. involves all members of the organization as appropriate, and
4. actively involves Senior Management in support of the environmental management program.

LaRC's EMS is committed to the goals of Executive Order 13423, "Strengthening Federal Environmental, Energy and Transportation Management," which calls for Federal facilities to conduct their environmental activities in a continuously improving, efficient, and sustainable manner. Executive Order 13423 also dictates Agency goals regarding:

- Vehicles
- Petroleum conservation
- Alternative fuel use
- Energy efficiency
- Greenhouse gases
- Renewable power
- Building performance
- Water conservation
- Procurement
- Toxic materials and chemicals
- Electronics management

One of the P2 objectives of LaRC's Environmental Management System is to ensure that debris from facility construction and demolition activities is reused and recycled to the maximum extent practical.

### **3.6 HEALTH AND SAFETY**

LaRC adheres to OSHA and applicable Federal, State and local safety and health regulations. In addition to Federal regulations LaRC also implements its own health and safety regulations many of which are referenced in Langley Policy Directive 1700.1, "Safety Program." This directive sets forth the Center's Safety Policy, which is to provide employees a safe and healthful work environment that is free from hazards that can cause or result in loss of life or injury or damage to equipment and property.

The Center Director is the ranking official charged with the ultimate responsibility for the Center's Safety Program. Implementation of the program is achieved through specific delegation of responsibilities. The LaRC Safety Office is responsible for the day-to-day implementation of LaRC's Safety Program. Each building at the Center is assigned a Facility Safety Head (FSH) and Facility Coordinator (FC) to ensure operations are carried out in accordance with the LaRC's safety requirements. The FSH and FC responsibilities include establishing emergency operation procedures, reviewing and implementing facility operational procedures, and personnel training.

LaRC has been recognized by OSHA as a leader in health and safety by awarding the Center the Star designation level of achievement in the Voluntary Protection Program (VPP). In addition to its VPP and Safety Programs, LaRC has its own fire program and maintains a fire department on site which is centrally located at Building 1248. In the event of an emergency such as fire, explosion, chemical spill or other accident, fire department personnel serve as first responders to initiate actions as necessary to minimize hazards to all personnel and limit damage to property and the environment.

As part of its Safety Program, contractors performing work at LaRC must comply with all applicable safety and health regulations, including OSHA, Agency and Center regulations. Contractors are responsible for providing their own employees with a safe and healthful workplace, and for ensuring their work is performed in a safe manner. Every major on-site contractor must have a designated Safety Officer and site-specific safety and health plan. For off-site contractors performing temporary work at the Center, supervisory personnel must attend a safety briefing provided by the LaRC Safety Office prior to project startup.

### **3.7 VISUAL RESOURCES**

The aesthetic quality of an area or community is composed of visual resources. Physical features that make up the visible landscape include land, water, vegetation and man-made features, such as buildings, roadways and structures. As defined in the Center Master Plan, LaRC's buildings and structures reflect two broad architectural themes: an entirely functional architecture, such as wind tunnels; and institutional architecture, typical of various period architectural styles. Examples of institutional architecture at LaRC include Brick Box, Metal Box, Panel Type, Open Volume, and New Campus. Details of these architectural types, including the buildings proposed for deconstruction that fall into each category, are provided below:

Brick Box architecture (no buildings proposed for deconstruction are of this type):

- Two or three story red-brick, veneer buildings with window and door openings "punched" into the masonry surfaces.
- Window units usually arranged in a horizontal manner with textured divisions established by masonry patterns.
- Horizontal elements established with stone window sills and parapet copings.
- Window frames generally dark bronze in color.
- Usually flat roof surfaces.

Panel-Type architecture (includes Buildings 1232B, 1234, 1237A, 1237B, 1237C, and 1259):

- Flat roof structures.
- Curtain-wall systems between masonry and walls.
- One or two stories high.
- Glass and colored panels within the metal grid.

Open Volume architecture (includes Buildings 1295A and 1295D):

- Ridged roof structures.
- Metal panels or corrugated cement asbestos panels used for exterior walls and roof.
- Variable exterior colors: aluminum, blue, yellow, gray.

New Campus architecture (includes Buildings 1162, 1162A, 1163, 1164, 1165, 1203, 1283, 1284A, 1284B, and 1284C):

- Buff-brick exterior walls.
- Bronze color window frames.
- Exposed concrete structural systems.
- Pre-cast concrete facing material.
- Articulated structural elements.
- One to two-story office wings. Two to four-story support/test areas.

Fluid Structures architecture (includes Building 1133B):

- Spherical and cylindrical building forms.
- Exposed structural elements.
- Silver or white color.
- Large scale elements which become dominant focal points throughout the Center.
- Functional elements clearly articulated.

Metal Box architecture (includes Buildings 1156 and 1287):

- Flat roof structures.
- Aluminum panels used as exterior skins.
- Generally used in conjunction with "brick-box" or "panel-type" buildings.

### **3.8 AIR QUALITY**

The Virginia DEQ administers the state's air Operating Permit Program. LaRC has a State Operating permit that establishes emission limits for specific stationary air pollution sources as well as Center-wide emission limits. The Center is not required to have a Title V Federal Operating Permit. LaRC qualifies as a synthetic minor source because its air emissions are limited below the prescribed thresholds by its air permit. The Center's air permit contains enforceable conditions that limit the amount of air pollutants that LaRC may emit. Specific permit requirements vary according to the air pollution source, but they generally include physical, operational, record keeping and reporting requirements.

The Clean Air Act (42 U.S.C. 7401 et. seq.), as amended, establishes the authority to set safe concentration levels for six criteria pollutants: particulate matter measuring less than 10 microns in diameter (PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), ozone (O<sub>3</sub>), and lead (Pb). LaRC is located within the Hampton Roads Intrastate Air Quality Control Region (AQCR). The Hampton Roads AQCR includes four counties (Isle of Wight, James City, Southampton, and York), as well as ten cities (Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg). Air quality in the Hampton Roads AQCR is currently designated as attainment for all criteria pollutants. However, the Hampton Roads AQCR is considered an 8-hour ozone maintenance area.

The General Conformity Rule of the Clean Air Act (Section 176(c)) prohibits Federal actions in nonattainment or maintenance areas which do not conform to the State implementation plan (SIP) for the national ambient air quality standards. An action is subject to the general conformity rule if the emissions from a proposed Federal action in a nonattainment or maintenance area exceed certain annual emission thresholds (de minimis levels) or are regionally significant (i.e. greater than or equal to 10% of the emissions inventory for the region). In the Hampton Roads AQCR, the applicable de minimis thresholds are 100 tons per year of NO<sub>x</sub> and 100 tons per year of VOCs. Regionally significant (10%) emissions inventories in the Hampton Roads AQCR would be 715.2 tons per year of NO<sub>x</sub> and 879 tons per year of VOCs.

### **3.9 WATER RESOURCES**

#### *Surface Waters*

LaRC is located on the coastal basin of the Back River, which flows into the Chesapeake Bay. Approximately forty percent of the LaRC West Area drains into the Brick Kiln Creek, which

runs along the northern boundary of LaRC and joins the Back River Northwest Branch. Tabbs Creek, which drains most of the rest of the West Area, also flows north into the Back River Northwest Branch. A small portion of the West Area in the south drains to Tides Mill Creek, which joins the Back River Southwest Branch. The entire LaRC East Area drains to the Back River. An upstream segment of Brick Kiln Creek, all of Tabbs Creek, and the Back River are listed as impaired waters by the EPA. All local waterways are influenced by tides in the Chesapeake Bay.

LaRC operates under three water discharge permits. A permit from the Hampton Roads Sanitation District (HRSD) allows LaRC to discharge non-hazardous industrial wastewater and sanitary sewage to the HRSD sanitary sewer system. The Center has two water permits under the Virginia Pollutant Discharge Elimination System (VPDES), which regulate industrial process wastewater and storm water discharges from the Center. LaRC has ten permitted outfalls in the West Area, and the Center performs periodic sampling and monitoring of the effluent from the outfalls to ensure compliance with permit limits. Figure 3.5 shows the locations of LaRC's permitted outfalls in relation to the proposed deconstruction activities. The buildings proposed for deconstruction are located throughout the Center and drain to outfalls 1, 3, 5, 7, 8, 9, 11, and 12.

In accordance with Virginia's Department of Conservation and Recreation (DCR), construction activities at LaRC that disturb equal to or greater than 4047 square meters (one acre) require coverage under the General Permit for Discharges of Stormwater From Construction Activities. Additionally, since LaRC is within a Chesapeake Bay Preservation locality, construction activities any larger than 232 square meters (2,500 square feet) also require coverage.

LaRC has few water pollution sources due to the relatively low level of industrial operations at the Center. The major pollutants are the chemicals used to treat the boilers and cooling towers, and these are discharged in accordance with LaRC's permits. LaRC employs various Best Management Practices to prevent or mitigate storm water and/or sewer system pollution from facility activities.

### *Floodplains*

Floodplains are the flood-prone, lowland areas adjoining inland and coastal water including areas of offshore islands. The 100-year floodplain area is considered the area where there is a one percent chance of flooding in any given year. Due to its proximity to the Chesapeake Bay and Back River, approximately one-third of the West Area of LaRC is within the 100-year floodplain. The stillwater elevation for the 100-year floodplain for LaRC is estimated by the Federal Emergency Management Agency (FEMA) to be 2.6 meters (8.5 feet) above mean sea level (MSL). FEMA has estimated 100-year floodwater levels with accompanying waves at about 3.3 meters (11 feet) above MSL near the Center. Buildings 1156 and 1162 are located within this floodplain. The stillwater level for the 500-year floodplain is 2.9 meters (9.8 feet) above MSL. Eight buildings, 1162A, 1163, 1164, 1165, 1259, 1284A, 1284B, and 1284C, are located within the 500-year floodplain. Figure 3.6 shows the extent of the floodplains on LaRC and the location of the 21 facilities.

## Environmental Assessment for Deconstruction of 21 Buildings

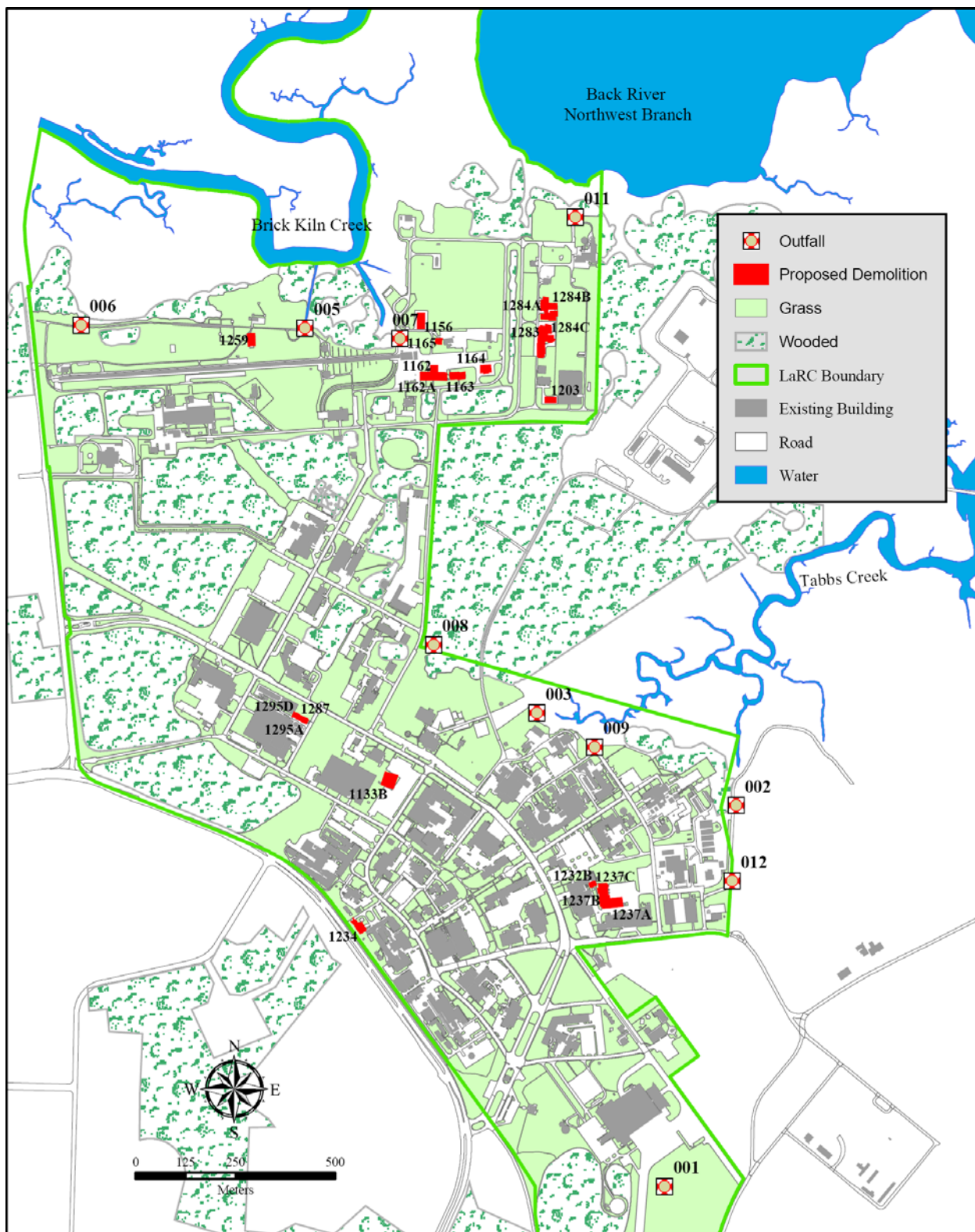


Figure 3.5 – LARC Outfalls

## Environmental Assessment for Deconstruction of 21 Buildings

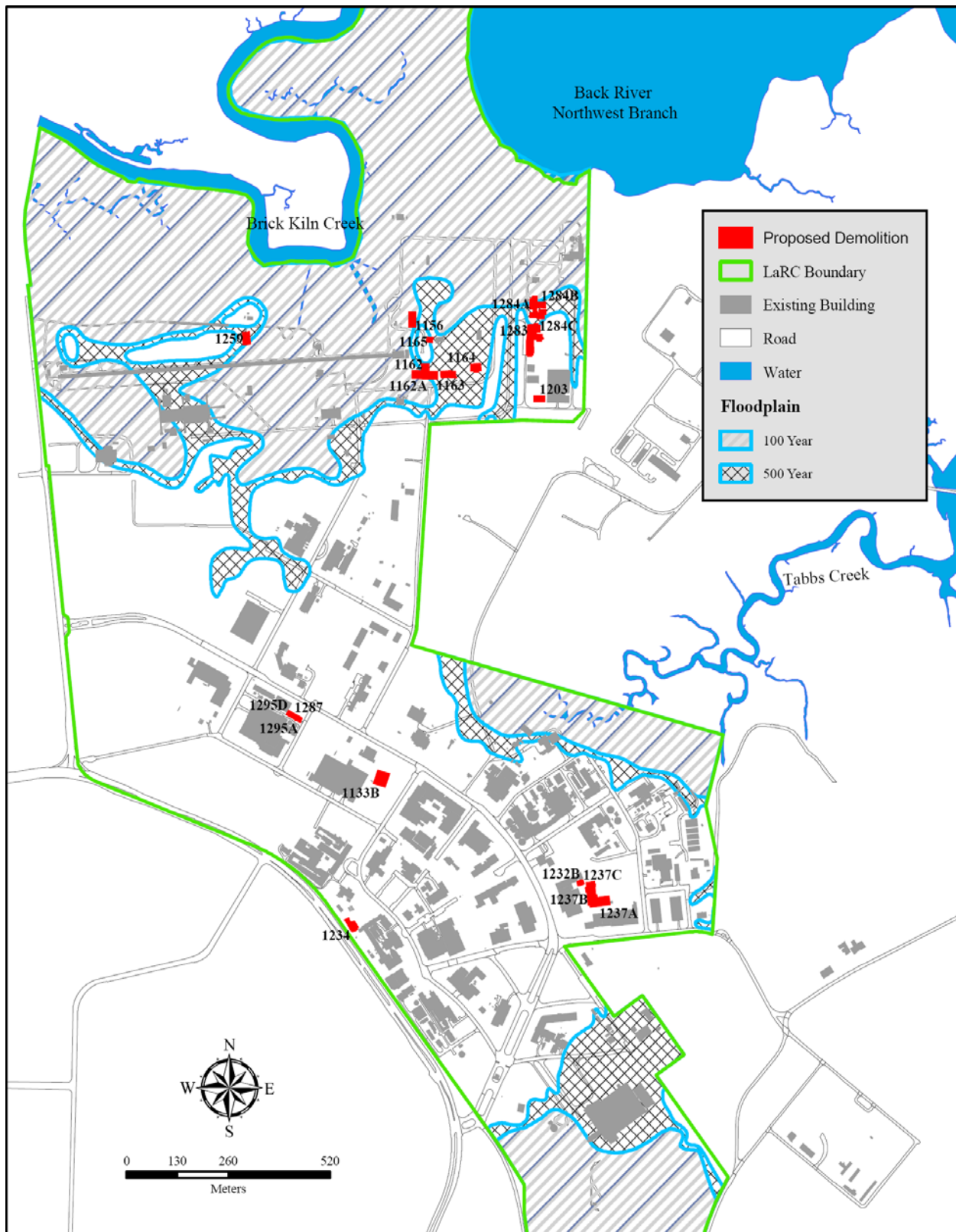


Figure 3.6 – LARC Floodplains

### **3.10 WILDLIFE RESOURCES**

LaRC's West Area supports several wildlife species with its unimproved lands providing habitat for fur-bearing (game) mammals, small mammals, birds, reptiles, amphibians, and fish. Tall fencing surrounding the West Area property limits movement of many larger animals on and off the property from adjacent unimproved lands. Some species that would be expected in this area include common rodents, such as house mouse or white-footed mouse; birds such as American robin, blue jay, fish crow, and common grackle, and reptiles such as eastern box turtle. LaRC's West Area also attracts some white-tailed deer, raccoons, and Virginia opossum that forage from the adjacent woods and wetland areas. The buildings proposed for deconstruction are typically located in a highly developed area that offers limited value to native wildlife.

### **3.11 VEGETATION**

Significant portions of LaRC contain undeveloped wooded vegetation as well as large areas of maintained grass and landscaping. All the facilities are in highly developed areas where nearby vegetation is limited to landscaping plants and trees.

## **4.0 ENVIRONMENTAL IMPACTS**

This chapter describes the potential impacts or effects of both the Proposed Action and the No-Action alternative on the environmental resources described in Chapter 3.

### **4.1 LAND USE**

#### **4.1.1 Proposed Action**

##### *Coastal Zone Management*

Since LaRC is located within the coastal zone as defined under Virginia DEQ's Coastal Zone Management Program, proposed LaRC activities must be consistent with the enforceable policies regarding coastal resources. As noted in Section 3.0, the following enforceable policies are not applicable to the location of the Proposed Action: Fisheries Management, Subaqueous Lands Management, Dunes Management, Tidal and Nontidal Wetlands Management, and Shoreline Sanitation. The Coastal Lands Management policy is addressed in this section and the remaining Coastal Zone Management Program policies relating to air and water pollution are addressed in Section 4.8 and Section 4.9 respectively. As described in these sections, the Proposed Action would be consistent with the Coastal Zone Management Program's enforceable policies.

The Coastal Lands Management program establishes authority for the oversight of activities in the Chesapeake Bay Resource Management Areas (RMAs) and Resource Protection Areas (RPAs). Certain development activities within these zones are restricted in order to protect the quality of state waters. Both RMA and RPA features exist on LaRC property. Activities associated with the Proposed Action would be consistent with all requirements established for RMAs and RPAs. With the exception of Building 1156, all other buildings proposed for deconstruction are outside the designated RPAs or RMAs. The removal of Building 1156 would facilitate the infiltration of stormwater into the ground by decreasing impervious surface area. The reintroduction of vegetation into the area would also provide a natural buffer area around the nearby water resource. As such, implementation of the Proposed Action would have a minor positive impact on the RMA and land use.

##### *Functional Zones*

The deconstruction of the 21 buildings would involve localized changes from developed industrial use to open space. The building removal would have an environmental benefit because there would be an increase of green space resulting from a facility footprint reduction of approximately 6,084 square meters (65,493 square feet). Implementation of the Proposed Action would not affect the boundaries of the current functional zones at LaRC.

#### **4.1.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change to the current land use or functional zones.

## **4.2 NOISE**

### **4.2.1 Proposed Action**

With the implementation of the Proposed Action, heavy equipment and vehicles would cause temporary increases in noise at the project areas and along traffic corridors. The 21 buildings are located in highly developed areas, and high noise levels generated from aircraft and wind tunnel operations are common. Compared to noise generated by aircraft, noise produced by the deconstruction activities would generally be more impulsive, relatively lower in magnitude, and spread out during the day. As such, implementation of the Proposed Action would have a negligible effect on the noise environment.

### **4.2.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change in noise levels in the area.

## **4.3 CULTURAL RESOURCES**

### **4.3.1 Architectural Resources**

#### **4.3.1.1 Proposed Action**

Implementation of the Proposed Action would impact LaRC's cultural resources as three of the facilities are potentially eligible for listing in the National Register as contributing resources to a proposed historic district. In accordance with Section 106 of the NHPA, LaRC would minimize the impact by completing mitigation measures in consultation with the Virginia State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), if participating. Examples of mitigation include preparing documentation to record the history of the facilities, and adding information about the facilities to the Center's CRM website. Maintained by the HPO, the website includes photos, historical documents, virtual tours, and interviews of researchers that worked at the facilities. For those facilities not surveyed, the LaRC HPO would consult with the SHPO and the ACHP regarding eligibility and effect determinations. As such, implementation of the Proposed Action would have a minor negative impact to LaRC's architectural resources.

#### **4.3.1.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change to LaRC's architectural resources.

### **4.3.2 Archaeological Resources**

#### **4.3.2.1 Proposed Action**

The buildings proposed for deconstruction are located in highly industrialized areas that have experienced previous ground disturbance, and the discovery of intact archaeological resources would not be anticipated. If archaeological resources exist in these areas, they would be in highly disturbed secondary contexts. Additionally, with the exception of capping utilities and removing slab foundations, deconstruction activities would involve incidental subsurface ground disturbance. In the event that resources were uncovered during deconstruction, all earthmoving activity would immediately stop and LaRC would notify the SHPO. In addition, LaRC would

implement the protective procedures included in Section 4.6 of the CRMP, “Unanticipated Discovery of Cultural Materials or Human Remains.” As such, implementation of the Proposed Action would not affect known archaeological resources.

#### **4.3.2.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no impact to archaeological resources.

### **4.3.3 Traditional Resources**

#### **4.3.3.1 Proposed Action**

There are no traditional resources located at LaRC so the Proposed Action would have no impact on traditional resources.

#### **4.3.3.2 No-Action**

There are no traditional resources located at LaRC so the No-Action alternative would have no impact on traditional resources.

## **4.4 HAZARDOUS, REGULATED AND SOLID WASTE**

### **4.4.1 Proposed Action**

All hazardous and regulated waste generated from deconstruction activities would be disposed of in accordance with LaRC’s waste management procedures and applicable Federal, State, and local regulations. In accordance with LaRC’s building closure and demolition policies, the buildings would be thoroughly inspected for hazardous and regulated materials prior to deconstruction. Examples of hazardous and regulated materials that could be encountered include mercury switches, fluorescent light bulbs, oils, chemicals, and lead-based paints. Many of the older facilities at the Center still have small PCB light ballasts or capacitors. LaRC ensures that PCB materials are properly packaged, transported and disposed of at an approved disposal facility. Asbestos is also present in many LaRC buildings. Small amounts of ACM have been identified in Buildings 1133B, 1156, 1203, 1232B, 1234, 1237A, 1237B, 1237C, 1283, 1284A, 1284B, 1284C, and in the transite siding on the exterior of 1287. All contractors performing asbestos work at LaRC would be appropriately licensed and permitted, and the waste would be properly packaged, labeled and transported to a permitted landfill.

Implementation of the Proposed Action would generate large volumes of solid waste including concrete, structural steel, and miscellaneous building components. As described in 4.5.1, contractors would be directed to recycle materials to the maximum extent possible, thereby reducing the amount of debris disposed in landfills. Non-hazardous, non-regulated, solid materials that are not collected for recycling would be consolidated and transported for disposal to a local landfill. As such, implementation of the Proposed Action would have a negligible impact on the environment resulting from the generation of hazardous, regulated and solid waste.

#### **4.4.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change to the current levels of hazardous, regulated or solid waste generation at the Center.

### **4.5 POLLUTION PREVENTION**

#### **4.5.1 Proposed Action**

The deconstruction of the 21 buildings would be carried out following LaRC's principles of P2, to include source reduction, recycling/reuse, treatment and proper disposal of wastes. "Deconstructing" the buildings, as opposed to demolition, would include the dismantling and extracting of reusable/recyclable materials prior to the destruction/removal of the facility. Materials extracted from the buildings such as concrete, steel structural elements and other metals would be recycled to the maximum extent possible. Maximizing recycling in order to reduce the quantity of materials disposed in the local landfill is one of LaRC's P2 goals. While there would be an increase in solid waste generated from deconstruction activities, this would be offset by eliminating the need for future maintenance on the facilities that could potentially result in pollution, such as painting, cleaning, and other general maintenance activities. Furthermore, contractors would be required to follow applicable Best Management Practices to further reduce pollution. As such, use of P2 practices would ensure that the implementation of the Proposed Action would have minimal impacts on the environment.

#### **4.5.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change in the levels of wastes or pollution generated at the Center.

### **4.6 HEALTH AND SAFETY**

#### **4.6.1 Proposed Action**

The deconstruction activities performed during the Proposed Action would be carried out by qualified and properly licensed and permitted contractors. All contractors performing work at LaRC are required to comply with all applicable safety and health regulations, including OSHA and NASA regulations. Contractors involved in the Proposed Action would be required to prepare and follow a site-specific Health and Safety Plan that complies with the regulations to ensure the safety of human health and the environment during the deconstruction activities. Adherence to applicable health and safety procedures would minimize the risk of injury to either the contractors working in the active project areas or the surrounding LaRC personnel. Therefore, implementation of the Proposed Action would have minimal impacts on worker health and safety.

#### **4.6.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no impacts to worker health and safety.

## **4.7 VISUAL RESOURCES**

### **4.7.1 Proposed Action**

Implementation of the Proposed Action would remove deteriorating, aging and often unsightly infrastructure from LaRC's landscape and create open space within industrialized areas. The resulting open space would improve LaRC's visual resources as the areas would be graded and seeded following deconstruction. Although visual resources in the immediate project areas would be temporarily degraded during the active deconstruction, the resulting open space would provide enhanced visual quality. Therefore, implementation of the Proposed Action would have a long-term positive impact on visual resources at LaRC.

### **4.7.2 No-Action**

With the No-Action alternative, the exterior of many of the aging facilities would continue to deteriorate, and no new open green space would be created. Eventual degradation would result in a decline in aesthetic quality of the area in and around where the buildings are located. As such, implementation of the No-Action alternative would result in a minor negative impact to the visual resources at LaRC.

## **4.8 AIR QUALITY**

### **4.8.1 Proposed Action**

The deconstruction activities associated with the Proposed Action would result in a slight increase in emissions from vehicle/equipment exhaust and from fugitive dust. These effects would be minor and short term during the length of the project. In relation to the large number of personal and Government vehicles operating on the Center, the additional emissions resulting from vehicles and from equipment would be negligible. In addition, fugitive dust would be minimized by using control methods outlined in the Virginia Regulations for the Control and Abatement of Air Pollution (9 Virginia Administrative Code 5-50-90). These precautions may include the use of water for dust control, covering of open equipment for conveying materials, prompt removal of spilled or tracked dirt from paved streets, and removal of dried sediments resulting from soil erosion.

The Proposed Action is not subject to the General Conformity Rule of the Clean Air Act because emissions of applicable pollutants would not exceed annual de minimis thresholds, nor are they regionally significant (i.e. 10% of regional emissions inventory). Since the Hampton Roads Air Quality Control Region (AQCR) is an ozone maintenance area, the emissions of ozone precursor pollutants (VOCs and NO<sub>x</sub>) were calculated for the deconstruction associated with the Proposed Action using the *US Air Force Conformity Applicability Model (ACAM)* 4.3.3. Calculations showed no emissions of the ozone precursor pollutants.

The Proposed Action would not involve open burning.

No new stationary air emission sources are associated with the deconstruction of the 21 buildings, so there would be no revisions to LaRC's Stationary Source Permit to Operate from the Virginia DEQ. LaRC would ensure that all activities associated with deconstruction activities would comply with the Federal Clean Air Act as enforced by the Virginia State Implementation Plan and the State Air Control Board (Code of Virginia § 10-1.1300). Therefore

the Proposed Action would be consistent with the enforceable air management policies of the Coastal Zone Management Act. As such, implementation of the Proposed Action would result in minimal impact on air quality at LaRC.

#### **4.8.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change in LaRC's impact on air quality.

### **4.9 WATER RESOURCES**

#### **4.9.1 Proposed Action**

The Proposed Action would result in minimal impact to the water resources of LaRC and the surrounding environment. Soil disturbance during deconstruction activities would produce a minor and temporary increase in suspended solids in the stormwater reaching the outfalls that drain the affected areas (primarily outfalls 1, 3, 5, 7, 8, 9, 11, and 12). In accordance with Virginia's Department of Conservation and Recreation (DCR), construction activities at LaRC that disturb equal to or greater than 4,047 square meters (one acre) require coverage under the General Permit for Discharges of Stormwater From Construction Activities. Additionally, since LaRC is within a Chesapeake Bay Preservation locality, construction activities larger than 232 square meters (2,500 square feet) also require coverage. Silt fences, storm drain inlet and outlet protection, and other appropriate standard construction practices would be implemented in accordance with the erosion and sediment control requirements of Virginia's DCR. Additionally, LaRC would ensure that the contractors obtain the appropriate permits and prepare the required plans in accordance with DCR's construction site stormwater permit requirements. Following completion of the deconstruction, there would be no long-term impact to the quality or quantity of stormwater drainage to the outfalls.

The Virginia Coastal Zone Management Program maintains enforceable policies related to point source and non-point source water pollution. The Proposed Action does not involve point source water pollution, but does have the potential to generate a non-point water pollution source. The Coastal Zone Management Program requires that soil-disturbing projects be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the State's waters. By contract, LaRC would require contractors to adhere to the standards of LaRC's current General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems that requires LaRC to implement Best Management Practices (BMPs) mitigating stormwater pollution from Center activities. These BMPs include employee training, preventive maintenance, visual inspections, spill prevention and response, sediment and erosion control, good housekeeping, and record keeping and reporting. Since LaRC would implement appropriate BMPs to reduce erosion and pollution, the Proposed Action would be consistent with the Coastal Zone Management Program.

Ten of buildings proposed for deconstruction are located in the 100-year or 500-year floodplains. Deconstruction activities would comply with provisions of Executive Order 11988, *Floodplain Management*, and the Chesapeake Bay Preservation Act. Since structures built within the floodplains are at increased risk for loss due to flooding, the removal of these buildings would reduce LaRC's vulnerability to natural disaster. In addition, deconstruction would reduce the

hindrance of natural flood flow and entrainment of debris. As such, implementation of the Proposed Action would result in minor impacts to water resources at LaRC.

#### **4.9.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and twelve of the buildings would remain in the 100-year and 500-year floodplains. They would continue to impede natural flood flow and entrainment of debris. As such, implementation of the No-Action alternative could result in a minor negative impact to the water resources at LaRC.

### **4.10 WILDLIFE RESOURCES**

#### **4.10.1 Proposed Action**

Disturbance resulting from the Proposed Action would be limited to the local project sites. The activity and noise generated from equipment and vehicles may temporarily displace wildlife from the immediate vicinity of the project areas. The buildings do not currently provide significant habitat to wildlife, so it is expected that the impacts to wildlife caused by the deconstruction activities would be very minor and short-term. Implementation of the Proposed Action would result in long-term positive impact to wildlife as removal of the buildings would result in more open green space on LaRC property.

#### **4.10.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change to the current status of LaRC's wildlife resources.

### **4.11 VEGETATION**

#### **4.11.1 Proposed Action**

All buildings proposed for deconstruction are located in highly developed areas. The only vegetation that would be impacted by the Proposed Action would be landscaping plants and manicured grass in the project areas, but these landscapes would be replanted following removal of the facilities. There would be a net increase in vegetation at the Center because the Proposed Action would result in a reduced facility footprint of approximately 6,084 square meters (65,493 square feet). These cleared areas would be reseeded or allowed to revert to native vegetation. Therefore the Proposed Action would have a slight positive impact on LaRC's vegetation resources.

#### **4.11.2 No-Action**

Under the No-Action alternative, LaRC would not deconstruct the 21 buildings, and there would be no change to LaRC's current vegetation.

## **5.0 CUMULATIVE EFFECTS**

The CEQ regulations require that all Federal agencies include cumulative impacts in their environmental analyses (40 CFR 1508.25(c)). 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 actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). This includes those that may be "individually minor but collectively significant actions taking place over time" (40 CFR 1508.7).

Cumulative effects are most likely to arise when a relationship exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects. The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the timeframe in which the effects could be expected to occur.

The geographic extent for the environmental resources analyzed in this EA is limited to the local LaRC West Area because the region of influence for potential environmental impacts from the proposed project is largely confined within the LaRC fence line. The timeframe includes recent past and present actions continuing into the foreseeable future at LaRC. An effort has been made to generally identify actions that are being considered and that are in the planning phase at this time.

### **5.1 PAST, PRESENT AND REASONABLY FORESEEABLE ACTIONS**

As an active research facility, LaRC undergoes continual change in order to align its capabilities with the Agency's overall mission. Like any major research installation, LaRC requires new construction, facility improvements and infrastructure upgrades to ensure the Center's resources are appropriate for carrying out its research. Many of LaRC's recent past, present and foreseeable future actions are related to an overarching NASA objective to streamline the Center's infrastructure and restructure and modernize the Center's facilities. To meet NASA's developing mission requirements, LaRC continues to pursue projects that transform the Center into a more modern, efficient, and technologically advanced Center. Given the age of LaRC's infrastructure and the changes in NASA's mission, many facilities have outlived their useful life and require extensive renovation or demolition. The projects below comprise the major past, present, and reasonably foreseeable future actions at NASA LaRC.

Between 2004 and 2006, LaRC demolished fourteen dilapidated and abandoned buildings in order to reduce the Center's unneeded and unused infrastructure. Architectural surveys were performed on the facilities and the surveys determined that none of the buildings were culturally or historically significant. Based on the EA prepared for the project, LaRC determined that minimal environmental impacts would occur as a result of the demolitions, and a Finding of No Significant Impact (FONSI) was issued.

In 2008 LaRC deconstructed Building 1212B, the 7x10-Foot High Speed Tunnel. NASA closed the facility in 1994 due to lack of need and because duplicate or superior testing capabilities exist at other NASA facilities. Since Building 1212B was determined eligible for listing in the National Register, LaRC developed a Memorandum of Agreement with the SHPO to minimize the adverse effect of deconstruction. In accordance with Section 106 of the National Historic Preservation Act and the mitigation stipulations of the Memorandum of Agreement, LaRC prepared Level 1 Historic American Engineering Record documentation on the facility, and developed a public interpretation website. After Section 106 consultation was complete, LaRC prepared an EA that determined no substantial environmental impacts would occur as a result of the deconstruction, and a FONSI was issued.

LaRC is planning to deconstruct thirteen abandoned or under-utilized buildings throughout the Center during the 2008-09 timeframe. The purpose of the proposed deconstruction is to streamline LaRC's infrastructure by removing deteriorating facilities that are no longer operational and/or needed to support NASA's mission. Four of the buildings are potentially eligible for listing in the National Register as contributing resources to LaRC's proposed historic district. LaRC is performing Section 106 consultation with the SHPO regarding deconstruction of these four buildings to minimize the adverse effects of the project.

LaRC is planning to deconstruct four closed wind tunnels between 2009 and 2012. The facilities are Building 640 (the 8-Foot Transonic Pressure Tunnel), Building 641 (the 8-Foot High Speed Tunnel), Building 643 (the Full Scale Tunnel), and Building 1146 (the 16-Foot Transonic Tunnel). The decision to deconstruct the facilities is based on the determination of no current or future government need to use the tunnels and no viable plans from non-governmental entities (industry, universities, etc.) to operate or adaptively reuse the facilities. The project would result in an adverse effect to LaRC's cultural resources since two of the facilities are National Historic Landmarks (NHLs) and two are eligible for listing in the National Register, both individually and as contributing resources to a proposed historic district. In order to mitigate the loss of the NHLs, NASA fulfilled the consultation and mitigation requirements of the NHL PA and is in the process of preparing mitigation documentation prescribed in a MOA for the two National Register eligible properties. LaRC prepared an EA for the project and a FONSI was issued in June of 2008.

LaRC is proposing the construction of a Hydro-Impact Basin at the Landing and Impact Research Facility (LandIR), Building 1297 in spring 2009. The project would allow for full-scale water-impact testing for simulated Orion Crew Exploration Vehicle (CEV) ocean splashdown research in support of NASA's Constellation Program. The Proposed Action consists of construction of a rectangular basin of steel mesh and spray-on concrete; use of the water-filled basin for CEV testing for approximately five years; and draining and refilling of the basin following completion of the testing program. The Hydro-Impact Basin would measure 35 meters (115 feet) by 27 meters (90 feet) with a maximum depth of 7.6 meters (25 feet), and would be filled with 4.5 million liters (1.2 million gallons) of potable water. LaRC prepared an EA for the project and a FONSI was issued in January of 2009.

Beginning in 2009 and continuing over the next 15 years, LaRC is proposing to implement a major five-phase modernization and upgrade project called New Town. Site improvements

would include construction of five new buildings, the renovation of two existing buildings, and the deconstruction of an additional 22 abandoned and unneeded buildings; as well as upgrades to roadwork, parking lots, and utilities. The project would modernize the center core of LaRC, better align LaRC's capabilities with the future direction of the NASA mission, and significantly reduce the Center's operations and maintenance costs. This initiative would remove aging and inefficient facilities to be replaced by modern offices and research laboratories. The new facilities and modifications to existing facilities would meet the Leadership in Energy and Environmental Design (LEED) silver standards for building design. The New Town project would result in an adverse effect to several of LaRC's cultural resources. However, LaRC plans to mitigate the adverse effect through performing mitigation measures included in a center-wide PA, currently under development with the SHPO and the ACHP. LaRC prepared an EA for the project and a FONSI was issued in October of 2008. A supplement to the New Town EA is currently being prepared in order to address potential environmental impacts associated with the recent decision to install geothermal ground source heat and cooling systems for the five new buildings. The geothermal systems would result in significant energy savings for LaRC.

As described in Section 1.3 the Agency's evolving mission, especially the Constellation Program to return humans to the moon, could continue to affect the activities and operations at the NASA field centers. LaRC's contribution to the Constellation project including leading the Launch Abort System integration project requires the introduction of various new research and development activities at the Center. NASA assessed these effects in the agency-wide Programmatic Environmental Impact Statement (PEIS). The PEIS resulted in a Record of Decision that was signed on February 28, 2008. The current and reasonably foreseeable activities that would occur at LaRC in support of Constellation would be similar to ongoing research activities conducted at LaRC in support of existing programs. If major activities not anticipated in the PEIS are proposed for implementation at LaRC, appropriate NEPA documentation would be prepared.

## **5.2 ANALYSIS OF CUMULATIVE IMPACTS**

The following analysis examines the impacts on the environment that could result from the incremental impact of the Proposed Action when added to the actions described above. The analysis examines whether such a relationship would result in potentially significant impacts not identified when the Proposed Action is considered alone.

With the exception of cultural resources, LaRC has determined that the projected effect of the Proposed Action, coupled with the other past, current and future actions described above, would result in minimal cumulative impacts to the resources analyzed in this EA.

LaRC has determined that the projected cumulative effect of the Proposed Action, coupled with the other past, current and future actions occurring at LaRC would be the potential loss of LaRC's historic properties. The impacts would be caused by the removal or modification of historic properties and the potential change in the character or integrity of LaRC's proposed historic district. In accordance with Section 106 of the National Historic Preservation Act, LaRC plans to minimize the impacts to historic properties through consultation with the SHPO and carrying out appropriate mitigation measures to preserve LaRC's history and legacy to the

maximum extent practical. While the resources once removed would be lost, the history of the facilities would be preserved through mitigation measures, as described in Section 4.3.1.1.

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## **7.0 LARC PREPARERS AND CONTRIBUTORS**

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## **APPENDIX A**

### **Photographs of 21 Buildings Proposed for Deconstruction**

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Building 1133B – NASA Television Earth Station



Building 1156 – General Equipment Storage



Building 1162 – 1162 Office Complex



Building 1162A – 1162 Office Complex



Building 1163 – Office Facility



Building 1164 – Office Facility



Building 1165 – Storage Facility



Building 1203 – Storage Facility



Building 1232B – 1232 Office Complex



Building 1234 – Jet Exit Test Facility



Building 1237A – Foundry & Glass Blowing Shop



Building 1237B – Lab Facility



Building 1237C – Lab Facility



Building 1259 – ALDF North Arresting Gear House



Building 1283 – Fabrication Facility



Building 1284A – Security Storage Facility



Building 1284B – 1284 Research Lab



Building 1284C – 1284 Research Lab



Building 1287 – Flow Impedance Test Lab



Building 1295A – Vacuum Sphere Facility



Building 1295D – Vacuum Sphere Facility

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